START

# U. S.
# OFFICIAL GAZETTE
# UNITED STATES
# PATENT OFFICE
# VOL. 957
# APRIL
# 1977

MICRO PHOTO DIVISION

BELL & HOWELL

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# OFFICIAL GAZETTE of the UNITED STATES PATENT and TRADEMARK OFFICE

April 5, 1977 Volume 957 Number 1


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# PATENT AND TRADEMARK OFFICE NOTICES

## Board of Appeals Decisions Rendered in the Month of February 1977

| | |
|---|---|
| Affirmed | 181 |
| Affirmed in Part | 24 |
| Reversed | 62 |
| Total | 267 |

## Revised Page Numbering Format for Official Gazette

The Patent and Trademark Office has decided to use a separate page number series for the notice section of the OFFICIAL GAZETTE effective with the April 5, 1977 issue. This revised numbering series will result in savings in printing costs to the Office and will also provide complete citation data on each page of the notice section.

Specifically, in the Patents Section of the OFFICIAL GAZETTE, the pages containing the "Patent and Trademark Notices," "Patent Notices" and "Condition of Patent Applications" sections will be numbered consecutively in each volume which cover the period of one month. Each page number of these notice sections will be preceded by the volume number for that month and the capital letters "OG," for example, "957 OG 2." The "Defensive Publications," "Reissue Patents Granted," "Plant Patents Granted," "Patents Granted," and "Design Patents Granted" sections will be separately numbered consecutively throughout each month without any prefix. The patent index sections will continue to be numbered with the "PI" prefix followed by a new series of arabic numerals in each issue.

In the Trademark Section of the OFFICIAL GAZETTE, the pages containing the "Patent and Trademark Notices," "Condition of Trademark Applications," and "Trademark Notices" sections will be numbered consecutively in each volume which cover the period of one month. Each such page in notice portion of the Trademark Section will be preceded by the volume number for that month and the capital letters "TMOG," for example, "957 TMOG 3." The "Marks" section will be separately numbered consecutively each month with the "TM" prefix. The "Index of Registrants" section pages will be indicated by the prefix "TMI" followed by a new series of arabic number series for each issue.

C. MARSHALL DANN,
Mar. 15, 1977. *Commissioner of Patents and Trademarks.*

## Patent Suits

Notices under 35 U.S.C. 290; Patent Act of 1952

**3,154,060,** A. Hundere, RECIPROCATING-PISTON GASOLINE ENGINE FUEL-AIR RATIO CONTROL, **filed** June 2, 1970, D.C., W.D. Wash. (Seattle), Doc. 8997, *Alcor Aviation Inc.* v. *Radair Inc. and Uniwest Inc.* Judgment filed in District Court, July 13, 1972, which was appealed. Circuit Court affirmed District Court decision. Circuit Court judgment received on Feb. 20, 1976.

**3,395,800,** Kraus and Fall, SEWAGE TREATMENT AND APPARATUS THEREFOR, **filed** Oct. 26, 1976, D.C., E.D. Mich. (Detroit), Doc. 76–229, *Ecodyne Construction* v. *Barton-Malow Construction Co.* **Same, filed** Oct. 26, 1976, D.C., E.D. Mich. (Detroit), Doc. 76–72230, *Ecodyne Corporation* v. *A. J. Etkins Construction Co.*

**3,451,314,** L. F. Smrekar, COLLET MECHANISM, **filed** Nov. 12, 1976, D.C., N.D. Ohio (Cleveland), Doc. C76–1199, *Larry F. Smrekar* v. *The Warner and Swasey Company.*

**3,462,026,** L. Maccherone, MACHINE FOR AUTOMATICALLY PLACING BAGS ON A WICKET; **Re. 27,523,** same, **filed** Nov. 11, 1976, D.C., C.D. Calif. (Los Angeles), Doc. CV76–3511–RMT, *Universal Machinery Corp.* v. *FMC Corp.*

**3,497,877,** Diemond and Greenberg, POOL WITH INTEGRAL SLIDE, **filed** Nov. 10, 1976, D.C., C.D. Calif. (Los Angeles), Doc. CV76–3502–RJK, *Muskin Corporation* v. *Coleco Industries, Inc.*

**3,519,235,** L. E. Walter, FOLDING SIGN SUPPORT, **filed** May 20, 1975, D.C. Conn. (Hartford), Doc. H75–165, *Walter Sign Corp.* v. *Continental Products, Inc.* Plaintiff is owner of said patent. Perpetual injunction shall issue out of and under the seal of this court, Mar. 24, 1976.

**3,609,799,** R. D. Lee, FOOD PATTY PRESS, **filed** Sept. 28, 1973, D.C.N.J. (Camden), Doc. C–1399–73, *Le Mark Industries, Inc.* v. *Edwards Creative Products, Inc.* The complaint and counter-complaint is hereby dismissed without prejudice, Nov. 15. 1976.

**3,650,766,** Y. Smadar, EXTRUDED FOOD PRODUCTS AND METHOD OF PRODUCING SAME, **filed** Nov. 15, 1976, D.C., E.D. Tenn. (Knoxville), Doc. C–3–76–363, *DCA Food Industries, Inc.* v. *Wintergarden Frozen Foods, Inc.* **Same, filed** Nov. 19, 1976, D.C. Tenn. (Jackson), Doc. C–76–131–E, *DCA Food Industries, Inc.* v. *Wintergarden, Inc.*

**3,663,880,** A. Gabor, APPARATUS FOR CONTROLLING THE RELATIVE POSITION BETWEEN TWO RELATIVELY MOVABLE MEMBERS; **3,858,509,** W. J. Grundherr, CONTROL LOGIC FOR PRINT WHEEL AND HAMMER OF HIGH SPEED PRINTING APPARATUS, **filed** July 24, 1975, D.C., N.D. Calif. (San Francisco), Doc. C–75–1556–CBR, *Xerox Corporation and Diablo Systems, Inc.* v. *Qume Corporation and Sen Lin Lee (also known as David Lee).* Stipulation of dismissal, Nov. 11, 1976.

**3,745,511,** D. L. Fussell, MULTICONDUCTOR CABLE CONNECTOR, **filed** Nov. 16, 1976, D.C., S.D. Tex. (Houston), Doc. CA76–H–1901, *Mark Products, Inc.* v. *Geosource Inc.*

**3,752,228,** R. C. Bosse, I-TYPE SEGMENTED FINNED TUBE; **3,764,774,** same, I-TYPE SEGMENTED FINNED TUBE AND ITS METHOD OF MANUFACTURE, **filed** Nov. 11, 1976, D.C., N.D. Okla. (Tulsa), Doc. 76–C–572–C, *Escoa Fintube Corporation* v. *Tranter, Inc.*

**3,760,375,** Irwin and Levine, SOURCE DATA ENTRY TERMINAL, **filed** July 22, 1976, D.C., N.D. Ill. (Chicago), Doc. 76c2695, *Sycor, Inc.* v. *International Business Machines Corporation.* Case transferred to U.S.D.C. for the Eastern District of Michigan, Southern Division, Aug. 10, 1976.

**3,764,774.** (See 3,752,228.)

**3,810,282,** C. F. Doggett, BURIAL DEVICE AND METHOD FOR USING SAME, **filed** Nov. 12, 1976, D.C., S.D. Iowa (Des Moines), Doc. 76–364–2, *John R. Floren and United Merchandising Corporation* v. *Charles F. Doggett and Hawkeye Machinery Company.*

**3,810,631,** J. M. Braly, GOLD CLUB HEAD OF THE IRON TYPE HAVING A CONCAVE SOLE, **filed** Nov. 12, 1976, D.C. Del. (Wilmington), Doc. 76–395, *Con-Sole Golf Corporation* v. *Wilson Sporting Goods Company.*

**3,815,955,** C. A. Gibilterra, CHAIR CONSTRUCTION; **D. 241,487,** same, CHAIR OR THE LIKE, **filed** Nov. 15, 1976, D.C., N.D. Ill. (Chicago), Doc. 76c4210, *Vecta Contract, Inc.* v. *Brad Laycock & Associates, Inc. et al.*

**3,829,348,** Spiegel and Miller, DECORATIVE THREE-DIMENSIONAL OBJECTS, **filed** Nov. 15, 1976, D.C., E.D. Pa. (Philadelphia), Doc. 76–3555, *Gilbreth International Corporation* v. *F. W. Woolworth Co.*

**3,849,728,** A. Evans, FIXED POINT PROBE CARD AND AN ASSEMBLY AND REPAIR FIXTURE, **filed** June 1, 1976, D.C., C.D. Calif. (Los Angeles), Doc. CV76–1751–DWW, *Micro-Probe Incorporated* v. *Wentworth Laboratories, Inc.*

**3,854,467,** Hofmeister, Nicolin and Barrie, FORCE MULTIPLYING TYPE ARCHERY BOW, **filed** Apr. 25, 1975, D.C. N. Mex. (Albuquerque), Doc. C–75–226, *Herter's Inc.* v. *Groves Archery Corporation.* The plaintiff agreed to dismiss with prejudice all claims of infringement of said patent against the defendant and the case was closed, Mar. 5, 1976.

**3,858,509.** (See 3,663,880.)

**3,867,806,** Lancaster and Lancaster III, PROCESS OF MAKING A STRETCHED-WRAPPED PACKAGE, **filed** Sept. 1, 1976, D.C.N.J. (Newark), Doc. C–76–1713, *Lantech Inc.* v. *Packaging Sales and Development Corporation.* Consent judgment for permanent injunction, Nov. 11, 1976.





**3,873,076,** O. R. Evans, ANNULAR BUMPER GUARD FOR FLOATING VESSELS, **filed** July 26, 1976, D.C., W.D. La. (Shreveport), Doc. CV 760776–L, *Oreco III, Inc.* v. *Regal Tool & Rubber Co., Inc.*

**3,876,184,** C. N. Eudy, ANCHOR WINCH, **filed** Feb. 18, 1976, D.C., N.D. Miss. (Oxford), Doc. EC76–29 S, *Charles N. Eudy* v. *Motor-Guide, Herschede Hall Clock Co., a division of Arnold Industries, Inc.*

**3,928,933,** T. Iwamoto, HOLDING TOY, **filed** Sept. 29, 1976, D.C., N.D. Calif. (San Francisco), Doc. C–76–2132 ACW, *ITI Hawaii, Inc. and Takeji Iwamoto* v. *Gems of the Golden West and Jack B. Neuman and Florence C. Neuman.* Judgment on consent decree; defendant had infringed plaintiff's valid patent, defendant enjoined from further restraint after certain time, Nov. 12, 1976.

**3,953,025,** M. S. Mazman, MUSCLE BUILDING EXERCISE DEVICE, **filed** Nov. 17, 1976, D.C., E.D. Calif. (Fresno), Doc. F–76–211, *Universal Gym Equipment* v. *Martin Mazman and DeWayne Zinkin.*

**Re. 27,523.** (See 3,462,026.)

**Re. 28,419,** R. J. Schoerner, METHOD OF FABRICATING ALUMINUM ALLOY ROD, **filed** Nov. 17, 1976, D.C., E.D. La. (New Orleans), Doc. 76–3606, *Southwire Company* v. *Kaiser Aluminum & Chemical Corporation.*

**D. 230,668,** J. Johnson, BAR STOOL; **D. 230,671,** same, CHAIR, **filed** Nov. 12, 1976, D.C., C.D. Calif. (Los Angeles), Doc. CV76–3540–MML, *Landes Mfg. Co. et al.* v. *Chromodern Chair Co.*

**D. 237,768,** E. L. Huffman, EYE SHADE WITH REMOVABLE CROWN, **filed** Oct. 28, 1976, D.C., E.D. Calif. (Los Angeles), Doc. CV76–3367LEW, *Erline L. Huffman* v. *Five Star Sporting Goods.*

**D. 241,487.** (See 3,815,955.)

**D. 242,181,** M. Davis, LUGGAGE CASE, **filed** Nov. 16, 1976, D.C., N.D. Ill. (Chicago), Doc. 76c4237, *Airway Industries, Inc.* v. *Suh-Won America, Inc.*

# PATENT NOTICES

## Certificates of Correction for the Week of Apr. 5, 1977

| | | | |
|---|---|---|---|
| Re. 28,887 | 3,979,437 | 3,994,871 | 4,000,487 |
| Re. 29,108 | 3,979,839 | 3,995,042 | 4,000,543 |
| D. 239,319 | 3,980,937 | 3,995,045 | 4,000,556 |
| 3,492,047 | 3,982,420 | 3,995,111 | 4,000,691 |
| 3,575,131 | 3,983,020 | 3,995,256 | 4,000,706 |
| 3,622,424 | 3,983,040 | 3,995,284 | 4,000,709 |
| 3,660,089 | 3,983,433 | 3,995,466 | 4,000,773 |
| 3,676,418 | 3,983,613 | 3,995,776 | 4,000,805 |
| 3,705,050 | 3,983,879 | 3,995,813 | 4,000,953 |
| 3,717,453 | 3,984,034 | 3,995,994 | 4,001,022 |
| 3,741,860 | 3,984,300 | 3,996,217 | 4,001,028 |
| 3,827,260 | 3,984,603 | 3,996,218 | 4,001,094 |
| 3,868,794 | 3,985,323 | 3,996,278 | 4,001,232 |
| 3,881,336 | 3,985,363 | 3,996,281 | 4,001,233 |
| 3,883,612 | 3,985,605 | 3,996,298 | 4,001,241 |
| 3,886,865 | 3,985,927 | 3,996,362 | 4,001,460 |
| 3,887,292 | 3,986,099 | 3,996,612 | 4,001,577 |
| 3,891,542 | 3,987,074 | 3,996,709 | 4,001,742 |
| 3,911,824 | 3,987,210 | 3,996,717 | 4,002,608 |
| 3,913,262 | 3,987,243 | 3,996,739 | 4,002,731 |
| 3,919,409 | 3,988,066 | 3,996,842 | 4,002,790 |
| 3,928,319 | 3,988,172 | 3,996,890 | 4,002,800 |
| 3,939,091 | 3,988,239 | 3,997,122 | 4,002,876 |
| 3,939,106 | 3,988,320 | 3,997,463 | 4,003,123 |
| 3,939,178 | 3,988,913 | 3,997,699 | 4,003,189 |
| 3,940,372 | 3,989,387 | 3,998,013 | 4,003,264 |
| 3,942,650 | 3,989,641 | 3,998,400 | 4,003,371 |
| 3,944,797 | 3,989,670 | 3,998,882 | 4,003,463 |
| 3,948,480 | 3,989,715 | 3,998,940 | 4,003,575 |
| 3,951,892 | 3,989,855 | 3,998,946 | 4,003,685 |
| 3,958,808 | 3,989,877 | 3,998,950 | 4,003,806 |
| 3,960,966 | 3,990,124 | 3,998,991 | 4,003,890 |
| 3,961,001 | 3,990,591 | 3,999,041 | 4,003,979 |
| 3,961,892 | 3,990,940 | 3,999,056 | 4,004,171 |
| 3,963,340 | 3,991,004 | 3,999,260 | 4,004,244 |
| 3,964,980 | 3,991,612 | 3,999,316 | 4,004,387 |
| 3,965,119 | 3,991,731 | 3,999,486 | 4,004,775 |
| 3,966,768 | 3,992,198 | 3,999,537 | 4,004,812 |
| 3,967,100 | 3,992,348 | 3,999,618 | 4,004,859 |
| 3,967,306 | 3,992,555 | 3,999,622 | 4,004,960 |
| 3,972,400 | 3,993,753 | 3,999,908 | 4,005,157 |
| 3,974,407 | 3,993,882 | 3,999,963 | 4,005,294 |
| 3,977,385 | 3,994,022 | 3,999,970 | 4,005,615 |
| 3,977,650 | 3,994,062 | 4,000,034 | 4,005,898 |
| 3,978,254 | 3,994,511 | 4,000,055 | 4,006,839 |
| 3,978,629 | 3,994,521 | 4,000,316 | |
| 3,978,691 | 3,994,825 | 4,000,444 | |
| 3,978,933 | 3,994,837 | 4,000,486 | |

## Disclaimers

3,792,294.—*James Jerome Royer,* Hanover, Pa. RECTANGULAR AT-CUT CRYSTAL PLATE. Patent dated Feb. 12, 1974. Disclaimer filed Feb. 18, 1977, by the assignee, *Bell Telephone Laboratories, Incorporated.*

Hereby enters this disclaimer to claims 1, 4 and 6 of said patent.

3,889,515.—*Walter J. Grombka,* Tiffin, Ohio. WEDGING STRUCTURE FOR PRESSES OR THE LIKE. Patent dated June 17, 1975. Disclaimer filed Feb. 10, 1977, by the assignee, *The National Machinery Company.*

Hereby enters this disclaimer to claims 1, 2, 4, 5, 6 and 9 of said patent.



# PATENT EXAMINING CORPS

**RENE D. TEGTMEYER, Assistant Commissioner**
**WILLIAM FELDMAN, Deputy Assistant Commissioner**

## CONDITION OF PATENT APPLICATIONS AS OF FEBRUARY 26, 1977

| PATENT EXAMINING GROUPS | Actual Filing Date of Oldest New Case Awaiting Action |
|---|---|
| **CHEMICAL EXAMINING GROUPS** | |
| GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices. | 7-2-76 |
| GENERAL ORGANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director. Heterocyclic, Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides. | 6-22-76 |
| HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes. | 3-18-76 |
| COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—R. FRIEDMAN, Director. Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography. | 4-22-76 |
| SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—H. S. VINCENT, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes. | 3-1-76 |
| **ELECTRICAL EXAMINING GROUPS** | |
| INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Illumination; Horology; Acoustics; Recorders; Weighing Scales. | 10-15-75 |
| SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director. Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material. | 1-12-76 |
| INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts. | 1-9-76 |
| RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—N. ANSHER, Director. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating. | 9-7-76 |
| ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring. | 4-2-76 |
| DESIGNS, GROUP 290—C. D. QUARFORTH, Director. Industrial Arts; Household, Personal and Fine Arts. | 9-10-75 |
| **MECHANICAL EXAMINING GROUPS** | |
| HANDLING AND TRANSPORTING MEDIA, GROUP 310—D. J. STOCKING, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment. | 3-26-76 |
| MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus: Plastics Working Apparatus; Plastic Block and Earthenware Apparatus: Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks. | 8-2-76 |
| AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—G. M. FORLENZA, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination. | 5-3-76 |
| HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—B. R. GAY, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication. | 4-2-76 |
| GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—M. M. NEWMAN, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors; Miscellaneous Hardware; Locks; Building Structures; Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Coating; Textiles; Apparel and Shoes; Sewing Machines. | 7-22-76 |

**Expiration of patents:** The patents within the range of numbers indicated below expire during March 1977, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 2,926,352 to 2,931,037, inclusive
Plant Patents..... Numbers 1,919 to 1,925, inclusive

# DEFENSIVE PUBLICATIONS

## PUBLISHED APRIL 5, 1977

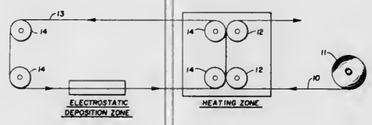
Published at the request of the applicant or owner in accordance with the Notice of Dec. 16, 1969, 869 O.G. 687. The abstracts of Defensive Publication applications are identified by distinctly numbered series and are arranged chronologically. The heading of each abstract indicates the number of pages of specification, including claims and sheets of drawings contained in the application as originally filed. The files of these applications are available to the public for inspection and reproduction may be purchased for 30 cents a sheet.

Defensive Publication applications have not been examined as to the merits of alleged invention. The Patent and Trademark Office makes no assertion as to the novelty of the disclosed subject matter.

### T957,001
### DYEING PROCESS

**James L. Chitwood, Rte. 8, 4412 Beechcliff Dr., Kingsport, Tenn. 37664**

**Continuation of Ser. No. 543,194, Jan. 22, 1975, abandoned.**
**This application Mar. 8, 1976, Ser. No. 664,462**
**Int. Cl.² D06P *5/00***
**U.S. Cl. 8—2**
**1 Sheets Drawing. 3 Pages Specification**

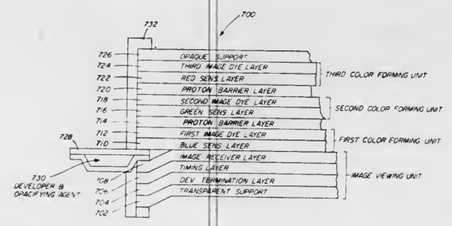



Disclosed is a process for dyeing comprising continually electrostatically depositing a powdered dye on a grounded electrically conductive reusable substrate, continuously positioning the grounded electrically conductive reusable substrate adjacent a heatable fabric and continuously heating the heatable fabric and powdered dye at a temperature and time sufficient to cause the powdered dye to diffuse into the fabric.

### T957,002
### PHOTOGRAPHIC IMAGE TRANSFER ELEMENT AND PROCESS

**James W. Meyer, c/o Kodak Park Division, Rochester, N.Y. 14650**

**Continuation of Ser. No. 610,480, Sept. 3, 1975, abandoned.**
**This application Nov. 4, 1976, Ser. No. 738,767**
**Int. Cl.² G03C *5/54, 7/00, 1/40***
**U.S. Cl. 96—29 D**
**2 Sheets Drawing. 60 Pages Specification**




A photographic element is disclosed which includes a support having as a coating thereon a radiation-sensitive layer capable of selectively releasing protons in exposed areas. In direct contact with the radiation-sensitive layer is an image-forming dye capable of shifting between a mobile and an immobile form in an aqueous medium upon protonation of a carboxy or amine substituent. The portion of the dye remaining mobile after imagewise protonation can be transferred to a receiver sheet to form a viewable dye image.

### T957,003
### METHOD OF CLEANING PVC REACTORS

**Kenneth D. Freshour, Ponca City, Okla., assignor to Continental Oil Company, Ponca City, Okla.**

**Filed July 12, 1976, Ser. No. 704,140**
**Int. Cl.² B08B *7/00***
**U.S. Cl. 134—4**
**No Drawing. 8 Pages Specification**

Surfaces of polyvinylchloride reactors are cleaned using a solvent gel composition. The solvent gel composition comprises: (a) solvent, (b) gelling agent, and (c), in some cases, a neutralizing agent. Suitable solvents include N-methyl-2-pyrrolidone, N-ethyl-2-pyrrolidone, and N-propyl-2-pyrrolidone. Suitable gelling agents include carboxy polymethylene polymer and hydroxyethyl cellulose. A suitable neutralizing agent is di-2-ethylhexylamine. The composition is applied to the reactor surfaces by conventional means, such as a brush. The composition is left on the reactor surface for at least one-half hour. It is then removed from the reactor surface for at least one-half hour. It is then removed from the reactor surface using a scraper (preferably non-metallic). If necessary, the entire process may be repeated to completely remove the deposits. In some cases it may be desirable to then apply the solvent per se in order to remove any film or polymer which may remain.

### T957,004
### ELECTROPHORETIC DEPOSITION OF STYRENE-MALEIC ANHYDRIDE COPOLYMERS

**Jerry A. Dieter, Park Forest, and Robert C. Strand, Homewood, both of Ill., assignors to Atlantic Richfield Company, New York, N.Y.**

**Continuation of Ser. No. 479,012, June 13, 1974, which is a continuation of Ser. No. 264,215, June 19, 1972, which is a division of Ser. No. 834,540, June 18, 1969. This application Aug. 26, 1976, Ser. No. 718,305**
**Int. Cl.² C25D *13/06***
**U.S. Cl. 204—181**
**No Drawing. 21 Pages Specification**

An electrophoretic coating composition bath based on styrene-maleic anhydride copolymer is disclosed. The electrophoretic coating composition bath comprises a dispersion in water of an at least partially neutralized, partial ester of styrene-maleic anhydride copolymer, a cross-linking agent for the styrene-maleic anhydride copolymer, e.g., melamine-formaldehyde resin, and a neutralization agent for said styrene-maleic anhydride copolymer. The styrene-maleic anhydride copolymer has an about 1:1 to 4:1 molar ratio of styrene to maleic anhydride. The copolymer has a molecular weight of about 500 to 4,000 and is esterified to an acid number in the range of about 20 to 350. The copolymer is esterified to about 25 to 125% half-ester and neutralized to about 20 to 100% based on the esterified resin. The neutralizing agent suitable for use in the present invention can be for example, alkali metal hydroxides, ammonia, lower aliphatic amines, and lower aliphatic hydroxy amines. The bath can contain a coupling agent which is preferably a glycol ether, such as monopropylether of propylene glycol and n-butyl ether of ethylene glycol, or water-soluble solvent for the resin, e.g., n-butanol, propanol and cyclohexanol, or water-insoluble solvent, such as toluene xylene and mineral hydrocarbon solvents. The electrophoretic deposition process comprises passing a direct electric current through the electrophoretic coating composition bath to an object having a conductive surface which is immersed in said bath and connected as the anode in the system.

**T957,005**

## BLOCK COPOLYMER PARTICLE FORMING PROCESS

**John E. Gorman, 5422 Olympia Fields Lane, Houston, Tex. 77069**

**Continuation-in-part of Ser. No. 597,101, July 18, 1975, abandoned. This application June 15, 1976, Ser. No. 696,257**

**Int. Cl.² B29B** *1/03*

**U.S. Cl. 264—140**

**No Drawing. 8 Pages Specification**

A process is provided for the formation of block copolymer particles having a reduced tendency to agglomerate which comprises extruding the block copolymer into a water bath in the presence of water-dispersible polyvalent metal salts of higher fatty acids and/or water-dispersible surfactants and forming nibs, pellets or strands in the bath. Suitable water soluble surfactants include anionic, cationic and non-ionic surfactants. Especially contemplated is the use of zinc stearate as the surfactant.

**T957,006**

## ORIGINAL DOCUMENT REARRANGEMENT APPARATUS FOR USE IN RECIRCULATING FEEDERS

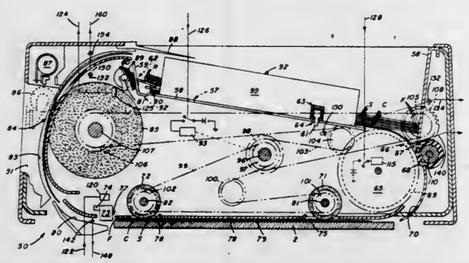
**Michael Gerald Reid, 2294 Manitou Road, Rochester, N.Y. 14606, and William Edward Hunt, 39 Killarney Drive, Rochester, N.Y. 14616**

**Filed Mar. 30, 1976, Ser. No. 671,865**

**Int. Cl.² B65H** *5/22*

**U.S. Cl. 271—3.1**

**9 Sheets Drawing. 32 Pages Specification**



Apparatus is disclosed for automatically rearranging documents in a recirculating feeder when a malfunction, such as a paper jam, has occurred in the feeder or in the copier. The use of a recirculating feeder facilitates the collation of the final copies produced by the copier without the need for a sorter accessory. If a malfunction, such as a paper jam, occurs in the copier, the automatic rearrangement apparatus initiates a feeding sequence in the feeder and causes the feeder to rearrange the original documents until the appropriate document is at the bottom of the stack for continuity in copying by the copier. If a malfunction occurs in the feeder, after the operator corrects the malfunction and replaces the original documents in their initial order in the feeder, the automatic rearrangement apparatus initiates a feeding sequence and rearranges the documents until the appropriate document is at the bottom of the stack for continuity in copying by the copier. At this time, the copier is ready to resume normal operation.

**T957,007**

## VOLTAGE-MODE LOGIC CIRCUITRY WITH IMPROVED INPUT/OUTPUT CHARACTERISTICS

**Paul V. Jordan, Poughkeepsie, and Robert F. Sechler, Wappingers Falls, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**

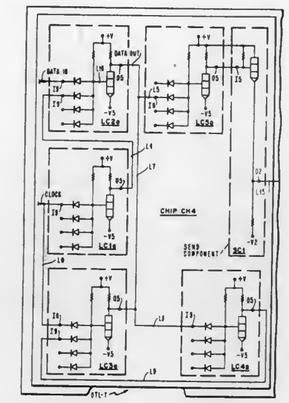
**Continuation of Ser. No. 450,279, March 11, 1974, abandoned, which is a continuation of Ser. No. 265,136, June 22, 1972, abandoned. This application July 30, 1976, Ser. No. 710,764**

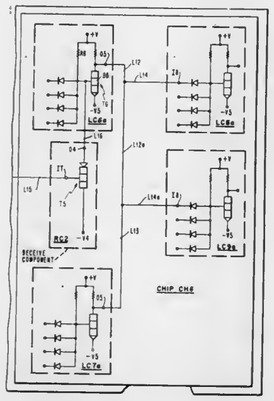
**Int. Cl.² H03K** *19/08;* **H01L** *27/00*

**U.S. Cl. 307—213**

**9 Sheets Drawing. 22 Pages Specification**

Coupling of signals between Large Scale Integrated Circuit chips is facilitated by provision of an emitter follower output stage for the chip. Special input circuits are also provided. The logic circuits may be DTL or Schottky TTL. The special input circuit may be a DTL type or a CTL (complementary transistor logic) type. Pull down resistors may be employed with the emitter follower output driver and the special DTL input circuit.





**T957,008**

## SWITCHING CIRCUIT WITH ACCURATE CURRENT THRESHOLD

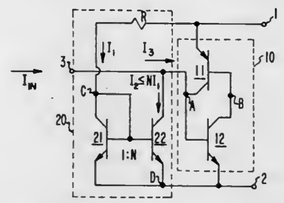
**Abel Ching Nam Sheng, Morris Plains, N.J., assignor to RCA Corporation**

**Filed Apr. 12, 1976, Ser. No. 676,195**

**Int. Cl.² H03K** *17/72*

**U.S. Cl. 307—252 N**

**1 Sheets Drawing. 20 Pages Specification**



A threshold current gate provides a diversion path for substantially all input current lower than a threshold value applied to the trigger electrode of a switch, such as a semiconductor controlled rectifier (SCR), thereby inhibiting switch triggering. When the input current exceeds the threshold value, that portion which exceeds the same flows into and triggers the switch.



**T957,009**

## NON-BLOCKING OXYGEN-RESISTANT VINYLIDENE CHLORIDE POLYMER COATING COMPOSITIONS

**Robert G. Jahn, 2046 Sharp, Saginaw, Mich. 48602**

**Filed May 17, 1976, Ser. No. 686,755**

**Int. Cl.² B32B** *27/30, 27/32, 5/16*

**U.S. Cl. 428—327**

**No Drawing. 19 Pages Specification**

Heat-sealable vinylidene chloride polymer coatings having improved anti-blocking tendencies while retaining resistance to oxygen transmission are obtained from aqueous dispersions of a normally crystalline vinylidene chloride polymer wherein such dispersions have incorporated therein from about 0.5 to about 5 percent based on the weight of normally crystalline vinylidene chloride polymer of a plurality of polymeric microspheres having an average diameter of between about 1 to about 5 microns, such microspheres consisting essentially of a vinylidene chloride polymer containing at least about 50 percent by weight of polymerized vinylidene chloride with any remainder of such polymer being one or more monoethylenically unsaturated comonomer.

**T957,010**

## SEPARATION OF DILUENT FROM POLYMERIZATION REACTION MIXTURE

**Denis George Harold Ballard, and Eric Jones, both of Runcorn, England, assignors to Imperial Chemical Industries Limited, London, England**

**Filed Mar. 8, 1976, Ser. No. 664,986**

**Claims priority, application United Kingdom, Mar. 7, 1975, 9561/75**

**Int. Cl.² C08F** *6/10, 6/00*

**U.S. Cl. 526—130**

**No Drawing. 22 Pages Specification**

A process for the separation of diluent from an ethylene polymerization reaction mixture wherein ethylene is copolymerized using as a catalyst an organo-metallic compound supported on an inorganic material. Subsequent to reaction, there is added to the reaction mixture a wetting agent and the diluent is then removed from the reaction mixture by steam distillation to give a product having significant solubility in the diluent.

A wide variety of wetting agents may be used, which may be either water-soluble or water-insoluble. However, water soluble wetting agents are much preferred, so that most or at least some of the wetting agent remains in the aqueous phase at the end of the steam distillation step. The wetting agent may also possess hydrocarbon solubility; but this does not appear to be of paramount importance. It should also be stable at the steam distillation temperature and should have low steam volatility. It is also convenient if the wetting agent is biodegradable to alleviate effluent disposal problems.

Examples of wetting agents include water soluble salts of di(hydrocarbyl) sulphosuccinic acids; poly(ethylene oxides) terminated with branched fluorocarbon groups, adducts of linear alcohols with ethylene oxide, and block copolymers of ethylene oxide and propylene oxide.

In general concentrations of wetting agent in the range 0.005 to 0.10% weight/volume, calculated on diluent, are suitable. Preferred concentrations are generally in the range 0.01 to 0.06% weight/volume.

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

**Re. 29,167**

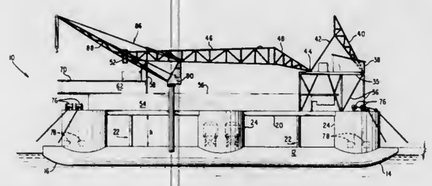
## TWIN HULL VARIABLE DRAFT DRILLING VESSEL

**Samuel Harry Lloyd, III, Mill Valley, Calif., assignor to Santa Fe International Corporation, Los Angeles, Calif.**

**Original No. 3,616,773, dated Nov. 2, 1971, Ser. No. 766,662, Sept. 4, 1968. Continuation of Ser. No. 221,769, Jan. 8, 1972, abandoned. Application for reissue May 15, 1975, Ser. No. 577,674**

**Int. Cl.² B63B** *35/00*

**U.S. Cl. 114—264** **66 Claims**



**1.** A variable draft vessel comprising:

a pair of elongated hulls disposed in side-by-side spaced substantially parallel relation one to the other;

a working platform;

means connected to said hulls and said platform to support said platform in spaced relation above said hulls;

said connecting means including at least six upstanding stabilizing columns disposed on said hulls, a pair of said columns being located adjacent opposite ends of said hulls on opposite sides of the pitch axis of the vessel, at least three columns being located on each hull and on opposite sides of the roll axis of the vessel;

said hulls having a combined displacement sufficient to float the vessel in a low draft condition with the hulls having freeboard;

and means for ballasting and deballasting the vessel to respectively submerge the hulls and portions of said connecting means below said platform below the waterline thereby to provide a high draft condition and refloat the vessel with the hulls having freeboard, the displacement of the submerged hulls and portions of said connecting means being sufficient to maintain the vessel buoyant in the high draft condition;

said connecting means being spaced one from the other to provide an open frame area between the components thereof and between said platform and said hulls;

the cross sectional area and configuration of said columns, the weight distribution of the vessel, and the geometry of the submerged hulls and portions of said connecting means being such as to maintain the natural period of the vessel in the high draft condition no less than six seconds;

said vessel having a length to width ratio of at least 2 to 1;

said stabilizing columns being connected to said hulls on the outboard sides thereof with the distance between the pitch axis and the centroid of the stabilizing columns on opposite sides of the pitch axis being greater than the transverse distance between the roll axis and the centroid of the stabilizing columns on opposite sides of the roll axis, said stabilizing columns having outboard portions thereof which extend transversely beyond the outboard sides of the respective hulls thereby providing increased moment for stabilizing action about the roll axis.

*106. A column stabilized semisubmersible vessel consisting of a pair of elongated hulls disposed in substantially parallel spaced side-by-side relation with each of said hulls spaced from and lying on an opposite side of the longitudinal centerline of said vessel, said vessel further comprising;*

*a working platform spaced above said hulls a predetermined height and normally lying in a generally horizontal plane;*

*means for supporting said platform in fixed spaced relation above said hulls including at least three pairs of upstanding columns connecting with each of said hulls and said platform, each of said columns having a substantially constant cross sectional area over the effective height of the column between the platform and associated hull;*

*each of said hulls having an oblong transverse cross section with a breadth greater than its height and having top and bottom substantially planar parallel surfaces extending substantially the entire length of each hull;*

*a plurality of longitudinally spaced structural truss means interconnecting and reinforcing the structural relationship of the hulls, platform and columns, with such truss means including substantially transversely extending members structurally interconnecting uppermost portions of the hulls;*

*said vessel being generally rectangular in plan with the length of said vessel along its longitudinal centerline and roll axis being at least plural times as great as the width of said vessel along its transverse centerline and pitch axis;*

*at least three of said columns being located on each of said two hulls on opposite sides of the vessel's roll axis with pairs of such columns being located near opposite ends of each of said hulls on opposite sides of the vessel's pitch axis and another pair of said columns being located at an intermediate position on each of said hulls;*

*the configuration and cross-sectional areas of said columns throughout effective height thereof and the distances of said columns from the vessel's longitudinal roll axis and transverse pitch axis being such that said columns maintain the vessel's metacenter above the vessel's center of gravity for the high draft semisubmerged operating positions of the vessel and also being such that said columns provide righting moment about the longitudinal roll axis which is less than righting moment provided about said transverse pitch axis when the vessel is in semisubmerged column stabilized operating position;*

*said hulls having ballast compartments; and*

*means for ballasting said vessel when required to alter its draft between a low draft hull-supported floating condition in which the hulls have freeboard with said transversely extending members structurally interconnecting uppermost portions of the hulls being disposed above the mean waterline and a high draft semisubmerged column stabilized floating and operating condition in which the mean waterline is located along intermediate portion of said columns above said hulls and below the underside of said platform.*

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**Re. 29,168**

## PHOTOGRAPHIC ELEMENTS WITH LIGHT ABSORBING LAYERS

**Donald W. Heseltine; Philip W. Jenkins, and John D. Mee, all of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

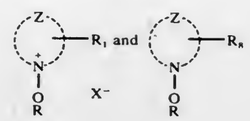
**Original No. 3,745,009, dated July 10, 1973, Ser. No. 82,086, Oct. 19, 1970. Continuation of Ser. No. 766,307, Oct. 9, 1968, Pat. No. 3,615,432, which reissued Nov. 5, 1974 as Re. 28,225. Application for reissue July 1, 1975, Ser. No. 592,281**

**Int. Cl.² G03C** *1/84, 1/02*

**U.S. Cl. 96—84 R** **21 Claims**

**1.** Sheet material adapted for making accurate visible records of light images and comprising, in combination as coextensive layers, transparent support means, transparent photosensitive means for recording said light images *forming at least one of said layers*, and, *as a remaining of said layers*, light-

absorptive heat decolorizable color means [which is ] *consisting essentially of* a compound represented by a formula selected from the group consisting of:



wherein:

$R_1$ can be one of:
- (a) a methine linkage terminated by a heterocyclic nucleus of the type contained in cyanine dyes,
- [(b) an alkyl radical,]
- (c) an anilinovinyl radical,
- [(d) a hydrogen atom,
- (e) an aryl radical,
- (f) an aldehyde group, ] and
- (g) a styryl radical;

$R_8$ can be one of:
- (a) a methine linkage terminated by a heterocyclic nucleus of the type contained in merocyanine dyes,

R can be one of:
- (a) an alkyl radical, and
- (b) an acyl radical;

X is an acid anion;

Z represents the atoms necessary to complete a five to six membered heterocyclic nucleus.

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**Re. 29,169**

**PROCESS FOR THE DEMONSTRATION AND DETERMINATION OF REACTION COMPONENTS HAVING SPECIFIC BINDING AFFINITY FOR EACH OTHER**

**Antonius Hermanus Wilhelmus Maria Schuurs, and Bauke Klaas van Weemen, both of Oss, Netherlands, assignors to Akzona Incorporated, Asheville, N.C.**

**Original No. 3,791,932, dated Feb. 12, 1974, Ser. No. 221,447, Jan. 27, 1972. Application for reissue Jan. 26, 1976, Ser. No. 652,362**

**Claims priority, application Netherlands, Feb. 10, 1971, 7101728**

**Int. Cl.² G01N *31/14***

**U.S. Cl. 195—103.5 A** **6 Claims**

1. Process for the demonstration and determination of a component of the reaction between a bindable substance selected from the group consisting of an antigen, a hapten, and a low molecular substance, and a protein capable of binding said bindable substance specifically, said protein being selected from the group consisting of an antibody and a specific binding protein, comprising the steps of:
- a. providing a given quantity of the binding partner of the component to be determined, which binding partner is in an insoluble form;
- b. reacting the component to be determined with its binding partner to form a reaction mixture having a solid phase and a liquid phase;
- c. separating the solid phase from the liquid phase;
- d. adding to said solid phase a given quantity of a coupling product of the component to be determined with an enzyme; and
- e. determining the enzyme activity of the solid phase which is a measure of the quantity of reaction component to be determined.

**Re. 29,170**

**COATING COMPOSITION AND NOVEL COMPLEXER THEREFOR**

**Roger E. Burke, Savannah, Ga., assignor to Union Camp Corporation, Wayne, N.J.**

**Original No. 3,869,484, dated Mar. 4, 1975, Ser. No. 311,452, Dec. 4, 1972. Application for reissue Mar. 18, 1976, Ser. No. 668,299**

**Int. Cl.² C08H *17/36***

**U.S. Cl. 260—404.5** **7 Claims**

1. A metal amine complexer, contained in an aqueous solution, consisting essentially of:
- a. zinc;
- b. from 0.9 to 6 moles, per mole of the metal, of a polyalkylene polyamine having the formula:

$$NH_2[(CHR)_aNH]_nH,$$

where a is from 2 to 3, n is from 2 to 5, and [ each ] R is selected from the group consisting of hydrogen and methyl; and
- c. at lest one aliphatic, monocarboxylic acid having from six to 18 carbon atoms.

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**Re. 29,171**

**MULTI-DIRECTIONAL SOUND SYSTEM**

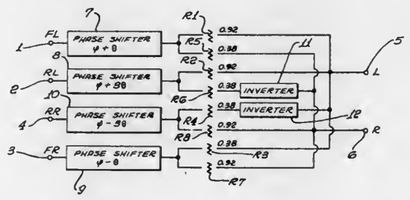
**Susumu Takahashi, Tokyo, Japan, assignor to Sansui Electric Co., Ltd., Tokyo, Japan**

**Original No. 3,777,076, dated Dec. 4, 1973, Ser. No. 268,726, July 3, 1972. Application for reissue Dec. 20, 1974, Ser. No. 534,850**

**Claims priority, application Japan, July 2, 1971, 46-48674**

**Int. Cl.² G11B *3/74***

**U.S. Cl. 179—100.4 ST** **7 Claims**




1. An encoder system for producing two channel signals suitable for recording on a phono disc from first to fourth directional audio input signals, said encoder system comprising:

first to fourth input terminals for receiving said first to fourth audio input signals, respectively;

first and second output terminals from which said two channel signals are derived, respectively;

first to fourth phase shifter means coupled to said first to fourth input terminals, respectively, said first to fourth phase shifter means being operative to introduce relative phase differences of about +22.5°, +67.5°, −22.5° and −67.5° between said first to fourth audio input signals;

means connected in circuit with said first phase shifter means for coupling about 0.92 of said first audio input signal to said first output terminal;

means connected in circuit with said first phase shifter means for coupling about 0.38 of said first audio input signal to said second output terminal;

means connected in circuit with said second phase shifter means for coupling about 0.92 of said second audio input signal to said first output terminal;

means connected in circuit with said second phase shifter means for coupling about −0.38 of said second audio input signal to said second output terminal;

means connected in circuit with said third phase shifter means for coupling about 0.38 of said third audio input signal to said first output terminal;



means connected in circuit with said third phase shifter means for coupling about 0.92 of said third audio input signal to said second output terminal;

means connected in circuit with said fourth phase shifter means for coupling about −0.38 of said fourth audio input signal to said first output terminal; and

means connected in circuit with said fourth phase shifter means for coupling about 0.92 of said fourth audio input signal to said second output terminal.

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**Re. 29,172**

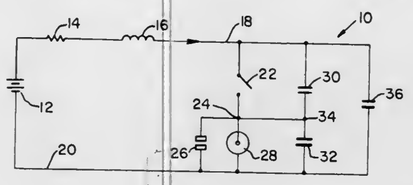
**VOLTAGE-DIVIDING DC CIRCUIT BREAKER AND METHOD**

**Michael A. Lutz, Livermore, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.**

**Original No. 3,777,179, dated Dec. 4, 1973, Ser. No. 298,042, Oct. 16, 1972. Application for reissue Dec. 8, 1975, Ser. No. 638,720**

**Int. Cl.² H01H *33/00***

**U.S. Cl. 361—3** **5 Claims**



1. A voltage dividing DC circuit breaker for breaking a circuit against line voltage and having circuit breaking components of insufficient capability for withstanding open circuit line voltage comprising:

first and second buses in said circuit breaker;

first and second serially connected switches connected between said buses and connected to an intermediate bus therebetween;

an electronic *crossed field* switch *device* capable of offswitching all the current through said circuit breaker against voltage build up less than the open circuit voltage connected in parallel to said second switch between said intermediate and second buses; and

first and second serially connected capacitors connected to said first and second buses and at their intermediate point connected to said intermediate bus, so that in normal conduction current flows through said circuit breaker through said first and second switches in the closed condition, and when said first and second switches are opened, said first switch arcs and said second switch forces the circuit current through said electronic *crossed field* switch *device*, and when said electronic *crossed field* switch *device* is offswitched, current through said first switch decreases so that its arc extinguishes and current builds up with the standoff voltage divided between said first bus, and said intermediate bus and said second bus in accordance with the capacities of first and second capacitors.

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**Re. 29,173**

**LASER TRANSMITTER SYSTEM**

**Richard A. Dye, and C. Raymond Berry, both of Santa Barbara, Calif., assignors to Santa Barbara Research Center, Goleta, Calif.**

**Original No. 3,909,745, dated Sept. 30, 1975, Ser. No. 515,810, Oct. 17, 1974. Application for reissue June 18, 1976, Ser. No. 697,584**

**Int. Cl.² H01S *3/096***

**U.S. Cl. 331—94.5 PE** **6 Claims**

1. A laser transmitter system comprising: mechanical energy-producing means;

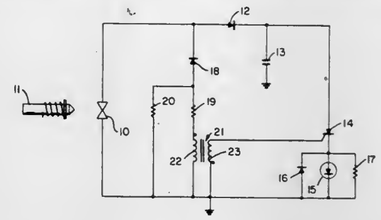
piezoelectric means for providing electrical signals in response to said mechanical energy-producing means;

a first diode coupled between said piezoelectric means and a storage capacitor;

a storage capacitor coupled to said first diode, said capacitor being charged in response to said piezoelectric means;

silicon controlled rectifier having first, second and third electrodes, said first electrode being coupled to said first diode, said silicon controlled rectifier for discharging said capacitor in response to a signal applied to said third electrode of said rectifier;

laser diode means coupled to said second electrode of said silicon controlled rectifier for providing an output signal in response to current being discharged therethrough;



a second diode being coupled between said piezoelectric device and a transformer; and

a transformer having primary and secondary windings, said primary winding being coupled to said second diode, said secondary winding being coupled to said third electrode of said silicon controlled rectifier, said transformer for providing a signal to said third electrode of said silicon controlled rectifier in response to said piezoelectric means.

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**Re. 29,174**

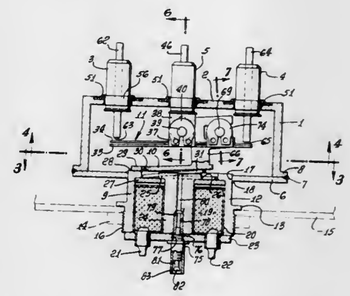
**PRESSURIZED RELAY ASSEMBLY**

**Victor E. DeLucia, Santa Monica, Calif., assignor to Torr Laboratories, Inc., Van Nuys, Calif.**

**Original No. 3,891,950, dated June 24, 1975, Ser. No. 494,825, Aug. 5, 1974. Application for reissue Oct. 29, 1975, Ser. No. 626,645**

**Int. Cl.² H01H *1/66***

**U.S. Cl. 335—151** **23 Claims**



*17. A relay assembly comprising: a housing, normally opened contact means and normally closed contact means in said housing including terminals projecting from said housing, electromagnetic operating means for closing and opening said contact means upon energization and deenergization of said electromagnetic operating means, means forming a seal between said terminals and said housing, and means for admitting a pressurized dielectric gas into said housing, said contact means including spring contact arms, means pivotally supporting said spring contact arms including common terminals extending through said housing, and means pivotally and electrically connecting said spring arms on said common terminals.*

# PLANT PATENTS

## GRANTED APRIL 5, 1977

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

**4,032**

### GLADANTHERA GULDEMOND-MYRTA

**Cornelius K. Guldemond, deceased, late of Ross Township, Kalamazoo County, Mich., by Myrta M. Guldemond, legal representative, assignor to Myrta M. Guldemond, Galesburg, Mich.**

**Division of Ser. No. 601,480. This application Mar. 26, 1976, Ser. No. 670,944**

**Int. Cl.² A01H** *5/00*

**U.S. Cl. Plt.—85** **1 Claim**

1. A new and distinct variety of plant in the Iridaceae family, substantially as herein shown and described, characterized particularly as to novelty by the unique combination of the characteristics of the common Gladiolus and the *Acidanthera murielae*, namely the flower of a Gladiolus, the drooping characteristic of the flower of the *Acidanthera murielae*, and the fragrance of the *Acidanthera murielae*.

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**4,033**

### GLADANTHERA GULDEMOND-CORNELIUS

**Cornelius K. Guldemond, deceased, late of Ross Township, Kalamazoo County, Mich., by Myrta M. Guldemond, legal representative, assignor to Myrta M. Guldemond, Galesburg, Mich.**

**Filed Aug. 4, 1975, Ser. No. 601,480**

**Int. Cl.² A01H** *5/00*

**U.S. Cl. Plt.—85** **1 Claim**

1. A new and distinct variety of plant in the Iridaceae family, substantially as herein shown and described, characterized particularly as to novelty by the unique combination of the characteristics of the common Gladiolus and the *Acidanthera murielae*, namely the flower of a Gladiolus, the drooping characteristic of the flower of the *Acidanthera murielae*, and the fragrance of the *Acidanthera murielae*.

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**4,034**

### ROSE PLANT—LIFIRANE VARIETY

**Jelle J. Zwemstra, Galgeweg 24, Posthus 35, Naaldwijk, Netherlands**

**Filed Mar. 24, 1976, Ser. No. 669,745**

**Claims priority, application Netherlands, Mar. 26, 1975, 75S2853; Morocco, Oct. 30, 1975, 17282**

**Int. Cl.² A01H** *5/00*

**U.S. Cl. Plt.—19** **1 Claim**

1. A new and distinct variety of Grandiflora rose-plant of vegetative reproduction characterized by the fact that,

from the physical point of view, the plant with Spinach green adult wood, is erect, the flower is double, Rose Neyron in color, the petals are consistent and give the flower a form which initially is high-centered, and when open a form wherein the petals are projecting and overlapping,

from the biological point of view, this rose-plant is of vigorous vegetation, its capacity for re-blooming is excellent, and its flowers last a long time whether cut or on the plant,

substantially as shown and described.

**4,035**

### DRACAENA PLANT

**Hideo Obayashi, Totohashi, Japan, assignor to Cerro Gordo, Inc., Dorado, P.R.**

**Filed May 14, 1976, Ser. No. 686,662**

**Int. Cl.² A01H** *5/12*

**U.S. Cl. Plt.—88** **1 Claim**

1. The new distinct variety of Dracaena plant substantially as herein shown and described, characterized particularly by medium long, narrow, sword-shaped, dense spreading leaves, the leaves being compactly grouped and erect, the texture thereof being hard and the distinctive color pattern of its leaves with a marginal red-pink strip widening from base to apex, a less prominent mid-rib pink stripe merging with the marginal stripe at the apex, two green stripes on either side of the mid-rib stripe, widening from base to apex, coloration of all stripes on both sides being substantially the same.

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**4,036**

### ROSE PLANT

**Ernest D. Williams, 1510 Lebanon Ave., Dallas, Tex. 75208**

**Filed Apr. 13, 1976, Ser. No. 676,569**

**Int. Cl.² A01H** *5/00*

**U.S. Cl. Plt.—7** **1 Claim**

1. A new and distinct variety of miniature rose plant of hardy, dwarf, rounded, much branched, bush type, substantially as illustrated and described, characterized by buds and flowers resembling Windy City (miniature — U.S. Plant Pat. No. 3,792) in general form and size; the bud and flower color resembling the variety Little Darling (Floribunda — U.S. Plant Pat. No. 1,581, expired) in the blending of yellow, pink and red but usually with more contrast, the general color effect being, yellow with contrasting shades of red; the small buds having rather long sepals with extra foliaceous parts; and further characterized by a plant which is vigorous and compact with abundant disease resistant foliage, a plant which is easily propagated from cuttings, an abundance of bloom with flowers borne singly or several to the stem in loose clusters.

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**4,037**

### ROSE PLANT — MEIRODIUM VARIETY

**Marie-Louis Paolino, (widow of Francis Meilland), c/o Meilland & Cie, Societe en nom collectif, 134 boulevard du Cap, Antibes (Alpes Maritimes), France**

**Filed Feb. 17, 1976, Ser. No. 658,710**

**Claims priority, application France, Feb. 20, 1975, 75.00915; Italy, June 18, 1975, 24488/75**

**Int. Cl.² A01H** *5/00*

**U.S. Cl. Plt.—20** **1 Claim**

1. A new and distinct variety of hybrid tea rose-plant of vegetative reproduction, characterized by the fact that,

from the physical point of view, the plant with lettuce green adult wood, is erect, the flower is double, Blood red on the inside and cardinal red on the outside, the petals are firm and show a yellow unguis;

from the biological point of view, this rose-plant is of vigorous vegetation, blooms practically continuously, its flowers last a long time, and its petals drop off cleanly substantially as shown and described.



# PATENTS

## GRANTED APRIL 5, 1977

### ERRATA

| For CLASS | See PATENT NO. |
|---|---|
| 090–013.5 | 4,015,509 |
| 090–020.5 | 4,015,510 |
| 223–032 | 4,015,748 |
| 273–136 G | 4,015,778 |
| 244–042 DA | 4,015,787 |
| 248–168 | 4,015,806 |
| 125–021 | 4,015,931 |
| 075–201 | 4,015,947 |
| 075–157.5 | 4,015,948 |
| 428–653 | 4,015,949 |
| 428–648 | 4,015,950 |
| 002–159 | 4,016,027 |
| 428–542 | 4,016,183 |
| 358–083 | 4,016,361 |
| 358–142 | 4,016,362 |
| 358–248 | 4,016,363 |
| 358–245 | 4,016,364 |
| 200–277 | 4,016,401 |
| 361–222 | 4,016,455 |
| 361–228 | 4,016,456 |
| 361–049 | 4,016,457 |
| 361–052 | 4,016,458 |
| 361–088 | 4,016,459 |
| 361–018 | 4,016,461 |
| 361–117 | 4,016,462 |
| 361–383 | 4,016,463 |
| 361–433 | 4,016,464 |
| 361–433 | 4,016,465 |
| 361–278 | 4,016,466 |

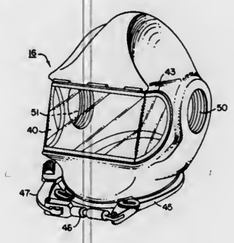
# PATENTS

## GRANTED APRIL 5, 1977

NOTE: A cross reference listing of applications published under the second Trial Voluntary Protest Program is located in the back of this Issue. These entries will be in numerical order by document publication number

## GENERAL AND MECHANICAL

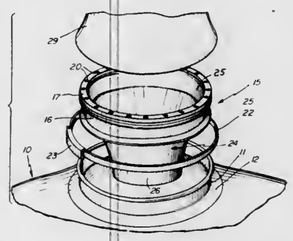
**4,015,294**
**DIVING HELMET ASSEMBLY**
**Wilbur J. O'Neill, Severna Park, Md., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.**
**Filed Nov. 15, 1972, Ser. No. 306,945**
**Int. Cl.² B63C *11/12***
**U.S. Cl. 2—2.1 R** **14 Claims**




1. A diving helmet assembly comprising:
A. an adapter unit for placement on the diver's head and having a standardized outer surface;
B. a helmet body for placement on said adapter unit and having a standardized inner surface generally conforming to said outer surface of said adapter unit;
C. said helmet body including,
i. a helmet body shell portion, the interior of which includes said standardized inner surface; and
ii. insulation means disposed over the outside of said helmet body shell;
D. at least one gas conduction duct disposed on the outside of said helmet body shell; and
E. said insulation means being also disposed over said gas conduction duct.

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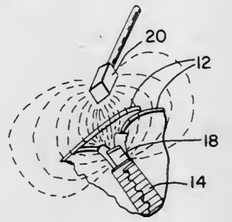
**4,015,295**
**DIVING SUIT AND NECK SEAL THEREFOR**
**Woodrow A. Lancaster, 207 S. Main St., Middleton, Mass. 01949; William T. Jebb, 88 Holly St., Gloucester, Mass. 01930, and Alan M. Chagan, 25 Appleton Ave., Beverly, Mass. 01915**
**Filed Apr. 15, 1976, Ser. No. 677,217**
**Int. Cl.² B63C *11/04***
**U.S. Cl. 2—2.1 R** **10 Claims**




1. A diving suit for use with a helmet having a dam, said suit including a body section, a collar, and a neck seal, said neck seal including first and second rings dimensioned to permit the head of the wearer to pass freely therethrough and freely to encircle his neck, a neck dam in the form of a sleeve extending downwardly through said first ring with its upper end overlying said first ring, said second ring overlying said upper dam end and detachably attached to said first ring and clamping said dam end therebetween, said first ring having an external channel over which both the collar of the suit and the helmet dam extends and clamping means encircling said first ring and securing said collar and neck dam in said channel.

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**4,015,296**
**ELASTIC STOCKING**
**Frank Malick, 8836 Major Ave., Morton Grove, Ill. 60053**
**Filed Mar. 17, 1976, Ser. No. 667,709**
**Int. Cl.² A41B *11/00***
**U.S. Cl. 2—239** **2 Claims**




1. An elastic stocking having external and internal sides, and a leg engaging portion including two longitudinal edges having internal and external sides, respectively, comprising:
a zipper having two synthetic plastic material engaging portions and magnetizable material slider means movable along said engaging portions from a first position to a second position and vice versa for closing and opening said zipper, respectively, said engaging portions being attached to said internal sides of said stocking and spaced from said longitudinal edges, whereby said edges overlap in the closed portion;
magnet means for moving said magnetizable material slider means, said magnet means being positioned on the external side of said stocking along said edges for selectively closing and opening said zipper contactlessly, whereby, upon said slider means having attached said engaging portions to one another in said first position and upon said magnet means moving said slider means from said first to said second position, said longitudinal edges overlap with one another thereby substantially preventing said zipper being visible from the external side of said stocking.

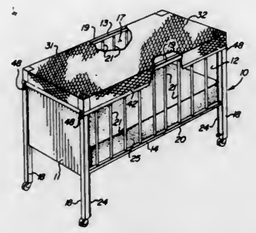
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**4,015,297**
**SAFETY CANOPY FOR CRIB**
**Dorothy A. Christian, P.O. Box 1493, Sedona, Ariz. 86336**
**Filed Nov. 26, 1975, Ser. No. 635,717**
**Int. Cl.² A47C *29/00*; B65B *11/00***
**U.S. Cl. 5—97** **2 Claims**

1. A safety canopy for use in combination with a generally rectangular crib for containing a child and including a pair of spaced upright stationary end panels and a pair of spaced upright side panels extending between said end panels, at least one of said upright side panels being movable, said canopy comprising:
a shallow inverted box-like structure sized and shaped to closely receive and conform to the upper portion of said crib therein and including,
i. a substantially horizontal top panel of flexible foraminous material, sized and shaped to overlay said crib and having opposed pairs of end and side edges,

reinforcing means for positioning and at each corner of securing said box-like structure on said crib independently of the movable side panel for permitting movement of the movable side panel without interference by said canopy in its secured position including,

ii. a pair of elongate side panels of reinforced flexible material, each of said elongate side panels being secured along one of its longitudinal edges to one of said side edges of said horizontal panel and depending therefrom, and



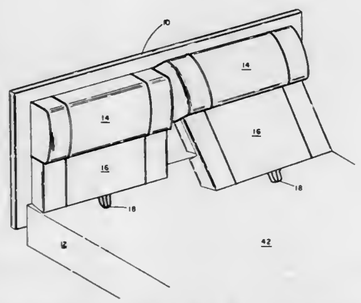
iii. a pair of elongate end panels of reinforced flexible material, each of said elongate end panels being secured along one of its longitudinal edges to one of said end edges of said horizontal panel and depending therefrom,

each said elongate end panel being secured at its ends to the adjacent ends of said elongate side panels and forming the substantially vertical corners of said box-like structure; and

b. attachment means extending downwardly from said elongate end panels proximate each corner of said box-like structure for detachably securing said structure solely to the stationary portion of said crib.

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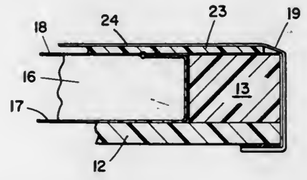
**4,015,298**
**TILTABLE HEADBOARD**
**Chester A. Scott, Ridgeview Drive, Burlington, Iowa 52601**
**Filed Feb. 2, 1976, Ser. No. 654,240**
**Int. Cl.² A47C *21/00***
**U.S. Cl. 5—327 B** **6 Claims**



1. A tiltable suport unit for the upper body and head usable in connection with a generally horizontal supporting surface such as a bed or seat and the like, said tiltable support unit having a front surface engageable by the upper body and head and comprising: a generally hollow box-like upper section mountable on a stationary pivot above said horizontal supporting surface for swingable movement of said unit out over said horizontal supporting surface to a selected inclined position, a lower section attached to and swingable with said upper section, and guide means combined with said upper section and said lower section to provide for free telescopic movement of said lower section inside of said upper section and toward and away from said upper section thereby to vary the length of said unit as it is swung about said stationary pivot, the bottom of said lower section providing a flat surface inclined upwardly from the front surface of the unit toward the rear, said flat surface being engageable with said horizontal supporting surface when said unit is swung to a selected inclined position with said lower section extended whereby said unit is maintained in said selected inclined position, said upper section having a front, sides and a top and being open at the bottom, said guide means including a first guide member affixed to the inside of each side of said upper section, said lower section being of a generally box-like construction with a front, sides and bottom, and a second guide member of said guide means affixed to the inside of each side of said lower section and engageable with a respective one of said first guide members thereby providing for linear slidable movement of said lower section relative to said upper section.

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**4,015,299**
**WATER BED**
**Robert Tinnel, 3798 Grand Ave., Oakland, Calif. 94610**
**Filed Feb. 9, 1976, Ser. No. 656,605**
**Int. Cl.² A47C *27/08***
**U.S. Cl. 5—370** **2 Claims**



1. A bed construction comprising a base member formed of a thick sheet of dense foam material, a border member formed of a resilient, dense foam material secured to the periphery of said base member, said border member extending continuously about said periphery and projecting upwardly therefrom, said border member including an interior wall extending generally orthogonally from said base member; said bed construction also including a seating area at the periphery therof, said seating area comprising a broad, laterally extending upper surface of said border member, said base member and sid interior wall of said border member defining an upwardly opening coffer having generally vertical side walls, a water mattress disposed within said coffer, and a resilient, insulating pad extending over said water mattress and said upper surface of said border member.

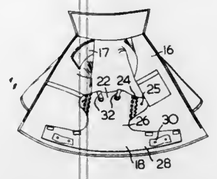
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**4,015,300**
**FLOTATION JACKET**
**John S. Hayward, 570 Linnet Lane; Martin S. Collis, 2415 Alpine Crescent; John D. Eckerson, West Coast Road, and Lorne K. Rosenblood, 965 Kentwood Terrace, all of, Victoria, British Columbia, Canada**
**Filed May 6, 1976, Ser. No. 683,858**
**Claims priority, application Canada, Nov. 25, 1975, 240373**
**Int. Cl.² B63C *9/10***
**U.S. Cl. 9—341** **1 Claim**

1. A flotation jacket having front, back, and arm portions with flotation material therein to provide adequate inherent buoyancy for an adult, and a flap secured to the lower terminal edge of the jacket and foldable between a concealed position on the inside of the jacket and a deployed position suspended from the said lower edge of the jacket; said flap, in the deployed position having a main panel for passage between the legs of the wearer and securement to the front of the jacket thereby enclosing the groin area; and a pair of wing panels, one on either side of the main panel, said wing panels



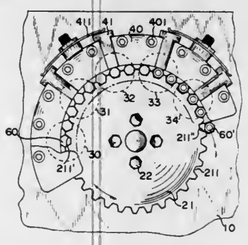
being adapted for encirclement of the upper thigh area; and means for securing the panels in their concealed and abdominal enclosing positions; said flap comprising waterproof insu-



lative closed-cell material providing thermal protection to vital heat loss areas in the groin and mid-thigh area of the wearer and limiting access of cold water to other high heat loss areas of the trunk of the body.

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**4,015,301**
**CUT-OFF STOCK FEEDING DEVICE FOR AN AUTOMATIC HIGH SPEED COLD NUT FORMER**
**Yuan Ho Lee, 85, Jen Ho Road, Tainan, China /Taiwan**
**Filed Aug. 19, 1975, Ser. No. 605,840**
**Int. Cl.² B21J *5/12*; B21K *1/64, 27/00***
**U.S. Cl. 10—76 T** **2 Claims**



1. In combination with an automatic, high-speed, cold nut former having a plurality of insert dies arcuately positioned such that the center of each die is located with equal circular pitch along the circumference of a circle and allocated in order of successive operations in the nut forming process and a drive shaft adapted to transmit intermittent, rotary motion, a cut-off stock feeding device comprising:

a transfer feeding disc coaxially affixed upon one end of said drive shaft, the peripheral edge of said disc in alignment with the locus of the centers of said dies, said disc sequentially transferring the cut-off stock blanks to the center of each of said plurality of dies upon intermittent rotation of said shaft;

a plurality of indentations along the peripheral edge of said disc, said indentations having the same contour as one side of the formed article to receive and accommodate the cut-off stock blanks;

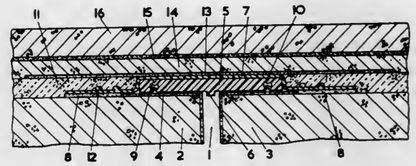
means for transferring a cut-off stock blank to a die from the indentation aligned with said die;

means for returning, upon completion of a forming operation, said cut-off stock blank from said die to the same indentation from which said blank was transferred; and

means cooperating with said disc for retaining said stock blank in said indentation upon return of said blank from one of said dies.

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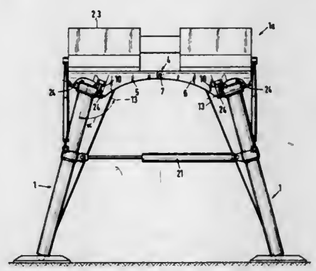
**4,015,302**
**EXPANSION JOINTS**
**Michael Nicholson Clark, Taunton, England, assignor to Secretary of State for Environment in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, England**
**Filed May 9, 1975, Ser. No. 576,120**
**Claims priority, application United Kingdom, May 10, 1974, 20901/74**
**Int. Cl.² E01D *19/06***
**U.S. Cl. 14—16.5** **13 Claims**



1. A buried expansion joint for use in the construction of a bridge having a pair of spaced structural members each covered with a waterproofing layer and surmounted by a roadway, said expansion joint comprising a pad of flexible plastics material located over the gap formed between said structural members, and a flashing of flexible plastics material extending in a direction transverse of the gap over the said pad and downwardly at the two sides of the pad and then outwardly along the surface of said structural members, the outwardly extending edge portions of said flashing lying beneath said waterproofing layers, said edge portions having means attaching said edge portions to said waterproofing layers.

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**4,015,303**
**SUPPORT ELEMENT FOR A BRIDGE**
**Wolfgang Eyb, Leonberg; Friedhelm Soffge, Kornwestheim; Ortwin Piper, Schwieberdingen, and Gerhard Albrecht, Illingen, all of Germany, assignors to Firma Dr. Ing. h.c.f. Porsche Aktiengesellschaft, Germany**
**Filed May 12, 1975, Ser. No. 576,446**
**Int. Cl.² E01D *19/02***
**U.S. Cl. 14—75** **29 Claims**



1. Supporting apparatus for bridge portions, especially for a portable bridge of the type including a plurality of bridge portions connected to one another; said apparatus comprising:

carrier means for supporting said bridge portions including two carrier sections have the bridge portions mounted thereon,

means for pivotally connecting the two carrier elements to one another, said bridge portions being arranged on respective sides of said pivotal connecting means,

a pair of support legs spaced from one another;

means for pivotally supporting the respective support legs at free ends of the respective carrier sections for movement between respective storage positions and in-use positions with said support legs supporting said carrier means, and

a holding element connecting said support legs to one an-

other, said holding element being separate from and spaced from said carrier means when said support legs are in their in-use positions,

wherein said holding element, said pivotal connecting means of said carrier elements, and the respective pivotal supporting means of said support legs are spaced from one another so as to form a three-hinge support for the bridge portions whereby said two carrier sections and the bridge portions associated therewith are adapted to execute compensating movements about the pivotal connecting means in response to at least one of an adjustment of a base of the support legs and an irregularity of a support surface upon which the support legs rest.

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**4,015,304**

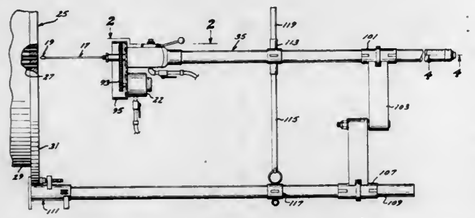
## DRILLING OR REAMING MACHINE

**Lester L. Dillinger, 8632 Park St., Bellflower, Calif. 90706**

**Continuation of Ser. No. 464,051. This application June 30, 1975, Ser. No. 591,522**

**Int. Cl.² B08B** *9/02*

**U.S. Cl. 15—104.1 R** **6 Claims**



1. A machine for reaming heat exchanger tubes, comprising:

a hollow drive shaft adapted to be reciprocably driven along its longitudinal axis and having a cutterhead attached to its forward end and a drive piston attached to its rearward end;

an elongated inner cylindrical member providing a chamber for reciprocation of said drive piston therein;

an extension member attached to the forward end of said inner cylindrical member and having a cylindrical opening therein which provides an extension of said reciprocation chamber;

an outer elongated cylindrical member disposed about said inner member and substantially longitudinally coextensive therewith, said outer cylindrical member being of substantially larger diameter than said inner cylindrical member and thereby providing a longitudinally extending passageway between said two members;

closure means attached to the rearward ends of said inner and outer cylindrical members to close said passageway;

said extension member being also attached to the forward end of said outer cylindrical member for closing off the forward end of said passageway;

a forward drive opening formed in said inner cylindrical member near the rearward end thereof and communicating said passageway with said reciprocation chamber;

said extension member having a reversing drive opening extending laterally therein and communicating with said reciprocation chamber; and

four-way valve means supported upon said extension member and selectively operable for applying fluid pressure either to said reversing drive opening, or through said passageway to said forward drive opening.

**4,015,305**

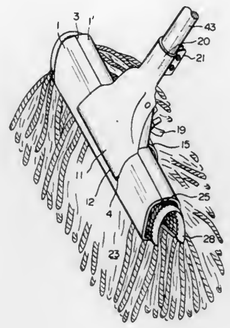
## MOP HOLDER

**Toshiyoshi Komatsu, Osaka, Japan, assignor to Duskin Franchise Co., Ltd., Osaka, Japan**

**Filed Mar. 3, 1976, Ser. No. 663,442**

**Int. Cl.² A47L** *13/255, 13/258*

**U.S. Cl. 15—150** **9 Claims**



1. A mop holder comprising a holding member for holding a mop formed of a synthetic resin having a high resistance to folding, a handle shaft and a linking member for linking said holding member to the handle; wherein said holding member comprises a pair of shell members integrally formed of said synthetic resin and extending in the lengthwise direction, a hinge that links said pair of shell members so that they can be opened and closed, a pair of teeth trains to hold the mop, and a plurality of anchoring pins provided inside said shell members; the outer surface of said shell members being convex, said hinge being thinner than said shell members, and flexible and extending in the lengthwise direction; said pair of teeth trains being provided at the free edges of extension plates bent inwardly from said shell members at the lower edge opposite to the hinge of said shell members and over the entire lengthwise direction thereof, so that said pair of teeth trains are disposed to face each other; said anchoring pins being arranged in the vicinity of both ends, in the lengthwise direction, of said shell members to protrude inwardly of said shell members, so that when said pair of shell members are closed, the anchoring pins provided on each of the shell members engage with the mop alternately; a recessed groove on the outer surface of each of said pair of shell members near said lower edge and at the central part in the lengthwise direction, a said recessed groove being in parallel to said lower edge so as to mount thereon a linking member; said linking member being equipped with a stop piece that is inserted in said recessed groove at the lower edge and includes a support member having a tightening-loosening tube into which is inserted the handle shaft at the upper part, a bracket being pivotally attached to said support member and having at the lower edge a stop piece that will be inserted in the other of said recessed grooves, and a fastening mechanism provided on said support member and bracket to adjust the clearance between the stop piece of said support member and the stop piece of said bracket; said holding member being inserted in a space defined by said support member and said bracket, so that said teeth trains are positioned outwardly and said hinge disposed inwardly in said space; said pair of stop pieces being fitted to said pair of recessed grooves, respectively; and wherein the mop is detachably fastened to said linking member by said fastening mechanism.



**4,015,306**

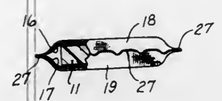
## APPLICATOR PADS

**Larry A. Fenster, 301 Birch Drive, Roslyn, N.Y. 11576**

**Division of Ser. No. 264,631. This application Nov. 21, 1973, Ser. No. 417,926**

**Int. Cl.² A47L** *13/16*

**U.S. Cl. 15—209 R** **9 Claims**



1. A pad for applying automobile polish to the painted surfaces of an automobile, said pad comprising a resilient absorbant foam core and a fibrous fabric covering thereover, for applying said polish to the painted surface of an automobile by bringing said fabric covering, on said pad, into contact with said body of polish to pick up the polish thereon and then bringing said fabric covering, on said pad, into contact with said painted surface to apply the polish thinly to said surface, said pad being adapted to be compressed to express air therefrom and then permitted to expand during use and being adapted to be reused, said fabric covering comprising spaced layers of air-permeable fabric, covering opposite faces of said core, extending beyond the periphery of said core, and having meeting free edges adjacent said core, the improvement in which said pad comprises a film of heat-sealable organic plastic disposed on each of said faces of said core between said core and said covering and, around the entire periphery of said core, a fused band where said free fabric edges are joined to each other and to said film by fused film material, said film having a hole to permit air to flow from and to said core when said core is, respectively compressed and permitted to expand.

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**4,015,307**

## APPARATUS FOR CLEANING ROTATING CYLINDRICAL SURFACES

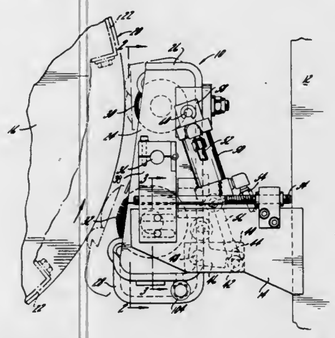
**Joseph J. Kossak, Roselle, N.J., assignor to Oxy-Dry Sprayer Corporation, Chicago, Ill.**

**Continuation of Ser. No. 66,524. This application Nov. 20, 1974, Ser. No. 525,478**

**Claims priority, application United Kingdom, Aug. 25, 1969, 42333/69**

**Int. Cl.² A46B** *15/00;* **B41F** *35/00;* **B41L** *41/00*

**U.S. Cl. 15—256.52** **10 Claims**



1. An apparatus for cleaning a rotating cylindrical surface containing undesired foreign matter thereon comprising, a scrub means including a rotatable brush roller having an axis and substantially radially extending bristles, means for moving the rotatable brush into and out of contact with the surface being cleaned, means for supplying a predetermined amount of solvent for the foreign matter to the bristles of the brush, means including a wiper roller having an absorbent surface for drying the surface which has been scrubbed, means for moving the wiper roller into and out of contact with the scrubbed surface, a flicker bar including a substantially flat inclined surface positioned to contact the bristles at an angle and for a distance sufficient to allow the individual bristles to flex so as to remove the foreign matter therefrom, the flicker bar being positioned with respect to the brush in such a fashion that substantially all of the foreign matter removed from the bristles is not allowed to return to the brush and, a housing having an upper portion for the wiper roller and a lower portion for the brush roller, the upper portion being hingedly connected to the lower portion so that the brush roller may be readily exposed.

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**4,015,308**

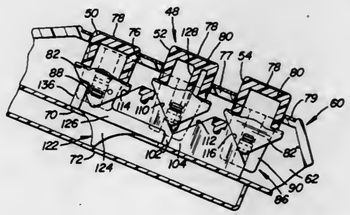
## VACUUM BLEED SYSTEM FOR A VACUUM CLEANER OR THE LIKE

**Clifford P. Rickmers, North Canton, Ohio, assignor to The Hoover Company, North Canton, Ohio**

**Filed Oct. 29, 1975, Ser. No. 626,744**

**Int. Cl.² A47L** *9/00*

**U.S. Cl. 15—339** **15 Claims**



11. A floor care appliance having means for varying suction air flow including;

a. a housing for said floor care appliance,

b. a single aperture in said housing for the admittance of bleed air,

c. a motor and fan system within said housing for inducing suction air flow into said housing,

d. a valving arrangement carried with said housing that modulates the flow of bleed air into said housing,

e. said valving arrangement driven by a series of operator actuatable push buttons,

f. said push buttons directly driving portions of said valving arrangement to modulate said flow of bleed air,

g. means for providing an automatic cancelling feature for said push buttons, separate from said valving arrangement and said push buttons, and

h. portions of said valving arrangement including means for sealing said single aperture in said housing for providing one modulated flow of bleed air to said housing and separate means vertically imposable in the path of said bleed air and abuttingly sealing against said housing for providing a second modulated flow of bleed air to said housing.

**4,015,309**

## HINGE WITH COMPRESSIONS SPRING FOR COUNTER-BALANCING WEIGHT OF LEAVES

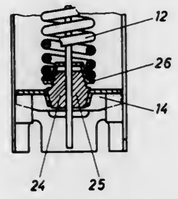
**Wilhelm Gronbach, Dr. Fritz-Huber-Str. 73, 8090 Wasserburg,Inn, Germany**

**Filed Nov. 20, 1975, Ser. No. 633,611**

**Claims priority, application Germany, Nov. 22, 1974, 2455419**

**Int. Cl.² E05F** *1/12*

**U.S. Cl. 16—190** **5 Claims**




1. A hinge with compression spring for counter-balancing the weight of leaves, e.g. covers, flaps or the like that are pivotable about a horizontal axis, particularly on freezer chests, wherein one end of the compression spring supports itself in the fixed hinged portion with the prestressing and its other end, by way of the end of a guide rod supporting the compression spring, engages the second hinge portion that is attached to the leaf, wherein the guide rod for the spring is supported at its lower end, through the interposition of a rocker, on a knife bearing of the fixed hinged portion, wherein brake jaws are disposed between the end of the guide rod supporting the compression spring and the associated end of the compression spring, said brake jaws being in the form of a double cone, one cone being at the side facing the rocker and guided in a complementary conical hole of the rocker and the other cone facing the compression spring.

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**4,015,310**

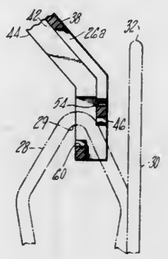
## PENDANT FOR DRAPERY TRAVERSE ROD

**Walter J. MacFarlane, Kensington, and Dieter G. Koss, Middletown, both of Conn., assignors to The Stanley Works, New Britain, Conn.**

**Filed Mar. 18, 1976, Ser. No. 668,282**

**Int. Cl.² A47H** *15/00*

**U.S. Cl. 16—87.4 R** **8 Claims**




1. For use with a drapery rod suited for supporting drapes and a conventional drapery hook having a reversely bent upper end provided with an apex attached to the drape heading thereof, a drapery hanger having an eye to receive the reversely bent end of the hook, said drapery hanger including means for attachment to the drapery rod extending from one face thereof and having a downwardly depending portion providing an enlarged eye to facilitate the insertion of the end of the hook, said eye having a top wall adjacent said one face of the hanger for facing the drape and a bottom wall adjacent the face of the hanger opposite said one face for facing away from the drape to provide a supporting surface for the apex of the reversely bent end of the hook, said supporting surface being vertically offset to the rear of said top wall and away from said one face so that the lifting of said hook relative to the hanger causes the apex of the hook to pass to the rear of the hanger thereby to prevent inadvertent disengagement thereof.

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**4,015,311**

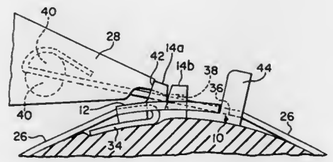
## BUCKLE WITH A VISUAL TENSION INDICATOR

**Gary Martin Curtis, Seattle, Wash., assignor to Illinois Tool Works Inc., Chicago, Ill.**

**Filed Apr. 28, 1976, Ser. No. 681,108**

**Int. Cl.² F16L** *33/00*

**U.S. Cl. 24—23 R** **4 Claims**




1. In a buckle for securing ends of a complementary looped band together about a workpiece under predetermined tension, said buckle including a body having substantially parallel spaced top and bottom walls and side walls joining the top and bottom wall to each other, means on said bottom wall of said body to accept and anchor a first free end of the complementary band, said top and bottom walls of said body providing a throat to accept the second free end of the complementary band, said top wall presenting an edge against which a complementary tensioning tool can be seated for stretching the complementary band to a predetermined degree of tension, said top wall having a slot intermediate its margins traversing a substantial portion of its extent and extending between said side walls, a top wall portion at least one side of said slot being distortable as force is applied against the edge by the complementary tensioning tool to visually indicate that the desired tension has been applied, and means for securing the second end of said band relative to said buckle to permanently set the said band relative to said buckle in tensioned condition.

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**4,015,312**

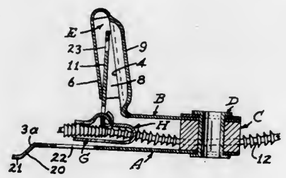
## TAB PULLER AND SLIDE FASTENER PROTECTOR

**Marion M. Krekler, 13824 Jersey, Norwalk, Calif. 90650**

**Filed Aug. 23, 1976, Ser. No. 716,978**

**Int. Cl.² A44B** *19/26*

**U.S. Cl. 24—205.15 H** **7 Claims**




1. A device of the type described comprising:
a. a lower arm;
b. an upper arm;
c. means for pivotally interconnecting the ends of the two arms together and for spacing them apart so that the lower arm can be swung from a closed position where the lower arm underlies the upper arm, into an open position where the lower arm is swung away from the upper arm but still lies in a plane substantially parallel to the plane in which the upper arm swings;
d. said upper arm having a housing whose entrance is adapted to receive the tab of a slide fastener, the tab being held in said housing when the lower arm is swung back into a position underlying the upper arm; and
e. a cord connected to the device for pulling it along the slide fastener for interconnecting the two rows of teeth of the slide fastener.



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**4,015,313**

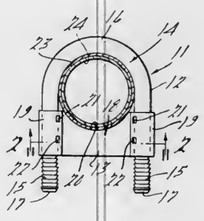
## U-BOLT CLAMPING ELEMENT

**William G. Oldford, 4944 Lakeshore, Lexington, Mich. 48450**

**Continuation of Ser. No. 462,624. This application May 28, 1975, Ser. No. 581,540**

**Int. Cl.² B65D** *63/00*

**U.S. Cl. 24—277** **1 Claim**




1. A clamp for a cylindrical element embodying a U-bolt having an arcuate web and two extending legs, teeth on said legs having parallel top surfaces with inwardly sloping walls therebelow forming arcuate notches, a saddle constructed from a sheet metal body having a central web portion with an arcuate edge, aperture portions on said body disposed on either side of said central web which receive said legs , and a plurality of vertically spaced fingers formed integrally with the body having the ends extending into the aperture portions in position to deflect inwardly and outwardly over the sloping walls of the legs until one of the ends in each aperture portion rests upon the top surface of a tooth on each leg, the plurality of fingers being fractionally spaced a portion of the distance between a pair of said parallel top surfaces of the teeth. /

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**4,015,314**

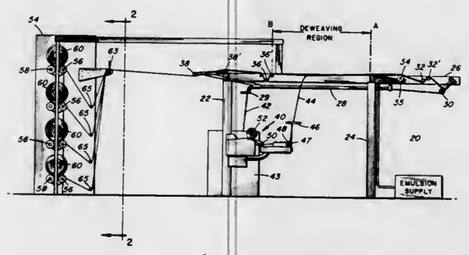
## YARN TAPE DEWEAVING METHOD AND APPARATUS

**William Dan Hurst, Dalton, Ga.; Donald E. Huffman, Chattanooga, Tenn.; Hermon A. King, and Jack Puckett, both of Dalton, Ga., assignors to Dixie Yarns, Inc., Chattanooga, Tenn.**

**Filed Feb. 11, 1976, Ser. No. 657,056**

**Int. Cl.² D04B** *19/00;* **D03J** *1/04*

**U.S. Cl. 28—17** **9 Claims**




1. Apparatus for removing a filler thread from a multiple end yarn tape, comprising:
first means defining a yarn tape path and a filler thread removal region;
yarn end take-up means, located downstream of said first means along said yarn tape path, for separately taking up each end of said multiple end yarn tape and for maintaining a substantially uniform speed of said yarn tape along said path;
filler thread take-up means, located upstream of said yarn end take-up means along said yarn tape path, for removing said filler thread from said tape in said filler thread removal region; and
means coupled to said filler thread take-up means for controlling the speed at which said filler thread take-up means removes said filler thread from said yarn tape, including means for preventing the location at which said filler thread is removed from said yarn tape from moving outside said filler thread removal region.

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**4,015,315**

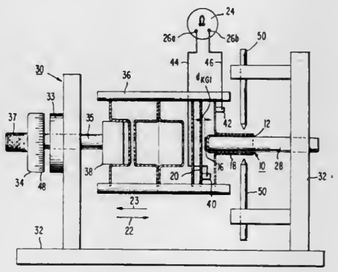
## METHOD OF SETTING CATHODE-G1 SPACING

**Robert Porter Stone, Lancaster, Pa., assignor to RCA Corporation, New York, N.Y.**

**Filed July 14, 1975, Ser. No. 595,808**

**Int. Cl.² H01J** *9/18*

**U.S. Cl. 29—25.16** **4 Claims**

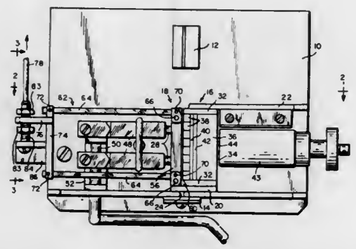



1. A method of manufacturing a television tube electron gun assembly including at least one oxide cathode and a G1 grid wherein said G1 grid is assembled into a unitary structure and said cathode is subsequently inserted to a predetermined spacing relative to said G1 grid, said spacing being determined with the aid of a position adjusting micrometer and an electrical continuity indicator having a pair of measurement terminals, said method comprising the steps of:
a. moistening said oxide cathode with water thereby causing said oxide cathode to become electrically conductive;
b. removeably mounting said cathode on fixed cathode support means;
c. removeably mounting said unitary structure on said position adjusting micrometer for adjusting and measuring the position of said G1 grid;
d. connecting one of said measurement terminals of said electrical continuity indicator to said cathode and the other measurement terminal to said G1 grid;
e. advancing said G1 grid toward said fixed cathode until said continuity indicator indicates electrical continuity between said cathode and said G1 grid;
f. measuring the position of the G1 grid when electrical continuity is obtained;
g. withdrawing said G1 grid from said cathode to a measured position which is equal to the algebraic sum of the predetermined spacing and the measured position at which electrical continuity was obtained;
h. permanently fixing the cathode at said predetermined spacing with respect to said G1 grid; and
i. removing the moisture from said cathode thereby causing said cathode to return to its non-conductive state.

## 4,015,316
## COMBINATION TENSION AND SLUB CATCHING DEVICE

**Samuel L. Abbott, Wilton, N.H., assignor to Abbott Machine Co., Inc., Wilton, N.H.**

Continuation of Ser. No. 466,983, May 6, 1974, abandoned.
This application Oct. 1, 1975, Ser. No. 618,475
Int. Cl.² **D01H** *13/22*; **B65H** *63/06*
U.S. Cl. 28—64 2 Claims



1. In a yarn processing machine, a support, spaced yarn guides on the support for guiding the yarn along a predetermined path and a combination tension and slub catching device mounted on the support between the guides, comprising members mounted on the support at opposite sides of the yarn path defining a narrow elongate yarn passage, one of said members having a rigid surface and the other a yieldable surface such as to yield with respect to the rigid surface when an enlargement in the yarn passes between them, means for fixing the position of the member having the yieldable surface relative to the member having the rigid surface, means movable in response to variations in yarn tension, and means for moving the member having the rigid surface perpendicularly with respect to the member having the yieldable surface in response to said last means to maintain a constant tension, comprising spaced parallel links, means pivotally connecting the links at one end to the support for pivotal movement about spaced parallel fixed axes parallel to the face of the member having the rigid surface, means connecting the same ends to said member having the rigid surface for pivotal movement about spaced parallel axes parallel to the member having the rigid surface, means pivotally connecting the other ends of said links to a rigid part for pivotal movement about spaced parallel axes parallel to the face of the member having the rigid surface at a spacing corresponding to the spacing between the fixed axes and means connecting said part to said tension responsive means.

## 4,015,317
## PROCESS FOR SIZING TEXTILE FIBERS FOR USE ON WATER JET LOOMS

**Kenneth E. Johnsen, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.**

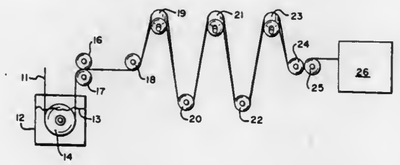
Filed Feb. 18, 1976, Ser. No. 658,972
Int. Cl.² **D06C** *29/00*; **D06L** *1/14*; **C08F** *220/04*; **D03D** *47/32*
U.S. Cl. 28—72.6 10 Claims

1. In a process for weaving textile fibers into fabric on a water jet loom wherein the fibers are sized prior to weaving, the improvement which comprises (a) depositing on the fibers a sizing amount of an inherently water dispersible copolymer of an aliphatic $\alpha$-olefin and an ammoniated $\alpha$, $\beta$-ethylenically unsaturated carboxylic acid, (b) drying the resulting textile fibers such that the copolymer forms a tough, adherent water-insensitive coating on the textile fibers, and (c) weaving the resulting sized fibers on a water jet loom.

## 4,015,318
## METHOD OF SKEWING TWILL FABRIC TO AVOID LEG TWIST

**Karin Hakanson, San Francisco, Calif., assignor to Levi Strauss & Co., San Francisco, Calif.**

Division of Ser. No. 470,075, May 15, 1974, U.S. Pat. No. 3,959,826. This application Mar. 4, 1976, Ser. No. 663,962
Int. Cl.² **D06C** *3/00*; **D06H** *3/12*
U.S. Cl. 28—72 R 11 Claims

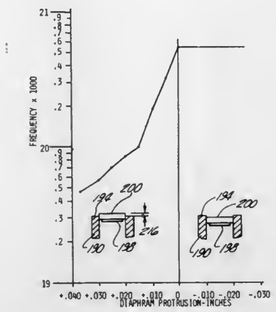


1. A method of manufacturing twill fabrics for use in the manufacture of products to be laundered comprising the steps of weaving the fabric having a given twill direction on a loom, and, during preparation and finishing, skewing the fabric so that its edge in the direction of the twill is advanced with respect to the opposite edge at least 3% of the width of the fabric, and maintaining the skew in the fabric through all subsequent finishing steps.

## 4,015,319
## METHOD FOR MANUFACTURING AN ULTRASONIC TRANSDUCER

**Walter E. Levine, Port Huron, Mich., assignor to Bindicator Company, Port Huron, Mich.**

Filed Mar. 20, 1975, Ser. No. 560,245
Int. Cl.² **H01L** *41/22*
U.S. Cl. 29—25.35 15 Claims



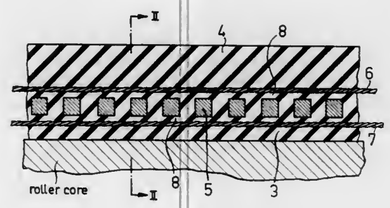

1. The method of constructing an ultrasonic transducer having a shell open at least at one end and a vibratory element having an element periphery and including a piezoelectric crystal, said method comprising the steps of locating said vibratory element over an open end of said shell coaxially therewith such that said vibratory element is mechanically coupled to said shell, and adjusting resonant frequency of said element and shell by varying the mechanical coupling between said vibratory element and said shell around the periphery of said element until the resonant frequency of the combined element and shell is equal to a preselected frequency.



## 4,015,320
## ROLLER FOR THE PRESSURE TREATMENT OF WEBS OF GOODS

**Werner Meckel, Nienhagen, and Werner Kilian, Wettbergen, both of Germany, assignors to Continental Gummi-Werke Aktiengesellschaft, Hannover, Germany**

Filed May 17, 1976, Ser. No. 686,948
Claims priority, application Switzerland, May 15, 1975, 006242/75
Int. Cl.² **B21B** *31/08*
U.S. Cl. 29—130 9 Claims

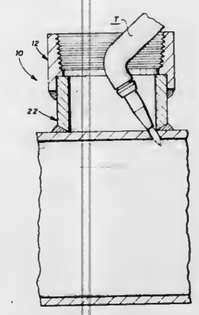



1. A roller for the pressure treatment of webs of goods, which comprises: a rigid roller core, a hose-shaped mantle of elastomeric material mounted on said core; and reinforcing inserts embedded in said mantle, said reinforcing inserts including a monofile coil of substantially non-extensible material extending over the length of said mantle, two layers of rectilinear thread-shaped strength carriers which extend substantially in the axial direction of the roller in mutually spaced parallel arrangement while being distributed in the circumferential direction of the roller and extending over the length of said roller and while being respectively located radially on opposite sides of said coil.

## 4,015,321
## WELDED PIPE FITTING AND METHOD OF MAKING SAME

**Melvin L. Witter, 9553 Atherton, Dallas, Tex. 75231**

Continuation-in-part of Ser. No. 535,283, Dec. 23, 1974, abandoned. This application June 14, 1976, Ser. No. 695,815
Int. Cl.² **B21D** *53/00*; **F16L** *41/02*
U.S. Cl. 29—157 T 11 Claims



1. A relatively light-weight branch pipe fitting having a first end contoured for welding to a main pipe and its other end having internal threads for receiving a branch pipe, comprising:

a. a short section of relatively thick steel pipe having a generally uniform outer diameter and a bore of a given diameter, and said section having a first end with internal threads for receiving a branch pipe and its other end being counterbored to provide a finished seat, and the remaining wall alongside the counterbored portion having a residual thickness which lies within the range of about ¼ to ¾ of the original wall thickness, with the total length of said thick pipe section being not much more than that amount which is structurally required for providing threads to sealingly receive the end of a branch pipe;

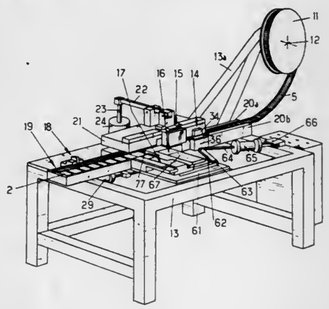
b. a short piece of relatively thin steel pipe having a generally uniform outer diameter which is less than that of the thick pipe section but greater than the bore of said section, with a first end of the thin pipe being configured to engage the counterbored seat in the thick section and its free end being contoured so as to permit it to fit flush against a round main pipe for efficient welding thereto, with the length of the thin pipe being approximately the same as the length of the thick pipe; and

c. the thick and thin pipes being engaged end-to-end with the first end of the thin pipe mating with the counterbored seat in the thick pipe, and there being a circumferential weld bead extending externally around the juncture of the two pipes to hold them rigidly together and to seal the fitting formed thereby, and the total length of the fitting being relatively short, whereby a cutting torch may be inserted internally of the fitting for cutting a hole in the main pipe after the fitting has been welded thereto.

## 4,015,322
## APPARATUS FOR LOCATING CONNECTORS ONTO A CIRCUIT BOARD

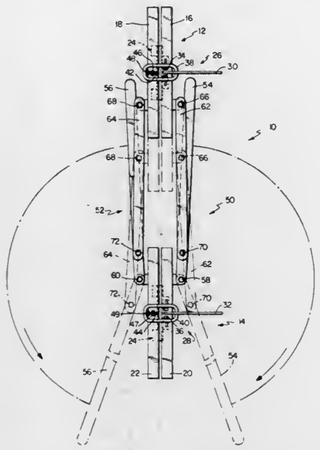
**Aimé Cabaud, Versailles, France, assignor to Comatel - Comptoir European de Materiel Electronique, Issy-Les-Moulineaux, France**

Filed June 3, 1976, Ser. No. 692,483
Int. Cl.² **H01K** *43/00*
U.S. Cl. 29—739 15 Claims



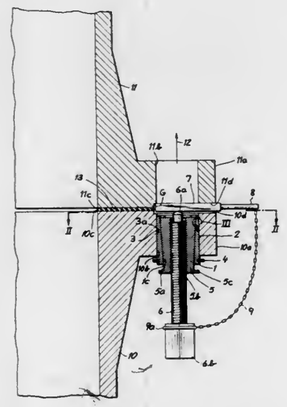
1. Apparatus for locating connectors onto a circuit board, said connectors each having first and second opposed end portions, each of said first end portions being intended for insertion into a printed circuit or for soldered connection to a conductor, and each of said second end portions comprising a clamp said connectors being arranged in a strip by first connecting means interconnecting the connectors at their first end portions, and second connecting means interconnecting the connectors adjacent their second end portions, said apparatus comprising a frame, a reel for said strip of connectors, support means for supporting the said reel an the frame, means defining a guide path for the strip as it is unwound from the reel, means for indexing the strip stepwise along the guide path, first cutting means for cutting a portion of the strip longitudinally adjacent the clamps whereby to separate the adjacent connectors from the second connecting means, means for gauging the clamps of the connectors of a portion of the strip, means for inserting a circuit board into the gauged clamps of the connectors of the strip, second cutting means for cutting the first connecting means transversely, and means for discharging from the apparatus circuit boards provided with said connectors.

**4,015,323**
**PIPE MATING TOOL**
George William Topper, P. O. Box 9, Safford, Ariz. 85546
Filed May 10, 1976, Ser. No. 685,021
Int. Cl.² B23P *19/04*
U.S. Cl. 29—237 8 Claims



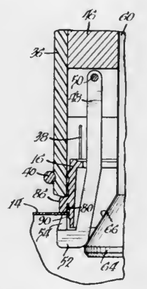
1. A tool for mating two pipes comprising:
a pair of clamping means, each holding one of said pipes, the axial length of said clamping means being greater than the diameter of said pipe; and
a pair of linking means, each connected one hundred and eighty degrees apart to both of said clamping means so as to be in a single plane, movable in said plane from a first position to a second position to decrease the distance between said clamping means.

**4,015,324**
**DEVICE FOR SEPARATING FLANGE PIPES**
Arnold Lutter, Bruckenkopf 10 1/2, Ingolstadt, Germany (8070)
Filed May 21, 1976, Ser. No. 688,730
Claims priority, application Germany, May 23, 1975, 2522817
Int. Cl.² B23P *19/04*
U.S. Cl. 29—239 10 Claims



1. A device for separating the flanges of a pipe joint wherein a pair of flanges are spacedly juxtaposed and at least one of the flanges is provided with a bore, said device comprising a spreadable sleeve receivable in said bore, an internally threaded core member received in said sleeve and axially displaceable relative thereto for spreading said sleeve against the wall of said bore to anchor said sleeve in said bore, a plate receivable between said flanges, and a screw threaded into said core member and adapted to bear against said plate for pressing said plate against the other of said flanges while simultaneously displacing said sleeve and said core relatively, thereby spreading said flanges apart.

**4,015,325**
**METHOD AND APPARATUS FOR SECURING INSERTS TO CONTAINERS**
Marvin G. Theobald, La Grange, and Richard G. Olson, Chicago, both of Ill., assignors to National Can Corporation, Chicago, Ill.
Filed Mar. 29, 1976, Ser. No. 671,541
Int. Cl.² B23P *11/02*
U.S. Cl. 29—451 8 Claims



1. Apparatus for assembling a nonmetallic apertured insert onto a rim extending from the end panel of a metal container and surrounding an opening therein, comprising: support means for supporting said container, a first member for gripping said insert, a second member adapter to pass through the aperture in said insert, said second member having expansible means for extending beyond the periphery of said opening, and drive means for (1) moving said second member relative to said first member to pass said second member through the aperture of an insert gripped by said first member and the opening of the container, (2) expanding said expansible means beyond the periphery of said opening, and (3) moving said members towards each other to force said insert onto said rim while supporting said end panel by said expansible means.

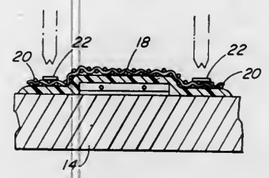
7. A method of inserting nonmetallic apertured inserts onto a rim extending above the end of a metal container and surrounding an opening therein, comprising the steps of gripping an insert and aligning the insert with the opening in said container, passing a support member through the aperture in said insert and the opening in the container, moving said support member into engagement with said end adjacent the periphery of said opening, and moving said insert toward said container while said support member is in engagement with said end to force said insert onto said rim.

**4,015,326**
**METHOD OF MOUNTING A STRAIN GAGE TO A SURFACE**
Given A. Brewer, Marion, Mass., assignor to Brewer Engineering Laboratories, Inc., Marion, Mass.
Division of Ser. No. 550,516, Feb. 18, 1975, U.S. Pat. No. 3,940,730. This application Dec. 5, 1975, Ser. No. 637,888
Int. Cl.² B23P *3/00*
U.S. Cl. 29—460 3 Claims

1. The method of attaching a strain-deformable resistance wire strain gage to a surface of a metallic structure in which strain is to be monitored, comprising the following steps:



a. cementing said strain gage to said structure surface
b. placing over said strain gage a protective barrier layer of curable silicone plastic in an uncured state, completely covering the exposed surface of said strain gage and extending therebeyond over a portion of said structure surface,
c. placing over said silicone plastic barrer layer an apertured metallic overlay member covering that portion of said barrier layer that covers said strain gage and providing flange portions adjacent thereto
d. placing a sheet metal strip over said flange portions



e. welding said sheet metal strip through said apertured metallic overlay member and through said uncured protective barrier layer to said surface of said structure by pressing at least a part of said sheet metal strip into conductive contact with said flange portions and with said underlying structure surface and causing an electric current to flow through said part to said surface
said silicone plastic protective barrier being thereafter cured by exposure to a curing medium through said apertured metallic overlay member to provide a void-free seal around said welds and said gage.

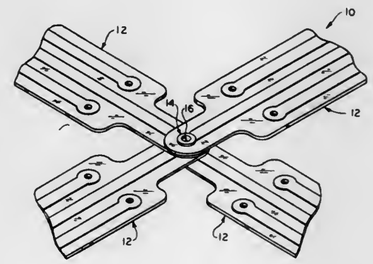
**4,015,327**
**METHOD OF MAKING A DECORATIVE STEREO SPEAKER ENCLOSURE**
Peter McCarthy, Weston, Canada, assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest
Filed Mar. 26, 1976, Ser. No. 670,627
Int. Cl.² B23P *3/00*, *19/04*
U.S. Cl. 29—460 9 Claims

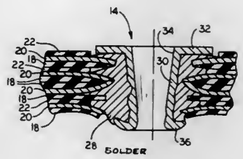


1. A method for manufacturing a decorative enclosure comprising making a face mask of a person by applying a liquid polymeric material to the face of a person, said polymeric material being fusible to form a substantially continuous flexible film at about human body temperature, maintaining said polymeric material on the face of a person until said polymeric material forms a substantially continuous cast film having three-dimensional contours conforming to the surface it is applied to, removing said substantially continuous film and filling said contours with a pourable material that is capable of hardening to form a casting embedding a hollow frame in said pourable material at the base of said casting to obtain a casting having said frame secured to the base thereof, mounting a sound transducer in said frame.

6. A method for manufacturing a decorative loud speaker enclosure comprising making a face mask of a person by applying a release agent to the face of a person applying a liquid polymeric material to such face of a person, said polymeric material being fusable to form a substantially continuous flexible film at about human body temperature, maintaining said polymeric material on the face of a person until said polymeric material forms a substantially continuous cast film having three-dimensional contours conforming to the surface it was applied to, removing said substantially continuous film and filling said contours with a pourable material that is capable of hardening in order to form a casting, mounting said film in a base embedding a hollow frame in said pourable material at the neck of said casting to obtain a three-dimensional casting having said frame secured to the base thereof to obtain a three-dimensional casting having said frame secured to the base thereof, securing a loud speaker comprising a sound transducer in said frame, coating said casting with a plastic material, decorating said casting which has been coated with colors to duplicate the facial features from which said film was cast.

**4,015,328**
**MULTILAYERED CIRCUIT ASSEMBLY INCLUDING AN EYELET FOR MAKING WELDABLE CONNECTIONS AND A METHOD OF MAKING SAID ASSEMBLY**
Cletus G. McDonough, 200 Elm Tree Lane, Elmhurst, Ill. 60126
Filed June 2, 1975, Ser. No. 582,735
Int. Cl.² H05K *1/04*
U.S. Cl. 29—625 4 Claims






1. A method of making a multilayered circuit assembly from a plurality of flat, flexible circuit elements, each circuit element including a substrate having conductive means defining an electrical path of travel formed between a base layer made of insulation material and a cover layer made of insulation material, each circuit element having a connecting station associated with the conductive means, said method comprising the steps of:
forming the conductive means on the base layer of each circuit element;
punching a first opening through said conductive means and base layer at a connecting station of each circuit element;
soldering the connecting station of each circuit element so that a solid solder pad fills said first opening whereby said solder electrically contacts said conductive means;
punching a second opening through the cover layer of each circuit element;
securing the cover layer of each circuit element over the base layer and conductive means so that said first opening is generally concentric with said second opening;

punching a third opening in each circuit element through said solder pad, said third opening being smaller than and generally concentric with said first and second openings, the interior of said third opening being defined by the remaining solder;

stacking a plurality of punched and soldered circuit elements on top of one another so that the third openings of each are generally concentric;

inserting terminal means into the third openings of the stacked circuit elements so that a portion thereof contacts the solder; and

staking said terminal means so that the outer surface thereof forms a cold weld interference fit against the solder.

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**4,015,329**

## TERMINATION OF ELECTRIC CABLES

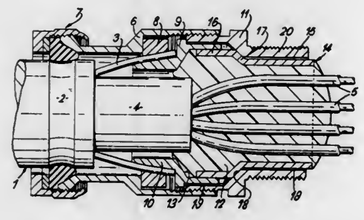
**John Blundell Hutchison, "Europa", Liverpool Road, Formby, Merseyside, England**

**Filed Dec. 16, 1975, Ser. No. 641,343**

**Claims priority, application United Kingdom, Dec. 20, 1974, 55233/74**

**Int. Cl.² H02G** *3/06, 15/04, 1/14*

**U.S. Cl. 29—628** **18 Claims**



**1.** A method of forming a termination at the end of an electric line comprising at least one insulated conductor and a protective layer surrounding said insulated conductor where said line enters an enclosure through an aperture therein distinguished by the following sequence of steps:

1. Preparing said end of the line with said conductor projecting forwardly from an end of said protective layer;
2. Securing said end of the line in a first annular terminator member having a recess in its forwardly-directed face around a passage therethrough, said line extending through said passage and said end of the protective layer being within said recess;
3. Applying a quantity of a hardenable compound, in a pasty or viscous condition, to fill and stand proud of said recess and to adhere to said line within said recess;
4. Assembling a second annular terminator member, having a recess in its rearwardly-directed face, with said first terminator member to enclose said compound to an extent sufficient to allow generation of pressure in said compound;
5. Drawing said first terminator member and said second terminator member together by means of a pair of further annular terminator members before said compound has hardened to press said compound into firm contact with said line, and
6. Securing a said further annular terminator member by mechanically engaging same in said aperture in the enclosure.

**10.** A terminator for an electric line comprising a first annular terminator member with a passage for said line; securing means for securing said line to said first annular terminator member; a second annular terminator member telescopically engageable at its rear end with the front end of said first annular terminator member, and means including a pair of further annular terminator members for drawing said first and second annular terminator members towards one another, said first annular terminator member having a recess in its front face surrounding said passage and said second annular terminator member having a recess in its rear face to form with said recess in said first annular terminator member a compound chamber.

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**4,015,330**

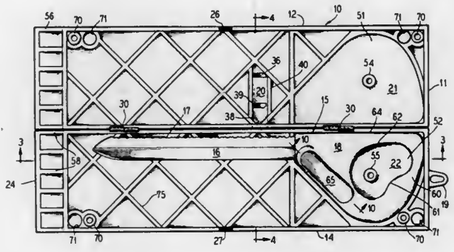
## CUTTING BOARD CASE AND KNIFE SET

**Samuel J. Popeil, and Lorenzo Anthony Ruiz, both of Chicago, Ill., assignors to Popeil Brothers, Inc., Chicago, Ill.**

**Filed May 5, 1976, Ser. No. 683,479**

**Int. Cl.² B26B** *11/00*

**U.S. Cl. 30—124** **10 Claims**



**1.** A cutting board case and knife set comprising, in combination,

a cutting board portion having hinged opposed halves,

a knife handle recess within said halves,

a cutting surface opposed to said recesses,

a knife having a blade portion and a handle portion,

said handle having a configuration complimentary to the handle recess,

releasable lock means for holding both halves together when encasing said knife,

and latch means for securing said halves when opened in a cutting board configuration,

whereby, when folded by its hinge means, the cutting board halves encase the knife and shield the same.

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**4,015,331**

## DOMESTIC OR TRADESMAN'S KNIFE

**Karl Heinz Balke, No. 4a, Schubertstrasse, Solingen 19, Germany**

**Filed Feb. 9, 1976, Ser. No. 656,455**

**Claims priority, application Germany, Feb. 15, 1975, 2506406**

**Int. Cl.² B26B** *9/02*

**U.S. Cl. 30—355** **4 Claims**

**1.** A knife for cutting food, said knife consisting essentially of:

a. a handle and a blade,

b. said blade including a plurality of teeth located in an ordered disposition along at least one edge thereof;

c. said ordered disposition of teeth including a set of two rows of cutting teeth and a third row of intermediate cutting teeth being located between each set of two rows of cutting teeth;

d. said blade having two smooth opposing faces with each row of said set of two rows of cutting teeth being ground off alternately on opposite sides of the blade to form a cutting edge within the plane of each of the smooth faces of the blade;



e. said third row of intermediate cutting teeth being ground off from both faces to form a point on each third row at a location intermediate said two faces of the blade.



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**4,015,332**

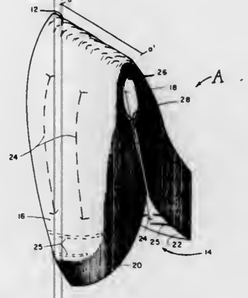
## CROWN FORM AND METHOD

**John E. Manne, 64 Delmar Place, Delmar, N.Y. 12054**

**Filed Sept. 23, 1975, Ser. No. 615,914**

**Int. Cl.² A61C** *5/08*

**U.S. Cl. 32—12** **12 Claims**



**1.** A dental crown form, which comprises;

a tubular shell corresponding generally in configuration and dimension to a natural tooth, fabricated from a flexible, synthetic, polymeric resin and having

i. a closed first end, the exterior thereof defining an occlusal surface corresponding in configuration and dimension to the occlusal surface of a natural tooth;

ii. a restricted, open second end which is festooned in a contour to correspond generally to the cervical line of a natural tooth;

iii. sidewalls flaring outwardly from said open second end and integral with said closed first end, said sidewalls corresponding in configuration and dimension to the mesial, distal, lingual and buccal surfaces, respectively, of a natural tooth; and

iv. means for fluid communication between the interior and the exterior of said shell, in the sidewall at points on the surfaces corresponding to said mesial and said distal surfaces; said sidewall having a plurality of slits therein, at least two of which are positioned in surfaces opposite to each other, said slits being substantially uniform in width throughout their length and originating at the open second end and terminating at a point in the sidewall;

provided that when said shell corresponds to the configuration and dimension of a tooth selected from the group consisting of a pre-molar, a canine and an incisor, said surfaces opposite each other are the mesial and distal surfaces and when said shell corresponds in configuration and dimension to a molar tooth, said surfaces opposite to each other are the lingual and buccal surfaces, respectively.

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**4,015,333**

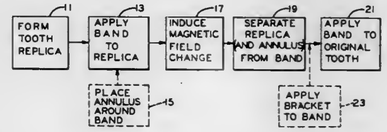
## ORTHODONTIC BAND FORMING METHOD AND APPARATUS

**Eugene L. Dellinger, 1326 Old Lantern Trail, Fort Wayne, Ind. 46825, and Robert J. Loubier, 5122 Chippewa Court, Fort Wayne, Ind. 46804**

**Filed Oct. 22, 1975, Ser. No. 624,951**

**Int. Cl.² A61C** *7/00*

**U.S. Cl. 32—14 A** **12 Claims**




**1.** The method of conforming an orthodontic band to thee peripheral contour of an individual tooth comprising the steps of:

forming a replica of the tooth;

applying an orthodontic band to the replica;

and rapidly changing the magnetic field within the band to induce a current flow around the band which current flow interacts with the magnetic field to crimp the band closely about the replica.

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**4,015,334**

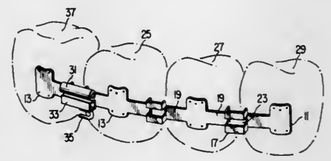
## POSTERIOR DIRECT BOND ORTHODONTIC UNIT SEGMENT

**Dan Moss, 247 Ridge Road, Cedar City, Utah 84720**

**Filed Oct. 15, 1975, Ser. No. 622,604**

**Int. Cl.² A61C** *7/00*

**U.S. Cl. 32—14 A** **16 Claims**



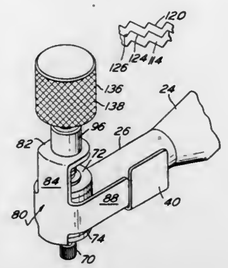
**1.** An orthodontic bracket comprising:

a. an elongated section of metal;

b. a plurality of contoured surfaces formed in said elongated section of metal, each of said surfaces being respectively adapted to be attached to the buccal surface of a different tooth of a patient undergoing orthodontic treatment; and

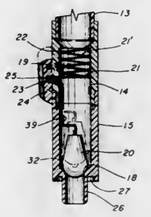
c. at least one attachment means which is adapted for attaching an archwire to said elongated section of metal.

**4,015,335**
## COLLET WRENCH
**John E. Nash, Downingtown, and Trevor D. Reader, King of Prussia, both of Pa., assignors to Star Dental Manufacturing Co., Inc., West Conshohocken, Pa.**
**Division of Ser. No. 496,604, Aug. 12, 1974, Pat. No. 3,960,039. This application Feb. 24, 1976, Ser. No. 660,896**
**Int. Cl.² A61C *1/10***
**U.S. Cl. 32—27** **7 Claims**



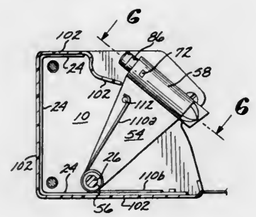
**1.** In combination a turbine driven dental handpiece and a collet wrench therefor, said handpiece comprising a turbine housing, a rotor rotatably mounted in said turbine housing, said rotor including a rotor shaft having a bore extending therethrough, a collet threadedly received within said bore, said collet having a first bore extending inwardly from one end thereof for receiving a dental bur and a second bore of non-circular cross-section extending inwardly from the opposite end thereof, said wrench comprising a frame, means on said frame for preventing the rotation of said rotor shaft, and means on said wrench for rotating said collet relative to said rotor shaft, said collet-rotating means comprising a shaft having an end of non-circular cross-section received in said second bore of said collet, means for rotating said shaft to threadedly advance said collet within said rotor shaft, and means to prevent further rotation of said shaft after a predetermined rotational force has been applied to said collet.

**4,015,336**
## VALVE FOR AN ORAL EVACUATOR SYSTEM
**W. Grant Johnson, 717 E. Chapman, Orange, Calif. 02007**
**Filed July 1, 1975, Ser. No. 592,140**
**Int. Cl.² A61C *17/04***
**U.S. Cl. 32—33** **7 Claims**



**1.** A valve structure for an oral evacuator system adapted to be connected to a source of negative pressure, said valve structure comprising:
a member adapted for contact with the mouth;
an elongated housing including a lingitudinal bore extending through said housing connecting to said member at its distal end and adapted to connect to source of negative pressure at its proximal end, having a valve seat formed by a reduced diameter portion of said bore, and a slot extending through said housing to said bore and lonitudinally of said housing;
a valve member moveable distally of said source of negative pressure in said bore for abutting engagement with said valve seat to prevent passage of flowable materials therebetween;
a spring connected to said housing and to said valve member for biasing said valve member into abutting engagement with said valve seat, said spring including an offset portion extending outwardly through said slot; and
a manually operable member exteriorly of said housing and connected to said offset spring portion remotely of said valve member for moving said offset spring portion in said slot and compressing said spring, whereby said valve member moves out of engagement with said valve seat to permit passage of flowable materials therebetween, said operable member being adapted to substantially seal said slot when said spring is compressed.

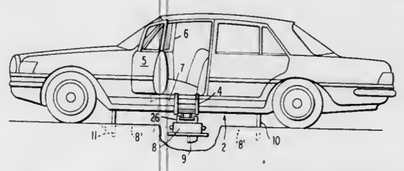
**4,015,337**
## COMBINED TAPE MEASURE AND MARKING DEVICE
**James A. Taylor, 12721 Harbor Blvd., Garden Grove, Calif. 92640**
**Filed June 7, 1976, Ser. No. 693,300**
**Int. Cl.² G01B *3/10*; B43L *9/04***
**U.S. Cl. 33—138** **5 Claims**



**1.** A tape measure of the type that includes a housing having first and second side walls and an end wall in which a transverse slit is defined, a spool rotatably supported in said housing on which an elongate tape having measuring graduations thereon is wound, said tape extending through said slit, and on a free end of which a stop is mounted to prevent said tape from being completely retracted into said housing, and means for rotating said spool in a direction to retract said tape into said housing, the improvement of a marking device on said tape measure wherein:
a. an arm pivotally supported on said side wall and parallel thereto, said arm having a first free portion, and a transverse pointer forming a part of said free end portion;
b. spring means that at all times tend to pivot said arm from a first downward position to a second upward position;
c. a first tube having first and second open ends, said tube being mounted on said first end portion of said arm and substantially normal relative to the longitudinal axis of said arm;
d. a marking quill assembly that includes a cylindrical body having first and second ends, an elongate marking tip extending from said first end of said body, and an outwardly extending cylindrical collar on said cylindrical body adjacent said second end thereof;
e. a second tube that occupies a fixed position in said first tube, said second tube having a first open end and a resilient slit, closed second end portion that projects outwardly through said first end of said first tube, and a transverse body shoulder inside said second tube intermediate said first open end and second closed end thereof;
f. a compressed helical spring disposed in said tube that encircles said marking quill assembly and has one end in contact with said collar and the other end in engagement with said body shoulder;
g. an elongate button slidably movable in said second tube adjacent said first end thereof and projecting outwardly therefrom; and
h. stop means that prevent said helical spring from moving said button outwardly from said second tube, with said device when said arm is pivoted to said first position with said pointer transversely aligned wit' a desired graduation on said tape, permitting a mark to be made that is transversely aligned with said desired graduation when said button is forced downwardly to move said marking tip longitudinally through said second end portion of said second tube to contact a surface on which said mark is desired to be made.



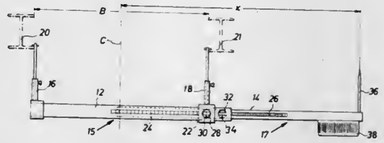
**4,015,338**
## METHOD AND APPARATUS FOR CONTROL MEASUREMENT OF A MOTOR VEHICLE FRAME AND OR AGGREGATES CONNECTED THERETO
**Lutz Kunze, Sindelfingen; Kurt Knapp, Neuhausen, and Klaus Brammer, Stuttgart, all of Germany, assignors to Daimler-Benz Aktiengesellschaft, Germany**
**Filed Aug. 28, 1974, Ser. No. 501,356**
**Claims priority, application Germany, Aug. 28, 1973, 2343270**
**Int. Cl.² G01C *15/12***
**U.S. Cl. 33—228** **64 Claims**



**1.** A method for carrying out control measurements of a measurement object, the measurement object having at least one reference measuring axis, the method comprising the steps of:
mounting a guide means so as to extend transversely of the reference measuring axis
mounting a single light source for selective displacement on said guide means;
selecting a plurality of selected measuring control points on the measuring object;
placing plumb line rulers having measurement control values thereon at the selected measuring control points of the measuring object;
transmitting at least one light beam from the single light source in a direction substantially parallel to the reference measuring axis of the measurement object;
selectively displacing the single light source on said guide means to align said at least one light beam with the respective plumb line rulers;
determining a first coordinate of the measuring object by measuring the displacement of the single light source means along said guide means;
determining a second coordinate of the measurement object by measuring the distance between the light source and the respective plumb line means; and
determining a thir . coordinate of the measuring object by measuring the distance between a control measuring value on the plumb line ruler and the point at which the light beam strikes the plumb line ruler.

**4,015,339**
## MEASURING TOOL FOR FRAMEWORKS
**Torgny William Hörvallius, Gavle, Sweden, assignor to Aktiebolaget SAMEFA, Stockholm, Sweden**
**Filed Nov. 3, 1975, Ser. No. 628,608**
**Int. Cl.² G01B *5/25, 11/27***
**U.S. Cl. 33—288** **13 Claims**

**1.** In a measuring tool for checking frameworks, especially a vehicle chassis frame, by illustrating the position and straightness of the frame centreline in a position offset to the frame, the tool including a fixed part and a movable part, the fixed part including a suspended part comprising a bar portion and holders of which at least one is mounted for movement along the bar portion, and by which the suspended part is arranged to be suspended in a fixed position between two opposing sides of the frame to be checked, the movable part of the measuring tool including an indicator part comprising a sliding portion mounted for longitudinal movement with respect to the bar portion of the suspended part, the improvement comprised in that:
the suspended part and indicator part of the measuring tool are each provided with a length scale formed with uniform graduations between the scale markings, an index fixed with respect to the movable holder, said scale of said suspended part being formed on said bar portion thereof and arranged for reading against said index, thereby reflecting alterations in the distance between the sides of the frame being checked and consequently alterations in the position of the frame centreline, a second index fixed with respect to said suspended part, said scale of said indicator part being formed on said sliding portion thereof and arranged for reading against said second index, the scale graduations of said bar portion scale being twice as large as those of said sliding portion scale, whereby said alteration in frame sides distance and frame centreline position, changing said bar portion scale reading by a given number of graduations, can be compensated by an appropriately directed shift of said sliding portion by the same number of graduations of its scale, to leave unchanged the positions of said centreline and the sliding portion with respect to each other.
**6.** In a measuring tool for checking frameworks, especially a vehicle chassis frame, by illustrating the position and

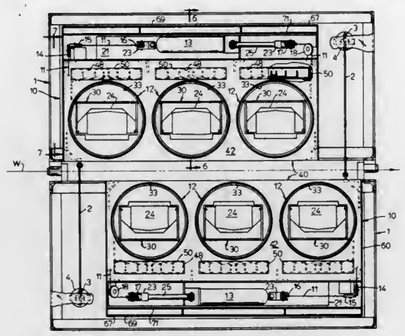


straightness of the frame centreline in a position offset from said frame, such tool including a fixed part and a movable part, said fixed part including a suspended part comprising a bar portion and holders of which at least one is mounted for movement along said bar portion, and by which said suspended part is arranged to be suspended in a fixed position between two opposing sides of said frame to be checked, said movable part of said measuring tool including an indicator part comprising a sliding portion mounted for longitudinal movement with respect to said bar portion of said suspended part, the improvement comprised in that:
said suspended part and said indicator part of said measuring tool are each provided with a length scale formed with uniform graduations between the scale markings, an index fixed with respect to said movable holder, the scale of said suspended part being formed on said bar portion thereof and arranged for reading against said index, thereby reflecting alterations in the distance between the sides of said frame being checked and consequently alterations in the position of the frame centreline, a second index also fixed with respect to said movable holder, the scale of said indicator part being formed on said sliding portion thereof and arranged for reading against said second index, the scale graduations of said bar portion scale being twice as large as those of said sliding portion scale, whereby a said alteration in frame sides distance and frame centreline position changing said bar portion scale reading by a given number of graduations can be compensated by an appropriately directed shift of said sliding portion by the same number of graduations of its scale, to leave unchanged the positions of said centreline and sliding portion with respect to each other.

## 4,015,340
## ULTRAVIOLET DRYING APPARATUS

Robert E. Treleven, Green Bay, Wis., assignor to TEC Systems, Inc., DePere, Wis.

Filed Aug. 20, 1975, Ser. No. 606,295
Int. Cl.² F26B 3/28
U.S. Cl. 34—4 16 Claims



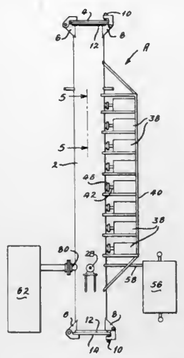
1. Ultraviolet radiating means for curing and drying a substrate comprising: a housing means; a plurality of ultraviolet elongated lamp assemblies each having a longitudinal axis and supported in parallel relation in said housing for selectively radiating ultraviolet radiation against said substrate, an elongated heat exchanger supported in said housing and adjacent said lamp assemblies, said housing including means for supporting each of said lamp assemblies for rotation about its longitudinal axis from a drying position wherein said lamps direct radiation to said substrate to a heat exchange position wherein said lamp assemblies direct radiation to said heat exchange assemblies, and means for simultaneously rotating each of said lamp assemblies including a flexible member wound around each of said lamp assemblies and secured to each of said lamp assemblies and a fluid motor supported by said housing, said fluid motor including a reciprocable member having opposite ends, said flexible member having opposite ends, one of said opposite ends of said flexible member being attached to an end of said reciprocable member for movement therewith and the other of said opposite ends of said flexible member being attached to the other end of said reciprocable member for movement therewith whereby activation of said fluid motor causes said flexible member to simultaneously rotate said lamp assemblies.

## 4,015,341
## SEED DRYING PROCESS AND APPARATUS

Howard F. McKinney, Florissant; Nathan L. Higginbotham, Chesterfield, and Dick Q. Durant, Manchester, all of Mo., assignors to McDonnell Douglas Corporation, St. Louis, Mo.

Filed Dec. 22, 1975, Ser. No. 643,507
Int. Cl.² F26B 3/28, 5/04
U.S. Cl. 34—4 13 Claims

1. A process for drying seed without significantly impairing the germinating qualities of the seed, said process comprising: placing the seed in an atmosphere of substantially reduced pressure; subjecting the seed to microwave energy while maintaining the individual seeds in a generally quiescent condition with respect to one another, the seed being subjected to the microwave energy while the seed is within the atmosphere of reduced pressure so as to convert liquid water within the seed to water vapor which leaves the seed and enters the atmosphere of reduced pressure; and condensing the water vapor

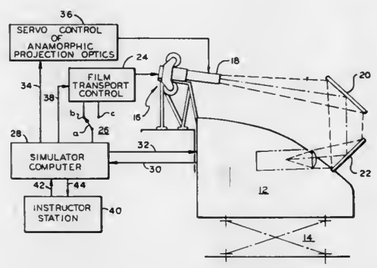


derived from the seed while the water vapor is in the atmosphere of reduced pressure.

## 4,015,342
## FLEXIBLE VISUAL DISPLAY SYSTEM

Francis L. Masselle, Hallstead, Pa., assignor to The Singer Company, Binghamton, N.Y.

Filed May 7, 1973, Ser. No. 357,947
Int. Cl.² G09B 9/08
U.S. Cl. 35—12 N 5 Claims



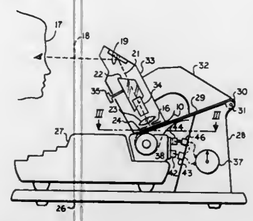

1. A visual simulation system for vehicle trainers comprising, in combination:
- a student station having simulated controls appropriate to the vehicle for providing output signals representative of the actuation of said simulated controls;
- a cine film strip carrying a first motion picture sequence recorded on selected frames uniformly spaced from each other by at least one intermediate frame and a second motion picture sequence recorded on intermediate frames spaced from one another by the same number of frames as said selected frames;
- a cine projector for displaying said cine film strip including film transport means adjustable to advance said cine film in increments of a single or multiple frames at a time; and
- means responsive to selected ones of said output signals for selectively adjusting the film transport means to change momentarily between single and multiple frame film advance during operation of the projector so that a selection can be made as to which of the motion picture sequences is displayed.



## 4,015,343
## TESTING APPARATUS

Robert M. Gottsdanker, 100 E. Constance, Santa Barbara, Calif. 93105

Filed Mar. 29, 1976, Ser. No. 671,244
Int. Cl.² G09B 19/00
U.S. Cl. 35—22 R 6 Claims



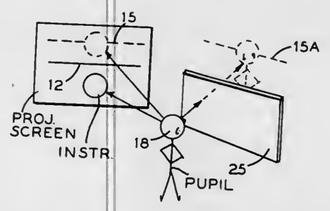
1. Apparatus for testing the visual-motor responses of human subjects who operate a keyboard device comprising:
- a. a typewriter having a horizontal striking line and a part that moves horizontally as the striking line is typed;
- b. a sheet of paper inserted into the typewriter and having a plurality of vertical commands in horizontal array that are miniature in size and therefore not easily readable, but visible to the subject along a sight path and also having a clear area along the striking line;
- c. optical means disposed in the sight path between the subject and the paper for rotating optically the commands so that they appear to the subject to be horizontal;
- d. a magnifier disposed in the sight path to enlarge the commands so that they are easily readable;
- e. a slitted mask disposed in the sight path to limit the number of commands visible to the subject;
- f. and means supporting said mask and connected to one of said typewriter or moving part of the typewriter, to obtain relative movement of the mask and paper as the typing progresses;

whereby new commands are revealed to the subject as responses to commands are typed.

## 4,015,344
## AUDIO VISUAL TEACHING METHOD AND APPARATUS

Herbert Michaels, 316 W. 79th St., Apt. 1 FW, New York, N.Y. 10024; William Stanton, 29 Fairview Ave., Great Neck, N.Y. 11023, and Edward Roll, Laurelton Road, Mount Kisco, N.Y. 10549

Continuation of Ser. No. 230,240, Feb. 29, 1972, abandoned.
This application Dec. 28, 1973, Ser. No. 429,152
Int. Cl.² A63B 69/00
U.S. Cl. 35—29 R 6 Claims




1. Apparatus for practicing a method for teaching physical arts and skills, such as, for example, dancing, which comprises:
- a. establishing the active image of a performing instructor in a virtual optical plane;
- b. simultaneously establishing in a similar virtual optical plane, the active performing image of a pupil imitating the action of the instructor; and
- c. placing both virtual images in position for direct simultaneous viewing by the pupil while performing, to enable the pupil to observe both images for instructive comparison, comprising, in combination,

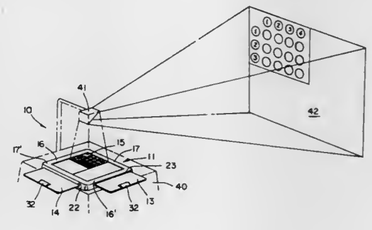
a photographic record of a main mirror in front of the performing instructor to show a front elevational mirror image of the instructor while performing;

and an auxiliary mirror to be positioned to one side of a visual reproduction of said main mirror and image, to enable an observer, such as a pupil, to stand where he can see the main mirror image of said instructor, while also seeing his own performing image in the auxiliary mirror.

## 4,015,345
## MULTIPLICATION LEARNING AID DEVICE

Howard E. Rice, Jr., 2684 Deming Blvd., Cheyenne, Wyo. 82001

Filed Dec. 17, 1975, Ser. No. 641,518
Int. Cl.² G09B 19/02
U.S. Cl. 35—31 E 1 Claim



1. A multiplication learning aid device for teaching multiplication tables and mentally reinforcing the concepts of multiplication to elementary school students, the device comprising, in combination:
- a framework containing a multiplication display board provided with vertical and horizontal rows for transparent or translucent display of the numbers 1 through 9;
- a series of translucent colored holes covered with colored translucent material with one each of the holes provided at each of the respective intersecting points of each of the numbers;
- a bottom insert slidable into the framework to protect the device when not in use, and removable from the framework when in use;
- vertical and horizontal inserts used to cover or uncover a combination of horizontal and vertical numbers with their corresponding number of colored holes to visually display the product result of a multiplicand and multiplier; and
- the numbers and the series of colored holes for use in combination with an overhead projector to visually display the multiplication tables to elementary school students on a screen for use as a visual aid.

## 4,015,346
## MACHINE FOR USE IN TEACHING THE MANNER IN WHICH A CLOCK INDICATES TIME

Toyotsugu Ogasawara, Tokyo, Japan, assignor to Tomy Kogyo Co., Inc., Tokyo, Japan

Filed Nov. 24, 1975, Ser. No. 634,420
Int. Cl.² G09B 19/12
U.S. Cl. 35—39 9 Claims

1. A machine for teaching the manner in which a clock having at least one rotary hand indicates time, which machine comprises:
- a support,
- a simulated clock face located on said support so that the front thereof is exposed, said clock face having a center,
- a first shaft rotatably mounted with respect to said clock

face and extending through the center of said clock face from the front thereof to the back thereof,

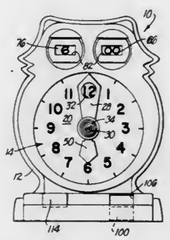
a second shaft rotatably mounted around said first mentioned shaft, said second shaft also extending through the center of said clock face from the front thereof to the back thereof,

a first simulated clock hand connected to said shaft so as to rotate therewith, said hand being located in front of said clock face and extending generally parallel to said clock face,

a second simulated clock hand, said second hand being connected to said second shaft so as to rotate therewith, said second hand also being located in front of said clock face and extending generally parallel to said clock face,

readout means for indicating a plurality of numerical values corresponding to positions of said hand relative to said clock face movably mounted on said support so as to be capable of being moved to a plurality of positions corresponding to various positions of said hand relative to said clock face,

said readout means having parts, one of said parts for indicating positions of said first mentioned hand relative to



said clock face and the second of said parts for indicating positions of said second hand relative to said clock face,

mechanical means for moving said readout means as said hand is moved, said mechanical means connecting said shaft and said readout means,

said mechanical means includes gear means for transmitting motion coupling said first mentioned shaft and said second shaft so that said shafts can be rotated in syncronism with one another so as to provide a single mechanical output and a single motion transmission means for transmitting rotation coupling one of said shafts and said readout means,

actuating means for causing rotation of at least one of said shafts,

display means for permitting a specific numerical value on said readout means to be visually inspected, said display means being located adjacent to said readout means,

cover means for covering the portion of said readout means capable of being visually inspected, said cover means being capable of being moved relative to said display means and said readout means so as to permit visual determination of a specific numerical value on said readout means.

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**4,015,347**

**INSOLES EFFECTIVE FOR CURING AND PREVENTING ATHLETE'S FOOT**

**Kazuyoshi Morishita, No. 20-C-305, Hinage-Aza-Toube, Chita, Aichi, and Nobuhiko Furukawa, No. 6-15, Yagumo 5-chome, Meguro, Tokyo, both of Japan**

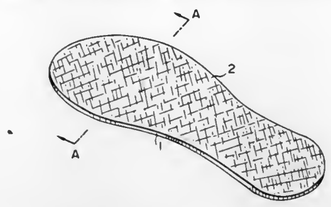
**Filed Nov. 14, 1975, Ser. No. 631,854**

**Claims priority, application Japan, Dec. 28, 1974, 49-157492[U]; Sept. 1, 1975, 50-119217[U]**

**Int. Cl.² A43B *13/38***

**U.S. Cl. 36—44** **7 Claims**

**1.** An insolve comprising a sheet of material having substantially the contour of a human foot or a portion of a human foot, said material comprising a moldable plastic having dispersed therein particles of a metal selected from the group



consisting of silver, alloys of silver, copper and alloys of copper.

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**4,015,348**

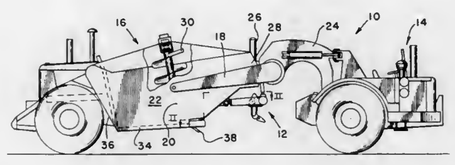
**RIPPER ASSEMBLY FOR TRACTOR DRAWN SCRAPER**

**James E. Gee, Washington, and Robert N. Stedman, Chillicothe, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.**

**Filed Sept. 30, 1975, Ser. No. 618,181**

**Int. Cl.² E02F *5/04***

**U.S. Cl. 37—124** **6 Claims**



**1.** In an earth working machine which comprises a scraper having a bowl with a back, a bottom, two sides and a forward cutting edge, a spreader forward of said cutting edge and supported by forward extensions of said sides, a tractor forward of said spreader for pulling said scraper and means for raising and lowering a forward end of said scraper relative to said tractor, a ripper assembly which raises and lowers in fixed relation to said spreader and to said cutting edge on operation of said raising and lowering means comprising:

a beam suspended generally vertically downwardly from said spreader and generally forwardly from said bowl;

a plurality of ripper sockets extending laterally from said beam;

a plurality of ripper shanks held in said sockets;

a means for adjusting the vertical separation between said beam and said spreader;

a pair of telescoping means between said beam and said spreader pivotally attached to a respective one of said beam and said spreader; and

a pair of arms, each pivotally attached at a first end thereof to a respective side of said bowl and attached at a second end thereof to said beam generally at an end thereof, said pair of arms, sides of said bowl and a pair of telescoping means forming a pair of triangular braces for said ripper assembly.

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**4,015,349**

**CHANGEABLE MESSAGE HIGHWAY SIGN MACHINE**

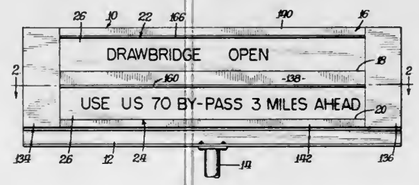
**Samuel B. Dunne, Dixon, Ill., assignor to Fosco Fabricators, Inc., Dixon, Ill.**

**Continuation of Ser. No. 106,100, Jan. 13, 1971, abandoned. This application Feb. 25, 1974, Ser. No. 445,627**

**Int. Cl.² G09F *11/10***

**U.S. Cl. 40—33** **18 Claims**

**2.** For displaying selectively to motorists any of a plurality of traffic meassages, a changeable message highway sign machine comprising a casing adapted to be mounted in an overhead position proximate to a highway traffic lane to confront oncoming motorists, the motorist confronting side of said casing being shaped to form a vertical sign face, said casing defining in said sign face a message aperture, a message bearing rotor defining on the periphery thereof a plurality of message faces extending longitudinally along the rotor and being angularly spaced around the rotor, each message face being adapted to present lettering of a written message, said rotor being disposed rotatably within said casing in aligned relation to said message aperture, means journalling said rotor for rotation about the axis thereof, means coacting with said rotor to turn the rotor selectively to any of a plurality of message presenting positions thereof wherein the respective message faces thereon are disposed in viewing alignment with said message aperture to be displayed therethrough to oncoming motorists, a first internally open member on said casing extending along the lower edge of said message aperture in close proximity to the rotary path of the periphery of the rotor, heating element means extending along the interior of said first member to thermally preclude an icing bridgeover between the rotor and the lower edge of the message aperture, a second internally open member on the casing extending along the upper edge of said message aperture in close proximity to the rotary path of the rotor periphery, and heating element means extending along the interior of said second member to preclude an icing bridgeover between the rotor and the upper edge of the message aperture.




**16.** For displaying selectively to motorists any of a plurality of traffic messages, a changeable message highway sign machine, comprising a casing adapted to be mounted in a position proximate to a highway traffic lane to confront oncoming motorists, said casing having a motorist confronting sign face formed with a message aperture, a message bearing rotor disposed in said casing and having at least three peripheral message faces spaced at angular intervals around said rotor, means in said casing rotatably supporting said rotor for rotation behind said message aperture to bring said message faces successively into view through said message aperture, and powder indexing means for indexing said rotor to bring each message face in turn into view through said message aperture, said rotor having at least three substantially parallel longitudinal corner chords with a multiplicity of skeletal truss braces secured between the successive adjacent chords to form a three-dimensional skeletal truss structure having a strength to resist bending in all directions, each corner chord having a hollow cylindrical longitudinal body with a pair of substantially flat longitudinal flanges formed integrally with said body and projecting therefrom toward the two adjacent corner chords of said rotor, said skeletal braces being secured to said flanges and extending between the confronting flanges of the adjacent corner chords, and at least three thin flat longitudinal sign panels secured to an extending between the confronting flanges of the adjacent corner chords, said sign panels having said message faces thereon.



**4,015,350**

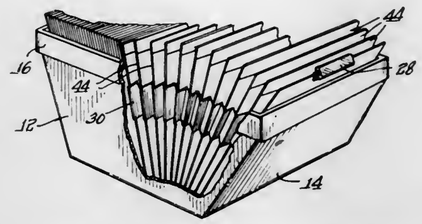
**CARD FILE CONTROL**

**Rolf Zurwelle, Churchville, Md., assignor to Business Efficiency Aids, Inc., Skokie, Ill.**

**Continuation of Ser. No. 479,228, June 14, 1974, abandoned. This application Nov. 17, 1975, Ser. No. 632,890**

**Int. Cl.² G09D *1/00***

**U.S. Cl. 40—105.5** **5 Claims**



**1.** A card file comprising a tray structure, and control means for effecting selective fanned separation of cards and the like within said tray, said control means comprising a pair of elongated pleated strip members and means supporting the strip members for disposing the same at positions spaced upwardly from the bottom of said tray and disposed along opposite sides thereof, the pleats of said strip members being resiliently urged apart and adapted to receive and separate individual cards between said pleats with the pleats maintaining the cards in substantially parallel array and in transverse edgewise alignment and being of sufficient inherent resiliency to normally tend to open up with included cards, means being provided for holding the cards relatively together at their bottoms, whereby the cards are separated at their tops by said strip members under the resilient urging of said pleats sufficient to maintain the cards in one area selectively fanned without skewing thereof for ease of viewing relative to cards in another area of the tray.

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**4,015,351**

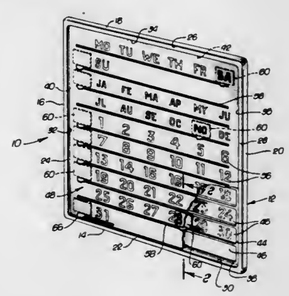
**PERPETUAL CALENDAR**

**Eli Sasson, 605 N. Bedford, Beverly Hills, Calif. 90210**

**Filed Feb. 23, 1976, Ser. No. 660,340**

**Int. Cl.² G09D *3/00***

**U.S. Cl. 40—110** **1 Claim**



**1.** A perpetual calendar comprising:

a base member including a marginal edge and a portion intermediate said marginal edge, and a plurality of horizontal parallel grooves formed in said portion;

an overlay of sheet material having an inner surface covering said portion of said base member capping said grooves, said overlay includes transparent indicia and said indicia is in overlying registry with said grooves of said base member and is arranged in columns and rows; and said overlay includes a plurality of horizontal slots

therethrough extending between the rows of indicia with a single slot in registry with a single groove;

color plate means corresponding in number to the number of said grooves and each is seated in one of said grooves for movement therein to be in registry behind selected ones of said indicia;

propelling means associated with said color plate means each including a portion projecting from said perpetual calendar for finger engagement to move said color plate means within said grooves for said registry behind selected ones of said transparent indicia; said propelling means includes a tab projection extending generally normal to the plane of said color plate means through said slot outwardly of said calendar;

said color plate means being visible through said sheet so as to highlight said selected indicia so that visual attention is directed thereto.

## 4,015,352
## SELF-ADHERING LETTER ASSEMBLY

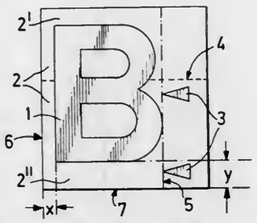
**Dieter Prange, Lessingplatz 2, Bueckeburg, Germany 4967**

**Filed May 29, 1975, Ser. No. 581,729**

**Claims priority, application Germany, Mar. 8, 1975, 2510783**

**Int. Cl.² G09F *3/10***

**U.S. Cl. 40—125 A** **9 Claims**




1. A self-adhering letter assembly comprising a removable support layer having an upper part and a lower part divisible along a line of perforation and a letter having an adhesive backing, said letter and said adhesive backing being disposed on and removably secured to one face of said support layer, and a portion of said letter being spaced inwardly a predetermined first distance from a left lateral edge of said support layer, at least one mark of relatively small size compared to said letters having an edge adjacent the right-hand side edge of the letter for forming a reference line alignable with the left edge of a next succeeding like support layer for another letter, thereby laterally to space adjacent letters equidistantly, said mark being formed independently of any support sheet and of the same material as said letter and positioned on said one face of said support layer and wherein said support layer and said next succeeding support layer about the same width.
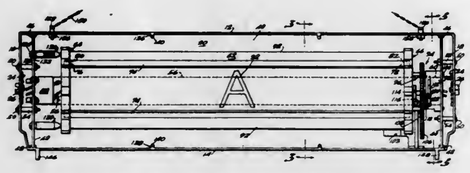
## 4,015,353
## ADVERTISING DISPLAY DEVICE

**Renato Zarfati, 251 - 174th St., N. Miami Beach, Fla. 33160**

**Filed Oct. 14, 1975, Ser. No. 621,650**

**Int. Cl.² G09F *11/02***

**U.S. Cl. 40—77** **9 Claims**



1. A device for displaying a variety of indicia comprising:

a main housing comprised of top, bottom, back and opposed end walls defining an interior chamber with an open front;

a front bezel, fixed relative to said open front, and including a front opening of predetermined dimensions;

a fluorescent light tube extending longitudinally through said chamber in electrical connection with a pair of opposed end terminals, fixed relative to a pair of opposed end plates fixed within said chamber, adjacent the respective end walls, each of said vertical end plates is slidably engaged in aligned, transverse grooves in said top and bottom walls and is fixed to one of said end walls by nut and bolt means between said one end wall and said end plates;

a cylindrical indicia display assembly rotatably journaled on said fluorescent light tube in an axial relationship therewith, said indicia display assembly being comprised of a longitudinally extending translucent tubular member and a pair of opposed end closure caps;

a plurality of longitudinally extending strips in a fixed, parallel, spaced apart relation along the outer face of said translucent tubular member for removable reception, between each adjacent pair thereof, of a sheet provided with indicia;

a drive motor with a speed reducer carrying a drive gear engaged with a driven gear, said driven gear being rotatably journaled on the axis of said fluorescent light tube;

indexing means actuated by said driven gear to periodically, sequentially rotate the indicia sheets into registration with said bezel opening, said indexing means comprises a ratchet, providing a plurality of teeth, formed integral with one end cap of said cylindrical display assembly, a drum type cam fixed relative to said fluorescent tube and cylindrical display assembly, a spring loaded cam follower, in engagement with said cam, and a pawl fixed for like pivotal movement on opposed ends of a common pin journaled through said driven gear which is rotatably sandwiched between said ratchet and cam, said cam providing high and low portions to impart like relative, pivotal movements to said cam follower and pawl, upon rotational movement of said driven gear, to pivot said pawl into sequential engagement with each one of said ratchet teeth to cause rotational movement of said indicia display assembly through a predetermined number of degrees during each rotation of each driven gear, and out of engagement therewith to arrest said rotational movement during the balance of each rotation of said driven gear.

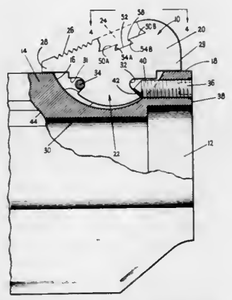
## 4,015,354
## GUN SIGHT

**Paul E. Brouthers, Monson, Mass., assignor to Dan Wesson Arms, Inc., Monson, Mass.**

**Filed Mar. 29, 1976, Ser. No. 671,355**

**Int. Cl.² F41G *1/02***

**U.S. Cl. 42—1 S** **9 Claims**



1. In combination, a firearm barrel having a muzzle and a gun sight, means forming an elongated slot in the top of said barrel with elongated sidewalls extending in a direction lengthwise of the barrel from a point spaced from said muzzle, said gun sight having an exposed sighting section and a support section integral therewith, said exposed section extending from said slot, said support section having a dovetail shape with indentations defined by said dovetail extending toward opposite ends of said slot and with opposite walls of said support section engaging said sidewalls to secure said gun sight against lateral movement, means in said slot for engaging said indentation remote from said muzzle to secure said gun sight against movement away from said muzzle, and means defining an opening in said barrel extending from said muzzle to said slot in alignment with said indentation and securing means removably positioned in said opening to secure said gun sight against movement toward said muzzle and to permit disengagement of said gun sight and said barrel upon removal of said securing means from said barrel.



## 4,015,355
## INCENDIARY PROJECTILE AND MANUAL LAUNCHER

**Alois Schiessl, Bad Reichenhall, and Hartmut Krone, Bayrisch Gmain, both of Germany, assignors to Firma Buck K.G., Germany**

**Filed Mar. 14, 1975, Ser. No. 558,236**

**Claims priority, application Germany, Mar. 14, 1974, 2412346**

**Int. Cl.² F41F *27/00***

**U.S. Cl. 42—1 F** **28 Claims**

1. A hand fired projectile launcher comprising a handled launching barrel, a propellant charge, triggering means for igniting said propellant charge, and a projectile disposed in said barrel, said projectile being of relatively high weight in comparison to other components of said launcher, the improvement wherein said projectile comprises:

a casing formed of an easily deformable material capable of disintegrating along substantially its entire length in response to impact,

an incendiary charge disposed in said casing,

an explosive disintegrator charge disposed in said casing and being suitable to explosively disintegrate said casing upon ignition, and

a first charge including a glow and delaying composition arranged to:

be ignited to a burning condition by said propellant charge,

ignite said incendiary charge,

continue to burn for a predetermined period after ignition of said incendiary charge, and

thereafter ignite said disintegrator charge to disintegrate the casing.

## 4,015,356
## REVOLVER CYLINDER FOR THE EJECTION OF RIMLESS CARTRIDGE CASES

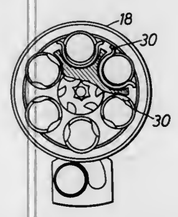
**Gilbert Maillard, Montbeliard, France, assignor to Manufacture de Machines du Haut-Rhin S.A., Mulhouse Cedex, France**

**Filed June 10, 1975, Ser. No. 585,697**

**Claims priority, application France, June 11, 1974, 74.20125**

**Int. Cl.² F41C *15/00***

**U.S. Cl. 42—68** **5 Claims**




1. A cylinder of a revolver having a plurality of chambers and provided with a mechanism for simultaneously ejecting a plurality of rimless cartridges therefrom, said mechanism comprising a collective ejector means provided with a head generally in the form of a disc presenting on its periphery a plurality of equally angularly spaced similar cutout portions adapted to the passage of cartridges therethrough, each cutout portion being essentially circular in form and being disposed in accurate alignment with a chamber of said plurality of chambers in the cylinder which receive the cartridges therewithin, the casings of said cartridges being flangeless and rimless but presenting an annular groove in the vicinity of the rear part of the cartridge disposed in the plane of the head of the ejector means, and cartridge retaining means disposed in the region of each cutout portion and adapted to engage within the annular groove in said cartridge, said retaining means cooperating with and engaging within such annular groove at the end of the introduction of the cartridges into the respective chambers in the revolver cylinder and until the complete ejection of the cartridges or casings, the head of the collective ejector means presents a peripheral groove which extends about the entire contour of the head provided with said cutout portions and which is disposed in such manner as to be located in the same plane as the annular groove in the rear part of the casings when the cartridges are fully inserted into the respective chambers in the revolver cylinder and the ejector means is retracted, said peripheral groove being adapted to receive the cartridge retaining means at the location of each cartridge at each cutout portion, said cartridge retaining means being elastic, such elastic retaining means being constituted by a plurality of generally U-shaped leaf springs which are of generally semi-circular form and which are adapted to engage in the annular groove in the rear end of a respective casing at two diametrically opposed zones.

## 4,015,357
## FIREARM BOLT

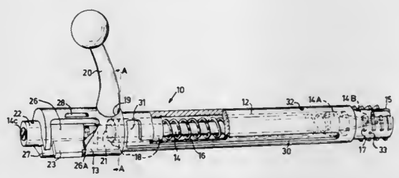
**Lars Ake Vilhelm Andersson, Sandstensvagen 71, S-136 51 Handen, Sweden**

**Filed Aug. 11, 1975, Ser. No. 603,684**

**Claims priority, application Sweden, Aug. 13, 1974, 7410321**

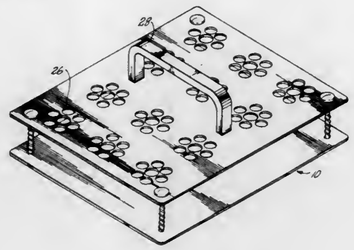
**Int. Cl.² F41C *11/00***

**U.S. Cl. 42—16** **3 Claims**




1. A bolt for a firearm, especially a rifle with bolt action loading having a receiver for the bolt, comprising a bolt body having a central bore, a striker rod slidably and rotatably mounted in said bore, a coil spring urging the striker rod forwardly, a nut detachably fastened to the rear end of the striker rod, a radial projection extending from said nut, said bolt body having a front part which comprises a bolt head with latches and a rear part which comprises a searing head with an aperture for guiding the radial projection from the nut on the rear end of the striker rod, a bolt lever detachably inserted in a sideways facing bore in said searing head, characterized in that the innermost part of the bolt lever is forked so as to embrace the striker rod on being inserted in the sideways facing bore, the front face of the forked part of the lever further having a cylindrical cavity and a cylindrical hollow body urged by the coil spring abutting its forward end face to press the rear portion of the cylindrical body into the cylindrical cavity, thus interlocking the bolt lever in its inserted position.

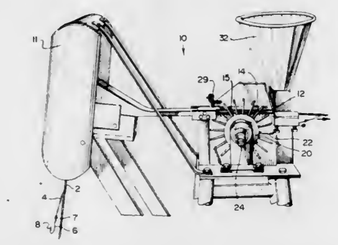
**4,015,358**
**CARTRIDGE STORING AND LOADING DEVICE FOR A REVOLVER**
**Richard Wayne Amos, Arcadia, Calif., assignor to Van Zandt Precision Products, Inc., Azusa, Calif.**
**Filed Feb. 2, 1976, Ser. No. 654,090**
**Int. Cl.² F41C** *27/00*
**U.S. Cl. 42—87** **5 Claims**



1. A fixture for storing and simplifying the loading of cartridges in the cartridge chamber of a revolver, comprising a flat frame plate, a flat cartridge supporting plate, guide members movably supporting the supporting plate from and in parallel relationship to the frame plate, the guide members permitting movement of the parallel plates toward each other, stop means for limiting the separation of the frame plate and supporting plate, and spring means urging the plates away from each other against the stop means, the supporting plate having a plurality of groups of holes for receiving the cartridge to be loaded, the holes in each group corresponding in size and arrangement to the cartridge chambers in the revolver to be loaded from the fixture.

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**4,015,359**
**HOOK BAITING MACHINE**
**Donald Andrews, P.O. Box 88, Topsail, Newfoundland, Canada**
**Filed July 18, 1975, Ser. No. 597,284**
**Int. Cl.² A01K** *97/00*
**U.S. Cl. 43—4** **11 Claims**



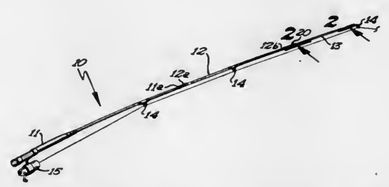
1. Apparatus for mechanically baiting fish hooks attached at spaced intervals by snoods to a long line comprising: guide means having a longitudinal axis, for receiving and circumscribing said line, snoods and eyes of the hooks to channel them longitudinally and unobstructedly through said apparatus while restricting them against lateral displacement from said guide means, said guide means comprising a longitudinal channel extending through said apparatus, at least one side of said channel having a parallel lateral clearance of sufficient width and depth to permit passage therethrough of the shank of each hook;

orienting and tensioning means laterally offset from said guide means beside a central portion thereof, which means comprises a moving spoke, to momentarily intercept each hook as it passes through the apparatus, the position and motion of said spoke being such that the shank and point of each intercepted hook is progressively rotatably and laterally oriented and such that the tension on the hook and associated snood is increased;

and a baiting chamber having an exit gate to hold bait within, positioned to receive the hook as it leaves said hook orienting and tensioning means, said spoke releasing said intercepted hook when the orientation of and tension on the hook and associated snood is such that the hook can securely impale said bait within said chamber, said impaled bait leaving said baiting chamber through said exit gate.

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**4,015,360**
**FIBERGLASS FISHING ROD WITH CARBON FILAMENT INSERT**
**George L. Herter, Waseca, Minn., assignor to Herter's, Inc., Waseca, Minn.**
**Filed Sept. 11, 1975, Ser. No. 612,536**
**Int. Cl.² A01K** *87/00*
**U.S. Cl. 43—18 GF** **2 Claims**



1. An elongate tapered fishing rod formed of fiberglass reinforced plastic comprising:

an elongate handle;

an elongate end portion connected to said handle and projecting longitudinally therefrom, said end portion including an elongate intermediate section and an elongate end section detachably connected together, said intermediate section being detachably connected with said handle;

an elongate flex-resistant element secured to said end portion and extending throughout the length of said end section;

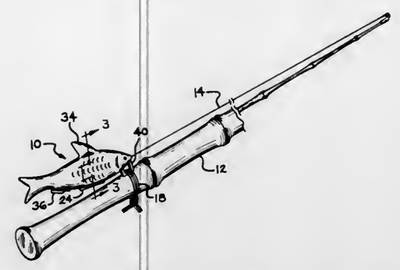
said flex-resistant element being formed of graphite threaded material and being of a lighter weight and greater stiffness than the fiberglass reinforced plastic to thereby impart substantial stiffness to that part of the end portion of the fishing rod with which it is associated without noticeably increasing the weight thereof, said flex-resistant element comprising an elongate flat strip having a cross-sectional size substantially less than the cross-sectional size of the hollow interior of said end section and being positioned interiorly thereof, said flex-resistant element extending diagonally of said end section from adjacent one end thereof to substantially the other end thereof.

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**4,015,361**
**FISH HOOK RETAINER**
**James J. O'Reilly, and Agnes C. O'Reilly, both of 1232 Granville Road, Newark, Ohio 43055**
**Filed Oct. 10, 1975, Ser. No. 621,387**
**Int. Cl.² A01K** *97/06*
**U.S. Cl. 43—25.2** **8 Claims**

1. A one-piece plastic fish hook retainer comprising a first housing portion having the contour of a fish and forming a shallow cavity, a second housing portion having the contour of a fish of the same size and shape as the first portion and forming a second shallow cavity, said cavities forming a hook-retaining space when the two portions are in closed, cooperating relationship, a hinge structurally integral with both of said housing portions at common edges thereof corresponding to the belly of the fish, one of said housing portions having an upwardly-extending catch flange at the edge opposite said hinge, the other of said housing portions having a dorsal fin at

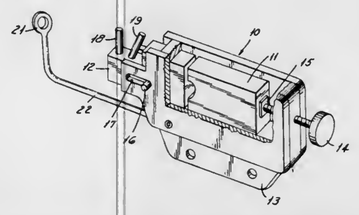




the edge opposite the hinge, said fin forming a groove to receive said flange, said fin being bendable to release said flange from said groove, the housing portion not having said dorsal fin having a release flange at the edge near said hinge to facilitate separation of said housing portions when the housing portions are to be separated.

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**4,015,362**
**FISHING LINE RELEASE MECHANISM**
**C. Evan Johnson, Onekama, Mich., assignor to Hitachi Magnetics Corporation, Edmore, Mich.**
**Filed Mar. 15, 1976, Ser. No. 667,096**
**Int. Cl.² A01K** *97/00*
**U.S. Cl. 43—43.11** **7 Claims**

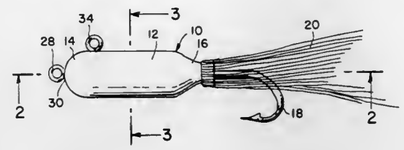


1. A fishing line release mechanism comprising: a housing defining an elongated passageway having an open end; a permanent magnet positioned within said passageway having a pole facing said open end; a tripping member composed of magnetic material positioned within the open end of said passageway, said tripping member being movable along said passageway from a position of strong attraction to said magnet to a position of weak attraction to said magnet; and at least one belaying pin mounted on said tripping member, said pin having its axis transverse to said passageway when said tripping member is in a position of strong attraction to said magnet and longitudinal with respect to said passageway when said member has been tripped to a position of weak attraction to said magnet as the result of a force exerted on said pin to pull said pin away from said magnet.

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**4,015,363**
**FISHING LURE**
**Joseph Sedlak, Clifton, N.J., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest**
**Filed Jan. 19, 1976, Ser. No. 650,023**
**Int. Cl.² A01K** *85/00*
**U.S. Cl. 43—42.22** **5 Claims**

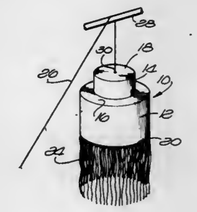
1. A fishing lure comprising fish hook means mounted in a buoyant metal cylinder means, eyelet means for securing fishing line to said cylinder, said eyelet means mounted in said cylinder forward of said hook, skirt means surrounding said hook, buoyancy adjusting means in said cylinder, said cylinder being streamlined and having a domed end and at the opposite end from said domed end, said cylinder slopes inwardly from the main cylinder wall towards the longitudinal axis of said



cylinder and then parallel to such axis, said fish hook extending outwardly from said sloping end, said eyelet means comprising first eyelet means mounted in the center of said dome and second eyelet means mounted between said dome and the center of said cylinder on the cylinder wall.

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**4,015,364**
**PINATA HAVING WEAKENED BOTTOM WALL AND MEANS FOR BREAKING SAME**
**Ramiro Oquita, 6014 Chandler Drive, San Diego, Calif. 92117**
**Filed Sept. 29, 1975, Ser. No. 617,602**
**Int. Cl.² A63H** *33/00*
**U.S. Cl. 46—11** **8 Claims**



1. A pinata, comprising:

a bottom wall having an extended surface;

side and top walls cooperating with said bottom wall to define a substantially enclosed chamber whereby a plurality of small items may be carried in said chamber on said bottom wall; and

means for suspending said pinata and for holding said bottom wall in assembled relation with, but free of direct attachment to, said side and top walls, comprising a suspension line through openings therefor in the top and bottom walls of said pinata and a retention member larger than said bottom wall opening secured to said suspension line exteriorly of said bottom wall, whereby to enable said pinata bottom wall to break-away upon successive pulling of said suspension line when a large number of said items are carried in said pinata on said bottom wall;

said means including at least one line of weakness through said bottom wall extended surface enabling at least a substantial portion of said bottom wall to break-away upon application thereto of a force which in the absence of said line of weakness would be insufficient to cause said break-away.

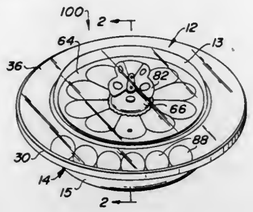
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**4,015,365**
**CHILD'S TOY**
**Albert Stubbmann, Franklin Lakes, N.J., assignor to Kohner, Inc., New York, N.Y.**
**Filed Aug. 29, 1975, Ser. No. 609,117**
**Int. Cl.² A63H** *1/32*
**U.S. Cl. 46—47** **18 Claims**

1. A child's toy comprising:

a transparent upper casing provided with a dome portion and an annular portion separated therefrom by a lateral annular segment;

a lower casing provided with a dome portion and an annular portion separated therefrom by a lateral annular segment, said lower casing being fixedly coupled to said upper casing, said coupled upper and lower casings being substantially watertight;




a disc disposed within said dome of said upper casing;

means suspended between said domes of said upper and lower casings for rotatably supporting said disc; and

means for producing rotary motion of said disc in response to movement of said upper and lower casings.

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**4,015,366**

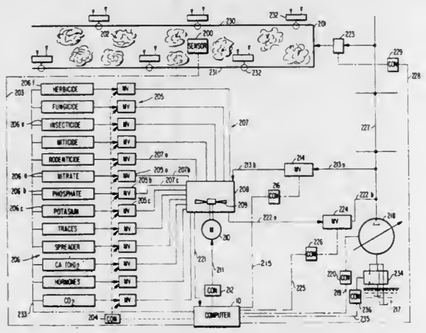
## HIGHLY AUTOMATED AGRICULTURAL PRODUCTION SYSTEM

**Arthur D. Hall, III, Port Deposit, Md., assignor to Advanced Decision Handling, Inc., Falls Church, Va.**

**Filed Apr. 11, 1975, Ser. No. 567,322**

**Int. Cl.² A01D** *46/00*; **A01G** *27/00*, *13/00*

**U.S. Cl. 47—1 R** **88 Claims**




1. A computerized system for the production of agricultural products in an agricultural area which comprises a plurality of homogeneous agricultural areas, said system comprising:

a. sensing means for sensing a plurality of desired parameters in said plurality of homogeneous agricultural areas, which parameters are necessary to achieve desired agricultural product growth, and for generating sensor data output representative of said parameters;

b. a plurality of different controlled means operative in response to selectively applied control signals for producing desired changes in said parameters;

c. computing means for comparing said sensor data output to pre-established standards for said plurality of parameters in said agricultural areas, said computing means being programmed to generate said control signals as a result of the comparison of said sensor data output and said pre-established standards both directly and in relation to the sensed inter-relationship of such comparisons from others of said parameters and to optimize said control signals; and

d. data transmission means connecting said sensing means and said controlled means to said computing means for receiving said sensor data output from said sensing means and transmitting said sensor data output to said computing means, and for receiving said control signal from said computing means and transmitting said control signal to said controlled means, said data transmission means comprising means for coding and multiplexing sensor data output from a plurality of said sensing means onto a single data transmission channel and means for coding and multiplexing control signals for a plurality of said controlled means onto a single data transmission channel.

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**4,015,367**

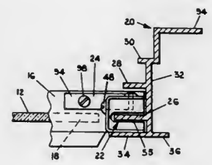
## WINDOW SASH POSITIONER

**William T. DeBruyn, Grand Rapids, Mich., assignor to The Citation Companies, Inc., Grand Rapids, Mich.**

**Filed Dec. 11, 1975, Ser. No. 639,625**

**Int. Cl.² E05D** *13/08*

**U.S. Cl. 49—451** **23 Claims**




1. A window positioner device for a vertically slidable window sash and an associated window jamb of the type having a rail with exposed sides extending vertically along at least a portion of the length of said jamb; said positioner providing relatively low frictional force upon said jamb as the window is raised and increased frictional force sufficient to hold the window in a desired raised position while the window is at rest, said positioner comprising: an outer housing member; a first member positioned in said housing and having a shoe portion adapted to frictionally and slidably engage one side of said jamb rail; a second member in said housing movably mounted with respect to said first member, said second member having a surface adapted to frictionally engage the opposite side of said rail; urging means for acting in response to the downward gravitational force produced by the weight of the window sash to urge said second member toward said shoe portion and into cooperative frictional engagement with said rail sufficient to hold the sash in place against its own weight; means mounting said second member for movement with respect to said first member and to said urging means in response to upward movement of the window sash, for thereupon decreasing the frictional engagement holding said second member with respect to said rail; and means for biasing said movably mounted second member into a first position, said urging means including cam means positioned between said housing and said second member, said cam means forcing said second member toward said shoe portion when said second member is in said first position.

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**4,015,368**

## DOOR OR PANEL SEAL

**Charles T. Court, Texarkana, and Jessie H. Miller, Wake Village, both of Tex., assignors to Newcourt, Inc., Texarkana, Tex.**

**Filed Sept. 14, 1972, Ser. No. 288,956**

**Int. Cl.² E06B** *7/23*

**U.S. Cl. 49—488** **37 Claims**

1. A peripheral channel gasket for a door, panel, or the like comprising:

a rigid channel member having spaced side members extending from one side of a base forming a groove for receiving an edge of the door or panel,

said one side of said base between said side members being substantially flat,



each of said side members having a substantially flat surface which extends from said one side of said base to the opposite free end of said side member,

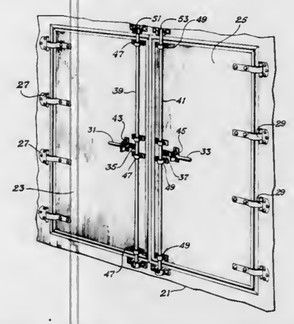
said substantially flat surface of each side member forming an angle of about **90°** with said one side of said base,

structure formed on the other side of said base forming at least one receiving groove,

a flexible sealing gasket to be held by said channel member and including a base with sealing means formed on one side thereof for forming a seal with another member,

at least one connecting leg extending from the other side of said base of said gasket for insertion into said receiving groove of said channel member,

said connecting leg in cross section including an enlarged




head coupled to the base of the gasket by way of a smaller neck portion,

said receiving groove in cross section including a smaller entrance portion which leads to an enlarged holding zone for receiving and holding said enlarged head of said connecting leg,

the entrance portion of said receiving groove in cross section having a minimum width less than the normal maximum cross sectional width of the enlarged head of the connecting leg,

said enlarged head of said connecting leg being constructed to allow it to be passed through the smaller entrance portion and into said enlarged holding zone of said receiving groove and which act to hold said enlarged head in said enlarged holding zone after insertion therein.

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**4,015,369**

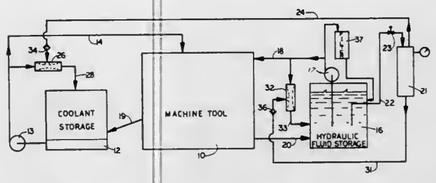
## DEVICE FOR REMOVING WATER FROM HYDRAULIC FLUID

**Gerald P. Dietrick, 523 Ridgeview Drive, Florence, Ky. 41042**

**Filed Dec. 16, 1975, Ser. No. 641,250**

**Int. Cl.² B24B** *55/02*; **B01D** *1/00*

**U.S. Cl. 51—2 R** **7 Claims**




6. A tower for removing water from hydraulic fluid which comprises an enclosed chamber, an upright stationary rod in the chamber, a plurality of vertically spaced substantially horizontal plates mounted on the rod, means for directing the fluid to flow crosswise of each of the plates in a thin film and downwardly from plate to plate, means for impressing a vacuum on an upper end portion of the chamber to cause water entrained in the hydraulic fluid on the plates to vaporize and to remove the water from the chamber, and means for removing the hydraulic fluid from a lower end portion of the chamber.

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**4,015,370**

## MACHINE FOR GRINDING OF PERIPHERAL SURFACES ON WORK PIECES

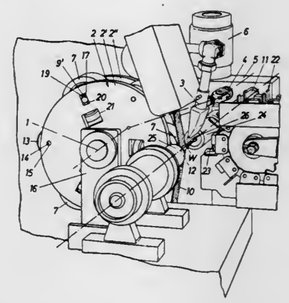
**Karl Lieser, Wuppertal-Elberfeld, Germany, assignor to Hermann Werner, a Kommanditgesellschaft, Wuppertal-Cronenberg, Germany**

**Filed Dec. 1, 1975, Ser. No. 636,526**

**Claims priority, application Germany, Dec. 30, 1974, 2461886**

**Int. Cl.² B24B** *7/00*

**U.S. Cl. 51—90** **9 Claims**




1. A machine for grinding of peripheral surfaces on workpieces, particularly, screw driver blades, comprising

a rotatable tool carrier,

at least one grinding element arranged on said rotatable tool carrier,

means for turning a workpiece to be ground,

means for driving said tool carrier in a predetermined transmission ratio synchronously to the turning of the workpiece such that said grinding element steps in an operative grinding position to the workpiece in periodic rotation synchronized with the turning of the workpiece.

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**4,015,371**

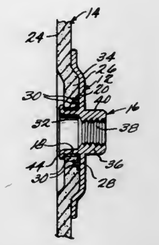
## GRINDING WHEEL ASSEMBLY

**Judson M. Grayston, Joplin, Mo., assignor to Machinery Brokers, Inc., Springfield, Mo.**

**Filed Apr. 8, 1976, Ser. No. 674,926**

**Int. Cl.² B24B** *41/04*; **B24D** *5/16*

**U.S. Cl. 51—168** **10 Claims**




1. A grinding wheel assembly for attachment to a rotary shaft comprising in combination:

a sheet metal member shaped to define a cylindrical section extending radially outwardly from one end of said cylindrical section,

a wheel member having at least one operative abrasive surface and a disk-shaped central hub portion for connection with a rotating shaft,

said hub portion being molded of moldable material with said sheet metal member embedded therein in a position such that (1) the exterior surface of said cylindrical section and the surface of the annular flange section facing the opposite end of the cylindrical section are contacted by the moldable material of the hub portion and (2) the opposite surfaces of both sections of said sheet metal member are exposed, and

a cast metallic member including a cylindrical hub connecting portion having an exterior diameter slightly less than the interior diameter of the cylindrical section of said sheet metal member, an annular hub face engaging flange portion extending outwardly from one end of said cylindrical portion and a central shaft connecting portion extending axially from said annular flange portion having interior shaft end engaging surfaces and exterior wrench engaging surfaces,

said sheet metal member having groove means formed therein at the juncture between the cylindrical and annular flange sections thereof, said groove means being open in an axial direction opposed to the axial direction of extent of said cylindrical section from said annular flange section,

said cast metallic member having tongue means formed in the juncture between said cylindrical portion and said annular flange portion, said tongue means being of a size and shape to engage in mating relation within said groove means,

said cast metallic member and said wheel member with said sheet metal member embedded therein being aligned axially and moved axially together into an assembled position wherein (1) said cylindrical portion extends through the exposed interior surface of said cylindrical section outwardly of one face of said hub portion, (2) said flange portion is disposed in adjacent relation to the exposed surface of said annular flange section and the opposite face of said hub portion, and (3) said tongue means is engaged in mating relation within said groove means,

the extremity of said cylindrical portion of said cast metallic member extending outwardly of said one hub portion face being deformed annularly outwardly into axially inwardly engaged relation to said one hub portion face to fixedly retain said cast metallic member and said wheel member with said sheet metal member embedded therein in said assembled position.

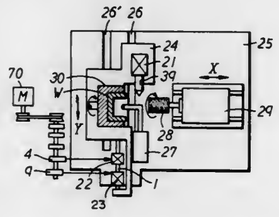
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**4,015,372**

## CAM-CONTROLLED GRINDING METHOD

**Nobuo Fukuma, Toyota, and Hideyuki Matsubara, Toyoake, both of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Japan**

**Filed Feb. 6, 1976, Ser. No. 656,076**
**Int. Cl.² B24B** *1/00*
**U.S. Cl. 51—281 R** **3 Claims**




1. In a grinding method which controls with a cam the relative positions of an abrasive wheel and a workpiece, each revolution of the cam comprising a single grinding cycle during which a single workpiece is ground as close as possible to a predetermined target dimension, the final portion of said cycle being a sparkout time, and which causes dressing of the abrasive wheel, with a dressing point in a fixed position with respect to the workpiece, during each grinding cycle to compensate for wear of the abrasive wheel, the improvement comprising the steps of:

a. measuring in process the processed dimension of a workpiece in each grinding cycle;

b. issuing a signal as soon as the dimension measured has reached the predetermined target dimension and simultaneously separating the abrasive wheel from the workpiece;

c. issuing a second signal when said sparkout grinding has been maintained at least for a certain minimum predetermined period of time;

d. comparing the timing or sequence of occurrence between the issuing point of said final dimension signal and the point at which said sparkout grind has completed the elapse of said certain period of time; and

e. compensating for the wear of the dresser by actuating a wheel-dresser-point-compensating-mechanism in response to said timing comparison whenever the final dimension signal precedes the completion of the predetermined minimum sparkout time.

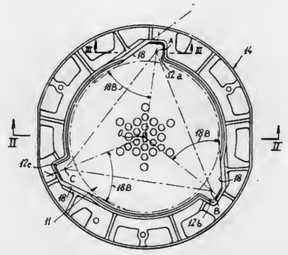
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**4,015,373**

## MANHOLE ASSEMBLY WITH REMOVABLE COVER, ESPECIALLY FOR A CARRIAGEWAY

**Pierre Boissier, Le Chesnay, France, assignor to Usines et Acieries de Sambre et Meuse, Feignies, France**

**Filed Feb. 6, 1976, Ser. No. 655,965**
**Claims priority, application France, Feb. 11, 1975, 75.04235**
**Int. Cl.² E02D** *29/14*
**U.S. Cl. 52—20** **6 Claims**




1. In a manhole assembly fitted with a removable cover especially for a carriageway and comprising a flat frame which is anchored horizontally at the level of the carriageway in the service position, the said frame being such as to provide a passageway having a vertical axis and surrounded by an edge-section of the frame so adjusted as to receive the cover which is mounted within the frame along the axis aforesaid in the service position, the cover having three radial projections which are disposed at the apices of a triangle and are capable of resting on the edge-section of the frame in order to form a horizontal bearing triangle for the cover, the edge-section of the frame being provided with three recesses each comprising inclined bearing means adapted to receive a first lateral face of one of the three radial projections of the cover and to initiate a horizontal movement of rotation of the cover about its vertical axis under the action of the weight of the cover; the improvement comprising a retaining face defining one side of said recess and which is inclined downwardly outwardly away from said axis thereby to lock the projection in the recess against tilting movement of the cover about a side of said triangle.

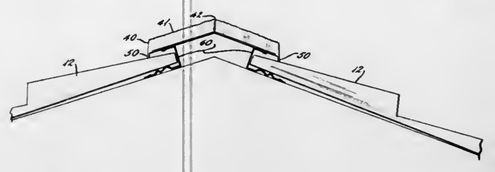


**4,015,374**

## ANGLED CAP MEMBER FOR SIMULATED CEDAR SHAKE CONSTRUCTION

**George Epstein, Akron, and Robert E. Mollman, Chagrin Falls, both of Ohio, assignors to Alside, Inc., Akron, Ohio**

**Division of Ser. No. 332,163, Feb. 13, 1973. This application Mar. 6, 1974, Ser. No. 448,623**
**Int. Cl.² E04D** *1/30*
**U.S. Cl. 52—57** **5 Claims**




1. A cap suitable for ridges and hips on a simulated shake roofing, said cap being characterized by the appearance of individual shakes and comprising:

an angled cap member having a central ridge extending longitudinally lengthwise thereof and angled side edges;

a plurality of simulated apparently overlapped shakes extending along the length of said cap member, on each side of the central ridge thereof;

a downwardly extending tongue forming each longitudinal edge of said cap member adapted to rest on a first course of simulated roof shakes;

means at the angled side edges of said cap member for interfitting successive like cap members angled side to angled side; and

nailing means at one of said angled side edges for securing said cap member to a roof.

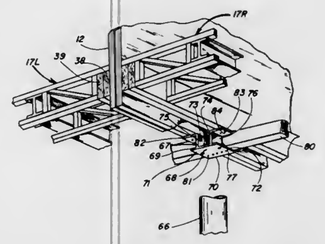
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**4,015,375**

## FLOOR FRAME ASSEMBLY FOR A MOBILE BUILDING

**Fredrick H. Lindsay, Rte. 1, Box 71, Darwin, Minn. 55324**

**Filed Mar. 21, 1975, Ser. No. 560,792**
**Int. Cl.² B62D** *25/00*
**U.S. Cl. 52—143** **9 Claims**




1. A building comprising:

first and second unified floor frame assemblies having adjacent portions, said assemblies each including a plurality of parallel lower beams and a plurality of middle beams mounted to said lower beams, said assemblies further including a pair of adjacent interior sidewalls attached to said middle beams and extending therebeneath;

exterior sidewalls mounted to said assemblies;

wheeled carriages mounted to said assemblies facilitating transportation of said assemblies to a building site;

a skirt permanently mounted externally to said sidewalls and extending adjacent said floor assemblies;

supporting means connected to said assemblies at said adjacent portions operable to support said assemblies; and,

connecting means connected to said middle beams and to said supporting means, said connecting means slidably receiving said interior sidewalls;

said connecting means includes a bracket, said bracket has a plate attached directly to said supporting means, said bracket has a first and second upstanding wall fixedly mounted to said plate with said interior sidewalls of said assemblies positioned between said first and second upstanding wall, said frame assemblies including runners attached to said lower beams, one of said runners from each of said first and second assemblies rest atop and are attached directly to said plate, at least one of said middle beams of said first assembly rests atop and is attached to said first upstanding wall, at least one of said middle beams of said second assembly rests atop and is attached to said second upstanding wall.

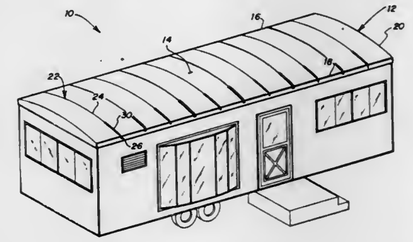
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**4,015,376**

## APPARATUS FOR STABILIZING A MOBILE HOME ROOF

**Leslie L. Gerhardt, 1001 Ranch Road, Rte. 1, Cedar Hill, Tex. 75104**

**Filed Apr. 12, 1976, Ser. No. 675,957**
**Int. Cl.² E04B** *7/00*
**U.S. Cl. 52—23** **9 Claims**




5. The combination comprising:

a. a mobile home having a membrane-type roof suspended over a plurality of roofing trusses, and the roof membrane being formed from a series of large panels secured together at their adjacent edges so as to form seams in the roof, and the membrane being secured to the trusses and other structural members with conventional fasteners;

b. a plurality of brackets for attachment to the structural members along the edges of the roof, and said brackets having means for engaging the ends of a strap member, and said brackets being spaced approximately four feet apart along the edges of said roof;

c. a plurality of flexible but non-stretchable straps extending transversely across the roof of the mobile home, with there being one strap for each pair of brackets on opposite sides of the roof, and the length of said straps being less than the width of the mobile home; and

d. a plurality of helical springs including one spring for each strap, and the straps being sized such that a spring which connects one end of a strap to a bracket must be placed in tension in order to permit the opposite end of the strap to be connected with an opposite bracket, with said tensioned springs serving to keep the straps in contact with the membrane-type roof but not connected to same, whereby the roof is restrained by the straps against any upward movement as a result of wind gusts.

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**4,015,377**

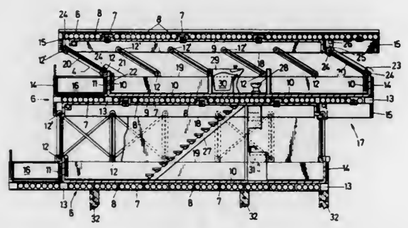
## COLLAPSIBLE MULTILEVEL BUILDING

**Andrzej Jastrzebski, 40, rue des Echevins B, Brussels, Belgium**

**Continuation of Ser. No. 497,079, Aug. 13, 1974, abandoned. This application Dec. 29, 1975, Ser. No. 645,312**
**Int. Cl.² E04B** *1/344*
**U.S. Cl. 52—66** **3 Claims**

1. A collapsible, multistory building structure comprising at least first, second and third platform members each extending in generally horizontal planes, said second platform member

being disposed between said first and third platforms, said building structure having wall means between said platform members extending from at least one of said platform members toward an adjacent platform member for providing an enclosed space between said first and second platform members and between said second and third platform members when said building structure is in its collapsed condition, said second platform member having surfaces facing said first and third platform members for forming the floor and ceiling respectively to the enclosed space formed above and beneath said second platform member each of said platform members having generally parallel sides said second platform member having a first set of supporting braces pivotally connected to its sides, said first set extending between said second platform member and said first platform member and being also pivotally attached to said wall means extending therebetween, said second platform member having a second set of supporting braces pivotally connected to its sides said second set extending between said second platform member and said third platform member and being also pivotally attached to said wall means extending therebetween each of said supporting braces being swingable in a vertical plane, a first number of



said supporting braces in said first set being connected to one end of said first platform member and extending to said second platform member and pivotally connected thereto at a distance from an end of said second platform member equal to the length of said brace, a first number of said supporting braces in said second set extending from one end of the opposite face of said second platform member to said third platform member and pivotally connected thereto at a distance from an end of said third platform member equal to the length of a said brace, each of said braces in said first and second sets being equally spaced from each adjacent brace whereby said braces allow movement in an angular pivoting fashion between said first, second and third platform members relative to one another and whereby said first, second and third platform members when collapsed, form a parallelepiped shaped unit and when raised establish a stepped relationship between adjacent platforms so that one end of said second and third platform members is cantilevered over at least the next adjacent lower platform member thereby forming an overhanging roof, the opposite end of said second and third platform member being stepped away from and exposing the next lower platform member thereby forming a gallery area in the lower platform member.

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**4,015,378**

**DEVICE FOR CLAMPING FLAT PANELS AGAINST METAL SECTION UPRIGHTS, PARTICULARLY FOR LINING DRYING CHAMBERS**

**Enrico Fava, Cento (Ferrara), Italy, assignor to Essiccatoi Fava S.p.A., Cento (Ferrara), Italy**

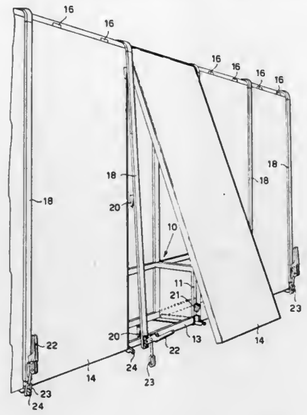
**Filed June 1, 1976, Ser. No. 691,873**

**Claims priority, application Italy, June 12, 1975, 24316/75**

**Int. Cl.² E04B** *2/82*

**U.S. Cl. 52—127** **3 Claims**

**1.** Device for clamping flat panels against a supporting structure comprising spaced metal section uprights and upper and lower horizontal cross members, particularly for lining drying chambers, comprising means for hooking or hinging the individual panels to the upper horizontal cross members of the supporting structure, and butt straps fastened upperly to the structure and designed to vertically cover the joints between two adjacent panels at the structure uprights, each of said butt straps being provided on that face facing the respective upright with a series of projecting wedge-shaped elements



spaced apart and arranged to co-operate with a like number of inclined plane intake pieces projecting from the upright, means being also provided at the lower end of each butt strap to exert a traction downwards thereon so as to lock the wedge-shaped elements in the respective inclined plane intake pieces and to exert a pressure on the panel edges in a direction perpendicular to the support surfaces of the uprights.

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**4,015,379**

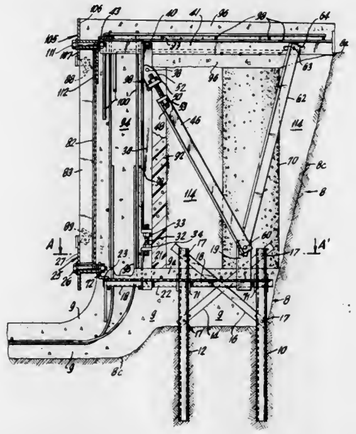
**IN-GROUND SWIMMING POOL AND APPARATUS AND METHOD FOR CONSTRUCTING SAME**

**Andrew Elliott Colson, Jr., 22 Way Drive, Summit, N.J. 07901**

**Filed June 10, 1976, Ser. No. 694,828**

**Int. Cl.² E04H** *3/16*

**U.S. Cl. 52—169.1** **22 Claims**



**1.** In combination in apparatus for fabricating a pool, plural pair of anchor posts spaced about a pool periphery, at least one of each pair of said anchor posts being partially axially disposed in a pool substrata, plural horizontally disposed locator arm means each affixed to a different pair of said anchor posts, plural frame lattice means each affixed to a different, associated one of said locator arm means, outer pool



wall defining form means affixed to said frame means and oriented in a direction between adjacent ones of said frame means, plural bottom form retaining runner means each secured to a different, adjacent pair of said locator arm means, plural upper form retaining means each affixed to a different adjacent pair of said frame means, and plural contiguous inner pool wall defining form sheet means secured between said upper and bottom form retaining runner means and oriented in a direction between adjacent ones of said frame means.

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**4,015,380**

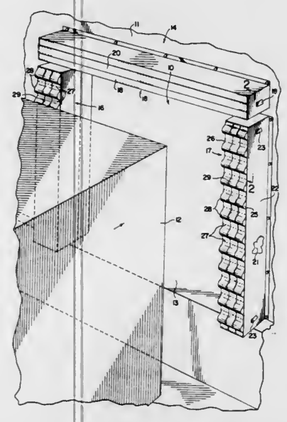
**TRUCK LOADING DOCK SEAL**

**Thomas W. Chalfant, Westlake, Ohio, assignor to Chalfant Sewing Fabricators, Inc., Cleveland, Ohio**

**Filed Apr. 28, 1976, Ser. No. 681,075**

**Int. Cl.² E06B** *7/23*

**U.S. Cl. 52—173 DS** **3 Claims**



**1.** In a loading dock seal structure supported along the outside top and sides of a wall adjacent a loading dock doorway, said structure including a top member and two side members to sealingly engage the top and sides of the end of a truck or trailer cargo body backed into loading and unloading position relative to said doorway, each of said side member comprises:

an elongated upright compressible block,

at least one layer of flexible material secured to the outer face of said block,

a strip of flexible material secured to said layer at uniformly spaced locations along horizontal seams to form outwardly extending horizontal bulges between said horizontal seams,

whereby upon engagement by said cargo body said bulges collapse accordion fashion to a flattened condition against said layer and the interior surfaces of said bulges slide against one another in a vertical direction to accommodate vertical movement of said truck cargo body during loading and unloading in its docked position against said seal.

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**4,015,381**

**ROUND BUILDING WITH COMBINED CENTER SUPPORT TUBE AND FLUE STRUCTURE**

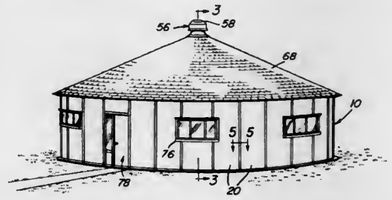
**Norbert T. Schmidt, 716-10th Ave. East, Alexandria, Minn. 56308**

**Filed Sept. 24, 1975, Ser. No. 616,301**

**Int. Cl.² E04H** *1/00*

**U.S. Cl. 52—199** **9 Claims**

**1.** In combination, a generally circular building having a foundation, an upstanding perimeter wall supported from and enclosing a generally circular interior area above said foundation, a roof structure bridging the upper marginal portions of said perimeter wall and defining a vaulted ceiling closure for said interior area, a plurality of angularly spaced upstanding partial cylindrical interior partition walls supported from said foundation spaced inwardly of said perimeter wall, said partition walls being generally concentric relative to said perimeter wall and defining a substantially open central portion of said interior area inwardly of said partition walls, one end of each of said partition walls including an upstanding full radial partition extending between the partition wall and a corresponding portion of said perimeter wall and the other end of each of said partition walls including an upstanding partial portion extending outwardly toward but terminating a spaced distance inwardly of a corresponding portion of said perimeter wall, partial inwardly projecting partitions extending inwardly from peripherally spaced portions of said perimeter wall toward and terminating outwardly of portions of said partition walls spaced intermediate the corresponding full and partial partitions thereof, a space heater structure mounted centrally within said interior area, said interior area being substantially completely open, in vertical directions, from said foundation to said vaulted ceiling, for vertical air flow currents therein, whereby rising convection air currents of heated air may be



generated in the central portion of said interior area by said space heater structure and the convection air currents may thereafter move downwardly along the inner surfaces of said vaulted ceiling and perimeter wall and thereafter inwardly over said foundation toward said central portion of said interior area, said building including a central upstanding roof support column supported at its lower end from said foundation centrally of said area, at least an upper portion of said column being hollow, a support frame encircling and supported from said column at a level spaced above the upper portions of said perimeter wall structure and spaced outwardly of said column, said roof structure including downwardly and outwardly inclined roof rafter members spaced about said column in generally radial planes with their upper innermost end portions anchored relative to corresponding portions of said frame and their lower outermost end portions anchored relative to the upper portions of corresponding portions of said perimeter wall structure, said roof structure including a central void area defined by upper marginal portions of said roof structure spaced outwardly from and extending about the upper end portion of said column, and a cap structure supported from said upper marginal portions of said roof structure toward and terminating outwardly of portions of said partition walls spaced intermediate the corresponding full and partial partitions thereof.

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**4,015,382**

**REINFORCED DOOR FRAME**

**Harry M. Noyes, McKean, Pa., assignor to Fenestra, Erie, Pa.**

**Filed Aug. 10, 1976, Ser. No. 713,188**

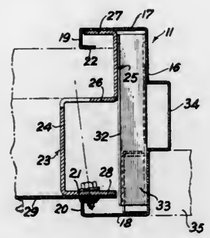
**Int. Cl.² E06B** *1/04*

**U.S. Cl. 52—204** **5 Claims**

**1.** A door frame comprising a head section and two jamb sections,

said sections each comprising an elongated generally channel shaped member and a generally Z-shaped stiffener

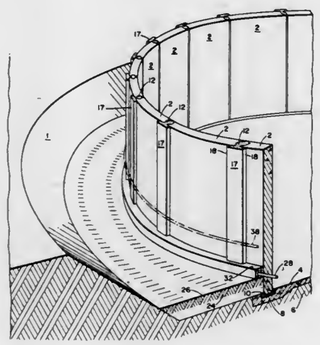
member defining generally flat front wall and substantially flat side walls extending generally perpendicular to one side of said front wall,
the outer end portion of said side walls being bent inwardly at approximately 90° forming a channel,
the inner ends of said channel being bent toward said front wall forming a first inner end and a second inner end generally parallel to each other,



a generally Z-shaped spacer approximately equal length to said front wall,
said spacer having a first leg and a second leg disposed generally parallel to each other and to said side walls of said channel,
one of said ends of the said Z-shaped spacer being adapted to be secured to one of the side walls of said channel and means for securing one of said end walls to said one side wall with an element supported therebetween.

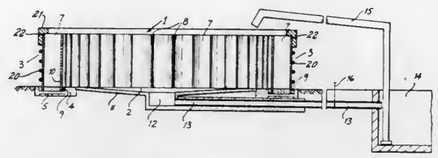
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**4,015,383**
**CONCRETE TANK OF PRECAST CONCRETE PANELS WITH PRETENSIONING BEAM MEANS**
**Francis X. Crowley, 24 Lanark Road, Wellesley, Mass. 02181**
**Continuation of Ser. No. 418,443, Nov. 23, 1973, abandoned.**
**This application May 9, 1975, Ser. No. 576,121**
**Int. Cl.² E04H** *12/16*
**U.S. Cl. 52—224** **3 Claims**



1. A tank wall comprising:
a multiplicity of precast panels of concrete, laterally spaced-apart over their entire thickness, and vertically one-piece integral over the entire height of said wall,
cast concrete filler units filling the entire spaces between said panels,
a plurality of vertically spaced-apart cast continuous circular concrete beams contiguous with said panels,
said beams forming horizontal collars surrounding said wall to reinforce said wall, and
metal reinforcing means surrounding said wall and covered by the concrete of said beams,
said reinforcing means being in tension while the tank formed by said wall is empty, thereby to stress said wall.

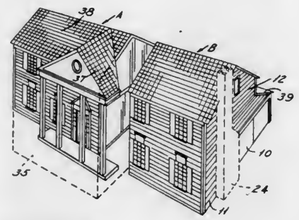
**4,015,384**
**CONSTRUCTION OF TANK**
**Anthony Dermot Barry, Cork, Ireland, assignor to John A. Wood Limited, Victoria Cross, Ireland**
**Filed June 10, 1975, Ser. No. 585,457**
**Claims priority, application Ireland, June 13, 1974, 1237/74**
**Int. Cl.² B65G** *5/00*
**U.S. Cl. 52—224** **14 Claims**



1. A cylindrical tank comprising:
a base;
a plurality of concrete pipes erected on the base each having its longitudinal axis perpendicular to the base and having a hole adjacent to the base to communicate with the interior of the tank; and
means for grouting adjacent pipes together.

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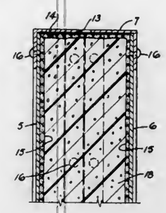
**4,015,385**
**HOUSE WITH UNFINISHED BONUS SPACE**
**William J. Pulte, 1505 Kirkway Drive, Bloomfield Hills, Mich. 48013**
**Filed June 2, 1975, Ser. No. 582,679**
**Int. Cl.² E04H** *1/04*
**U.S. Cl. 52—236** **9 Claims**



1. A house comprising;
a two story generally rectangular finished exterior shell, a central entrance in one of the longer side exposures of said rectangular shell, a vertical wall structure extending between said longer side exposures at one side of said entrance dividing the house into two major internal two-story portions of comparable size, the portion having said entrance being finished with complete initial living quarters including living, kitchen, eating, multiple bedroom, closet, bath, hall and stairway accommodations, the other portion including a built-in garage (bounded by at least two interior walls), and adjacent unfinished first floor room space, floor structure overlying both said garage and adjacent first floor room space for unfinished second floor rooms adjacent said vertical wall structure, and provisions including means for convenient utility connections facilitating optional future completion of said other portion to include desired supplemental finished rooms on both stories.



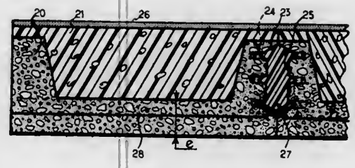
**4,015,386**
**FIRE-RETARDANT LOW TEMPERATURE INSULATING BUILDING PANEL**
**Sanford L. Cook, Edison, N.J., assignor to Clark Door Company, Inc., Cranford, N.J.**
**Filed Feb. 7, 1975, Ser. No. 547,919**
**Int. Cl.² E04C** *2/26*; **E04B** *1/94*
**U.S. Cl. 52—232** **4 Claims**



1. A fire-retardant low temperature insulating panel comprising:
a. a sheet metal casing having top, bottom, side and end walls,
b. a layer of hydrous alkaline metal silicate substantially completely lining the interior surfaces of said casing, and
c. a poured core of polymeric foam resin filling the interior of the lined enclosure.

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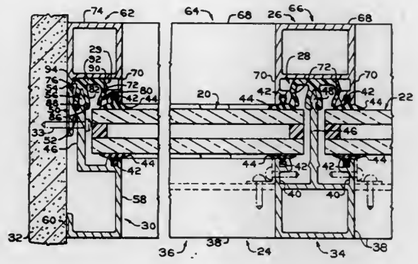
**4,015,387**
**PREFABRICATED STRUCTURAL ELEMENTS FOR PARTITIONS AND WALLS OF BUILDINGS AND PARTITIONS AND WALLS CONSISTING OF SUCH ELEMENTS**
**Etienne Lucien Tillie, La Colle sur Loup, France, assignor to Tramex S.A., Luxembourg, Luxembourg**
**Filed Aug. 14, 1974, Ser. No. 497,325**
**Claims priority, application France, Aug. 30, 1973, 73.31439; May 17, 1974, 74.17311**
**Int. Cl.² E04C** *1/00*
**U.S. Cl. 52—309.17** **9 Claims**



1. A prefabricated core element for the construction of partitions and bearing walls of buildings, said core element having the shape of a substantially parallelepipedic plate having peripheral edges and comprising a composite of a first section formed of a thermal insulation material having the face thereof constituting one face of the core element and a second section having the face thereof constituting the opposed face of the core element and being coextensive throughout the area of said core element with said first section, said second core section being made from a lightweight, rigid and strong loadbearing material having a U-shaped cross section with enlarged parallel peripheral edges having load bearing capacity and occupying the major portion of the thickness of the core element at least along said peripheral edges, said first member filling the interior of said U-shaped second member and extending over the peripheral edges thereof to form an entire face, said second core section having on at least one of the edges thereof a plurality of longitudinal grooves and a plurality of blind bores formed in said grooves extending into said core at an angle with respect to the edge surface, said grooves and blind bores being adapted to be filled after juxtaposition with a like prefabricated element with a settable binder injected therebetween.

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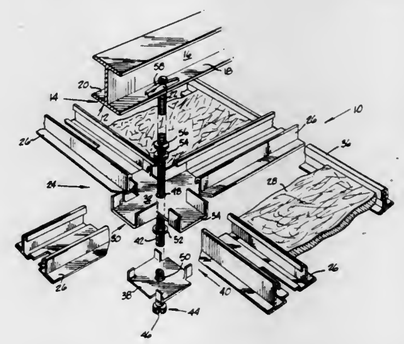
**4,015,388**
**RETAINING CLIP FOR A DIVISION BAR**
**James W. Hemminger, Buchanan, Mich., assignor to PPG Industries, Inc., Pittsburgh, Pa.**
**Filed Jan. 14, 1976, Ser. No. 649,119**
**Int. Cl.² E04B** *1/62*
**U.S. Cl. 52—395** **26 Claims**



1. A retaining clip for a division bar wherein the division bar is of the type having a gutter member and a facing member, comprising:
a base having a major surface;
a bifurcated member attached to and extending away from said major surface of said base for engaging the gutter member;
at least one flexible leg attached to and extending away from said major surface of said base in spaced relation to said bifurcated member; and
means formed on at least said at least one flexible leg for maintaining the clip in the facing member.

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**4,015,389**
**CEILING SYSTEM AND PREFABRICATED OVERHEAD BUILDING ASSEMBLY USING THIS SYSTEM**
**Neil Jay Thompson, Palatine, Ill., assignor to Johns-Manville Corporation, Denver, Colo.**
**Filed Apr. 17, 1975, Ser. No. 569,111**
**Int. Cl.² E04B** *5/52*; **E04C** *3/30*
**U.S. Cl. 52—475** **14 Claims**



1. A prefabricated overhead building assembly, comprising:
a. a prefabricated overhead building structure including planar support means having a plurality of spaced top openings extending therethrough;
b. a ceiling support grid positioned below and adjacent to said planer support means and including
i. a plurality of elongated support runners, and

ii. a plurality of connectors connecting said runners together to form said grid, said connectors including respective bottom openings extending therethrough and corresponding in number to said top openings, said bottom openings being in vertical alignment with said top openings;

c. a plurality of threaded bolts having enlarged heads and corresponding in number to said top and bottom openings, said bolts extending through respective ones of said bottom openings and into vertically aligned top openings such that the heads of said bolts lie below and adjacent said connectors, said bolts being of sufficient length to provide a predetermined maximum spacing between said planer support means and said support grid;

d. a plurality of thread nuts corresponding in number to said bolts, said nuts being thread mounted around respective ones of said bolts directly above said connectors, said nuts being thread movable against said connectors and cooperating with the heads of said bolts to prevent movement of said connectors along the lengths of said bolts; and

e. threaded means associated with and cooperating with said bolts for preventing free movement of said bolts through said top openings but allowing threaded movement through the top openings, said threaded movement being provided to adjust the spacing between said planer support means and said grid.

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**4,015,390**

## GLAZING STRUCTURES

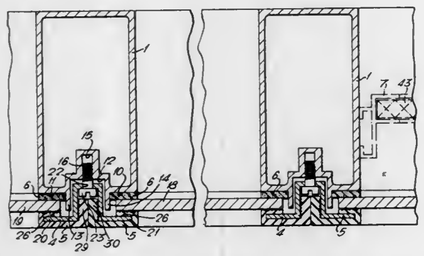
**Ronald Howorth, Littleborough, England, assignor to BTR Industries Limited, England**

**Filed May 25, 1976, Ser. No. 689,848**

**Claims priority, application United Kingdom, Oct. 29, 1975, 44674/75**

**Int. Cl.² E04B** *1/00*

**U.S. Cl. 52—495** **3 Claims**



1. A glazing structure comprising an elongated structural member having two spaced apart surfaces to abut against, with or without the interposition of gaskets, the one faces of two panel edge portions respectively, a glazing bead of open channel section whereof the channel base is arranged to engage the structural member between the said surfaces with the side walls of the channel extending outwardly away from the structural member, the side walls being turned outwardly from one another at their end portions to provide abutments facing towards the surfaces to lie opposite the other faces of the edge portions of the panels respectively, means accessible from the outer side of the channel section of the glazing bead to secure the base of the channel of the bead to the structural member and two gaskets of elastomeric material each having a first portion to lie between the abutment and the other faces and second portions to enter within the channel of the glazing bead, the arrangement being such that the glazing bead can first be secured to the structural member with the first portions of the gaskets secured between the bead and the panels to hold the panels in position and the second portions can then be pressed side by side into the channel to form a weatherproof seal for the channel.

**4,015,391**

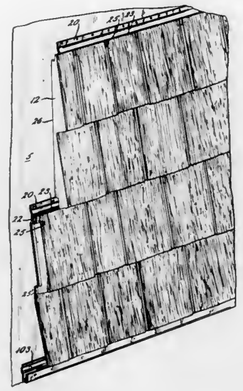
## SIMULATED CEDAR SHAKE CONSTRUCTION

**George Epstein, Akron, and Robert E. Mollman, Chagrin Falls, both of Ohio, assignors to Alside, Inc., Akron, Ohio**

**Filed Feb. 13, 1973, Ser. No. 332,163**

**Int. Cl.² E04D** *1/26*

**U.S. Cl. 52—520** **6 Claims**



1. A simulated shake panel characterized by the random appearance of individual shakes comprising a board-shaped panel member having:

means at the top, bottom and side marginal edges of said panel member for interfitting successive like panels top to bottom and side to side;

nailing means for securing said panel to a building, said nailing means being concealed when successive like panels are interfitted;

the front face of said panel comprising a plurality of simulated side by side underlapped randomly sized shakes in at least two courses thereof, each shake course having a random butt line, said shakes being disposed in top and bottom overlapping and underlapping relation, apparently exposing an underlying wall surface to view at the side by side and top and bottom underlaps, the end shakes in one course being half-shakes and the end shakes in a second course being full shakes with the terminus of at least one of the end full shakes in said second course being spaced inward on the panel face from the terminus of the adjacent half-shake of said first course, whereby panels joined edge create in said one course the simulation of a cracked full shake spanning the side edge joint masking same in the said one course, and leaving a full side-by-side shake underlap appearance at the side edge joint of said second course, said underlap being visually the same as the underlapped intra-panel side-by-side shakes.

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**4,015,392**

## BUILDING WALL PANEL SYSTEM

**James W. Eaton, Sleepy Hollow, Ill., assignor to Masonite Corporation, Chicago, Ill.**

**Filed Jan. 26, 1976, Ser. No. 652,413**

**Int. Cl.² E04D** *1/00*

**U.S. Cl. 52—533** **8 Claims**

1. An integral siding/roofing building wall panel, comprising:

an elongated rectangular base portion formed of structural sheet material having opposite spaced apart inner and outer faces,

said base portion having longitudinal upper and lower edges dimensioned to span across for attachment with at least one pair of spaced apart upwardly extending parallel structural supports of a building structure, said lower edge of said base portion sloping upwardly at an acute angle from said inner face toward said outer face,

said base portion including opposite ends adapted to lie along said structural supports and of sufficient thickness between said faces for providing a rigid wall,

an outer surface portion formed of sheet material on the outer face of said base portion,

said outer surface portion having an outer, weather resistant surface formed by an embossing process to resemble a plurality of shingle elements laid side by side and having an upper edge spaced downwardly and parallel of said upper edge of said base portion forming an exposed fastening strip surface on said outer face of said base portion along said upper edge, said outer surface portion terminating along said upper edge with an interlocking surface sloping upwardly and outwardly of said fastening strip surface of said base portion at an acute angle adapted for positive interlocking engagement with said sloped lower





edge of said base portion of another of said building wall panels placed in an adjacent upward level against said structural supports,

said outer surface portion having a lower edge portion projecting downwardly of said lower edge of said base portion and having an inner face portion adapted to abut and overlie said fastening strip surface on the base portion of another of said building wall panels interlocked therewith when placed in an adjacent lower level against said structural supports,

said lower edge portion having an irregular lower edge formed to resemble lower edges of shingle elements placed side by side, and said outer surface portion formed with grooves between adjacent shingle elements open along said lower edge to discharge water onto the outer surface portion of a panel interlocked therewith in an adjacent lower row and

a key spline along said upper edge of said outer surface portion, said key spline having a lower portion embedded in said base portion and sloping parallel of said interlocking upper edge of said outer surface portion.

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**4,015,393**

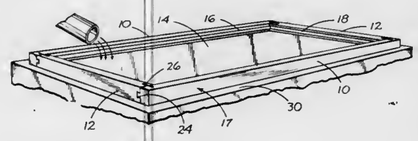
## PANEL WITH CORE AND METHOD OF CONSTRUCTING

**Charles Herbert Warwick, 1800 SW. North Shore Road, Lake Oswego, Oreg. 97034**

**Filed June 4, 1973, Ser. No. 366,340**

**Int. Cl.² E04B** *2/28*

**U.S. Cl. 52—615** **3 Claims**



1. A panel comprising

an outer frame of side and end rail members joined together at corners with mortise and tenon joints, and a core of fire-resistant material within and bounded by said frame,

a joint in said frame including a tenon portion presented by and an integral part of one of said rail members fitting within a mortise portion presented by an an integral part of another of said rail members, and at least one of said portions being part of a continuous expanse of like cross-sectional profile extending along the rail member which presents the portion, along that side of the rail member which faces said core,

said core having an edge margin extending alongside said continuous expanse which lies against and is shaped to have a locking fit with said continuous expanse said mortise and tenon portions having a shape forming a dovetail joint, and the locking fit of said edge margin of said core with said continuous expanse being a dovetail fit.

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**4,015,394**

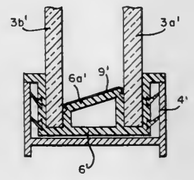
## DOUBLE-INSULATED GLASS WINDOW WITH INSULATING SPACER

**Gerald Kessler, 388 Cranberry Road, Broadman, Ohio 44512**

**Filed Oct. 14, 1975, Ser. No. 622,088**

**Int. Cl.² E04B** *1/62*; **E04F** *15/14*

**U.S. Cl. 52—616** **1 Claim**



1.

a. An insulating window comprising two parallel spaced-apart glass panes separated by an enclosed interior space,

b. a plastic space member sealing and separating said glass panes, said space member extending longitudinally along the outer edges of the panes between their inner faces, and having an interior surface which faces the interior space between the two panes and extends laterally between said inner faces of the panes,

c. an impermeable, very thin metallic coating on said interior surface of the plastic member extending continuously from one of said panes to the other and thus shielding the interior space between the two panes from direct contact with said interior surface of the plastic member,

d. said interior surface of the plastic member extending at an angle to the inner faces of said panes, and the exposed surface of said impermeable coating being highly reflective so that radiant heat striking said surface of said coating will be reflected preferentially toward one of said panes rather than toward the other one, to increase the heating effect on the side toward which the radiant heat is directed.

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**4,015,395**

## PUNCHEON UNIT FOR BUILDERS SCAFFOLDING

**Peter Eric Gostling, Sutton Coldfield, England, assignor to C. Evans & Sons Limited, Ilford, United Kingdom**

**Filed June 9, 1975, Ser. No. 585,065**

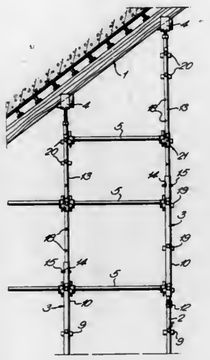
**Claims priority, application United Kingdom, June 13, 1974, 26276/74**

**Int. Cl.² E04G** *1/14*; **E04H** *12/00*

**U.S. Cl. 52—637** **8 Claims**

1. A puncheon unit for use with a scaffold structure of the kind comprising upright support members having support elements arranged at a standard spacing, and cross members attached at their ends to said support elements, said puncheon unit comprising an outer tubular member formed at one end to be attached to an upright support member of said scaffold structure and, at or near its other end, with a transverse hole to receive a locking pin, an inner tubular member telescopi-

cally received in said outer member and formed with a series of spaced transverse holes to coact with said hole of said outer member, wherein both said outer member and said inner member are additionally provided with spaced cross member channel-shaped support elements, the spacing of said support elements of said outer member corresponding to said standard



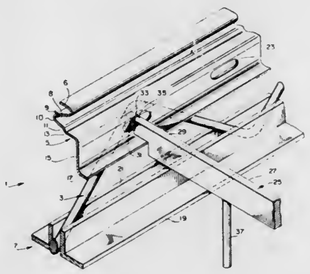
spacing of said support elements of said upright support members, and the spacing of said transverse holes and said support elements of said inner member being from a fraction up to 1 times said spacing, said spaced cross member channel-shaped support elements each projecting the same distance from the longitudinal axis of said inner and outer tubular members.

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**4,015,396**
**JOIST**

**Ernest Otto Butts, and Felix F. Laurus, both of Ottawa, Canada, assignors to Hambro Structural Systems Ltd., Ottawa, Canada**

**Filed June 3, 1975, Ser. No. 583,289**
**Claims priority, application Canada, June 11, 1974, 202200**
**Int. Cl.² E04C** *3/16, 3/293, 3/07*
**U.S. Cl. 52—690** **10 Claims**



1. A steel joist for use in a composite concrete and steel floor constructed by using concrete pouring form panels, said joist having upper and lower chords vertically spaced by a joining web, characterized by said upper chord comprising:
- a single elongated member having an upper section with substantially a zig-zag cross section including integral top, oblique and lower portions the latter of which has an underside that extends transversely substantially flat from the lower end of said oblique portion for a substantial horizontal distance to an outer end,

said elongated member further having, integral with said upper section, a lower section including a concrete pouring form panel support shelf extending horizontally in both the longitudinal and transverse directions of said elongated member, and

said lower section of said elongated member further including vertically offsetting step down means integrally connecting said lower portion at its said outer end to said shelf for limiting the horizontal extent a first pouring panel can be pushed under said lower portion on one side of said step down means and providing the said shelf on the other side thereof at a given vertical level for supporting a pouring panel like said first panel at substantially the same level as said first panel.

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**4,015,397**
**SERVICE POLES AND ACCESSORIES**

**Charles T. Flachbarth, and John L. Myers, both of Parkersburg, W. Va., assignors to Textron, Inc., Providence, R.I.**

**Division of Ser. No. 464,803, Apr. 29, 1974, U.S. Pat. No. 3,889,044. This application Apr. 28, 1975, Ser. No. 572,466**
**Int. Cl.² E04B** *1/38*
**U.S. Cl. 52—713** **6 Claims**



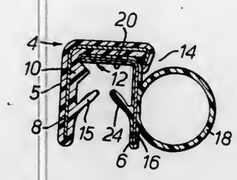
1. For a service pole for supplying power and/or telephone outlets in a room and pole being adapted to extend between the floor and ceiling of the room and the ceiling being the suspended type having means for supporting panels, a pedestal comprising;
- a bracket having a base and a pair of flanges respectively connected adjacent to the top and bottom of the base and extending outwardly therefrom, the flanges being formed with aligned apertures, the aperture in one of the flanges being formed with a flat;
- a foot having a base and a threaded leg the leg extending through said aligned apertures and making a sliding therewith, and the leg having a flat engaging said aperture flat to prevent rotation of the pedestal with respect to the bracket;
- a pair of nuts threaded on said leg respectively on the top side and bottom side of one of said flanges for securing the leg to the flange;
- a cavity formed in the bottom of said base; and
- plate means mounted in said cavity for engaging the floor on which the pole is mounted.



**4,015,398**
**CHANNEL-SHAPED SEALING, FINISHING AND GUIDING STRIPS**

**Robert G. Bright, Gerhart-Hauptmann-Strasse 5, 406 Viersen 1, Germany**

**Filed Sept. 10, 1975, Ser. No. 612,201**
**Int. Cl.² E04C** *2/38;* **E08B** *3/00*
**U.S. Cl. 52—716** **14 Claims**



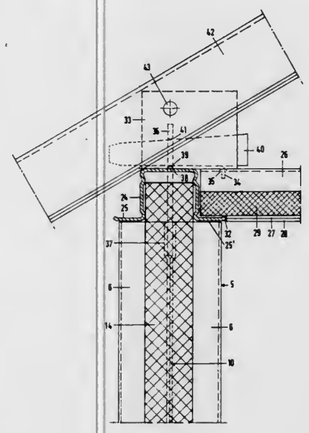

1. A sealing strip, comprising
- reinforcing metal carrier means defining a generally channel shape having a base and side walls,
- flexible covering material enclosing the base and the side walls of the channel, and
- respective gripping ribs defined by and integral with the said flexible covering material and positioned on the inner, facing, surfaces of the said side walls of the channel, the ribs extending along the said surfaces longitudinally of the channel and being directed towards each other,
- the ribs on the respective surfaces being of different hardnesses.

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**4,015,399**
**BUILDING, METHOD AND APPARATUS FOR THE CONSTRUCTION THEREOF**

**Pier Prins, Damwoude, Netherlands, assignor to Prins N.V., Dokkum, Netherlands**

**Filed Dec. 31, 1974, Ser. No. 537,828**
**Int. Cl.² E04B** *1/14*
**U.S. Cl. 52—747** **6 Claims**



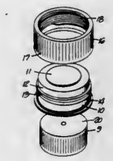
1. A method of erecting a building essentially from pre-fabricated elements comprising steel carrying and supporting sections and wall, ceiling, floor, roof and the like panel members, wherein the carrying and supporting sections are generally U-shaped in cross section and formed with at least one end flange extending generally outwardly from the end of at least one of the legs of said U-shaped sections, comprising:
- securing first ones of said sections having a single end flange, peripherally embracing the floor so that said single end flange of each extends upwardly from the floor;
- securing stiles to said single end flange of said first ones of said sections so as to extend upwardly from the floor, said stiles being formed by second ones of said sections having two legs each formed with an end flange extending generally outwardly from the end thereof;
- peripherally clampingly engaging wall panels between laterally spaced adjacent stiles for the former to be retained therebetween;
- securing anchor means to the upper portion of the stiles, said anchor means having a vertically extending upper portion;
- securing tie beams between upper portions of opposing stiles in engagement with the upper portion of the anchor means so as to hold the stiles mutually together, said tie beams comprising third ones of said sections having two legs each formed with an end flange extending generally outwardly from the end thereof, said legs extending downwardly;
- clampingly engaging wall plates to the upper margins of the wall panels so as to overlie the upper ends of the stiles with the upper portion of the anchor means extending through the wall plates, said wall plates being formed by fourth ones of said sections having two legs each formed with an end flange extending generally outwardly from the downwardly extending legs; and
- anchoring roof beams comprising fifth ones of said sections to the upper portion of the anchor means for supporting roof panels thereon, each of said fifth ones of said sections having two legs each formed with an end flange extendng generally outwardly from the end thereof and said legs extending downwardly.

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**4,015,400**
**METHOD OF OPENING MEDICAL LIQUID CONTAINER WITH SEPARABLE OUTER AND INNER CLOSURES**

**Pradip V. Choksi, North Hollywood, and Roy B. Steidley, Seal Beach, both of Calif., assignors to American Hospital Supply Corporation, Evanston, Ill.**

**Division of Ser. No. 338,662, Mar. 7, 1973, U.S. Pat. No. 3,923,183. This application Sept. 15, 1975, Ser. No. 613,635**
**The portion of the term of this patent subsequent to Apr. 20, 1993, has been disclaimed.**
**Int. Cl.² B65B** *43/40*
**U.S. Cl. 53—3** **5 Claims**



1. A method of opening a sterile medical liquid container with a dispensing outlet closed by an inner closure and an outer externally threaded cap bonded to the container comprising the steps of:
- rotating an internally threaded annular ring in a given direction to screw this ring onto the outer cap with said ring being totally free of any contact with said inner closure;
- further rotating the annular ring in the same direction for fracturing the outer cap;

lifting the combined threaded ring and outer cap from the inner closure;

and thereafter opening the inner closure after the threaded ring and outer closure have been completely separated therefrom.

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**4,015,401**

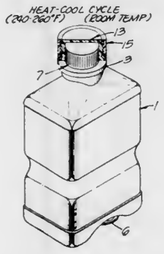
## METHOD OF FORMING CLOSURE SYSTEM FOR MEDICAL LIQUID CONTAINER

**Elmer F. St. Amand, North Hollywood, and Thomas R. Thornbury, La Crescenta, both of Calif., assignors to American Hospital Supply Corporation, Evanston, Ill.**

**Division of Ser. No. 338,684, Mar. 7, 1973, Pat. No. 3,923,062. This application Apr. 17, 1975, Ser. No. 568,989**

**Int. Cl.² B65B** *53/06, 43/00, 7/28;* **B67B** *3/20*

**U.S. Cl. 53—29** **4 Claims**




**1.** A method of forming a bacteria-tight hermetic seal at an outlet of a container for sterile liquids, comprising the steps of:

a. blow molding at a pressure of 50 to 150 psi a first thermoplastic material to form a container with a threaded neck having internal stresses;

b. injection molding at a pressure of 5,000 to 20,000 psi a second thermoplastic material to form a rigid closure with a top wall and a depending skirt having internal threads, with said skirt being thicker than the depth of threads in the skirt, said closure having substantially greater internal stresses than the container neck;

c. placing liquid within the container;

d. assembling the threaded closure onto the threaded neck;

e. subjecting both the top wall and thick threaded skirt of the rigid closure as well as the threaded container neck to a common stress relieving environment to form therebetween a bacteria-tight joint that is openable with a predetermined force of 10 to 30 inch pounds of torque.

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**4,015,402**

## APPARATUS AND METHOD FOR LOADING BLOCK-LIKE ARTICLES INTO A RECEPTACLE

**David K. Domnitz, Taylors, and Billy R. Osborne, Woodruff, both of S.C., assignors to W. R. Grace & Co., Duncan, S.C.**

**Filed Feb. 19, 1976, Ser. No. 659,382**

**Int. Cl.² B65B** *43/36*

**U.S. Cl. 53—29** **11 Claims**

**9.** A method of loading block-like articles into an opened receptacle comprising the steps of:

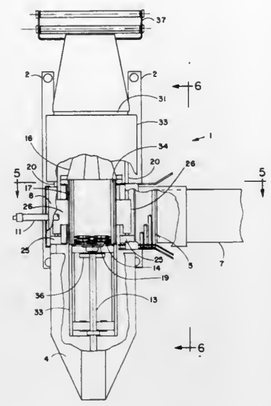
a. providing a movable loading carriage with spreader means and with conveyor bed means for receiving said article, said conveyor bed means being movable relative to said carriage;

b. applying a pulling force to the upper portion of a block-like article to pull same onto said conveyor bed;

c. at least partially opening a receptacle so that its mouth faces said article;

d. advancing said loading carriage to a position adjacent said opened receptacle;

e. spreading the mouth of said bag with said spreader means so that said article will not touch the mouth of said receptacle when placed therein; and,




f. applying a pushing force to the side of said article opposite said receptacle to push said article and conveyor bed means into the receptacle.

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**4,015,403**

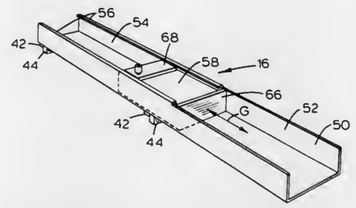
## WRAP-AROUND CARTON FORMING MACHINE

**Marinus J. M. Langen, Rexdale, Canada, assignor to H. J. Langen & Sons Ltd., Rexdale, Canada**

**Division of Ser. No. 553,269, Pat. No. 3,968,623. This application Sept. 29, 1975, Ser. No. 617,311**

**Int. Cl.² B65B** *11/22*

**U.S. Cl. 53—195** **3 Claims**




**1.** In a wrap-around carton loading and forming machine of the type wherein a carton blank is wrapped around a mandrel bucket, within which the article which is to be wrapped is located, as the mandrel bucket moves through a wrapping station, the improvement of;

a. a frame,

b. an endless conveyor mounted for movement longitudinally of said frame, said conveyor having a pair of oppositely disposed first and second side edges, a portion of said first edge extending adjacent said wrapping station,

c. a plurality of upwardly open mandrel buckets mounted on said conveyor at longitudinally spaced intervals therealong and extending transversely thereof, each of said buckets having a first portion disposed between said side edges of said conveyor and secured against lateral movement with respect to said conveyor, and a second portion projecting laterally outwardly from said first side edge of said conveyor and terminating in an outer end, said second portion providing a mandrel about which a carton blank may be wrapped in said wrapping station, said mandrel having a length extending outwardly from said first side edge of said conveyor at least equal to the length of the article to be wrapped so as to extend into said wrapping station as the mandrel buckets are moved by said conveyor along said frame, said mandrel buckets being longitudinally spaced with respect to one another a distance sufficient to permit a carton blank to be located therebetween for wrapping about said mandrel buckets as they are moved through said wrapping station, said buckets having a U-shaped channel extending therealong so as to extend across said conveyor and into said second portion thereof to provide an article receiving chamber therein,

d. a plunger slidably mounted in the U-shaped channel of each mandrel bucket for movement therein in a direction which extends transversely of said conveyor, said plunger having a pushing end located within said channel and directed towards said outer end of said second portion, said plunger being movable between a first position in which it is disposed within said first portion of its associated mandrel bucket and spaced a substantial distance inwardly from said outer end of said mandrel bucket and a second position at or adjacent said outer end so as to discharge an article from said bucket by way of said outer end in response to movement of said plunger from said first position to said second position,

e. guide rail means disposed directly above said mandrel buckets and engaging said plunger means for moving said plunger means with respect to said mandrel buckets between said first and second positions in response to movement of said mandrel buckets with said conveyor,

f. drive means for drivingly engaging said conveyor for driving said conveyor continuously to drive said mandrel buckets continuously through said wrapping station.



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**4,015,404**

## APPARATUS FOR BUNDLING STACKS OF NEWSPAPERS

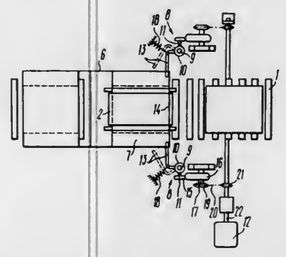
**Nikolai Ivanovich Anikanov, Bolshaya Bronnaya ulitsa, 2/6, kv. 6, Moscow; Evgeny Arkadievich Baburin, Prospekt Romena Rollana, 25, kv. 264, Kiev; Leonid Pavlovich Grachev, Serafimovicha ulitsa, 2, kv. 181, Moscow; Grigory Iosifovich Zax, Mechnikova ulitsa, 14a, kv. 24, Kiev; Grigory Avramovich Radutsky, 16 Parkovaya ulitsa, 49, korpus 2, kv. 68; Mikhail Evseevich Frumkin, Naberezhnaya-Novikova-Proboya, 9, kv. 34, both of Moscow, and Rafail Efimovich Kheifets, Brest-Litovsky prospekt, 162, kv. 30, Kiev, all of U.S.S.R.**

**Continuation-in-part of Ser. No. 624,560, is a continuation of Ser. No. 459,346, April 9, 1974, abandoned. This application Feb. 19, 1976, Ser. No. 659,519**

**Claims priority, application U.S.S.R., Apr. 13, 1973, 899752**

**Int. Cl.² B65B** *11/02*

**U.S. Cl. 53—218** **2 Claims**



**1.** In an apparatus for bundling stacks of newspapers, comprising a feed-in rollerway for feeding stacks of newspapers, an endless driven roller conveyor for accepting stacks fed in by said rollerway, arranged downstream of the rollerway in the stack feeding direction and being adapted to be intermittently driven by an associated drive means, a detachable frame arranged above said roller conveyor, means for feeding a web of wrapping paper intermediate said frame and a stack, the width of the web of wrapping paper being somewhat greater that the width of the stack, for margins of this wrapping paper web to protrude in the areas of the end faces of the bundle-to-be, said frame being reciprocable in a vertical plane to be put over the wrapping paper onto the stack, whereby the stack becomes wrapped up at its top plane and two sides, in which way a bundle with open end faces is formed, an improvement residing in that in the stack wrapping-up zone defined by the frame and said roller conveyor there is mounted to each side of said feed-in rollerway a device for retaining newspapers in the stack from being crumpled, each said device including a bell crank pivotable about a pivot axis in a plane parallel with the feeding direction of said feed-in rollerway, one arm of said bell crank being operatively connected with the drive means of said roller conveyor, for pivoting said bell crank into two alternative positions in one of which the other, free arm of said bell crank is introduced into the area of the protruding margins of the wrapping paper web and is aligned with the lower edge of the stack, foremost in the direction of the latter's advance, for the said margins of the wrapping paper web to be guided about the said free arm as the wrapping paper web is being introduced to underlie the bottom side of the stack; in the other of said alternative positions, at the moment when the operation of introducing the wrapping paper to underlie the bottom side of the stack is nearing its completion, said free arm is retracted from under the wrapping paper web, to enable the stack to leave the roller conveyor unobstructedly, the operative connection between the first-mentioned arm of said bell crank an the drive means of said roller conveyor being such that the bell crank is driven from said second position into said first position thereof before the motion of the roller conveyor is arrested.

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**4,015,405**

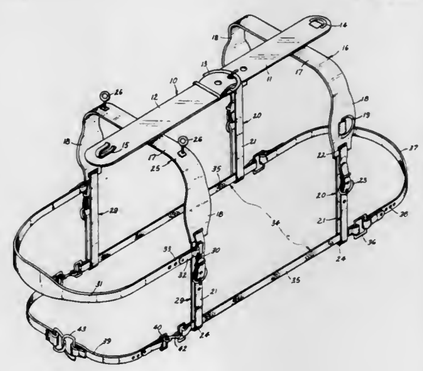
## ALL PURPOSE TRAINING HARNESS

**Patricia R. Westlund, 6879 E. Cholla St., Scottsdale, Ariz. 85254**

**Filed May 22, 1975, Ser. No. 579,920**

**Int. Cl.² B68B** *1/00*

**U.S. Cl. 54—71** **4 Claims**



**1.** In an all purpose training harness for horses that is adjustable to fit horses of various sizes within a wide range,

a. a top strap including two parts which are detachably connected by a buckle which provides for adjusting the length of said top strap,

b. a rear cross strap of inverted U shape comprising a substantially flat back and a pair of legs depending from the ends of said back, said back having a central portion secured to said top strap,

c. a rear strap hanger suspended from each leg and including means for adjusting its effective length,

d. a front cross strap of inverted U-shape providing a substantially flat back and a pair of legs depending from the

ends of said back, said front strap having a central portion secured to said to strap,

e. a front strap hanger suspended from each of said legs and including means for adjusting the effective length thereof,

f. a breast strap having ends attached to said front strap hangers; and

g. a body strap supported by said strap hangers and comprising:

I. two elastic side parts each presenting rear and front ends,

II. a U-shaped hind strap having ends adjustably connected to the rear ends of said side parts,

III. a U-shaped fore strap having ends adjustably connected to the front ends of said side parts; and

IV. means on said fore strap for attaching a lead line thereto; and

h. each leg of each cross strap being formed with a slot and each strap hanger comprising a strap loop that is passed through one of said slots with its end being adjustably connected by a buckle whereby each strap hanger includes a bend at its lower end with all of said bends receiving and supporting said body strap, and in which the elastic side parts of the body strap are slidably received in said bends and include front end portions projecting beyond the bends in which they are received.

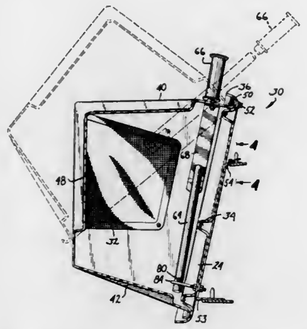
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**4,015,406**

## LAWNMOWER BAGGING APPARATUS

**Robert H. Witt, Bloomington; Herbert F. Horner, Jr., Tonka Bay, and Richard A. Thorud, Bloomington, all of Minn., assignors to The Toro Company, Minneapolis, Minn.**

**Filed Aug. 4, 1975, Ser. No. 601,443**
**Int. Cl.² A01D** *35/22*
**U.S. Cl. 56—202** **12 Claims**



1. In a lawn and garden implement in which vegetation is transported to and collected in a receptacle with a substantially rigid, boxlike structure enclosed by top and bottom walls, opposed side walls and a rear wall, said receptacle being hingedly fastened to an implement main frame along an edge of said top wall to permit said receptacle to pivot about a substantially horizontal axis and close against a receptacle base mounted on said main frame, a handle and latch mechanism, comprising:

a. means defining an elongated handle member;

b. means for telescopically mounting said handle member in said receptacle with a portion thereof protruding through an aperture in said top wall so that said handle member is upwardly extensible therefrom to function as a lever for pivotal emptying of said receptacle, and downwardly retractable into a handle storage position; and

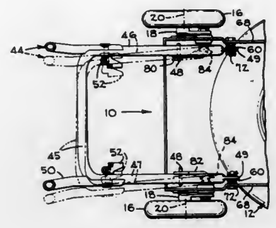
c. apertured latch means carried by said implement main frame for receiving one end of said handle in an aperture thereof when said handle member is in said storage position.

**4,015,407**

## MOWER WITH SHOCK MOUNTS

**Roger J. Bacon, Holland, Wis., assignor to FMC Corporation, San Jose, Calif.**

**Filed Oct. 8, 1975, Ser. No. 620,898**
**Int. Cl.² A01D** *35/26*
**U.S. Cl. 56—255** **3 Claims**



1. In a mower having a housing, wheels supporting the housing for movement over the ground, an engine, and a handle bar assembly including a pair of support arms with lower mounting ends; the improvement which comprises a first group of resilient shock mounts connecting the engine to the housing defining a first vibration barrier for minimizing engine induced vibration from being transmitted to the housing, a second group of resilient shock mounts connecting the lower ends of the handle bar arms to the housing, a pair of height adjusting braces having upper and lower ends, a third group of resilient shock mounts connecting the lower ends of the braces to the housing with the upper ends being disposed adjacent associated ones of said arms, and means connecting the upper ends of said braces to the associated ones of said arms, said second and third groups of resilient shock mounts being effective to provide a second vibration barrier for minimizing engine induced vibrations from being transmitted to the upper end of the handle bar assembly, said second and third groups of resilient shock mounts also being arranged to permit transverse movement of the upper end of the handle bar assembly relative to the housing for minimizing transmission of shock forces to the upper end of the handle bar assembly due to movement of the mower over rough ground, said third group of shock mounts being arranged to urge the upper ends of the height adjusting braces against the associated handle bar arms.

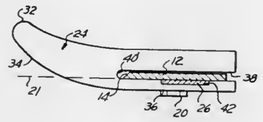
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**4,015,408**

## SAFETY GUARD FOR ROTARY-TYPE CUTTER

**Maurice H. Cornellier, 7039 Pinhurst, Dearborn, Mich. 48126**

**Filed Mar. 29, 1976, Ser. No. 671,399**
**Int. Cl.² A01D** *55/18*
**U.S. Cl. 56—295** **9 Claims**



1. A safety guard assembly for rotary-type cutter blade adapted to rotate in a substantially horizontal plane about a vertically disposed shaft, said cutter blade having at least a portion of a leading edge with respect to the direction of rotation of said cutter blade sharpened to form a cutting edge, said safety guard assembly comprising a plurality of parallelly disposed individual guard units each formed of a non-cutting guard member disposed such as to surround said cutter blade at said cutting edge in a plane substantially perpendicular to the plane of rotation of said cutter blade, each of said non-cutting guard members having a curvilinear lower edge extending forwardly of said cutting edge from above said plane of rotation to below said plane of rotation directly below said cutting edge, said curvilinear edge extending forwardly to a curved tip, and means for rigidly supporting said plurality of said non-cutting guard members on said cutter blade in mutually spaced relationship so as to leave exposed portions of said cutting edge between each pair of consecutive non-cutting guard members.



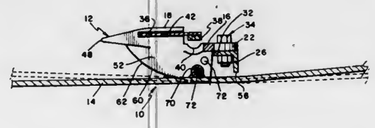
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**4,015,409**

## COMBINED SICKLE GUARD UNIT AND ATTACHMENT MOUNTING MEANS

**Clinton F. Baker, 109 S. 8th St., Fredonia, Kans. 66736**

**Filed Aug. 11, 1975, Ser. No. 603,376**
**Int. Cl.² A01D** *55/10*
**U.S. Cl. 56—312** **17 Claims**



12. A unitary sickle guard unit comprising a plurality of parallelly spaced and forwardly projecting guard fingers joined integrally at their rear ends by a horizontally extending bar, said mounting bar being provided with integral means having spaced apertures therethrough for enabling the mounting of the unit on a horizontal support, and each of said guard fingers being provided with an integral medial rib depending therefrom, with said depending ribs having openings therethrough that are aligned in parallelism with and disposed at a height below that of the mounting bar.

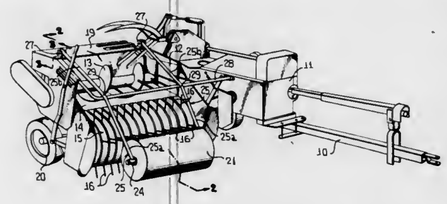
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**4,015,410**

## HAY OR CROP SAVING ATTACHMENT FOR MOBILE PICK-UP BALER

**Palmer L. Smith, Rte. 4, Thomasville, Ga. 31792**

**Filed Mar. 4, 1976, Ser. No. 664,041**
**Int. Cl.² A01D** *89/00, 83/00*
**U.S. Cl. 56—364** **7 Claims**



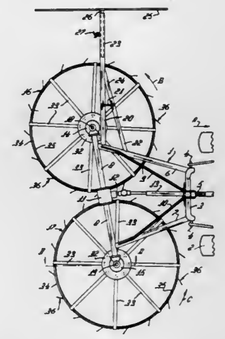
1. In a mobile pick-up baler for hay and the like, a counter-rotating pick-up rotor having circumferentially spaced radial pick-up teeth for elevating hay from a windrow and delivering it to a transverse axis auger which feeds the hay into a side mounted bale case, the improvement which comprises a relatively large transverse axis cylinder arranged immediately in advance of said pick-up rotor, and means floatingly supporting said cylinder on the pick-up baler in such a way that the cylinder can rise relative to the pick-up rotor responsive to contact with a thick windrow and is positively prevented from falling below a certain elevation at which the bottom of the cylinder is spaced somewhat from the ground.

**4,015,411**

## RAKING MACHINES

**Cornelis van der Lely, 7, Bruschenrain, Zug, Switzerland, and Ary van der Lely, 10, Weverskade, Maasland, Netherlands**

**Filed Oct. 11, 1974, Ser. No. 514,309**
**Claims priority, application Netherlands, Oct. 12, 1973, 7314028; Feb. 18, 1974, 7402172; Jan. 18, 1974, 7400685; June 19, 1974, 7408181**
**The portion of the term of this patent subsequent to June 15, 1993, has been disclaimed.**
**Int. Cl.² A01D** *79/00*
**U.S. Cl. 56—366** **47 Claims**



1. A raking machine comprising a frame movable over the ground and at least one rake head supported on said frame and rotatable about an upwardly extending axis, said rake head comprising a substantially central portion and outer flexible wall means which, at least during rotation, is deflectable and extends around said axis of rotation, support means interconnecting said flexible wall means with the central portion and raking means on said wall means, said raking means being located adjacent the outer perimeter of said wall means, driving means connected to rotate said rake head and said wall means being acted upon by centrifugal forces generated during rotation thereof to normally assume an outer generally circular configuration when viewed in plan.

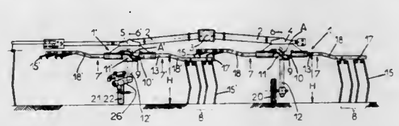
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**4,015,412**

## HAY-MAKING MACHINE

**Walter Reber, 50, avenue du Marechal Foch, Saverne (Bas-Rhin), France**

**Filed June 16, 1975, Ser. No. 587,238**
**Claims priority, application France, July 18, 1974, 74.25974**
**Int. Cl.² A01D** *79/02*
**U.S. Cl. 56—370** **9 Claims**



1. A hay-making machine for windrowing, comprising at least two rake wheels driven by the energy of a motor vehicle so as to rotate in identical rotation directions about upwardly directed axes and each comprising arms carrying identical working tools, means mounting said wheels side by side on said machine, said arms extending substantially radially towards the exterior, means guiding said arms in such manner that their working tools, over a partial range of their revolution, pivot upwards and in the direction opposite to the directions of rotation of the said rake wheels, characterised in that

the distance between said axes is such that the trajectories described by the outer working tools of the rake wheels overlap between the axes of rotation of the said rake wheels, the outer working tools of one rake wheel passing above the outer working tools of the other rake wheel in the zone of overlap of the said trajectories, and in that the longitudinal axes of the tool-carrier arms cross the axis of rotation of the associated rake wheel at a point which is situated at substantially the same distance above the ground for one rake wheel as for each other rake wheel.

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**4,015,413**

## AGRICULTURAL IMPLEMENT FOR RAKING OR SPREADING CROP LYING ON THE GROUND HAVING AN IMPROVED FRAME

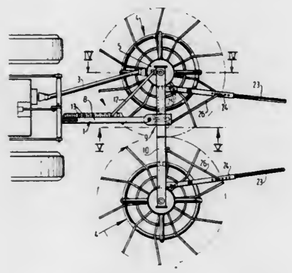
**Nicolaas van der Plas, 152, Savelstraat, Sterrebeek, Belgium, and Berend Broijl, 26, Prinses Irenestraat, Kleotinge, Netherlands**

**Filed Aug. 19, 1975, Ser. No. 605,802**

**Claims priority, application Netherlands, Aug. 20, 1974, 7411126**

**Int. Cl.² A01D** *79/00*

**U.S. Cl. 56—370** **17 Claims**



**1.** An agricultural implement for raking or spreading crop lying on the ground, comprising in combination:

a frame adapted to be attached to a three-point lift of a tractor, said frame including a longitudinal beam disposed in trailing relation behind the three-point lift and extending in the direction of implement movement, and a transverse beam;

pivot means connecting said transverse beam between its ends to the trailing end of said longitudinal beam for povital movement about a generally vertical axis and for pivotal movement about a generally horizontal axis transverse to the axis of said transverse beam;

locking means connecting said longitudinal and transverse beams for adjustment of said transverse beam between a position perpendicular to the longitudinal beam and a position in which the longitudinal and transverse beams include an acute angle;

a pair of ground-engaging support means connected to said transverse beam, one of which is located to one side of said longitudinal beam and the other of which is located to the other side of said longitudinal beam, for following the ground contours while said transverse beam rocks about said generally horizontal axis;

a pair of rake wheels rotatably suspended below said transverse beam for sweeping through generally horizontal paths, one rake wheel being adjacent one support means and the other being adjacent the other support means; and

drive means drivingly interconnecting said rake wheels for rotation thereof by a tractor power take-off shaft.

**4,015,414**

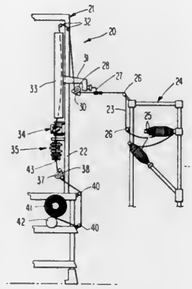
## MONITORED TWIST CONTROL APPARATUS AND METHOD

**William C. Sholly, Jr., Souderton, Pa., assignor to The Warner & Swasey Textile Machine Company, Gastonia, N.C.**

**Continuation-in-part of Ser. No. 478,599, June 12, 1974, Pat. No. 3,994,123, which is a continuation-in-part of Ser. No. 405,036, Oct. 10, 1973, abandoned. This application Feb. 20, 1975, Ser. No. 551,350**

**Int. Cl.² D02G** *1/02*; **D01H** *13/32*; **G01L** *5/00*

**U.S. Cl. 57—34 HS** **33 Claims**



**1.** In yarn false twisting wherein yarn travles along a predetermined path and has twist applied thereto, the process of obtaining improved twist uniformity by the steps of

a. continuously applying twist to yarn travelling along its path;

b. continuously monitoring the amount of twist in yarn travelling along the path by

i. first setting the axis of an arcuately moveable member at a predetermined fixed angle with the yarn path, the fixed angle corresponding to the desired amount of twist in the yarn, and

ii. then sliding the yarn over the arcuately moveable member,

iii. detecting a deviation from the desired amount of twist in the yarn as a function of an imbalance of forces resulting from longitudinal and rotational movement of the yarn relative to the arcuately moveable member as expressed by arcuate movement about its axis of the moveable member while maintaining said set angle fixed, and

c. adjusting the amount of twist being applied to yarn travelling along the path in response to the movement of the moveable member, in compensation for the deviation in amount of twist so detected.

**29.** In an apparatus for applying twist of some type to yarn or the like, a means for monitoring the amount of twist in the yarn, said monitoring means including an arcuately moveable member having an axis of movement that is adapted to be fixedly disposed at a predetermined fixed angle with the yarn path, which angle corresponds to the desired amount of twist in the yarn, and with said moveable member being adapted for disposition at said angle for a sliding movement of yarn thereover, and including means for detecting a deviation from the desired amount of twist in the yarn as a function of arcuate movement of said moveable member.



**4,015,415**

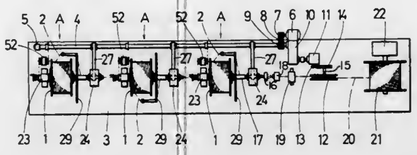
## TWISTING MACHINE

**Shoji Otsuki, 25, 10-Banchi, 4-Chome, Higashi Shinmachi, Yao, Osaka; Kenjiro Kuroishi, 399-Go, 4-Ban, Nishi-1-Chome, Shiki-Cho, Yao, Osaka, and Eiji Ohara, 49, 1-Ban, 4-Chome, Kathuyamakita, Ikuno, Osaka, Osaka, all of Japan**

**Filed Aug. 5, 1975, Ser. No. 602,066**

**Int. Cl.² D07B** *3/04*

**U.S. Cl. 57—34 R** **5 Claims**



**1.** A twisting machine for intertwisting linear objects comprising drums wound with said linear objects, rotary shaft means for rotatably supporting said drums, a main shaft disposed in parallelism with said rotary shaft means, means for drivingly connecting said main shaft and each of said rotary shaft means, arm members each disposed over the outer periphery of said drums and rotatable about the axis thereof to draw out said linear objects from said drums, guide means for guiding said drawn linear objects into an axially inner hollow portion of said rotary shaft means, a twisting means for intertwisting said guided linear objects at a uniform angle of twist thereby to form a continuity of thick, strong rope-like object, and a means for winding thereon said continuity.

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**4,015,416**

## METHOD AND DEVICE FOR CUTTING ROVE AT DOFFING IN FLYER FRAME

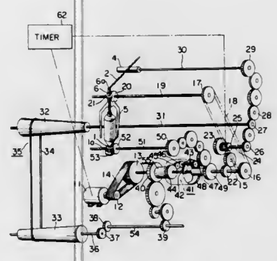
**Mitsuo Mori, Toyota; Katsumi Nakane, Okazaki, and Toshio Morishita, Kariya, all of Japan, assignors to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho, Kariya, Japan**

**Filed Feb. 27, 1976, Ser. No. 662,085**

**Claims priority, application Japan, Mar. 5, 1975, 50-26912**

**Int. Cl.² D01H** *1/24*, *1/26*, *9/16*

**U.S. Cl. 57—54** **11 Claims**




**6.** A flyer frame comprising a rotary flyer; a rotary bobbin on which a rove is wound due to a speed difference between the flyer and the bobbin; rove feeding rollers disposed near the flyer top; and an arrangement for driving the bobbin and the flyer with the speed difference and driving the rove feeding rollers, the driving arrangement including means for causing the rotation of the rove feeding rollers to be stopped, and means for causing the bobbin and flyer to rotate substantially at the same speed when the rotation of the rove feeding rollers is stopped.

**4,015,417**

## ALARM TIME SETTING NOTIFYING MECHANISM FOR A CLOCK OR THE LIKE

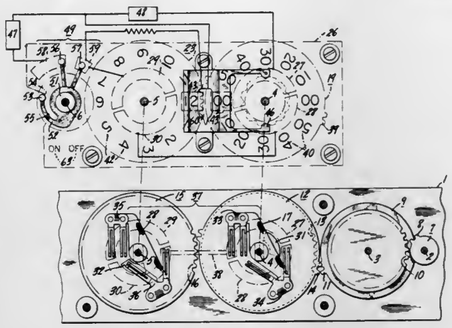
**Kiyoshi Kitai, Tokyo; Masuo Ogihara, Chiba; Kouzo Sato, Yotsukaido, and Nobuo Shinozaki, Chiba, all of Japan, assignors to Seiko Koki Kabushiki Kaisha, Japan**

**Filed Apr. 7, 1975, Ser. No. 565,469**

**Claims priority, application Japan, Apr. 8, 1974, 49-39618**

**Int. Cl.² G04B** *23/02*, *13/02*, *19/30*

**U.S. Cl. 58—22.7** **3 Claims**



**1.** In a clock of the type having an alarm device for detecting a preset alarm time and providing an audible alarm: alarm time indicating means for providing a visual indication of the preset alarm time; and alarm time setting notifying means for providing a visual indication indicative of the operative or inoperative state of said alarm device thereby notifying the user of the clock whether or not said alarm device is set to detect an alarm time, said alarm time setting notifying means comprising a manually movable selector movable to one position corresponding to the operative state of said alarm device and movable to another position corresponding to the inoperative state of said alarm device, means defining a notifying opening coacting with said alarm time indicating means to display therethrough the preset alarm time, an electrically energizeable illuminable element positioned so as to illuminate said notifying opening thereby illuminating the alarm time displayed therethrough, and switch means connected to an electric power source and connected to said selector for movement therewith and operative when said selector is moved to said one position to connect said illuminable element to said electric power source to thereby energize said element into illumination.

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**4,015,418**

## TIMEPIECE WITH DIGITAL TIME DISPLAY

**Daniel-François Rochat, Neuchatel, Switzerland, assignor to Ebauches S.A., Neuchatel, Switzerland**

**Filed Sept. 22, 1975, Ser. No. 615,352**

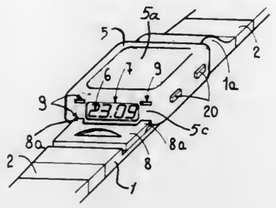
**Claims priority, application Switzerland, Oct. 15, 1974, 13789/74**

**Int. Cl.² G04C** *3/00*; **G04B** *19/00*, *37/00*

**U.S. Cl. 58—23 R** **14 Claims**

**1.** A timepiece having a digital time display comprising a casing having two opposite faces and a lateral wall intermediate said opposite faces, a lateral window opening through said lateral wall in which appear the indications of the display device, said casing being arranged in such a way as to be capable of occupying two different positions wherein said opposite faces are turned over, one with respect to the other, in each of which positions one or the other of said opposite faces is visible, commutation means ensuring that in one of the said positions of the casing the time indications are displayed

in one direction, while in the other position of the casing they are displayed in the opposite direction, so that the reading of



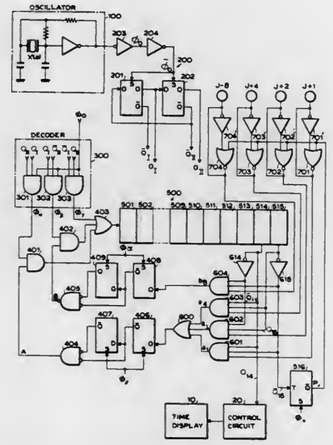

the time can be effected in either of said positions of the casing.

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**4,015,419**
**ELECTRONIC TIMEPIECE**

**Shigeru Morokawa, Tokorozawa, and Yukio Hashimoto, Niiza, both of Japan, assignors to Citizen Watch Co., Ltd., Tokyo, Japan**

**Continuation-in-part of Ser. No. 628,150, Nov. 3, 1975, which is a continuation of Ser. No. 401,118, Sept. 26, 1973, Pat. No. 3,916,612. This application Feb. 13, 1976, Ser. No. 658,037**
**Claims priority, application Japan, Oct. 2, 1972, 47-098766; May 21, 1973, 48-056444**
**Int. Cl.² G04C** *3/00*
**U.S. Cl. 58—23 R** **10 Claims**

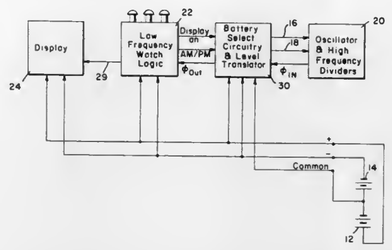



1. An electronic timepiece comprising:
a constant-frequency pulse generator;
circuit means connected to said generator for deriving therefrom a basic pulse train and at least one ancillary pulse train, said pulse trains having spacedly interleaved pulse positions;
a multistage frequency divider with high-frequency input means and low-frequency output means;
logical summing means connected to said circuit means for additively combining said pulse trains into a succession of driving pulses fed to said input means;
pulse-responsive means connected to said output means for receiving therefrom a low-frequency pulse sequence stepped down from said succession of driving pulses;
time-indicating means connected to said pulse-responsive means for being driven by said pulse sequence; and
control means selectively operable to suppress said ancillary pulse train, thereby decelerating the drive of said time-indicating means.

**4,015,420**
**BATTERY SELECT CIRCUITRY AND LEVEL TRANSLATOR FOR A DIGITAL WATCH**

**Dennis E. Walker, Costa Mesa, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.**

**Filed May 3, 1976, Ser. No. 682,431**
**Int. Cl.² G04C** *3/00*
**U.S. Cl. 58—23 BA** **5 Claims**



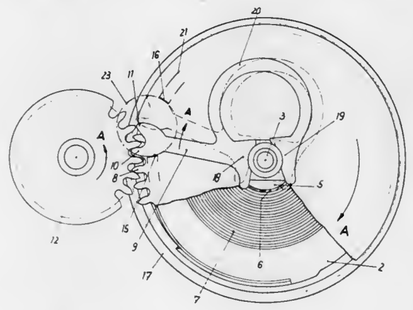

1. A method for increasing the battery life of the batteries in a digital watch with batteries, an oscillator, high frequency dividers and display devices which comprises:
a. connecting only one of first and second batteries to power the digital watch's oscillator and high frequency dividers when the watch's display elements are not activated;
b. connecting said first and second series connected batteries to both power the digital watch's oscillator, high frequency dividers and display devices when the watch's display elements are activated;
c. switching said batteries at predetermined time periods, thereby connecting said first battery to the digital watch's oscillator and high frequency dividers during one time period and then connecting said second battery to the digital watch's oscillator and high frequency dividers during another substantially equal time period.

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**4,015,421**
**MAINSPRING MECHANISM AND SPRING BARREL ASSEMBLY**

**Kurt Mürrle, Pforzheim, Germany, assignor to Pforzheimer Uhren-Rohwerke Rudolf Wehmer, Pforzheim, Germany**

**Filed Dec. 15, 1975, Ser. No. 640,445**
**Claims priority, application Germany, Jan. 23, 1975, 2502562**
**Int. Cl.² G04B** *1/16*
**U.S. Cl. 58—86** **8 Claims**




4. In a watch, a mainspring mechanism comprising
a barrel bridge,
a barrel arbor rotatably mounted in said barrel bridge
a spring barrel rotatably mounted on said barrel arbor,
a spring core non-rotatably connected to said barrel arbor and surrounding the same,



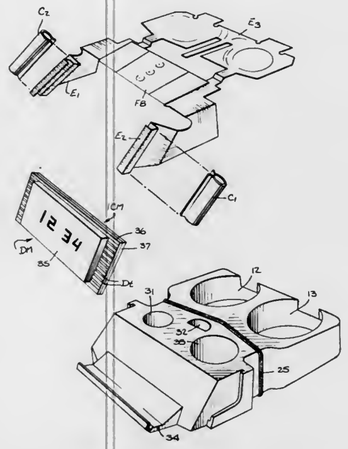
a coiled spring disposed in said barrel and having an inner end secured to said spring core and an outer end secured to said barrel,
a ratchet wheel disposed between said main spring and said barrel bridge and non-rotatably connected to said spring core and formed with ratchet teeth,
first and second stops carried by said bridge and spaced apart in the peripheral direction of said ratchet wheel,
a winding wheel having winding wheel teeth which are in mesh with said ratchet teeth and protrude from said ratchet teeth on the side remote from said spring, and a locking lever which is disposed between said first and second stops on that side of said ratchet wheel which is remote from said spring and is frictionally coupled to said spring core and has locking tooth means adjacent to said ratchet teeth,
said locking lever being movable against the force of said spring from a first position, in which said locking lever engages said first stop and said locking tooth means inter-engage with said winding wheel teeth, to a second position, in which said locking lever engages said second stop and said locking tooth means are disengaged from said winding wheel teeth.

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**4,015,422**
**SOLID-STATE ELECTRONIC WATCH ASSEMBLY**

**Egbert Van Haaften, Closter, N.J., assignor to Bulova Watch Company, Inc., New York, N.Y.**

**Filed June 2, 1975, Ser. No. 582,924**
**Int. Cl.² G04B** *37/00*
**U.S. Cl. 58—88 R** **8 Claims**



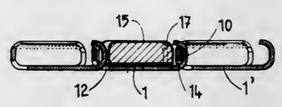

1. In a solid state electronic watch provided with a generally rectangular case having a window formed on one end thereof, and an assembly receivable within said case, said assembly comprising:
A. an insulating block having a ledge projecting from the forward section thereof adjacent said one end of the case, said block having cavities therein to accommodate discrete elements, including a cavity in the rear section of the block to receive a battery cell,
B. an electro-optic display module formed by a chip constituted by a group of digital display stations mounted on a rectangular board on whose fact at either edge thereof is an array of terminals for applying drive signals to the stations;
C. an integrated electronic circuit module formed by an integrated circuit chip mounted on a like board on whose face at either edge thereof is an array of corresponding terminals, said integrated electronic circuit being constituted by a high-frequency standard whose output is applied to a divider to produce low-frequency timing pulses and a display actuator responsive to said pulses, said frequency standard being constituted by an oscillator operating in conjunction with a quartz crystal unit, which is one of the discrete elements received in one of said cavities, said electronic circuit, when energized, functioning to generate said drive signals, said modules being mounted in back-to-back relation on said ledge, with the display stations exposed to view through the window of said case, and
D. a flexible printed circuit board overlying said block for electrically interlinking interlinking the terminals of the modules and connecting the integrated electronic circuit to discrete elements held in the cavities of the block, said flexible board including a pair of extensions having an array of conductive lines, and means connected to some of said lines to engage and interconnect the edge terminals of said modules, said means being constituted by a pair of multi-connector clamps, each clamp being formed by a pair of flexible tines which are adapted to engage and electrically shunt a pair of corresponding edge terminals of said modules.

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**4,015,423**
**METAL STRAPS FORMED BY INTERCONNECTED LINKS**

**Patrick J. C. Brunet, Annecy, France, assignor to Zuccolo, Rochet & Cie, Annecy, France**

**Filed Oct. 29, 1974, Ser. No. 518,756**
**Claims priority, application France, Oct. 30, 1973, 73.40371**
**Int. Cl.² F16G** *13/18*
**U.S. Cl. 59—82** **6 Claims**




1. A metal strap, particularly a strap for a wrist-watch, comprising links each of which consists of a link frame in the form of a generally rectangular box with a top and four sides turned over towards an underside of the strap to define an open bottom of the link frame, each link frame having on one side at least one substantially rectangular aperture leaving a free edge part of said side which forms a cross-pin, and, projecting from the side opposite said one side, at least one corresponding integral hook which passes through a corresponding said aperture in an adjacent link frame and pivotally engages about the corresponding cross-pin, and link bases each engaged in the open bottom of a link frame to hold the adjacent link frames together, each link base having on one edge at least one boss which holds captive the cross-pin of an adjacent link frame in the corresponding hook of the link frame and, on an opposite edge, means defining at least one recess which leaves a free passage for the hook of another adjacent link frame accommodating the cross-pin of the link frame in which said link base is fitted.

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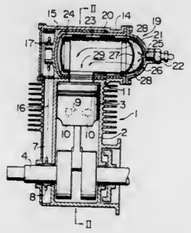
**4,015,424**
**COMBUSTION ENGINE WITH DUAL FUNCTION MOTOR ELEMENT AND ROTARY VALVE FOR CYCLICAL FUEL AND EXHAUST METERING**

**Sakuta Shinohara, No. 52-6, 1-chome, Hohnan, Suginami, Tokyo, Japan**

**Filed Apr. 11, 1975, Ser. No. 567,191**
**Int. Cl.² F02G** *3/00, 3/02*
**U.S. Cl. 60—39.6** **3 Claims**

1. In a combustion powered engine, an apparatus for effecting combustion of fuel gas comprising means for volumetrically compressing a mixture of air and fuel homogeneously

mixed without stratification, including an operating member disposed within a casing and movable therein to cause volumetric compression of said mixture and volumetric expansion of combustion gas, means defining a cylindrical volume, means forming an introducing part through which said compressed mixture can be fed from said casing into said cylindrical volume, means defining a mixture chamber where a flow of said mixture can be established along an outer annular layer portion of said cylindrical volume concentric with said cylindrical volume in a direction away from said introducing part, means for receiving said mixture flow and effecting continuous combustion of the mixture by heat radiated from a hot surface and provided at a position within said cylindrical volume and remote from said introducing part, said cylindrical volume defining means including a cylindrical combustion tube provided adjacent of said casing, said mixture chamber defining means including a cylindrical convection tube provided within said cylindrical combustion tube concentrically therewith so as to leave said chamber between the inner peripheral wall surface of said cylindrical combustion tube and the other peripheral wall surface of said cylindrical convection tube, said convection tube having an end open to said mixture chamber, said continuous combustion effecting means including a heat radiation plate provided within said convection tube concentrically therewith so as to divide the inside of the convection tube into a combustion chamber which is in communication with said mixture chamber through said opening end of said convection tube and a combustion gas chamber, said heat radiation plate being heated by combustion gas in said combustion chamber, whereby the resultant heat accumulated therein radiates into said combustion chamber to ignite fuel and air mixture introduced into said combustion chamber, combustion gas chamber ports provided in said heat radiation plate, said introducing part forming means including an aperture provided in the wall of said combustion tube to allow said mixture chamber to communicate with said casing, and outlet part forming means comprising an aperture provided in the wall of said convection tube to allow said combustion gas chamber to communicate with said casing, and including a rotary valve provided concentrically with said combustion tube to serve to allow compressed mixtue to be introduced into said mixture chamber through said aperture of said combustion tube from said casing only when said operating member in said casing is in an ending portion of its compression stroke and to allow combustion gas to flow into said casing through said aperture of said convection tube from said combustion gas chamber only when said operating member in said casing is in an initial portion of its expansion stroke, whereby a constant pressure can be maintained in said fuel and air mixture chamber.



**4,015,425**

## GAS TURBINE ENGINE FUEL CONTROL SYSTEM

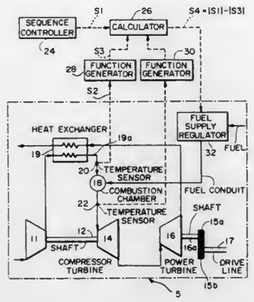
**Takane Itoh, Yokohama, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan**

**Filed July 9, 1974, Ser. No. 486,850**

**Claims priority, application Japan, July 10, 1973, 48-77728**

**Int. Cl.² F02C** *9/08*

**U.S. Cl. 60—39.28 T** **2 Claims**




**1.** A gas turbine engine fuel feed control system, the turbine engine having a compressor, a heat exchanger, a combustion chamber, a compressor turbine, a power turbine, a fuel supply regulator connected between said combustion chamber and a fuel tank, a sequence controller generating a first electrical signal therefrom and controlling said fuel supply regulator in accordance with a preselected schedule,

characterized in that calculating means is provided between said sequence controller and said fuel supply regulator, and controlling said first electrical signal such that said fuel supply regulator supplies an optimum quantity of fuel for injection to said combustion chamber at the time of ignition in dependence on the engine temperature as it exists just prior to the time of ignition.

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**4,015,426**

## FUEL CONTROL SYSTEM

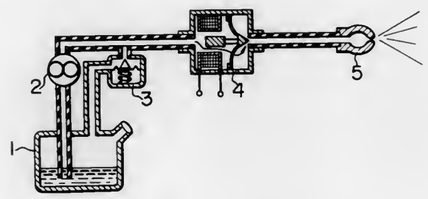
**Nobuhito Hobo, Inuyama, and Sumihiro Kaga, Inazawa, both of Japan, assignors to Nippondenso Co., Ltd., Japan**

**Continuation of Ser. No. 416,280, Nov. 15, 1973, abandoned. This application Aug. 11, 1975, Ser. No. 603,512**

**Claims priority, application Japan, Nov. 20, 1972, 47-117047**

**Int. Cl.² F02C** *9/08*

**U.S. Cl. 60—39.28 R** **5 Claims**



**1.** A fuel control system for a gas turbine engine which has a fuel feed pump and an injection nozzle, comprising:

a. electromagnetic valve means including first and second systems of electromagnetic valves inserted, in parallel with each other, between said fuel feed pump and said injection nozzle;

b. a control voltage generator for generating a control voltage corresponding to a predetermined fuel metering characteristic of said gas turbine engine, said control voltage generator including:



first detecting means for generating a first control voltage responsive to engine rotational speed,

second detecting means for generating a second control voltage responsive to engine load,

selector means connected to said first and second detecting means for selecting one of said two control voltages;

c. a trigger signal generator for generating a trigger signal having a predetermined period;

d. a timing pulse generator connected to said control voltage generator and to said trigger signal generator for alternately generating first and second timing pulse signals each time said trigger signal is generated, the pulse width of said first and second timing pulse signals varying in accordance with said control voltage; and

e. an amplifier connected to said timing pulse generator for amplifying said timing pulse signals and applying the amplified signals to said first and second systems to alternately actuate said first and second systems of electromagnetic valves in said electromagnetic valve means whereby fuel is supplied smoothly to said gas turbine engine.

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**4,015,428**

## FUEL CONTROL APPARATUS FOR AN AUTOMOBILE ENGINE EQUIPPED WITH AN ELECTRONICALLY CONTROLLED FUEL INJECTION SYSTEM AND AN EXHAUST GAS PURIFYING SYSTEM

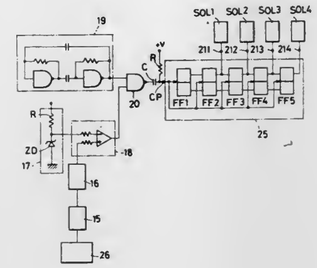
**Mitsuo Kawai, Toyoda, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyoda, Japan**

**Filed July 15, 1974, Ser. No. 488,660**

**Claims priority, application Japan, Mar. 13, 1974, 49-17390**

**Int. Cl.² F02B** *75/10*

**U.S. Cl. 60—277** **4 Claims**




**1.** In a fuel control apparatus for an automobile engine equipped with an electronically controlled fuel injection system; and a catalytic exhaust gas purifying system, said fuel injection system including a plurality of sensors to detect the operating conditions of said automobile engine and changes in the weather and transmit signals to an electronic computer, said computer including means to determine the optimum timing and rating of fuel injection in accordance with said signals received from said sensors, a plurality of fuel injection nozzles each associated with at least one of a plurality of cylinders of said engine, and means for supplying fuel under pressure from a source of fuel supply to each of said fuel injection nozzles, said means for supplying including a plurality of fuel distributing pipes each leading to one of said fuel injection nozzles, wherein the improvement comprises:

a plurality of solenoid valves, each provided in one of said fuel distributing pipes, to supply fuel to one of said fuel injection nozzles upon opening and discontinue supply of fuel thereto upon closure;

means for generating and transmitting a signal when the temperature of said purifying system exceeds a predetermined level, including an AND gate for gating a control pulse and a condenser and resistor to differentiate said control pulse, thereby producing the transmitted signal; and

electric control means including a multiplexer responsive to said differentiated control pulse to selectively close said solenoid valves and stop the selective closing of said solenoid valves holding the condition that one of said solenoid valves is closed and the others of said valves are opened when the temperature of said purifying system is lower than a predetermined level.

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**4,015,427**

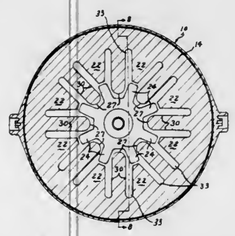
## FUEL GRAIN FOR SPHERICAL BOOST-SUSTAIN ROCKET MOTOR

**William T. Brooks, Waco, Tex., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**

**Filed Nov. 12, 1975, Ser. No. 631,280**

**Int. Cl.² F02K** *9/04*

**U.S. Cl. 60—253** **1 Claim**



**1.** In a spherical solid rocket motor for delivering boost-sustain operation having a rocket motor casing; a thrust nozzle, a fuel grain igniting means, a fuel grain within said rocket motor casing, comprising: an internal cavity formed by a plurality of regressively burning star point first segments and a plurality of second segments, having parallel side walls, positioned between the star point segments and extending into the cavity a greater distance than the star point segments; said second segments having side walls substantially parallel to the side walls of the star point segments; said second segments having means, including the parallel side walls, for providing a large burning surface and a sharp transition from boost to sustain operation; means, for providing a plurality of radially extending slots at the forward end of said fuel grain; and means for providing an unrestricted burning area at the end of the fuel grain adjacent the thrust nozzle.

## 4,015,429
## OUTBOARD MOTOR FOR REDUCING EXHAUST GAS POLLUTANTS

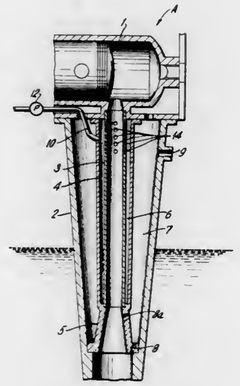
Heinz Pichl, Uppsala, Sweden, assignor to AB Volvo Penta, Goteborg, Germany

Continuation-in-part of Ser. No. 507,870, Sept. 20, 1974, abandoned, which is a continuation of Ser. No. 290,698, Sept. 20, 1972, abandoned. This application Sept. 29, 1975, Ser. No. 617,653

Claims priority, application Sweden, Sept. 20, 1971, 11843/71

Int. Cl.² F01N 3/10

U.S. Cl. 60—298 6 Claims



1. An outboard motor comprising an engine arranged to be located above the water level, a generally vertically extending exhaust gas tube having an upper end and a lower end with the upper end connected to said engine and said exhaust gas tube and extending downwardly from the engine with its lower end positioned below the water level, a tubular shaped wall laterally enclosing and spaced outwardly from said exhaust gas tube and extending for the axial length of said exhaust gas tube and forming an annular space about said exhaust gas tube with the upper and lower ends of the annular space being closed, a tubular member located within the annular space and laterally enclosing said exhaust gas tube for at least a major portion of the axial length of the said exhaust gas tube from the upper end toward the lower end thereof, said tubular member spaced radially outwardly from said exhaust gas tube and the lower end of said tubular member being connected to said exhaust gas tube, said tubular member being spaced radially inwardly from said tubular shaped wall and dividing said annular space into an inner annular insulating space between said exhaust gas tube and said tubular member from the upper end of said tubular member to the location of its connection to said exhaust gas tube with the insulating space being closed at its upper and lower ends, and an outer annular space laterally enclosing said insulating space for the axial length thereof, means for circulating a liquid through said outer annular space, and means for supplying air into said inner annular insulating space and for directing air from said inner annular insulating space into said exhaust gas tube adjacent the upper end thereof for supplying oxygen into said exhaust gas tube for aiding in the combustion of unburned components in the exhaust gases within said exhaust gas tube.

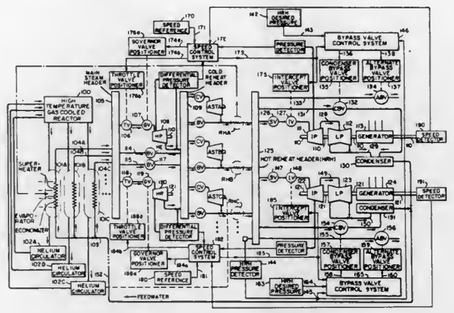
## 4,015,430
## ELECTRIC POWER PLANT AND TURBINE ACCELERATION CONTROL SYSTEM FOR USE THEREIN

Andrew S. Braytenbah, Pennsauken, N.J., and Karl O. Jaegtnes, Chester, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Sept. 30, 1975, Ser. No. 618,098

Int. Cl.² F01K 13/02

U.S. Cl. 60—644 26 Claims



1. An electric power plant having a steam generator which includes a superheat section for generating superheat steam, and a reheat section for reheating steam, comprising,

a turbine-generator, said turbine-generator comprising a high pressure turbine portion connected to pass a first steam flow from an outlet of the superheat section to an exhaust of said high pressure portion, and a lower pressure turbine portion connected to pass a second steam flow from an outlet of the reheat section to an exhaust of said lower pressure portion, said high and lower pressure turbine portions being shaft coupled to drive an electric generating means,

first bypass means connected to conduct steam from the outlet of the superheat section to the exhaust of said high pressure turbine portion,

means for conducting steam from the exhaust of said high pressure turbine portion to an inlet of the reheat section,

second bypass means connected to conduct steam from the outlet of the reheater section to the exhaust of the lower pressure turbine portion,

means for generating a first signal representative of a desired shaft speed of said turbine-generator,

means connected to detect the shaft speed of said turbine-generator and to generate a second signal representative of the detected shaft speed, and

means for varying one of the first and second steam flows in response to a difference between the first and second signals to reduce such difference whereby the detected shaft speed is controlled according to the desired shaft speed, and for governing at a substantially constant level that one of the first and second steam flows which is not varied for purposes of controlling the shaft speed.

## 4,015,431
## FLOATABLE OIL FENCE

Isami Ahiko, Chofu, Japan, assignor to Suzuei Co. Ltd, Japan

Filed Mar. 29, 1974, Ser. No. 456,379

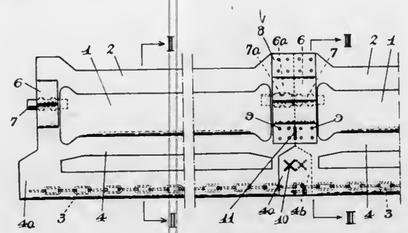
Claims priority, application Japan, Apr. 2, 1973, 48-38854[U]

Int. Cl.² E02B 15/04

U.S. Cl. 61—1 F 7 Claims

1. In a floatable boom, elongated tubular means for containing air under pressure so as to be rendered floatable, upper fin means fixed to and extending longitudinally along said tubular means, said upper fin means extending upwardly from said tubular means for opposing the movement of water and material floating thereon over said tubular means, lower fin means fixed to and extending longitudinally along said tubular means, said lower fin means extending downwardly from said tubular means for opposing the movement of the surface of a body of water and any material thereon beneath said tubular means, and elongated partition means situated in the interior of and extending longitudinally along said tubular means for dividing the interior thereof into a plurality of longitudinally extending chambers, said partition means preventing said





chambers from communicating with each other so that in the event of rupture of said tubular means at one of said chambers, said tubular means will nevertheless remain afloat, said tubular means and upper and lower fin means being in the form of a plurality of sections joined in end-to-end relation, each section terminating in a pair of end walls carrying pipes which pass through said end walls and respectively communicate with said chambers, and the pipes of each section communicating with the pipes of adjoining sections so that the chambers of the several sections communicate with each other through said pipes.

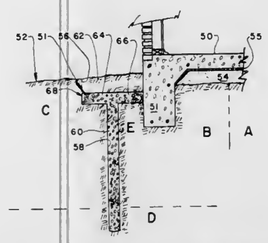
## 4,015,432
## STABILIZING SUBSOIL MOISTURE UNDER LIGHT STRUCTURES

Henry F. Ball, 116 Reaves Court, Euless, Tex. 76039

Filed Dec. 26, 1974, Ser. No. 536,548

Int. Cl.² E02D 3/00

U.S. Cl. 61—35 17 Claims



1. In a method of constructing a light structure on a high shrink-swell soil having the steps of preparing the soil for pouring of a slab-type foundation; constructing a form for the foundation, placing sand within the form to provide a cushion for supporting the slab; placing structural steel within the form; pouring concrete material into the form and allowing the concrete material to harden to construct a slab; erecting a structure on the slab; and the improvement which comprises the steps of:

adding selective quantities of water to the soil until the moisture content is at least equal to the plastic limit in the area over which the slab is to be constructed; and

constructing a moisture-controlling barrier of a predetermined width and depth in the soil and abutting the periphery of the slab whereby capillary movement of moisture from under the slab soil surrounding the slab is inhibited and whereby movement of water by percolation into the soil under the slab is permitted, the step of constructing the moisture-controlling barrier comprising forming a trench abutting the periphery of the slab; filling the trench with aggregate material having a minimum particle dimension in excess of ¼ of an inch.

## 4,015,433
## METHOD FOR SETTLING ANCHORING DEVICE IN THE GROUND

Mituo Shibata, No. 15-3, Oshima 2-Chome, Kawasaki, Kanagawa, Japan

Division of Ser. No. 537,159, Dec. 30, 1974, Pat. No. 3,935,912, which is a continuation of Ser. No. 350,841, April 13, 1973, abandoned.

This application Nov. 19, 1975, Ser. No. 633,193

Int. Cl.² E02D 5/44, 5/54

U.S. Cl. 61—53.6 7 Claims



1. A method for settling an anchoring device in a shaft based in the ground, said anchoring device comprising:

a vertical tubular rod; a plurality of support arms, one end of each support arm being connected with a lower part of the tubular rod so that said support arm is turnable about the connected end in a vertical plane including an axis of said tubular rod; a plurality of fluke blades one of which is mounted on each support arm, to constitute cutting arms; means for urging said cutting arms to outwardly turn about said connected ends of said support arms from a folded state in which said cutting arms are brought together about said tubular rods; means for stationarily supporting one end of said urging means on a part of said tubular rod; holding means for releasably restraining said cutting arms in the folded state, said holding means having a line means to release the restraint of said cutting arms above the ground surface, and; means for limiting the turn of said cutting arms to a selected angle from said folded state;

said shaft having a smaller diameter than the distance defined by said cutting arms when opened to said selected angle;

said method comprising at least the processes of:

folding the cutting arms by means of the holding means having the release line;

pulling said release line of said holding means when said anchoring device reaches a bottom of said shaft;

providing rotational motion to said cutting arms lying against the inner wall of said shaft from above the ground by means of an ordinary boring machine for a predetermined time; and

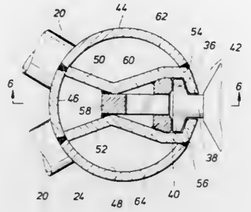
lifting said anchoring device while said cutting arms rotate at a preselected height so that a cavity engageable with said cutting arms of said anchoring device is formed in said bottom of said shaft.

**4,015,434**

## LEG AND GUIDE CONSTRUCTION FOR USE IN JACKUP BARGES

**D. Jarratt Tarrant, Houston, Tex., assignor to Scandril Offshore, Inc., Houston, Tex.**

**Filed Oct. 22, 1975, Ser. No. 624,719**
**Int. Cl.² E02B** *17/02*
**U.S. Cl. 61—91** **6 Claims**




**1.** For use in a leg of a jack up rig for use in off shore oil well drilling operations, a vertical frame member adapted to be positioned at a corner of the leg and further adapted to cooperate with a guide means on the rig, the frame member comprising:

an elongate structural member of circular cross section which includes a parallel slot means on the exterior thereof, said slot means having a width sufficient to enable insertion of a guide means supported by a jack up rig into the slot means and having a length at least equal to the desired length of travel of the leg relative to the rig;

an undercut adjacent to said slot means which extends parallel thereto for locking a guide means therein which guide means has a neck and a wider portion supported by the neck and wherein said undercut and said slot means are profiled to match the profile of the guide means;

a rack of teeth supported by said structural member on the interior of said elongate structural member and facing said slot means, said slot means and said teeth forming a means for receiving a drive gear inserted into the teeth for imparting axial movement to said structural member; and

wherein the circular cross section surrounds said rack which is joined thereto by means positioned axially of said structural member and joined to said rack.

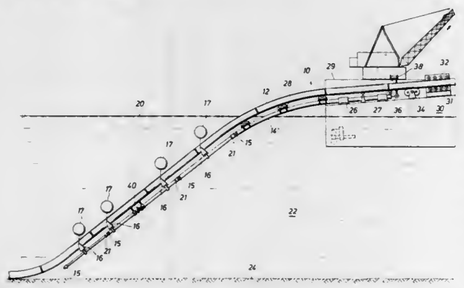
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**4,015,435**

## MARINE PIPELAYING APPARATUS

**Clarence W. Shaw, Metairie, La., assignor to J. Ray McDermott & Co., Inc., New Orleans, La.**

**Filed Jan. 30, 1975, Ser. No. 545,526**
**Int. Cl.² B63B** *35/04*
**U.S. Cl. 61—108** **11 Claims**



**1.** A marine pipelaying apparatus for laying pipeling on a submerged surface in a body of deep water from a vessel floating on the surface of the body of water and adapted to be transported between different locations on board the surface vessel and launched therefrom, comprising:

a bendable, non-articulated pipeline support member, self-supporting over its entire length, secured to and extending from the rear of the surface vessel into water for supporting the pipeline in a profile that is within the elastic limit of the pipe,

said pipeline support member having a tapered configuration wherein the upper portion of the support member secured to the surface vessel is of a larger cross section than is the unsecured lower end, and comprising a plurality of interconnected co-axial sections that may be disassembled for loading on the surface vessel and assembled for launching of the support member from the surface vessel;

means for releasably clamping said pipeline support member in a fixed relation to the surface vessel;

means for rendering the pipeline slidably movable above and along said pipeline support member; and

a plurality of variable buoyancy float means providng buoyancy forces to reduce pipeline negative buoyancy to balance pipeline weight.

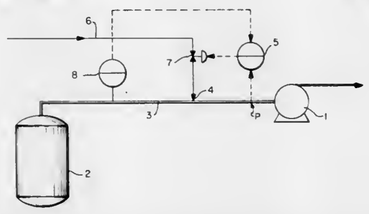
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**4,015,436**

## METHOD FOR CONTROLLING THE CAPACITY OF A BLOWER AND A DEVICE FOR CONTROLLING THE PRESSURE IN A LIQUEFIED GAS STORAGE TANK UTILIZING SAID METHOD

**Masao Seki, Tokyo, Japan, assignor to Tokyo Gas Company Limited, Tokyo, Japan**

**Filed July 30, 1975, Ser. No. 600,482**
**Int. Cl.² F17C** *7/02*
**U.S. Cl. 62—48** **2 Claims**




**1.** An apparatus for controlling the pressure in a liquefied gas storage tank so as to maintain it substantially constant, comprising a gas blower, a boil-off gas discharging tube connected between the storage tank and said blower, liquefied gas injection means in said boil-off gas discharging tube on the suction side of said blower, a control valve in said injection means, a temperature controller coupled between said control valve and said gas discharging tube on the suction side of said blower for opening said control valve according to the difference between a set temperature and a sensed temperature and a pressure controller coupled between said temperature controller and said gas discharging tube adjacent said storage tank for sensing the pressure of gas in said tank and setting the temperature of said temperature controller at which said temperature controller actuates said control valve according to the pressure in said storage tank.

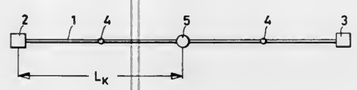


**4,015,437**

## PROCESS FOR COOLING CRYOCABLES USING A HYDROGEN SLUSH

**Wolfgang Daus, Frankfurt am Main-Hochs, Germany, assignor to Messer Griesheim GmbH, Frankfurt am Main, Germany**

**Filed May 13, 1975, Ser. No. 576,987**
**Claims priority, application Germany, May 15, 1974, 2423609**
**Int. Cl.² F25C** *1/00*; **H01B** *9/06*
**U.S. Cl. 62—76** **1 Claim**




**1.** In a process for cooling cryocables by low-boiling gases, which are recooled at cooling stations distributed along the length of the cable and whose pressure loss is equalized at pumping stations equally distributed along the length of the cable, the improvement comprising producing a slush of the low-boiling gas and using the slush as the coolant at each cooling station by allowing liquid or gas under high pressure to expand in a nozzle alternately to a pressure below the pressure of the triple point thereby producing ice and subsequently to a pressure above the pressure of the triple point thereby producing liquid.

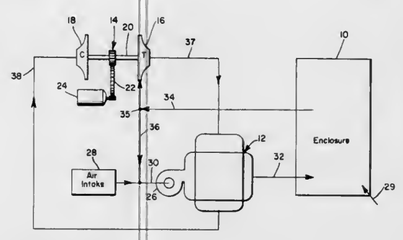
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**4,015,438**

## AIR CYCLE AIR CONDITIONING SYSTEM FOR VEHICLES

**Robert C. Kinsell, Los Angeles; James C. Noe, Canoga Park, and John P. Byrne, Westminster, all of Calif., assignors to The Garrett Corporation, Los Angeles, Calif.**

**Filed Aug. 29, 1975, Ser. No. 609,128**
**Int. Cl.² F25B** *9/00*
**U.S. Cl. 62—88** **16 Claims**




**1.** In combination:

an enclosure to be cooled;

a source of air at substantially ambient pressure;

a heat exchanger having first and second air passages;

blower means for propelling air from the source through the first passage of the heat exchanger for cooling and into the enclosure;

means for directing at least a portion of the air from the enclosure to a turbine means for lowering the temperature and pressure of the air;

means for directing the air from the turbine means through the second passage of the heat exchanger for removal of heat from the exchanger; and

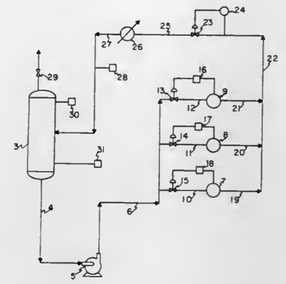
compressor means for increasing the pressure of air from the second passage of the heat exchanger for expulsion.

**4,015,439**

## COOLING PROCESS FOR SUBAMBIENT AND ABOVE AMBIENT TEMPERATURES

**Sidney Simon Stern, New York, N.Y., assignor to Stauffer Chemical Company, Westport, Conn.**

**Filed June 2, 1975, Ser. No. 583,345**
**Int. Cl.² F25B** *1/00*
**U.S. Cl. 62—114** **8 Claims**




**1.** A method of providing cooling at above ambient temperature comprising, in a closed system having an evaporation zone, providing a supply of liquid refrigerant suitable to obtain a first variable temperature level of above ambient cooling, passing said refrigerant from said supply through said evaporation zone, condensing effluent vapor from said evaporation zone at a second variable temperature level of an available cooling medium and returning said condensed refrigerant to said supply, while maintaining said first variable temperature level constant at a level above said second variable temperature of the available cooling medium.

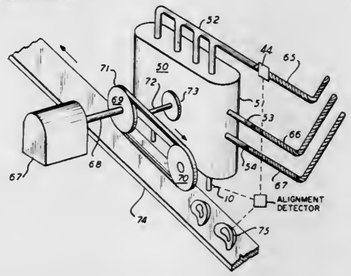
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**4,015,440**

## APPARATUS FOR DEPOSITING CARBON DIOXIDE SNOW

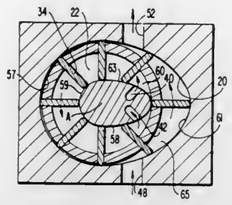
**Victor F. Pietrucha, Kearny; Michael E. Minard, Basking Ridge, and Gordon J. Ozmec, Berkeley Heights, all of N.J., assignors to Airco, Inc., Montvale, N.J.**

**Division of Ser. No. 523,385, Nov. 13, 1974, Pat. No. 3,932,155. This application July 14, 1975, Ser. No. 595,821**
**Int. Cl.² F25D** *3/12*
**U.S. Cl. 62—166** **3 Claims**




**1.** Apparatus for depositing carbon dioxide snow onto items to be refrigerated comprising a plurality of snow horn means for receiving liquid carbon dioxide and emitting said snow therefrom; valve means for selectively enabling passage of liquid carbon dioxide to said plurality of snow horn means; means for translating said items; means for translating said snow horn means into alignment with corresponding ones of said items; means for detecting said alignment; and means responsive to detection of said alignment for operating said valve means to enable passage of said liquid carbon dioxide to said snow horn means aligned with said items whereby said snow is deposited onto corresponding ones of said items.

**4,015,441**
**REFRIGERATION APPARATUS**
**Sylvia J. Robinet, 404, 6505 Huntridge Hill, NW., Calgary, Alberta, Canada T2K 5E5**
**Filed Mar. 10, 1976, Ser. No. 665,531**
**Int. Cl.² F25D** *9/00;* **F01C** *1/30, 11/00;* **F03C** *3/00*
**U.S. Cl. 62—402** **11 Claims**



1. Refrigeration apparatus comprising a first stator having an inner wall defining a cavity, a second stator within said cavity and having an outer wall spaced from the inner wall of said first stator, one of said cavity and said second stator being at least in part non-circular in cross section, a rotor including a sleeve within said cavity and rotatable about a fixed axis, said rotor defining a first chamber within said cavity between said sleeve and the inner wall of said first stator and a second chamber within said cavity between said sleeve and the outer wall of said second stator, said sleeve having a plurality of circumferentially spaced slots, a plurality of vanes carried by said rotor for sliding movement in said slots along respective radii of said sleeve, said vanes being substantially equal in length between their respective radially inner and outer edges, the inner and outer walls of said first and second stators respectively being spaced one from the other such that the linear distance therebetween along any radius from said axis of rotation is substantially equal to the length of said vanes, said vanes being slidable radially, upon rotation of said rotor through at least part of each revolution thereof, whereby the outer and inner edges of said vanes are maintained in substantially continuous engagement with the walls of the first and second stators respectively, an inlet carried by said apparatus for delivering air into said second chamber, an outlet carried by said apparatus in communication with said second chamber, said vanes forming with said sleeve and said second stator a plurality of variable volume working chambers within said second chamber for compressing air delivered thereto and delivering such compressed air to said outlet upon rotation of said rotor, a heat exchanger connected to said outlet for cooling the compressed air received from said second chamber, an inlet connected to said heat exchanger for admitting the cooled air from said heat exchanger into said first chamber, and an outlet carried by said apparatus in communication with said first chamber, said vanes forming with said sleeve and the inner wall of said first stator a plurality of variable volume working chambers within said first chamber for expanding and cooling air admitted thereto and delivering such expanded and cooled air through the latter mentioned outlet upon rotation of said rotor.

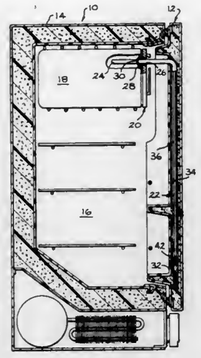
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**4,015,442**
**HOUSEHOLD REFRIGERATOR HAVING A DOOR COOLING APPARATUS**
**Frank A. Schumacher, Louisville, Ky., assignor to General Electric Company, Louisville, Ky.**
**Filed June 5, 1975, Ser. No. 583,919**
**Int. Cl.² F25D** *19/00*
**U.S. Cl. 62—449** **4 Claims**

1. In a household refrigerator having an outer door, a freezing compartment, and a freezing compartment door, door cooling apparatus comprising:

a closed heat pipe system including a generally elongate probe and a cooling portion, and containing a heat transfer medium;

the freezing compartment door having an opening therein for receiving said probe, and a deflectable sealing element attached adjacent the opening, said sealing element being constructed to seal the annulus between said probe and the freezer door opening in the presence of said probe and to seal the freezer door opening in the absence of said probe;

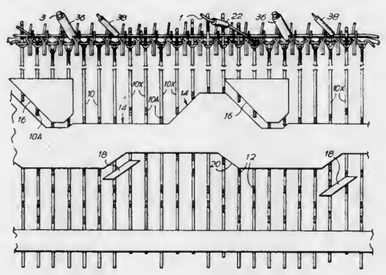


said probe extending outwardly from the interior of the outer door generally perpendicular thereto and being of curvilinear configuration with the curvature determined by the arcuate pathway followed by said probe in response to pivotal movement of the outer door, said probe being positioned so as to extend past said deflectable sealing element and through said opening into the interior of said freezing compartment when the outer door is in the closed position; and

said cooling portion being connected to the door and extending along an inner wall of the door.

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**4,015,443**
**KNITTED FABRICS HAVING PATTERN EFFECTS**
**Vinicio Luchi, Via Wilfredo Pareto 43, Prato, Florence, Italy**
**Filed Apr. 4, 1975, Ser. No. 565,258**
**Claims priority, application Italy, Apr. 19, 1974, 9412/74**
**Int. Cl.² D04B** *9/12*
**U.S. Cl. 66—9 R** **5 Claims**
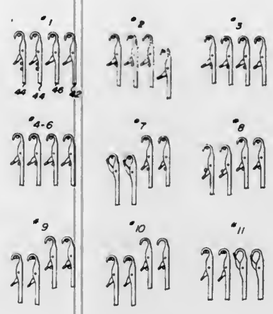


1. A process for forming a fabric using a knitting machine having needles, said process comprising knitting on the machine a fabric having courses of interlinked stitches, incorporating longitudinal and first transverse weft yarns in the fabric, incorporating a further transverse weft yarn in the fabric, said further transverse weft yarn being interlinked with the zones of the fabric in which the stitches of one course of knitted stitches are interlinked with those of an adjacent course, and providing a needle selection such that the further weft yarn appears in selected parts of the surface of the fabric.



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**4,015,444**
**METHOD OF KNITTING A TWO-WAY NON-RUN VENTILATED FABRIC**
**Daniel W. Johnson, Cleveland, Tenn., assignor to Amtex, Inc., Cleveland, Tenn.**
**Filed Feb. 6, 1976, Ser. No. 655,934**
**Int. Cl.² D04B** *9/38*
**U.S. Cl. 66—42** **6 Claims**



1. A method of knitting a ventilated fabric which is non-run in a longitudinal direction and in a transverse direction comprising the steps of:

a. knitting said fabric in the form of a cylinder on a circular knitting machine wherein the number of thread feeds is a whole number multiple of nine operative at three different speeds, and the number of knitting positions being a whole number multiple of 11 so as to have two terminal knitting positions which lack a thread feed, said knitting step including rotating a needle carrier cylinder about a vertical axis, providing the needle carrier cylinder with needles arranged in a repetitive set of four needles,

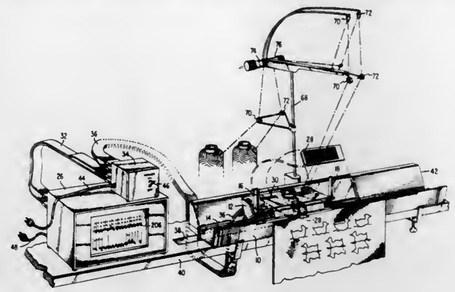
b. camming the needles into knit, welt and tuck positions as they rotate about said axis,

c. using the intermediate thread speed to build up excess thread on the last two needles of each set of four needles when they are in a knit position and the other two needles of that set when they are in a welt position to provide extra fabric strength, and subsequently casting off the thread from the two needles on which excess yarn was built up to create a drop stitch.

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**4,015,445**
**AUTOMATED HOME KNITTING MACHINE WITH MEANS FOR CONTROLLING THE KNITTING OF DESIGN ROWS**
**William Kahan, New York, N.Y., and Thomas Richard Peer, Glenwood, N.J., assignors to The Singer Company, New York, N.Y.**
**Filed Oct. 30, 1975, Ser. No. 627,178**
**Int. Cl.² D04B** *15/66*
**U.S. Cl. 66—75.2** **12 Claims**

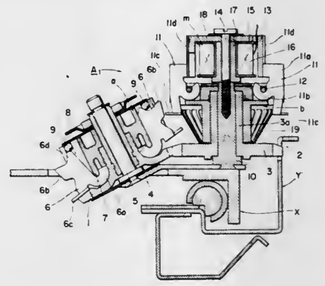
1. In a programmable knitting machine the combination comprising a needle bed wherein needles are supported in side by side relation, needle selecting means including a carriage movable on the needle bed for causing the needles during each movement thereof in one direction or another to knit a course of fabric, a program card and a card reader for reading rows of instruction marks on the card for a design to be formed in a fabric in courses corresponding to said rows, electronic control means responsive to the reader and operably connected to the needle selecting means for controlling the knitting of fabric pursuant to the instruction marks, switch means operably connect to the electronic means, the switch means being manually operable to modify the operation of the



electronic control means and thereby control the order in which design rows are knit into courses on the machine, and a device responsive to the operation of the switch means for visually indicating a knitting order as prescribed by the switch means for the design rows.

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**4,015,446**
**PATTERNING SYSTEM FOR A KNITTING MACHINE**
**Yutaka Kagaya, Musashi-Murayama, Japan, assignor to Silver Seiko Co., Ltd., Kodaira, Japan**
**Filed Sept. 12, 1975, Ser. No. 612,861**
**Claims priority, application Japan, Sept. 14, 1974, 49-105522**
**Int. Cl.² D04B** *7/00, 15/66*
**U.S. Cl. 66—75.2** **12 Claims**



1. A patterning system in a hand-operated straight knitting machine comprising, in combination:

a needle bed;

movable knitting needles mounted in said needle bed and each having a butt;

a carriage mounted for reciprocative sliding movement along said needle bed;

a pair of needle selecting means mounted on said carriage in a spaced relation from each other in the longitudinal direction of said needle bed for engagement with said butts of said needles to select the latter, each of said needle selecting means including an electromagnet;

program providing means for providing a unit number of electric signals representative of data for needle selection for a course of knitting;

switch means for detecting the moving direction of said carriage relative to said needle bed and providing an electric signal representative of the moving direction of said carriage; and

control circuit means for control of said electromagnets

including a program memory electrically connected with said program providing means for temporarily storing therein signals provided by said program providing means, said program memory being controlled by and connected to said switch means, and read out means for successively reading out signals stored in said program memory in regular sequence in response to the carriage movement for energizing said electromagnets in accordance with said read out signals and including a portion responsive to the output signal of said switch means for selectively determining which of said electromagnets is to be supplied with and energized in accordance with the signals being read out of said program memory.

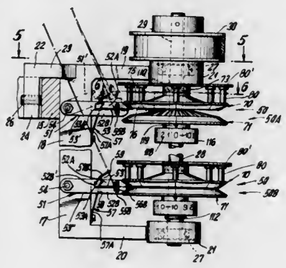
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**4,015,447**

## METHOD AND APPARATUS FOR POSITIVELY FEEDING YARN

**Morris Philip, 2519 Grand Ave., Bronx, N.Y. 10468**

**Filed Jan. 3, 1975, Ser. No. 538,268**
**Int. Cl.² D04B** *15/48*
**U.S. Cl. 66—132 R** **21 Claims**



1. A method of positively feeding yarn of indefinite length from a yarn source to a knitting machine comprising the steps of:

a. extending said yarn in a course from a yarn source to said machine;

b. feeding said yarn in said course through a planar arcuate path;

c. while feeding said yarn through said planar arcuate path in said course repeatedly performing the operations of

1. wedging said yarn at a first location in said planar arcuate path into at least one scissors-like bite formed by an angular shaped rib means of a plurality of such rib means bites in said planar arcuate path to positively grip and hold said yarn from slippage relative to said rib means bite and said yarn course;

2. while gripping and holding said yarn from slippage relative to said bite and said yarn course moving said bites with said yarn grip thereby downstream along said planar arcuate path to draw said yarn from said source and to convey said yarn downstream through a portion of said course, and

3. releasing said yarn from said rib means bites at a location in said planar arcuate path downstream from said first location while wedging said yarn in said planar arcuate path upstream of said release location and at said first location into at least another one of said plurality of scissors-like bits formed by an angular shaped rib means;

c. said repeated operations overlapping so that said yarn is being continuously gripped, held and conveyed by at least one rib means bite to continuously maintain the movement of the yarn under the control of said bites, whereby said yarn is positively fed by said moving bites;

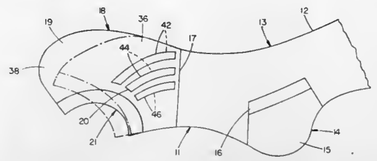
d. said bites, during said movement, being moved synchronously with the knitting operation of said machine.

**4,015,448**

## SUPPORT STOCKING

**Herbert Knohl, Seneca, S.C., assignor to Colgate-Palmolive Company, New York, N.Y.**

**Continuation-in-part of Ser. No. 426,318, Dec. 19, 1973, abandoned. This application Jan. 8, 1975, Ser. No. 539,350**
**Int. Cl.² D04B** *9/52, 9/56*
**U.S. Cl. 66—185** **7 Claims**



1. A tubular knit seamless stocking having a boot portion, a heel portion, an instep portion and a toe portion

said boot, heel and instep portions being formed primarily of fine stretch non-elastomeric multifilament torque yarn having a denier within the range of about 50 to 100 and of 2.5 to 5.5 denier per filament, with a crimp contraction of at least about 46 percent, knitted in every course of said portions and incorporating substantially throughout said boot and instep portions at least one elastomeric stretchable retractive yarn having the major portion thereof inlaid coursewise of, and locked in, said knitted boot and instep portions at frequent intervals in every course in which it occurs

said toe portion being formed primarily of said non-elastomeric yarn free from elastomeric stretchable retractive yarn and

said heel and toe portions each including a shaped pocket knit of said non-elastomeric yarn including partial courses, the yarn of each partial course being cut at opposite ends, and the yarn of each partial course being knit in tuck-float relationship at its terminal ends with at least one stitch loop of an immediately adjacent course to prevent pulling out of the cut ends of yarn.

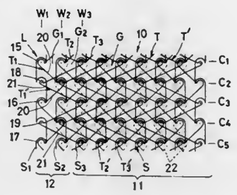
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**4,015,449**

## SLIDE FASTENER TAPE

**Yoshio Matsuda, Nyuzen, and Akira Nogai, Kurobe, both of Japan, assignors to Yoshida Kogyo Kabushiki Kaisha, Japan**

**Filed Apr. 17, 1975, Ser. No. 569,097**
**Claims priority, application Japan, Apr. 25, 1974, 49-46902**
**Int. Cl.² D04B** *21/00;* **A44B** *19/00*
**U.S. Cl. 66—195** **2 Claims**



1. A stringer tape of a warp-knitted structure for mounting thereon a row of interlocking fastener elements, comprising a web portion and a marginal edge portion to which the row of interlocking fastener elements is secured by a line of sewing stitches, said marginal edge portion including an outermost wale extending outwardly of said line of stitches and tricot stitches connecting each course of said outermost wale to a corresponding course in an adjoining wale, and said line of stitches passing through sinker loops of said tricot stitches interconnecting said outermost wale and adjoining wale said tricot stitches being the sole connection between said outermost and adjoining wales.

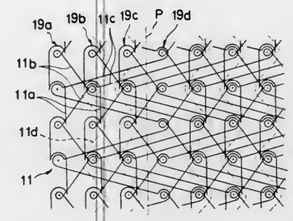


**4,015,450**

## CONCEALED SLIDE FASTENERS

**Yoshio Matsuda, Nyuzen, and Yoshitoki Tsubokawa, Kurobe, both of Japan, assignors to Yoshida Kogyo Kabushiki Kaisha, Japan**

**Filed Sept. 10, 1975, Ser. No. 611,896**
**Claims priority, application Japan, Sept. 25, 1974, 49-116206[U]**
**Int. Cl.² D04B** *21/00*
**U.S. Cl. 66—195** **2 Claims**



1. In a concealed type of slide fastener having a pair of warp-knit support tapes each having a longitudinal element-carrying edge portion inwardly folded toward the remaining portion of the tape, rows of fastener elements, each row secured to a respective element-carrying edge portion; each of said fastener elements having leg portions, a coupling head portion merging into said leg portions and connecting portions remote from said coupling head portion and connecting the element to respective adjacent elements, said support tapes having knitted threads forming a warp-knit structure defining on one surface of each support tape a multiplicity of longitudinally extending alternated wales and interwale grooves, the improvement in which the number of knitting threads forming the wales is reduced at the wale region of each support tape which is located adjacent the path of a sewing needle as compared to the number of knitting threads at the remaining regions of the tape, whereby each support tape can be sewn onto a garment fabric in a manner that the sewing needle provides a sewn seam at and along the inwardly folded edge of the tape, the wale region adjacent the path of said sewing needle consisting of tricot stitches in the lay 1-2/1-0 and stitches in the lay 0-1/4-3 while the remaining regions of the support tape consist of chain stitches, tricot stitches in the lay 1-2/1-0 stitches in the lay 0-1/4-3 and reinforcing warp threads.

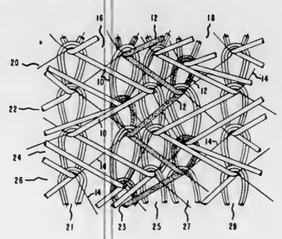
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**4,015,451**

## WARP KNIT FABRIC

**Bharat Jaybhadra Gajjar, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Oct. 8, 1975, Ser. No. 620,836**
**Int. Cl.² D04B** *21/00*
**U.S. Cl. 66—195** **13 Claims**



1. A warp knitted fabric at least a portion of which comprising: at least two full sets of threads knitted in courses according to a stitch pattern forming spaced wales of knitted loops, said portion of said fabric having a continuous pattern throughout its length of at least one group of wales, said group of wales, said group being separated from adjacent wales by exaggerated spacing.

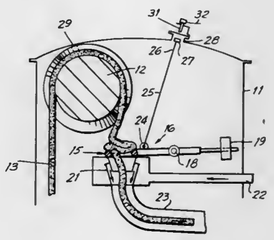
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**4,015,452**

## INTERRUPTING THE ROTARY MOVEMENT OF A GUIDE ROLLER

**Hans Kreitz, Aachen, Germany, assignor to Fa. H. Krantz, Aachen, Germany**

**Filed Oct. 9, 1975, Ser. No. 621,058**
**Claims priority, application Germany, Nov. 2, 1974, 2452185**
**Int. Cl.² D06B** *3/28*
**U.S. Cl. 68—175** **5 Claims**



1. Apparatus for automatically interrupting the movement of a textile web in a processing tank when said web accumulates in said tank, comprising a roller, drive means for said roller, said web passing over said roller for advance thereof, a frame on which the accumulated web will bear and having an opening through which the web passes, a lever pivoted between its ends, said frame being supported by one end of said lever, a ring nozzle positioned beneath said frame and aligned with the opening therein, a guide tube associated with said ring nozzle, said web passing through said ring nozzle and said guide tube, means to provide flow of liquid under pressure into said ring nozzle and said tube to advance said web through said tube, a switch in circuit with said drive means and means operatively connecting said lever to said switch to open the latter and break the circuit to the drive means for said roller when said lever is pivoted by the accumulation of web thereon.

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**4,015,453**

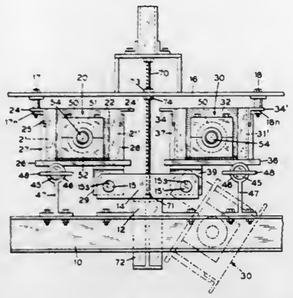
## DYE PAN MOUNTING FOR APPARATUS FOR MULTI-COLOR DYEING OF YARN ENDS

**Clifford Aldene Bryant, Dalton, Ga., assignor to West Point Pepperell, Inc., West Point, Ga.**

**Filed Feb. 26, 1976, Ser. No. 661,569**
**Int. Cl.² D06B** *1/14, 23/30*
**U.S. Cl. 68—202** **11 Claims**

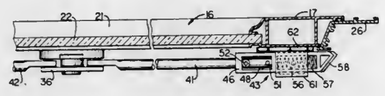
1. In a machine for selective dyeing of yarns in a sheet thereof wherein the yarn sheet passes over dye-pick-up rolls, a receptacle having greater length than width and adapted to hold dye, fixed supporting framework, securing means adjacent an edge of said receptacle supporting said receptacle from said framework in dye-holding position, a dye-pick-up roll positioned within said receptacle and adapted to be engaged by passing yarns, pivot means supporting said receptacle and having an axis running lengthwise of said receptacle and being supported from said framework, the axis of said pivot means being parallel in a lengthwise direction to said

receptacle and positioned adjacent one wall of said receptacle to enable tilting of said receptacle when freed from said supporting means to cause its interior to face approximately vertically.



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**4,015,454**
**LATCHING ASSEMBLY FOR CAP DOOR**
**Dale L. Struble, Reading Township, Hillsdale County, Mich., assignor to Union Products, Incorporated, Sturgis, Mich.**
**Filed Mar. 29, 1976, Ser. No. 671,266**
**Int. Cl.² E05C** *1/12, 21/00*
**U.S. Cl. 70—2** **10 Claims**



**1.** In a cap door having a pair of spaced and substantially parallel frame elements, one of said frame elements being adapted to be hingedly connected to a cap, a handle rotatably supported on the other frame element and disposed adjacent the exterior side of the door, and a latching mechanism mounted on the door and positioned adjacent the interior side of said other framing member, said latching mechanism being interconnected to and activated by said rotatable handle, the improvement wherein said latching mechanism includes:

a rotatable lever drivingly interconnected to and rotated by said handle;

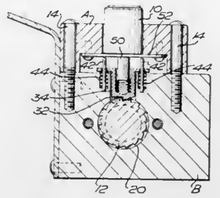
an elongated rigid rod extending along one side of said door and having one end thereof pivotally connected to said lever;

guide means fixed to said door and coacting with said rod adjacent the other end thereof for slidably guiding same; and

bolt means mounted on the other end of said rod and being positioned to project outwardly beyond an edge of the door so as to latchingly engage a part of the cap, said bolt means including a bolt member slidably mounted on the other end of said rod and spring means coacting between said bolt member and said rod for normally urging said bolt member axially outwardly of said rod;

said bolt means further including conversion means associated with at least one of said rod and bolt member for permitting said bolt member to be rigidly fixed relative to said rod when it is desired to have said latching mechanism function as a deadbolt.

**4,015,455**
**LOCKING UNIT FOR IMMOBILIZING VEHICLES**
**Peter Leverton, South Kirkby, near Pontefract, England, assignor to Nu-Line Products (Engineering) Limited, United Kingdom**
**Filed Aug. 27, 1975, Ser. No. 608,025**
**Int. Cl.² E05B** *17/00*
**U.S. Cl. 70—19** **3 Claims**

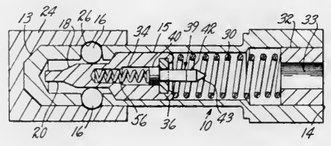


**1.** A locking unit for immobilizing a road vehicle, comprising

1. a sealed housing adapted to be affixed to the vehicle,
2. a locking member operatively connected to the sealed housing by a shaft arranged to rotate in the housing, the shaft carrying ratchet teeth within the housing, at least one end of the shaft being accessible from outside the housing and having a coupling arm attached thereto whereby the coupling arm can be connected to an appropriate part of the vehicle,
3. a pawl mounted in the housing for engagement with the ratchet teeth on the locking member,
4. guide means in the housing for guiding the pawl into engagement with the ratchet teeth,
5. first resilient means in the housing urging the pawl out of engagement with the locking member,
6. a lock affixed to the housing, the lock having a barrel arranged to move in and out relative to the ratchet teeth of the locking member, one end of the barrel being adapted to actuate the pawl, the lock being released by a key to permit movement of the barrel, and
7. second resilient means disposed between the pawl and said one end of the barrel whereby inward movement of the barrel causes the pawl to engage the ratchet teeth and prevent rotation of the locking member in one direction while permitting rotation in the opposite direction.

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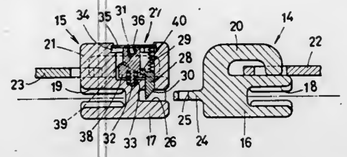
**4,015,456**
**PLUNGER-OPERATED LOCK**
**Sigurd M. Moberg, Etlan, Va., assignor to E. J. Brooks Company, Newark, N.J.**
**Filed June 28, 1976, Ser. No. 700,078**
**Int. Cl.² E05B** *67/36*
**U.S. Cl. 70—34** **5 Claims**



**1.** A lock of the plunger operated type, having a housing open at one end, a lock operating plunger axially movable in the housing and biased forwardly away the open end and a tool-engagable member mounted on the operating plunger said member being spring biased to normally extend rearwardly therefrom and being movable forwardly into an inaccessible position on the application of a forward axial force thereto.



**4,015,457**
**INTERLOCKABLE SLIDERS**
**Takeo Fukuroi, Uozu, Japan, assignor to Yoshida Kogyo Kabushiki Kaisha, Japan**
**Filed Feb. 6, 1976, Ser. No. 655,962**
**Claims priority, application Japan, Feb. 10, 1975, 50-18774[U]**
**Int. Cl.² E05B** *19/26;* **E05B** *67/38*
**U.S. Cl. 70—68** **4 Claims**

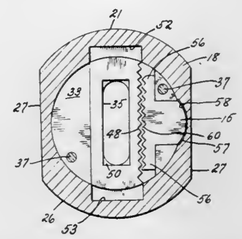


**1.** In a two-way closable slide fastener which comprises a pair of stringer tapes each carrying along their longitudinal inner edge a row of fastener elements, and a pair of sliders disposed in reverse relationship with their front ends opposed to each other, and movable along the rows of fastener elements so that the slide fastener may be closed by the sliders from either end thereof, each of the sliders having a pair of spaced apart upper and lower portions and a connecting portion interconnecting the upper and lower portions at the front end of the slider to define a guide channel for guiding the rows of fastener elements therethrough, and one of the sliders having a chamber formed in the upper portion thereof, the improvement which comprises in combination: a tongue formed on the connecting portion of the other slider and extending toward the front end of the one slider having said chamber, said tongue having an aperture formed therein; means defining in the connecting portion of said one slider a socket portion for receiving said tongue therein; and a locking means for locking the sliders together, said locking means being contained in said chamber of the upper portion of said one slider and including a generally cylindrical rotating member supported within said chamber for rotation relative thereto, a bolt member, and a biasing means for normally urging said bolt member into said socket portion, said bolt member having a surface cooperating with said biasing means to permit the bolt member to engage said aperture upon insertion of said tongue into said socket portion, and biasing means operatively engaging said bolt member with said cylindrical member to selectively disengage the bolt member from said aperture in response to the rotary movement of said cylindrical member when said tongue is received in said socket portion.

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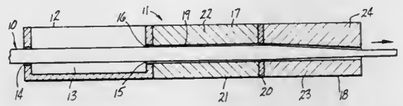
**4,015,458**
**WAFER TYPE TUMBLER LOCK CONSTRUCTION HAVING INDIVIDUAL SIDE BAR TUMBLER INHIBITING MEANS**
**Leonard Mercurio, 34 Beaumont Drive, Plainview, N.Y. 11803**
**Filed Nov. 21, 1975, Ser. No. 634,156**
**Int. Cl.² E05B** *15/14*
**U.S. Cl. 70—364 R** **2 Claims**

**1.** In a cylinder type lock including a housing and a cylinder element rotatably disposed within said housing, said cylinder having planar wafer tumblers and side bar means for inhibiting lateral movement of said tumblers relative to the principal axis of said cylinder upon an attempt to pick said lock, the improvement comprising: said housing having a cylindrical bore supporting said cylinder for rotational motion, said bore having at least one elongated groove having an axis parallel to that of said cylinder; said cylinder element including a plurality of generally planar annular segments in mutually stacked relation, elongated pin means penetrating each of said segments for integrating said cylinder elements; each of said segments including a diametrically extending first slot therein, and a second slot radially extending substantially at right angles to and communicating with said second slot; one of said wafer tumblers being disposed in said first slot, each tumbler having a generally centrally disposed key-engaging through opening, and first and second longitudinal edges, at least one of which is serrated; a T-shaped side bar member having an elongated shank portion slideably disposed in said second slot of each of said segments, and a cross bar portion having a serrated edge thereon disposed in said first slot to position said last mentioned serrated edge opposite a serrated edge of a tumbler, said shank portion projecting into a portion of said groove in said housing; whereby upon an attempt to rotate said cylinder element relative to said housing element without a proper key, the surface of said groove serves to cam said shank of said side bar inwardly to bring the serrated edge thereon into contact with the serrated edge on a respective tumbler element and inhibit transverse movement of said tumbler until said cylinder element is returned to its initial condition.



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**4,015,459**
**HYDRODYNAMIC DRAWING OF MULTIPLE GAUGE METAL STRIP**
**Joseph Winter, New Haven; Eugene Shapiro, Hamden, and Warren F. Smith, Branford, all of Conn., assignors to Olin Corporation, New Haven, Conn.**
**Continuation-in-part of Ser. No. 462,755, April 22, 1974, abandoned. This application Dec. 31, 1975, Ser. No. 645,749**
**Int. Cl.² B21C** *3/10*
**U.S. Cl. 72—45** **24 Claims**



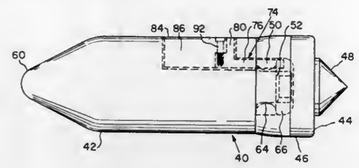
**1.** A method for the preparation of multiple gauge metal strip of rectangular cross section possessing regions of at least two variable thicknesses defining a stepped surface configuration in at least one of the broad surfaces of said strip said method comprising, drawing a previously shaped strip through a die defining said rectangular cross section wherein direct surface-to-surface contact between said strip and said die is prevented, the width dimension of said strip is unchanged and the ratio of strip perimeter to strip cross sectional area changes by at least 30%.

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**4,015,460**
**ROLLING MILL PLUG ASSEMBLY**
**Harry M. Moore, Jr., Beaver Falls, Pa., assignor to Damascus Steel Casting Company, New Brighton, Pa.**
**Filed Jan. 9, 1976, Ser. No. 647,908**
**Int. Cl.² B21B** *25/00*
**U.S. Cl. 72—97** **8 Claims**

**1.** A rolling mull plug assembly comprising a guide plug and a working plug, said working plug including female connecting means and said guide plug including male connecting means

for interlocking relationship with said female connecting means, said assembly including locking means associated with




the male and female connecting means to maintain said connecting means in interlocking relationship.

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**4,015,461**
**CLOSED DROP FORGING DIE**

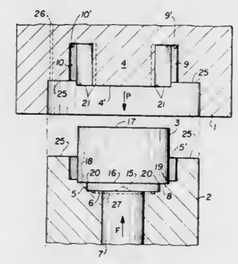
**Franz Schober, Munich-Obermenzing, Germany, assignor to Bayerische Leichtmetallwerk Graf Bluecher von Wahlstatt KG, Munich, Germany**

**Continuation of Ser. No. 483,631, June 27, 1974, which is a continuation-in-part of Ser. No. 301,873, Oct. 30, 1972. This application Nov. 20, 1975, Ser. No. 633,822**

**Claims priority, application France, July 27, 1972, 72.27067**

**Int. Cl.² B21J** *1/06, 5/00*

**U.S. Cl. 72—358** **4 Claims**




**1.** A closed hot drop-forging die for shaping a blank into a claw coupling member, including a first upper die member (**1**) having first cavity elements (**9, 10**) including respective first cavity bottoms (**9', 10'**) and a second lower die member (**2**) having second cavity elements (**5, 5'**), including a second cavity bottom (**6**), said first and second cavity elements (**5, 5'**) forming a closed die cavity (**11**) when the die members are in interface contact with each other, the volume of the die cavity in the closed condition of the die members corresponding to the volume of said blank, the die members having interface surfaces which completely contact each other in the closed condition of said die members to avoid a flash gutter at said interface surfaces, and wherein one of the die members is movable relative to the other along a central, longitudinal axis common to both die members, wherein the first upper die member (**1**) comprises a first facing surface (**4'**) having a central portion and sectional portions extending radially outwardly from said central portion, said first facing surface being located symmetrically and centrally relative to said longitudinal axis and adapted to initially engage one facing surface (**17**) of the blank to apply the forging pressure to the blank, said first facing surface (**4'**) being located axially and radially remote from the first cavity bottoms (**9', 10'**) of the first cavity elements (**9, 10**), said first facing surface (**4'**) having a given surface area, and wherein the second, lower die member (**2**) comprises a second, substantially ring shaped facing surface (**8**) constituting a counter support adapted to initially support a corresponding ring surface (**18**) of the blank opposite said one facing surface (**17**) of the blank, said second facing surface (**8**) being located axially remote from the second bottom (**6**) of the second cavity elements (**5'**) of the second lower die member (**2**), wherein the second cavity elements include a recess (**5**) below said ring shaped facing surface (**8**) and an annular cavity element (**5'**) above said ring shaped surface (**8**), and a cylindrical wall portion (**19**) between said surface (**8**) and said second cavity element (**5'**) to center the blank and close the lower cavity when the blank rests on said surface (**8**), said second ring shaped facing surface (**8**) having a surface area substantially less than said given surface area of said first facing surface (**4'**) which applies the forging pressure to the blank, whereby upon relative movement between the two die members (**1, 2**) the material of the blank is forced to first flow axially into said recess (**5**) below said ring shaped facing surface (**8**) of the second die member (**2**) to fill this recess (**5**) completely prior to being forced to flow axially in the opposite direction to then enter the cavity elements (**9, 10**) of the first upper die member (**1**) whereafter the cavity (**11**) of the first and second die members is completely filled, said die further comprising venting means.

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**4,015,462**
**DEVICE AND METHOD FOR THE DETERMINATION OF THE SPECIFIC GRAVITY OR OSMOLALITY OF A LIQUID**

**Jerome Greyson, and Sisto Nicholas Stiso, both of Elkhart, Ind., assignors to Miles Laboratories, Inc., Elkhart, Ind.**

**Filed Jan. 8, 1976, Ser. No. 647,416**

**Int. Cl.² G01N** *9/00, 13/04*

**U.S. Cl. 73—32 R** **7 Claims**

**7.** Test means for determination of specific gravity or osmolality of a liquid, comprising a plurality of osmotically fragile, semipermeable membrane capsules each enclosing an inner phase of predetermined specific gravity containing a solute and a coloring substance, contact of said test means with a liquid having a specific gravity lower than said predetermined specific gravity producing hydrostatic pressure within said capsules which is effective to cause release of said inner phase from said capsules, the density of the color produced by release of the coloring substance from said capsules upon such contact being inversely related to and indicative of the specific gravity of the liquid contacted.

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**4,015,463**
**MEASURING DEVICE FOR THE WATER ACTIVITY OF FREE WATER CONTAINING VICTUALS**

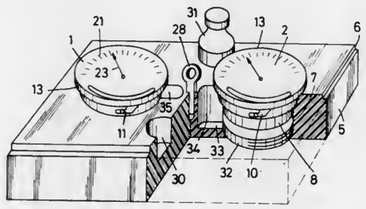
**Otto Friedrich Pott, Mossingen, Germany, assignor to G. Lufft Metallbarometerfabrik, Stuttgart, Germany**

**Filed June 30, 1975, Ser. No. 592,062**

**Claims priority, application Germany, June 28, 1974, 2431051**

**Int. Cl.² G01N** *33/00*

**U.S. Cl. 73—73** **13 Claims**




**1.** A readily portable measuring apparatus for measuring the water activity of substances containing free water, including a foamed lower section of insulating material, a foamed upper section of insulating material connected to said lower section, a closed receptacle formed of separable top and bottom parts, said bottom part receiving the substance to be measured, the top part carrying hygrometer means and thermometer means therein, the bottom part of said receptacle frictionally engaging in a recess in said lower section, said top and bottom parts being separably connected with sealing means therebetween to form the closed receptacle, said top part opening to said bottom part, said top part projecting above said lower section, said upper section being recessed to surround and extend above said top part, the instruments in said top part being readable from above said receptacle and said upper section having an opening through which said instruments may be observed.



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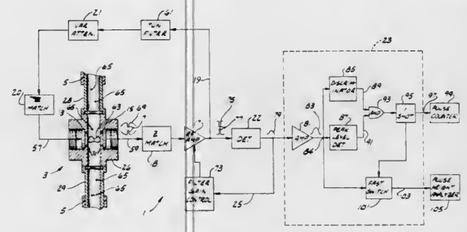
**4,015,464**
**ULTRASONIC CONTINUOUS WAVE PARTICLE MONITOR**

**James G. Miller, Clayton; Richard E. Clark, Richmond Heights; Mark S. Conradi; Dennis R. Dietz, both of Clayton, all of Mo., and Joseph S. Heyman, Gloucester, Va., assignors to The Washington University, St. Louis, Mo.**

**Filed Feb. 21, 1975, Ser. No. 551,913**

**Int. Cl.² G01N** *29/02, 15/00*

**U.S. Cl. 73—61 R** **18 Claims**



**1.** Apparatus for sensing particles in a fluid medium comprising:

an ultrasonic resonator cavity for containing a fluid medium;

first transducer means on one side of the cavity for continuously propagating thereacross ultrasonic compressional waves whose phase and amplitude are perturbed by the presence of particles in the fluid medium;

second transducer means positioned on the opposite side of the cavity from the first transducer means substantially parallel to and in registry therewith for receiving the ultrasonic waves and converting them to rf electric waves of the same frequency and whose phases and amplitudes are modulated in response to any perturbations in the ultrasonic waves;

means for amplifying the rf waves;

feedback means for applying the amplified rf waves to the first transducer means thereby to establish a self-excited continuous wave oscillatory circuit;

attenuation means in the circuit for causing its operation to be marginally oscillatory whereby small changes in the amplitude of the rf waves caused by any perturbations in the ultrasonic waves produce relatively large changes in the amplitude thereof; and

detection means responsive to perturbations in the rf wave for demodulating the amplified rf wave to produce signals indicative of the presence of particles in the fluid medium whereby enhanced sensitivity to small changes in the ultrasonic properties of the fluid medium caused by the presence of particles therein is achieved.

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**4,015,465**
**COLOR DISPLAYING FATIGUE SENSOR**

**William R. Scott, 532 Harbour Drive, Andalusia, Pa. 19020**

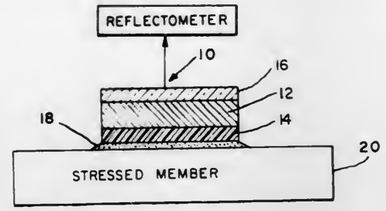
**Filed Mar. 31, 1975, Ser. No. 563,916**

**Int. Cl.² G01N** *3/00;* **G01B** *11/18*

**U.S. Cl. 73—91** **5 Claims**

**1.** A fatigue analysis process for determining the amount of fatigue experienced by a structural member subject to cyclic loading comprising:

affixing a continuous metal alloy film to a portion of a surface of said specimen, said film being selected from the group consisting of $Ag_{50}Zn_{50}$, CuAu, $Cu_3Au$, $Ag_{54}Zn_{46}$ and $Ag_{50}Cd_{50}$, and having the property of undergoing a




detectable color change upon experiencing sufficient cyclic stress; and

observing said film to ascertain the extent of said color change.

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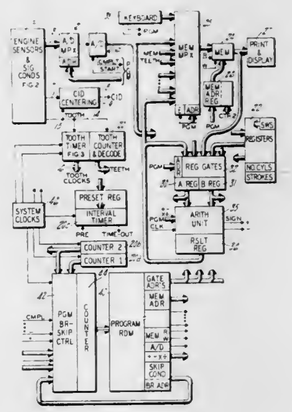
**4,015,466**
**DETERMINATION OF NUMBER OF TEETH ON AN INTERNAL COMBUSTION ENGINE FLYWHEEL**

**Philip P. Stick, Enfield; James F. Willenbecher, East Windsor, and Lee R. Armstrong, Enfield, all of Conn., assignors to United Technologies Corporation, Hartford, Conn.**

**Filed May 7, 1976, Ser. No. 684,037**

**Int. Cl.² G01N** *15/00*

**U.S. Cl. 73—116** **9 Claims**



**1.** Apparatus for determining the number of teeth on the flywheel of an internal combustion engine, comprising:

tooth sensing means adapted to be disposed to sense the passage of each tooth of the flywheel of the engine when the engine is rotating, said means providing a tooth signal each time that an integral number of teeth of the flywheel passes in proximity to said tooth sensing means;

means for registering a plurality of standard data manifestations, each one representing a number indicative of a number of teeth permissible on a flywheel of an internal combustion engine of the type under test;

processing means, responsive to the tooth signals presented by said tooth sensing means and to said registering means, for measuring the number of said tooth signals provided as the engine rotates through a known angle and presenting a measured data manifestation indicative of the number of teeth on said flywheel, for comparing said mea-

sured data manifestation with each of said standard data manifestations and for selecting one of said standard data manifestations of said registering means as a result of the comparison; and

means presenting for system use a manifestation of the standard number of teeth indicated by said selected one of said standard data manifestations as the determined number of teeth on the flywheel of the engine under test.

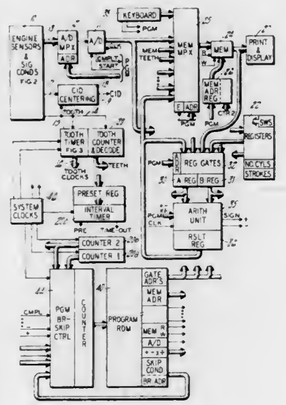
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**4,015,467**

## SUB-CYCLIC MEASUREMENTS OF SPEED AND TIME FOR INTERNAL COMBUSTION ENGINE HORSEPOWER INDICATION

**Lee R. Armstrong, Enfield, Conn., assignor to United Technologies Corporation, Hartford, Conn.**

**Filed May 7, 1976, Ser. No. 684,217**
**Int. Cl.² G01L 5/26**
**U.S. Cl. 73—116** **4 Claims**




1. Apparatus for providing indications of speed of an internal combustion engine at two points in time, spaced across a significant portion of an acceleration profile of the engine while accelerating, together with an accurate measure of the elapsed time between the two speed measurements, comprising:

means for registering indications of a starting threshold speed and an ending threshold speed and providing a start speed data manifestation and an end speed data manifestation in response thereto;

speed sensing means, adapted to be disposed for response to a mechanical movement of a portion of the engine through successive angles which are a small fraction of a full revolution of the engine, for successively providing measured data manifestations of the time elapsed during angular revolution of the engine through said known angle;

an interval timer operative in response to command input signals applied thereto to commence timing of an interval and to cease timing of an interval and to provide an elapsed time manifestation indicative of the interval of time measured thereby; and

processing means responsive to said speed sensing means and to said registering means for comparing said measured data manifestation against said start manifestation and said end data manifestation and for providing a start command input signal to said interval timer in response to said measured data manifestations indicating a speed as high as the speed represented by said start data manifestation, and responsive to said measured data manifestation indicating that the engine has achieved a speed equal to said end speed manifestation to provide a stop command input signal to said interval timer.

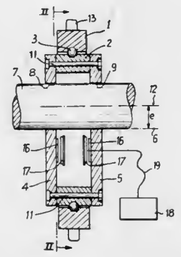
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**4,015,468**

## DEVICE FOR THE MEASUREMENT OF THE RADIAL FORCE SUSTAINED BY A ROTARY ORGAN

**François Simon, Chemin des Molieres, Le Viviers Du Lac, France 73420**

**Filed July 3, 1975, Ser. No. 592,892**
**Claims priority, application France, July 12, 1974, 74.24304**
**Int. Cl.² G01L 5/00**
**U.S. Cl. 73—136 R** **10 Claims**



1. A device for the measurement of the relative radial force between a rotatable organ and a stationary support, comprising an outer annular organ to which a force is applied, the radial component of which is to be measured; an inner annular organ mounted concentrically within said outer annular organ; means for rotatably mounting said outer annular organ on said inner annular organ so that said outer annular organ rotates about a first common axis of said inner and outer annular organs in response to said force; a first end support flange mounted to one side surface of said inner annular organ; a second end support flange mounted to the other side surface of said inner annular organ and parallel with said first end support flange; means passing through said inner annular organ having a first end connected to said first end support flange and a second end connected to said second end support flange for mounting said end support flanges to said side surfaces of said inner annular organ; each of said inner annular organ, said first end support flange, and said second end support flange having an opening formed therethrough, the opening in said inner annular organ being greater than the openings in said first and second end support flanges and the opening in each of said inner annular organ and said first and second support flanges being in axial alignment; stationary support means for supporting said inner and outer annular organs and said end support flanges extending through each of said openings; and means mounted on at least one of said end support flanges and said inner annular organ for detecting deformation caused by said force, said openings in said first and second end support flanges, and said inner annular organ, said stationary support means for supporting said inner and outer annular organs and said first and second support flanges having a second common axis offset from said first common axis in a radial direction so that said first common axis, said second common axis, and said radial component of said force all lie in a common vertical plane, whereby in response to said force one of said end support flanges and said inner annular organ is deformed in response to the radial component thereof and is measured by said means for detecting.

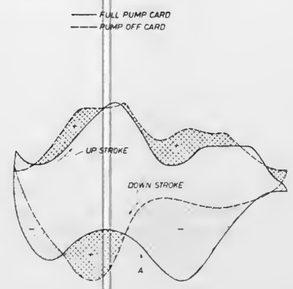


**4,015,469**

## PUMP-OFF MONITOR FOR ROD PUMP WELLS

**Fred A. Womack, Humble, and Daniel F. Jahns, Houston, both of Tex., assignors to Shell Oil Company, Houston, Tex.**

**Filed July 2, 1976, Ser. No. 701,774**
**Int. Cl.² E21B 47/00**
**U.S. Cl. 73—151** **2 Claims**




1. A method for monitoring a rod pumped well to determine when the well pumps-off by measuring the load on the rod and the displacement of the rod and then integrating the load versus displacement to obtain the energy input to the rod, the improvement comprising:

integrating the load versus displacement measurements over an interval that extends equally in displacement on either side of the top of the pump stroke; and

determining when the well pumps-off by comparing the integrated values to detect when the integrated value decreases.

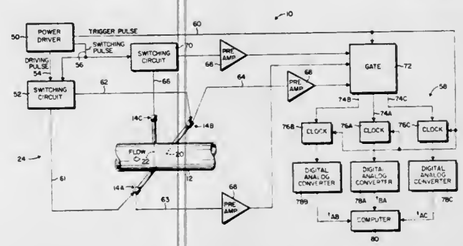
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**4,015,470**

## FLOW MEASURING METHOD AND APPARATUS

**Roderick G. Morrison, Idaho Falls, Idaho, assignor to TRW Inc., Redondo Beach, Calif.**

**Filed Dec. 26, 1973, Ser. No. 428,270**
**Int. Cl. G01f 1/00**
**U.S. Cl. 73—194 A** **10 Claims**




1. The method of measuring selected variables of a fluid flowing through a conduit comprising the steps of:

transmitting first acoustic pulses through said fluid between first pulse transmitting and receiving positions located at opposite sides of the conduit passage and along a first path crossing said passage normal to and intersecting the conduit axis in a manner such that the pulse transit times between said positions and the adjacent points of intersection of said path with the passage wall are in a known ratio;

transmitting second acoustic pulses through said fluid between second pulse transmitting and receiving positions located at opposite sides of the conduit passage and along a second path crossing said passage at an oblique angle to and intersecting the conduit axis in a manner such that the pulse transit times between said second positions and the adjacent points of intersection of said second path with said passage wall are in a known ratio;

one of said first positions and one of said second positions coinciding and the path intersection points adjacent said coincident positions also coinciding;

measuring and producing an electrical output representing the transit time of said first pulses between said first positions;

measuring and producing an electrical output representing the transit time of said second pulses between said second positions; and

said outputs being adapted to be combined in accordance with selected mathematical equations to obtain any of the following fluid variables: flow velocity, sonic velocity, compressibility, temperature, mass flow rate, or density.

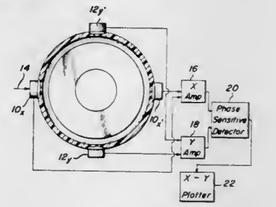
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**4,015,471**

## SPHERICAL ELECTROMAGNETIC WATER CURRENT VELOCITY SENSOR WITH PROTRUDING ELECTRODES

**Lawrence B. Marsh, Silver Spring, Md., assignor to Marsh-McBirney, Inc., Rockville, Md.**

**Filed Nov. 18, 1975, Ser. No. 633,000**
**Int. Cl.² G01F 1/58**
**U.S. Cl. 73—194 EM** **5 Claims**




1. Electromagnetic sensing means for sensing the velocity of a fluid current, comprising

a. a spherical body (**2, 30**) formed of a non-ferromagnetic material, said spherical body being adapted to be completely submerged in the fluid current;

b. electromagnetic means including a first coil (**4, 34**) mounted within said spherical body for establishing in the fluid about said spherical body a first magnetic field the axis of which passes through the center of said spherical body;

c. a plurality of pairs of diametrically-opposed electrodes (**10, 12; 42, 44, 46**) mounted in circumferentially spaced relation on the periphery of said spherical body,

1. each of said electrodes being contained in a common first plane that is normal to the magnetic axis of said first coil,

2. the electrodes of each electrode pair protruding from the outer surface of said spherical body by a common distance which is between 0.100 and 0.125 inch per inch of diameter of said spherical body; and

d. detecting and indicating means (**16, 18, 20, 22; 54, 56, 52, 60**) for comparing the amplitudes of the electrical signals produced across the electrodes of the electrode pairs, respectively, thereby to afford an indication of the velocity of the fluid current.

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**4,015,472**

## TWO-WIRE TRANSMISSION SYSTEM FOR VORTEX FLOWMETER

**Peter J. Herzl, Morrisville, Pa., assignor to Fischer & Porter Co., Warminster, Pa.**

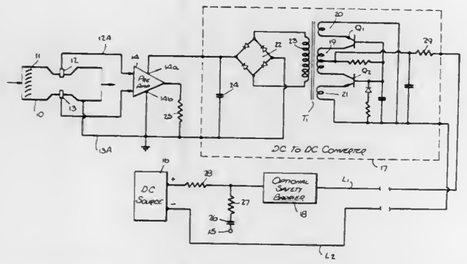
**Filed Mar. 9, 1976, Ser. No. 665,178**
**Int. Cl.² G01F 1/32**
**U.S. Cl. 73—194 B** **10 Claims**

1. An isolated two-wire line transmission system for supplying d-c operating power to the power terminals of a pre-

amplifier whose input is connected to the transducer of a grounded vortex-type flowmeter yielding a low-frequency a-c signal within a given range as a function of flow rate and for concurrently conveying the amplified low-frequency a-c signal output of the pre-amplifier to a remote terminal, said system comprising:

A. a d-c voltage source;

B. a DC-to-DC converter whose input is connected via said two-wire line to said source and whose output is connected by at least one lead to said amplifier power terminals, whereby the direct-current carried by said lead depends on the power drawn by said amplifier from said converter; said converter being constituted by a high-frequency carrier oscillator whose operating frequency is substantially higher than the highest frequency in the




low-frequency range of said flowmeter, said carrier being applied by a high-frequency isolation transformer to a full-wave rectifier whose output is fed by said lead to said power terminals, said transformer being substantially unresponsive to frequencies in said low-frequency range,

C. a load resistor connected between the output of said amplifier and said lead, said resistor drawing a sufficiently heavy current to modulate the direct-current flowing through said lead in accordance with the amplified low-frequency a-c signal flowing through said resistor, this modulation being reflected in the demand imposed by said converter on said d-c source through said line, whereby the current in said line has an a-c modulation component; and

D. means coupling said output terminal to said line to extract only the a-c modulation component therefrom.

**4,015,473**

## MASS FLOWMETER FOR A GASEOUS MEDIUM, FOR EXAMPLE AIR

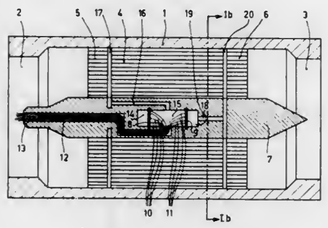
**Wilhelm Josef Kleuters, and Antonius Cornelis Maria Gieles, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed Oct. 30, 1975, Ser. No. 627,108**

**Claims priority, application Netherlands, Nov. 6, 1974, 7414460**

**Int. Cl.² G01F** *1/38*

**U.S. Cl. 73—205 L** **6 Claims**



1. Apparatus for measuring the mass flow of a gas, comprising:

a laminar restriction through which a gas may flow from an inlet side to an outlet side;

an evacuated space;

a first diaphragm in open communication on one side with said evacuated space and on the other side with the gas flowing through said laminar restriction, said first diaphragm having at least one surface electric resistance element acting as a strain gauge for measuring the pressure difference between said evacuated space and the gas flowing through said laminar restriction, said at least one resistance element of said first diaphragm having a resistance inversely proportional to temperature and being in good heat-exchanging contact with the gas flowing through said laminar restriction;

a second diaphragm in open communication on one side with the inlet side of said laminar restriction and on the other side with the outlet side of said laminar restriction, said second diaphragm having at least one surface electric resistance element acting as a strain gauge for measuring the pressure difference between the inlet and outlet side of said laminar restriction, said at least one resistance element of said second diaphragm having a resistance inversely proportional to temperature and being in good heat-exchanging contact with the gas flowing through said laminar restriction; and

circuit means for multiplying the pressure difference measured by said at least one resistance element of said first diaphragm by the pressure difference measured by said at least one resistance element of said second diaphragm, the product being a measure of the mass flow of the gas flowing through said laminar restriction.

**4,015,474**

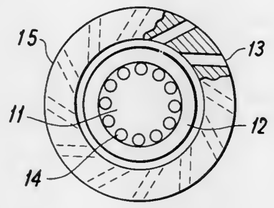
## STABILIZING MEANS FOR ROTOR OF BEARINGLESS FLOWMETER

**David E. Hoppe, 294 Beacon St., Boston, Mass. 02116**

**Continuation of Ser. No. 300,145, Oct. 24, 1972, abandoned. This application Oct. 10, 1975, Ser. No. 621,531**

**Int. Cl.² G01F** *1/06*

**U.S. Cl. 73—229** **1 Claim**




1. An improved rotor-stabilized bearingless flowmeter comprising

inlet means for receiving fluid entering said flowmeter,

at least nine circumferentially spaced jet passages adapted to respond to said fluid from said inlet means,

an operating chamber adapted to receive said fluid from said jet passages and each of said jet passages opening into said chamber through the circumferential periphery thereof at an angle with a chamber radius so that said fluid entering said chamber from said jet passage tends to rotate within said chamber while passing therethrough,

a rotor within said chamber adapted to rotate therein in a substantially stable manner in cooperation with said fluid entering said chamber from said at least nine jet passages and rotating within said chamber and passing through said chamber, and

outlet means adapted to exhaust said fluid exiting from said chamber inwardly from said circular periphery thereof whereby the action of said at least nine jet passages in cooperation with said rotor and said chamber in the



operation of said flowmeter tends to provide substantially stable rotor operation.

**4,015,475**

## METHOD OF AND DEVICE FOR STRIPPING OFF A LOST MEASURING HEAD DETACHABLY PLACED UPON A MEASURING LANCE

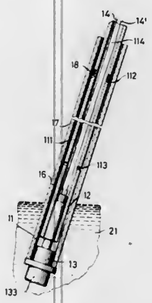
**Wolfgang Pluschkell, Dortmund-Wambel, and Heinrich Wisnewski, Dortmund, both of Germany, assignors to Hoesch Werke Aktiengesellschaft, Dortmund, Germany**

**Filed Dec. 10, 1975, Ser. No. 639,224**

**Claims priority, application Germany, Dec. 10, 1974, 2458256**

**Int. Cl.² G01K** *1/14*

**U.S. Cl. 73—343 R** **8 Claims**



4. In combination, a measuring lance having a longitudinal bore and also having a first end section to be immersed into a melt and also a second end section forming a free sealed end section, connecting means provided at said second end section for connection with a source of compressed air, a socket fixedly mounted in said first section, a protective tubular cover surrounding said lance and said socket and protruding beyond said socket in the direction away from said second end section of said lance, a measuring head arranged within and surrounded by that portion of said tubular cover which protrudes beyond said socket in the direction away from said second lance section, said measuring head being provided with a plug member normally engaging said socket, measuring conductor lines respectively normally electrically connected to said plug member and extending through said lance for connection with a measuring device, and fluid pressurc conveying means for conveying fluid pressure through said second section to said measuring head to strip the latter from said lance.

**4,015,476**

## SCANNING PYROMETER SYSTEM

**John J. Roche, and Glenn L. Hunsicker, both of Allentown, Pa., assignors to Bethlehem Steel Corporation, Bethlehem, Pa.**

**Filed Nov. 8, 1974, Ser. No. 522,363**

**Int. Cl.² G01J** *5/52*

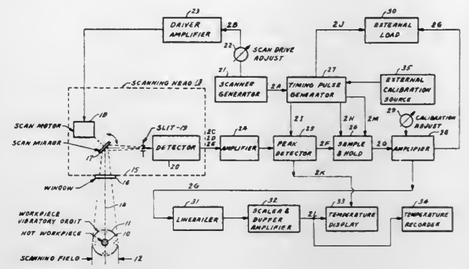
**U.S. Cl. 73—355 R** **12 Claims**

1. A scanning pyrometer system for determining a variable temperature of a movable hot workpiece which may experience increases or decreases in temperature at various locations in a scanning field, said system comprising:

a. means including an oscillating mirror for continuously scanning said field, and further including a detector aligned with said mirror for producing a detector output signal which varies with the temperature of said hot workpiece,

b. means for detecting and storing a new peak in the variable temperature detector output signal each scan, said means adapted to be updated each scan,

c. means synchronized only with the mirror movement in scanning means (a) for controlling the updating of means (b), and




d. means for utilizing the stored peak temperature signal to determine the temperature of said hot workpiece.

**4,015,477**

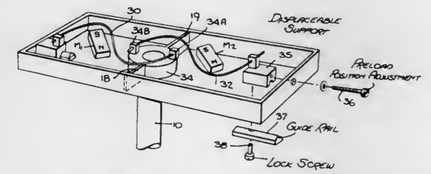
## LINEAR DISPLACEMENT TRANSDUCER

**W. Jorge Sitkewich, Warminster, Pa., assignor to Fischer & Porter Co., Warminster, Pa.**

**Filed Dec. 22, 1975, Ser. No. 643,133**

**Int. Cl.² G01L** *9/16*

**U.S. Cl. 73—398 R** **7 Claims**




1. A displacement transducer capable of accurately measuring a small movement of a displaceable element, said transducer comprising:

A. an S-shaped wire formed of magnetostrictive material and having two arc sections, one end of the wire being fixed and the other being linked to said element, whereby movement of the element results in a change in the curvature of the arcs;

B. means subjecting the wire to a stationary magnetic field;

C. an amplifier whose input is connected to one section of the wire and whose output is connected to the other section thereof, whereby electrical pulses yielded in the amplifier output produce torsional vibration in the two sections to create a sinusoidal electrical signal which is fed back to the input of the amplifier, thereby sustaining oscillations in the amplifier to produce an output signal whose frequency depends on the radius of curvature of the wire sections and is therefore a function of displacement, the relationship between the output signal and displacement exhibiting non-linear deviations; and

D. means associated with the wire to linearize the relationship between displacement and the frequency of the output signal.

**4,015,478**

## DIRECT-ACTING PRESSURE SENSOR

**Siegfried H. A. Schmaus, 806 Powder Mill Lane Penfield Downs,, Philadelphia, Pa. 19151**

**Division of Ser. No. 632,920, Nov. 18, 1975, Pat. No. 3,986,400. This application Apr. 27, 1976, Ser. No. 680,701**

**Int. Cl.² G01L** *7/04*

**U.S. Cl. 73—418** **3 Claims**

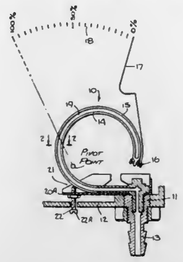
1. A fluid pressure sensor comprising:

A. inner and outer flat springs having similarly curved for-

mations and maintained in concentric relation to define a pressure region therebetween;

B. a fixed fluid input socket anchoring said springs at one end thereof, the free end of the springs being joined to form a tip whose travel is indicative of fluid pressure; and

C. a flexible bladder occupying said region and having an



internal chamber, the faces of said bladder engaging said springs and being bonded thereto avoid slide friction therebetween, thereby minimizing hysteresis, said internal chamber communicating with said fluid input socket whereby the pressure of fluid fed to said chamber through said socket applies a load on said springs producing deflection thereof whereby said tip is caused to travel.

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**4,015,479**

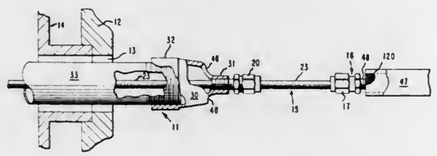
## SAMPLING PROBE AND METHOD

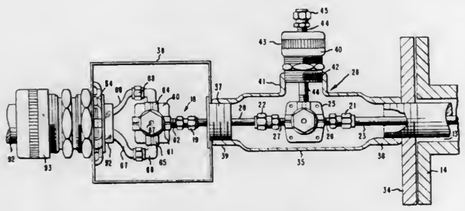
**Glenn Dwight Apple, Newark, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed May 13, 1976, Ser. No. 686,645**

**Int. Cl.² G01N *1/22***

**U.S. Cl. 73—422 R** **9 Claims**





1. In a probe for sampling a primary fluid located in a confined region defined by at least one wall, said probe comprising: a sample tube having a first end extending through the wall into the confined region and a second end located outside the confined region and a filter attached to the first end of said sample tube, the improvement wherein said probe further comprises:

a. a housing extending through the wall into the confined region and surrounding that portion of said sample tube located outside of the confined region, said housing being in substantially fluid-tight association with the wall and having at least one orifice connecting the interior of said housing to the confined region at a position remote from said filter;

b. a source of relatively high pressure, temperature controlled secondary fluid; and

c. valving means alternately connecting said source of secondary fluid to the interior of said housing, or to the second end of said sample tube.

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**4,015,480**

## BALANCING METHOD AND APPARATUS

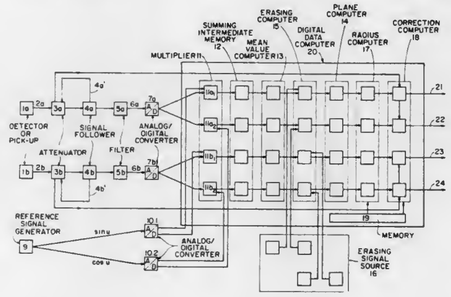
**Alfred J. Giers, Rossdorf, Germany, assignor to Carl Schenck AG, Darmstadt, Germany**

**Filed Nov. 26, 1975, Ser. No. 635,722**

**Claims priority, application Germany, Dec. 14, 1974, 2459282**

**Int. Cl.² G01M *1/22***

**U.S. Cl. 73—462** **24 Claims**




1. A method for determining the unbalance of a rotating body to be balanced and having an unbalance which causes an unbalance oscillation having an unbalance frequency, comprising producing instantaneous, unbalance representing signals, providing a reference signal having a reference period, said reference signal having a frequency equal to said unbalance frequency, producing reference values at least at three points of time during said reference period of the reference signal, said reference values representing or approximating sine and cosine reference values with respect to said reference period at said three points of time, miltiplying in a digital manner said unbalance representing signals with said sine and cosine reference values at said three points of time to produce respective sine and cosine products, separately summing in a digital manner said sine products at least during one period of said reference signal to produce a sine sum, separately summing in a digital manner said cosine products at least during one period of said reference signal to produce a cosine sum, and producing an unbalance indicating signal from said sine and cosine sums by digitally forming means values from said sums.

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**4,015,481**

## BUBBLE BALANCER

**Arthur Kamin, Mundelein; Clifford A. Evans, Waukegan, and Lehner C. Freborg, Libertyville, all of Ill., assignors to Ammco Tools, Inc., North Chicago, Ill.**

**Filed May 24, 1976, Ser. No. 689,511**

**Int. Cl.² G01M *1/12***

**U.S. Cl. 73—483** **8 Claims**

1. Apparatus for use in determining the condition of balance of a rotor, comprising in combination,

an upright support member,

the upper end portion of said support member having the shape of a portion of a sphere,

said portion exceeding 180° in the vertical direction,

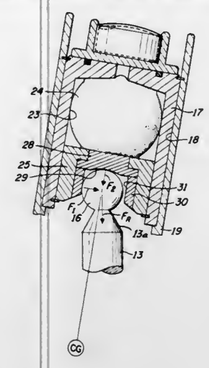
a pivot head having means thereon for mounting a rotor to be balanced,

said pivot head having a downwardly opening recess defined by an annular side wall and a top wall,

said upper end portion of said support member being disposed in said recess in engagement with said top wall,



the respective dimensions of said sphere and said annular side wall being such that when said pivot head is tilted about 3° relative to the vertical said end portion of said



support member may simultaneously engage said annular and top walls at respective locations on said end portion angularly displaced by substantially 90° in the vertical direction.

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**4,015,482**

## CONTROL SYSTEM FOR POWER TRAIN AND AUXILIARY EQUIPMENT DRIVEN FROM A COMMON PRIME MOVER

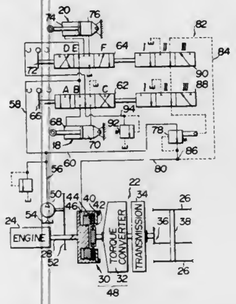
**Ryuji Ito, Ebina, and Mitsuaki Komatsu, Yokohama, both of Japan, assignors to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan**

**Filed Apr. 12, 1976, Ser. No. 675,884**

**Claims priority, application Japan, Apr. 14, 1975, 50-44248**

**Int. Cl.² F16H *37/00***

**U.S. Cl. 74—15.84** **8 Claims**




1. In combination with a power train driven by a prime mover and including a variable torque absorption transmission mechanism which has an actuating chamber effective to vary the torque absorption characteristic of the transmission mechanism in response to variable fluid pressure supplied thereto, a system comprising:

a source of fluid under pressure;

means operatively connecting the source to the power train at a point intermediate the prime mover and the transmission mechanism whereby the source is driven by the prime mover;

at least one control valve operatively connected to the source;

fluid actuated cylinder means operatively connected to the control valve and having a pair of opposed fluid chambers, the control valve being adapted to control communication between the source and the fluid chambers of the cylinder means;

a variable pressure regulator valve through which the source communicates with the actuating chamber of the transmission mechanism; and

means for causing the pressure regulator valve to vary the fluid pressure supplied to the actuating chamber of the transmission mechanism in response to establishment of communication between the source and a predetermined one of the fluid chambers of the cylinder means by the control valve;

whereby the transmission mechanism is automatically conditioned for a relatively low torque absorption characteristic upon establishment of communication between the source and the predetermined fluid chamber of the cylinder means.

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**4,015,483**

## VEHICLE TRANSMISSION

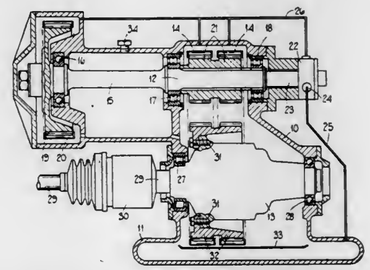
**Peter Stuart Warner, Henlow, England, assignor to Joseph Lucas Limited, Birmingham, England**

**Filed Nov. 25, 1975, Ser. No. 635,231**

**Claims priority, application United Kingdom, Nov. 29, 1974, 51715/74**

**Int. Cl.² F16H *57/04*; F01M *9/10***

**U.S. Cl. 74—230** **5 Claims**



1. A vehicle transmission comprising a casing including a sump for lubricating fluid, a rotary shaft and a differential unit mounted one above the other in said casing, at least one drive operatively interconnecting said differential unit and said rotary shaft, said rotary shaft, differential unit and drive means being disposed above a normal lubricant level in the sump, and a lubricating fluid pump driven by said shaft, said pump having an inlet communicating with the sump, and an outlet arranged in use to discharge pressurized lubricating fluid onto moving parts of the transmission internally of the casing.

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**4,015,484**

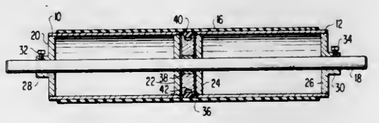
## GUIDE PULLEY FOR WIDE BELTS

**Miller Taylor, c/o Taylor Tobacco Enterprises Inc., Highway 701 South, Elizabethtown, N.C. 28337**

**Filed Feb. 20, 1976, Ser. No. 659,879**

**Int. Cl.² F16H *55/36, 7/18***

**U.S. Cl. 74—230.3** **4 Claims**



1. A composite pulley for a wide flat belt having a longitudinally disposed central rib on one surface thereof comprising a pair of coaxial spaced apart cylindrical pulley portions adapted to support the wide belt on opposite sides of the central rib and grooved pulley means coaxially disposed intermediate and freely rotatable relative to said cylindrical pulley portions adapted to receive and guide said central rib.

**4,015,485**

## CRANK SHAFT FOR A MULTI-CYLINDER SHORT STROKE INTERNAL COMBUSTION ENGINE

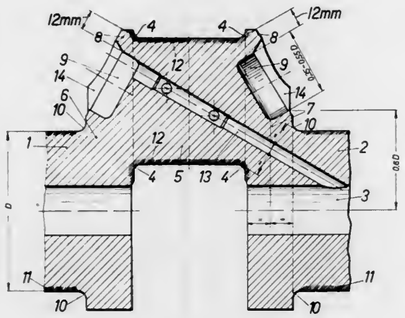
**Karl Ganter-Ullmann, Cologne; Paul Neussel, Langenfeld; Hubert Abermeth; Jürgen Wahnschaffe, both of Cologne, and Heiner Klier, Bensberg-Refrath, all of Germany, assignors to Klockner-Humboldt-Deutz Aktiengesellschaft, Cologne, Germany**

**Filed July 24, 1975, Ser. No. 598,565**

**Claims priority, application Germany, July 24, 1974, 2435476**

**Int. Cl.² F16C** *3/04*; **F16F** *3/14*

**U.S. Cl. 74—596** **4 Claims**




**1.** A crank shaft in combination for a multicylinder short stroke internal combustion engine having crank pins and shaft journals with one diameter of adjacent crank pins and shaft journals overlapping each other and also having crank webs each of which connects one crank pin with a portion of one respective adjacent shaft journal, each of said crank webs decreasing in thickness from approximately the middle of the crank pin with increasing distance from the shaft center, each of said crank webs within the region of the respective adjacent crank pin portion being provided with a blind bore forming a relief bore having its axis inclined with regard to the axis of the respective adjacent shaft journal so as to confine therewith an acute angle, each of said relief bores having a flat bottom surface and a circumferential surface merging with said flat bottom surface along a transitional rounded surface section with that merging surface which is closest to the area of the respective nearest shaft journal being located approximately in a plane perpendicular to the longitudinal axis of said crank shaft and approximately in the middle of each crank web between the respective adjacent crank pin and said last mentioned shaft journal, while with a diameter ratio of crank pin to shaft journal amounting to 0.8 the diameter of said relief bores corresponds to from 0.35 to 0.55 times the diameter of the respective adjacent shaft journals but with its maximum being limited to such a value that the overlapping of the respective relief bore with the outer contour of the respective adjacent web is spaced from the shaft axis by a minimum distance of 0.6 times the diameter of the shaft journal while each relief bore has a minimum distance of 12 mm from the respective section over which the crank pin merges with the respective adjacent crank web.

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**4,015,486**

## POWER SHIFT TRANSMISSION

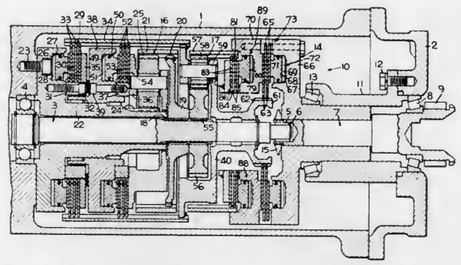
**George O. Zach, Jr., Hales Corners, Wis., assignor to Allis-Chalmers Corporation, Milwaukee, Wis.**

**Filed Dec. 19, 1974, Ser. No. 534,555**

**Int. Cl.² F16H** *3/44*, *57/10*

**U.S. Cl. 74—753** **10 Claims**

**1.** A planetary transmission comprising a transmission housing, a first planetary gearset and a second planetary gearset each having a sun gear mounted on a common axis, each planetary gearset including a sun gear, a ring gear, a planetary carrier, and planet gears mounted on the planetary carrier, an input shaft rotatably mounted for rotation about said common axis, means integrally connecting said input shaft to the ring gear of said first planetary gearset and the sun gear of said second planetary gearset, an output shaft rotatably mounted for rotation about said common axis, means integrally connecting the sun gear on said first planetary gearset to said transmission housing, a torque transmitting member interconnected with the planetary carrier of said second planetary gearset, a brake mounted on said transmission housing, a clutch selectively connecting said planetary carrier of said first



planetary gearset with said torque transmitting member, a friction member in each of said brake and said clutch connected to said torque transmitting member, a clutch carrier integrally connected to said output shaft and mounted for rotation about said common axis, a plurality of clutches carried on said clutch carrier, a friction member carried on each of said ring gear and said planetary carrier of said second planetary gearset forming an element in each of said clutches in said clutch carrier, hydraulic means for selectively and alternatively actuating said brake and clutches to thereby selectively provide a plurality of power paths through said planetary gearsets in said transmission when said brake or clutches are engaged.

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**4,015,487**

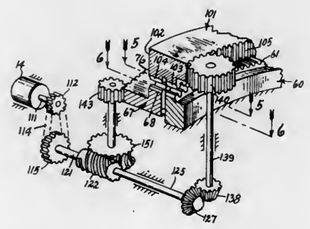
## INDEX MECHANISM

**Stanley Arthur Pfister, Wilmington, Ohio, assignor to Cincinnati Milacron, Inc., Cincinnati, Ohio**

**Filed Feb. 23, 1976, Ser. No. 660,399**

**Int. Cl.² B23B** *29/32*

**U.S. Cl. 74—813 L** **2 Claims**



**1.** In a mechanism for positioning and securing an indexable machine member against rotation with respect to a base member, said mechanism comprising a first coupling element connected to the base member and including a first annular array of teeth, a second coupling elememt connected to the indexable machine member and including a second annular array of teeth disposed in a concentric relationship with an axis of rotation of the indexable machine member and with said first annular array of teeth, a third coupling element disposed in a concentric relationship with the axis of rotation of the machine member and with said first and second annular arrays of



teeth, said third coupling element including tooth means for meshing engagement with at least a portion of said first and second annular arrays of teeth to position and secure the machine member in a selectable predetermined position with the base member, and means for affecting axial movement between said third coupling element and at least one of said annular arrays of teeth to move said tooth means into and out of meshing engagement with at least one of said annular arrays of teeth, and further having means to index said indexable machine member, an improved fine resolution index mechanism comprising:

a. unequal numbers of uniformly spaced teeth on said first and said second arrays of teeth;

b. first and second tooth portions on said third coupling element wherein said first tooth portion is coequal to said first array of teeth and said second tooth portion is coequal to said second array of teeth; and

c. means to drive said third coupling element about said axis at a predetermined speed ratio relative to said indexable machine member when said member is indexed, wherein said member and said second coupling element may be indexed to successive angular increments corresponding to the angular difference in respective tooth spaces on said first and second arrays of teeth.

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**4,015,488**

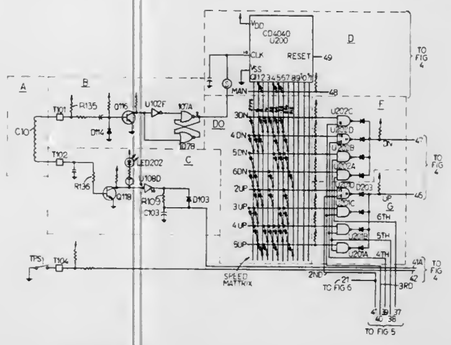
## DIGITAL ELECTRONIC CONTROLLER FOR POWER TRANSMISSION

**Richard C. Akeson, Brookfield, and Robert W. Hockenbury, Milwaukee, both of Wis., assignors to Twin Disc, Incorporated, Racine, Wis.**

**Filed Sept. 29, 1975, Ser. No. 617,429**

**Int. Cl.² B60K** *41/06*

**U.S. Cl. 74—866** **4 Claims**



**1.** In combination:

a prime mover;

accelerator means operable to regulate the speed of said prime mover;

a gear shift mechanism driven by said prime mover and shiftable in a manual gear range including neutral and reverse and shiftable in an automatic gear range including a plurality of speed ranges above neutral;

electrically actuatable devices for shifting said mechanism into any gear of said manual and automatic gear ranges;

a range selector switch selectively movable to any one of a plurality of gear range positions and for providing an electrical range signal indicative of the gear range position selected;

speed sensing means for providing an electrical speed signal indicative of the output speed of said mechanism, said speed sensing means providing a pulsed electrical speed signal whose frequency is indicative of the output speed of said mechanism;

means for providing an electrical acceleration signal indicative of whether said accelerator means is being operated or not to effect regulation of the speed of said prime mover;

and electronic digital control means to provide control signals for actuating said devices, said control means including a signal pattern recognition circuit having an upshift section and a downshift section: said control means effecting operation of said mechanism in any gear in said manual gear range solely in response to said range signal;

said control means effecting upshift operation of said mechanism to any gear in said automatic gear range in response to said range signal, said speed signal and an acceleration signal indicative that said prime mover is being accelerated, said acceleration signal indicative that said accelerator means is being operated enabling said upshift section of said signal pattern recognition circuit to effect said upshift operation;

and said control means effecting downshift operation of said mechanism to any gear in said automatic gear range in response to said range signal, said speed signal, and an acceleration signal indicative that said prime mover is not being accelerated, said acceleration signal indicative that said accelerator is not being operated enabling said downshift section of said signal pattern recognition circuit to effect said downshift operation, said electronic digital control means comprising:

a counter circuit for receiving said speed signal and for providing a count signal indicative of the output speed of said mechanism:

said signal pattern recognition circuit being adapted for receiving said count signal and for providing a shift signal based on recognition of a predetermined count signal pattern and corresponding to the speed of said mechanism;

a shift logic circuit for receiving a shift signal from said signal pattern recognition circuit, said range signal and said acceleration signal, and for providing an upshift or downshift indicative of whether or not the output speed of the mechanism corresponds to the selected gear range and indicative, in the case of an upshift signal, of whether or not the prime mover is being accelerated;

an up/down counter circuit for receiving said upshift or downshift signal from said shift logic circuit and for providing an output signal indicative of which gear range should be employed;

and a decoder circuit for receiving said output signal and for providing control signals for operating said devices to effect shifting of said gear shift mechanism.

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**4,015,489**

## DENTAL HANDPIECE AND WRENCH THEREFOR

**Nathaniel H. Lieb, Narberth; Franklin W. Kerfoot, Jr., Newtown Square, and Richard A. Wallace, Audubon, all of Pa., assignors to Star Dental Manufacturing Co., Inc., West Conshohocken, Pa.**

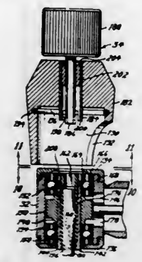
**Division of Ser. No. 476,749, June 5, 1974, Pat. No. 3,947,966, which is a division of Ser. No. 217,745, Jan. 14, 1972. This application July 25, 1975, Ser. No. 599,265**

**Int. Cl.² B25B** *27/00*

**U.S. Cl. 81—55** **5 Claims**

**1.** A wrench for use on a dental handpiece having a turbine housing, a rotor shaft, and a collet threadedly secured in said rotor shaft, said wrench comprising a housing, said wrench housing being adapted to be placed over the turbine housing of said dental handpiece, a tube mounted in said wrench housing, said tube being secured to said wrench housing, said wrench housing having a cavity formed therein, means within said cavity for securing said wrench housing on said turbine housing, said securing means comprising a spring, said spring being positioned within a groove formed in the wall of said cavity, said tube having a finger which is adapted to be re-

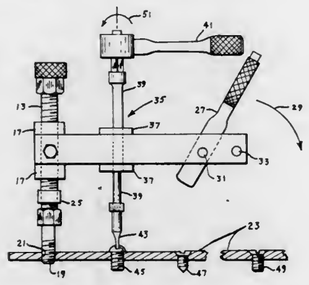
ceived in a slot in the rotor shaft of said handpiece, and a shaft rotatably mounted within said tube, said shaft being adapted



to threadedly advance or retract said collet relative to said rotor shaft.

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**4,015,490**
**SCREW REMOVAL TOOL**
**William R. Burrous, 4702 Sharynne Lane, Torrence, Calif. 90505**
**Filed Mar. 4, 1976, Ser. No. 663,638**
**Int. Cl.² B25B** *13/48, 15/00*
**U.S. Cl. 81—180 R** **3 Claims**

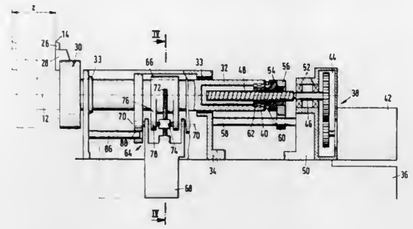


1. A screw removal tool removing difficult to remove screws in hard to reach areas comprising, a horizontally disposed beam member in spaced parallel relationship to the workpiece, a free turning vertically oriented shaft positioned at one end of said beam member, an inserting screw attached to the lower end of said free turning shaft for insertion into a threaded opening in the workpiece, a lever handle attached to the other end of said beam ember for applying downward pressure thereto, and a driver assembly positioned on said main beam member between said handle and said free turning shaft, said driver assembly including a slide block disposed on said beam member to permit said driver assembly to be axially aligned over the difficult to remove screw and rotated while applying downward pressure to said lever handle thereby causing the screw to be loosened.

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**4,015,491**
**TURRET LATHE**
**Fernand Peter, Mulhouse, France, assignor to Manurhin-Automatic, S.A., Mulhouse-Cedex, France**
**Filed Apr. 8, 1976, Ser. No. 675,182**
**Claims priority, application France, June 13, 1975, 75.18552**
**Int. Cl.² B23B** *3/18*
**U.S. Cl. 82—2 R** **10 Claims**

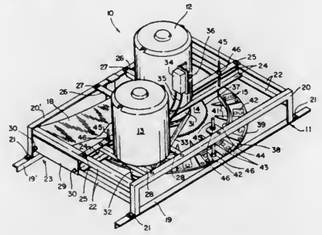
1. In a turret lathe having a fixed frame, a lathe spindle mounted for rotation on the frame, a tool-carrying turret mounted on a turret-carrying shaft which is parallel to the spindle of the lathe, such shaft being adapted for translational movement along its axis under the action of a longitudinal advancing mechanism and angular displacement around its axis under the action of a transverse advancing mechanism, the improvement wherein the transverse advancing mechanism comprises an oscillating arm which is adapted to be fixedly connected to the turret-carrying shaft, a driving means



having a driving rod, the arm being connected at its extremity by an articulating means to the driving rod of the driving means, the driving means being pivotally mounted around a second axis fixed parallel to the axis of the turret-carrying shaft, the second axis being separated from the axis of such shaft by a distance R equal to that which separates it from the axis of the articulating means connecting the free extremity of the oscillating arm to the driving rod.

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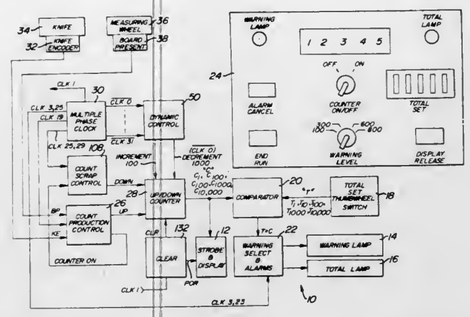
**4,015,492**
**MUFFIN SLICER AND PERFORATOR**
**John Terragnoli, 103 Wallace Ave., Buffalo, N.Y. 14214**
**Filed Feb. 5, 1976, Ser. No. 655,555**
**Int. Cl.² B26D** *3/08*
**U.S. Cl. 83—2** **9 Claims**



7. A machine for selectively perforating and slicing baked goods, such as muffins and buns, adapted to be mounted on a conveyor of a baked goods production line which delivers such baked goods to the machine and removes them from it, which comprises perforating means, slicing means, means for directing the baked goods selectively into contact with the perforating means or the slicing means so as to perforate and slice said goods, a framework and motor driving means for the slicing means, in which the perforating means includes a plurality of perforating knives mounted on a support and arranged so that when the baked goods are being perforated they travel along a path past said knives so that they are pierced and perforated by said knives in such manner as to make separation of halves of the individual baked goods readily effected, the slicing means includes a cutting wheel adapted to slice the baked goods when said goods are passed past the cutting wheel and the selectively directing means includes a guide for selective movement into a position wherein forward movement of the conveyor selectively moves the baked goods past the perforating means or past the slicing means, depending on the position of the guide with respect to the conveyor supporting surface.



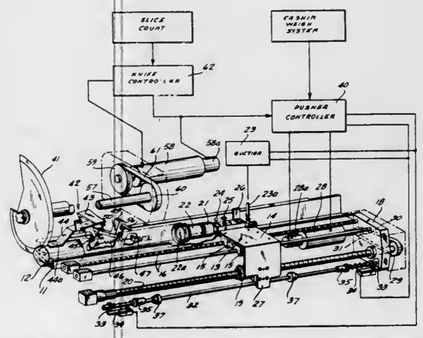
**4,015,493**
**DYNAMIC PRODUCTION COUNTER FOR A CORRUGATOR**
**Allan Brent Woolston, Wynnewood, Pa., assignor to Molins Machine Company, Inc., Camden, N.J.**
**Filed Mar. 15, 1976, Ser. No. 666,847**
**Int. Cl.² B26D** *7/28*
**U.S. Cl. 83—13** **13 Claims**



11. An improved method of indicating the number of sheets of moving material automatically cut by a knife, comprising:
generating a first digital signal indicative of a predetermined number of sheets of material to be cut by the knife;
providing a second digital signal indicative of the number of sheets of material cut by the knife;
cyclically incrementing and decrementing said second digital signal by predetermined counts to cause said second digital signal to cyclically vary;
detecting coincidence of said cyclically varied second digital signal to said first digital signal; and
generating a warning signal indicative of a preselected number of sheets of material remaining to be cut in response to said detecting means.

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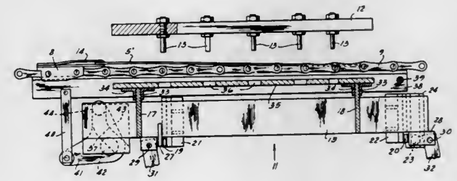
**4,015,494**
**COLD CUT SLICING SYSTEM**
**Robert J. Spooner, and Oscar W. Dillon, both of Essex, Conn., assignors to Cashin Systems Corporation, Williston Park, N.Y.**
**Filed June 24, 1975, Ser. No. 589,831**
**Int. Cl.² B26D** *5/20, 4/50*
**U.S. Cl. 83—76** **2 Claims**



1. In a slicing machine having a slicing blade for slicing a loaf of meat product and feeding means for pushing the said loaf to be sliced into the slicing blade the improvement for holding down the loaf of meat and preventing the rotation of such loaf comprising
a. a hold down plate positioned adjacent the slicing blade and applying pressure to the top of the loaf;
b. a lifter to raise the hold down plate when the slicing operation has been completed and only the butt of the loaf remains; and
c. actuator means associated with the feeding means to actuate the said lifter at the conclusion of the slicing operation
whereby the hold down plate will be clear of the butt end of the loaf and permit the feeder and butt to move backward.

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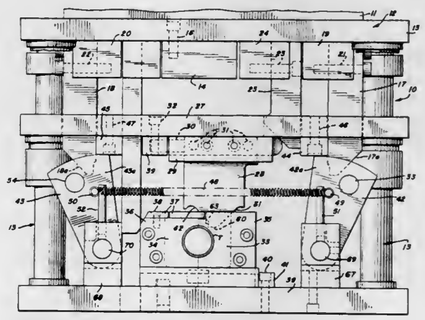
**4,015,495**
**DEVICE FOR STRIPPING WASTE FROM A SHEET DIE CUT ON A PLATEN PRESS**
**Marcel Yerly, Renens, Switzerland, assignor to J. Bobst & Fils S.A., Switzerland**
**Filed Feb. 14, 1975, Ser. No. 549,972**
**Claims priority, application Switzerland, Mar. 7, 1974, 003251/74**
**Int. Cl.² B26D** *7/06;* **B31B** *1/00*
**U.S. Cl. 83—103** **11 Claims**



1. A platen press including a station having a vertically movable lower part, a cooperating upper part, conveying chains adjacent opposed side edges of said upper and lower parts, a gripper bar supported at its ends by said chains and having means for holding a sheet in a position between said parts, chain support guides underlying each of said chains and supporting said chains in said press, each of said chain support guides having ends and means for moving at least one end of each of said chain support guides toward and away from said upper part as said movable lower part moves toward and away from said upper part.

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**4,015,496**
**DIMPLELESS TUBE CUTOFF DEVICE**
**Donald R. Hill, Elmhurst, Ill., assignor to Hill Engineering, Inc., Addison, Ill.**
**Filed Feb. 6, 1976, Ser. No. 655,885**
**Int. Cl.² B26D** *3/16*
**U.S. Cl. 83—466.1** **14 Claims**



8. Tube cutoff apparatus comprising:
means for supporting a tube to be cut;
a cutoff blade having a notching tip portion and a slicing edge portion extending away from said notching tip portion;
support means for supporting the blade transaxially adjacent the tube;

means for moving said blade on said support means to cause said notching tip portion to move in a first direction chordally through a portion of the tube to notch said tube portion; and

means for moving the blade support means to move the blade in a second direction suitably to cause said slicing edge portion to slice through the notched tube commencing from the notched portion and continuing therefrom through the remainder of the tube to complete the cutoff operation.

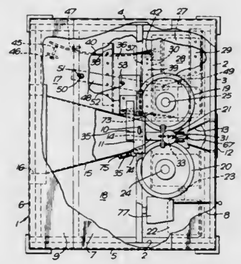
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**4,015,497**

## CABLE STRIPPING MACHINES WITH LINKED CUTTING AND DRIVING WHEELS

**John E. Burgess, South Broughton, England, assignor to Cleveland Marine Limited, South Broughton, England**

**Filed May 12, 1976, Ser. No. 685,602**
**Int. Cl.² H02G 1/12**
**U.S. Cl. 83—425.2** **26 Claims**



**1.** In a machine for stripping automatically the sheath from metal cored cables, said machine comprising a pair of driving wheels, opposed peripheries of said driving wheels defining a nip through which, in use, a cable to be stripped is fed by said driving wheels, a pair of opposed cutting wheels, and a peripheral cutting edge on each of said cutting wheels projecting into the region of said nip substantially midway between said driving wheels whereby, as a cable is fed through said nip, the sheath of said cable is slit by said peripheral cutting edges of said cutting wheels continuously along the length of said cable on opposite sides of said cable to enable said sheath to separate from the core of said cable, the improvement wherein said machine includes means mounting one of said driving wheels for rotation about a fixed axis, means mounting the other of said driving wheels for movement linearly towards and away from said one driving wheel with said fixed axis, means biassing said linearly movable driving wheel towards said driving wheel with said fixed axis, and means linking said cutting wheels to said movable driving wheel whereby when said movable driving wheel is displaced towards or away from said driving wheel with said fixed axis, said cutting wheels are simultaneously displaced in the same direction but through half the distance moved by said movable driving wheel.

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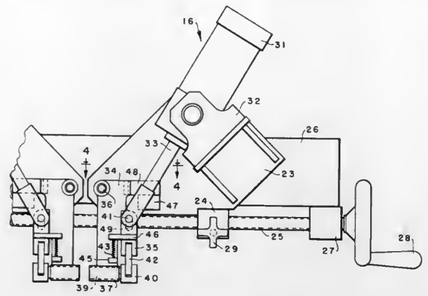
**4,015,498**

## CUTTER

**Edwin E. Mallory, Niles, Mich., and John R. Tolan, South Bend, Ind., assignors to Milliken Research Corporation, Spartanburg, S.C.**

**Filed Sept. 24, 1975, Ser. No. 616,205**
**Int. Cl.² B26D 1/38**
**U.S. Cl. 83—564** **2 Claims**

**1.** Apparatus to cut a length of material comprising: a frame, anvil means pivotally secured to said frame out of the path of travel of the length of material, knife means rotably supported within said anvil means, said anvil means having a slot therein adjacent said knife means, bias means operably associated with knife means to prevent the actuation of said knife means until said anvil is pivoted into position with the slot telescoping the length of the material, means to automatically pivot said anvil means into a position with said slot telescoping the length of material and overcome said bias means to rotate said knife means to cut the length of material located in said slot.



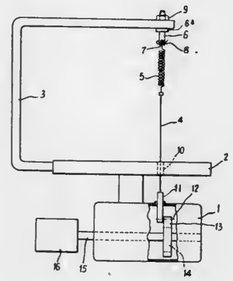
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**4,015,499**

## DEVICE FOR MOUNTING ON A MACHINE TO ALLOW THE MACHINE TO BE USED AS A SAW

**Jacques Arthaud, 5, Allee du Bresil, 91300 Massy, France**

**Filed Nov. 3, 1975, Ser. No. 628,428**
**Int. Cl.² B27B 19/02**
**U.S. Cl. 83—752** **4 Claims**



**1.** A power driven jig saw comprising a saw wire, a tension spring secured to one end of the saw wire, power means connected to the other end of the saw wire to reciprocate the saw wire against the tension of the tension spring, the tension spring being secured to the saw wire at one end of the tension spring, and means for selectively fixing the other end of the tension spring in any of a plurality of adjusted positions of rotation of said other end of the tension spring about the axis of the tension spring.

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**4,015,500**

## BOW SAW MACHINE

**Paul Stolzer, Achern, Germany, assignor to KEURO Maschinenbau Gesellschaft mit beschrankter Haftung & Co., Kommanditgesellschaft, Achern, Germany**

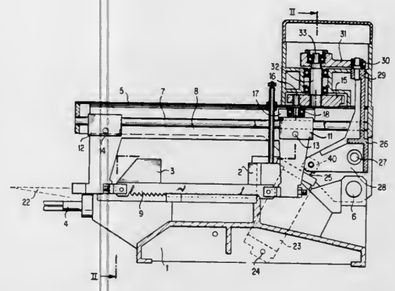
**Filed June 3, 1976, Ser. No. 692,303**
**Int. Cl.² B23D 51/20**
**U.S. Cl. 83—755** **11 Claims**

**1.** In a bow saw machine having a machine frame; means for immobilizing a workpiece in the machine; a housing; means for pivotally attaching the housing to the machine frame for providing for a swinging motion of the housing generally in a vertical plane; a saw bow supporting a saw blade in a generally horizontal orientation during the sawing operation; guide means supported in said housing for longitudinally displaceably mounting the saw bow; a drive motor; a crank drive supported in the housing and having a first eccentric coupled to the saw bow for effecting a reciprocating motion thereof along a path of reciprocation determined by the guide means; the crank drive being located above the saw bow substantially within the zone of its path of reciprocation; the improvement comprising

a. a hydraulic cylinder-and-piston means for controlling the sawing pressure and the feed of the saw blade; said cylinder-and-piston means being supported in said machine frame;

b. a bell crank including a pivot supported in said housing; said bell crank having first and second arms extending





from said pivot and being arranged at an angle to one another; each arm having an outer end; the outer end of said first arm of said bell crank being pivotally connected to said cylinder-and-piston means; and

c. a horizontal push rod having first and second ends; said first end of said push rod being connected to a second eccentric of said crank drive for effecting a horizontal reciprocating motion of said second end of said push rod; said second end of said push rod being articulated to the outer end of said second arm of said cylinder-and-piston means for lifting said saw blade off the workpiece during each idle stroke of the saw bow and for lowering the saw blade into a sawing position for the beginning of each work stroke.

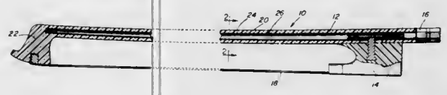
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**4,015,501**

## INJECTION MOLDED STICK FOR STRINGED MUSICAL INSTRUMENT BOW

**Helmut F. K. Schaller, Kuckucksweg 16, 8501 Feucht, Germany**

**Filed Dec. 2, 1975, Ser. No. 637,106**
**Int. Cl.² G10D 1/02**
**U.S. Cl. 84—282** **17 Claims**



**1.** A bow stick for a stringed musical instrument bow, said stick comprising an elongated shaft portion and a head portion at one end of said shaft portion, said head portion being adapted to receive a hold one end of a set of hairs extending from said head portion to a frog carried by the other end of said shaft portion, said shaft portion along at least a major part of its length having a hollow longitudinally extending interior bore and being made of two different materials located in two different zones in a transverse cross section through said shaft portion, one of said materials being a strengthening material and the other of said materials being a moldable plastic material molded to said strengthening material so as to integrally fix said two materials to one another, said head portion of said stick being molded of the same plastic material as, and being of one piece with, said plastic material of said stick portion.

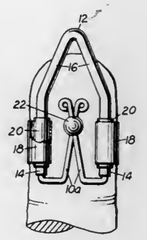
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**4,015,502**

## PICK FOR STRING INSTRUMENTS

**Jack C. Strong, P.O. Box 251, Brightwood, Oreg. 97011**

**Continuation-in-part of Ser. No. 563,336, May 5, 1975, abandoned. This application May 24, 1976, Ser. No. 689,137**
**Int. Cl.² G10D 3/16**
**U.S. Cl. 84—322** **8 Claims**



**1.** A pick for string instruments comprising

a. a body member formed of a length of wire-like material,

b. said body member having a pair of side portions arranged to engage longitudinally the under portion of a finger adjacent each side,

c. said body member also having a front projecting portion leading from said side portions formed into a string picking head,

d. and a strap arranged to extend laterally over the top and down the sides of a musician's finger,

e. said strap having opposite end portions attached to respective side portions of said body member for holding said body member firmly on the finger for picking,

f. said strap being flexible for contoured fitting over the musician's finger.

**8.** A pick for string instruments comprising

a. a body member formed of a length of wire-like material,

b. said body member having a pair of said portions arranged to engage longitudinally the under portion of a finger adjacent each side,

c. said body member also having a front projecting portion leading from said side portions formed into a string picking head,

d. said picking head having a resilient picking surface,

e. and means on said body member arranged to attach it to a musician's finger.

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**4,015,503**

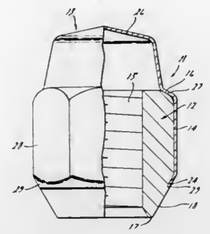
## CAPPED WHEEL NUT

**Ralph Romano, Brighton, Mich., assignor to Grand Machining Company, Detroit, Mich.**

**Filed May 3, 1976, Ser. No. 682,517**
**Int. Cl.² F16B 37/14**
**U.S. Cl. 85—35** **4 Claims**

**1.** In a capped wheel nut, a polygonal nut body having internal threads, a first conical surface extending outwardly from one end of said nut body at a predetermined included angle with respect to the axis of the nut, said first conical surface being so dimensioned as to interfit with a conical wheel depression, a second conical surface axially adjacent said first surface and extending outwardly therefrom toward the other end of said nut body but at a substantially lesser included angle with respect to said axis than said first surface, a notched portion on said nut body interconnecting the outer end of said first conical surface and the inner end of said second conical surface, said notched portion being formed by a reversely conical surface extending transversely to said first

and second conical surfaces, a domed cap having sides closely interfitting with the sides of said polygonal nut body, and portions on said cap swaged into the notch formed by said



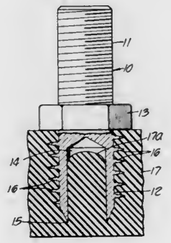
reversely conical surface, the reversely conical surface having a width approximately equal to the metal thickness of said cap.

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**4,015,504**
**SELF-BORING FASTENER AND METHODS OF USE THEREOF**

**José Rosán, Sr., San Juan Capistrano, and Marvin P. Reece, Dana Point, both of Calif., assignors to Rosan Hydraulics Inc., Newport Beach, Calif.**

**Continuation-in-part of Ser. No. 415,978, Nov. 15, 1973, abandoned. This application Apr. 11, 1975, Ser. No. 567,415**
**Int. Cl.² F16B *25/00***
**U.S. Cl. 85—42** **19 Claims**

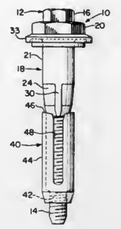


1. A self-boring fastener for installation in a boreless workpiece, comprising in combination;
a workpiece composed of wood, rubber or synthetic plastic materials, and an elongated cylindrical element mounted within said workpiece, said cylindrical element having at least one end thereof provided with an axial cavity so as to form a continuous curcumferential wall member having an opened end and an oppositely disposed closed end wherein a compression chamber is defined by said axial cavity;
said wall member being provided with a longitudinally extending knife edge at the open extremity thereof;
said elongated cylindrical element being provided with a thin knife-edge element helically positioned about the outer periphery of said cylindrical element;
driving means carried by said cylindrical element to rotatably embed the fastener in a workpiece; and
a compressed core of workpiece material within said compression chamber.

**4,015,505**
**ONE SIDED FASTENER DEVICE**

**Pierre Charles Murray, Elgin, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.**

**Filed Feb. 23, 1976, Ser. No. 660,203**
**Int. Cl.² F16B *13/04***
**U.S. Cl. 85—77** **7 Claims**



1. A blind fastener assembly for clamping a plurality of complementary plate-like workpieces together with access from only one side thereof, comprising a threaded fastener member with a radially enlarged driving head including rotation inducing surfaces, a sleeve member comprising a tubular body with a head provided with means to resist rotation when said sleeve is mounted in a complementary workpiece at an outer end thereof and a gradually tapered portion at its distal end, the tapered portion of said sleeve comprising two frustoconical sections of different and successively greater angles of taper from the body to the distal extremity of said sleeve, the body of the sleeve member being generally cylindrical of a predetermined diameter substantially equal to the diameter of apertures formed in the complementary workpieces, the threaded fastener member extending through the sleeve so that the distal end of the fastener projects beyond the distal end of the sleeve, the tapered portion including rib means formed thereon and extending generally longitudinally thereof to the free extremity of the sleeve, an expansion member including an internally threaded first end portion threadingly engaging the distal end of the fastener and a workpiece clamping second end portion, said second end portion being generally tubular with an outer diameter substantially equal to the predetermined diameter of the sleeve body and an inner diameter greater than the diameter at the free extremity of the tapered section but less than the diameter at the juncture of the two frustoconical sections, generally longitudinally extending slot means extending through the second end portion toward the first end portion, the slot means forming a pair of wing-like tubular segments adapted to be deflected radially outwardly as the expansion member is pulled upwardly over the tapered section of the sleeve as a result of rotation of the screw relative to the expansion member, the slot and rib means coacting to prevent relative rotation between the expansion member and sleeve member, the uppermost edge of each wing-like tubular segment being convex toward the head of the sleeve thereby lying in a plane inclined downwardly toward the slot when the expansion member is in an unexpanded condition but adapted to lie in a plane substantially perpendicular to the axis of the fastener assembly when expanded to clamp the bottommost plate with line contact.

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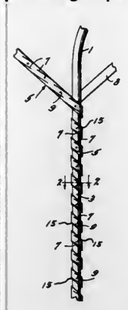
**4,015,506**
**METHOD OF FORMING BARRIER WIRE**

**Daniel D. Musgrave, 8201 Caraway St., Cabin John, Md. 20731**

**Filed Apr. 12, 1976, Ser. No. 676,067**
**Int. Cl.² F41H *11/08***
**U.S. Cl. 89—1 A** **10 Claims**

1. A method of forming barrier wire comprising wrapping a grooved strip of deformable material helically around a strand of flexible material, providing explosive means located in-





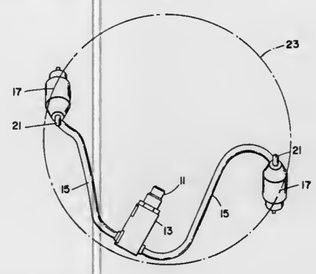
wardly of said deformable material, and deforming barrier portions out from said strip by said explosive means.

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**4,015,507**
**EJECTION SYSTEM**

**Henry Toy, Los Altos; Phillip Bernstein, Sunnyvale, and Johan C. Van der Zwaan, Los Altos, all of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Mar. 25, 1976, Ser. No. 670,321**
**Int. Cl.² F41F *5/00*; B64D *1/02***
**U.S. Cl. 89—1.5 F** **6 Claims**



1. An ejection system which comprises:
a. a cartridge;
b. said cartridge mounted at its lower portion to a manifold chamber to contain gases when emergent therefrom;
c. said manifold chamber having a pair of apertures;
d. a manifold tube having two sections, the end of each section joining said manifold chamber at one of said apertures, and having a diameter such that said two sections function as one chamber; and
e. a pair of thrusters, each joined to the other end of one of said sections of said manifold tube and mounted to a carrier at such an angle to provide desired linear and rotational force components to a projectile.

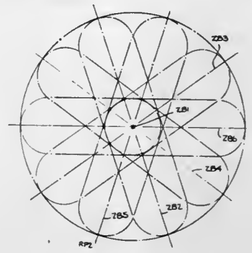
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**4,015,508**
**BURST DISPERSION CONTROL**

**Fredrick M. Blodgett, Jr., Essex Junction, and Peter B. Schuyler, Richmond, both of Vt., assignors to General Electric Company, Burlington, Vt.**

**Filed Sept. 29, 1975, Ser. No. 617,475**
**Int. Cl.² F41D *7/04***
**U.S. Cl. 89—12** **6 Claims**

1. A gun comprising:
a stationary housing;
a rotor having a plurality of longitudinally extending gun barrels and journaled for rotation about a longitudinal axis within said housing; and
control means operable while said rotor is operating for varying the longitudinal alignment of at least one of said gun barrels with respect to said longitudinal axis;
said control means including
a muzzle constraint adjacent each of said barrels at its respective distal end,



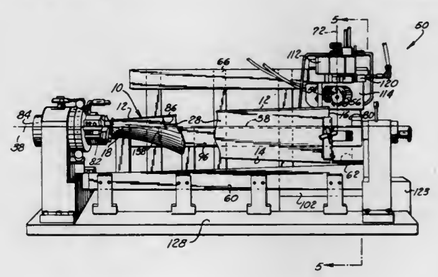
said muzzle constraint having an oversize diameter bore receiving said one of said gun barrels and permitting free, cantilever, transverse vibrational movement of the distal end of said one of said gun barrels within said bore.

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**4,015,509**
**METHOD AND APPARATUS FOR SHAPING AN AIRFOIL**

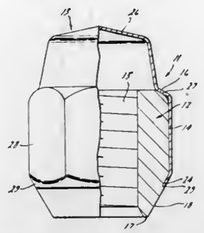
**Eugene J. Malinowski, Richmond Heights, and Raymond J. Zyck, Willowick, both of Ohio, assignors to TRW Inc., Cleveland, Ohio**

**Filed Oct. 23, 1974, Ser. No. 517,388**
**Int. Cl.² B23C *1/16, 1/00***
**U.S. Cl. 90—13.5** **32 Claims**



1. An apparatus for use in shaping an airfoil having major side surfaces interconnected by an arcuately bowed and longitudinally extending edge portion which bows transversely to the major side surfaces, said apparatus comprising a rotatable forming tool, means for supporting said forming tool for rotation about its central axis, means for providing for engagement of said forming tool with the arcuately bowed edge portion of the airfoil throughout the length of the arcuately bowed edge portion by effecting relative movement between said forming tool and airfoil while maintaining said forming tool in engagement with the arcuately bowed edge portion of the airfoil, and means for maintaining the central axis of said forming tool in the same angular orientation relative to an arcuately bowed longitudinal central axis of the edge portion of the airfoil during engagement of said forming tool with the arcuately bowed edge portion of the airfoil throughout the length of the arcuately bowed edge portion of the airfoil, said means for maintaining the central axis of the forming tool in the same angular orientation relative to an arcuately bowed longitudinal axis of the edge portion of the airfoil including means for varying the angular orientation of the central axis of the forming tool relative to a straight line extending between opposite

and second conical surfaces, a domed cap having sides closely interfitting with the sides of said polygonal nut body, and portions on said cap swaged into the notch formed by said



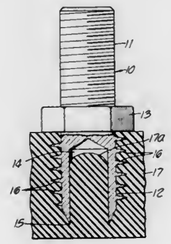
reversely conical surface, the reversely conical surface having a width approximately equal to the metal thickness of said cap.

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**4,015,504**
**SELF-BORING FASTENER AND METHODS OF USE THEREOF**

**José Rosán, Sr., San Juan Capistrano, and Marvin P. Reece, Dana Point, both of Calif., assignors to Rosan Hydraulics Inc., Newport Beach, Calif.**

**Continuation-in-part of Ser. No. 415,978, Nov. 15, 1973, abandoned. This application Apr. 11, 1975, Ser. No. 567,415**
**Int. Cl.² F16B** *25/00*
**U.S. Cl. 85—42** **19 Claims**

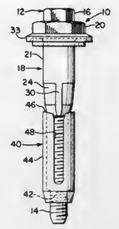


1. A self-boring fastener for installation in a boreless workpiece, comprising in combination;
a workpiece composed of wood, rubber or synthetic plastic materials, and an elongated cylindrical element mounted within said workpiece, said cylindrical element having at least one end thereof provided with an axial cavity so as to form a continuous curcumferential wall member having an opened end and an oppositely disposed closed end wherein a compression chamber is defined by said axial cavity;
said wall member being provided with a longitudinally extending knife edge at the open extremity thereof;
said elongated cylindrical element being provided with a thin knife-edge element helically positioned about the outer periphery of said cylindrical element;
driving means carried by said cylindrical element to rotatably embed the fastener in a workpiece; and
a compressed core of workpiece material within said compression chamber.

**4,015,505**
**ONE SIDED FASTENER DEVICE**

**Pierre Charles Murray, Elgin, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.**

**Filed Feb. 23, 1976, Ser. No. 660,203**
**Int. Cl.² F16B** *13/04*
**U.S. Cl. 85—77** **7 Claims**



1. A blind fastener assembly for clamping a plurality of complementary plate-like workpieces together with access from only one side thereof, comprising a threaded fastener member with a radially enlarged driving head including rotation inducing surfaces, a sleeve member comprising a tubular body with a head provided with means to resist rotation when said sleeve is mounted in a complementary workpiece at an outer end thereof and a gradually tapered portion at its distal end, the tapered portion of said sleeve comprising two frustoconical sections of different and successively greater angles of taper from the body to the distal extremity of said sleeve, the body of the sleeve member being generally cylindrical of a predetermined diameter substantially equal to the diameter of apertures formed in the complementary workpieces, the threaded fastener member extending through the sleeve so that the distal end of the fastener projects beyond the distal end of the sleeve, the tapered portion including rib means formed thereon and extending generally longitudinally thereof to the free extremity of the sleeve, an expansion member including an internally threaded first end portion threadingly engaging the distal end of the fastener and a workpiece clamping second end portion, said second end portion being generally tubular with an outer diameter substantially equal to the predetermined diameter of the sleeve body and an inner diameter greater than the diameter at the free extremity of the tapered section but less than the diameter at the juncture of the two frustoconical sections, generally longitudinally extending slot means extending through the second end portion toward the first end portion, the slot means forming a pair of wing-like tubular segments adapted to be deflected radially outwardly as the expansion member is pulled upwardly over the tapered section of the sleeve as a result of rotation of the screw relative to the expansion member, the slot and rib means coacting to prevent relative rotation between the expansion member and sleeve member, the uppermost edge of each wing-like tubular segment being convex toward the head of the sleeve thereby lying in a plane inclined downwardly toward the slot when the expansion member is in an unexpanded condition but adapted to lie in a plane substantially perpendicular to the axis of the fastener assembly when expanded to clamp the bottommost plate with line contact.

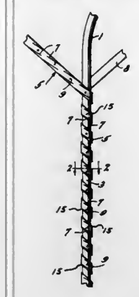
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**4,015,506**
**METHOD OF FORMING BARRIER WIRE**

**Daniel D. Musgrave, 8201 Caraway St., Cabin John, Md. 20731**

**Filed Apr. 12, 1976, Ser. No. 676,067**
**Int. Cl.² F41H** *11/08*
**U.S. Cl. 89—1 A** **10 Claims**

1. A method of forming barrier wire comprising wrapping a grooved strip of deformable material helically around a strand of flexible material, providing explosive means located inwardly of said deformable material, and deforming barrier portions out from said strip by said explosive means.

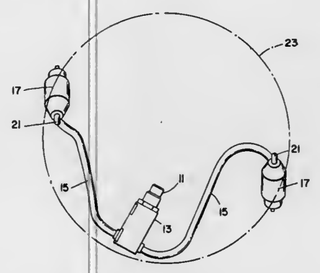


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**4,015,507**
**EJECTION SYSTEM**

**Henry Toy, Los Altos; Phillip Bernstein, Sunnyvale, and Johan C. Van der Zwaan, Los Altos, all of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Mar. 25, 1976, Ser. No. 670,321**
**Int. Cl.² F41F** *5/00;* **B64D** *1/02*
**U.S. Cl. 89—1.5 F** **6 Claims**



1. An ejection system which comprises:
a. a cartridge;
b. said cartridge mounted at its lower portion to a manifold chamber to contain gases when emergent therefrom;
c. said manifold chamber having a pair of apertures;
d. a manifold tube having two sections, the end of each section joining said manifold chamber at one of said apertures, and having a diameter such that said two sections function as one chamber; and
e. a pair of thrusters, each joined to the other end of one of said sections of said manifold tube and mounted to a carrier at such an angle to provide desired linear and rotational force components to a projectile.

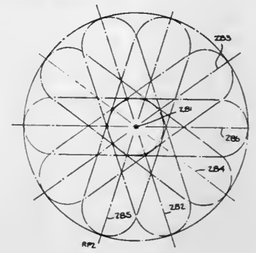
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**4,015,508**
**BURST DISPERSION CONTROL**

**Fredrick M. Blodgett, Jr., Essex Junction, and Peter B. Schuyler, Richmond, both of Vt., assignors to General Electric Company, Burlington, Vt.**

**Filed Sept. 29, 1975, Ser. No. 617,475**
**Int. Cl.² F41D** *7/04*
**U.S. Cl. 89—12** **6 Claims**

1. A gun comprising:
a stationary housing;
a rotor having a plurality of longitudinally extending gun barrels and journaled for rotation about a longitudinal axis within said housing; and
control means operable while said rotor is operating for varying the longitudinal alignment of at least one of said gun barrels with respect to said longitudinal axis;
said control means including
a muzzle constraint adjacent each of said barrels at its respective distal end,



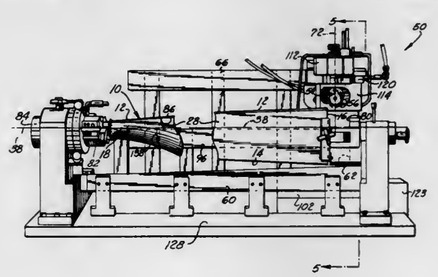
said muzzle constraint having an oversize diameter bore receiving said one of said gun barrels and permitting free, cantilever, transverse vibrational movement of the distal end of said one of said gun barrels within said bore.

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**4,015,509**
**METHOD AND APPARATUS FOR SHAPING AN AIRFOIL**

**Eugene J. Malinowski, Richmond Heights, and Raymond J. Zyck, Willowick, both of Ohio, assignors to TRW Inc., Cleveland, Ohio**

**Filed Oct. 23, 1974, Ser. No. 517,388**
**Int. Cl.² B23C** *1/16, 1/00*
**U.S. Cl. 90—13.5** **32 Claims**

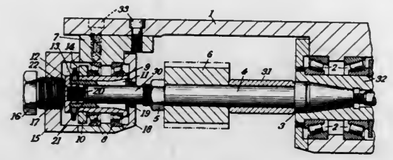


1. An apparatus for use in shaping an airfoil having major side surfaces interconnected by an arcuately bowed and longitudinally extending edge portion which bows transversely to the major side surfaces, said apparatus comprising a rotatable forming tool, means for supporting said forming tool for rotation about its central axis, means for providing for engagement of said forming tool with the arcuately bowed edge portion of the airfoil throughout the length of the arcuately bowed edge portion by effecting relative movement between said forming tool and airfoil while maintaining said forming tool in engagement with the arcuately bowed edge portion of the airfoil, and means for maintaining the central axis of said forming tool in the same angular orientation relative to an arcuately bowed longitudinal central axis of the edge portion of the airfoil during engagement of said forming tool with the arcuately bowed edge portion of the airfoil throughout the length of the arcuately bowed edge portion of the airfoil, said means for maintaining the central axis of the forming tool in the same angular orientation relative to an arcuately bowed longitudinal axis of the edge portion of the airfoil including means for varying the angular orientation of the central axis of the forming tool relative to a straight line extending between opposite

ends of the arcuately bowed edge portion of the airfoil during relative movement between said forming tool and the arcuately bowed edge portion of the airfoil.

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**4,015,510**
**MOUNTING FOR ROTARY MACHINE TOOL PARTICULARLY FOR GEAR HOBBING MACHINES**
**Brian Hodgson, Rowlands Gill, England, assignor to Charles Churchill Limited, England**
**Filed Nov. 7, 1974, Ser. No. 521,870**
**Int. Cl.² B23B** *31/20;* **B23F** *5/22*
**U.S. Cl. 90—20.5** **3 Claims**

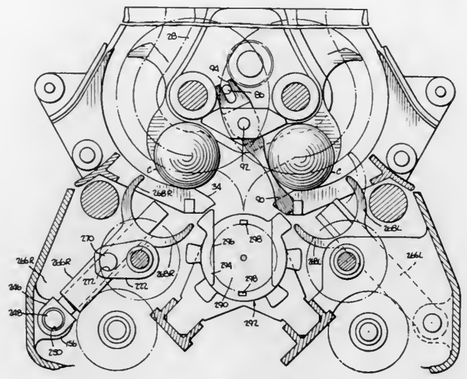


1. A tool mounting for a gear hobbing machine which comprises a hobbing spindle, a hob detachably mounted on said spindle, a bearing assembly supporting the outboard end of said hobbing spindle, a supporting member and means detachably connecting said bearing assembly to said supporting member, said bearing assembly including a bearing housing, a bearing sleeve surrounding the spindle, live bearing elements interposed between the bearing sleeve and the bearing housing, wedge means between the bearing sleeve and the spindle, means urging said wedge means to a position in which it eliminates significant radial play between the bearing sleeve and the spindle, release means for moving said wedge means to an alternative position in which it permits movement of the sleeve with respect to the spindle to enable the hob to be changed, an end cap at the inboard end of the bearing housing having an aperture therethrough for the spindle to enter the bearing housing, a sealing ring in the aperture and surrounding the spindle, a pad slidably fitted within a bore of the wedge means and a spring urging the pad against the end of the spindle so that at all times the bearing housing is sealed against the ingress of foreign matter.

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**4,015,511**
**FEEDER**
**Lawrence R. Folsom, Schenectady, N.Y.; John F. O'Brien, St. Albans, Vt.; Roger E. Gaboriault, Williston, Vt.; August J. Haberstroh, N. Hero, Vt., and Ettore J. Mancuso, Jr., Essex Junction, Vt., assignors to General Electric Company, Burlington, Vt.**
**Filed Aug. 19, 1974, Ser. No. 498,353**
**Int. Cl.² F41D** *9/02*
**U.S. Cl. 89—33 SF** **27 Claims**

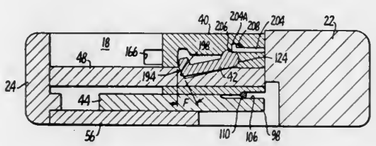
1. An at least partly self acting gun having a single gun barrel and a single gun bolt and undergoing repeated cycles of operation and firing linked rounds of ammunition comprising:
a housing;
said gun bolt having a bolt face and disposed in said housing and reciprocable along a longitudinal axis to and between a seared station and a chambered station;
said bolt face including a pair of diametrically opposed extractor hooks defining a passageway therebetween for passing the extractor disk of the case of a round of ammunition;
first transfer means disposed in said housing for receiving a first train of linked rounds and for side stripping the leading round from its link in the train;
second transfer means disposed in said housing for receiving a second train of linked rounds and for side stripping the leading round from its link in the train;
third transfer means disposed in said housing for transferring the stripped leading round from said first transfer means to said bolt face when said bolt is at its seared station;
fourth transfer means disposed in said housing or transferring the stripped leading round from said second transfer means to said bolt face when said bolt is at the seared station; and
drive means having a first disposition for driving said first



and third transfer means and for locking said second and fourth transfer means, and a second disposition for driving said second and fourth transfer means and for locking said first and third transfer means;
said third and fourth transfer means respectively disposing the extractor disk of the case of a transferred round of ammunition into said passageway defined by said extractor hooks, with said hooks entering the extractor groove of that case.

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**4,015,512**
**GAS-OPERATED FIREARM**
**Jay J. Feerick, 1847 MacArthur Blvd., Oakland, Calif. 94602**
**Filed Oct. 29, 1974, Ser. No. 518,639**
**Int. Cl.² F41D** *5/04*
**U.S. Cl. 89—190** **2 Claims**

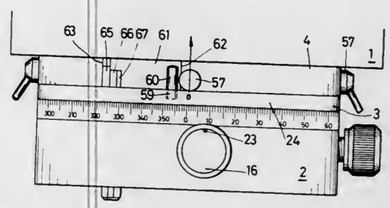


1. A firearm, comprising: a receiver defining a cartridge-receiving chamber, said
chamber having an open breech; a bolt for closing said breech; guide ways for carrying said bolt;
a driving spring for driving said bolt along said guide ways to close said breach;
a locking member pivotally mounted in said bolt;
recesses in said guide ways for receiving said locking member to lock said bolt in its breech-closing position;
an operating slide slidably mounted in said receiver for sliding parallel to said bolt;
a gas piston for driving said operating slide rearwardly in said receiver from its pre-firing position whenever a cartridge is detonated in said chamber;
return springs for driving said operating slide forwardly in said receiver past said pre-firing position;
a cam pivotally mounted in said receiver for driving said locking member from said recess when rotated in a first direction by said operating slide; and
a sliding member slidably mounted in said bolt and positioned to be driven into said bolt by said receiver when said bolt closely approaches said receiver, said sliding member bearing against a surface of said locking member and driving said locking member into its bolt-locking state whenever said locking member is driven into said bolt.



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**4,015,513**
**INDEXING DEVICES**
**Heins Ditzel, and Werner Ditzel, both of Hainstrasse 27-29, 6369 Schoneck 1, Germany**
**Division of Ser. No. 628,649, Nov. 4, 1975. This application May 18, 1976, Ser. No. 687,603**
**Claims priority, application Germany, Nov. 5, 1974, 2452340; May 6, 1975, 2520022**
**Int. Cl.² B23F** *23/08;* **B23B** *5/22*
**U.S. Cl. 90—57** **6 Claims**

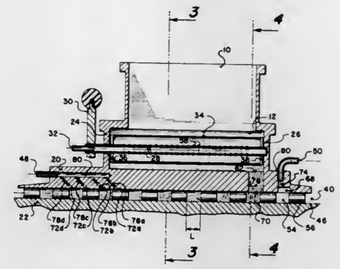


1. An indexing device comprising first, second and third discs substantially coaxial with one another; first and second engagement means of said first and second discs, respectively, interengageable releasably to latch said first and second discs in any selected relative angular position; said second and third discs having respective abutment surfaces; gage means between said abutment surfaces; so that said second and third discs can be angularly positioned relative to each other by turning said second and third discs relative to each other until said gage means abuts both said abutment surfaces; clamping means including a clamping member movable in an axial direction of said discs to clamp said second and third discs against the relative turning; one of said second and third discs having therein a first radially extending passage; the other of said second and third discs having therein a second passage extending transversely to said first passage and communicating with the latter; said clamping means including a first pin turnably received in said first passage and including an eccentric portion; a second pin received in said second passage; and retaining means of said other disc arranged to engage said second pin to limit movement of the latter lengthwise of said second passage, said eccentric portion so engaging said second pin that, by turning of said first pin, said second pin can be moved lengthwise of said second passage into clamping engagement with said retaining means; wherein an axially outer one of said discs is formed with an axial bore for receiving a tool shank; the indexing device further comprising means for releasably engaging the tool shank when inserted into said bore.

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**4,015,514**
**APPARATUS FOR MAKING CIGARETTE FILTERS**
**Walter A. Nichols, Richmond, Va., assignor to Philip Morris Incorporated, New York, N.Y.**
**Filed Jan. 29, 1976, Ser. No. 653,467**
**Int. Cl.² A24C** *5/50*
**U.S. Cl. 93—1 C** **15 Claims**

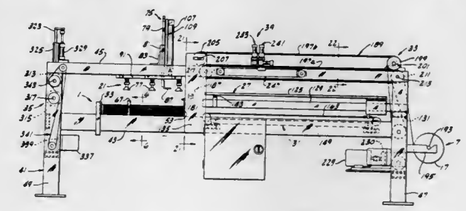
1. Apparatus for feeding particulate material into spaces between filter plugs secured to a continuous filter wrap comprising:
a. a hopper means for containing said material and having an outlet for discharging said material;
b. fluidizing means having an extent thereof supported in said hopper means in engagement with said material for issuing pressurized air through said material while said material is in said hopper means; and
c. material feed control means having an elongate passage therethrough for conveying said filter wrap therethrough in partially encircling relation to said filter plugs and spaces, said material feed control means including a unitary housing part having first, second and third conduit means therein communicating with said passage at



first, second and third locations respectively successively longitudinally disposed along said passage, said first location being longitudinally spaced from said second location by a distance not less than the longitudinal distance between successive of said filter plugs, said first conduit means being pressurized negatively with respect to said hopper means, said third conduit means being pressurized positively with respect to said first conduit means and negatively with respect to said hopper means, said second conduit means communicating further with said hopper means outlet.

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**4,015,515**
**APPARATUS FOR INSERTING LINERS IN BAGS**
**Harold K. Johnson, Burnsville, Minn., assignor to Bemis Company, Inc., Minneapolis, Minn.**
**Filed Apr. 16, 1976, Ser. No. 677,786**
**Int. Cl.² B31B** *1/00*
**U.S. Cl. 93—8 W** **27 Claims**



1. Apparatus for inserting liners in open-mouth bags, each liner being an open-mouth bag having a bottom end closure at the opposite end from the mouth, said apparatus comprising:
means for holding a stack of bags with the bags in the stack extending longitudinally of the apparatus and with the mouths of the bags in the stack directed toward one end of the apparatus constituting its rearward end;
means for gripping the upper wall of the uppermost bag of the stack and raising it to open said bag for insertion of a liner therein;
an inserter movable forward longitudinally of the apparatus from a rearward retracted position wherein its foward end is rearward of the mouth of the opened bag through a forward stroke above said stack holding means for entry of the inserter in the opened bag to insert a liner therein and for movement of said bag with the liner therein to an

outfeed position wherein the forward end portion of the bag is forward of the stack;

said inserter having means for gripping a liner for forward movement of the liner with the inserter into the opened bag;

means for moving the inserter longitudinally of the apparatus through a forward stroke from its retracted position and then through a rearward return stroke back to its retracted position;

means for feeding a liner from a supply thereof to bring the liner into position for being gripped by said liner gripping means for insertion of the liner in said opened bag;

means for operating the liner gripping means to grip said liner and for releasing the grip after insertion of the liner; and

outfeed means forward of the stack holding means engageable with a lined bag in the outfeed position for feeding the lined bag forward.

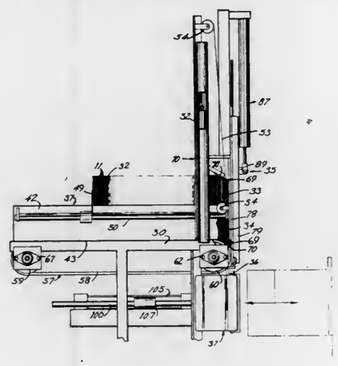
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**4,015,516**

## PLUG PAD INSERTING APPARATUS FOR CARTON FORMING MACHINES

**Robert H. Graham, Spokane, Wash., assignor to R. A. Pearson Company, Spokane, Wash.**

**Filed Feb. 13, 1976, Ser. No. 657,844**
**Int. Cl.² B31B 7/00**
**U.S. Cl. 93—36.3** **16 Claims**



1. A plug pad inserting apparatus for inserting a carton bottom plug pad into a pre-formed or partially formed carton of the type including folded semi-rigid panels such as cardboard and including:

A. an open top end;

B. upright peripheral side and end walls;

C. a bottom end that when complete is formed by:

a. end flaps folded inwardly across the bottom end from the end walls with inward end flap edges spaced apart by a prescribed distance;

b. side flaps folded inwardly across the bottom end overlapping the end flaps and including inside edges spaced closely adjacent one another;

c. a recess opening toward the top end and defined by the end flap edges, side walls, and surfaces of the side flaps that face the top end;

wherein the plug pad includes peripheral edges defined by parallel oppositely facing planar side surfaces and is equal in dimension to the recess and

wherein the plug pad inserting apparatus is comprised of:

a supportive framework;

a magazine means for receiving a stack of plug pads, and having an open discharge end for releasing individual pads;

mandrel means for receiving single pads from the magazine means at a mandrel loading station;

pad placing means for feeding successive pads to the mandrel means at the mandrel loading station;

mandrel drive means for moving the mandrel into the open end of a carton to press against the carton bottom; and

ejection means for removing the single pad from the mandrel and pressing the pad into the recess.

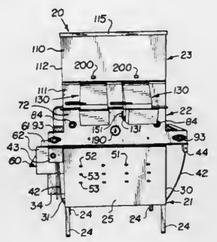
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**4,015,517**

## FOOD PROCESSING DEVICE

**Johnny B. Pomara, Jr., Dallas, Tex., assignor to El Chico Corporation, Dallas, Tex.**

**Filed Sept. 10, 1975, Ser. No. 612,171**
**Int. Cl.² A47J 27/14**
**U.S. Cl. 99—355** **7 Claims**



1. A food processing device for heating soft tortillas and for heating, storing, and dispensing toasted tortilla chips comprising: a heating means a bottom heating section including housing means defining a bottom heating compartment enclosed around the sides and ends thereof and open at the bottom and top; means secured with said housing defining said bottom compartment for heating the space within said bottom compartment; a middle section connected with said bottom secton defining a middle compartment open at the bottom and top thereof and communicating with said heating means in said bottom section for heating said middle compartment; a conveyor system in said middle section including an upper conveyor belt and a lower conveyor belt, said upper conveyor belt having a lower portion thereof and said lower conveyor belt having an upper portion thereof moving in closely spaced parallel relationship for capturing and transporting through said middle compartment soft tortillas for heating such tortillas and holding said tortillas in substantially flat condition, said upper conveyor belt being shorter than said lower conveyor belt, said upper portion of said lower conveyor belt extending from opposite ends of said middle section providing an input end and a discharge end for said soft tortillas; shelf means secured at said discharge end of said lower conveyor belt below said end of said belt for supporting a container to receive and hold heated soft tortillas discharged from said discharge end of said lower conveyor belt; drive means connected with said upper and lower conveyor belts for driving said belts at substantially equal speeds, an upper housing section secured with said middle housing section in defining an upper compartment for storing, heating and dispensing said toasted tortilla chips, said upper housing section having ends and sides corresponding with ends and sides of said middle housing section; a movable top secured on said upper housing section for movement between an open condition for filling said upper compartment with said tortilla chips and a closed condition for confining heat in said upper compartment; a floor in said upper housing section separating said upper compartment from said middle compartment; dispensing chute means connected with said middle and upper housing sections, said dispensing chute means defining a passage for hot gasses between said middle compartment and said upper compartment around said floor including a first opening from said chute means and said middle compartment and a second opening spaced upwardly from said first opening from said chute means into said upper compartment and including a



door means into said chute means for access into said upper compartment through said upper opening from said chute means into said upper compartment for dispensing said tortilla chips from said upper compartment; and flue means connected into said upper section above and below said floor for venting said middle compartment and said upper compartment to the atmosphere.

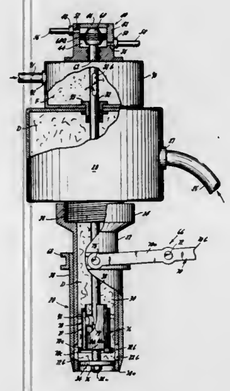
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**4,015,518**

## APPARATUS FOR FORMING A VARIETY OF SHAPED BODIES WITH AN INTERNAL FILLING

**Howard Roth, Yonkers, N.Y.; Peter R. Baldry, Greenwich, Conn.; Harold B. Kaufman, Jr., New York, N.Y.; John P. McCarthy, College Point, N.Y., and Kurt Wallenfels, Jackson Heights, N.Y., assignors to DCA Food Industries Inc., New York, N.Y.**

**Filed Mar. 16, 1976, Ser. No. 667,379**
**Int. Cl.² A21C 9/06**
**U.S. Cl. 99—450.6** **25 Claims**



1. An apparatus for simultaneously forming a plastic material and a filling material into shaped bodies, each having an internal filling, said apparatus comprising a forming mechanism including a nozzle body having a plurality of shaped orifices in its periphery for forming said plastic material and defining an outer chamber adapted to be connected in communication with a source of said plastic material, a cutter sleeve mounted on said nozzle body for movement relative thereto, said cutter sleeve being normally disposed to close said plastic material forming orifices and being moveable relative to said nozzle body to selectively cover and uncover said plastic material forming orifices; a filling forming mechanism disposed within said nozzle body and including outer and inner members arranged to define an inner chamber therebetween adapted to be connected in communication with a source of filling material, means mounting said outer and inner members for movement relative to one another, said outer and inner members being normally disposed to retain said filling material in said inner chamber and coacting, when opened, to define an outwardly opening channel confronting said plastic material forming orifices and permitting the exiting of said filling material from said inner chamber, a shell mounted to one of said outer and inner members and arranged to confront said channel, said shell having a plurality of shaped filling material forming orifices therein each being arranged in confronting relation to one of said plastic material forming orifices, said outer and inner members and said shell being constructed and arranged so that the closing and opening of said inner chamber is effective to cover and uncover said filling material forming orifices; and actuating means for said plastic material forming and said filling material forming mechanisms adapted to selectively uncover and cover said plastic and filling material forming orifices in timed relation to one another.

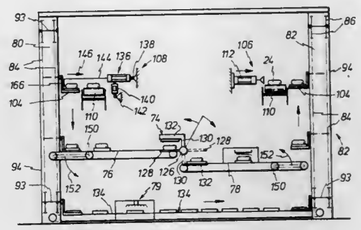
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**4,015,519**

## APPARATUS FOR STORING CHEESE LOAVES AND FOR PERIODICALLY TURNING THEM UPSIDE DOWN

**Gerrit Jan van Elten, Barneveld, and Antonius Hurkmans, Baarn, both of Netherlands, assignors to Technisch Ontwikkelingsbureau van Elten B.V., Voorthuizen, Netherlands**

**Filed Apr. 24, 1975, Ser. No. 571,088**
**Claims priority, application Germany, May 3, 1974, 2421515**
**Int. Cl.² A01J 25/16**
**U.S. Cl. 99—452** **12 Claims**



1. An apparatus for storing cheese loaves and for periodically turning them upside down, said apparatus comprising an array of adjacent units, each unit constituting a multiplicity of horizontal open-ended guideways in superimposed relationship, each guideway accommodating a multiplicity of adjacent horizontal boards, each board having a width and a length sufficient to support at least one loaf of cheese, the height of each guideway being in excess of the height of each loaf, horizontal supply conveyor means extending transversely to said guideways in front of said array for conveying a loaf-carrying board into registry with a selected one of said guideways, said supply conveyor means having an input end, a pushing device mounted in adjacent relationship to said supply conveyor means for horizontally pushing said board on said conveyor means away from the latter and into said selected guideway a distance corresponding to the width of said board causing the latter to push said multiplicity of adjacent horizontal boards one step thereby discharging one board from said selected one of said guideways on the rear side of said array, horizontal discharge conveyor means extending transversely to said guideways across said rear side of said array for receiving the discharged board from said selected one of said guideways, said discharge conveyor means having an output end, means for vertically adjusting said horizontal supply conveyor means and discharge conveyor means to a common selected level into registry with a selected horizontal row of said guideways, means for moving said pushing device into registry with said selected one of said guideways, transporting means extending adjacent to said array from said output end of said discharge conveyor means to said input end of said supply conveyor means, and overturning means for turning a cheese loaf upside down, said overturning means being included in said transporting means.

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**4,015,520**

## STACK-FORMING MACHINE HAVING TILTING PRESS

**John Dale Anderson, and Bruce Leo Lutz, both of Box 788, Hesston, Kans. 67062**

**Filed June 6, 1975, Ser. No. 584,468**
**Int. Cl.² B30B 1/08**
**U.S. Cl. 100—215** **11 Claims**

1. A stack-forming machine including:

a container having a crop-receiving body and a vertically reciprocable press for compacting the crop in the body,

outfeed position wherein the forward end portion of the bag is forward of the stack;

said inserter having means for gripping a liner for forward movement of the liner with the inserter into the opened bag;

means for moving the inserter longitudinally of the apparatus through a forward stroke from its retracted position and then through a rearward return stroke back to its retracted position;

means for feeding a liner from a supply thereof to bring the liner into position for being gripped by said liner gripping means for insertion of the liner in said opened bag;

means for operating the liner gripping means to grip said liner and for releasing the grip after insertion of the liner; and

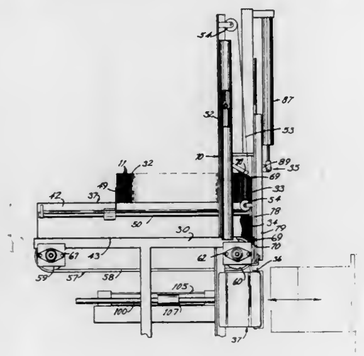
outfeed means forward of the stack holding means engageable with a lined bag in the outfeed position for feeding the lined bag forward.

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## 4,015,516
## PLUG PAD INSERTING APPARATUS FOR CARTON FORMING MACHINES

**Robert H. Graham, Spokane, Wash., assignor to R. A. Pearson Company, Spokane, Wash.**

**Filed Feb. 13, 1976, Ser. No. 657,844**
**Int. Cl.² B31B 7/00**
**U.S. Cl. 93—36.3** **16 Claims**



**1.** A plug pad inserting apparatus for inserting a carton bottom plug pad into a pre-formed or partially formed carton of the type including folded semi-rigid panels such as cardboard and including:

A. an open top end;

B. upright peripheral side and end walls;

C. a bottom end that when complete is formed by:

a. end flaps folded inwardly across the bottom end from the end walls with inward end flap edges spaced apart by a prescribed distance;

b. side flaps folded inwardly across the bottom end overlapping the end flaps and including inside edges spaced closely adjacent one another;

c. a recess opening toward the top end and defined by the end flap edges, side walls, and surfaces of the side flaps that face the top end;

wherein the plug pad includes peripheral edges defined by parallel oppositely facing planar side surfaces and is equal in dimension to the recess and

wherein the plug pad inserting apparatus is comprised of:

a supportive framework;

a magazine means for receiving a stack of plug pads, and having an open discharge end for releasing individual pads;

mandrel means for receiving single pads from the magazine means at a mandrel loading station;

pad placing means for feeding successive pads to the mandrel means at the mandrel loading station;

mandrel drive means for moving the mandrel into the open end of a carton to press against the carton bottom; and

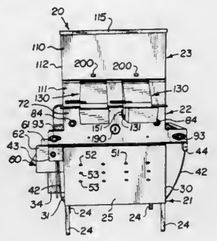
ejection means for removing the single pad from the mandrel and pressing the pad into the recess.

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## 4,015,517
## FOOD PROCESSING DEVICE

**Johnny B. Pomara, Jr., Dallas, Tex., assignor to El Chico Corporation, Dallas, Tex.**

**Filed Sept. 10, 1975, Ser. No. 612,171**
**Int. Cl.² A47J 27/14**
**U.S. Cl. 99—355** **7 Claims**



**1.** A food processing device for heating soft tortillas and for heating, storing, and dispensing toasted tortilla chips comprising: a heating means a bottom heating section including housing means defining a bottom heating compartment enclosed around the sides and ends thereof and open at the bottom and top; means secured with said housing defining said bottom compartment for heating the space within said bottom compartment; a middle section connected with said bottom secton defining a middle compartment open at the bottom and top thereof and communicating with said heating means in said bottom section for heating said middle compartment; a conveyor system in said middle section including an upper conveyor belt and a lower conveyor belt, said upper conveyor belt having a lower portion thereof and said lower conveyor belt having an upper portion thereof moving in closely spaced parallel relationship for capturing and transporting through said middle compartment soft tortillas for heating such tortillas and holding said tortillas in substantially flat condition, said upper conveyor belt being shorter than said lower conveyor belt, said upper portion of said lower conveyor belt extending from opposite ends of said middle section providing an input end and a discharge end for said soft tortillas; shelf means secured at said discharge end of said lower conveyor belt below said end of said belt for supporting a container to receive and hold heated soft tortillas discharged from said discharge end of said lower conveyor belt; drive means connected with said upper and lower conveyor belts for driving said belts at substantially equal speeds, an upper housing section secured with said middle housing section in defining an upper compartment for storing, heating and dispensing said toasted tortilla chips, said upper housing section having ends and sides corresponding with ends and sides of said middle housing section; a movable top secured on said upper housing section for movement between an open condition for filling said upper compartment with said tortilla chips and a closed condition for confining heat in said upper compartment; a floor in said upper housing section separating said upper compartment from said middle compartment; dispensing chute means connected with said middle and upper housing sections, said dispensing chute means defining a passage for hot gasses between said middle compartment and said upper compartment around said floor including a first opening from said chute means and said middle compartment and a second opening spaced upwardly from said first opening from said chute means into said upper compartment and including a door means into said chute means for access into said upper compartment through said upper opening from said chute means into said upper compartment for dispensing said tortilla chips from said upper compartment; and flue means connected into said upper section above and below said floor for venting said middle compartment and said upper compartment to the atmosphere.

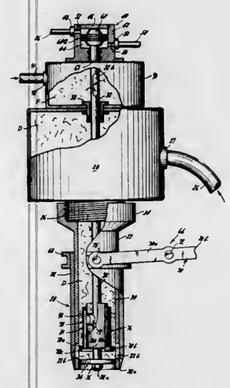


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## 4,015,518
## APPARATUS FOR FORMING A VARIETY OF SHAPED BODIES WITH AN INTERNAL FILLING

**Howard Roth, Yonkers, N.Y.; Peter R. Baldry, Greenwich, Conn.; Harold B. Kaufman, Jr., New York, N.Y.; John P. McCarthy, College Point, N.Y., and Kurt Wallenfels, Jackson Heights, N.Y., assignors to DCA Food Industries Inc., New York, N.Y.**

**Filed Mar. 16, 1976, Ser. No. 667,379**
**Int. Cl.² A21C 9/06**
**U.S. Cl. 99—450.6** **25 Claims**



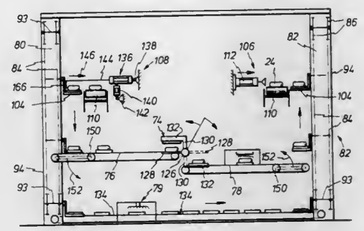
**1.** An apparatus for simultaneously forming a plastic material and a filling material into shaped bodies, each having an internal filling, said apparatus comprising a forming mechanism including a nozzle body having a plurality of shaped orifices in its periphery for forming said plastic material and defining an outer chamber adapted to be connected in communication with a source of said plastic material, a cutter sleeve mounted on said nozzle body for movement relative thereto, said cutter sleeve being normally disposed to close said plastic material forming orifices and being moveable relative to said nozzle body to selectively cover and uncover said plastic material forming orifices; a filling forming mechanism disposed within said nozzle body and including outer and inner members arranged to define an inner chamber therebetween adapted to be connected in communication with a source of filling material, means mounting said outer and inner members for movement relative to one another, said outer and inner members being normally disposed to retain said filling material in said inner chamber and coacting, when opened, to define an outwardly opening channel confronting said plastic material forming orifices and permitting the exiting of said filling material from said inner chamber, a shell mounted to one of said outer and inner members and arranged to confront said channel, said shell having a plurality of shaped filling material forming orifices therein each being arranged in confronting relation to one of said plastic material forming orifices, said outer and inner members and said shell being constructed and arranged so that the closing and opening of said inner chamber is effective to cover and uncover said filling material forming orifices; and actuating means for said plastic material forming and said filling material forming mechanisms adapted to selectively uncover and cover said plastic and filling material forming orifices in timed relation to one another.

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## 4,015,519
## APPARATUS FOR STORING CHEESE LOAVES AND FOR PERIODICALLY TURNING THEM UPSIDE DOWN

**Gerrit Jan van Elten, Barneveld, and Antonius Hurkmans, Baarn, both of Netherlands, assignors to Technisch Ontwikkelingsbureau van Elten B.V., Voorthuizen, Netherlands**

**Filed Apr. 24, 1975, Ser. No. 571,088**
**Claims priority, application Germany, May 3, 1974, 2421515**
**Int. Cl.² A01J 25/16**
**U.S. Cl. 99—452** **12 Claims**



**1.** An apparatus for storing cheese loaves and for periodically turning them upside down, said apparatus comprising an array of adjacent units, each unit constituting a multiplicity of horizontal open-ended guideways in superimposed relationship, each guideway accommodating a multiplicity of adjacent horizontal boards, each board having a width and a length sufficient to support at least one loaf of cheese, the height of each guideway being in excess of the height of each loaf, horizontal supply conveyor means extending transversely to said guideways in front of said array for conveying a loaf-carrying board into registry with a selected one of said guideways, said supply conveyor means having an input end, a pushing device mounted in adjacent relationship to said supply conveyor means for horizontally pushing said board on said conveyor means away from the latter and into said selected guideway a distance corresponding to the width of said board causing the latter to push said multiplicity of adjacent horizontal boards one step thereby discharging one board from said selected one of said guideways on the rear side of said array, horizontal discharge conveyor means extending transversely to said guideways across said rear side of said array for receiving the discharged board from said selected one of said guideways, said discharge conveyor means having an output end, means for vertically adjusting said horizontal supply conveyor means and discharge conveyor means to a common selected level into registry with a selected horizontal row of said guideways, means for moving said pushing device into registry with said selected one of said guideways, transporting means extending adjacent to said array from said output end of said discharge conveyor means to said input end of said supply conveyor means, and overturning means for turning a cheese loaf upside down, said overturning means being included in said transporting means.

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## 4,015,520
## STACK-FORMING MACHINE HAVING TILTING PRESS

**John Dale Anderson, and Bruce Leo Lutz, both of Box 788, Hesston, Kans. 67062**

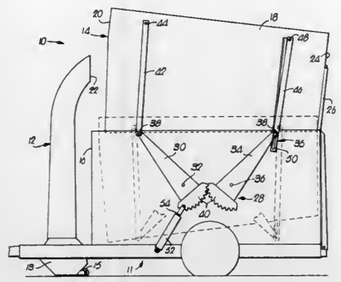
**Filed June 6, 1975, Ser. No. 584,468**
**Int. Cl.² B30B 1/08**
**U.S. Cl. 100—215** **11 Claims**

**1.** A stack-forming machine including:

a container having a crop-receiving body and a vertically reciprocable press for compacting the crop in the body,

said press having a length and width substantially the same as the interior of said body;

a loader for feeding crops into the container; and



press-actuating mechanism for reciprocating said press along a substantially vertical, rectilinear path of travel to compact all of the crop in the body simultaneously,

said mechanism being operable to tilt the press during reciprocation of the latter.

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**4,015,521**

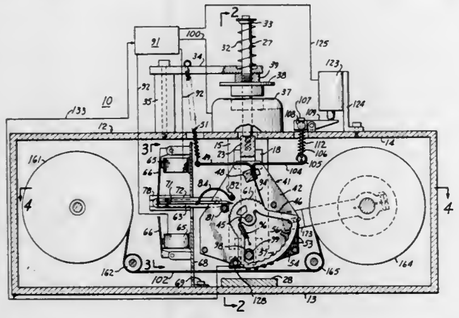
## CHARACTER PRINTING APPARATUS

**Joseph J. Neff, Pasadena, Calif., assignor to Bell & Howell Company, Chicago, Ill.**

**Filed Apr. 14, 1975, Ser. No. 567,589**

**Int. Cl.² B41J** *1/44*

**U.S. Cl. 101—99** **22 Claims**



**1.** In apparatus for printing characters on a printout surface, the improvement comprising in combination:

a shaft having a longitudinal axis;

a plurality of curved segments mounted side by side on said shaft for individual angular movement about said axis, each of said segments having a series of character types on an outer curved surface and a distinct first surface feature behind each of said character types in an inner curved surface;

means connected to said shaft for mounting said shaft for movement together with said segments toward and away from said printout surface perpendicularly to said axis;

means operatively associated with said segments for selectively positioning said character types adjacent said printout surface, said character type positioning means including means for individually moving said segments angularly relative to said axis and for selectively resetting said segments to a rest position; and

means operatively associated with said segments for selectively moving said shaft and segments toward and away from said printout surface, said segment moving means including a print hammer structure having a second surface feature constructed for simultaneously engaging said angularly moved segments at their first surface features behind the selectively positioned character types, and means coupled to said hammer structure for actuating said print hammer structure toward said angularly moved segments and said printout surface for a printout of said characters on said selectively positioned character types, said first and second surface features being mutually complementary;

said means for individually moving said segments including for each segment an individual actuating rod having a longitudinal axis, means coupled to said actuating rod for selectively moving the actuating rod along said longitudinal axis, means coupled to the particular segment and operatively associated with said actuating rod for translating movement of said actuating rod along said longitudinal axis into angular movement of the particular segment relative to said axis, and means for mounting said actuating rod for angular movement during movement of said segments toward and away from said printout surface; and

said translating means including a ratchet teeth structure for each of said segments, and said means for moving said actuating rod including means for moving said actuating rod into engagement with said ratchet teeth structure for angular movement of the particular segment.

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**4,015,522**

## MULTICOLOR SHEET-FED PRINTING PRESS

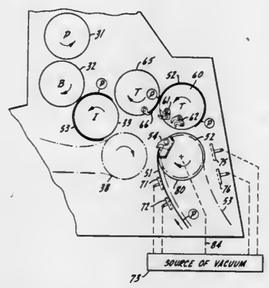
**Friedrich Preuss, Sprendlingen, and Kurt Difflipp, Dietzenbach, both of Germany, assignors to Roland Offsetmaschinenfabrik Faber & Schleicher AG, Germany**

**Filed May 26, 1976, Ser. No. 690,177**

**Claims priority, application Germany, May 28, 1975, 2523662**

**Int. Cl.² B41F** *7/06*

**U.S. Cl. 101—183** **10 Claims**




**1.** In a multicolor sheet fed printing press installation, the combination comprising, a first press unit having means including a first impression cylinder for printing on one side of a sheet, a second press unit having means including a second impression cylinder for printing on one side of a sheet, a conveyor comprising an endless conveyor chain having grippers and trained about an inlet sprocket in the first press unit for taking a sheet from the first impression cylinder and trained about an outlet sprocket in the second press unit for delivering the sheet to the second impression cylinder, first and second transfer drums interposed in series between the outlet sprocket and the second impression cylinder for controlling the feeding of the sheets to the latter, the first transfer drum having (1) means including a normal set of grippers for gripping the leading edge of the sheet at the outlet sprocket for printing on a first side of the sheet in the second press unit, and (2) means including an auxiliary set of grippers for gripping the trailing edge of the sheet at the outlet sprocket and for transferring the gripped edge to the normal set of grippers, thereby to reverse the sheet for printing on the second side of the sheet in the second press unit, and means for receiving sheets from the second impression cylinder and for delivering them at a delivery point.



**4,015,523**

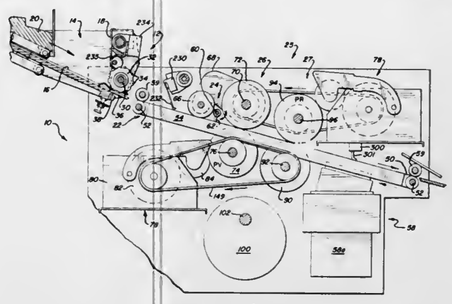
## METHOD AND APPARATUS FOR FEEDING AND PRINTING DOCUMENTS

**Robert H. Evans, and Ronald F. Wochinski, both of Palatine, Ill., assignors to AES Technology Systems, Inc., Elk Grove Village, Ill.**

**Continuation-in-part of Ser. No. 285,608, Sept. 1, 1972, abandoned. This application Jan. 24, 1973, Ser. No. 326,395**

**Int. Cl.² B41F** *13/24*; **B65H** *7/20*

**U.S. Cl. 101—233** **17 Claims**



**1.** A document feeding device comprising selectively actuated feeding means adapted to sequentially deliver documents from a source to a feed path; continuously operating means for moving said documents along said feed path; aligning means along said feed path for temporarily interrupting the movement of each of said documents along said feed path and for aligning each of said documents relative to said feed path; control means responsive to the presence of documents in said feed path for effecting actuation of said aligning means to allow said continuously operating document moving means to move each of said aligned documents further along said feed path and for effecting actuation of said feeding means to feed a subsequent document to said feed path; printing means along said path for printing indicia on said documents, said printing means being disposed downstream of said aligning means; and means for actuating said printing means in response to actuation of said aligning means.

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**4,015,524**

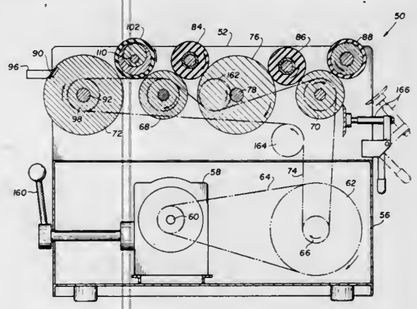
## PROOFING PRESS

**Lawrence Herbert, New York, N.Y., assignor to Pantone, Inc., Moonachie, N.J.**

**Filed Sept. 17, 1975, Ser. No. 614,123**

**Int. Cl.² B41F** *13/24*

**U.S. Cl. 101—247** **8 Claims**



**1.** For use preparatory to a printing run to be conducted at a selected speed and printing pressure, a proofing press for producing a sample printed at said speed and pressure for checking purposes comprising a variable speed drive operatively arranged to power in rotation at least one driving roller, drive means connected from said driving roller to transmit the rotative movement thereof to a cooperating pair of front and rear driven rollers spaced from each other so as to define an ink film forming station therebetween, plural idler ink film forming rollers operatively arranged to be driven in rotation by said front and rear driven rollers so as to spread an ink supply into a film on the surfaces of each idler roller and on said pair of driven rollers, a substrate sample transport roller spaced from said front driven roller so as to define a sample inking station therebetween, drive means connected from said driving roller to transmit the rotative movement thereof also to said substrate sample transport roller, and an inking roller at said inking station mounted to be pivotally traversable between positions of established pressure contact initially with said front driven roller having said ink film over the surface threof and subsequently with said substrate sample being urged through printing movement relative to said inking roller by said transport roller, whereby said sample is printed at a speed selected for said transport roller and at a pressure corresponding to said established pressure contact therewith.

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**4,015,525**

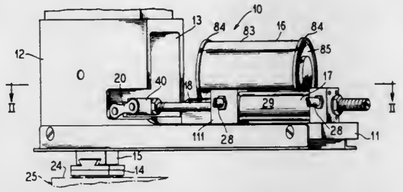
## IMPRINTER AND ACTUATOR THEREFOR

**James L. Shenoha, Lockport, Ill., assignor to Norwood Marking & Equipment Company, Downers Grove, Ill.**

**Filed Apr. 26, 1976, Ser. No. 680,382**

**Int. Cl.² B41K** *1/42*

**U.S. Cl. 101—333** **14 Claims**



**1.** An imprint marker having a frame member, a stationary power cylinder carried by the frame member having a projectable power ram reciprocatable in a first longitudinal plane only, a type bar carrying member having a first end adapted to carry a type bar, a first pivotable member pivotably attached to the frame through a first pivot axis at a right angle to the projection of the power ram, the type bar carrying member pivotably attached to the first pivotable member at a moving second pivot axis parallel to the first pivot axis and spaced therefrom, the second pivot axis positioned intermediate first and second ends of the type bar carrying member, a second end portion of the type bar carrying member pivotable around a frame carried fixed pivot having a third pivot axis parallel to the first and second pivot axes, the connection between the second end portion and the fixed pivot being a lost motion connection, the improvement of a rigid force transmitting connection between the ram and the first pivoting member, said connection having portions thereof pivotable with respect to the ram and frame.

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**4,015,526**

## EXPLOSIVE CHARGE

**John Alan Bond, Stevenston; George Martin Frazer Cheyne, Troon, both of Scotland, and Adrien Patrick Rayner, Iver, England, assignors to Imperial Chemical Industries Limited, London, England**

**Filed Apr. 4, 1975, Ser. No. 565,136**

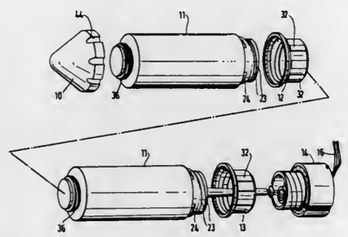
**Claims priority, application United Kingdom, Apr. 10, 1974, 15803/74; July 25, 1974, 32872/74**

**Int. Cl.² E21B** *43/26*

**U.S. Cl. 102—21.6** **19 Claims**

**1.** A flexible plastics container for an explosive charge for

use under hydrostatic pressure comprising: a body having a closed end wall and at the other end a neck of smaller transverse cross-section than the body, said neck having an open outer end and an inner end joined to the body by at least two shoulder portions, the shoulder portion nearest the neck having a shoulder surface facing generally in the same direction as the open end of the neck and merging with the inner end of the neck and a generally cylindrical surface which merges into a shoulder surface of the adjacent shoulder portion; and a closure cap for sealing the opening at the outer end of said neck, said cap having a circular end wall portion adapted to



engage the outer end of said neck transversely to provide a leakproof seal and, depending from said circular end wall portion, a continuous central plug adapted to fit closely into the opening and support the neck against internal distortion and an outer annular skirt adapted to fit around the outside of the neck and to tightly embrace with its lower peripheral edge said generally cylindrical surface to support the neck and adjacent shoulder portion against external distortion, the plug and skirt defining an annular recess adapted to receive the neck, and the closure cap and container body having engagement means to retain the closure cap and body in sealing engagement.

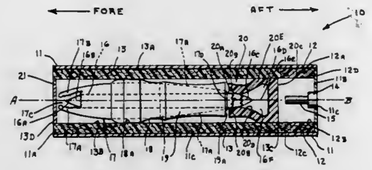
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**4,015,527**

## CASELESS AMMUNITION ROUND WITH SPIN STABILIZED METAL FLECHETTE AND DISINTEGRATING SABOT

**Harold O. Evans, Fort Walton Beach, Fla., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**

**Filed Mar. 10, 1976, Ser. No. 665,597**
**Int. Cl.² F42B** *5/02*
**U.S. Cl. 102—38** **9 Claims**




1. A caseless round, comprising:
a. a cylindrical-configurated hollow outer case having a fore end, an aft end and an internal surface, with said fore end open and said aft end closed, and with said closed aft end having an aperture therein;
b. an aft grain charge shaped in the form of a hollow, open-ended cylinder and having an outer surface, an inner surface, an aft surface and a fore surface, with said aft grain charge disposed wholly within said hollow outer case, and with said outer surface of said aft grain charge abutting with said internal surface of said outer case, and also with said art surface of said aft grain charge abutting with said closed aft end of said outer case;
c. a fore grain charge shaped in the form of a hollow, open-ended cylinder and having an outer surface and an aft surface, with said fore grain charge disposed within said hollow outer case, and with said outer surface of said fore grain charge abutting with said internal surface of said outer case, and also with said aft surface of said fore grain charge abutting with said fore surface of said aft grain charge;
d. a primer charge disposed within said hollow outer case at the aft end thereof, and with said primer charge positioned at said aperture of said outer case aft end and within said hollow, open-ended aft grain charge;
e. a booster charge disposed within said hollow outer case at the aft end thereof, and with said booster charge positioned in communication with, and fore of, said primer charge and within said hollow, open-ended aft grain charge;
f. a flechette of high density material, with said flechette having a longitudinal axis, a fore end with a suitably shaped tip thereat, and an aft end with a plurality of fins thereat, and with said flechette centrally located wholly with said hollow, open-ended fore grain charge;
g. a sabot, with an open fore end and an open aft end, comprising a plurality of identical constituent portions disposed wholly within said hollow open-ended fore grain charge, and surrounding said flechette in a snug fit, with said open fore end of said flechette shaped to catch air and positioned at said open fore end of said sabot, and with said aft end of said flechette protruding from said open aft end of said sabot;
h. a first seal fitted over said sabot and disposed wholly within said hollow open-ended fore grain charge, with said first seal having a rotating band ring external of, abutting with, and integrated with said first seal, and with said rotating band ring abutting with said inner surface of said fore grain charge;
i. a fore boot seal fitted over said open aft end of said sabot, and interposed between, and press fit between, said first seal and said sabot;
j. an aft boot seal having an open fore end with a forwardly disposed air-catching circumferential groove thereat, a closed aft end, and a cavity in communication with said open fore end, with said aft boot seal comprising a plurality of portions loosely fitted around said plurality of fins of said flechette, and with said fins wholly within said aft boot seal cavity, and also with said aft boot seal portions abutting said inner surface of said fore grain charge, thereby releasably uniting said aft boot seal portions;
k. and, a second seal disposed at the open fore end of said fore grain charge, thereby closing said end.

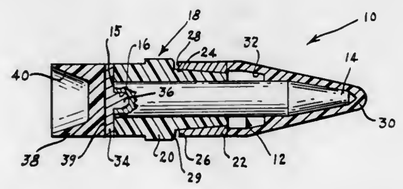
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**4,015,528**

## HIGH DENSITY ARMOR PIERCING PROJECTILE

**Irwin R. Barr, Lutherville, Md., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**

**Filed Mar. 19, 1975, Ser. No. 559,860**
**Int. Cl.² F42B** *13/06*
**U.S. Cl. 102—52** **7 Claims**



1. A high density armor piercing projectile comprising a high density penetrator core, said penetrator core being of a length substantially greater than the width thereof and being tapered at one end thereof and having a substantially flat surface at the other end thereof, an indentation being formed within said flat surface of said penetrator core, a carrier body encompassing said penetrator core and having one end thereof located adjacent said flat surface of said core, the other end of said carrier body being of a conical configuration, an enlarged annular segment formed about the midpoint of said carrier body for engaging the barrel bore of a weapon, a stabilizing ring encompassing said conical end of said carrier body and being displaced a predetermined distance from the shoulder of said enlarged annular segment of said carrier body, a lightweight nose being mounted on said tapered end of said penetrator core and abutting at an end thereof said stabilizing ring, a flat pusher plate mounted against the rear flat surface of said penetrator core, said pusher plate having a nipple thereon, said nipple fitting within said indentation in said penetrator body and an obturator mounted on said pusher plate.



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**4,015,529**

## ILLUMINATIVE AND INCENDIARY EXPLOSIVE MUNITIONS

**Charles A. Knapp, Wayne, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Division of Ser. No. 583,720, June 4, 1975, Pat. No. 3,959,041, which is a continuation of Ser. No. 347,602, April 3, 1973, abandoned. This application Jan. 16, 1976, Ser. No. 649,624**
**Int. Cl.² F42B** *13/14*
**U.S. Cl. 102—66** **7 Claims**

1. In a shaped charge, a composition having illuminating and incendiary properties comprising a high explosive and a pyrophoric metal selected from the group consisting of zirconium, titanium and misch metal, wherein said pyrophoric metal possesses a particle size of at least about 1/10 inch and is attached to the shaped charge liner on the side adjacent to said high explosive.

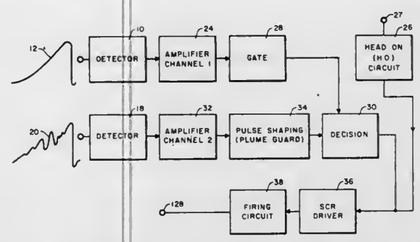
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**4,015,530**

## TWO CHANNEL OPTICAL FUZING SYSTEM

**John O. Dick, Riverside, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Mar. 30, 1966, Ser. No. 540,145**
**Int. Cl.² F42C** *13/04*
**U.S. Cl. 102—70.2 P** **2 Claims**




1. In a two channel optical fuzing system for a guided missile, the combination comprising:
a. a first infrared energy detector for generating an output signal in proportion to infrared energy detected in a predetermined region forward of the missile,
b. a gate circuit coupled to said first infrared detector for generating an output of a predetermined time duration when the infrared energy is no longer detected by said first infrared energy detector,
c. a second infrared energy detector for generating an output signal in proportion to infrared energy detected in a predetermined region aft of said forward predetermined region,
d. decision circuit means coupled to said gate circuit and to said second infrared energy detector for generating an output pulse when the output signal of said second infrared energy detector is received during the presence of an output gate signal from said gate circuit,
e. a pulse drive circuit coupled to the output of said decision circuit means to provide a low impedance output,
f. circuit means coupled to said pulse drive circuit for initiating an output pulse signal upon the first detection of an infrared source when it is determined that the missile is approaching an infrared source in a head-on direction,
g. a firing circuit coupled to the output of a said pulse drive circuit for generating a low impedance high energy pulse in response to an input pulse from said pulse drive circuit.

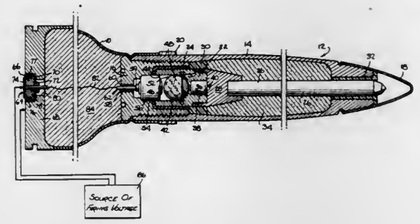
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**4,015,531**

## ELECTRICAL FUZE WITH SELECTABLE MODES OF OPERATION

**Richard Thomas Ziemba, Burlington, Vt., assignor to General Electric Company, Burlington, Vt.**

**Filed Jan. 31, 1975, Ser. No. 545,843**
**Int. Cl.² F42C** *11/06*
**U.S. Cl. 102—70.2 R** **16 Claims**



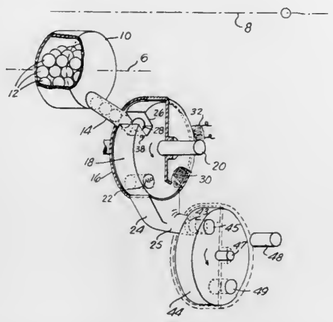
1. A weapon system comprising:
a source of voltage having first and second output conductors;
a fuze for a round of ammunition, including
first and second input conductors respectively and releasably coupled to said voltage source first and second conductors,
an electrical primer coupled to and across said first and second input conductors, and requiring a first quantity of electrical power for ignition,
a capacitor and unidirectional current flow controlling means coupled in series circuit to and across said first and second input conductors, said controlling means permitting charging of said capacitor from said first and second input conductors and precluding discharging of said capacitor through said first and second conductors,
an electrical detonator and a normally open switch coupled in series circuit to and across said capacitor, said detonator requiring a second quantity of electrical power for ignition which is less than said first quantity of electrical power;
said weapon system having a mode of operation such that
initially said input conductors are coupled to said voltage source conductors, said switch is open, and said capacitor receives and stores a third quantity of electrical power which is equal to or greater than said second quantity of electrical power before said primer receives and is ignited by said first quantity of electrical power, and
subsequently said input conductors are decoupled from said voltage source conductors, said switch is closed, and said capacitor discharges stored electrical power to said detonator which ignites said detonator.

**4,015,532**

## ENERGY GENERATOR FOR ROTATING PROJECTILES

**Warren P. Morrow, Silver Spring, Md., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Feb. 11, 1976, Ser. No. 657,130**
**Int. Cl.² F42C** *9/00, 15/00*
**U.S. Cl. 102—70.2 GA** **10 Claims**



1. Apparatus mounted within a rotating projectile having a main spin axis, which comprises:
rotor means having a pivot axis displaced from said main spin axis, said rotor means including means for normally biasing same in a first position
means overcoming said biasing means for rotating said rotor means about said pivot axis to a second position; and
means coupled to said rotor means for generating energy when said rotor means moves between said first position and said second position.

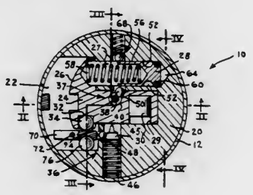
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**4,015,533**

## DUAL PRESSURE SENSING SAFING AND ARMING MECHANISM

**Ray A. Hermanson, Minneapolis, Minn., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**

**Filed June 15, 1976, Ser. No. 696,341**
**Int. Cl.² F42C** *5/00*
**U.S. Cl. 102—81** **11 Claims**



1. A dual pressure sensing safeing and arming mechanism comprising a housing, said housing containing therein a detonator, means for moving said detonator from an inoperable to an operable position, first means for preventing the movement of said detonator moving means, second means for preventing the movement of said detonator moving means, means operably connected to said first movement preventing means for releasing said first movement preventing means upon the application of a first predetermined pressure signal, means operably connected to said second movement preventing means for releasing said second movement preventing means upon the application and subsequent reduction of a second predetermined pressure signal and a firing mechanism in operative relationship with said detonator when said detonator is in the operable position whereby upon the application in a predetermined sequence of said first and second pressure signals, said first movement prevention means is released and said second movement prevention means is released thereby allowing said detonator to be moved to the operative position.

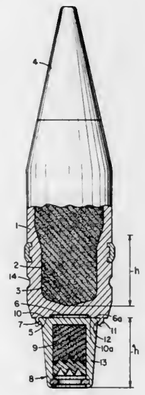
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**4,015,534**

## EXPLOSIVE PROJECTILE WITH PROJECTILE BODY

**Walter Engel, Dubendorf; Werner Senn, Zurich, and Max Steinemann, Winterthur, all of Switzerland, assignors to Werkzeugmaschinenfabrik Oerlikon-Buhrle AG, Zurich, Switzerland**

**Continuation of Ser. No. 533,286, Dec. 16, 1974, abandoned. This application Aug. 16, 1976, Ser. No. 714,920**
**Int. Cl.² F42B** *11/16*
**U.S. Cl. 102—87** **3 Claims**



1. An explosive projectile comprising in combination:
I. a projectile body possessing
a. a hollow compartment for receiving an explosive charge,
b. a notch groove for the attachment of a cartridge sleeve at the region of the explosive charge,
c. a rear end surface,
d. a border ring substantially coaxial with the projectile body and extending rearwardly from the rear end surface thereof;
II. a tracer composition sleeve secured to the projectile body and possessing
a. a front end surface which sealingly bears at the rear end surface of the projectile body
b. a flange at said front end surface with a substantially conical part surrounded by said border ring for interconnecting the projectile body and the tracer composition sleeve and wherein
III. at least one of said rear end surface of the projectile body and said front end surface of the tracer composition sleeve having a substantially disc-shaped recess forming a substantially ring-shaped sealing contact surface between such rear and front end surfaces.

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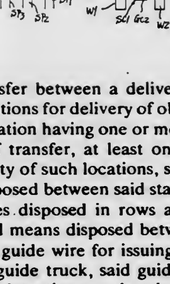
**4,015,535**

## HYPERVELOCITY SPALLATORS

**John W. Bond, Jr., Alexandria, Va., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Continuation-in-part of Ser. No. 566,883, April 10, 1975, abandoned. This application Oct. 22, 1976, Ser. No. 734,795**
**Int. Cl.² F42B** *11/26, 13/00*
**U.S. Cl. 102—92.3** **6 Claims**

1. A hypervelocity projectile means for producing backface spallation of armor plate, upon impacting said armor plate at velocities of at least 3 km/sec, to an extent of more than 20 times the mass of the projectile means without penetration of said projectile means through said armor plate comprising:
a. a body having a tip of ablation alleviating material;
b. a secondary tip of high density material located rearwardly adjacent to said tip of ablation alleviating material; and



c. at least two stress wave shaping segments positioned rearwardly of said secondary tip, said wave shaping segments having different impedance factors which increase in value from the frontmost shaping segment to the rearmost shaping segment.

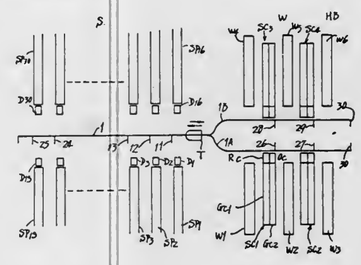
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**4,015,536**

## TRANSFER SYSTEM

**Toshiaki Sato, Amagasaki, Japan, assignor to Unitika Ltd., Japan**

**Filed Sept. 29, 1975, Ser. No. 617,824**
**Claims priority, application Japan, Nov. 9, 1974, 49-129201; Nov. 22, 1974, 49-134638; Feb. 8, 1975, 50-16702**
**Int. Cl.² B61J** *3/00*
**U.S. Cl. 104—88** **7 Claims**



1. A system for transfer between a delivery work station having one or more locations for delivery of objects of transfer and a reception work station having one or more locations for reception of objects of transfer, at least one of such work stations having a plurality of such locations, said system comprising a guide wire disposed between said stations, said guide wire including sub-wires disposed in rows along said guide wire, a guide truck, and means disposed between one end of each sub-wire and said guide wire for issuing a speed reduction command to said guide truck, said guided truck having guide wire sensors for detecting an electric current in said guide wire, being adapted to perform loading and unloading operations and to depart, stop, travel back and forth and return to its home base in response to signals from said sensors, and a central control unit containing a sequence programmer having output switches for operation and input switches for step-up and adapted to designate a delivery location or reception location in response to a transfer demand signal, issue a materials handling command under control of said sequence programmer in response to control signals including those from detectors associated with said locations, and set or change a section of energization of said wire between said location.

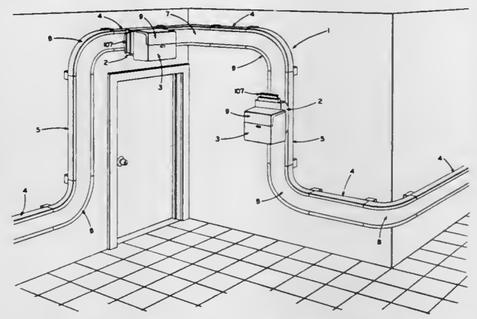
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**4,015,537**

## INTERIOR RAILWAY TRANSPORTATION SYSTEM

**Harry T. Graef, Dover; Kenneth R. Hansen, Massillon, and Larry A. Morrison, North Canton, all of Ohio, assignors to Diebold, Incorporated, Canton, Ohio**

**Filed June 9, 1975, Ser. No. 585,025**
**Int. Cl.² B61B** *3/02, 13/00;* **B61C** *11/00, 13/04*
**U.S. Cl. 104—91** **27 Claims**



1. In controlled self-propelled car transportation apparatus of the type in which a car travels along a track system having horizontal and vertical track runs with curves between the runs and inside and outside corners between horizontal runs; the track system including connected, straight, and curved corner track sections; each section being formed as a continuous rigid channel; the channel having a continuous web and two spaced continuous legs integral with the web terminating in free ends; the free ends of the legs being formed as rail heads having inner circularly rounded and outer surfaces; opposite rail heads having their rounded surfaces facing each other in spaced relation; means mounting the connected continuous straight, curved and corner track sections to form a track system; and the channel web, when mounted, of each section being oriented vertically throughout the entire track system.

13. In controlled self-propelled car transportation apparatus of the type in which a car travels along a track system having vertical aligned spaced track rail heads formed with convex semicircularly rounded surfaces facing each other in spaced relation; the car including a chassis; a pair of spaced swivel axle means mounted on the chassis; guide rollers journaled on each end of the swivel axle means normally biased axially away from each other; each guide roller being formed with a smooth concave groove continuously semicircularly rounded in cross section; the semicircularly rounded guide roller groove cross section maintaining complete rounded surface engagement with the semicircularly rounded track rail head surfaces at all times during car travel throughout the track system, thereby transmitting the car load to one of the track rail heads directly and uniformly throughout contacting semicircularly rounded guide roll and rail head surfaces.

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**4,015,538**

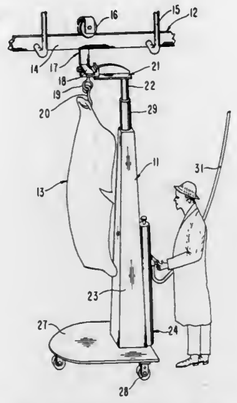
## CARCASS TRANSFER METHOD AND DEVICE

**Harry B. Webb; James W. Lee, both of Ocala, Fla., and Robert B. Blair, Guymon, Okla., assignors to Swift and Company Limited, Chicago, Ill.**

**Filed May 27, 1975, Ser. No. 580,904**
**Int. Cl.² B66B** *9/20*
**U.S. Cl. 104—97** **5 Claims**

1. A method for transporting animal carcasses suspended from an overhead rail system comprising: activating a lifting means of a portable cantilevered means, upwardly extending

said portable cantilevered means in a substantially vertical sliding direction until it is in approximate mating alignment with a carcass suspending means of an overhead rail system, moving said portable cantilevered means into mating engagement with said carcass suspending means, upwardly actuating said lifting means to free the carcass suspending means from



the rail system, freely suspending the carcass from said portable cantilevered means, leaning a portion of said carcass against a generally vertical portion of the cantilevered means to impart added stability to the carcass and to avoid the development of a pendulum effect by said suspended carcass, and transporting said carcass to a desired location.

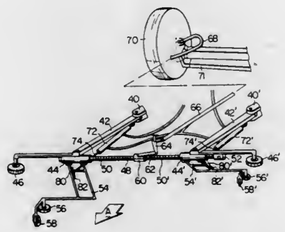
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**4,015,539**

## TRANSPORTATION SYSTEM AND VEHICLES THEREFOR

**Mitsuharu Hamada, Yokohama, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan**

**Filed Aug. 11, 1975, Ser. No. 603,780**
**Claims priority, application Japan, Aug. 16, 1974, 49-93965**
**Int. Cl.² B62D** *3/00*
**U.S. Cl. 104—130** **11 Claims**



1. A steering system of a vehicle capable of moving along a track including parallelly extending two guide walls at both sides thereof, two guide channels formed on opposite sides thereof, and junctions where two portions of the track join into one portion, and one portion of the track is branched off into two portions, said steering system comprising:
   first and second support members secured to the vehicle body;
   first and second elongate members pivotally mounted at their one ends on said first and second supporting members, respectively, the elongate members extending generally in the forward direction with respect to the vehicle cruising direction;
   a transverse axle pivotally connecting the other ends of said first and second elongate members, the axles being movable in the transverse direction with respect to the vehicle cruising direction in accordance with the pivotal movement of the elongate members;
   first and second guide rollers movably connected to said first and second elongate members, respectively, and extending in the opposite transverse directions to each other with respect to the vehicle cruising direction so that the first and second guide rollers are contactable with the parallelly extending guide walls of the track;
   first and second follower support members respectively pivotally mounted at one ends thereof on one and the other ends of said transverse axle;
   first and second guide followers respectively movably mounted on other ends of said first and second follower support members, the first and second guide followers being respectively engageable with the two guide channels of the track;
   first and second hydraulic cylinders respectively having piston rods and pivotally mounted on the first and second elongate members, the piston rods pivotally connected to the first and second follower support members, the hydraulic cylinders being hydraulically connected to a hydraulic control system; and
   a linkage mechanically connecting said transverse axle and the steerable wheels of the vehicle so that a transverse movement of the transverse axle is converted into angular movement of the steerable wheels for directional guidance of the vehicle.

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**4,015,540**

## ELECTROMAGNETIC TRANSPORTATION SYSTEM

**Richard C. Roxberry, Morristown, N.J., assignor to The Port Authority of N.Y. & N.J., New York, N.Y.**

**Filed May 1, 1975, Ser. No. 573,397**
**Int. Cl.² B61B** *13/08*
**U.S. Cl. 104—148 LM** **10 Claims**



1. An electromagnetic transportation system comprising:
   a vehicle capsule,
   a guideway to support said vehicle capsule,
   a plurality of spaced electrically conductive stator coils disposed about said guideway and about said capsule therein,
   a source of three-phase electrical energy connected across said stator coils,
   a plurality of said coils being connected in banks of series connections with a plurality of said banks of series connected coils connected in parallel across each phase of said three phase source of supply,
   said capsule comprising a substantially elongated member in an axial direction coextensive with the axial length of said guideway and being constructed of a ferro-magnetic material,
   said capsule further comprising spaced segments of non-ferro-magnetic material thereby to increase the efficiency of electromagnetic propagation of said capsule along said guideway,
   said capsule including wheel members adapted to roll along a portion of said guideway wherein said capsule is propelled along said guideway by electromagnetic propagation,
   said guideway comprises a channel support member disposed within said stator coils having a peripheral extent less than the internal peripheral extent of said stator coils thereby to support said vehicle capsule and to cooperate with said moving capsule to utilize aerodynamic support effects, and
   said stator coils being unconfined about a portion of their peripheral extent to provide for venting of air pressures generated by capsules moving within said coils.

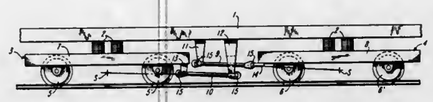


**4,015,541**

## BOGIE DRAFT LINKS

**Willi Roosen, Baunatal, Germany, assignor to Rheinstahl AG, Essen, Germany**

**Filed July 16, 1975, Ser. No. 596,568**
**Claims priority, application Germany, July 18, 1974, 2434584**
**Int. Cl.² B61D** *1/14, 3/08, 5/20, 5/50*
**U.S. Cl. 105—199 R** **7 Claims**



1. In combination with a rail vehicle having a bridge boom and at least two trucks in longitudinally spaced relation therebeneath and each truck pivotal in a horizontal plane and resiliently supporting the bridge boom, and means for transmitting longitudinal forces both under pulling tension and under braking pressure between said bridge boom and said trucks comprising a longitudinal steering bar extending between the bridge boom and each truck respectively, said bars being disposed one above the other and overlapping each other symmetrically as to be positioned in a central vertical longitudinal plane of the bridge boom between both trucks, first swivel means at one end of each bar connecting the respective bar to the bridge boom and in the region of said bridge boom between said trucks, and second swivel means connecting the other ends of said bars to the center of the adjacent end of a respective one of said trucks.

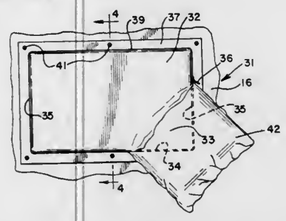
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**4,015,542**

## CONVERTIBLE HEADREST FOR SLEEPING CARS

**Jack E. Gutridge, Dyer, Ind., and Patricia A. Raidt, Calumet City, Ill., assignors to Pullman Incorporated, Chicago, Ill.**

**Filed Feb. 17, 1976, Ser. No. 658,196**
**Int. Cl.² B60N** *3/00*
**U.S. Cl. 105—322** **1 Claim**



1. In a railway car compartment comprising first, second and third angularly joined upright side walls, a seat within the compartment having a backrest positioned against said second side wall and at one side adjacent to said first side wall, said backrest terminating in a generally horizontal straight upper edge,
   a combination pillow and headrest mounted on said second side wall immediately above said backrest upper edge comprising:
   a flexible rectangular shaped cover having a front wall and a lower edge portion immediately above said backrest and paralleling the same and having first and second vertical end edge portions and a top edge portion defining corners,
   said first vertical end edge portion being located contiguous to said first side wall,
   flange means on said cover and extending outwardly from each of said portions for mounting said cover to said second side wall,
   means providing an access opening into the cover remote from said first side wall and extending from intermediate the ends of said lower edge portion to said second vertical edge portions around the corner defined thereby and terminating intermediate the ends of said second vertical edge portion,
   a pillow conforming to the shape and dimensions of the cover insertable into the cover through said corner opening beneath said front wall and withdrawable with respect to said cover through said opening,
   the disposition of said opening in said corner maximizing accessability into the cover for removing and inserting the pillow horizontally from said first vertical edge portion to the second vertical edge portion and from said lower edge portion to the upper edge portion, and
   closure means for said opening on said lower edge and second vertical edge portions.

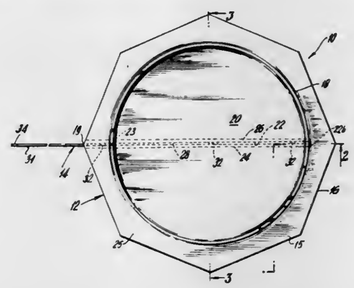
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**4,015,543**

## PLATFORM SUPPORT STRUCTURE

**Arthur J. Stankowitz, 2905 Summit Ave., Union City, N.J. 07087**

**Filed Oct. 29, 1974, Ser. No. 519,049**
**Int. Cl.² A47B** *17/00*
**U.S. Cl. 108—27** **5 Claims**

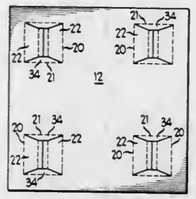


1. A platform support structure including in combination:
   a platform member having a first and a second substantially parallel opposed surfaces with a predetermined thickness therebetween; said second surface having a narrow elongated slot extending into said platform member a distance equal to at least two thirds of said predetermined thickness; said first surface of said platform structure including a raised wall member extending outwardly from said first surface a distance equal to at least said predetermined thickness, at least a portion of said wall member being arranged vertically above at least a portion of said elongated slot;
   an elongated support member having two opposed longitudinal sides with a narrow lateral support surface extending therebetween, at least a portion of said support surface and the adjacent longitudinal sides of said support member being mounted snugly within said elongated slot; and
   two elongated projections extending outwardly from said second surface, one of said elongated projections being arranged respectfully adjacent to at least a portion of each side of said elongated slot and each of said projections including a surface which is contiguous with at least a portion of one of said opposed longitudinal sides of said support member.

## 4,015,544
## DISPOSABLE PALLET

**Richard R. Szatkowski, deceased, late of Westmont, Ill. (Richard X. Szatkowski, administrator), assignor to Richard X. Szatkowski**

**Filed Apr. 24, 1975, Ser. No. 571,061**
**Int. Cl.² B65D** *19/34*
**U.S. Cl. 108—51.3** **13 Claims**



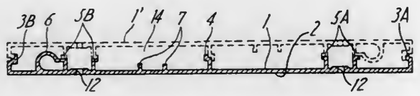
**1.** A pallet comprising:
a. at least two sheets of flat material bonded together to form a loading deck and supporting legs;
b. each of said legs comprising two primary panels formed in each sheet and folded downwardly to define a square aperture in said deck, said panels of each sheet being folded about parallel hinge lines, the hinge lines of the panels of one sheet being perpendicular to those of the other; and
c. said primary panels having extensions at their bottom edge which are folded parallel to said deck, said extensions overlapping and being bonded together in the area of said overlap.

**11.** A method of manufacturing a pallet comprising the steps of:
a. forming at least two primary panels in each of at least two sheets of flat material, said panels of each pallet being foldable downwardly about parallel score lines to define a single aperture;
b. placing an adhesive on a surface of one of said sheets of flat material;
c. stacking another of said sheets of flat material in contact with said adhesive of said one sheet such that the score lines of said sheets are perpendicular to one another and intersect at the ends; and
d. pushing said panels downwardly below the plane of said sheets inserted in its place to bond said sheets together and to form a four-sided supporting leg.

## 4,015,545
## SHELF ASSEMBLY

**Masayuki Kurokawa, Tokyo, Japan, assignor to Nittetsu Curtainwall Corporation, Tokyo, Japan, a part interest**

**Filed July 24, 1975, Ser. No. 598,693**
**Claims priority, application Japan, July 25, 1974, 49-87691[U]**
**Int. Cl.² A47S** *47/04*
**U.S. Cl. 108—107** **5 Claims**

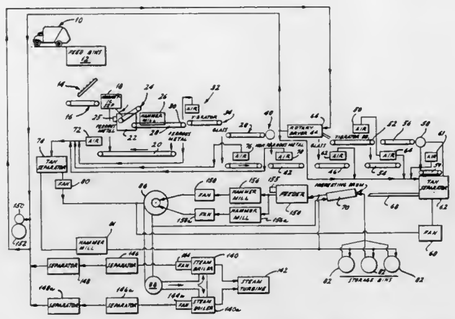


**1.** A shelving assembly comprising:
shelf board means for supporting articles thereon; and
a plurality of side board means on two sides of said shelf board means for supporting said shelf board means, each side board means having:
an inner flat side adjacent said shelf board, and an outer side opposite said inner side, said outer side having:
bent first projections having crank-like cross-sections at both ends of the sides of said side board means,
a bent second projection having a crank-like cross-section at the center of said outer side,
a plurality of third spacer projections symmetrically arranged on both sides of said second projection, said first, second and third projections being substantially the same height, said first and second bent projections being engageable with corresponding bent projections of a similar side board means placed adjacent thereto, and said third projection also engageable with corresponding third projections on said similar side board means adjacent thereto, whereby said adjacent side board means are spaced from each other by said projections, and
a tubular portion formed on said outer side of said side board means.

## 4,015,546
## APPARATUS AND METHOD FOR CONVERTING REFUSE TO USEFUL ENERGY

**Eugene H. Paules, 854 W. Broadway, Red Lion, Pa. 17356**

**Filed Oct. 9, 1975, Ser. No. 620,962**
**Int. Cl.² F23G** *5/04*
**U.S. Cl. 110—8 A** **39 Claims**



**1.** A method of utilizing refuse to provide useful heat energy comprising the steps of:
separating glass, metals and other generally non-combustibles from refuse to provide a volume of generally combustible refuse;
shredding the combustible refuse into relatively small particles;
injecting a mixture of primary combustible air and the small particles of combustible refuse into a combustion chamber having a predetermined temperature and simultaneously separating the particles and imparting a cyclonic motion to the mixture whereby the particles ignite and are converted to combustion gases flowing through the combustion chamber;
determining the temperature in said combustion chamber and controlling the flow of secondary combustion air to said combustion chamber in accordance with temperature changes therein to provide maximum combustion temperatures and substantially complete combustion of the particles and resultant combustion gases; and,
maintaining a constant negative pressure in said combustion chamber to control the flow of the particles and gases whereby combustion gases are discharged from said combustion chamber.

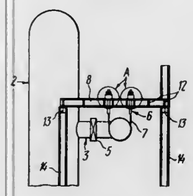
**16.** A system for utilizing refuse to provide useful heat energy comprising:
separating means for separating glass, metals and other generally non-combustibles from said refuse to provide a volume of generally combustible refuse;
shredding means for shredding the generally combustible refuse into relatively small particles;
incinerator means to which a mixture of said particles of refuse and air is fed, said incinerator means including a generally cylindrical combustion chamber and a tangentially disposed separating nozzle through which said mixture is fed whereby said particles are separated and mixed with said air and whereby said mixture enters said combustion chamber with a cyclonic motion;
control means associated with said combustion chamber for maintaining the combustion temperature of the burning mixture in said chamber at its maximum,
said control means including means for changing the amount of secondary combustion air fed to said combustion chamber in accordance with temperature changes therein; and,
blower means for controlling the flow of said burning mixture such that combustion gases are discharged from said combustion chamber.



## 4,015,547
## SUPPORTING DEVICE FOR BLAST-FURNACE HOT-BLAST MAIN

**Viktor Yakovlevich Miller, Perekopskaya ulitsa, 11, korpus 4, kv. 41; Gennady Petrovich Kandakov, Sevastopolsky prospekt, 51, korpus, 2, kv. 163, and Alexandra Moiseevna Kuznetsova, Meierovsky proezd, 1/1, korpus 1, kv. 100, all of Moscow, U.S.S.R.**

**Continuation of Ser. No. 564,049, April 1, 1975, abandoned. This application Mar. 10, 1976, Ser. No. 665,416**
**Int. Cl.² F23L** *15/00;* **F28F** *9/00*
**U.S. Cl. 110—56** **3 Claims**



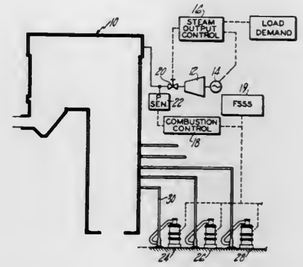
**1.** In an installation for heating and supplying air to a blast furnace comprising: air heater; a blast-furnace hot-blast main comprising a trunk section; connecting pipes rigidly and airtightly connecting the air heaters to the trunk section; and a supporting device for the hot-blast main; the improvement wherein the supporting device comprises; a carrying beam; self-contained supports mounting the carrying beam; precompressed springs installed on the carrying beam; hangers of the hot-blast main secured on the carrying beam through the springs; the pre-compression force in the springs being substantially equal to the mass of the section of the hot-blast main supported by the hangers and the magnitude of the pre-compressed setting of the springs being several times larger than the maximum possible displacement of the connecting pipes when the air heaters are vertically displaced during their operation.

## 4,015,548
## DISTRIBUTED PROGRAMMABLE CONTROL SYSTEM

**Jack A. Schuss, West Hartford, Conn., assignor to Combustion Engineering, Inc., Windsor, Conn.**

**Filed June 25, 1975, Ser. No. 590,389**
**Int. Cl.² F23K** *3/00;* **F23N** *1/00*
**U.S. Cl. 110—101 C** **5 Claims**

**1.** A sub-routine control system for use with a fuel consuming apparatus, the apparatus including a plurality of similar groups of ancillary equipment which contribute to overall system operation, the apparatus further including sensors which provide signals commensurate with conditions which influence safety of operation, each ancillary equipment group being provided with a plurality of sensors for monitoring operating parameters and generating signals commensurate therewith, said control system comprising:
a first programmable controller, said first programmable controller being connected to receive signals commensurate with the operational status of said ancillary equipment groups, said first programmable controller generating command signals for said equipment groups in response to said operational status signals and in accordance with stored instructions whereby said equipment groups will be operated in accordance with a schedule, said first programmable controller also being connected to receive the signals commensurate with the sensed conditions which influence the safety of operation of the apparatus and generating a shut-down signal for the apparatus when said safety signals indicate that an unsafe operating regime is being approached;
a second programmable controller, said second programmable controller being connected to receive the signals commensurate with sensed conditions which influence the safety of operation of the apparatus and generating a shut-down signal for the apparatus when said safety signals indicate that an unsafe operating regime is being approached;
means delivering the signals commensurate with sensed operating conditions which influence the safety of operation of the apparatus to said first and second programmable controllers;




a plurality of third programmable controllers corresponding in number to the number of similar ancillary equipment groups;
means delivering signals commensurate with the monitored operating parameters of each ancillary equipment group to respective of said programmable controllers of said third plurality;
means delivering said command signals from said first programmable controller to said programmable controllers of said third plurality, said controllers of said third plurality of each generating operational status and control signals for its associated equipment group in response to the operating parameter signals and to an input command signal in accordance with stored instructions;
means for delivering the signals commensurate with those monitored operating parameters which relate to the safety of operation of each equipment group to its associated controller of said third plurality, said controllers of said third plurality each generating operation termination signals commensurate with actual and potential violation of safe operating conditions of the ancillary equipment group in response to said safety related operating parameter signals and in accordance with stored instructions;
means for delivering the signals commensurate with those monitored operating parameters which relate to the safety of operation of another ancillary equipment group of each of said programmable controllers of said third

plurality, said controllers of said third plurality each also generating operation termination signals commensurate with actual and potential violation of safe operating conditions of a second ancillary equipment group in response to said safety related operating parameter signals and in accordance with stored instructions, said delivering means insuring that the safety of operation of each ancillary equipment group is redundantly checked by a pair of programmable controllers of said third plurality;

means for comparing the operation termination signals pertaining to each ancillary equipment group as generated by a pair of programmable controllers of said third plurality, said comparing means providing an indication of any discrepancy between the signals commensurate with actual and potential violation of safe operating conditions for an individual equipment group; and

means delivering the operational status signals generated by said programmable controllers of said third plurality to said first programmable controller.

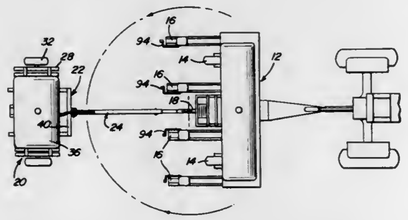
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**4,015,549**

## HERBICIDE TANK TRAILER

**Owen J. Brown, Jr., R.R. 2, Pittsfield, Ill. 62363**

**Filed Dec. 3, 1975, Ser. No. 637,153**
**Int. Cl.² A01C** *7/08*
**U.S. Cl. 111—8** **4 Claims**



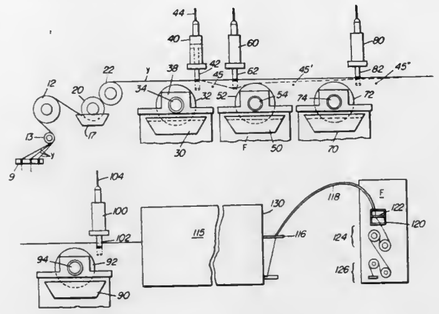
1. In combination with a farm draft vehicle and a wide multi-row ground wheel supported trailer-type planter coupled behind said draft vehicle and including a central frame portion and transversely spaced trailing press wheels disposed rearwardly of said central frame portion, a liquid tank trailer including ground engaging support wheels and a low main frame from which said wheels are supported, a large capacity liquid tank supported from said frame, said trailer including a forwardly projecting towing tongue having a low forward end portion and an elevated elongated front-to-rear extending portion disposed to the rear of said forward end portion, upstanding means connecting the front end of said front-to-rear extending portion to said low forward end portion, means connecting the rear end of said front-to-rear extending portion to said trailer main frame, the effective horizontal distance between said main frame and said low forward end portion of said trailer tongue being greater than the distance from said central frame portion to either outer side of said planter, said low forward end portion being coupled to said central frame portion at a point spaced forward of said press wheels and rearward of the ground wheels of the planter.

**4,015,550**

## APPARATUS AND METHOD FOR SELECTIVE MULTI-COLOR DYEING OF INDIVIDUAL YARNS AND PRODUCING THEREFROM A PREDETERMINED COMPLEX DESIGN IN A TUFTED CARPET

**William Chelsea Bartenfeld; Clifford Aldene Bryant, and Wilbur Koontz Newman, Sr., all of Dalton, Ga., assignors to West Point Pepperell, Inc., West Point, Ga.**

**Filed Aug. 12, 1975, Ser. No. 603,930**
**Int. Cl.² D05C** *15/26*
**U.S. Cl. 112—79 A** **34 Claims**



1. Apparatus for dyeing yarn ends individually at predetermined positions along their lengths and manufacturing tufted carpets therefrom to produce a predetermined multi-colored complex pattern therein, the dyeing apparatus comprising

a series of troughs containing different dye baths,

a draw roll around which a sheet of yarn ends from a supply is trained and fed to said dye baths,

a rotating pick-up roller supported above each trough and partially immersed in its dye bath,

a plurality of banks of movable yarn guides for individual yarn ends, said banks extending laterally in planes parallel to the axes of said pick-up rollers and supported above said pick-up rollers, there being at least one bank of yarn guides for each pick-up roller,

pattern control means to move each yarn guide individually to cause yarn carried by it to engage a pick-up roller while a predetermined length of yarn passes,

a drying chamber through which the sheet of yarns passes subsequent to the last dye bath,

a tufting machine having needles in which the individual yarn ends are threaded, and by which the yarn ends are needled through a backing sheet to reproduce the desired pattern,

said tufting machine having at least one pair of cooperating feed rolls,

and means to drive said tufting machine feed rolls and said draw roll in synchronism.

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**4,015,551**

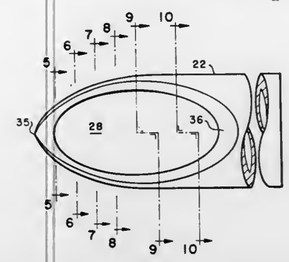
## TUFTING NEEDLE

**Sheldon M. Jeter, Carlisle, S.C., assignor to Milliken Research Corporation, Spartanburg, S.C.**

**Filed Mar. 29, 1976, Ser. No. 671,248**
**Int. Cl.² D05B** *85/10*
**U.S. Cl. 112—222** **2 Claims**

1. A tufting needle comprising a cylindrical shank provided with a cylindrical axial yarn passageway, and means to admit air to said passageway, and means to admit air to said passageway to blow yarn therethrough, said shank being beveled at its lower end, said passageway having a yarn inlet opening at one end and an inclined elliptical shaped yarn discharge opening at its other end defined by the beveled lower end of said shank, said elliptical shaped yarn discharge opening being in axial alignment with said passageway, said beveled lower end of said shank being arcuate in cross section and having a taper extending convexly inwardly, said taper merging smoothly with the remainder of said shank as a circumferential line being ground from the beveled lower end towards the shank with successively larger radii to around said shank near the upper periphery of said elliptical opening so that the length of the taper is greatest on the side of the shank which defines the lower periphery of said elliptical opening and progressively decreases around the shank in both directions from said side, to provide a pointed beveled lower end and a gradual rounded curvature towards the shank.





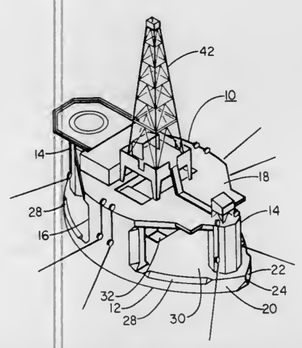
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**4,015,552**

## SEMI-SUBMERSIBLE DRILL BARGE

**Mehmet D. Korkut, 3848 Veterans Blvd., Metairie, La. 70002**

**Filed Aug. 25, 1975, Ser. No. 607,856**
**Int. Cl.² B63B** *35/44*
**U.S. Cl. 114—265** **5 Claims**



1. An improved semi-submersible drill barge comprising:

a. a double-ended closed hull defining a center opening and having convex sides tapering fore and aft from a maximum beam amidships to sharp oppositely-disposed ends for reducing flat plate resistance ad increasing stability of hull;

b. two end columns mounted, respectively freestanding, on said respective hull ends to extend respectively upwardly therefrom, said columns being convexly structured for reducing resistance to wind and water;

c. two beam columns mounted, respectively freestanding, amidships and spaced transversely apart on said hull with the outboard sides of said columns being conformed to and in continuation of said convex sides of said hull for reducing resistance to wind and wave; and

d. a work deck mounted on said end and beam columns and defining an aperture in vertical alignment with the center opening of said hull, said work deck mounting a drill rig over said aligned center opening and aperture.

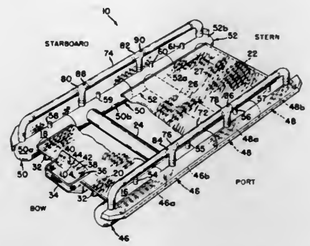
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**4,015,553**

## SUBMERSIBLE BARGE CONTROL SYSTEM

**Frederic H. Middleton, Madison, Wis., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Aug. 18, 1975, Ser. No. 605,572**
**Int. Cl.² B63G** *8/00, 8/26*
**U.S. Cl. 114—16 E** **10 Claims**



1. A control system for a submersible barge which has starboard bow, port bow, starboard stern, and port stern quadrants, said control system comprising:

said barge having starboard and port pontoons which are each divided into forward and aft ballast tanks;

ballasting and deballasting means for selectively flooding or blowing each of said ballast tanks so as to move any of the barge quadrants in a downward or an upward inclination;

means, including a pair of joy sticks, for selectively actuating the ballasting and deballasting means;

said joy sticks each having bow, stern, starboard and port directional movements and diagonal directional movements between each of the starboard and bow, port and bow, starboard and stern, and port and stern pairs of directional movements so as to constitute a total of eight available directions of movements;

the joy sticks being mounted with their bow, stern, starboard, and port directions corresponding to the bow, stern, starboard, and port portions of said barge;

the actuating means interconnecting the joy sticks with the ballasting and deballasting means for inclining the barge in the direction of movement of the respective joy stick in any of said eight available directions of movement.

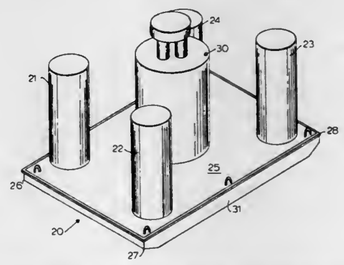
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**4,015,554**

## CONSTRUCTION AND LAUNCH BARGE AND METHOD OF PRODUCING AND INSTALLING OFFSHORE STRUCTURES

**Philip Y. Chow, Orinda, Calif., assignor to Lin Offshore Engineering, Inc., San Francisco, Calif.**

**Filed May 2, 1975, Ser. No. 574,110**
**Int. Cl.² B63B** *9/00*
**U.S. Cl. 114—65 R** **6 Claims**



1. A construction and launch barge, including in combination:

a barge hull of shallow draft,

a construction deck supported by said hull for support of a floatable offshore structure at the center thereof during construction and during towing of said barge to an offshore site,

four hollow buoyant column stabilizers, one located adjacent to each corner of said barge, detachably secured thereto and attached thereto by cable means, and connected together in pairs by struts,

ballast compartments below deck,

means for admitting water to and for expelling it from said ballast compartments, and

means for forcing air into and for expelling it from said ballast compartments,

said column stabilizers being of sufficient size and water displacing area so that the resultant metacenter of the barge under full load, including the floatable offshore structure carried thereby, is always above the center of gravity under full load and also always above the center of gravity of the combined barge under full load and the ballast water needed to raise the water plane to the water plane of the floatable offshore structure.

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**4,015,555**

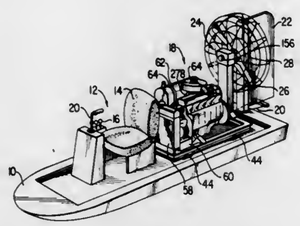
## AIR BOAT

**Sherman L. Tinkham, 1406 E. Lotus Path, Clearwater, Fla. 33516**

**Continuation of Ser. No. 347,865, April 4, 1973, abandoned. This application Nov. 29, 1974, Ser. No. 528,262**

**Int. Cl.² B60F** *3/00*

**U.S. Cl. 115—1 C** **32 Claims**



1. An air boat comprising, an air boat hull, a hull propelling assembly including a motor and an aerodynamic propeller, the propelling assembly further including means mounting the propeller above the motor and operatively supporting the propeller on the motor for propelling the hull, said means being a pylon having an upper portion with a propeller mount operatively receiving the propeller, and said pylon having a lower portion with substantially the entire vertical support for said pylon being at said lower portion of said pylon, and the mounting means further including means defining a vertical load bearing connection between said lower portion and said motor with said motor supporting at least a substantial portion of the weight of said pylon and in which said lower portion and said motor are secured, one on the other, and the propelling assembly further including means drivingly connecting the propeller mount and the motor for operating the propeller, responsive to operation of the motor, to propell the air boat hull, and means mounting the propelling assembly on the hull with the propeller mount above the motor.

**4,015,556**

## DEVICE FOR PROPELLING BOATS

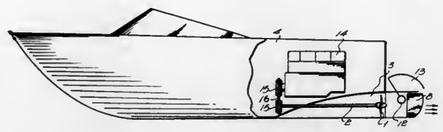
**Alejandro Lorenzo Carlos Bordiga, Avenida San Martin 4180, Buenos Aires, Argentina**

**Continuation of Ser. No. 476,034, June 3, 1974, abandoned. This application Mar. 26, 1976, Ser. No. 670,971**

**Claims priority, application Argentina, June 4, 1973, 248381; Feb. 6, 1974, 252209**

**Int. Cl.² B63H** *5/16*

**U.S. Cl. 115—39** **5 Claims**



1. A propelling device for a propeller-driven boat having a hull with a stern transom and provided with a longitudinally-extending channel at the aft portion of the hull, said channel being open at the rear extremity thereof at said stern transom and along its entire length for flow of water therethrough, a propeller disposed in entirety in said channel adjacent said stern transom for rotation coaxially in said channel at a level above the keel of the boat, a pair of parallel vertical axles supported in spaced relation rearwardly of the stern transom, a pair of deflector fins carried by said axles for rotation about vertical axes passing through said axles, said fins being mounted rearwardly of the propeller, control rods connected to the fins, a connecting rod joining said control rods and being operative therewith to keep said fins parallel to one another while permitting conjoint parallel movement thereof under the action of a steering force applied to said connecting rod, and a curved deflector plate supported for pivotable movement about a horizontal axis disposed rearwardly of said stern transom between said vertical axles and said stern transom, said deflector plate being pivotable between a position in which the deflector plate is raised to an inoperative position in which it does not deflect the mass of water propelled rearwardly by the propeller and an operative position in which the mass of water propelled rearwardly by the propeller is caused to reverse direction.

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**4,015,557**

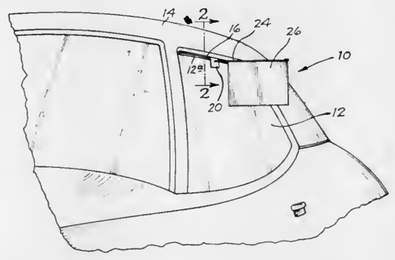
## VEHICLE DISPLAY ASSEMBLY

**Joseph Schulein, 2405 NW. 88th St., Vancouver, Wash. 98665**

**Filed Sept. 15, 1975, Ser. No. 613,118**

**Int. Cl.² B60Q** *1/52*

**U.S. Cl. 116—42** **6 Claims**



1. A removable display assembly for use on a vehicle arranged to communicate a visual message to oncoming and upcoming vehicular traffic comprising:

carrying means including a clip having laterally opposed side members joined by an interconnecting portion, said portion positionable over the upper margin of a side window such that said side members are disposed on opposite sides of the window, said clip also including at least one aperture; and

elongate rod means insertable through said aperture for permitting the upper margin of a substantially rolled up side window to press against said rod means such that said connecting portion will be urged upwardly for contact against the side window's uppwer rest, said rod means being frictionally engaged against the upper margin and extending from the side window for displaying an attached visual message.

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**4,015,558**

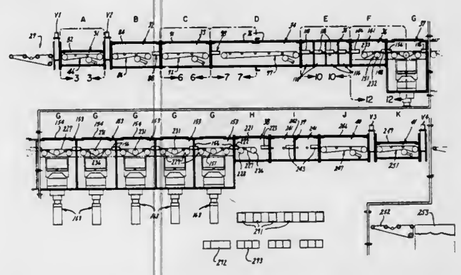
## VAPOR DEPOSITION APPARATUS

**Edward A. Small; Richard H. Edwards; Eugene A. Eufusia; Robert M. Clary, and Nils H. Bergfelt, all of Santa Rosa, Calif., assignors to Optical Coating Laboratory, Inc., Santa Rosa, Calif.**

**Continuation of Ser. No. 311,783, Dec. 4, 1972, abandoned. This application May 5, 1975, Ser. No. 574,300**

**Int. Cl.² C23C** *13/10*

**U.S. Cl. 118—6** **14 Claims**



1. In a multiple layer coating apparatus for coating substrates carried by frames disposed in generally horizontal positions, means forming at least one coating chamber, a vertically disposed coating material source in the coating chamber for vaporizing at least one material for carrying out coating operations in the coating chamber whereby the vaporized material moves upwardly, means forming an entrance chamber in communication with the coating chamber, means forming an exit chamber in communication with the coating chamber, valve means disposed at opposite ends of each of the entrance and exit chambers for sealing said entrance and exit chambers and interrupting communication with said coating chamber, means for creating a vacuum condition in the coating chamber, a separate driven conveyor assembly provided in each of the entrance chambers, the coating chamber and the exit chamber for receiving and advancing the frames and substrates therethrough so that the frames carrying the substrates and the substrates are maintained in a generally horizontal position in at least the coating chamber with the bottom sides of the substrates being exposed to the vapor stream from the source, said driven conveyor assembly in the coating chamber having a horizontal supporting surface upon which said frames are adapted to rest during travel through the coating chamber, said separate driven conveyor in said coating chamber being driven at a substantially uniform slow speed, said valve means being movable to open positions to permit said frames to pass therethrough, said separate driven conveyor assemblies in said entrance chamber and said exit chamber being capable of being driven at a fast speed in comparison to said slow speed and frame spacing means including means having a plurality of sensing elements in excess of two adapted to be actuated by the frames for sensing the spacing between frames for controlling the operation of the conveyor assemblies whereby a frame is moved rapidly out of the entrance chamber toward the coating chamber until a predetermined spacing exists between it and the preceding frame for maintaining a predetermined minimum spacing between the frames during their travel through the coating chamber.

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**4,015,559**

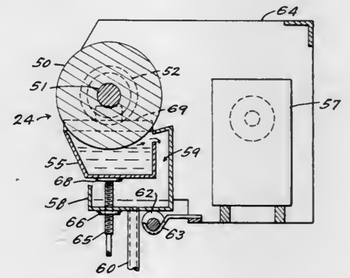
## APPARATUS FOR COATING CONTINUOUSLY PRODUCED FILAMENTS

**James H. Sears, and James Newton Holloway, Jr., both of Anderson, S.C., assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio**

**Filed Jan. 13, 1975, Ser. No. 540,738**

**Int. Cl.² B05C** *1/08*

**U.S. Cl. 118—259** **10 Claims**



1. Apparatus for applying liquid to filaments comprising:

an open topped container for holding liquid to be applied to filament the sidewall of the container on the side of filament travel defining an upper edge at the opening of the container;

a rotatable mounted applicator member positioned proximate the opening to transfer liquid from the container to filaments passed across the member, the member being mounted with its surface in immediately adjacent spaced apart relationship to the upper edge of the open topped container on the side of filament travel, and,

a screw having one end in contact with the container, the screw adapted to position the container with respect to the member so as to modify the spaced relationship between the upper edge of the container and the surface of the member to keep a sufficiently close spaced apart relationship to restrict air flow into the container from air movement caused by filament travel.

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**4,015,560**

## APPLICATION OF GASKET-FORMING MATERIAL TO WORKPIECES

**William A. Paul, 1808 Parkside Blvd., Toledo, Ohio 43607**

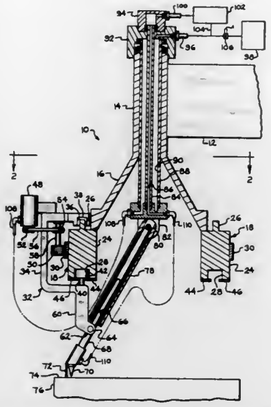
**Filed Jan. 12, 1976, Ser. No. 648,394**

**Int. Cl.² B05C** *5/02*

**U.S. Cl. 118—323** **14 Claims**

1. Apparatus for applying a bead of gasket-forming material along a mateable surface of a workpiece, said apparatus comprising a track located in a predetermined position relative to the mateable surface of the workpiece, said track having a shape generally the same as the shape desired for the bead to be applied to the mateable surface of the workpiece, a gasket-forming material nozzle carried by said track and directed

toward the mateable surface of the workpiece, means for supplying gasket-forming material to said nozzle, and means



for moving said nozzle along the track and along a determined path relative to the workpiece.

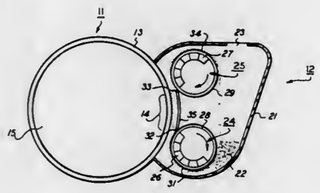
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**4,015,561**

## ANTI-GRAVITATIONAL CASCADE DEVELOPMENT FOR ELECTROSTATIC PROCESSORS

**Willard L. Howard, Marion, and Ryland F. Rogers, Webster, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.**

**Filed Dec. 12, 1974, Ser. No. 532,084**
**Int. Cl.² G03G *13/09***
**U.S. Cl. 118—654** **11 Claims**



1. A development system for developing latent electrostatic images carried by an image bearing member with developer including toner particles and ferromagnetic carrier particles as said member moves through a substantially magnetic field free development zone having an upper side and a lower side; said system comprising the combination of

a sump for storing a supply of said multi-component developer,

first magnetic means positioned between said sump and the lower side of said development zone for feeding developer from said sump and propelling said developer upwardly into and through said development zone, and

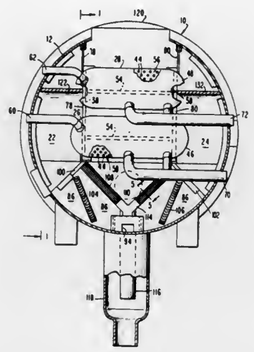
second magnetic means positioned between said sump and the upper side of said development zone for capturing excess developer emerging from said development zone and returning said excess developer to said sump.

**4,015,562**

## MOISTURE SEPARATOR AND REHEATER

**Hrant Harry Yousoufian, Montclair, N.J., assignor to Foster Wheeler Energy Corporation, Livingston, N.J.**

**Filed July 25, 1975, Ser. No. 599,214**
**Int. Cl.² F22G *1/00***
**U.S. Cl. 122—483** **6 Claims**



1. Apparatus for separating moisture from and reheating steam comprising:

a horizontally elongated casing;

a pair of side plates extending upward and longitudinally in said casing;

a bundle of tubes between said plates for flowing heating vapor;

a steam inlet at one end of said apparatus;

a steam outlet through said shell above and between said pair of side plates;

a steam baffle bridging said plates adjacent to said steam inlet so that steam coming in through said steam inlet will impinge against said baffle to separate into two streams, each of said streams flowing between one of said side plates and said casing;

a plurality of first vanes parallel to each other and a plane perpendicular to the longitudinal axis of said apparatus, each of said vanes extending downward from said side plates;

a pair of zig-zag moisture separators below said bundle of tubes, said separators each extending downward and inward from said side plates;

a plurality of second vanes, parallel to each other and the longitudinal axis of said apparatus, said second vanes being positioned between said moisture separators and said first vanes so that steam from said streams will be deflected inward and downward by said first vanes and then upward and inward by said second vanes to approach said separators at an angle substantially perpendicular to said separators and then flow up across said tubes and out of said apparatus through said vapor outlet, each of said second vanes being curved over its width to substantially conform to the path said stream takes while travelling between said second vanes; and

a pair of top plates, each of said top plates extending between one of said side plates and said shell to define the top of one of said streams, each of said top plates being inclined downward away from said steam inlet so that the steam flowing in said streams will move at a substantially uniform velocity.

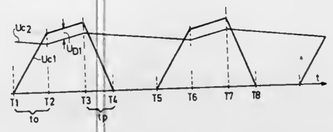


**4,015,563**

## STABILIZED FUEL INJECTION SYSTEM

**Ulrich Drews, Vaihingen-Pulverdingen; Lothar Winkelmann, Ludwigsburg, and Peter Werner, Stuttgart, all of Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany**

**Filed Aug. 27, 1975, Ser. No. 608,211**
**Claims priority, application Germany, Sept. 23, 1974, 2445317**
**Int. Cl.² F02B *3/00***
**U.S. Cl. 123—32 EH** **9 Claims**



1. In a fuel injection system for an internal combustion engine (1) having at least one fuel injection valve (2, 7) controlling flow of fuel to the engine during the opening time of the valve;

means (20, 21, 22) generating an electrical pulse in synchronism with rotation of the engine, said pulse having a pulse duration representative of speed of the engine;

a main capacitor (C1);

a charge circuit (A) controlled by the pulse generating means connected to charge the main capacitor (C1) during said pulse;

a discharge circuit (E) controlled by an operating parameter of the engine connected to discharge said main capacitor (C1) at a rate controlled by said engine operating parameter, and generating a timing pulse during the time of discharge of said main capacitor (C1);

and connecting circuit means (24, 25, 10) applying an opening pulse to the fuel injection valve, or valves (2, 7) having a time duration controlled at least in part by said timing pulse;

a stabilization circuit (29) to stabilize the charge rate of the maincapacitor (C1) under transient engine operating conditins comprising

an auxiliary capacitor (C2);

a charge circuit (L) connected to the auxiliary capacitor (C2);

and a diode coupling the auxiliary capacitor in parallel with the main capacitor (C1), the diode being poled to permit current flow from the main capacitor to the auxiliary capacitor when the voltage across the main capacitor exceeds the voltage across the auxiliary capacitor to thereby decrease the rate of charge on the main capacitor as supplied by said main capacitor charge circuit (A).

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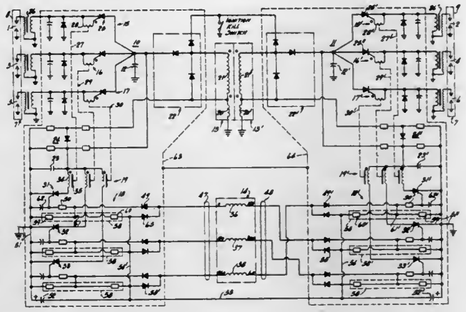
**4,015,564**

## IGNITION SYSTEM FOR INTERNAL-COMBUSTION ENGINES HAVING TIMING STABILIZING MEANS

**Arthur O. Fitzner, Fond du Lac, Wis., assignor to Brunswick Corporation, Skokie, Ill.**

**Filed Aug. 14, 1974, Ser. No. 497,319**
**Int. Cl.² F02P *5/04***
**U.S. Cl. 123—117 R** **24 Claims**

1. In an ignition system for an internal combustion engine employing a triggered switch means for periodically transferring energy to a spark plug, said triggered switch means including an input means having a threshold forward switching level and a reverse blocking level, an improvement in an engine driven triggering signal source and its interconnecting circuit developing time spaced actuation of said switch means adapted to be connected to an engine and comprising, source means having an input means adapted to be driven in synchronism with said engine and connected to the switch means, said source means establishing an output signal operable to actuate said switch means, bias signal means connected in circuit with the source means and said switch means and establishing a modifiying bias signal applied substantially proportional to the output of the source means and utilizing a significant portion of the bias signal to modify the output signal from said source means during triggering periods to establish an effective variable threshold forward switching level essentially matched to the output voltage of the source and thereby maintain a constant triggering train for varying speed of said source means,



said bias signal level rising significantly above said reverse blocking level of said switch means, signal limiting means connected across said bias means and across the input means and including voltage divider means having intermediate tap connected to said input means for impressing only a portion of the bias signal as a reverse voltage on said input means of said triggered switch means in the interval between triggering periods, said reverse voltage being limited to a value essentially below the reverse blocking level of the switch means.

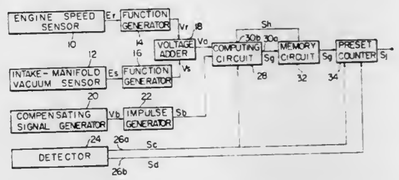
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**4,015,565**

## SPARK-ADVANCE CONTROL APPARATUS FOR INTERNAL COMBUSTION ENGINE

**Shigeo Aono, Tokyo; Kenji Ikeura, Yokohama, and Yoshitaka Hata, Fujisawa, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan**

**Filed June 12, 1975, Ser. No. 586,214**
**Claims priority, application Japan, June 21, 1974, 49-70288**
**Int. Cl.² F02P *1/00***
**U.S. Cl. 123—117 D** **11 Claims**




1. An apparatus for controlling spark advance in an internal combustion engine having an output shaft and an intake manifold, the apparatus comprising, in combination:

analog signal generating means responsive to output speed of the engine and to vacuum in said engine intake manifold for producing an analog signal which varies with detected engine output speed with the detected intake manifold vacuum in accordance with respective predetermined schedules,

digital signal generating means responsive to preselected operating parameters which affect performance characteristics of the engine for producing a first train of impulses with a frequency related to said parameters,

detecting means responsive to rotational motion of the output shaft of the engine for producing a second train of impulses each representative of a timing at which a respective piston in each cylinder of said engine reaches a predetermined position relative to its associated engine

cylinder and a third train of impulses having a frequency proportional to angular displacement of said output shaft,

a computing circuit coupled to said detecting means to said digital signal generating means and to said analog signal generating means and responsive to each of the impulses of said second train of impulses from said detecting means for passing therethrough impulses of said first train of impulses from said digital signal generating means for a period of time which varies with the analog signal from said analog signal generating means in accordance with a predetermined schedule,

a memory circuit for temporarily registering the impulses passed through said computing circuit from said digital signal generating means during each time interval between the impulses of said second train of impulses from said detecting means, and

a preset counter circuit connected to said detecting means and to said memory circuit and responsive to signals therefrom for producing a spark-advance control signal at a timing which is advanced in proportion to that number of impulses registered in said memory circuit from said digital signal generating means in a time period immediately preceding each of said time intervals between the impulses of the second train of impulses from said detecting means and to the frequency of the impulses of the third train of impulses from said detecting circuit impressed on the counter circuit during each of said time intervals.

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**4,015,566**

## ELECTRONIC IGNITION CONTROL SYSTEM FOR INTERNAL COMBUSTION ENGINES

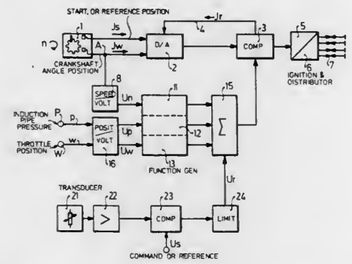
**Josef Wahl, Stuttgart, Germany, assignor to Robert Bosch G.m.b.H., Stuttgart, Germany**

**Filed June 17, 1975, Ser. No. 587,627**

**Claims priority, application Germany, July 29, 1974, 2436421**

**Int. Cl.² F02Q** *5/04*

**U.S. Cl. 123—117 R** **14 Claims**




**1.** Electronic ignition system for internal combustion engines to control the timing of ignition instant with respect to engine crankshaft position having

sensing means (**1, 8; 16**) generating at least one sensing signal representative of an engine operation parameter;

at least one function generator (**11, 12, 13**) connected to and controlled by the respective signal generating means and generating a signal representative of ignition timing in dependence on the respective parameter being sensed;

means (**3, 5, 6, 15**) connected to and controlled by said function generator and providing an ignition trigger signal at a predetermined instant of time with respect to engine crankshaft position; and

a closed control loop (**3, 5, 6, 7, 19, 20, 21, 21′, 23, 24**) including

a. the engine (**19**) itself,

b. a transducer (**21, 21′**) responsive to an actual engine operating condition varying with variation in ignition timing and providing an operating signal,

c. means (Us, **35, 36**) providing a command reference signal representative of a commanded engine operating condition,

d. a comparator (**23**) having the operating signal applied thereto and comparing said operating signal with the predetermined command reference signal (Us) and providing an error output signal (Ur),

the error output signal being applied as a superimposed additional control signal to said ignition trigger signal providing means (**3, 5, 6, 15**) to additionally affect ignition timing in accordance with the error signal in said loop.

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**4,015,567**

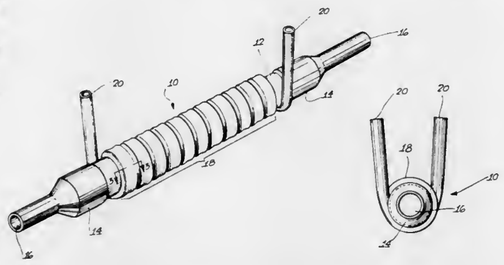
## GASOLINE PREHEATER

**Gary Zabenskie, Waterloo, Canada, assignor to Jan Wassing, Kitchener, Canada**

**Filed May 12, 1975, Ser. No. 576,410**

**Int. Cl.² F02M** *31/00*

**U.S. Cl. 123—122 E** **10 Claims**



**1.** A gasoline pre-heater in combination with a liquidcooled internal combustion engine, the pre-heater comprising a coil of copper tubing through which gasoline is passed prior to supply to the internal combustion engine for combustion, said tubing coil being in tensioned contact about a copper cylinder through which internal combustion engine coolant is passed and fixed adjacent each tubing coil end to the cylinder, and wherein the cylinder contacting tubing of the tubing coil has a cross-sectional configuration substantially that of a centrally waisted ellipse.

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**4,015,568**

## INTAKE MANIFOLD PRESSURE REGULATOR OF INTERNAL COMBUSTION ENGINE

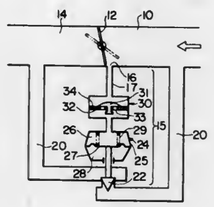
**Masakazu Horiye, Tokyo; Kenichi Sasaki, and Mitsutaka Konno, both of Yokohama, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan**

**Filed Sept. 12, 1975, Ser. No. 612,864**

**Claims priority, application Japan, Sept. 17, 1974, 49-11863**[U]

**Int. Cl.² F02M** *23/04*, *7/12*

**U.S. Cl. 123—124 R** **5 Claims**



**1.** An intake manifold pressure regulator of an internal combustion engine having an induction passage and an intake manifold communicable through a throttle valve, comprising a



port means so located and arranged that substantially atmospheric pressure prevails at said port means when the throttle valve is in its fully closed position, while the pressure at said port means drops below the atmospheric as the throttle valve moves to an open position; a by-pass around and exclusive of said throttle valve; a by-pass valve in said by-pass; means operatively connected to said by-pass valve and being responsive at a predetermined retard to the substantially atmospheric pressure at said port means for closing said by-pass valve to prevent by-passing around and exclusive of said throttle valve.

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**4,015,569**

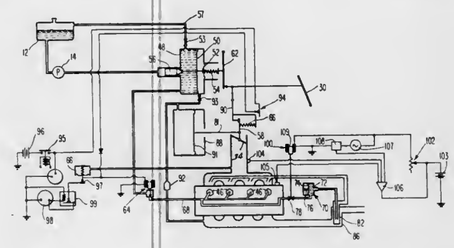
## FUEL METERING AND VAPORIZING SYSTEM FOR INTERNAL COMBUSTION ENGINES

**Ervin Leshner, and Michael D. Leshner, both of Cherry Hill, N.J., assignors to Fuel Injection Development Corporation, Bellmawr, N.J.**

**Filed Jan. 7, 1976, Ser. No. 647,120**

**Int. Cl.² F02M** *7/18*, *31/02*

**U.S. Cl. 123—133** **28 Claims**



**1.** A charge forming system for an internal combustion engine including at least one cylinder and having an inlet manifold including a throttle member, comprising:

manual control means;

transducer means adapted to be coupled to the engine for providing a manifestation of changes in developed engine power;

regulating means for controlling the flow of fuel and air to the engine, said regulating means being coupled to said manual control means and said transducer means and responsive to the latter to progressively change the fuel-to-air ratio of the charge supplied to the engine in a fixed direction as a consequence of a manifested change in developed engine power and continuing the progressive change in fuel-to-air ratio until the manifested change in developed engine power ceases; and

vaporizing means coupled to said regulating means and adapted to be coupled in heat transfer relation to the engine for receiving and vaporizing liquid fuel.

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**4,015,570**

## LIQUID-FUEL VAPORIZER

**S. Smith Sommerville, 6305 Old Stage Road, Raleigh, N.C. 27603**

**Filed July 28, 1975, Ser. No. 599,889**

**Int. Cl.² F02M** *31/00*

**U.S. Cl. 123—133** **9 Claims**

**1.** A fuel vaporizing apparatus adapted to work in conjunction with an internal combustion engine or the like to vaporize fuel and mix the same with a system of air passing therethrough to form an air-fuel mixture, said fuel vaporizing apparatus comprising:

a. a housing means adapted to receive and channel a system of air therethrough;

b. spray nozzle means projecting interiorly of said housing means for spraying fuel in an atomized state interiorly of said housing means wherein the fuel vapor resulting from the atomized fuel mixes with air of the system of air passing through said housing means to form an air-fuel mixture;

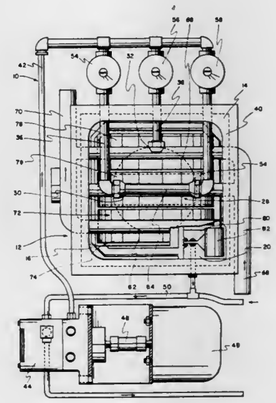
c. a fuel supply system including pump means operatively connected between a source of fuel and said nozzle means for supplying fuel to said nozzle means;

d. control means operatively connected and associated with said nozzle means for selectively controlling the quantity of fuel expelled from said nozzle means;

e. baffle means disposed below said nozzle means and in the path of the air-fuel mixture for intercepting droplets of fuel not substantially vaporized and for urging said fuel droplets from the passing air-fuel mixture;

f. means for capturing said fuel droplets not substantially vaporized and intercepted by said baffle means and for returning the fuel of said fuel droplets back to said fuel supply system where the same can be rerouted through said nozzle means;

g. heating means disposed interiorly of said housing means for assisting in the vaporization of fuel passing through said housing means; and wherein said control means is operatively connected to a throttle plate that effectively

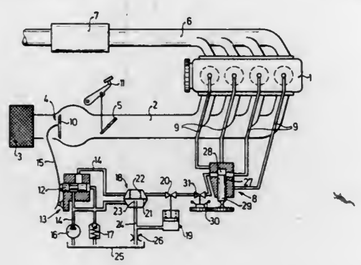


controls the volumetric rate of air passing through said fuel vaporizing apparatus, and wherein said control means is responsive to the angular positioning of said throttle plate for controlling the quantity of fuel expelled from said nozzle means, and wherein said nozzle means includes a plurality of separate nozzles operatively connected to said fuel supply system and projecting interiorly of said housing means; and wherein said control means comprises a series of solenoid switches wherein each solenoid switch is operatively connected to one respective nozzle and operative to open and close the same, and a step switching mechanism operatively connected to each of said solenoid switches and responsive to the angular position of said throttle plate for activating certain solenoid switches as said throttle plate is rotated from a closed position to a completely opened position such that as the angular position of said throttle plate is changed respective solenoid switches are particularly actuated to open or close respective nozzles and to consequently vary the quantity of fuel being expelled into said housing means relative to the angular position of said throttle plate.

## 4,015,571
## FUEL-AIR MIXTURE CONTROLLER FOR INTERNAL COMBUSTION ENGINES

**Gerhard Stumpp, Stuttgart, Germany, assignor to Robert Bosch G.m.b.H., Stuttgart, Germany**

**Filed Feb. 20, 1975, Ser. No. 551,498**
**Claims priority, application Germany, Mar. 1, 1974, 2409775**
**Int. Cl.² F02M *39/00***
**U.S. Cl. 123—139 AW** **8 Claims**



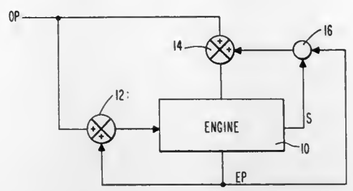
1. A fuel-air ratio regulator for an internal combustion engine, comprising:
   a. an air induction tube;
   b. a fuel injection pump;
   c. a primary fuel pump;
   d. a fuel line connecting the primary fuel pump to the fuel injection pump;
   e. an air quantity measuring member, having a portion thereof disposed in said air induction tube for displacement therein under the influence of an air stream drawn into said air induction tube;
   f. means mounting said air quantity measuring member for effecting the displacement within said air induction tube;
   g. first fuel control means, connected in the fuel line between said primary fuel pump and said fuel injection pump and actuated by said air quantity measuring member; and
   h. second fuel control means, connected in the fuel line between said first fuel control means and said fuel injection pump and actuatable by said first fuel control means so that said second fuel control means meters out a fuel quantity which maintains a predetermined desired fuel-air ratio wherein said first fuel control means includes:
      i. a fuel valve with a movable valve member actuated mediately by said air quantity measuring member, whereby motions of said movable valve member tend to produce changes in the pressure gradient across said fuel valve which are counteracted by said fuel control means, and the flow cross section of said fuel valve corresponds to the air quantity aspirated by the engine;
      ii. a differential pressure valve connected both upstream and downstream of said fuel valve; and
      iii. a servo motor connected in the fuel line between said pressure differential valve and said second fuel control means, said servo motor being actuated by said differential pressure valve to influence the operation of said second fuel control means.

## 4,015,572
## CHARGE FORMING SYSTEM FOR INTERNAL COMBUSTION ENGINES

**Ervin Leshner, and Michael D. Leshner, both of Cherry Hill, N.J., assignors to Fuel Injection Development Corporation, Bellmawr, N.J.**

**Filed Jan. 7, 1976, Ser. No. 647,326**
**Int. Cl.² F02M *7/18*; F02B *17/00*, *3/02***
**U.S. Cl. 123—139 AW** **40 Claims**

1. A charge forming system for optimizing the air-to-fuel ratio of an internal combustion engine, comprising:
   control means for varying the flow of fuel and air to the engine;
   means adapted to be coupled to the engine for producing a manifestation of delivered engine power;

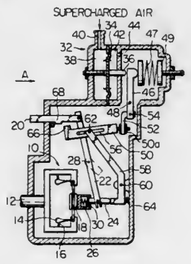



   servo means coupled to said control means for progressively monotonically altering the air-to-fuel ratio of the charge delivered to the engine in response to a manifested change in delivered engine power at least until said manifested change ceases.

## 4,015,573
## SUPERCHARGED DIESEL ENGINE FUEL INJECTION PUMP GOVERNOR ASSEMBLY

**Rikuo Okura, Kawagoe, and Yasuhide Suzuki, Okabe, both of Japan, assignors to Diesel Kiki Co., Ltd., Tokyo, Japan**

**Filed Feb. 14, 1974, Ser. No. 442,467**
**Claims priority, application Japan, Mar. 5, 1973, 48-26587[U]**
**Int. Cl.² F02D *1/04*, *1/06***
**U.S. Cl. 123—140 MP** **12 Claims**



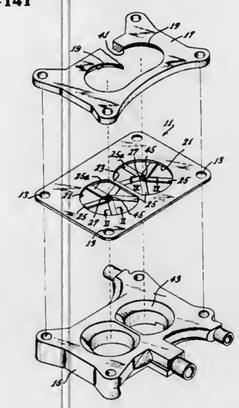

1. In an internal combustion engine having a fuel injection pump, a governor assembly for said injection pump, said governor assembly comprising:
   a control rod operatively connected to the fuel injection pump and movable from a position to provide maximum fuel injection volume for starting the engine in a direction to decrease the fuel injection volume;
   a centrifugal governor driven from the engine and operatively connected to said control rod to urge said control rod from said position of maximum fuel injection volume at zero engine speed in said direction to decrease the fuel injection volume according to a predetermined function of engine speed;
   pressure-sensitive means responsive to an engine induction air pressure and operative to limit movement of said control rod toward said position of maximum fuel injection volume to a position corresponding to a predetermined maximum fuel injection volume corresponding to sensed induction air pressure when connected to said control rod;
   a first linkage engageable with said centrifugal governor and arranged to connect said pressure sensitive means to said control rod only when sensed engine speed is above a predetermined value; and
   a second linkage to operatively connect said centrifugal governor to said control rod, including yieldable means arranged to yield only when movement of said control rod is being limited by said pressure-sensitive means to prevent breakage of said governor assembly.



## 4,015,574
## APPARATUS FOR IMPROVING FUEL-AIR MIXTURE

**Roy A. Hanff, 569 Lawrence Drive, San Luis Obispo, Calif. 93401**

**Filed Nov. 18, 1974, Ser. No. 524,885**
**Int. Cl.² F02M *29/00***
**U.S. Cl. 123—141** **25 Claims**



1. A device for improving a carbureted air-fuel mixture comprising
   a plate including
      a plurality of openings in said plate through which a carbureted air-fuel mixture may be passed, each opening spaced and segregated from all adjacent openings and having a total unobstructed area equal to that of a carburetor bore with which each opening in said plate may be aligned when said plate is employed with a carburetor,
   a plurality of spokes of triangular cross-sectional configuration radially fixedly located in each opening, each having
      a first surface against which a first portion of an air-fuel mixture passed through said opening may be deflected into a turbulent flow in a direction along a generally obtuse angle relative to the axis of said opening and
      a second surface across which a second portion of such an air-fuel mixture may be deflected into a turbulent flow in a direction generally perpendicular to the axis of said opening, and
   means for reducing the centrifugal force of such mixture portions deflected by said first and second surfaces and for ensuring mixture flow at the center of each said opening.

## 4,015,575
## INTAKE SYSTEM WITH FOCUSING MEANS

**Albert H. Fox, Village of Shoreview, Minn., assignor to Bryce J. Fox and Edna R. Fox, Village of Shoreview, Minn., part interest to each**

**Continuation-in-part of Ser. No. 417,879, Nov. 21, 1973, abandoned. This application Apr. 10, 1975, Ser. No. 566,791**
**Int. Cl.² F02M *29/00***
**U.S. Cl. 123—141** **14 Claims**

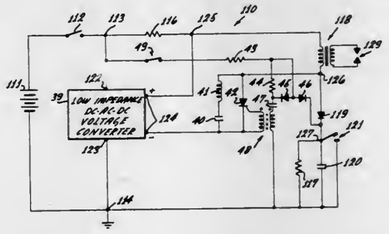
1. An intake system adapted to supply a substantially intimately blended combustible mixture to a combustion machine, said system comprising conduit means for conducting a flowing stream of fuel and air to a combustion machine, upstream air entrance means for introducing air into said conduit means, upstream fuel inlet means for introducing fluid fuel into said conduit means, and mixing means downstream from said air entrance means and from said fuel inlet means, said mixing means comprising a peripheral flow focusing structure for redirecting the flow of at least substantially all peripheral portions of said stream from vectors of generally linear flow substantially adjacent the interior surface of said conduit means to vectors of inward flow interjacently substantially converging toward a central zone removed from said interior surfaces of said conduit means and removed form said focusing structure, said converging vectors of flow being effective to cause substantially intimate blending of the air and fuel of said flowing stream, said focusing structure being characterized by comprising wall means extending inwardly within said conduit means from substantially the entire intersection between an imaginary plane substantially transverse to said conduit means and the interior surface of said conduit means, said outermost peripheral edge of said wall means being fixed to said conduit means at said intersection, at least a portion of said wall means having the form of an approximately annular rise wall spaced from said interior surface of said conduit means and extending upstream within said conduit means from said imaginary plane, said rise wall including passage means extending therethrough substantially adjacent said imaginary plane and throughout said rise wall for the flow of said stream in said substantially converging fashion through said rise wall into the said central zone.




## 4,015,576
## IGNITION SYSTEM

**Edward M. Junak, 1835 Bass, Grand Junction, Colo. 81501**

**Filed Apr. 22, 1974, Ser. No. 462,595**
**Int. Cl.² F02P *1/00***
**U.S. Cl. 123—148 E** **5 Claims**




1. In an ignition system for generating energy pulses for firing spark plugs in combustion chambers of an engine thereby igniting a combustible fuel mixture within said combustion chambers comprising:
   a. a source of electrical energy,
   b. an inductive means for generating inductive pulses for storing and releasing electromagnetic energy, and
   c. a contact breaking means for periodically making and breaking a circuit between said source of electrical energy and said inductive means whereby said inductive means receives energy from said source of electrical energy through said contact breaking means in one condition of said contact breaking means and releases said

energy to said spark plugs in a second condition of said contact breaking means, the improvement comprising:

1. a pulse generating means for generating short pulses in addition to said inductive pulses, said pulses being of short duration and having fast rise time relative to said inductive pulses,
2. combining means for combining said short pulses and said inductive pulses, and
3. means for isolating said contact breaking means from said inductive means at least for the duration of said short duration pulse,

whereby a pulse produced by an existing inductive ignition system is caused to have improved rise time and the contact breaking means are protected during a destructive portion of said pulse by the addition of the recited means, said combining means combining said short pulses having a first polarity and produced by said pulse generating means with said inductive pulses having a second polarity produced by said inductive means by coupling said pulse generator across said inductive means so that the inductive pulses and the short pulses are of opposite polarity, said isolating means being poled and connected between said inductive means and said contact breaker means for conduction responsive to said inductive pulses and for isolation responsive to said short pulses.

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**4,015,577**

## RECIPROCABLE PISTON INTERNAL COMBUSTION ENGINE, ESPECIALLY DIESEL ENGINE

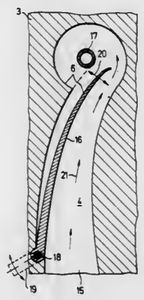
**Ludwig Elsbett, and Gunter Elsbett, both of Industriestrasse 14, D 8543 Hilpoltstein, Germany**

**Filed Aug. 22, 1973, Ser. No. 390,493**

**Claims priority, application Germany, Aug. 23, 1972, 2241355**

**Int. Cl.² F01L *3/00***

**U.S. Cl. 123—188 M** **5 Claims**



1. A reciprocable piston internal combustion engine, especially diesel engine having smoke development therewith, which includes in combination: a cylinder, a piston reciprocable in said cylinder and provided with a combustion chamber therein for receiving fuel and air for combustion, a cylinder head associated with said cylinder and comprising recess means aligned with said combustion chamber, said cylinder head also being provided with air conveying passage means leading into said recess means, valve guiding means arranged in said recess means, valve means guided in said valve guiding means for continuously controlling change in the supply of air from said recess means to said combustion chamber, and air guiding means simultaneously movably arranged within said air conveying passage means and including a movable vane pivoted at a point remote from said recess means with a free end extending toward said valve guiding means so that said free end overlies said recess means, said free end being movable to restrict the passage of air into said chamber and vary the velocity of circulating air, thereby subjecting the fuel-air mixture in the combustion chamber to a strongly defined twist during all load ranges of the internal combustion engine keeping relatively low the supply of oxygen to the combusting the fuel-air mixture in the center of the combustion chamber.

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**4,015,578**

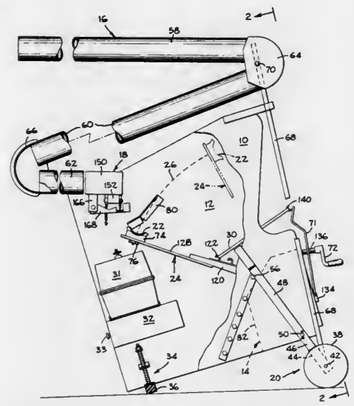
## BALL THROWING APPARATUS

**Donald W. Wright, 911 Old Orchard Road, Campbell, Calif. 95008**

**Filed Apr. 27, 1973, Ser. No. 355,152**

**Int. Cl.² F41B *3/04***

**U.S. Cl. 124—7** **6 Claims**



1. A ball-throwing apparatus comprising:
a. a flexible arm mounted for pivotal movement;
b. ball-receiving means mounted on one end of said arm;
c. means for biasing said arm along an arcuate path in one direction; and
d. means for translating the movement of said arm along said arcuate path in a direction opposite to said one direction and for releasing said arm at one extreme point along said arcuate path to permit said arm to move under the influence of said biasing means to the other extreme point of said arcuate path,
e. said ball-receiving means including a slide member having an arcuate surface, a cup having an arcuate shape with one surface conforming to the contour of the arcuate surface of said slide member, and releasable locking means joining said cup with said slide member at various peripheral positions of said cup, whereby said cup can be releasably locked in one of a plurality of peripheral positions with respect to said slide member to alter the angle trajectory of a thrown ball.

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**4,015,579**

## SPACE HEATER

**George H. Wirth, New Athens, and Sherwin L. Derby, O'Fallon, both of Ill., assignors to Autocrat Corporation, New Athens, Ill.**

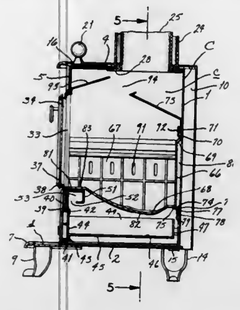
**Filed Aug. 25, 1975, Ser. No. 607,683**

**Int. Cl.² F24C *1/14***

**U.S. Cl. 126—63** **20 Claims**

1. A space heater comprising a cabinet having a rear wall, a base wall, a front wall, parallel side walls, and a top wall, said walls internally defining a combustion chamber, said front wall having a first opening, closure means provided in said first opening optionally permitting access to said combustion chamber therethrough, a pair of laterally spaced apart, upstanding side liners provided in said combustion chamber inwardly of the adjacent cabinet side walls, an upstanding back liner extending between said side liners at the rearward ends thereof and being spaced forwardly of said rear wall, said side liners and said back liner terminating at their upper ends spacedly below said cabinet top wall, a fuel-supporting, apertured grate provided spacedly upwardly of said cabinet bottom wall and cooperating with said side liners and back liner to define a firebox, the spacing between said side liners and back liner and the adjacent cabinet walls defining air passages,





said air passages being closed at their upper ends in the upper end portion of said side liners and back liners, said side liners and back liner having openings through which said firebox and said air passages communicate, exhaust means projecting upwardly of said cabinet top wall and communicating with said combustion chamber and said firebox, and means for introducing air into said cabinet beneath said grate for flow upwardly through the apertures thereof and into said air passages.

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**4,015,580**

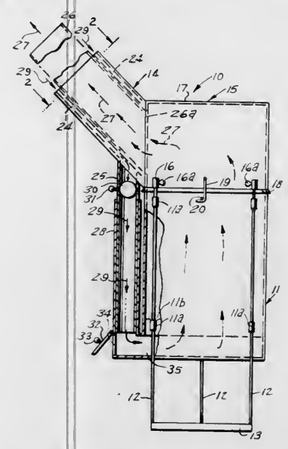
## SAFE HEATER

**Leonard V. Moore, 602 Redfield Ave., Los Angeles, Calif. 90042**

**Filed Dec. 10, 1975, Ser. No. 635,434**

**Int. Cl.² F24B *3/00***

**U.S. Cl. 126—65** **3 Claims**



1. A heater for the burning of fuels indoors, comprising, a base, a plurality of equally spaced apart legs secured to said base, a fire box elevatable on said legs of said base, a main heating chamber supported on said legs of said base, intake air and exhaust pipe means secured to said main heating chamber, and air intake pipe means secured to said fire box, wherein said exhaust pipe is secured fixedly over the opening in the side wall of said main heating chamber and said air intake pipe is secured on the outer periphery of said exhaust pipe, fixedly, and said air intake pipe intersects and is secured fixedly to air intake pipe means slideably received within an external pipe secured fixedly to said fire box, said intake pipe means slideably received therein, having adjustable damper valve means which controls the flow of fresh air into a breathing chamber secured fixedly to the bottom of said fire box, said breathing chamber having hinged door means for covering and uncovering said breathing chamber, said air travelling through fuel support means secured fixedly within said fire box.

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**4,015,581**

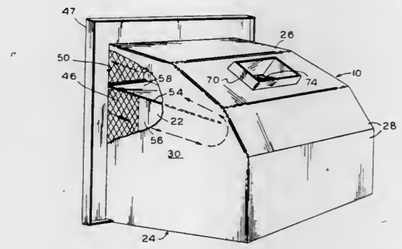
## FIREPLACE HEATER

**Donald S. Martenson, Rte. 1, Box 20-A, Beavercreek, Oreg. 97004**

**Filed Mar. 20, 1975, Ser. No. 560,218**

**Int. Cl.² F24B *1/18***

**U.S. Cl. 126—121** **2 Claims**



1. A self-contained fireplace heater adapted for insertion within existing fireplaces comprising:
a metal firebox including a firebox chimney for exhausting products of combustion from said firebox into a fireplace chimney, a front access opening for positioning at the front of a fireplace, a controllable draft opening below said access opening, and access door means for closing said access opening to retain within said firebox heat from a fire therewith,
a jacket surrounding and integral with said firebox including wall portions spaced laterally and vertically outwardly from corresponding wall portions of said firebox to provide an air conduction space between said firebox and said jacket, said jacket having an open front at the front of said firebox,
and baffle means extending transversely from opposite sidewalls of said jacket to corresponding opposite sidewalls of said firebox to subdivide said air conduction space into cold air intake passage means below said baffle means and warm air exhaust passage means above said baffle means, said baffle means providing for communication between said cold and warm air passages at the rear interior of said jacket,
said access door means comprising transparent heat-resistant front access door panel means at the front access opening of said firebox selectively operable to open and close said front access opening,
said firebox including opposite vertically extending sidewalls extending rearwardly from said front access opening, a generally vertically extending rear wall portion joining the rear ends of said opposite sidewall portions and an upper wall joining the upper ends of said sidewalls and rear and wall,
said upper wall including a front upper wall portion sloping upwardly and rearwardly from adjacent the upper end of said front access opening and a rear upper wall portion sloping downwardly and rearwardly from the rear end of said front upper wall portion to the upper end of said rear wall to provide the upper portion of said firebox with a domed effect,

said baffle means between said jacket and firebox sidewalls extending rearwardly from the upper end of said front access opening to an upper rear wall portion of said firebox so that the vertical extent of said intake passage means is substantially greater than the vertical extent of said exhaust passage means,

said intake passage means having intake openings at opposite sides of said firebox access opening extending continuously vertically from the lower ends of said firebox sidewalls to the front edges of said baffle means.

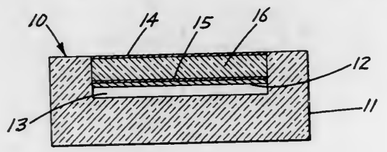
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**4,015,582**

## SOLAR HEAT COLLECTOR

**Benjamin Y. H. Liu, Minneapolis; Richard C. Jordan, and Klaus Willeke, both of St. Paul, all of Minn., assignors to The Regents of the University of Minnesota, Minneapolis, Minn.**

**Filed May 31, 1974, Ser. No. 474,941**
**Int. Cl.² F24J 3/02**
**U.S. Cl. 126—270** **14 Claims**




1. A solar heat collector comprising:

A. a heat insulative base,

B. a layer of heat absorptive material overlying said insulative base,

C. a light transmitting insulating protective covering overlying said heat absorptive material, said covering being impervious to the passage of air and functioning as an air buffer, and including:

1. an outer non-porous light transmitting sheet of air impermeable material spaced from said heat absorptive material,

2. a layer of light transmitting insulating material under said outer sheet and substantially coextensive therewith and confined within and occupying at least part of the space between said outer sheet and the heat absorptive layer, said insulating material being a lightweight packing having a myriad of gas-containing voids substantially uniformly distributed throughout the mass of the packing and sandwiched between said outer sheet an intermediate non-porous sheet of air impermeable material overlying said heat absorptive layer, and

D. passage means spaced from said insulating layer for circulating a heat transfer fluid through the collector in close proximity to said heat absorbing layer.

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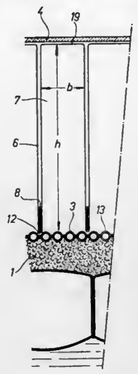
**4,015,583**

## DEVICE FOR RECEIVING OR EMITTING RADIATION ENERGY

**Nikolaus Laing, Hofener Weg 35-37, 7141 Aldingen near Stuttgart, Germany**

**Continuation-in-part of Ser. No. 370,839, June 18, 1973, abandoned. This application May 6, 1975, Ser. No. 574,881**
**Claims priority, application Austria, June 23, 1972, 5406/72**
**Int. Cl.² F24J 3/02**
**U.S. Cl. 126—270** **4 Claims**

1. An energy transmission device through which energy may pass comprising an optically active layer adapted to face the sun and a plurality of parallel extending U-shaped channels having vertically extending legs covering the side of said layer facing the sun wherein said channels are formed by a single sheet of a thin film-like radiation permeable plastic material folded along fold lines to form said U-shaped channels and having a weight means positioned exteriorly of said channels along said fold lines whereby when said channels are pressurized the plastic material will move against said weight means to form an end of a leg of said U-shaped channel, and wherein the width of said U-shaped channels is less than the height thereof to reduce convection currents within the channels.



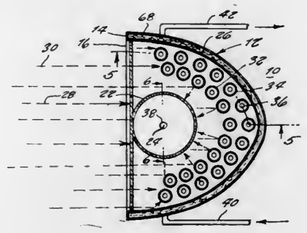

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**4,015,584**

## PARABOLIC SOLAR ENERGY HEAT EXCHANGER

**Louis B. Haberman, c/o Solarex Hydraulics Corp., 14 Lucon Drive, Deer Park, N.Y. 11729**

**Filed Aug. 18, 1975, Ser. No. 605,757**
**Int. Cl.² F24J 3/02**
**U.S. Cl. 126—271** **28 Claims**



1. A solar energy heat exchanger comprising

a. walls shaped into an open ended parabolic housing;

b. a transparent flat front plate connecting the ends of the parabolic housing and capable of passing the sun's rays therethrough into the housing, the inner surface of said parabolic housing internally reflecting at least some of the sun's rays reaching it;

c. a longitudinal focal tube positioned about the focal line of said parabolic housing, capable of retaining a fluid medium therein, and receiving both direct sun rays passing through said front plate and reflected sun rays from said inner surface of the parabolic housing; and

d. a top and bottom cover on said parabolic housing to form a complete enclosure therewith, and wherein said flat front plate is of glass material, said focal tube is of glass material, said focal tube is molded of one piece with said front plate, and said focal tube is tangential to said front plate.

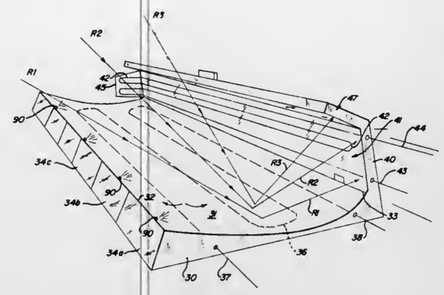


**4,015,585**

## SOLAR HEATING APPARATUS

**Arthur Fattor, 5380 S. Holly, Englewood, Colo. 80110**

**Filed Aug. 21, 1975, Ser. No. 606,558**
**Int. Cl.² F24J 3/02**
**U.S. Cl. 126—271** **8 Claims**




1. Solar heat absorbing device comprising

a. parabolic trough reflector means having its horizontally-oriented extent in straight lines and its vertical extent along a parabola, for focusing solar radiation into a narrow, linear area, which varies vertically at various seasons of the year mounted in a general horizontal position;

b. upright, generally vertical, target means depending upwardly along the length of an edge of said reflector means in position to be impinged on by the linear area reflected radiation as well as receiving direct solar radiation, and an overhang target means depending from said upright target means extending over said reflector means;

c. a plurality of lengths of fluid carrying pipes mounted on said target means to receive solar radiation and having inlet and outlet means for circulating fluid therethrough; and

d. said target and carried pipes being blackened.

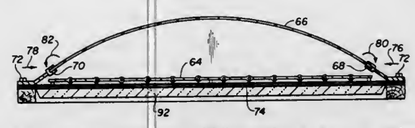
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**4,015,586**

## SOLAR WATER HEATER

**Henry J. Vroom, Commack; Warren Robert Bolle, Old Bethpage; Herbert Schneider, Plainview, and Burton Swerdling, Hauppauge, all of N.Y., assignors to Grumman Aerospace Corporation, Bethpage, N.Y.**

**Filed Jan. 12, 1976, Ser. No. 648,258**
**Int. Cl.² F24J 3/02**
**U.S. Cl. 126—271** **3 Claims**




1. A heating system for utilizing solar energy to raise the temperature of a fluid that is in turn circulated by controllable means to raise the temperature of a separate fluid, said system comprising:

solar collector means including a housing having a base insulated by glass fiber blanket on one side covered by a vinyl vapor barrier, a flat collector plate supported above the base on the other side thereof, channel dome edge restraints spaced a predetermined distance apart on each side of said base, end frames between the dome edge restraints at each end, elastomeric seals in the form of rubber extrusions mounted in a contour on a portion of the end frames above said base, cap means to stabilize and affix the seals in proper orientation on the end frames, and a flat transparent closure bowed by having its sides in the channel dome edge restraints spaced apart a width less than the closure and its ends abutting the seals under the cap means on the end frames to provide an accurate dome over the base that will with the base, edge restraints and seals on said end frames seal the collector plate environment above the base which is insulated and protected from any surface thereunder by the insulating blanket and vapor barrier between the base and surface;

a heat exchanger connected to receive a fluid from said collector plate and return same;

storage tank means for a fluid to be heated, said storage tank means having its exterior walls in heat transfer relationship with said heat exchanger and fluid inlet and outlet means for a fluid to be heated by heat transferred to the walls of said storage tank means;

pump means in the return from heat exchanger to collector plate for circulating a fluid between said heat exchanger and said solar collector means;

flow directing valve means to prevent return flow from heat exchanger to collector plate in the means connected to permit the heat exchanger to receive fluid from said collector plate;

a pressurized expansion tank in the return from the heat exchanger to said solar collector means for fluid expansion and replenishment within a closed circuit of collector plate and heat exchanger; and

a differential temperature controller including temperature sensors in the solar collector means for obtaining temperature of fluid in the collector plate and in the storage tank means for obtaining temperature of fluid therein and relay means responsive to the sensors for a switch to control operation of said pump means and thereby the circulation of fluid used to raise the temperature of the fluid inside the walls of said storage tank means by heating said walls from said heat exchanger.

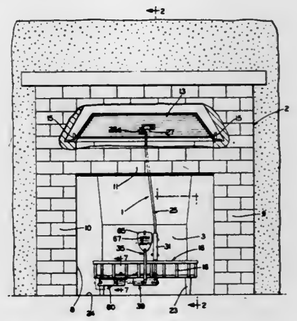
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**4,015,587**

## FIREPLACE DAMPER OPERATING MECHANISM

**Walter R. Wincek, 3251 Alpine St., NE., Canton, Ohio 44721**

**Filed Mar. 11, 1976, Ser. No. 666,144**
**Int. Cl.² F23L 11/00**
**U.S. Cl. 126—286** **9 Claims**



1. Fireplace damper operating mechanism for a fireplace of the type having a firebox and chimney flue including:

a. a damper plate pivotally mounted within the chimney flue for swinging movement between open and closed positions;

b. connecting rod means extending generally vertically downwardly from the damper plate, said connecting rod means having upper and lower ends with said upper end being operatively connected to the damper plate;

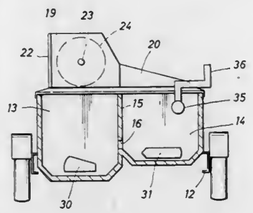
c. grate means located generally beneath the damper plate within the firebox;

d. latch means mounted on the front portion of the grate means;

e. generally L-shaped control rod means having first and second leg portions with said first leg portion being rotatably mounted on the grate means and extending generally horizontally centrally beneath the grate means between the front and rear of the firebox;
f. link means operatively connecting the rear end of said first leg portion to the lower end of the connecting rod means;
g. the second leg portion of the control rod means being located centrally in front of the grate means and adapted to swing through an approximate 90° arc between damper closed and open indicating positions, said second leg portion extending generally vertically upwardly in front of and above the grate means when in closed damper indicating position and extending generally horizontally along the front of the grate means and engageable with the latch means when in damper open indicating position to latch the control rod means in damper open position; and
h. movement of the second leg portion through the 90° arc rotates the control rod means to move the connecting rod means vertically to swing the damper plate between open and closed positions through the link means connection.

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**4,015,588**
**TAR KETTLE**
**Curtis R. Blackwell, San Antonio, Tex., assignor to Reeves Roofing Equip. Co., Inc., San Antonio, Tex.**
**Filed June 2, 1976, Ser. No. 697,934**
**Int. Cl.² E01C *19/45*; F24H *1/00***
**U.S. Cl. 126—343.5 A** **4 Claims**

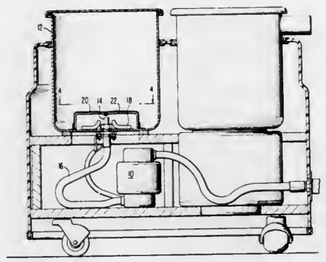



1. In a pollution-control kettle for heating tar and the like, the combination comprising:
a pair of generally adjacent portable vats;
means for selectively heating tar in each of said vats to different temperatures so as to provide a low temperature vat and a high temperature vat;
means for providing closed covers for said vats to retard escape of noxious gases therefrom;
means for introducing cold tar into said low temperature vat;
conduit means extending between said vats at a level substantially below the normal liquid levels of said vats for providing free gravity flow of liquid tar from said low temperature vat to said high temperature vat;
and means for removing heated tar from said high temperature vat without removing said cover means therefrom, whereby the escape of noxious gases from said vats is retarded.

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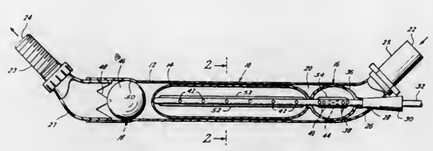
**4,015,589**
**STEAM CLEANER PROTECTION SCREEN**
**James M. Wimsatt, Carson City, and Carl Parise, Reno, both of Nev., assignors to Parise & Sons, Inc., Reno, Nev.**
**Filed Jan. 20, 1976, Ser. No. 650,647**
**Int. Cl.² A47L *5/00***
**U.S. Cl. 126—344** **2 Claims**

1. In a steam cleaner for cleaning rugs, upholstry, and the like, said steam cleaner comprising: a soap tank adapted to contain a mixture of water and detergent during use of the steam cleaner, said tank including a bottom wall and a tubular electrical resistance heater element in the form of an open loop, single turn coil overlying the bottom wall of the soap tank for heating the mixture of water and detergent contained in the soap tank during use of the steam cleaner, and a tank outlet tube projecting through the bottom wall of the tank within the confines of said heater element, the improvement comprising an inverted cup-shaped screen, facing said bottom wall and overlying said heater element and outlet tube, an annular rim surrounding the periphery of the screen adjacent its open end, spring tabs fixed to said rim at circumferentially spaced positions and extending radially therefrom, spring clips fixed to the bottom wall of said soap tank at positions corresponding to said spring tabs on said screen on opposite sides of said resistance heater element with portions overlying the radially projecting ends of said tabs of said inverted cup-shaped cylindrical screen such that, said screen is pervious to the mixture of water and detergent contained in the soap tank during the use of the steam cleaner, and impervious to the fingers of users of the steam cleaner and of implements which may be inserted within said tank and acts simultaneously to filter foreign objects such as cigarette butts which may be introduced into the soap tank during use of the steam cleaner and wherein, said cup-shaped screen may be readily removed by rotating said screen to detach said tabs from said spring clips.



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**4,015,590**
**BALLOON ACTIVATED BLOOD PUMP**
**Nils A. Normann, Houston, Tex., assignor to Baylor College of Medicine, Houston, Tex.**
**Filed Apr. 12, 1976, Ser. No. 675,848**
**Int. Cl.² A61B *19/00***
**U.S. Cl. 128—1 D** **14 Claims**



1. A heart assist blood pump comprising,
a tubular conduit having an inlet and an outlet for connection with the circulatory system of the body,
a sealable opening in the conduit between the inlet and the outlet,
a gas line extending from the outside of said conduit through the opening and into the conduit,
an inflatable pump balloon positioned in the conduit and connected to the gas line, and the inside of the balloon in communication with the line for receiving gas from the line and inflating with positive line pressure and deflating with decreased line pressure thereby creating a pumping action in the conduit, the inflated balloon having an outside diameter smaller than the inside diameter of the portion of the conduit in which the balloon is positioned,
an inlet valve positioned in the conduit between the balloon and the conduit inlet, and
an outlet valve positioned in the conduit between the balloon and the conduit outlet.

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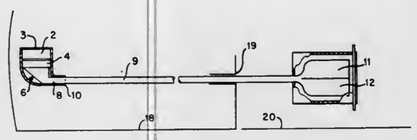


**4,015,591**
**CHOLESTERIC LIQUID CRYSTALLINE PHASE MATERIAL-DYE COMPOSITION AND VENAPUNCTURE METHOD EMPLOYING THE COMPOSITION**
**Fred K. Suzuki, Arlington Heights, and Thomas W. Davison, Streamwood, both of Ill., assignors to Liquid Crystal Products, Inc., Arlington Heights, Ill.**
**Filed Feb. 17, 1976, Ser. No. 658,407**
**Int. Cl.² A61B *10/00***
**U.S. Cl. 128—2 R** **20 Claims**

12. A method of effecting vanapuncture in the human body which comprises:
a. in any order, (1) cooling the skin over a venous area of the body, and (2) applying directly on the skin over said area a layer about 100 to 300 microns thick of a composition having thermal color responsive characteristics, said layer exhibiting improved color contrast and high color intensity, said composition comprising an enantiotropic cholesteric liquid crystalline phase material exhibiting a mesophase color change at a temperature reached by the skin upon rewarming due to venous blood flow, and at least two oil-soluble dyes dissolved in said material in a total dye concentration of 0.01–1% by weight of the composition, each of said dyes reflecting light of a different wave length in the range of 400 to 700 nanometers, and said dyes together absorbing light of substantially all wave lengths within said range;
b. allowing the skin over said area to rewarm due to venous blood flow, until said material exhibits a mesophase color change to thereby delineate a vein therebeneath; and
c. directing an instrument for venapuncture to a site in said area indicated by said delineation to constitute the location of a vein.

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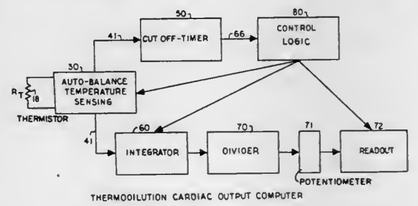
**4,015,592**
**NUCLEAR MEDICINE SYSTEM FOR IMAGING RADIATION**
**Patrick Ralph Bradley-Moore, 510 E. 86th St., New York, N.Y. 10028**
**Continuation-in-part of Ser. No. 536,200, Dec. 24, 1974, abandoned. This application June 12, 1975, Ser. No. 586,170**
**Int. Cl.² A61B *6/00***
**U.S. Cl. 128—2 A** **21 Claims**




1. A nuclear medicine device for forming a nuclear radiation image at a location inside an animal body and for transmitting a representation of said image to a location outside the body comprising:
a front end comprising means for forming, at a location inside an animal body, a two-dimensional image of a selected nuclear radiation pattern; and
a middle part comprising means interfacing with the front end to receive therefrom a two-dimensional representation of the nuclear radiation pattern image formed therein and adapted to extend to a location outside the body to transmit the received two-dimensional representation thereto.
18. A nuclear medicine method of examining a selected portion of an animal body comprising the steps of:
causing said selected portion of the body to form a nuclear radiation pattern;
introducing into the animal body a device for detecting nuclear radiation and forming by said device, at a location inside the body, a two-dimensional image of said nuclear radiation pattern; and
transmitting a two-dimensional representation of said image formed of the two-dimensional nuclear radiation pattern to a location outside the body.

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**4,015,593**
**APPARATUS AND METHOD FOR MEASURING CARDIAC OUTPUT**
**Virgil B. Elings, 5680 Via Salerno, Goleta, Calif. 93017, and David T. Phillips, 5107 Calle Asilo, Santa Barbara, Calif. 93111**
**Filed Mar. 24, 1975, Ser. No. 561,650**
**Int. Cl.² A61B *5/02***
**U.S. Cl. 128—2.05 V** **18 Claims**



THERMODILUTION CARDIAC OUTPUT COMPUTER

4. An autobalance circuit for sensing the temperature changes of a flowing blood-injectate mixture for use in equipment for measuring cardiac output by thermal dilution, the autobalance circuit including
a thermally variable resistor for detecting the temperature of the blood-injectate mixture in accordance with the resistance of the variable resistor,
a source of current coupled to the variable resistor for producing a voltage drop across the variable resistor in accordance with the resistance of the variable resistor,
first means coupled to the variable resistor and responsive to the change in the voltage drop across the variable resistor for producing an output voltage in accordance with the change in the voltage drop across the variable resistor, and
wherein the first means includes a source of reference voltage and a means for subtraction coupled to the source of reference voltage and to the voltage drop across the variable resistor for producing the output voltage from the first means in accordance with subtraction of the source of reference voltage from the voltage drop across the variable resistor,
a feedback loop coupled to the first means and responsive to the output voltage from the first means for producing a feedback signal having a value for providing a zero output voltage from the first means to initially balance the circuit and with the feedback loop including means for decoupling the output voltage from the first means to the feedback loop after the production of te zero output voltage from the first means and with the feedback loop including a holding control for maintaining the same value for the feedback signal after the output signal from the first means is decoupled for providing after the initial balance an output signal from the first means only in accordance with changes in the voltage drop across the variable resistor.
10. Apparatus for terminating the integration of a time-temperature curve for use in equipment for measuring cardiac

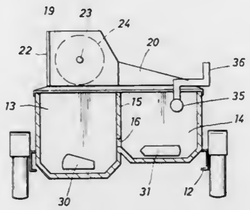
e. generally L-shaped control rod means having first and second leg portions with said first leg portion being rotatably mounted on the grate means and extending generally horizontally centrally beneath the grate means between the front and rear of the firebox;
f. link means operatively connecting the rear end of said first leg portion to the lower end of the connecting rod means;
g. the second leg portion of the control rod means being located centrally in front of the grate means and adapted to swing through an approximate 90° arc between damper closed and open indicating positions, said second leg portion extending generally vertically upwardly in front of and above the grate means when in closed damper indicating position and extending generally horizontally along the front of the grate means and engageable with the latch means when in damper open indicating position to latch the control rod means in damper open position; and
h. movement of the second leg portion through the 90° arc rotates the control rod means to move the connecting rod means vertically to swing the damper plate between open and closed positions through the link means connection.

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**4,015,588**
**TAR KETTLE**

**Curtis R. Blackwell, San Antonio, Tex., assignor to Reeves Roofing Equip. Co., Inc., San Antonio, Tex.**

**Filed June 2, 1976, Ser. No. 697,934**
**Int. Cl.² E01C *19/45*; F24H *1/00***
**U.S. Cl. 126—343.5 A** **4 Claims**




1. In a pollution-control kettle for heating tar and the like, the combination comprising:
a pair of generally adjacent portable vats;
means for selectively heating tar in each of said vats to different temperatures so as to provide a low temperature vat and a high temperature vat;
means for providing closed covers for said vats to retard escape of noxious gases therefrom;
means for introducing cold tar into said low temperature vat;
conduit means extending between said vats at a level substantially below the normal liquid levels of said vats for providing free gravity flow of liquid tar from said low temperature vat to said high temperature vat;
and means for removing heated tar from said high temperature vat without removing said cover means therefrom, whereby the escape of noxious gases from said vats is retarded.

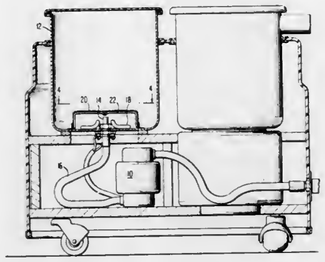
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**4,015,589**
**STEAM CLEANER PROTECTION SCREEN**

**James M. Wimsatt, Carson City, and Carl Parise, Reno, both of Nev., assignors to Parise & Sons, Inc., Reno, Nev.**

**Filed Jan. 20, 1976, Ser. No. 650,647**
**Int. Cl.² A47L *5/00***
**U.S. Cl. 126—344** **2 Claims**

1. In a steam cleaner for cleaning rugs, upholstry, and the like, said steam cleaner comprising: a soap tank adapted to contain a mixture of water and detergent during use of the steam cleaner, said tank including a bottom wall and a tubular electrical resistance heater element in the form of an open loop, single turn coil overlying the bottom wall of the soap tank for heating the mixture of water and detergent contained in the soap tank during use of the steam cleaner, and a tank outlet tube projecting through the bottom wall of the tank within the confines of said heater element, the improvement comprising an inverted cup-shaped screen, facing said bottom wall and overlying said heater element and outlet tube, an annular rim surrounding the periphery of the screen adjacent its open end, spring tabs fixed to said rim at circumferentially spaced positions and extending radially therefrom, spring clips fixed to the bottom wall of said soap tank at positions corresponding to said spring tabs on said screen on opposite sides of said resistance heater element with portions overlying the radially projecting ends of said tabs of said inverted cup-shaped cylindrical screen such that, said screen is pervious to the mixture of water and detergent contained in the soap tank during the use of the steam cleaner, and impervious to the fingers of users of the steam cleaner and of implements which may be inserted within said tank and acts simultaneously to filter foreign objects such as cigarette butts which may be introduced into the soap tank during use of the steam cleaner and wherein, said cup-shaped screen may be readily removed by rotating said screen to detach said tabs from said spring clips.

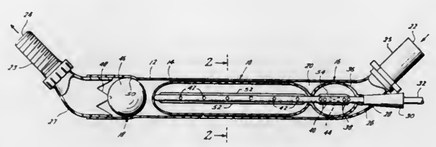


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**4,015,590**
**BALLOON ACTIVATED BLOOD PUMP**

**Nils A. Normann, Houston, Tex., assignor to Baylor College of Medicine, Houston, Tex.**

**Filed Apr. 12, 1976, Ser. No. 675,848**
**Int. Cl.² A61B *19/00***
**U.S. Cl. 128—1 D** **14 Claims**



1. A heart assist blood pump comprising,
a tubular conduit having an inlet and an outlet for connection with the circulatory system of the body,
a sealable opening in the conduit between the inlet and the outlet,
a gas line extending from the outside of said conduit through the opening and into the conduit,
an inflatable pump balloon positioned in the conduit and connected to the gas line, and the inside of the balloon in communication with the line for receiving gas from the line and inflating with positive line pressure and deflating with decreased line pressure thereby creating a pumping action in the conduit, the inflated balloon having an outside diameter smaller than the inside diameter of the portion of the conduit in which the balloon is positioned,
an inlet valve positioned in the conduit between the balloon and the conduit inlet, and
an outlet valve positioned in the conduit between the balloon and the conduit outlet.

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**4,015,591**
**CHOLESTERIC LIQUID CRYSTALLINE PHASE MATERIAL-DYE COMPOSITION AND VENAPUNCTURE METHOD EMPLOYING THE COMPOSITION**

**Fred K. Suzuki, Arlington Heights, and Thomas W. Davison, Streamwood, both of Ill., assignors to Liquid Crystal Products, Inc., Arlington Heights, Ill.**

**Filed Feb. 17, 1976, Ser. No. 658,407**
**Int. Cl.² A61B *10/00***
**U.S. Cl. 128—2 R** **20 Claims**

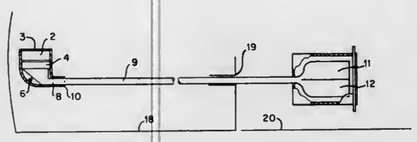
12. A method of effecting vanapuncture in the human body which comprises:
a. in any order, (1) cooling the skin over a venous area of the body, and (2) applying directly on the skin over said area a layer about 100 to 300 microns thick of a composition having thermal color responsive characteristics, said layer exhibiting improved color contrast and high color intensity, said composition comprising an enantiotropic cholesteric liquid crystalline phase material exhibiting a mesophase color change at a temperature reached by the skin upon rewarming due to venous blood flow, and at least two oil-soluble dyes dissolved in said material in a total dye concentration of 0.01–1% by weight of the composition, each of said dyes reflecting light of a different wave length in the range of 400 to 700 nanometers, and said dyes together absorbing light of substantially all wave lengths within said range;
b. allowing the skin over said area to rewarm due to venous blood flow, until said material exhibits a mesophase color change to thereby delineate a vein therebeneath; and
c. directing an instrument for venapuncture to a site in said area indicated by said delineation to constitute the location of a vein.

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**4,015,592**
**NUCLEAR MEDICINE SYSTEM FOR IMAGING RADIATION**

**Patrick Ralph Bradley-Moore, 510 E. 86th St., New York, N.Y. 10028**

**Continuation-in-part of Ser. No. 536,200, Dec. 24, 1974, abandoned. This application June 12, 1975, Ser. No. 586,170**
**Int. Cl.² A61B *6/00***
**U.S. Cl. 128—2 A** **21 Claims**



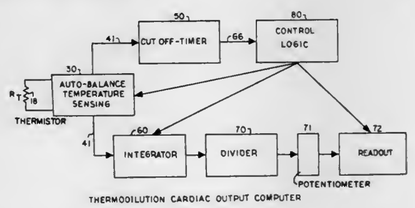

1. A nuclear medicine device for forming a nuclear radiation image at a location inside an animal body and for transmitting a representation of said image to a location outside the body comprising:
a front end comprising means for forming, at a location inside an animal body, a two-dimensional image of a selected nuclear radiation pattern; and
a middle part comprising means interfacing with the front end to receive therefrom a two-dimensional representation of the nuclear radiation pattern image formed therein and adapted to extend to a location outside the body to transmit the received two-dimensional representation thereto.
18. A nuclear medicine method of examining a selected portion of an animal body comprising the steps of:
causing said selected portion of the body to form a nuclear radiation pattern;
introducing into the animal body a device for detecting nuclear radiation and forming by said device, at a location inside the body, a two-dimensional image of said nuclear radiation pattern; and
transmitting a two-dimensional representation of said image formed of the two-dimensional nuclear radiation pattern to a location outside the body.

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**4,015,593**
**APPARATUS AND METHOD FOR MEASURING CARDIAC OUTPUT**

**Virgil B. Elings, 5680 Via Salerno, Goleta, Calif. 93017, and David T. Phillips, 5107 Calle Asilo, Santa Barbara, Calif. 93111**

**Filed Mar. 24, 1975, Ser. No. 561,650**
**Int. Cl.² A61B *5/02***
**U.S. Cl. 128—2.05 V** **18 Claims**




4. An autobalance circuit for sensing the temperature changes of a flowing blood-injectate mixture for use in equipment for measuring cardiac output by thermal dilution, the autobalance circuit including
a thermally variable resistor for detecting the temperature of the blood-injectate mixture in accordance with the resistance of the variable resistor,
a source of current coupled to the variable resistor for producing a voltage drop across the variable resistor in accordance with the resistance of the variable resistor,
first means coupled to the variable resistor and responsive to the change in the voltage drop across the variable resistor for producing an output voltage in accordance with the change in the voltage drop across the variable resistor, and
wherein the first means includes a source of reference voltage and a means for subtraction coupled to the source of reference voltage and to the voltage drop across the variable resistor for producing the output voltage from the first means in accordance with subtraction of the source of reference voltage from the voltage drop across the variable resistor,
a feedback loop coupled to the first means and responsive to the output voltage from the first means for producing a feedback signal having a value for providing a zero output voltage from the first means to initially balance the circuit and with the feedback loop including means for decoupling the output voltage from the first means to the feedback loop after the production of te zero output voltage from the first means and with the feedback loop including a holding control for maintaining the same value for the feedback signal after the output signal from the first means is decoupled for providing after the initial balance an output signal from the first means only in accordance with changes in the voltage drop across the variable resistor.
10. Apparatus for terminating the integration of a time-temperature curve for use in equipment for measuring cardiac

output by thermal dilution and with the time-temperature curve represented by a varying voltage having an initial rising portion to a peak and a decay from the peak, the apparatus including

first means responsive to the varying voltage for detecting and holding the peak voltage,

second means coupled to the first means and responsive to the peak voltage and to the varying voltage for detecting when the varying voltage decays to a first predetermined percentage of the peak voltage,

third means coupled to the first means and responsive to the peak voltage and the varying voltage for detecting when the varying voltage decays to a second predetermined percentage of the peak voltage lower than the first predetermined percentage,

fourth means coupled to the second and third means and responsive to the detection by the second and third means for producing a cutoff signal which is time delayed after the detection by the third means in accordance with the time interval between the detection by the second and third means; and

fifth means coupled to the fourth means and responsive to the cutoff signal and the varying voltage for integrating the varying voltage relative to time and for terminating the integration in response to the cutoff signal.

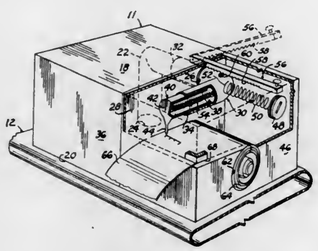
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**4,015,594**

## RECORDING SPHYGMOMANOMETER SPHYGPRESSURE GRAPH

**Lilian Ellen Siverson, 3784 Spruce St., Burnaky, BC V5G, 1X9, Canada**

**Filed June 14, 1976, Ser. No. 696,039**
**Int. Cl.² A61B** *5/02*
**U.S. Cl. 128—2.05 G** **1 Claim**



1. A blood-pressure-measuring device, comprising:

a blood-flow-restricting sleeve;

pump means for pressurizing said sleeve;

a housing secured to said sleeve, said housing having an aperture communicating with the interior of said sleeve;

a right-angular tube telescopically received at one end portion within the housing aperture;

a first spring normally biasing said one end portion of said right-angular tube into the aperture;

ratchet means including a rack pivotally supported by said housing in overlying relation with respect to said one end portion of said right-angular tube, said rack having a series of ratchet teeth projecting toward said right-angular tube;

a pawl secured to said right-angular tube and engaged by said ratchet teeth permitting telescopic movement of said right-angular tube into the housing aperture and preventing telescopic extending movement of said right-angular tube out of the housing aperture;

a scribing tube having one closed end and having its open end telescopically received within the other end portion of said right-angular tube;

a second spring within said scribing tube normally biasing said scribing tube into said other end portion of said right-angular tube;

graph paper supported by said housing; and

a stylus secured to the closed end of said scribing tube and contacting said graph paper.

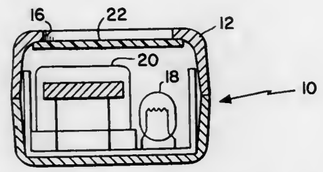
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**4,015,595**

## PHOTOPLETHYSMOGRAPHS

**J. Malvern Benjamin, Jr., c/o Bionic Instruments, Inc., 221 Rock Hill Road, Bala Cynwyd, Pa. 19004**

**Filed Sept. 15, 1975, Ser. No. 613,301**
**Int. Cl.² A61B** *5/02*
**U.S. Cl. 128—2.05 V** **7 Claims**



1. A probe for use with a photoplethysmograph for the measurement of peripheral pulsatile blood flow comprising:

a casing having a window therein,

a light source and a photo-sensitive cell mounted in said casing to overlie said window,

said light source being arranged to direct light through said window,

said photo-sensitive cell being arranged adjacent said light source to respond to light passing through said window as it is reflected from a field in line with said light source, and

a light control film mounted to extend across said window for collimating the light emitted from said light source to direct the same toward said field and for collimating the light reflected to said photo-sensitive cell and passing through said window.

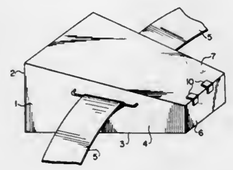
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**4,015,596**

## APPARATUS FOR DETECTING AND INDICATING ELECTRICAL BODY POTENTIALS

**Heinz Dehnert, Freiburg, Breisgau, Germany, assignor to Hugo Sachs Elektronik Kommanditgesellschaft, Hugstetten-March, Germany**

**Filed June 25, 1975, Ser. No. 590,369**
**Claims priority, application Germany, Mar. 29, 1975, 7510018**[U]
**Int. Cl.² A61B** *5/04*
**U.S. Cl. 128—2.06 R** **5 Claims**



1. Apparatus for the detection and indication of electrical body potentials having a generally box-like structure, a cathode ray tube in said box-like structure, said cathode ray tube having a face constituting at least a part of one of the side walls of said box-like structure, first and second electrode means adapted to contact a human body in the respective places between which the body potential is to be measured, and means responsive to any potential difference between said first and second electrodes, controlling said cathode ray tube so that the latter indicates said body potentials, characterized by



said first and second electrode means comprising first and second electrodes on each of two sides of the box-like structure, said two sides being different from the side wall that includes the face of the cathode ray tube, and

said first and second electrode means comprising first and second electrodes each of which extends around the corner of the box that connects said two sides.

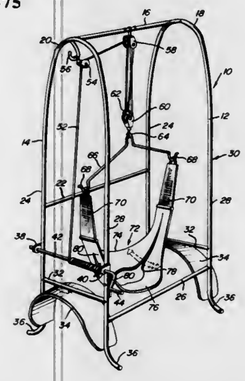
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**4,015,597**

## PORTABLE CERVICAL TRACTION APPARATUS

**Tony J. Beaver, Boise, Idaho, assignor to Cervical Traction Company, Inc. (Entire), Boise, Idaho**

**Filed Oct. 9, 1975, Ser. No. 621,244**
**Int. Cl.² A61H** *1/02*
**U.S. Cl. 128—75** **3 Claims**



1. In combination, a pair of upstanding generally parallel and inverted U-shaped opposite side frame portions disposed and spaced side-by-side relation, each of said frame portions including front and rear legs interconnected at their upper end portions by means of a curved bight portion extending therebetween, said frame portions being spaced apart at their lower ends a distance less than shoulder width but greater than head width, a front to rear extending brace rigidly secured between the lower end portions of the front and rear legs of each frame portion, an upper horizontal brace member extending between and rigidly anchored to said bight portions, transverse braces extending between and rigidly secured to each pair of corresponding front and rear legs intermediate the upper and lower ends thereof, a downwardly concave arched shoulder support received and extending between and rigidly secured to the lower end portions of the legs of each frame portion, said front to rear extending braces closely overlying and being secured to the longitudinal mid-portions of said shoulder supports, a block and tackle assembly depending downwardly from a central portion of said upper horizontal brace member and supporting a head sling therefrom, said block and tackle including a pull line free end portion, a winding member journaled from a lower portion of one of said opposite frame portions, the free end portion of said pull line being attached to said winding member for winding thereon, the upper end portion of said one opposite side frame portion including anti-friction guide means supported therefrom with which an intermediate portion of said winding member free end portion extending between said block and tackle and said winding member is guidingly engaged for longitudinal shifting relative thereto.

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**4,015,598**

## ANAESTHESIC SYSTEM

**Glenn E. Brown, 24040 Summit Road, Los Gatos, Calif. 95030**

**Filed Sept. 5, 1975, Ser. No. 610,682**
**Int. Cl.² A61M** *16/00*
**U.S. Cl. 128—188** **12 Claims**




1. A mask for administering gas to a patient comprising:

a. an inner cup-shaped wall arranged to fit over the nose or mouth of a patient and to engage the face of the patient along the peripheral edge thereof to form a gas chamber between the face of the patient and the inner surface of said inner wall;

b. an outer wall secured to and spaced from said inner wall to form an exhaust passage therebetween communicating with said chamber for receiving exhaust gas exhaled by the patient into said chamber and having a peripheral edge disposed in the vicinity of the peripheral edge of said inner wall defining means for receiving gas leaking between said peripheral edge of said inner wall and the face of the patient;

c. means connected to said inner wall and communicating with said chamber for introducing gas into said chamber to be inhaled by the patient; and

d. means connected to said outer wall and communicating with said exhaust passage for removing the exhaust gas and the leakage gas;

e. pressure control means connected between said inner and outer walls for communicating said chamber with said exhaust passage, said pressure control means being arranged for gas to enter said chamber from said means for introducing gas into said chamber when the patient inhales gas and arranged for exhaled gas to enter said exhaust passage from said chamber when the patient exhales gas.

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**4,015,599**

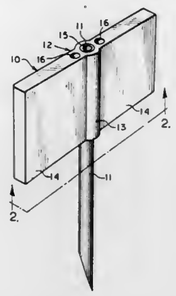
## ANESTHETIC DELIVERY SYSTEM

**Laurence I. Peterson, Doylestown, Pa., assignor to Rohm and Haas Company, Philadelphia, Pa.**

**Filed July 21, 1975, Ser. No. 597,810**
**Int. Cl.² A61M** *16/00*
**U.S. Cl. 128—188** **7 Claims**

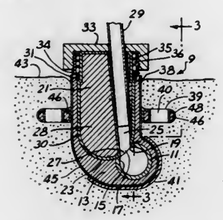
1. A method of delivering a flow of anesthetic gas to a patient at a controllable, substantially constant concentration of such anesthetic in a gaseous carrier stream which comprises contacting the gaseous carrier stream with a bed of solid macroreticular polymeric adsorbent having adsorbed thereon a sufficient amount of anesthetic to produce a partial pressure of anesthetic high enough to cause sustained release of the anesthetic to the gaseous carrier stream to result in a concentration of anesthetic in the gaseous carrier stream suitable for anesthesia, maintaining the temperature of the bed below that which would cause volatilization of a detrimental amount of any extractable portion of the macroreticular polymeric adsorbent or decomposition of the adsorbent, but high enough to effect the sustained release of the anesthetic.

**4,015,600**
**CATHETER NEEDLE ASSEMBLY**
**James P. Liautaud, River and Bluff Roads, Trout Valley, Cary, Ill. 60013**
**Filed July 7, 1975, Ser. No. 593,316**
**Int. Cl.² A61M** *5/00, 5/32*
**U.S. Cl. 128—214 R** **1 Claim**



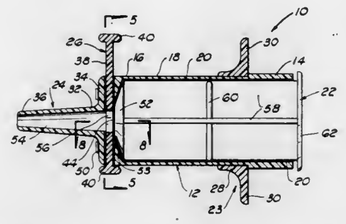
1. In a catheter needle assembly of the type having
a molded body including a central hub portion and a pair of diametrically opposed wing-like tab portions extending in opposite directions from a central axis, and
a hollow-core needle embedded in and extending through said hub portion along said axis,
the improvement comprising:
means including a pair of passageways extending through respective ones of said tab portions adjacent said central hub portion in parallel spaced-apart relationship to said axis for establishing hinge lines between said tab portions and said hub portion to enable said tab portions to fold about said hub portion to provide a surface for gripping said catheter needle assembly.

**4,015,601**
**BLOOD ACCESS DEVICE**
**Jack C. Bokros, and Victor Slivenko, both of San Diego, Calif., assignors to General Atomic Company, San Diego, Calif.**
**Filed Oct. 14, 1975, Ser. No. 622,090**
**Int. Cl.² A61M** *5/00*
**U.S. Cl. 128—214 R** **12 Claims**



1. A device to provide access to the circulatory system of a living body comprising a tubular conduit of generally circular cross section insertable in a living blood vessel; a generally cylindrical housing having one end closed and extending transversely of and adjoining said conduit, the point of adjoining being spaced from the housing axis, said housing having fluid communication with said conduit through an aperture in a wall common to both, the perimeter defining said aperture being formed of a sharp edge of the wall, said housing having a length sufficient to extend from the blood vessel to a point outside the living body; a valve body in said housing, said valve body having therein a port alignable with said aperture, said valve body being adapted to receive a catheter in fluid communication with said port, and said valve body being coaxially rotatable in said housing between positions of alignment and non-alignment of said aperture and said port to selectively establish fluid communication between the circulatory system and a catheter inserted in said valve body; and at least all blood and tissue contacting surfaces of said device being made of a biologically compatible material.

**4,015,602**
**EAR MOLD INJECTION DISPENSER**
**Eugene A. Nelson, and Woodrow R. Rice, both of Wichita, Kans., assignors to Mid-States Laboratories, Inc., Wichita, Kans.**
**Filed Dec. 8, 1975, Ser. No. 638,449**
**Int. Cl.² A61M** *1/00*
**U.S. Cl. 128—234** **6 Claims**



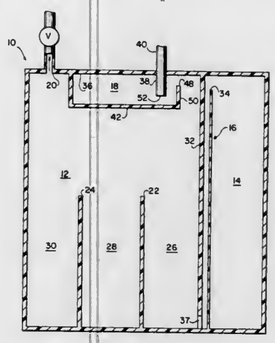
1. An ear mold injection dispenser for receiving and mixing ear impression material therein and dispensing the material into the ear canal and the cavity of the ear, the dispenser comprising:
a tubular body having an opening in a first end portion of said body, an opening in a second end portion of said body, said body having an outer circumference and an inner circumference, the front of the second end portion of said body including outwardly extending posts integrally formed therein;
a sliding plunger received in the opening of the first end portion of said body, the sides of said plunger disposed adjacent the inner circumference of said body;
a funnel having a first end portion and a second end portion, the first end portion of said funnel including a flange portion therearound, said flange portion having apertures therethrough for receiving said posts therein in a snap fit; and
a valve slidably mounted between the first end portion of said funnel and the second end portion of said body.

**4,015,603**
**SURGICAL DRAINAGE SYSTEM WITH PRESSURE INDICATOR**
**Leonard D. Kurtz, Woodmere, and Robert E. Bidwell, Melville, both of N.Y., assignors to Deknatel Inc., Queens Village, N.Y.**
**Filed Oct. 10, 1975, Ser. No. 621,600**
**Int. Cl.² A61M** *1/00*
**U.S. Cl. 128—276** **5 Claims**

1. A surgical drainage system adapted to receive a drainage tube for the drainage of a body cavity comprising a unitary, integral structure including:
a first, gas-tight, collection compartment in fluid communication with the body cavity to be drained, said first compartment partitioned into a plurality of chambers, said collection compartment having a first port through the uppermost end of said compartment, said port adapted to receive the drainage tube so that the drainage tube extends downwardly through said port into said first compartment a distance substantially less than the height of said first compartment, said first compartment having a second port through the uppermost end of said compartment for placing said compartment in fluid communication with a source of vacuum;

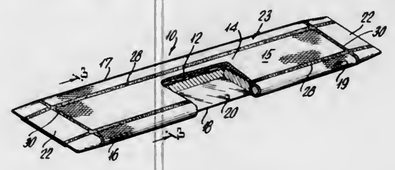


an underwater seal means for forming a fluid seal at the end of the drainage tube, said seal means including a second fluid collection compartment contained within said first compartment and having a volume that is small with respect to the volume of said first compartment, said second fluid collection compartment dependent downwardly from the uppermost portion of said first compartment, the drainage tube extending into said second compartment, said second compartment having a port in fluid communication with said first compartment, said port located above the fluid seal formed in said second compartment;
a third compartment located adjacent to and having a common wall with said first collection compartment; and
a connecting passageway for connecting in fluid communi-



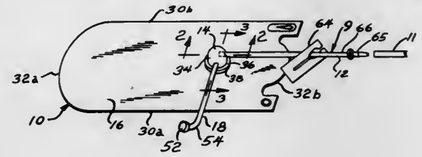
cation said first collection compartment and said third compartment, an opening in the lower end of said common wall between said first and third compartments in communication with the lower end of said connecting passageway, said connecting passageway being open at the upper end in communication with said third compartment so that the initial fluid drained from said port of said underwater seal means enters said first collection chamber so as to seal off said opening in said common wall and simultaneously seal off said third compartment and connecting passageway from said first compartment, the volume of said connecting passageway being small with respect to said third compartment, said connecting passageway providing visual indication of any oscillations of fluid therein caused by changes in pressure in the body cavity.

**4,015,604**
**ABSORBENT PRODUCT WITH SIDE LEAKAGE CONTROL MEANS**
**Charles Csillag, Montreal, Canada, assignor to Personal Products Company, Milltown, N.J.**
**Filed Mar. 25, 1976, Ser. No. 670,509**
**Int. Cl.² A41B** *13/02*; **A61F** *13/18*
**U.S. Cl. 128—287** **12 Claims**



1. An absorbent product for absorbing and retaining body fluids and comprising an absorbent element of porous hydrophilic material as the absorbent medium, said absorbent element having first and second major surfaces and longitudinal side edges and transverse end edges therebetween; the improvement wherein means are provided for retarding premature failure of said product by leakage of said body fluids from said side edges while still maintaining said side edges soft and absorbent, said means comprising a narrow, longitudinally extending zone extending along each of said side edges but spaced away from each of said side edges, said longitudinally extending zone being impregnated with a hydrophobic material from major surface to major surface, the extreme marginal portions of said absorbent element along said longitudinal edges being free of said impregnation.

**4,015,605**
**DRAINAGE RECEPTACLE**
**Daniel M. McWhorter, Arlington Heights, Ill., assignor to The Kendall Company, Boston, Mass.**
**Filed Oct. 28, 1975, Ser. No. 626,428**
**Int. Cl.² A61F** *5/42*
**U.S. Cl. 128—294** **18 Claims**



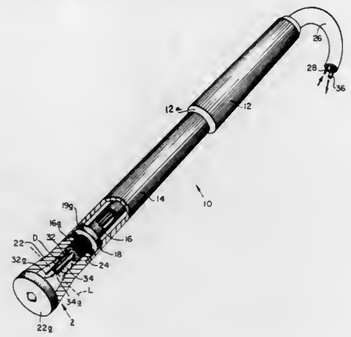
1. A drainage receptacle, comprising:
a collection bag having a lower back wall for placement on a generally horizontal supporting surface, an upper flexible front wall having an opening extending through the front wall, and a collection chamber intermediate said front and back walls;
a connector having a base attached to said front wall around the periphery of said opening, said base having a generally planar surface defining a lowermost portion of said connector and facing toward said back wall, said connector having a cavity located only above said front wall and communicating with said chamber through said opening;
a drainage conduit communicating with the connector cavity through an inlet port spaced above said front wall opening, whereby liquid normally drains from said conduit through said opening into the chamber while the connector base is spaced from the back wall of said bag; and
a sampler conduit communicating with the connector cavity through an outlet port located at a level intermediate the inlet port and said front wall opening, whereby the base of said connector may be moved toward the back wall of the bag to prevent passage of liquid from the drainage conduit into the chamber until liquid passes into the sampler conduit for obtaining a sample.

**4,015,606**
**METHOD AND MEANS FOR CONTROLLING THE FREEZE ZONE OF A CRYOSURGICAL PROBE**
**Robert K. Mitchiner, Boulder, Colo., and Wayne A. Russell, Chelmsford, Mass., assignors to Dynatech Corporation, Burlington, Mass.**
**Filed Sept. 9, 1975, Ser. No. 611,620**
**Int. Cl.² A61B** *17/36*
**U.S. Cl. 128—303.1** **5 Claims**

1. A cryosurgical probe comprising
A. a housing,
B. a hollow tip protruding from the housing,
C. means defining an expansion or evaporation chamber in the tip, said means including a surface isolating said chamber from said housing,
D. a refrigerant supply conduit extending through the housing and through said surface and projecting into said chamber,

E. a refrigerant exhaust conduit extending through the housing and through said surface and projecting into said chamber, said exhaust conduit terminating inside the chamber short of the supply conduit, and

F. means for conducting refrigerant to the supply conduit so that the refrigerant exhausts from the end thereof inside



the chamber following a path leading more or less directly to the end of the exhaust conduit thereby leaving a region of stagnant gas proximally of the end of the exhaust conduit inside the chamber, said stagnant gas thereby insulating parts of the probe proximally of the end of the exhaust conduit from refrigerant flow so that they do not become cold enough to freeze human tissue.

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**4,015,607**

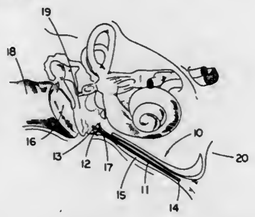
**EUSTACHIAN TUBE PROSTHESIS AND METHOD FOR ITS IMPLANTION**

**J. William Wright, III, 7763 Spring Mill Rd., Indianapolis, Ind. 46260**

**Filed Jan. 23, 1976, Ser. No. 651,723**

**Int. Cl.² A61M** *27/00*; **A61F** *11/00*

**U.S. Cl. 128—350 R** **11 Claims**



1. A eustachian tube prosthesis which comprises:

a flexible tube of a material compatible with body tissue, said tube having a first end and a second end; and

flange means mounted on said tube between said first and second ends for positioning said tube within the eustachian tube passageway of a person such that the first end is located within the middle ear cavity and the second end is located within the eustachian tube passageway, said flange means including a flexible flange of a material compatible with body tissue, the length of the tube between said flange and said second end being sufficient to span at least a major portion of the eustachian tube passageway, the flange extending generally radially from the tube, the flange being positioned not more than about 4 mm from the first end of said tube and not more than about 38 mm from the second end of said tube.

**4,015,608**

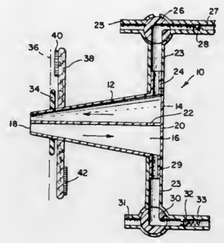
**LARYNGECTOMY LUNG PROTECTOR**

**William F. Rogers, Maggie, N.C., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest**

**Filed Oct. 8, 1975, Ser. No. 620,576**

**Int. Cl.² A61M** *16/00*

**U.S. Cl. 128—351** **3 Claims**



1. Breathing apparatus comprising hollow frusto-cone means having a base extending toward a tapered end, said tapered end of said cone being insertable in an opening in the throat in the region of the larynx, said base of said cone being sealed by plate means, said cone having air inlet passage means for directing air toward and out of the tapered end of said cone, air outlet passage means for leading air away from the tapered end of said cone, first valve means for controlling the flow of air into said air inlet passage, second valve means for controlling the flow of air out of said air outlet passage, adjustable seal means slidably mounted on and encircling said cone toward the tapered end of said cone for forming an adjustable seal between the outer wall of said cone and a throat opening, said first valve means comprises first check valve means for leading air into said air inlet passage and first by-pass valve means for diverting the flow of air into said air inlet passage from said first check valve or the ambient air surrounding said breathing device, said second valve means comprising second check valve means for leading air out of said air outlet passage and second by-pass valve means for diverting the flow of air from said air outlet passage to said second check valve or the ambient air surrounding said breathing device.

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**4,015,609**

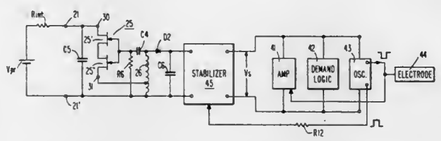
**CIRCUIT FOR LOW POWER-LOW ENERGY SOURCE**

**Cor A. Mensink, Voorst, and Jan P. Schuimer, Dieren, both of Netherlands, assignors to Vitatron Medical B.V., Dieren, Netherlands**

**Filed Nov. 17, 1975, Ser. No. 632,280**

**Int. Cl.² A61N** *1/36*; **H02M** *3/335*

**U.S. Cl. 128—419 PG** **22 Claims**




1. A circuit for DC to DC conversion of the voltage level of a low voltage power source, comprising:

a. an oscillator circuit having an input for connection to said power source and an output for providing a relatively high amplitude oscillator signal, said oscillator circuit having a low starting resistance input path connected across said source, said path containing an active circuit comprised of at least two FETs, said active circuit being characterized by having a high impedance state and a low impedance state; and



b. a rectifier circuit connected to said oscillator circuit output, for providing a rectified voltage signal from said oscillator signal.

8. A circuit for conversion of the voltage level of a low voltage power source and for providing a regulated output, comprising:

a. an oscillator circuit having an input for connection to said power source and an output for providing a relatively high amplitude oscillator signal, said oscillator circuit having a low starting resistance input path connected across said source, said path containing an active device, said device characterized by having a high impedance state and a low impedance state;

b. a rectifier circuit connected to said oscillator output, for providing a rectified voltage signal from said oscillator signal;

c. a regulator circuit with an output terminal, said regulator circuit connected to said rectifier circuit, for providing at said output terminal a regulated output from said rectified voltage signal, said regulator circuit comprising a regulating element between said rectifier circuit and said output terminal, and a regulating control path between said output terminal and said regulating element, said control path comprising an OTA, first input means for connecting to a first input terminal of said OTA a signal representative of said regulator output signal, said reference generator means being connected to a second input of said OTA, the output of said OTA being connected to said regulating element whereby said OTA acts to control said regulating element as a function of said output relative to said reference, said reference means comprising a current generator connected to said output terminal, the output of said current generator being connected both to said second OTA input terminal and into the OTA bias terminal, said current generator comprising an FET in combination with an adjustable resistor, whereby a regulated signal is provided at said regulator output terminal.

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**4,015,610**

**CIGARETTE FILTER TIP**

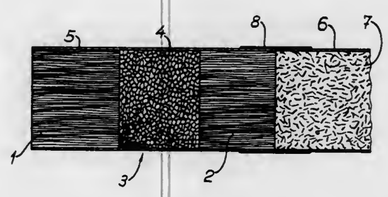
**René C. Pasche, Lausanne, Switzerland, assignor to Baumgartner Papiers S.A., Switzerland**

**Continuation-in-part of Ser. No. 537,766, Dec. 31, 1974, abandoned. This application Feb. 6, 1976, Ser. No. 655,980**

**Claims priority, application Switzerland, Feb. 4, 1974, 1472/74**

**Int. Cl.² A24B** *15/02*

**U.S. Cl. 131—9** **4 Claims**



1. A filter tip cigarette comprising a cigarette section comprising tobacco wrapped in cigarette paper, a tip section comprising successively in a lengthwise direction a first fibrous filter element, a granular filter element and a second fibrous filter element and a transparent tubular casing holding said filter elements together in a unitary structure, said tip section being assembled in end-to-end relation with said cigarette section, and a band of joining paper wrapper around adjacent portions of said cigarette section and said tip section to join said cigarette section and tip section together, said joining paper extending only around a portion of one of said fibrous filter elements of said tip section, thus leaving said granular filter element wholly visible, said granular filter element comprising material which changes color by reaction of noxious components in smoke produced by combustion of said tobacco, said material which changes color comprising an inorganic iron sulfate which is transformed into an iron sulfide by reaction with hydrogensulfide in the cigarette smoke.

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**4,015,611**

**CIGARETTE FILTER**

**Arno Holst, Wiesbaden-Biebrich; Michael Kostrzewa, Wiesbaden, and Helmut Lask, Wiesbaden-Schierstein, all of Germany, assignors to Hoechst Aktiengesellschaft, Germany**

**Filed Mar. 26, 1975, Ser. No. 562,143**

**Claims priority, application Switzerland, Mar. 28, 1974, 4300/74**

**Int. Cl.² A24C** *5/50*

**U.S. Cl. 131—268** **2 Claims**

1. A cigarette filter of cellulosic material composed at least partially of a cellulose ether prepared by etherifying it to a virtually completely water-soluble cellulose ether and cross-linking said cellulose ether to a degree such that more than 50 percent by weight thereof is no longer soluble in water, but still capable of absorbing water to at least its own dry weight.

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**4,015,612**

**FILM-FORMING POLYMER MODIFIED WITH A FLUOROALIPHATIC RADICAL CONTAINING COMPOUND AND HAIR STYLING COMPOSITION THEREOF**

**Frank J. Pavlik, St. Paul, and Robert L. Hansen, Roseville, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

**Continuation of Ser. No. 758,630, Sept. 9, 1968, abandoned. This application Apr. 26, 1974, Ser. No. 464,491**

*Disclosure was also published under second Trial Voluntary Protest Program on Mar. 30, 1976*

**Int. Cl.² A45D** *7/00*; **A61K** *7/11*

**U.S. Cl. 132—7** **7 Claims**

1. A method of styling hair comprising combing and styling hair into a desired configuration and applying to the thus configured hair a liquid hair styling composition capable of holding hair in place under humid and windy conditions while imparting a soft hand and sheen to the hair and which is easily removed by shampooing comprising a polymer solvent and in combination therewith a fluoroaliphatic radical containing modified film-forming polymer, said fluoroaliphatic radical being a fluorinated saturated monovalent nonaromatic radical containing from 3 to 20 carbon atoms, in which the carbon atoms of the chain are substituted only by fluorine, chlorine or hydrogen atoms with no more then one hydrogen or chlorine atom for every two carbon atoms, and in which a divalent oxygen or trivalent nitrogen atom, bonded only to carbon atoms, can be present in the aliphatic chain, said polymer being a linear polar polymer having a specific viscosity in one percent solution in methyl ethyl ketone at 25°C. of at least 0.05, having pendant fluoroaliphatic groups contributing 0.5 to 15 percent by weight fluorine to the polymer, said polymer also containing between five and 22 percent by weight pendant carboxyl groups.

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**4,015,613**

**TANK CLEANING APPARATUS**

**Charles A. Papworth, 1018 SW. 21st St., Ft. Lauderdale, Fla. 33315**

**Filed Oct. 17, 1975, Ser. No. 623,438**

**Int. Cl.² B08B** *3/02*, *9/08*

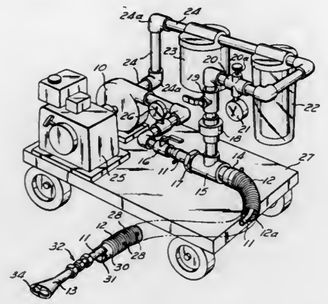
**U.S. Cl. 134—102** **27 Claims**

1. In an apparatus for cleaning a tank which is at least partly full of liquid, said apparatus comprising a pump for withdrawing liquid from the tank and pumping it back into the tank, filter means for filtering the liquid withdrawn from the tank before the liquid is returned to the tank, and a unitary flexible hose assembly comprising an outer hose and an inner hose

extending along the inside of the outer hose and defining therewith a return passageway for liquid withdrawn from the tank, the improvement wherein:

said outer hose has an inlet opening at its lower end for insertion into the tank to be cleaned and having its upper end operatively connected to the inlet side of the pump to pass thereto the liquid withdrawn from the tank,

said inner hose is operatively connected at its upper end to the outlet side of the pump for passing liquid therefrom under pressure through the interior of the inner hose back into the tank,



said inner hose has discharge means on its lower end projecting beyond said lower end of said outer hose and having a discharge opening for discharging liquid under pressure from the inner hose into the tank to agitate the contents of the tank for withdrawal through said outer hose,

and said pump is operatively connected to said inner and outer hoses to pump the liquid withdrawn through the outer hose in a continuous recirculating flow back into the inner hose substantially immediately without intermediate storage of the liquid.

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**4,015,614**

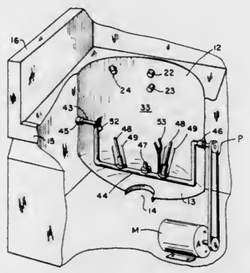
**APPARATUS FOR WASHING SANITARY CONVENIENCES SUCH AS BED PANS AND THE LIKE**

**Arne Ingvar Jönsson, Getinge; Olov Valdemar Malmström, Halmstad, and Bengt Gunnar Julius Tibell, Eskilstuna, all of Sweden, assignors to Aktiebolaget Electrolux, Stockholm, Sweden**

**Continuation of Ser. No. 437,622, Jan. 29, 1974, abandoned. This application Aug. 14, 1975, Ser. No. 604,726**

**Int. Cl.² B08B** *3/00, 9/00*

**U.S. Cl. 134—152** **3 Claims**



1. Apparatus for washing bed pans and similar articles comprising a housing provided with a chamber, a cover for said chamber, a liquid supply, a plurality of nozzles mounted on the wall of said chamber and connected to said liquid supply whereby the wall of said chamber as well as the exterior surfaces of said articles are sprayed with liquid, a crank-shaped pipe being rotatably journalled in and extending across said chamber, motor means for slowly rotating said pipe, and said pipe being positioned in a generally horizontal plane and having at least one ejector nozzle and means for conducting liquid thereto, said pipe additionally being provided with at least one holder for holding said articles, both said ejector nozzle and said holder being mounted on said crank-shaped pipe, said articles removably held on said crank-shaped being pipe while being sprayed internally with liquid that passes through said pipe by said holders and said ejector nozzle, and one of said nozzles having a central bore for the liquid supply and a connecting channel located substantially transverse thereto, a relatively wide cut-out passage located at an angle with respect to the wall of the chamber and joined to said connecting channel for conducting the liquid supply from said connecting channel through said cut-out passage in the form of a liquid spray whereby the wall of the washing chamber is sprayed with a liquid curtain that covers approximately an angle of 180° .

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**4,015,615**

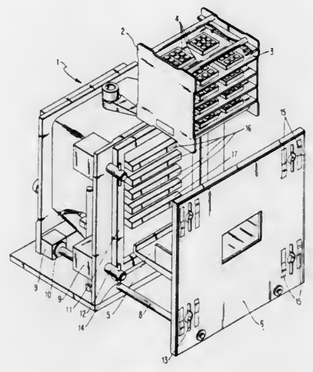
**FLUID APPLICATION SYSTEM**

**Jorn-Olaf Christian Weber, Wappingers Falls, and Carl Yakubowski, Hyde Park, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed June 13, 1975, Ser. No. 586,769**

**Int. Cl.² B08B** *3/02*

**U.S. Cl. 134—196** **6 Claims**



1. Apparatus for fluid application to a plurality of substantially planar objects comprising:

carriers for said planar objects;

means for supporting said carriers in a vertical array attached to the door of said apparatus;

a chamber having a like number of agitation mechanisms to the number of said carriers;

said agitation mechanisms being positioned in said chamber in a vertical array so that when said door is closed said agitation mechanisms fit interleaved to, and above and parallel to the plane of said carriers;

each of said mechanisms include an orificed plate positioned on one side of each of said carriers; and

means for moving fluid through said orificed plate with a pulsating motion.

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**4,015,616**

**AUTOMATIC WATERING DEVICE**

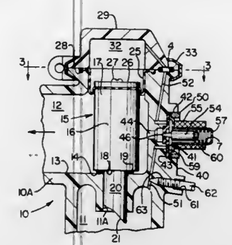
**Ludovic F. Hanff, 6243 Evergreen Ave., North, Seminole, Fla. 33542**

**Filed Aug. 25, 1975, Ser. No. 607,115**

**Int. Cl.² A01G** *25/00*

**U.S. Cl. 137—78** **4 Claims**

1. A moisture sensitive hydroelectrical switch comprising a hollow body having an inlet end, an outlet end, and a dry chamber, an electrical switch, having electrical conduits provided with switch contacts, fastened in said dry chamber, a fluid tight pressure gland, having a medial passageway, rotatively connected to said hollow body at said outlet end with said electrical conduits passing through said medial passageway, a body extension having a hollow core fastened to the inlet end of said hollow body, an adjustable sleeve, provided with an axial passageway, rotatively connected to said body



extension, a rod having a head, fabricated from waterproof electrical insulation, slidably mounted in said axial passageway, a peg, fabricated from electrical insulated material, fastened in said head, a hollow sleeve, fabricated from resilient material, interposed between said adjustable sleeve and said head to urge said peg against said switch contacts, a plurality of collars, fabricated from moisture sensitive material, which expands when wet and contracts when drying, fastened to said rod to move said peg toward and away from said switch contacts to open and close said electrical switch.

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**4,015,617**

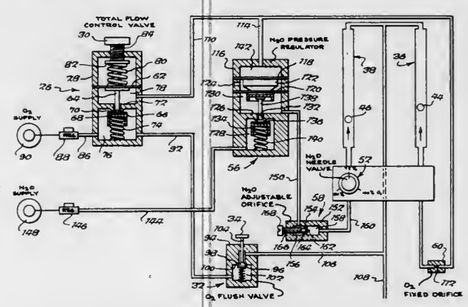
**ANALGESIC APPARATUS**

**Edward A. Connolly, Williamsville, N.Y., assignor to Fraser Sweatman, Inc., Lancaster, N.Y.**

**Filed Mar. 25, 1975, Ser. No. 561,906**

**Int. Cl.² G05D** *11/03*

**U.S. Cl. 137—88** **8 Claims**



1. Analgesic apparatus comprising at least two flowmeters; means for supplying one fluid component to one of said flowmeters; means for supplying a second fluid component to another of said flowmeters; fixed orifice means having a permanently restricted passage for determining the maximum rate of flow of said one component; pre-setting means for determining the maximum rate of flow of said second component thereby to establish maximum relative proportions of said components entering said flowmeters, the position of said pre-setting means being set prior to normal use of said apparatus so as to eliminate the necessity for any adjustment thereof during normal use of said apparatus; control means for varying the rate of flow of said second component independently of the rate of flow of said one component during use of said apparatus in order to selectively vary the relative proportions of said components up to said maximum relative proportions and flow control means operable to selectively vary the total rate of flow of said fluid components substantially without varying the relative proportion thereof.

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**4,015,618**

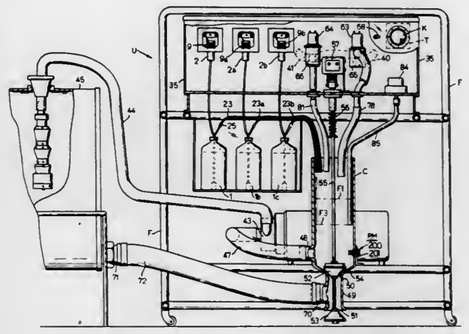
**APPARATUS FOR AUTOMATICALLY MIXING AND CIRCULATING CLEANING SOLUTIONS THROUGH DAIRY EQUIPMENT**

**Rolyn A. Schmid, Hayward, Wis., assignor to Bender Machine Works, Inc., Hayward, Wis.**

**Filed Nov. 24, 1975, Ser. No. 634,876**

**Int. Cl.² G05D** *11/08;* **B08B** *9/08*

**U.S. Cl. 137—93** **22 Claims**



1. In apparatus for mixing a cleaning solution of predetermined pH value for circulation through dairy equipment, in combination:

a container having a cleaning ingredient therein;

a mixing receptacle having a solvent therein;

a pump for supplying said cleaning ingredient from said container to said mixing receptacle for mixture with said solvent to form said cleaning solution; and

control means, said control means including timing means to effect activation of said pump for a predetermined interval of time,

said control means further including means for sensing the pH value of the said cleaning solution as said cleaning ingredient is being supplied to said mixing receptacle by said pump and for effecting deactivation of said pump when a predetermined pH value is reached and before expiration of said predetermined interval of time.

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**4,015,619**

**CLUTCH-BRAKE STEERING MECHANISM FOR TRACTORS**

**Daniel B. Shore, Niles, and Probir K. Chatterjea, Mount Prospect, both of Ill., assignors to International Harvester Company, Chicago, Ill.**

**Filed Mar. 24, 1975, Ser. No. 561,119**

**Int. Cl.² F15B** *13/06*

**U.S. Cl. 137—102** **5 Claims**

1. For use in a fluid pressure system including high pressure, low pressure, and inlet-outlet conduits:

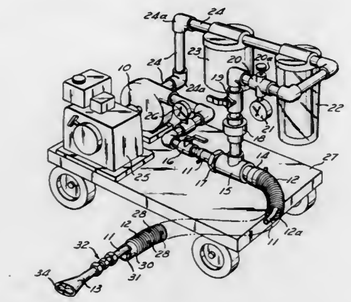
signal-pressure setting valve assembly means with a common bore therein hydraulically disposed for communicating with said conduits and controllably connecting the high and low pressure conduits for producing an actual inlet-outlet pressure in the inlet-outlet conduit in correspondence with a signal pressure as set;

said assembly means comprising independently slideable, hydropotentiometer and satisfied-metering spools in the common bore for establishing the signal and actual pressures, said satisfied-metering spool communicating at its opposite ends with the signal and actual pressures in the bore in such way that the established pressure on the hydraulic fluid at intervening points between adjacent

extending along the inside of the outer hose and defining therewith a return passageway for liquid withdrawn from the tank, the improvement wherein:

said outer hose has an inlet opening at its lower end for insertion into the tank to be cleaned and having its upper end operatively connected to the inlet side of the pump to pass thereto the liquid withdrawn from the tank,

said inner hose is operatively connected at its upper end to the outlet side of the pump for passing liquid therefrom under pressure through the interior of the inner hose back into the tank,



said inner hose has discharge means on its lower end projecting beyond said lower end of said outer hose and having a discharge opening for discharging liquid under pressure from the inner hose into the tank to agitate the contents of the tank for withdrawal through said outer hose,

and said pump is operatively connected to said inner and outer hoses to pump the liquid withdrawn through the outer hose in a continuous recirculating flow back into the inner hose substantially immediately without intermediate storage of the liquid.

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**4,015,614**

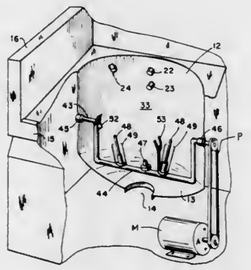
**APPARATUS FOR WASHING SANITARY CONVENIENCES SUCH AS BED PANS AND THE LIKE**

**Arne Ingvar Jönsson, Getinge; Olov Valdemar Malmström, Halmstad, and Bengt Gunnar Julius Tibell, Eskilstuna, all of Sweden, assignors to Aktiebolaget Electrolux, Stockholm, Sweden**

**Continuation of Ser. No. 437,622, Jan. 29, 1974, abandoned. This application Aug. 14, 1975, Ser. No. 604,726**

**Int. Cl.² B08B** *3/00, 9/00*

**U.S. Cl. 134—152** **3 Claims**



1. Apparatus for washing bed pans and similar articles comprising a housing provided with a chamber, a cover for said chamber, a liquid supply, a plurality of nozzles mounted on the wall of said chamber and connected to said liquid supply whereby the wall of said chamber as well as the exterior surfaces of said articles are sprayed with liquid, a crank-shaped pipe being rotatably journalled in and extending across said chamber, motor means for slowly rotating said pipe, and said pipe being positioned in a generally horizontal plane and having at least one ejector nozzle and means for conducting liquid thereto, said pipe additionally being provided with at least one holder for holding said articles, both said ejector nozzle and said holder being mounted on said crank-shaped pipe, said articles removably held on said crank-shaped being pipe while being sprayed internally with liquid that passes through said pipe by said holders and said ejector nozzle, and one of said nozzles having a central bore for the liquid supply and a connecting channel located substantially transverse thereto, a relatively wide cut-out passage located at an angle with respect to the wall of the chamber and joined to said connecting channel for conducting the liquid supply from said connecting channel through said cut-out passage in the form of a liquid spray whereby the wall of the washing chamber is sprayed with a liquid curtain that covers approximately an angle of 180° .

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**4,015,615**

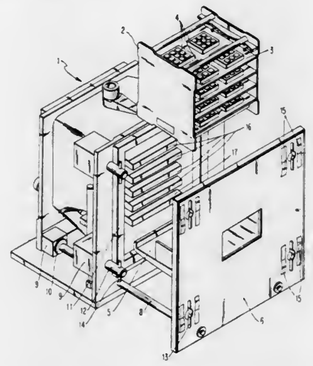
**FLUID APPLICATION SYSTEM**

**Jorn-Olaf Christian Weber, Wappingers Falls, and Carl Yakubowski, Hyde Park, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed June 13, 1975, Ser. No. 586,769**

**Int. Cl.² B08B** *3/02*

**U.S. Cl. 134—196** **6 Claims**



1. Apparatus for fluid application to a plurality of substantially planar objects comprising:

carriers for said planar objects;

means for supporting said carriers in a vertical array attached to the door of said apparatus;

a chamber having a like number of agitation mechanisms to the number of said carriers;

said agitation mechanisms being positioned in said chamber in a vertical array so that when said door is closed said agitation mechanisms fit interleaved to, and above and parallel to the plane of said carriers;

each of said mechanisms include an orificed plate positioned on one side of each of said carriers; and

means for moving fluid through said orificed plate with a pulsating motion.

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**4,015,616**

**AUTOMATIC WATERING DEVICE**

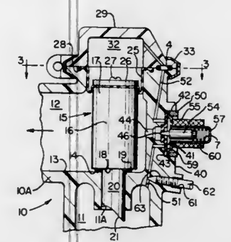
**Ludovic F. Hanff, 6243 Evergreen Ave., North, Seminole, Fla. 33542**

**Filed Aug. 25, 1975, Ser. No. 607,115**

**Int. Cl.² A01G** *25/00*

**U.S. Cl. 137—78** **4 Claims**

1. A moisture sensitive hydroelectrical switch comprising a hollow body having an inlet end, an outlet end, and a dry chamber, an electrical switch, having electrical conduits provided with switch contacts, fastened in said dry chamber, a fluid tight pressure gland, having a medial passageway, rotatively connected to said hollow body at said outlet end with said electrical conduits passing through said medial passageway, a body extension having a hollow core fastened to the inlet end of said hollow body, an adjustable sleeve, provided with an axial passageway, rotatively connected to said body



extension, a rod having a head, fabricated from waterproof electrical insulation, slidably mounted in said axial passageway, a peg, fabricated from electrical insulated material, fastened in said head, a hollow sleeve, fabricated from resilient material, interposed between said adjustable sleeve and said head to urge said peg against said switch contacts, a plurality of collars, fabricated from moisture sensitive material, which expands when wet and contracts when drying, fastened to said rod to move said peg toward and away from said switch contacts to open and close said electrical switch.

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**4,015,617**

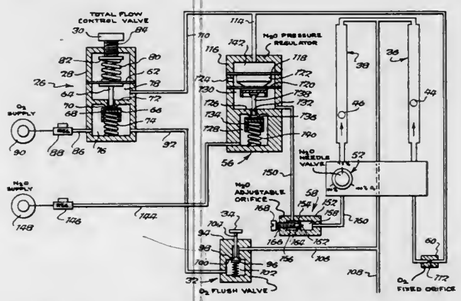
**ANALGESIC APPARATUS**

**Edward A. Connolly, Williamsville, N.Y., assignor to Fraser Sweatman, Inc., Lancaster, N.Y.**

**Filed Mar. 25, 1975, Ser. No. 561,906**

**Int. Cl.² G05D** *11/03*

**U.S. Cl. 137—88** **8 Claims**



1. Analgesic apparatus comprising at least two flowmeters; means for supplying one fluid component to one of said flowmeters; means for supplying a second fluid component to another of said flowmeters; fixed orifice means having a permanently restricted passage for determining the maximum rate of flow of said one component; pre-setting means for determining the maximum rate of flow of said second component thereby to establish maximum relative proportions of said components entering said flowmeters, the position of said pre-setting means being set prior to normal use of said apparatus so as to eliminate the necessity for any adjustment thereof during normal use of said apparatus; control means for varying the rate of flow of said second component independently of the rate of flow of said one component during use of said apparatus in order to selectively vary the relative proportions of said components up to said maximum relative proportions and flow control means operable to selectively vary the total rate of flow of said fluid components substantially without varying the relative proportion thereof.

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**4,015,618**

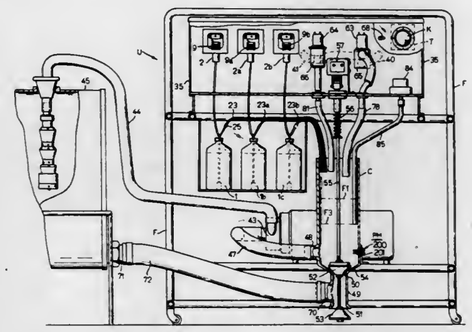
**APPARATUS FOR AUTOMATICALLY MIXING AND CIRCULATING CLEANING SOLUTIONS THROUGH DAIRY EQUIPMENT**

**Rolyn A. Schmid, Hayward, Wis., assignor to Bender Machine Works, Inc., Hayward, Wis.**

**Filed Nov. 24, 1975, Ser. No. 634,876**

**Int. Cl.² G05D** *11/08;* **B08B** *9/08*

**U.S. Cl. 137—93** **22 Claims**



1. In apparatus for mixing a cleaning solution of predetermined pH value for circulation through dairy equipment, in combination:

a container having a cleaning ingredient therein;

a mixing receptacle having a solvent therein;

a pump for supplying said cleaning ingredient from said container to said mixing receptacle for mixture with said solvent to form said cleaning solution; and

control means, said control means including timing means to effect activation of said pump for a predetermined interval of time,

said control means further including means for sensing the pH value of the said cleaning solution as said cleaning ingredient is being supplied to said mixing receptacle by said pump and for effecting deactivation of said pump when a predetermined pH value is reached and before expiration of said predetermined interval of time.

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**4,015,619**

**CLUTCH-BRAKE STEERING MECHANISM FOR TRACTORS**

**Daniel B. Shore, Niles, and Probir K. Chatterjea, Mount Prospect, both of Ill., assignors to International Harvester Company, Chicago, Ill.**

**Filed Mar. 24, 1975, Ser. No. 561,119**

**Int. Cl.² F15B** *13/06*

**U.S. Cl. 137—102** **5 Claims**

1. For use in a fluid pressure system including high pressure, low pressure, and inlet-outlet conduits:

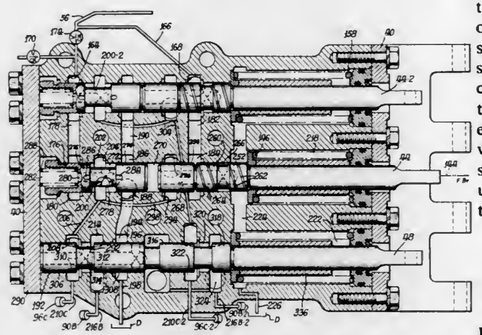
signal-pressure setting valve assembly means with a common bore therein hydraulically disposed for communicating with said conduits and controllably connecting the high and low pressure conduits for producing an actual inlet-outlet pressure in the inlet-outlet conduit in correspondence with a signal pressure as set;

said assembly means comprising independently slideable, hydropotentiometer and satisfied-metering spools in the common bore for establishing the signal and actual pressures, said satisfied-metering spool communicating at its opposite ends with the signal and actual pressures in the bore in such way that the established pressure on the hydraulic fluid at intervening points between adjacent

ends of the hydropotentiometer and satisfied-metering spools is the signal pressure;

said hydropotentiometer spool being of an elongated shape so as to vary the signal pressure established thereby between the high and low pressure conduits from a maximum to a minimum at successive points proportionately along its length;

said satisfied-metering spool controlling the inlet-outlet conduit and varying, in said conduit, said actual pressure



established by modulation thereby between the high and low pressure conduits aforesaid; and

means for positioning the hydropotentiometer spool for precisely setting signal pressure in the common bore to a desired value, said satisfied-metering spool reaching a satisfied position when the force on that end of the spool which is exposed to signal pressure set in the bore by the hydropotentiometer spool is balanced by the force on the metering spool end exposed to the actual pressure in the bore.

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**4,015,620**

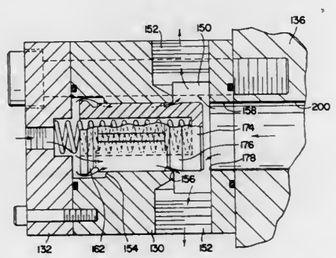
**HIGH RESPONSE UNLOADING VALVE**

**Louis F. Carrieri, LaGrange Park, Ill., assignor to Gulf & Western Manufacturing Company, Southfield, Mich.**

**Filed Oct. 11, 1974, Ser. No. 514,106**

**Int. Cl.² F16K** *11/00*

**U.S. Cl. 137—115** **13 Claims**



**12.** A hydraulic fluid pressure relief valve comprising a housing, a pair of fluid receiving chambers in said housing, discharge passageway means in said housing for said chambers, each of said chambers having an inlet opening and an outlet opening, said outlet openings being in fluid flow communication with said discharge passageway means, fluid pressure actuated valve elements each coaxial with a corresponding one of said outlet openings, means interconnecting said valve elements for displacement simultaneously between first and second positions, each of said valve elements having an end portion cooperable with the corresponding outlet opening in said first and second positions to respectively close and open the corresponding chamber with respect to said discharge passageway means, said valve elements being displaceable from said first position toward said second position by fluid in one of said chambers at a pressure exceeding a given pressure, said valve elements being biased toward said first position by fluid in the other chamber at said given pressure, said outlet opening of said one chamber including a cylindrical wall having an axially outer edge, the end portion of the corresponding one of said valve elements including cylindrical head means engaging an axial length of said wall from said edge when said one valve element is in said first position, said one valve element moving a given axial distance from said first toward said second position to cause said other chamber to open to said discharge passageway means through the corresponding outlet opening, said axial length being greater than said given axial distance, and said outlet opening of said other chamber including valve seat means transverse to the axis of the latter opening, the end portion of the other of said valve elements including a surface engaging said seat means only when said other valve element is in said first position, whereby said outlet opening of said other chamber opens immediately upon displacement of said other valve element from said first toward said second position.

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**4,015,621**

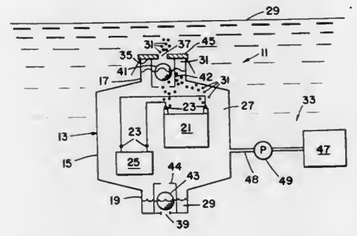
**PRESSURE CONTROL AND FLUID VENTING SYSTEM FOR A PRESSURIZED CONTAINER**

**Darryl E. Laxo, Novato, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Mar. 18, 1976, Ser. No. 667,914**

**Int. Cl.² F16K** *24/00*

**U.S. Cl. 137—173** **7 Claims**



**1.** A pressure control and fluid venting system for a pressurized container comprising:

a. first, second, and third openings in the walls of said container communicating with the fluid of an ambient atmosphere below the surface of a body of water;

b. a first float, a second float, and a lid;

c. said first float sealing said first opening when it is seated, said second float sealing said second opening when it is seated, and said lid sealing said third opening when it is seated;

d. said container containing a first fluid, a second fluid, and said atmospheric fluid;

e. said first fluid having a density less than either the density of said second fluid or said atmospheric fluid and said second fluid having a density less than that of said atmospheric fluid;

f. said first float having a density greater than said first fluid and less than said second fluid, and said second float having a density greater than said second fluid and less than said atmospheric fluid;

g. said lid weight being sufficient to keep said lid seated unless the pressure in said container exceeds the local pressure of said ambient atmosphere by a predeterminable value; whereby

h. when the level of said second fluid drops below a given level, said first float unseats and allows the venting of said first fluid; when the level of said atmospheric fluid reaches a given level, said second float unseats and allows the venting of said atmospheric fluid; when the internal pressure of said container exceeds the local pressure of said ambient atmosphere by an amount which approaches a value which would rupture said container, said lid unseats and allows the relief of said pressure; and when the local pressure of said ambient atmosphere exceeds the internal pressure of said container by an amount which approaches a value which would crush said container, said first float and said second float unseat to permit the entry of said atmospheric fluid to equalize the pressures.



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**4,015,622**

**VALVE FOR USE WITH INFLATABLE ARTICLES SUCH AS PNEUMATIC BOATS**

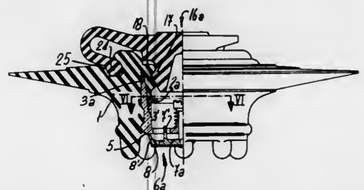
**Ezio Pagani, Bergamo, Italy, assignor to National Distillers and Chemical Corporation, New York, N.Y.**

**Filed Nov. 19, 1975, Ser. No. 633,353**

**Claims priority, application Italy, Nov. 22, 1974, 29726/74; May 30, 1975, 23875/75**

**Int. Cl.² F16K** *15/20*

**U.S. Cl. 137—223** **5 Claims**



**1.** A valve for use with an inflatable article, said valve comprising

a hollow cylindrical valve body;

a closure member adapted to seat against the bottom wall of said valve body, said closure member including a cap and a pin, having a head, secured to said cap;

a hub formed as part of the bottom wall of said valve body, and a spring disposed between said hub and said head such that said closure member is urged against said bottom wall;

a pair of upstanding tabs on said closure member normally extending through openings provided in the bottom wall of said valve body such that said valve is in its closed position;

said valve including means for deflating said article such that when said pin is pressed inwardly and rotated, the tabs on said closure member will be moved sufficiently such that they will then abut against a solid portion of said bottom wall so as to keep said valve in the open position.

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**4,015,623**

**TIRE VALVE WITH PRESSURE RELEASE MEANS**

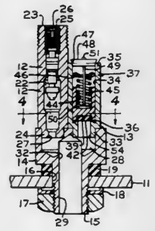
**Gregory E. Wanstreet, Canal Fulton, Ohio, assignor to The B.F. Goodrich Company, Akron, Ohio**

**Continuation of Ser. No. 412,627, Nov. 5, 1973, abandoned. This application Aug. 27, 1975, Ser. No. 608,060**

**Int. Cl.² F16K** *15/20*

**U.S. Cl. 137—224** **2 Claims**

**1.** An inflating and pressure relieving tire valve assembly for use on a tire rim of a tire wheel assembly comprising an elongated valve body having a first portion attachment means; said valve body having a pair of adjoining contiguous outwardly extending parallel open ended cylindrical portions, one being long and one short relative to each other; a chamber within said body closely adjacent to the said first portion; a tire connecting passage for communicating an inflating medium from said chamber; an inflating passage in the long one of said cylindrical portions joining said open end with said chamber and having a valve core therein for communicating an inflating medium from a source of fluid pressure to said chamber; a pressure relief passage in the short one of said adjoining cylindrical portions joining said open end with said chamber; said pressure relief passage having a pressure exhaust port at one open end and a pressure release port at the other end providing fluid communication between said chamber and said exhaust port at one end of said relief passage to release excess inflating medium through said exhaust port to the atmosphere; the cross-sectional area of said inflating passage being less than the cross-sectional area of said relief port; a pressure release valve mechanism in said pressure relief passage operative to control flow of fluid therethrough; pressure responsive means operative to close said valve mechanism at fluid pressures in said chamber less than a predetermined pressure and open said valve mechanism when fluid pressures in said chamber exceed said predetermined pressure; said pressure release valve mechanism comprising a piston closely reciprocably received within said pressure relief passage; said piston having



recesses along the outer periphery for directing the flow of fluid thereby from said chamber to said exhaust port; said piston being an elongated cylindrically shaped member with a cup-shaped centrally disposed bore; said elongated piston mounted for linear movement in said pressure relief passage; valve seat means at the end of said pressure relief port having a diameter that is less than the effective diameter of said piston; sealing means on one end of said piston to sealingly engage said valve seat; a press fit star washer in said pressure relief passage; spring means seated in said bore of said piston and extending outwardly therefrom engaging said star washer for biasing said piston toward said valve seat to close said pressure relief passage from communicating with said chamber; and an exhaust port dust cover and indicator means operatively interconnected by rod means with said valve mechanism to close said exhaust port when said valve mechanism is closed and open said exhaust port when said valve mechanism is open.

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**4,015,624**

**TIRE VALVE**

**Gregory E. Wanstreet, Canal Fulton, and C. Lucas Plaat, Troy, both of Ohio, assignors to The B.F. Goodrich Company, Akron, Ohio**

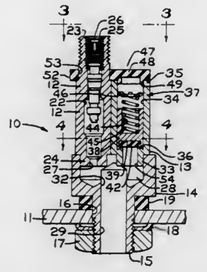
**Continuation of Ser. No. 407,920, Oct. 19, 1973, abandoned. This application Aug. 27, 1975, Ser. No. 608,061**

**Int. Cl.² F16K** *15/20*

**U.S. Cl. 137—224** **1 Claim**

**1.** Valve means for a pneumatic tubeless tire mounted upon a vehicle wheel rim, said valve means comprising an elongated body provided with means on one end for securing the body in operating position, the said body having a chamber therein disposed adjacent the said one end with a first passageway in communication with and extending from one side of said chamber through the said one end of said body, said chamber communicating with a pair of parallel generally cylindrical passageways, said parallel passageways in communication with and extending from the opposite side of said chamber through the opposite end of said body, a valve core in one of said pair of passageways permitting fluid under pressure to be introduced or exhausted therethrough, a valve seat of lesser

diameter than the internal diameter of said other of the pair of passageways surrounding the communating opening between the latter passageway and said chamber, a cylindrical piston slidably in the said other pair of passageways with one end of said piston for abuttingly contacting said valve seat in fluid sealingly relationship, a compression spring disposed in said other of said pair of passageways with one end of the spring disposed in an axial bore provided in the other end of said piston, a perforate member engaging the other end of said spring, said perforate member having peripheral portions gripping the sidewall of the passageway in which the spring is located for retaining said perforate member at a selected position and thereby provide a pre-selected compression of said spring, said piston having fluid passageways axially thereof radially outwardly of the end area which sealingly



engages said valve seat, the cross-sectional area available for fluid passage into said chamber from said one of said pair of passageways being less than that for exhaust of fluid from said chamber through the other of said pair of passageways when the piston is displaced from said valve seat, an imperforate flexible dust cap means normally closing said other of said pair of passageways at the end thereof opposite said chamber, said dust cap means being displaceable by fluid under pressure exiting from said chamber when said piston is displaced from said valve seat, means for retaining said flexible dust cap means upon said body in said displaced condition to indicate a release of pressure, said cap means and retaining means are formed integrally of resilient deformable material with a part thereof frictionally held in the outer end of said other of said pair of passageways and a further part embracing an external portion of said body.

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**4,015,625**

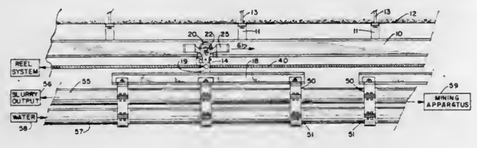
**HYDRAULIC MATERIALS HANDLING SYSTEM**

**Danrick W. Alexander, Fairmont, W. Va., assignor to Continental Oil Company, Ponca City, Okla.**

**Filed Dec. 29, 1975, Ser. No. 644,354**

**Int. Cl.² F16L** *3/00*

**U.S. Cl. 137—355.2** **5 Claims**



**1.** In an overhead support apparatus for a slurry hose transportation system which includes a rail member anchored to a support means a predetermined distance above the floor, a plurality of spaced roller means movably engaged with and supported by said rail member and slurry hose means for attachment to said plurality of spaced roller means, a rigid beam support system comprising:

a. at least one beam, each said beam having first and second ends;

b. means for pivotally attaching each said beam intermediate said ends to a corresponding one of said plurality of spaced roller means; and

c. a plurality of slurry hose clamping means for pivotally attaching said slurry hose means to each of said beams; said rigid beam support system being so constructed and arranged that said at least one beam supports said slurry hose means above the floor and substantially parallel to the floor when in storage and, alternately, when in use.

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**4,015,626**

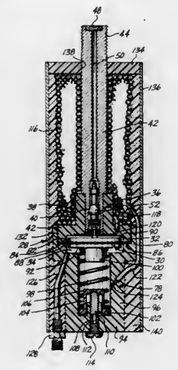
**CONSTANT FLOW VALVE FOR LOW FLOW RATES**

**Petur Thordarson, Seattle, Wash., assignor to Thordarson, Inc., Seattle, Wash.**

**Filed Jan. 22, 1976, Ser. No. 651,360**

**Int. Cl.² F16L** *7/00*

**U.S. Cl. 137—375** **9 Claims**



**1.** A constant flow valve for use in relatively low flow rate systems, comprising:

housing means defining an internal cavity;

movable wall means within said housing means, dividing said cavity into upstream and downstream chambers;

means defining an elongated fluid passageway extending perpendicularly of said movable wall means and having an upstream inlet end connectible with a source of fluid under pressure and a downstream end in communication with said upstream chamber;

means defining a control orifice within said elongated fluid passageway;

means for varying the size of said control orifice including an elongated control stem within said elongated fluid passageway extending downstream from said control orifice also perpendicularly of said movable wall means, said control stem having a downstream end in contact with said movable wall means and a valve plug at its upstream end operable to increase the size of said control orifice when the control stem is moved upstream and to decrease the size of said control orifice when the control stem is moved downstream;

a substantial length of relatively small internal diameter, high flow resistance tubing coiled about at least a portion of the means defining said elongated fluid passageway, said tubing having an inlet communicating with said upstream chamber and an outlet communicating with said downstream chamber, said tubing providing a small diameter fluid passageway extending from the upstream chamber to the downstream chamber and performing the dual functions of a pressure reducing restriction between the two chambers and a flow rate averager, so that a substantially true constant flow rate emits from said tubing;

bias means within said downstream chamber for urging the movable wall against the control stem in the upstream direction an amount resulting in the control orifice normally being partially open, with pressure variations between the two chambers serving to move said movable wall and said control stem, to increase or decrease the size of the control orifice, so that the flow rate through the control orifice and into the tubing is averageable to a substantially true constant flow rate; and

outlet passageway means of fixed size leading from the downstream chamber, outwardly from said constant flow valve.



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**4,015,627**

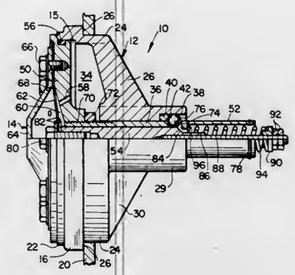
**PRESSURE RELIEF VALVE**

**Allen M. Bower, Painsville, Ohio, assignor to Emco Wheaton Inc., Conneaut, Ohio**

**Filed May 9, 1975, Ser. No. 575,871**

**Int. Cl.² F16K** *31/126*

**U.S. Cl. 137—494** **2 Claims**



**1.** A pressure relief valve comprising: a housing having an inner end and an outer end, said housing being mountable in a wall of a pressure vessel with the inner end exposed to the interior of the vessel and the outer end exposed to the exterior of the vessel, a pressure relief passage opening through said housing between said inner end and said outer end through which the interior of a vessel may be vented, a valve seat in said pressure relief passage, a valve member slidably mounted in said housing, said valve member including a valve head adpated to engage said valve seat when in a first position to close said through passage, said valve member being mounted for movement between said first position and a second position in which the pressure relief passage is open to permit full flow therethrough, lock means for releasably interlocking said valve member and said housing to retain said valve member in said first position, pressure responsive lock release means mounted on said valve member and movable in response to an increase in pressure, at said inner end of said housing, above a predetermined minimum pressure, to release said lock means to free said valve member with respect to said housing and thereby permit said valve member to move freely to said second position without any further significant increase in pressure at said inner end of said valve, said housing having a stem passage opening therethrough, said stem passage having a radially outwardly extending recess formed therein, said valve member including a valve stem slidably mounted in said stem passage, a lock release passage extending longitudinally of said stem, a locking passage extending radially through said valve stem, said lock means being mounted for movement in said locking passage between a locking position projecting from said stem into said recess of said housing to interlock said valve member with respect to said housing when said valve member is in said first position and a release position in which it is inwardly withdrawn from said recess to release said valve with respect to said housing, said lock release passage communicating with said locking passage means, said pressure responsive lock release means including; a lock release shaft mounted for movement in said lock release passage between a first position in which said lock means is retained in said locking position projecting into said recess and a second position in which said lock release shaft is spaced from said recess such that said lock means is free to withdraw to said release position, and a pressure sensitive diaphragm mounted on said valve member and connected to said lock release shaft to move said shaft between the first and second positions in response to pressure variations as required, and return spring means extending between said lock release shaft and said valve stem normally urging said lock release shaft to said first position with respect to said valve stem.

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**4,015,628**

**DILUTION DEVICE**

**Ellwood A. Randolph, 680 Sharp Lane, Baton Rouge, La. 70815**

**Filed Dec. 12, 1975, Ser. No. 640,203**

**Int. Cl.² B01F** *3/08*

**U.S. Cl. 137—566** **9 Claims**

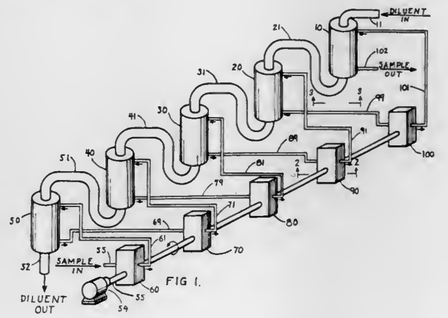



FIG 1.

**1.** In combination, apparatus for the controlled dilution with a preselected amount of fluid diluent, of a sample comprised of a particulate solids containing fluid comprising

a plurality of vessels serially connected one to another, wherein the total of a diluent stream can be introduced into a first vessel to flow from one preceding vessel to the next of the series, the total diluent passing from the diluent entry side of a vessel and egressing from the diluent exit side of said vessel, and egressing finally from the diluent exit side of the last vessel of the series, as determined by the direction of flow of the diluent,

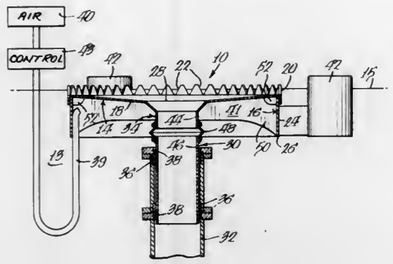
means for the introduction of a sample comprising a particulate solids containing fluid into the diluent entry side of the last vessel of the series, the particulate solids containing fluid and diluent being thoroughly admixed one with the other to form a homogeneous mixture,

means associated with each adjacent pair of the serially connected vessels for withdrawal of the total of the fluid effluent from the diluent exit side of a downstream vessel, and for reintroduction of the total of the fluid effluent (fluid) into the diluent entry side of the upstream vessel of the associated pair of vessels, the particulate solids containing fluid and diluent being thoroughly admixed one with the other in each of the vessels to form a homogeneous mixture, and

means for withdrawal of a diluted sample from the diluent exit side of the first vessel of the series,

whereby a sample of a particulate solids containing fluid of relatively high solids concentration can be introduced into the last vessel of the series, and the diluted sample discharged from the first vessel of the series.

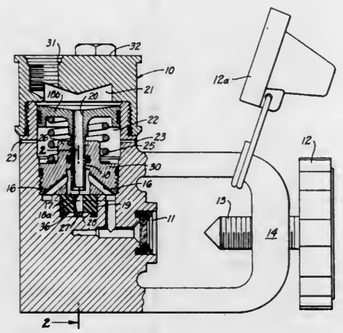
**4,015,629**
## ADJUSTABLE FLOW FLOATING WEIR ASSEMBLY
**Thomas H. Morgan, P.O. Box 10604, Jackson, Miss. 39209, and Wayne S. Posey, P.O. Box 1556, Forest, Miss. 39074**
**Filed Sept. 15, 1975, Ser. No. 613,284**
**Int. Cl.² G01F *11/00*; E03B *11/00***
**U.S. Cl. 137—578** **9 Claims**




1. An adjustable-flow floating weir assembly in a liquid-containing basin for regulating the flow of liquid out of said basin, comprising: a receptacle including a peripheral wall and a bottom, said wall having a peripheral portion extending upwardly from said bottom and defining at its upper edge a plurality of peripherally spaced notches and a lower peripheral non-porous skirt portion extending below said bottom to a lowermost edge, said lower skirt portion and bottom defining a chamber, said bottom defining an opening, conduit means communicating with said opening and connecting said receptacle to the exterior of said basin, passage means for air to flow under pressure to and from a region within the chamber adjacent the underside of said receptacle bottom above the lowermost edge of said skirt and means for controlling the flow of said air whereby the vertical position of said weir assembly can be varied to regulate the liquid flow through said notches to the exterior of said basin.

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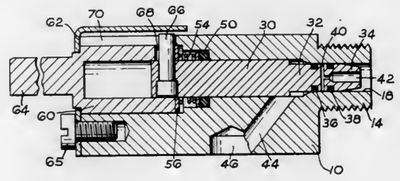
**4,015,630**
## REGULATOR FIRST STAGE FOR UNDERWATER DIVING
**Boris L. Contreras, Huntington Park, Calif., assignor to Pittman Products, Inc., Huntington Park, Calif.**
**Filed Oct. 23, 1975, Ser. No. 625,065**
**Int. Cl.² F16K *31/12***
**U.S. Cl. 137—505.25** **3 Claims**



1. A regulator first stage for underwater diving comprising a regulator body, said body having a high pressure inlet connected to a high pressure chamber, a low pressure chamber having at least one low pressure port connected thereto, a piston mounted for reciprocal movement within said regulator, a passage extending longitudinally through said piston and connecting said high pressure chamber to said low pressure chamber, a high pressure port connected to said high pressure chamber and disposed at the end of said regulator body adjacent to said high pressure chamber, a valve seat for engaging the end of said piston to close off said passage, an opening extending through said valve seat in alignment with the passage extending through said piston, an additional low pressure port formed in said regulator body, passage means extending through said regulator body and connecting said additional low pressure port to said opening in said valve seat, whereby said additional low pressure port is connected to said low pressure chamber through said passage in said piston, at least a portion of the flow path between the end of said piston and said additional low pressure port being of smaller cross-sectional diameter than the passage through said piston, whereby the rate of flow to said vest is less than the rate of flow through the conventional low pressure port of said regulator, and means for removably connecting a vest inflator hose to said additional low pressure port.

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**4,015,631**
## GAS TAPS
**Stephen Hayes, Dudley, England, assignor to Ewarts Limited, Dudley, England**
**Filed Mar. 7, 1975, Ser. No. 556,451**
**Int. Cl.² F16K *1/12*, *1/34***
**U.S. Cl. 137—625.33** **11 Claims**



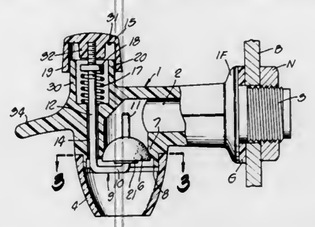
1. A gas tap comprising a body provided with a flow passage including successive sections of differing diameter, a plunger which has a tapered nose portion and is mounted for axial movement along said flow passage to control the flow rate of gas through said passage, and an O-ring carried by the plunger and encircling the same at a position adjacent the tapered nose portion, the plunger being movable, from a closed position in which the tapered nose portion is received within the smaller diameter section of the flow passage and the O-ring is located wholly within and sealingly engages the wall of said smaller diameter section, to an open position in which the nose portion extends into the smaller diameter section and the O-ring is located within the larger diameter section, the plunger being provided with a formation extending from the tip of said nose portion towards the O-ring, which formation affords communication between said successive flow passage sections when the plunger is in said open position, and is constituted by a passageway formed in the plunger, said passageway opening at the tip of said nose portion and also at a point on the periphery of the plunger between the O-ring and the tip of the nose portion.

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**4,015,632**
## VALVE CONSTRUCTION
**Carl E. Frahm, and Shirley E. Frahm, both of 1428 Oak Meadow Road, Arcadia, Calif. 91106**
**Filed Aug. 18, 1975, Ser. No. 605,431**
**Int. Cl.² F16K *1/32***
**U.S. Cl. 137—801** **1 Claim**

1. A spigot comprising: a body member with an orifice at the end thereof, a plug member, and means for moving said plug member between a first position against said orifice in sealing relation therewith a second position spaced from said orifice to permit fluid flow therethrough, a nozzle, means attachably mounting said nozzle on said body member in communication with said orifice to control fluid flow from said orifice, said nozzle when mounted on said body member extending around said plug member to prevent access to said plug member, said plug member moving means being mounted exclusively in said body member such that said nozzle may be attached without engagement with said plug member moving means, a thumb piece, said plug member actuating means extending beyond said body member and terminating in said thumb piece engageable by a person's thumb, a projection extending from such body member engageable by a person's finger when simultaneously the person's thumb engages said thumb piece, said plug member moving means including

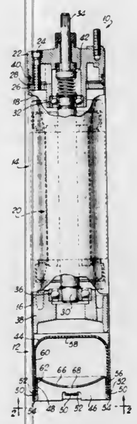




a wire element that has a vertical portion extending through an elongated opening in said body member and a bent horizontal portion on which said plug member is mounted, said body member having an upper cylindrical portion through which said wire element extends, said wire element having a threaded portion in its upper end, a coil compression spring within said cylindrical portion and having one of its ends engaging said body member, a nut on said threaded portion engaging the other end of said spring, said thumb piece having a threaded portion engaging said threaded portion of said wire element, said thumb piece having a cylindrical skirt portion encircling said body cylindrical portion, and said thumb piece having a portion engageable with said body cylindrical portion engageable with said body cylindrical portion to limit movement of said thumb piece.

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**4,015,633**
## ASSEMBLY FOR SEALING AND PRESSURE EQUALIZATION OF A SUBMERSIBLE HOUSING
**Ronald D. Mandell, Elkhorn, Wis., assignor to Sta-Rite Industries, Inc., Delavan, Wis.**
**Filed Oct. 17, 1975, Ser. No. 623,499**
**Int. Cl.² F16L *55/10*; B65D *7/42***
**U.S. Cl. 138—89** **8 Claims**

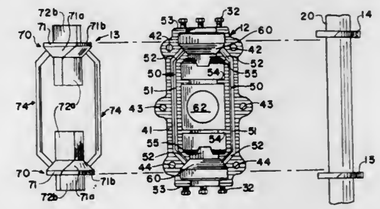


1. An assembly for sealing and pressure equalization of a submersible, fluid-filled device, said assembly comprising:

a housing with a generally circular cylindrical wall defining an open end;
a sheet metal retaining member including a cylindrical band portion having a circular cylindrical shape complementary to the shape of the housing end wall;
an imperforate, generally cup-shaped diaphragm having an end wall and having a circular cylindrical side wall complementary in shape to said band portion;
said housing wall and said band member defining a circular cylindrical annular space therebetween;
the side wall of said diaphragm sandwiched in said space between said band member and said housing wall and pressed into sealing engagement with said housing wall by said band member;
recess means defined in a circle circumscribing said housing wall spaced from the open end of the housing wall;
a plurality of locking tabs integral with said sheet metal retaining member and disposed in a circular array on said band portion;
said tabs sloping and extending radially outwardly from said band;
said tabs bein resiliently compressed inwardly upon insertion of said retaining member into the housing, and expanding into said recess means to prevent withdrawal of said retaining member from the housing; and
lip means defined on the edge of said band portion engageable with the edge of the open end of the housing;
the axial distance from said lip means to said tabs being substantially equal to the axial distance from said recess means to said housing edge.

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**4,015,634**
## SPLIT-SLEEVE PIPE DEVICE WITH INTEGRAL SEAL AND INSULATOR
**Joe William Christie, P.O. Box 386, Frisco, Tex. 75034**
**Filed May 2, 1975, Ser. No. 574,245**
**Int. Cl.² F16L *41/06***
**U.S. Cl. 138—99** **7 Claims**



1. A split-sleeve pipe device comprising in combination:
a cylindrical elongated housing enclosure including an upper housing-half section and a lower housing-half section connectable together around a pipe; each of said housing-half sections having first longitudinally spaced central internal semi-circular flanges disposed in planes perpendicular to the longitudinal axis of said housing-half sections, each of said housing-half sections having a second pair of internal semi-circular flanges spaced apart longitudinally on opposite sides and outwardly of said first pair of internal flanges and disposed in planes perpendicular to the longitudinal axis of said housing sections, said second flanges each having an outwardly facing conical seal surface; said housing-half sections having inwardly extending end flanges disposed in planes perpendicular to the longitudinal axis of said housing sections; said housing-half sections each having a longitudinal gasket groove along each side edge of each of said half sections for accommodating an elongated gasket portion along each side of said housing enclosure from said conical gasket seat surface at one end of said enclosure to said

conical gasket seat surface at the other end of said enclosure; each of said housing-half sections having longitudinal side flanges provided with bolt holes for coupling said housing-half sections together around a pipe; a first of said housing-half sections having boss means defining a lateral opening to said housing enclosure and a second of said housing-half sections having an enlargement defining a chamber opening into said housing enclosure aligned with said opening of said first housing-half section; each of said housing-half sections having set screws axially aligned and circumferentially spaced through said end flange at each end of each of said half sections for expanding gasket means within said housing enclosure at each end thereof around said pipe passing therethrough; a pair of compression rings adapted to fit around said pipe and having annular outwardly extending flanges perpendicular to the axis of said ring; each of said rings being split whereby said rings may be spread apart and fitted around said pipe during assembly of said device on said pipe; and a one-piece gasket adapted to fit around said pipe within said housing enclosure between said housing-half sections to provide a fluid type seal between said housing-half sections and said pipe along a longitudinal portion of said pipe and to electrically insulate said pipe from said housing sections; said gasket having split annular end members each adapted to fit within said housing-half sections between one of said second internal flanges and the adjacent end flange of said housing-half section, each of said end members having a conical seal surface engageable with said conical seat surface on said second flange of said housing-half sections to provide an annular seal around said pipe within said housing enclosure at each end of said enclosure, annular flange portions extending inwardly and outwardly from each of said seal surfaces for surrounding and insulating said pipe and contacting respectively, said first central internal flanges and said end flanges, and said gasket having longitudinal side runner portions extending along each side of said gasket between said end members for engagement with said gasket grooves along each of said side portions of each of said housing-half sections to provide a fluid type longitudinal seal along each side of said housing enclosure between the enjoining side edges of said housing-half sections between said annular end members of said gasket.

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**4,015,635**

## TUBES FOR THE PRODUCTION OF CARRIER BAGS WITH LATERAL ACCORDION FOLDS

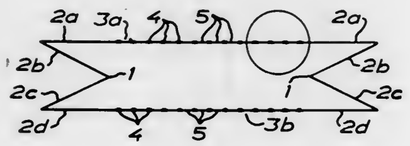
**Pehr Gunnar Heine Göransson, Malmo, Sweden, assignor to Röttneros Bag System AB, Malmo, Sweden**

**Filed July 15, 1975, Ser. No. 596,000**

**Claims priority, application Switzerland, July 15, 1974, 9737/74**

**Int. Cl.² F16L *11/10***

**U.S. Cl. 138—119** **4 Claims**




1. A tube of weldable sheeting for the production of carrier bags, comprising

a. first and second tube wall portions, extending longitudinally of the tube in circumferentially spaced relationship,

b. alternating ribs and bands extending longitudinally of the tube and forming together each of said first and second tube wall portions, each of said ribs being of lesser width and greater thickness than each of said bands,

c. third and fourth tube wall portions, extending longitudinally of the tube and integrally connected to said first and second tube wall portions so as to form a tubular formation together with said first and second tube wall portions, said third and fourth tube wall portions having a thickness corresponding approximately to ½ of the sum total of the thicknesses of one of said ribs and one of said bands.

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**4,015,636**

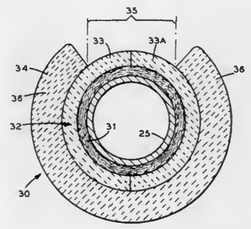
## CERAMIC REFRACTORY COVERING MEMBERS

**Don B. Van Fossen, Alliance, Ohio, assignor to The Babcock & Wilcox Company, New York, N.Y.**

**Filed Dec. 4, 1975, Ser. No. 637,569**

**Int. Cl.² F16L *9/10*, *9/22*; F27B *9/14***

**U.S. Cl. 138—149** **6 Claims**




1. A refractory covering for application to a fluid conveying tubular member comprising a thermal insulating layer disposed about and contacting the tubular member, an inner ceramic refractory layer of split tiles disposed about and contacting the insulating layer, and an outer ceramic refractory tile layer forming a unitary collar contacting and extending about a major portion of the outer circumference of the inner tile layer to hold the split tiles together and to completely provide support of the collar by the tubular member.

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**4,015,637**

## TRIAXIAL FABRIC FORMING MACHINE AND COMPONENTS THEREOF

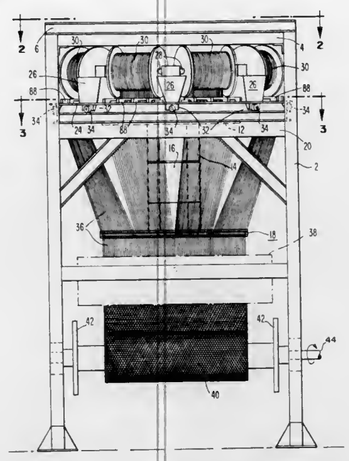
**Murray Halton, Bryn Mawr; Norris F. Dow, Radnor; Richard M. Dow, and Michael J. Hillebrand, both of Philadelphia, all of Pa., assignors to N.F. Doweave, Inc., Philadelphia, Pa.**

**Filed Nov. 11, 1974, Ser. No. 522,751**

**Int. Cl.² D03D *41/00*, *49/16***

**U.S. Cl. 139—11** **19 Claims**

1. In a machine for forming triaxial fabric comprising means for supplying a plurality of warp yarns in an array of two sheets of generally parallel warp yarns, and triaxial weaving means consisting of means for moving said warp yarns in each of said sheet transversely of said parallel warp yarns, the direction of movement of warp yarns in one of said sheets being opposite that of warp yarns in the other of said sheets, means transferring warp yarns from the edge of each of said sheets to the corresponding edge of the other said sheet, means for intermittently displacing selected warp yarns generally perpendicularly from the plane of said sheets to form weaving sheds, and means for taking up woven fabric on a roll, the improvement comprising a warp yarn supply creel rotatable about a vertical axis, means for guiding said warp yarns downwardly from said creel into an array of two sheets of warp yarns adapted for weaving a triaxial fabric therefrom and means for imparting



rotational movement to said creel in timed relation with said transverse movement of said warp yarns.



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**4,015,638**

## HEDDLE FRAME ON WHICH THE LATERAL SUPPORTS ARE DETACHABLY CONNECTED TO THE FRAME STAVES

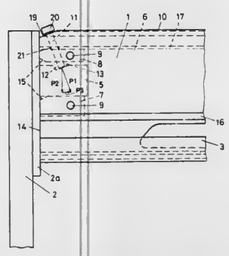
**Martin Graf, Wuehrenbach, Switzerland, assignor to Grob & Co. Aktiengesellschaft, Horgen, Switzerland**

**Filed Mar. 16, 1976, Ser. No. 667,322**

**Claims priority, application Switzerland, Mar. 25, 1975, 3820/75**

**Int. Cl.² D03C *9/06***

**U.S. Cl. 139—91** **13 Claims**



1. A heddle frame comprising at least one frame stave having a recess in at least one end thereof, at least one lateral support having a projection protruding from one side thereof adjacent one end of the lateral support and adapted to be inserted in said recess so that said stave and said support are disposed at right angles to each other and connecting means for detachably securing said projection within said recess, said connecting means comprising screw means supported by said stave and extending into operative engagement with said projection in said recess to detachably secure said projection in said recess, said screw means being disposed in the plane of said frame and inclined relative to the longitudinal axis of said stave and said support and said projection being provided with a bearing surface perpendicular to the longitudinal axis of said screw means so that a component of force will be exerted on said projection parallel to said stave to draw said lateral support against the end of said stave and a component of force will be exerted on said projection parallel to said support to clamp said projection in the recess in the stave.

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**4,015,639**

## HEDDLE FRAME WITH LATERALLY DISPLACED LATERAL SUPPORTS

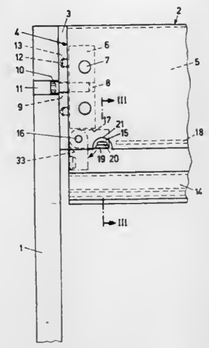
**Bernhard R. Koch, Horgenberg, Switzerland, assignor to Grob & Co. Aktiengesellschaft, Horgen, Switzerland**

**Filed Aug. 11, 1975, Ser. No. 603,902**

**Claims priority, application Switzerland, Aug. 12, 1974, 10971/74**

**Int. Cl.² D03C *9/06***

**U.S. Cl. 139—92** **5 Claims**



1. A heddle frame comprising lateral supports, an elongated frame stave, mounting means securing opposite ends of said stave to said supports, a heddle carrying rod connected to and disposed below said stave in spaced parallel relation thereto in a common vertical plane, said rod being co-extensive in length with said stave, said mounting means comprising a mounting plate secured to each end of said stave at right angles thereto, and said lateral supports being secured to right opposite faces of said plates and disposed in a vertical plane laterally offset relative to the vertical plane of said stave and rod to expose the ends of said rod to enable heddles to be placed on and removed from the ends of said rod without interference by said supports.

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**4,015,640**

## HIGH SPEED BROAD FABRIC LOOM REED CONSTRUCTION

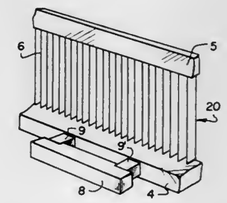
**Gerhard Oesterle, Staad, SG, Switzerland, assignor to Aktiengesellschaft Adolph Saurer, Switzerland**

**Continuation-in-part of Ser. No. 521,759, Nov. 7, 1974, abandoned. This application Mar. 4, 1976, Ser. No. 663,918**

**Claims priority, application Switzerland, Nov. 28, 1973, 01672/73**

**Int. Cl.² D03D *49/62***

**U.S. Cl. 139—192** **6 Claims**

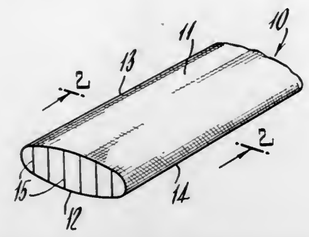


1. A reed for high speed broad fabric loom, comprising an upper reed beam, a lower reed beam, reed blades stretched between said upper reed beam and said lower reed beam, and a dynamic oscillation absorber member comprising a mass, and mounting means including, a dampening member resiliently mounting said absorber member on at least one of said upper and lower reed beams.

## 4,015,641
## CUSHIONED NARROW WOVEN TUBULAR FABRIC

**Richard Everett Goff, Jr., Barrington; Normand Daniel Guay, Woonsocket, and Joseph Amos Priestley, Barrington, all of R.I., assignors to Johnson & Johnson, New Brunswick, N.J.**

**Filed July 16, 1975, Ser. No. 596,473**
**Int. Cl.² D03D *3/02, 11/02***
**U.S. Cl. 139—384 R** **8 Claims**

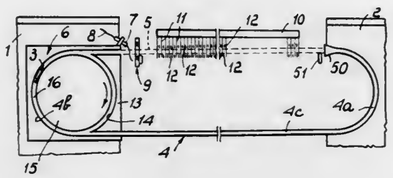


1. A narrow woven tubular fabric having a flattened oval cross-section, said fabric comprising an upper layer and a lower layer, both of said layers containing monofilament filling yarns, said monofilament filling yarns having a denier between 100 to 2080, said layers being connected together along their longitudinal edges and said layers being resiliently separated by a plurality of monofilament warp yarns alternately intermittently woven with each of said layers, said monofilament warp yarns having a denier of between 100 to 2080, the sum of the denier of a monofilament filling yarn plus a monofilament warp yarn being in the range of from 430 denier to 4200 denier and the ratio of denier of monofilament filling yarn to monofilament warp yarn being from 20:1 to 1:20.

## 4,015,642
## SHUTTLELESS LOOM OF THE TYPE HAVING UNIDIRECTIONAL WEFT THREAD CARRIERS

**Francesco Mollica, Via Cairoli, 5, Varese, Italy**

**Filed Feb. 23, 1976, Ser. No. 660,748**
**Claims priority, application Italy, Dec. 29, 1975, 30818/75**
**Int. Cl.² D03D *47/24***
**U.S. Cl. 139—438** **5 Claims**

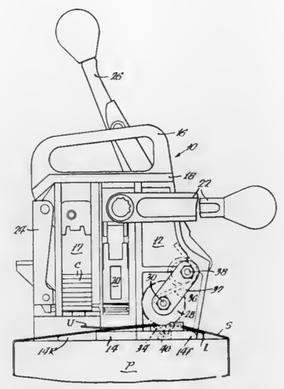


1. A shuttleless loom of the type having unidirectional weft thread carriers, comprising a throwing and recovering device for at least one of said carriers, wherein said device includes a guide for causing said at least one of said carriers to move along a closed path one portion of which passes through the shed, said guide including a linear throw portion and a linear return portion and two arcuate portions connecting said linear portions at opposite sides of the loom, said device comprising at at least one of said arcuate portions a circular guide portion substantially tangent to said linear return portion and to said linear throw portion, a flywheel rotatably arranged within said circular guide portion and defining the inner wall thereof, said flywheel being provided with entraining means for said at least one of said carriers, and means for causing said at least one of said carriers to make at least one complete revolution within said circular guide portion and to be thrown out of said circular guide portion into said throw portion after said at least one complete revolution.

## 4,015,643
## TENSIONING TOOL WITH SELF-ENERGIZING GRIPPER PLUG

**Nelson Cheung, Arlington Heights, Ill., assignor to Signode Corporation, Glenview, Ill.**

**Filed Jan. 21, 1976, Ser. No. 651,199**
**Int. Cl.² B21F *9/02***
**U.S. Cl. 140—93.4** **8 Claims**



1. A strap tensioning tool having a main frame, a base secured to the frame and adapted to contact a package to be tied with a strap loop, a strap feed wheel mounted from the main frame at a location adjacent the base, means operable to rotate the feed wheel, a gripper plug located in said base and defining a concave gripping surface, the feed wheel and gripper plug being constructed and arranged to receive overlapping ends of said strap loop, means for providing relative movement between said feed wheel and said gripper plug to permit loading and releasing of said overlapping loop strap ends, means for providing a biasing force on the overlapping strap ends between the feed wheel and gripper plug, whereby when the feed wheel is rotated the strap end contacted by the feed wheel will be drawn in a loop tightening direction, and means for pivotally mounting said gripper plug in said base location with the pivotal axis parallel to the axis of said feed wheel and with said concave gripping surface aligned symmetrically with the convex surface of said feed wheel about the mid-point of the arc of the concave gripping surface, thus permitting rotation of said gripper plug about said pivotal axis under the influence of the force on the overlapped strap ends during the tensioning action by the feed wheel, the interaction between the feed wheel surface and concave gripping surface distributing the impressed force therebetween substantially uniformly over the segment of the overlapping strap ends lying between the two surfaces to preclude pinching of the strap.

## 4,015,644
## PRODUCTION OF A VARIEGATED PRODUCT

**Alfred W. Kinney, Kansas City, Mo., assignor to Phillips Petroleum Company, Bartlesville, Okla.**

**Division of Ser. No. 377,449, July 9, 1973, Pat. No. 3,886,973. This application Mar. 31, 1975, Ser. No. 563,401**
**Int. Cl.² B65B *3/10***
**U.S. Cl. 141—9** **10 Claims**

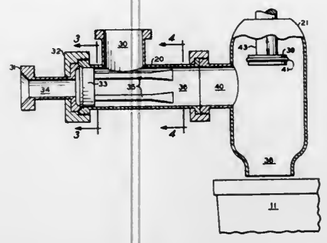
1. A process for filling a container with a variegated product having a generally liquid material distributed within a generally plastic material, said process comprising:

passing a stream of said plastic material into a generally tubular chamber having a downstream outlet and an intermediate inlet, both of approximate diameter D, by forcing said plastic material under pressure into said intermediate inlet;



forming said generally liquid material into at least one ribbon-shaped stream, each said ribbon-shaped stream comprising a stream having a two dimensional cross-sectional shape, transverse to its direction of flow, defined by one relatively long dimension and one relatively short dimension; and

injecting at least one said ribbon-shaped stream of said



generally liquid material into said plastic material stream within said chamber;

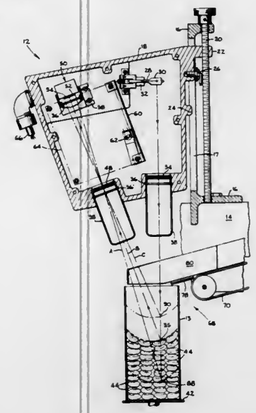
passing the resultant combined stream of said plastic material and said liquid material along a path of flow generally parallel to the central axis of said chamber through said downstream outlet into a filling valve; and

periodically releasing a quantity of said combined stream from said filling valve into a container.

## 4,015,645
## CAN FILLING APPARATUS

**Donald W. Chamberlin, Los Gatos, Calif., assignor to FMC Corporation, San Jose, Calif.**

**Division of Ser. No. 402,431, Oct. 1, 1973, abandoned. This application Mar. 31, 1975, Ser. No. 563,540**
**Int. Cl.² B65B *1/14, 57/06***
**U.S. Cl. 141—34** **8 Claims**

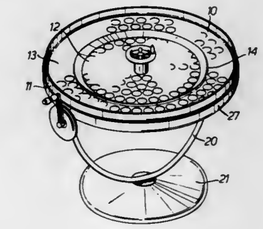


1. Apparatus for filling a container to a predetermined level comprising means for supporting a container having a vertical axis of generation, means for filling said container with a product, means for rotating the container and product about said axis, a light source, a first lens for focusing the light from said light source upon a spot on a rotating annulus that is concentric with said axis and is formed on the top surface of the product in said container, a second lens positioned so as to receive at least a portion of the light reflected from said annulus, a photodetector means having a pair of photosensitive elements positioned directly adjacent to each other in a plane parallel to the plane of said second lens, said photosensitive elements being electrically connected so that an output signal is provided therefrom which is indicative of the relative amounts of light received by each of the elements, said second lens being positioned with respect to said photodetector means and said rotating annulus so that said light reflected from said spot on said annulus is focused on said photodetector means, said photodetector means being capable of providing a continuous measurement of the angle between said lenses about said spot on said rotating annulus to thereby provide continuous measurement of the level of the top surface of the product in said container, and control means connected to said photodetector means and to said means for filling the container for stopping said means for filling the container in response to said output signal when said top surface of the product in said container reaches said predetermined level.

## 4,015,646
## LIQUID DISPENSING APPARATUS

**Edgar W. Borrow, Padnell Grange, Cowplain, Portsmouth, Hampshire, England**

**Filed Sept. 24, 1975, Ser. No. 616,493**
**Claims priority, application United Kingdom, Sept. 27, 1974, 42174/74**
**Int. Cl.² B65B *1/14***
**U.S. Cl. 141—34** **5 Claims**



2. Liquid dispensing apparatus comprising

a tray, the surface of the tray having a central circular area surrounded by an annular area,

an annular upward step separating said circular area from said annular area,

an upwardly directed flange on the tray surrounding the annular area,

each said area having a plurality of apertures therein,

an equal plurality of drinking vessels removably sealed in said apertures with the rim of each vessel flush with the part of the tray defining the aperture in which it is received,

means supporting the tray for rotation about an axis through its centre perpendicular to the plane of the central area, and

means supporting the tray for tilting movement about a horizontal axis.

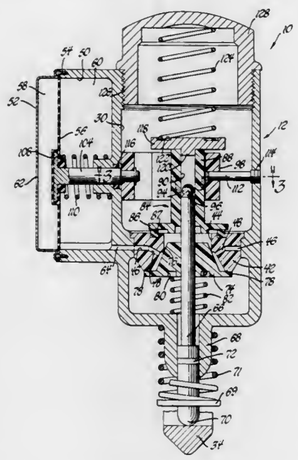
## 4,015,647
## AUTOMATIC NOZZLE ASSEMBLY

**Lowell F. Nelson, Muskegon, Mich., assignor to Enterprise Brass Works, Muskegan, Mich.**

**Filed Nov. 10, 1975, Ser. No. 630,302**
**Int. Cl.² B65B *57/14***
**U.S. Cl. 141—206** **11 Claims**

1. An automatic nozzle assembly comprising: housing means having an inlet and an outlet and a fluid passage extending therebetween, an annular valve seat disposed in said fluid passage in sealing engagement with said housing and having a valve opening therethrough, said valve seat having an annular groove about the periphery thereof, at least one valve passage extending through said valve seat between said groove and said valve opening, said housing means defining a dia-

phragm cavity, a diaphragm dividing said diaphragm cavity into first and second chambers, said housing means having a passage therein communicating said second chamber of said diaphragm cavity with said annular groove in said valve seat, a valve stem extending through said housing means for engagement by a handle exteriorly of said housing means, said valve stem being in sealing engagement with said housing means and extending through said opening in said valve seat, a check valve slidably disposed on said stem for engaging said valve seat in the opening thereof on the downstream side of said opening, first spring means reacting between said housing means and said check valve for urging said check valve into said opening and for allowing said check valve to move out of



said opening in response to fluid flow to create a venturi with said opening in said valve seat to which said valve passage is responsive, a poppet valve member for engaging said valve seat in a closed position on the upstream side of said opening for closing said opening to prevent fluid flow therethrough, second spring means reacting between said housing means and said poppet valve for urging said poppet valve to said closed position, said poppet valve being disposed upon said valve stem, control means interconnecting said valve stem and said poppet valve and said diaphragm for causing said poppet valve to open in response to movement of said valve stem and to close independently of movement of said valve stem in response to movement of said diaphragm.

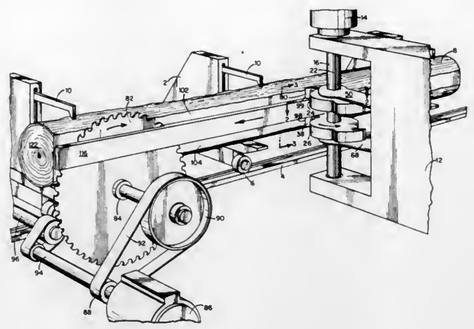
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**4,015,648**
**SAWMILL**

**Henry M. Shepard, c/o Forest-All Corporation, Sheep Davis Road, Concord, N.H. 03301**

**Continuation of Ser. No. 455,965, March 29, 1974, abandoned. This application Apr. 13, 1976, Ser. No. 676,427**
**Int. Cl.² B27C** *1/02, 9/00*
**U.S. Cl. 144—326 R** **7 Claims**

**1.** A machine for cutting a log into boards, said machine comprising a pair of chippers mounted in axially movable and keyed relation on a vertical shaft, means for rotating said shaft and chippers at proper chipping speed, each said chipper including cutting edges defining circular paths which will produce simultaneously first vertical and horizontal surfaces on the said log, means for moving said chippers to and maintaining them at determinable vertical positions on said shaft, a reciprocable horizontal carriage, means for securing a log thereon, means for lateral adjustment of said carriage so that the said log will be engaged by the cutting edges of said chippers as the log passes thereby to produce said vertical and horizontal surfaces, a vertically positioned saw whose faces are parallel to the axis of said shaft and the direction of movement of said carriage, said saw located beyond said chippers so that an advancing log will first engage said chippers and then engage said saw, the cutting edges of said chippers being



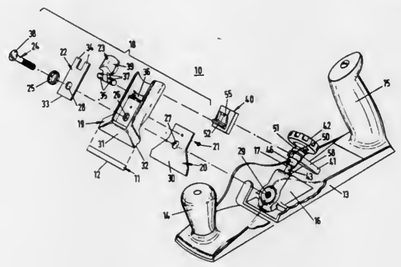
disposed within the planes defined by the parallel faces of said saw whereby as a board is cut from said log said first vertical surfaces are replaced by saw produced vertical surfaces.

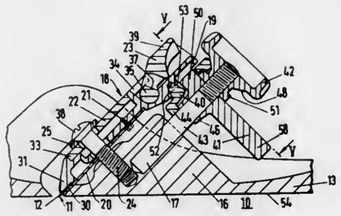
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**4,015,649**
**WOOD PLANES**

**Richard Gilbert, Dronfield, England, assignor to Stanley Tools Limited, Woodside, England**

**Filed Oct. 21, 1975, Ser. No. 624,313**
**Claims priority, application United Kingdom, Oct. 29, 1974, 46848/74**
**Int. Cl.² B27G** *17/02*
**U.S. Cl. 145—11** **3 Claims**





**1.** A plane adapted to be fitted with a disposable blade of the type whose maximum dimension is parallel to the direction of the cutting edge of the blade comprising a main body having a rigid central block and a planar underside; a stud rigidly fixed to and projecting from said block; a blade holding assembly mounted on said block for adjustable movement relative thereto, said assembly comprising a blade support having a blade receiving recess on one surface, a blade retaining spring member secured to said one surface of said blade support and



self-biased away from the support adjacent said recess, an elongated release plate and a quick release lever mounted on said support on the surface thereof opposite said one surface and a headed fastener retentively mounting said blade holding assembly on said block; said quick release lever including trunnions and said blade support having a groove on said opposite surface remote from said recess for receiving said trunnions, one end of said release plate being supported on said blade support and the other end being forked to provide a pair of arms resting on the trunnions of the quick release lever, said lever being selectively operable between a blade clamping position and a blade releasing position, the arrangement of the blade holding assembly being such that when the quick release lever is in its blade clamping position, the trunnions urge the arms away from the blade support causing the plate to bear against the headed bolt to clamp said spring member between said support and said block for clamping the blade in said blade receiving recess, said trunnions being formed with relieved portions adapted to engage the arms of the release plate when the quick release lever is in its blade releasing position to position the arms nearer the blade support whereby said spring member is unclamped and self-biases away from the blade support recess for releasing the blade; a rotary adjustment member threadably engaging said stud and operable for drivably advancing and retracting said blade holding assembly and an intermediate element for the blade holding assembly interposed between said assembly and the rotary adjustment member, said intermediate element engaging the rotary adjustment member so that rotation thereof in opposite directions causes advancement and retraction respectively of the element and assembly relative to the main body without rotation of the element; said intermediate element additionally permitting slewing of the blade holding assembly relative to said element.

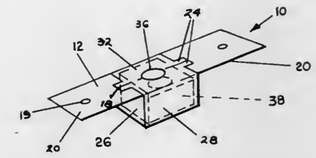
**2.** A plane adapted to be fitted with a disposable blade of the type whose maximum dimension is parallel to the direction of the cutting edge of the blade comprising a main body having a rigid central block and a planar underside; a stud rigidly fixed to and projecting from said block, said stud having an unthreaded portion adjacent said block and a threaded portion remote from said block; a rotary adjustment member threadably engaging said threaded stud portion and having a frustoconical surface portion; a blade holding assembly mounted on said block for movement relative thereto for adjusting the coarseness of cut of a blade mounted therein; a slewing adjustment lever pivotally mounted on said stud; an intermediate element for said blade holding assembly having a portion bearing upon the unthreaded portion of the stud and a frustoconical surface portion in confronting surface engagement with the frustoconical portion of the rotary adjustment member, said element and rotary adjustment member being interengaged by a flange-in-groove connection whereby rotation of the rotary adjustment member in opposite directions causes movement of both the rotary adjustment member and element along said stud; said blade holding assembly comprising a blade support member having a blade receiving recess, a blade retaining member secured to said support, a bolt connecting the blade holding assembly to the block and means for releasably clamping the blade retaining member between the blade support and the block for clamping the blade in the blade receiving recess; said bolt connecting the blade holding assembly to the block in such a manner that said assembly can pivot about said bolt for slewing adjustment and can move relative to the block for coarseness of cut adjustment; said element and said blade support being provided with slideable rib-in-groove connecting means extending transversely of said stud; said connecting means exhibiting an arcuate configuration along the extent thereof to facilitate said pivotal slewing adjustment; said slewing adjustment lever having a projection engaging said blade support member whereby pivotal adjustment of the lever causes pivotal slewing adjustment of said assembly relative to said element.

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**4,015,650**
**CAGED NUT**

**James C. Anderson, 5011 Whites Bridge Road, Smyrna, Mich. 48887**

**Filed Aug. 15, 1975, Ser. No. 605,198**
**Int. Cl.² F16B** *39/00*
**U.S. Cl. 151—41.76** **5 Claims**



**1.** A caged nut for mounting a threaded nut on a surface comprising:
- a nut having a threaded opening therethrough;
- housing means for enclosing the nut and limiting lateral and rotational movement thereof, said housing means comprising:
- a central section abutting one side of the nut with a bolt clearance opening therethrough mating with the opening in the nut;
- vertical walls extending at right angles from the central section and terminating in outer ends, said walls including two opposed ends walls and two opposed side walls that form the sides of a box, said vertical walls being positioned to be adjacent to the edges of the nut so as to prevent the nut from rotational movement;
- mounting flanges extending outwardly from the outer ends of the end walls, each end wall and attached mounting flange constituting a single arm member;
- locking flanges extending inwardly from the outer ends of the side walls;
- locking tabs extending outwardly from the sides of the locking flanges; and
- retaining means in the arm members for engaging and holding the locking tabs in place so as to prevent the side walls from spreading apart when a spreading force is exerted on the side walls by rotation of the nut, said retaining means comprising openings in the arm members that receive and retain the locking tabs.

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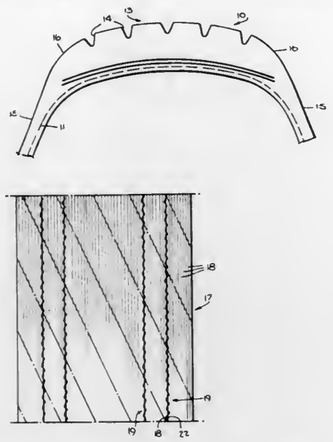
**4,015,651**
**TIRE CORD CODING SYSTEM**

**Jerry L. Witt, Winnsboro, S.C., and Barry B. Holmes, Miami Shores, Fla., assignors to Uniroyal Inc., New York, N.Y.**

**Filed May 22, 1975, Ser. No. 579,769**
**Int. Cl.² B60C** *9/16, 9/20*
**U.S. Cl. 152—356** **13 Claims**

**1.** In a tire cord fabric adapted for use in a pneumatic tire and having means incorporated therein for identifying the source of the tire cords, said fabric comprising a multiplicity of parallel, regular cords, and at least one pair of special cords parallel to said regular cords, said special cords and regular cords each being visible and distinguishable by X-rays according to their different constructions, and each special cord in a pair of special cords being spaced from each other by a particular number of identifiable regular cords, with each particular number of spacing cords being a code representing a respec-

tive source of said regular cords whereby any given source of the regular cords in the fabric may be identified according to



the code represented by the number of said regular cords between a pair of said special cords.

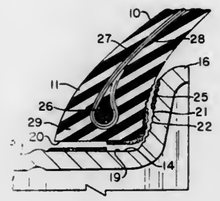
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**4,015,652**

## TIRE AND RIM ASSEMBLY

**James T. Harris, Cuyahogo Falls, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio**

**Filed Nov. 12, 1975, Ser. No. 630,980**
**Int. Cl.² B60C** *15/02, 17/00*
**U.S. Cl. 152—379.1** **4 Claims**



**1.** A tire and rim assembly comprising a rim for a wheel, said rim having a generally cylindrical shape and a pair of radially outwardly extending rim flanges at the edges, a first bead seat on said rim adjacent one of said rim flanges, a second bead seat on said rim adjacent the other of said flanges, an annular tire having a U-shaped cross section with circumferentially extending edges, a first bead portion at one of said edges and a second bead portion at the other of said edges, said first bead portion being mounted on said first bead seat and including a first annular inextensible bead ring with reinforcing plies embedded in and adhered by a bond to a bead covering material, said second bead portion including a second annular inextensible bead ring with reinforcing plies embedded in and adhered by a bond to said bead covering material, said first bead portion being adhered to said rim at said first bead seat by a cement providing a bond with sufficient strength to retain said first bead portion in said first bead seat during operation of said tire in the deflated condition and said bond between said bead covering material and said first bead ring with reinforcing plies being stronger than said bond between said first bead portion and said rim at said first bead seat so that said first bead portion can be unseated from said first bead seat without breaking said bond between said bead covering material and said first bead ring and reinforcing plies during dismounting of said tire from said rim.

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**4,015,653**

## PANEL DEPLOYMENT SYSTEM

**Paul Slysh, and LeRoy E. Siden, both of San Diego, Calif., assignors to General Dynamics Corporation, San Diego, Calif.**

**Filed Apr. 8, 1976, Ser. No. 675,007**
**Int. Cl.² E06B** *3/32*
**U.S. Cl. 160—213** **20 Claims**



**1.** A deployable structure comprisng:
a plurality of panels hingedly connected together in end-to-end relation and alternately folded into an accordion folded stack;
deployment arms, each having a free end and a rotatably fixed end, said deployment arms disposed adjacent to said stack;
at least one crawler engaged with one of said deployment arms and engaged with one of said panels;
a deployment drive for rotating said deployment arms to a position substantially perpendicular to said stack;
a crawler device for translating said crawler along the longitudinal length of said deployment arm; and
a panel drive disposed on said crawler for linear movement of said panels in a deployment plane substantially coplanar with said rotated deployment arms, causing said panels to alternately unfold from said accordion folded stack.

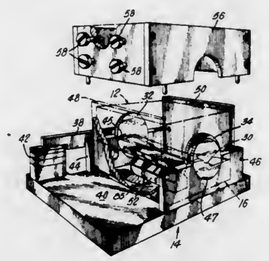
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**4,015,654**

## ADJUSTABLE TOOLING METHOD AND APPARATUS FOR INVESTMENT PATTERNS

**John B. Witchell, Pierrefonds, Canada, assignor to United Aircraft of Canada Limited, Longueuil, Canada**

**Filed Feb. 3, 1975, Ser. No. 546,677**
*Disclosure was also published under second Trial Voluntary Protest Program on Apr. 6, 1976*
**Int. Cl.² B22C** *7/00*
**U.S. Cl. 164—4** **12 Claims**



**1.** An apparatus for making a mold for pre-investment pattern, including a base, a locating means having indexing means adapted to be removably fitted to mating indexing means on said base, support means for supporting a representation of a form over said base, means for adjusting said representation of a form relative to said base and said locating means and means for spatially fixing said representation relative to said means.

**12.** A method of providing stator vane castings for a stator ring in a gas turbine engine, comprising the steps of forming a pattern of the airfoil section of the vane, providing separate inner and outer shroud mold cavities, splitting said pattern, mounting one of said split pattern sections on a support means, providing a casting chamber with a base, placing a locating block in the bottom of said casting chamber on said base in a predetermined position relative to the said base, orienting the support member with the split pattern section thereon in said casting chamber in a position relative to said locating block, pouring casting material into said casting chamber, removing said so-formed cast having a split pattern airfoil section cavity and the locating block, matching the so-formed cast mold with a companion mold made from the other split pattern airfoil section, mounting said assembled cast pieces on a lathe by means of said locating block and machining the cast material in the areas of the ends of the mold cavity so as to provide a suitable profile for receiving the inner and outer shroud mold cavities, matching the profiled mold pieces defining the airfoil section cavity with the mold pieces defining the inner and outer shroud cavities, pouring investment materials such as wax or investment plastic, into the so-formed mold cavity, separating the mold, investing the so-formed vane pattern, testing the vane in an assembled vane ring, preparing a new investment pattern on the basis of the data from the test by using the same split pattern on the support means and orienting the split airfoil pattern section in the said casting chamber relative to the locating block in response to the data acquired from the test, repeating the steps of matching and forming the pre-investment pattern, preparing a new investment cast vane and repeating the steps of this method until a suitable throat area and stagger angle of the stator vane ring is obtained.



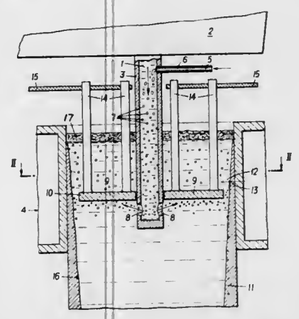
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**4,015,655**

## PROCESS AND APPARATUS FOR CONTINUOUSLY CASTING STRANDS OF UNKILLED OR SEMI-KILLED STEEL

**Thorwald Fastner; Max Mayrhofer, and Ernst Bachner, all of Linz, Austria, assignors to Vereinigte Osterreichische Eisen- und Stahlwerke-Alpine Montan Aktiengesellschaft, Linz, Austria**

**Filed June 20, 1975, Ser. No. 588,817**
**Claims priority, application Austria, June 25, 1974, 5236/74**
**Int. Cl.² B22D** *21/02, 11/00, 27/00, 11/10*
**U.S. Cl. 164—66** **7 Claims**



**1.** In a process for continuously casting strands of unkilled or semi-killed steel of a certain composition with a carbon content between **0.02** and **0.20%**, wherein the steel is cast from a tundish through a casting tube extending into a water-cooled mould, a strand skin and a front of solidification forming in the mould cavity adjacent the mould walls and wherein the solidifying strand is extracted from said mould and further cooled, the improvements comprising the steps of:
adjusting the composition of said steel, prior to casting by deoxidation, to a value [%C] × [%O] of below 0.002, the steel having a content of soluble Al not exceeding 0.01% and a Si content not exceeding 0.05%;
introducing flush gas into said casting tube during casting, thereby forming gas bubbles; and
deflecting said gas bubbles emerging from said casting tube toward the mould walls by means of a horizontal guiding plate having a cross-section somewhat smaller than the cross-section of the mould cavity to cause said gas bubbles to ascend evenly distributed at said strand skin along said front of solidification.

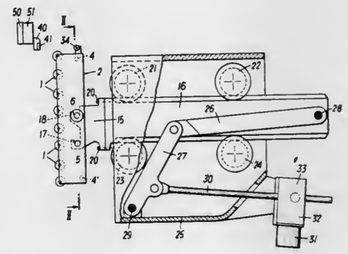
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**4,015,656**

## STRAND GUIDING MEANS FOR GUIDING A STRAND CONTINUOUSLY CAST IN A CONTINUOUS CASTING PLANT

**Alois Scheinecker, and Gunter Holleis, both of Linz, Austria, assignors to Vereinigte Osterreichische Eisen- und Stahlwerke-Alpine Montan Aktiengesellschaft, Linz, Austria**

**Filed Jan. 5, 1976, Ser. No. 646,670**
**Claims priority, application Austria, Jan. 7, 1975, 59/75**
**Int. Cl.² B22D** *11/128*
**U.S. Cl. 164—282** **11 Claims**



**1.** A strand guiding means for guiding one side of a strand continuously cast in a continuous casting plant having a carrying structure and a continuous casting mould, the strand guiding means comprising:
a frame part carrying support elements for said strand;
an adjustment means for adjusting said frame part relative to the strand both toward said strand and away from said strand a sufficient distance to allow said frame part to clear the mould, which adjustment means includes a displacement ruler; and
quick locking means detachably connecting said frame part with said displacement ruler to allow for a vertically upward removal of said frame part after release of said quick locking means and retraction of said displacement ruler.

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**4,015,657**

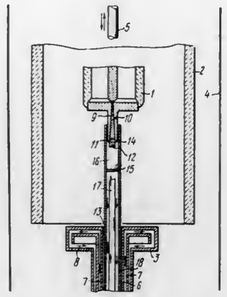
## DEVICE FOR MAKING SINGLE-CRYSTAL PRODUCTS

**Dmitry Andreevich Petrov, ulitsa Chkalova, 21, kv. 80, and Alexei Tikhonovich Tumanov, ulitsa Bolshaya Gruzinskaya, 36, kv. 58, both of Moscow, U.S.S.R.**

**Filed Sept. 3, 1975, Ser. No. 609,976**
**Int. Cl.² B22D** *15/04;* **B01J** *17/20*
**U.S. Cl. 164—361** **7 Claims**

**1.** A device for making single-crystal products by vertically-directed crystallization of molten metal, comprising: a ceramic mould for the molten metal, said ceramic mould having a bottom formed with a pocket for accommodating a seed intended for the initiation of the crystal and making single-crystal products, said bottom of said mould including a wall and said pocket extending downwardly from said wall; a cooler formed with an axial hole, said cooler being situated under said mould with provision for vertical motion; a cooling unit for cooling a seed in said pocket, said cooling unit extending into said axial hole of said cooler, interacting with said seed pocket, installed with provision for independent vertical movement relative to said cooler and seed pocket, and including a tube having an upper end region surrounding and embracing said seed pocket; a partition in said tube, said partition

being situated at an elevation lower than said seed pocket and dividing the space in said tube into an upper compartment into which said seed pocket extends and a lower compartment



which is supplied with refrigerant; said tube being made of a metal whose thermal conductivity ensures a maximum temperature gradient along the length of a seed in said pocket for the initiation of a crystal.

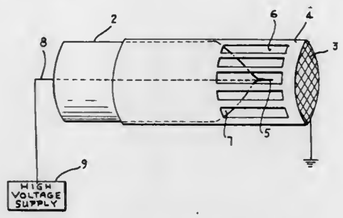
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**4,015,658**

## APPARATUS FOR ELECTRIC ENHANCEMENT OF HEAT TRANSFER

**Kenneth G. Kibler, and Harris G. Carter, Jr., both of Fort Worth, Tex., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**

**Filed Nov. 12, 1975, Ser. No. 631,355**
**Int. Cl.² F28F** *13/16*
**U.S. Cl. 165—96** **4 Claims**




**1.** Apparatus for electric enhancement of heat transfer of a heated object excluding the electric field therefrom in a preselected gaseous medium comprising a solid insulating rod of a predetermine diameter conically shaped at one end thereof, an electrically conducting point rigidly affixed to said conically shaped end and extending therefrom, an external high voltage supply of a predetermined magnitude, an electrical conductor running along the longitudinal axis of said solid insulating rod interconnecting said external high voltage supply and said electrically conducting point, a grounded conductive screen, a hollow insulating tube of a predetermined diameter having first and second openings, said grounded conductive screen completely covering said first opening, said hollow insulating tube being cylindrically and longitudinally slotted in the approximate region of said first opening, permitting free motion of said preselected gaseous medium, said hollow insulating tube enclosing said solid insulating rod and slightly pressure fitted thereto permitting sliding over said solid insulating rod for adjustment of the spacing of said electrically conducting point and said grounded conductive screen, the combination of said solid insulating rod, said electrically conducting point, said high voltage supply, said hollow insulating tube, and said grounded conductive screen constituting a first probe, the grounded conductive screen of said first probe being placed in the immediate region of said heated object to permit concentration of electric current flow toward the heated object.

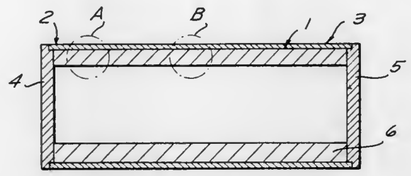
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**4,015,659**

## HEAT PIPE

**Hermann J. Schladitz, 74 Plaentschweg, Munich, Germany**

**Filed June 9, 1975, Ser. No. 584,951**
**Claims priority, application Germany, June 10, 1974, 2427968**
**Int. Cl.² F28D** *15/00*
**U.S. Cl. 165—105** **4 Claims**



**1.** A heat pipe, comprising a tightly sealed pipe-shaped body having an inner capillary system, said body being partially filled with a volatile medium and having a heat absorbing end and a heat emitting end, the capillary system comprised of polycrystalline metal whiskers at least in the region of the heat absorbing end and of the heat emitting end of the heat pipe, the whiskers having a metallic connection to the wall of the heat pipe the capillary system including metallized inorganic threads or fibers, between the end sections of polycrystalline metal whiskers.

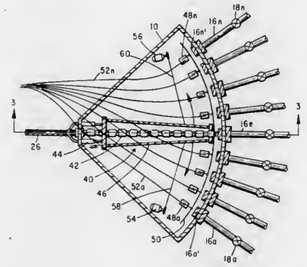
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**4,015,660**

## SUBSEA OIL AND GAS PRODUCTION MANIFOLD SYSTEM

**Harry R. Lewis, Jr., Chicago, Ill., assignor to Standard Oil Company (Indiana), Chicago, Ill.**

**Filed Dec. 16, 1975, Ser. No. 641,216**
**Int. Cl.² E21B** *43/01*
**U.S. Cl. 166—.5** **5 Claims**



**1.** A subsea maifold system for selectively connecting a transport line to one of a plurality of well lines from underwater wells, which comprises:

an enclosed wedge-shaped container,

a plurality of well-line inlets arranged in an arc on the inside of said container,

a passage in said container at the approximate center of a circle defined by said arc, said passage connected to said transport line,

a hollow, flexible arm having a first end connected to said passage and the other end extendible to and retractable from said arc, and

means to move said other end of said flexible arm to a selected well-line inlet, including means to extend and to retract radially said other end of said flexible arm to and from said inlet.

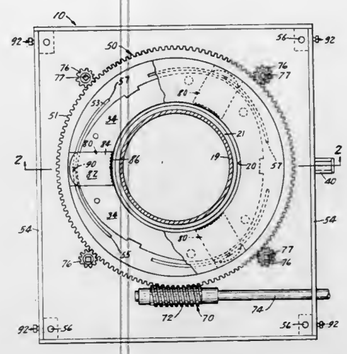


**4,015,661**

## APPARATUS FOR COUPLING AND UNCOUPLING PIPE SECTIONS

**John L. Christensen, 906 11th St. SE., Rochester, Minn. 55901**

**Filed Mar. 15, 1976, Ser. No. 667,024**
**Int. Cl.² E21B** *33/03*
**U.S. Cl. 166—77.5** **9 Claims**



**1.** Apparatus for coupling and uncoupling pipe sections at the head of a well casing, said apparatus comprising:

a. a base member adapted to support a platform over the head of a well casing, said platform having an opening therein which is adapted to permit said pipe sections to pass therethrough;

b. a plurality of self-engaging clamps supported on said platform around the periphery of, and projecting slightly over, said opening, said clamps being supported in a manner such that force exerted upwardly thereagainst by a pipe coupling in said opening effects disengagement of said clamps with respect to said pipe coupling but force exerted downwardly against said clamps will effect self-engagement thereof with respect to the periphery of said pipe coupling to prevent further downward movement, and rotational movement, of said coupling;

c. means for preventing self-engagement of said clamps with respect to said pipe coupling;

d. drive gear retaining means above said base and platform, said retaining means being supported in such a manner that rotational movement with respect to said platform is restricted while upward vertical movement is permitted,

e. drive gear means supported by said retaining means, said gear means being aligned over said opening in said platform, said gear means having a plurality of gripping arms in the center thereof adapted to grip a pipe section therein and cause rotational movement of said pipe section with respect to said coupling;

f. power means operatively associated with said drive gear means for effecting rotational movement thereof.

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**4,015,662**

## WELL TOOL WHICH CHANGES RECIPROCATING MOVEMENT TO ROTARY MOTION

**Chudleigh B. Cochran, Houston, Tex., assignor to Brown Oil Tools, Inc., Houston, Tex.**

**Filed Oct. 23, 1975, Ser. No. 625,259**
**Int. Cl.² E21B** *43/00*; **E21C** *3/00*
**U.S. Cl. 166—104** **21 Claims**

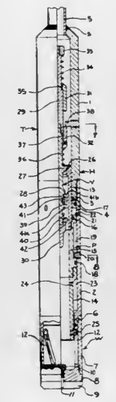
**1.** A well tool comprising:

a. a tubular housing connectable in fluid communication with the lower end of a pipe string;

b. a piston assembly carried by said housing for relative reciprocal movement therein between first and second terminal positions in response to fluid pressure communicated to said housing through said pipe string;

c. a working member carried by said housing for movement between first and second terminal positions in response to said reciprocal movement of said piston assembly;

d. valve means carried by said housing and having a closed position relative to said piston assembly blocking communication between said pipe string and a portion of said piston assembly, and an open position relative to said piston assembly permitting fluid communication between said pipe string and said portion of said piston assembly; and



e. retainer means cooperative between said valve means and said piston assembly to retain said valve means in said closed position when said piston assembly is in said first terminal position, but releaseable responsive to predetermined movement of said piston assembly toward said second terminal position to permit movement of said valve means to said open position and fluid communication with said portion of said piston assembly or returning said piston assembly to said first terminal position.

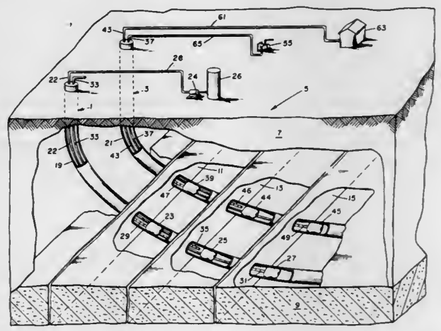
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**4,015,663**

## METHOD OF SUBTERRANEAN STEAM GENERATION BY IN SITU COMBUSTION OF COAL

**Malcolm K. Strubhar, Irving, Tex., assignor to Mobil Oil Corporation, New York, N.Y.**

**Filed Mar. 11, 1976, Ser. No. 665,985**
**Int. Cl.² E21B** *43/24, 43/26*; **F24J** *3/02*; **F28D** *21/00*
**U.S. Cl. 166—258** **4 Claims**



**1.** A method of burning in situ a subterranean coal formation and recovering the heat resulting therefrom, comprising:

a. providing a first well and a second well that extend from

the surface of the earth and communicate with said coal formation;

b. forming by hydraulic fracturing techniques a first fracture that extends through said coal formation and communicates with said first well and said second well;

c. forming by hydraulic fracturing techniques a second fracture, spaced apart from said first fracture, that extends through said coal formation and communicates with said first well and said second well;

d. injecting a combustion-supporting gas into said first fracture;

e. igniting said coal to form a combustion front about said first fracture and to generate heat and hot product gases;

f. continuing to inject said combustion-supporting gas into said first fracture to propagate said combustion front through said coal formation along said first fracture and conduct said heat through said coal formation and into said second fracture;

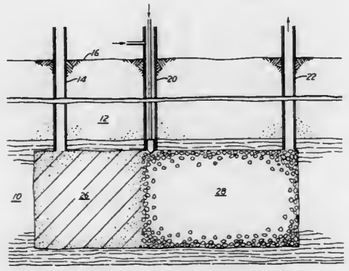
g. injecting a fluid into said second fracture to absorb said heat and heat said fluid; and

h. continuing to inject said fluid into said second fracture to flow said heated fluid through said second fracture to facilitate the recovery of said heat.

## 4,015,664
## SHALE OIL RECOVERY PROCESS

**Willard P. Acheson, Pittsburgh; Hans H. A. Huygen, Bakerstown, and Robert P. Trump, Valencia, all of Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.**

**Filed Apr. 14, 1976, Ser. No. 677,040**
**Int. Cl.² E21B** *43/24, 43/26*
**U.S. Cl. 166—259** **9 Claims**

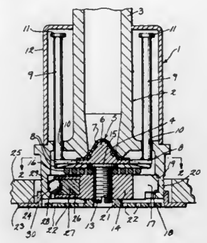


1. A method of producing oil from oil shale covered by overburden comprising drilling a pilot hole through the overburden and into the shale, undercutting the pilot hole through an interval in the shale and removing cuttings therefrom to form a cavity of enlarged diameter adapted to allow expansion of the shale, drilling first shot holes through the overburden and into the shale at a location spaced from the pilot hole, detonating an explosive in the first shot holes in the interval of the oil shale to blast oil shale into the cavity and thereby form a mass of rubblized oil shale between the shot hole and the pilot hole, displacing air down the pilot hole and into the oil shale, igniting the oil shale, continuing the injection of air into the pilot hole to burn shale in the cavity between the injection hole and the first shot hole, delivering oil and combustion products through the first shot holes to the surface, drilling second shot holes into the shale at a location laterally spaced from the first shot holes downwardly through the overburden and oil shale, thereafter detonating explosives in the second shot holes to rubblize oil shale into void space between the pilot hole and the first shot hole, injecting air into the rubblized shale adjacent the first shot hole, igniting the rubblized oil shale in the oil shale formation, producing oil and combustion products through a second shot hole, and repeating the series or rubblizing and in-situ combustion steps to cause combustion of the oil shale to move laterally through the oil shale.

## 4,015,665
## CONCEALED SPRINKLER HEAD

**John R. Simons, Delavan, and John W. Fenske, Wauwatosa, both of Wis., assignors to Grunau Company, Inc., Milwaukee, Wis.**

**Filed Aug. 7, 1975, Ser. No. 602,831**
**Int. Cl.² A62C** *37/06, 37/12*
**U.S. Cl. 169—40** **3 Claims**



1. An automatic sprinkler head to be mounted above the level of a ceiling in a building, comprising an orifice body having an inlet to be connected to a water line and having a discharge outlet, a valve cap assembly to enclose the outlet and including deflector means, said deflector means acting to deflect the water being discharged from said outlet in a desired spray pattern when said valve cap assembly is moved to the open position, latch means disposed in engagment with said valve cap assembly to maintain said assembly in the closed position, one end of said latch means defining a projection, first abutment means formed on said orifice body and disposed to be engaged by said projection, said latch means having a recess located in spaced relation to said projection, said recess having a generally horizontal axis, said latch means includes a vertical opening communicating with the inner end of said recess, a tubular housing connected to said opening and projecting downwardly from said latch means, a fusible element disposed within said housing and adapted to melt at a predetermined elevated temperature, a series of balls disposed within said housing and said recess, the innermost of said series of balls being disposed in engagement with said fusible element, second abutment means formed on the orifice body and spaced from said first abutment means, the outermost of said series of balls being engaged with said second abutment means, and a decorative plate carried by said housing and adapted to bear against the undersurface of the ceiling, said housing projecting downwardly beyond said plate, melting of said fusible element resulting in said outermost ball being moved inwardly of said recess to release said latch means and open said discharge outlet.

## 4,015,666
## SOD UNDERCUTTING KNIFE

**Gerardus Johannes Brouwer, Keswick, and Theodorus Petrus Hubertus Gerrits, Newmarket, both of Canada, assignors to Brouwer Turf Equipment Limited, Keswick, Canada**

**Filed Mar. 3, 1975, Ser. No. 554,811**
**Int. Cl.² A01B** *45/04*
**U.S. Cl. 172—19** **6 Claims**

6. An undercutting knife for a sod cutting machine, said knife comprising:

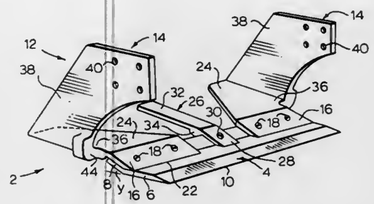
a. an undercutting blade have a front cutting edge, and a rear portion,

b. combined support and guide means for said undercutting blade, said support and guide means having a front portion and a rear portion, and means detachably connecting said front portion of said support and guide means to said rear portion of said blade for smooth passage of sod from said blade over said support and guide means,

c. said rear portion of said support and guide means having two outer edge portions, one at each side thereof, each edge portion being located above said front cutting edge so that said edge portions remain above the ground when said knife is in normal use,

d. a pair of mounting arms one integrally connected to each outer edge portion, each arm being adapted to be connected to carrying means for carrying and reciprocating said knife,

e. said blade having a transverse bend therein extending across its width, and dividing said blade into a front portion and said rear portion, said cutting edge being formed on said front portion and said rear portion slanting upwardly from said rear portion,



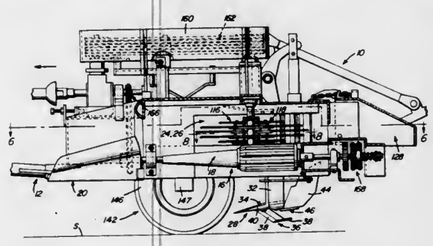
f. said front portion of said support and guide means having a bevel in its lower surface at the front edge thereof, the angle between said bevel and the remainder of the lower surface of said front portion of said support and guide means being the same as the angle between said front and rear portions of said blade, said bevel lying over the upper surface of said front portion of said blade immediately in front of said bend, whereby to reduce interference to movement of sod passing from said blade over said support and guide means.



## 4,015,667
## COTTON STALK AND ROOT SHREDDER WITH RE-BEDDER

**Aldo Ruozi, 157 N. McDonald Way, Bakersfield, Calif. 93309**

**Filed Apr. 14, 1975, Ser. No. 568,127**
**Int. Cl.² A01B** *35/18;* **A01D** *43/12*
**U.S. Cl. 172—133** **16 Claims**



1. In a root and stalk shredder which includes a frame movable in a direction of movement along a path of travel, a pair of longitudinally extending, parallel, power driven lifting rollers rotatably mounted on the frame and extending longitudinally parallel to the path of travel, guide means mounted on the frame forward of the rollers in the direction of movement of the frame for guiding stalks between the roller, a blade assembly mounted on the frame over the rollers and operatively associated with the rollers for cutting roots and stalks lifted by the rollers, and a plow assembly mounted on the frame; the improvement wherein the plow assembly comprises, in combination:

a. a standard attached to the frame;

b. an earth engaging digging blade affixed to the standard and arranged vertically below and centrally between the rollers substantially rearward of the rollers along the path of travel of the frame for effecting a splitting of the earth and freeing of the roots subsequent to an initial grasping of the stalks by the rollers;

c. a fin including a fin affixed to the undersurface of the digging blade and extending cantilever fashion away from the digging blade and the standard to a free end terminating the fin, and an uplifting wing mounted on the free end of the fin and transversely to the fin, the fin assembly being arranged for fracturing the soil below the digging blade, preventing soil compaction by the digging blade, and facilitating directional plant root growth; and

d. a furrowing-out shovel blade attached to the standard adjacent to the digging blade and arranged extending substantially rearwardly of the standard along the path of travel of the frame for splitting the bed and leaving a furrow open for receiving shredded crop,

the improvement further comprising a bed re-shaping assembly arranged rearwardly of the frame relative to the direction of movement of the frame, the bed re-shaping assembly including, in combination:

1. a pair of notched disc blades;

2. bracket means mounted on the frame and rotatably mounting the disc blades for lifting and lowering the disc blades relative to the frame and selectively engaging the disc blades in a bed being re-shaped;

3. first and second tool bars adjustably connected to the bracket means, the disc blades rotatably mounted on the first and second tool bars at a point thereon spaced from the connection of the first and second tool bars to the bracket means; and

4. a tool bar assembly mounted on the bracket means together with and adjacent to the notched discs, the tool bar assembly including a third tool bar adjustably attached to the first tool bar, and a sweep blade adjustably mounted on the third tool bar at a point thereof spaced from the attachment of the third tool bar to the first tool bar, the first tool bar and third tool bar being arranged extending in substantially parallel planes.

16. In a root and stalk shredder which includes a frame movable in a direction of movement along a path of travel, a pair of longitudinally extending, parallel, power driven lifting rollers rotatably mounted on the frame and extending longitudinally parallel to the path of travel of the frame, guide means mounted on the frame forward of the rollers in a direction of movement of the frame for guiding stalks between the rollers, a blade assembly mounted on the frame over the rollers and operatively associated with the rollers for cutting roots and stalks lifted by the rollers, and a plow assembly mounted on the frame; the improvement wherein each of the lifting rollers comprises, in combination;

a. a cylindrical portion rearward of a forward end of the rollers relative to the direction of movement of the frame; and

b. a sleeve constructed from a resilient material arranged in conforming engagement on the cylindrical portion of the roller, the sleeve being provided with a plurality of longitudinally extending, outwardly projecting ribs on an outer surface of the sleeve, and a plurality of longitudinal rods embedded in each lifting roller sleeve, each rib having a rod associated therewith, for absorbing shock and prolonging wear of the sleeve.

## 4,015,668
## POWER CULTIVATOR APPARATUS

**Richard R. Wilson, 6901 W. 36th Street South, Wichita, Kans. 67215**

**Filed Oct. 21, 1974, Ser. No. 516,433**
**Int. Cl.² A01B** *69/00;* **B62D** *51/04*
**U.S. Cl. 172—260** **2 Claims**

1. A power cultivator apparatus operable for earthworking operations in limited space areas, comprising:

a. a power means mounted on a support and guide means;

b. said support and guide means including a main support frame assembly having a centrally positioned drive wheel assembly connected thereto and at one end a handle bar assembly secured thereto;

c. a tool means connected to said main support frame assembly having a tool member secured to a tool support frame;

d. a control means including a tool control assembly to raise and lower said tool member;

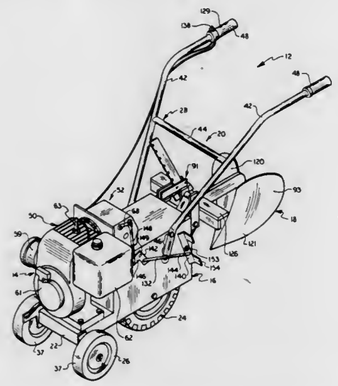
e. said tool control assembly having a foot operable tool actuator connected to said tool support frame;

f. said tool actuator including an actuator member secured to a lock bar, and a spring member connected to said tool actuator to bias same to the latched condition

g. said tool support frame having a latch member releasably connectable with said lock bar;

h. said actuator member movable through one's foot against the bias of said spring member and out of engagement with said latch member to raise or lower said tool member, and, on removing one's foot from said actuator member, said spring member moves said lock bar into locking engagement with said latch member;

i. said support and guide means having a lateral support wheel assembly mounted on a forward portion of said main support frame assembly;



j. said lateral support wheel assembly including a pair of wheel members each rotatably mounted on a separate shaft member from the shaft member on which the other of said pair of wheel members is mounted, each said shaft member connected to a separate actuator arm member from the actuator arm member connected to the other said shaft member, and each said arm member pivotally connected to said support frame assembly by a common shaft member interconnecting said actuator arm members;

k. said control means including a wheel control assembly having a foot operably wheel actuator connected to one of said actuator arm members by a rod member, said wheel actuator pivotally connected to said support frame assembly and a wheel spring member connected to said wheel actuator and to said support frame to bias said wheel actuator to raised and lowered positions;

l. said wheel actuator, when positioned in said lowered position, cooperating with said drive wheel assembly to support said power cultivator apparatus on a ground surface; and

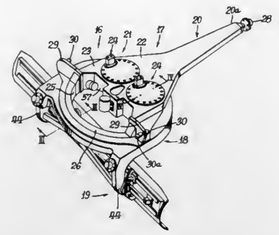
m. said wheel actuator, when moved by one's foot to said raised position, causes rotation of said actuator arm member and raising of said wheel members out of contact with the ground surface for earthworking operations with said tool means.

**4,015,669**

## CIRCLE MOUNTING BAR AND CIRCLE ASSEMBLY FOR A MOTOR GRADER

**Carroll Richard Cole, Decatur, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.**

**Filed Mar. 3, 1976, Ser. No. 663,594**
**Int. Cl.² E02F** *3/76*
**U.S. Cl. 172—796** **28 Claims**



1. A motor grader circle mounting bar and circle assembly comprising, in combination:

a circle mounting bar including a beam with a connecting end, and a circle carrying structure which is structurally integral with the end of said beam opposite said connecting end, said carrying structure comprising an annular, upright wall member provided with a drive opening, and radially outwardly extending top and bottom flange members on said wall member which define therewith an outwardly open annular cavity, said flange members having bearing surfaces facing into said cavity, and one of said flange members being detachably connected to said wall member;

and a circle structure rotatably mounted between said flange members, said circle structure comprising an annular member which has continuous bearing surfaces abutting the bearing surfaces on said flange members and cooperating with the carrying structure to define a closed annular chamber, and internal ring gear means on said annular member in the same transverse plane with the drive opening so said ring gear means may be driven by a drive member supported on the carrying structure;

and a separate sealing means between said annular member and each of said flange members to seal said chamber.

**4,015,670**

## FLUID OPERATED HAMMER

**Ian Graeme Rear, 53 Louise St., Nedlands, Perth, Australia 6000**

**Filed Sept. 5, 1975, Ser. No. 610,809**
**Claims priority, application Australia, Sept. 6, 1974, 8797/74**
**Int. Cl.² E21B** *5/00*; **E21C** *7/00*
**U.S. Cl. 173—15** **11 Claims**

1. A fluid operated hammer for rock drills, comprising:

a cylinder;

a drill chuck mounted at one end of said cylinder to receive a drill bit;

a drill sub attached to the other end of said cylinder;

a tubular fluid feed tube mounted in the drill sub and extending towards the chuck, the longitudinal central axis of the feed tube corresponding to the longitudinal central axis of the cylinder;

at least one set of apertures provided in the side wall of the feed tube and spaced from each end;

a piston slidably mounted in the cylinder and over the feed tube to move between the drill chuck and drill sub, the lower end being adapted for striking an anvil portion of the drill bit extending through the drill chuck;

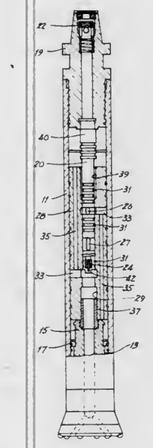
a first passageway in said piston communicating with one end face thereof and opening into the centre of the piston at a location spaced along the length of said piston;



a second passageway in said piston communicating with the end face of the piston communicating with the end of the piston opposite to that of the first passageway and opening into the centre of the piston at a location spaced along said piston;

the central bore of the piston having at each end of a counterbored portion, the remaining length of the central bore being of uniform diameter corresponding substantially to that of the feed tube, wherein said piston is symmetrical about its central diametric axis to be reversible in the cylinder without affecting the function thereof;

said drill bit being capable of limited longitudinal movement in the drill chuck and said anvil portion being formed with an upwardly directed annular spigot intended to be sealingly engaged by the adjacent counterbore of the piston when the piston and anvil portion are in abutting relationship;



one of said passageways communicating with one of said set of apertures in the feed tube when the piston is in abutting relationship with the anvil portion and said drill bit portion occupies its innermost position in respect of the chuck; to admit fluid into the space between the piston and drill chuck to drive the piston upwards;

the other of said passageways communicating with one of said set of apertures, when the piston is at its upper position in the cylinder and said drill bit portion occupies its innermost position in respect of the chuck, to admit fluid into the space between the piston and drill sub to drive the piston downwards; and

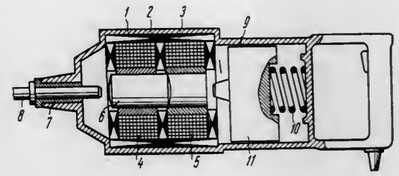
wherein when said drill bit is at its outermost position in respect of the chuck, the piston is maintained at its lowermost position abutting the anvil position, the upper counterbore is in communication with one of said set of apertures and said second fluid passageway provides communication between the uppermost end of the piston and the space between the end of the feed tube and the drill bit.

**4,015,671**

## ELECTRIC HAMMER

**Vladimir Mikhailovich Borisov, ulitsa Grekova 14, kv. 69; Boris Grigorievich Goldshtein, Molodogvardieskaya ulitsa 24, korpus 1, kv. 26; Albert Adlofovich Goppen, Novocheremushkinskaya ulitsa 44, korpus 2, kv. 90; Vladimir Alexeevich Eletsky, ploschad Vosstania 1, kv. 12"a".; Viktor Lvovich Sherman, Leningradskoe shosse, 7/2, kv. 606, all of Moscow; Kherbert Zhanovich Bush, Komsomolskaya ulitsa 13, kv. 23, Daugavpils; Nikolai Pavlovich Ryashentsev, Krasny prospekt, 50, kv. 53, and Evgeny Mikhailovich Timoshenko, ulitsa Sibiryakov-Gvardeitsev, 8, kv. 51, both of Novosibirsk, all of U.S.S.R.**

**Filed Apr. 17, 1973, Ser. No. 352,030**
**Int. Cl.² B25D** *11/06*
**U.S. Cl. 173—117** **2 Claims**



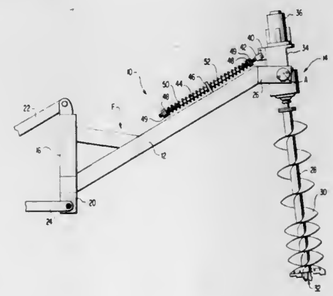
1. An electric hammer comprising: a housing; a stator accommodated in said housing; a hammer piston reciprocably mounted in said stator; a shock absorber accommodated in said housing and including a resilient member and an intermediate member disposed between said hammer piston and said resilient member; the mass of said intermediate member of the shock absorber being greater than the mass of said hammer piston, the mass of said intermediate member of the shock absorber and the force of said resilient member being determined by the ratio between the natural frequency of oscillations of the intermediate member and the stroke frequency of the hammer member, said ratio being substantially equal to (0.25–0.6).

**4,015,672**

## DIGGER ATTACHMENT

**Daniel E. Kinnison, 119 E. 9th St., Kimball, Nebr. 69145**

**Filed July 7, 1975, Ser. No. 593,500**
**Int. Cl.² E21C** *5/00*
**U.S. Cl. 173—160** **6 Claims**



1. A digger attachment for a tractor comprising a frame including an elongated arm, an auger carried by said frame arm adjacent one end thereof and for pivotal movement about a transverse pivotal axis, said auger having a rotatable shaft carrying a blade, means carried by said frame adjacent the opposite end thereof for securing the frame to the tractor for movement of said arm between a raised position with said auger blade poised for initial penetration into the ground and

a lowered position with the auger blade penetrating the ground to a predetermined depth respectively, and means cooperable between said frame arm and said auger for biasing said auger for movement into a first angular position relative to said arm such that, when said arm lies in its raised position, the rotational axis of said auger blade is slightly inclined from a true vertical line through its transverse pivotal axis with the auger blade tip located on the side of said true vertical line remote from said securing means, said auger being pivotal about its transverse axis and against said biasing means when said arm is moved from said raised position to said lowered position such that the rotational axis of said auger blade is substantially parallel to said true vertical line when said arm lies in said lowered position, said biasing means including a shaft pivotally carried by one of said auger and said arm and an abutment carried by each of said shaft and the other of said auger and said arm, and a spring about said shaft between said abutment for biasing said auger into said predetermined angular position relative to said arm, an extended portion of said shaft extending freely through one of the abutments, a third abutment carried by said shaft and a spring about the extended shaft portion between said one abutment and said third abutment, said springs cooperating with said abutments to bias said auger into said first angular position.

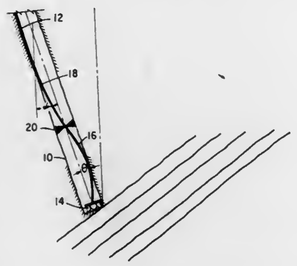
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**4,015,673**

## DIRECTIONAL DRILLING SYSTEM

**James T. Craig, Jr., Bixby, and Arthur Park, Tulsa, both of Okla., assignors to Standard Oil Company (Indiana), Chicago, Ill.**

**Division of Ser. No. 487,482, July 11, 1974, Pat. No. 3,961,674. This application Mar. 22, 1976, Ser. No. 669,367**
**Int. Cl.² E21B** *7/04*
**U.S. Cl. 175—61** **2 Claims**



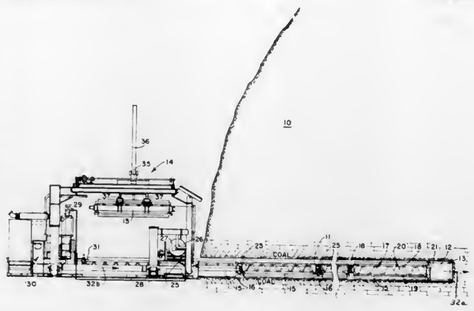

1. A method of determining if a bottom hole assembly (BHA) is stable for an angle $\theta_0$ of deviation in which the BHA includes a bit, a centralizer, a lower section of heavy-walled pipe called drill collars having a length X between said bit and said centralizer, which comprises:
   a. determine the angle $\theta_0$, $\theta_0$ being the angle the centerline of the lower section of heavy-walled pipe makes with the center line of the borehole;
   b. if the angle $\theta_0$ is positive, i.e., centerline of the lower section of heavy-walled pipe is above the centerline of the hole, the BHA is stable, proceed to step (e);
   c. if the angle $\theta$ is negative, decrease the length X;
   d. repeat step (a), if $\theta_0$ is positive, the BHA is stable; if $\theta_0$ is not positive, repeat steps (c) and (a) until $\theta_0$ is positive;
   e. then using the stable BHA in the drilling of a well.

**4,015,674**

## APPARATUS FOR UNITIZING A PAIR OF AUGERS

**Arthur L. Hawthorne, St. Clairsville, Ohio, and David R. Hazen, McMurray, Pa., assignors to Consolidation Coal Company, Pittsburgh, Pa.**

**Filed May 2, 1975, Ser. No. 574,071**
**Int. Cl.² E21C** *13/04*
**U.S. Cl. 175—91** **7 Claims**



1. Apparatus for unitizing a pair of side-by-side augers wherein each auger includes a shaft adapted to rotate about its axis having rotational coupling means at each end and flightings along its length, said apparatus comprising:
   a. bearing means rotatably mounted on each of said shafts;
   b. spacing means pivotally secured to each of said bearing means and between said pair of augers to align the rotational axis of said shafts substantially parallel with each other; and
   c. joining means attached to said spacer means to secure said auger pair with another said rotatably coupled auger pair.

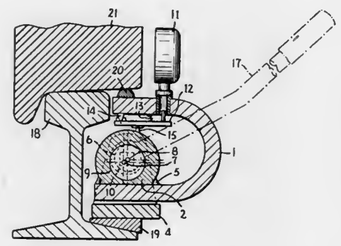
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**4,015,675**

## METHOD OF MEASURING A RAILWAY-VEHICLE LOAD

**Tzvyatko Penchev Stanev, Sofia, Bulgaria, assignor to DSO "Bulgarski Darjavni Jeleznitzi", Sofia, Bulgaria**

**Division of Ser. No. 388,888, Aug. 16, 1973, Pat. No. 3,887,002. This application Apr. 3, 1975, Ser. No. 564,664**
**Int. Cl.² G01G** *3/00*
**U.S. Cl. 177—1** **1 Claim**




1. A method of measuring the load of a railway vehicle wheel for a railway vehicle on a track which comprises the steps of:
   a. disposing between said track and a wheel of the vehicle a U-shaped shackle having a lower arm and an upper arm;
   b. lifting said lower arm while said upper arm bears against said wheel, thereby causing said arms to deflect toward one another; and
   c. registering the relative deflection of said arms toward one another on a dial guage whereby the deflection of said arms registered on said gauge at the instant said wheel is lifted from said track represents the wheel load.

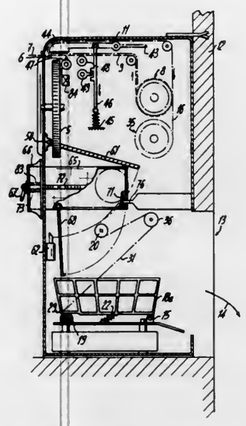


**4,015,676**

## RECORDING SCALE, FOR THE RECOVERY OF USED MATERIALS SUCH AS WASTE PAPER

**Henri Pittet, 6, rue du Mileant, 1203 Geneva, Switzerland**

**Filed May 27, 1975, Ser. No. 581,162**
**Claims priority, application Switzerland, May 25, 1974, 7175/74**
**Int. Cl.² G01G** *23/20*
**U.S. Cl. 177—5** **24 Claims**



1. A recording scale, especially for the recovery of used materials such as waste paper, said scale comprising:
   a. a weighing means;
   b. a closed casing enclosing said weighing means for determining the weight of materials presented;
   c. means for recording weight determined by the weighing means;
   d. means defining an opening in said casing and accessible from the exterior thereof for introduction of materials to be recovered, said opening being located opposite to said weighing means for bringing the materials to be weighed onto said weighing means, and
   e. ejecting means for transferring the weighed materials from said weighing means into a storage chamber, said ejecting means including an actuating member accessible from the exterior of said casing for operation of the ejecting means, and means normally holding said actuating member in a locked position and releasing said actuating member to allow operation of the ejection means in response to actuation of the weighing means, the weight-recording means being operable in response to operation of said ejecting means.

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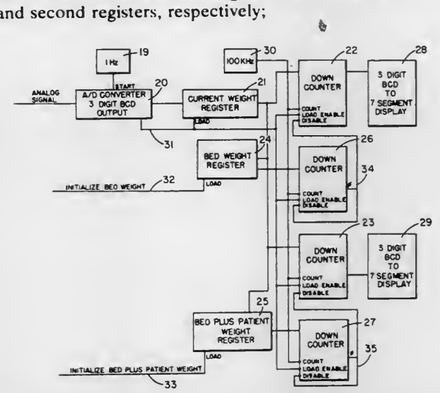
**4,015,677**

## AUTOMATIC PATIENT WEIGHING SYSTEM

**John Silva; Robert A. Garrett, both of San Diego; Franklin R. Borkat, La Mesa, and Frank Young, San Diego, all of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed July 25, 1975, Ser. No. 599,295**
**Int. Cl.² G01G** *13/14, 3/14*
**U.S. Cl. 177—165** **4 Claims**

1. A patient weighing system comprising:
   a bed assembly for receiving and supporting a patient;
   weight responsive means supporting said bed assembly for producing analog signals as a function of instantaneous total weight;
   analog-to-digital conversion means for converting said analog signals to commensurate digital signals;
   a first storage register for storing the digital signal representative of the weight of said bed assembly without the patient;
   a second storage register for storing the digital signal representative of current total weight of said bed assembly with the patient;
   a first down counter connected to receive the digital count from said first storage register;
   a second down counter connected to receive the digital count from said second storage register;
   a control clock for cyclically actuating said analog-to-digital conversion means at a predetermined frequency and producing cyclic signals for enabling said first and second down counters to load the digital counts from said first and second registers, respectively;




   a second clock having a substantially higher frequency than said control clock and connected for simultaneously counting down said first and second down counters;
   a connection from the output of said first down counter producing a signal when it reaches zero count for disabling said second down counter, whereby the remainder digital count in said second down counter is representative of net patient weight; and
   means responsive to said remainder digital count for visually displaying patient weight.

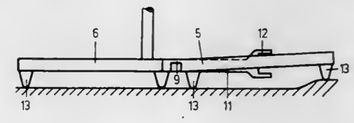
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**4,015,678**

## MASS AND FORCE METER WITH LEVELLING MEANS

**Armin Wirth, and Johannes Wirth, both of Zurich, Switzerland, assignors to Wirth, Gallo and Company, Switzerland**

**Filed Aug. 6, 1975, Ser. No. 602,423**
**Claims priority, application Switzerland, Nov. 14, 1974, 15297/74**
**Int. Cl.² G01G** *21/28, 21/12*; **F16M** *13/00*
**U.S. Cl. 177—244** **8 Claims**



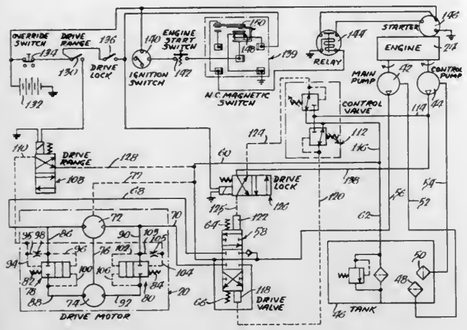

1. A mass and force meter comprising a four cornered frame with four sides, four legs each mounted under one corner of said frame, a four cornered load support with four sides resting upon said frame by means of four intermediary levers, each pair of opposite sides of the frame as well as the load support mounted for undergoing a relative angular displacement around an axis bisecting each pair of oppositely located sides under the effect of the weight of the meter itself, when the meter is positioned on an uneven surface, while two originally parallel and adjacent sides of the frame and the load support remain substantially parallel.

**4,015,679**

## DRIVE RANGE AND LOCK CONTROL SYSTEM

**Ronald J. Klitz, Mosinee, Wis., assignor to J. I. Case Company, Racine, Wis.**

**Filed May 16, 1975, Ser. No. 578,354**
**Int. Cl.² F16H** *39/48*
**U.S. Cl. 180—66 R** **11 Claims**




**1.** In a vehicle having an earthworking implement supported thereon and first and second ground engaging means on opposite sides of said vehicle for supporting and driving said vehicle, a control system comprising: hydraulic drive motor means connected to operate said ground engaging means for driving said vehicle, said motor means including first and second drive motor sections; a hydraulic fluid reservoir: main hydraulic circuit means including said drive motor means, said reservoir, main pump means for supplying fluid under pressure from said reservoir to said drive motor means, fluid actuated drive valve means actuatable to control flow of pressurized fluid to and from said drive motor means, and speed control valve means in said main hydraulic circuit having a first position supplying fluid to both said drive motor sections at a first slower speed range and a second position precluding supply of fluid to one of said motor sections to operate said motor means at a second higher speed range; control hydraulic circuit means including said reservoir, said drive valve means, control pump means for supplying fluid under pressure to actuate said drive valve means, manually operated control valve means for controlling flow of fluid under pressure to and from said drive valve means to control actuation thereof; and selectively actuatable means operable to connect one of said hydraulic circuit means to said speed control valve means to move said speed control means to said second position.

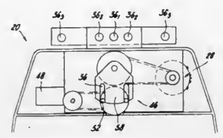
**4,015,680**

## AUTOMATIC RAILLESS GROUND CONVEYOR INSTALLATION

**Herbert Pircher, Planegg, and Johannes Hambuch, Geiselbullach, both of Germany, assignors to Buro Patent AG, Glarus, Switzerland**

**Division of Ser. No. 481,897, June 21, 1974, Pat. No. 3,948,342. This application Mar. 25, 1976, Ser. No. 670,456**
**Claims priority, application Switzerland, June 26, 1973, 9251/73**
**Int. Cl.² B62D** *1/24*
**U.S. Cl. 180—98** **5 Claims**

**1.** An automatic railless ground conveyor installation comprising a guide track for defining a route network having branches, a number of individual driverless traveling conveyor cars, each of said conveyor cars possessing steering mechanism for the contactless scanning of the guide track and a work control mechanism, said work control mechanism including code reading means for the contactless scanning of individual code markings identifying the branches and directly influencing the steering mechanism in the sense of reaching a destination determined by a target code set at the work control mechanism, the steering mechanism comprising a central scanning element which during straight ahead travel of the conveyor car is located over the guide track and after turning of the conveyor car onto the guide track serves to reset the steering deflection of the conveyor car, and at least two scanning elements arranged to each side of the central scanning



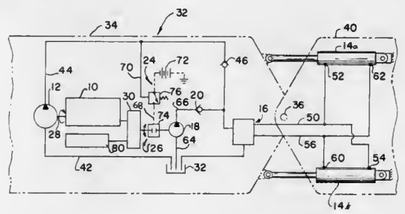
element at progressively increasing distance therefrom and transversely arranged with respect to the direction of conveyor car travel, the outermost scanning elements when activated by the guide track serve to trigger a greater steering deflection than the inner situated scanning elements.

**4,015,681**

## GROUND DRIVEN HYDRAULIC EMERGENCY STEERING SYSTEM

**Daniel B. Shore, Niles, and Edward D. Duke, Chicago, both of Ill., assignors to International Harvester Company, Chicago, Ill.**

**Filed Nov. 6, 1975, Ser. No. 629,441**
**Int. Cl.² B62D** *5/06*
**U.S. Cl. 180—133** **4 Claims**



**1.** An emergency steering system for use with a hydraulic steering system of a vehicle including a primary driven pump, a reservoir source of fluid, a selective valving means including a steering valve and means to position said steering valve, a hydraulic steering cylinder and first conduit for delivering fluid from said reservoir source of fluid through said driven pump and said selective valving means to said hydraulic steering cylinder, said first conduit means hosting a one-way check valve allowing fluid to flow from said pump to said selective valving means, and further second conduit for delivering fluid from said steering cylinder through said selective valving means to said reservoir source of fluid, the improvement comprising:

an emergency fluid pump having an input port and an output port for supplying fluid to said hydraulic steering system;

a ground drive source having motion corresponding to the motion of said vehicles;

a electromagnetic clutch means coupled to said emergency fluid pump and said ground drive source which when engaged allows said ground drive source to drive said emergency fluid pump and which when disengaged prevents said ground drive source from driving said emergency fluid pump;

sensing means responsive to the presence of fluid pressure in said first conduit;

third conduit means allowing fluid communication between said output port of said emergency fluid pump and said first conduit means of said hydraulic steering system;

a one-way check valve allowing fluid to flow in only one direction in said third conduit;



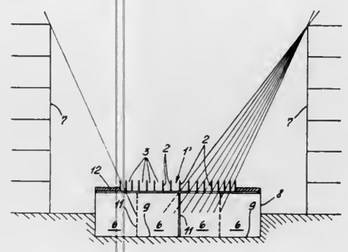
a fourth conduit means allowing fluid communication between said inlet port of said emergency fluid pump and said reservoir source of fluid.

**4,015,682**

## PROTECTING SYSTEM FOR ROADWAY ADJACENT AREAS

**Alfred Keller, Hermikonstrasse 25, CH-8600 Dubendorf, Switzerland**

**Continuation of Ser. No. 434,315, Jan. 17, 1974. This application Apr. 14, 1975, Ser. No. 567,773**
**Int. Cl.² G10K** *11/00*
**U.S. Cl. 181—33 E** **18 Claims**



**1.** The combination comprising:

a. a roadway adapted for motor vehicular traffic and extending along the surface of the ground, and

b. a noise protecting assembly for controlling sound emanating from the roadway,

c. said noise protecting assembly including a frame structure and a plurality of walls consisting at least partially of sound absorbent material,

d. said frame structure having dimensions of length and width and including a portion disposed above the roadway,

e. said walls having a width disposed vertically above the roadway,

f. said walls having a length disposed in a direction parallel to the centerline of the roadway and being laterally spaced with respect to each other across the width of the frame structure thereby forming intervals therebetween,

g. said walls and intervals being effective to prevent the direct path of sound from a source of noise on the roadway to objects in the vicinity of the roadway,

h. said intervals being between the walls and allowing the passage of air and light to the roadway.

**4,015,683**

## NOISE SUPPRESSOR FOR VACUUM SWEEPER AND THE LIKE

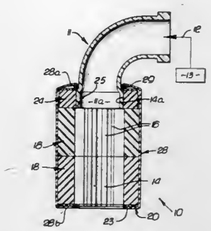
**William H. Williams, Rancho Palos Verdes, Calif., assignor to Purex Corporation Ltd., Lakewood, Calif.**

**Filed Dec. 29, 1975, Ser. No. 644,932**
**Int. Cl.² F01N** *3/06;* **A47L** *5/00*
**U.S. Cl. 181—36 R** **10 Claims**

**1.** In a noise suppressor package attachable to air exhaust tubing, the combination comrising:

a. annular body means defining an axially extending bore to pass said exhaust, said body means including compressible foam segments which project radially inwardly at said bore, said segments being axially elongated and circularly spaced, and

b. a tubular cover extending about said body means and having a flexible neck at one end of said body means, said



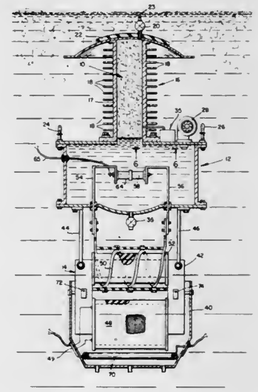
neck being radially inwardly constrictable about said exhaust tubing to retain the package to the tubing.

**4,015,684**

## SNOW FIELD SOUND IMPLODER

**Joseph Pauletich, 91-18 43rd Ave., Elmhurst, N.Y. 11373**

**Filed May 5, 1975, Ser. No. 574,240**
**Int. Cl.² G01V** *1/04*
**U.S. Cl. 181—120** **5 Claims**



**1.** A sonic imploder comprising a top steam chamber, a tank in communication with said chamber, a pump for maintaining the water level in said tank, a transformer, an electrode in said tank electrically heated by said transformer and a heater ring at the bottom of said imploder for melting snow and ice in which said device is adapted for sonic emission.

**4,015,685**

## APPARATUS FOR ALIGNING A MOBILE LIFT WORK PLATFORM

**Leonard L. Lenz, Greenville, S.C., assignor to American Mobile Corporation, Greenville, S.C.**

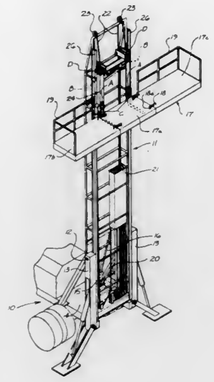
**Filed June 16, 1975, Ser. No. 586,944**
**Int. Cl.² B66B** *9/20*
**U.S. Cl. 182—145** **2 Claims**

**1.** In a work platform carried for movement up and down on parallel rails longitudinally mounted on an upright tower wherein the work platform is cantilevered laterally on a carriage on each side thereof movable on said rails, the improvement including:

A. a pair of vertically spaced wheels carried by said carriage on each outer side of said rails laterally thereof;

B a pair of transversely spaced flanges carried by said carriage adjacent each of a pair of said wheels;

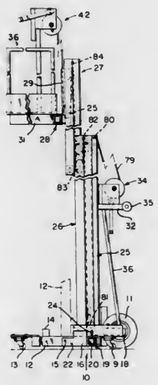
C. a member bridging each pair of said flanges;
D. a shaft extending at right angles through each of said pairs of flanges adjacent and in alignment with said bridging members;
E. a wheel carrying extension of said shaft carried eccentrically of one end of said shaft; and



F. a threaded means carried by said bridging members engaging said shafts fixing said shafts against rotation within said flanges;
whereby said threaded means may be disengaged from said shafts to adjust the spacing of said wheels from the adjacent rail.

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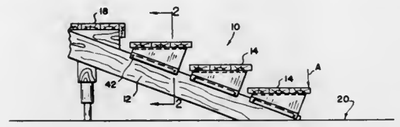
**4,015,686**
**PORTABLE MULTI-STAGE MECHANICAL LIST**
**Sherman W. Bushnell, Jr., 2924 Western Ave., Seattle, Wash. 98121**
**Continuation-in-part of Ser. No. 327,623, Jan. 29, 1973, Pat. No. 3,876,039. This application Apr. 4, 1975, Ser. No. 565,138**
**Int. Cl.² E04G** *1/22*; **B66B** *9/20*
**U.S. Cl. 182—148** **13 Claims**



1. In combination:
a first mast having a stop,
a sheave assembly slidably mounted on the first mast for downward movement relative to said stop,
a latch carried by the first mast for movement between inactive and latching positions,
means for moving the latch from inactive position when said sheave assembly engages said stop into latching position when said sheave assembly moves downwardly away from said stop, and
a second mast slidingly carrying said first mast and having a row of vertically spaced recesses arranged to receive said latch when the latch is in latching position whereby the first mast is locked against downward movement relative to said second mast when said latch occupies one of said recesses.

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**4,015,687**
**STEP BRACKET**
**Robert Dean, Owosso, Mich., assignor to Spiral-Craft, Owosso, Mich.**
**Filed Jan. 8, 1976, Ser. No. 647,625**
**Int. Cl.² E06C** *7/08*
**U.S. Cl. 182—220** **6 Claims**

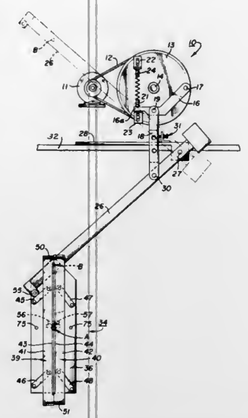


1. A step bracket adapted for securing a step to a stringer which stringer is sloped to the horizontal at a predetermined angle and wherein said step is substantially level with the horizontal slope, said step bracket comprising
a first elongated flat portion positioned on top of and abutting said stringer, said first portion having at least two apertures formed therethrough;
a second flat and triangularly shaped portion disposed in a vertical plane and having its lower edge secured to one lateral edge of said first portion and having its upper edge generally horizontal,
a third flat portion disposed in a horizontal plane and having one end secured to the upper edge of said second portion, said third portions having at least two spaced apertures formed therethrough;
a fourth flat portion disposed in a vertical plane and having its upper edge secured to the other lateral edge of said first portion, wherein said fourth portion flatly abuts against the side of said stringer and includes at least two spaced apertures formed therethrough, and
means for fastening said step to said bracket and said bracket to said stringer.

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**4,015,688**
**MASTER DOOR OPERATOR FOR VERTICALLY MOVABLE ELEVATOR GATES AND LANDING DOORS**
**Karl Mangel, 4709 B Church St., Skokie, Ill. 60076**
**Filed June 23, 1975, Ser. No. 589,030**
**Int. Cl.² B66B** *13/12*
**U.S. Cl. 187—52 LC** **12 Claims**

12. In an elevator including an elevator car having a vertically movable gate and a plurality of vertically movable landing doors at a plurality of landings, comprising
driving clutch means pivotally mounted to said gate for limited rotation in a vertical plane,
said clutch means including first and second clutch plates,
a plurality of driven clutch means pivotally mounted to respective ones of said doors,
said driven clutch means including a pair of clutch members,
means carrying said clutch members in spaced apart relationship for movement of said clutch plates therebetween,
driving means carried by said elevator car including a pivotally mounted arm for lifting and rotating said plates, and
means operative upon rotation of said driving means for causing said clutch plates to move apart into engagement with said clutch members,

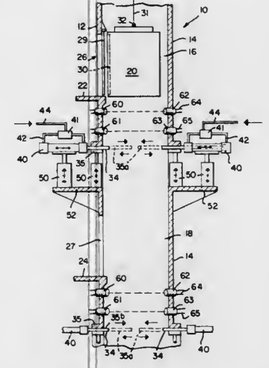


whereby said gate and said doors are opened in synchronism by said driving means.

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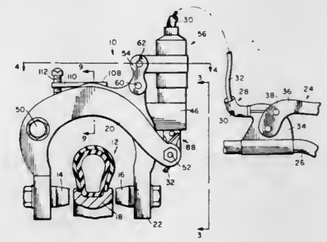
**4,015,689**
**ELEVATOR SYSTEM SAFETY BRACE DEVICE**
**Ronald Johnson, Chicago, Ill., assignor to Lawrence Peska Associates, Inc., New York, N.Y.**
**Filed Mar. 13, 1975, Ser. No. 558,057**
**Int. Cl.² B66B** *5/06*
**U.S. Cl. 187—62** **5 Claims**



1. An elevator safety device for use with elevators installed in an elevator shaft in a building or other structure including an elevator car and supporting means for said car for movement in said elevator shaft for movement between floors of said building, comprising: a plurality of safety brace elevator movement blocking means engaging said elevator shaft and extensible into and out of the path for movement of said elevator car for blocking downward movement of said car in said shaft; said safety brace elevator movement blocking means including at least one elongated brace member; support bracket means carried in said elevator shaft for supporting said brace member for movement of said brace member from retracted to extended positions on said support bracket means and including brace member reciprocating means for moving said brace member from extended to retracted positions and back again; brace retaining means for retaining said brace means member in extended normal position to block descent of said elevator car; retracting control means for operating said brace reciprocating means for moving said brace means members into retracted position out of the path of descent of said elevator car whenever said car undergoes less than a predetermined excessive rate of descent in speed; fluid cylinder housing means; piston means in said housing means and connected at one end to a said brace member for movement therewith; valve means for admitting a fluid into said housing means for moving said piston means; fluid pumping means for actuating said piston means; timing control means for actuating said fluid pumping means for moving said piston means and said interconnected brace member from extended car blocking position to retracted car unblocking position whenever said speed of car descent remains below said predetermined rate of speed; and actuating means brought into action upon excessive speed of descent of said car beyond a predetermined speed to actuate said blocking means to prevent retraction thereof and block movement of said car therepast in said shaft.

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**4,015,690**
**BICYCLE BRAKE WITH FORCE MODIFYING MEANS**
**Allen E. Armstrong, 34 Robinson Road, Lexington, Mass. 02173**
**Continuation-in-part of Ser. No. 602,668, Aug. 7, 1975. This application Oct. 24, 1975, Ser. No. 625,534**
**Int. Cl.² B62L** *1/16*
**U.S. Cl. 188—24** **17 Claims**



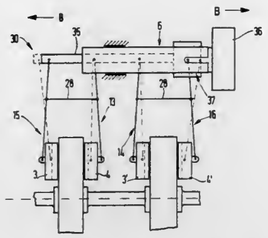
1. In combination with a force applying device, a brake assembly for an element rotatably mounted on a frame, comprising a pair of calipers, brake pads carried by the calipers and engageable with the rotatable element, means pivotally mounting at least one of the calipers for angular displacement about an axis fixed to the frame, linkage means connected to said calipers for displacement thereof respectively at different leverage ratios, guide means connected to the linkage means for guiding movement of said one of the calipers, and force transmitting means connecting the force applying device to the linkage means and to the other of the calipers for sequentially displacing the calipers relative to the rotatable element at said different leverage ratios, said linkage means including a lever element pivotally mounted on the frame about said fixed axis, a link connecting said one of the calipers to the force transmitting means, and means pivotally connecting said other of the calipers to said lever element about a movable axis establishing a higher of said leverage ratios for said other of the calipers.

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**4,015,691**
**DISC BRAKE FOR RAILWAY VEHICLES**
**Hans Pöllinger; Franz Prahl, and Mathias Schörwerth, all of Munich, Germany, assignors to Knorr-Bremse GmbH, Munich, Germany**
**Filed Oct. 16, 1975, Ser. No. 622,958**
**Claims priority, application Germany, Oct. 19, 1974, 2449853**
**Int. Cl.² F16D** *55/228*
**U.S. Cl. 188—59** **12 Claims**

1. A disc brake for a railway vehicle having two brake discs on the axle of a wheel and axle assembly, comprising a pair of

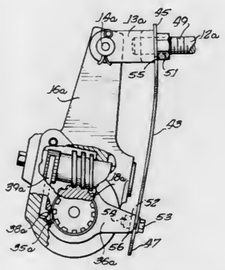
brake shoes on opposite faces of each brake disc, means suspending said brake shoes from the frame of the wheel and axle assembly, a pair of brake levers for each brake disc, said brake levers each having one end thereof connected to a said brake shoe and the other ends of said brake levers being remote from said brake shoes, pull-rod means for pivotally connecting each pair of brake levers between the ends thereof, said brake levers defining two outer levers and two



inner levers disposed between said outer levers, a displaceably supported brake cylinder having a reciprocable piston rod extending therefrom and said cylinder pivotally connected to the remote end of one of said outer brake levers, the remote end of the other of the outer brake levers being pivotally connected to said piston rod, and means for defining a pair of fixed points, said fixed point means comprising a carrier and the remote ends of said two inner brake levers being pivotally connected to said fixed points on said carrier.

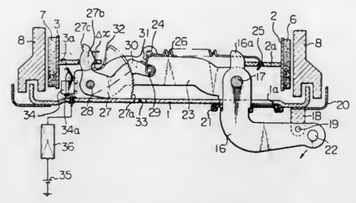
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**4,015,692**
**AUTOMATIC SLACK ADJUSTER**
**George P. Mathews, Birmingham, Mich., assignor to Borg-Warner Corporation, Chicago, Ill.**
**Filed Nov. 6, 1975, Ser. No. 629,424**
**Int. Cl.² F16D** *65/56*
**U.S. Cl. 188—79.5 K** **16 Claims**



1. In a slack adjusting mechanism usable in lever actuating systems including a rotatable lever actuated by an actuating chamber and piston rod and connected to and rockable about the axis of rotation of a cam shaft for actuation of the system, said piston rod being secured to a clevis pivotally mounted on said lever, a worm gear in the lever secured to the cam shaft and meshing with a worm mounted on a rotatable shaft, and an adjusting mechanism including a reference point operatively connected to the worm and actuatable when the lever rocks through an arc to a point beyond the movement required for normal clearance, said reference point being provided on the end of a control arm, the opposite end of the control arm being formed as a ring journalled in said lever around the axis of rotation of the cam shaft, and means to control the location of said reference point with respect to said system during the lever rocking motion while allowing motion of said reference point with respect to said piston rod.

**4,015,693**
**LINING WEAR ADJUSTER**
**Yoshihiro Hayashida, Chigasaki, and Haruyuki Amano, Ebina, both of Japan, assignors to Tokico Ltd., Kawasaki, Japan**
**Division of Ser. No. 506,051, Sept. 16, 1974, Pat. No. 3,943,486. This application Dec. 12, 1975, Ser. No. 640,263**
**Claims priority, application Japan, Jan. 17, 1974, 49-8035**
**Int. Cl.² F16D** *65/58*
**U.S. Cl. 188—79.5 P** **1 Claim**



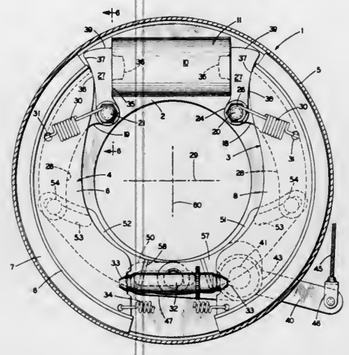
1. An adjusting device for use in an internal-shoe drum brake having lined arcuate first and second brake shoes mounted on a stationary back plate, said brake shoes being separable from each other during the braking operation, said device comprising:
a two-part strut extending between said two brake shoes, the length of said two-part strut automatically increasing to compensate for wearing of said shoe linings, said two-part strut comprised of:
a strut member operatively connected to said first brake shoe, and
a ratchet member pivotally mounted on said strut member having a projecting end portion thereof engageable with said second brake shoe when the brake lining is worn;
pawl member means biasly mounted on said strut member adjacent said ratchet member and engageable with said ratchet member for engaging said ratchet member and preventing rotation of said ratchet member in the direction which reduces the overall effective length of said two-part strut between said brake shoes as said brake lining on said brake shoes wears away; and
said stationary back plate having an opening therethrough behind said ratchet member engaging said pawl member means for contacting therethrough said ratchet member engaging said pawl member means and disengaging the pawl member means from said ratchet member.

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**4,015,694**
**BRAKE CONSTRUCTION**
**John D. Danko, Canton, and Richard C. St. John, North Canton, both of Ohio, assignors to Aspro, Inc., Canton, Ohio**
**Filed Oct. 30, 1975, Ser. No. 627,250**
**Int. Cl.² F16D** *51/22*
**U.S. Cl. 188—106 A** **17 Claims**

1. Brake construction including
a. a backing plate adapted to be mounted on a stationary part of a vehicle axle;
b. a pair of brake shoes slidably mounted in end-to-end relationship on the backing plate and expandable towards and against a brake drum, said brake shoes having camming surfaces on a pair of opposed ends;
c. a hydraulic brake actuator mounted on the backing plate and located between said pair of opposed ends of the brake shoes, said actuator having an axis and a pair of pistons outwardly movable along said axis;
d. strut means interconnecting the other pair of opposed brake shoe ends;
e. a pair of lever means pivotally mounted on the backing plate, each of said lever means having a thrust transmitting portion and a swinging end portion integral with the thrust transmitting portion, said thrust transmitting portion being interposed between and respectively engageable with a respective one of the actuator pistons and a respective one of said pair of opposed ends of the brake shoes with the swinging end portions extending toward said other pair of opposed brake shoe ends and adapted to move inwardly in opposite directions with respect to each other when the thrust transmitting portions pivot outwardly;
f. mechanically actuated parking brake means operatively connected to the lever means swinging end portions; and

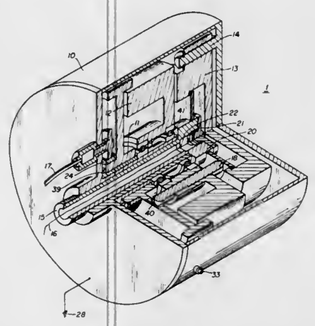




g. the lever means thrust portions each having a camming surface engageable with a respective one of the brake shoe camming surfaces, whereby, operation of the hydraulic actuator moves the pistons outwardly rotating the thrust transmitting portions outwardly in opposite directions with respect to each other and into sliding camming engagement with their respective brake shoe ends to expand said brake shoes outwardly toward a brake drum.

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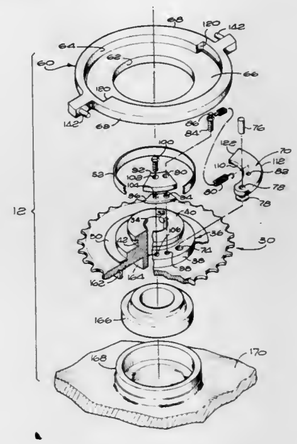
**4,015,695**
**ANTI-SKID CONTROL SYSTEM**
**Kenneth Elvin Pope, Box 39-A Rte. 3, Wagoner, Okla. 74467**
**Filed Mar. 29, 1976, Ser. No. 671,089**
**Int. Cl.² B60T** *8/093*
**U.S. Cl. 188—181 A** **7 Claims**



1. In an anti-skid control system for controlling the disproportionate rate between the angular deceleration of a vehicle wheel and the lineal deceleration of a moving vehicle over a surface, the combination comprising a rigid outer housing, the said housing enclosing a hollow support shaft suitable for mounting a first rotatable wheel, the said first wheel by means of an unidirectional clutch driving a controlled inertia damped second wheel, the said controlled inertia damped second wheel having in its interface a slot to accomodate at least one cam follower supported within the second wheel in a manner so as to be free to move axially to actuate a coaxial switch mounted on the end of the said hollow shaft, the said coaxial switch having means to actuate an air control valve.

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**4,015,696**
**CENTRIFUGAL BRAKING DEVICE**
**Robert D. Lichti, 3318 Warwood, Lakewood, Calif. 90712**
**Filed Oct. 20, 1975, Ser. No. 624,007**
**Int. Cl.² B60T** *7/12*
**U.S. Cl. 188—189** **7 Claims**



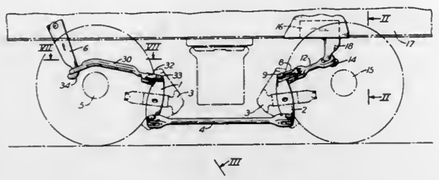
1. A centrifugal braking device for a rotary shaft comprising:
a sprocket mounted to said shaft for rotation therewith, said sprocket having a cylindrical hub,
at least one centrifugal body pivotally connected to said hub, said body having a contact surface thereon, said body being shiftable about an axis extending generally parallel to the rotation axis of said shaft from a rest position on non-use where said contact surface is immediately adjacent to the peripheral surface of said hub to a stop position outwardly displaced from the periphery of said hub in response to centrifugal force, and
a substantially stationary annular member having an inner bore and an outer bore, said annular member being disposed concentrically around said hub with said inner bore positioned adjacent to said hub and said outer bore being radially displaced from said hub, the periphery of said outer bore being aligned with said body and having at least one contact surface defined thereon facing in countering relation to one direction of rotation of said shaft in position to be struck by said contact surface on said body for stopping engagement therewith when said body is pivoted outwardly to said stop position in response to centrifugal force, the periphery of said outer bore also defining a cam surface that aids displacement of said body from the stop position to the rest position when said shaft is rotated in the other direction.

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**4,015,697**
**RAILWAY CAR BRAKE RIGGING LINKAGE**
**Roland E. Cale, Cortland, Ohio, assignor to Schaefer Equipment Company, Warren, Ohio**
**Filed Oct. 14, 1975, Ser. No. 622,373**
**Int. Cl.² F16D** *65/14*
**U.S. Cl. 188—209** **4 Claims**

1. Brake rigging linkage for connection to an upper end of a railway car brake beam lever, comprising an elongated link provided at one end with an opening for receiving a member supported by a railway car body, the opposite end of the link being provided with a rectangular slot therethrough with its

longer dimension extending lengthwise of the link, and a clevis extending through said slot and having parallel free ends provided with aligned openings therethrough for connecting it to the upper end of a brake beam lever, the portion of the clevis in said slot substantially filling it so that the clevis is restrained by the link from swinging relative to the link in a



plane perpendicular to the axis of said clevis openings, the clevis being provided beside said rectangular slot with detents adjacent the link, the combined thickness of the detents and the adjoining portion of the clevis being slightly greater than the depth of said rectangular slot to prevent accidental separation of the clevis from the link before installation in brake rigging.

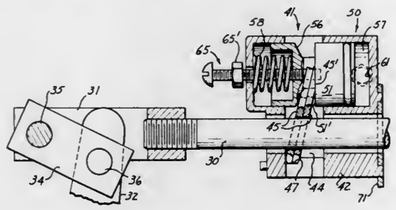
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**4,015,698**

## ACTUATING MECHANISM FOR PRESSURIZED FLUID BRAKE SYSTEM AND FAIL-SAFE LOCKING DEVICE THEREFOR

**William Sousamian, Hacienda Heights, and John J. Filisky, Jr., Los Angeles, both of Calif., assignors to William Sousamian, Hacienda Heights, Calif.**

**Filed June 16, 1975, Ser. No. 587,187**
**Int. Cl.² F16D** *65/32*
**U.S. Cl. 188—265** **22 Claims**



1. In a fluid pressure operated brake system where a brake actuator rod is selectively movable along a straight line path of travel corresponding to its longitudinal axis to actuate a brake crank arm disposed adjacent a first end of said actuator rod, the improvement of mechanism for connecting said first rod end to said crank arm comprising:

a clevis having an open and closed end, said clevis forming a longitudinal extension of the first end of said actuator rod with said open clevis end positioned outwardly, said crank arm being positioned to interfit within said clevis; and

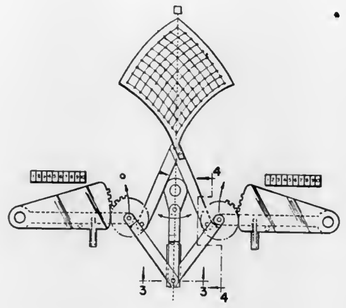
a rigid connecting member for connecting said clevis to said crank arm, one end of said conecting member being connected to said crank arm to pivot about a first axis, the other end of said connecting member being connected to the outer open end of said clevis to pivot about a second axis whereby said connecting member is disposed to extend from said crank arm outwardly from the closed end of said clevis towards its open end.

**4,015,699**

## ALPHANUMERIC SERIAL PRINTER WITH A FLEXIBLE MEMBRANE PRINTING ELEMENT

**Nicholas Kondur, Jr., Riverton, Wyo., assignor to Burroughs Corporation, Detroit, Mich.**

**Continuation-in-part of Ser. No. 459,020, April 8, 1974, abandoned. This application Oct. 16, 1975, Ser. No. 622,900**
**Int. Cl.² B41J** *1/16*
**U.S. Cl. 197—57** **32 Claims**



1. In a printing device including a supporting frame structure having keyboard input means, a rotatable drive shaft, an actuatable hammer, and means for carrying and transversely moving a web medium relative to said hammer, the improvement comprising:

a. rotatable crank means associated with said drive shaft and rotatable therewith in response to said keyboard input means,

b. a multi-position printing element operably associated with said hammer and with the web medium carried by said carrying and moving means and having type characters arranged in columns and rows therein, said columns corresponding to a first axis of said printing element and said rows corresponding to a second axis thereof,

c. quadrilateral linkage means operably coupled to said crank means and to said printing element and effective in response to said keyboard input means for moving said printing element along its said first and second axes, said linkage means comprising a first and second terminal link connected to said printing element and pivotally coupled together, a first and second drive link pivotally coupled together and coupled also to said crank means, a rotatably mounted first spur gear pivotally coupled to said first terminal link and to said drive link, and a rotatably mounted second spur gear pivotally coupled to said second terminal link and to said second drive link,

d. first positioning means coupled to said linkage means and responsive to said keyboard input means to selectively position said printing element relative to its said first axis, said first spur gear being mounted at the innermost extremity of said first positioning means, and

e. second positioning means coupled to said linkage means and responsive to said keyboard input means to selectively position said printing element relative to its said second axis, said second spur gear being mounted at the innermost extremity of said second positioning means, said selective positioning of said printing element relative to said first and second axes occurring concurrently during each rotation of said crank means, whereby individual type characters of said printing element may be selectively positioned relative to said actuatable hammer for serially printing characters on said web medium.

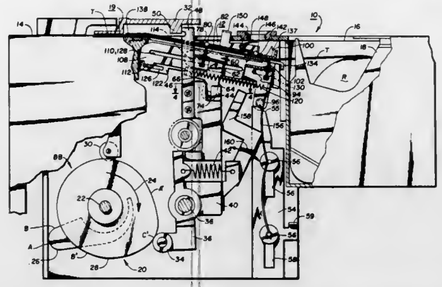


**4,015,700**

## TAPE ADVANCE MECHANISM

**Michael W. Paque, Stillwater, Minn., assignor to Kroy Industries Inc., Stillwater, Minn.**

**Filed Oct. 30, 1975, Ser. No. 627,079**
**Int. Cl.² B41J** *1/28, 19/58*
**U.S. Cl. 197—84 R** **21 Claims**



1. A mechanism for moving a tape to be printed through a printing apparatus, said mechanism comprising a frame for mounting said mechanism to the printing apparatus and a shuttle, wherein;

said shuttle includes a slide mounted to said frame for reciprocal movement in an operative direction and a return direction and further includes a lever arm pivotally mounted to said slide for rotation relative thereto;

said lever arm includes first force accepting means for accepting a force from the printing apparatus in the operative direction of said slide and first force exerting means for exerting a force against said first force accepting means, application of which force tends to rotate said lever arm in a first direction, and second force accepting means for accepting a force in the return direction of said slide and second force exerting means for exerting a force against said second force accepting means, application of which force tends to rotate said lever arm in a second direction and to urge said lever arm and said slide in the return direction of said slide;

said first force accepting means is movable in the operative direction of said slide independently of said first force exerting means;

said slide includes a backing means and said lever arm includes a nipper cooperating with said backing means to limit rotation of said lever arm in the first direction and to grip the tape therebetween; and

said slide and said lever arm include stop means for limiting rotation of said lever arm in the second direction.

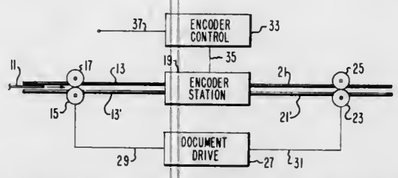
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**4,015,701**

## APPARATUS FOR DRIVING A DOCUMENT THROUGH AN ENCODER STATION

**William B. Templeton, Howell, Mich., assignor to Burroughs Corporation, Detroit, Mich.**

**Filed Aug. 28, 1975, Ser. No. 608,567**
**Int. Cl.² B41J** *13/00*
**U.S. Cl. 197—127 R** **16 Claims**




1. A system for driving a document through an encoder apparatus having means for generating signals indicative of the characters to be encoded at predetermined character positions on said document and having an encoder station therein for printing said characters at said predetermined character positions, said document drive system comprising:

first drive means for transporting said document at a first relatively high predetermined document transport speed into and out of said encoder apparatus;

second drive means within said encoder apparatus for receiving said document from said first drive means and driving said document past said encoder station and toward said first drive means which again receives and exits said document from said encoder apparatus; and

means for controlling the operation of said second drive means for increasing the throughput of said encoder apparatus, said control means including:

means at the input of said encoder apparatus for receiving said document from said first drive means and for registering said document at a predetermined position as it enters said encoder apparatus;

means coupled to said second drive means for transporting said document from said predetermined position at the entrance of said encoder apparatus toward said encoder station and for driving at least that portion of said document having said predetermined character positions in which characters are to be encoded past said encoder station at a relatively constant, relatively slow predetermined encoding speed until the last character to be encoded on said document is printed thereon;

means for rapidly accelerating said document from said predetermined encoding speed toward said first relatively high predetermined document transport speed of said first drive means for exiting said document from said encoder apparatus when the last character to be encoded on said document has been printed thereon; and

means responsive to the exit of said document from said encoder apparatus for restoring said second drive means to await the arrival of the next successive document at the input of said encoder apparatus for transporting said next successive document toward said encoder station.

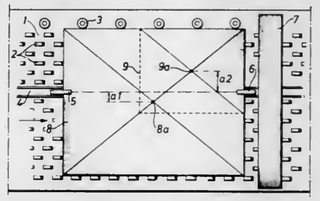
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**4,015,702**

## METHOD AND APPARATUS FOR CONVEYING METAL PLATES

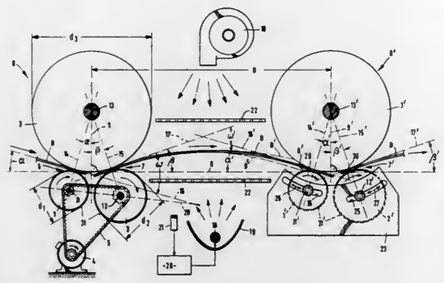
**Charles Gunnar Birger Bergling, Kungalv, Sweden, assignor to Esab-Hebe AB, Hallsberg, Sweden**

**Filed July 2, 1975, Ser. No. 592,674**
**Claims priority, application Sweden, July 8, 1974, 7408980**
**Int. Cl.² B65G** *25/04*
**U.S. Cl. 198—486** **3 Claims**



1. A conveyor for transporting large plates of a predetermined range of different sizes comprising a substantially horizontal conveyor track including means for supporting a plate free for longitudinal movement thereon, guide means extending longitudinally along a side of said track for guidingly engaging an edge of a plate to be transported, conveyor drive means including means for gripping each of the front and rear ends of a plate to be transported at points in a line parallel to said guide means, the means for gripping the plate being spaced from said guide means by from 40 to 48 percent of the width of said conveyor track.

**4,015,703**
## SHEET MATERIAL TRANSPORT SYSTEM
**Edwin Keller, Dietlikon, Switzerland, assignor to Gretag Aktiengesellschaft, Regensdorf, Switzerland**
**Filed Sept. 19, 1975, Ser. No. 615,108**
**Claims priority, application Switzerland, Sept. 24, 1974, 12923/74**
**Int. Cl.² B65G** *15/00*
**U.S. Cl. 198—624** **4 Claims**



1. A transport system for moving items of material in sheet, foil, film or similar flexible form comprising:

first and second groups of rollers, each group having three rollers a first and a second of which are spaced apart to cooperate with the third roller at locations spaced around the circumference of the third roller and respectively define therewith an entry nip and an exit nip for moving such flexible items through the group of rollers, the nip planes of the entry and exit nips being inclined at an angle to one another;

at least one roller of each group being arranged to receive drive for rotating the rollers of the group to move such items through the group;

said second group of rollers being spaced from the first group with the entry nip of the second group being disposed adjacent the exit nip of the first group, the nip planes of the entry nip of the second group and the exit nip of the first group being inclined at an angle to one another to define a zig-zag path of movement for such items from the entry nip of the first group of rollers to the exit nip of the second group of rollers;

and further comprising an adjustable support means for at least one of said first and second rollers of at least one of said groups, said adjustable support means including a support device to which said at least one roller of said at least one group is journalled, said support device including means adjustable in an arc having a radius essentially equal to the sum of the radii of said first roller and said at least one roller whereby the circumferential location about the third roller of the entry nip or the exit nip, respectively, of said at least one group is adjustable.

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**4,015,704**
## EGG CARRIER
**William H. Warren, 729 S. Main St., Centerville, Mass. 02632**
**Filed Aug. 7, 1975, Ser. No. 602,549**
**Int. Cl.² B65G** *17/46*
**U.S. Cl. 198—652** **9 Claims**

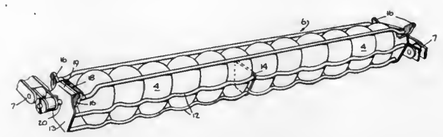
1. An improved carrier for eggs comprising the combination of:

spaced end members;

an elongated egg support including a plurality of rods extending between said end members;

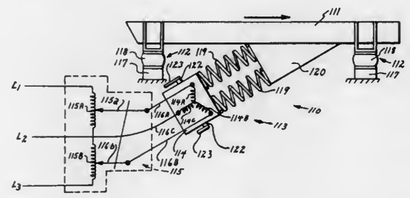
means for pivotally mounting said carrier on spaced endless conveyor members; and

a cover pivotally mounted on said carrier including operatively connected activating members for moving the cover between open and closed positions.



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**4,015,705**
## ADJUSTABLE DRIVE VIBRATORY DEVICE
**George D. Dumbaugh, Louisville, Ky., assignor to Vibranetics, Inc., Louisville, Ky.**
**Continuation of Ser. No. 237,276, March 23, 1972, abandoned. This application Jan. 23, 1974, Ser. No. 435,633**
**Int. Cl.² B65G** *27/32*
**U.S. Cl. 198—770** **10 Claims**



5. An electric motor drive for a vibratory free mass system comprising:

a. a mass mounted for free vibratory movement,

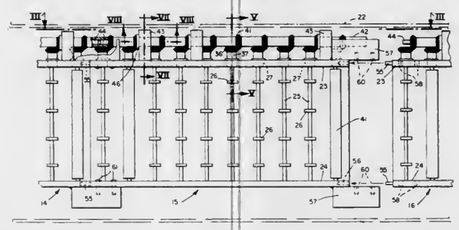
b. drive means, including a three-phase A.C. squirrel cage electric motor carrying an eccentric weight, for exciting said mass to vibratory movement with a given frequency and stroke, and

c. control means having minimal impedance that remains essentially constant for selectively simultaneously adjusting the voltage applied across two of the three phases of said motor during its "running speed" condition of operation through a range of voltage values including a plurality of different partial values of the full voltage available while a substantially constant voltage is maintained on its third phase and thereby selectively simultaneously altering said stroke and frequency such that said motor develops negative braking torque as voltage is reduced by adjustment of said control means and, conversely, said braking torque will be released as voltage is increased by adjustment of said control means.

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**4,015,706**
## CONNECTING MODULES FOR AN ETCHING SYSTEM
**Daniel L. Goffredo, Riverton, N.J., and Conrad Dale Shakley, Spring Mills, Pa., assignors to Chemcut Corporation, State College, Pa.**
**Continuation of Ser. No. 198,622, Nov. 15, 1971, abandoned. This application Jan. 15, 1974, Ser. No. 433,482**
**Int. Cl.² B65G** *13/02*
**U.S. Cl. 198—780** **10 Claims**

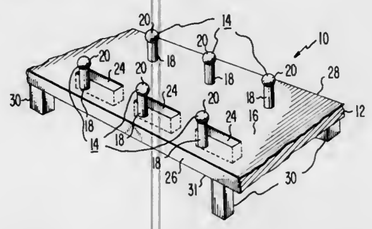
1. An apparatus of the module type for use in a modular chemical treatment system for the treatment of articles as part of an overall etching or other chemical treatment operation that utilizes a plurality of serially connected modules, the module comprising a module body, rotatably driveable conveying means for conveying articles through the module body and for defining a longitudinal path of movement of articles through the module body, drive means for said conveying means in driving engagement therewith, said drive means being disposed longitudinally of one side of said module and including drive rod means of substantially the length of said module in the longitudinal direction, and drive rod coupling means at at least one end of said drive rod means for operative coupling with the drive means of another module upon serially adjacent positioning of said module relative to another module for imparting rotation from one drive rod means to an adjacent drive rod means, alignment means comprising a matable component of a male-female engagement device carried by at least said one end of said module body for transversely aligning said module rigidly with the longitudinally adjacent module, and including rigid mechanical fastening means carried by at least one end of said module body for rigid connection to an adjacent module body to be disposed thereagainst, wherein said conveying means include transversely disposed rotatable shaft members with driven gear means carried at one end thereof, along said one side of said module and with said drive means including drive gear means carried on said drive rod means in driving engagement with said driven gear means, wherein said drive gear means comprise a plurality of individual gears having gear spacer means disposed therebetween and disposed end-to-end over said drive rod means with adjacent said gears being longitudinally spaced from each other by said gear spacer means an amount corresponding to the longitudinal spacing of adjacent said driven gear means.





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**4,015,707**
## CARRIER FOR SEMICONDUCTOR COMPONENTS
**Thaddeus William Kisor, Flemington, N.J., assignor to RCA Corporation, New York, N.Y.**
**Filed June 7, 1976, Ser. No. 694,045**
**Int. Cl.² B65D** *73/02*
**U.S. Cl. 206—328** **7 Claims**



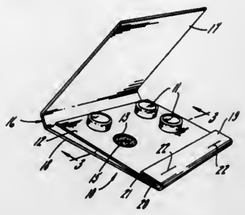
1. A carrier for semiconductor components having header containing at least one hole therein, said carrier comprising:

an elongated strip having a plurality of protrusions extending from one side thereof, each of said protrusions having a stem portion and a knob portion, said protrusions provide means for securing said components to said strip via said hole in said header; and

means in said strip for aligning said hole of said semiconductor components with said knob portion.

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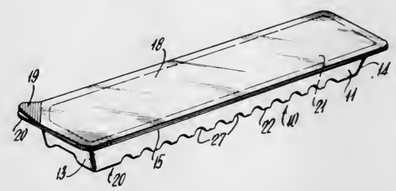
**4,015,708**
## BUTTON CELL STORAGE AND MERCHANDISING PACKAGE
**Roger William Kelm, New Richmond, Wis., assignor to Gould Inc., Rolling Meadows, Israel**
**Filed Nov. 21, 1975, Ser. No. 634,070**
**Int. Cl.² B65D** *73/02, 85/58*
**U.S. Cl. 206—333** **9 Claims**



1. A storage and merchandising package for button cells which have at least one vent hole in one end thereof comprising in combination a substantially flat first layer of material having one or more apertures therein dimensioned to receive respective ones of said button cells, and a second layer of backing material laminated to the first layer and having exposed adhesive thereon in the areas underlying said apertures releasably retaining said button cells in said apertures with said one end in contact with said adhesive and said vent hole covered thereby, said first layer being relatively rigid to thereby stiffen said second layer and substantially preclude warpage thereof which tends to separate said exposed adhesive from said button cells and said second layer of material and said adhesive thereon covering said vent hole permitting the passage of hydrogen therethrough but being substantially impermeable to the passage of oxygen, carbon dioxide and water vapor.

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**4,015,709**
## SYRINGE PACKAGE
**Marcus Jacob Millet, New York, N.Y., assignor to Johnson & Johnson, New Brunswick, N.J.**
**Filed Oct. 28, 1975, Ser. No. 626,436**
**Int. Cl.² B65D** *85/62, 81/04*
**U.S. Cl. 206—366** **11 Claims**



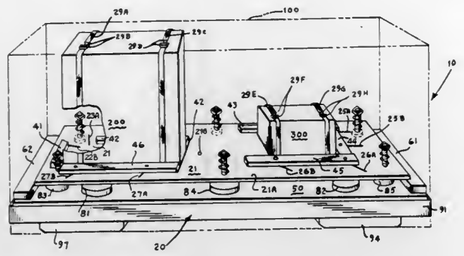
1. A container for a plurality of syringes, comprising: an elongated tray having an open top, enclosed side walls and an enclosed bottom wall, said bottom wall having an internal surface and an external surface; and means on the external surface of said bottom wall for holding said plurality of syringes after said syringes have been removed from said container and said container has been placed in an inverted position with said top facing downwardly.

**4,015,710**

## REUSABLE SHIPPING CONTAINER ASSEMBLY

**Lester G. Biggs, Newalla, Okla., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**

**Filed Oct. 17, 1975, Ser. No. 623,528**
**Int. Cl.² B65D** *19/26*
**U.S. Cl. 206—386** **3 Claims**



**1.** A reusable container assembly for housing and shipping an item, comprising:

a. means for securing and supporting the item, wherein said means includes:

1. a planar base component, of preselected configuration, made of wood and having a plurality of slots therein and therethrough, and also having a plurality of holes therein and therethrough;
2. a plurality of adjustable and removable straps made of nylon and having fasteners, with each said strap passing through two different slots of said plurality of base slots;
3. a plurality of bracing blocks, with each said bracing block removably attached to said base at two different slots of said plurality of base slots;
4. a planar floor component, of preselected configuration similar to, and of larger dimensions, than, said base, with said floor having a forward portion, an aft portion, a top surface, a bottom surface, and a plurality of holes therein and therethrough, and with said floor disposed under said base, with said plurality of floor holes in vertical alignment with said purality of base holes, thereby forming a plurality of matched sets of vertically aligned, spacedapart holes, consisting of one base hole and one floor hole;
5. first header member attached to the top surface of said floor at the forward portion thereof;
6. a second header member attached to the top surface of said floor at the aft portion thereof;
7. a plurality of bolts, one bolt for each of said plurality of matched sets of holes formed by said base and said floor, with each said bolt passing through a different one of said plurality of matched sets of holes; 8. a first plurality of cushioning members disposed between, and abutting with, said base and said top surface of said floor;
9. a second plurality of cushioning members, one for each of said plurality of bolts, with each said cushioning member of said second plurality encircling its respective bolt and simultaneously also disposed between, and abutting with, said base and said floor;
10. a plurality of relief springs, one relief spring for each of said plurality of bolts, with each said relief spring disposed on and encircling its respective bolt, and with each said relief spring having two ends, with one end abutting said base and with the other end restrained, whereby each said relief spring is held captive;
11. a plurality of skids, with each skid of said plurality having a top surface and a bottom surface, and with each said skid attached by its top surface to said bottom surface of said floor;
12. and, a plurality of rubbing strips, with each rubbing strip of said plurality having a top surface, and with at least two of said rubbing strips of said plurality attached by their respective top surfaces to said bottom surface of a different one of each said skid of said plurality of skids;

b. and, means for housing said means for securing and supporting the item, and for housing the secured and supported item, wherein said housing means includes a completely closeable container made of fiberboard.

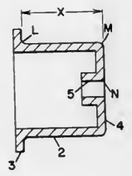
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**4,015,711**

## END PLUG FOR ROLLED MATERIALS

**Henry L. Mason, Scarsdale, N.Y., assignor to Precision Plastics Industries, Inc., Bridgeport, Conn.**

**Continuation-in-part of Ser. No. 465,762, May 1, 1974, abandoned. This application Apr. 4, 1975, Ser. No. 565,246**
**Int. Cl.² B65D** *85/67, 85/672, 85/676, 85/677*
**U.S. Cl. 206—/413** **14 Claims**



**1.** An improved end plug for a rolled goods packaging container which comprises a circular cylinder known as a sleeve having an external surface upon which the rolled goods are placed and an internal surface, which is concentric to and around a symmetrical axis with a continuous back flange, said back flange being nearly perpendicular to the sleeve; the outer diameter of said back flange is greater than the sleeve, and a second flange attached continously to the sleeve at the front of said sleeve, said second flange being concentric to and symmetrical with said sleeve and at least 20% of the area of said second flange being perpendicular to said sleeve, said sleeve being at an angle of 90° to the back flange for a distance of up to one-half of the sleeve length and then tapers at an angle of up to 10% off the vertical and the internal surface tapers at an angle of up to 10° off the vertical with respect to the back flange in the direction of the symmetrical axis.

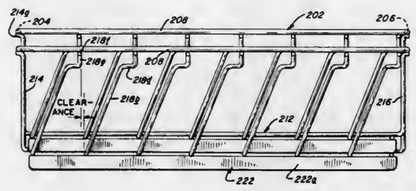
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**4,015,712**

## BASKET ADAPTED TO BE STACKED IN OR ON TOP OF ANOTHER SUBSTANTIALLY IDENTICAL BASKET

**Carl Tommy Wadensten, Falkenberg, Sweden, assignor to Kommanditbolaget Pemac Invention AB & Co., Falkenberg, Sweden**

**Continuation-in-part of Ser. No. 502,626, Sept. 3, 1974, abandoned. This application Sept. 4, 1975, Ser. No. 610,371**
**Int. Cl.² B65D** *85/62*
**U.S. Cl. 206—507** **22 Claims**



**14.** In a basket construction wherein an identical pair of baskets of generally rectangular periphery are adapted to be selectively stacked or nested, respectively either one above another or one within the other, by merely rotating one basket in its plane about a vertical axis, the baskets being nestable when corresponding walls of the baskets are in vertical alignment with each other and the baskets stacking when different walls of the baskets are in vertical alignment with each other, the improvement comprising, in combination:

each basket having a top frame of rectangular periphery providing generally straight peripheral frame legs, and a basket bottom of generally rectangular periphery, with frame legs of the top frame being joined to the basket bottom by side walls means that include at least one pair of opposite side walls that are a mirror image of each other;

each of said mirror image side walls being disposed in a vertical plane whose thickness is bounded between a vertical projection of the inner periphery of the associate frame leg of the top frame and a vertical projection of the corresponding edge of the basket bottom;

said mirror image side walls each including in said vertical plane thereof, a first plurality of longitudinally spaced upper abutments and a second plurality of longitudinally spaced lower abutments respectively adjacent the top frame and basket bottom, inclined upright spacer members extending between the top frame and the basket bottom, said abutments and spacer members being constructed and arranged so that the lower abutments on an upper basket engage upper abutments on a lower basket when the baskets are stacked, and with the lower abutments on the upper basket being longitudinally offset relative to the upper abutments on a lower basket when the baskets are nested.





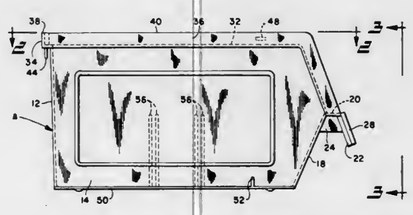
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**4,015,713**

## STACKABLE STORAGE BIN

**Stuart A. Clipson, Glendale, and Jack L. Lemkin, Cincinnati, both of Ohio, assignors to Midland-Ross Corporation, Cleveland, Ohio**

**Filed May 23, 1975, Ser. No. 580,217**
**Int. Cl.² B65D** *21/02*
**U.S. Cl. 206—509** **2 Claims**



**1.** A stackable bin including rear and sidewalls extending upwardly from a bottom wall and sloping slightly outwardly so that the interior size of said bin decreases slightly from the top toward the bottom thereof, outwardly extending flanges adjacent the bottom edges of said sidewalls extending along substantially the full length of said bin, said rear and sidewalls being stepped outwardly adjacent the top of said bin to provide support shoulders, the distance across said shoulders on said sidewalls being substantially the same as the distance between the outer edges of said flanges so that said flanges on an upper bin are supportable on said shoulders of a lower bin, projections extending inwardly from said sidewalls above said shoulders generally parallel thereto and in forwardly spaced relationship to said rear wall, generally vertical ribs extending outwardly from said sidewalls and upwardly from said flanges, said ribs on an upper bin stacked upon a lower bin being located closely adjacent said projections on the lower bin and between said rear wall and said projections on the lower bin to block forward sliding movement of the upper bin relative to the lower bin, and said flanges on the upper bin being received beneath said projections on the lower bin to block vertical separation of the bins, whereby the same said projections which cooperate with said ribs also cooperate with said flanges to perform the dual function of blocking vertical separation and forward sliding movement of an upper bin relative to a lower bin.

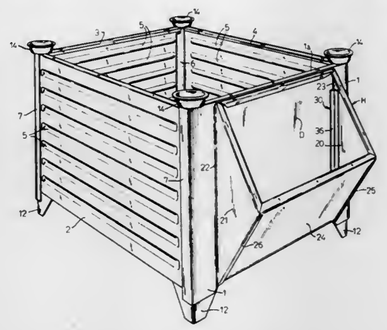
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**4,015,714**

## MATERIAL HANDLING BOX HAVING A SIDE HOPPER AND DOOR

**Robert L. Silver, and Bert R. Eisenhut, both of Racine, Wis., assignors to Triple E Corporation, Racine, Wis.**

**Filed Mar. 10, 1976, Ser. No. 665,509**
**Int. Cl.² B65D** *21/02, 43/12*
**U.S. Cl. 206—511** **10 Claims**



**1.** A metal material handling box or the like formed from four vertical sides which are fabricated from sheet steel and welded together to form a one-piece unitary box, a bottom wall located between and within said sides and rigidly secured thereto, one of said sides having an outwardly extending hopper having a width extending partially across said one of said sides, said hopper having a downwardly and outwardly inclined open top, said one of said sides also having an opening coextensive with the width of said hopper whereby access to the interior of said box may be had through said inclined open top of said hopper, said hopper including two outwardly extending and generally vertically positioned sides which are formed integrally with said one of said sides of said box by being bent at approximate right angles to said one of said sides of said box, said hopper also including a bottom wall which is inclined upwardly and outwardly from said one of said sides of said box, generally vertical guide means in said one of said sides and along each edge of said opening, and a generally vertical shiftable door slideable in said vertical guide means whereby said opening in one of said sides can be completely closed or can be open to the extent to which the door is vertically raised.

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**4,015,715**

## STABLE PLATFORM SHIPPING CONTAINER

**Michael A. Kelf, Bremerton, Wash., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Jan. 23, 1974, Ser. No. 436,004**
**Int. Cl.² B65D** *81/02*; **F16F** *15/00*
**U.S. Cl. 206—521** **2 Claims**

**1.** A shipping container comprising:

a. a base having a bottom member and four side wall members and four corner sections beveled at about 30° to the bottom member;

b. a platform;

c. spring bias means for operably connecting said platform to said base;

d. said spring bias means comprises four pneumatic springs;

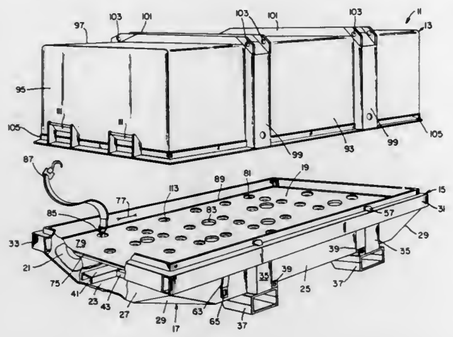
e. said platform having four corners wherein one pneumatic

spring is mounted between each corner and said base to support said platform in compression;

f. each of said pneumatic springs on one of said beveled corners being mounted with the axis of said spring being about perpendicular to said corner;

g. said platform has a preselected weight of about 800 pounds wherein said platform and said pneumatic springs are tuned to isolate said platform from shock and vibration when supporting a cargo having a weight range of from about 0 to about 800 pounds;

h. an air accumulator being operably connected to each of said pneumatic springs;



i. means for increasing the air pressure in said springs and accumulator with increased cargo weight and for decreasing the air pressure in said springs and accumulator with decreased cargo weight;

j. first and second spaced apart bottom support members being operably connected to the exterior of said bottom member; and

k. first and second spaced apart longitudinal members being operably connected to the interior of said bottom member and are about perpendicular to said first and second spaced apart bottom support members.

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**4,015,716**

**CONTAINERS AND A CUSHION SUPPORT FOR USE THEREIN**

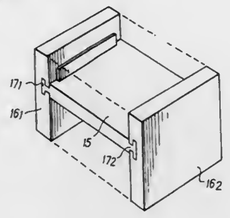
**Cyril Nichols, Maidstone, England, assignor to Leonard Gould & Company Limited, Maidstone, England**

**Filed Mar. 10, 1975, Ser. No. 556,872**

**Claims priority, application United Kingdom, Mar. 11, 1974, 10847/74**

**Int. Cl.² B65D** *81/04, 85/38*

**U.S. Cl. 206—521** **13 Claims**



1. A cushion support structure for use in packaging, comprising:

a first resilient slab member having a linear dovetail mortise groove formed in a first surface thereof;

a second resilient slab member having a linear dovetail mortise groove formed in a first surface thereof;

a support member shaped in a flat polygonal form having formed on each of at least two edges a dovetail tenon complementary with the dovetail mortise grooves of said first and second slab members and being slidable therein; and,

said first and second resilient slab members depending from said support member positioning said support member in spaced apart relation from the bottom edges of said first and second resilient slab members.

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**4,015,717**

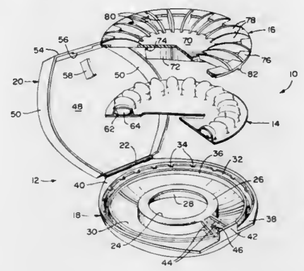
**TABLET PACKAGE FOR USE IN CHRONOLOGICALLY DISPENSING TABLETS**

**James E. Richardson, Weston, and Stephen C. Swain, Westport, both of Conn., assignors to The Medical Dispenser Company, Atlantic Highlands, N.J.**

**Continuation-in-part of Ser. No. 455,979, March 29, 1974, Pat. No. 3,904,075. This application Aug. 25, 1975, Ser. No. 607,581**

**Int. Cl.² B65D** *85/56*

**U.S. Cl. 206—534** **12 Claims**



1. A tablet package for use in chronologically dispensing tablets comprising

a sheet of material having a plurality of pockets formed therein;

a plurality of tablets each disposed in one of said pockets in said sheet of material;

a frangible closure layer secured to said sheet of material to enclose said tablets; and

a plurality of time related indicia disposed on said closure layer associated with each of said tablets and aligned with said pockets in said sheet of material whereby dispensing of said tablets from said tablet package ruptures said closure layer to obliterate said time related indicia associated therewith.

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**4,015,718**

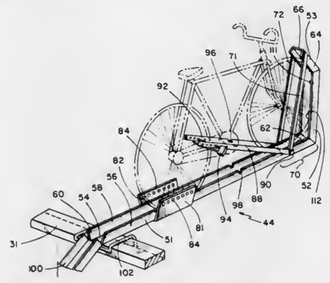
**BICYCLE STORAGE RACK**

**Walter Bernard, 4800 S. Lake Park Ave., Chicago, Ill. 60615**

**Continuation of Ser. No. 567,559, Apr. 14, 1975, abandoned. This application June 4, 1976, Ser. No. 692,964**

**Int. Cl.² B62H** *3/08, 5/00*

**U.S. Cl. 211—5** **9 Claims**



1. A bicycle storage rack comprising at least one bicycle receiving channel member including a first, elongate, generally horizontally disposed, segment, a second generally upright segment extending upwardly from one end of said first segment, and a rigidly mounted third segment extending angularly upwardly from the upper end of said second segment and above said first segment, said segments being arranged to form between the ends thereof a rigid continuous bicycle receiving trough which extends generally horizontally, then upwardly and finally in a reverse direction over a portion of the generally horizontal section of the trough, said trough being adapted to receive bicycle wheels therein with a portion of said first segment adjacent said one end of said first segment together with said second segment and said third segment forming a bicycle wheel receiving and retaining formation preventing removal of the bicycle by upward movement of the bicycle wheel, with said third segment extending above a portion of one wheel of said bicycle, and said channel member further includes a locking strap for securing a bicycle to said channel member said locking strap being pivotally secured at one end to said first segment, and which has at least one hole therein near the other, free end thereof and which is movable between a generally horizontal position juxtaposed with said first segment and an angularly upwardly extending position where a leg of a padlock can be inserted through said hole.



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**4,015,719**

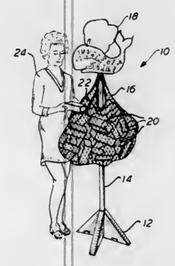
**FLOATING NET DISPLAY APPARATUS**

**Irwin Hanopole, West Orange, N.J., assignor to Magla Products, Irvington, N.J.**

**Filed Jan. 6, 1975, Ser. No. 538,474**

**Int. Cl.² A47F** *1/06*

**U.S. Cl. 211—133** **10 Claims**



1. A display apparatus comprising:

a flexible net adapted to receive display materials therein, said net having a multi-sided shape and including a center and a plurality of corners;

a mast having a top and a bottom end, said mast passing approximately through the center of said net, said net being attached to said mast; and,

a base means attached to the bottom end of said mast for providing free-standing support to said mast, said flexible net substantially surrounding at least part of said mast and said corners of said net being brought up and being attached to said mast to form a bag-like configuration.

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**4,015,720**

**COUPLING DEVICE FOR PNEUMATIC BRAKE LINES**

**Jack Peché, Johannesburg, South Africa, assignor to Achille George Richman, London, England, a part interest**

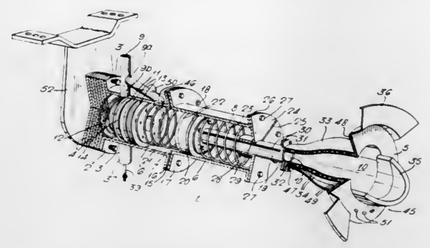
**Filed Oct. 28, 1975, Ser. No. 626,701**

**Claims priority, application South Africa, Oct. 28, 1974, 74/6799; Oct. 28, 1974, 74/6799A**

**Int. Cl.² B60T** *7/12*

**U.S. Cl. 213—1.3** **13 Claims**

1. Apparatus for coupling pneumatic brake lines of vehicles comprising: an axially and resiliently compressible tubular projection attachable to a vehicle to extend outwardly parallel to the vehicle draught axis to its free end; a valve for controlling flow of air between a brake line of the vehicle and the bore of the projection; means to bias the valve so that it is closed when the projection is fully extended and open when the projection has been axially compressed to a predetermined extent; and a head at the free end of the projection formed to align and



connect substantially airtightly with a similarly formed head of an opposing projection of like apparatus attached to an adjacent vehicle when the vehicles are coupled, which coupling action compresses both projections to the predetermined extent.

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**4,015,721**

**PROGRAMMABLE DEVICE FOR MECHANICALLY EXECUTING WORK PROCESSES**

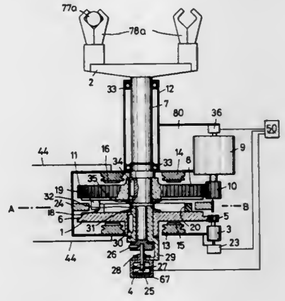
**Holger Scheler, Klausdorf, Schwentine, Germany, assignor to Hagenuk vormals Neufeldt & Kuhnke GmbH, Kiel, Germany**

**Filed Aug. 25, 1975, Ser. No. 607,431**

**Claims priority, application Germany, Sept. 6, 1974, 2442865**

**Int. Cl.² B25J** *9/00*

**U.S. Cl. 214—1 BB** **37 Claims**

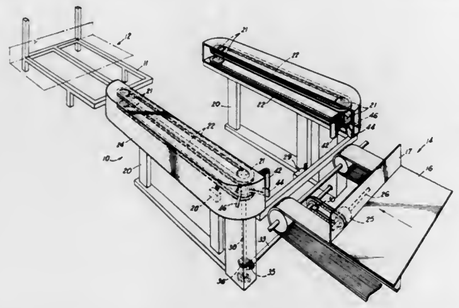


1. A programmable device for mechanically executing work processes, more particularly, a handling device having moving elements consisting of a series of mutually coupled rotating or displacement elements, wherein the moving element situated at the one end is associated with a production unit while the moving element situated at the other end has a tool mounted thereon, characterized in that the moving elements (**79, 79', 80**) consist of load-independent programmable auxiliary positioning gears (**3, 5, 6, 1, 20; 3', 5', 46, 41, 60**) and of load-dependent follow-up positioning gears (**10, 11, 8, 19, 2; 10', 51, 42,59, 2'**), wherein the programmable auxiliary positioning gear has stops (**20; 60**) for a positioning member (**2; 2'**); said load-dependent follow-up positioning gears having a contact member (**19, 59**) cooperating with said stops to position said positioning member, and a follow-up drive (**9; 9'**) for driving said follow-up gears at a velocity controlled by the distance between said stops and said contact member without loading said auxiliary positioning gear, said stops being connectable in a force-locking manner with a stationary housing part (**12; 12'**) and said positioning member (**2; 2'**) being

moved to a position determined by the stops (**20; 60**) of the auxiliary positioning gear by the follow-up gear in synchronism therewith through the intermediary of a speed control means (**4; 4'**).

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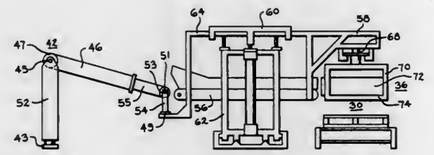
**4,015,722**
**STACKING MACHINE AND METHOD**
**William H. Cooper, Jr., East Point, and James Dean Cobb, Atlanta, both of Ga., assignors to McKenney's, Inc., Atlanta, Ga.**
**Filed Oct. 16, 1975, Ser. No. 622,990**
**Int. Cl.² B65G** *57/14*
**U.S. Cl. 214—6 D** **13 Claims**



**6.** A machine for stacking articles adjacent the end of a conveyor adapted to be driven at a predetermined speed comprising, in combination, a pair of sprockets horizontally mounted to each side of a horizontal article flight path extending from an end of the conveyor; an endless chain mounted to each of said pairs of sprockets aside the flight path; means mounted to said endless chains for vertically supporting and for propelling between said chains articles received from the conveyor along the flight path; power transmission means for driving each of said chains and said supporting and propelling means aside said flight path at a speed greater than said predetermined speed; and coupling means for selectively coupling and uncoupling said endless chains with the conveyor through said power transmission means.

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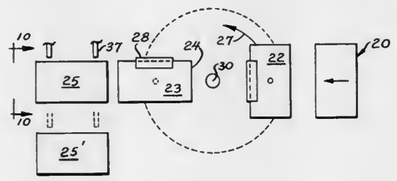
**4,015,723**
**AUTOMATIC PALLETIZER METHOD AND APPARATUS**
**Thomas Beaty, Jr., 20180 Whipple Drive, Northville, Mich. 48167, and Asib S. Samander, 25802 Jeanette, Roseville, Mich. 48066**
**Division of Ser. No. 101,529, Dec. 28, 1970. This application Dec. 12, 1975, Ser. No. 640,240**
**Int. Cl.² B65G** *57/24*
**U.S. Cl. 214—6 P** **1 Claim**



**1.** Apparatus for stacking articles in successive interlocking layers upon a stationary pallet comprising:
a transport frame,
a loading head rotatably connected to said transport frame,
means for moving said transport frame along a first axis for selectively loading portions of said pallet,
means for moving said transport frame along a second axis perpendicular to said first axis for selectively loading portions of said pallet,
means for rotating said loading head for stacking, in conjunction with each of said moving means, a first layer of articles on said pallet,
means for vertically raising said transport frame and said loading head for stacking successive layers on said pallet, said loading head located directly below said rotating means, and
said means for vertically raising said transport frame comprises:
a side transport frame, and
a hoist frame supported by said side transport frame and supporting said transport frame so that said transport frame and said loading head move together as an integrated element.

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**4,015,724**
**METHOD AND APPARATUS FOR HANDLING SUBSTACKS OF BUSINESS FORMS TO DEVELOP BALANCED STACKS**
**Harvey J. Spencer, Green Bay, Wis., assignor to Paper Converting Machine Company, Green Bay, Wis.**
**Filed Aug. 21, 1975, Ser. No. 606,650**
**Int. Cl.² B65G** *57/16*
**U.S. Cl. 214—6.5** **3 Claims**



**1.** Apparatus for handling substacks of business forms to develop balanced stacks for packing comprising:
a frame,
means on said frame for assembling forms at the end of a delivery path into a series of substacks each having a predetermined number of forms therein,
means on said frame for rotating alternate substacks 90° in one direction and for rotating the other alternate substacks 90° in the opposite direction,
pusher means on said frame for advancing the rotated substacks into a stacking station, said rotating means including a shaft having a vertical axis and a relatively elongated support member at the top thereof, means operably associated with said shaft for oscillating the same 180° in opposite directions to alternately place one end of said support member adjacent said assembling means while the other end is adjacent said stacking station, two platforms rotatably mounted on said support member, one for each end thereof, and drive means for each platform for rotating the same 90° for each 180° of rotation of said shaft, and
means on said frame responsive to the accumulation of a predetermined number of substacks in said stacking station for moving a stack of forms into a packaging station.

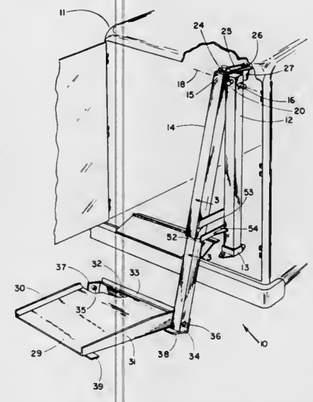
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**4,015,725**
**PIVOTABLE AND EXTENDABLE APPARATUS FOR LIFTING A PERSON TO AND FROM A VEHICLE**
**John Patrick Ryan, and Jack B. Hart, both of Indianapolis, Ind., assignors to Marion County Muscular Dystrophy Foundation, Indianapolis, Ind.**
**Filed Aug. 28, 1975, Ser. No. 608,507**
**Int. Cl.² B60P** *1/44*
**U.S. Cl. 214—75 R** **9 Claims**

**1.** An apparatus for lifting a handicapped person to and from a vehicle comprising:



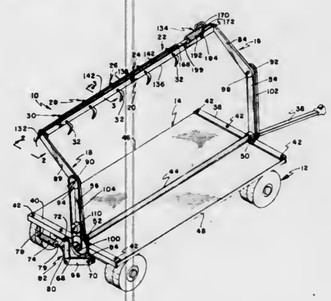
a post fixedly mounted within said vehicle with said post having a top end;
a channel pivotally mounted about a horizontal pivot axis to said top end of said post with said channel having a bottom end swingable outwardly of said vehicle;
a member slidably and telescopically mounted to said channel;
a platform movably mounted to said member;
first means mounted to said vehicle for swinging said member and said platform outwardly from and clear of said vehicle; and,
second means connected to said channel and to said member for extending said member to position said platform



on ground and also for retracting said member to cooperate with said first means to position said platform within said vehicle, said first means includes a bridge pivotally mounted to said vehicle, said bridge when pivoted to a horizontal position has a length extending outwardly of said vehicle to said platform allowing movement of a wheelchair from within said vehicle across said bridge to said platform, said bridge including an abutting surface engaging and thus pivoting said first channel outwardly from said vehicle when said bridge is pivoted to said horizontal position, further said second means is constructed such that said second member can only be extended by operation of said second means.

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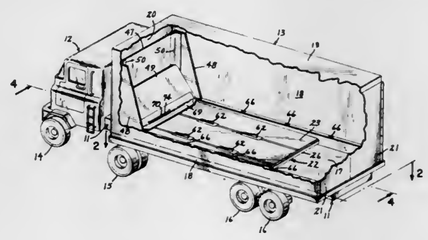
**4,015,726**
**HAY LOADER**
**Clinton F. Baker, 109 S. 8th St., Fredonia, Kans. 66736**
**Filed Mar. 17, 1975, Ser. No. 559,028**
**Int. Cl.² B60P** *1/48*
**U.S. Cl. 214—77 R** **15 Claims**



**1.** In load handling apparatus, a horizontal and elongated support member having a spatial orientation of its longitudinal extent, power means drivingly connected to opposite ends of the support member for laterally translating the latter selectively in all directions normal to the extent of the support member throughout a three-dimensional zone while positively maintaining the longitudinal spatial orientation thereof, said power means including a pair of rotatable and concentric shafts, with each of such shafts being essentially coextensive with and having its opposite ends operatively coupled respectively to the opposite ends of the support member, load engaging means extending along and carried by the support member for selectively engaging and releasing a load, said engaging means comprising a plurality of engaging units spaced along a major portion of the longitudinal extent of the support member, and means for operating all the units of said engaging means in unison, whereby a load of elongated form can be engaged at one location and moved to and released at a second location.

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**4,015,727**
**TRUCK UNLOADING DEVICE**
**Howard Dwight Rezac, 403 Spencer St., Gregory, S. Dak. 57533**
**Filed Aug. 6, 1975, Ser. No. 602,279**
**Int. Cl.² B60P** *1/00*
**U.S. Cl. 214—82** **6 Claims**



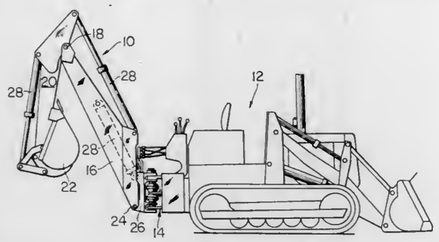
**1.** In a vehicle box having laterally spaced side walls, a floor, and front and rear ends, unloading apparatus comprising:
a. a platform having an upper material supporting surface extending for substantially the full width of the space between said side walls and for the greater part of the length of said box;
b. roller means mounting the platform for forward and rearward movements on said floor;
c. means for imparting rearward material discharge movements and forward return movements to said platform;
d. wall means including a transverse wall structure;
e. means including a carriage and guide means therefor mounting said wall means above said platform for forward and rearward movements in said box;
f. inter-engaging means on said platform and carriage for imparting movements to said wall means in a rearward material discharging direction responsive to said rearward material discharge movement of said platform;
g. and releasable means for holding said wall means against forward movement thereof during forward return movement of the platform.

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**4,015,728**
**MATERIAL HANDLING APPARATUS**
**Noble G. Barker, Pekin, Ill.; John E. Corwin, Portland, Ind.; Jimmy D. Myers, Morton, Ill., and Jan B. Yates, Reynoldsburg, Ohio, assignors to Caterpillar Tractor Co., Ill.**
**Filed Feb. 24, 1975, Ser. No. 552,393**
**Int. Cl.² E02F** *3/32*
**U.S. Cl. 214—138 G** **4 Claims**

**1.** A material handling apparatus, comprising: a boom including first and second elongated arms; means pivotally interconnecting said boom arms; a material handling means;

means pivotally connecting said material handling means to one of said boom arms; a bifurcated yoke; means pivotally connecting the other of said boom arms to said yoke, said yoke having a pair of vertically spaced, generally horizontally extending arms; a vehicle frame portion for mounting said yoke; means pivotally interconnecting said yoke arms to said vehicle frame portion for rotation about a generally vertical axis; a vertically disposed, double-acting cylinder having an internal, vertically reciprocal piston and supported by said yoke arms; means securing said cylinder against rotation to said vehicle frame portion; a coupling device secured to at least one of said yoke arms and having a first splined surface; means carried by said piston and movable therewith and having a second splined surface slidably engaging said first splined surface; means carried by said piston and movable therewith and defining a third splined surface; means carried by one of




said cylinder and said vehicle frame portion and defining a fourth splined surface in sliding engagement with said third splined surface; at least one said splined surfaces having a helical pitch whereby reciprocation of said piston within said cylinder will cause rotation of said coupling device thereby effecting rotation of said yoke to ultimately swing said boom and said material handling means about said generally vertical axis; a piston rod connected to said piston for movement therewith, said rod having an end extending exteriorly of said cylinder; said second and third splined surfaces are located on said rod end; said vehicle frame portion including a journal assembly pivotally mounting one of said yoke arm and constituting said means pivotally interconnecting said yoke arms to said vehicle frame portion; said journal assembly including a bore slidably receiving said piston rod end, the interior of said bore being provided with said fourth splined surface.

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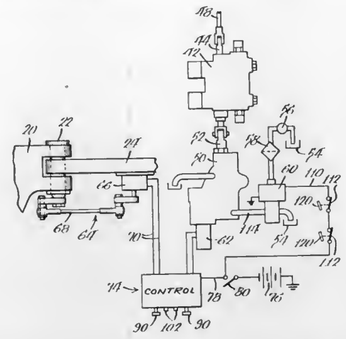
**4,015,729**

**AUTOMATIC CONTROL SYSTEM FOR BACKHOE**

**Donald J. Parquet; Carl O. Pedersen, both of Burlington, and Robert M. Barton, Davenport, all of Iowa, assignors to J. I. Case Company, Racine, Wis.**

**Filed Jan. 2, 1976, Ser. No. 646,035**
**Int. Cl.² E02F** *3/32*
**U.S. Cl. 214—138 R** **7 Claims**

**1.** In a vehicle having a frame and a material handling implement pivoted about a pivot axis on said frame by hydraulic motor means with a reservoir and pressurized fluid source connected to said motor means through a control valve having a valve spool movable in opposite directions from a neutral position to actuate said motor means, and a position setting means for automatically setting the position of said implement with respect to said frame, the improvement of said position setting means comprising an actuator having an output connected directly to said valve spool with said pressurized fluid source connected to said actuator, an actuating element for activating said actuator, a position indicating means between said frame and implement, said position indicating means having an implement signal having a value which is the function of the angular position of said implement on said frame, control means for receiving said implement signal, said control means having a manually settable control element producing a control signal having a value which is the function of the desired angular setting of said implement on said frame, said control means producing an output signal supplied to said actuating element and having a value which is proportionate




to the difference between said implement signal and said control signal to activate said actuator and move said implement at a rate which is proportional to the valve of said output signal.

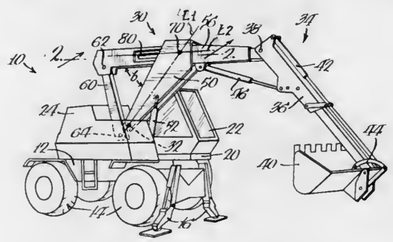
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**4,015,730**

**ADJUSTABLE BOOM FOR MATERIAL HANDLING IMPLEMENT**

**William D. Symmank, Schofield, Wis., assignor to J. I. Case Company, Racine, Wis.**

**Filed Nov. 24, 1975, Ser. No. 634,921**
**Int. Cl.² E02F** *3/38*
**U.S. Cl. 214—141** **7 Claims**



**1.** A mobile excavator comprising a selfpowered frame structure; a platform revolvable about a vertical axis on said frame structure; a boom including a first elongated boom section; pivot means on said platform defining a horizontal pivot with one extreme end of said first boom section pivoted on said pivot means; a second elongated hollow boom section; material handling means supported on one end of said second boom section for pivotal movement about a horizontal pivot axis; support means at the opposite extreme end of said first boom section supporting an intermediate portion of said second boom section for movement along a longitudinal axis of said second boom section; a rigid link of fixed length having one end pivotally connected to an opposite end of said second boom section by a first pivotal connection; a horizontal pivotal connection between the opposite end of said rigid link and said platform in close proximity to said pivot means; and power means between said boom sections and located within said second elongated hollow boom section for moving said second boom section relative to said support means to change the location of said one end of said second section with respect to said opposite extreme end of said first boom section.



**4,015,731**

**PREPARATION OF A WET LOAD OF COAL FOR TRANSPORT AND STORAGE**

**Eke Verschuur, Amsterdam, Netherlands, assignor to Shell Oil Company, Houston, Tex.**

**Division of Ser. No. 513,968, Oct. 11, 1974, Pat. No. 3,957,456. This application Nov. 20, 1975, Ser. No. 633,891**
**Claims priority, application United Kingdom, Oct. 23, 1973, 49214/73**
**Int. Cl.² B63B** *27/24*
**U.S. Cl. 214—152** **2 Claims**

**1.** A method of transporting coal by ship, in which the ship is loaded with a wet load of coal prepared from an aqueous slurry of coal fines, the wet load of coal having less water than the slurry to economize transportation and being resistant to settling and compacting of the fines in the coal to facilitate removal of the wet load of coal from the ship, comprising preparing briquettes with a dry appearance containing less then 20% by weight of water from the aqueous slurry of coal fines and subsequently mixing the briquettes with a mass of water and coal fines, and loading the ship with the resulting wet load of coal.

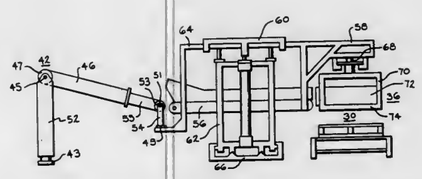
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**4,015,732**

**AUTOMATIC PALLETIZER METHOD AND APPARATUS**

**Thomas Beaty, Jr., 20180 Whipple Drive, Northville, Mich. 48167, and Asib S. Samander, 25802 Jeanette, Roseville, Mich. 48066**

**Division of Ser. No. 101,529, Dec. 28, 1970. This application Dec. 12, 1975, Ser. No. 640,238**
**Int. Cl.² B65G** *57/24*
**U.S. Cl. 214—152** **1 Claim**



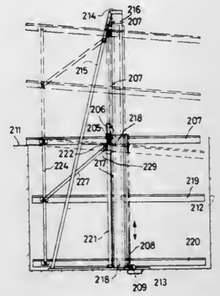
**1.** A method of stacking articles in successive interlocking layers upon a stationary pallet comprising the steps of:
conveying articles to be stacked along a linearly extendable conveyor to a transport frame supported by a hoist frame, said transport frame having a loading head rotatably connected thereto;
moving said transport frame along a first axis for selectively loading portions of said pallet;
moving said transport frame along a second axis perpendicular to said first axis for selectively loading articles on portions of said pallet;
rotating said loading head for stacking, in conjunction with each of said steps of moving, a first layer of articles on said pallet;
raising said hoist frame for stacking successively higher layers on said pallet; and
moving said extendable conveyor in response to movement of said transport frame supported by said hoist frame.

**4,015,733**

**DEVICE FOR STORAGE OF MOTOR VEHICLES**

**Otto Woehr, Sr., Korntal, and Wolfgang Woehr, Muenchingen, both of Germany, assignors to MPB Metall- and Parksystem-Bau GmbH, Korntal, Germany**

**Filed Jan. 29, 1975, Ser. No. 545,022**
**Claims priority, application Germany, Feb. 1, 1974, 2404833**
**Int. Cl.² E04H** *6/06*
**U.S. Cl. 214—16.1 ED** **12 Claims**



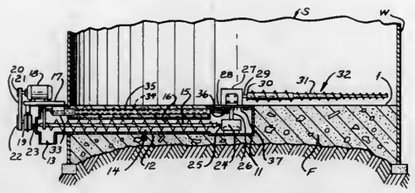
**1.** A device for storage of motor vehicles, comprising:
a. a frame member adapted for placement on a floor level located below an adjacent entrance plane for said motor vehicles, and including centrally positioned, vertically extending, telescopically arranged fixed and sliding rail means;
b. at least two generally horizontally oriented, separate platforms arranged one above the other;
c. Connecting rod means pivotally connected to said platform and extending generally vertically therebetween for maintaining said platforms in substantially parallel relationship;
d. pivot means pivotally connecting each of said platforms generally centrally thereof to said sliding rail means on said frame member, whereby to permit rotation of each of said platforms about a horizontal axis, said connecting rod means maintaining said platforms in substantially parallel relationship during such rotation;
e. raising and lowering means operatively connected between said frame member and said platforms for raising and lowering said platforms simultaneously between a lower position wherein one end of the uppermost platform is positioned substantially level with an adjacent said entrance plane, and an upper position wherein one end of the lowermost platform is positioned substantially level with and adjacent said entrance plane;
f. means for connecting said raising and lowering means to at least one of said platforms for causing tilting of both platforms simultaneously in substantially parallel relationship about their respective pivot means in cooperation with the connecting rod means when the raising and lowering means is actuated to raise the platforms towards their upper position, said lowermost platform having the end thereof adjacent said entrance plane higher than the opposite end of said lowermost platform when said lowermost platform is in its upper position;
g. means to limit the rotational movement of the platforms about their respective pivot means; and
h. means engageable with at least one of said platform to cause said platforms to rotate back to a generally level position in their lowermost position.

**4,015,734**

## SWEEP AUGER FOR BOTTOM SILO UNLOADERS

**Jonathan J. Laidig, Mishawaka, Ind., assignor to Laidig Silo Unloaders, Inc., Mishawaka, Ind.**

**Filed Aug. 14, 1975, Ser. No. 604,655**
**Int. Cl.² B65G** *65/46*
**U.S. Cl. 214—17 DA** **7 Claims**



1. In a bottom silo unloader having a sweep auger drivingly supported at its inner end for rotation about a transverse related vertical axis and for simultaneous rotation about its own axis, the improvement wherein the sweep auger comprises a series of helical flight bearing shaft sections of which the outermost shaft section has the smallest diameter and each succeeding shaft section in a direction inwardly therefrom has a larger diameter than the immediately preceding shaft section, and wherein the helical flights about each of the shaft sections all have the same radial depth, the loading capacity of the channels between the flights of each succeeding shaft section being larger than that to the preceding shaft section.

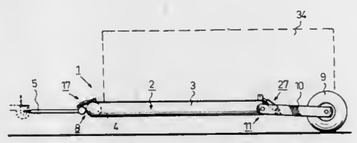
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**4,015,735**

## MEANS FOR CHANGING THE POSITION OF A LOAD-CARRYING COMPONENT OF A TRANSPORT UNIT

**Kjell Berglund, Revingevagen 4, S-240 35 Harlosa, and Signar Nordlund, Bjarshog, S-212 90 Malmo, both of Sweden**

**Filed Mar. 7, 1975, Ser. No. 556,298**
**Claims priority, application Sweden, Mar. 15, 1974, 7403485**
**Int. Cl.² B60P** *3/00*
**U.S. Cl. 214—313** **12 Claims**



1. A transport device comprising:

a. a U-shaped main frame comprising two longitudinal, generally parallel side members, and a cross member connecting the side members at the front thereof, said side members having load engaging means thereon for supporting a load therebetween, the rear end of said U-shaped main frame being open to permit the rear portion of said load to project rearwardly of said members;

b. a swingable fore frame member pivotally connected to said cross member;

c. a pair of swingable rear frame members, one of said rear frame members being pivotally connected to the rear end of each of said side members and forming an extension thereof;

d. first power actuating means connected between said cross member and said swingable fore frame, and operable for pivoting the foreward end of said main frame between raised and lowered positions;

e. second power actuating means connected between the rear ends of said side members and said swingable rear frame members, and operable for pivoting the rear end of said main frame between raised and lowered positions, said swingable rear frame members extending downwardly at an angle from said side members when said rear end of said main frame is in a raised position, and pivoting upwardly toward a position wherein they are in general alignment with said side members as said rear end of said main frame pivots from its raised position toward its lowered position; and

f. gripping means on at least one of said swingable rear frame members disposed rearwardly of the rear end of its associated side member, and adapted to engage said projecting rear portion of a load supported between side members when said rear end of said main frame is in a position beneath its raised position, whereby when said second power actuating means is operated to raise said rear end of said main frame said projecting rear portion of said load will be carried downwardly by said downwardly pivoting rear frame members, thereby effecting an upward tilting of the foreward end of said load.

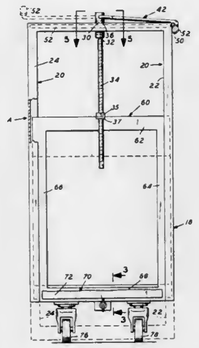
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**4,015,736**

## PORTABLE DEVICE FOR LIFTING AND MOVING AN OBJECT

**Earl R. Erickson, R.R. 5, Box 550, Grand Rapids, Minn. 55744**

**Continuation of Ser. No. 531,857, Dec. 12, 1974, abandoned.**
**This application Feb. 12, 1976, Ser. No. 657,616**
**Int. Cl.² B60P** *3/40*
**U.S. Cl. 214—390** **1 Claim**



1. A portable device for lifting and moving an object comprising:

a. a first support member including a rectangular stationary frame formed of spaced side bars connected at the upper ends to

b. a top cross bar and connected at the lower ends to

c. a bottom cross bar spaced from said top cross bar,

d. a movable inverted U-shaped frame having spaced side channel members connected at the top by a top cross member,

e. said stationary frame side members positioned within the side channel members of said movable frame for slidable movement of said movable frame on said stationary frame,

f. a foot connected to the free end of each of said side channel members,

g. said side channel members connected at one end to a top cross member, and of a length greater than that of said spaced side bars of said stationary frame so as to be extendable below said bottom cross bar to a position upon a surface upon which the device is placed for engagement of said foot members under an object to be lifted,

h. means connected to said top cross bar of said stationary frame and said top cross member of said movable frame for slidably lifting said movable frame upon and relative to said stationary frame whereby said foot members raise an object positioned thereon, said means including a screw member threadedly engaged at one end to said top cross bar of said stationary frame and rotatably mounted on said top cross member of said movable frame, and a handle connected to said screw member for rotation of the same,

i. a second support member identical to said first support member, and

j. adjustable flexible means connected to said first and second support members for maintaining said first and second support members in close proximity to an object positioned thereon for moving.



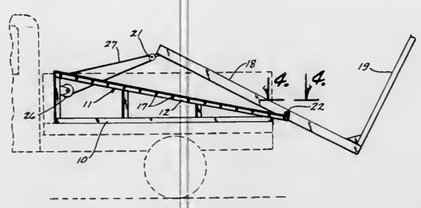
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**4,015,737**

## BALE MOVER

**Harold G. Wright, Scranton, and Richard J. Gordon, Grand Junction, both of Iowa, assignors to Scranton Manufacturing Company, Inc., Scranton, Iowa**

**Filed May 19, 1975, Ser. No. 578,534**
**Int. Cl.² B60P** *1/16*
**U.S. Cl. 214—501** **1 Claim**



1. Apparatus for loading and unloading objects comprising:

a framework rigidly connected to a vehicle;

track means rigidly connected to said framework, said track means having one end lower than the other end thereof, the lower end of said track means having stop means thereon, said track means including a first pair of spaced apart straight parallel track members having a plurality of rollers rotatably disposed therebetween and a second pair of spaced apart straight parallel track members having a plurality of rollers rotatably disposed therebetween;

a frame having two fork members connected thereto adjacent one end thereof, said fork members being disposed at an angle with respect to said frame, said frame being movably mounted on said track, said frame including two parallel straight frame members connected to said fork members and disposed at right angles with respect thereto, and means for connecting said two straight frame members together, said rollers being disposed below the top sides of the first and second pair of straight track members whereby said frame members extend between said track members and thereby guided by said straight track members;

projection means connected to said frame intermediate the ends thereof for contacting said stop means and thereby preventing the frame from moving off of the track means; and

actuating means interconnecting a portion of the other end of said frame and a portion of said framework for controlling the movement of said frame with respect to said framework, said actuating means including a winch connected to said framework and a cable connected to said winch at one end and to said framework at the other end thereof, a pulley connected to said frame and said cable being disposed around one side of said pulley.

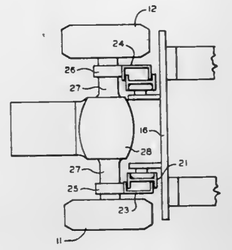
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**4,015,738**

## MATERIAL-HANDLING APPARATUS

**Christian D. Gibson, and Kenneth F. Hart, both of Greene, N.Y., assignors to The Raymond Corporation, Greene, N.Y.**

**Continuation of Ser. No. 443,952, Feb. 20, 1974, abandoned.**
**This application Apr. 13, 1976, Ser. No. 676,564**
**Int. Cl.² B66F** *9/20*
**U.S. Cl. 214—674** **18 Claims**



1. A lift truck, comprising, in combination: a base frame having a forward edge; a pair of rigid housings affixed to said base frame and extending forwardly therefrom at opposite sides of said base frame, thereby providing a space between said housings; a pair of drive wheels journalled in respective ones of said rigid housings on an axis near the forward ends of said rigid housings; a pair of motors mounted on said base frame rearwardly from said forward edge of said base frame and connected by flexible power-transmission means to respective ones of said housings near the rearward ends of said housings; a respective plurality of gear means inside each of said housings for connecting said drive wheels to said motors; a vertically-extending mast assembly carrying a load carriage; a load-engaging means carried on said load carriage to support a load forwardly from the axis of said drive wheels; a pair of mounting blocks, each of said mounting blocks being located above and fixedly secured to the top of a respective one of said housings, each of said mounting blocks having a plurality of longitudinally-spaced bores, said mast assembly including a pair of laterally-extending stub shaft members mounted near its lower end, said stub shaft members being adapted to pivotally seat within selected pairs of said bores further the top of each of said housings is provided with a seat having three mutually-perpendicular surfaces, each of said mounting blocks being adapted to be bolted atop a respective one of said housings to engage the three surfaces of said housing.

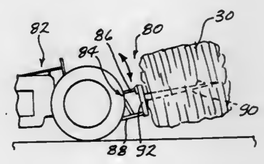
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**4,015,739**

## HAY BALE HANDLING MACHINE

**Randal A. Cox, R.R. 1, Van Wert, Iowa 50262**

**Filed Oct. 23, 1974, Ser. No. 517,434**
**Int. Cl.² E02F** *3/62*
**U.S. Cl. 214—766** **18 Claims**



1. A pickup truck mounted round bale handling machine comprising,

a pickup truck having a frame and a cab and a rearwardly disposed box on said frame including opposite sidewalls, a front end wall, a bed, and an open rear end,

a round bale hay handling machine having a base frame

operatively secured to said truck frame at the rear open end of said box,

a single elongated hay support finger member pivoted at one end to said base frame and being pointed at the other end for penetrating a bale of hay along its center longitudinal axis and supporting the bale along the length of said support finger and said support finger being positioned on the longitudinal centerline axie of said truck bed, and

power means connected to said hay support finger for pivoting it between raised and lowered positions with said finger extending rearwardly in said lowered position and adapted to penetrate a hay bale upon said truck moving rearwardly, and extending upwardly above said truck bed in said raised position for transport of a hay bale positioned between the opposite sidewalls of said truck box.

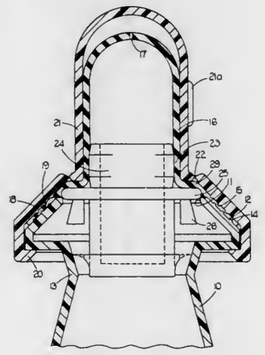
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**4,015,740**

## INFANTS FEEDING BOTTLE

**Eric Kenneth Hurst, London, England, assignor to Lewis Woolf Griptight Limited, Birmingham, England**

**Filed Sept. 17, 1975, Ser. No. 614,061**
**Int. Cl.² A61J 9/00**
**U.S. Cl. 215—11 C** **4 Claims**



**1.** An infants feeding bottle comprising a container for liquid having an outlet opening surrounded by seating, a resilient teat having an outlet orifice, the teat having a portion secured onto the seating of the container by an attachment part, a teat cap enclosing the teat and connected to the attachment part by a severable portion, and a closure member frictionally engaged in the interior of the teat and arranged to be dislodged therefrom, to allow access between the interior of the container and the interior of the teat by manipulation of the cap while the cap still encloses the teat, said cap being movable, after severing of said severable portion between the cap and the attachment part, in a direction towards the interior of the container to exert pressure on the closure member, through the teat, and dislodge said closure member from the teat into the interior of the container.

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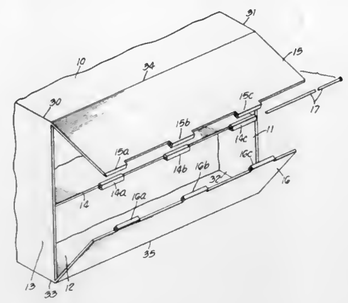
**4,015,741**

## COLLAPSIBLE CARRYING CASE

**Carl E. Frahm, and Shirley E. Frahm, both of 1428 Oak Meadow Rd., Arcadia, Calif. 91106**

**Filed Aug. 15, 1975, Ser. No. 605,161**
**Int. Cl.² B65D 7/24, 9/14**
**U.S. Cl. 220—6** **1 Claim**

**1.** A collapsible case having a pair of end walls and a pair of side walls and two flaps serving as the bottom for the case, a divider in said case, said divider and said flaps each having alignable openings, and a pin extending through said alignable openings, said end walls are hinged on corresponding ones of said side walls and said flaps are hinged on a corresponding one of said side walls, and said pin being removable from said alignable openings in said divider and in said flaps to allow said divider to be detached from said flaps and to allow said flaps to hinge on said side walls and said end walls to hinge on said side walls such that said end walls, side walls, and flaps



may be folded to assume a general planer flat structure with said divider sandwiched therein between said end walls and said side walls.

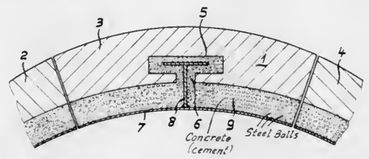
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**4,015,742**

## ANCHORAGE OF A LINING IN A CAST IRON REACTOR PRESSURE VESSEL

**Wolfgang Albrecht, and Rolf Dörling, both of Gummersbach, Germany, assignors to L. & C. Steinmuller GmbH, Gummersbach, Germany**

**Filed Aug. 18, 1975, Ser. No. 605,264**
**Claims priority, application Germany, Aug. 19, 1974, 2439706**
**Int. Cl.² B65D 25/18; G21C 13/08**
**U.S. Cl. 220—9 A** **3 Claims**




**1.** In combination with a reactor pressure vessel of a nuclear power station having pressure-tight lining composed of individual cylindrical segments: a substantially cylindrical outer cast iron pressure container coaxially surrounding said lining in radially spaced relationship thereto, and composed of individual cast iron segments parallel to the longitudinal axis of said lining, each of said last mentioned segments having a recess, communicating with the space between said lining and said pressure container, a plurality of anchors of a T-shaped cross section respectively arranged in said recesses so that the stem and the transverse bar of said T-shaped cross section are spaced from the walls of the respective recess and the stem of said T-shaped cross section engages the respective adjacent cylindrical segment of said lining and is connected thereto, said anchors being substantially parallel to the longitudinal axis of said lining, and filler material filling the space between said lining and said container and completely surrounding said T-shaped anchors to fill the spaces in said recesses.



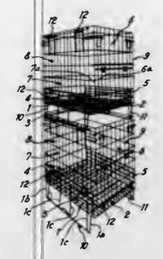
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**4,015,743**

## CONTAINERS MADE IN METALLIC WIRES

**Oscar Beretta, Neuilly(Seine), France, assignor to Societe Anonyme a Responsabilite Limitee: Technifil, Neuilly-sur-Seine, France**

**Continuation-in-part of Ser. No. 405,654, Oct. 11, 1973, Pat. No. 3,917,103. This application Aug. 15, 1975, Ser. No. 605,206**
**Int. Cl.² B65D 7/20, 7/24, 21/02**
**U.S. Cl. 220—19** **10 Claims**



**1.** A collapsible metal wire basket comprising a hollow base including a bottom and fixed edge walls secured to said bottom and extending perpendicular thereto, side walls mounted on the top of said edge walls of the base, a door in at least one of said side walls, means pivotably connecting said door to the base such that said door is vertical when closed and substantially horizontal under the base when open, at least two of said side walls being opposed to one another and articulated to the top of said edge walls, upper supports on the upper external part of said at least two opposed articulated side walls, lower supports on the exterior of the fixed edge walls and feet mounted on the base and shaped relative to said upper and lower supports for selectively resting on the supports on an identical basket such that when baskets are stacked and the side walls are folded into the hollow base, the feet rest on the lower supports of the identical basket and when the side walls are erect the feet rest on the upper supports of the identical basket.

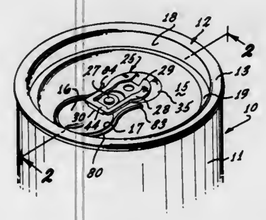
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**4,015,744**

## EASY-OPEN ECOLOGY END

**Omar L. Brown, Dayton, Ohio, assignor to Ermal C. Fraze, Dayton, Ohio**

**Continuation of Ser. No. 625,820, Oct. 28, 1975, abandoned. This application Mar. 24, 1976, Ser. No. 670,084**
**Int. Cl.² B65D 41/32**
**U.S. Cl. 220—269** **24 Claims**



**1.** An easy-opening end structure for use with a container comprising:

an end wall of sheet material including a chuck wall terminating in a peripheral flange positioned vertically above a center panel section and a groove located at the base of the chuck wall and extending vertically below said center panel section;

means in said center panel section defining a pour panel at least partially circumscribed by a scoreline to form an opening in said center panel section;

tab means including a lifting end and an opening end;

means to affix said tab means to said center panel section such that the opening end thereof overlies said pour panel whereby said tab remains fixed to said central panel section after formation of said opening;

said scoreline including a portion located between the opening end of said tab and said affixing means and defining a generally circular pour panel;

said tab including spaced side legs interconnected at the forward end by a cross-member including finger means to bear against said panel during an opening sequence,

said cross-member of said tab being in chordal relation to said scoreline;

said tab being a longitudinally rigid lever operative in response to raising the lifting end thereof to cause the opening end of the tab to bear against said panel and to lift on said affixing means thereby lifting the portion of center panel surrounding said affixing means to initiate rupture of the portion of the scoreline located between the opening end of the tab and the affixing means by a shearing action; and

said tab being operative in response to raising the lifting end thereof to urge said panel downwardly to effect rupture of the remainder of the scoreline.

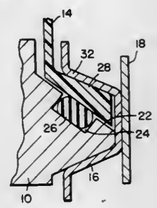
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**4,015,745**

## REUSABLE SEAL WITH THERMAL EXPANSION COMPENSATION

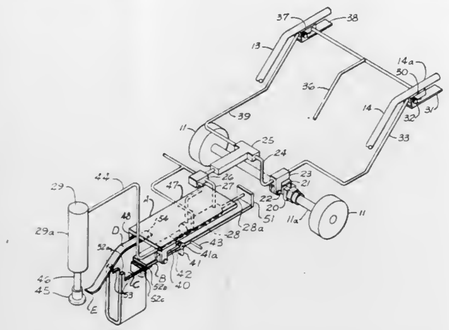
**Amedio D. Petrangelo, Webster, N.Y., assignor to Stromberg-Carlson Corporation, Rochester, N.Y.**

**Continuation of Ser. No. 423,931, Dec. 12, 1973, abandoned. This application Sept. 22, 1975, Ser. No. 615,522**
**Int. Cl.² B65D 45/32**
**U.S. Cl. 220—320** **4 Claims**



**1.** A resealable container comprising a generally circular base of metal, a plastic cover fittable on said base for defining in conjunction therewith an enclosed chamber, an annular flange integral with said cover and extending radially outwardly therefrom at the end of the cover that is normally closed by the base, said flange being flared outwardly in thickness and its diameter at ordinary room temperature being slightly less than the diameter of the base, and a V-groove ring assembly for retaining the flange of said cover in engagement with the base, said V-groove ring being shaped to define in conjunction with a radially outer portion of the base a chamber generally congruent with said flange, said ring having a circumferential wall portion of approximately the same diameter as said base for restraining said flange from expanding outwardly beyond the edge of said base.

**4,015,746**
**FASTENER POSITIONING DEVICE**
**Edward L. Thomas, 25 Queen Anne Road, Greenville, S.C. 29607**
**Filed Jan. 26, 1976, Ser. No. 652,298**
**Int. Cl.² B65H** *3/36*
**U.S. Cl. 221—263** **7 Claims**

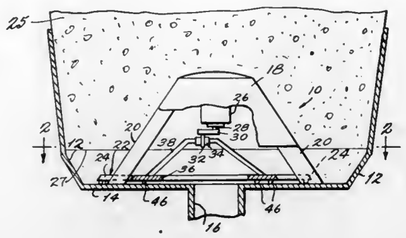


1. A device for feeding fasteners having an enlarged impact receiving head and an elongated shank portion extending outwardly from an intermediate position thereof to a fastener receiving means comprising:
a housing;
an elongated member slidably carried by said housing;
a notch at one end of said elongated member open at an end and side of said elongated member receiving a fastener supporting the head with the shank projecting through the notch;
retaining means carried by said housing engaging said head remote from the shank maintaining said fastener within said notch;
means moving said elongated member forwardly while said retaining means engages said head maintaining said fastener within said notch for positioning the fasteners for reception by the fastener receiving means prior to retracting the elongated member permitted by said notch open at an end releasing said shank portion formerly disposed therein.

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**4,015,747**
**GRAVITY DISCHARGE APPARATUS**
**Frank J. Miksitz, Phillipsburg, N.J., assignor to Universal Feeders, Inc., Bethlehem, Pa.**
**Continuation-in-part of Ser. No. 467,558, May 6, 1974, Pat. No. 3,874,566, which is a continuation-in-part of Ser. No. 216,105, Jan. 7, 1972, Pat. No. 3,809,286. This application Mar. 31, 1975, Ser. No. 563,453**
**The portion of the term of this patent subsequent to May 7, 1991, has been disclaimed.**
**Int. Cl.² B65G** *65/48*
**U.S. Cl. 222—1** **4 Claims**

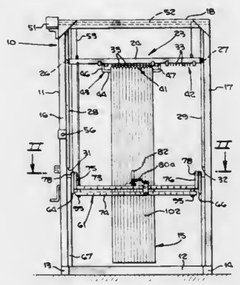
1. A method for discharging granular material by gravity assist from an upper zone containing an annular mass of the granular material which is supported on a bottom wall of the zone and which is disposed below a shroud, said bottom wall having a discharge opening therein located below the shroud, said method comprising disposing a horizontal annular plate below the shroud and above said bottom wall in a position such that at least a portion of the granular material in the annular mass thereof resides on the upper surface of the plate, orbiting the plate in a horizontal plane relative to said discharge opening in a manner to urge granular material from the annular mass thereof inwardly to the periphery of the aperture in the plate and thereafter through the discharge opening along a path which moves in a horizontal plane around the



periphery of the aperture, and periodically reversing the direction of the orbit of the plate.

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**4,015,748**
**DRAPERY PLEATING AND FINISHING MACHINE**
**Steven T. Golden, 822 Teague Drive, Santa Paula, Calif. 93060**
**Filed May 26, 1976, Ser. No. 690,066**
**Int. Cl.² A41H** *43/00;* **D05B** *35/08*
**U.S. Cl. 223—32** **22 Claims**

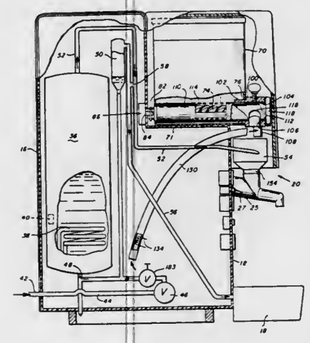


1. In an apparatus for pleating and stretching draperies in which an upstanding frame carries a horizontally disposed hanger bar for securing an upper end of a drapery, and a pleater bar assembly vertically movable on said frame, said pleater bar assembly including first and second horizontally disposed elongated pleater bars mounted on said carriage means, the second pleater bar having a plurality of longitudinally spaced laterally outwardly extending pleating fingers, said first pleater bar having a plurality of longitudinally spaced laterally outwardly extending inner and outer nested normally coplanar pleating fingers alternately mounted relative to said second pleater bar fingers to assume an interdigitated relationship for combing the drapery therebetween, manually operated means for selectively axially shifting said inner and outer nested pleating fingers of said first pleater bar for clamping the folds of the drapery on both sides of said second pleater bar fingers by the inner and outer fingers of said first pleater bar, whereby a lower hem of the drapery may be neatly and uniformly locked by the fingers of the pleater bars on both sides of each drapery fold, the improvement which comprises:
said first pleater bar including bulge preventing means thereon for initially contacting only the inner area of said drapery at the forward ends of the fingers of said second pleater bar when said manually operated means is actuated to clamp said folds thereby allowing the drapery to shaft about said nested fingers as actuation of said operating means clamps said folds so that the drapery material between said nested fingers conforms to the fingers of said first pleater bar in the back portion of said drapery fold adjacent the forward ends of the fingers of said second pleater bar before the entire drapery fold is clamped between said nested fingers upon actuation of said operating means to thereby prevent formation of a bulge in said drapery folds between the forward ends of said fingers of said first pleater bar and said second pleater bar when in clamped position.



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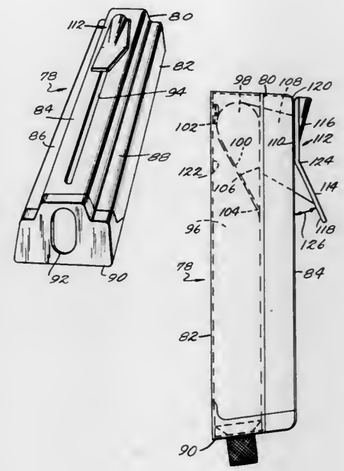
**4,015,749**
**HOT COFFEE DISPENSER**
**William A. Arzberger, Medfield, and Edward J. Lalumiere, Woburn, both of Mass., assignors to Jet Spray Cooler, Inc., Waltham, Mass.**
**Continuation-in-part of Ser. No. 464,220, April 25, 1974, abandoned. This application Apr. 3, 1975, Ser. No. 564,772**
**Int. Cl.² B67D** *5/30*
**U.S. Cl. 222—70** **15 Claims**



1. A coffee dispensing machine comprising:
a housing and a hot water tank in said housing,
a hopper assembly comprising a hopper for containing powder coffee concentrate on said housing,
an outlet passage in the bottom portion of said hopper assembly for discharging selected amounts of powder coffee from said hopper,
a mixing assembly mounted on said housing adjacent said outlet passage and positioned to receive both powder discharged through said passage and water from the tank,
a heat conducting block formed of good heat conducting material and surrounding said outlet passage and when heated maintaining the outlet passage and region in the hopper assembly adjacent the passage hot and dry,
a heat tube having a discharge end disposed adjacent the outlet passage,
heating means in the housing causing heated air to flow through the tube to its discharge end to heat said block and outlet passage,
a deflector connected to the block immediately adjacent the outlet passage,
said heating means being operatively associated with the block for heating the block and passing a stream of heated air to said block in a direction toward said deflector whereby said deflector prevents powder discharged through the passage from flying around the discharge region,
and said outlet passage being formed in said block.

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**4,015,750**
**PASTE DISPENSING DEVICE**
**Arthur Lloyd Wilston, 300 Redington Road, Troy, Pa. 16947**
**Continuation-in-part of Ser. No. 566,325, April 9, 1975, Pat. No. 3,974,943. This application May 4, 1976, Ser. No. 683,237**
**Int. Cl.² B65D** *35/28*
**U.S. Cl. 222—103** **4 Claims**



1. Apparatus for dispensing material contained in a collapsible tube comprising:
a plurality of walls including a top and a bottom wall and first and second end walls connected together to define a housing enclosure for the tube, said first end wall having an aperture for receiving the neck of the tube, said top wall extending between said end walls, said top wall having a raised central portion and opposite sides, said central portion extending the length of said housing, a slot formed in said central portion of said top wall extending between said end walls, a planar shoulder portion extending from each side of said central portion with said shoulder portions extending the length of said housing substantially perpendiculiar to said side walls,
a press member slidably disposed in said housing, said press member having a flat top surface having outer parallel side edges each being immediately adjacent and engageable with said shoulder portion so as to be slidable thereon, said press member including a leading edge and a rear portion both extending between said outer parallel side edges, a base located adjacent said rear portion, and perpendicularly spaced from said top surface, a pressing surface extending from said leading edge to said base,
said top surface of said press member having a handle stem extending substantially perpendicularly therefrom through said slot in said top wall of said housing, said handle stem having a manually engageable portion fixed thereto exteriorly of said housing, said manually engageable portion having a leading section and a trailing section with said trailing section extending parallel to said top surface of said press member and with said leading section extending at an angle relative to said trailing section.

**4,015,751**

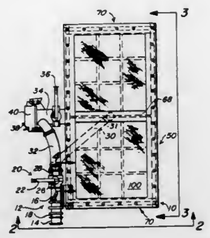
## QUICK CHANGE FLUIDIZING OUTLET ASSEMBLY

**Dallas W. Rollins; Robert W. Randolph, both of St. Charles, and Gerald D. Garner, Florissant, all of Mo., assignors to ACF Industries, Incorporated, New York, N.Y.**

**Filed July 2, 1975, Ser. No. 592,500**

**Int. Cl.² B65G** *69/06*

**U.S. Cl. 222—195** **13 Claims**



1. A fluidizing outlet assembly comprising: an outlet body having upper flange means adapted to mount the outlet assembly on a hopper; said outlet body having a lower body flange on each side of the outlet body; said outlet body further including a bottom pan having an upper pan flange spaced below said lower body flange on each end of the outlet body; said outlet body comprising a unitary member having portions vertically spaced from each other to define longitudinally spaced slots; said bottom pan being inclined downwardly on opposite ends of the outlet body toward an outlet in said body for unloading the lading, and further including a fluidizing header and filter support assembly in the mid portion of said body; said bottom pan comprising means defining a fluidizing plenum in fluid communication with said fluidizing header; said filter support assembly having means adapted to engage and support at least a pair of filter assemblies; each assembly engaging said outlet body on one end of the outlet body and on at least one side of the outlet body; each filter assembly engaging said filter support assembly in the mid portion of said body; each of said filter assemblies comprising a filter member and a lower supporting member; each of said filter assemblies being separately readily removable from said outlet body whereby another filter assembly may be quickly inserted into said outlet body.

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**4,015,752**

## RAPID CHARGING VALVE FOR A PRESSURIZED DISPENSER

**Herbert Meuresch, Wiesbaden, and Tilo Patenge, Hattersheim, both of Germany, assignors to Precision Valve Corporation, Yonkers, N.Y.**

**Filed Jan. 27, 1976, Ser. No. 652,729**

**Claims priority, application Germany, Jan. 29, 1975, 2503626**

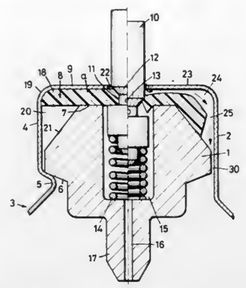
**Int. Cl.² B65D** *83/14*

**U.S. Cl. 222—402.16** **7 Claims**

1. In a valve for a pressurized dispenser, said valve having a mounting cup, a valve housing immovable relative thereto and a gasket for sealing a discharge passage, the gasket being clamped between a rim of said housing and an adjacent wall of the mounting cup, said mounting cap having a pedestal portion comprising an end wall and a circumferential wall and a filling aperture in the end wall radially outward of the discharge passage and only inward of the clamping rim, the improvement which comprises

said gasket having an annular clamped region, a peripheral edge having portions which extend to contact a surrounding wall separated by other portions which do not contact the surrounding wall, and a marginal portion between the peripheral edge and the clamped region, and

a clearance space below the marginal portion of the gasket to accommodate the marginal portion so that the marginal portion may radially stretch and deflect during filling to provide a flow passage along the adjacent wall surfaces over the gasket, past the clamped region and around the peripheral edge of the gasket.



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**4,015,753**

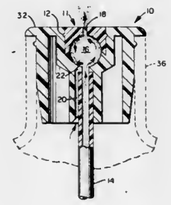
## DIP TUBE POWDER SPRAY CONTROL DEVICE

**Robert Bennett, 170 Sturbridge Road, Easton, Conn. 06425**

**Filed Mar. 17, 1976, Ser. No. 667,480**

**Int. Cl.² B65D** *83/06*

**U.S. Cl. 222—193** **6 Claims**



1. A device comprising:

a first vertical hollow conduit open at top and bottom ends, said conduit having a circular cross section with a first diameter;

a hollow spherical chamber having a second diameter substantially larger than the first diameter and disposed above the first conduit; the top end of the first conduit being connected to and communicating with the bottom of the chamber;

a second vertical hollow conduit disposed above the chamber, said second conduit having a circular cross section with a third diameter smaller than said first diameter and open at top and bottom ends, the bottom end of the second conduit being connected to and communicating with the top of the chamber, the top end of the second conduit constituting a discharge port;

a third vertical hollow conduit open at top and bottom ends and disposed alongside of the first conduit, the third conduit having a circular cross section, the diameter of the third conduit being substantially equal to the third diameter, said third conduit having an open bottom and disposed above the bottom end of the first conduit and having an open top end disposed below the top end of the first conduit; and

a fourth inclined hollow conduit open at both ends, the top end of the third conduit being connected to the lower end of the fourth conduit, the upper end of the fourth conduit being connected to said chamber and communicating therewith, said fourth conduit having a circular cross section, the diameter of the fourth conduit having a circular cross section, the diameter of the fourth conduit being substantially equal to said third diameter.



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**4,015,754**

## DOSING DEVICE WITH PNEUMATIC DISCHARGE FOR FLOWABLE SOLIDS

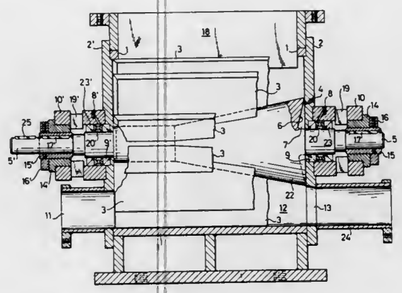
**Gerardus Cornelis Leurs; Rumoldus Matthijs Marinos Johannes Bosma, both of Breda, and Theodorus Johannes Antonius Pouw, Gilze, all of Netherlands, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany**

**Filed June 12, 1975, Ser. No. 586,153**

**Claims priority, application Germany, June 14, 1974, 2428579**

**Int. Cl.² B65G** *53/40*

**U.S. Cl. 222—194** **4 Claims**



1. A particulate material feeding device comprising a casing having a cylindrical rotor chamber therein, an inlet for particulate material formed in said casing, a pressure fluid inlet and a material-fluid outlet formed in opposite walls of said casing, said pressure fluid inlet and said outlet being axially aligned with one another and circumferentially spaced from said particulate material inlet, a rotor mounted for rotation in said chamber, said rotor having a hub and a plurality of radial blades which, together with the peripheral wall of said chamber, define a series of circumferentially arranged pockets that upon rotation of said rotor come sequentially into registry with said pressure fluid inlet and said material-fluid outlet, said rotor hub having an outer surface that diverges in the direction of the outlet wall of said casing to cause the cross-sectional area of said pockets to decrease between said pressure fluid inlet and said material-fluid outlet, said outlet being of such size and configuration as to register simultaneously with at least two of said rotor pockets, whereby no part of said outlet obstructs any part of the discharge end of a pocket in registry therewith.

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**4,015,755**

## ELECTROMAGNETICALLY ACTUATABLE METERING VALVE FOR SUCCESSIVE DELIVERY OF MEASURED VOLUMES OF FLUID FROM A FLUID RESERVOIR

**Edward Lerner, 3 Marshall St., Irvington, N.J. 07111, and John A. Ventura, 32 Jefferson St., Nutley, N.J. 07110**

**Filed Dec. 12, 1975, Ser. No. 640,069**

**Int. Cl.² G01F** *11/30*

**U.S. Cl. 222—442** **6 Claims**

1. An electromagnetically operable metering valve for the successive delivery of measured volumes of fluid of a predetermined density from a fluid reservoir comprising:

an elongated, hollow valve body closed at the top and the bottom and defining an interior valve cavity;

fluid inlet means communicating with said cavity proximal to said top of said body;

fluid discharge means proximal to said bottom of said cavity;

a valve core of predetermined material seated in said cavity, movable toward and away from said top and said bottom of said body;

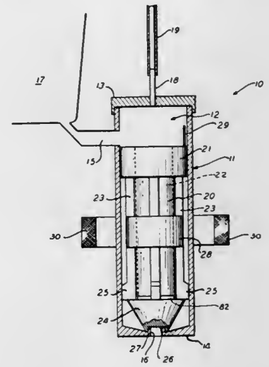
first closure means on said core, proximal to said top thereof, and operably engageable with said inlet means to effect a seal of said inlet means when said core is moved to an uppermost position;

second closure means on said core proximal to said bottom thereof operatively engageable with said discharge means to effect a seal of said discharge means when said core is moved by gravity to a lowermost position;

magnetic means operatively connected to said valve core;

electromagnetic means positioned proximal to said valve body and at a predetermined position with respect thereto;

said electromagnetic means for establishing a predetermined electromagnetic field for attracting said magnetic means and for thereby urging said valve core from said lowermost position upwardly into said uppermost position; and



said valve core of said predetermined material being of a predetermined weight such that: (i) said predetermined electromagnetic field is insufficient alone to move said valve core from said lowermost position upwardly into said uppermost position, (ii) upon said valve body being filled with said fluid the buoyant effect of said fluid on said valve core is insufficient alone to overcome said gravity and move said valve core out of said lowermost position, and (iii) the combined buoyant effect of said fluid on said valve core upon said fluid filling said valve body and the establishment of said predetermined electromagnetic field are required to move said valve core from said lowermost position upwardly into said uppermost position thereby preventing delivery of said fluid from said metering valve unless said valve body is filled with said fluid.

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**4,015,756**

## SPOUT FOR SWIVEL-SPOUT DISPENSING CLOSURES

**James M. Beck, Carol Stream, Ill., assignor to U.S. Cap & Closure, Inc., Chicago, Ill.**

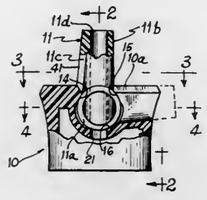
**Continuation-in-part of Ser. No. 414,262, Nov. 9, 1973, abandoned. This application Oct. 10, 1975, Ser. No. 621,429**

**Int. Cl.² B67D** *3/00*

**U.S. Cl. 222—534** **6 Claims**

1. In the combination of a container and a dispensing closure having a base and a swivel-spout mounted in the top of said base, at least one of said base and said swivel spout being of a resilient but generally shape retaining material, the base being adapted to be attached to a container for flowable material, the spout having a nozzle connected to a cylindrical knuckle pivotally engaged by a "snap fit" with a plurality of complementary bearing openings in the base, a portion of said openings coacting with the outer surface of said knuckle in sealing relationship, said spout being adapted for pivotal movement between "on" and "off" positions to permit flow of

the material and interruption thereof respectively, a bore in said nozzle extending through the knuckle, passage means in said base adapted to provide fluid communication between the interior of said container and said spout, said bore, when registered with said passage through the base by said pivotal movement to the "on" position providing fluid communication between the interior of the container and the exit end of the bore, an improvement in the spout in which said spout comprises first and second hollow cylinders, the first cylinder forming the knuckle with a wall of resilient but generally shape retaining material which will deform to the degree necessary when said knuckle is inserted into said bearing openings with a "snap fit" and regain its cylindrical form after



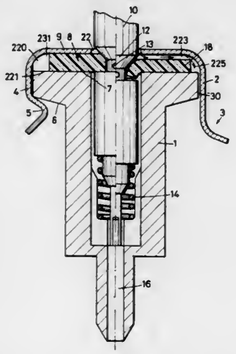

said insertion, said second hollow cylinder forming said nozzle with said bore and arranged at right angles to said first hollow cylinder and extending through the wall and interior of said first hollow cylinder to provide communication between said bore and said passage in said base, diametrically positioned web-like means connecting the outer surfaces of the portion of said second cylinder lying within the first cylinder with the adjacent inner surfaces of the first cylinder, the web-like means and the portion of said second cylinder within said first cylinder coacting to strengthen the wall portions of said first cylinder containing said second cylinder to which a force necessary to pivot the spout is applied, the remaining hollow wall portions of said first cylinder on each side of said second cylinder remaining resilient.

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**4,015,757**
**RAPID CHARGING VALVE FOR A PRESSURIZED DISPENSER**

**Herbert Meuresch, Wiesbaden; Steven Padar, Kelkheim, and Franz Zimmerhackel, Hattersheim, all of Germany, assignors to Precision Valve Corporation, Yonkers, N.Y.**

**Filed Jan. 27, 1976, Ser. No. 652,730**
**Claims priority, application Germany, Jan. 29, 1975, 2503626**
**Int. Cl.² B65D** *83/00*
**U.S. Cl. 222—402.16** **7 Claims**




1. In a valve for a pressurized dispenser, said valve having a mounting cup, a valve housing immovable relative thereto and an annular gasket for sealing a discharge passage, said mounting cup having a pedestal portion comprising an end wall and a circumferential wall and a filling aperture in the end wall radially outward of the discharge passage and only inward of the clamping rim, a region of the gasket being clamped between a rim of said housing and said end wall the improvement which comprises

clearance space means adjacent the outer marginal portion of the gasket to accommodate the marginal portion so that the marginal portion may radially stretch during filling to provide a flow passage along the adjacent wall surfaces over the gasket, past the clamped region and around the peripheral edge of the gasket, and

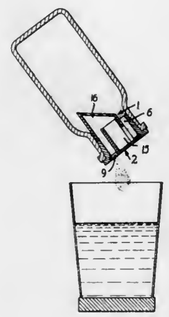
a plurality of spacer means extending between said housing and said end wall located radially outwardly of the gasket perimeter to define the axial distance between said clamping rim and said end wall.

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**4,015,758**
**DISPENSING CLOSURE FOR A CONTAINER**

**Claudio Cavazza, Rome, Italy, assignor to Sigma-Tau Industrie Farmaceutiche/Riunite S.p.A., Italy**

**Filed June 16, 1975, Ser. No. 586,927**
**Claims priority, application Italy, June 17, 1974, 51562/74**
**Int. Cl.² G01F** *11/26*
**U.S. Cl. 222—457.5** **2 Claims**




1. A dispensing closure for a container comprising, a tubular element having a tubular body insertable axially snugly into a neck of a container for being substantially wholly housed therein and having a shoulder about an open top end thereof and a bottom wall partially closing an opposite bottom end, said bottom wall being inclined relative to the axis of said tubular body and terminating in an upstanding wall extending into said tubular body and spaced inwardly from an inner wall surface of the tubular body and extending partially into the interior of said tubular body defining jointly with said inner wall surface a bottom inlet providing in use communication of the interior of said container with the interior of said tubular element, a second element assembled with the first element having a top in use snugly on said shoulder closing partially the open top end of said tubular element and defining a top outlet opening in said tubular element and spaced in a circumferential direction from the bottom inlet into the interior of said tubular element, said second element having a wall extending from said top spaced inwardly from said upstanding wall defining jointly therewith a chamber interiorly of said tubular body having an opening confronting said inner wall surface of said tubular element and in communication with said bottom inlet, said bottom wall being inclined toward said upstanding wall to define a second chamber in communication with the first-mentioned chamber and disposed between the bottom wall and the first chamber and bounded by inner surfaces of said bottom wall and said tubular body, the second element wall extending into the interior of said tubular body between said upstanding wall and another inner wall surface of the tubular body opposite the first-mentioned inner wall surface and disposed spaced axially inwardly from said bottom wall and spaced from said another inner wall surface of the tubular body opposite the first-mentioned inner wall surface thereof and defining therewith an outlet providing communication between the interior of said second chamber and said top outlet opening, whereby when said dispensing closure is mounted on a container for dispensing the content thereof and said container is inverted from an upright position a quantity of said contents enters into the interior of said tubular element through said bottom inlet into the first-mentioned chamber and when said container is returned to an upright position the same quantity of contents is retained in said second chamber of said tubular element and upon reinverting of said container with the closure thereon the quantity of contents in said chamber of said tubular element is dispensed from said second chamber through said top outlet opening and another similar quantity of the contents is introduced into said first-mentioned chamber of said tubular element for subsequent metered dispensing upon reinverting of said container

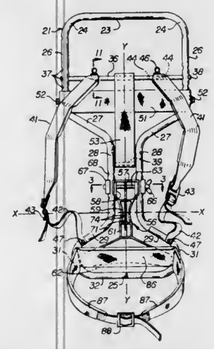


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**4,015,759**
**BACKPACK FRAME HAVING SHOULDER AND HIP SUPPORTS WITH FLEXIBLE CONNECTION TO HIP SUPPORT**

**Peter D. Dreissigacker, and Richard A. Dreissigacker, both of 4224 El Camino Real, Palo Alto, Calif. 94306**

**Filed May 27, 1975, Ser. No. 580,557**
**Int. Cl.² A45F** *3/10*
**U.S. Cl. 224—25 A** **15 Claims**



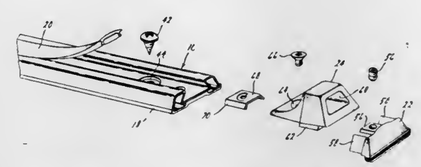

1. A backpack frame comprising a rigid member of extended length adapted to extend along the back of the wearer having an upper portion, a middle portion below said upper portion, and a lower portion below said middle portion, said middle portion generally fitting between the shoulder blades and the waist of the wearer, a pair of shoulder straps, each said shoulder strap having an upper end and a lower end, upper end fastening means to attach each said upper end to said upper portion, lower end fastening means to attach each said lower end to said lower portion, a hip engaging belt to encircle the hips of the wearer, and a connector, said connector being vertically elongated, first means rigidly connecting the upper end of said connector to said middle portion, second means attaching the lower end of said connector to said belt, said connector having third means on its upper end adapted for cooperative engagement with said first means, a narrow portion below said third means, a horizontally elongated stretcher below said narrow portion shaped to fit behind the hips of the wearer and having fourth means for cooperative engagement with said second means, said stretcher being rigid relative to said narrow portion but resilient about a vertical axis to apply tension to said hip engaging means to maintain said stretcher out of contact with the back of the wearer, said narrow portion having at least two generally vertically extending ribs, said ribs being thin in a horizontal-transverse direction and being wide in a horizontal-longitudinal direction, whereby said narrow portion can flex about a vertical axis and also about a horizontal-longitudinal axis but resists rotation about a horizontal-transverse axis so that said stretcher does not move toward and away from the wearer in a horizontal-longitudinal direction.

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**4,015,760**
**VEHICLE ARTICLE CARRIER**

**John A. Bott, 931 Lake Shore Drive, Grosse Pointe Shores, Mich. 48236**

**Filed Aug. 14, 1975, Ser. No. 604,644**
**Int. Cl.² B60R** *9/00*
**U.S. Cl. 224—42.1 D** **7 Claims**


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second means being adapted to be connected on said first means for selectively retaining said object in a predetermined position relative to said mounting device; and

said second means being capable of changing its profile relative to said aperture in said object so that said profile has at least one dimension greater than the largest cross-sectional dimension of said aperture when said object is to be retained in said predetermined position, and so that said profile has all of its dimensions less than the smallest cross-sectional dimension of said aperture when said object is to be moved relative to said first means, and

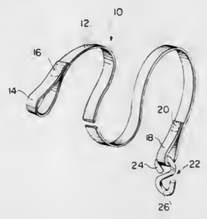
wherein said second means is a quadrilateral-type toggle mechanism capable of changing its dimension relative to the cross-sectional dimension of the aperture in said object so that said toggle mechanism is capable of forming at least two positions, one of which at least two arms of said toggle mechanism overlap the edge of said object and the other of which none of the arms of said toggle mechanism overlap the edge of said object.

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**4,015,762**
**PORTABLE SKI CARRIER**

**Anthony Mendillo, 901 Main St., East Greenwich, R.I. 02818**

**Filed Mar. 1, 1976, Ser. No. 662,843**
**Int. Cl.² B65D** *69/00*
**U.S. Cl. 224—45 S** **4 Claims**




1. A portable device for carrying skis, comprising an elongated flexible strap, on one end of which a loop is formed and on the other end of which a hook is secured, said strap being unencumbered along the length thereof and the loop end of said strap being wrapped around an end of said skis and receiving the remaining portion of said strap therethrough, wherein said remaining portion is pulled in tightened relation on one side of the bindings of said skis to lock said loop end around the end of said skis, the hook end of said strap being wrapped around the other end of said skis to leave said hook exposed, the portion of said strap adjacent to said hook being received therein and pulled relative thereto to lock said strap in tightened relation on the other side of said bindings, wherein said loop and hook ends are located in spaced relation relative to each other, the length of said strap extending between the secured loop and hook ends defining a carry portion for portably transporting said skis.

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**4,015,763**
**ALIGNMENT PAWL FOR FILM-CARRIER ADVANCE MECHANISM**

**Alan S. Keizer, Huntingdon Valley, Pa., assignor to The Jade Corporation, Huntingdon Valley, Pa.**

**Continuation-in-part of Ser. No. 510,207, Sept. 30, 1974. This application Dec. 5, 1975, Ser. No. 637,921**
**Int. Cl.² B65H** *17/40*
**U.S. Cl. 226—55** **8 Claims**

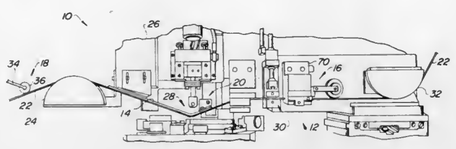
1. Apparatus for sequentially positioning individual lead frames on a lead frame film-carrier at a bonding site, said lead frame film-carrier having sprocket holes therein, comprising;

means for guiding a lead frame film-carrier to and from a bonding site;

feed means for intermittently advancing said film-carrier in a forward longitudinal direction;

biasing means for biasing said film-carrier in a reverse longitudinal direction opposite to the direction of advance by said feed means, said biasing means placing said film-carrier under minimal tension;

pawl means cooperating with said sprocket holes for accurately positioning individual lead frames in both the lateral and longitudinal directions at the bonding site, said pawl means being stationary with respect to said film-carrier; and



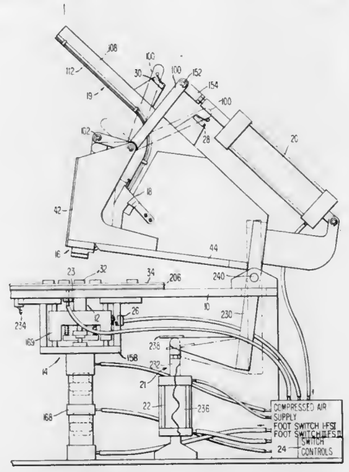

said feed means including means for over-advancing said film-carrier in the forward longitudinal direction from a home position and then releasing said film-carrier so that said biasing means moves said film-carrier in the reverse longitudinal direction until said pawl means engage said sprocket holes thereby positioning said film-carrier at the bonding site while said film-carrier is under minimal tension.

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**4,015,764**
**SOLID STATE CHIP INSERTION APPARATUS**

**David John Durney, Holland, Pa., assignor to Burroughs Corporation, Detroit, Mich.**

**Filed May 30, 1975, Ser. No. 582,350**
**Int. Cl.² B27F** *7/08*
**U.S. Cl. 227—118** **10 Claims**




1. Solid state chip insertion apparatus comprising:

chip insertion means including means arcuately movable from a chip receiving position to a chip insertion position for inserting a solid state chip into a printed circuit board;

means for individually releasing said chips from a supply so as to move by gravity to said insertion means;

means mounting a printed circuit board for adjustable positioning movement adjacent to said chip insertion means;

detent template means carried by said printed circuit board mounting means for guiding said board to a predetermined chip location in rows and columns without visual alignment of said board and said chip;

operator controlled means operably associated with said chip insertion means for actuating said insertion means



effective to insert a chip into said printed circuit board; and

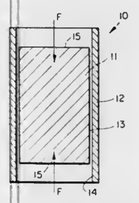
clinching means for deforming the contacts of said chips to retain the chips within said printed circuit board so as to prevent accidental dislodgement therefrom after insertion of the chips into and through the board prior to soldering.

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**4,015,765**
**FORMATION AND UTILIZATION OF COMPOUND BILLET**

**Nazeer Ahmed, Princeton, N.J., assignor to Western Electric Company, Inc., New York, N.Y.**

**Filed May 10, 1976, Ser. No. 685,000**
**Int. Cl.² B23P** *11/02*
**U.S. Cl. 228—131** **5 Claims**




1. A method of forming a compound billet, wherein a solid, longitudinally extending first member, composed of aluminum, is retained firmly within a hollow, longitudinally extending second member, composed of copper, the method comprising the steps of:

a. providing a solid, longitudinally extending first element within a hollow, longitudinally extending second element, said first element being composed of aluminum and having predetermined external dimensions in a plane perpendicular to the direction of longitudinal extension, and said second element being composed of copper and having internal dimensions in said perpendicular plane at least equal to said predetermined external dimensions of the first element;

b. applying to the longitudinal ends of the solid, first element a longitudinal compressive stress of a magnitude sufficient to cause the first element to deform plastically outwardly, perpendicularly to said direction of longitudinal extension, to such an extent as to cause the second element also to deform plastically outwardly, perpendicularly to said direction of longitudinal extension; and then

c. releasing the longitudinal compressive stress at the longitudinal ends of the first element and allowing the first and second elements to relax inwardly, such that a tendency toward a greater degree of relaxation strain in the copper, second element will cause the second element to grasp firmly the exterior of the aluminum, first element, thereby forming said compound billet.

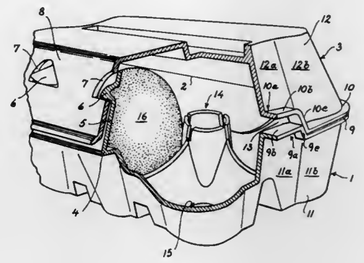
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**4,015,766**
**PACKAGE OF FIBER MATERIAL OR OTHER RESILIENT MATERIAL FOR RECEIVING FRAGILE ARTICLES, PARTICULARLY EGGS**

**Jørgen Nilaus Petersen, Lyngby, Denmark, assignor to Aktieselskabet Brodrene Hartmann, Lyngby, Denmark**

**Filed Nov. 19, 1975, Ser. No. 633,259**
**Claims priority, application Denmark, Jan. 27, 1975, 251/75**
**Int. Cl.² B65D** *1/36*
**U.S. Cl. 229—2.5 EC** **4 Claims**

1. A package for receiving fragile articles such as eggs which package comprises a base member having two opposite end walls and two opposite side walls, a top member having two opposite end walls and two opposite side walls, said top member being hinged along one of its side walls to one of the side walls of said base member, at least the end walls of said top and bottom member having outwardly extending flanges, the intermediate portion of said end walls being displaced inwardly of said members with respect to the outer end portions of said walls, the flanges of said top and bottom members in the region of said intermediate displaced portions having their flanges offset transversely of the major plane of said



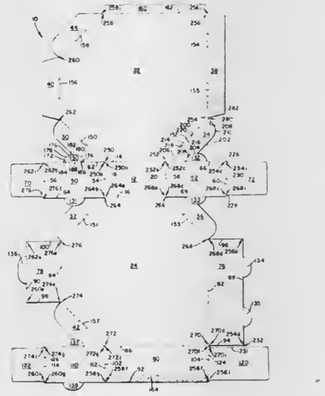

members, the offset flange portion of one of said members forming a recess, the offset flange portion of the other of said members forming a projection, said projection in the closed condition of said package being engaged within said recess to maintain alignment of said members laterally, and the terminal edges of said offset portions being located in substantially the same vertical plane as the terminal edges of the adjoining flanges.

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**4,015,767**
**CONTAINER**

**Roger G. Ferriter, Yonkers, N.Y., assignor to Wix Corporation, Gastonia, N.C.**

**Filed May 5, 1976, Ser. No. 683,634**
**Int. Cl.² B65D** *5/06*
**U.S. Cl. 229—16 R** **15 Claims**



1. An integral foldable container blank, comprising:

a first rectangular wall panel;

a first polygonal end panel foldably connected along one edge thereof to one side edge of said first wall panel, said end panel having an adhesive receiving flange foldably attached to another edge thereof, and a plurality of tongues foldably connected to the other edges thereof, said tongues having locking tab receiving apertures defined therein;

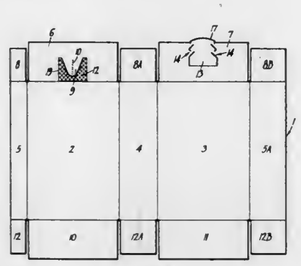
a second polygonal end panel foldably connected along one edge thereof to the other side edge of said first wall panel, and having a plurality of tongues foldably connected thereto at other edges thereof;
second and third rectangular wall panels each having a flap foldably connected to an end edge thereof and each connected along the other end edge thereof to an end edge of said first wall panel;
fourth and fifth rectangular wall panels each foldably connected along one side edge thereof to an edge of said second end panel, said fourth and fifth wall panels having locking tabs on the other side edges thereof;
a sixth rectangular wall panel foldably connected along one side edge thereof to an edge of said second end panel and having a flap foldably connected to one end edge thereof;
a seventh rectangular wall panel foldably connected along one end edge thereof to the other end edge of said sixth wall panel and including locking tabs on each side edge thereof and a flap on the other end edge thereof;
two of said wall panels being adjacent each other and each having a length greater than the length of the other wall panels.

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## 4,015,768
## SEALED END CARTON WITH RECLOSABLE POURING OPENING

**Noel McLennan, Mount Waverly, Australia, assignor to Nicholas Proprietary Ltd., Australia**

**Filed July 23, 1975, Ser. No. 605,374**
**Claims priority, application Australia, July 23, 1974, 8293/74; Nov. 27, 1974, 9789/74**
**Int. Cl.² B65D** *5/72*
**U.S. Cl. 229—17 R** **7 Claims**



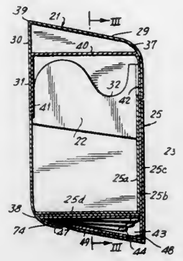
1. A container for the storage and dispensing of pourable materials, the container being formed of sheet packaging material and having means defining a reclosable pouring opening, said means comprising:
an inner sheet having a tongue defined by a cut line in the inner sheet, the base of said tongue being free of scoring and being liftable by bending against its inherent resiliency to form a pouring opening and returnable for frictional engagement with said inner sheet to close said pouring opening by pressure applied thereto;
an outer sheet overlying and sealingly adhered to said inner sheet, said outer sheet having lines of weakness defining and being severable to provide a tab frictionally re-engageable with said outer sheet, said tab overlying said tongue and part of said inner sheet with its base overlying the base of said tongue, said tab being adhered to said tongue but substantially unadhered to said inner sheet so as to be hingedly liftable from said inner sheet;
said container being openable by hingedly lifting said tab whereby said lines of weakness are severed and said tongue is hingedly lifted to form said pouring opening, and reclosable by pressing said tab against said inner sheet whereby said tab frictionally engages said outer sheet and said tongue is pressed into frictional re-engagement with said inner sheet, said lines of weakness defining said tab comprise a series of unconnected cuts constituting a zig-zag pattern extending to the edge of the outer sheet, a hinge crease or score line being provided at the base of said tab, said container is a box-shaped carton.

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## 4,015,769
## CIGARETTE BOX OR PACKAGE

**Shlomo Erlich, 1740 Clement St., San Francisco, Calif. 94121**

**Filed Jan. 30, 1976, Ser. No. 653,788**
**Int. Cl.² B65D** *5/66*
**U.S. Cl. 229—44 CB** **17 Claims**



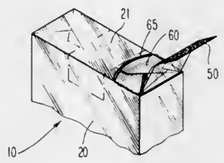
1. A cigarette box having opposite pairs of wider and narrower walls, and having at its top a three-sided insert projecting above one of the narrower and adjacent wider walls of the box and comprising a relatively narrow end wall and front and rear walls extending laterally therefrom, said end wall and the laterally extending front and rear walls of the insert provided with open cutouts therein separated by corner sections, said insert being disposed within and extending below the upper edges of the said one narrower and side walls of the box the box having a closure hinged to the opposite narrow wall of the box, whereby upon opening of the closure, the insert and its cutouts are exposed and enable the cigarettes to be removed by being gripped wth the aid of thumb and finger pressure from any two of three directions and mangling of the tops of the cigarettes thereby avoided.

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## 4,015,770
## PACKAGING

**Bernard J. Tamarin, The Philadelphian, 1C 41, 2401 Pennsylvania Ave., Philadelphia, Pa. 19130**

**Filed July 24, 1975, Ser. No. 598,699**
**Int. Cl.² B65D** *17/16*
**U.S. Cl. 229—51 C** **10 Claims**



1. Cigarette package comprising a rectangular access end surface covered by an inner wrapper folded thereover and by an outer sheath overlying the wrapper, with arcuate slits in superposition extending through both wrapper and sheath substantially across the end surface from one wide side edge to the opposite wide side edge about one-third of the length thereof from one narrow side edge and curving theretoward, and a generally rectangular pull tab substantially covering the portion of the end surface bounded by the narrow end, the slit, and the intervening segments of the wide side edges, the pull tab adhering to such end portion and covering and sealing the slit and terminating in a nonadherent pull portion adjacent the slit.

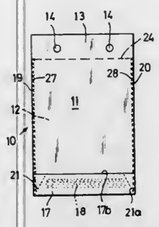


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## 4,015,771
## PACKAGING BAG OF THERMOPLASTIC SYNTHETIC PLASTIC FILM

**Karl Heinz Sengewald, Kuensebeck, Germany (4801)**

**Filed Dec. 29, 1975, Ser. No. 644,594**
**Claims priority, application Germany, Jan. 14, 1975, 7500834**[U]; Mar. 21, 1975, 2512452
**Int. Cl.² B65D** *33/20, 33/36*
**U.S. Cl. 229—62** **5 Claims**



1. A bag of thermoplastic synthetic plastic film, particularly adapted for packaging printed material or the like, comprising:
first and second equi-width panels of thermoplastic synthetic plastic film
superimposed, with respective lateral margins aligned, to form opposite bag walls;
the second bag wall panel being continued at one end into an integrally connected short length
reflected over the edge of and onto the corresponding end margin of the first panel as a closure flap;
said closure flap being releasably bonded to the said end margin by a stripe of non-hardening adhesive whereby the flap may be lifted to open the bag and then reclosed to be again held by the adhesive;
the lateral margins of said panels being connected by welded side seams;
the lateral ends of the closure flap being including in the welded side seams and thereby secured to the bag wall panels;
the ends of the panels distal from the flap being free to afford an open mouth for bag filling, which is thereafter thermoplastically sealable; and
in the regions of its two lateral ends the said closure flap having respective lines of perforations each extending over the entire height of the closure flap.

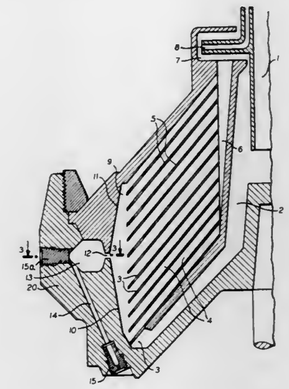
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## 4,015,772
## CONTINUOUSLY OPERATING CENTRIFUGE DRUM FOR THE STERILIZATION OF LIQUIDS

**Heinrich Hemfort, Oelde, Germany, assignor to Westfalia Separator AG, Oelde, Germany**

**Filed Jan. 14, 1976, Ser. No. 649,165**
**Claims priority, application Germany, Jan. 18, 1975, 2501924**
**Int. Cl.² B04B** *1/14*
**U.S. Cl. 233—20 A** **9 Claims**

1. In a centrifuge suitable for purification of a liquid comprising a specifically heavier concentrate fraction and a specifically lighter liquid fraction, comprising a drum for the centrifuging which is rotably mounted, an inlet to the drum for introduction of the liquid to be centrifuged, an outlet for removal of specifically lighter liquid fraction and a separating chamber adjacent the periphery of the drum defined in part by the inner surface of the drum outer wall for formation and collection of the specifically heavier concentrate fraction, the improvement which comprises:
a concentrate chamber in the drum disposed radially outwardly of the separating chamber, and about the drum axis, and which is smaller than the separating chamber,
a plurality of passageways communicating the concentrate chamber with the exterior of the drum for discharge of concentrate from the drum,
means defining a narrow annular gap communicating the separating chamber with the concentrate chamber, the annular gap being shorter in height than the height of the concentrate chamber, so that accumulation of concentrate in the separating chamber is limited,
said gap having an inlet defined by inner surface of the drum outer wall, the gap inlet being positioned at the locus of greatest separating chamber diameter,
said inner surface of the drum outer wall being inclined for flow of concentrate from the separating chamber to said gap.

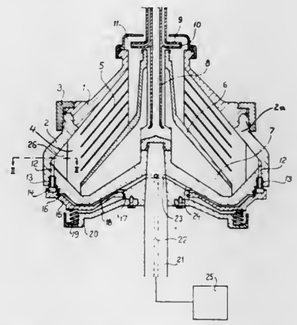


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## 4,015,773
## CENTRIFUGE FOR SEPARATING SOLIDS FROM LIQUIDS

**Henric Wilhelm Thylefors, Stockholm, Sweden, assignor to Alfa-Laval AB, Tumba, Sweden**

**Filed Jan. 27, 1976, Ser. No. 652,754**
**Claims priority, application Sweden, Feb. 4, 1975, 7501189**
**Int. Cl.² B04B** *1/14*
**U.S. Cl. 233—20 A** **4 Claims**

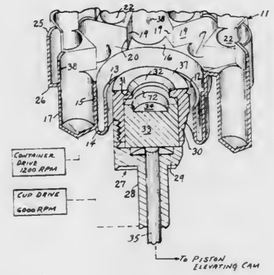


1. A centrifugal separator comprising a rotor mounted for rotation about an axis and including two axially united and interconnected parts forming between them a separating chamber, the rotor having a central inlet for a mixture of liquid and solid particles and having a central outlet for separated liquid, the rotor also having several peripheral outlets being constituted by channels extending through the rotor

from the radially outermost part of the separating chamber to the outside of the rotor body, each said channel having a discharge opening at the outside of the rotor body, means movable axially to and from sealing contact with the outside of the rotor body to close and open said channels, said means including areas which, when in sealing contact with the outside of the rotor body, exert on opposite sides of each discharge opening a sealing force substantially parallel to the rotor axis, one of said rotor parts being constituted by a bowl formed in one piece and provided with an edge portion directed radially inward, the other rotor part having a substantially smaller diameter than the bowl part and being connected therewith at said edge portion, the chamber-surrounding portion of the bowl part, including said edge portion, having a form which, as seen in an axial section through the rotor, is substantially the axial section form of a hollow conical body.

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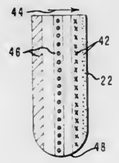
**4,015,774**
**DUAL CENTRIFUGE AND SAMPLE CONTAINER**
**Daniel G. Taylor, Minneapolis, Minn., assignor to Minneapolis War Memorial Blood Bank, Minneapolis, Minn.**
**Filed June 7, 1976, Ser. No. 693,649**
**Int. Cl.² B04B** *5/04, 11/06*
**U.S. Cl. 233—26** **20 Claims**




1. A centrifuge apparatus comprising a vertically-mounted centrifuge cup member, means for rotating said cup member, vertically movable bottom wall means in said cup member, means for at times moving said bottom wall means upwardly to force rotating liquid material out of said cup member, a container member surrounding said cup member, said container member having a plurality of levels containing collecting pockets, and means for positioning said container member and cup member at different relative heights such that material forced out of the cup member can be received respectively at the different levels.

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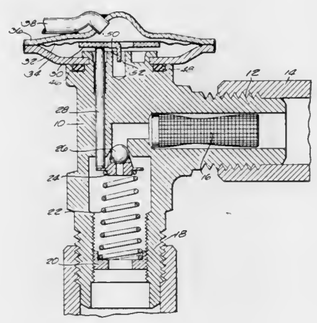
**4,015,775**
**METHOD OF GRADIENT SEPARATION**
**Vernon Carl Rohde, Newtown, Conn., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**
**Filed July 16, 1975, Ser. No. 596,234**
**Int. Cl.² B04B** *5/02*
**U.S. Cl. 233—26** **3 Claims**




1. A method using density gradient centrifugation of separating particulate matter in a sample as a function of the physical characteristics of the matter comprising the steps of:
introducing said sample into an enclosed elongated column of liquid capable of forming a density gradient or having a density gradient along the longitudinal axis of said column,
rotating said column of liquid about a spin axis other than the longitudinal axis of said column such that said longitudinal axis intersects a plane normal to said spin axis at an angle of 90°, whereby said density gradient forms or reorients transversely of said longitudinal axis,
reorienting said density gradient along said longitudinal axis, and
withdrawing different portions of said liquid and separated particulate matter from said reoriented density gradient along said longitudinal axis.

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**4,015,776**
**THERMOSTATIC EXPANSION VALVE**
**Charles D. Orth, Cedarburg, and Marcel P. Griffoul, West Allis, both of Wis., assignors to The Singer Company, New York, N.Y.**
**Filed Jan. 23, 1976, Ser. No. 651,717**
**Int. Cl.² G05D** *27/00*
**U.S. Cl. 236—92 B** **3 Claims**



1. A thermostatic expansion valve comprising,
a valve body having an inlet and an outlet,
a valve in the body to control flow between the inlet and the outlet,
a spring biasing the valve to its seated position,
a diaphragm head assembly mounted on the upper end surface of the valve body, the assembly including upper and lower stampings and a diaphragm mounted between the stampings to define a pressure chamber in the space between the diaphragm and the upper stamping,
means interconnecting the diaphragm and the valve, the improvement comprising,
an annular integral extension from said surface received within a corresponding aperture in the lower head stamping,
an O-ring between said surface and the lower head stamping,
said extension being crimped outwardly to firmly fix the lower head stamping on the valve body with the O-ring effecting a seal.

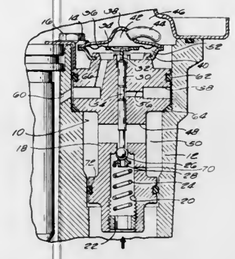
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**4,015,777**
**THERMOSTATIC EXPANSION VALVE CAPSULE**
**Charles F. Treder, Brookfield, Wis., assignor to The Singer Company, New York, N.Y.**
**Filed Feb. 5, 1976, Ser. No. 655,491**
**Int. Cl.² G05D** *23/02*
**U.S. Cl. 236—92 B** **6 Claims**

1. A thermostatic expansion valve comprising,
a valve body having an inlet and outlet,



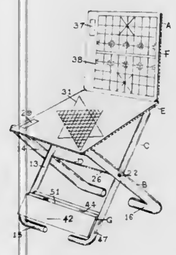
a valve for regulating flow from the inlet to the outlet,
a head assembly mounted on the body and divided into two chambers by a diaphragm,
a temperature responsive charge in the head chamber remote from the body whereby the pressure in the head chamber varies with variation in temperature outside the head chamber to move the diaphragm,
a push pin engaged by the diaphragm in the diaphragm chamber opposite the head chamber and slidably mounted in a bore in the body and operatively connected to the valve to actuate the valve,



the refrigerant pressure in said diaphragm chamber being lower than the pressure at the valve end of the push pin whereby refrigerant tends to flow along the push pin in the clearance between the pin and the bore,
a flow bypass conduit means intercepting the bore and leading to a low pressure space to divert refrigerant flow from the bore away from the diaphragm chamber, said bypass conduit means being connected to the diaphragm chamber,
and a reduced diameter section in said pin adjacent said bypass conduit means.

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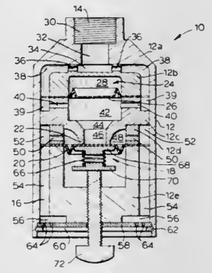
**4,015,778**
**MULTIFUNCTIONAL FOLDING CHAIR**
**Helen Ho-Chiu Chen, and David Wan-Ching Chen, both of B7, 640 W. 153 St., New York, N.Y. 10031**
**Filed Jan. 26, 1976, Ser. No. 652,340**
**Int. Cl.² A63F** *9/00*
**U.S. Cl. 273—136 G** **5 Claims**



1. A multifunctional, height adjustable folding chair comprising:
two generally U-shaped open frames, one outer and major and the other inner and minor, with perpendicular locking channels formed on the planar top portions thereof and horizontal slots formed adjacent the lower ends of the leg portions of said minor frame, braced one within the other by a transverse common fastener through lateral holes formed at points generally midway between the ends of the paired legs of said chair;
a flat, generally rectangular seat, which has a game board pattern printed on the top, three locking slits formed adjacent the rear end, a rectangular cutout formed on one lateral side and a storage shelf built onto the undersurface, connected pivotally and detachably at the rear end by a transverse row of bosses on its undersurface to said minor frame through said locking channels thereon, and connected detachably at the frontal end by a choice of three transverse rows of bosses on its undersurface to said major frame through said locking channels thereon, in the extended operative condition of said chair;
a flat, nearly square back panel, which has game board patterns printed on the back and the front thereof different from each other and from said pattern on said seat, and also has a rectangular cutout on one lateral side to correspond with said rectangular cutout on said seat, connected pivotally and detachably by three angle joints at the rear end thereof to said seat through said locking slits thereon;
a rectangular storage chamber mounted between said leg portions of said minor frame adjacent the lower ends thereof through said slots thereon; members being dimensioned to fit one another, such that in switching from the extended position of said chair to the folded position, said back panel is folded over said seat which is then disengaged from the top of said major frame and folded over said minor frame which in turn is folded along with all other members within the boundaries of said major frame.

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**4,015,779**
**FLUID OSCILLATOR AND PULSATING SHOWER HEAD EMPLOYING SAME**
**Clyde C. K. Kwok, Montreal, Canada, assignor to E. V. Rippingille, Jr., Key Largo, Fla.**
**Filed Oct. 9, 1975, Ser. No. 621,257**
**Claims priority, application Canada, Sept. 19, 1975, 235925**
**Int. Cl.² B05B** *3/14*
**U.S. Cl. 239—102** **10 Claims**

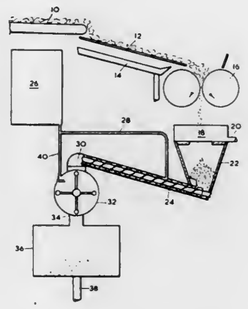


1. A fluid oscillator for producing pulsations in a flow of fluid comprising:
a. a housing having a fluid inlet channel for connection to a supply of fluid under pressure, and a fluid outlet channel for flow of fluid through the housing;
b. valve means located between the inlet and outlet channels for controlling fluid flow from the inlet to the outlet channel, the valve means being adapted to open by fluid pressure in the inlet channel and adapted to close by a reduction in fluid pressure in the outlet channel, the valve means including means for biassing the valve means toward a closed position;
c. the outlet channel being dimensioned to produce a reduction in fluid pressure therein after the valve means reached a fully open position, so that the valve means commences to close;
d. a pressure accumulator located adjacent to the inlet channel to attenuate fluctuations in fluid pressure in the inlet channel; and
e. an elastic separator element located in the housing to define a sealed gaseous compartment in the pressure

accumulator, so that pressure fluctuations in the inlet channel are generally absorbed by compression and expansion of the gas in the accumulator.

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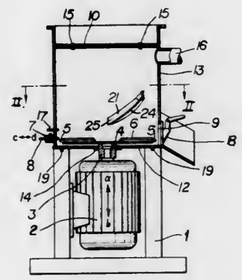
**4,015,780**
**POWDER FORMING**
**Robert Gilmore Hall, Cambridge, England, assignor to BOC Limited, London, England**
**Filed May 5, 1975, Ser. No. 574,640**
**Int. Cl.² B02C** *23/06*
**U.S. Cl. 241—23** **3 Claims**



1. A process for producing powdered metal which comprises taking metal swarf, substantially removing oil from the swarf, reducing the metal swarf to a particle size of about 6 mm diameter, then substantially removing residual oil and grease from the said particles, cooling the said particles of swarf to a temperature in the range of about minus 20° C to minus 100° C to considerably reduce the impact strength of the swarf particles, and introducing the so cooled swarf particles into a comminuting mill wherein coolant is introduced into the mill during the milling operation so as to maintain the swarf particles at the said temperature range during comminution to a powdered metal having a particle size in the range of about −40 to +350 BSS for producing metal powder suitable for compaction and forging by conventional powder metallurgy techniques.

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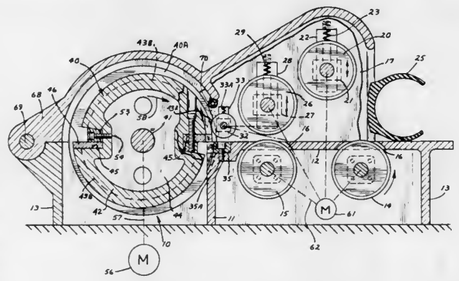
**4,015,781**
**CONVERSION OF PLASTIC WASTE INTO EXTRUDABLE PELLETS**
**Erich Beck, Am See 29, 652 Worms - Weinsheim, Germany**
**Filed July 22, 1974, Ser. No. 490,873**
**Claims priority, application Germany, July 4, 1974, 2432495; July 4, 1974, 2432494**
**Int. Cl.² B02C** *23/36*
**U.S. Cl. 241—46.11** **12 Claims**



1. In an apparatus for the conversion of plastic waste into usable material, means including an upright wall forming a cylindrical working space, at least one rotatable knife arranged at the bottom of said space coaxial therewith, and counter action tools arranged along the wall at the bottom of said space, facing said knife, means above said knife at the top of said space for charging said space with plastic waste; and elongated means attached to said wall at a predetermined height substantially above, and separated from said counter action tools, and projecting from said wall at a distance small against the radius of said wall; said elongated means extending at said height circumferentially and in the direction of its elongation, at least along a portion of the periphery of said wall; and while said waste is being cut and circulated by said knife and thereby rising along the wall, reflecting said rising waste at said height back toward the path of said knife.

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**4,015,782**
**DEVICE FOR REDUCING POLYMERS OR THE LIKE TO SUBSTANTIALLY UNIFORM SMALL SIZE PIECES**
**Bernard H. Granite, 3519 Rhode Island Ave. South, St. Louis Park, Minn. 55426**
**Filed July 9, 1975, Ser. No. 594,455**
**Int. Cl.² B02C** *13/26*
**U.S. Cl. 241—62** **15 Claims**

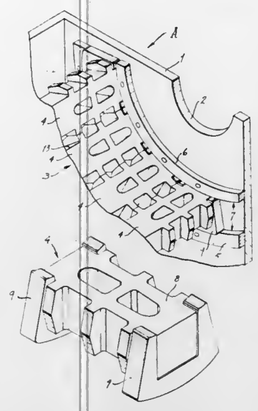


1. A device for chopping elastomeric materials comprising a support frame, a rotor including at least one movable cutting blade extending in direction axially along the rotor, said movable cutting blade having a plurality of teeth formed adjacent one edge thereof extending toward the periphery of the rotor, said teeth being defined by outer end edges and spaced side edges generally perpendicular to the axis of rotation of said rotor, a stationary cutting blade having a cutting edge having teeth adapted to mate with and be complimentary to the teeth formed on said movable cutting blade including side stationary teeth edges parallel to the side edges of the teeth on the rotor, and means to mount said stationary cutting blade adjacent the peripheral edge of said rotor so that said movable cutting blade teeth and said stationary cutting blade teeth interfit upon rotation of said rotor and the adjacent side edges of interfitting teeth provide a scissor like cutting action along the mating sides of the movable and stationary teeth.

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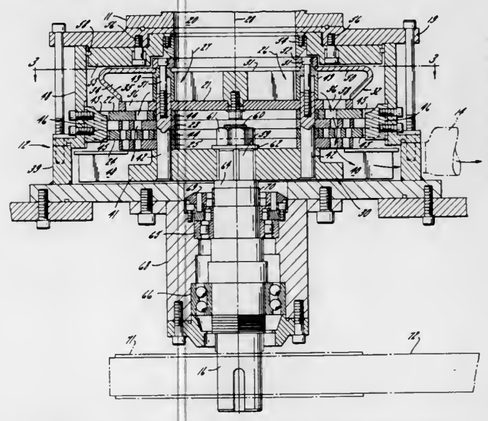
**4,015,783**
**REVERSIBLE GRATE BAR AND SUPPORT FOR CRUSHERS**
**Donald G. Miller, Glendale, Mo., assignor to American Pulverizer Company, St. Louis, Mo.**
**Filed July 10, 1975, Ser. No. 594,777**
**Int. Cl.² B02C** *23/10*
**U.S. Cl. 241—73** **14 Claims**

1. In a reversible grate bar for a crusher of the type having side supports for holding the grate bar surface in place during crusher usage, each bar having a width approximating the distance between the sides of the crusher, a pair of removable shoes provided for embracing each end of the bar and adapted for securely confining the bar upon the said side supports of the crusher, and said grate bar being reversible and supportive within said shoes for thereby disposing either side of the grate bar in the formation of crusher surface.



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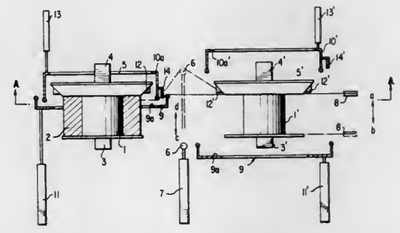
**4,015,784**
**EMULSIFIER FOR SAUSAGE BATTER AND THE LIKE**
**Alvin W. Hughes, 4N 194 Church St., Bensenville, Ill. 60106**
**Filed Feb. 5, 1976, Ser. No. 655,626**
**Int. Cl.² B02C** *19/12*
**U.S. Cl. 241—162** **4 Claims**



1. An apparatus for emulsifying sausage batter or the like comprising in combination:
an enclosed cylindrical emulsifying chamber, said chamber having an axial inlet at the top thereof, said chamber further having a discharge conduit, said discharge conduit being arranged perpendicular to the axis of said chamber at the bottom and tangential to the periphery thereof,
a rotatable drive shaft means arranged coaxial with and passing through the bottom of said emulsified chamber;
a plurality of spaced alternating rotatable and non-rotatable perforate rings, the uppermost and lowermost of said rings being rotatable, said rotatable rings being driven by said drive shaft means;
means within said chamber disposed above and rotatable with the uppermost of said rings to impart rotational movement to and impel said sausage batter from said axial inlet outward and vertically downward into the openings of said uppermost rotating ring; and
means within said chamber disposed beneath and rotatable with the lowermost of said rings to receive the sausage batter directly as it exits vertically downward from said rotating lowermost ring and to maintain the rotational movement of said sausage batter as said means directs the sausage batter into said discharge conduit.

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**4,015,785**
**METHOD AND APPARATUS FOR TREATING THE TERMINAL OF A WIRE-LIKE OBJECT IN A WIRE-LIKE OBJECT TAKE-UP APPARATUS**
**Yoshio Ikegami, Miki; Hirohumi Kimura, and Tadashi Kohge, both of Kobe, all of Japan, assignors to Kobe Steel Ltd., Kobe, Japan**
**Filed Oct. 6, 1975, Ser. No. 620,017**
**Claims priority, application Japan, Oct. 4, 1974, 49-114863; Apr. 12, 1975, 50-44404; May 16, 1975, 50-58959**
**Int. Cl.² B65H** *67/04*
**U.S. Cl. 242—25 A** **15 Claims**



1. A method for treating the terminal end portion of a wire-like object within a wire-like object take-up apparatus within which, when the wire-like object wound upon a full bobbin is moved toward an empty bobbin and grasped and severed so as to consecutively and alternately perform the take-up operation of the wire-like object upon empty bobbins, the terminal portion of the wire-like object upon the full bobbin being conducted and guided by cover means, comprising the steps of:
moving a main cylindrical terminal treating cover and an auxiliary cylindrical terminal treating cover toward each other along the outer periphery of the full bobbin and relative to the wire-like object being fed to the full bobbin so as to thereby provide an overlapped condition by portions of the main and auxiliary covers for initially guiding and confining said wire-like object within an accommodating spacing defined therebetween prior to the terminal portion of the wire-like object passing therebetween; and
actuating a wire-actuating rod, subsequently and independently of said treating covers, for pushing said wire-like object to a position so as to be grasped by a pawl operatively associated with said empty bobbin and be cut by a cutter operatively associated with said full bobbin and for thereby causing said terminal portion of the wire-like object to enter said accomodating spacing defined between the main and auxiliary covers relatively disposed at said overlapped condition, and through an overlapped portion between the main and auxiliary covers, so as the thereby be accommodated and retained within said spacing as a result of centrifugal forces acting thereon during rotation of said full bobbin.

3. An apparatus for treating the terminal portion of a wire-like object within a wire-like object take-up apparatus within which the wire-like object is moved from a full bobbin to an empty bobbin disposed parallel thereto for thereby performing a continuous take-up operation, comprising in combination:
an auxiliary cylindrical terminal treating cover disposed

upon a pawl wheel side of said bobbin and which is movable along the axis of rotation of the bobbin, said auxiliary cylindrical terminal treating cover being larger in diameter than the outer periphery of said bobbin;

a main cylindrical terminal treating cover disposed opposite said auxiliary terminal treating cover and movable along the axis of rotation of said bobbin so as to form a terminal accommodating spacing around the outer periphery of said bobbin between said auxiliary terminal treating cover and said main terminal treating cover;

first actuating means for actuating said auxiliary terminal treating cover;

second actuating means for actuating said main terminal treating cover;

a wire-actuating rod for pushing said wire-like object to a position so as to be grasped by a pawl provided upon the periphery of said bobbin; and

third actuating means for actuating said wire-pushing rod.

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**4,015,786**

**BOBBIN CHANGING APPARATUS**

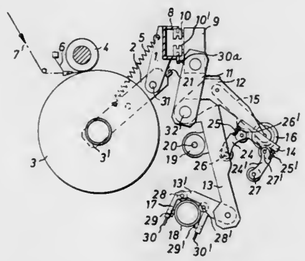
**Valter Slavik, Horgen, and Marc Meisser, Meyrin, both of Switzerland, assignors to Heberlein & Co. AG, Wattwil, Switzerland**

**Filed Feb. 5, 1975, Ser. No. 547,168**

**Claims priority, application Switzerland, Feb. 6, 1974, 1610/74**

**Int. Cl.² B65H** *67/04, 54/26*

**U.S. Cl. 242—35.5 A** **7 Claims**



1. In a device for bobbin-exchanging on a textile machine having a line of bobbin holders for holding bobbins to which filaments are fed continuously, the device being mounted to move along the line of bobbin holders and comprising a support, a first arm, pivotal connecting means between said support and said first arm for said first arm to swivel towards and away from a selected bobbin holder in the line thereof, a first holding device mounted on said first arm for receiving a full bobbin from the bobbin holder and withdrawing the full bobbin therefrom, a second arm, pivotal connecting means between said first and second arms for said second arm to swivel towards and away from said first arm, a power driven friction roller mounted on said second arm for frictionally rotating the full bobbin when being withdrawn from the bobbin holder, a third arm, pivotal connecting means between said support and said third arm for said third arm to swivel towards and away from the bobbin holder, a second holding device mounted on said third arm for the guided transport of an empty bobbin to said bobbin holder, and means connected to said support for controlling the opening and closing of the bobbin holder to enable the bobbin therein to be exchanged.

**4,015,787**

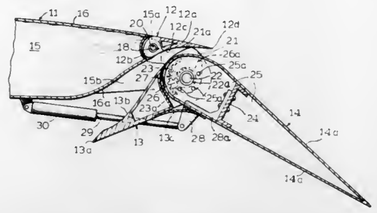
**AIRCRAFT WING**

**Joseph R. Maieli, Central Islip; Gordon Rosenthal, Jericho, and Domenick T. Torrillo, Dix Hills, all of N.Y., assignors to Fairchild Industries Inc., Germantown, Md.**

**Filed Nov. 17, 1975, Ser. No. 632,468**

**Int. Cl.² B64C** *3/50*

**U.S. Cl. 244—42 DA** **3 Claims**



1. An aircraft wing comprising in combination a main body portion, a plurality of movable auxiliary sections disposed at the trailing edge of said main body portion, said movable auxiliary sections comprising a leading auxiliary section and a trailing auxiliary section, hinge means operably connecting said auxiliary sections and said main body portion, said hinge means including a fixed hinge member disposed on said main body portion and connecting said leading and trailing auxiliary sections to the main body portion, said leading and trailing auxiliary sections being movable about said fixed hinge member relative to said main body portion and one another and connecting means disposed within said auxiliary sections for connecting said auxiliary sections and for causing said leading auxiliary section and said trailing auxiliary section to move about said fixed hinge member simultaneously, said connecting means disposed between said leading and trailing auxiliary sections being operable to lock said leading and trailing auxiliary sections when said trailing section is partially deployed above the wing.

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**4,015,788**

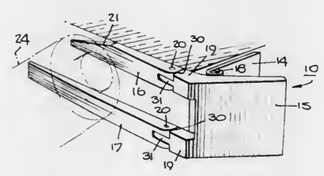
**PAPER ROLL AND SPINDLE EJECTION DEVICE**

**Robert O'Connor, 1777 E. 48th St., Brooklyn, N.Y. 11204**

**Filed Dec. 22, 1975, Ser. No. 642,974**

**Int. Cl.² A47K** *10/18*

**U.S. Cl. 242—55.2** **13 Claims**



11. In combination,

a wall mounting;

a longitudinally compressible spindle rotatably mounted in said mounting;

a paper roll having a core mounted on said spindle;

an ejection device for ejecting said spindle and core from said mounting after emptying of said paper roll, said device including a mounting plate, a tab pivotally mounted on said plate, and a pair of fingers mounted on said tab and extending between said spindle and said mounting to compress said spindle upon pivoting of said tab towards said mounting plate; and

means securing said mounting plate to said mounting.



**4,015,789**

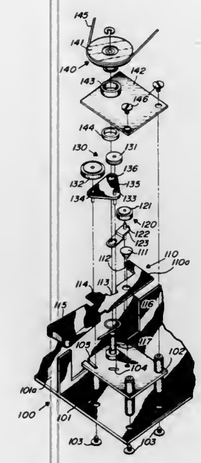
**REVERSIBLE CARTRIDGE TAPE PLAYER SYSTEM WITH SIDE DRIVE**

**Melvin A. Lace, Prospect Heights, and Fernand F. Pelletier, Elmhurst, both of Ill., assignors to Motorola, Inc., Schaumburg, Ill.**

**Filed Aug. 5, 1974, Ser. No. 491,431**

**Int. Cl.² G11B** *15/20, 15/44*

**U.S. Cl. 242—55.19 R** **50 Claims**



1. A reversible cartridge tape player for a continuous loop cartridge having

a hub means rotatably mounted in the cartridge,

a continuous loop tape wound on the hub means and adapted for being driven through the cartridge in a forward direction by being removed from the hub means at the inner convolution and returned to the hub means at the outer convolution, and

tape guide means for guiding the inner convolution of tape onto the hub means when the tape is driven in the reverse direction

wherein the tape player comprises:

a housing having a cartridge receiving cavity therein,

tape playing and driving instrumentalities including a capstan drive shaft mounted on the housing in communication with the cavity and adapted for driving the tape in the forward direction when the tape cartridge is fully inserted in the cavity during a normal playback mode of operation of the player,

drive means mounted in the housing for driving the tape in a reverse direction through the cartridge during a rewind mode of operation of the player,

means mounted in the housing for coupling the drive means to a peripheral surface portion of the cartridge hub means at a point radially displaced from the axis of rotation of the cartridge hub means,

means mounted in the housing for engaging the drive means with the coupling means to drive the hub means in the reverse direction, and

means for disengaging the capstan tape drive during the rewind mode of operation by moving the cartridge outwardly slightly in the cartridge receiving cavity,

whereby during the rewind mode of operation of the player the tape is driven through the cartridge by being removed from the hub means at the outer convolution and returned to the hub means at the inner convolution.

**4,015,790**

**TAPE CARTRIDGE**

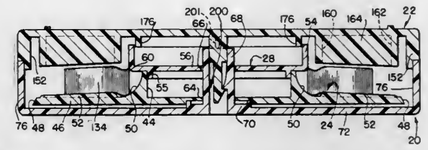
**Anthony L. Gelardi, Cranston, R.I., and Gregory Mathus, Cambridge, Mass., assignors to The Morningstar Corporation of Cambridge, Cambridge, Mass.**

**Continuation of Ser. No. 607,295, Jan. 4, 1967, abandoned.**

**This application Aug. 5, 1975, Ser. No. 602,076**

**Int. Cl.² G11B** *23/10*

**U.S. Cl. 242—55.19 A** **27 Claims**



1. A magnetic tape cartridge for endless tape comprising a cover and a base,

and a reel mounted for rotation on the base for carrying the endless tape in a wound condition with an exposed loop, said reel having a reel flange and a central column with the column diminishing in diameter away from the flange,

and a cap secured to the reel on top of the column and having an outer cylindrical wall substantially greater in diameter than the top of the column and with the bottom of the cylindrical wall being spaced from the flange less than the width of the tape to be packaged in the cartridge.

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**4,015,791**

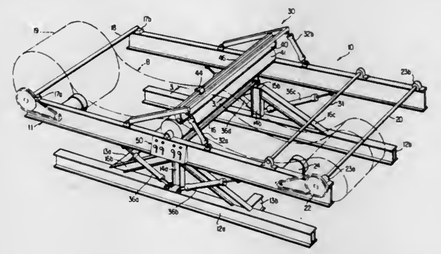
**APPARATUS FOR SLITTING BELT MATERIAL**

**John G. Price, Box 3197, Montgomery, Ala. 36109**

**Filed Feb. 6, 1976, Ser. No. 655,998**

**Int. Cl.² B65H** *35/02, 19/30*

**U.S. Cl. 242—56.2** **7 Claims**



1. An apparatus for longitudinally slitting rolled sheet material comprising:

a structural frame having first and second ends, first bracket means mounted on the first end of said frame;

a first shaft rotatably and removably mounted on said first bracket means;

second bracket means mounted on the second end of said frame;

a second shaft rotatably and removably mounted on said second bracket means;

a drinving means for reversibly driving said second shaft at a variable speed;

roller means mounted on said frame for frictionally engaging and forwarding said sheet material from said first end to said second end, said roller means including a drive roller and a driven roller;

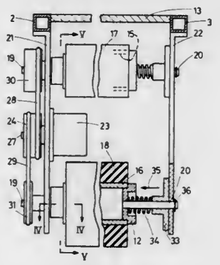
means for raising and lowering said driven roller for placing a fixed pressure upon the sheet material passing between said roller means;

laterally adjustable knife means mounted on said means for raising and lowering said driven roller means; and

hydraulically powered means for tilting said frame about an axis parallel to said first and second shafts and intermediate between the ends of said frame so as to lower said first end to permit placing of the stock roll of the belt on said first bracket means, tilting said frame to a horizontal working position and tilting said frame so as to lower said second end for removal of slit roll material from said second bracket means.

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**4,015,792**
**DEVICE FOR ALTERNATELY WINDING FLEXIBLE BANDS AND THE LIKE BETWEEN TWO ROLLS**
**Christian Thenon, Chatillon-sur-Cluses, and Bernard Pelletier, Cluses, both of France, assignors to Etablissements Carpano & Pons, France**
**Filed Mar. 26, 1976, Ser. No. 670,713**
**Claims priority, application France, Apr. 11, 1975, 75.11404**
**Int. Cl.² B65H** *17/02*
**U.S. Cl. 242—67.4** **7 Claims**



1. Apparatus for reversibly winding a flexible band into a roll, comprising;

first and second reels connectable respectively to opposite ends of a flexible band for reversibly winding the band onto a winding-up one of the reels to permit providing a roll of the band wound up on the one reel up to a maximum roll diameter D and for thereby unwinding the band from an unwinding one of the reels down to a minimum roll diameter *d*; and

means for turning the reels, comprising a single drive means reversibly rotatable for the reversible winding, first and second turning elements turnable by the drive means for turning the first and second reels respectively at respective rotary speeds W1 and W2 which satisfy a relation $D/d \leq W2/W1$ to keep the band taught while the roll diameters change between D and *d*, and first and second unidirectional coupling means disposed respectively between the first turning element and the first reel and between the second turning element and the second reel, for alternately enabling the first and second turning elements to turn the respective reels for alternate winding up and unwinding of the roll on either reel.

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**4,015,793**
**FILM TAKE-UP REEL**
**William F. Hemminger, Seaford, N.Y., assignor to Pandick Press, Inc., New York, N.Y.**
**Filed Jan. 14, 1976, Ser. No. 649,061**
**Int. Cl.² B65H** *75/28*
**U.S. Cl. 242—74** **14 Claims**

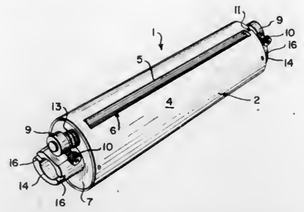
1. A film take-up reel having a hollow spool member with a longitudinal slot for receiving the film wherein said spool member defines an outer surface and an inner surface comprising:

a. a tightening shaft member rotatably secured adjacent the hollow spool member and having an effective diameter substantially less than the effective diameter of the spool member;

b. said spool member defining a slot extending substantially the entire length of the spool member and extending through the outer surface and the inner surface;

c. said tightening shaft member being rotatably secured adjacent said slot and registering with said slot along the internal surface of said spool;

d. said tightening shaft member having a shaft slot extending

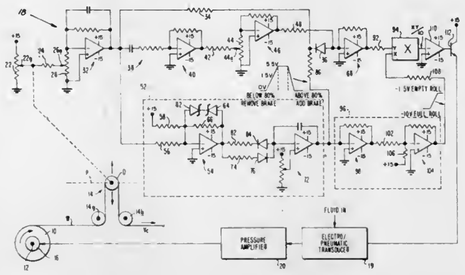


entirely therethrough and registering with said spool slot for receiving a portion of the film when in a predetermined open position; and

e. said shaft slot cooperating with said spool slot for imparting convolutions to the film by rotation of said shaft to a predetermined closed position to secure the film to the spool the open and closed positions being maintainable in the absence of a portion of film.

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**4,015,794**
**WEB TENSION CONTROL SYSTEM**
**Edward F. Meihofer, Norfolk, Mass., assignor to Butler Automatic, Inc., Canton, Mass.**
**Filed Sept. 15, 1975, Ser. No. 613,312**
**Int. Cl.² B65H** *25/22*
**U.S. Cl. 242—75.44** **12 Claims**



1. In a web-tension control system of the type having a web roll support, a brake for braking the web roll, a festoon downstream from the web roll including a dancer around which web from the roll is trained on its way to a web consuming machine and means for controlling the brake in response to dancer position so as to maintain substantially constant tension in the web, the improvement comprising

A. means for establishing a selected dancer reference position,

B. means for producing a position signal indicative of the actual dancer position,

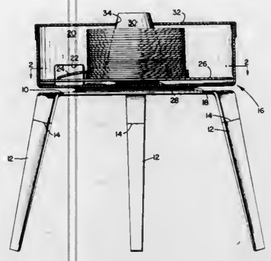
C. means for comparing the average position of the dancer to the selected reference position to develop a relatively slowly changing second electrical signal representing the average braking torque required to maintain the dancer at said reference position,

D. means for summing said position and second signals to produce a control signal, and

E. means for applying the control signal to control said brake.



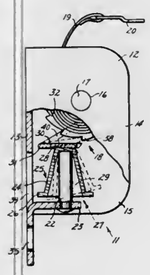
**4,015,795**
**CABLE DISPENSER**
**Robert S. Y. Chong, Aiea, Hawaii, assignor to Merry Whirler Manufacturing Corporation, Aiea, Hawaii**
**Filed Oct. 28, 1975, Ser. No. 625,891**
**Int. Cl.² B65H** *49/00, 75/30*
**U.S. Cl. 242—85** **9 Claims**



1. A cable dispenser comprising a relatively stationary base, a cable dispensing control member having a bottom and an upstanding substantially cylindrical side wall, means mounting said member on said base for free rotation about the axis of said side wall, a turntable for supporting a coil of cable disposed within said member, means mounting said turntable on the bottom of said member for free rotation about said axis independently of rotation of said member, and means providing a dispensing opening at said wall through which the cable may be withdrawn from the dispenser, whereby when cable is pulled out through said opening said member is automatically oriented to align said opening with the cable payout direction while said turntable is free to relatively rotate as the cable is pulled out of the dispenser.

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**4,015,796**
**VEHICLE SENSITIVE INERTIAL SENSOR FOR RETRACTORS AND THE LIKE**
**Wallace Carson Higbee, Romeo, Mich., assignor to The Firestone Tire & Rubber Company, Akron, Ohio**
**Filed June 7, 1974, Ser. No. 477,296**
**Int. Cl.² B65H** *75/48*
**U.S. Cl. 242—107.4 A** **4 Claims**



2. A pendulum for sensing omnidirectional inertial imbalance inertially actuated safety equipment such as seat belt retractors comprising:

a frame structure;

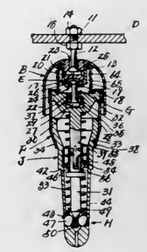
a flat topped post upstanding in said frame structure in a normal vertical direction;

a bell shaped housing having an exterior flat top and having an internal flat surface parallel to said flat top of said bell shaped mass on said upstanding post; and

an actuating lever having a portion extending over said flat topped exterior portion of said bell housing and displaceably movable by engagement with said flat topped exterior portion of said bell housing on inertial displacement of said bell housing in any direction relative to said post.

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**4,015,797**
**BOBBIN HANGER**
**Zenzaburo Tsukumo, Nishinomiya, Japan, assignor to NTN Toyo Bearing Company Ltd., Osaka, Japan**
**Filed Nov. 6, 1975, Ser. No. 629,583**
**Claims priority, application Japan, Nov. 9, 1974, 49-129299**
**Int. Cl.² B65H** *49/00, 49/02;* **D03J** *5/08*
**U.S. Cl. 242—130.2** **5 Claims**



1. A bobbin hanger for mounting on a hanger rail comprising an elongated main body member having a top centrally disposed cavity area and a bottom disposed cavity area at the respective ends thereof, attaching means fixedly secured to and within the top cavity area of said body member and constituting the means for attaching the bobbin hanger to a hanger rail, the bottom cavity area having a spherical surface at its lower end thereof, an intermediate member having an elongated bar-like central body portion, an enlarged top head portion, and an enlarged bottom head portion at each end of the body portion respectively, said top head portion being seated in said bottom cavity area of said main body member and being semi-circular in configuration with the bottom surface thereof being spherical and corresponding to the spherical surface of said bottom cavity area, and a bottom member having an enlarged upper portion with a recess area of a dimension greater than the diameter of said main body member for receiving the bottom end of said main body therein and an internal cavity area extending centrally downwardly from said recess area, the bottom of said internal cavity area being enlarged to receive the enlarged bottom head portion of said intermediate member therein to connect said bottom member to said intermediate member, said bottom member further having a bottom tubular portion having a diameter sufficient to permit same to pass through the central aperture of a bobbin, said bottom portion also including means adjacent its lower end to releasably engage a bobbin when the portion is inserted in the central aperture of a bobbin.

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**4,015,798**
**FLEET ANGLE SYSTEM AND METHOD OF LEVEL WINDING**
**John S. Benya, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**
**Filed Feb. 17, 1976, Ser. No. 658,639**
**Int. Cl.² B65H** *54/28*
**U.S. Cl. 242—157.1** **5 Claims**

1. An apparatus for level winding several layers of a cable on a winch drum which avoids the creation of undue stresses thereon comprising:

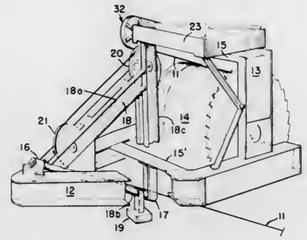
means for supporting the winch drum to permit the winding and unwinding of the cable thereon;

means mounted on the supporting means for pivoting about an axis and having an extension disposed to be pivoted about the pivot axis across the width of the drum;

means carried on the supporting means for moving the extension of the pivoting means across the width of the winch drum;

means connected to the extension of the pivoting means and the moving means for ensuring the travel of the extension across the width of the winch drum, the ensuring means includes a drive pin secured to the moving means and extending toward the extension of the pivoting means, said drive pin has its longitudinal axis coplanar with the axis of the first sheave;

means carried on the pivoting means for orientating the cable where it leaves the winch drum and where it is played out from the apparatus substantially parallel to the pivot axis of the pivoting means, the orientating means



includes a first sheave journaled on the extension of the pivoting means adjacent the winch drum and a second sheave journaled on the extension of the pivoting means adjacent the pivot axis, the first and second sheaves are positioned with repsect to each other on the extension to locate the cable in a coplanar relationship with respect to the pivot axis;

means coupled between the winch drum and the moving means for controlling the rate at which the extension of the pivoting means moves across the width of the drum; and

means carried on the pivoting means for counterweighting the extension of the pivoting means and the orientating means.

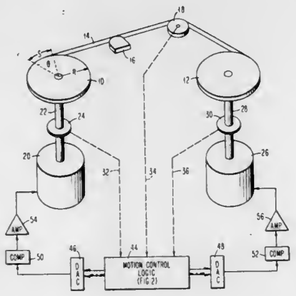
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**4,015,799**

## ADAPTIVE REEL-TO-REEL TAPE CONTROL SYSTEM

**John Alexander Koski; Rudolf Werner Lissner, and Spencer Donald Roberts, all of San Jose, Calif., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Nov. 14, 1975, Ser. No. 631,808**
**Int. Cl.² G03B *1/04*; G11B *15/32***
**U.S. Cl. 242—203** **12 Claims**




1. A reel-to-reel tape transport apparatus

wherein an unbuffered length of tape follows a fixed-length path from a supply reel past a read/write head and guide to a take-up reel, and one motor drives the take-up reel and another motor drives the supply reel to maintain appropriate tension and tape motion at the read/write head, characterized by

a control mechanism which is continually adaptive to dynamic changes as the tape is moved from the supply reel to the take-up reel comprising:

means for measuring the variable amount of tape displaced each time one of said reels is rotated through a preselected angle;

motion control logic means responsive to said measuring means, including means for deriving reel radii and tape inertial values corresponding thereto, and including means for calculating tape position error; and

arithmetic logic means responsive to said measuring means for calculating from said tape position error and said inertial values the appropriate torque for each reel to drive said position error to zero along a predetermined profile with negligible tape tension disturbances.

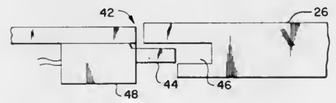
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**4,015,800**

## AERODYNAMIC SPIN CONTROL DEVICE FOR AIRCRAFT

**William Bihrle, Jr., 284A Tennis Court Road, Cove Neck, N.Y. 11771**

**Filed Apr. 22, 1975, Ser. No. 570,505**
**Int. Cl.² B64C *17/00***
**U.S. Cl. 244—76 R** **12 Claims**




1. In a high speed airplane with lifting surfaces, an aerodynamic spin control device for preventing or controlling a spin caused at least in part by the propelling side force generated by the fuselage forebody of said airplane at high angles of attack, said spin control device comprising in combination with said high speed airplane, spin control means located at the forebody area of said airplane for deploying from a housed position laterally outwardly away from the normal contour of the forebody of said airplane in response to spin conditions.

12. A method for preventing entry into or effecting recovery from a spin of a high speed airplane with lifting surfaces, caused in part by the propelling yawing moment generating by the fuselage forebody of the high speed airplane at high angles of attack, comprising varying the configuration of the forebody in response to predetermined spin conditions to change the flow field over the fuselage forebody so as to change the fuselage yawing moment from pro-spin to anti-spin.

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**4,015,801**

## MANEUVERABLE, RAM AIR INFLATED, FLEXIBLE AERIAL WING

**William H. Womble, 186 Eldridge St., Manchester, Conn. 06040, and John D. Campbell, 8764 Croydon Ave., Los Angeles, Calif. 90045**

**Continuation of Ser. No. 528,722, Dec. 2, 1974, abandoned. This application Oct. 30, 1975, Ser. No. 627,118**
**Int. Cl.² B64D *17/14***
**U.S. Cl. 244—145** **3 Claims**

1. Improvements in ram air inflated parachutes of the type comprising a canopy formed of a flexible, non-porous fabric having a leading edge and a trailing edge, and a plurality of forwardly facing transversely adjacent air cells having an upper wall and a lower wall and extending from said leading edge toward said trailing edge and terminating along a cell termination line formed by the joining of said upper and lower walls, said improvements comprising means for displacing the separation point of the relative airflow over the upper surface of said canopy toward said trailing edge and providing more lift, said means comprising a transverse opening in the upper wall of at least some of said cells, said opening being positioned forwardly of said termination line and having the effect of moving said separation point further rearwardly toward said trailing edge.



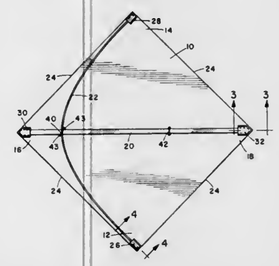
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**4,015,802**

## KITE CONSTRUCTION

**Romeo Victor Heredia, 5648 Waring Road, San Diego, Calif. 92120**

**Continuation of Ser. No. 536,404, Dec. 26, 1974, abandoned. This application Jan. 12, 1976, Ser. No. 648,369**
**Int. Cl.² B64C *31/06***
**U.S. Cl. 244—153 R** **10 Claims**



1. An improved kite construction comprising:

a flying surface of flexible sheet material in a four sided polygon with four corners comprising upper, lower, right and left terminal portions,

an elongated vertical rib extending between said upper and lower terminal portions,

at least one elongated cross rib extending between said left and right terminal portions,

attachment means secured to each of said corners for receiving and retaining the ends of said vertical rib and said cross rib,

said cross rib having a length that is substantially greater than the distance between said left and right terminal portions so that said cross rib is forced to assume a bowed configuration,

a bridle means secured at spaced points to said vertical rib for attaching said kite to a kite string,

said bridle is secured around said vertical rib with an end loop at each of said spaced points,

a pair of beads are strung on each of said end loops and bear against said vertical rib through said sheet material.

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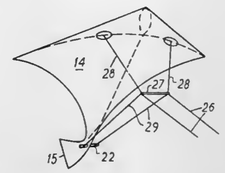


**4,015,803**

## KITE WITH AN IMPROVED RUDDER

**Stephen Temple, 66, Girton Road, Cambridge, England**

**Filed Feb. 9, 1976, Ser. No. 656,602**
**Int. Cl.² B64C *31/06***
**U.S. Cl. 244—153 R** **8 Claims**



1. A kite comprising a plane sail; a plurality of spars including a main spar having an axis and supporting said sail; a rudder, said rudder being formed on and extending outwardly of said sail and being rotatable about an axis of rotation at an acute angle to the plane of said sail, said axis of rotation being disposed in a plane which is normal to said plane of said sail and which contains said axis of said main spar supporting said sail; and a plurality of control strings for controlling movement of said rudder with respect to said sail by causing said rudder to be in operation turned into the air flow supporting said said therely to control the attitute of said sail relatively to said air flow.

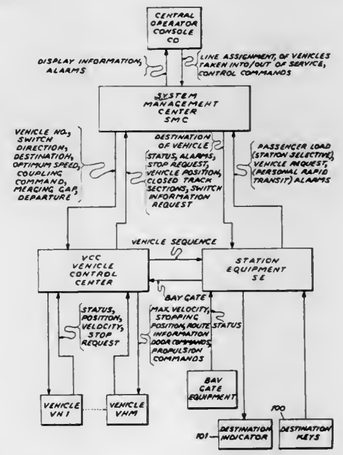
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**4,015,804**

## SYSTEM FOR THE DEMAND-DEPENDENT CONTROL OF GUIDED VEHICLES

**Karl Ulrich Dobler, Waiblingen; Wolfgang Jakob, Ludwigsburg; Klaus Eltzschig, Korntal, and Helmut Ubel, Stuttgart, all of Germany, assignors to International Standard Electric Corporation, New York, N.Y.**

**Continuation-in-part of Ser. No. 577,148, May 13, 1975, abandoned. This application Feb. 6, 1976, Ser. No. 655,913**
**Claims priority, application Germany, May 15, 1974, 2423590**
**Int. Cl.² B61L *27/00***
**U.S. Cl. 246—5** **6 Claims**




1. A system for the demand-dependent control of guided

vehicles where the equipment necessary of demand registration and control are organized hierarchically comprising:

an uppermost hierarchy level including

an operations control center, and

a plurality of station equipment each coupled to said operations control center by a two-way communication path,

said operations control center initiating commands in accordance with destination demands at each of said plurality of station equipment;

an intermediate hierarchy level including

at least one commad and control center coupled to associated ones of said plurality of station equipment by a two-way communication path and coupled to said operations control center by a two-way communication path,

said command and control center checks commands received from said operations control center and said associated ones of said plurality of station equipment giving special consideration to safety criteria; and

a last hierarchy level including

a plurality of vehicles coupled to said command and control center by a two-way communication way to perform the requested tasks in commands received from said command and control center and continuously exchanges information with said command and control center.

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**4,015,805**

## RAILWAY SWITCH OR RAILWAY CROSSING

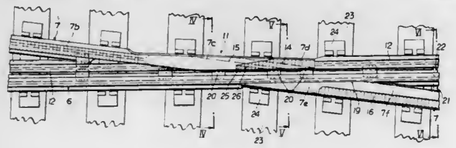
**Eduard Friesenbichler, Hauptstr. 6,, A 8740 Zeltweg, Austria**

**Filed Jan. 2, 1976, Ser. No. 646,337**

**Claims priority, application Austria, Jan. 9, 1975, 114/75**

**Int. Cl.² E01B** *7/12*

**U.S. Cl. 246—458** **7 Claims**



1. A railway switch for transferring railway vehicles from a main track to a siding and, respectively, crossing of a siding with a main track, said switch or crossing comprising a frog in which one rail of the main track is uninterrupted, noting that a portion of a rail of the siding located between the rails of a main track ends adjacent said one rail of the main track leaving a gap for wheel flanges of wheels travelling on the main track, that a rolling surface of the rail portion of the siding located between the rails of the main track is, in the area adjacent said rail of the main track, super-elevated relative to a rolling surface of said rail of the main track and that a portion of the rail of the siding located outside of the rails of the main track is provided with a ramp for lifting the wheel flanges, said ramp ascending to the height of the rolling surface of the main track, characterized in that the rolling surface of the portion of the rail of the siding located between the rails of the main track is located with its uppermost area at a greater height than the rolling surface of said rail of the main track for an amount corresponding at least to one half of the difference between the diameter of the wheel flange and the diameter of the rim of a wheel subjected to maximally tolerable wear and descends like a ramp to an area adjacent said rail of the main track to a height which is greater for maximally one half of the difference between the diameter of the wheel flange and the rolling surface of the rim of a new wheel than the height of the rolling surface of said rail of the main track and is preferably approximately greater for one half of said difference.

**4,015,806**

## TRIPOD ARRANGEMENTS

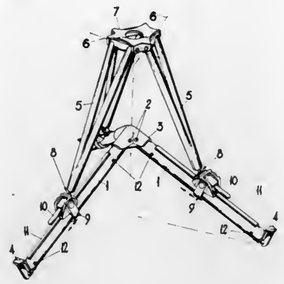
**David Christopher Cattermole, Enfield, England, assignor to Elliott Brothers (London) Limited, Chelmsford, England**

**Filed Mar. 21, 1975, Ser. No. 560,603**

**Claims priority, application United Kingdom, Mar. 26, 1974, 13290/74**

**Int. Cl.² F16M** *11/38*

**U.S. Cl. 248—168** **6 Claims**



1. A tripod arrangement comprising:

I. a lower tripod including

A. three legs,

B. a center member,

C. means freely pivotally connecting said legs to said center member,

D. means on said center member to define a fully spread position for each of said three legs to which said legs are deployed in use, and

E. feet at the lower ends of said legs for resting on the ground,

II. an upper tripod including

A. a platform,

B. three legs, and

C. means freely pivotally interconnecting said three legs of the upper tripod at their upper ends to said platform, and

III. means releasably coupling the lower end of each of the legs of the upper tripod to bear upon and to be independently and separately adjustable along a substantial part of the length of a respective leg of the lower tripod,

IV. each of said three upper legs being independently adjustable along the respective leg of the lower tripod while the other legs of the upper tripod are fixed to the respective legs of the lower tripod.

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**4,015,807**

## LOGIC PASSING DEVICE FOR AUTOMATIC RAILWAY PILOTING

**Guy Bourree, Paris, and Claude Pontier, Velizy, both of France, assignors to Societe Generale de Constructions Electriques et Mecaniques (ALSTHOM), Paris, France**

**Filed Mar. 31, 1976, Ser. No. 672,443**

**Claims priority, application France, Apr. 4, 1975, 75.10610**

**Int. Cl.² B61L** *3/24*

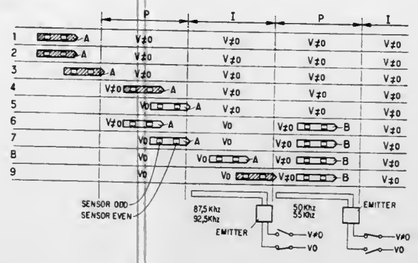
**U.S. Cl. 246—187 B** **3 Claims**

1. Automatic railway piloting method for a track divided into sections, each section comprising a closed loop circuit fed by an emitter on the ground sending out signals whose frequency is variable according to the speed limit other than zero or zero speed which the train must keep to in the said section, the engine of the train being equipped with sensors receiving the said signals and allowing the train to drive at the said speed limit or to stop, in which case, the automatic piloting is changed over to visual driving, the said sections being successively even and odd and having a code of frequencies in the even sections and another code of frequencies in the odd sections corresponding to each speed different from zero and to zero speed, said method comprising establishing only any one of the following transition conditions to give rise to a permission to drive:

For the start-up tripping;

Speeds other than zero, even towards speeds other than zero, odd

Speeds other than zero, odd towards speeds other than zero, even




For subsequent tripping;

Speeds other than zero, even towards speeds other than zero, odd

Speeds other than zero, even towards zero speeds, odd

Speeds other than zero, odd towards speeds other than zero, even

Speeds other than zero, odd towards zero speed, even.

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**4,015,808**

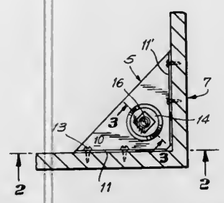
## COMBINED LEVELING BRACKET AND SHOCK ABSORBER FOR CABINET

**John P. Carroll, Islip, N.Y., assignor to Living Walls Inc., New York, N.Y.**

**Filed Dec. 15, 1975, Ser. No. 641,047**

**Int. Cl.² B65D** *19/40;* **F16F** *15/06*

**U.S. Cl. 248—188.4** **2 Claims**



1. A device for leveling an installed cabinet and for absorbing impacts to the cabinet during transit thereof comprising a base plate, means for mounting said base plate in said cabinet, means defining a threaded bore in said base plate, a threaded stem having opposed ends, said stem being threadable through said threaded bore means, a foot mounted on one end of said threaded stem, said foot being constrained from moving along the longitudinal axis of said threaded stem, said threaded stem being threaded along the entire portion between said foot and said other end, a resilient grommet having a bore therein, said grommet being removably mounted on said threaded stem, said grommet being resiliently compressable between said foot and said base plate, and said device being substantially rigid when said grommet is removed from said threaded stem.





**4,015,809**

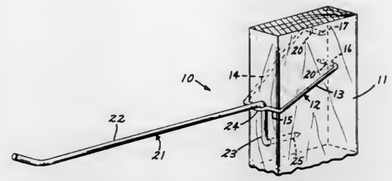
## HANGER DEVICE

**Robert T. Buril, 413 Wacouta St., St. Paul, Minn. 55101**

**Filed Apr. 24, 1975, Ser. No. 571,071**

**Int. Cl.² E04G** *3/00*

**U.S. Cl. 248—217.2** **4 Claims**



1. A hanger device for securement at an edge of a timber of known thickness, comprising a support member and a bail member;

said support member being of rod-like material and comprising a leg portion, for longitudinally engaging said edge of said timber, and a cantilever portion substantially perpendicular to said leg portion;

and said bail member being of rod-like material and comprising a pair of spaced arm portions including opposite ends, said arm portions being interconnected at first ends by a bight portion;

said arm portions extending in the same general direction from said bight portion, and being provided at second ends with securing means for fastening said bail member to the faces of said timber at locations spaced from said edge,

and said bight portion comprising a saddle portion between two aligned lateral portions, said saddle portion offsetting in a direction generally opposite to the general direction of said arm portions by an amount generally the same as the size of said leg portion of said support member, so that when said saddle member engages said leg portion, said linear portions can engage the surface of said edge of the timber, wherein said cantilever portion includes a pair of laterally spaced horizontal arms and a connecting portion connecting common ends of said pair of arms together, said downwardly depending leg portion being fixedly secured to said first connecting portion generally centrally between said lateraly spaced horizontal arms.

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**4,015,810**

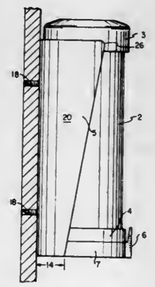
## AUTOMATIC FLOAT-OFF STORAGE BRACKET

**Wayne E. Williams, Hollywood, Fla., assignor to ACR Electronics, Inc., Hollywood, Fla.**

**Filed Dec. 15, 1975, Ser. No. 640,441**

**Int. Cl.² A47K** *1/08*

**U.S. Cl. 248—311.1** **15 Claims**



8. In combination, a module to be releaseably supported

having an elongated body portion, a lower portion, and an enlarged upper portion, and a mounting device for holding and releasing said module when stored in said mounting device, said mounting device comprising:

a base providing a support surface for the lower portion of said module device,

a lower retainer arrangement associated with said base and engaging said module's lower portion to prevent lateral movement of the lower portion of said module until said module is displaced upward relative to the mounting device a first predetermined distance from said base to allow unrestrained lateral passage of said lower portion from said lower retainer arrangement,

an upper retainer arrangement engaging the upper end of said module to prevent only lateral movement of upper portion of said module until said module is displaced upward relative to the mounting device a second predetermined distance no greater than said first predetermined distance,

said upper retainer arrangement having a side opening of a dimension permitting lateral passage of the body portion of said module, after said upward displacement,

whereby after movement upward relative to said mounting device by said first predetermined distance the module may move laterally through said side opening for complete disengagement from the mounting device.

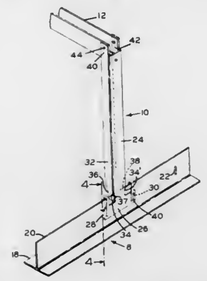
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**4,015,811**

## SUPPORT FOR A VAULTED CEILING MODULE - II

**Ernest B. Nute, Jr., Mountville, and Kenneth L. Wasson, Lancaster, both of Pa., assignors to Armstrong Cork Company, Lancaster, Pa.**

**Filed Dec. 29, 1975, Ser. No. 644,649**
**Int. Cl.² H05B *33/02*; E04B *5/52***
**U.S. Cl. 248—343** **4 Claims**



1. In a support structure for supporting ceiling elements within a suspended ceiling system, the suspended ceiling system having main runner structures which are generally of an inverted "T" shape with an upwardly extending vertical web, said support structure having a body portion and at the lower end thereof, there being a cutout which will permit a portion of the body portion to be positioned on one side of the vertical web of a main runner structure and another portion of the body portion to be positioned on the other side of the vertical web of the main runner structure, at least one side of the body portion which is positioned on one side of the main runner structure having a plate structure, said plate structure extending generally parallel with the vertical web of the main runner and said plate structure having on the ends thereof a plurality of vertical tabs, said vertical web of the main runner structure having a plurality of vertical apertures positioned therein and only one of the tabs of the plate structure of the support structure being positioned in one of the apertures of the vertical web, at least one tab engaging the vertical web side, the upper end of the body portion having means to fasten the support structure to support bars which in turn will be positioned above and parallel to the plane of the main runner structures, the improvement comprising a clip means affixed to the plate structure and engaging the vertical web of the main runner structure to positively hold the plate structure in position against the vertical web of the main runner structure.

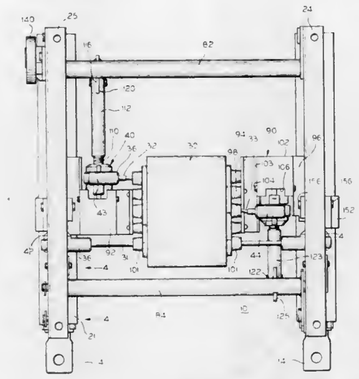
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**4,015,812**

## SEAT ADJUSTMENT MECHANISM

**Max Otto Heesch, Brooklyn, Mich., assignor to International Telephone and Telegraph Corporation, New York, N.Y.**

**Filed Oct. 28, 1975, Ser. No. 626,298**
**Int. Cl.² A45D *19/04***
**U.S. Cl. 248—394** **12 Claims**



1. A six-way power seat track for a vehicle comprising a pair of parallel rail members laterally spaced apart, a carriage tracked to said rail members and including a pair of track members with each track member individually engaging one of said rail members and constraining said carriage to movement substantially in a fore and aft sense, means interfacing between said track and rail members for causing movement of said carriage in said fore and aft sense, drive motor means, a pair of seat support brackets, for carrying respective sides of a seat, a first mechanism driven by said motor means for elevating the front end of a seat mounted on said seat support brackets, a second mechanism driven by said motor means for elevating the rear end of both of said seat support brackets, each of seat end elevating mechanisms including a torsion bar mounted on said carriage at an end thereof, each of said torsion bars being rotatable in response to selective operation of said motor means, and a link pivotally affixed to each torsion bar at one end thereof and secured at the other end to one of said seat support brackets, said links being individually responsive to rotation of the respective torsion bars for elevating the like end of both said seat support brackets to raise the respective seat end thereof.

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**4,015,813**

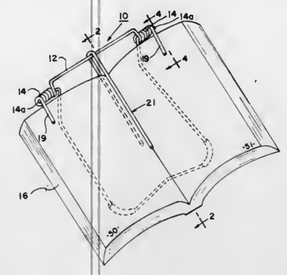
## BOOKHOLDER

**Thomas Andrew Graham, 796 Maplewood Ave., Palo Alto, Calif. 94303**

**Continuation-in-part of Ser. No. 477,622, June 10, 1974, abandoned. This application Mar. 3, 1975, Ser. No. 554,809**
**Int. Cl.² A47B *19/00***
**U.S. Cl. 248—452** **8 Claims**

1. An improved bookholder for supporting a book and holding the pages thereof in the open condition for reading, comprising a spreader member adapted to extend along the top edge of the book when the same is in the open condition, said spreader member including at each end thereof a socket-like formation serving as portion of a hinge, a spine, a spine gripping member secured to said spreader intermediate the ends thereof and extending perpendicular thereto at one side of the spreader member, said gripping member being of bifurcated construction so as to define an openable slot therein for receiving the spine of the book in such slot, extension means at each end of said spreader member projecting in the same direction as said spine gripping member and serving to hold the pages of the book on each side of said gripping member in the selected open position, a stand of wire-form construction and including a foot portion having extending from the end portions thereof spaced side arms, the end portions of each side arm terminating in a pintle-like projection cooperatively





received in an associated socket member of the spreader to effect a stiff friction hinge connection between the stand and spreader, the general axis of said hinge connection being offset from the general plane of said spreader member, said pintle member being skewed at an angle with respect to the general axis of the socket-like member of the spreader, and the end portions of said side arms serving as abutments with said spreader member when said bookholder is in an extended condition.

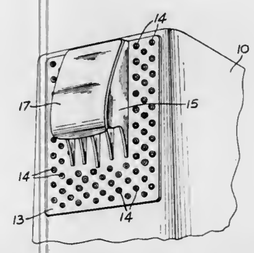
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**4,015,814**

## FORMATION OF LUGS ON INGOT MOULDS

**Edwin Fowles, Tarporley, England, assignor to Hilti Aktiengesellschaft, Schann, Liechtenstein**

**Filed Mar. 29, 1976, Ser. No. 671,107**
**Claims priority, application United Kingdom, May 14, 1975, 20283/75**
**Int. Cl.² B22D *7/06***
**U.S. Cl. 249—174** **4 Claims**



1. A method of forming a lifting lug on an ingot mould which comprises the steps of:

a. securing a weldable mounting plate to said mould, in the desired location for said lug, by fasteners driven through said mounting plate and into the material of said mould;

b. welding to said mounting plate a plurality of elongate fillets each shaped to provide a substantially linear liner edge for contacting said mounting plate and a curved and lobe-shaped outer edge, in an array whose overall configuration conforms to the desired lifting lug shape, said welding being effected along said linear edges of said fillets;

c. positioning a consolidating plate across the said outer edges of said fillets; and

d. welding said consolidating plate to said outer edges of said fillets.

4. An ingot mould having a lifting lug which comprises:

a mounting plate secured to said mould by fasteners driven through said mounting plate and into the material of said mould;

a plurality of elongate fillets welded to said mounting plate and projecting therefrom in an array whose overall configuration corresponds to the overall configuration of said lifting lug, each said fillet providing a substantially linear edge by which it is welded to said mounting plate and a lobe-shaped outer edge; and

a colsolidating plate overlying said outer edges of said fillets and welded thereto.

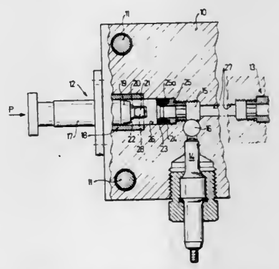
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**4,015,815**

## CONTAMINATION-RESISTANT VALVE FOR HIGH-TEMPERATURE, HIGH-PRESSURE APPLICATIONS

**Ernst Leisner, Gerlingen; Wolfgang Ulbricht, Tamm, and Helmut Kaufmann, Bischberg, all of Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany**

**Filed May 19, 1975, Ser. No. 579,118**
**Claims priority, application Germany, May 17, 1974, 2424148**
**Int. Cl.² F16K *1/44***
**U.S. Cl. 251—191** **14 Claims**



1. Contamination-resistant valve particularly for especially high-temperature, high-pressure and shock applications comprising

a housing (**10**) formed with a bore (**26**) therein in communication (**27**) with a combustion chamber (**16, 29**) and with a gas inlet duct (**28**) terminating in the bore to supply a combustible gas to the bore and hence to the chamber;

a valve plunger (**17**) slidable in the bore to selectively permit gas from the gas duct (**28**) to enter the bore (**26**) and hence communicate with the chamber, or to seal the gas duct from the chamber and prevent entry of combustion gases from the chamber to the duct,

an insert sleeve (**25a, 31**) located in the bore (**26**) and having at least a portion thereof and facing the plunger of lesser diameter than the bore (**26**);

a plastically deformable material (**24, 24*a*, 24*b*)** located between the wall of the bore (**26**) and said respective portion of the insert sleeve (**25*a*, 31**) and extending towards the plunger (**17**) and having an engagement surface engageable by the plunger;

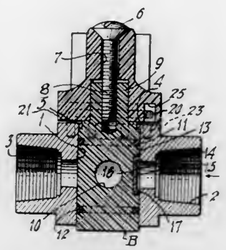
a counter engagement surface (**20, 22, 35**) formed on the plunger engaging the sealing material;

and a projection (**21, 35**) extending from the end of the plunger (**17**) facing the plastically deformable material and hence the sleeve and fitting into the insert sleeve (**25*a*, 31**) so that when the plunger and its counter engagement surface are pressed against the deformable material, a tight closing fit between the plunger projection (**21, 35**) and the sleeve will form by compression of the plastically deformable material and transfer of force in radial direction from the sealing material to the insert sleeve and hence against said projection (**21, 35**) extend-

ing from the plunger (17) to seal the sleeve (25a, 31) against said projection.

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**4,015,816**
**ROTARY PLUG VALVE**
**Albert L. Semon, 11 Eliot Place, Short Hills, N.J. 07078**
**Filed Apr. 24, 1975, Ser. No. 571,085**
**Int. Cl.² F16K *51/00***
**U.S. Cl. 251—285** **14 Claims**

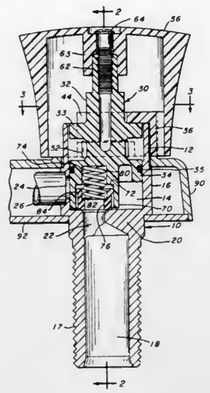


1. A rotary plug valve comprising:
a valve body having a cylindrical opening therethrough providing a valve chamber from which extend radially aligned flow ports;
a cylindrical plug rotatably disposed in said opening and having a transverse passage therethrough movable selectively into and out of register with said flow ports upon rotation of said plug into open and closed positions respectively, and
sealing means to encircle one of said flow ports in sealing contact with the wall of said opening when the plug is in closed position, including a generally circular recess in the cylindrical face of said plug having a bottom wall and a side wall of greater diameter than said one flow port, and a disk having a generally circular rib at its edge which has inherent resiliency seated in said recess with the rear side of said disk and its edge in sealing contact with the bottom wall and side wall of said recess respectively and with the front side of said rib to encircle said one flow port in sealing contact with the wall of said opening in valve body;
and further comprising:
a knob mounted on the end of said plug outwardly of the valve body and having circular groove in its bottom side, and wherein said body has a circular row of spaced recesses concentric with and beneath said knob, there is an arcuate wire stop element having a finger perpendicular to the general plane of said stop element at each end thereof selectively removably insertable in said recesses, and there is a stop lug in said circular groove of the knob between and to coact with said fingers of said arcuate wire stop element, providing for stopping rotation of said plug selectively in any one of a plurality of different positions.

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**4,015,817**
**STOP MEANS FOR VALVES**
**Pericles Alexandre Argyris, Houston, Tex., and William Randolph Williams, Morgantown, W. Va., assignors to Rockwell International Corporation, Pittsburgh, Pa.**
**Filed Feb. 18, 1975, Ser. No. 550,290**
**Int. Cl.² F16K *3/00*, *51/00***
**U.S. Cl. 251—288** **10 Claims**

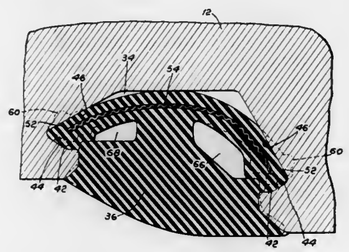
1. A valve assembly comprising a housing, a cylindrical chamber within said housing and inlet and outlet ports in said housing communicating with said chamber, a closure member within said chamber rotatable between a valve open and a valve closed position, a stop member mounted on said housing, stop means on said stop member defining a valve open and a valve closed position, cooperating means on said housing and said stop member to insure a predetermined orientation of said stop means with respect to said inlet and outlet



ports comprised of at least two spaced openings on said housing each of a different configuration from the other and at least two spaced portions on said stop member each of which has a configuration to match respectively the configuration of one of said openings on said housing.

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**4,015,818**
**VALVE WITH SELF-RETAINING VALVE SEAT**
**A. Assem Tawakol, Elmira, N.Y., assignor to International Telephone and Telegraph Corporation, Nutley, N.J.**
**Filed July 23, 1975, Ser. No. 598,320**
**Int. Cl.² F16K *1/22***
**U.S. Cl. 251—307** **15 Claims**

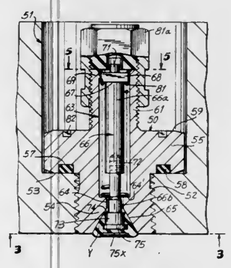


1. A valve, comprising:
a body having a passage extending therethrough;
a closing means moveably mounted in said body and including a closing member disposed in said passage for opening and closing said passage, said body and said closing member each having opposed surfaces when the closing member is closing said passage;
a groove formed in one of said opposed surfaces, said groove being defined by surfaces that are formed and arranged to have an inner groove portion that is wider than an outer groove portion;
seal means formed of resilient material disposed in said groove for providing a seal between the opposed surfaces, said seal means including at least one axially extending arm; and
a spring member embedded in said seal means and extending into said arm for urging said arm in an axial direction away from said seal means into sealing engagement with the surfaces defining the wider inner groove portion and into an interference fit with the surfaces defining the narrower outer groove portion for retaining the seal means within said groove, whereby installation of the seal means into the groove is facilitated by the arm and spring means which may bend as they pass the outer groove portion and thereafter return to engage the inner groove portion and provide the interference fit.



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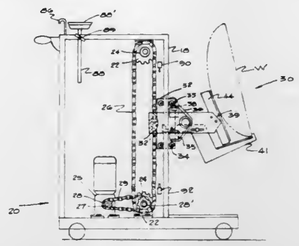
**4,015,819**
**GAS CHARGING VALVE FOR ACCUMULATOR**
**Abduz Zahid, Los Angeles, Calif., assignor to Greer Hydraulics, Inc., Los Angeles, Calif.**
**Division of Ser. No. 503,397, Sept. 5, 1974, Pat. No. 3,930,521. This application July 1, 1975, Ser. No. 592,336**
**Int. Cl.² F16K *31/00***
**U.S. Cl. 251—339** **1 Claim**



1. A valve assembly comprising a casing having an axial bore therethrough between an inlet and outlet and of reduced diameter near the outlet end defining an annular shoulder, the outermost extremity of said axial bore at the outlet end being flared outwardly to define a beveled valve seat, a valve stem slidably mounted in said bore, said stem being of dimensions such as to provide clearance for gas flow through said bore, said stem having a head portion at one end thereof extending into the beveled extremity of said casing bore, said head portion having a cylindrical stop portion with a sharp peripheral edge formed integral therewith facing said beveled seat and of diameter greater than the smaller diameter portion of said beveled seat and a length less than the depth of the beveled seat, a resilient elastomeric valve disc in the form of an annular bead secured to the cylindrical stop portion of the stem, said stem having an abutment secured thereto at the other end thereof, a coil spring encompassing said stem and reacting against said abutment and said shoulder to move the periphery of said annular valve bead against the larger diameter wall surface of said beveled seat in a first seating position of said valve disc with said peripheral edge free from contact with said beveled seat, said valve disc being shiftable substantially entirely and said head portion shiftable entirely into said valve seat in a second seating position whereat said sharp peripheral edge of said clyindrical portion of said stem engages against the smaller diameter portion of said beveled seat responsive to pressure exerted directly against said disc of a predetermined magnitude greater than said spring force, abutment of the sharp peripheral edge of said cylindrical portion of said stem against the smaller diameter portion of said beveled seat will limit the movement of the valve disc, whereby at said second seating position said disc and seat present a smooth inwardly facing surface substantially free of projections outwardly of said seat, said resilient disc completely closing off the flared end of said axial bore in both said first and second seating positions.

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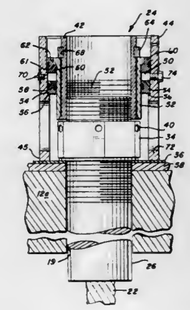
**4,015,820**
**WORK LIFTING AND SUPPORTING DEVICE**
**Elbert W. Davis, 1090 Boiling Springs Road, Spartanburg, S.C. 29303**
**Filed Sept. 17, 1975, Ser. No. 614,346**
**Int. Cl.² B60P *1/14***
**U.S. Cl. 254—4 B** **20 Claims**



1. A device for lifting and supporting a workpiece comprising:
a. a frame;
b. chain drive means associated with said frame;
c. a power source associated with said chain drive means to provide vertical movement thereto;
d. a support section secured to said chain drive means; said support section having guide means pivotally connected thereto and cooperating with a portion of said frame, said support means further comprising a first horizontal member, second horizontal members associated with said first horizontal member for axial adjustment with respect thereto, and a support arm associated with each said second horizontal member, said support arms being capable of adjustment transverse to the length of said horizontal members;
e. workpiece securing means associated with said support frame to secure a workpiece thereto; and
f. switch means associated with said power source to actuate said power source for adjustment of said support section in a desired vertical direction.

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**4,015,821**
**CABLE TENSIONING ASSEMBLY**
**Henry G. Warrington, Boynton Beach, Fla., assignor to Vulcan Iron Works, Inc., Chattanooga, Tenn.**
**Filed Jan. 14, 1976, Ser. No. 648,888**
**Int. Cl.² E21B *19/00***
**U.S. Cl. 254—29 A** **7 Claims**

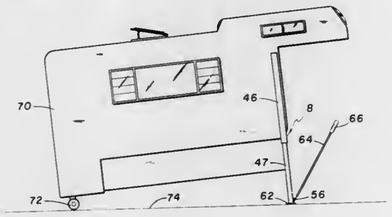


1. An apparatus for tensioning a cable having a threaded fitting on one end thereof, said apparatus comprising
a base positioned around said fitting,
a movable retaining element positioned on said fitting and adjacent said base,

a sleeve removably secured to said fitting and adjacent said element,
a jack member positioned over said fitting having one end abutting said base,
said jack member including piston means for tensioning said cable, and
an abutment member secured to said sleeve and adapted to abut said piston means to provide a mechanical connection between said sleeve and said sack member.

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**4,015,822**
**CAMPER JACK**
**Carl M. Rasmussen, 377 S. Sterling Drive, Fruit Heights, Utah 84037**
**Filed Dec. 8, 1975, Ser. No. 638,789**
**Int. Cl.² B60P** *1/64*
**U.S. Cl. 254—45** **2 Claims**

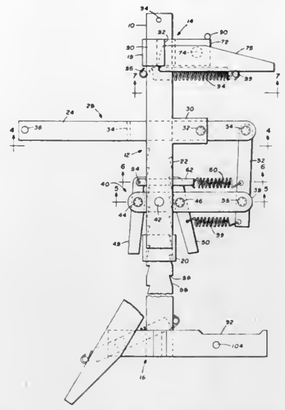



1. An extensible jack comprising:
a piston hydraulically operable in a cylinder;
a hydraulic fluid reservoir surrounding the cylinder along a substantial portion of its length;
a housing connected to the piston;
a valve block coextensive with the reservoir and at the base of the cylinder, said valve block fitting telescopically within the housing and comprising at least one hydraulic conduit therein in fluid communication between the reservoir and cylinder and having at least one check valve in the conduit, said valve block further comprising means for accessing the check valve through the exterior of the valve block, said accessing means being essentially flush with the exterior surface of the valve block so as to permit substantially all of the valve block to be recessed telescopically into the housing so as to permit the housing to slidably cover the valve block when the piston is fully retracted into the cylinder; and
hydraulic fluid pumping means for pumping fluid from the reservoir to the cylinder.

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**4,015,823**
**WIRE STRETCHER AND FASTENER**
**Felix B. Romberg, P.O. Box 218, Holland, Tex. 76534**
**Filed Dec. 22, 1975, Ser. No. 643,000**
**Int. Cl.² B66F** *1/04*
**U.S. Cl. 254—72** **12 Claims**

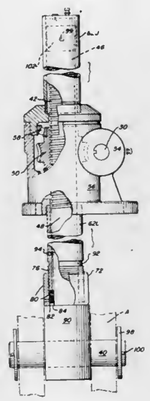
1. A wire stretcher and fastener comprising:
a flat ratchet bar having a longitudinal axis;
a frame slidably connected to said ratchet bar for relative movement along said ratchet bar;
two clamps constructed and positioned to grip wire along said longitudinal axis;
one of said clamp being mounted at one end of said ratchet bar and the other being mounted at the remote end of said frame;
drive means mounted on said frame for selectively moving said frame and ratchet bar relative to each other and thereby drawing the two clamps towards each other;
the wire clamp on said ratchet bar projecting laterally from said ratchet bar;
an arm projecting laterally from said ratchet bar at the same end and in the opposite direction from said wire clamp, for engaging and winding a stretched incoming length of wire with a stretched outgoing length of wire between the end of said ratchet bar and an adjacent post; and



said laterally projecting arm being perforated for receiving a pin for spacing the incoming length of wire from the outgoing length of wire at that location when the wire stretcher is rotated to fasten the wire.

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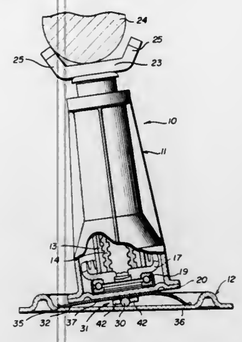
**4,015,824**
**JACK SAFETY STOP**
**Anthony G. Profet, Wheeling, Ill., assignor to Templeton, Kenly & Company, Broadview, Ill.**
**Filed Apr. 5, 1976, Ser. No. 673,390**
**Int. Cl.² B66F** *3/18*
**U.S. Cl. 254—89 R** **14 Claims**



1. In a supporting jack construction the combination comprising drive means, mating driven means adapted to be reciprocally moved by said drive means along a predetermined path, stop means disposed adjacent an end limit of said predetermined path adapted to resist axial movement of said driven means by collapsing upon exertion of a predetermined collapsing force thereagainst; such collapsing force being inadequate to result in damage to said drive means and driven means at the point of the mating relation.



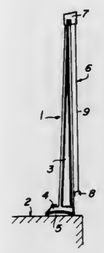
**4,015,825**
**TILTABLE JACK**
**Richard S. Graafsma, Benton Harbor, and R. Harlan Nehrig, Stevensville, both of Mich., assignors to Auto Specialties Manufacturing Company, St. Joseph, Mich.**
**Filed Jan. 28, 1976, Ser. No. 653,096**
**Int. Cl.² B66F** *13/00*
**U.S. Cl. 254—101** **27 Claims**



1. A tiltable jack comprising a jack housing member, a base member adapted to support the jack, a pivot pin disposed between the base member and the housing member and tiltably supporting the jack housing member on the base member, a bowed leaf spring disposed between the jack housing member and the base member for urging the jack housing member toward and into an upright position relative to the base member and pivot pin retaining means including a plurality of tangs depending from the leaf spring for retaining the pivot pin between the jack housing member and base member.

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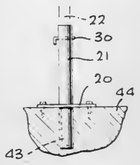
**4,015,826**
**ADJUSTABLE MOUNTING ASSEMBLY FOR RAILING**
**René Lauzier, Ruy 38300, Bourgoin Jallieu, France**
**Filed Dec. 2, 1974, Ser. No. 528,893**
**Int. Cl.² E04B** *17/14*; **F16C** *11/06*
**U.S. Cl. 256—59** **1 Claim**



1. A railing assembly comprising:
an elongated railing, a base, said assembly comprising:
a support post secured to said railing and having a foot formed with a downwardly turned recess having a toroid-segmental surface;
a mounting block on a base for said railing and having an upwardly facing toroid-segmental surface complementary to said surface of said foot and at least partially receivable in said recess; and
screw means engageable through said foot and said block and with said base for bolting said foot to said base, said block and foot surfaces being shaped as mutually complementary surfaces of a segment of a common torus having an axis of revolution parallel to said railing, said screw means including a single screw passing through said foot and said mounting block at a location to one side of a vertical plane passing through said axis.

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**4,015,827**
**SUPPORT STANCHION**
**Harold E. Brand, 11039 Fenway St., Sun Valley, Calif. 91352**
**Filed Nov. 21, 1975, Ser. No. 634,071**
**Int. Cl.² E84H** *17/14*
**U.S. Cl. 256—59** **1 Claim**



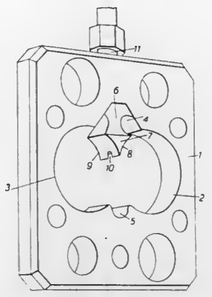
1. A life line support system comprising the combination of:
a plurality of stanchions wherein each stanchion consists of a stationary portion and a removable portion;
said stationary portion being fixedly attached to a roof of a building construction on the perimeter of an area to be protected;
said stationary portion having an anchor base and a tubular portion secured thereto and a gusset plate interconnecting said tubular portion and said anchor plate;
said removable portion constituting an elongated post having a selected end insertably received into said tubular portion;
fastener means detachably coupled to said tubular portion for retaining said elongated post in position thereon;
a plurality of eyelets carried on said elongated post for slidably carrying life lines therethrough;
said fastener means includes a pin insertably carried within aligned holes provided in said tubular portion and said removable portion;
index means for aligning said removable portion with said tubular portion;
an expandable plate means as a part of said tubular portion for mounting on the roof;
said plate means is composed of a pair of L-shaped members movably secured together in sliding and in releasable relationship by bolts; and
a selected one of said plate L-shaped members fixedly carrying said gusset plate and said tubular portion so as to constitute a structural unit.

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**4,015,828**
**INJECTION OF ADDITIVES INTO LIQUID STREAMS**
**David Roy Miles, Pontypool, England, assignor to Imperial Chemical Industries Limited, London, England**
**Filed Oct. 30, 1973, Ser. No. 411,167**
**Claims priority, application United Kingdom, Nov. 6, 1972, 51041/72**
**Int. Cl.² D01F** *1/02*
**U.S. Cl. 259—6** **5 Claims**

1. A process for the incorporation of a liquid additive into a liquid stream which is being forwarded by meshing gears in a gear pump having an inlet location for the stream at a low pressure zone which is adjacent the point of gear separation and an outlet location for the combined stream and additive, said process comprising injecting said additive into said zone

at a point immediately adjacent the point in which the gears in the gear pump separate and upstream of said inlet for the



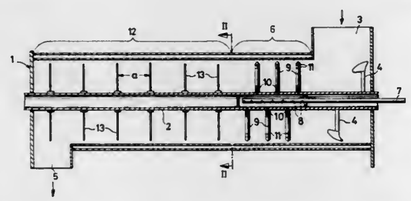
stream, and thereafter allowing the additive to be forwarded and mixed with the stream by the action of the gear pump.

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**4,015,829**
**APPARATUS FOR APPLYING GLUE TO FIBER MATERIAL**

**Hermann Förster, Paderborn; Wilhelm Schlüter, Schwaney, and Horst Sterr, Siebenstern, all of Germany, assignors to Wilhelm Lodige; Fritz Lodige and Josef Lucke, all of Paderborn, Germany**

**Continuation-in-part of Ser. No. 502,630, Sept. 3, 1974, abandoned. This application Mar. 4, 1976, Ser. No. 664,048**
**Claims priority, application Germany, Sept. 1, 1973, 2344231**
**Int. Cl.² B01F** *7/04*
**U.S. Cl. 259—9** **9 Claims**



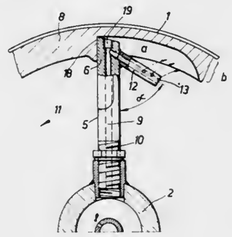
**1.** A device for applying glue to fibers of wood and like material, and for distributing the glue in the material, which includes in combination: a substantially horizontally disposed drum-shaped container having an inlet in the top at one end for admitting the material to which glue is to be applied, and having an outlet in the bottom at the other end for discharge of said material with the glue applied uniformly thereto, said drum-shaped container comprising a first axial zone adjacent to and communicating with said inlet, glue applying means in said first zone for the application of glue to fiber material supplied to the drum through said inlet, said drum-shaped container also comprising a second axial zone forming a mixing chamber in which said material and the glue applied thereto are thoroughly intermixed, said mixing chamber communicating at one end with said first axial zone and at the other end with said outlet, a shaft extending through said drum-shaped container on the axis thereof and rotatable therein, needle-shaped tools arranged in groups on said shaft in said second axial zone and extending in radial direction from said shaft to near the inner wall of said mixing chamber, said groups of needle-shaped tools being located on said shaft in axially and circumferentially spaced relationship to each other, said shaft having material impelling means thereon within the range of said inlet at the upstream end of said first zone and also upstream from said glue applying means and forming the sole means to impel material supplied to the drum via said inlet toward said outlet, said glue applying means comprising radial elements mounted on said shaft in said first zone and extending to near the inner wall of said chamber, said elements being tubular and having perforations therein, and means for supplying glue to said elements via said shaft, said material following a generally helical path along the inner wall of said container under the combined influences of said impelling means and said elements and said needle-shaped tools.

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**4,015,830**
**APPARATUS FOR APPLYING GLUE TO CHIPS, FIBERS AND THE LIKE**

**Wilhelm Lödige, Elsener Str. 9c; Fritz Lödige, Leuschner Str. 12, and Josef Lücke, Im Lohfeld 13, all of 4790 Paderborn, Germany**

**Filed July 17, 1975, Ser. No. 596,727**
**Claims priority, application Germany, July 17, 1975, 2434358**
**Int. Cl.² B01F** *7/02, 15/02*
**U.S. Cl. 259—25** **16 Claims**



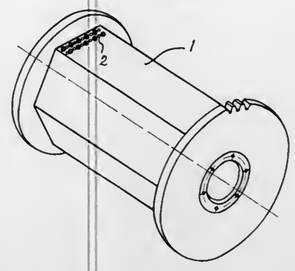
**1.** An apparatus for applying glue to chips and fibers of wood, bagasse and other cellulose containing substances, which includes in combination: chamber means having a substantially cylindrical mantle, a drive shaft rotatable within said chamber means and extending in the axial direction of said mantle, said shaft having associated therewith an axially extending glue conveying passage adapted to be connected to a supply of glue, and glue applying tools connected to said drive shaft for rotation therewith and radially outwardly extending from said shaft into the vicinity of the inner surface of said mantle for plowing through a ring of chip material to be formed on said mantle and to have glue applied thereto, each of said tools having a glue conveying conduit communicating with said glue conveying passage and each tool also having a radially outer section provided with at least one glue discharge conduit having at least one glue discharge opening adapted to direct its discharge of glue in the direction toward said mantle and thereby into a ring of chip material to be formed on said mantle and to have glue applied thereto, said at least one glue discharge conduit communicating with the respective pertaining glue conveying conduit, and said at least one glue discharge conduit being provided on the trailing side of the pertaining tool when considering the direction of rotation of the latter, each glue discharge conduit forming an acute angle opening toward said drive shaft with the pertaining glue conveying conduit, said glue applying tools including a head portion in the vicinity of the ring of chip material forming a loosening-up zone therewith, said glue discharge conduit being provided with a plurality of glue discharge openings, and at least one glue discharge opening being spaced from the respective adjacent mantle surface by such a distance as to be located radially inwardly along one side of the ring of chip material to be formed on said mantle.



**4,015,831**
**ARRANGEMENT FOR GALVANIZATION AND CHEMICAL TREATMENT OF ARTICLES**

**Wolfgang Petzold, Stuttgart, Germany, assignor to Schering Aktiengesellschaft, Berlin and Bergkamen, Germany**

**Filed Sept. 20, 1974, Ser. No. 507,951**
**Claims priority, application Germany, Dec. 8, 1973, 2361683**
**Int. Cl.² B01F** *9/00;* **C25D** *17/00*
**U.S. Cl. 259—81 R** **7 Claims**



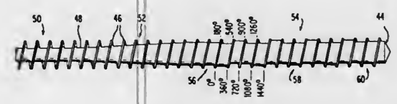
**1.** A drum for plating and chemical treatment of articles comprising, a drum wall with distributed openings through said wall, said openings being alternating conically shaped and arranged over the entire drum wall, the cross-section of one opening on the exterior surface of the drum wall being smaller than the cross-section of said one opening on the interior surface of the drum wall, the cross-section of a neighboring opening on the exterior surface of the drum wall being larger than the cross-section of said neighboring opening on the interior surface of the drum wall, so that said drum wall has substantially maximum perforation density.

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**4,015,832**
**EXTRUDER SCREWS**

**George A. Kruder, Marion, Ohio, assignor to Koehring Company, Milwaukee, Wis.**

**Division of Ser. No. 282,905, Aug. 23, 1972, Pat. No. 3,870,284. This application Jan. 31, 1975, Ser. No. 545,863**
**Int. Cl.² B29B** *1/10, 1/04;* **B29F** *3/02;* **B29H** *1/10*
**U.S. Cl. 259—191** **3 Claims**



**1.** A process for extruding polymeric material in a molten state under pressure comprising:
- feeding polymeric material in the form of a particulate solid to a barrel having a cylindrical inner surface and having rotating therein screw means provided with conveying land means disposed in close proximity to said cylindrical inner surface to continuously move said material in a substantially helical path toward an extrusion die without shearing said material over shearing land means disposed intermediate axially adjacent portions of said conveying land means,
- converting said material to a generally molten state with no more than a minor amount of incompletely melted particles therein, and
- metering the flow of the generally molten material by cyclically varying, through at least three cycles, the cross sectional area between axially adjacent portions of said conveying land means of the helical path by varying the depth of the helical path from the inner wall of the barrel between a minimum depth at which the material is subjected to maximum shearing force and heat production and a maximum depth at which the material is subjected to lower shearing force and heat production,

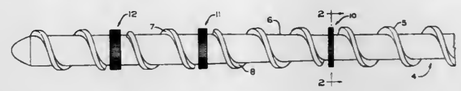
whereby the high energy input into said polymeric material during the portions of the cycles when the depth of the path from the inner wall is in the order of said minimum depth assures complete melting of all of said incompletely melted particles, without the molten material being raised to such a temperature over said plurality of cycles as to cause it to be degraded thereby.

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**4,015,833**
**EXTRUDER SCREW**

**Heung Tai Kim, Avon Lake, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio**

**Filed Oct. 3, 1975, Ser. No. 619,510**
**Int. Cl.² B29B** *1/12*
**U.S. Cl. 259—191** **6 Claims**



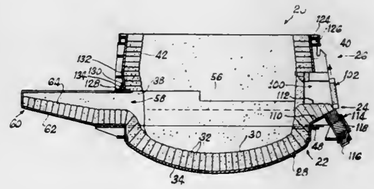
**1.** An extruder feed screw having a core extending longitudinally thereof, said core supporting helical flight means for advancing material from the rear portion thereof to the forward portion thereof, said feed screw having a plurality of axially spaced shear rings, each of said shear rings having a plurality of slits extending from said core outwardly to the periphery of said rings, said slits being linear and longitudinally extending, and the axial length of said shear rings being greater in the direction of the forward portion of said feed screw relative to an adjacent shear ring that is disposed rearwardly thereof considering the feed of the material processed by said feed screw is from the rear portion to the forward portion of the feed screw.

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**4,015,834**
**LIFTING BAIL FOR MODULAR DIVISIBLE METALLURGICAL FURNACE SHELLS**

**Edgar Wunsche, Oshawa, Canada, assignor to Engineered Metal Products Company, Inc., Birmingham, Ala.**

**Division of Ser. No. 519,236, Oct. 30, 1974, Pat. No. 3,952,140, which is a continuation of Ser. No. 277,142, Aug. 2, 1972, Pat. No. 3,871,632. This application Feb. 13, 1976, Ser. No. 657,959**
**Int. Cl.² C21C** *7/00*
**U.S. Cl. 266—275** **1 Claim**



**1.** A lifting bail in combination with a furnace shell for use with molten metal,
- comprising a generally dish-shaped bottom furnace wall section having a metal casing and a refractory lining,
- a first generally ring-shaped furnace wall section removably mounted on top of said bottom section and having a metal casing and a refractory lining,
- a second generally ring-shaped furnace wall section removably mounted on top of said first wall section and having a metal casing and a refractory lining,

said first wall section having a molten metal outlet opening

and a pouring spout projecting outwardly beneath said opening,
said second wall section having a slag discharge opening and a movable door for closing said opening,
and a generally horizontal lifting bail frame for separately lifting said first and second wall sections,
said lifting bail frame being non-symmetrical and having a lifting device projecting upwardly therefrom and first and second pairs of suspension devices extending downwardly therefrom,
said suspension devices of said first pair being spaced apart a substantially greater distance than said suspension devices of said second pair,
said lifting device being spaced a smaller distance from said suspension devices of said first pair than from said suspension devices of said second pair,
each of said first and second wall sections having first and second pairs of connecting elements for connection to said respective first and second pairs of suspension devices,
said connecting elements of said first pair being spaced apart a relatively great distance corresponding to the distance between said suspension devices of said first pair,
said connecting elements of said second pair being spaced apart a relatively smaller distance corresponding to the distance between said suspension devices of said second pair,
said connecting elements on said first wall section being disposed with said first pair of connecting elements relatively close to said pouring spout and with said second pair of connecting elements relatively more remote from said pouring spout whereby said first wall section will hang level from said bail,
said connecting elements on said second wall section being disposed with said first pair of connecting elements relatively close to said slag door and with said second pair of connecting elements relatively more remote therefrom whereby said second wall section will hang level from said bail.

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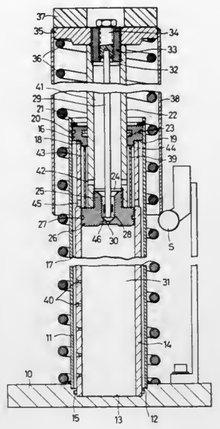
**4,015,835**

## SHOCK ABSORBERS FOR ELEVATORS

**Günter Schumacher, Neuhausen; Peter Tef, Stuttgart, and Max Wiester, Munich, all of Germany, assignors to R. Stahl Aufzuege GmbH, Stuttgart, Germany**

**Filed Aug. 19, 1975, Ser. No. 605,858**
**Claims priority, application Germany, Aug. 21, 1974, 2440094**
**Int. Cl.² B66B** *5/28*; **F16F** *9/48*
**U.S. Cl. 267—124** **14 Claims**

1. A hydraulic shock absorber comprising:
a vertically oriented cylinder,
a hollow piston rod mounted concentrically with said cylinder,
a piston connected to the lower end of said piston rod,
said piston adapted for vertical movement within said cylinder and slidably movable against the walls of said cylinder,
a cylindrical expansion chamber substantially surrounding said cylinder, said cylinder having apertures therethrough for passage of fluid from the interior of said cylinder to said cylindrical expansion chamber,
means for providing fluid communication between said cylindrical expansion chamber and the hollow interior of said piston rod,
whereby fluid from the interior of said cylinder passes into said expansion chamber and said piston rod upon the downward movement of said piston and said piston rod into said cylinder, and



wherein said piston rod contains a dip stick for measuring the fluid level.

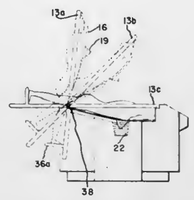
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**4,015,836**

## MAMMOGRAPHY TABLE

**Rowland W. Redington, Schenectady, and John L. Henkes, Jr., Latham, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.**

**Division of Ser. No. 600,874, July 31, 1975. This application Jan. 16, 1976, Ser. No. 649,707**
**Int. Cl.² A61G** *13/00*
**U.S. Cl. 269—322** **8 Claims**



1. A tomographic examination table comprising:
a fabric sling horizontally disposed;
shoulder and lower rib cage support means, including a horizontal surface, disposed below said sling which function to support the shoulder and lower rib cage of a female humoid patient;
rigid platform means extending from said sling which function to support the lower body of said patient; and
upper rib cage support means extending diagonally upwards from the sides of said sling.

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**4,015,837**

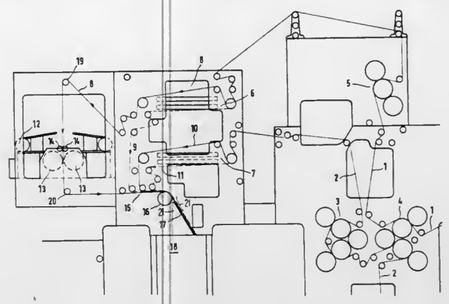
## METHOD AND APPARATUS FOR INSERTING SUPPLEMENTS INTO ROTARY PRESS PRODUCTS

**Erwin Ostler, Augsburg, Germany, assignor to Hier. Muhleberger KG, Augsburg, Germany**

**Filed Apr. 2, 1976, Ser. No. 672,912**
**Claims priority, application Germany, Apr. 25, 1975, 2518336**
**Int. Cl.² B65H** *39/02*
**U.S. Cl. 270—58** **14 Claims**

1. The method of inserting supplements into a rotary press product wherein said product is produced by continuously running at least one elongated paper web from a supply roll through printing rolls, comprising the steps of applying an electrostatic charge to the surface of said running web subsequent to passage of the web through said printing rolls, delivering a series of supplements sequentially and in face-to-face relation to the charged running surface of said web for electrostatic adhesion of said supplements to said web while said web





is still running, and thereafter folding successive portions of said web while said supplements are electrostatically adhered thereto to form at the conclusion of said folding step, folded rotary press products each of which has one of said supplements inserted therein.

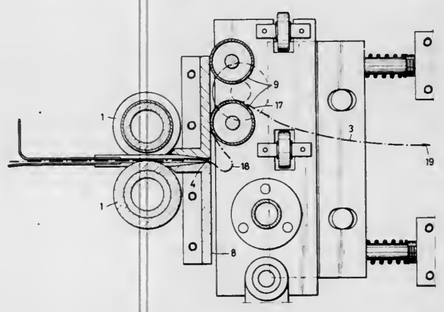
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**4,015,838**

## APPARATUS AND METHOD OF FORWARDING SHEET FROM PAPER OR SIMILAR MATERIAL

**Wilhelm Thurmann, Glueck-Auf-Strasse 7, Wilnsdorf-Obersdorf, Germany**

**Filed Oct. 30, 1975, Ser. No. 627,308**
**Claims priority, application Germany, Oct. 30, 1974, 2451469**
**Int. Cl.² B65H** *45/00*
**U.S. Cl. 270—61 F** **12 Claims**



1. A method of folding an elongated sheet of material such as paper or foil, comprising the steps of
a. forming a double loop of substantially S-shaped configuration as viewed along an edge thereof in a portion of said sheet intermediate the ends thereof, said double loop including a folding loop with a rounded apex and a pair of legs extending therefrom, and a blind loop of opposite curvature to said folding loop displaced longitudinally of said sheet relative to said folding loop
b. pressing together said pair of legs of said folding loop remotely from said apex of said loop progressively to said apex, to produce a fold in said sheet; and
c. maintaining the shape of said blind loop substantially unaltered during said pressing step.

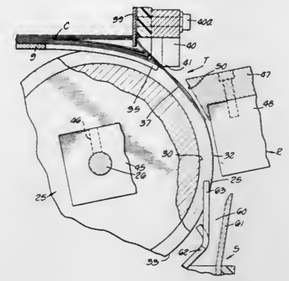
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**4,015,839**

## CARD FEEDING STATION

**James W. McKee, Mission Viejo, Calif., assignor to True Data Corporation, Santa Ana, Calif.**

**Division of Ser. No. 198,722, Nov. 15, 1971, Pat. No. 3,847,382. This application Nov. 11, 1974, Ser. No. 522,735**
**Int. Cl.² B65H** *3/06*, *3/34*
**U.S. Cl. 271—37** **7 Claims**



1. In card handling apparatus: a feed station adapted to receive a stack of cards, card transport means including a feed roll having a cylindrical friction surface, means for feathering said cards towards said feed roll to present the leading edge of successive cards to said feed roll, drive means for continuously rotating said feed roll, pressure applying means adjacent to said feed roll for engaging the leading edge of successive cards and pressuring said cards into frictional engagement with said surface of said feed roll, feed means operable independently of said drive means normally holding the leading edge of said cards and said pressure applying means in positions at which cards are out of frictional contact with said feed roll, and means for operating said feed means to allow said pressure applying means to press said cards successively into engagement with said feed roll, said feed roll having a peripheral groove, said feed means including a plate mounted for pivotal movement on an axis transverse to said cards, said plate having a portion extending into said groove for normally holding said cards out of frictional engagement with said feed roll, said plate being operable by said operating means to move said portion of said plate into said groove to enable frictional engagement of the card adjacent to said plate with said feed roll.

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**4,015,840**

## DEVICE FOR TESTING SHEETS DELIVERED FROM A FOLDING APPARATUS ASSOCIATED WITH ROTARY PRINTING PRESSES

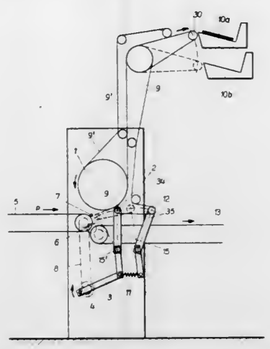
**Peter Schröder, Frankenthal, Germany, assignor to Albert-Frankenthal AG, Frankenthal, Germany**

**Filed Mar. 2, 1976, Ser. No. 663,016**
**Claims priority, application Germany, Mar. 27, 1975, 2513774**
**Int. Cl.² B65H** *29/60*
**U.S. Cl. 271—64** **10 Claims**

1. Device for testing sheets which are delivered from a folding apparatus associated with rotary printing presses having a first delivery belt positioned at a first level movable at a predetermined rotary speed for delivering folded sheets of printed matter, comprising:
a second delivery belt positioned adjacent to and at a second level lower than said first level for normally receiving the printed sheets and movable at the same rate of speed as said first delivery belt;
a rotatable drum;
a first guide belt coupled with and movable with said rotatable drum and movable at a speed higher than said predetermined speed;
a receiving roller;

a second guide belt coupled with and movable at the same speed as said first guide belt and movable in tangential juxtaposition therewith adapted to transport a folded sheet therebetween;

an oscillatable arm connected with and supporting said receiving roller for oscillatory movement from a first position remote from said first delivery belt to a second position adjacent to said first delivery belt to intercept one of the sheets leaving said first delivery belt onto said



second guide belt and movable to a third position to transfer said intercepted sheet to said tangential juxtaposition of said first and second guide belts, said receiving roller being moved into tangential contact with said rotatable drum when said oscillatable arm moves into the third position thereof; and

a special delivery means positioned at a delivery end of said tangentially positioned guide belts for receiving the sheet carried between said guide belts.

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**4,015,841**

**SORTER**

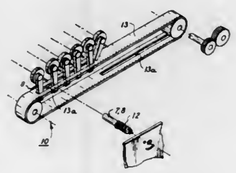
**Sakae Mitsumasu, Ebina, Japan, assignor to Rank Xerox Ltd., London, England**

**Filed May 24, 1976, Ser. No. 689,290**

**Claims priority, application Japan, Sept. 11, 1975, 50-124332[U]**

**Int. Cl.² B65H** *39/10*

**U.S. Cl. 271—173** **8 Claims**



1. In a sorting apparatus for collating sheets into sets comprising:

means for conveying said sheets along a desired path;

a plurality of sheet receiving bins arranged along said path;

means for distributing said sheets from said conveying means sequentially into said sheet receiving bins, said distributing means including a plurality of movable guide members associated with said bins for removing sheets from said conveying means and guiding them into said bins, and means for moving sequentially each of said guide members between a first position wherein said guide member will remove a sheet from said conveying means and guide it into a bin associated with said guide member and a second position wherein said guide member will not remove a sheet from said conveying means;

the improvement wherein said means for moving said guide members includes:

a cam comprising a web having a cam surface with at least one discontinuity therein; and

at least one follower member connected to each of said guide members, each of said follower members being arranged to responsively engage said cam surface;

whereby said follower members sequentially move said guide members between said first and second positions responsive to said discontinuity in said cam surface.

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**4,015,842**

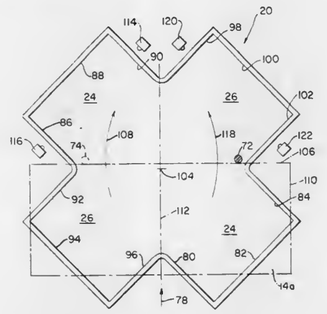
**BILL STACKER**

**George J. Perry, Sudbury, Mass., assignor to NCR Corporation, Dayton, Ohio**

**Filed Nov. 20, 1975, Ser. No. 633,995**

**Int. Cl.² B65H** *33/06*

**U.S. Cl. 271—185** **7 Claims**



1. An automatic bill stacker comprising:

hopper means for storing bills;

feed means for extracting a single bill from said hopper means;

a container means being cruciform in cross section and having first and second intersecting rectangular compartments therein, and also having an opening therein to enable bills to enter said compartments;

chute means for guiding a bill extracted from said hopper means in a feeding direction in a feed plane to said opening of said container means;

selector means moveable between first and second positions for engaging a leading edge of a bill moving in said feed plane causing it to rotate in one direction and enter said first compartment when said selector means is in said first position, and for causing said bill to rotate in a second direction opposite from said one direction and to enter said second compartment when said selector means is in said second position; and

control means for controlling the operation of said feed means and said selector means so as to enable successive bills from said hopper means to be alternately deposited in said first and second compartments.

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**4,015,843**

**NEWSPAPER STREAMLINER**

**James R. Tennant, Rte. 3, Box 247, Haughton, La. 71037**

**Filed Oct. 14, 1975, Ser. No. 621,681**

**Int. Cl.² B65H** *9/16*

**U.S. Cl. 271—240** **9 Claims**

1. A newspaper streamliner for maintaining the alignment of newspapers in a newspaper conveyor system comprising:

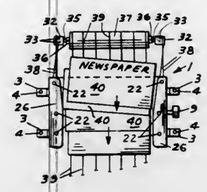
a. a frame positioned in said conveyor system;

b. a first and second set of vertically oriented, essentially aligned rollers disposed in essentially parallel relationship on said frame on either side of the conveyor in said conveyor system;



c. a first endless belt mounted on said first set of vertically oriented rollers and a second endless belt mounted on said second set of vertically oriented rollers; and

d. a set of drive pulleys mounted in cooperation with said conveyor system and rotating at essentially the same




pheripheral speed as the conveyor system, and at least one set of drive cables removably cooperating with said drive pulleys and at least one roller in each of said first and second set of vertically oriented rollers to drive said vertically oriented rollers and said endless belts.

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**4,015,844**

**SHEET CONVEYING DEVICE FOR A PLATEN PRESS**

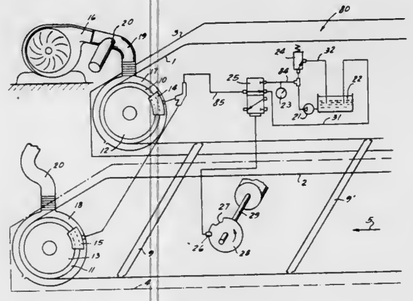
**Walter Gruetter, Morrens, and Jean-Daniel Bron, Prilly, both of Switzerland, assignors to J. Bobst & Fils, S.A., Switzerland**

**Filed May 5, 1976, Ser. No. 683,403**

**Claims priority, application Switzerland, May 7, 1975, 005859/75**

**Int. Cl.² B65H** *5/02*

**U.S. Cl. 271—266** **10 Claims**



1. In a device for conveying a sheet between stations of a platen press with a dwell period at each station, said device comprising a pair of endless chains arranged within side frames of the press, gripper bars attached by their ends to the spaced pair of endless chains and extending therebetween, a drive shaft extending between the side frames and mounted for rotation, said drive shaft having a drive sprocket for each of said pair of endless chains, at least one driven sprocket for each of said pair of endless chains mounted on the side frames in spaced relation to the drive shaft, means for intermittently rotating said drive shaft including a pinion connected to the drive shaft by a one-way clutch, a sector gear mounted for oscillating movement and engaging the pinion and a connecting rod for transferring movement of an eccentric to the sector gear, the improvements comprising at least one of the driven sprockets having an axial extension, braking means supported on the side frame adjacent said one driven sprocket for engaging said extension, means including at least one blower for cooling said braking means, and means for actuating said braking means including a control shaft mounted for rotation and making one complete revolution for each cycle of oscillation of the sector gear, said control shaft having means for causing the engagement and disengagement of the braking means during a portion of each revolution thereof.

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**4,015,845**

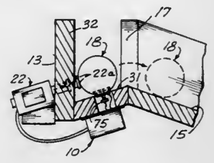
**AUTOMATIC CUE BALL SEPARATING AND RETURN ASSEMBLY FOR BILLIARD TABLES**

**Randy D. Sines, 601 5th Ave. S., Apt. 2, Great Falls, Mont. 59405**

**Filed Feb. 17, 1976, Ser. No. 658,251**

**Int. Cl.² A63D** *15/00*

**U.S. Cl. 273—11 C** **9 Claims**



1. An automatic cue ball separating and return assembly for billiard tables of the type having six ball receiving pockets with ball return runs leading from the pockets to a common single file run and with an object ball access opening at an end of the run and a separate cue ball return run leading from a junction with the single file return run to a separate cue ball access opening, said assembly comprising:

a cue ball having a solid smooth spherical outer shell encapsulating a metallic core member and being equal in size and weight to the object balls;

means for electrically producing an oscillating electrical field at a location along the single file run;

wherein said field is distorted by the metallic core of the cue ball but is relatively insensitive to non-metallic object balls;

detecting means for responding to disruption of the electrical field and for producing a signal in response thereto; and

kicker means adjacent the juncture of the single file run and cue ball return run operated in response to the signal to force the cue ball from the single file run onto the cue ball return run.

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**4,015,846**

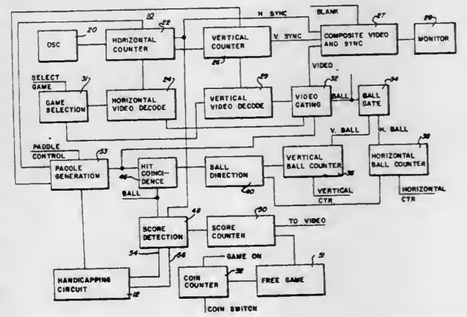
**HANDICAPPING CIRCUIT FOR ELECTRONIC GAMES**

**Robert Ralph Runte, Palatine, and Theodore A. Mau, Chicago, both of Ill., assignors to Robert Ralph Runte, Palatine, Ill.**

**Filed Apr. 30, 1976, Ser. No. 681,845**

**Int. Cl.² A63F** *9/00*

**U.S. Cl. 273—85 R** **19 Claims**

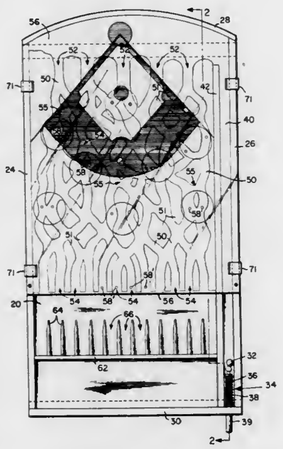



1. An electronic handicapping circuit for use with an elec-

tronic visual game comprising: means for generating a movable video image; means for providing scoring event signals; means for receiving said signal of said scoring event; means for selectively storing said signal of said scoring event connected to said means for receiving said score signal; means for providing a predetermined score differential and means for providing an output indication for said predetermined score differential connected to said means for selectively storing said signal of said scoring event, said means for providing said output indication of said predetermined score differential being adapted to provide a control signal, said control signal being adapted to regulate a movable video image generated by said electronic visual game.

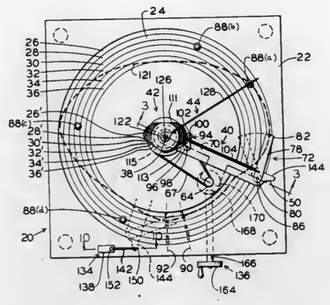
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**4,015,847**
**PINBALL SPORTS COMPLEX**
**Stephen B. Myers, 413 Crest Road, Oreland, Pa. 19075**
**Filed Mar. 25, 1976, Ser. No. 670,451**
**Int. Cl.² A63F 7/06**
**U.S. Cl. 273—121 R** **12 Claims**



1. A game apparatus comprising: a game board, a ball, wall means on said game board extending around peripheral portions thereof and projecting upwardly from the top thereof to define a field of play in which said ball is confined, said game board being adapted to be set in an indicated position with one end of the field of play raised higher than the other end of the field of play, means on the upper surface of said game board defining a plurality of passageways for said ball extending from the upper end to said lower end of the field of play, said passageways including a plurality of intersections where said ball may take alternative paths, means for propelling said ball into the upper end of the playing field whereby said ball may move by gravity through said passageways to the lower end of the playing field, a cover mounted on said wall means to extend across said field of play, said cover having openings therein aligned with said alternative paths at said intersections, and a plurality of defensive players each of which includes a pin adapted to be extended through said openings in said cover into said alternative paths therebeneath to block the movement of said ball.

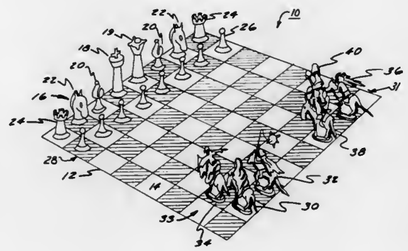
**4,015,848**
**GAME APPARATUS**
**Edward M. Pauwels, 2038 Hollywood Place, South Bend, Ind. 46616**
**Filed Feb. 2, 1976, Ser. No. 654,618**
**Int. Cl.² A63F 9/14**
**U.S. Cl. 273—126 R** **11 Claims**



1. A game apparatus comprising:
a housing;
shaft means secured to said housing;
boom means having a first end pivotally located on said shaft means and a second end extending over a play surface, said play surface having a plurality of indicator pieces located therein;
cam means positioned on said shaft means adjacent said boom means;
follower means pivotally located on said boom means;
resilient means for biasing said follower means into continual engagement with said cam means;
arm means attached to said second end of the boom means and adapted to contact said indicator pieces;
linkage means for connecting said arm means to said follower means; and
actuator means responsive to an operator input for rotating said boom means around said shaft means causing said follower means to follow said cam means and move said arm means in irregular path over said play surface to preferably advance at least one of said plurality of indicator pieces from a first position to a second position during a cycle of revolution of said boom means around said shaft.

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**4,015,849**
**CHESS-LIKE GAME**
**Charles A. MacLean, 23073 Beech, Dearborn, Mich. 48124**
**Filed Oct. 29, 1975, Ser. No. 626,940**
**Int. Cl.² A63F 3/02**
**U.S. Cl. 273—131 KC** **1 Claim**

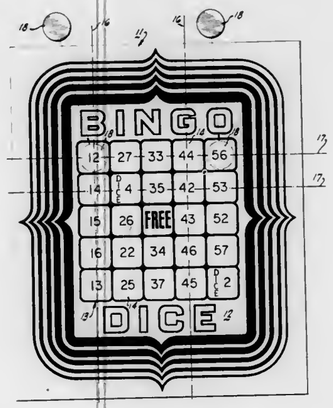


1. A chess-like game for at least two players comprising:
a checkerboard playing area with ranks and files of bilaterally alternating colored spaces;
a first set of chess pieces comprising a subset of eight royalty figures for one of the two players initially positioned to form a royalty row along one rank at the edge of said checkered playing area;
a subset of eight pawn figures for said one player initially positioned on said playing area in the rank adjacent the rank occupied by the royalty figures to form a pawn row in front of said royalty row; and
a set of six horsemen figures for the other player, said figures of said last-mentioned set each differing from the others and being visually distinguishable from said royalty figures and said pawn figures.



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**4,015,850**
**BINGO DICE GAME**
**Mitchell John Russell, 814 N. Delaware, San Mateo, Calif. 94010**
**Filed Sept. 2, 1975, Ser. No. 609,247**
**Int. Cl.² A63F 3/06**
**U.S. Cl. 273—135 B** **8 Claims**




1. A game comprising a plurality of playing cards having playing surfaces, indicia on said playing surfaces deliniating a plurality of areas arranged in five vertical columns and five horizontal rows, each of said plurality of areas having located therein a symbol specific thereto, first and second dice each having a plurality of die faces, indicia on ones of said first die faces, including a letter and a number, indicia on ones of said second die faces including different numbers, so that the combination of said dice face indicia from one face of each die corresponds to said symbol specific to one of said plurality of areas on ones of said plurality of playing cards, and a plurality of markers each formed to lie within one of said plurality of areas, whereby successive casting of said pair of dice produces a succession of upturned dice face indicia combinations, so that when said succession of combinations is marked by placing ones of said plurality of markers to overlie corresponding symbols in ones of said plurality of areas, a pattern is created on said playing surfaces wherein the purpose is to duplicate by chance a predetermined pattern on one of said playing surfaces.

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**4,015,851**
**RUBBER GRIP FOR TENNIS RACKET HANDLES**
**Paul H. Pennell, North Jackson, Ohio, assignor to Elastomeric Products Inc., North Jackson, Ohio**
**Filed Feb. 9, 1976, Ser. No. 656,714**
**Int. Cl.² A63B 49/08**
**U.S. Cl. 273—75** **1 Claim**

1. A rubber grip for a tennis racket handle comprising a single longitudinally stretchable wrapping strip formed of two layers of two different rubber compounds cured and joined by vulcanization, the first compound being relatively harder and stronger than the second compound which is relatively softer, more tacky and weaker than the first compound, the first compound forming a base layer of the wrapping strip when positioned around a tennis racket handle and the second compound forming the outer layer and the surface of the rubber grip on the tennis racket handle, said strip having opposite edges, longitudinally extending flanges formed on



said opposite edges of said wrapping strip in oppositely disposed relation to one another, one of said flanges having a surface coextensive the surface of the base layer and the other flange having a surface coextensive with the surface of the outer layer and surface of the rubber grip, a tab formed on and extending perpendicularly from the longitudinal flange having a surface coextensive with said base layer and arranged to be initially overlapped by said wrapping strip when the rubber grip is wrapped around a tennis racket handle so as to form a self-containing end construction.

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**4,015,852**
**MAZE-TYPE PUZZLE**
**Ross E. Gibson, 1168 W. Cliff Drive, Santa Cruz, Calif. 95060**
**Filed May 12, 1976, Ser. No. 685,767**
**Int. Cl.² A63F 9/08**
**U.S. Cl. 273—153 R** **6 Claims**

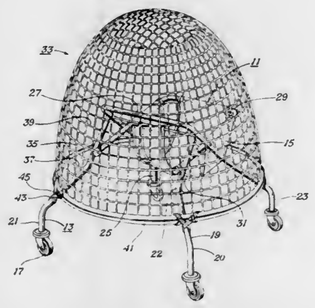



1. A puzzle comprising:
a game board having a plurality of predesignated areas on the playing surface thereof;
upstanding walls defining the perimetral boundaries of said areas;
at least one opening in the wall defining each of said areas;

a plurality of first connecting means in one of said areas adapted to have a plurality of string-like elements secured adjacent one end thereof respectively to corresponding ones of said connecting means;
a plurality of second connecting means located separately in preselected other of said designated areas adapted to be detachably connected with the other ends of the string-like elements; and
a plurality of string-like elements each adapted to be secured adjacent one end thereof to respective ones of said first connecting means and at the other end with respective ones of said second connecting means.

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**4,015,853**
**BABY WALKER ENCLOSURE**
**Cherry Sue Summers, 4133 Cherokee Trail, Fort Worth, Tex. 76133**
**Filed Aug. 25, 1975, Ser. No. 607,104**
**Int. Cl.² B62B** *7/00*
**U.S. Cl. 280—87.02 W** **9 Claims**

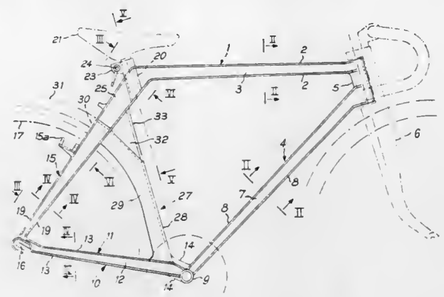


1. A device for attachment to a baby walker of the type having a frame mounted on castors and a seat for a child supported by the frame comprising:
an enclosure extending over and around the seat for enclosing the child;
means for attaching the enclosure to the frame;
a plurality of intersecting ribs spaced apart to form a plurality of apertures, the apertures being small enough such that a child may not extend his hand through; and
a lip at its bottom perimeter for carrying the attaching means.

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**4,015,854**
**FRAME FOR VARIOUS CYCLES**
**Louis Maurice Ramond, 28, rue de la Baume, Saint-Etienne, France**
**Filed Mar. 25, 1975, Ser. No. 561,834**
**Claims priority, application France, Mar. 29, 1974, 74.12210**
**Int. Cl.² B62L** *3/04*
**U.S. Cl. 280—281 R** **8 Claims**

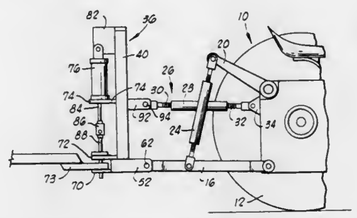
1. A bicycle frame formed by a plurality of elements integral with each other to form a structurally continuous and homogeneous, unitary structure without inhomogeneous joints including welds, said elements including a top crossbar, a steering tube at the front end of said crossbar, a transverse crank gear case below and spaced downwardly from said crossbar, a bottom member extending from said steering tube to said crank gear case, a wheel receiving fork having two arms extending rearwardly from said crank gear case and having wheel spindle receiving openings at the rearward ends of said arms, a pair of struts extending from said arms of said fork, adjacent said openings, to the opposite, rear end of said crossbar and a rigid strut member extending from said struts at portions thereof intermediate said top crossbar and said openings to said arms of said fork adjacent said crank gear case, said crossbar, said bottom member, said two arms, said struts and said strut member each having an open cross-section which has at least one open side, said crossbar and said bottom member lying substantially in a plane, each of said crossbar, said bottom member, said two arms and said struts being disposed with said open side thereof facing away from said plane, and said strut member having a portion which extends



from adjacent said crank gear case to a portion of said struts spaced from said rear end of said crossbar, having a partition extending transversely to said plane and from intermediate the ends of said portion of said strut member to adjacent said rear end of said crossbar and having a strengthening member intermediate and joined to said partition and said last-mentioned portion whereby said strut member acts as a stiffening member between said struts, and said arms to prevent movement of the upper ends of said struts toward said crank gear case.

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**4,015,855**
**IMPLEMENT HITCH**
**Clarence R. Murray, P.O. Box 1227, Erick, Okla. 73645**
**Filed Feb. 27, 1976, Ser. No. 662,143**
**Int. Cl.² B60D** *1/04*
**U.S. Cl. 280—415 A** **9 Claims**



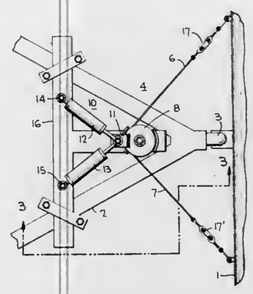
1. An implement hitch for connecting an agricultural tractor to an agricultural implement comprising:
an A-frame having a top and a bottom and including a pair of convergent side frame members interconnected by a central crossbar and having spaced lower ends;
a horizontally extending draw bar extending between and interconnecting the lower ends of the side frame members of the A-frame, and having a front side and a rear side;
link-engaging bracket pairs on the opposite ends of said draw bar and on the front side thereof, the brackets in each bracket pair defining a space for receiving therebetween the lateral lift links of an agricultural tractor;
a clevis bracket projecting from the rear side of said draw bar at the center thereof and including two vertically spaced apertured plates;
means on said central crossbar for connecting a central adjusting link of a tractor to said central crossbar;



power cylinder supporting means on said A-frame above said clevis bracket for supporting a power cylinder above said clevis bracket on said A-frame;
a piston rod extensible from said power cylinder and projecting downwardly therefrom; and
pin means connected to said piston rod and aligned with the apertures in said vertically spaced plates for extension therethrough.

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**4,015,856**
**STABILIZER MECHANISM**
**William Van Smith, 1617 Duke St., Memphis, Tenn. 38108**
**Filed Oct. 7, 1975, Ser. No. 620,508**
**Int. Cl.² B62D** *53/00*
**U.S. Cl. 280—446 B** **5 Claims**

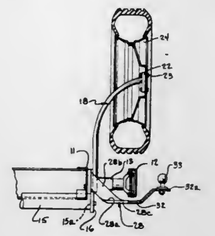


1. A stabilizer mechanism adapted to be coupled between a towing vehicle and a towed vehicle for controlling swaying movement of such towed vehicle, the mechanism comprising:
force transferring means;
a cable having a first section adapted to be coupled to one lateral side of a rear end of a towing vehicle and subsequently being coupled to said force transferring means and a second section adapted to be coupled from said force transferring means to an opposite lateral side of the rear end of the same towing vehicle, whereby said cable sections are capable of transferring a force indicative of relative movement between a respective towing vehicle and towed vehicle to said force transferring means;
said force transferring means providing an output force corresponding to the force received from said cable;
force absorbing means coupled to receive the force from said force transferring means, said force absorbing means including at least one shock absorber having one end coupled to said force transferring means and its other end adapted to be pivotally coupled to a frame portion of a respective towed vehicle, said shock absorber serving to dampen forces applied to said force transferring means.

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**4,015,857**
**VEHICLE TRAILER HITCH**
**Anthony J. Ross, 526 - 74th St., and James A. Ross, 528 - 74th St., both of Holmes Beach, Fla. 33510**
**Filed Feb. 11, 1976, Ser. No. 657,163**
**Int. Cl.² B60D** *1/14*
**U.S. Cl. 280—495** **4 Claims**

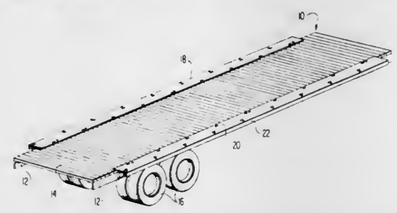
1. In a recreational vehicle of the type including a frame having a rear frame cross member, a rear vehicle bumper spaced rearwardly from the rear frame cross member, and a holding tank dump tube having an outlet at a location substantially medially between the ends of the rear frame cross member, a trailer hitch comprising a generally U-shaped hitch bracket having spaced legs and a connecting web and mounting plates secured to the ends of said legs, said mounting plates being disposed in a generally upright plane and attached to said rear frame cross member at relatively opposite sides of the dump tube outlet, the spaced legs being formed of flat bar stock with their major transverse dimensions disposed in a generally upright plane at the point of attachment to the mounting plates and the said legs extending downwardly and rearwardly from the respective mounting plate to a level below the bumper, said web of said U-shaped hitch bracket being formed of two web sections of flat bar stock each integrally joined to a respective one of the legs and said two web sections of flat bar stock having the major transverse axis



thereof disposed in a generally horizontal plane with the longitudinal axis of said web sections converging rearwardly at a level below the underside of the rear vehicle bumper whereby to space the web portion of the hitch bracket rearwardly from the dump tube outlet a distance sufficient to provide access thereto, a tongue member attached to the converging ends of the web sections of the hitch bracket and extending rearwardly therefrom, and coupling means on the tongue member for connecting a trailer thereto.

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**4,015,858**
**OVERWIDTH DEVICE FOR FLAT BED TRUCK OR TRAILER**
**Richard R. Love, Box 468, Buhl, Idaho 83316**
**Filed Mar. 23, 1976, Ser. No. 669,612**
**Int. Cl.² B62D** *21/00*; **B60P** *1/00*
**U.S. Cl. 280—656** **9 Claims**



1. A truck or trailer vehicle having a flat bed including a pair of horizontally disposed frame members arranged in spaced parallel relation to one another for supporting suitable decking in superimposed relation thereto, side plate members slidably positioned upon said decking and overlying each of said frame members, means carried by said frame members and engagable with said side plate members for slidably advancing the greater portion of said side plate members over and beyond said frame members to increase the area of said flat bed.

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**4,015,859**
**VEHICLE LEVELING SYSTEM**
**Robert W. Hegel, and Burke A. West, both of Monroe, Mich., assignors to Monroe Auto Equipment Company, Monroe, Mich.**
**Division of Ser. No. 489,728, July 18, 1974, Pat. No. 3,917,309. This application July 30, 1975, Ser. No. 600,432**
**Int. Cl.² B60G** *11/28*
**U.S. Cl. 280—714** **7 Claims**

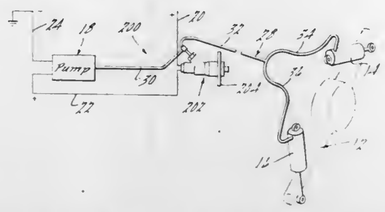
1. A vehicle leveling system control device for use in a

leveling system of the type including a pair of fluid pressure operated leveling struts, an electrically energized source of pressurized fluid and a fluid circuit communicating the source with the struts,

said control device including a housing defining a chamber communicable with said fluid circuit,

a piston within said housing having one side thereof exposed to the fluid pressure in said chamber,

a control stem adjustably connected with said piston and defining a passage communicable with the atmosphere,




electrical switching means normally maintaining an open electrical circuit between a source of electrical energy and said electrically energized source of fluid pressure,

said switching means being actuatable to a position closing said electrical circuit and thereby energizing said source of fluid pressure in response to a preselected movement of said stem within said housing, and

spring means acting against the opposite side of said piston from said side thereof exposed to said chamber.

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**4,015,860**

**VEHICLE SEAT SAFETY HARNESS**

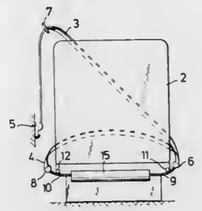
**Claes-Gustav Erik Yngve Tisell, Strangnas; Karl Erik Björn Lundell, Bromma; Sven Henry Nilsson Hörner, Eskilstuna; Gustav Yngve Thorstensson, and Gustav Sven Erik Karlstedt, both of Sollentuna, all of Sweden, assignors to Forenade Fabriksverken, Eskilstuna, Sweden**

**Filed Oct. 1, 1975, Ser. No. 618,486**

**Claims priority, application Sweden, Oct. 3, 1974, 7412471**

**Int. Cl.² B60R** *21/10*

**U.S. Cl. 280—747** **7 Claims**



1. An arrangement for tensioning a strap upon or immediately prior to a collision between a vehicle and another object, the strap forming part of a vehicle seat safety harness and having opposite end portions comprising, in combination, strap tensioning means comprising a cylinder, two pistons, having mutually opposing end faces, said two pistons arranged for movement in said cylinder in mutually opposite directions, a chamber between the mutually opposing end faces of said pistons, and two lines attached respectively to each of said pistons and said strap opposite end portions for exerting a substantially simultaneous pulling action on the strap opposite end portions, force generating means for actuating said strap tensioning means thereby drawing the strap tightly against an individual seated in the vehicle seat and sensing means responsive to an impact or an imminent impact on the vehicle for actuating said force generating means.

**4,015,861**

**STEERING WHEELS**

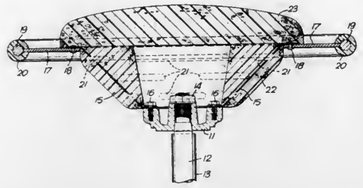
**Peter Molyneux Finch, Oxford, England, assignor to British Leyland UK Limited, London, England**

**Filed June 4, 1975, Ser. No. 583,832**

**Claims priority, application United Kingdom, June 4, 1974, 24606/74**

**Int. Cl.² B60R** *21/02*

**U.S. Cl. 280—750** **1 Claim**



1. A steering wheel comprising a hub member for attachment to a steering column, a dished metallic member secured to said hub member and extending outwardly from said hub member, a wheel rim member secured to the periphery of said dished member; said dished member having a plurality of spaced overlapping slots formed therethrough and extending partially around said dished member; a body of rigid plastics foam material in which said dished member is embedded to improve impact energy absorbing properties, and a pad of semi-rigid plastics foam material which extends over at least said dished member on the face that in use is facing a driver.

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**4,015,862**

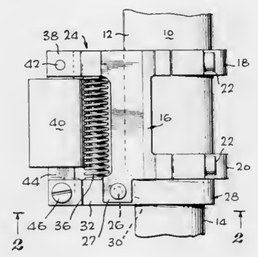
**SHOCK ABSORBER LOCK**

**Clinton F. Bahrman, Burbank, and Thomas Ross Welch, Los Angeles, both of Calif., assignors to Clinton F. Bahrman, Burbank, Calif.**

**Filed Dec. 8, 1975, Ser. No. 638,323**

**Int. Cl.² B60R** *27/00*

**U.S. Cl. 280—754** **8 Claims**



1. A shock absorber lock comprising:

a yoke for attachment to the first shell of a two-shell axially operable shock absorber;

a collar pivoted on said yoke, a bore through said collar, said collar embracing the second shell of the shock absorber, said collar being pivoted on said yoke and being pivotable from a first position when said collar does not engage the second shell to a second position wherein said collar engages on and locks on the second shell to lock the shells with respect to each other; and

motor means interconnecting said yoke and said collar to move said collar from its nonengagement position to its engagement position.



**4,015,863**

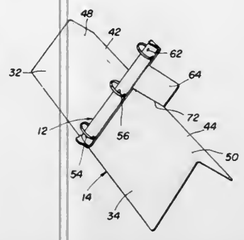
**EASEL BINDER**

**Edward T. Holum, Northbrook, Ill., assignor to Holum & Sons Co., Inc., Berkeley, Ill.**

**Filed July 17, 1975, Ser. No. 596,614**

**Int. Cl.² A47B** *23/00*; **B42D** *3/00*

**U.S. Cl. 281—33** **2 Claims**



1. An easel binder comprising a retainer mechanism for receiving and retaining items such as pages to be enclosed within the binder, said retainer mechanism including an elongated frame member mounting the inner ends of spaced spring flexured split ring assembles, cover means including front and back panels connected to an intermediate connecting panel, said intermediate connecting panel underlying said frame member, each of said cover means panels including an articulated portion joined to the remainder of the panels along bend lines located intermediate opposite lower and upper ends of said elongated frame member and extending transversely of said elongated frame member, said articulated portions being foldable along an apical portion from a first generally planar position to a second angularly extending position for supporting the binder in an easel providing position, a one-piece resilient sheet material member including an elongated planar base portion between said intermediate panel and said elongated frame member and substantially coextensive with both said panel and said frame member for entirely underlying said elongated frame member and the inner ends of said split ring assemblies, said one-piece resilient sheet material member including a flap portion normally disposed in the plane of said planar base portion and extending laterally from said planar base portion when said articulated panel portions are in said generally planar position, said flap portion being integrally articulated to a longitudinally extending margin of said base portion along a resilient junction located closely adjacent said apical portion between said upper end of said frame member and an adjacent transversely extending bend line and serving as the sole connecting means with said base portion independently of connection with the overlying frame member for permissive movement of said flap portion between said generally planar position and an angularly extending articulated cover portion retaining position, said sheet material being a tough resilient plastic material of predetermined thickness, and score means in said sheet material member at said junction for defining a relatively thin, easily bendable hinge therebetween, fastener means extending between and fixedly securing said remaining portion of the intermediate cover panel and said base portion with respect to said frame member, and additional fastener means located toward said upper end of the frame member and extending between and securing only said base portion and said frame member.

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**4,015,864**

**WELL APPARATUS**

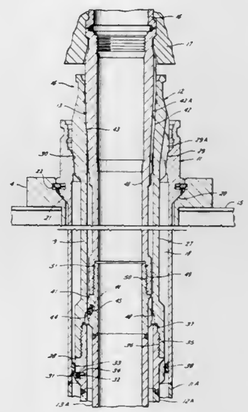
**Edward J. Szymczak, Spring, Tex., assignor to Cameron Iron Works, Inc., Houston, Tex.**

**Filed Oct. 28, 1975, Ser. No. 626,231**

**Int. Cl.² F16L** *39/00*

**U.S. Cl. 285—133 A** **8 Claims**

1. An assembly for use in suspending casing within a well at an offshore location, comprising a first tubular member to which an outer casing may be connected for lowering into a well bore, said first member having an upwardly facing shoulder thereon, a second tubular member to which an inner casing may be connected for lowering into the well bore within the first member, said second member having a downwardly facing shoulder thereon landable on the shoulder on the first member to support the second member in spaced relation to the first member to define an annular space therebetween, and means on the inner surface of the first member



and outer surface of the second member for latching the second member down against upward movement when it has been landed on the first member, said second member including an upper tubular section on which the shoulder is formed and a lower tubular section on which the latching means is provided, and means sealably connecting the tubular sections to one another intermediate the shoulder and the latching means thereon, said connecting means being disconnectible so as to permit separation of said sections while disposed within said first member.

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**4,015,865**

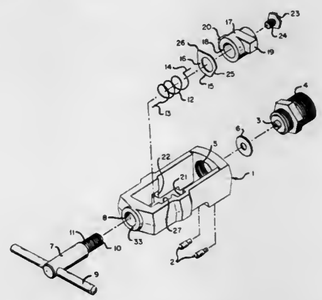
**SAFETY YOKE FOR HIGH PRESSURE GASES**

**Robert M. Kongelka, Washington, Pa., assignor to Superior Valve Company, Washington, Pa.**

**Filed Feb. 13, 1976, Ser. No. 657,957**

**Int. Cl.² F16L** *19/02*

**U.S. Cl. 285—198** **11 Claims**



1. Safety yoke means for connection to a source of high pressure gas comprising a yoke body, cam means positioned within the yoke body and having portions adapted to engage the yoke body in locking relationship thereto, screw means

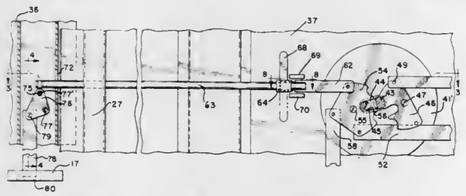
threadably engaging the cam means and operable to clamp a valve body against the yoke body, and locking means in cooperative relationship between the cam means and the screw means, said locking means being operable at all times when the cam means are not locked to the valve body and being moved to inoperative position when the cam means are in locking relationship to the yoke body.

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**4,015,866**
**OPERATING MECHANISM FOR DOUBLE SLIDING DOORS**

**Ronald W. Marsh, Michigan City, and Walter J. Marulic, Gary, both of Ind., assignors to Pullman Incorporated, Chicago, Ill.**

**Filed Oct. 28, 1975, Ser. No. 626,159**
**Int. Cl.² E05C 9/06**
**U.S. Cl. 292—36** **10 Claims**



1. A vehicle having a door opening, first and second doors positioned side-by-side in said opening, said doors being slidably supported on said vehicle for sliding movement from a position closing said opening to an open position to one side of said opening, said second door having a bolt locking member engageable with a portion of said vehicle to lock said second door in said opening, and a rotatable member on said second door connected to said locking member for moving the same between locking and unlocking position, the improvement of;
   a door locking mechanism for said first door comprising,
   a second locking bolt connected to said first door for relative sliding movement,
   a keeper on said vehicle engageable by said second locking bolt,
   an actuating element movably supported on said (first) door for reciprocating said second locking bolt,
   actuating linkage mechanism including a rod slidably supported on said second door and being connected to said rotatable member for reciprocating movement in response to rotation of said rotatable member,
   and means on said rod selectively engageable with said actuating element for moving the same whereby said second bolt is moved into and out of locking position relative to said keeper.

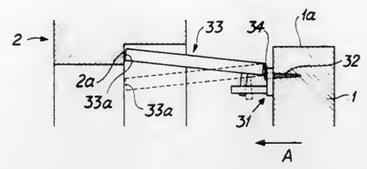
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**4,015,867**
**DEVICE FOR LATCHING A DOOR IN A PRE-DETERMINED POSITION OR ROTATION**

**Lars Siden, Hudiksvall, Sweden, assignor to Akustik Miljo AB, Hudiksvall, Sweden**

**Filed Apr. 6, 1976, Ser. No. 674,169**
**Claims priority, application Sweden, Apr. 9, 1975, 75040444**
**Int. Cl.² E05C 3/04**
**U.S. Cl. 292—262** **5 Claims**

1. A device comprising a securing means and a latching means for latching a door in a pre-determined position of rotation relative to a frame associated with said door when rotating the door in one direction, and with means securely attached to the door, in which the securing means is arranged to co-act with the door at its upper horizontal edge surface, wherein
   a. the latching means extends from the securing means in the form of a horizontally or substantially horizontally extending portion,
   b. that the securing means and the latching means are pivotally arranged relative to each other and exhibit locking means which are adapted to co-act with each other so that the latching means is able to adopt one of two position of rotation relative to the securing means,
   c. a first position of rotation in which rotation of the door is



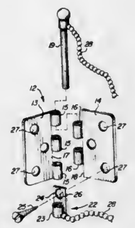
prevented and a second position of rotation in which the door is free to rotate,
   d. the securing means and the latching means are formed integrally,
   e. that said rotation of the latching means is effected via a thin portion formed between said latching means and said securing means.

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**4,015,868**
**DOOR LOCK EMPLOYING INTERLOCKING HINGE PLATES**

**Carl T. Buttler, Glendale, Ariz., assignor to Kenneth E. Marquis, Phoenix, Ariz.**

**Filed Feb. 12, 1976, Ser. No. 657,445**
**Int. Cl.² E05C 1/04**
**U.S. Cl. 292—302** **2 Claims**



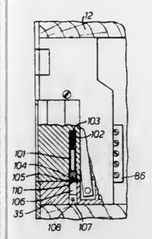
1. A locking mechanism for the non-hinge side of a door like member pivotally mounted on a jamb comprising;
   a pair of apertured metallic plates, one mounted on said door like member and the other mounted on said jamb so as to be juxtapositioned to each other when the door like member is closed,
   each of said plates having ears extending laterally of their juxtapositioned edges which intermesh and coaxially align to define a bore for receiving a pin,
   a pin for insertion into said bore to interlock said plates together in door closed position, and
   chain means attached to one of said plates and said pin for securing said pin thereto when not inserted into said bore formed by the intermeshing ears of said plates,
   said means further comprising an apertured third plate having an open ended hollow cylinder mounted thereon for receiving and holding said pin when said plates are separated from each other,
   said third plate being attached to one of said plates by a screw passing through the aligned aperture of said third plate and an aperture in one of said plates.



**4,015,869**
**CATCH MECHANISM**

**Stephen Horvath, St. Ives, Australia, assignor to Access Control Systems Pty. Ltd., Melbourne, Australia**

**Filed Sept. 30, 1975, Ser. No. 618,119**
**Int. Cl.² E05B 15/02**
**U.S. Cl. 292—341.16** **10 Claims**



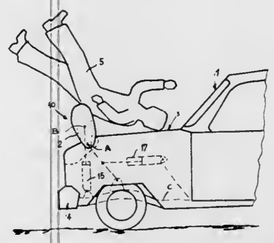
1. A door catch mechanism comprising a body; a catch member pivotally mounted on the body to pivot between an operative position and an inoperative position; biasing means biasing the catch member toward its operative position; power operated detent means having a first condition in which said catch member is held in said operative position and a second condition in which said catch member is released such that it can be moved to its inoperative position against the action of said biasing means by a moving force applied directly to the catch member from without the catch mechanism; and heat responsive locking means operable in response to application of heat thereto when said catch member is in its operative position to lock the catch member to remain permanently in said operative position regardless of the condition of the detent means.

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**4,015,870**
**FRONT PROTECTION DEVICE FOR MOTOR VEHICLES**

**Georges Stcherbatcheff, and André Lefeuvre, both of Boulogne-Billancourt, France, assignors to Regie Nationale des Usines Renault and Automobiles Peugeot, both of Paris, France**

**Filed May 28, 1975, Ser. No. 581,579**
**Claims priority, application France, May 30, 1974, 74.18751**
**Int. Cl.² B60R 21/14**
**U.S. Cl. 293—32** **7 Claims**



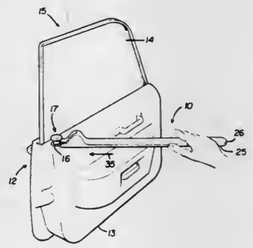
1. A pedestrian protection device extending across the front end of the body of a motor vehicle having a chassis comprising, in combination, a transversely extending beam disposed on the front end of the vehicle adjacent the vehicle upper surface for movement between an inoperative retracted position and an operative raised position, said beam having a curvilinear cross-sectional shape and a pair of side flanges, a first pivot trunnion associated with said side flanges and defining a transversely extending axis of rotation, first connecting means pivotably connected at one end to said first pivot trunnion and pivotally connected at its other end to the vehicle chassis to permit movement of said first transversely extending axis of rotation during the movement of said beam between said inoperative and operative positions, a second pivot trunnion associated with said side flanges and, defining a second transversely extending axis of rotation for said beam and second connecting means including a fluid pressure actuated cylinder pivotally connected to the vehicle chassis and having a piston operatively connected to said second pivot trunnion for pivotally moving said beam about said second axis of rotation between an inoperative retracted position and an operative raised position to increase the height of the front portion of the vehicle.

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**4,015,871**
**DOOR VALET**

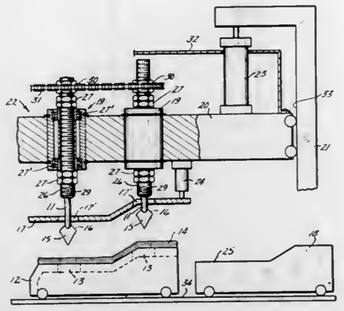
**Claus E. Koerbel, Warren, and Kenneth M. McIntyre, Grosse Pointe Woods, both of Mich., assignors to Lunar Industries, Inc., Fraser, Mich.**

**Filed Aug. 13, 1975, Ser. No. 604,188**
**Int. Cl.² A47F 13/06; B25J 1/00**
**U.S. Cl. 294—19 R** **2 Claims**



1. Apparatus for utilization by a person in a motor vehicle to unlock the doors of the vehicle by raising a door lock button having a stem of a first diameter and an enlarged head portion at the upper end of the stem, said apparatus comprising a relatively straight elongated handle having a longitudinal axis and substantially flat upper and lower surfaces generally parallel to one another, one end of said handle being adapted to be hand-held by said person and the opposite end including a lock button-engaging portion integral therewith, said lock button engaging portion terminating in a wedge having two spaced apart bifurcated legs separated by a longitudinal slot defining a pair of facing surfaces which are (a) substantially perpendicular to the flat upper and lower surfaces of the handle, (b) substantially parallel to the axis of the handle, and (c) spaced apart a distance of between about 0.25 and about 0.40 inches, the facing surfaces flaring outwardly near the end of the legs to facilitate insertion of the door lock button into the slot, said legs and the longitudinal axis of said slot being substantially parallel to the longitudinal axis of said handle so as to form an integral longitudinal extension thereof, each of said legs having an upper arcuate camming surface inclined toward the distal end thereof and a flat lower surface parallel to and coplanar with the lower surface of said handle, the upper arcuate camming surfaces each being essentially one-fourth of a sinusoid and including a first gently sloping portion at their terminal ends which blends into a more steeply sloping portion of approximately 45° and the more steeply sloping portion blending into a more gently sloping portion near the end of the slot, such that the manual application of a unidirectional, generally horizontal force in the direction of the longitudinal axis of said handle by said person causes said stem to be received within said slot and the underside of said enlarged head portion to be engaged first by said first gently sloping portion and the continued application of said force in said longitudinal direction causing the lock button to be engaged by said more steeply sloping portion to vertically cam the lock button upwardly to unlock said door.

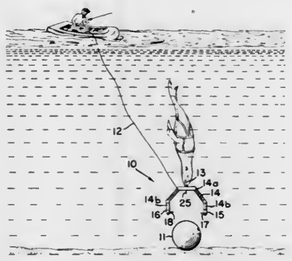
**4,015,872**
**IMPALING TRANSFER PROCESS AND APPARATUS**
**Edward J. Loznak, 306 E. Park, St. Johns, Mich. 48879, and Eugene L. Wood, 6785 Telegraph Road, Birmingham, Mich. 48010**
**Filed June 25, 1975, Ser. No. 590,049**
**Int. Cl.² B08B *1/00***
**U.S. Cl. 294—61** **7 Claims**



1. A process for the transfer of blanket-like penetrable material including the following steps:
positioning an impaling structure above said material;
driving said impaling structure to penetrate said material and orienting by rotating the impaling structure to a position transverse of entry to resist withdrawal from said material;
elevating said impaling structure whereby said material is lifted and carried with said impaling structure;
orienting said impaling structure above a work surface while reorienting the impaling structure by rotation to a position registrable with the entry to allow material withdrawal and stripping said material from said impaling structure to disengage said material therefrom and drop said material onto said work surface.

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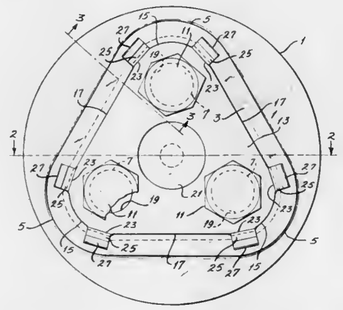
**4,015,873**
**RETRIEVER**
**Arthur F. Langguth, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**
**Filed Dec. 22, 1975, Ser. No. 642,801**
**Int. Cl.² B66C *1/28***
**U.S. Cl. 294—66 R** **6 Claims**



1. An apparatus for permitting the retrieval of a sunken object having a known dimension comprising:
means configured for gripping by a marine mammal;
means connected to the gripping means for fitting about the sunken object when positioned thereat by the marine mammal;
means carried on the fitting means for rotating to a position at least partially within the dimensions of the fitting means as the object is being positioned in the fitting means and for rotating to a position extending from the fitting means after the object has been positioned in the fitting means to lock the object therein;
means carried on the fitting means for reducing the weight of the apparatus; and
means carried on the fitting means for aurally indicating the positioning of the object in the fitting means to the marine mammal.

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**4,015,874**
**RAILWAY AXLE END CAP SCREW LOCKING DEVICE**
**James J. Hennessy, Chambersburg, Pa., assignor to Hennessy Products, Incorporated, Chambersburg, Pa.**
**Filed Sept. 9, 1975, Ser. No. 611,609**
**Int. Cl.² F16B *39/02***
**U.S. Cl. 295—36 R** **12 Claims**



1. A locking device for a railway axle end cap screw having a polygonal head, comprising a plate having a circular aperture of sufficient size to accommodate the shank of the screw and a peripheral edge spaced radially from said aperture and shaped for anti-rotational relation with the inner surface of the adjacent portion of the end cap rim, and a pair of plate-like tabs substantially normal to the plane of said plate on said peripheral edge of said plate and intersecting said plate on normals to radii of said aperture, said tabs being wholly spaced radially from the center of said aperture a greater distance than the maximum radius of the cap screw head whereby to provide sufficient clearance for rotation of the cap screw into end cap securing position and being of substantially greater length than the thickness of the head of said cap screw and having their ends remote from said plate preformed to facilitate forcibly folding said tabs into the space between the polygonal head of the cap screw and the end cap rim whereby through engagement with the rim and the cap screw head at locations spaced circumferentially thereof, to prevent undesired rotation and loosening of the screw.

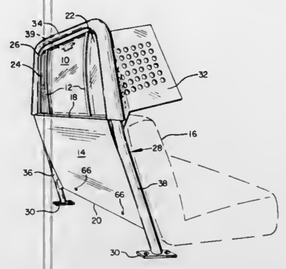
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**4,015,875**
**VERTICAL SLIDING AUTOMOBILE PARTITION HAVING CURVED TRACK MOUNTED ON FRONT OF SHIELD PLATE**
**John R. Setina, 2926 Yelm Highway SE., Olympia, Wash. 98501**
**Filed Mar. 31, 1976, Ser. No. 672,404**
**Int. Cl.² B62D *33/04***
**U.S. Cl. 296—24 R** **18 Claims**

1. Automobile partition apparatus comprising:
shield means for preventing objects from passing from the rear seat to the front seat of the automobile, said shield means adapted to extend across the width of the automobile at a position behind and separate from the front seat backrest and to extend from an upper edge adjacent the top of the front seat backrest downward along said backrest to a lower edge;



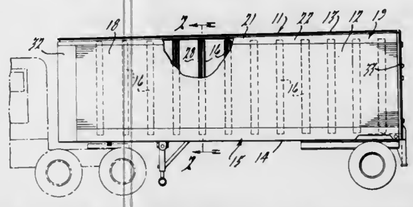
a substantially unbreakable, light transparent partition means for enabling visual observation over the shield means extending from the upper edge of said shield to the roof of the automobile, said partition means being separate from said backrest and including a vertical sliding partition window which slides along the front surface of the shield between an open position lowered below said upper edge of said guard plate and located between the shield and said backrest, and a closed position raised above said shield;



vertically curved track means for supporting said partition window and for vertical sliding movement, and preventing pivotal movement of said partition window so that said partition window does not project behind said shield;
means for attaching said track means to the front surface of said shield so that said track means extends along said shield and upward above the shield to form a portion of said partition means; and
mounting means for attaching the shield means and the partition means to the body of the automobile as an integral unit which can be removed without damage.

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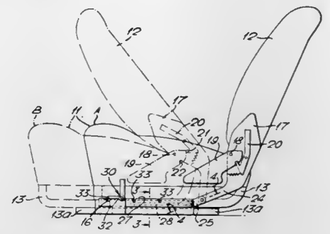
**4,015,876**
**WEDGE TYPE TRAILER BODY**
**Adrian F. Hulverson, Grosse Pointe Woods, and Eugene Chosy, Grosse Pointe Farms, both of Mich., assignors to Fruehauf Corporation, Detroit, Mich.**
**Filed May 11, 1972, Ser. No. 252,264**
**Int. Cl.² B62D *33/04***
**U.S. Cl. 296—28 M** **6 Claims**



6. In a wedge type trailer body to be mounted on front and rear wheels, an underframe which slopes downwardly toward the rear when supported on the front and rear wheels, side walls comprising upper and lower side rails, respectively, a plurality of spaced posts of substantially equal length extending fron one of said rails at right angles thereto, the other of said side rails having a vertically extending flange of a width to overlap the ends of said posts when the top edge of said upper side rail is disposed in a substantially horizontal plane and the bottom edge of said lower side rail slopes downwardly generally parallel to said underframe.

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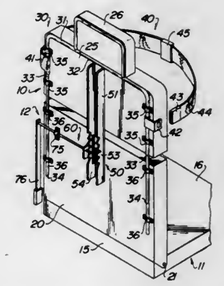
**4,015,877**
**VEHICLE SEAT ASSEMBLIES**
**John Charles Gladstone Button, Warwick, England, assignor to Chrysler United Kingdom Limited, London, England**
**Filed Mar. 3, 1975, Ser. No. 554,670**
**Claims priority, application United Kingdom, Mar. 7, 1974, 10337/74**
**Int. Cl.² B60N *1/04***
**U.S. Cl. 297—341** **2 Claims**



1. A vehicle seat assembly comprising a seat, a seat squab pivotally mounter thereon for tilting movement, first locking means for locking the squab against tilting movement with respect to the seat, means to mount the seat for bodily fore and aft sliding movement, a slideway comprising a fixed elongate element extending parallel to the fore and aft direction of movement of the seat, a U-section elongate slide element which receives the fixed element, means between the slide element and the fixed element to constrain the slide element to slide linearly along the fixed element, second locking means for locking the slide element in a selected one of a plurality of positions of adjustment along the fixed element, the squab having an arm with an end extending therefrom towards the slide and a link pivotally connected at one of its ends to the slide and pivotally connected at its other end to the end of the arm so as to permit the end of the arm to rise and fall with respect to the slide as the squab is tilted with respect to the seat, the arrangement being such that, with the first locking means only released, tilting the squab forwardly over the seat moves the seat forwardly along said mounting means, and, with the second locking means only released, the seat with the squab locked thereto can be adjusted fore and aft on said mounting means.

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**4,015,878**
**CHAIR CONSTRUCTION FOR LONG USE COMFORT**
**Charles M. Perkins, R.F.D. No. 2, Albion, Ill. 62806**
**Filed Jan. 16, 1976, Ser. No. 649,719**
**Int. Cl.² A62B *35/00***
**U.S. Cl. 297—385** **8 Claims**



1. A chair construction comprising a seat for supporting gravitational load of a user, a lower back part upstanding from a rear region of said seat, an upper back part generally over

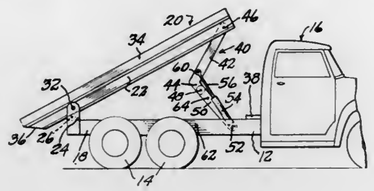
said lower back part for engaging the back of a user, mounting means mounting said upper back part for up and down movement in a generally vertical plane away from and toward said seat over said rear region of the latter, a belt carried by said upper back part for snug vertically supporting engagement about a user's torso, and retaining means for releasably retaining said upper back part in a selected position of said up and down movement, whereby a user's torso is adapted to be elevated generally vertically away from while remaining on the seat for lessened pressure on the user's buttocks and increased comfort during long usage.

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## 4,015,879
## CONVERTIBLE ADJUSTABLE TILTING BED FOR VEHICLES

**Forest M. Shonkwiler, 22652 W. Madison Road, South Bend, Ind. 46614**

**Filed Feb. 26, 1976, Ser. No. 661,830**
**Int. Cl.² B60P** *1/04*
**U.S. Cl. 298—14** **5 Claims**



1. In combination,
a vehicle having a frame,
bracket means carried by the rear portions of the sides of said vehicle frame,
a dump bed carried by said vehicle frame and including frame members juxtaposed to said bracket means,
releasable means for pivoting said dump bed frame members to said bracket means,
folding support means connecting the front of said dump bed to said vehicle frame and including pivotally connected upper and lower arms,
power actuated extensible and contractible means pivoted at its opposite ends to said vehicle frame and to an intermediate portion of the upper arm of said folding support means, and
releasable means for anchoring the lower arm of said folding support means to said vehicle frame, whereby
said dump bed may be tilted about said pivot means upon operation of said power actuated means when said anchor means is released and said dump bed may be shifted bodily on said vehicle frame to and from inclined ramp forming position at the rear of said vehicle frame upon operation of said power actuated means when said anchor means locks said lower folding support arm to said vehicle frame and said pivot means is released.

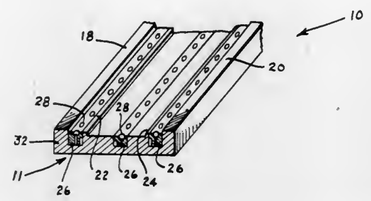
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## 4,015,880
## MULTIPLE LEVEL FLUID BEARING TRACK ASSEMBLY

**Ronald L. Colvin, Mesa, and James H. Williams, Tempe, both of Ariz., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**

**Filed May 21, 1975, Ser. No. 579,746**
**Int. Cl.² B65G** *53/04*
**U.S. Cl. 302—31** **3 Claims**

1. A multiple level fluid bearing track assembly for transporting articles of various dimensions comprising a body, said body having a centrally located longitudinally extending base portion of a predetermined height, a first pair of longitudinally extending shoulders adjacent said base portion, said base portion and said first pair of shoulders forming a lower level of said track assembly, first means for transporting articles of one dimension in a predetermined direction, said first transporting means being in the form of a longitudinally extending fluid jet insert located within said base portion intermediate said first pair of shoulders, said body having a second pair of longitudinally extending shoulders spaced a predetermined distance in the transverse direction from said first pair of shoulders, second means for transporting articles of another dimension in said same predetermined direction as said articles of said one



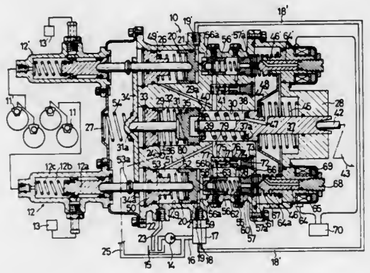
dimension, said second transporting means being in the form of a pair of longitudinally extending fluid jet inserts of a height greater than said predetermined height of said base portion, each of said pair of inserts being located adjacent one of said second pair of shoulders, respectively, and forming in conjunction therewith an upper level of said track assembly whereby articles of various dimensions can be interchangeably or simultaneously transported in said predetermined direction by said track assembly.

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## 4,015,881
## BRAKE CONTROL DEVICE

**Yoshiharu Adachi, Toyota, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Kariya, Japan**

**Filed July 15, 1974, Ser. No. 488,458**
**Claims priority, application Japan, July 28, 1973, 48-85239**
**Int. Cl.² B60T** *8/06*
**U.S. Cl. 303—114** **5 Claims**



1. A brake control device having a pump driven by a vehicle engine and a reservoir, comprising:
a manual operating means including a brake pedal actuated by a vehicle driver;
wheel brake cylinders for the brakes of the wheels of the vehicle;
operating means operatively connected with said brake pedal for actuating said wheel brake cylinders;
pressure control valve means operatively connected with said operating means and including a hollow seat member provided with a normally open passage therethrough and a valve seat thereon, said valve seat cooperating with a first valve member for selectively controlling the amount of flow of hydraulic fluid from said pump to said reservoir;
flow control valve means fluidly communicating with said pump and including a second valve member cooperating with a valve seat and forming a variable orifice for controlling communication between said pump and said reservoir and a fixed orifice associated with said second valve member for restricting the flow of hydraulic fluid supplied to the normally open passage of said pressure control valve means;
power chamber means in hydraulic communication with said pump; said second valve member being responsive to the pressure in said power chamber means and the amount of flow through said passage for varying the opening of said variable orifice;
power piston means reciprocable in said power chamber means and disposed between said pump and said flow control valve means, said power piston means being operable by said first valve member which selectively restricts the flow of hydraulic fluid from said pump to said reservoir via said variable orifice and said passage; and
master cylinders connected to and selectively operable by said power piston means for supplying fluid pressure to said wheel brake cylinders, whereby the variable orifice of said flow control valve means is controlled according to the movement of said pressure control valve means.

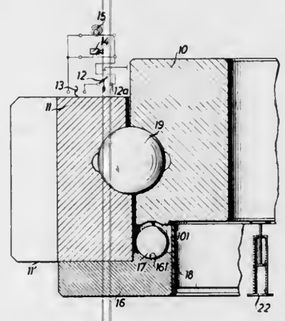


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## 4,015,882
## ANTI-FRICTION BEARING

**Alois Stenert, Lippstadt, Germany, assignor to Hoesch Werke Aktiengesellschaft, Dortmund, Germany**

**Filed Apr. 11, 1975, Ser. No. 567,189**
**Claims priority, application Germany, Apr. 13, 1974, 2418056**
**Int. Cl.² F16C** *9/00*; **G08B** *21/00*
**U.S. Cl. 308—1 A** **8 Claims**



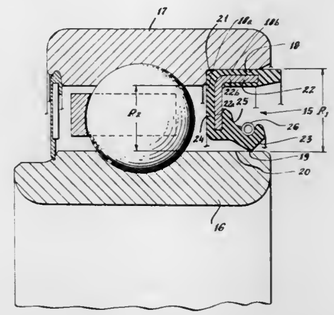
1. An anti-friction bearing which includes inner and outer rings with complementary raceways and anti-friction elements in said raceways between said rings to support a load on said bearing, opposed, complementary auxiliary raceways unitary with said rings for receiving anti-friction elements therebetween, detector means to indicate excessive relative translation movement of said inner and outer rings undr load, comprising a detector element carried by one ring and cooperating with means fixed on the other ring upon excessive relative translation movement of said rings under load, and signalling means actuated by said detector means upon such excessive movement, said auxiliary racewwys receiving anti-friction elements for cooperation with said anti-friction bearing to support said load.

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## 4,015,883
## ANNULAR SEALING MEMBERS AND ASSEMBLIES INCORPORATING THEM

**Geoffrey Taylor, Luton, England, assignor to SKF Industrial Trading and Development Company, B.V., Nieuwegein, Netherlands**

**Continuation of Ser. No. 408,894, Oct. 23, 1973, abandoned.**
**This application June 13, 1975, Ser. No. 586,652**
**Int. Cl.² F16C** *1/24, 33/78*
**U.S. Cl. 308—187.1** **8 Claims**



1. In a bearing assembly including coaxial inner and outer race rings defining between them an annular gap having a central part and a first end part, a plurality of captive rolling elements in said central part of the gap and seal means closing said first end part of the gap, the improvement in combination therewith, wherein said outer race ring defines a bore having axially adjacent first and second surfaces of first diameter and smaller second diameter respectively, with a shoulder surface extending transversely of the assembly axis between said first and second surfaces, and said inner race ring has a third surface on its outer circumference which is spaced from and defines with said first surface said end part of said gap, and said seal means comprises an annular body part of flexible, resilient material formed of outer and inner rings and a web connecting said seal means rings which, with said web, define in axial section, a C-shape having outer and inner circumferential seal surfaces respectively for sealingly contacting said first and third surfaces of said outer and inner race rings and said web has an axial surface for sealingly contacting said shoulder of said outer race ring, said seal means further comprising a reinforcing part of less flexible material than said body part material, said reinforcing part defining in axial section an L-shape and comprising a ring part embedded in said seal means outer ring and web at least partially embedded in the web of said seal means body part, said seal means outer seal surface, when in free state having an outer diameter slightly greater than said inner diameter of said outer ring first seal surface, and said seal means outer seal surface, when situated in and closing said first end part of said gap, being radially compressed in an interference fit.

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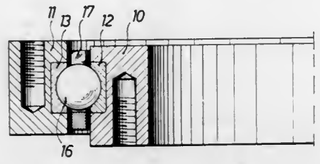
## 4,015,884
## CENTER-FREE ONE-ROW WIRE BALL BEARING

**Johannes Bertram, Unna-Billmerich, and Heinz Wolzenburg, Dortmund, both of Germany, assignors to Hoesch Werke Aktiengesellschaft, Dortmund, Germany**

**Filed Dec. 17, 1975, Ser. No. 641,752**
**Claims priority, application Germany, Dec. 19, 1974, 2460120**
**Int. Cl.² F16C** *33/58*
**U.S. Cl. 308—216** **8 Claims**

1. A center-free one-row ball bearing which includes in combination: a one-piece inner bearing ring and a one-piece outer bearing ring arranged in radially spaced relationship and

coaxially with regard to each other, only two race wires respectively arranged in said inner ring and said outer ring so as to radially face each other in radially spaced relationship to each other, said race wires being located radially with regard to the axis of rotation of said bearing, and a plurality of balls




arranged radially between and in rolling contact with said two race wires, those surfaces of said race rings which face each other respectively forming uninterrupted raceways for said balls, the radius of said raceways always being greater than the radius of said balls rolling on said raceways so that the balls have a twopoint contact with their raceways.

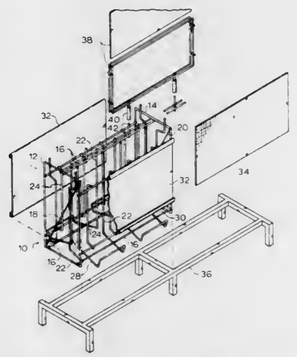
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**4,015,885**

## DISPENSING AND DISPLAY DEVICE

**Jon Clemens Baggaley, Hamilton, Canada, assignor to Tonecraft Limited, Toronto, Canada**

**Filed Mar. 1, 1976, Ser. No. 662,957**
**Int. Cl.² A47F** *7/00*; **B65H** *19/00*
**U.S. Cl. 312—42** **3 Claims**




1. A display and storage device for rolls of decorative sheet material comprising

a body having a series of storage racks each adapted to support a single file column of rolls of decorative sheet material with their roll axes parallel and horizontal;

a front display face on said body for each of said storage racks that substantially conceals its respective storage rack and has a width substantially equal to the width of its storage rack;

said storage racks being arranged one above the other and the front display faces of said storage racks being in a substantially common vertical plane;

said racks each having a depth greater than the depth but less than twice the depth of a roll of decorative material to be contained thereby whereby to support said rolls in a single file comumn as aforesaid;

said front display face being formed with a dispensing opening for rolls of decorative sheet material adjacent the lower end of said storage rack whereby the bottom roll of said column can be withdrawn from said column;

said storage racks each terminating in a support ledge adjacent said dispensing opening;

said body being formed with a filling opening for admitting rolls of decorative sheet material to said storage rack;

similar rolls of decorative material being loadable in each of said storge racks;

said front display faces having a vertical extent substantially coextensive with the vertical height of their respective storage rack and a horizontal extent substantially coextensive with the lateral extent of their respective storage rack whereby said front display faces can display the full width of a substantial length of the decorative sheet material of the rolls of decorative sheet material in a column in their respective rack.

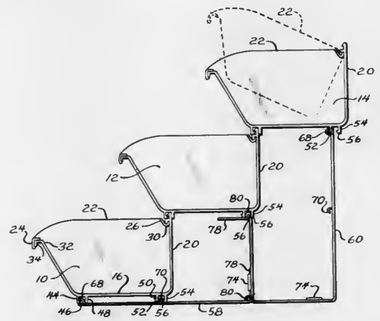
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**4,015,886**

## STORAGE BINS

**Chester H. Wickenberg, 1125 Forest Drive, Elgin, Ill. 60120**

**Filed Nov. 3, 1975, Ser. No. 627,849**
**Int. Cl.² A47B** *77/00*, *87/00*; **F16B** *12/00*; **A47B** *81/00*
**U.S. Cl. 312—107** **12 Claims**




1. A storage and display system comprising:

a plurality of bins adapted to be stacked and detachably interlocked in a vertical array;

tier-supporting means including at least two brackets adapted to be detachably interlocking to form horizontal and vertical supporting surfaces for the bins;

each of said plurality of bins consisting of a bottom, a substantially upstanding front wall and an upstanding rear wall;

each bottom of the bins having a front flange means and a rear flange means disposed on its outside surface, each upstanding rear wall of the bins having an additional flange means disposed on its upper end;

said brackets having hook-shaped projections adapted to interengage with the bins thereby detachably interlocking the bins onto the brackets;

said plurality of bins including at least three bins, a first bin of said at least three bins being positioned onto the supporting means so that the hook-shaped projections interengage with the front and rear flange means on the bottom of said first bin;

a second bin of said at least three bins being stacked above said first bin by interengaging so as to detachably interlock said additional flange means on the upper end of the rear wall of the first bin with the front flange means on the bottom of the second bin and by interengaging so as to detachably interlock the rear flange means on the bottom of the second bin with said supporting means; and

a third of said at least three bins being stacked above the first and second bins by interengaging so as to detachably interlock said additional flange means on the upper end of the rear wall of the second bin with the front flange means on the bottom of the third bin and by interengaging so as to detachably interlock the rear flange means on the bottom of the third bin with said supporting means.

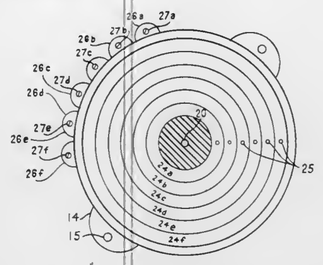


**4,015,887**

## LAMP CIRCUIT CONNECTOR FOR TRAILERS

**Joseph H. Ross, 1719 San Jose Ave., Almeda, Calif. 94501, and Dudley G. Richardson, 40 Woodland Way, Piedmont, Calif. 94611**

**Continuation-in-part of Ser. No. 558,941, March 17, 1975, abandoned. This application June 1, 1976, Ser. No. 691,478**
**Int. Cl.² H01R** *39/00*
**U.S. Cl. 339—6 R** **5 Claims**




1. A connector device for connecting the lamp circuit of a tractor vehicle to the lamp circuit of a trailer vehicle, comprising:

a. a base member;

b. a plurality of different diameter nonconducting rings rotatably disposed one within the other on the base member, each ring having a connector member on its under surface and a positioning hole on its upper surface;

c. a first set of conductors attached to the connector members of the rings and attachable to the lamp circuit of one of the vehicles;

d. a plurality of contactor plates radially disposed on the base member, each contactor plate having connector members adapted for making electrical contact with the connector members of the rings;

e. a second set of conductors attached to the connector members of the contactor plates and attachable to the lamp circuit of the other of the vehicles;

f. a face plate rotatably disposed over the rings, and having positioning holes alignable with the positioning holes of the rings;

g. a program pin for insertion through the positioning hole of the face plate into the positioning holes of the rings; and

h. means for mounting the connector on one of the vehicles.

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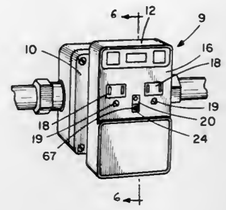
**4,015,888**

## ELECTRICAL DEVICE WITH RETRACTABLE GROUNDING PIN AND INDICATING MEANS

**Charles W. Draper, Clearwater, and Raymond H. Legatti, Belleair, both of Fla., assignors to Square D Company, Park Ridge, Ill.**

**Filed Nov. 5, 1975, Ser. No. 629,163**
**Int. Cl.² H01R** *3/06*
**U.S. Cl. 339—14 P** **10 Claims**

1. An electrical device selectively pluggable into electrical outlets with either two or three ports and in which two of the ports are connected to power lines, the electrical device comprising a body having a cavity closed by front and rear walls, two prongs operatively connected within the cavity and projecting from the body through the rear wall for reception respectively in the ports of an outlet which are connected to power lines, a grounding pin operatively connected within the cavity and mounted for movement between an extended position wherein the pin extends from the body through an opening in the rear wall for reception in a third port of the outlet and a retracted position wherein the pin is retracted within the cavity, means for locking the grounding pin in the extended position, and a plunger mounted for reciprocal movement between a position wherein an outer end portion of the plunger is readily visible at an opening in the front wall to a




position where it is not readily visible at the opening in the front wall for indicating whether the grounding pin is in its extended or retracted position.

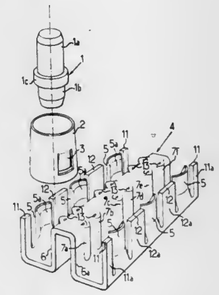
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**4,015,889**

## SHUNT FOR PROVIDING A DIRECT ELECTRICAL CONNECTION

**Lucien Blanchet, Le Vesinet, France, assignor to Air LB, Colombes, France**

**Filed Oct. 20, 1975, Ser. No. 624,059**
**Claims priority, application France, Nov. 12, 1974, 74.37278**
**Int. Cl.² H01R** *13/12*, *31/08*
**U.S. Cl. 339—19** **3 Claims**




1. Shunt device for making a direct electrical connection between a plurality of male plugs at the ends of electrical conductors, said device comprising

an elongated metal strip formed from a single sheet of resilient metal and defining two parallel channels, each channel having a bottom, an internal wall adjacent the other channel, and an external wall more remote therefrom

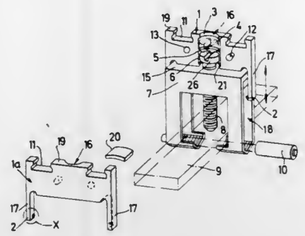
said internal walls being connected together along their upper ends and formed with a plurality of pairs of elongated parallel bosses transverse to the bottoms of said channels and projecting into said channels,

said external walls being divided along lines transverse to said channel bottoms into a plurality of tongues parallel to said bosses, one tongue being positioned opposite each pair of bosses and acting as a spring to grip a plug inserted between that tongue and the pair of bosses thereopposite.

## 4,015,890
## IDENTIFICATION MEMBER FOR ELECTRICAL TERMINALS

Gottfried Glaesel, Minusio, Switzerland, assignor to Heco Electric GmbH, Glarus, Switzerland

Filed May 7, 1976, Ser. No. 684,346
Int. Cl.² H01R 3/00
U.S. Cl. 339—113 B 11 Claims

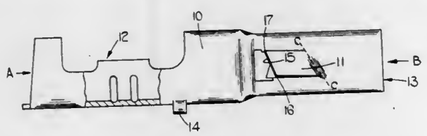


1. An identification member for attachment to an uninsulated electrical terminal comprising a metal sleeve and a clamping screw located in a wall thereof, which identification member consists of two plates of insulating material provided with means for securing the plates together face to face, each of the two mating faces containing a recess extending thereacross to accommodate the clamping screw, at least one plate having a pair of generally parallel laterally spaced legs at opposite sides thereof and retaining detent members on the legs for engaging in the ends of a said sleeve of a terminal to retain the identification member thereon, at least one recess being provided in that side of each plate that faces away from the legs, adapted to receive an identifying plate or tag.

## 4,015,891
## ELECTRICAL CONNECTOR

Donald Stuart Pemberton, Stoke-on-Trent, England, assignor to Rist's Wires & Cables Limited, Birmingham, England

Filed Apr. 22, 1975, Ser. No. 571,015
Claims priority, application United Kingdom, May 1, 1974, 19081/74
Int. Cl.² H01R 13/40
U.S. Cl. 339—217 S 7 Claims

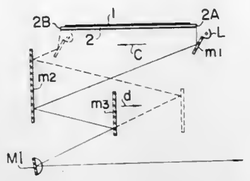


1. An electrical connector comprising an elongate, electrically conducting body, one end of said body being formed to be connected with a bared end of an electrical lead, an opposite end of said body being formed to be engaged with another electrical connector, and at least one lance longitudinally extending from said body intermediate said ends thereof for opposing disengagement of the electrical connector from a recess in a housing for the connector, said lance having an edge at a free and thereof said edge extending across said lance which is angled relative to said body forming a point for digging into said housing so that one end of said edge of said lance lies further away from a longitudinal axis of said body and nearer to said opposite end of said body than an opposite end of said edge of said lance.

## 4,015,892
## OPTICAL SCANNING SYSTEM FOR SLITWISE EXPOSURE

Yasuhiro Tabata, Kawasaki, Japan, assignor to Ricoh Co., Ltd., Japan

Filed Mar. 15, 1976, Ser. No. 667,140
Claims priority, application Japan, Mar. 17, 1975, 50-32013
Int. Cl.² G02B 27/17
U.S. Cl. 350—6 7 Claims

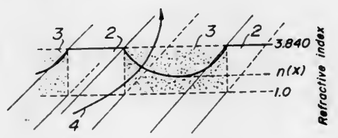


1. An optically scanning apparatus comprising;
a. means for maintaining a material to be scanned stationarily within a predetermined area in a plane,
b. means for lighting the material,
c. first reflector means movable between opposite ends of said predetermined area along a fixed path parallel to said plane at a rate for reflecting a light flux from successive slitwise areas of an image of said material,
d. second reflector means disposed stationary adjacent to one of said area ends for reflecting the flux reflected by said first reflector means,
e. third reflector means movable along a fixed path at a rate having a component, in a direction parallel to said plane, which is proportional to the rate of movement of said first reflector means but reverse in direction of movement, for reflecting the flux reflected by said second reflector means,
f. means focusing the flux reflected by said third reflector means, and
g. means controlling the movements of said first and third reflector means.

## 4,015,893
## COMPOUND SEMICONDUCTOR OPTICAL INTEGRATED CIRCUIT HAVING ISOLATION ZONES FOR LIGHT TRANSMISSION

Takuo Sugano, Tokyo, and Yoshifumi Mori, Ichikawa, both of Japan, assignors to Kentaro Hayashi, President, University of Tokyo, Tokyo, Japan

Division of Ser. No. 403,303, Oct. 3, 1973, abandoned. This application Aug. 25, 1975, Ser. No. 607,855
Claims priority, application Japan, Oct. 12, 1972, 47-102280
Int. Cl.² G02B 5/14
U.S. Cl. 350—96 WG 1 Claim



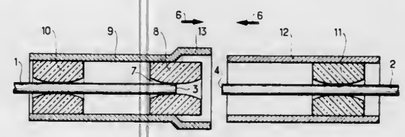

1. A compound semiconductor optical integrated circuit having isolation zones for light transmission comprising a compound semiconductor substrate selected from a group consisting of GaP and GaAs, a compound semiconductor layer of $GaAs_{0.6}P_{0.4}$ applied through an epitaxial growth on said substrate, and plasma oxide films in a given pattern in the compound semiconductor layer formed to a depth extending to the compound semiconductor substrate and forming isolation zones for light transmission, the compound semiconductor layer having a constant refractive index greater than the refractive index of the plasma oxide films and the refractive index of the oxide films gradually decreasing from the boundary with the compound semiconductor layer in the direction of oxide film inside, the compound semiconductor layer between the oxide films serving as a light transmission path.



## 4,015,894
## CONNECTOR FOR OPTICAL FIBRES

Lucien Rocton, Malakoff, France, assignor to Compagnie Industrielle des Telecommunications Cit-Alcatel, Paris, France

Filed Nov. 10, 1975, Ser. No. 630,645
Claims priority, application France, Nov. 13, 1974, 74.37418
Int. Cl.² G02B 5/14
U.S. Cl. 350—96 C 9 Claims

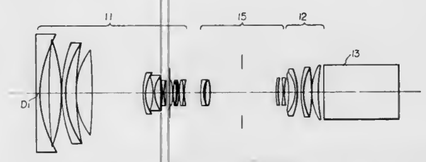


1. A connector for optical fibres having a very small diameter, wherein two ends to be connected are inserted on both sides in a duct crossing through a part made of a synthetic stone basically containing alumina, constituting a connecting part, the diameter of said duct being very close to that of the fibres.

## 4,015,895
## ZOOM LENS SYSTEM HAVING ENLARGED RANGE OF VARIATION IN MAGNIFICATION

Ryusho Hirose, Machida, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 432,204, Jan. 10, 1974, abandoned. This application Aug. 14, 1975, Ser. No. 604,484
Claims priority, application Japan, Jan. 18, 1973, 48-8118
Int. Cl.² G02B 15/02, 15/14
U.S. Cl. 350—183 1 Claim

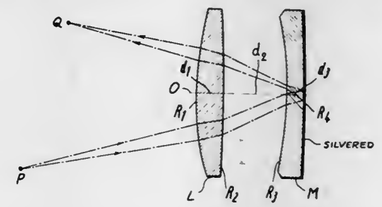


1. A zoom lens system having an enlarged range of variation in magnification, comprising:
an afocal zoom lens section, having a focusing lens group, a variator lens group, a compensator lens group and a fixed convergent lens group composed of a plurality of lens elements;
a diaphragm arranged between the compensator lens group and the fixed convergent lens groups;
a convergent image forming lens arranged apart and a certain length from the convergent lens group of the zoom lens section; and
an afocal extending assembly for changing image magnification composed of a front convergent group and a rear divergent group being axially apart from the front convergent group, said front convergent group and said rear divergent group being composed of a plurality of spherical lenses, said assembly being removably inserted between the convergent lens group of the zoom lens portion and the convergent image forming lens, said zoom lens system having an increased focal length when said assembly is inserted in comparison to the focal length of the zoom lens when said assembly is removed while maintaining the same image position, wherein said converging group in said afocal extending assembly is composed of a negative meniscus lens and an axially spaced positive lens, and wherein said divergent group is composed of a positive lens arranged at the object side and an axially spaced biconcave lens, whereby an image of equal quality is formed on the focal plane when the afocal extending assembly is mounted and dismounted.

## 4,015,896
## REFLECTING-LENS OBJECTIVE

Günther Sonnet, Bad Kreuznach, Germany, assignor to Jos. Schneider & Co., Bad Kreuznach, Germany

Filed July 9, 1975, Ser. No. 594,230
Claims priority, application Germany, July 10, 1974, 2433062
Int. Cl.² G02B 17/08
U.S. Cl. 350—201 1 Claim




1. A reflecting-lens objective consisting of a biconvex lens and a negative-meniscus lens with a silvered convex surface air-spaced from said biconvex lens, the radii $R_1$ - $R_4$ and the thicknesses and separation $d_1$ - $d_3$ of said lenses, based upon an overall focal length of 100, their refractive indices $n_e$ and their Abbe numbers $\nu_e$ being substantially as given in the following Table:

| | | $n_e$ | $\nu_e$ |
|---|---|---|---|
| $R_1 = +\ 43$ | $d_1 = 3.9$ | 1.55 | 63 |
| $R_2 = -\ 238$ | $d_2 = 9.3$ | air space | |
| $R_3 = -\ 49$ | $d_3 = 2.4$ | 1.66 | 45 |
| $R_4 = -\ 664$ | (silvered) . | | |

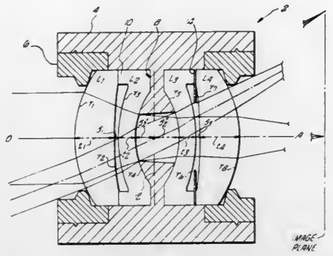
## 4,015,897
## FOUR ELEMENT LENS SYSTEM

Kunihiko Konoma, Sakai, Japan, and Kaname Satou, Torrance, Calif., assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed May 2, 1975, Ser. No. 573,869
Claims priority, application Japan, July 11, 1974, 49-79900
Int. Cl.² G02B 9/36
U.S. Cl. 350—209 32 Claims

1. A lens system adapted for use on a camera comprising in a direction from the object to image side of the lens system, a first positive meniscus lens convex to the object side, a second negative meniscus lens convex to the object side, a third negative meniscus lens of the same shape as the second lens and convex to the image side, a fourth positive meniscus lens of the same shape as the first lens and convex to the image side, the optical axis of each lens being aligned, and means for setting the point of intersection for the principal rays defining

the maximum field angle and the optical axis, between the second and third lens, so that the point of intersection is on the



second lens side relative to the center of symmetry of the distance between the second and third lenses.

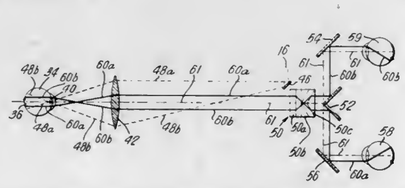
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**4,015,898**

## UPRIGHT WIDE ANGLE STEREO OPHTHALMOSCOPE

**Kurt Ernest Schirmer, 56 Granville Road, Hampstead, Quebec, Canada**

**Filed Apr. 14, 1975, Ser. No. 567,850**
**Int. Cl.² A61B *3/12***
**U.S. Cl. 351—6** **9 Claims**



**1.** An ophthalmoscope having an elongate linear housing and an objective lens at one end of the housing for passing a bundle of rays from the fundus of an eye, a single inversion roof top prism in the housing optically aligned with the objective lens, said prism including means for inverting, reversing and separating the rays passing therethrough, binocular means connected to the housing for passing the rays emitting from said prism to the left eye and to the right eye through respective eyepieces, said binocular means having a common axis with the objective lens and the rays passing through the left and right eyepiece providing a stereo upright unreversed image of the retina to the observer.

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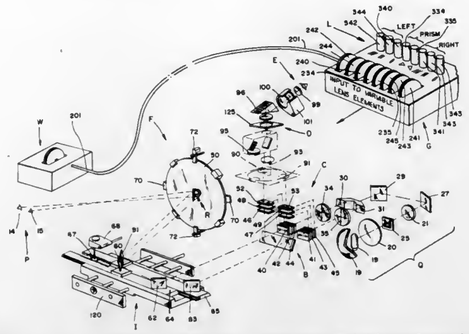
**4,015,899**

## EYE TEST APPARATUS WITH PHYSICIAN ROUTED PATIENT INPUT ADJUSTMENT TO VARIABLE OPTICAL ELEMENTS

**William E. Humphrey, Oakland, Calif., assignor to Humphrey Instruments, Inc., Berkeley, Calif.**

**Filed Oct. 22, 1975, Ser. No. 624,808**
**Int. Cl.² A61B *3/02***
**U.S. Cl. 351—17** **12 Claims**

**1.** An eye testing apparatus including in combination a patient viewing station for testing at least one eye of a patient; a target for view by said patient located along at least one view path for one eye; first correction optics in said view path between said patient viewing station and said target, said first corrective optics including first variable spherical optics to vary the spherical correction of said target and first variable astigmatic optics to vary the astigmatic correction of said target; first means for varying said first variable spherical optics responsive to a first input; second means for varying said first astigmatic optics responsive to a second input; a patient input adjacent said patient viewing station; and, means for selectively connecting at an eye examiner station said patient input to said first input to said first variable spherical



optics and to said second input to said first variable astigmatic optics.

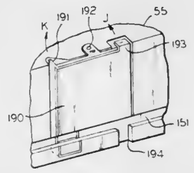
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**4,015,900**

## MICROFICHE READER

**Thomas R. Wells, Des Plaines, Ill., assignor to Bell & Howell Company, Chicago, Ill.**

**Filed Dec. 16, 1974, Ser. No. 532,803**
**Int. Cl.² G03B *23/08*, *23/14***
**U.S. Cl. 353—27 R** **18 Claims**



**1.** A microfiche reading system of a type which uses a cartridge containing a library file of microfiche film stored in a spaced parallel relationship, carrier means for receiving a selected film from said file and for transporting said film with a rectilinear motion through said reader, extraction means for removing said selected film from said cartridge, for inserting it into said carrier, and for thereafter returning it from said carrier to said cartridge, and interlocking means for precluding movement of said cartridge at all times while a microfiche film is out of the cartridge and for precluding a sequence of mechanical movements of said reader parts which might damage the film while it is out of said cartridge.

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**4,015,901**

## PHOTOGRAPHIC FILM POSITIONING MECHANISM

**Harry Arthur Hele Spence-Bate, 115 Cheam Place, Morley, Australia 6062**

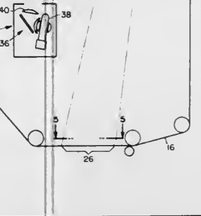
**Filed June 13, 1975, Ser. No. 586,656**
**Claims priority, application Australia, July 4, 1974, 70860/74**
**Int. Cl.² G03B *27/42***
**U.S. Cl. 355—53** **28 Claims**

**1.** A positioning mechanism comprising a frame, a carrier element mounted for forward and reverse movement along a linear path, said element being connected to a cam follower,

a. cylindrical positioning means mounted for rotational movement on said frame, the positioning means having an axis of rotation substantially parallel with said path,

at least one helical first groove defining a camway formed on the positioning means, said cam follower having a first engagement portion of a width substantially that of the camway,

at least one depression in said camway into which the follower is adapted to be received, said cam follower being adapted for movement forward or away from the said axis of rotation of the positioning means into or out of the depression,



whereby said carrier element is located in a predetermined position without lateral movement of said follower in said depression.

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**4,015,902**

## ILLUMINATION SYSTEM FOR CONTINUOUS PATH ENLARGER

**Ellis I. Betensky, Toronto, Canada, assignor to Fimacon Associates, Rochester, N.Y.**

**Filed Oct. 31, 1975, Ser. No. 627,779**
**Int. Cl.² G03B *27/32*, *27/48*, *27/52*, *27/70***
**U.S. Cl. 355—60** **34 Claims**



**1.** Apparatus for illuminating an original for projecting an image thereof onto a recording sheet moving synchronously with the original comprising:

a. an illumination system including a plurality of separate illumination sources, each arranged for illuminating a portion of the width of an original; and

b. each of said illumination sources including a light source and a lens system, each lens system including a final element having side edges at an acute angle to the direction of travel of said sheet through an exposure area therefor.



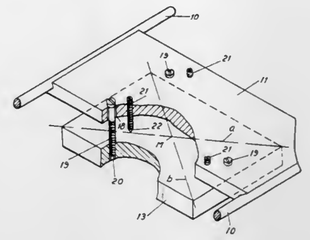
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**4,015,903**

## MICROFILM CAMERA APPARATUS

**Hans Zimmet, and Manfred Wiessner, both of Dresden, Germany, assignors to VEB Pentacon Dresden, Germany**

**Filed Dec. 20, 1974, Ser. No. 534,771**
**Claims priority, application Germany, Dec. 27, 1973, 175652**
**Int. Cl.² G03B *27/58***
**U.S. Cl. 355—72** **5 Claims**



**1.** A micro-film camera including:

a. a housing,

b. a table for receiving a subject to be photographed at the base of the housing,

c. an objective lens supported in a fixed position above the table,

d. a carrier plate supported by the housing above said objective lens having a surface for holding a film sheet between the objective lens and said surface,

e. a carriage slidable in relation to the objective lens associated with the carrier plate for sliding the carrier plate into and out of an operative position, and

f. means connecting said carrier plate to said slidable carriage, said means comprising three retaining screws, passing through the slidable carriage and screwed into the carrier plate, which screws form the angles of a triangle which includes the geometric centre of the carrier plate, and, associated with each retaining screw, a support screw which passes through the slidable carriage and abuts the carrier plate, by means of which the distance between the carrier plate and the slidable carriage can be adjusted at each of the angles of said triangle.

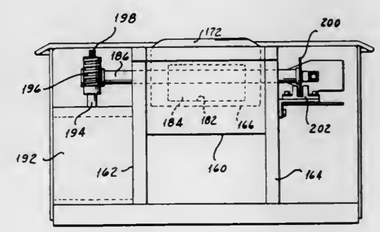
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**4,015,904**

## OPTICAL SHOE ASSEMBLY FOR USE WITH A MULTI-SENSOR OPTICAL HEAD

**Joseph De Remigis, New Market, Canada, assignor to Sentrol Systems Ltd., Downsview, Canada**

**Division of Ser. No. 450,894, March 13, 1974, Pat. No. 3,936,189. This application July 7, 1975, Ser. No. 593,439**
**Int. Cl.² G01J *1/02***
**U.S. Cl. 356—243** **4 Claims**

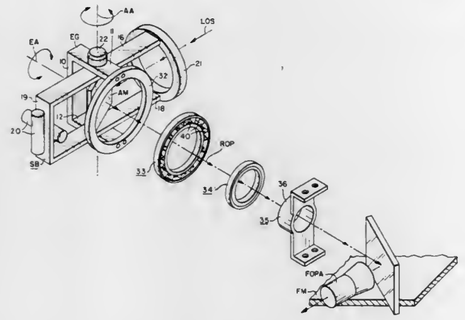


**1.** In optical apparatus for measuring optical characteristics of a web, an optical shoe assembly over which said web is adapted to pass, an optical shoe assembly including a member

having a plurality of sides, means on a first side of said member providing spaced white and black backgrounds, a black standard carried by a second side of said member, a white standard carried by a third side of said member, and means mounting said member adjacent to said web for selective movement of said sides into operative relationship with said web.

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**4,015,905**
**TARGET SIGHTING DEVICE**
**Wayne B. Lloyd, Baltimore, Md., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.**
**Filed Feb. 18, 1976, Ser. No. 658,950**
**Int. Cl.² G01C** *15/14*
**U.S. Cl. 356—248** **4 Claims**

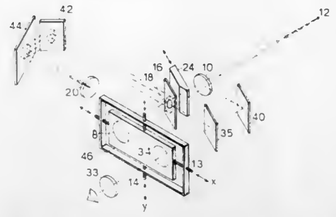


1. An improved target sighting device comprising,
a vertically-disposed elevation gimbal having a horizontal elevation axis extending therethrough,
small-diameter shaft means pivotally supporting a rear portion of said gimbal with respect to said elevation axis,
large diameter ring bearing means pivotally supporting a forward portion of said gimbal with respect to said elevation axis,
a flat mirror pivotally supported on said gimbal about a vertical azimuth axis for aiming target information from one side of said gimbal in a direction along said elevation axis toward the center of said ring bearing means, and
an annular flex pivot means interposed between said ring bearing means and said gimbal,
said flex pivot means being relatively rigid with respect to transmission of force in straight linear directions and relatively yieldable to a limited extent circumferentially about its central axis.

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**4,015,906**
**METHOD AND APPARATUS FOR ALIGNING AN INVISIBLE BEAM PARTICULARLY A LASER BEAR**
**Uzi Sharon, Tel-Aviv, Israel, assignor to Laser Industries, Ltd., Tel-Aviv, Israel**
**Filed June 23, 1975, Ser. No. 589,591**
**Claims priority, application Israel, Mar. 14, 1975, 46832**
**Int. Cl.² G02B** *23/04, 27/14, 23/14*
**U.S. Cl. 356—138** **32 Claims**

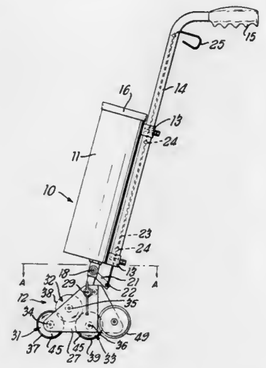
1. An alignment device for aligning a focussed beam of radiant energy with respect to a target comprising:
means in the path of the focussed radiant energy beam for dividing said beam into a first portion and a second portion, said beam dividing means being formed as an aperture having a diameter smaller than the diameter of the radiant energy beam which permits the first portion of the beam to pass therethrough to the target and reflects the remainder of said radiant energy beam to form said second portion of the beam;
a shutter for selectively intercepting said first portion of the beam between said beam dividing means and said target;
a sighting member intercepting said second portion of the beam;
an optical system for viewing the sighting member and the target with said sighting member and said target imaged on one another; and



means for adjusting the position of said first portion of the beam on said target by adjusting the position of said second portion of the beam on said sighting member while said sighting member and said target are imaged on one another.

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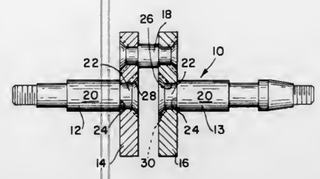
**4,015,907**
**FLUID APPLICATORS**
**Guy Bryan Lodge, Island Farm Ave., West Molesey, Surrey, England**
**Continuation-in-part of Ser. No. 564,333, April 2, 1975, abandoned. This application Oct. 9, 1975, Ser. No. 621,124**
**Claims priority, application United Kingdom, July 7, 1975, 15268/75**
**Int. Cl.² A46B** *11/00*; **B44D** *3/22*
**U.S. Cl. 401—48** **21 Claims**



1. A fluid applicator for applying fluid to a surface, comprising a reservoir for fluid, a fluid outlet in the reservoir, two side frame members, at least one roller assembly mounted between the side frame members, said assembly comprising at least two rollers, at least one of which is situated so as to receive fluid from the outlet, at least two of the rollers being arranged one behind the other so as to roll over the surface to be marked and to apply the fluid to the surface in a single line, each roller comprising a spindle and a cylindrical sleeve of an absorbent material removably mounted on the spindle, the ends of each spindle being journalled in respective side frame members, means releasably connecting at least one of said side frame members to said spindle whereby said side frame can be removed to permit said sleeve to be removed from a respective spindle for cleaning or replacement.



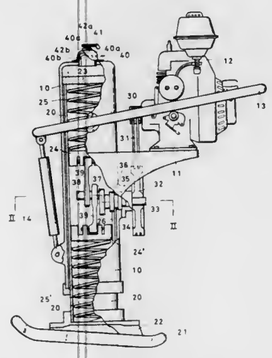
**4,015,908**
**MULTIPLE-PIECE CRANKSHAFT**
**Allan J. Ashley, North Aurora, Ill., assignor to Amsted Industries Incorporated, Chicago, Ill.**
**Filed Mar. 18, 1976, Ser. No. 668,136**
**Int. Cl.² B25G** *3/28*
**U.S. Cl. 403—274** **3 Claims**



1. A multiple-piece crankshaft comprising: a shaft having a body portion and a smaller diameter portion at one end forming a shoulder; at least one crank arm having an opening therethrough, said opening being chamfered at one end; a plurality of keyways in and parallel to said chamfer; the smaller diameter portion of said shaft being received in said opening with said shoulder abutting said crank arm on the face thereof opposite said chamfer and with said smaller diameter portion extending into said chamfer; said smaller diameter portion being conformed to fill said chamfer and to substantially fill said keyways so as to be rigidly locked in assembled relationship with the crank arm.

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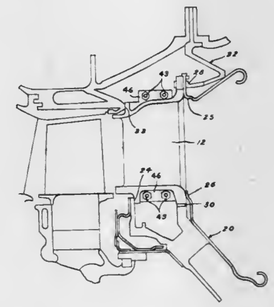
**4,015,909**
**TAMPING MACHINE**
**Shinzo Yamamoto, 21-1 Kajiyama 2-chome, Tsurumi, Yokohama, Kanagawa, Japan**
**Filed July 27, 1976, Ser. No. 709,020**
**Claims priority, application Japan, Jan. 24, 1976, 51-7149[U]**
**Int. Cl.² E01C** *19/34*
**U.S. Cl. 404—133** **4 Claims**



1. A tamping machine comprising a vertically long casing having a lower end open, a prime mover supported on said casing, a cylinder snugly mounted in said casing so as to be vertically movable therein and having upper and lower ends respectively closed, a foot member fixed to said cylinder at the lower end thereof exposed out of said casing lower end, a pair of pistons each snugly mounted in said cylinder so as to be vertically movable therein as a unit, a pair of coiled springs disposed in said cylinder respectively between the closed upper end thereof and one of said pistons and between the closed lower end of said cylinder and the other piston, a drive shaft having an outer end drive-transmittingly connected with said prime mover via transmission means and transversely extending through bearings mounted at the wall of said casing and a vertically long slot formed in the wall of said cylinder so as to dispose the inner end of said drive shaft between said two pistons, and crank means drive-transmittingly connected with said drive shaft inner end so that rotation output drive of said prime mover may subject the unit of said pistons to vertical reciprocation and consequently said two springs to alternate compression for causing vibrating reciprocation of said foot member.

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**4,015,910**
**BOLTED PAIRED VANES FOR TURBINE**
**Kenneth E. Harmon, North Palm Beach, and John L. Mayers, Lake Park, both of Fla., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**
**Filed Mar. 9, 1976, Ser. No. 665,216**
**Int. Cl.² F01D** *1/02*
**U.S. Cl. 415—217** **1 Claim**



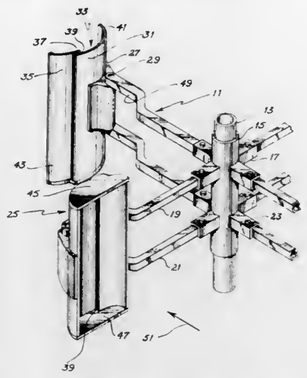
1. In the first stage of a gas turbine having an inner stator support assembly; an outer stator support assembly; a plurality of paired vane sections; means for circumferentially retaining the paired vane sections between the inner and outer stator support assemblies; means for axially retaining said paired vane sections and means for radially retaining the said paired vane sections; said paired vane sections comprising first vane members each including a turbine vane and an inner and outer vane platform; second vane members each including a vane and an inner and outer vane platform; said inner and outer vane platform of the first and second vane members including means for interconnecting the first and second vane members; said means for interconnecting the first and second vane members including flanges on the inner and outer vane platforms of the first vane members and flanges on the inner and outer vane platforms of the second blade members and means for removably securing the flanges of the first vane members to the flanges of the second vane members.

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**4,015,911**
**HIGHER EFFICIENCY WIND MOTOR WITH RECEPTORS OF DIMINISHED DRAG CHARACTERISTICS**
**Arthur Darvishian, 5314 Sheridan Drive, Williamsville, N.Y. 14221**
**Continuation-in-part of Ser. No. 432,031, Jan. 9, 1974, Pat. No. 3,897,170. This application July 28, 1975, Ser. No. 599,656**
**Int. Cl.² F03D** *3/06*
**U.S. Cl. 416—119** **7 Claims**

1. A self-adjusting wind motor comprising a plurality of wind receptors that move substantially in the plane of the wind, which automatically are presented to the wind in positions of higher resistance to the wind when moving in the direction of the wind and move into positions of lower resistance to the wind when moving against it, said automatic

adjustment of positions being caused by the action of the wind and centrifugal force on the receptors, said receptors each having an opening therein for passage of wind therethrough during operation thereof when moving across the wind and against the wind to diminish resistance to said movements, a substantially vertical shaft and a plurality of arms held to the



shaft or to a collar thereon, said wind receptors being mounted on said arms, so that the receptors and arms rotate substantially horizontally with the shaft and/or collar thereon in response to wind pressure, with the receptors being pivoted with respect to the mounting arms, with the pivot locations being on outer portions of the receptors.

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**4,015,912**

**ELECTROMAGNETIC PUMPING DEVICE FOR LIQUIDS**

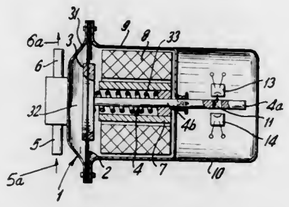
**Siegfried Kofink, Zell (Neckar), Germany, assignor to J. Eberspacher, Germany**

**Filed Mar. 20, 1975, Ser. No. 560,494**

**Claims priority, application Germany, Mar. 23, 1974, 2414165**

**Int. Cl.² F04B** *17/04*

**U.S. Cl. 417—417** **6 Claims**



1. A pump, comprising a housing having a pumping chamber with an inlet to said pumping chamber and a discharge from said pumping chamber, a pumping diaphragm having a portion arranged in said pumping chamber and being displaceable to pump liquid from said inlet to said pumping chamber and out said discharge, an electromagnet having an armature portion connected to said diaphragm, return spring means acting on said armature to move it away from said electromagnet, a power circuit connected to said electromagnet to energize said electromagnet and attract said armature portion to move it against said spring means and to flex said diaphragm to pump liquid, said power circuit having a photocell switch therein to connect and disconnect said electromagnet, said armature having a part with an opening movable by movement of said armature portion to and away from alignment with said photocell switch to cyclically actuate said photocell switch and said armature.

**4,015,913**

**DIAPHRAGM AIR PUMP**

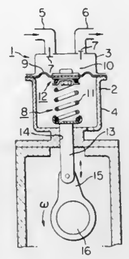
**Hirokazu Nakamura, Kyoto, Japan, assignor to Mitsubishi Jidosha Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Feb. 27, 1975, Ser. No. 553,473**

**Claims priority, application Japan, Dec. 20, 1974, 49-145543**

**Int. Cl.² F16J** *1/10*; **F04B** *19/22, 45/04*

**U.S. Cl. 417—471** **3 Claims**



1. A diaphragm air pump comprising a housing, a flexible diaphragm mounted in the housing to define a compression chamber therewithin, one way check valves located in the inlet and outlet ports of the housing, and a coil spring fixed at its one end to said diaphragm and operatively connected at its other end to one end of a first rod positioned for only axial movement, and a connecting rod, being the drive member for the air pump, and having one end pivotally connected to the other end of said first rod, the other end of the connecting rod being rotatably mounted on a cam mounted on a shaft driven by an engine of a motor vehicle and adapted to transmit actuating and retracting forces from the shaft to the diaphragm through said coil spring, whereby output of the pump is high at low or middle revolutions of the engine but is low at high revolutions thereof when the engine shaft revolutions are greater than the natural frequency of an assembly formed of said coil spring and flexible diaphragm, said coil spring being on the axis of said first rod.

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**4,015,914**

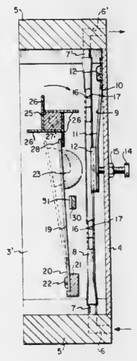
**METERING PUMP WHEREIN TUBULAR PUMP IS RESPONSIVE TO FORCE IMPULSES**

**Jack Kushner, Lindenhurst, and Henry G. Zwirblis, Nesconset, both of N.Y., assignors to Delta Scientific Corporation, Lindenhurst, N.Y.**

**Filed May 18, 1972, Ser. No. 254,718**

**Int. Cl.² F04B** *43/08, 45/06*

**U.S. Cl. 417—478** **4 Claims**



1. A metering pump comprising:

a. a pump body having at least one inlet and outlet means;



b. a tubular conduit connected between each inlet and outlet means, the wall of said conduit being of resilient material which is flexible in a direction transverse to the length of the conduit; and

c. transmitting means for periodically imparting against the conduit force impulses having a magnitude and duration sufficient to move discrete quantities of fluid through said conduit in substantially synchronized relationship to the impingement of said force impulses on said conduit and to impart momentum to the fluid sufficient to sustain movement thereof through said conduit after the force has been removed, said transmitting means including:

1. a striker plate structure including a hammer-like member having a spring biased arm and a head element mounted on the arm, said structure being mounted on said pump body adjacent to and on one side of the conduit for cyclical tapping action movement between a first position spaced from the conduit and a second position in contact therewith to deliver said force impulses thereto, each force impulse causing flexure of the conduit and each force impulse having a relatively short duration with respect to the recovery time of resilient conduit wall, and

2. drive means for actuating said hammer-like member, said drive means including:

i. a driven rotor, and

ii. at least one lifter element mounted on the rotor for engagement with said arm upon rotation of the rotor to thereby cause movement of said hammer-like member between said first and second positions.

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**4,015,915**

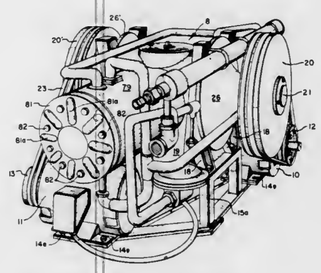
**OIL FREE COMPRESSOR**

**James A. Hardman, 1095 Hyland Lake Drive, Salt Lake City, Utah 84121**

**Filed Nov. 20, 1972, Ser. No. 308,015**

**Int. Cl.² F01L** *15/14*; **F04B** *7/04*

**U.S. Cl. 417—490** **7 Claims**



1. An oil free compressor comprising

at least one input shaft;

means mounting each said input shaft for axially rotational movement;

a rotor fixed to and rotatable with each said input shaft;

a shuttle member;

means coupling each said rotor to one end of the shuttle member, said means including a metal ball member in which said shuttle member reciprocates and rotationally oscillates and a metal socket fixed to and carried by said rotor and surrounding a portion of said ball member, the surface of the ball member engaging the socket being harder than the surface of the socket that engages the ball member;

means for lubricating the engaging surfaces of the ball member, and the shuttle member and the ball member and the socket, said means for lubricating including

an oil tight rotor housing having oil therein into which the rotor dips during rotation of the rotor,

a groove formed around the rotor,

stripper means at an upper part of the housing extending into the groove to block oil centrifugally held in the groove, and

means for directing oil from the stripper means to the means coupling each said rotor to the shuttle member;

a piston shaft journaled on said shuttle member and secured against movement axially therealong;

a compressor cylinder; and

piston means in said cylinder, connected to said piston shaft and reciprocal and rotatable with said piston shaft whereby air input and output from said cylinder is regulated by said piston means.

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**4,015,916**

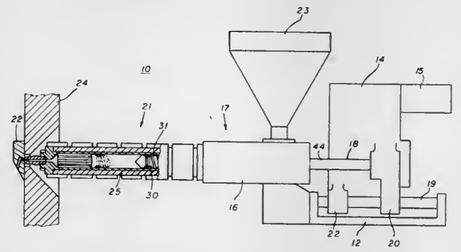
**HEATING AND STRATIFICATION DEVICE FOR AN INJECTION MOLDING MACHINE**

**Nickolas N. Sokolow, Cheshire, Mass., assignor to Beloit Corporation, Beloit, Wis.**

**Filed Nov. 28, 1975, Ser. No. 635,791**

**Int. Cl.² B29F** *3/08*

**U.S. Cl. 425—242 R** **13 Claims**



1. An injection molding machine including a plasticizing unit, said plasticizing unit comprising a barrel, a reciprocal and rotatable screw means for plasticizing and feeding plastic material towards the outlet end of said barrel, said screw means being disposed within said barrel, said improvement comprising:

a combination heat transfer and stratification device,

said device being disposed in fluid communication with the outlet of said screw means, and being disposed within a forward portion of said barrel,

said device defining a generally tubular shaped open ended structure having radially extending ribs,

said ribs extending longitudinally and substantially continuously along the length of the device to stratify plastic melt,

heating means in close proximity to said device for supplying heat to said device, and

said tubular section conducting heat along said ribs, and into said plastic material.

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**4,015,917**

**APPARATUS FOR MAKING REINFORCED WICKET HOLE DIRECTIONALLY TEAR PRONE**

**Alvin E. Ericson, Chicago, Ill., assignor to Union Carbide Corporation, New York, N.Y.**

**Division of Ser. No. 446,060, Feb. 26, 1974. This application July 3, 1975, Ser. No. 593,129**

**Int. Cl.² B28B** *1/48*

**U.S. Cl. 425—290** **1 Claim**

1. Apparatus for making an apexed hole having a varying thickness hole edge perimeter of melted and rehardened plastic film sheet material comprising, in combination;

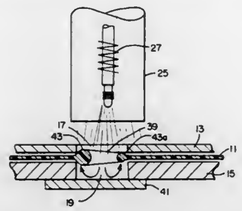
a masking template having an opening of size and apexed shape substantially congruent with a preselected size and apexed shape of the hole to be formed;

a backing template having an opening of size and shape

substantially similar to the size and shape of the opening in the masking template;

clamping means to hold the masking template and the backing template juxtaposed with their respective said openings in substantially concentric alignment;

hot gas stream supply means arranged and disposed to impinge a hot gas stream on the masking template epicentrically towards the apex of the concentric centerline of the openings in the templates; and




a closure means contiguous to the opening in the backing template, arranged and disposed to redirect the gas stream counter to its initial flow, from the opening in the backing template towards the opening in the masking template.

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**4,015,918**

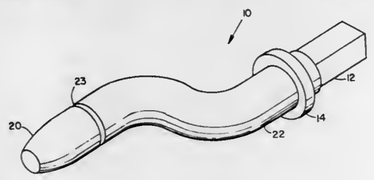
## HOSE MOLDING DEVICE

**Donald J. McPhee, Littleton, and Mark A. Newberry, Lakewood, both of Colo., assignors to The Gates Rubber Company, Denver, Colo.**

**Filed June 25, 1975, Ser. No. 590,367**

**Int. Cl.² B29C** *17/00*

**U.S. Cl. 425—403** **15 Claims**




**14.** An assembly for curing hose comprising:

a generally cylindraceous member with at least one curved portion between two generally straight first and second end portions and having a circumferential groove near the second end portion;

a radial collar secured to the cylindraceous member near the first end portion, the collar defining a first hose end molding surface; and

a removable collar comprising a stretchable elastomeric sleeve having at least one circumferential element end that defines a second hose end molding surface, and means integrally molded at and extending inwardly of the internal diameter of the sleeve in the form of a molded circumferential bead near the circumferential element end wherein the sleeve has a diameter less than the second end of the cylindraceous member, and the bead is nestable within the circumferential groove, the sleeve stretched over the second end portion and a bead retained in the circumferential groove.

**4,015,919**

## MULTI-ROLL CALENDER FOR RUBBER OR SYNTHETIC PLASTICS MATERIALS

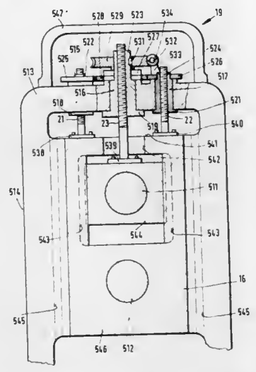
**Werner Pawelczyk, Hannover, Germany, assignor to Hermann Berstorff Maschinenbau GmbH, Hannover-Kleefeld, Germany**

**Filed Apr. 30, 1976, Ser. No. 681,856**

**Claims priority, application Germany, May 24, 1975, 2523088**

**Int. Cl.² B29C** *15/00*

**U.S. Cl. 425—367** **3 Claims**




**1.** In a multi-roll calender for rubber or synthetic plastics material a pair of rolls with a gap therebetween and mounted at their ends in a calender stand, in which at each of the ends of said pair of rolls, said pair of rolls are rotatably mounted in a bearing block which can be moved to move said pair of rolls together with respect to said calender stand with said gap between said two rolls of the pair rolls maintained constant, one of the rolls of said pair of rolls is displaceable relative to said bearing block and to the other roll of said pair of roll by having its end engaged in a mounting member which displaceable in said bearing block, a fixed screw spindle is secured to said mounting member, a rotatable internally threaded sleeve is secured against axial movement in said calender stand and has said fixed screw spindle engaged therein, a drivable worm wheel is rotationally rigidly connected to said internally threaded sleeve, said internally threaded sleeve carries an electromagnetic coupling which can be energised to entrain a spur gear for rotation with said internally threaded sleeve, said spur gear is meshed with two further spur gears each rotationally rigidly connected to a respective further rotatable internally threaded sleeve secured against axial movement in said calender stand and respective screw spindles are secured to said bearing block and are each engaged in a respective one of said further rotatable internally threaded sleeves.

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**4,015,920**

## DEVICE FOR PRODUCING MOLDED ARTICLES FROM FOAMABLE PLASTICS

**Jean-Pierre Niederst, Schottmar, and Karl Holzinger, Bad Oeynhausen, both of Germany, assignors to Herbert Kannegiesser Kommanditgesellschaft, Vlotho, Weser, Germany**

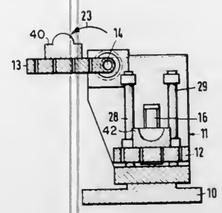
**Filed June 13, 1975, Ser. No. 586,768**

**Claims priority, application Germany, June 14, 1974, 2428831**

**Int. Cl.² B29C** *1/16*

**U.S. Cl. 425—451.9** **5 Claims**

**1.** In a device for producing molded articles from foamable plastics, such as polyurethane, wherein a bipartite mold in which the molded articles are foamed is secured to two clamping plates of a mold carrier disposed on top of one another and one of the two clamping plates is movable towards the other clamping plate and returnable to its initial position while maintaining it parallel position to the other clamping plate by means of working cylinders, the improvement comprising: the second clamping plate of said mold carrier which is not movable by means of the working cylinders is mounted to be pivotable out of its position with respect to the first clamping plate about a pivot axis disposed laterally thereto through an




angle of at least 180° from a parallel position with respect to the first clamping plate, and the mold carrier with the two clamping plates is pivotable about a first axis parallel to the pivot axis of the second clamping plate and about a second axis disposed at right angles to its first axis and laterally with respect to the two clamping plates.

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**4,015,921**

## CONTINUOUSLY OPERATING PRELIMINARY PRESS OR FINISHING PRESS FOR THE MANUFACTURE OF PARTICLE BOARDS, SUCH AS CHIP BOARDS, FIBER BOARDS AND THE LIKE

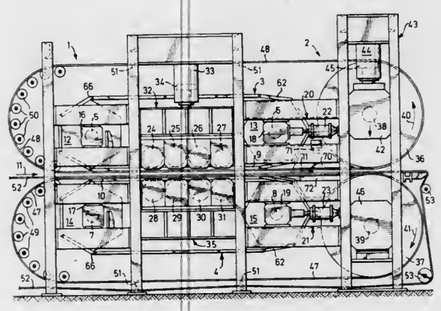
**Albert De Mets, Roeselare, Belgium, assignor to Konstruktiewerkhuizen, DeMets N.V., Belgium**

**Filed Aug. 27, 1975, Ser. No. 608,343**

**Claims priority, application Belgium, Aug. 27, 1974, 147937**

**Int. Cl.² B29C** *15/00*

**U.S. Cl. 425—371** **20 Claims**




**1.** In a press for the manufacture of particle boards comprising two endless plate belts arranged one above the other to define a material-treatment path therebetween, said endless plate belts being mounted for revolution around polygonal drums, the improvement wherein at least one of said plate belts includes a plurality of essentially rectangular belt plates, directly and pivotally mounted to one another, so that adjacent belt plates pivotally move with respect to one another around only a single mutual pivotal axis, said belt plates being mounted to one another only along the lateral edges of said belt plates, each face of each of said belt plates defining at the leading and trailing edges of each belt plate a series of projections and recesses for meshing with the recesses and projections of adjacent belt plates, the projections and recesses on one face of each belt plate edge being arranged alternatively with respect to the projections and recesses on the other face of the same belt plate edge.



**4,015,922**

## APPARATUS FOR THE MANUFACTURE OF TUBULAR BODIES OF SEMICONDUCTOR MATERIAL

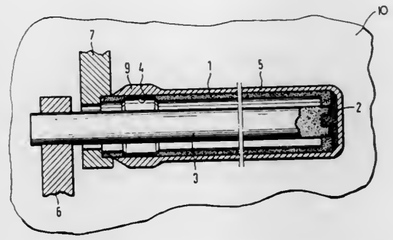
**Wolfgang Dietze, Munich; Ronrad Reuschel, Vaterstetten, and Andreas Kasper, Garching-Hochbruck, all of Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany**

**Division of Ser. No. 417,380, Nov. 19, 1973, Pat. No. 3,979,490, which is a continuation of Ser. No. 205,492, Dec. 7, 1971, abandoned. This application Feb. 18, 1976, Ser. No. 658,892**

**Claims priority, application Germany, Dec. 9, 1970, 2060651**

**Int. Cl.² B29D** *23/00*

**U.S. Cl. 425—471** **8 Claims**




**3.** Apparatus for the manufacture of tubular bodies of silicon semiconductor material and concurrently provide the tubular-shaped body with an annular reinforcement which comprises a reaction vessel, a rod or tube-shaped carrier of carbon disposed in said reaction vessel, means operative to electrically heat the tubular carrier by direct passage of electric current therethrough, said means being further operative to heat said carrier at at least one local annular zone of the external surface to a different temperature than that of the remaining carrier surface said heating being effected by passage of an electric current from an energy source through said carrier body, said reaction vessel containing reaction gases of hydrogen and a silicon halide which is in contact with said heated carrier and precipitates silicon induced by said carrier heated to a temperature sufficient to cause precipitation out of said reaction gases of a layer of semiconductor material on the surface of said carrier, with more rapid precipitation of silicon on the surface of said local annular zone due to its different temperature causing formation of an annular reinforcement on said tubular shaped body of silicon semiconductor material.

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**4,015,923**

## DEVICE FOR PRODUCING EXPANSIONS IN PLASTICS PIPES AND PIPE COMPONENTS

**Ilkka Järvinen; Erkki Salmela, both of Lahti, and Antero Kaikkonen, Nastola, all of Finland, assignors to Upo Osakeyhtio, Finland**

**Filed Jan. 5, 1976, Ser. No. 646,738**

**Claims priority, application Finland, Jan. 20, 1975, 750127**

**Int. Cl.² B29C** *17/00*

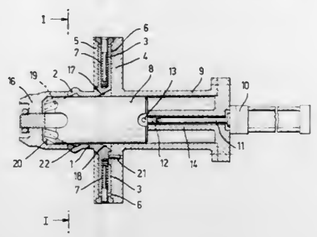
**U.S. Cl. 425—393** **8 Claims**

**1.** A device for producing expansions and in particular inside grooves, such as packing grooves, in plastics pipes and pipe components. which comprises

a form ring for shaping the inside profile of the expansion, the circumference of which ring is divided into two groups of segments which can be shifted radially inwards so that the form ring can be disassembled and removed from the pipe after shaping of the expansion such that in the disassembled position, one group of segments will be situated radially inside the other group of segments, said other group of segments being provided with an internal circumferential groove into which part of the outer circumference of said one group of segments can be located in said disassembled position;

a mandrel that can be shifted axially through the form ring, and comprising two groups of inclined surfaces, one surface group for each segment group so as to produce radial movement of the segments, the first group of inclined surfaces being arranged axially at a distance from the second group of inlcined surfaces;

a core body that surrounds the madrel and in relation to which the mandrel can be shifted axially;



first guide means in connection with the core body; second guide means in connection with the segments and cooperating with said first guide means so that the segments can perform a movement that has a radial component; and loading units arranged on the core body to continuously drive said second guide means radially inwards.

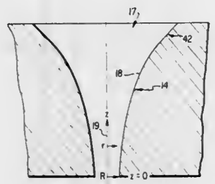
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**4,015,924**

## SPINNING APPARATUS PROVIDING FOR ESSENTIALLY CONSTANT EXTENSIONAL STRAIN RATE

**Herman L. LaNieve, Summit, N.J., assignor to Celanese Corporation, New York, N.Y.**

**Division of Ser. No. 387,407, Aug. 10, 1973, Pat. No. 3,925,525. This application July 8, 1975, Ser. No. 594,010**
**Int. Cl.² D01D *3/00***
**U.S. Cl. 425—455 F** **13 Claims**



**1.** In apparatus for spinning filaments from fiber-forming, liquid polymeric material which apparatus includes a spinneret for extending said material through at least one converging nozzle passagway having an entry opening, and an exit orifice with a cross-sectional area in the range of about $3 \times 10^{-6}$ to $50 \times 10^{-4}$ square centimeters, the improvement wherein said nozzle passageway is bounded by gradually curving walls having a profile shaped to provide an essentially constant extensional strain rate on liquid polymeric material extruded therethrough to form a filament solely of that material, said profile being described essentially by the equation

$$\frac{1}{r_w^2} = AZ + \frac{1}{R^2}$$

where:

$R$ is the perpendicular distance between an axis of the passageway axis and the nozzle wall at the exit orifice;

$r_w$ is the perpendicular distance between nozzle wall and point along that axis;

$Z$ is the distance along that axis measured from said exit orifice; and

$A$ is a constant.

**4,015,925**

## EXTRUSION EQUIPMENT AND ESPECIALLY DIE STRUCTURE FOR MAKING PLASTIC SIDING

**Peter F. Heilmayr, McPherson, Kans., assignor to Certain-teed Products Corporation, Valley Forge, Pa.**

**Continuation of Ser. No. 225,348, Feb. 10, 1972, abandoned, which is a continuation of Ser. No. 2,900, Jan. 14, 1970, abandoned. This application Oct. 17, 1973, Ser. No. 407,314**
**Int. Cl.² B29F *3/04***
**U.S. Cl. 425—461** **3 Claims**

**1.** A die structure for producing a siding of a thermoplastic material having a hanger edge portion, a panel portion, and a butt edge portion, said die structure comprising

a. an adapter section having an entry passageway therein connecting to the discharge outlet of an extruder unit,

b. a restriction section downstream of said adapter section having a restriction passage therein,

c. a transition section between said adapter section and said restriction section having a transition passage connecting said entry passage and said restriction passage,

d. a die lip section downstream of said restriction section having a lip orifice substantially conforming to the shape of the siding produced, the die lip section being maintained at the same cross-sectional shape for a distance in the flow channel upstream of the orifice equal to 10 to 30 times the thickness of the siding produced,

e. and a flow equalization section between said restriction section and said die lip section having a flow equalization passage connecting said restriction passage and said lip orifice,

f. all of said passages being interconnected in sequence and being unobstructed to thereby provide an uninterrupted flow channel from the discharge outlet of the extruder unit with which the entry passageway is connected to the die lip orifice, whereby the flow of the thermoplastic material throughout the length of said uninterrupted flow channel and out of the die lip orifice is adapted to be established and maintained by the action of the extruder unit with which the die structure is used.

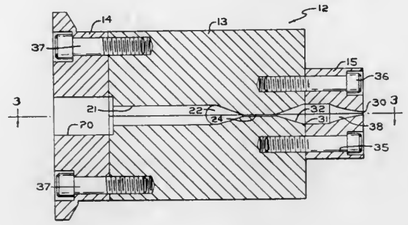
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**4,015,926**

## MULTIPLE STRAND DIE HEAD

**Sam Donald Nehmey, Lorain, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio**

**Filed Jan. 20, 1976, Ser. No. 650,807**
**Int. Cl.² B29F *3/04***
**U.S. Cl. 425—464** **4 Claims**



**1.** An extrusion die head for use with an extruder, one end of said die head having a longitudinally extending bore extending thereinto for receiving extrudate from an extruder, said die head having an elongated chamber with an opening centrally disposed therein, said opening communicating with said bore, the other end of said die head having a plurality of outlet orifices for directing a plurality of extrudates therefrom, each orifice is connected to a passageway that extends rearwardly from said other end of said die head, said passageways increasing in cross-sectional dimension as said passageway extends further away from said other end, said passageway increases in cross-sectional dimension until they form a single passageway



that in interconnected with an elongated recess that extends laterally across the width of said die head, an elongated narrow channel in said die head disposed in alignment with said recess and extending laterally across the width of said die head, said narrow channel interconnecting said recess with said chamber, said chamber extends laterally across the full width of said die head and in alignment with said narrow channel and being of the same width as said channel, and said chamber across the full width of said die head tapers substantially uniformly from said full width to said narrow channel.

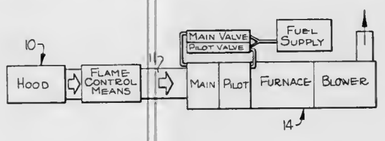
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**4,015,927**

## AUTOMATIC HIGH-LOW BURNER OPERATION

**Clifford Culpepper, Jr., Charlotte, N.C., assignor to Aero-Dyne Manufacturing, Inc., Charlotte, N.C.**

**Division of Ser. No. 413,770, Nov. 8, 1973, Pat. No. 3,932,137. This application Jan. 12, 1976, Ser. No. 648,152**
**Int. Cl.² F23D *13/20***
**U.S. Cl. 431—5** **5 Claims**




**1.** In a method for disposing of combustible debris wherein debris is entrained in a flowing stream of air, conveyed with the air through duct work, delivered with the air and fuel to a combustion chamber and burned in the combustion chamber, an improvement which facilitates economical operation in disposing of intermittently varying quantities of debris and comprising the steps of sensing the presence in the flowing stream of air of entrained debris being conveyed through the duct work, distinguishing between second concentrations of entrained conveyed debris being above and below a threshold concentration, and responding to the distinguishing of concentrations by varying the quantity of fuel delivered to the combustion chamber whereby the fuel required to dispose of debris is delivered only as needed and excessive fuel usage is avoided during periods when the concentration of debris is below the threshold concentration.

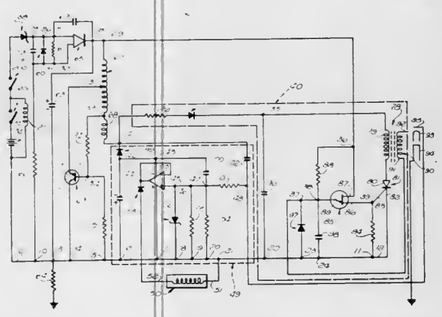
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**4,015,928**

## HEATING SYSTEM

**Elmer A. Carlson, Agoura, Calif., assignor to International Telephone and Telegraph Corporation, New York, N.Y.**

**Filed Jan. 23, 1976, Ser. No. 651,635**
**Int. Cl.² F23N *5/00*, *5/24***
**U.S. Cl. 431—74** **4 Claims**



**1.** A heating system comprising: first and second main input leads; first means for impressing a D.C. voltage between said main input leads; a transformer having first and second inductive windings, each having first and second ends, said first inductive winding having a tap, said first inductive winding first end being connected to said first main input lead, said first inductive winding second end being connected to said second inductive winding first end at a first junction; a first transistor having a base, an emitter and a collector; a first resistor connected between said first junction and said base, said emitter being connected to said tap, said collector being connected to said second main input lead; a second resistor connected between said base and said second main input lead; a first capacitor connected between said first and second main input leads; a conductive fluid fuel burner connected to said second main input lead; a fuel valve actuable to admit fuel to said burner; second means connected between said second inductive winding second end and said second main input lead actuable when said voltage is impressed as aforesaid to actuate said valve; and third means actuable when said voltage is impressed as aforesaid to ignite the fuel emanating from said burner.

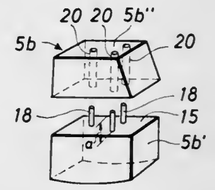
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**4,015,929**

## ROTARY KILN FOR PRODUCING AN EXPANDED CLAY PRODUCT AND A METHOD OF MANUFACTURING THE ROTARY KILN

**Harry Kamstrup-Larsen, Vanlose, Denmark, assignor to Leca Trading & Concession A/S, Denmark**

**Filed Dec. 15, 1975, Ser. No. 640,927**
**Claims priority, application Denmark, Jan. 23, 1975, 214/75**
**Int. Cl.² F27B *7/14***
**U.S. Cl. 432—3** **10 Claims**




**1.** In a rotary kiln for producing an expanded clay product from clay or clay slate, comprising a firing section, the peripheral speed of which is rather great, a drying section positioned downstream from the firing section, the peripheral speed of which is rather low, and ribs formed from refractory bricks mounted in said firing section and protruding radially relative to the lining so as to move the clay product, at least a part of each refractory brick forming said ribs being reinforced, said bricks forming said ribs having first and second portions, said first portion forming at least part of the lining within said kiln and having an interior surface facing the interior of said kiln, said interior surface being at the same height as the lining measured in a radial direction, said second portion extending inwardly away from the interior surface of said first portion and means for reinforcing said first and second portions and for securing said second portion to said first portion so that said second portion is in contact with the interior surface on said first portion.

**10.** A method of manufacturing a rotary kiln for producing an expanded clay product from clay or clay slate, said kiln having a firing section the peripheral speed of which is rather great, a drying section positioned downstream from the firing section the peripheral speed of which is rather low, and ribs formed from refractory bricks mounted in the firing section for moving the clay product, said method including the steps of: forming a first series of reinforced refractory bricks so that reinforcing members extend away from one surface of said bricks; mounting the reinforced first series of refractory bricks at predetermined locations within the kiln so that the first series of bricks forms at least part of the lining of the kiln and

the surface from which the reinforcing members extend faces the center line of the kiln; forming a second series of refractory bricks having through holes corresponding in number and location to the number and position of reinforcing members extending from bricks in said first series, mounting said second series of refractory bricks on the reinforced first series of refractory bricks so that said reinforcing members mesh with and extend at least part way into the holes provided in bricks comprising said second series of bricks, securing the second series of bricks to the reinforcing members extending away from the first series of reinforcing bricks so that bricks within said second series of refractory bricks can be replaced in a like manner when worn down to the level of the reinforcing members.

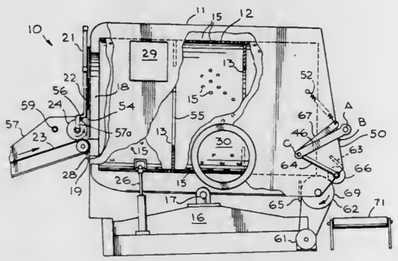
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**4,015,930**

## CONTINUOUS LAUNDRY DRYING APPARATUS

**Frederick W. Grantham, 12055 Goshen Ave., Los Angeles, Calif. 90049**

**Filed Sept. 4, 1975, Ser. No. 610,167**
**Int. Cl.² F26B *11/02***
**U.S. Cl. 432—105** **5 Claims**



1. Apparatus for drying laundry articles comprising:
a housing having an article loading means and a dried article ejection means spaced therefrom, wherein the article loading means comprise:
a. an inlet opening in said housing for receiving batch loads;
b. a closure mechanism movable over said inlet opening and responsive to gravity to move to a closed position;
c. a conveyor external to said housing and positioned to feed articles to said inlet opening;
d. first means adjacent the conveyor and responsive to articles thereon of a first selected size to open mechanically and automatically said closure mechanism by an amount related to the size to the article; and
e. second means adjacent the conveyor and responsive to articles thereon of a second selected size larger than said first size to open mechanically and automatically said closure mechanism for a predetermined time interval;
the apparatus further comprising:
a single rotary drum having an article input portion adjacent to said article loading means and an article exit opening at its opposite end and in communication with said dried article ejection means;
an air inlet opening into an article input portion of the drum, and air outlet means for receiving air from the drum and for imparting an axial component to the air flow toward the dried article ejection means in the direction of movement of laundry articles toward the ejection means;
air conduit means mounted externally of said housing having portions in alignment with said air inlet opening and said air outlet means respectively;
an air heating means and an air blower means mounted in said air conduit means; and
annular partition means having a central opening and extending radially interiorly from an internal periphery of the rotary drum walls to divide the drum into a plurality of sections.

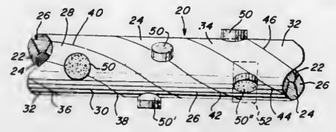
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**4,015,931**

## BONDED-ABRASIVE WIRE SAW

**Babu N. Thakur, Schaumburg, Ill., assignor to Engelhard Minerals & Chemicals Corporation, Murray Hill, N.J.**

**Filed Sept. 29, 1975, Ser. No. 617,853**
**Int. Cl.² B28D *1/08***
**U.S. Cl. 125—21** **24 Claims**



1. A wire saw comprising in combination:
a. an elongated abrasive carrier comprising a plurality of discrete high tensile strength metal strands having a fatigue limit in excess of about 60,000 p.s.i. longitudinally interlocked in contacting relationship, said strands having complementally nesting cross-sectional configurations forming in juxtaposed combination a generally circular transverse cross section having a cross-sectional void space of less than about 20 percent, the largest cross-sectional dimension of each of said strands being no more than about one half the largest cross-sectional dimension of said abrasive carrier; and
b. circumferentially-discontinuous discrete segments of bonded abrasive particles fixedly secured adjacent the outer periphery of the elongated abrasive carrier and longitudinally disposed spacedly therealong whereby to abrade a workpiece when said wire saw is brought into abrading contact therewith.

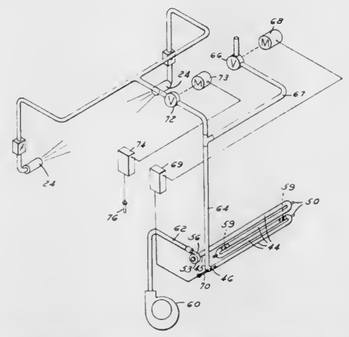
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**4,015,932**

## COMBUSTION AIR PREHEATER

**Daniel A. Zurawski, 4128 Graceway Drive, Toledo, Ohio 43606**

**Filed Jan. 30, 1975, Ser. No. 545,527**
**Int. Cl.² F27D *17/00***
**U.S. Cl. 432—179** **13 Claims**



1. A combustion air preheater for recovering exhaust heat from an enclosure forming at least part of a flue of a furnace and supplying heated air to a burner of the furnace, comprising:
a cylindrical preheater pipe having an inlet end and an outlet end,
means for mounting the preheater pipe in said enclosure with the inlet and outlet ends of the pipe located externally of the enclosure,



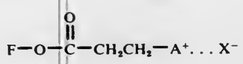
air inlet means connected to the inlet end of the preheater pipe for introducing air thereto in a direction generally transverse and tangential to the longitudinal axis thereof, said air inlet means comprising a housing having an outlet opening connected to the inlet end of the preheater pipe and aligned axially therewith, said housing having an inlet opening directed transversely to the axis of the outlet opening and spaced radially outward of said axis, and a generally cylindrical baffle defining an annular passage communicating tangentially with the inlet opening and axially with the outlet opening;
an air passage connecting the outlet end of the preheater pipe to the burner,
and control means operatively associated with said air passage for regulating at least one physical property of air supplied to the burner through said air passage.

## 4,015,933
## PROCESS FOR DYEING BLENDED FABRICS

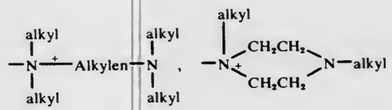
Stefan Koller, Ramlinsburg; Arnulf Ruediger Lapple, Arlesheim, and Marielise Pacher, Munchenstein, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Apr. 24, 1975, Ser. No. 571,343
Claims priority, application Switzerland, Apr. 29, 1974, 5872/74
Int. Cl.² D06P *3/82*
U.S. Cl. 8—21 A 16 Claims

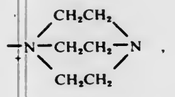
1. A process for dyeing or printing a blend of wool and polyacrylic fibers which comprises the step of applying to the fibers a dye of the formula



wherein A is of the formulas



or



X is an anion and F is the radical of a dye of the disperse class.

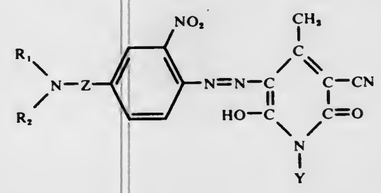
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## 4,015,934
## PROCESS FOR THE DYEING OF SYNTHETIC TEXTILE MATERIAL

Hans Wilhelm Liechti, Oberwil, and Jurgen Markert, Basel, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Nov. 12, 1973, Ser. No. 415,282
Claims priority, application Switzerland, Nov. 16, 1972, 16731/72; Nov. 16, 1972, 16730/72
Int. Cl.² D06P *1/18*
U.S. Cl. 8—41 C 13 Claims

1. A process for dyeing synthetic textile material by the exhaust process, comprising the step of treating the textile material with a dispersion in a halogenated hydrocarbon solvent material of an azopyridone dyestuff of the formula



wherein

$R_1$ and $R_2$ each independently represent hydrogen, or an optionally substituted lower alkyl, lower alkenyl, cycloalkyl or aryl radical, or

$R_1$ and $R_2$ form together with the nitrogen atom binding them, optionally with the inclusion of a further hetero atom, a non-aromatic 5- or 6-membered hetero ring,

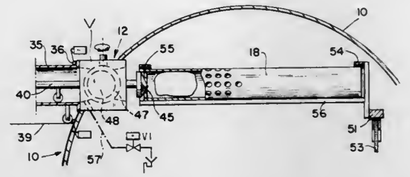
Y represents hydrogen, or a lower alkyl group optionally substituted by the hydroxyl or cyano group, and

Z represents —CO— or —$SO_2$—.

## 4,015,935
## METHOD AND APPARATUS FOR FEEDING AND DISCHARGING A CONTINUOUSLY OPERATING AUTOCLAVE

Bror Lennarth Andersson, and Nils Arne Fahlvik, both of Getinge, Sweden, assignors to Aktiebolaget Electrolux, Stockholm, Sweden

Filed Nov. 21, 1975, Ser. No. 634,252
Claims priority, application Sweden, Dec. 2, 1974, 7415089
Int. Cl.² A23L *3/04*; A61L *1/00, 3/00*
U.S. Cl. 21—2 7 Claims




1. In a feed and discharge arrangement for a continuously operating autoclave provided with a heated medium at superatmospheric pressure and an internal conveyor for sterilization of articles carried by perforated containers; the improvement comprising: a feed lock for inserting said perforated containers into said autoclave and onto said internal conveyor, a discharge lock for withdrawing said perforated containers having treated articles therein from said autoclave, each of said locks being provided with a valve which in its open position has an aperture that is larger than the diameter of each of said perforated containers, each of said locks including at least two interfitting telescoping cylinders one of which is adapted to contain a perforated container and is provided with a front end creating a front sealing surface when abutting a part of said lock whereby the forward part of said one cylinder forms a locking chamber, a first means in the locking chamber of said feed lock for pushing said container therein through said valve and onto said internal conveyor, and a second means in the locking chamber of said discharge lock for discharging said container from said internal conveyor through said discharge lock valve and into the locking chamber of said discharge lock after said container has been transported to a position adjacent to said discharge lock.

7. A method for respectively feeding and discharging articles into an autoclave and onto an internal continuous conveyor in a heated liquid bath at superatmospheric pressure for sterilization comprising:

a. placing articles to be processed in perforated containers,

b. arranging said containers in aligned rows at a feed station leading into said autoclave,

c. passing said containers through a feed lock at a feed station and into said autoclave and onto said continuous conveyor, and wherein said feed lock comprises a plurality of telescoping interfitting cylinders in which a forward part of one cylinder forms a locking chamber, and a valve, and a piston in said locking chamber, the method of passing said containers through a feed lock including the steps of:

1. advancing the one cylinder to seal with the valve thereby forming said locking chamber and enclosing a perforated container within said locking chamber,
2. opening the valve,
3. advancing the piston so that the perforated container is moved through the feed lock and onto the conveyor in the autoclave,
4. retracting the piston to a return position,
5. closing the valve,
6. equalizing the pressure between the locking chamber and the ambient by means of a conduit having a valve therein and connected to the feed lock, and
7. returning the one cylinder to its initial position,

d. treating said articles in said liquid bath, and

e. discharging said treated articles through a discharge lock at a discharge station.

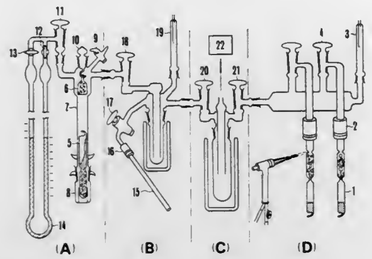
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**4,015,936**

## METHOD FOR DETERMINATION OF TOTAL NITROGEN AND HEAVY NITROGEN CONTENT

**Kikuo Kumazawa, Tokyo, Japan, assignor to Hiryokagaku Kenkyusho, Tokyo, Japan**

**Filed Aug. 26, 1975, Ser. No. 607,799**
**Int. Cl.² G01N** *7/02, 7/18*
**U.S. Cl. 23—230 PC** **1 Claim**




**1.** A method for determining the total nitrogen content of a given specimen, said method comprising:
sealing the specimen together with calcium oxide and copper oxide in a container;
heating the sealed container to a temperature sufficient to cause the specimen to undergo combustion and generate nitrogen;
opening the sealed container in an evacuated environment to release the generated nitrogen;
measuring the volume and pressure of the nitrogen thus released.

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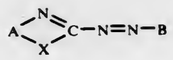
**4,015,937**

## PROCESS FOR DETECTING THE COMPLETION OF THE STERILIZING TREATMENT USING A COLOR CHANGING INDICATOR COMPOSITION

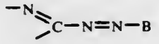
**Kozo Miyamoto, and Kunitaka Fujiwara, both of Toyonaka, Japan, assignors to Sakata Shokai Ltd., Osaka, Japan**

**Filed Nov. 14, 1975, Ser. No. 631,904**
**Int. Cl.² G01N** *21/06;* **C09B** *29/00*
**U.S. Cl. 23—230 R** **20 Claims**

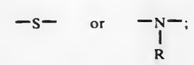
**1.** A process for detecting the completion of a sterilizing treatment of a medical or a surgical instrument in which a gaseous alkylene oxide is the sterilizing agent, which comprises exposing to said alkylene oxide the material to be sterilized and a color changing indicator composition, which indicator composition visibly exhibits a color change when exposed to said alkylene oxide, and maintaining said alkylene oxide in contact with said material and said indicator composition at least until said color change occurs in said indicator composition, said color changing indicator composition comprising from 1 to 5% by weight of an azo dye represented by the following formula



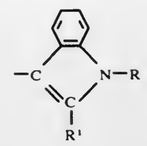
wherein A represents an ethylene residual group, an o-phenylene residual group, or



with proviso that —N is linked with X, while —C with N in the formula (1), respectively, which is further enabled to have an undissociative group as a substituent; X represents



B represents an aniline-derivative residual group which can be coupled to the para-position or an enamine residual group having the formula,



and the both groups are further enabled to have an undissociative group as a substituent, said R represents a hydrogen atom or a lower alkyl group having from 1 to 3 carbon atoms, said $R^1$ represents a hydrogen atom, a lower alkyl group having from 1 to 3 carbon atoms or a phenyl group, said undissociative group represents a lower alkyl group having from 1 to 3 carbon atoms, an alkoxy group having from 1 to 3 carbon atoms, —$R^2$—OH, chlorine, a phenyl group or a nitro group, wherein $R^2$ represents an alkylene group having from 1 to 3 carbon atoms, from 10 to 50% by weight of a hydrophobic polymer and from 30 to 85% by weight of a solvent or mixed solvent.

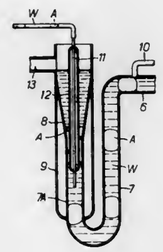
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**4,015,938**

## SAMPLE SUPPLY APPARATUS AND METHOD FOR AUTOMATIC ANALYSIS SYSTEMS

**Ronald Frank Jay, New Malden, England, assignor to Technicon Instruments Corporation, Tarrytown, N.Y.**

**Filed Nov. 18, 1975, Ser. No. 633,059**
**Int. Cl.² G01N** *1/14, 1/18*
**U.S. Cl. 23—230 R** **13 Claims**



**8.** A method of obtaining for a continuous-flow analysis system a stream *of successive liquid segments separated by immiscible fluid segments,* comprising the steps of:
flowing a *stream of liquid separated by immiscible fluid segments* along a conduit toward an outlet thereof;
intermittently positioning an inlet portion of a tube *within said conduit and* in fluid-flow communication with said stream; and
aspirating through said tube a portion of said *successive liquid and immiscible fluid segments, in turn,* when said inlet portion is *positioned within said conduit.*

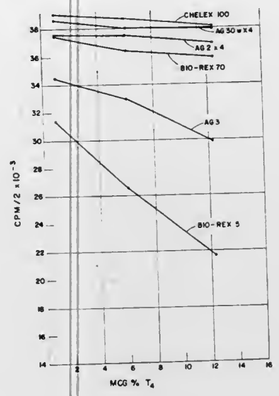


**4,015,939**

## COMPETITIVE BINDING THYROID ASSAY WITH IMPROVED BOUND-FREE SEPARATION STEP

**Nathan Lewin, Corte Madera, and Vito J. Mangiardi, San Rafael, both of Calif., assignors to Bio-Rad Laboratories, Inc., Richmond, Calif.**

**Filed May 12, 1976, Ser. No. 685,595**
**Int. Cl.² G01N** *33/16*
**U.S. Cl. 23—230 B** **10 Claims**




**1.** In a competitive binding assay for serum thyroid hormone having the step of separating unbound thyroid hormone from thyroid hormone bound by thyroid binding protein, the improvement comprising: separating unbound thyroid hormone by removal with an intermediate base anion exchange resin.

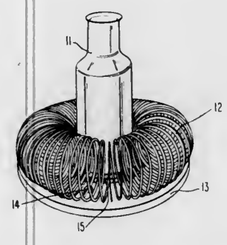
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**4,015,940**

## HOLDING DEVICE FOR LABORATORY WARE

**Daniel R. Conlon, 600 Meetinghouse Road, Jenkintown, Pa. 19046**

**Filed Apr. 28, 1976, Ser. No. 680,990**
**Int. Cl.² B01L** *9/00, 3/00*
**U.S. Cl. 23—259** **2 Claims**



**1.** A supporting device for laboratory flasks and containers, bottles and the like which are relatively unstable on a flat surface which comprises a helical spring joined at its ends to form a torus-shaped body with several turns of said spring being loosely affixed to a base, thereby permitting expansion of said torus-shaped body when an object having a dimension greater than the central opening of the torus is inserted therein, wherein said helical spring is constructed of a thin wire having a rectangular cross-section with its long side directed radially relative to the helix and is wound to have no compression or tension between turns, and wherein the natural frequency of said spring is between 10 and 100 cycles per minute.

**2.** In combination, a laboratory container which is relatively unstable on a flat surface and a supporting device for said laboratory container surrounding and in contact with said container and holding it in a fixed position, said supporting device comprising a helical spring joined at its ends to form a torus-shaped body with several turns of said spring being loosely affixed to a base, said helical spring being constructed of a thin wire having a rectangular cross-section with its long side directed radially relative to the helix and being wound to have no compression or tension between turns, said helical spring having a natural frequency of between 10 and 100 cycles per minute, said container having a dimension, at its location of contact with said torus-shaped body, greater than the unexpanded central opening of said torus-shaped body.

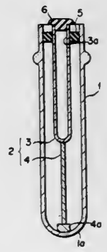
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**4,015,941**

## TEST TUBE ASSEMBLY

**Motoji Kurata, Hatsukaichi, Japan, assignor to Japan Medical Supply Co., Ltd., Japan**

**Filed Jan. 29, 1976, Ser. No. 653,631**
**Claims priority, application Japan, Jan. 29, 1975, 50-012443**[U]
**Int. Cl.² B01L** *3/14;* **G01N** *1/10*
**U.S. Cl. 23—259** **4 Claims**



**1.** A test tube assembly adapted to be used for blood testing said assembly comprising:
a cylindrical holding member;
a test tube disposed in said cylindrical holding member;
a leg connected to the bottom of said test tube for supporting said test tube within said holding member, said leg having a foot at one end thereof for stabilizing it within said cylindrical holding member, wherein the sum of the lengths of said test tube and said leg is equal to that of said cylindrical holding member; and
means for holding said test tube within said cylindrical holding member for eliminating lateral movement of said test tube.

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**4,015,942**

## APPARATUS FOR DELIVERING LIQUID AND REMOVING LIQUID FROM A CONTAINER

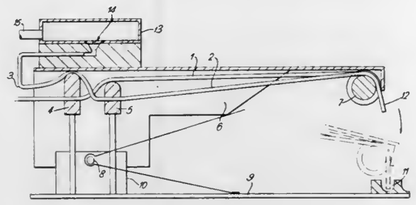
**Neville Burton Coupe, Billingshurst, England, assignor to Denley-Tech Limited, Sussex, England**

**Filed Dec. 5, 1975, Ser. No. 638,099**
**Claims priority, application United Kingdom, Dec. 10, 1974, 53431/74**
**Int. Cl.² B01L** *11/00;* **B67C** *3/28;* **F16L** *55/14*
**U.S. Cl. 23—259** **10 Claims**

**1.** Apparatus for use in the delivery of liquid to and the withdrawal of material from containers comprising:
at least a first pair of conduit means, said conduit means of said pair of each including a constrictible tubular portion, a first of said conduit means of said pair having a free end for delivery of liquid to a container and the second of said conduit means having a free end for withdrawal of material from the container by suction;
pivotable support means for said conduit means, said sup-

port means mounting said conduit means such that the free ends thereof may be simultaneously moved relative to the container between a first position and a second position;

first abutment means, said first abutment means being fixedly mounted relative to said support means for compressing said second conduit means constrictible portion when said support means is in the first position whereby material may not be withdrawn through said second con-



duit means when said pivotable support means is in the first position; and

second abutment means, said second abutment means being fixedly mounted relative to said support means for compressing said first conduit means constrictible portion when said support means is in the second position whereby liquid may not be supplied through said first conduit means when said pivotable support means is in the second position.

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**4,015,943**

**APPARATUS FOR THE ESTERIFICATION OF TEREPHTHALIC ACID IN THE GAS PHASE**

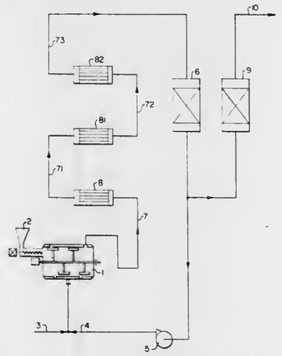
**Horst-Dieter Wulf; Ferdinand List, both of Marl; Friedrich-August Orlowski, Haltern; Norbert Wilke, and Emmerich Pflegerl, both of Marl, all of Germany, assignors to Chemische Werke Huls Aktiengesellschaft, Marl, Germany**

**Division of Ser. No. 420,307, Nov. 29, 1973, Pat. No. 3,972,912. This application Apr. 21, 1976, Ser. No. 679,046**

**Claims priority, application Germany, Dec. 15, 1972, 2261333**

**Int. Cl.² B01J** *8/04;* **C07C** *69/76*

**U.S. Cl. 23—262** **1 Claim**



**1.** An apparatus for the esterification of a normally solid organic acid in the solid state with normally liquid alcohol in the gaseous or vapor state, to an ester in the presence of a granular solid esterification catalyst, which consists essentially of a rotatable tunnel oven;

means for heating said tunnel oven;

means for feeding said organic acid in the solid state into one end of said oven;

means for feeding said alcohol into said one end of said oven;

means for discharging a gaseous current of alcohol and said acid from the other end of said oven;

an esterification pre-reactor having a fixed bed catalyst;

means for forwarding the gaseous current of alcohol and said acid from said means for discharging to said pre-reactor, said fowarding means comprising conduit means and heat exchanger means;

a follow-up esterification reactor having a fixed bed catalyst;

means for forwarding a current of said alcohol, said acid and ester formed in the pre-reactor from said pre-reactor to said follow-up reactor; and

means connected to said pre-reactor for recirculating a portion of said alcohol, said acid and said ester to said rotatable tunnel oven.

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**4,015,944**

**DUAL TEMPERATURE DEUTERIUM EXTRACTION PROCESS**

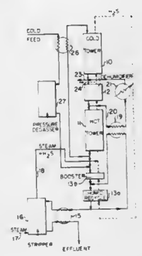
**Gerard J. C. A. Pauluis, and Alistair I. Miller, both of Deep River, Canada, assignors to Atomic Energy of Canada Limited, Ottawa, Canada**

**Filed Dec. 18, 1974, Ser. No. 533,768**

**Claims priority, application Canada, Mar. 19, 1974, 195387**

**Int. Cl.² C01D** *11/00;* **C01B** *5/02*

**U.S. Cl. 23—270.5 W** **5 Claims**



**1.** Apparatus for obtaining a product enriched in deuterium by dual temperature isotope exchange comprising:

a. a hot and a cold tower with liquid and gas streams passing in countercurrent deuterium exchange relation therein,

b. means for recycling the gas from the top of the cold tower to the bottom of the hot tower,

c. a humidifier section between cold and hot towers through which a liquid stream and the recycled gas passes,

d. a dehumidifier between hot and cold towers through which the gas and liquid streams pass,

e. means for heat exchange between humidifier and dehumidifier,

f. a cold liquid feed inlet to the apparatus,

g. a heat exchanger for heating the cold liquid feed,

h. means for applying said heated liquid to the system at the top of the humidifier section at a point between the liquid outlet of the hot tower and the liquid input to the humidifier,

i. means for recycling a portion of the liquid leaving the hot tower to the top of the cold tower via the said heat exchanger, and

j. means for taking a product enriched in deuterium from the system.



**4,015,945**

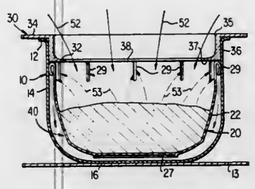
**DEVICE FOR MIXING BONE CEMENT**

**S. Arthur Frankel, Billings, Mont.; George E. McGuire, De Pere, Wis., and Robert O. Wuthrich, Indianapolis, Ind., assignors to Zimmer, U.S.A. Inc., Warsaw, Ind.**

**Filed Mar. 15, 1976, Ser. No. 666,728**

**Int. Cl.² B01L** *3/00*

**U.S. Cl. 23—292** **3 Claims**



**1.** A device for mixing a volatile substance which emits an obnoxious or harmful vapor, while simultaneously preventing said obnoxious or harmful vapor from escaping into the ambient atmosphere, said device comprising,

A. a bowl-shaped container having an open upper end and an exhaust port in the side wall of said container;

B. means for connecting said container to a low pressure source, said means associated with said exhaust port;

C. a replaceable, resilient bowl-shaped plastic liner having an open upper end, said liner fitting entirely within said container; means associated with said liner for spacing the walls of said liner away from the walls of said container, said space defining a fluid passageway; a plurality of exhaust openings uniformly spaced at the upper end of said liner, the interior of said liner being in fluid flow communication with said fluid passageway through said exhaust openings; and,

D. a deflector cap having

1. a hollow cylindrical member which is adapted to be slideably positioned within said container,

2. a first flat annular disc extending radially inwardly from the lower edge of said hollow cylindrical member, said first annular disc being supported at the open upper end of said liner and extending over and closing the space between said container and said liner when said cylindrical member is fully inserted within said container, and

3. a second flat annular disc extending radially outwardly from the upper edge of said cylindrical member, and said second annular disc being supported at the open upper end of said container when said cylindrical member is fully inserted within said container, said first annular disc defining an access opening into said liner sufficiently large to permit entry of a human hand, the diameter of said access opening being less than the inside diameter of the upper end of said liner, said first annular disc thereby functioning to deflect the ambient atmosphere into the interior and toward the center of said liner when said means (B) is connected to a low pressure source,

whereby when a volatile substance is being mixed in said liner the obnoxious or harmful vapor admixed with ambient air will be drawn out of said liner through said exhaust opening into said fluid passageway and out of said device through said exhaust port.

**4,015,946**

**PROCESS FOR RECOVERING AMMONIUM SULPHATE FROM AQUEOUS SOLUTIONS OF AMMONIUM SULPHATE WHICH CONTAIN ORGANIC COMPOUNDS**

**Jentje Bonnema, Beek, and Henri J. H. Simon, Geleen, both of Netherlands, assignors to Stamicarbon N.V., Geleen, Netherlands**

**Continuation of Ser. No. 798,155, Feb. 10, 1969, abandoned. This application July 12, 1971, Ser. No. 161,997**

**Claims priority, application Netherlands, Feb. 8, 1968, 6801824**

**Int. Cl.² B01D** *9/02;* **C01C** *1/24*

**U.S. Cl. 23—300** **3 Claims**

**1.** In a process for recovering purified ammonium sulphate from a contaminated aqueous ammonium sulfate solution containing at least 30 percent by weight ammonium sulfate and organic impurities soluble in a water-soluble organic substance, said aqueous solution obtained from

the synthesis of acrylonitrile prepared by oxidation of gaseous propylene in the presence of ammonia, wherein the reaction product is treated with sulfuric acid and then separated from the resulting ammonium sulfate solution;

the synthesis of methyl methacrylate prepared from acetone cyanohydrin, methanol, and sulfuric acid; or

the synthesis of methyl acrylate prepared from acrylonitrile, methanol, and sulfuric acid,

the improvement which comprises intimately contacting said aqueous solution of ammonium sulfate containing said organic impurities with an organic substance selected from the group consisting of lactams of 4 to 20 carbon atoms and mixtures thereof, said organic substance being present in an amount sufficient to form an organic phase and an aqueous phase during crystallization, crystallizing said aqueous solution containing ammonium sulfate, organic contaminants, and lactams of 4 to 20 carbon atoms by evaporation, whereby a two-phase liquid system containing a substantially saturated aqueous ammonium sulfate-containing phase and a lactam-containing phase and solid ammonium sulfate crystals are formed,

maintaining said phases in a liquid state so as to extract said organic impurities from the aqueous phase by means of the organic substance and separating the phases.

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**4,015,947**

**PRODUCTION OF SINTERED ALUMINUM ALLOY ARTICLES FROM PARTICULATE PREMIXES**

**Edul M. Daver, Westfield, N.J., assignor to Alcan Aluminum Corporation, Cleveland, Ohio**

**Filed Sept. 10, 1975, Ser. No. 611,888**

**Int. Cl.² B22F** *3/00;* **C23C** *1/04*

**U.S. Cl. 75—201** **20 Claims**

**1.** A method of producing a sintered metal article comprising:

a. intimately mixing a major proportion of an aluminum premix powder with a minor proportion of particles of an alloy, of a metal selected from the class consisting of cobalt and nickel, having a hard intermetallic Laves phase present in a matrix softer than the Laves phase, said minor proportion being effective to impart wear resistance to the produced article; and

b. sintering the resultant mixture at a temperature for effecting controlled diffusion of said particles such that the particles are strongly bonded to metal of the premix powder while remaining as discrete hard cores distributed through the sintered article, thereby to produce a structurally integral, wear-resistant article.

**7.** A method of producing a sintered metal article comprising:

a. intimately mixing

i. a major proportion of an aluminum premix powder containing a major proportion of aluminum and a minor proportion of magensium with

ii. a minor proportion of particles of an alloy, of a metal

selected from the class consisting of cobalt and nickel and containing molybdenum and silicon as principal alloying elements, having a hard intermetallic Laves phase present in a proportion of at least about 30% by volume in a matrix softer than said Laves phase, said minor proportion of particles being between about 5 and about 25% by volume of the resultant mixture of premix powder and said particles of said alloy; and

b. sintering the resultant mixture at a temperature between about 530° and about 590° C for producing a strong, structurally integral, wear-resistant article by effecting controlled diffusion of said particles such that the particles are bonded to metal of the premix powder while remaining as discrete hard cores distributed through the sintered article.

**16.** A method of producing a sintered metal article comprising:

a. establishing an intimate mixture consisting essentially of

i. about 75 to about 95% by volume of an aluminum premix powder comprising at least about 90% by weight Al and about 0.5 to about 2.5% by weight Mg, and

ii. about 5 to about 25% by volume of particles of an alloy consisting essentially of about 50 to about 62% by weight of a metal selected from the class consisting of Co and Ni, about 28 to about 35% by weight Mo, about 2 to about 10% by weight Si, up to about 17% by weight Cr, and having a hard intermetallic Laves phase present in a proportion of about 30 to about 65% by volume in a matrix softer than the Laves phase;

b. compacting said mixture; and

c. sintering the compacted mixture for about 15 to about 60 minutes at a temperature between about 530° and about 590° C for producing a strong, structurally integral, wear-resistant article by effecting controlled diffusion of said particles such that the particles are bonded to metal of the premix powder while remaining as discrete hard cores distributed through the sintered article.

**18.** A method of producing a sintered metal article, comprising:

a. mixing, with a major proportion of metal powder consisting essentially of aluminum, a minor proportion of particles of an alloy consisting essentially of about 50 to about 62% by weight of a metal selected from the class consisting of Co and Ni, about 28 to about 35% by weight Mo, about 2 to about 10% Si, up to about 17% by weight Cr, and having a hard intermetallic Laves phase present in a proportion of about 30 to about 65% by volume in a matrix softer than the Laves phase, said minor proportion being effective to impart wear resistance to the produced article;

b. compacting the resultant mixture; and

c. sintering the compacted mixture at a temperature of about 625° C for producing a structurally integral, wear-resistant article by effecting controlled diffusion of said particles such that the particles are bonded to metal of the premix powder while remaining as discrete hard cores distributed through the sintered article.

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**4,015,948**

## COPPER-BASE SOLDER

**Masatoshi Tsuda, No. 6, Minamiichi-iocho Taishogun, Kita, Kyota, Japan**

**Continuation-in-part of Ser. No. 430,708, Jan. 4, 1974, abandoned. This application Aug. 6, 1975, Ser. No. 602,532**

**Int. Cl.² C22C** *9/05*

**U.S. Cl. 75—157.5** **3 Claims**

**1.** A shock absorbing copper-manganese-zinc solder consisting essentially of from 60 percent to 64 percent of copper, from 30 percent to 34 percent of manganese, from 2 percent to 10 percent of zinc, and from 0.05 percent to 0.5 percent of titanium, said solder having a melting point range of from 847° C. to 865° C., a wettability range of from 0.49 to 0.81 $mm^2/mg$, and a hardness of 120 to 126 (Hmv) 100 gr.

**4,015,949**

## PLAIN BEARINGS

**Dennis Stanley Baker, High Wycombe, and Glyndwr John Davies, London, both of England, assignors to The Glacier Metal Company Limited, Middlesex, England**

**Continuation of Ser. No. 402,334, Oct. 1, 1973, abandoned. This application Oct. 8, 1975, Ser. No. 620,754**

**Claims priority, application United Kingdom, June 13, 1973, 28054/73; July 4, 1973, 31969/73; Aug. 30, 1973, 40801/73**

**Int. Cl.² B32B** *15/08*

**U.S. Cl. 428—653** **2 Claims**

**1.** A bearing comprising a steel backing having an aluminum containing layer bond ed to it, and a lining of polyphenylene sulphide adherent to said aluminum containing layer.

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**4,015,950**

## SURFACE TREATMENT PROCESS FOR STEELS AND ARTICLE

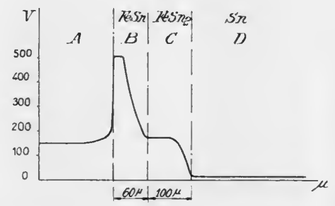
**Jacques Galland; Dominique Boutard nee Gabillet, both of Antony, and Jacques Chêne, Paris, all of France, assignors to Agence Nationale de Valorisation de la Recherche (ANVAR), Neuilly-sur-Siene, France**

**Filed Aug. 1, 1975, Ser. No. 601,045**

**Claims priority, application France, Aug. 14, 1974, 74.2829**

**Int. Cl.² C23C** *1/04*

**U.S. Cl. 428—648** **34 Claims**




**1.** A method of providing a hard and corrosion resistant layer comprising iron and tin on a surface of a steel substrate which comprises: immersing a surface of a steel substrate in a bath of molten tin maintained at a temperature of from 400° to 700° C for a period of time sufficient to cause a tin-containing layer containing diffused iron to adhere to said surface, said tin-containing layer comprising a first, inner, portion adjacent the steel substrate containing iron and tin in amounts corresponding substantially to the formula FeSn, a second portion adjacent said first portion containing iron and steel in amounts corresponding substantially to the formula $FeSn_2$, and a third, outer, portion of tin adjacent said second portion; removing said surface bearing said tin-containing layer from said bath; and removing said third portion and said second portion of said tin-containing layer to provide said surface of said steel substrate with a hard and corrosion resistant layer containing iron and tin in amounts corresponding substantially to the formula FeSn.

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**4,015,951**

## FUEL PELLETS AND METHOD FOR MAKING THEM FROM ORGANIC FIBROUS MATERIALS

**Rudolf Wilhelm Gunnerman, 535 Haynes Ave., Beverly Hills, Calif. 90210**

**Filed Jan. 5, 1976, Ser. No. 646,514**

**Int. Cl.² C10L** *5/00*

**U.S. Cl. 44—10 E** **10 Claims**

**1.** A process for making fuel pellets from organic fibrous material which comprises adjusting the moisture content of comminuted fibrous material to from 16 to about 28% by weight, compressing the material in a die into a substantially symmetrical shape while at the said moisture content at a pressure whereby the temperature of the resulting pellet as it emerges from the die is from about 325° to 350° F. and drying the pellets to a moisture content which is approximately in equilibrium with the surrounding atmosphere.

**5.** A combustible organic fibrous pellet having a substantially symmetrical configuration with a maximum dimension in cross-section of not more than about one-half inch, a density above about 65 pounds per cubic foot and a substantially smooth protective surface coating of natural substances which have exuded from the organic fibrous material adapted to burn substantially uniformly and develop a BTU of from about 8,500 – 9,000 per pound.

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**4,015,952**

## LIQUID HYDROCARBON COMPOSITIONS OF IMPROVED BEHAVIOR IN THE COLD AND CONTAINING DIENE POLYMERS

**Jean-Pierre Durand, Chatou; Bernard Aubin, Malakoff; Francois Dawans, Bougival, and Gilbert Chapelet, Bron, all of France, assignors to Institut Francais du Petrole, des Carburants et Lubrifiants et Entreprise de Recherches et d'Activities Petrolieres Elf, Rueil-Malmaison, France**

**Filed Nov. 27, 1974, Ser. No. 527,802**

**Claims priority, application France, Nov. 28, 1973, 73.42470**

**Int. Cl.² C10L** *1/16*

**U.S. Cl. 44—80** **12 Claims**

**1.** A composition comprising a major portion of a petroleum middle distillate and an amount sufficient to improve its filterability in the cold of at least one partially hydrogenated 1,3-butadiene homopolymer having essentially function-free terminal groups, which has:

a. a microstructure, as determined before hydrogenation, of at least about 90% of 1,4-addition units;

b. an average molecular weight by number of 500 to 20,000 and

c. an olefinic unsaturation ratio of 5–80% of the units constituting the polymeric chain.

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**4,015,953**

## FIRECHECK

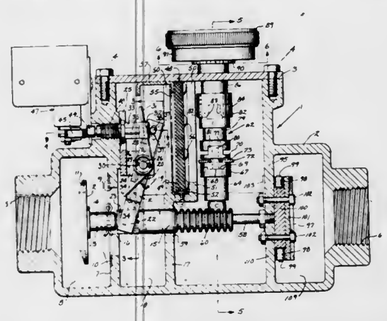
**Wallace I. Stenzel, Thiensville; Frederick W. Kufrin, Janesville, and Donald J. Allen, Fort Atkinson, all of Wis., assignors to Waukee Engineering Co., Milwaukee, Wis.**

**Division of Ser. No. 409,401, Oct. 25, 1973. This application July 7, 1975, Ser. No. 593,781**

*Disclosure was also published under second Trial Voluntary Protest Program on Mar. 16, 1976*

**Int. Cl.² F23D** *13/46*

**U.S. Cl. 48—192** **9 Claims**



**1.** A firecheck adapted to be connected in a combustible gas line, comprising a casing having an inlet and an outlet and an access opening, a cover plate to removably enclose the access opening, a burner screen located within the casing between the inlet and the outlet and disposed in communication with said access opening, control valve means disposed within the casing for controlling the flow of gas through the casing and movable between an open position and a closed position, opening means for moving the valve means to the open position, valve closing means for moving the valve means to the closed position, and means responsive to removal of the cover plate from the casing for actuating said valve closing means to move said valve means to the closed position.

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**4,015,954**

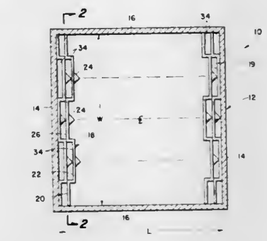
## LAMINAR FLOW FLAME ARRESTOR

**Robert D. Reed, Tulsa, Okla., assignor to John Zink Company, Tulsa, Okla.**

**Filed Dec. 29, 1975, Ser. No. 644,595**

**Int. Cl.² F17D** *3/00*

**U.S. Cl. 48—192** **6 Claims**



**1.** A flame arrestor for use in passage-ways for combustible oxidant/fuel mixtures compriseing:

a. a housing of rectangular cross-section of selected values of internal cross-sectional width W and length L, and having a selected height H parallel to the direction of flow of said mixtures;

b. a plurality of substantially identical planar laminae stacked in parallel contiguous contact within said housing along the entire internal length L of said housing;

c. each lamina having a width W and height H and formed with a plurality of spaced-apart, parallel, shallow, rectangular channels, parallel to and extending the length of said height dimension H, said channels of selected depth D and width C, said laminae being so stacked as to form a plurality of substantially equal sized narrows slots for gas flow, said slots of width D and length C for a distance H in the flow direction.

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**4,015,955**

## FLUID SEPARATION PROCESS AND MEMBRANE

**Edward F. Steigelmann, Naperville, Ill., and Charles S. Sokol, Cincinnati, Ohio, assignors to Standard Oil Company, Chicago, Ill.**

**Filed Feb. 5, 1975, Ser. No. 547,217**

**Int. Cl.² C07C** *11/12, 9/00*

**U.S. Cl. 55—16** **23 Claims**

**1.** A membrane-liquid barrier system comprising a semi-permeable membrane film and an aqueous liquid barrier in contact with said film, said liquid barrier having dissolved therein a complex-forming cuprous ion component and said barrier being in contact with a reducing agent in an amount sufficient to retard oxidation of said cuprous ion component.

**4,015,956**

## PROCESS AND ARRANGEMENT FOR THE ENRICHMENT OF GASES

**Heinrich Münzner, Essen-Kray; Heinrich Heimbach, Bochum; Werner Körbächer, Essen-Borbeck; Werner Peters, Wattenscheid; Harald Juntgen, Essen-Heisingen; Karl Knoblauch, Essen, and Dieter Zündorf, Essen-Heisingen, all of Germany, assignors to Bergwerksverband GmbH, Essen, Germany**

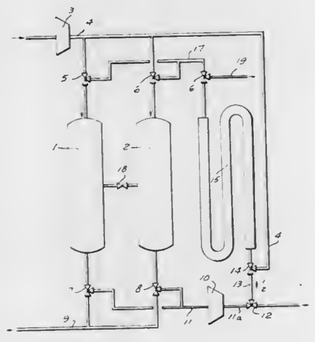
**Continuation-in-part of Ser. No. 245,460, April 19, 1972, abandoned, and a continuation-in-part of Ser. No. 161,211, July 9, 1971, Pat. No. 3,801,513. This application Feb. 22, 1974, Ser. No. 445,319**

**Claims priority, application Germany, Apr. 23, 1971, 2119829; Feb. 16, 1972, 2207117**

**The portion of the term of this patent subsequent to Mar. 8, 1994, has been disclaimed.**

**Int. Cl.² B01D** *15/06*

**U.S. Cl. 55—25** **25 Claims**



1. A process for the oxygen-enrichment of air, comprising initially loading at least one adsorber with oxygen by conveying a stream of air into said one adsorber while evacuating an initial effluent gas from said one adsorber, said one adsorber adsorbing oxygen preferentially to nitrogen, and said initial effluent gas initially having a proportion of oxygen which is less than the proportion of oxygen in said air stream; terminating said initial loading when the proportion of oxygen in said initial effluent gas approximates the proportion of oxygen in said air stream; thereafter additionally loading said one adsorber with oxygen by conveying a nitrogen-containing gas stream having substantially 25 to 40 % by volume of oxygen into said one adsorber while evacuating another effluent gas from said one adsorber, said other effluent gas initially having a proportion of oxygen which at most approximately equals the proportion of oxygen in said air stream; terminating said additional loading before the proportion of oxygen in said other effluent gas substantially exceeds the proportion of oxygen in said air stream; thereafter initially unloading said one adsorber by creating an underpressure therein so as to obtain a first fraction which has substantially 25 to 40 % volume of oxygen; subsequently substantially completely unloading said one adsorber at an underpressure so as to obtain a second fraction which has substantially 40 to 90 % by volume of oxygen; recovering said second fraction as product gas; and using said first fraction in at least one loading step similar to said additional loading step.

**4,015,957**

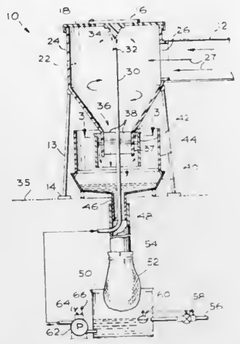
## EXTRACTOR FOR AIRBORNE PARTICULATE MATTER

**Frederick W. Grantham, 12055 Goshen Ave., Los Angeles, Calif. 90066**

**Division of Ser. No. 456,057, March 29, 1974, Pat. No. 3,920,425. This application Sept. 12, 1975, Ser. No. 612,651**

**Int. Cl.² B01D** *47/16*

**U.S. Cl. 55—227** **12 Claims**



1. Apparatus for extracting airborne particulates, said apparatus including:

a mixing chamber having a first, tangentially disposed upper opening for the introduction of airborne particulates into said chamber in a rotary motion and including means for producing a mixture of a settling liquid and said particulates, the mixing chamber also having a second, lower opening for air and said mixture to flow out through;

a basin positioned below the mixing chamber to collect the mixture of liquid and particulates while allowing the air to escape, the basin having an outlet opening for draining said mixture therefrom;

an air stream straightening chamber of cylindrical cross-section connected to the mixing chamber at the second opening thereof and positioned between the mixing chamber and the basin and including at least one baffle member for terminating the rotary motion of the air stream;

particulate collector means connected to the basin outlet opening to receive the flow of said mixture from the basin for collecting the particulates from the liquid; and

a venturi cylinder surrounding, spaced from and extending beyond the straightening chamber in the direction of the basin.

**4,015,958**

## WET CENTRIFUGAL SEPARATOR FOR GAS

**Kurt Leschonski, Clausthal-Zellerfeld, and Hans Rumpf, Karlsruhe, both of Germany, assignors to Kurt Leschonski, Germany**

**Continuation of Ser. No. 565,055, April 14, 1975, abandoned. This application May 20, 1976, Ser. No. 688,261**

**Claims priority, application Germany, Apr. 5, 1974, 2416583**

**Int. Cl.² B01D** *47/10*

**U.S. Cl. 55—235** **11 Claims**

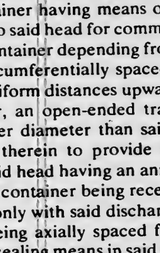
1. Apparatus for removing impurities from a flow of gas, comprising:

a housing including an outer wall having a gas inlet and a gas outlet;

cyclone means mounted in said gas inlet to impart a spiral direction to the incoming gas flow;

constriction means in said housing adjacent and downstream of said cyclone means to increase the velocity of the gas flow;

a separation chamber in said housing in communication with said constriction means and said outlet, said separation chamber including a perforate wall spaced from said outer wall of said housing forming a liquid collection chamber therebetween; and



a liquid supply means including a spray nozzle centrally disposed in said separation chamber to spray droplets of cleansing liquid radially through the gas toward said perforate wall to capture impurities, said perforate wall passing the impurity-laden droplets into said liquid collection chamber.



**4,015,959**

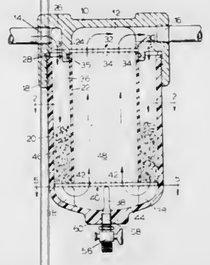
## IN-LINE FILTER FOR GASES

**George A. Grote, Glen Rock, Pa., assignor to Beach Precision Parts Co., Glen Rock, Pa.**

**Filed Sept. 12, 1975, Ser. No. 613,043**

**Int. Cl.² B01D** *29/04*, *29/08*

**U.S. Cl. 55—274** **7 Claims**



1. An in-line gas filter unit comprising in combination, a head defining a cavity having an inlet port for gases to be filtered and a discharge port for outlet of filtered gases, barrier means in said head between said ports, an outer transparent cup-shaped container having means on the open end separably connectable to said head for communication with only said inlet port, said container depending from said head and having a plurality of circumferentially spaced relatively short radial ribs extending uniform distances upwardly from the lower end of said container, an open-ended transparent inner tubular container of lesser diameter than said outer container positioned coaxially therein to provide an annular filter space therebetween, said head having an annular seat and the upper end of said inner container being received within said seat for communication only with said discharge port in said head and the lower end being axially spaced from the bottom of said outer container, sealing means in said seat engaging said upper end of said inner container, relative coarse filter material filling said annular space between said lower end of said inner container and an intermediate position between the ends of said inner container, thereby rendering the portion of said inner container between said upper end thereof and said coarse filter material visible through said outer container, an additional filter cartridge of desiccant filter material contained in a porous enclosure positioned within said inner container and extending substantially between the opposite ends thereof and in tight engagement with the inner surface thereof to insure passage of gases through said desiccant material for additional filtering thereby, upper and lower perforated rigid discs positioned respectively flatly across the opposite ends of said inner container and the perforations therein being sufficiently large to permit ready passage of gases therethrough without impeding the movement of said gases as the same pass to and from said desiccant filter material of said additional filter cartridge, the lower perforated rigid disc being supported upon said radial ribs and commonly supporting the lower ends of said coarse filter material and said additional filter cartridge, whereby the condition of said desiccant filter material is visible through said outer container and said upper portion of said inner container to indicate the need to replace said additional filter when necessary and gases pass downwardly through said coarse filter material and upwardly through said desiccant filter material in passage to said discharge port free of contaminating moisture and vapor.

**4,015,960**

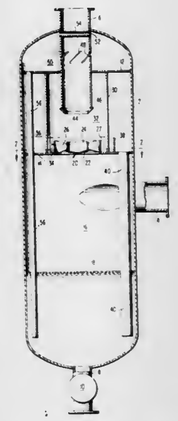
## CENTRIFUGAL SEPARATOR FOR SEPARATING ENTRAINED LIQUID FROM A STREAM OF LIQUID-BEARING GASES

**Dale E. Nutter, Tulsa, Okla., assignor to Heat/Fluid Engineering Corporation, Tulsa, Okla.**

**Filed Mar. 17, 1975, Ser. No. 558,990**

**Int. Cl.² B01D** *45/12*

**U.S. Cl. 55—355** **18 Claims**



1. Apparatus for separating entrained liquid from a stream of liquid-bearing gases, comprising,

a circular wall forming a separation chamber which has a longitudinal axis, an upstream end, and a downstream end which is disposed above the upstream end, said wall having an interior surface equidistant from and facing the longitudinal axis,

means at the upstream end of the separation chamber for producing a tangential velocity component causing a helical flow of said liquid-bearing gases which flow is centered about the longitudinal axis and extends upward from the upstream end toward the downstream end of the separation chamber, whereby the particles of liquid entrained in the gases are thrust outwardly by centrifugal action to impinge and coalesce on said interior surface of the separation chamber wall,

a gas outlet tailpipe extending centrally and longitudinally into the separation chamber from the downstream end of the separation chamber, said tailpipe having an upper outlet opening means and a lower inlet opening means for receiving a central portion of the helical flow of gases which has only a residual amount of entrained liquid,

said tailpipe having aperture means therein located above and downstream of said inlet opening means, whereby residual liquid in the tailpipe is conducted from the tailpipe through the aperture means,

a lower liquid sump, a closed secondary chamber surrounding the aperture means, and drain conduit means for carrying liquid from the secondary chamber to the sump, said drain conduit means having an outlet opening submerged in liquid in the sump to sustain a pressure differential between the secondary chamber and the sump,

said apparatus having conduit means communicating between said secondary chamber and a point substantially at the center of said tailpipe downstream of the aperture means to reduce the pressure differential across said aperture means in the tailpipe and thus promote the flow of residual liquid through said aperture means.

**12.** Apparatus for separating entrained liquid from a stream of liquid-bearing gases, comprising,

a circular wall forming a separation chamber which has a longitudinal axis, an upstream end, and a downstream end which is disposed above the upstream end, said wall having an interior surface equidistant from and facing the longitudinal axis,

means at the upstream end of the separation chamber for producing a tangential velocity component producing a helical flow of said liquid-bearing gases which flow is centered about the longitudinal axis and extends upward from the upstream end toward the downstream end of the separation chamber, whereby the particles of liquid entrained in the gases are thrust outwardly by centrifugal action to impinge and coalesce on said interior surface of the separation chamber wall,

a gas outlet tailpipe extending centrally and longitudinally into the separation chamber from the downstream end of the separation chamber, said tailpipe having an upper outlet opening means and a lower inlet opening means for receiving a central portion of the helical flow of gases which has only a residual amount of entrained liquid,

said tailpipe having aperture means therein located above and downstream of said inlet opening means, whereby residual liquid in the tailpipe is conducted from the tailpipe through the aperture means,

a lower liquid drain opening in the wall of the separation chamber for releasing the liquid from the separation chamber, a deentrained liquid chamber surrounding the wall of the separation chamber and communicating with the separation chamber through the lower liquid drain opening so as to collect the liquid released from the separation chamber, the liquid flowing in a circular direction within the deentrained liquid chamber,

a downcomer communicating with the deentrained liquid chamber so as to discharge the liquid from the deentrained liquid chamber, and an overflow weir positioned in the deentrained liquid chamber in the flow path between the lower liquid drain opening and the downcomer, said lower liquid drain opening being disposed upstream of the overflow weir in the flow direction such that the overflow weir interrupts the circular flow of the liquid.

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**4,015,961**

## FILTER BAG AND COUPLING

**Laurence M. Howard, Cresskill, N.J., and Robert Schaaf, Brooklyn, N.Y., assignors to Air Filters, Inc., Brooklyn, N.Y.**

**Filed Jan. 8, 1976, Ser. No. 647,612**
**Int. Cl.² B01D *46/02***
**U.S. Cl. 55—378** **9 Claims**

**1.** A filter bag for interconnecting to a socket of a cooperating member comprising:

a tubular filter member fabricated from a filter material;

an annular thin walled flexible band having axially spaced apart edges;

a plurality of discrete resilient tab means extending outwardly from an outer surface of said band, each of said tab means being defined by a free end struck outwardly from said band and a hinge line connecting each of said tab means to said band, said tab means being peripherally spaced apart from each other and being disposed along two axially separated paths around said band;

a flexible collar secured to said outer surface of said band to define a band and collar assembly, said collar being disposed on said tab means with said collar substantially conforming to shape of said tab means to provide discrete protrusions along each of said two paths and a recess between said two paths of protrusions;



said tubular filter member including retaining means for holding said band and collar assembly at one end of said tubular filter member;

said one end of said tubular filter member being capable of snugly fitting into the socket of the cooperating member, whereby said resilient tab means are pressed inwardly to permit a portion of the socket member to be positioned in said recess between said separated paths, where said portion of the socket member is retained in said recess by the protrusions disposed on either side thereof.

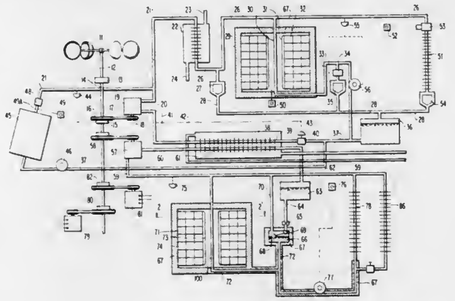
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**4,015,962**

## TEMPERATURE CONTROL SYSTEM UTILIZING NATURALLY OCCURRING ENERGY SOURCES

**Leo L. Tompkins, Jackson, Miss., assignor to Xenco Ltd., Jackson, Miss.**

**Filed Dec. 20, 1974, Ser. No. 534,922**
**Int. Cl.² F25B *27/00***
**U.S. Cl. 62—2** **17 Claims**



**1.** A temperature control system for controlling the temperature within an enclosed structure comprising:

a. a source of heat;

b. a first heat exchanger for transferring heat from said source of heat to a liquid passing therethrough so as to cause said liquid to evaporate;

c. a first compressor connected to said first heat exchanger to raise the temperature and pressure of the evaporated liquid;

d. a wind driven device having an output shaft;

e. means operatively connecting said output shaft of said wind driven device to said first compressor such that said wind driven device drives said compressor;

f. heat radiating means connected to said compressor, and located within said enclosed structure to transfer heat from the evaporated liquid to the surrounding atmosphere causing said evaporated liquid to condense;

g. first liquid receiving means connected to said heat radiating means and said first heat exchanger to receive and store the liquid from the heat radiating means; and wherein said liquid comprises a refrigerant; and

h. a solar collector having an inlet connected to said first liquid receiving means and an outlet connected downstream of said compressor so as to transfer solar heat to the condensed refrigerant and cause the same to boil and evaporate; and

i. means interposed between said solar collector and said liquid receiving means to control the flow of condensed refrigerant entering said solar collector.



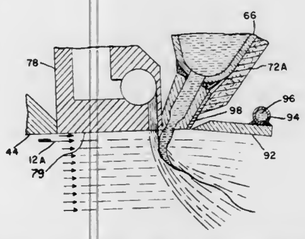
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**4,015,963**

## METHOD AND APPARATUS FOR FORMING FIBERS BY TORATION

**Marcel Levecque, Saint-Gratien; Jean A. Battigelli, and Dominique Plantard, both of Rantigny, all of France, assignors to Saint-Gobain Industries, Neuilly-sur-Seine, France**

**Continuation-in-part of Ser. No. 353,984, April 24, 1973, Pat. No. 3,885,940. This application Mar. 6, 1975, Ser. No. 555,811**
**Claims priority, application France, Feb. 21, 1975, 75.05512**
**Int. Cl.² C03B *37/04***
**U.S. Cl. 65—5** **30 Claims**



**1.** Equipment for making glass fibers comprising supply means for molten glass having a discharge orifice, means for establishing a gaseous blast directed in a path with a boundary of the blast adjacent the glass discharge orifice, means for establishing a gaseous jet directed in a path transverse to the path of the blast and penetrating the blast at a location upstream of the glass orifice, the jet being of smaller width than the width of the blast and separate plate means positioned downstream of the jet along the path of travel of the blast.

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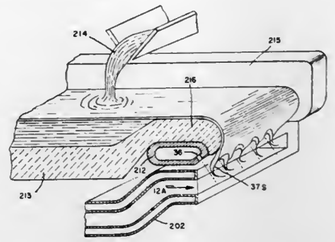
**4,015,964**

## METHOD AND APPARATUS FOR MAKING FIBERS FROM THERMOPLASTIC MATERIALS

**Marcel Levecque, Saint-Gratien; Jean A. Battigelli, and Dominique Plantard, both of Rantigny, all of France, assignors to Saint-Gobain Industries, Neuilly-sur-Seine, France**

**Continuation-in-part of Ser. No. 353,984, April 24, 1973, Pat. No. 3,885,940. This application Mar. 11, 1975, Ser. No. 557,282**
**Claims priority, application France, Dec. 26, 1975, 75.04970**
**Int. Cl.² C03B *37/04***
**U.S. Cl. 65—5** **18 Claims**

**1.** A process for making fibres comprising establishing feed of a stream of attenuable material from a delivery means, establishing a gaseous blast directed in a path transverse to said stream in spaced relation to the delivery means so that said stream approaches the blast toward one side thereof, and establishing a gaseous jet of smaller cross section than that of the blast, the jet being directed toward the blast at the same side thereof as said stream, the jet having greater kinetic energy than the blast and penetrating the blast to establish a zone of interaction of the jet and the blast, and the stream of attenuable material being directed in a path independent of the path of the jet and positioned to meet the blast at a point adjacent said zone of interaction.



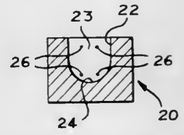
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**4,015,965**

## METHOD OF MAKING ARTIFICIAL INTRAOCULAR LENSES WITH HOLES

**Emil W. Deeg, Woodstock, Conn., and David A. Krohn, Southbridge, Mass., assignors to American Optical Corporation, Southbridge, Mass.**

**Filed Dec. 22, 1975, Ser. No. 642,927**
**Int. Cl.² C03C *19/08, 15/00***
**U.S. Cl. 65—23** **8 Claims**



**1.** The method of making a lens for a pseudophakos having spaced apart holes of preselected diametral dimension adjacent its edge comprising the steps of:

aligning and fixedly supporting a plurality of wires in spaced juxtaposition, the spacings between said wires corresponding to spacings between said holes to be produced in said lens and said wires being of diametral dimension corresponding to the diametral size preselected for said holes;

casting a molten ophthalmic lens glass over and around said plurality of wires;

allowing said molten glass to cool in place about said wires to produce a rigid preform of said lens;

removing said wires to produce holes in their place; and

at one stage of the process following said step of allowing said molten glass to cool, cutting, grinding and polishing at least a portion of said preform to the final size and configuration desired of opposite optical surfaces, center thickness and edge configuration of the finished pseudophakic lens.

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**4,015,966**

## MANUFACTURE OF X-RAY ABSORBING GLASS COMPOSITION BY A FLOAT GLASS PROCESS

**Edward A. Weaver, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio**

**Filed June 1, 1976, Ser. No. 691,929**
**Int. Cl.² C03B *18/02***
**U.S. Cl. 65—65 A** **5 Claims**

**1.** In the process for melting an X-ray absorbing glass composition having an LAC of at least about 26/cm at 0.6 A which composition is adapted for use as the faceplate of a cathode ray television tube, wherein a glass batch for said composition is melted to yield a molten glass, and the resulting molten glass is floated on a bath of molten tin, the improvement wherein

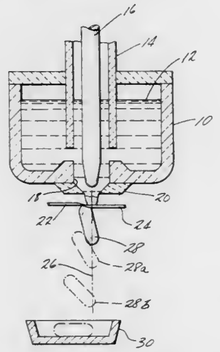
said X-ray absorbing glass composition is free of the oxides of lead, antimony and arsenic and consists essentially of:

| Component | % by Weight |
|---|---|
| $SiO_2$ | 60–65 |
| $Al_2O_3$ | 0–5 |
| $Na_2O$ | 2–10 |
| $K_2O$ | 0–17 |
| $CaO + MgO$ | 2–10 |
| $BaO$ | 0–5 |
| $SrO$ | 5–15 |
| $ZrO_2$ | 0–10 |
| $WO_3$ | 0–5 |
| $TiO_2 + CeO_2$ | 0.1–1 |
| $TiO_2$ | 0–1 |
| $CeO_2$ | 0–1 |
| $Fe_2O_3$ | 0–1. |

## 4,015,967
## METHOD FOR SHEARING AND TURNING THE GLASS GOB

**William R. Ward, Jr., Columbus, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio**

**Filed Mar. 31, 1976, Ser. No. 672,214**
**Int. Cl.² C03B** *5/38*
**U.S. Cl. 65—133** **3 Claims**

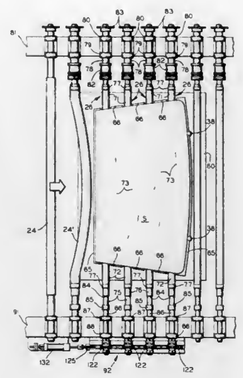



1. A method for shearing gobs of glass from a vertically flowing stream of molten glass wherein lateral motion is imparted to the gob being sheared, which comprises the steps of:
advancing one of an opposed pair of shear blades horizontally toward the centerline of said glass stream;
simultaneously advancing the other one of said opposed pair of shear blades horizontally toward said centerline of said glass stream;
overlapping said pair of shear blades at approximately said glass stream centerline to thereby shear said gob from said glass stream;
withdrawing said first mentioned shear blade from said glass stream centerline while continuing to maintain said pair of shear blades in an overlapping configuration;
advancing said second mentioned shear blade to a location beyond said glass stream centerline in the direction of withdrawal of said first mentioned shear blade in synchronism with the withdrawal of said first mentioned shear blade to thereby maintain overlapping configuration of said pair of shear blades, whereby the travel of said second mentioned shear blade beyond said glass stream centerline in synchronism with said first mentioned shear blade will cause a lateral motion of said gob being sheared; and
withdrawing said second mentioned shear blade from the position it attained beyond said glass stream centerline.

## 4,015,968
## GLASS SHEET SUPPORTING AND CONVEYING APPARATUS

**Robert G. Revells, Toledo, Ohio; Earl J. Olson, and Charles W. Sutton, both of Lathrop, Calif., assignors to Libbey-Owens-Ford Company, Toledo, Ohio**

**Filed Nov. 20, 1975, Ser. No. 633,868**
**Int. Cl.² C03B** *23/02*
**U.S. Cl. 65—289** **5 Claims**



1. In apparatus for supporting and conveying sheets of glass, a frame, a plurality of rotatable conveyor rolls mounted on said frame, each of said conveyor rolls being formed of an inner core member and an outer flexible load supporting sleeve, drive means for rotating said sleeves about said core members, respectively, said conveyor rolls each having straight opposite end portions and an arcuately shaped central portion, and means for pivoting said conveyor rolls to displace said central portions of said rolls from a common plane supporting said glass sheet to angular positions disengaging said roll central portions from said glass sheet; the improvement wherein said pivoting means comprises a shaft operatively connected to said inner core member of each of said rolls, a coupling mounted on each said shaft and having a first section rigidly secured to said shaft and a second section freely rotatable on said shaft, means for rotating the several second coupling sections, means transmitting the torque from said second coupling sections to said first coupling sections to effect shifting of said conveyor roll central portions between said common plane and said angular positions, and means for angularly adjusting one of said coupling sections relative to the other of said coupling sections.

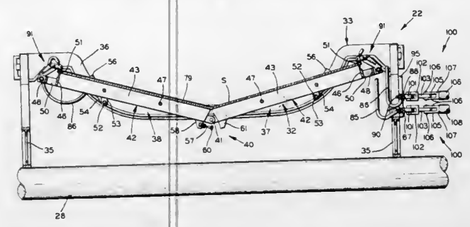
## 4,015,969
## APPARATUS FOR BENDING GLASS SHEETS TO RELATIVELY SHARP ANGLES

**Laurence A. Brown, Toledo; Floyd T. Hagedorn, Oregon, and Foster V. Waltz, Jr., Toledo, all of Ohio, assignors to Libbey-Owens-Ford Company, Toledo, Ohio**

**Filed Jan. 2, 1976, Ser. No. 646,234**
**Int. Cl.² C03B** *23/02*
**U.S. Cl. 65—289** **13 Claims**

1. In apparatus for bending a glass sheet to a relatively sharp angle by passing an electric current through an electrically conducting line formed on the sheet with a portion extending along a line about which heat is generated to bend the sheet therealong and which includes a frame, an outline type bending mold supported on said frame and having a shaping surface formed thereon, electrically conducting means including at least one electrical contact mounted on said mold in spaced relation to said shaping surface and engageable with said electrically conducting line on said glass sheet supported on said mold; the improvement which comprises a holder for said contact, a support, means connecting said holder to said support, means pivotally mounting said support on said mold for



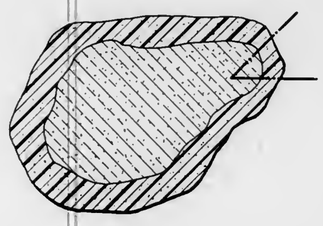


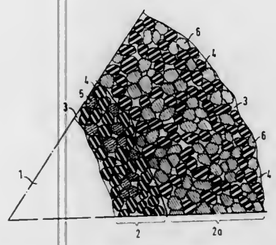
pivotal movement between a glass engaging position and a glass disengaged position, and means for biasing said support into said glass engaging position to urge said contact against said electrically conducting line.

## 4,015,970
## GRANULAR PRODUCTS FOR SOIL TREATMENT

**Claude Hennart, Aubervilliers, France, assignor to Airwick Industries, Inc., Carlstadt, N.J.**

**Continuation of Ser. No. 198,550, Nov. 15, 1971, abandoned, which is a continuation-in-part of Ser. No. 854,403, Sept. 2, 1969, abandoned. This application Oct. 3, 1974, Ser. No. 511,726**
**Claims priority, application France, Sept. 6, 1968, 68.165314; Aug. 20, 1970, 70.30538; Apr. 8, 1971, 71.12474**
**Int. Cl.² C05G** *3/00*
**U.S. Cl. 71—11** **19 Claims**





1. Coated granular product for the treatment of soil which comprises a central solid nucleus, constituting from about 65 to 99% of the weight of the granule, said nucleus consisting of at least 40 to 100% of its weight of a fertilizer material which is soluble in water without decomposition, and a coating of one or several layers constituting from about 1 to 35% of the weight of the granule, at least one layer of said coating comprising particles of an active substance different from that of the nucleus and selected from fertilizers and substances providing plants with oligo-elements, said granular product being characterized in that said layers essentially consist of
a. from about 90 to 99%, calculated on the weight of said coating, of particles of a solid material having an average main diameter not exceeding 0.2mm of which at least 25%, calculated on the weight of the coating, consist of a material soluble in water without decomposition in the ratio of at least 1 gram of substance for 50 grams of water and
b. from about 1 to 10%, calculated on the weight of said coating, of a water-insoluble, solid, plastified or nonplastified, non-cured resin, said granular product being non-dusty and non-hygroscopic but releasing the active materials of the coating and of the nucleus, without any delay as soon as said product is brought into contact with the moisture of the soil.

## 4,015,971
## METHOD OF PRODUCING FERTILIZERS FROM SEA-LIKE WATERS

**Valery Pavlovich Barannik, ulitsa Gogolya, 24, kv. 24, and Arkady Georgievich Kolesnikov, ulitsa Lenina, 33, kv. 51, both of Sevastopol, U.S.S.R.**

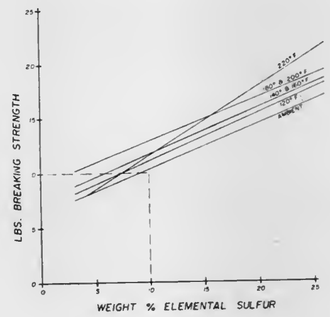
**Filed Feb. 6, 1975, Ser. No. 547,875**
**Int. Cl.² C05D** *9/02*
**U.S. Cl. 71—31** **4 Claims**

1. A method of producing fertilizers from sea-like waters comprising introducing, into said water, bivalent iron ions in an amount within the range of from 10 to 100 mg per liter of water at a pH of from 5 to 9, said bivalent iron ions being oxidized and transformed into trivalent iron ions with the formation of iron hydroxide; allowing the iron hydroxide-containing water to stand to permit sorption of microelements and organic substances present in said water by said iron hydroxide at a sorption time of at least 0.1 hour within said pH range without sorption of sodium chloride under said conditions; separating the resulting precipitate; drying the separated precipitate to the air-dry state to produce a fertilizer containing mainly iron in an amount of from 23.4 to 31.5%, total carbon 2.3 to 6.0% and total amount of microelements of 0.1 to 0.3%.

## 4,015,972
## FORTIFIED GYPSUM GRANULE

**Kenneth Ray Watkins, Wheaton, and Robert John Wenk, Arlington Heights, both of Ill., assignors to United States Gypsum Company, Chicago, Ill.**

**Filed Aug. 13, 1975, Ser. No. 604,366**
**Int. Cl.² C05D** *3/02*
**U.S. Cl. 71—31** **10 Claims**




1. A hard, scarcely dusting gypsum granule composition consisting essentially of a combination of at least about 5% by weight of elemental sulfur and a major proportion of calcium sulfate, said granule having a resistance to attrition on the order of at least about 70.

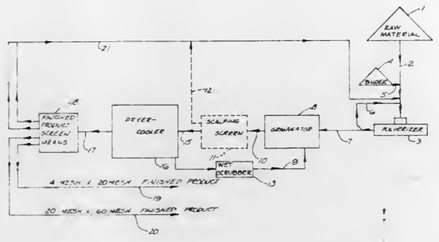
## 4,015,973
## LIMESTONE-EXPANDING CLAY GRANULES AND METHOD OF MAKING THEM

**Paul M. Perrine, Aurora, Ind., assignor to American Pelletizing Corporation, Aurora, Ind.**

**Continuation-in-part of Ser. No. 439,364, Feb. 4, 1974, abandoned, which is a continuation-in-part of Ser. No. 335,022, Feb. 23, 1973, abandoned. This application Dec. 20, 1974, Ser. No. 534,687**

**Int. Cl.² C05D** *3/02*

**U.S. Cl. 71—63** **4 Claims**




1. The process of preparing soil neutralizer and conditioner granules which both neutralize the soil and increase the water and neutrient holding capacity thereof, which comprises the steps:

A. mixing and grinding about 90 to 99% by weight of a finely divided calcium and magnesium bearing raw material selected from the group consisting of limestone, dolomitic limestone, and marl, with about 1% to 10% by weight of high expansion sodium bentonite;

B. continuously recycling a portion of the mixture for further grinding to produce the needed percentage of fines for a better and more uniform final product;

C. agitating the mixture and gradually adding water thereto so that the mixture has a water content of from about 1 to about 15% by weight, based on the weight of the dry material, to form granules, said water being sufficient in amount to activate the sodium bentonite;

D. drying the granules at a temperature within the range from about 100° to about 1000° F., and

E. screening the dried granules to recover the granules having a particle size which will pass through a ½ inch screen and at least be retained on a 60 mesh screen, said granules containing about 90 to 99% by weight of said raw material and about 1 to 10% by weight of said sodium bentonite.

## 4,015,974
## AMIDO PHOSPHOROTHIOLATES

**Takeo Satomi, Nishinomiya; Naganori Hino, Toyonaka; Koshi Tateishi, Minoo; Masachika Hirano, Toyonaka; Kunio Mukai, Nishinomiya; Katsuji Nodera, Takarazuka, and Mitsuru Sasaki, Nishinomiya, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan**

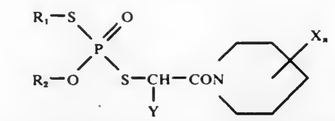
**Continuation of Ser. No. 385,473, Aug. 3, 1973, abandoned. This application Sept. 30, 1975, Ser. No. 618,264**

**Claims priority, application Japan, Aug. 5, 1972, 47-78666; May 24, 1973, 48-58833**

**Int. Cl.² C07D** *211/16*

**U.S. Cl. 71—87** **13 Claims**

1. A compound of the formula




(I)

wherein $R_1$ is lower alkyl, lower alkenyl, lower alkynyl, cycloalkyl having up to 6 carbon atoms, phenyl $C_1$-$C_2$ alkyl, and phenyl $C_1$-$C_2$ alkyl substituted with halogen or lower alkyl or halogen substituted alkenyl having up to 3 carbon atoms; $R_2$ is lower alkyl; Y is hydrogen or methyl, X is lower alkyl and n is an integer of 1 to 5.

## 4,015,975
## COMPOSITIONS CONTAINING ALKYL 2-NITRO-5-(2',4'-DICHLOROPHENOXY)-THIOBENZOATES, AND METHOD OF USE THEREOF

**Saburo Tamura, Tokyo; Tetsuo Takematsu, Utsunomiya, and Hisae Haruta, Ibaraki, all of Japan, assignors to Fujisawa Pharmaceutical Co., Ltd., Osaka, Japan**

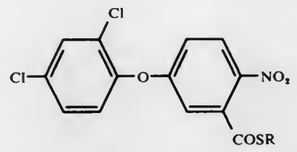
**Division of Ser. No. 542,052, Jan. 17, 1975, Pat. No. 3,953,489. This application Jan. 28, 1976, Ser. No. 653,117**

**Claims priority, application Japan, Apr. 10, 1974, 49-41129; June 10, 1974, 49-66276**

**Int. Cl.² A01N** *9/12*

**U.S. Cl. 71—100** **18 Claims**

1. A method of killing weeds, which comprises applying to said weeds an amount effective to injure said weeds of a compound of the formula:




wherein R is lower alkyl.

## 4,015,976
## N-ACETYL L-POLYCHLOROBENZAMIDE HERBICIDES

**Lewis William Watts, Jr., Austin, Tex., assignor to Texaco Development Corporation, New York, N.Y.**

**Division of Ser. No. 379,460, July 16, 1973, Pat. No. 3,959,370. This application June 26, 1975, Ser. No. 590,745**

**Int. Cl.² A01N** *9/20*

**U.S. Cl. 71—118** **1 Claim**

1. A process for controlling the growth of undesirable vegatation which comprises applying to said vegetation a herbicidally effective amount of N-ecetly-pentachlorobenzamide.

## 4,015,977
## PETROLEUM COKE COMPOSITION

**Chester C. Crawford, 13385 La Cresta Drive, Los Altos Hills, Calif. 94022**

**Continuation-in-part of Ser. No. 172,288, Aug. 16, 1971, abandoned. This application Apr. 24, 1974, Ser. No. 463,511**

**Int. Cl.² C22B** *1/08*

**U.S. Cl. 75—3** **7 Claims**

1. Metallurgical grade carbonaceous material in the form of agglomerates not less than about ¼ inch in diameter and suitable for use in metallurgical and calcining equipment for metal reduction, metal melting and calcining processes, said agglomerates consisting essentially of (a) a carbonaceous component, (b) an alkali metal silicate and (c) refractory component which is a metal oxide or a derivative of a metal oxide which on heating under conditions of use yields a metal oxide



said carbonaceous component (a) containing petroleum coke as at least a major ingredient, being present in the agglomerates in the form of particles the major part of which by weight are greater than 200 mesh in size;

said alkali metal silicate component (b) being selected from the class consisting of sodium silicate having an $SiO_2$/$Na_2O$ weight ratio between about 2.4/1 and 3.75/1 and potassium silicate having an $SiO_2/K_2O$ weight ratio between about 1.80/1 and 2.50/1;

the proportions of components (a), (b) and (c) being as follows:

the carbonaceous component (a) being present in major amount exceeding the combined weight of components (b) and (c) and such that the agglomerates, when ignited will continue to burn by forced or natural air draft and will serve as a reductant for ferrous metal oxides, to melt ferrous metal or to calcine linestone,

the alkali metal silicate component (b) being present in an amount not less than about 4% by weight of the agglomerates and sufficient to act as a binder for the carbonaceous component (a);

the refractory component (c) being selected and being present in an amount to increase the softening point of component (b) and to avoid softening of the agglomerates at service temperatures not less than about 2000° F.

said agglomerates having a mechanical strength sufficient to pass the drop-shatter test of ASTM D141-48.

## 4,015,978
## METHOD FOR PRODUCTION OF MAGNESIUM-CONTAINING BRIQUETS AND MAGNESIUM

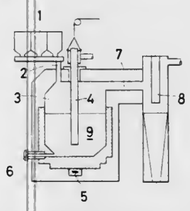
**Tomoo Matsushima; Tsutou Odajima; Junzo Tsuruki, and Yasuo Yoshida, all of Yokohama, assignors to Showa Denko Kabushiki Kaisha, Tokyo, Japan**

**Filed Oct. 17, 1975, Ser. No. 623,490**

**Claims priority, application Japan, Feb. 21, 1975, 50-20852; Feb. 21, 1975, 50-20853**

**Int. Cl.² C22B** *29/00*

**U.S. Cl. 75—10 A** **12 Claims**




1. Magnesium-containing briquets containing, as components each in a finely divided and dispersed state, magnesium oxide, components naturally present in a magnesium ore, one member selected from the group consisting of ferrosilicon and silicon, and calcium oxide, and having an overall bulk density in the range of from 1.4 to 2.2 g/cm³, squeeze strength at room temperature in the range of from 30 to 230 kg/cm², an overall porosity in the range of from 35 to 55% and a refractoriness in the range of Pyrometric Cone No. 15 to No. 31.

## 4,015,979
## BONDING OF PARTICULATE MATERIALS

**Robert Anthony Fishburn, and Frank Ernest George Ravault, both of Birmingham, England, assignors to Foseco International Limited, Birmingham, England**

**Continuation of Ser. No. 419,882, Nov. 28, 1973, abandoned. This application Oct. 31, 1975, Ser. No. 627,784**

**Claims priority, application United Kingdom, Dec. 11, 1972, 57048/72; Dec. 11, 1972, 57049/72**

**Int. Cl.² B01J** *2/00*

**U.S. Cl. 75—25** **5 Claims**

1. A method of bonding particulate material containing a source of metal ions which material is capable of reacting with an aqueous solution of formic acid to give ions of said metal, consisting essentially of:

a. treating said particulate material with said formic acid solution to form an acid solution containing ions of said metal together with unreacted or undissolved particulate material,

b. increasing the pH of said solution to convert said metal ions to a precipitated metal hydroxide, and

c. bonding said unreacted or undissolved particulate material with said hydroxide as a binder formed by steps (a) and (b).

## 4,015,980
## USE OF FLUORINATED β-DIKETONES IN THE SOLVENT EXTRACTION OF ZINC

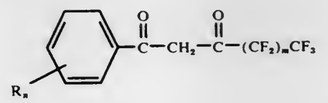
**Kenneth D. MacKay, Circle Pines, Minn., and R. Brantley Sudderth, Tucson, Ariz., assignors to General Mills Chemicals, Inc., Minneapolis, Minn.**

**Filed Aug. 4, 1975, Ser. No. 601,765**

**Int. Cl.² C22B** *19/26*

**U.S. Cl. 75—120** **6 Claims**

1. The process of recovering zinc from an aqueous ammoniacal solution thereof which comprises contacting said solution with a solution of a fluorinated β-diketone dissolved in an essentially water immiscible liquid hydrocarbon solvent to extract at least a portion of the zinc into the organic phase, separating the organic phase from the aqueous phase and stripping zinc from the organic phase, said β-diketone having the formula




where *n* is a whole integer of 1 to 4, *m* is 0, 1 or 2 and R is an alkyl group of 1–25 carbon atoms with the proviso that $R_n$ must provide solubility properties sufficient for the β-diketone and the resulting zinc complex thereof to be soluble at a level of at least 2% by weight in the essentially water immiscible liquid hydrocarbon solvent.

## 4,015,981
## TOOTH FILLING ALLOY

**Svetlana Tanovna Rogova, ulitsa Belomorskaya, 18, korpus 4, kv. 44; Mikhail Vladimirovich Pikunov, Vtoraya Parkovaya, 44, korpus 3, kv. 147; Alla Ivanovna Kuptsova, Slavyansky bulvar, 47, kv. 32; Galina Zakharovna Obukhova, Simferopolsky proezd, 16, korpus 2, kv. 82; Dmitry Mikhailovich Karalnik, Krasnoyarskaya ulitsa, 5, korpus 2, kv. 159, and Anatoly Ivanovich Rybakov, ulitsa Bakinskikh komissarov, 3, korpus 1, kv. 84, all of Moscowcow, U.S.S.R.**

**Filed Mar. 30, 1976, Ser. No. 671,955**

**Int. Cl.² C22C** *30/02*, *30/04*

**U.S. Cl. 75—134 B** **1 Claim**

1. A tooth filling alloy having the following composition, in percent by weight:

| | |
|---|---|
| gallium | 36 – 40 |
| tin | 26 – 27 |
| copper | 34 – 37 |

and prepared by mixing together 40 – 45 percent by weight of a eutectic liquid gallium-tin alloy containing 11 percent by weight of tin, with 55 – 60 percent by weight of a powdered copper-tin alloy of the formula $Cu_3Sn$, having particles of maximum size of 40 microns and containing 55 – 70 percent by weight of particles of $Cu_3Sn$ under 20 microns in size.

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**4,015,982**

## MOLD FOR CONTINUOUS CASTING PROCESS

**Katashi Saito; Kiminari Kawakami, and Moriyuki Ishiguro, all of Hiroshima, Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan**

**Continuation-in-part of Ser. No. 504,144, Sept. 9, 1974, abandoned, which is a continuation of Ser. No. 338,640, March 6, 1973, abandoned. This application July 29, 1975, Ser. No. 599,995**

**Claims priority, application Japan, Mar. 7, 1972, 47-22784**

**Int. Cl.² C22C** *9/00, 9/04*

**U.S. Cl. 75—156.5** **10 Claims**

1. A continuous casting, consisting essentially of Cu, 83 to 88%; Pb, maximum 0.5%; combination of Sn, Al and Fe, total 1.0% and remainder Zinc; and having a cooling capacity of 0.1 to 0.7 [Cal/(cm².° C·$\sqrt{\ }$ sec)] and thermal conductivity of 0.3 to 0.7 [Cal/(cm·sec·° C)].

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**4,015,983**

## METHOD OF ERASING MANIFOLD IMAGES

**Philip C. Schoonover, E. Rochester, N.Y., and Martin S. Maltz, Mississauga, Canada, assignors to Xerox Corporation, Samford, Conn.**

**Continuation-in-part of Ser. No. 575,107, May 6, 1975, abandoned. This application June 30, 1976, Ser. No. 701,324**

**Int. Cl.² G03G** *17/00, 13/00*

**U.S. Cl. 96—1 M** **4 Claims**




1. A method for forming and erasing a manifold image which comprises the steps of:

a. providing a sandwich comprising a layer of electrically photosensitive imaging material interpositioned between a donor sheet and a receiver sheet, said layer being structurally fracturable in response to the combined effect of an applied electrical field and exposure to electromagnetic radiation to which said material is sensitive, at least one of said sheets being at least partially transparent to said electromagnetic radiation;

b. exposing said layer to said electromagnetic radiation while said layer is subjected to a first electrical field of a predetermined voltage, one of said first electrical field and said radiation comprising an imagewise pattern while the other is uniformly applied to said imaging material layer, whereby a fracturable manifold image is created in said layer responsive to said imagewise pattern; and

c. uniformly applying in the dark an erasure electrical field of the same polarity as said first electrical field, said erasure electrical field having a voltage sufficiently higher than said predetermined voltage to cause substantially all of said layer to adhere preferentially to one of said sheets, whereby said fracturable manifold image is erased from said sandwich.

**4,015,984**

## INORGANIC PHOTOCONDUCTOR IN GLASS BINDS WITH GLASS OVERCOAT LAYER

**Wasaburo Ohta, and Koji Hirakura, both of Tokyo, Japan, assignors to Kabushiki Kaisha Ricoh, Tokyo, Japan**

**Continuation-in-part of Ser. No. 469,857, May 14, 1974, abandoned. This application May 28, 1975, Ser. No. 581,492**

**Claims priority, application Japan, May 17, 1973, 48-054872; July 18, 1973, 48-080268**

**Int. Cl.² G03G** *5/04*

**U.S. Cl. 96—1.5** **5 Claims**

1. A photosensitive material for use in electrophotography requiring at least two stages of charging, comprising a conductive substrate coated with a photoconductive layer containing an inorganic photoconductive substance and an inorganic glass and a transparent, inorganic glass insulating layer containing an inorganic high-dielectric substance, the said substance having a specific dielectric constant of from $10^2$ to $10^4$, the weight ratio of the inorganic photoconductive substance to the inorganic glass in the photoconductive layer being in the range of from 1:4 to 2:1, and the amount of the inorganic high-dielectric substance in the insulating layer being up to 25% by weight of that of the inorganic glass.

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**4,015,985**

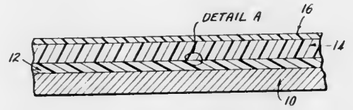
## COMPOSITE XEROGRAPHIC PHOTORECEPTOR WITH INJECTING CONTACT LAYER

**Robert N. Jones, Fairport, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

**Filed Apr. 9, 1975, Ser. No. 566,456**

**Int. Cl.² G03G** *5/08*

**U.S. Cl. 96—1.5** **5 Claims**




1. A photosensitive member comprising a conductive substrate, an intermediate layer overlying said substrate and a photoconductive layer overlying said intermediate layer, said photoconductive layer comprising an insulating organic resin matrix containing therein photoconductive particles from 0.01 to 1.0 microns in size, with substantially all of the photoconductive particles being in substantial particle-to-particle contact in said member in a multiplicity of interlocking photoconductive paths through the thickness of said layer, said photoconductive paths being present in a volume concentration, based on the volume of said layer, of from about 1 to 25 percent, with the outer surface of said photoconductive layer comprising organic resin material, said intermediate layer comprising an insulating organic resin matrix bonded to both said photoconductive layer and said substrate, said intermediate layer further comprising, based on the volume of said intermediate layer, from 25 to 99 percent conductive particles selected from the group consisting of silver, gold, platinum, copper and brass ranging in size from 0.1 to 5.0 microns dispersed uniformly in said intermediate layer, said intermediate layer being joined to said photoconductive layer along an interface wherein at least a portion of said photoconductive particles in said photoconductive layer contact at least a portion of said conductive particles in said intermediate layer, said conductive particles having available charge carriers at suitable energy levels whereby said photoconductive particle to conductive particle contact points constitute individual charge carrier injecting contact points.



**4,015,986**

## METHOD OF DEVELOPING AND STRIPPING POSITIVE PHOTORESIST

**Gabor Paal, Stuttgart, and Jürgen F. Wüstenhagen, Boeblingen, both of Germany, assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Aug. 22, 1975, Ser. No. 607,000**

**Claims priority, application Germany, Oct. 3, 1974, 2447225**

**Int. Cl.² G03C** *5/00;* **G03F** *7/08*

**U.S. Cl. 96—36** **3 Claims**

1. A method of forming a patterned resist mask on a substrate comprising coating a layer of novolak resin based positive photoresist comprising an alkali-soluble phenolformaldehyde novolak resin and a 1,2-diazide naphthoquinone sensitizer, on said substrate, selectively exposing said layer to actinic radiation through a patterned mask, subsequently baking said layer at a temperature between 130° and 210° C, and then developing said layer with an aqueous solution consisting essentially of between about 0.038 and 1.5 percent by weight of a permanganate and between about 2 to 30 percent by weight of phosphoric acid such that only the exposed areas of said layer area completely removed to leave a patterned resist mask of unexposed resist on said substrate.

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**4,015,987**

## PROCESS FOR MAKING CHIP CARRIERS USING ANODIZED ALUMINUM

**Robert F. Garry, Sunnyvale, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Aug. 13, 1975, Ser. No. 604,392**

**Int. Cl.² G03C** *5/00*

**U.S. Cl. 96—36.2** **5 Claims**

1. A process for making chip carriers with an anodized aluminum substrate comprising:

punching registration and center holes in an aluminum substrate;

anodizing the aluminum substrate;

coating the top surface of said substrate with adhesive;

laminating a thin metal foil to said top surface;

coating said metal surface with photo resist;

pin registration printing the image of a circuit by masking said photo resist covered metal surface with a photo template registered to said substrate and irradiating the exposed photo resist;

developing the image of the electrical circuit by removing the exposed or non-exposed portions of the photo resist;

etching the bared developed portions of said thin metal foil to form leads;

recoating the substrate with photo resist;

exposing the photoresist in areas overlying said leads to radiation;

baring said leads by developing of the photoresist;

plating said leads with thick nickel;

exposing the remainder of said photoresist to bare the remainder of said circuit; and

activating and plating said circuit, said circuit comprising the nickel coated leads and the bared metal foil, with gold.

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**4,015,988**

## MULTILAYER COLOR PHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL

**Keisuke Shiba; Takeshi Hirose; Jun Hayashi, and Toshiaki Aono, all of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan**

**Filed Mar. 4, 1975, Ser. No. 555,314**

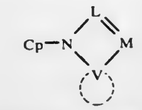
**Claims priority, application Japan, Mar. 4, 1974, 49-25482**

**Int. Cl.² G03C** *1/76, 7/00, 1/06, 1/40*

**U.S. Cl. 96—69** **14 Claims**

1. A multilayer color photographic light-sensitive material which comprises a support having thereon at least two silver halide emulsion layer units, each of which is sensitive to radiation of a substantially different wavelength region within the wavelength region from about 220 nm to about 800 nm and which contains a color-forming coupler capable of forming a dye on coupling with an oxidized primary aromatic amine developing agent,

with at least one of the emulsion layer units containing an ICC coupler represented by the general formula (I)

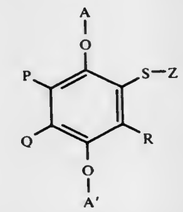



(I)

wherein Cp represents a coupler residue bonded at its coupling position to the N of formula (I); L and M each represents a nitrogen atom or a

methine group, and at least one of L and M represents a nitrogen atom; and V represents a monocyclic or dicyclic aromatic ring of the benzene series; which releases a triazole derivative or a diazole derivative on coupling with an oxidized primary aromatic amine developing agent, and

with the emulsion layer unit containing the ICC coupler or another layer containing a hydroquinone derivative represented by the general formula (II)




(II)

wherein A and A′ each represents a hydrogen atom or a group capable of being eliminated by an alkali, and A′ can combine with R or Q to form a ring; P, Q or R each represents a hydrogen atom, an alkyl group, an aryl group, an alkylthio group, an arylthio group, a hydroxy group, a halogen atom, an alkoxy group, an aryloxy group, a heterocyclic ring or an —S—Z group, and P and Q can combine to form a ring; and Z represents a heterocyclic ring residue substantially photographically inert in a bonded state; which releases imagewise depending upon development a compound having a mercapto group and/or a coupler which releases a compound having a mercapto group on coupling with an oxidized primary aromatic amine developing agent.

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**4,015,989**

## COLOR LIGHT-SENSITIVE MATERIAL WITH SPONTANEOUSLY DEVELOPABLE SILVER HALIDE EMULSION CONTAINING DESENSITIZING DYE

**Yasushi Oishi, and Masanao Hinata, both of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan**

**Filed Jan. 30, 1975, Ser. No. 545,671**

**Claims priority, application Japan, Jan. 30, 1974, 49-12453**

**Int. Cl.² G03C** *1/40, 1/76, 1/48, 7/00*

**U.S. Cl. 96—77** **26 Claims**

1. A color photographic light-sensitive material which comprises a support having thereon at least one emulsion layer unit comprising:

A. a hydrophilic colloid layer containing spontaneously developable silver halide grains which are associated with a color coupler capable of reacting with an oxidation product of an aromatic primary amino colour developing agent to provide a dye and which are rendered substan-

tially light-insensitive with a desensitizing dye which is so strongly adsorbed on said spontaneously developable silver halide grains that it does not substantially migrate to a negative-type light sensitive silver halide emulsion layer adjacent thereto, and,

B. an adjacent negative-type light-sensitive silver halide emulsion layer associated with a compound capable of reacting with an oxidation product of an aromatic primary amino color developer to release a diffusible development inhibitor.

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## 4,015,990

## COLOR PHOTOGRAPHIC LIGHTSENSITIVE MATERIAL

**Yaichi Ishida; Hiroshi Ikeda, and Shigetoshi Hiraishi, all of Nagaokakyo, Japan, assignors to Mitsubishi Paper Mills, Ltd., Tokyo, Japan**

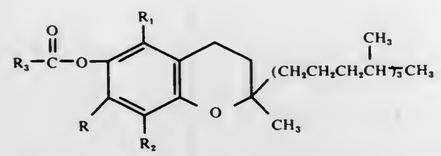
**Filed June 19, 1975, Ser. No. 588,653**

**Claims priority, application Japan, July 9, 1974, 49-78421**

**Int. Cl.² G03C** *1/84, 7/00*

**U.S. Cl. 96—84 UV** **8 Claims**

**1.** In a color photographic lightsensitive material comprising a support and, coated thereon, a coupler-dispersed silver halide emulsion, the improvement in that the said emulsion contains as a light-fading stabilizer at least one tocopherol derivative having the general formula,



(I)

wherein R, $R_1$ and $R_2$ represent individually a hydrogen atom or a methyl group; and $R_3$ represents a straight chain or branched-chain alkyl group having 1 to 18 carbon atoms, or a methyl substituted or unsubstituted aryl group.

**3.** A color photographic lightsensitive material as claimed in claim **1**, which additionally contains an ultraviolet absorber.

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## 4,015,991

## LOW FLUID LOSS CEMENTING COMPOSITIONS CONTAINING HYDROLYZED ACRYLAMIDE/2-ACRYLAMIDO-2-METHYLPROPANE SULFONIC ACID DERIVATIVE COPOLYMERS AND THEIR USE

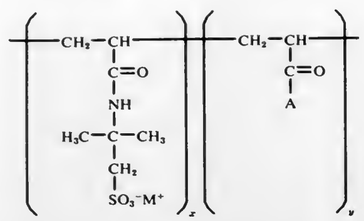
**Leonard J. Persinski, Pittsburgh, Pa.; Michael M. Cook, Boxford, Mass., and Sally Lee Adams, Pittsburgh, Pa., assignors to Calgon Corporation, Pittsburgh, Pa.**

**Continuation-in-part of Ser. No. 602,940, Aug. 8, 1975, abandoned. This application May 10, 1976, Ser. No. 684,530**

**Int. Cl.² C04B** *7/35*

**U.S. Cl. 106—90** **3 Claims**

**1.** A low fluid loss cement composition capable of forming a fluid slurry when mixed with water, said cement composition comprising dry hydraulic cement and from about 0.05 to about 5.0 percent by weight, based on weight of hydraulic cement on a dry basis, of a water-soluble copolymer having a molecular weight of at least 10,000, said copolymer having the formula:



wherein A is independently selected from $—NH_2$ and $—^-M^-$, provided at least 20 percent of the A groups are $—^-M^+$; M is hydrogen, ammonium, sodium or potassium; *x* is from about 10 to about 90 mole percent; and *y* is from about 90 to about 10 mole percent.

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## 4,015,992

## PROCESS FOR ACTIVATING A NON-CONDUCTIVE SUBSTRATE AND COMPOSITION THEREFOR

**Horst Jung, Bielefeld; Karl-Wilhelm Sassenroth, Heepen, and Nikolaus Ferenczy, Altenhagen, all of Germany, assignors to Dr. Hesse & Cie. Spezialfabrik fur Galvanotechnik, Bielefeld-Heepen, Germany**

**Filed Nov. 19, 1973, Ser. No. 416,812**

**Claims priority, application Germany, Nov. 23, 1972, 2257378**

**Int. Cl.² C23C** *3/02*

**U.S. Cl. 106—1** **3 Claims**

**1.** An aqueous composition for activating a non-conductive substrate prior to metallization, consisting essentially of the reaction product obtained by reducing a solution of a salt of a metal of the palladium or platinum group or of gold with an excess of a polysaccharide, or a derivative thereof, capable of serving as a protective colloid for a noble metal sol and having at least one reactive aldehyde group, said composition having a pH of from 1.5 to 4.5.

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## 4,015,993

## HYDRAULIC COMPOSITION WITH ADDITIVE

**Tadao Natsuume, Yokosuka, Japan, assignor to Nippon Zeon Co., Ltd., Tokyo, Japan**

**Filed Feb. 12, 1975, Ser. No. 549,486**

**Claims priority, application Japan, Feb. 19, 1974, 49-19730**

**Int. Cl.² C04B** *7/02, 7/35*

**U.S. Cl. 106—90** **9 Claims**

**1.** A hydraulic composition comprising 100 parts by weight of a hydraulic substance selected from portland cement, alumina cement, blast furnace slag or a mixture of quicklime and siliceous sand and 0.01–2 parts by weight of a cyclopentane derivative selected from 1,2,3,4-cyclopentanetetracarboxylic acid and alkali metal, alkaline earth metal and ammonium salts of 1,2,3,4-cyclopentanetetracarboxylic acid.

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## 4,015,994

## COATED GLASS FIBERS

**Homer G. Hill, Newark, Ohio, assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio**

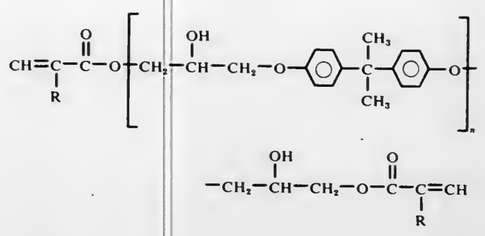
**Continuation-in-part of Ser. No. 523,306, Nov. 13, 1974, abandoned, which is a division of Ser. No. 442,529, Feb. 14, 1974, abandoned. This application Oct. 14, 1975, Ser. No. 622,186**

**Int. Cl.² C04B** *7/02*

**U.S. Cl. 106—99** **9 Claims**

**1.** A cementitious product comprising a composite of reinforcing materials and a cementitious matrix wherein one of the reinforcing materials comprises glass fibers having a thin coating on the surfaces of the fibers wherein the coating consists essentially of a vinyl ester represented by the formula:





wherein *n* is a number from 1 to 20 and each R group is hydrogen or an alkyl radical having 1 to 10 carbon atoms.

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## 4,015,995

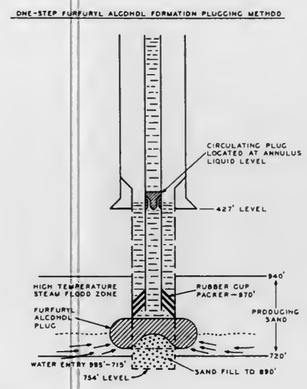
## METHOD FOR DELAYING THE SETTING OF AN ACID-SETTABLE LIQUID IN A TERRESTRIAL ZONE

**Patrick H. Hess, Diamond Bar, Calif., assignor to Chevron Research Company, San Francisco, Calif.**

**Division of Ser. No. 418,624, Nov. 23, 1973, Pat. No. 3,943,084, which is a division of Ser. No. 273,256, July 19, 1972, Pat. No. 3,850,249. This application Aug. 25, 1975, Ser. No. 607,312**

**Int. Cl.² C08K** *3/36*

**U.S. Cl. 106—287 S** **5 Claims**




**1.** The method of setting an acid-settable liquid which sets at a temperature in the range from about −10° C. to 175° C. at a pH of less than about 5, which comprises dissolving in said liquid in parts by weight an amount of a delayed latent catalyst in the range from about 2 to 20 parts per 100 parts of the liquid, said catalyst being a mixture of a component which releases a strong acid and a basic component wherein the mixture contains an amount of base in the range from 0.02 to 0.98 equivalent per equivalent of releasable strong acid from the acid-releasing component; said liquid being an inorganic liquid selected from the group consisting of inorganic aqueous or alcoholic silicates said basic component being one or more suitable bases selected from the group consisting of organic and inorganic salt-forming bases having a pKb of less than about 13.5; and said acid-releasing component being one or more substantially neutral compounds selected from the group consisting of organic compounds which release a strong acid under solvolytic conditions at a rate in the range of from about $10^{-3}$ to $10^{-6}$ equivalent of the acid per liter per minute at said temperature.

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## 4,015,996

## AMORPHOUS PRECIPITATED SILICEOUS PIGMENTS

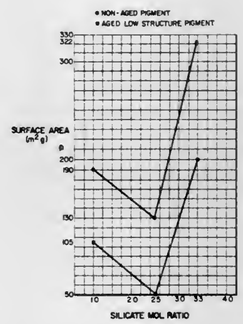
**Satish K. Wason, Churchville, Md., assignor to J. M. Huber Corporation, Locust, N.J.**

**Continuation-in-part of Ser. No. 519,720, Oct. 31, 1974, which is a continuation-in-part of Ser. No. 286,655, Sept. 6, 1974, Pat. No. 3,893,840. This application Apr. 2, 1975, Ser. No. 564,255**

*Disclosure was also published under second Trial Voluntary Protest Program on Mar. 30, 1976*

**Int. Cl.² C09C** *1/30*

**U.S. Cl. 106—288** **2 Claims**




**1.** A new composition of matter comprising an amorphous, finely divided precipitated silica pigment having a wet cake moisture content of less than 70 percent; an oil absorption on the order of less than 125 cc/100 gm; pack densities of greater than 12 pounds/cu. ft.; a valley abrasion of greater than 5.0 mg. wire loss; a surface area in the range of from 100 to 300 $m^2$/gm; and a refractive index of greater than 1.445, said silica having intimately admixed and associated therewith a metal cation selected from the group consisting of aluminum, magnesium, calcium and zinc, said cation being present in an amount of up to 10 percent by weight based on the total weight of said silica and serving to control the refractive index such that same is greater than 1.445 and serving to control the surface area such that same is in the range of from about 100 to 300 $m^2$/gm.

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## 4,015,997

## PROCESS FOR STABILIZING AQUEOUS COAL SLUDGES

**Joseph G. Selmeczi; Donald H. Marlin, both of Pittsburgh, and Daniel W. Kestner, Coraopolis, all of Pa., assignors to Dravo Corporation, Pittsburgh, Pa.**

**Continuation-in-part of Ser. No. 339,151, March 8, 1973, Pat. No. 3,920,795. This application July 22, 1975, Ser. No. 598,117**

**The portion of the term of this patent subsequent to Nov. 18, 1992, has been disclaimed.**

**Int. Cl.² C08K** *11/00*

**U.S. Cl. 106—287 R** **5 Claims**

**1.** A process for converting an aqueous coal processing waste sludge, containing finely divided coal particles and waste materials from the beneficiation of coal, into a sedentary mass of improved load supportive properties comprising:

a. providing a concentrated aqueous coal processing waste sludge having a solids content in the range of 20–80 weight percent solids;

b. adding to the concentrated sludge between 2–50 percent by weight, based on the weight of said solids, of granulated blast furnace slag;

c. intimately mixing the combined concentrated sludge and granulated blast furnace slag; and

d. maintaining the resulting mixture in a substantially quiescent stage and in the presence of excess water to produce a sedentary mass.

**4,015,998**

## 2,9-DICHLOROQUINACRIDONE PIGMENT COMPOSITIONS

**Edward Ephraim Jaffe, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Sept. 24, 1975, Ser. No. 616,378**

**Int. Cl.² C09B** *48/00*

**U.S. Cl. 106—288 Q** **5 Claims**

1. Pigmentary 2,9-dichloroquinacridone characterized by 20 values of its X-ray powder diffraction pattern having a strong band at 27.8°, medium bands at 5.3°, 15.2° and 23.2° and weak bands at 14.0°, 16.5°, 19.2°, 21.3° and 22.8°.

2. Pigmentary composition containing from 50 to 3% by weight of the 2,9-dichloroquinacridone of claim 1 in combination with 50 to 97% by weight of molybdate orange.

**4,015,999**

## PIGMENT COMPOSITIONS

**George Heddle Robertson, Paisley, and John Andrew Stirling, Glasgow, both of Scotland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

**Filed Dec. 19, 1975, Ser. No. 642,268**

**Claims priority, application United Kingdom, Jan. 8, 1975, 729/75; May 30, 1975, 23570/75**

**Int. Cl.² C08J** *3/00*; **C09C** *1/00*

**U.S. Cl. 106—308 Q** **9 Claims**

1. Pigment composition in the form of free-flowing, non-dusting, non-aggregating, non-sticky generally spherical beads which comprises from 40 to 80% by weight of a pigment or water-insoluble dyestuff from 5 to 40% by weight of a normally solid water-insoluble organic compound carrier or mixture of carriers melting below 100° C, from 2.5 to 25% of an organic acid having at least 8 carbon atoms and from 1.5 to 25% of an organic base having at least 8 carbon atoms, the amount of acid plus base being from 5 to 35% by weight of the total composition, and wherein said beads have a particle size of from 0.5 to 5 mm diameter.

**4,016,000**

## ORGANOSILICONE POLYMER SOLUTIONS

**Bela Prokai, Mahopac, and Bernard Kanner, West Nyack, both of N.Y., assignors to Union Carbide Corporation, New York, N.Y.**

**Division of Ser. No. 420,233, Nov. 29, 1973, Pat. No. 3,887,500, which is a division of Ser. No. 279,883, Aug. 11, 1972, Pat. No. 3,846,462. This application Sept. 6, 1974, Ser. No. 503,776**

*Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976*

**The portion of the term of this patent subsequent to Jan. 27, 1993, has been disclaimed.**

**Int. Cl.² C08K** *5/06*; **C08L** *75/08, 83/12*

**U.S. Cl. 106—316** **5 Claims**

1. Solution compositions comprising polymer Component (A) and solvent Component (B), said Component (A) being present in an amount from about 25 to about 80 parts by weight per 100 parts by weight of the total weight of (A) and (B), where:

Component (A) is an organosilicone polymer having the average formula,

$$R_3SiO[R_2SiO]_x[RSiO]_y[RSiO]_zSiR_3$$

$$\qquad\qquad R'CN \quad R''_p(OC_2H_4)_s(OC_3H_6)_mOW$$

wherein: R is an alkyl group having from 1 to 10 carbon atoms; R′ is a bivalent alkylene or a bivalent oxyalkylene group the oxygen atom of which is bonded to silicon; R″ is an organic radical comprising a bivalent alkylene radical a carbon atom of which is bonded to silicon; W comprises a monovalent hydrocarbyl group having from 1 to 12 carbon atoms; $p$ has a value of zero or one; $x$ has an average value of from about 10 to about 200; $y$ has an average value of from 3 to about 100; $z$ has an average value of from about 2 to about 30; and $m$ and $n$ are numbers such that the average molecular weight of the chain, $-(C_3H_6O)_m(C_2H_4O)_n-$, is from about 1,000 to about 6,000 and from about 20 to about 65 weight per cent of the chain is constituted of oxyethylene units; and

Component (B) is an alkylene oxide adduct of butanol having the formula $C_4H_9(OC_3H_6)_u(OC_2H_4)_sOH$, wherein the average value of $s$ is from about 8 to about 50 and the average value of $u$ is from about 6 to about 40.

**4,016,001**

## METHOD AND DEVICE FOR OBTAINING SUGAR CRYSTALS FROM A SUGAR SOLUTION

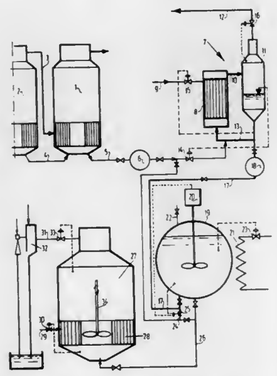
**Dirk Hoks, Hengelo, Netherlands, assignors to Stork Werkspoor Sugar B.V., Hengelo and Suiker Unie Holding B.V., Rotterdam, both of Netherlands**

**Filed June 13, 1975, Ser. No. 586,658**

**Claims priority, application Netherlands, June 14, 1974, 7408016**

**Int. Cl.² C13F** *1/00, 1/02*

**U.S. Cl. 127—16** **20 Claims**



13. In a system for obtaining sugar crystal from a sugar solution which includes a multi-stage evaporator and a boiling pan, the improvement which comprises:

a preconcentrator including supply means connecting said preconcentrator to a last stage of the multi-stage evaporator for supplying sugar solution of predetermined concentration to the preconcentrator, means for supplying heat to the preconcentrator and means for withdrawing steam from the sugar solution in the preconcentrator at a rate sufficient to maintain the pressure within the preconcentrator at less than atmospheric pressure whereby the concentration of the sugar solution within the preconcentrator is increased to a value at which seed crystals could be added to such solution if it were directly introduced into said boiling pan;

a holding vessel and supply means connecting said preconcentrator to the holding vessel for feeding sugar solution to said holding vessel, conduit means connnecting said holding vessel to the boling pan and including normally closed valve means for allowing sugar solution to accumulate in said holding vessel whereafter it is delivered batchwise to the boiling pan, agitating means for continuously stirring the contents of said holding vessel, means for maintaining a pressure within said holding vessel sufficiently higher than that in said preconcentrator as to prevent further concentration of said sugar solution in the holding vessel; and

said boiling pan including means for withdrawing steam therefrom at a rate sufficient to maintain the pressure in the boiling pan lower than atmospheric pressure and lower than that in said holding vessel, condenser means for condensing the steam issuing from said boiling pan, and means for supplying heat to said boiler pan.



**4,016,002**

## METHOD FOR REMOVING HEAT-INSULATING MATERIAL FROM AN INGOT MOLD BEFORE THE REMOVAL OF THE INGOT

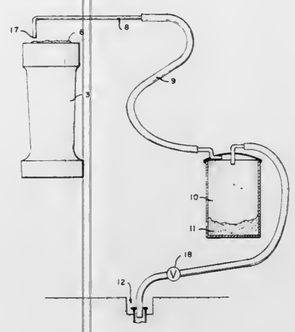
**Hannes Vallak, Geneva, Switzerland, assignor to Enn Vallak, Geneva, Switzerland**

**Continuation-in-part of Ser. No. 450,430, March 12, 1974, abandoned. This application Nov. 11, 1975, Ser. No. 630,788**

**Claims priority, application Sweden, Mar. 20, 1973, 7303892**

**Int. Cl.² B08B** *5/04*

**U.S. Cl. 134—6** **6 Claims**



1. A method for removing heat-insulating material, at least some of which is frangibly caked, from a partially cooled ingot mold containing a relatively hot ingot before removal of the hot ingot from the mold, comprising the steps of:

a. providing a low-pressure vacuum;

b. conducting said low-pressure vacuum through a rigid, manipulatable, heat-resistant conduit; and

c. simultaneously fragmentizing portions of the caked heat-insulating material with, and applying the low-pressure vacuum through, said rigid conduit for removing the material from the mold.

**4,016,003**

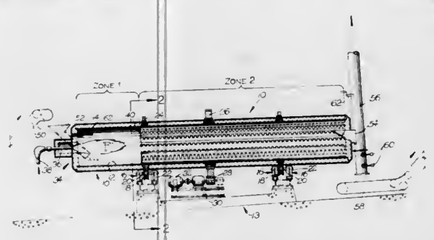
## BENEFICIATION OF METAL SCRAP

**William O. Stauffer, Moraga, Calif., assignor to Kaiser Aluminum & Chemical Corporation, Oakland, Calif.**

**Filed Jan. 23, 1976, Ser. No. 651,999**

**Int. Cl.² B08B** *7/00*

**U.S. Cl. 134—19** **17 Claims**




1. An apparatus for use in beneficiating relatively small shredded aluminous metal particles or the like covered with volatilizable materials comprising the combination of a somewhat inclined and rotatable roaster-type device, means for rotating said roaster-type device at selected speeds, said roaster-type device being provided with a metal particle entry end and a metal particle exit end, flame means for selectively heating said roaster-type device at the metal particle entry end thereof, means for introducing the metal particles into the said metal particle entry end of the roaster-type device and off to the one side of and below said flame means so as to avoid direct flame and particle contact, a plurality of rows of toothed flight elements radially mounted within said roaster-type device, said flight elements commencing a selected distance downstream from the material entry end of the roaster-type device and extending along the length of the roaster-type device for a major portion of the said length, said flight elements being adapted to contact and effect a separation of the metal particles one from another as well as a distribution of the metal particles cross-wise of the device and tumbling and cascading movements of the metal particles initially at points remote from the said metal particles entry end during passage of the metal particles through the roaster-type device so as to effect substantially full exposure of the volatile covered surfaces of the metal particles to the heat of the roaster-type device but without direct flame and particle contact, and means for recovering the beneficiated metal particles at the exit end of the roaster-type device.

10. A process for beneficiating shredded aluminous scrap metal particles of irregular shapes the exposed surfaces of certain of which are at least partly covered with volatilizable materials, comprising the steps of introducing said particles into the bottom area of a heated particle receiving zone while avoiding direct contact between the heat producing medium utilized to heat the said zone and the scrap metal particles, allowing said particles to flow freely downward into an adjoining and second heated zone located in open communication with said first zone and while distributing said particles substantially evenly across various portions of said second zone causing the particles to pass through said second zone in the form of cascading streams of repeatedly tumbled particles so as to effect maximum exposure of substantially all outer surfaces of the particles covered with volatilizable materials to the heat of the said zones and a volatilization of the volatilizable materials clinging thereto and during passage of the particles throughout all of the said zones maintaining the elevated temperatures of said zones below the ignition point of the volatilizable materials.

**4,016,004**

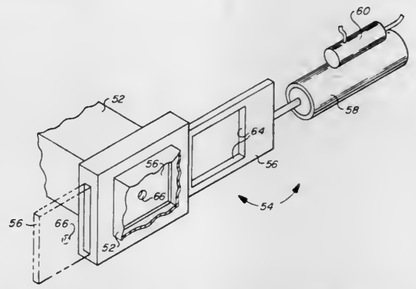
## TRASH COLLECTING SYSTEM FOR OPEN-END SPINNING MACHINE

**Ernest Koella, III, Rockford, Tenn., assignor to Platt Saco Lowell Limited, England**

**Filed June 25, 1975, Ser. No. 590,368**

**Int. Cl.² B08B** *5/04*; **D01H** *11/00*

**U.S. Cl. 134—21** **24 Claims**



1. In combination with an open-end spinning machine including a trash box having a trash-inlet opening and a trash-outlet opening therein, an improved method for collecting trash introduced into said box through said inlet, comprising:

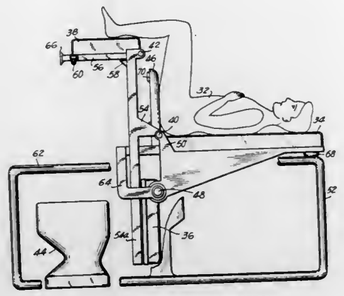
intermittently evacuating, at successive periodic times, trash from said box through said outlet;

and at other times applying to trash within said box a suction force adapted and effective to then retain the trash within said box and discourage possible reverse-passage of the trash through said inlet.

## 4,016,005
## METHOD OF TRANSFERRING A PERSON FROM A RECLINED POSITION TO A SEATED POSITION

**Paul L. DiMatteo, Huntington, N.Y., assignor to Dynell Electronics Corporation, Melville, N.Y.**

**Filed Jan. 28, 1975, Ser. No. 544,710**
**Int. Cl.² A61G 7/02, 7/10; B08B 3/02**
**U.S. Cl. 134—30** **23 Claims**



**1.** A method for placing a person onto a toilet from a reclined position comprising the sequentially taken steps of: supporting the back side of the person; moving the calves and thighs of the person in a direction toward the front side of the upper part of the person's body; bending said person's knees; uncovering substantially the posterior of said person, at least part of the weight of said person being directed away from said posterior during uncovering of said posterior; moving a toilet seat in contact with the posterior of said person independent of the toilet, said toilet being stationary when moving said toilet seat; moving said person to an upright seated position; and placing said person over the toilet in seated position with the lower part of the legs directed downwardly, the upper surface of said toilet seat contacting directly the posterior of said person when seated over said toilet, the backside of said person being supported while said person is moved to the seated position.

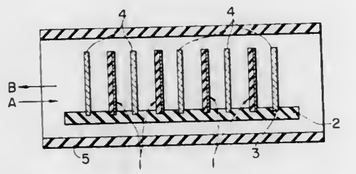
**4.** The method as defined in claim **1** including the steps of cleansing the posterior of said person with a fluid and drying thereafter the posterior of said person prior to returning the person to the reclined position.

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## 4,016,006
## METHOD OF HEAT TREATMENT OF WAFERS

**Akira Yoshinaka, Tokyo; Takaaki Aoshima, and Yoshimitsu Sugita, both of Kokubunji, all of Japan, assignors to Hitachi, Ltd., Japan**

**Continuation-in-part of Ser. No. 627,368, Oct. 30, 1975, abandoned. This application Mar. 16, 1976, Ser. No. 667,452**
**Claims priority, application Japan, Oct. 30, 1974, 49-124415**
**Int. Cl.² H01L 21/324**
**U.S. Cl. 148—1.5** **8 Claims**



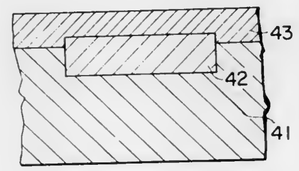
**1.** In a method of heat-treating a number of wafers each of which consists of a substance of poor heat conduction and a semiconductor layer formed on one surface thereof, said method of heat treatment of wafers comprising the fact that the treatment is performed under the state under which an auxiliary wafer made of a substance of good heat conduction is held in proximity to that surface of said substance of poor heat conduction which is opposite to said one surface.

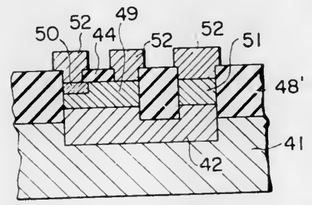
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## 4,016,007
## METHOD FOR FABRICATING A SILICON DEVICE UTILIZING ION-IMPLANTATION AND SELECTIVE OXIDATION

**Yasuo Wada, Tokyo; Hiroo Usui, Machida; Mitsumasa Koyanagi, Kokubunji, and Mikio Ashikawa, Koganei, all of Japan, assignors to Hitachi, Ltd., Japan**

**Filed Feb. 13, 1976, Ser. No. 658,065**
**Claims priority, application Japan, Feb. 21, 1975, 50-21008**
**Int. Cl.² H01L 21/76, 21/265**
**U.S. Cl. 148—1.5** **9 Claims**





**1.** A method for fabricating a semiconductor silicon device comprising:

1. growing an thin silicon oxide film by thermal oxidation on a surface of a monocrystal silicon substrate;
2. forming a polycrystalline silicon film at at least one predetermined location on said thin oxide film;
3. implanting nitrogen ions at a dose level greater than $1 \times 10^{15}$ $cm^{-2}$ in the outer surface of said polycrystalline silicon film and the exposed surface of said thin oxide film; and
4. forming a thick silicon oxide film serving as dielectric isolation structure by wet oxidation of the exposed surfaces.

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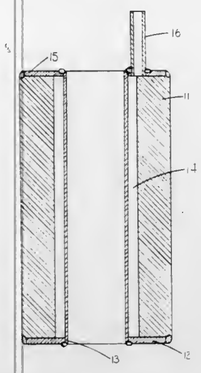
## 4,016,008
## CLAD METAL TUBES

**Robin Mackay Forbes Jones, Titusville, and Walter Adrian Petersen, Ridgewood, both of N.J., assignors to The International Nickel Company, Inc., New York, N.Y.**

**Filed July 31, 1975, Ser. No. 600,613**
**Int. Cl.² B22F 7/04**
**U.S. Cl. 138—140** **18 Claims**

**1.** A process for preparing a composite metallic tubular member having an internally-lined metal surface comprising: preparing a metal shell having concentric inner and outer surfaces; attaching to said metal shell a first end closure plate and a metal inner liner so that said metal shell and said metal inner liner are concentrically aligned, thereby forming an annular space; pouring a pre-alloyed, argon atomized metal powder into said annular space between said metal shell and said metal inner liner; attaching to said metal shell and said metal inner liner a second end closure plate thereby enclosing said annular space containing said metal powder and completing an assembly; heating said assembly for a time period sufficient to substantially through-heat said assembly to a temperature substantially corresponding to the extrusion temperature to be employed; and extruding said assembly through an extrusion die to produce said composite metallic tubular member having an internally-lined metal surface.





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## 4,016,009
## PRODUCING ROLLED STEEL PRODUCTS

**Mario Economopoulos, Liege, and Yves Jean Respen, Herstal, both of Belgium, assignors to Centre de Recherches Metallurgiques-Centrum voor Research in de Metallurgie, Brussels, Belgium**

**Filed Jan. 29, 1976, Ser. No. 653,607**
**Claims priority, application Belgium, Jan. 29, 1975, 824960; Feb. 28, 1975, 826201**
**Int. Cl.² C21D 9/52**
**U.S. Cl. 148—12 B** **10 Claims**

**1.** A method of producing a rolled steel product in a rolling mill including finishing stands, the method comprising the steps of reducing the temperature of the product, before it enters the finishing stands, to a value between $Ac_3$ and $Ac_3 + 150°$ C; quenching the product emerging from the finishing stands, thereby forming a quenched surface comprising martensite and/or bainite, the product still having an unquenched core; and allowing heat from the core to raise the temperature of the quenched surface to a value between 450° and 750° C, whereby the quenched surface is tempered.

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## 4,016,010
## PREPARATION OF HIGH STRENGTH COPPER BASE ALLOY

**Ronald N. Caron, Branford, and Stanley Shapiro, New Haven, both of Conn., assignors to Olin Corporation, New Haven, Conn.**

**Filed Feb. 6, 1976, Ser. No. 655,791**
**Int. Cl.² C22F 1/08**
**U.S. Cl. 148—12.7 C** **13 Claims**

**1.** A method for obtaining a spinodal, precipitation hardened copper base alloy having high strength and favorable strength to ductility characteristics which comprises:

A. providing a copper base alloy consisting essentially of from 10 to 30% nickel, from 1 to 5% aluminum, balance copper;
B. hot working said alloy with a finishing temperature in excess of 400° C;
C. solution annealing said alloy for from 10 seconds to 24 hours at a temperature of from 650° to 1100° C; and
D. cooling the alloy to room temperature

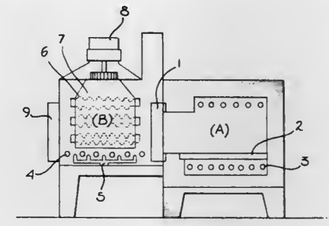
to provide a spinodal, precipitation hardened copper base alloy wherein the microstructure is characterized by the presence of finely dispersed precipitates of $Ni_3Al$ particles dispersed throughout the matrix.

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## 4,016,011
## METHOD FOR HEAT TREATMENT OF HIGH ALLOY STEEL IN A NONEXPLOSIVE ATMOSPHERE

**Takeji Asai, and Kaishu Yamazumi, both of Toyama, Japan, assignors to Kabushiki Kaisha Fujikoshi, Japan**

**Filed Sept. 10, 1975, Ser. No. 612,222**
**Claims priority, application Japan, Apr. 2, 1975, 50-40520**
**Int. Cl.² C21D 1/48**
**U.S. Cl. 148—16** **5 Claims**



**1.** A high temperature method for heat treatment of a high alloy steel article comprising the steps of:

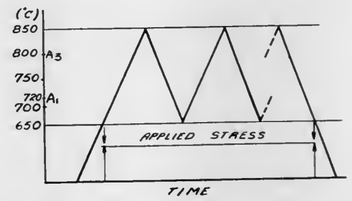
mixing nitrogen gas with a liquid organic compound having at least one oxygen atom;
heating the mixture until said liquid organic compound is caused to crack whereby a nonexplosive, neutral or weak reducing atmosphere of 0.5 to 1.5 percent carbon monoxide by volume, 0.5 to 2.5 percent hydrogen by volume, a minute quantity of activated carbon and the remainder being nitrogen is created;
subjecting said article to said atmosphere; and
heating said article to a high temperature in said atmosphere.

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## 4,016,012
## METHOD FOR SURFACE TREATMENT OF METALLIC MATERIALS

**Yoshiki Oshida, Yokohama, Japan, assignor to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed May 8, 1975, Ser. No. 575,694**
**Claims priority, application Japan, June 17, 1974, 49-68112**
**Int. Cl.² C21D 1/48**
**U.S. Cl. 148—16.5** **1 Claim**



**1.** A method for carburization of soft steel with a surface treatment agent to diffuse carbon into the soft steel, that is characterized as having at least two phase transformation temperatures, comprising

placing the surface treatment agent which is selected from the group consisting of CO, carbon and carbon admixed with $BaCO_3$ and the soft steel in a treating device;
heating said soft steel and surface treatment agent over a temperature cycle, wherein the minimum temperature of

said cycle is below the lower of said two phase transformation temperatures and the maximum temperature of said cycle exceeds the higher of said two phase transformation temperatures, wherein said heating over said cycle is undertaken alternately and repeatedly and is continuous between said minimum and maximum temperature as indicated by the broken line in FIG. 1 in the drawing; and

applying a stress to said agent and soft steel, said stress ranging from 0 to 2 kg/mm², when the material is heated to the lower limit temperature and releasing said stress at the end of one of said cycles at the minimum temperature, to effect carburization of the soft steel.

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## 4,016,013
## PROCESS FOR PRODUCING DIFFUSION LAYERS OF CARBIDES, NITRIDES AND/OR CARBONITRIDES

**Diethelm Bitzer, Putzbrunn near Munich, Germany, and Dieter Lohmann, Muttenz, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

**Filed Feb. 5, 1975, Ser. No. 547,285**

**Claims priority, application Switzerland, Feb. 7, 1974, 1702/74**

**Int. Cl.² C21D** *1/48*

**U.S. Cl. 148—16.5** **9 Claims**

**1.** A process for producing on a metallic or metalloid substrate, which consists at least partially of one or more of the elements selected from the group consisting of iron, boron, silicon and the transition metals of sub-groups 4 to 6 of the periodic table, a diffusion layer of material selected from the group consisting of said metal carbide, nitride and carbonitride which comprises

heating said substrate to a temperature of 500° C. to 1800° C., and

contacting said substrate with a gaseous or vaporous reactant stream comprising a carrier gas selected from argon and hydrogen and at least one carbon — and nitrogen — releasing compound which readily decomposes at substrate temperature, said compound selected from the group consisting of cyanuric chloride, 2,4-dichloro-6-diisopropylamino-s-triazine, 2-chloro-4,6-bis(diethylamino)-s-triazine, 2,4-bis(diethylamino)-6-dimethylamino-s-triazine, 2,4,5,6-tetrachloropyrimidine, 2,4,6-tris(diethylamino)-s-triazine, 2,4-bis(dimethylamino)-6(1-methylhydrazino)-s-triazine, 2,6-bis(-dimethylamino)-5-(cyanopyrimidine and 2,4-dichloro-6-(diallylamino)-s-triazine, permitting reaction thereof to form said diffusion layer on said substrate.

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## 4,016,014
## HIGH TEMPERATURE ALLOY

**Peter R. Sahm, Neckargemund, and Andrew R. Nicoll, Oftersheim, both of Germany, assignors to BBC Brown Boveri & Company Limited, Baden, Switzerland**

**Filed Dec. 31, 1974, Ser. No. 537,720**

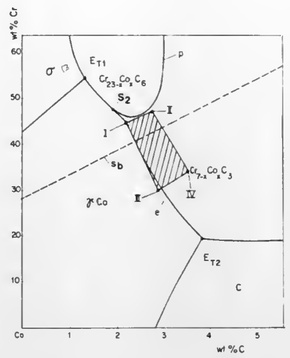
**Claims priority, application Germany, Feb. 11, 1974, 2406407**

**Int. Cl.² C22C** *19/07*

**U.S. Cl. 148—32** **10 Claims**

**1.** In a cast anisotropic body comprising a monovariant ternary eutectic alloy of Co, Cr and C, which is segregated into a matrix phase and a carbide dispersed phase, the matrix phase consisting essentially of a Co-Cr solid solution and the dispersed phase consisting essentially of a plurality of high strength carbide fibers predominantly of the $Cr_7C_3$ type oriented in substantial alignment, and integrally embedded in the matrix phase, the improvement which comprises:

replacing a portion of the Co, Cr and/or carbon in the matrix and/or dispersed phases of said alloy with nickel in an amount of 1.5 weight % to 8.5 weight % based on the total weight of the composition, with the proviso that the composition contains at least 1.5 weight % carbon, wherein the final composition of said eutectic alloy is




defined by that region of the Co, Cr, C phase diagram of FIG. 1 defined by the following boundaries:

| | | | |
|---|---|---|---|
| 1. | Co,Ni = 53.1% | Cr,Ni = 44.7% | C,Ni = 2.2% |
| 2. | 50.25% | 47% | 2.75 |
| 3. | 67.15% | 30% | 2.85% |
| 4. | 62.5% | 34% | 3.5% |

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## 4,016,015
## ROLLED STEEL ROD OR BAR

**Yves Jean Respen, Herstal; Paul Andre Cosse, Bellaire, and Mario Economopoulos, Liege, all of Belgium, assignors to Centre de Recherches Metallurgiques-Centrium voor Research in de Metallurgie, Brussels, Belgium**

**Division of Ser. No. 411,227, Oct. 31, 1973, Pat. No. 3,926,689. This application Sept. 26, 1975, Ser. No. 617,156**

**Claims priority, application Belgium, Oct. 31, 1972, 790867**

**The portion of the term of this patent subsequent to Dec. 16, 1992, has been disclaimed.**

**Int. Cl.² C22C** *35/00*

**U.S. Cl. 148—39** **5 Claims**

**1.** Rolled steel rod or bar having a surface layer composed of bainite or martensite, and a core composed of ferrite and carbides, the rod or bar having been produced in a hot rolling mill by a process comprising: superficially quenching the rod or bar at the exit of a finishing stand, to transform austenite in the surface layer of the rod or bar to bainite or martensite, with the core of the rod or bar remaining austenite; and subsequently cooling the rod or bar at such a rate that the core of austenite transforms to ferrite and carbides while the surface layer is tempered by heat transferred from the core.

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## 4,016,016
## METHOD OF SIMULTANEOUSLY FORMING A POLYCRYSTALLINE SILICON GATE AND A SINGLE CRYSTAL EXTENSION OF SAID GATE IN SILICON ON SAPPHIRE MOS DEVICES

**Alfred Charles Ipri, Princeton, N.J., assignor to RCA Corporation, New York, N.Y.**

**Filed May 22, 1975, Ser. No. 579,967**

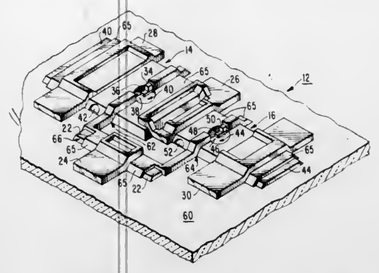
**Int. Cl.² H01L** *21/203, 21/84, 29/78*

**U.S. Cl. 148—175** **6 Claims**

**1.** In a method for manufacture of an integrated circuit comprised of devices comprising silicon mesas adjacent a single crystal insulating substrate, the circuit having a connecting strip, the strip extending from the substrate and merging into a conductive layer above the mesa, the improvement comprising making the connecting strip by the steps of:

a. depositing a polycrystalline silicon layer above at least one mesa onto a layer of a noncrystalline material adjacent the mesa from a silicon source evaporated at a temperature between 900° C and 1,200° C;

b. simultaneously depositing a single crystal silicon layer onto the substrate from the same silicon source evaporated at the same temperature, the substrate having an




exposed surface oriented for epitaxial growth of silicon thereon; and

c. selectively removing portions of the deposited polycrystalline silicon layer and the single crystal layer whereby the polycrystalline silicon layer is shaped to comprise a gate above said mesa and the single crystalline silicon layer is shaped to comprise said connecting strip.

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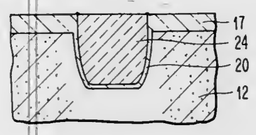
## 4,016,017
## INTEGRATED CIRCUIT ISOLATION STRUCTURE AND METHOD FOR PRODUCING THE ISOLATION STRUCTURE

**Joseph Adam Aboaf, Peekskill; Robert Wallace Broadie, Hopewell Junction, and William Aaron Pliskin, Poughkeepsie, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Nov. 28, 1975, Ser. No. 636,243**

**Int. Cl.² H01L** *21/316*

**U.S. Cl. 148—187** **13 Claims**




**1.** A method of producing a semiconductor device comprising:

forming porous silicon regions in a semiconductor body;

oxidizing said porous silicon regions at a temperature sufficient to completely oxidize said porous silicon regions and so that the oxidized porous silicon extends above the surface of the said body; and

subjecting the said oxidized porous silicon regions to a temperature higher than said oxidizing temperature to cause the densification of said oxidized porous silicon regions which result in their being substantially planar with the surface of the semiconductor body.



## 4,016,018
## METHOD OF PREPARING PRIMING EXPLOSIVES

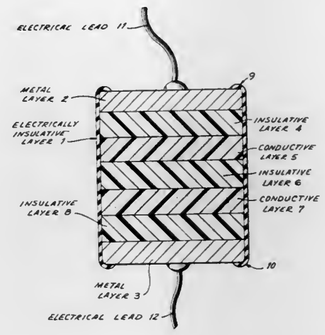
**Michel Pierre Alphonse Lenôtre, Tarbes, France, assignor to Etat Francais, Paris, France**

**Continuation-in-part of Ser. No. 100,428, Dec. 21, 1970, abandoned. This application Aug. 13, 1973, Ser. No. 387,812**

**Claims priority, application France, Dec. 22, 1969, 69.44313**

**Int. Cl.² C06B** *45/04, 45/10, 45/08, 35/00*

**U.S. Cl. 149—17** **8 Claims**




**1.** A method for the preparation of explosive priming compositions which are water-resistent comprising the following steps: forming an aqueous dispersion of (a) lead azide as a primary explosive having a particle size less than 5 microns (b) a polymerizable plastic material which is non-elastomeric and insoluble in water and is selected from the group consisting of a phenolic resin, a polyester, a polyamide, and vinyl copolymers, and (c) a plasticizer; said aqueous dispersion rendering the primary explosive substantially explosively insensitive to mechanical and electrical action; mechanically and vigorously agitating the aqueous dispersion; separating, by filtration, a liquid phase from a solid phase; mechanically working the material of the solid phase; and effecting final polymerization thereof whereby a final product is obtained in which the primary explosive regains its explosive sensitivity.

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## 4,016,019
## INTEGRATED INDICATOR SYSTEM FOR SOLVENT REMOVAL

**Alan H. Norris, Rome, Ga., assignor to Champion International Corporation, Stamford, Conn.**

**Filed Oct. 1, 1975, Ser. No. 618,611**

**Int. Cl.² F26B** *21/10*

**U.S. Cl. 156—64** **8 Claims**

**1.** A textile article having a plurality of thermosensitive fibers incorporated therein, each of said thermosensitive fibers being capable of indicating a predetermined maximum temperature by visual inspection, said maximum temperature being less than that of the melting point of the main construction fibers of said textile article, at least one of said thermosensitive fibers being capable of visually indicating a maximum temperature different from that of another of said thermosensitive fibers by undergoing a color change at said maximum temperature.

**3.** A method for the removal of a volatile organic solvent from a tufted textile article that is wetted with said solvent, which method comprises providing said tufted textile article with a plurality of thermosensitive fibers, each of said fibers being capable of visually indicating a predetermined maximum temperature, at least one of said fibers being capable of visually indicating a temperature substantially corresponding to the boiling point of said volatile solvent, other thermosensitive fibers being capable of visually indicating temperatures below and above the boiling point of said volatile solvent, and

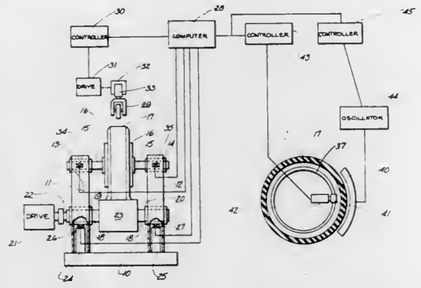
heating said textile article to a temperature at which said thermosensitive fibers indicate that the temperature of said textile article is substantially that corresponding to the temperature at which the volatile solvent evaporates.

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## 4,016,020
## SYSTEM FOR MEASURING AND CORRECTING VIBRATIONS GENERATED IN VEHICULAR TIRES

**Theodore Ongaro, Columbus, Ohio, assignor to Ongaro Dynamics Incorporated, Columbus, Ohio**

**Continuation-in-part of Ser. No. 402,899, Oct. 3, 1973, abandoned. This application Oct. 20, 1975, Ser. No. 623,639**
**Int. Cl.² B32B** *35/00*; **G01M** *1/00*
**U.S. Cl. 156—75** **19 Claims**




1. A method of correcting a rubber tire for vibration producing forces generated in the tire when operated under load and at cruising speed, which comprises the steps of:

revolving the tire at a cruising speed equal to from 50–90 m.p.h. under a load simulating the weight load supported by the tire in normal use to develop centrifugally generated forces in the tire,

measuring the magnitudes and locations of the centrifugally generated forces developed in the revolving tire, said measured forces comprising (a) forces generated by peripheral non-uniformities, and (b) forces developed by lack of tire symmetry, and

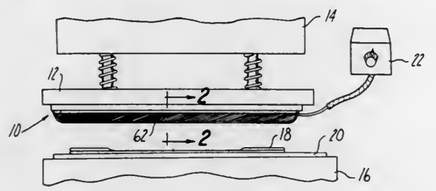
correcting the tire for both the (a) and (b) forces in two stages, the first stage comprising correction for the (a) forces by removing rubber from the periphery of the tire in accordance with the magnitude and location of the non-uniformities while the tire is rotating at cruising speed, and the second stage comprising correction for the (b) forces by selectively adding to or removing rubber from the tire in the areas at or adjacent the tire beads in accordance with the magnitude and location of the (b) forces.

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## 4,016,021
## HEAT SEALING UNIT AND METHOD OF MAKING SAME

**Lee La Fleur, 273 River St., Manistee, Mich. 49660**

**Filed Mar. 29, 1976, Ser. No. 671,580**
**Int. Cl.² B30B** *15/34*; **B32B** *31/00*; **H05B** *3/34*
**U.S. Cl. 156—154** **23 Claims**




1. A device for heat sealing plastic films comprising an electrical resistance heating unit in the form of an elongated flexible ribbon, a plurality of thin metal fins extending outwardly from one side of the ribbon, means securing the inner ends of said fins to said ribbon so that the individual fins extend transversely of the ribbon in closely spaced relation, all of said fins being flattened in a direction lengthwise of and against the ribbon in overlapping contacting relation, the outer ends of said fins being generally uniformly spaced from said ribbon and defining a heat sealing surface for the device and a resiliently compressible backing strip positioned against and secured to the other side of the ribbon.

21. The method of making a device for heat sealing plastic films which comprises the steps of folding a thin metal strip transversely along regularly spaced lines to form the strip into a succession of accordian-pleated fins having fold lines extending transversely of the strip, securing the apexes along one side of the pleated strip in closely spaced relation to a strip of flexible electrical resistance heating element, flattening the pleated elements against said heating element in a direction lengthwise of the heating element strip so that the successive fins lie one against the next in partially overlapping relation, mounting said heating element strip with the fins thereon on a relatively rigid backing member and thereafter removing the outer end portions of the fins from the pleated strip along a line generally parallel to the backing member.

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## 4,016,022
## LOW FLOW, VACUUM BAG CURABLE PREPREG MATERIAL FOR HIGH PERFORMANCE COMPOSITE SYSTEMS

**Charles E. Browning, and Theodore J. Reinhart, Jr., both of Dayton, Ohio, assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**

**Filed Dec. 30, 1975, Ser. No. 645,154**
**Int. Cl.² B29C** *17/00*
**U.S. Cl. 156—285** **13 Claims**

1. A method for fabricating a composite panel which comprises the following steps:

a. mixing in a common solvent 100 parts by weight of a carboxy terminated vinyl polybutadiene and 100 to 150 parts by weight of an epoxy novolak resin with 2.5 to 2.6 parts by weight of chromium octoate;

b. refluxing the resulting solution for a period of about 0.25 to 3 hours;

c. at the end of the reflux period, cooling the solution to room temperature;

d. adding to the cooled solution 8 to 10 parts by weight of 2,5-dimethyl-2,5-di(t-butylperoxy)hexane and 1 to 5 parts by weight of benzyldimethylamine;

e. stirring the solution containing the added materials, thereby obtaining a resin solution;

f. coating the resin solution on a tape formed of reinforcing fibers;

g. evaporating solvent from the resin solution, thereby obtaining tape impregnated with the resin;

h. cutting the resin impregnated tape into plies of a desired size;

i. stacking the plies to a desired thickness;

j. placing a porous glass reinforced Teflon coated fabric on the top and bottom of the stack of plies;

k. laying a breather cloth above and below the Teflon coated fabric;

l. positioning the resulting assembly on a base plate and installing a vacuum bag thereover sealed to the base plate;

m. evacuating air from the bag down to about 28 to 30 inches of mercury;

n. placing the assembly in an air circulating oven;

o. raising the temperature in the oven from room temperature to about 325° to 375° F at a rate of 3° to 7° F per minute; and

p. maintaining the assembly at a temperature in the aforementioned range for a period of 0.75 to 1.5 hours, thereby obtaining a cured composite panel, the amount of resin in the panel being substantially equal to the amount of resin in the stacked plies.

5. A prepreg material consisting essentially of the following components:

a. the reaction product obtained by reaction 100 parts by weight of a carboxy terminated vinyl polybutadiene and 100 to 150 parts by weight of an epoxy novolak resin in the presence of 2.5 to 2.6 parts by weight of chromium octoate;

b. zero to 20 parts by weight of bis(4-maleimidophenyl)methane;

c. 8 to 10 parts by weight of 2,5-dimethyl-2,5-di(t-butylperoxy)hexane; and

d. 1 to 5 parts by weight of epoxy catalyst.

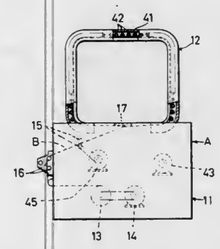


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## 4,016,023
## APPARATUS FOR AUTOMATICALLY BINDING PACKAGE

**Masaho Takami, No. 9-50, Yamanote-cho, Korien Hirakata, Osaka, Japan**

**Filed July 16, 1975, Ser. No. 596,567**
**Claims priority, application Japan, July 18, 1974, 49-87137; Dec. 28, 1974, 50-2936; Mar. 13, 1975, 50-32571**
**Int. Cl.² B65B** *13/32*
**U.S. Cl. 156—359** **5 Claims**




1. A package taping machine comprising:

a. a case (**11**) with a top for resting a package thereon and having openings at the top, a tape guide channel (**12**) over said opening to guide a tape around a package;

b. a tape table (**17**) slidable in the case below said opening;

c. a tape pay-off reel (**13**) in the case for feeding a thermoplastic tape up through said opening and around a package on the case and then through the opening below said table again;

d. a first clamping element (**18**) elevatable towards the table so as to hold the end portion of the tape against said table;

e. a second clamping element (**23**) elevatable towards said table so as to hold the overlapping portions of the tape against said table;

f. a rockable tape guide element supporting a vertically slidable tape cutting heater;

g. a pressing element (**22**) elevatable towards said table so as to press the overlapping portions of the tape against said table;

h. time control cams coupled to said first clamping element, tape guide elements, pressing element and second clamping element, all said elements being aligned successively in the lengthwise direction of the tape, said time control cams adapted to elevate said elements by direct contact with said elements in timed relation with each other;

i. a welding heater (**25**) adapted to be transversally inserted between the overlapping portions of the tape to be pressed against the table by said pressing element; and,

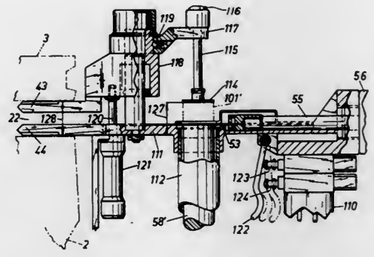
j. a bimetal element temperature control connected to said welding heater for controlling its heating temperature.

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## 4,016,024
## MACHINE TO ARRANGE A NOISE INSULATION BETWEEN TWO CONCRETE ELEMENTS

**Lars-Erik Karlsson, Kallered, Sweden, assignor to Nilcon Engineering AB, Kallered, Sweden**

**Filed Dec. 10, 1974, Ser. No. 531,224**
**Claims priority, application Sweden, Dec. 14, 1973, 7316899; Oct. 21, 1974, 7413207**
**Int. Cl.² B32B** *31/12*; **G01B** *5/14*
**U.S. Cl. 156—378** **15 Claims**



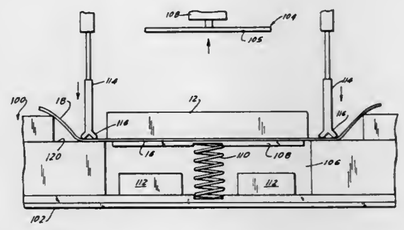

1. In an improved machine comprising a bed supporting a lower element and an upper element resting thereon, a number of lifting means, abutment means cooperating with said lifting means, a supply of resilient sound-insulating material, said lifting means arranged to raise said upper element into contact with said abutment means so as to form between said upper and said lower elements a gap having a height of a predetermined value, said predetermind value exceeding the height of one layer of said sound-insulating resilient material to be introduced into said gap, the improvement comprising a stand vertically movable adjacent said elements, said stand including a setting device insertable into said gap to sense the height thereof and adapted to set said stand vertically in dependence on the height of said gap, a stop abutment, said stop abutment being associated with said setting device to position said stop abutment dependent upon the position of said setting device, a feed device for feeding from said supply a blank of said resilient material against said stop abutment, and a device for severing a piece from one end of said blank, the height of said piece becoming dependent on the height of said gap.

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## 4,016,025
## ELECTRONIC SEALING APPARATUS

**Everett A. Peterson, 113 St. Marks Place, Roslyn Heights, N.Y. 11577**

**Filed June 29, 1976, Ser. No. 700,853**
**Int. Cl.² B32B** *19/02*; **H05B** *9/04*
**U.S. Cl. 156—380** **7 Claims**




1. An apparatus for use in sealing layers of thermoplastic material together from one side of the layers over a relatively thick layer of insulating material, said apparatus comprising means for supporting a first layer of thermoplastic material beneath a layer of insulating material with a marginal portion

of said thermoplastic material extending beyond said layer of insulating material, means turning the marginal edges of said first layer of thermoplastic material over a marginal portion of said layer of insulating material and means for sealing a second layer of thermoplastic material to the turned over marginal edge of said first layer of thermoplastic material above said layer of insulating material, said sealing means including a support, a first conductive element mounted on said support and adapted to be connected to a source of high frequency energy, a second conductive element mounted on said support in spaced relation to said first conductive element and adapted to be connected to an electrical ground; and means for electrically insulating said first and second elements from each other.

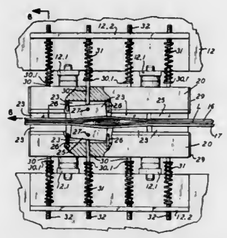
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**4,016,026**

## SEGMENTED HEATER FOR BAND SEALERS

**John J. Grevich, Star Prairie, Wis., assignor to Domain Industries, Inc., New Richmond, Wis.**

**Filed Feb. 24, 1975, Ser. No. 552,714**
**Int. Cl.² B30B** *5/06, 15/34*
**U.S. Cl. 156—555** **11 Claims**



1. A machine for sealing laminae of film together in closing bags and the like, comprising a frame;
- a pair of flexible, endless sealing heat transfer bands confronting each other and traveling together to receive and carry the film laminae therebetween for sealing;
- a pair of elongate heater bars on opposite sides of confronting portions of the bands and extending therealong, each of the bars having an elongate front face with a slot therein confronting a respective heat transfer band in spaced relation therewith;
- a plurality of elongate heat transfer slides carried in the slot of each heater bar and extending along the adjacent band, each of the slides having a longitudinally extending bearing face continuously engaging and transferring sealing heat to the adjacent band, the slides and heater bars having a non-interfering relation along said slot whereby to permit freedom of movement of the slides in a direction toward and away from the flat side of the bands, and to also permit said slides to be freely obliquely tiltable in the slot about axes extending parallel to the flat sides of the bands in the linear run and also extending transversely of the direction of travel of the bands along the linear runs such that the slides may follow any non-linearity in the bands and to maintain complete face to face contact with the bands as short lengths of the bands variously orient at oblique angles as the film is carried along with the bands; and

springs urging the slides toward the bands.

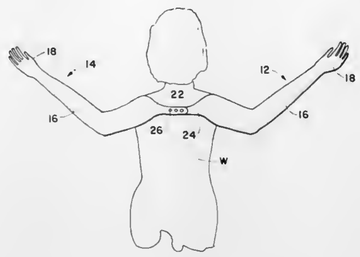
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**4,016,027**

## COSMETIC GLOVES

**Jane Kintanar, Flushing, N.Y., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest**

**Filed Mar. 24, 1976, Ser. No. 670,178**
**Int. Cl.² A41D** *19/00*
**U.S. Cl. 2—159** **2 Claims**




1. Cosmetic gloves for smoothing and firming the skin comprising
- hand-receiving portions for covering the hands formed from elastomeric and sheer yarn,
- an arm-receiving portion integral with each of said hand receiving portions,
- an end of each of said arm-receiving portions including a strap, and
- means for adjustably connecting said straps in overlapped relation.

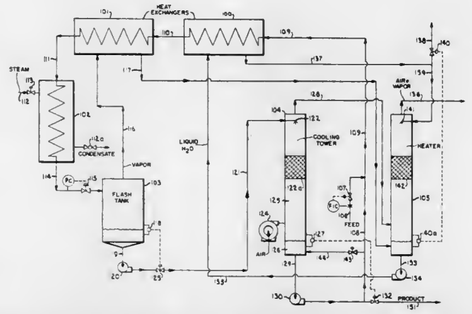
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**4,016,028**

## MULTIPLE EFFECT PROCESSES OF CONCENTRATING SOLUTIONS

**Walter L. Young; C. J. Douglas; Carl A. Connally, and Robert L. Cheek, all of Tulsa, Okla., assignors to Ozark-Mahoning Company, Tulsa, Okla.**

**Division of Ser. No. 443,339, Dec. 19, 1970, Pat. No. 3,956,061. This application Apr. 28, 1975, Ser. No. 572,274**
**Int. Cl.² B01D** *1/16, 3/06, 1/00*
**U.S. Cl. 159—48 L** **5 Claims**




1. A process of concentrating a solution using steam as the basic heat source to heat the solution to be concentrated, comprising:
- passing the solution to be concentrated through a series of three successive, temperature increasing, indirect heat exchanging steps to raise the temperature thereof, while maintaining the solution to be concentrated under sufficient back pressure to retain same in liquid form;
- the first indirect heat exchanging step being a liquid-liquid heat exchanging step; the second and third indirect heat exchanging steps being vapor-liquid heat exchanging steps;
- the heat exchanging medium to the third indirect heat exchanging step being steam;



- passing the heated solution from said third indirect heat exchanging step to a flash evaporation step to separate same into liquid and vapor phases;
- passing the vapor phase from said flash evaporation step in indirect heat exchange with the solution to be concentrated in the second one of said indirect heat exchanging steps;
- passing the liquid phase from the flashing step to an evaporative cooling step wherein same is distributed in counterflow relationship with air in a cooling tower;
- there being a water heater of counterflow, liquid-gas direct heat exchange type;
- the feed to the water heater comprising the condensate from the second indirect heat exchanging step and the vapor overhead from the cooling tower, both being passed to the lower part of the water heater;
- the heat exchanging medium to the first indirect heat exchanging step being the bottoms from the water heater;
- the overhead liquid feed to the water heater being the liquid heat exchange medium effluent from the first indirect heat exchanging step;
- passing a portion of the liquid bottoms from the cooling tower from the system as product, and
- recycling a portion of the liquid bottoms from the cooling tower into the new feed to maintain the evaporation rate and increase the concentration thereof.

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**4,016,029**

## PROCESS FOR DELIGNIFYING AND BLEACHING CELLULOSE PULP

**Hans Olof Samuelson, Goteborg, Sweden, assignor to Mo och Domsjo Aktiebolag, Ornskoldsvik, Sweden**

**Filed Mar. 6, 1975, Ser. No. 555,752**
**Claims priority, application Sweden, Mar. 14, 1974, 7403452**
**Int. Cl.² D21C** *9/10, 11/14*
**U.S. Cl. 162—31** **23 Claims**

1. A process for delignifying and bleaching cellulose pulp with improved selectivity which comprises contacting and reacting cellulose pulp, in the absence of a magnesium protector, with oxygen gas in the presence of sodium bicarbonate, as the sole alkali, at an oxygen partial pressure of at least 1 bar at a temperature within the range from about 110° to about 170° C while removing carbon dioxide in an amount to maintain the partial pressure of carbon dioxide within the range from about 0.001 to about 3 bars.

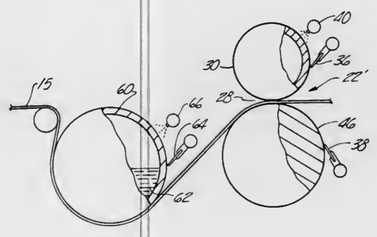
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**4,016,030**

## CALENDERING PAPER CONTAINING THERMOPLASTIC CONTAMINANTS

**John T. Sobota, Green Bay, Wis., assignor to Fort Howard Paper Company, Green Bay, Wis.**

**Continuation-in-part of Ser. No. 545,166, Jan. 29, 1975, abandoned. This application Jan. 8, 1976, Ser. No. 647,457**
**Int. Cl.² D21F** *5/06, 9/02*
**U.S. Cl. 162—199** **30 Claims**




1. The method of making paper on a paper-making machine of the type having calender rolls and a high-temperature drying section preceding said calender rolls, wherein paper is formed in said machine using pulp made from recycled waste paper, and wherein said pulp contains thermoplastic contaminants in an amount of one percent or less by dry weight, said thermoplastic contaminants having low melting temperatures, comprising drying said paper in said drying section at high temperatures above said melting temperatures such that said paper has a moisture content not greater than substantially 10 percent and such that said paper would be at a temperature on the order of said melting temperatures when said paper is calendered in said calender rolls, calendering said paper at high nip pressures of at least 25 pounds per linear inch in said calender rolls after said paper leaves said drying section, and cooling said thermoplastic contaminants below said melting temperatures after said paper leaves said drying section and before calendering is completed in said calender rolls to reduce the likelihood that said thermoplastic contaminants are in a sticky condition while said paper passes through said calender rolls.

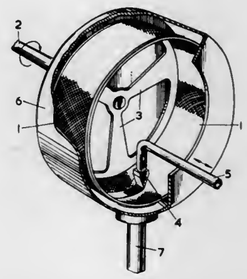
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**4,016,031**

## MANUFACTURE OF COMPOSITE MATERIALS

**Greville Euan Gordon Bagg, Waltham Abbey; John Cook, Cheshunt; Leslie Ernest Dingle, London; Henry Edwards, Harlow, and Hans Ziebland, Hertford, all of England, assignors to National Research Development Corporation, London, England**

**Continuation-in-part of Ser. No. 283,665, Aug. 25, 1972, abandoned. This application Jan. 6, 1975, Ser. No. 538,708**
**Claims priority, application United Kingdom, Sept. 1, 1971, 40699/71**
**Int. Cl.² D21F** *11/06*
**U.S. Cl. 162—213** **15 Claims**

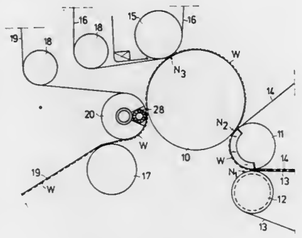



1. A process for the manufacture of composite materials comprising a matrix containing aligned reinforcing fibres including the steps of dispersing the fibres in a liquid dispersion medium, passing the dispersion through a slit shaped aligning nozzle or a tapered nozzle so that the fibres are at least partially aligned and depositing the dispersion containing the aligned fibres upon a permeable surface capable of retaining substantially all the fibres and moving relative to the nozzle at a speed greater than the speed with which the fibres are travelling immediately before deposition and with an angular velocity sufficient to pass the dispersion medium rapidly through the permeable surface by centrifugal acceleration to leave a substantially dry fibre felt and thereby maintaining the alignment of the aligned fibres on the permeable surface such that at least 50% of the fibres are within 10° of the desired alignment direction.

## 4,016,032
## SUCTION ROLL FOR TRANSFERRING A WEB AWAY FROM A PRESS SECTION

**Matti Kankaanpaa, Tapiola, Finland, assignor to Valmet Oy, Finland**

**Continuation-in-part of Ser. No. 310,805, Nov. 30, 1972. This application Apr. 14, 1975, Ser. No. 568,140**
**Claims priority, application Finland, Dec. 20, 1974, 3720/74**
**Int. Cl.² D21F *3/04***
**U.S. Cl. 162—305** **29 Claims**

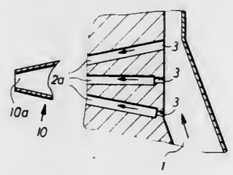


1. In a paper-manufacturing machine, press section means for dewatering a web received by said press section means from a wire while said web travels through said press section means to a drying section of the machine, said press section means including a press roll and a transfer means cooperating with said press roll for transferring the web from said press roll away from the latter toward the drying section, and said transfer means including at least a transfer suction roll means having an outer rotary shell formed with perforations through which suction is applied to the web, said outer rotary shell having opposed ends, suction chamber means situated outwardly beyond said shell closely adjacent to at least one of said ends thereof and communicating with said perforations of said shell at the interior of said shell at least through said one end thereof, and seal means situated at least at said one end of said shell between said suction chamber means and said shell for sealing an area through which said suction chamber means communicates with perforations of said shell at any given instant, so that seal water need not be applied to the interior of said shell to have access through said perforations thereof to the web.

## 4,016,033
## DISTRIBUTION MEANS FOR AQUEOUS SLURRY IN PAPERMAKING MACHINES

**Christian Schiel; Dieter Egelhof, and Karl Wolf, all of Heidenheim, Germany, assignors to J. M. Voith GmbH, Heidenheim, Germany**

**Filed Feb. 23, 1976, Ser. No. 660,705**
**Claims priority, application Germany, Mar. 1, 1975, 2508929**
**Int. Cl.² D21F *1/06***
**U.S. Cl. 162—343** **8 Claims**

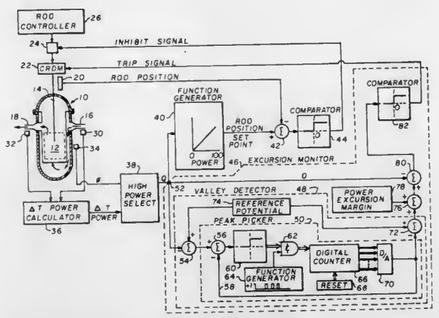


1. In a stock distribution means for delivery of an aqueous slurry in a machine for forming a paper web, a combination comprising a stock-containing stream dividing device; conduits in communication with and receiving streams of stock from said dividing device; means defining a passage communicating with and receiving said streams from said conduits, said passage having a width which equals or approximates the width of the paper web which is formed in said machine; a slice having a discharge orifice; and means defining at least two groups of channels connecting said passage with said slice to deliver stock to said orifice, said channels being inclined with respect to said conduits and each of said channels having a stock-receiving inlet portion communicating with said passage and an outlet portion which discharges stock into said slice, the inlet portions of one group of said groups of channels communicating with said passage upstream of the inlet portions of the other group of said groups of channels and at least a portion of each channel of said one group converging toward the channels of said other group, as considered in the direction in which the stock is fed from said passage to said slice, the cross-sectional areas of inlet portions of said other group of channels exceeding the cross-sectional areas of inlet portions of said one group of channels whereby the inlet portions of said one group of channels offer a greater resistance to the flow of stock from said passage into the inlet portions of said one group of channels and a lower resistance to the flow of stock from said passage into the inlet portions of said other group of channels.

## 4,016,034
## NUCLEAR REACTOR CONTROL OVERRIDE SYSTEM AND METHOD

**Charles Ronald Musick, Vernon, Conn., assignor to Combustion Engineering, Inc., Windsor, Conn.**

**Filed July 19, 1974, Ser. No. 490,158**
**Int. Cl.² G21C *7/06*, *17/00***
**U.S. Cl. 176—22** **14 Claims**



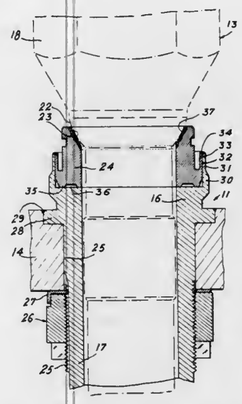

8. A process for the prevention of fuel damage in a critical nuclear reactor having control rods, wherein the process comprising the steps of:
a. determining permissible control rod configurations for each value of bulk power, said permissible control rod configurations being such that local power does not exceed specified limits established to prevent fuel damage;
b. determining from said permissible control rod configurations for each value of bulk power a power dependent control rod insertion limit;
c. generating a signal indicative of bulk reactor power;
d. generating a signal indicative of control rod position; and
e. in response to said indication of bulk reactor power, said indication of control rod position, and said power dependent control rod insertion limit, inserting sufficient negative reactivity to prevent local reactor power from exceeding said specified limits established to prevent fuel damage.



## 4,016,035
## FUEL ASSEMBLY SUPPORT COLUMN FOR A NUCLEAR REACTOR DIAGRID

**Bernard Gallet, Bruyeres le Chatel, and Robert Venot, Fontenay-aux-Roses, both of France, assignors to Commissariat a l'Energie Atomique, Paris, France**

**Filed June 9, 1975, Ser. No. 584,751**
**Claims priority, application France, June 12, 1974, 74.20401**
**Int. Cl.² G21C *21/08***
**U.S. Cl. 176—87** **2 Claims**



1. In a nuclear reactor including a fuel assembly support column, a nuclear reactor diagrid mounted on said column, a hollow cylindrical body rigidly fixed to said diagrid, an upper portion of said body passing through said diagrid and receiving a fuel assembly end-fitting supported vertically by said diagrid, a head for said body, a removable sleeve mounted in said head forming a coaxial extension of said hollow body, a conical bearing surface in said sleeve for sealing and centering the fuel assembly, said removable sleeve and said head of said support column body being engaged in interfitting relation, an annular lip for said sleeve, an annular lip for said head, said lips being in engagement and a removable welded connection sealing said sleeve to said head in an annular zone coaxial with said sleeve at extremities of said lips.

## 4,016,036
## PROCESS FOR SERIALLY CULTURING KERATINOCYTES

**Howard Green, Brookline, and James G. Rheinwald, Cambridge, both of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.**

**Filed Nov. 14, 1975, Ser. No. 632,037**
**Int. Cl.² C12K *9/00***
**U.S. Cl. 195—1.8** **27 Claims**

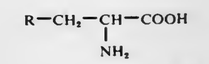
1. In the growth of keratinocytes in culture, the improvement of including in said culture either fibroblast cells treated to prevent their multiplication and at a density sufficient for keratinocyte multiplication, differentiation and colony expansion or medium conditioned by fibroblast cells.

## 4,016,037
## METHOD FOR PRODUCING L-AMINO ACID

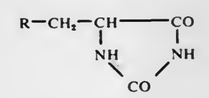
**Koji Mitsugi, Yokohama; Konosuke Sano, Machida; Kenzo Yokozeki, Kawasaki; Kazuhiko Yamada, Fujisawa; Ichiro Noda, Yokohama; Teruhiko Kagawa; Chikahiko Eguchi, both of Kawasaki; Naohiko Yasuda, Yokosuka; Fumihide Tamura, Kawasaki, and Kazushi Togo, Yokohama, all of Japan, assignors to Ajinomoto Co., Inc., Tokyo, Japan**

**Filed Oct. 15, 1975, Ser. No. 622,519**
**Int. Cl.² C12D *13/06***
**U.S. Cl. 195—29** **14 Claims**

1. A method for producing an L-amino acid of the formula:



which comprises:
a. holding a hydantoin compound of the formula:



at pH 5 to 11 in an aqueous solution at 15° to 70° C in the presence of an effective amount of enzyme produced by *Flavobacterium aminogenes* until the L-amino acid accumulates in the solution; said enzyme being capable of converting said hydantoin compound to said L-amino acid, and in said formula, R being phenyl or substituted phenyl radicals or indolyl or substituted indolyl radicals; and
b. recovering the L-amino acid formed from said aqueous solution.

## 4,016,038
## PROCESS FOR PREPARING MALTOSES FROM STARCHES

**Kaname Sugimoto; Mamoru Hirao; Masashi Kurimoto, and Eikichi Miyake, all of Okayama, Japan, assignors to Hayashibara Company, Okayama, Japan**

**Continuation-in-part of Ser. No. 810,359, March 25, 1969, abandoned. This application Mar. 27, 1972, Ser. No. 238,608**
**Claims priority, application Japan, Apr. 1, 1968, 43-21367**
**Int. Cl.² C12D *13/02***
**U.S. Cl. 195—31 R** **2 Claims**

1. A process for directly preparing maltose of high purity from starches which comprises uniformly gelatinizing and dispersing a starch slurry with a concentration of not less than 10% by weight at an elevated temperature of between 150°–170° C,; rapidly cooling the resulting dispersed starch solution to a temperature between 40° to 70° C. before retrogradation can take place; then adding a heat resistant alpha-1,6-glucosidase produced from *Lactobacillus plantarum* and β-amylase thereto; and conducting a saccharification of the mixture.

## 4,016,039
## PROCESS FOR THE RECOVERY OF PROTEINS FROM AQUEOUS SOLUTIONS OF PROTEINS

**Wolfgang Schreiber, Langenfield, Germany, assignor to Henkel & Cie G.m.b.H., Dusseldorf-Holthausen, Germany**

**Filed Mar. 22, 1976, Ser. No. 668,840**
**Claims priority, application Germany, Mar. 22, 1975, 2512735**
**Int. Cl.² C07G *7/028***
**U.S. Cl. 195—66 R** **11 Claims**

1. In the process for recovering an alkaline protease from

the fermentation of *Bacillus licheniformis* in aqueous solutions comprising the steps of adding a sufficient amount of a water-soluble inorganic salt to an aqueous solution of an alkaline protease from the fermentation of *Bacillus licheniformis* to effect precipitation of said alkaline protease, filtering the aqueous solution containing the precipitated alkaline protease in the presence of from 0 to 4% by weight of filter aids, and recovering said precipitated alkaline protease, the improvement which consists in adding from 0.5 to 3% by weight of a polyoxyethylene glycol having an average molecular weight of from 400 to 1,000 to said aqueous solution of alkaline protease before adding said inorganic salt.

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**4,016,040**

## PREPARATION OF ENZYME-CONTAINING BEADS

**Maung Hla Win, Berkeley Heights; Walter Anthony DiSalvo, North Arlington, and Edward Joseph Kenney, Bernardsville, all of N.J., assignors to Colgate-Palmolive Company, New York, N.Y.**

**Division of Ser. No. 347,534, April 3, 1973, Pat. No. 3,858,854, which is a continuation of Ser. No. 98,111, Dec. 14, 1970, abandoned, which is a continuation-in-part of Ser. No. 883,955, Dec. 10, 1969, abandoned. This application Nov. 1, 1974, Ser. No. 519,827**

**Int. Cl.² C07G** *7/02*

**U.S. Cl. 195—68** **3 Claims**

1. A process for manufacturing free-flowing substantially dust-free, substantially spherical, enzyme-containing beads consisting essentially of a water dispersible solid, fusible, substantially anhydrous, nonionic detergent binder having a melting point up to about 60° C., having dispersed therein an enzyme concentrate consisting essentially of proteolytic enzyme, said binder having a hydrophilic polyethylene oxide chain of 6 to 84 ethylene oxide units, the concentration of the proteolytic enzyme in said beads being sufficient so that the beads contain about 0.1 to 5 Anson units per gram, with substantially all of said beads passing through a 10 mesh U.S. Standard Sieve Series screen and at most about 11.2% of said beads passing through a 100 mesh U.S. Standard Sieve Series screen, which comprises blending a powdered concentrate of said enzyme with said binder in molten form and spraying droplets of said blend through a spray nozzle into cool air in a cooling tower to solidify said droplets and form said beads.

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**4,016,041**

## PROCESS OF MAKING GRANULAR ENZYMES OF REDUCED STICKINESS

**Daniël Marten van Kampen, Vlaardingen, Netherlands, assignor to Lever Brothers Company, New York, N.Y.**

**Filed Jan. 22, 1976, Ser. No. 651,672**

**Claims priority, application United Kingdom, Feb. 12, 1975, 5978/75**

**Int. Cl.² C07G** *7/02*

**U.S. Cl. 195—68** **2 Claims**

1. In a process for the preparation of enzyme-marumes with a reduced stickiness and an improved sievability, comprising forming an extrudate of a mixture of proteolytic or amylolytic enzymes and an organic or inorganic extrudable material, spheronizing the extrudate to form marumes while adding a dusting powder during the spheronizing operation, the improvement comprising adding magnesium oxide or a mixture of magnesium oxide with magnesium carbonate in a weight ratio of 10:1 as dusting powder, said powder having an average particle size ranging from 40 to 250 microns, in an amount of 0.1–5% by weight of the marumes.

**4,016,042**

## SUBSTRATE FOR THE QUANTITATIVE DETERMINATION OF ENZYMES

**Lars Gundro Svendsen, Reinach, Switzerland, assignor to Pentapharm A.G., Basel, Switzerland**

**Filed June 30, 1975, Ser. No. 592,023**

**Claims priority, application Switzerland, July 2, 1974, 9210/74; May 9, 1975, 6088/75**

**Int. Cl.² G01N** *31/14*

**U.S. Cl. 195—103.5 R** **12 Claims**

1. A chromogenic or fluorescent substrate for the quantitative determination of proteolytic enzymes of class E.C. 3.4.4., which split peptide chains on the carboxyl side of arginine and of lysine, except thrombin and thrombin-like enzymes, in human and mammal body fluids and in vegetable and animal cell extracts and in glandular venoms of cold-blooded animals, which essentially consists of a compound having the following formula:

$$R^1 - Pro - X - Y - NH - R^2 \qquad I$$

wherein $R^1$ represents hydrogen, or an acyl or sulfonyl group, $R^2$ represents an aromatic hydrocarbon group which may carry substituents, X represents a phenylalanyl, β-cyclohexylalanyl, phenylglycyl or tyrosyl group and Y represents a protonized arginyl or lysyl group, —NH—$R^2$ being a chromogenic or fluorescent group, and which, when subjected to the proteolytic action of the enzymes, yields a split product of formula $NH_2$—$R^2$ the quantity of which is measurable by photometric, spectrophotometric or fluorescence-photometric methods.

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**4,016,043**

## ENZYMATIC IMMUNOLOGICAL METHOD FOR THE DETERMINATION OF ANTIGENS AND ANTIBODIES

**Antonius H. W. M. Schuurs; Bauke K. Van Weemen, and Gerrit Wolters, all of Oss, Netherlands, assignors to Akzona Incorporated, Asheville, N.C.**

**Filed Sept. 4, 1975, Ser. No. 610,469**

**Int. Cl.² C12K** *1/04*

**U.S. Cl. 195—103.5 R** **8 Claims**

1. A method for the detection and determination of a component of an antigen-antibody reaction in a liquid sample containing the component to be determined, comprising the steps of:

a. providing a given quantity of a first reagent consisting of one component of said reaction selected from the group consisting of an antigen and an antibody bound to the surface of a water-insoluble, water-insuspensible, solid carrier;

b. providing a given amount of a second reagent consisting of a component having the same immunological properties as the component in the said first reagent covalently linked to an enzyme, and also providing a predetermined amount of the binding partner for the component to be determined, when the component in said liquid sample and the component bound to said solid carrier have the same immuno-chemical properties;

c. contacting a given quantity of said liquid sample with said reagents forming a reaction mixture having a solid phase and a liquid phase; and

d. determining the enzyme activity of either the solid or the liquid phase which is a measure of the presence and quantity of the component to be determined.



**4,016,044**

## METHOD AND APPARATUS FOR GOVERNING THE REACTION RATE OF ENZYMATIC REACTIONS

**Jean-Marie Fresnel, Haut-Thoiry, France, and Daniéle Trosset, Carouge, Switzerland, assignors to Battelle Memorial Institute, Switzerland**

**Continuation-in-part of Ser. No. 431,608, Jan. 8, 1974, Pat. No. 3,919,052. This application May 29, 1975, Ser. No. 581,761**

**Claims priority, application Switzerland, Jan. 10, 1973, 259/73; Jan. 10, 1973, 260/73**

**Int. Cl.² C12B** *1/00*

**U.S. Cl. 195—115** **14 Claims**

1. A method of governing the reaction rate of enzymatic reactions for continuously transforming a substrate by contact with an enzyme fixed to a solid carrier, comprising the steps of: bringing an electrically conductive liquid reaction system, containing at least one substrate to be transformed, into contact with an enzymatic electrode comprising at least one enzyme fixed to an electrically conductive solid support medium; and regulating the catalytic activity of said enzyme by applying an electric potential to said support medium while adjusting the value of said potential so as to transform said substrate at a given rate, said method further comprising the improvements consisting of:

a. providing said enzymatic electrode with a solid, inert, working electrode and with a particulate mass of discrete enzymatic particles, each formed essentially of said conductive support medium having said enzyme fixed to the surface thereof;

b. placing said enzymatic electrode in a reaction space wherein said particulate mass of enzymatic particles is arranged for electrical contact thereof with said working electrode;

c. circulating said liquid reaction system within said reaction space; and

d. applying said adjustable potential, via said working electrode, to the conductive support medium of said enzymatic particles.

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**4,016,045**

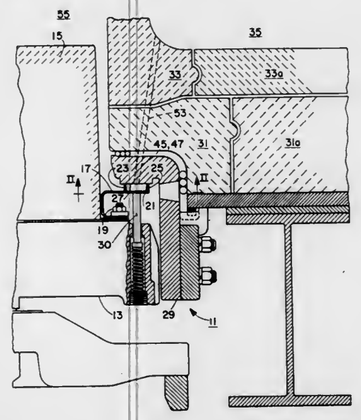
## COKE OVEN DOOR SEALING SYSTEM

**Joseph Van Ackeren, Allison Park, Pa., assignor to Koppers Company, Inc., Pittsburgh, Pa.**

**Filed Feb. 18, 1976, Ser. No. 658,928**

**Int. Cl.² C10B** *1/06, 25/06, 25/16, 29/00*

**U.S. Cl. 202—242** **6 Claims**




1. In combination, a coke oven having a chamber for coking coal and generating coke oven gases and a coke oven door sealing arrangement, said coke oven chamber having a coke oven door at one end thereof and heating flues at both sides thereof, said door coacting with a door jamb mounted cooperatively with an end brick structure of said heating flues at the ends thereof adjacent to said door, said coke oven door sealing arrangement comprising,

a. a U-shaped sealing strip carried by said door that cooperates with a sealing surface of said door jamb and forms a fluid channel around said door;

b. means dividing said channel into separate fluid channelways; and

c. means fluidly communicating each one of said channelways with a respective end flue, whereby coke oven gases in said channelways flow into said end flues.

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**4,016,046**

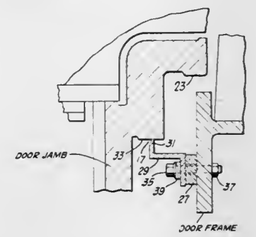
## APPARATUS AND METHOD FOR SEALING COKE OVEN DOORS

**Joseph Van Ackeren, and Linwood G. Tucker, both of Pittsburgh, Pa., assignors to Koppers Company, Inc., Pittsburgh, Pa.**

**Continuation-in-part of Ser. No. 397,708, Sept. 17, 1973, abandoned. This application Oct. 15, 1974, Ser. No. 514,304**

**Int. Cl.² C10B** *1/06, 29/00*; **F23M** *5/08*

**U.S. Cl. 202—248** **3 Claims**




1. In a coke oven battery having a door jamb at each end of each chamber of said battery, and a door adapted to coact with each door jamb and form a seal therewith, the improvement comprising:

a. a first sealing member mounted to said door that coacts with a first sealing surface of said door jamb, said first sealing member extending completely around the periphery of said door;

b. a second sealing member mounted to said door that coacts with a second sealing surface of said door jamb, said second sealing member extending only along two opposite vertical edges and the bottom edge of said door, said second sealing member being disposed between said chamber and said first sealing member and forming thereby a plenum between said sealing members; and

c. means for pressurizing said plenum.

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**4,016,047**

## SEPARATION AND RECOVERY OF POLYCHLORINATED PHENOLS

**Ray C. Christena, Wichita, Kans., assignor to Vulcan Materials Company, Birmingham, Ala.**

**Continuation of Ser. No. 414,533, Nov. 9, 1973, Pat. No. 3,909,365. This application Mar. 21, 1975, Ser. No. 560,800**

**Int. Cl.² C07C** *39/36*

**U.S. Cl. 203—6** **5 Claims**

1. A method for the separation and recovery of polychlorinated phenols from dark color-forming impurities contained therein comprising the steps of: (a) introducing into a distilland mixture of at least one polychlorinated phenol and dark color-forming impurities, an amount effective to inhibit color formation of at least one color inhibitor selected from the group consisting of; a phenol derivative selected from the group consisting of 2,6-ditertiary butyl cresol, alpha naphthol, p-aminophenol 4-(methylthio) phenol, 2,2'-methylenebis

(4-methyl-6-tertbutyl phenol), 2,2'-methylenebis (4-ethyl-6-tertbutyl phenol), and p-tertiary butyl catechol a hydroquinone compound selected from the group consisting of hydroquinone, 2,5-ditertiary butyl hydroquinone, monotertiary butyl hydroquinone, and the monomethyl ether of hydroquinone; an organic sulfur compound selected from the group consisting of alkyl phenol disulfide, liquid thiocarbamate, ditridecylthiodipropionate, and distearylthiodipropionate; and an organic phosphite compound selected from the group consisting of trinonyl phosphite, tris-2(chloroethyl)-phosphite, and triisooctyl phosphite, (b) distilling the resulting color inhibitor containing distilland to separate polychlorinated phenol vapors therefrom; and (c) condensing said vapor to recover purified polychlorinated phenols in an amount of at least about 84 percent of the impurity-containing polychlorinated phenol.

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**4,016,048**

## DISTILLATIVE PURIFICATION OF 2,5-DIOXO-1-OXA-2-PHOSPHOLANES

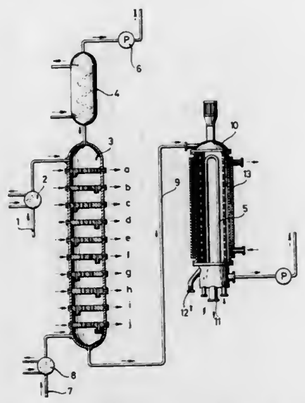
**Klaus Gehrmann, Erftstadt-Lechenich; Alexander Ohorodnik, Erftstadt-Liblar; Elmar Lohmar, Rodenkirchen, and Wernfried Riechmann, Bruhl, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany**

**Filed July 13, 1976, Ser. No. 704,774**

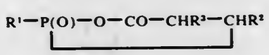
**Claims priority, application Germany, July 17, 1975, 2531920**

**Int. Cl.² B01D** *3/28, 3/34;* **C07F** *9/02*

**U.S. Cl. 203—49** **4 Claims**



**1.** A process for the distillative purification of a 2,5-dioxo-1-oxa-2-phospholane of the formula:



in which $R^1$ stands for an alkyl radical having from 1 to 4 carbon atoms, or a phenyl radical, and $R^2$ and $R^3$ each stand for hydrogen or $CH_3$, which comprises: preheating the respective crude compound to 120° to 160° C and feeding it to the head of a distilling column provided with a plurality of individually heatable trays maintained at temperatures increasing (as herein defined) from the uppermost tray to the lowermost, the uppermost tray in the column being maintained at 120° to 160° C and the lowermost tray being maintained at 160° to 200° C, the pressure at the head of the column being 20 to 200 mm Hg; introducing an inert gas (as herein defined) preheated to 160° to 200° C countercurrently at the base of the column; withdrawing overhead those impurities having a boiling point lower than that of the respective 2,5-dioxo-1-oxa-2-phospholane, together with the inert gas; withdrawing the 2,5-dioxo-1-oxa-2-phospholane thus freed from low-boiling impurities from the base of the distilling column and passing it to a film evaporator; and distilling off the 2,5-dioxo-1-oxa-2-phospholane from higher boiling impurities in the film evaporator under a pressure of 0.1 to 5 mm Hg.

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**4,016,049**

## SEPARATION OF PHENOL-CYCLOHEXANONE AZEOTROPE BY EXTRACTIVE DISTILLATION WITH ADIPIC ACID DIESTER

**George B. Fozzard, and Robert A. Paul, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.**

**Filed July 28, 1976, Ser. No. 709,367**

**Int. Cl.² B01D** *3/40;* **C07C** *37/22*

**U.S. Cl. 203—60** **5 Claims**

**1.** A process for the separation by extractive distillation of a cyclohexanone and phenol containing mixture which comprises subjecting the mixture to extractive distillation conditions in the presence of an adipic acid diester extractive distillation agent.

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**4,016,050**

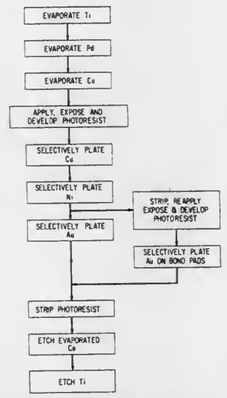
## CONDUCTION SYSTEM FOR THIN FILM AND HYBRID INTEGRATED CIRCUITS

**Nathan George Lesh, deceased, late of Bethlehem, Pa.; by Merchants National Bank of Allentown, executor, Allentown; Joseph Michael Morabito, Bethlehem, both of Pa., and John Henry Thomas, III, Pickerington, Ohio, assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed May 12, 1975, Ser. No. 576,711**

**Int. Cl.² C25D** *5/02, 5/10*

**U.S. Cl. 204—15** **19 Claims**




**1.** A method of forming electrical interconnections of a desired resistivity between thin film elements on an insulating substrate comprising the steps of:

forming on the substrate a first metal layer comprising titanium in a desired pattern to a thickness in the range 1,500–3,000 A;

forming over said titanium layer a second metal layer comprising copper to a thickness within the range 3,000–7,000 A;

electroplating additional copper onto said second layer to produce a total copper thickness within the range 25,000–40,000 A on selected areas of said second layer;

electroplating a third metal layer comprising nickel over said electroplated copper layer to a thickness within the range 8,000–20,000 A;

electroplating a fourth metal layer comprising gold on at least portions of said third layer to a thickness within the range 15,000–25,000 A; and



removing those portions of said first and second layers which are not covered by said electroplated metals.

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**4,016,051**

## ADDITIVES FOR BRIGHT PLATING NICKEL, COBALT AND NICKEL-COBALT ALLOYS

**Charles Geldzahler, and Satwant S. Sodhi, both of Chicago, Ill., assignors to Starlite Chemicals, Inc., Chicago, Ill.**

**Filed May 2, 1975, Ser. No. 574,031**

**Int. Cl.² C25D** *3/12, 3/56*

**U.S. Cl. 204—43 T** **5 Claims**

**1.** A process for producing bright nickel, cobalt or nickel-cobalt alloy deposits which comprises, electrodepositing nickel, cobalt or nickel-cobalt from an acidic aqueous plating solution of at least one salt of nickel, cobalt or nickel-cobalt and containing from about 0.005 to about 0.3 grams per liter of diethylaminopropyne sulfate, which is made by the method comprising the steps of adding diluted sulfuric acid slowly to the amine while vigorously agitating the solution, maintaining the solution at a temperature not exceeding 15° C, and terminating the addition of the diluted sulfuric acid when a pH in the range of 4.2 to 4.5 is obtained and including heating the plating solution above 60° C so as to increase the efficiency of the process.

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**4,016,052**

## ELECTRODEPOSITION PROCESS

**Shin-Ichi Tokumoto; Eiji Tanaka; Kenji Ogisu, and Hiroji Kawai, all of Yokohama, Japan, assignors to Sony Corporation, Tokyo, Japan**

**Filed Nov. 17, 1975, Ser. No. 632,808**

**Int. Cl.² C25C** *3/00*

**U.S. Cl. 204—64 T** **10 Claims**

**1.** In the process of electrodepositing a metal or alloy on a cathode immersed in an agitated fused-salt electrolyte comprised of halide salts including salts of said metal or of the constituent metals of said alloy, and in which the electrodeposition is effected at a predetermined temperature of said electrolyte; the improvement comprising the steps, in advance of said electrodeposition, of providing at least one of said halide salts in said electrolyte in an amount substantially in excess of the solubility level thereof at said predetermined electrodeposition temperature, heating the fused-salt electrolyte to a temperature substantially above said electrodeposition temperature so as to melt the electrolyte including substantially all of each of said halide salts provided in said excess amount, and then cooling the thus melted fused-salt electrolyte to said electrodeposition temperature so as to crystallize a portion of each of said halide salts provided in said excess amount and form solid particles thereof which, when agitated near the surface of the cathode in the course of said electrodeposition thereon, cause the electrodeposited metal or alloy to be flat and homogeneous.

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**4,016,053**

## FEEDING PARTICULATE MATTER

**Ivan D. Stankovich, Piedmont, and Stavros D. Louchis, Orinda, both of Calif., assignors to Kaiser Aluminum & Chemical Corporation, Oakland, Calif.**

**Filed Oct. 1, 1975, Ser. No. 618,544**

**Int. Cl.² C25B** *3/04;* **B65G** *53/22*

**U.S. Cl. 204—67** **9 Claims**

**1.** A method of feeding finely divided reduction-grade alumina to a plurality of aluminum reduction cells, each of said cells having at least one feeding device with a supply hopper associated therewith which feeds discrete quantities of alumina to the reduction cells comprising

a. feeding finely divided alumina from a source thereof to a primary air-activated gravity conveyor system;

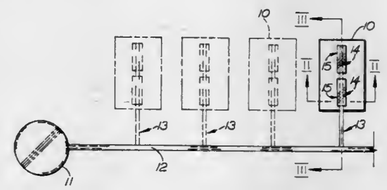
b. fluidizing the alumina in the primary air-activated gravity conveyor system and continuously maintaining the primary air-activated gravity conveyor systems essentially full of fluidized alumina;

c. transferring alumina from the primary air-activated gravity conveyor system to a plurality of secondary air-activated gravity conveyor systems;

d. fluidizing alumina in the secondary air-activated gravity conveyor systems and continuously maintaining the secondary conveyors essentially full of fluidized alumina;

e. transferring alumina from the secondary air-activated gravity conveyor systems to the supply hoppers associated with the feeding devices and maintaining the level of alumina within the feed hoppers at a desired level so that when one or more of the feeding devices feed discrete quantities of alumina to a reduction cell, the supply hopper is refilled with alumina from the secondary air-activated gravity conveyor system, the secondary air-activated gravity conveyor system is refilled with alumina from the primary air-activated gravity conveyor system and the primary air-activated gravity conveyor system is refilled with alumina from the alumina source.

**5.** A system for transferring finely divided particulate matter from a source thereof to a plurality of discharge points, each of said discharge points having a feeding device associated therewith for feeding discrete quantities of particulate matter comprising



a. a primary fluidizing conveyor system which receives particulate matter from said source and which is provided with means to fluidize particulate matter received from said source to cause said fluidized particulate matter to flow within the primary fluidized conveyor system and to continuously maintain the primary fluidizing conveyor system essentially full of fluidized particulate matter;

b. a plurality of secondary fluidizing conveyor systems which receive particulate matter from the primary fluidizing conveyor system and which are provided with means to fluidize particulate matter therein, to cause the said fluidized particulate matter to flow within the secondary fluidizing conveyor systems and to continuously maintain the secondary fluidizing conveyor essentially full of particulate matter; and

c. hoppers associated with the feeding devices to supply particulate matter thereto which receive particulate matter from the secondary fluidizing conveyors and which are provided therein with open-topped fluidizing conveyors in fluid communication with the secondary fluidizing conveyors to feed particulate matter to the inner chamber of said hopper.

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**4,016,054**

## HYDROMETALLURGICAL TREATMENT PROCESS FOR EXTRACTING CONSTITUENT METAL VALUES FROM FERRO-NICKEL

**Louis Gandon, Rambouillet, and Jean-Michel Demarthe, Viroflay, both of France, assignors to Imetal, Paris, France**

**Filed July 10, 1975, Ser. No. 594,812**

**Claims priority, application France, July 10, 1974, 74.24017**

**Int. Cl.² C25C** *1/08, 1/10;* **C25G** *1/00;* **C22B** *3/00*

**U.S. Cl. 204—105 R** **22 Claims**

**1.** A hydrometallurgical treatment process for extracting constituent metal values from ferro-nickel containing cobalt, comprising the following steps:

a. treating said ferro-nickel with chlorine in an aqueous medium and filtering the resultant matter;

b. oxidising said filtrate;
c. removing the iron contained in said oxidised filtrate by liquid/liquid extraction using an organic extractant (i) containing tributyl phosphate and regenerating said organic extractant (i) using an aqueous stripping solution (ii) thus yielding a pure aqueous solution of ferric chloride; and
d. removing the cobalt contained in said oxidised filtrate by liquid/liquid extraction using an organic extractant (iii) containing a tertiary amine and regenerating said organic extractant (iii) using an aqueous stripping solution (iv) thus yielding a pure aqueous solution of cobalt cloride, the chloride, oxidised filtrate comprising a solution of nickel chloride.

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**4,016,055**

## METHOD OF EXTRACTING CONSTITUENT METAL VALUES FROM POLYMETALLIC NODULES FROM THE SEA

**Louis Gandon, Rambouillet; Roger Jean, Maurepas, and Serge Solar, Dampierre, all of France, assignors to Societe Metallurgique Le Nickel SLN, Paris, France**

**Filed July 10, 1975, Ser. No. 594,814**
**Claims priority, application France, July 10, 1974, 49.24016**
**Int. Cl.² C25C *1/12*, *1/06***
**U.S. Cl. 204—106** **11 Claims**

**11.** A method of extracting constituent metal values from polymetallic nodules from the sea, comprising the following steps in succession:

a. melting the nodules under reducing conditions at a temperature up to 1700° C in the presence of a carbonaceous reducing agent in an amount of about from 3 to 10% of the weight of the melt;
b. reacting gaseous chlorine with the metal concentrate at a temperature of from 70° to 100° C in a reaction column continuously supplied at its lower end with water and gaseous chlorine and at its upper end with the metal concentrate, aqueous solution being continuously withdrawn from an upper part of the column, part of the withdrawn aqueous solution being recycled to the lower end of the reaction column, the amount of chlorine used being between 0.9 to 1.1 times that stoichiometrically necessary;
c. precipitating the copper contained in the aqueous solution using a more electropositive metal powder, and melting and casting the precipitate into anodes;
d. electro-refining the copper precipitate anodes;
e. removing the iron contained in the solution issuing from step (c) by liquid-liquid exchange by means of a first organic phase containing tributyl phosphate and regenerating said first organic phase by means of a first aqueous phase thus yielding a pure aqueous solution of ferric chloride;
f. removing the cobalt contained in the solution issuing from step (c) by liquid-liquid exchange by means of a second organic phase containing tri-isooctylamine and regenerating said second organic phase by means of a second aqueous phase thus yielding a pure aqueous solution of cobalt chloride; and
g. electrolyzing the aqueous solution resulting from the purification and removal in steps (e) and (f) to yield nickel and recycling the produced chlorine to reaction step (b).

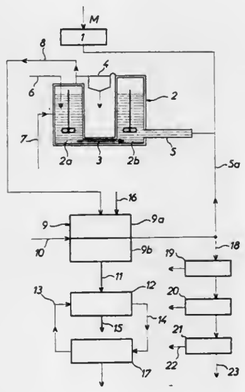
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**4,016,056**

## METHOD OF OBTAINING COPPER FROM SULPHURIZED CONCENTRATES

**Jean-Michel Demarthe, Viroflay; André Georgeaux, Rambouillet, and Alain Sonntag, Maurepas, all of France, assignors to Societe Miniere et Metallurgique de Penarroya, Paris, France**

**Filed May 15, 1975, Ser. No. 577,658**
**Claims priority, application France, May 15, 1974, 74.16772**
**Int. Cl.² C25C *1/12***
**U.S. Cl. 204—108** **16 Claims**



**1.** A method for obtaining electrolytic copper and other useful metals from sulphurized concentrates, comprising, in combination, the following stages:

a. lixiviating said sulphurized concentrate with an aqueous solution containing cupric chloride formed in situ, at least in part, by oxidation, by introducing hydrochloric acid and air into the cuprous chloride solution resulting from lixiviation;
b. partially extracting the copper contained in the lixiviation solution resulting from stage a), by contacting said lixiviation solution with an organic extractant containing a cationic solution, said extraction being accompanied by oxidation by injecting air into said lixiviation solution;
c. re-extracting the copper contained in said organic extractant by contacting said organic extractant with an aqueous solution of sulphuric acid and recycling the organic extractant to the extraction stage b); and
d. electrolyzing the copper sulphate obtained in stage c), to yield copper and an aqueous solution of sulphuric acid which is recycled to the re-extraction stage (c), at least part of the aqueous solution, which results from the partial copper extraction stage (b), being recycled to the lixiviation stage (a) and constituting a part of said cupric chloride solution, the other part of said aqueous solution being treated to recover the useful metals and the hydrochloric acid that it contains.



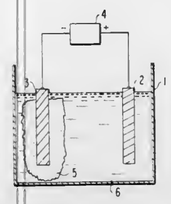
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**4,016,057**

## PROCESS OF PRODUCING FERROMAGNETIC MATERIALS

**Shin-ichiro Dezawa, and Yasuo Tamai, both of Odawara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan**

**Filed Dec. 1, 1975, Ser. No. 636,464**
**Claims priority, application Japan, Nov. 29, 1974, 49-137934; Nov. 29, 1974, 49-137935**
**Int. Cl.² C25C *5/00***
**U.S. Cl. 204—130** **19 Claims**



**1.** A process for improving the properties of a ferromagnetic material which comprises electrolyzing the ferromagnetic particles in an aqueous medium having a conductivity of greater than 50 milli moh/cm, containing a water-soluble electroconductive salt, and containing an anode and cathode while said ferromagnetic particles are in electrical contact with the cathode.

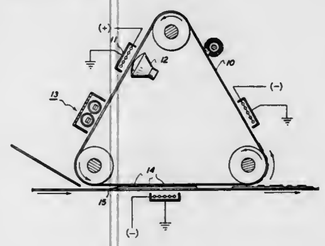
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**4,016,058**

## PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS

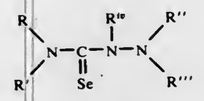
**Joseph Y. C. Chu, Fairport, and W. H. H. Gunther, Webster, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.**

**Division of Ser. No. 454,896, March 26, 1974. This application Jan. 15, 1976, Ser. No. 649,436**
**Int. Cl.² B01J *1/10***
**U.S. Cl. 204—158 R** **1 Claim**



**1.** A process for preparation of a solid phase dispersion of inorganic photoconductive materials in an insulating polymeric matrix comprising:

a. forming a solid phase dispersion from a film forming insulating polymeric resin and at least one organo-selenium compound of the formula



wherein R, R′, R″, R‴ and R$^{iv}$ are independently selected from hydrogen, alkyl, of 1 – 10 carbon atoms, phenyl, substituted phenyl, benzyl, and substituted benzyl; and

b. subjecting said polymeric composition to sufficient energy to decompose said selenium compound whereby elemental selenium is deposited within the organic polymeric composition in substantial conformity with the distribution of said energy throughout the composition.

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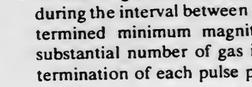
**4,016,059**

## METHOD FOR CURING INK AND COATING COMPOSITIONS OF ACRYLATED EPOXIDIZED SOYBEAN OIL AMINE COMPOUNDS

**David John Trecker, Old Lyme; George Wayne Borden, East Lyme, both of Conn., and Oliver Wendell Smith, South Charleston, W. Va., assignors to Union Carbide Corporation, New York, N.Y.**

**Division of Ser. No. 476,054, June 3, 1974, Pat. No. 3,931,071, which is a division of Ser. No. 343,692, March 22, 1973, Pat. No. 3,878,077, which is a division of Ser. No. 103,912, Jan. 4, 1971, abandoned. This application Mar. 28, 1975, Ser. No. 563,132**
**Int. Cl.² B01J *1/10***
**U.S. Cl. 204—161** **7 Claims**

**1.** A method for curing a composition comprising:
I. an acrylated epoxidized soybean oil amine compound having in the molecule the group:



wherein X in hydrogen or methyl and R′ taken singly is alkyl of 1 to 15 carbon atoms or aryl having up to 15 carbon atoms and the two R′ groups taken together with the nitrogen atom attached thereto form a heterocyclic ring having from 5 to 6 ring atoms, said compound being the reaction product of:
A. epoxidized soybean oil reacted with at least 2 moles of acrylic acid or methacrylic acid per mole thereof and
B. from 5 to 40 mole percent, based on acrylyl groups of an organic amine of the formula $R'_2NH$ wherein R′ is as defined above, and
II. an acrylyl compound, said method comprising exposing said composition to ionizing radiation, non-ionizing radiation, ultraviolet light radiation or high intensity predominantly continuum light radiation for a period of time sufficient to cure said compound to a tack-free state.

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**4,016,060**

## CORONA REACTION METHOD AND APPARATUS

**Frank Eugene Lowther, Severna Park, Md., assignor to Union Carbide Corporation, New York, N.Y.**

**Filed Mar. 13, 1975, Ser. No. 558,046**
**Int. Cl.² C01B *13/11***
**U.S. Cl. 204—176** **18 Claims**

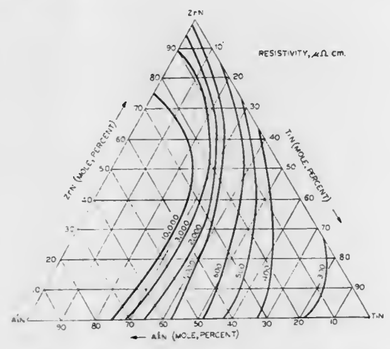
**1.** A process for conducting corona discharge reactions between spaced electrodes comprising the steps of:

a. passing a reactant gas through a corona discharge gap formed between said spaced electrodes;
b. periodically establishing a corona discharge by dissipating narrow pulse electrical power of high voltage in said gap with the width of each narrow pulse being a relatively small fraction of the pulse period as well as being less than the gas ion transit time across said gap and greater than the electron transit time; and
c. maintaining a low voltage bias potential across said gap during the interval between said narrow pulses of a predetermined minimum magnitude sufficient to remove a substantial number of gas ions from said gap being the termination of each pulse period.

## 4,016,061
## METHOD OF MAKING RESISTIVE FILMS

Kiyotaka Wasa, Nara; Fumio Hosomi, Higashiosaka, and Shigeru Hayakawa, Hirakata, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Division of Ser. No. 227,070, Feb. 17, 1972, Pat. No. 3,803,057. This application Jan. 16, 1974, Ser. No. 433,892
Claims priority, application Japan, Mar. 17, 1971, 46-15273; Mar. 17, 1971, 46-15274; Mar. 11, 1971, 46-13829
*Disclosure was also published under second Trial Voluntary Protest Program on Apr. 6, 1976*
Int. Cl.² C23C *15/00*
U.S. Cl. 204—192 F 5 Claims



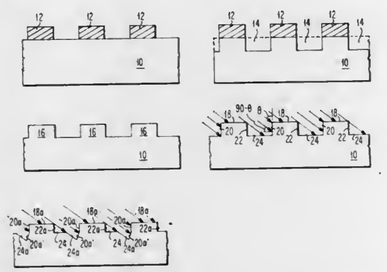

1. A method of making a thin resistive film comprising cathodically sputtering the thin resistive film onto a substrate from a composite cathode consisting essentially of Al, Ti and Zr and having a structure such that the surface area is 5 to 40% Al, 15 to 85% Ti and 10 to 80% Zr, the ratio of the area Al to Ti being less than 0.7, in a nitriding atmosphere at a pressure of $10^{-4}$ to $10^{-3}$ Torr.

3. A method of making a thin resistive film comprising cathodically sputtering the thin resistive film onto a substrate from a composite cathode consisting essentially of 10 to 50 mole % of AlN, 10 to 80 mole % of ZrN and 10 to 80 mole % of TiN, the mole ratio of the AlN to TiN being less than 1.2, in a non-reactive gas at a pressure of $10^{-4}$ to $10^{-3}$ Torr.

## 4,016,062
## METHOD OF FORMING A SERRATED SURFACE TOPOGRAPHY

Rajendra Rangraj Mehta, Palo Alto, and Otto Voegeli, San Jose, both of Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Sept. 11, 1975, Ser. No. 612,382
Int. Cl.² C23C *15/00*
U.S. Cl. 204—192 E 9 Claims

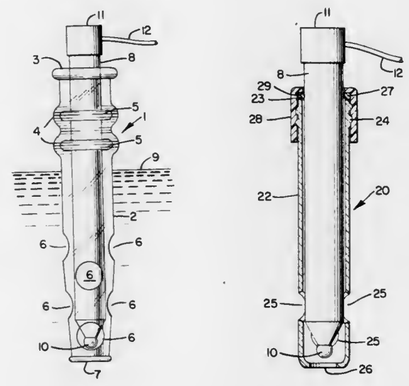


1. A method of forming a serrated surface topography comprising the steps of
forming a structure having a substantially rectangular wave surface topography,
ion milling said rectangular wave surface topography at an oblique angle of incidence to form a serrated surface topography.

## 4,016,063
## ELECTRODE SHIELD

Desmond Arpad Radnoti, 670 Alta Vista, Sierra Madre, Calif. 91024

Filed Aug. 6, 1975, Ser. No. 602,407
Int. Cl.² G01N *27/36*
U.S. Cl. 204—195 R 6 Claims



1. An electrode shield for housing and protecting an electrode, said shield comprising:
a hollow generally cylindrical shaped body having an opening at the top end thereof for receiving said electrode, an opening at the bottom end thereof smaller than said opening at said top end, a plurality of openings spaced apart along a portion of the wall thereof from said bottom end, a first recess formed in said wall below said opening and second recess formed in said wall below said first recess;
a first sealing ring housed in said first recess and extending into the inside of said hollow body beyond the inner surface of said hollow body; and
a second sealing ring housed in said second recess and extending into the inside of said hollow body beyond the inside surface of said hollow body, said first and said second sealing rings providing means for cushioning and frictionally holding said electrode in place when said electrode is inserted into said hollow body.

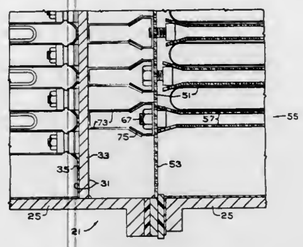
4. An electrode shield for housing an electrode, said shield comprising:
A hollow generally cylindrical shaped body having an opening at the top end thereof for receiving said electrode, an opening at the bottom end thereof smaller than said opening at said top end, a plurality of openings in the wall of said hollow body, said plurality of openings being spaced apart from said bottom end, and external threads formed adjacent said top end;
A cap being open at both ends and having internal threads for engaging said external threads of said hollow body to removably secure said cap to said hollow body; and
A sealing ring nested inside of said cap such that said sealing ring is compressed against the top end of said hollow body at the inside of said cap, said sealing ring providing cushioning means and means to frictionally hold said electrode in place when said electrode is slipped through said cap into said hollow body.



## 4,016,064
## DIAPHRAGM CELL CATHODE STRUCTURE

Hugh Cunningham; Carl W. Raetzsch; George L. Rich, and John D. Driskill, all of Corpus Christi, Tex., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Nov. 28, 1975, Ser. No. 636,019
Int. Cl.² C25B *9/00*
U.S. Cl. 204—256 10 Claims



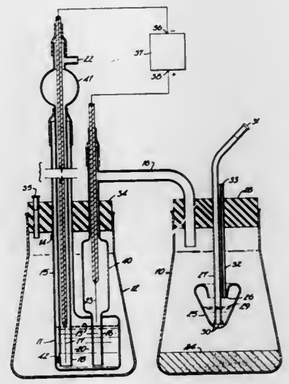
3. A method of assembling a diaphragm electrolytic cell having hollow fingered cathodes extending outwardly from a cathode back screen, each of said cathodes having an open base and having side walls, a top, a bottom, and a leading edge fabricated of foraminous metal, said cathodes and back screen being electrically and mechanically connected to a cathode base plate and having a permeable diaphragm thereon and said cell further having an anode unit with fingered anodes extending outwardly from an anode base plate, each of said anodes being interleaved between a pair of said cathodes, which method comprises:
inserting individual cathodes having bolt means projecting outwardly from the open base thereof between pairs of adjacent anodes;
positioning the cathode back screen on a plane substantially defined by the open bases of the individual fingered cathodes and passing the bolt means through apertures in the cathode back screen;
placing elastic conductor means onto said bolt means on the opposite side of the cathode back screen from the cathodes;
fastening the elastic conductor means, the bolt means, the back screen, and the cathode fingers together to form a cathode unit; and
assembling the anode unit, the cathode unit, and the cathode base plate together with the elastic conductor means of said cathode unit co-operating with elastic conductor means extending from said cathode base plate so as to form a single electrolytic diaphragm cell.

9. In a diaphragm electrolytic cell having a plurality of fingered anode blades extending outwardly from an anode base plate and cathode means electrically and mechanically connected to a cathode base plate parallel to and spaced from said anode base plate, said cathode means comprising a cathode back screen spaced from and parallel to said cathode base plate and plurality of hollow cathode fingers extending outwardly from said cathode back screen between said anode blades, each of said cathode fingers having an open base, and having side walls, a top, a bottom, and a leading edge fabricated of foraminous metal, the improvement comprising:
bolt means electrically and mechanically connected to each of said cathode fingers and extending outwardly from the open base thereof;
apertures in said cathode back screen corresponding to and of greater diameter than said bolt means whereby said cathode fingers are slideably adjustable; and
first elastic electrical conductor means extending outwardly from the cathode base plate toward the cathode back screen and second elastic electrical conductor means in electrical contact with said bolt means, on the opposite side of said cathode back screen from the cathode fingers, said first electrical conductor means and said second electrical conductor means being in electrical contact with each other.

## 4,016,065
## ELECTROLYTIC FIELD RESPIROMETER

Sidney Marion Beck, and Campbell Moore Gilmour, both of Moscow, Idaho, assignors to Idaho Research Foundation, Inc., Moscow, Idaho

Filed Oct. 16, 1975, Ser. No. 622,991
Int. Cl.² C25B *1/02, 1/04*
U.S. Cl. 204—275 9 Claims



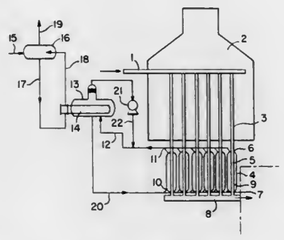
1. In an electrolytic field respirometer:
sealed sample chamber means for receiving an oxygen-consuming biological sample;
means located within the sample chamber means for absorbing carbon dioxide;
sealed compensating chamber means located physically proximate to said chamber means so as to be subjected to environmental temperature and pressure variations substantially identical to those to which the sample chamber means is subjected;
electrolytic cell means for maintaining a constant oxygen atmosphere within the sample chamber means, said electroltyic cell means comprising:
a. an enclosed vessel containing a volume of electrolyte capable of releasing hydrogen and oxygen when subjected to electrolysis;
b. an anode located within the vessel at a position spaced upwardly adjacent to the normal level of electrolyte within the vessel;
c. a cathode located within the vessel at an elevational position such that it is immersed within the electrolyte;
d. first outlet means for delivery of oxygen from the vessel during operation of the electrolyte cell, said first outlet means being in open communication with the interior of the enclosed vessel and having an open lower end surrounding the anode;
e. second outlet means for delivery of hydrogen during operation of the electrolytic cell, said second outlet means being in open communication with the interior of the enclosed vessel and having an open lower end surrounding the cathode;
a direct current supply having positive and negative terminals respectively connected to the anode and cathode;
the first outlet means of the electrolytic cell being in open communication with the interior of the sample chamber means;
the interior of the enclosed vessel of the electrolytic cell being vented, at an elevation above the normal level of the electrolyte, in open communication with the interior of the compensating chamber means.

**4,016,066**

## METHOD FOR RAPID COOLING OF THERMALLY CRACKED GASES OF HYDROCARBONS AND APPARATUS FOR CARRYING OUT THE METHOD

**Masatoyo Shiraiwa; Ichiro Tokumitsu, both of Tokyo; Toshisada Takemura, Ichikawa; Satoshi Hatano, Kudamatsu, and Hiroshi Yamaguchi, Tokyo, all of Japan, assignors to Idemitsu Sekiyukagaku Kabushiki Kaisha (Idemitsu Petrochemical Co., Ltd.), Tokyo, Japan**

**Continuation of Ser. No. 393,212, Aug. 30, 1973, abandoned. This application Apr. 21, 1975, Ser. No. 569,930**
**Claims priority, application Japan, Aug. 31, 1972, 47-86635**
**Int. Cl.² C10G 9/16**
**U.S. Cl. 208—48 Q** **3 Claims**



1. In an indirect method of rapid cooling of high temperature reaction gases containing heavy components which can form coke on heat exchanger walls and having a temperature of at least about 750° C and obtained by thermal cracking of hydrocarbons by passing said gases through a rapid cooling countercurrent flow heat exchanger cooled by a liquid heat exchange medium, the improvement comprising the steps of circulating a molten metal heat exchange medium between a cooling tank and said rapid cooling heat exchanger and introducing said molten metal medium into said rapid cooling heat exchanger countercurrently to said reaction gases at a temperature selected within the range of about 380°–550° C and above the dew point of the cokable components in said reaction gases.

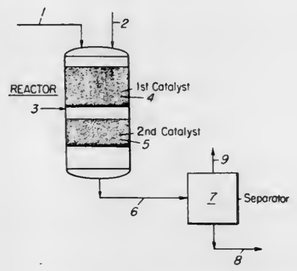
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**4,016,067**

## PROCESS FOR DEMETALATION AND DESULFURIZATION OF PETROLEUM OILS

**Ronald H. Fischer, and Donald Milstein, both of Cherry Hill, N.J., assignors to Mobil Oil Corporation, New York, N.Y.**

**Filed Feb. 21, 1975, Ser. No. 551,948**
**Int. Cl.² C10G 23/02, 23/16**
**U.S. Cl. 208—89** **9 Claims**




1. A process for catalytically demetalizing and desulfurizing a residual oil, said process consisting essentially of: passing a mixture of hydrogen and said oil at a hydrogen pressure of about 500 to 3,000 psig, a temperature of about 600° to 850° F, and a space velocity of 0.1 to 5.0 LHSV, through a trickle bed of first catalyst, said first catalyst comprising the oxides or sulfides of a Group VIB metal and an iron group metal on a support comprising a delta or theta phase alumina, said first catalyst having also at least about 60 percent of its pore volume in pores with diameters of about 100 to 200A, at least about 5 percent of its pore volume in pores greater than 500A., and a surface area of up to about 110 m²/g; and then passing said mixture of hydrogen and said oil through a bed of second catalyst disposed downstream of said first catalyst, said second catalyst comprising the oxides or sulfides of a Group VIB metal and an iron group metal on an alumina support, said second catalyst having a surface area of at least 150 m²/g and at least 50 percent of its pore volume in pores with diameters of 30 to 100A.

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**4,016,068**

## CATALYTIC REFORMING WITH AN ACTIVATED BIMETALLIC CATALYTIC COMPOSITE

**Richard E. Rausch, Mundelein, Ill., assignor to UOP Inc., Des Plaines, Ill.**

**Division of Ser. No. 482,708, June 21, 1974, Pat. No. 3,968,053, which is a division of Ser. No. 406,134, Oct. 12, 1973, Pat. No. 3,864,241, which is a continuation-in-part of Ser. No. 187,579, Oct. 7, 1971, abandoned, which is a continuation-in-part of Ser. No. 807,910, March 17, 1969, Pat. No. 3,740,328. This application June 10, 1976, Ser. No. 694,872**
**Int. Cl.² C10G 35/08**
**U.S. Cl. 208—139** **9 Claims**

1. A process for catalytically reforming a gasoline fraction, which process comprises contacting the gasoline fraction and a hydrogen stream at reforming conditions with an activated catalytic composite comprising a combination of a platinum group component, a tin component and a halogen component with a porous carrier material in amounts sufficient to result in a catalyst containing, on an elemental basis, about 0.01 to about 2 wt. % platinum group metal, about 0.01 to about 5 wt. % tin and about 0.1 to about 3.5 wt. % halogen; wherein the tin component is uniformly dispersed throughout the porous carrier material in a particle size less than 100 Angstroms in maximum dimension and in a positive oxidation state; and wherein the catalytic composite has been activated by contacting with an activating gas comprising oxygen and a halogenating component selected from the group consisting of halogen and hydrogen halide at a temperature between 700°to 1100° F. for a time of at least 0.5 to about 10 hours and, thereafter, reduced by contacting the resulting activated catalytic composite with a substantially water-free reducing agent at reduction conditions selected to reduce substantially all of the platinum group component to the elemental metallic state while maintaining substantially all of the tin component in an oxidation state above that of the elemental metal.

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**4,016,069**

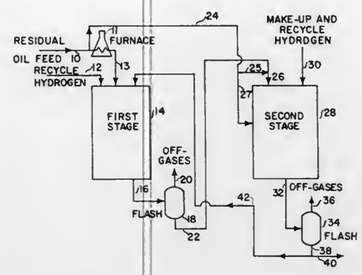
## MULTIPLE STAGE HYDRODESULFURIZATION PROCESS INCLUDING PARTIAL FEED OIL BY-PASS OF FIRST STAGE

**Robert D. Christman; Jordan S. Lasher; John A. Paraskos, all of Pittsburgh, and Stephen J. Yanik, Valencia, all of Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.**

**Filed Nov. 17, 1975, Ser. No. 632,375**
**Int. Cl.² C10G 23/02**
**U.S. Cl. 208—210** **7 Claims**

1. A process for hydrodesulfurization of a metal- and sulfur-containing asphaltenic feed oil comprising passing said oil and hydrogen downwardly through both first and second catalytic hydrodesulfurization stages in series, the catalyst in said stages comprising supported sulfided Group VI-B and Group VIII metals, said stages operated at a temperature of 600° to 790° F. and a hydrogen pressure of 500 to 5,000 psi, flashing contaminant gases including hydrogen sulfide and ammonia from the oil flowing between said stages, and concomitantly by-passing a portion of said feed oil around said first stage and charging it directly into said second stage.





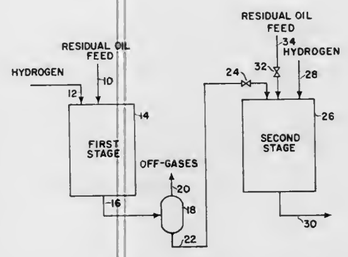

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**4,016,070**

## MULTIPLE STAGE HYDRODESULFURIZATION PROCESS WITH EXTENDED DOWNSTREAM CATALYST LIFE

**Robert D. Christman; Jordan S. Lasher; John A. Paraskos, all of Pittsburgh, and Stephen J. Yanik, Valencia, all of Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.**

**Filed Nov. 17, 1975, Ser. No. 632,376**
**Int. Cl.² C10G 23/02**
**U.S. Cl. 208—210** **3 Claims**




1. A process for hydrodesulfurization of residual feed oil comprising passing said oil and hydrogen downwardly through both first and second fixed bed catalytic hydrodesulfurization zones in series at a temperature of 600° and 900° F. and a hydrogen pressure of 500 to 5,000 psi, the catalyst in said zones comprising supported Group VI-B and Group VIII metals, flashing contaminant gases including hydrogen sulfide and ammonia from the oil flowing between said first and second zones, increasing the temperature in said zones to compensate for catalyst activity loss with increasing catalyst age, teminating said flow of said feed oil to said first zone when said second stage catalyst becomes substantially deactivated, and then directly charging said feed oil downwardly through said second zone thereby extending the operable life of said substantially deactivated second stage catalyst.

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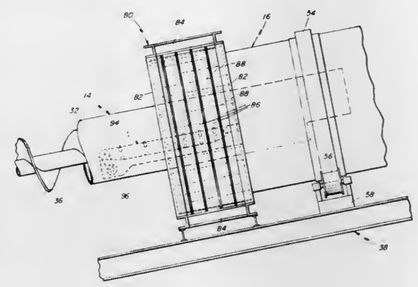
**4,016,071**

## MAGNETIC SEPARATION APPARATUS

**Malcolm M. Paterson, Atkinson, N.H., assignor to Raytheon Company, Lexington, Mass.**

**Filed Sept. 15, 1975, Ser. No. 613,718**
**Int. Cl.² B03C 1/30**
**U.S. Cl. 209—39** **8 Claims**

1. A materials classifier comprising a drum disposed with its longitudinal axis inclined at an angle to the horizontal, means for rotating the drum in a predetermined direction about said axis, first conveyor means for depositing mixed materials in the drum at a selected point along its length whereby the rotation of the drum will cause a tumbling action of said materials causing the materials to progressively move toward the lower end of the drum, means for directing a stream of air at relatively high velocity through the drum to entrain light materials and remove them out the upper end of the drum, magnetic means adjacent the lower end of the drum for receiving the separated heavy materials before their exit from the drum and removing magnetic materials therefrom, and second conveyor means for transporting said magnetic materials out the lower end of the drum separately from the remaining nonmagnetic materials, said magnetic means comprising a magnet array having one end portion disposed externally of the drum beneath the heavy materials, said array extending upwardly along the side of the drum in the direction of rotation thereof, the opposite end portion of the array terminating above said second conveyor means, and the magnets on the individual rings being adjustable toward and away from each other to control the magnetic field produced thereby.



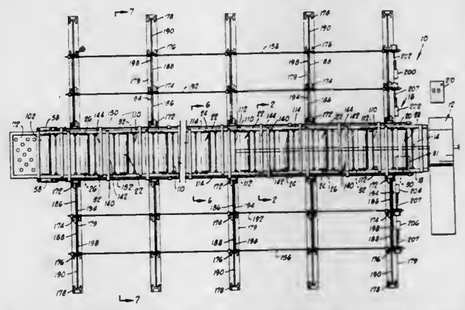
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**4,016,072**

## CONTROL APPARATUS FOR A LENGTH DETERMINING MACHINE

**Clarence William Cavenar, Moore, Okla., assignor to W & W Steel Company, Oklahoma City, Okla.**

**Continuation-in-part of Ser. No. 489,107, July 17, 1974, Pat. No. 3,923,157. This application Sept. 2, 1975, Ser. No. 609,386**
**Int. Cl.² B07C 5/04**
**U.S. Cl. 209—74 R** **12 Claims**



1. A control apparatus for controlling the operation of a length determining machine having a length determining assembly comprised of an inches portion and a feet portion, and a removal assembly comprised of a station portion and a kickoff portion, the control apparatus comprising:

input means for producing a length signal comprised of an inches portion and a feet portion, and a removal signal comprised of a station portion and a kickoff portion;

length decoder means for receiving the length signal and

actuating the length determining assembly of the length determining machine in response to the received length signal, the length decoder means comprising:

inches decoder means for receiving the inches portion of the length signal and actuating the inches portion of the length determining assembly of the length determining machine in response to the received inches portion of the length signal; and,

feet decoder means for receiving the feet portion of the length signal and actuating the feet portion of the length determining assembly of the length determining machine in response to the received feet portion of the length signal; and,

removal decoder means for receiving the removal signal and actuating the removal assembly of the length determining machine in response to the received signal, the removal decoder means comprising:

station decoder means for receiving the station portion of the removal signal and actuating the station portion of the removal assembly of the length determining machine; and,

kickoff decoder means for receiving the kickoff portion of the removal signal and actuating the kickoff portion of the removal assembly of the length determining machine.

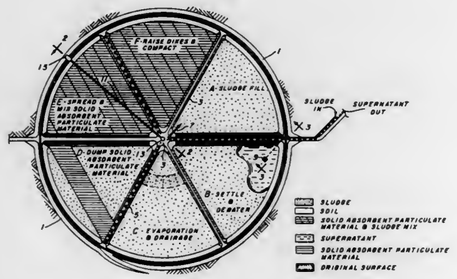
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**4,016,073**

## PROCESS FOR SLUDGE DISPOSAL AND CIRCULAR LANDFILL SYSTEM

**Joseph L. Jordan, Lakewood, Colo., assignor to Dravo Corporation, Pittsburgh, Pa.**

**Filed Apr. 7, 1976, Ser. No. 674,433**
**Int. Cl.² B01D** *15/00*
**U.S. Cl. 210—24** **7 Claims**




1. A process of disposing of waste products comprising an aqueous sludge and forming a stable landfill therefrom comprising:

a. preparing a circular disposal area having a raised central area and a perimeter dike;

b. subdividing said circular disposal area into a plurality of disposal ponds by erecting radial dikes extending from the raised central area to the perimeter dike;

c. charging aqueous sludge, from a central charging means into a first of said plurality of disposal ponds, adjacent the raised central area;

d. permitting the aqueous sludge to settle and form a settled sludge solids while removing supernatant water, formed by settling, from a location proximate the perimeter dike;

e. partially drying the settled sludge solids by evaporation of further water therefrom while mechanically disturbing any crust formed thereon to expose and aerate additional settled sludge solids;

f. depositing a quantity of solid absorbent particulate material on the partially dried sludge solids;

g. spreading the solid absorbent particulate material over the surface of the partially dried sludge solids while mechanically intermixing the two solids to form a landfill material within said disposal pond; and

h. compacting said landfill material and raising the level of said perimeter dike and radial dikes and repeating the sequence of steps (c)–(h).

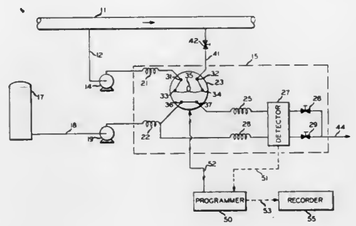
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**4,016,074**

## CHROMATOGRAPHIC SEPARATION

**Grady T. Porter, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.**

**Filed Aug. 5, 1975, Ser. No. 602,179**
**Int. Cl.² B01D** *15/08*
**U.S. Cl. 210—31 C** **24 Claims**




1. A process comprising:

establishing a flow of carrier liquid, comprising a suitable ether solvent and an effective amount of water for preventing column plugging, through a packed chromatographic column suitable for separating hydrocarbon materials from an acid;

introducing a liquid sample material comprising an acid and hydrocarbon material into said carrier liquid upstream of said chromatographic column; and

passing said carrier liquid containing said sample material through said chromatographic column to separate said acid from said hydrocarbon material.

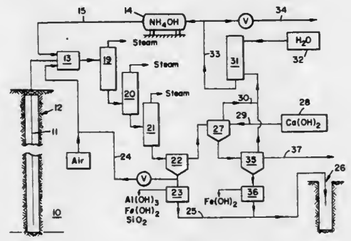
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**4,016,075**

## PROCESS FOR REMOVAL OF SILICA FROM GEOTHERMAL BRINE

**Vernon H. Wilkins, Sacramento, Calif., assignor to Southern Pacific Land Co., San Francisco, Calif.**

**Filed Mar. 17, 1975, Ser. No. 558,775**
**Int. Cl.² B01D** *21/00*
**U.S. Cl. 210—42 R** **3 Claims**




1. In a method of recovering energy and minerals from a mixture of geothermal steam and brine produced at a high temperature and pressure from an underground formation, wherein said produced brine is to be reduced to a substantially lower temperature and pressure, said produced brine at said high temperature and pressure having a high total dissolved solids content including dissolved aluminum and ferrous ions and a high concentration of dissolved silica greater than the saturation level of silica in said brine when said brine is at said substantially lower temperature and pressure, said produced brine at said high temperature and pressure having a pH of about 5, the steps of:



a. adding ammonium hydroxide to said produced mixture of steam and brine at said high temperature and pressure and reacting said ammonium hydroxide with said dissolved aluminum and ferrous ions to form soluble ammonium ions and a precipitated sludge of aluminum and ferrous hydroxides in said brine, said ammonium hydroxide being added in an amount sufficient to raise the pH of the brine to a level wherein a substantial portion of the dissolved silica will be swept out with said sludge such that the concentration of the remaining dissolved silica will be near the saturation level of silica in said brine when said brine is at said substantially lower temperature and pressure,

b. separating and removing said steam from said brine,

c. separating and removing said sludge from said brine,

d. reducing the temperature and pressure of said produced brine to said substantially lower temperature and pressure after the formation of said precipitated sludge.

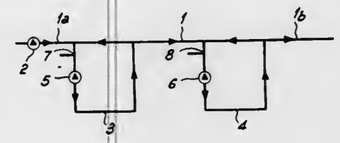
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**4,016,076**

## PROCESSING OF EMULSIONS

**Antoine Augustin Joseph Lefeuvre, Ennery, France, assignor to Societe d'Etudes et de Realisations Industrielles, Le Chesnay, France**

**Filed Mar. 21, 1974, Ser. No. 453,544**
**Claims priority, application France, Mar. 21, 1973, 73.10045; Jan. 23, 1974, 74.02173**
**Int. Cl.² C02B** *1/18*
**U.S. Cl. 210—61** **2 Claims**




1. A continuous method of processing a stable emulsion of oil-in-water comprising the steps of:

a. providing a main flowpath of an initial oil-in-water emulsion at a slightly alkaline pH,

b. diverting a portion of the emulsion from the main flowpath into a first shunt circuit,

c. injecting the first additive selected from the group consisting of salts of an alkaline earth metal at a controlled rate into said first shunt circuit,

d. joining the first shunt circuit to said main flowpath of initial emulsion thereby forming a mixture of said first additive and initial emulsion.

e. diverting a portion of the mixture formed in (d) from the main flowpath into a second shunt circuit,

f. injecting a second additive selected from the group consisting of salts of divalent and trivalent metals at a controlled rate into said second shunt circuit to cause inversion of said initial emulsion,

g. joining said second shunt circuit to the main flowpath, and

h. allowing the resultant mixture from step (g) to separate into separate layers of water and a water-in-oil emulsion.

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**4,016,077**

## BLOOD TRANSFUSION FILTERS

**Gus Schreiber, 5619 W. Caruth, Dallas, Tex. 75209**

**Filed Aug. 25, 1975, Ser. No. 607,474**
**Int. Cl.² B01D** *33/22*
**U.S. Cl. 210—77** **6 Claims**

1. A blood filter system comprising:

a rigid frame structure;

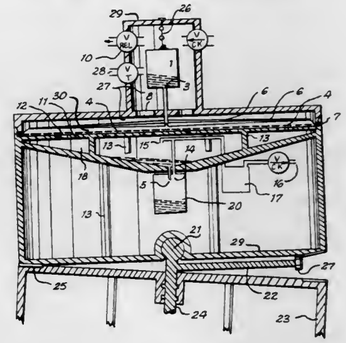
a filter support attached within said frame structure having openings therein to permit passage of blood therethrough, said filter support dividing said frame structure into an upper chamber and a lower chamber;

a filter positioned adjacent said filter support within said upper chamber;

a flexible solid sheath having its edges attached to said filter to form a collapsible blood receiving container;

seal means for sealing said solid sheath to said filter support to create a fluid-tight seal around the container formed by said sheath and said filter;

means for generating pressure in the upper chamber of said frame structure and against said solid sheath to force blood deposited within the container formed by said sheath and said filter through said filter; means to produce a rotating slow swirling wave of blood upon said filter mesh within said upper chamber, and;



collection means positioned below said filter support in the lower chamber of the frame structure to collect said blood filtered through said filter.

5. A method for filtering blood comprising:

depositing blood in a bag-like container having one surface composed for a filter mesh with the remainder of the container composed of a flexible solid sheath material;

sealing the sheath material to a filter support such that the filter is adjacent the support;

introducing blood into the container formed by the sheath material and the filter;

applying a pressure to the container opposite the filter support to force blood through the filter, and; rocking said bag-like container thereby to produce a rotating slow swirling wave of blood upon said filter mesh.

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**4,016,078**

## HEADER BLOCK FOR TUBULAR MEMBRANE PERMEATOR MODULES

**George B. Clark, Clayton, Calif., assignor to The Dow Chemical Company, Midland, Mich.**

**Filed Mar. 6, 1975, Ser. No. 556,055**
**Int. Cl.² B01D** *31/00*
**U.S. Cl. 210—94** **10 Claims**

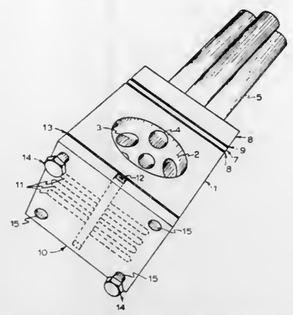
1. A header block having:

1. two opposed, generally planar faces, joined by a feed bore through said block, the axis of said bore being generally perpendicular to each of said faces;

2. a third generally planar face, to which said bore axis is generally parallel, connected to the bore and pierced by a plurality of generally parallel feed passageways terminating in said bore;

the walls defining the portions of said passageways adjacent said third face being adapted to receive, position and, in cooperation with suitable sealing means, to sealingly engage terminal portions of tubes inserted therein; and

3. a fourth generally planar face, opposed and generally parallel to said third face and connected thereto by a



plurality of permeate conduits which pass through said block and are not connected with said feed bore.

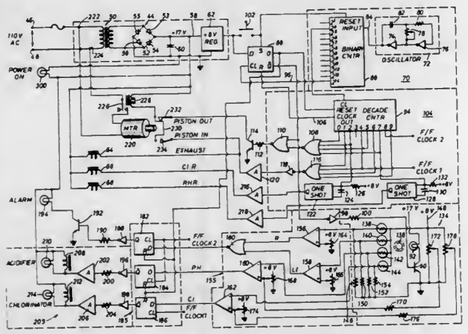
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**4,016,079**

## AUTOMATIC CHLORINE AND PH CONTROL APPARATUS FOR SWIMMING POOLS

**Ernest O. Severin, Houston, Tex., assignor to Aquasol, Inc., Houston, Tex.**

**Filed Sept. 16, 1975, Ser. No. 613,883**
**Int. Cl.² E04H *3/20***
**U.S. Cl. 210—96 R** **12 Claims**



1. An apparatus for automatically controlling a chlorinator supplying chlorine to water in a swimming pool, which comprises:

analyzer means having a sample cell for holding a liquid sample from a swimming pool and for producing an electrical signal functionally related to the chlorine residual in said liquid sample;

timing means including a counter operably connected to said analyzer means for generating a first set of timing signals to enable the operation of said analyzer means on a preselected periodic interval and a second set of timing signals; reagent control means for metering the introduction of chlorine reagent into the sample cell;

controller means for defining a cycle of operation and including a multistate counter receiving said second set of timing signals from said timing means, said controller means being operably connected to a motor driven plunger for drawing in and expelling liquid from the sample cell and said reagent control means to:

a. draw into and expel from the sample cell a quantity of liquid to wash out the cell during one phase of the cycle of operation,

b. draw a liquid sample and inject chlorine reagent into the sample cell during the following phase of the cycle of operation, and

c. exhaust the contents of the sample cell after a chlorine residual test has been completed;

comparator means coupled to said analyzer means for detecting the existence or non-existence of a desired level of chlorine residual in the liquid sample and for providing an output signal indicative thereof; and

feed control means responsive to the output signal from said comparator means for regulating a chlorinator supplying chlorine to the swimming pool water.

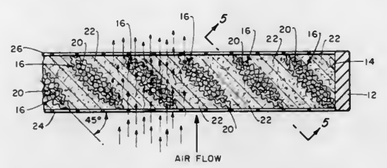
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**4,016,080**

## FLUID FILTER AND PURIFYING APPARATUS

**Douglas J. Williams, 25569 Langston St., Valencia, Calif. 91355**

**Filed Aug. 14, 1975, Ser. No. 604,884**
**Int. Cl.² B01D *23/10***
**U.S. Cl. 210—284** **8 Claims**




1. A fluid filter and purifying apparatus comprising:

a supportive structure;

a plurality of elongated envelopes, each said envelope terminating in a first end and a second end, each said envelope having a longitudinal axis, said envelopes connected to said supportive structure, said envelopes being spaced from each other forming a gap between adjacent envelopes, each said envelope being positioned to be inclined with respect to the direction of the fluid flow through said supportive structure, each said envelope being adapted to retain a quantity of granulated carbon, each said gap being adapted to contain a quantity of loosely packed fibrous material; and

an open mesh screening placed across said supportive structures and attached to both the front side and the back side of said supportive structure, thereby sandwiching therebetween said carbon containing envelope and said fibrous material.

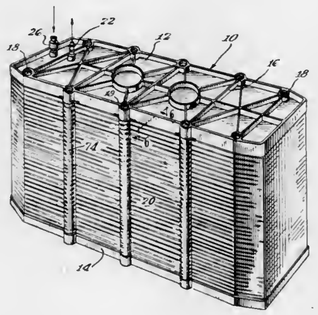
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**4,016,081**

## STAGED MEMBRANE DIFFUSION DEVICE AND MEMBRANE SUPPORT

**F. Jesus Martinez, Palatine, and William J. Schnell, Arlington Heights, both of Ill., assignors to Baxter Laboratories, Inc., Deerfield, Ill.**

**Filed Apr. 22, 1974, Ser. No. 462,674**
**Int. Cl.² B01D *31/00***
**U.S. Cl. 210—321 B** **15 Claims**



1. In a diffusion device which comprises: a stack of pairs of



semi-permeable membrane walls, said pairs defining a set of first flow passages along interior surfaces of said membrane wall pairs, and plate members positioned between adjacent membrane wall pairs for support thereof, and to define a second set of flow passages along exterior surfaces of said membrane wall pairs, and means for permitting communication of said flow passages with the exterior of said device, said means including flow conduits extending transversely of said stack in communication with one set of said flow passages, the improvement comprising: staging means for directing fluid in at least one of said sets of flow passages successively along different membrane wall pairs, to lengthen the fluid flow path through said flow passages for improved diffusion, said staging means comprising intact, port-free surfaces of membrane walls in registry with said transversely extending flow conduits, positioned to occlude flow at predetermined intervals along said transversely extending flow conduits and to redirect flow received from along one membrane wall pair along another membrane wall pair.

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**4,016,082**

## DEVICE FOR THE DIFFUSION OF SUBSTANCES BETWEEN TWO FLUIDS VIA SEMI-PERMEABLE DIAPHRAGMS

**Gerhard Riede, Eslov, and Gunnar Boberg, Lund, both of Sweden, assignors to Gambro AG, Baar, Switzerland**

**Filed Mar. 24, 1975, Ser. No. 561,221**
**Claims priority, application Sweden, Apr. 16, 1974, 7405033**
**Int. Cl.² B01D *31/00***
**U.S. Cl. 210—321 B** **6 Claims**



1. A dialysis apparatus comprising a plurality of stacked plates each having a substantial open area intermediate the sides and ends thereof, pairs of semi-permeable membranes disposed between adjacent spacing plates and extending over the open area therein, each spacing plate being disposed alternately between said pairs of membranes, said stack of spacing plates and pairs of membranes being provided with holes therethrough adjacent the ends thereof for forming distributing passages extending transversely of the stack of spacing plates and pairs of membranes for providing an inlet and outlet for a purifying liquid along the outside of each pair of membranes and for providing an inlet and outlet for a liquid to be purified between the membranes of each pair of membranes, the membranes of each pair being sealed together at spaced areas to form tortuous passageways between each pair of membranes at least in those areas corresponding to the open area of said spacing plates, the marginal edges of the holes forming the inlet and outlet for the purifying liquid of each pair of membranes being sealed together for preventing access of the purifying liquid from the distributing passages therefor into the liquid to be purified between the membranes of each pair and means for preventing leakage of the liquid to be purified from the distributing passages therefore into the purifying liquid.

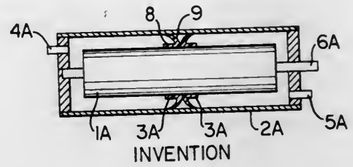
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**4,016,083**

## SPIRALLY-WOUND MEMBRANE-TYPE SEPARATOR MODULE CAPABLE OF REVERSING THE DIRECTION OF LIQUID FLOW

**Yasuhiro Sakaguchi, Yokohama; Junichi Koike, Ohimachi, and Takehisa Kubo, Ohmiya, all of Japan, assignors to Daicel, Ltd., Osaka, Japan**

**Filed Dec. 15, 1975, Ser. No. 640,754**
**Claims priority, application Japan, Dec. 18, 1974, 49-153344**
**Int. Cl.² B01D *31/00***
**U.S. Cl. 210—433 M** **4 Claims**




1. An apparatus for semi-permeable membrane separation processes, comprising: an outer cylindrical pressure vessel; a spirally-wound cylindrical membrane module disposed within said pressure vessel and extending axially therein, said module being radially spaced from said pressure vessel; seal means disposed in the space between said module and said pressure vessel, said seal means including an inner ring portion sleeved on said module and in substantially sealed relationship therewith and a pair of concave flange portions extending outwardly from the ring portion into substantially sealed relationship with the inner surface of said pressure vessel, the concavities of said flange portions opening toward opposite axial ends of said pressure vessel.

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**4,016,084**

## ZOSTERA SEAWEED ARTICLES AND METHODS OF PREPARING AND UTILIZING SAME

**Angelo M. Primo, 35053 Turner, Sterling Heights, Mich. 48077**

**Filed Feb. 14, 1975, Ser. No. 550,116**
**Int. Cl.² C09K *3/28*; B27K *9/00***
**U.S. Cl. 252—8.1** **10 Claims**

1. A flame-retardant product consisting essentially of:

a predetermined quantity and arrangement of an aquatic plant belonging to the genus Zostera;

said aquatic plant being dried;

said dried aquatic plant being then reduced to form small particles thereof; and

said small particles of said dried aquatic plant being then admixed with a carrier.

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**4,016,085**

## PRODUCTION OF HETEROPOLYSACCHARIDE BY FERMENTATION OF METHANOL

**Robert K. Finn; Alex L. Tannahill, both of Ithaca, N.Y., and Joseph E. Laptewicz, Jr., Groton, Conn., assignors to Cornell Research Foundation, Inc., Ithaca, N.Y.**

**Division of Ser. No. 523,559, Nov. 14, 1974, Pat. No. 3,932,218, which is a division of Ser. No. 364,559, May 29, 1973, Pat. No. 3,923,782. This application July 2, 1975, Ser. No. 592,603**
**Int. Cl.² C09K *7/02*; E21B *43/22***
**U.S. Cl. 252—8.5 C** **5 Claims**

1. A method of thickening an aqueous composition which comprises adding to said composition from 0.1 to 3.0% by weight of an heteropolysaccharide of bacterial origin having an intrinsic viscosity in the range of about 10 to 20 deciliters per gram and comprising the following constituents on a weight per cent basis:

1. Organic matter of 60 to 90% comprising

a. 10 to 30% glucose;
b. 3 to 15% mannose;
c. 3 to 15% galactose; and
d. 5 to 35% pyruvic acid;

2. Inorganic matter of 10 to 40% comprising
a. 5 to 25% phosphates; and
b. 5 to 25% cations.

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**4,016,086**

## POLYACRYLAMIDE POLYMERS DERIVED FROM ACRYLONITRILE WITHOUT INTERMEDIATE ISOLATION

**Charles J. Norton, and David O. Falk, both of Denver, Colo., assignors to Marathon Oil Company, Findlay, Ohio**

**Filed Jan. 26, 1972, Ser. No. 220,910**
**The portion of the term of this patent subsequent to July 24, 1990, has been disclaimed.**
**Int. Cl.² E21B *43/22***
**U.S. Cl. 252—8.55 D** **5 Claims**

1. In a process for the recovery of petroleum from formations by injecting aqueous solutions of viscosity-increasing compositions into the formation and displacing same therethrough to recover petroleum from the formation, the improvement comprising in combination:
a. hydrolyzing acrylonitrile by treatment with sulfuric acid and water in the presence of a polymerization inhibitor to form acrylamide monomer,
b. neutralizing the acrylonitrile hydrolysis product by treatment with base,
c. substantially removing the polymerization inhibitor from the acrylonitrile hydrolysis product,
d. polymerizing the hydrolyzed and neutralized acrylonitrile solution at a temperature in the range of about 10° to about 90° C in the presence of a polymerization catalyst to form polyacrylamide, having a molecular weight of about 1 million to about 100 million,
e. methylolating the polyacrylamide with about 0.01 to about 10 moles of formaldehyde per mole of acrylamide monomer unit, and thereafter injecting the polyacrylamide into the formation and displacing it into the formation to recover crude oil therefrom.

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**4,016,087**

## SURFACE TREATING AGENT FOR PROCESSING OF METALS

**Uraji Narushima, Yokohama, and Takashi Moriwake, Kawasaki, both of Japan, assignors to Nippon Paint Co., Ltd., Osaka, Japan**

**Filed July 3, 1975, Ser. No. 593,043**
**Claims priority, application Japan, July 8, 1974, 49-78591**
**Int. Cl.² C10M *3/22***
**U.S. Cl. 252—40.7** **7 Claims**

1. A surface treating agent for processing of metals, which comprises (A) a water-soluble thermoplastic synthetic resin having a glass transition temperature of 60° to 90° C and an average molecular weight of 15,000 to 50,000 which is obtained by copolymerizing (1) 16 to 40 parts by weight of an ester of acrylic acid with a monovalent aliphatic alcohol having 1 to 8 carbon atoms, (2) 40 to 64 parts by weight of a mixture of styrene and at least one member selected from the group consisting of methyl methacrylate, vinyl acetate and acrylonitrile wherein the mixture of styrene and the other monomer is in a proportion of 1:0.8 to 0.8:1 by weight, and (3) 10 to 20 parts by weight of a polymerizable hydrocarbyl carboxylic acid, (B) a metallic soap which is a salt of a higher fatty acid having 8 to 22 carbon atoms with an alkaline earth metal, and (C) water, said water-soluble thermoplastic synthetic resin (A) and the metallic soap (B) being contained in a ratio of 5:4 to 5:1 by weight and wherein the total concentration of component (A) and component (B) in water (C) is 50% by weight or less.

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**4,016,088**

## HYDRAULIC FLUIDS

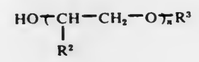
**Gerald John Joseph Jayne; Herbert Frank Askew, and Colin John Harrington, all of Swindon, England, assignors to Castrol Limited, England**

**Division of Ser. No. 508,842, Sept. 24, 1974. This application July 22, 1975, Ser. No. 598,010**
**Claims priority, application United Kingdom, Sept. 25, 1973, 44905/73; Dec. 14, 1973, 58175/73**
**Int. Cl.² C10M *3/46, 3/44***
**U.S. Cl. 252—78.3** **18 Claims**

1. An essentially chlorine free hydraulic fluid containing alkyl silane derivatives in an amount up to 99% by weight, the remainder being selected from conventional hydraulic fluid additives, conventional hydraulic fluid base stocks and mixtures thereof, said alkyl silane derivatives being prepared by a process which comprises reacting a di- or tri-chlorosilane of the formula:



with a diol or polyol and a glycol monoether of the formula:



wherein:
a. R is an alkyl group;
b. the or each group $R^2$ is a hydrogen atom or a methyl or ethyl group and each $R^2$ may be the same as or different from any other group $R^2$;
c. $R^3$ is an alkyl group;
d. *n* is an integer of from 1 to 10; and
e. X is a chlorine atom or the group R.

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**4,016,089**

## DENTURE CLEANING CONCENTRATE

**Glen B. Regan, and Barrier F. Regan, both of 727 Shasts St., Redwood City, Calif. 94063**

**Filed Nov. 11, 1974, Ser. No. 522,328**
**Int. Cl.² C11D *1/62, 3/40, 3/48***
**U.S. Cl. 252—106** **2 Claims**

1. A denture cleaning concentrate consisting essentially of an aqueous solution containing 4 to 10 percent by weight of orthophosphoric acid, 3.5 to 5 percent by weight of a water soluble alkyl phenyl polyglycolether, 0.5 to 1.0 percent by weight of a quaternary ammonium germicide containing one



alkyl group of 10 to 20 carbon atoms and three lower organic radicals selected from the group consisting of methyl, ethyl and benzyl and 0.003 to 0.01 percent by weight of a chemical indicator for pH which undergoes a color change at pH about 4.5.

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**4,016,090**

## STABLE BLEACHING COMPOSITION

**Yunosuke Nakagawa, Koshigaya, and Koitsu Sato, Funabashi, both of Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan**

**Filed Feb. 28, 1975, Ser. No. 554,012**
**Claims priority, application Japan, Mar. 6, 1974, 49-25995**
**Int. Cl.² C11D *7/54***
**U.S. Cl. 252—102** **2 Claims**

1. A dry, powder form, bleaching composition having an improved storage stability, consisting essentially of: from 5 to 90 percent by weight of sodium percarbonate; from one to 40 percent by weight of an activator for said sodium percarbonate and capable of increasing the bleaching effect of said sodium percarbonate in aqueous solution at a temperature below 80° C; and from 5 to 40 percent by weight of anhydrous potassium carbonate.

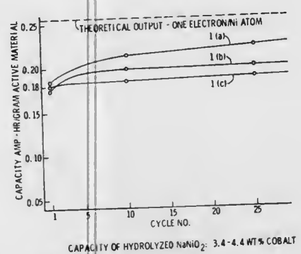
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**4,016,091**

## METHOD OF PREPARING HIGH CAPACITY NICKEL ELECTRODE POWDER

**John F. Jackovitz, Monroeville, and Earl A. Pantier, Verona, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Division of Ser. No. 558,110, March 13, 1975, Pat. No. 3,941,614. This application Oct. 30, 1975, Ser. No. 627,330**
**The portion of the term of this patent subsequent to Mar. 2, 1993, has been disclaimed.**
**Int. Cl.² H01M *4/88***
**U.S. Cl. 252—182.1** **5 Claims**




1. A method of making an active battery electrode powder, comprising the steps of:
a. mixing an admixture of NiO and $Na_2O_2$, wherein the weight ratio of NiO: $Na_2O_2$ is between about 1:1.35 to about 1:2.1;
b. heating the admixture at a reaction temperature of between about 800°–1150° C, for about ½ hour to 8 hours to melt the admixture and form a reaction product comprising $NaNiO_2$;
c. hydrolyzing the reaction product comprising $NaNiO_2$ in water at between 20°–95° C, forming a battery material comprising Ni hydroxide forms and then washing the battery material; and
d. maintaining the activity of the battery material by maintaining the temperature of the material below about 65° C.

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**4,016,092**

## ORGANIC COMPOSITIONS CONTAINING BORATE AND PHOSPHONATE DERIVATIVES AS DETERGENTS

**Harry J. Andress, Wenonah, N.J., assignor to Mobil Oil Corporation, New York, N.Y.**

**Continuation-in-part of Ser. No. 563,240, March 28, 1975, abandoned. This application Mar. 8, 1976, Ser. No. 664,853**
**Int. Cl.² C10M *1/46, 1/44, 1/54*; C07F *5/04***
**U.S. Cl. 252—32.5** **11 Claims**

1. An organic fluid composition comprising an organic medium selected from the group consisting of lubrication oils, greases, distillate fuel oils, mineral oil heat-exchange fluids and petroleum base power transmission fluids, and a minor amount, sufficient to impart detergent properties thereto, of the product obtained by (a) reacting an alkyl phenol having from about 20 to about 300 carbon atoms, formaldehyde and trishydroxymethylaminomethane and (b) reacting the product produced from (a) with a member selected from the group consisting of boric acid, dialkyl phosphonates and diaryl phosphonates in amounts from about 1 to 2 moles per mole of product produced from (a) and at temperatures from about 50° C to about 250° C to produce the corresponding borate or phosphonate derivatives.

9. The product obtained by (a) reacting an alkyl phenol having from about 20 to about 300 carbon atoms, formaldehyde and trishydroxymethylaminomethane and (b) reacting the product produced from (a) with a member selected from the group consisting of boric acid, dialkyl phosphonates and diaryl phosphonates in amounts from about 1 to 2 moles per mole of product produced from (a) and at temperatures from about 50° C to about 250° C to produce the corresponding borate or phosphonate derivatives.

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**4,016,093**

## METAL ALKYLPHENATE SULFIDES OF REDUCED CORROSIVENESS AND METHOD OF PREPARING SAME

**Emil Koft, Jr., Woodbury Heights, N.J., assignor to Mobil Oil Corporation, New York, N.Y.**

**Filed Mar. 19, 1976, Ser. No. 668,765**
**Int. Cl.² C10M *1/54***
**U.S. Cl. 252—42.7** **19 Claims**

1. A process for preparation of a metal alkylphenate sulfide which provides reduced corrosivity to metals comprising the steps of (1) reacting an alkylphenol sulfide with a minor amount of a basic material selected from the group consisting of an amine having the formula $RNH_2$, RR'NH or RR'R''N wherein R, R' and R'' are the same or different alkyl group of from 1 to about 20 carbon atoms, an alkylene polyamine having the formula $H_2N(C_mH_{2m}NH)_z—C_mH_{2m}NH_2$ wherein *m* is an integer of 2 or 3 and z is 0 or an integer of from 1 to 10 and a cyclic amine at a temperature of from about 100° C to about 250° C, (2) subjecting the reaction mixture of step (1) to steam sparging, carbonation, air sparging or a combination thereof at a temperature of from about 100° C to about 250° C, (3) reacting the product of step (2) with an alkaline earth metal oxide or hydroxide in the presence of an alcohol and carbon dioxide at a temperature of from about 10° C to about 70° C and (4) subjecting the product of step (3) to steam sparging, carbonation, air sparging or a combination thereof.

18. The reaction product prepared by the process of claim 1.

19. The fluid organic composition comprising a major proportion of an organic lubricant, fuel or transmission fluid and a minor proportion sufficient to provide detergent, antioxidant or improved corrosion properties thereto of the reaction product of claim 18.

## 4,016,094
## ELECTRO-OPTICAL DEVICE

**Masahide Tsukamoto, Neyagawa; Tetsuro Ohtsuka, Takatsuki; Kazuhisa Morimoto, Settsu, and Yoshinobu Murakami, Katano, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan**

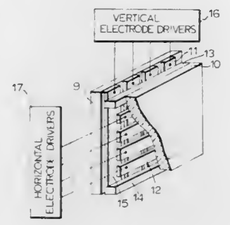
**Filed Mar. 17, 1975, Ser. No. 559,394**

**Claims priority, application Japan, June 7, 1974, 49-65287; June 7, 1974, 49-65288; June 10, 1974, 49-66404; June 11, 1974, 49-66904**

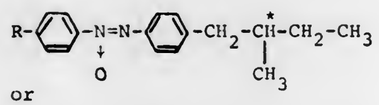
*Disclosure was also published under second Trial Voluntary Protest Program on Apr. 20, 1976*

**Int. Cl.² G02F** *1/16;* **C09K** *3/34;* **G02F** *1/13*

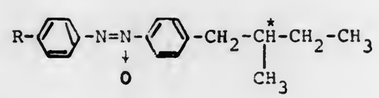
**U.S. Cl. 252—299** **7 Claims**




1. In an electro-optical device having a cell for containing a liquid crystal and consisting of two light-transparent plates opposed to each other and having electrically conductive electrodes on the inner surfaces thereof, the electrodes on at least one inner surface being light-transparent and spacer means between said opposed electrodes; and a power supply coupled to said electrodes for applying an electric voltage to said electrodes, the improvement comprising a liquid crystal in said cell between said electrodes consisting of 99.9 to 30 wt. % of at least one nematic liquid crystal and 0.1 to 70 wt. % of at least one optically active liquid crystal compound of the formula;



or



wherein R is a methoxy, ethoxy, propoxy or butoxy radical.

## 4,016,095
## SOURCE OF IONIZING RADIATION

**Tristan Silovanovich Ambardanishvili, territoriya ippodroma, korpus 4, kv. 38; Vakhtang Justinovich Dundua, territoriya ippodroma, korpus 4, kv. 25, and Mikhail Alexandrovich Kolomiitsev, ulitsa Ozhio, 7, all of Tbilisi, U.S.S.R.**

**Filed May 1, 1973, Ser. No. 356,194**

**Int. Cl.² G21G** *4/00*

**U.S. Cl. 252—301.1 R** **11 Claims**

1. An ionizing radiation source comprising a moulded and hardened composition based on a phenol-aldehyde resin and a radioactive material uniformly distributed in said resin, said radioactive material forming a chemical bond with the hydroxyl groups of the phenol-aldehyde resin to form a uniform distribution of the radioactive material throughout said resin, said radioactive material forming a solid molecular solution in said resin so as to be ionically and molecularly dispersed in said resin without formation of its own thermodynamic phase.

## 4,016,096
## METHOD AND DEVICE FOR CLOSING A RECEPTACLE FOR RADIOACTIVE WASTES

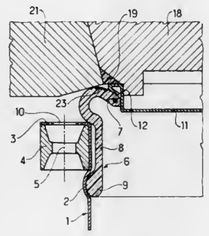
**André Meyer, Le Plessis Robinson, France, assignor to Groupement pour les Activities Atomiques et Advancees "GAAA", Le Plessis Robinson, France**

**Filed Sept. 12, 1975, Ser. No. 612,963**

**Claims priority, application France, Oct. 2, 1974, 74.33190; Dec. 6, 1974, 74.30051**

**Int. Cl.² G21F** *5/00*

**U.S. Cl. 252—301.1 W** **4 Claims**



1. A method for closing a cylindrical barrel for holding radioactive waste during the loading thereof, said barrel including an inside lid and an outside lid separated by an O-ring having two beads, said method comprising:

arranging on the top rim of the barrel, on the internal side thereof, said O-ring with beads at upper and lower positions said beads facing respectively towards and away from the interior of said barrel;

resting the inside lid on the upper bead bringing said O-ring into contact with an annular waste discharge port external of said inside lid;

orienting said barrel coaxially beneath the waste discharge port for waste discharge thereinto;

lifting said inside lid axially from said O-ring and said annular ring and filling said barrel with said waste;

resting the inside lid again on said O-ring upper bead;

driving said inside lid and said upper bead downwardly toward said lower bead below the level of said top rim such that any surface portion of said O-ring seal between said beads subjected to possible radioactive contamination during waste loading of said barrel is blocked from exposure to the barrel exterior; and

installing the outside lid on said barrel rim overlying said inside lid.

## 4,016,097
## PROCESS AND APPARATUS FOR FORMING SILICATE PRODUCTS

**Fred Smith, Norwich, England, assignor to Anglian Water Authority, Huntingdon, England**

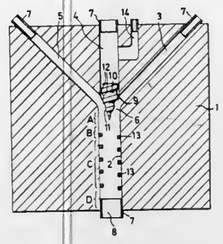
**Filed Oct. 22, 1975, Ser. No. 624,816**

**Int. Cl.² B01J** *13/00*

**U.S. Cl. 252—313 S** **12 Claims**

1. A process in which a stable aqueous dispersion of a complex alkali metal-aluminium-silicate having a pH of 3 to 7.5, which contains up to 5% silicate, measured as $SiO_2$, and which is soluble in hydrochloric acid, is prepared by mixing an aqueous solution of alkali metal silicate and an aqueous solution of an aluminium salt in apparatus comprising a mixing tube, at least two inlets through which aqueous streams can pass into one end of the tube, and an outlet at the other end of the tube, the process being characterised in that the bulk of the water is supplied to the tube through a first said inlet, the aqueous solution of alkali metal silicate is supplied through a second said inlet, and the aqueous solution of an aluminium salt is supplied either through said first inlet or a third said inlet, the aqueous streams from each inlet are constrained to





pass in a generally helical path along the tube by stationary means positioned in the tube, and the aqueous dispersion is removed through the outlet at a pressure which is at least 40 psi lower than the pressure at the inlet through which the bulk of the water is supplied.

## 4,016,098
## PROCESS FOR HARDENING MICROCAPSULES

**Keiso Saeki, and Hiroharu Matsukawa, both of Fujimiya, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan**

**Filed Dec. 13, 1974, Ser. No. 532,573**

**Claims priority, application Japan, Dec. 13, 1973, 48-140965**

**Int. Cl.² B01J** *13/02*

**U.S. Cl. 252—316** **12 Claims**

1. In a process for producing microcapsules by complex coacervation to microencapsulate hydrophobic oil droplets within a gelled coacervate wall, said process utilizing as the coacervate wall material at least two hydrophilic colloids having opposite electric charges and being ionizable in water, at least one of said colloids being gellable, the improvement comprising

a. subsequently to the formation of said gelled coacervate wall encapsulating said hydrophobic oil droplets, hardening said coacervate wall by contacting said coacervate wall with an oxidation product of a polysaccharide and

b. during said hardening stage, adjusting the pH of the system to an alkaline value of about 7 or above.

## 4,016,099
## METHOD OF FORMING ENCAPSULATED TONER PARTICLES

**Russel E. Wellman, Pittsford, and Robert W. Brown, Rochester, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.**

**Filed Mar. 27, 1972, Ser. No. 238,528**

**Int. Cl.² B01J** *13/02*

**U.S. Cl. 252—316** **16 Claims**

1. A method of forming encapsulated toner particles comprising:

a. Forming a dispersion of core material in a solution of wall material in a solvent by dissolving said core material and said wall material in a solvent to form a solution and effecting preferential phase-separation of said core material from said solution, said dispersion also containing a colorant selected from the group consisting of dyes and pigments and mixtures thereof dispersed therein;

b. Drowning said dispersion in at least one liquid which is miscible with the solvent and in which at least the wall material is substantially insoluble to effect phase-separation of said wall material forming a dilute dispersion of particles comprising said core material encapsulated with said wall material in said liquid and;

c. Recovering said colored encapsulated toner particles from said liquid.

## 4,016,100
## METHOD OF PREPARING A CONTROLLED RELEASE LIQUID PHARMACEUTICAL COMPOSITION

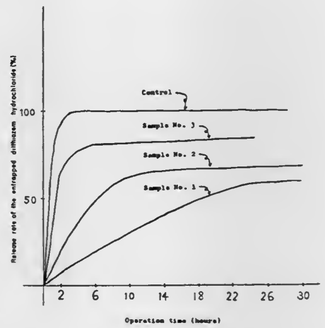
**Akira Suzuki, Takatsuki; Hiroshi Miura, Neyagawa; Saburo Matsuda, Kyoto, and Takashi Ohsawa, Ibaragi, all of Japan, assignors to Tanabe Seiyaku Co., Ltd., Osaka, Japan**

**Filed Jan. 26, 1976, Ser. No. 652,212**

**Claims priority, application Japan, Jan. 27, 1975, 50-11751**

**Int. Cl.² B01J** *13/02*; **A61K** *9/52*

**U.S. Cl. 252—316** **11 Claims**




1. A method of preparing a controlled release pharmaceutical composition, which comprises the steps of dispersing a phospholipid uniformly in water to give an aqueous phospholipid dispersion having lipid spherules, adding a medicament to the aqueous phospholipid dispersion to form a medicament dispersion, freezing said medicament dispersion thereby entrapping the medicament in the lipid spherules, and then thawing the frozen dispersion to give an aqueous suspension of the medicament entrapped in said lipid spherules, said spherules having a diameter of less than 5.0 $\mu$.

## 4,016,101
## PROCESS AND COMPOSITION FOR BREAKING EMULSIONS

**Sheldon B. Markofsky, Olney, and Louis L. Wood, Rockville, both of Md., assignors to W. R. Grace & Co., New York, N.Y.**

**Division of Ser. No. 423,503, Dec. 10, 1973, Pat. No. 3,993,615. This application Mar. 11, 1976, Ser. No. 665,748**

**Int. Cl.² B01D** *17/04*

**U.S. Cl. 252—344** **24 Claims**

1. A process for breaking a water-in-oil emulsion or an oil-in-water emulsion comprising subjecting the emulsion to the demulsifying action of a demulsifying composition formed by: (a) preparing a water soluble polyurea having at least 1 amino group per molecule by admixing and reacting in a liquid ketone or aldehyde having at least 2 carbon atoms per molecule; (i) a polyisocyanate; and (ii) a polyamine having at least 3 amino nitrogen atoms per molecule with at least 2 of the amino nitrogens being bonded to hydrogen atoms; and (b) forming a water soluble quaternary ammonium polymer by reacting said water soluble polyurea with an alkylating agent, and separating the resulting oil and water phases of the broken aqueous emulsion, the demulsifying composition being present in an amount effective for breaking the aqueous emulsion.

**4,016,102**

## RECOVERY OF PARTICULATE CARBON FROM SYNTHESIS GAS

**Charles P. Marion, Mamaroneck, N.Y., assignor to Texaco Development Corporation, New York, N.Y.**

**Division of Ser. No. 535,606, Dec. 23, 1974, Pat. No. 3,980,591. This application Apr. 30, 1976, Ser. No. 681,940**
**Int. Cl.² C01B 2/14**
**U.S. Cl. 252—373** **20 Claims**

1. A method for producing clean synthesis gas for the oxo or oxyl process comprising

1. reacting by partial oxidation a hydrocarbonaceous fuel or a slurry of solid carbonaceous fuel with substantially pure oxygen in the reaction zone of a free-flow noncatalytic synthesis gas generator at a temperature in the range of about 1300° to 3500° F and a pressure in the range of about 1 to 300 atmospheres in the presence of a temperature moderator to produce an effluent gas stream comprising $H_2$ and CO and containing entrained particulate carbon and at least one member of the group $CO_2$, $H_2O$, $H_2S$, COS, $CH_4$, A, $N_2$, and mixtures thereof;
2. introducing said effluent gas stream into gas cooling and gas scrubbing zones in which the gas stream is cooled and the entrained particulate carbon is removed, so as to produce a carbon-water dispersion;
3. removing gaseous impurities from the gas stream leaving (2), so as to produce a stream of synthesis gas substantially comprising $H_2$ and CO;
4. introducing the synthesis gas from (3) into an oxo or oxyl process for the production of liquid oxygen containing hydrocarbons, and separating therefrom a mixture of liquid organic by-products comprising at least one alcohol and at least one ester in admixture with at least one constituent from the group consisting of aldehydes, ketones, ethers, acids, olefins, saturated hydrocarbons, and water;
5. contacting said carbon-water dispersion from (2) with a liquid organic extractant comprising the aforesaid mixture of liquid organic by-products from (4) in an amount sufficient to render all of the carbon particles in said carbon-water dispersion hydrophobic and to resolve said carbon-water dispersion; and
6. by decanting, separately removing in a separating zone a stream of clarified water and a pumpable dispersion having a carbon content of about 0.5 to 5 weight % and comprising said carbon particles and said liquid organic extractant; and wherein said separating zone is at a temperature in the range of 180° to 700° F and a pressure sufficient to maintain both the extractant and water in liquid phase.

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**4,016,103**

## RECOVERY OF PARTICULATE CARBON FROM SYNTHESIS GAS

**Charles P. Marion, Mamaroneck, N.Y., assignor to Texaco Development Corporation, New York, N.Y.**

**Division of Ser. No. 535,607, Dec. 23, 1974, Pat. No. 3,980,592. This application Apr. 30, 1976, Ser. No. 681,942**
**Int. Cl.² C01B 2/14**
**U.S. Cl. 252—373** **9 Claims**

1. A method for continuously producing clean synthesis gas for the oxo or oxyl process comprising:

1. reacting by partial oxidation a hydrocarbonaceous fuel or slurry of solid carbonaceous fuel with a free-oxygen containing gas in the reaction zone of a free-flow noncatalytic synthesis gas generator at a temperature in the range of about 1300° to 3500° F and at a pressure in the range of about 1 to 300 atmospheres in the presence of a temperature moderator to produce an effluent gas stream comprising $H_2$ and CO and containing entrained particulate carbon and at least one member of the group $CO_2$, $H_2O$, $H_2S$, COS, $CH_4$, A, and $N_2$;
2. introducing said effluent gas stream into gas cooling and gas scrubbing zones in which the gas stream is cooled and contacted with water, effecting the removal of said particulate carbon from said effluent gas stream and producing a carbon-water dispersion;
3. removing gaseous impurities from the gas stream leaving (2) producing a stream of synthesis gas substantially comprising $H_2$ and CO;
4. introducing the synthesis gas from (3) into an oxo or oxyl process and separating therefrom a mixture of liquid organic by-products comprising at least one alcohol and at least one ester, and at least one constituent from the group consisting of aldehydes, ketones, ethers, acids, olefins, saturated hydrocarbons and water;
5. contacting said carbon-water dispersion with liquid organic extractant comprising light liquid hydrocarbon fuel fraction having a gravity in degrees API in the range of over 20 to about 100 and a carbon number in the range of about 5 to 16 and produced in the distillation zone in step (7) and a thin centrifuge stream of carbon-light hydrocarbon fuel dispersion produced in step (6) after removal of any waste gas wherein the amount of liquid organic extractant introduced is sufficient to render all of the carbon particles in said carbon-water dispersion hydrophobic and to resolve said carbon-water dispersion, and by decanting removing a stream of clarified water and a separate stream of carbon-extractant dispersion having a carbon content of about 0.5 to 5 weight % in a separating zone at a temperature in the range of ambient to 700° F and a sufficient pressure to maintain said liquid organic extractant and said clarified water in liquid phase;
6. introducing said carbon-extractant dispersion from (5) into a centrifuging zone at a temperature in the range of about ambient to 700° F and a pressure in the range of about 1 to 200 atmospheres, separately withdrawing from said centrifuging zone a thick stream of carbon-extractant having a carbon content in the range of about 1 to 10 weight percent, and a comparatively thin stream of carbon-extractant having a carbon content in the range of about 0.02 to 1.0 weight percent; degasifying said thin stream and introducing said stream into (5) as a portion of said liquid organic extractant, withdrawing said clarified water stream from said separating zone, optionally recycling said water to said gas-scrubbing zone in (2) to scrub carbon from the effluent gas stream from the gas generator, introducing said thick centrifuge stream of carbon-extractant in admixture with fresh heavy liquid hydrocarbon fuel having a gravity in degrees API in the range of about b −20 to 20 and in the amount of about 0.02 to 40 lbs. of fresh heavy liquid hydrocarbon fuel per lb. of light liquid hydrocarbon fuel in said thick centrifuge stream into a distillation zone; and
7. removing a light liquid hydrocarbon fuel fraction from said distillation zone and recycling same to (5) as a portion of said liquid organic extractant; removing from said distillation zone a pumpable bottoms slurry comprising particulate carbon and the unvaporized portion of said heavy liquid hydrocarbon fuel, mixing with each part by weight of said pumpable bottoms slurry about 0.01 to 99 parts by weight of said mixture of liquid organic by-products from the oxo or oxyl process in (4), and introducing same into said synthesis gas generator as at least a portion of said hydrocarbonaceous fuel.

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**4,016,104**

## RECOVERY OF PARTICULATE CARBON FROM SYNTHESIS GAS

**Charles P. Marion, Mamaroneck, N.Y., assignor to Texaco Development Corporation, New York, N.Y.**

**Division of Ser. No. 535,605, Dec. 23, 1974, Pat. No. 3,980,590. This application Apr. 30, 1976, Ser. No. 681,943**
**Int. Cl.² C01B 2/14**
**U.S. Cl. 252—373** **16 Claims**

1. A method for producing clean synthesis gas for the oxo or oxyl process comprising

1. reacting by partial oxidation a hydrocarbonaceous fuel or a pumpable slurry of solid carbonaceous fuel with a free-oxygen containing gas in the reaction zone of a free-flow noncatalytic synthesis gas generator at a temperature in the range of about 1300° to 3500° F and a pressure in the



range of about 1 to 300 atmospheres in the presence of a temperature moderator to produce an effluent gas stream comprising $H_2$ and CO and containing entrained particulate carbon and at least one member of the group $CO_2$, $H_2S$, COS, $CH_4$, $H_2O$, A, and $N_2$;
2. introducing said effluent gas stream into gas cooling and gas scrubbing zones where the gas stream is cooled and scrubbed with water and the entrained particulate carbon is removed, producing a carbon-water dispersion;
3. removing gaseous impurities from the gas stream leaving (2), producing a stream of synthesis gas substantially comprising $H_2$ and CO having a mole ratio of about 0.9–2.0 moles of $H_2$ per mole of CO;
4. introducing the synthesis gas from (3) into an oxo or oxyl process for the production of oxygen containing liquid hydrocarbons, and separating therefrom a mixture of liquid organic by-products comprising at least one alcohol, at least one ester, and at least one constituent from the group consisting of aldehydes, ketones, ethers, acids, olefins, saturated hydrocarbons, and water;
5. contacting said carbon-water dispersion from (2) with a liquid organic extractant comprising said mixture of liquid organic by-products in admixture with about 0 to 25 weight % of a light liquid hydrocarbon fuel having a gravity in degrees API of 20° and higher and a carbon number in the range of about 5 to 16, wherein the amount of liquid organic extractant introduced is sufficient to render all of the carbon particles in said carbon-water dispersion hydrophobic and to resolve said carbon-water dispersion into clarified water and liquid organic extractant-carbon dispersion;
6. removing by decanting from a separating zone at a temperature in the range of 180°–700° F and a sufficient pressure to maintain said liquid organic extractant and said clarified water in liquid phases a stream of clarified water and separating therefrom substantially any dissolved water soluble constituents from said liquid organic extractant, and recycling the purified water to the scrubbing zone in step (2) as said scrubbing water, and removing a separate stream of pumpable carbon-extractant dispersion having a carbon content of about 0.5 to 5 weight percent;
7. mixing said carbon-extractant dispersion with a liquid hydrocarbon fuel having a gravity in degrees API in the range of about −20° to 100° and in the amount of about 0.02 to 40 lbs. of fresh liquid hydrocarbon fuel per lb. of extractant in said carbon-extractant dispersion and with about 0 to 0.25 lbs. of fresh mixture of said liquid organic by-products from the oxo or oxyl process per lb. of said carbon-extractant dispersion plus liquid hydrocarbon fuel, and introducing the mixture into a fractional distillation zone; and
8. removing a light fraction from said distillation zone and introducing same into (5) as at least a portion of said liquid organic extractant; removing a pumpable bottoms slurry comprising particulate carbon and the unvaporized portion of said liquid hydrocarbon fuel and any unvaporized portion of said mixture of the liquid organic by-products from the oxo or oxyl process from said distillation zone and introducing same into said synthesis gas generator as at least a portion of said fuel.

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**4,016,105**

## CATALYST PREPARATIVE METHOD

**Ralph O. Kerr, Houston, Tex., assignor to Petro-Tex Chemical Corporation, Houston, Tex.**

**Filed Feb. 7, 1975, Ser. No. 548,163**
**Int. Cl.² B01J 27/18**
**U.S. Cl. 252—437** **8 Claims**

1. A method for preparing a phosphorus-vanadium oxidation catalyst which comprises

adding a reducing composition comprising an organic acid or aldehyde which is oxalic acid, citric acid, formic acid, ascorbic acid, malic acid, formaldehyde or acetaldehyde and a secondary alcohol which is isopropanol, 2-butanol, 2-pentanol, 3-pentanol, 2-octanol or 6-dodecanol, to an aqueous solution of a phosphoric acid,

heating said solution of organic acid or aldehyde, secondary alcohol and phosphroic acid to a temperature in the range of 50° to 80° C,

adding an inorganic vanadium compound which is vanadium pentoxide, ammonium metavanadate, vanadium trioxide, vanadyl chloride, vanadyl dichloride, vanadyl trichloride, vanadium sulfate, vanadium phosphate, vanadium tribromide, vanadyl formate, vanadyl oxalate, metavanadic acid or pyrovanadic acid to said aqueous solution,

maintaining the temperature of said solution in the range of 50° to 80° C,

dissolving said inorganic vanadium compound in said solution, the valence of said vanadium in solution being less than $5^+$, and

recoverng a vanadium-phosphorus composition,

said reducing composition being present in stoichiometric excess of the amount necessary to reduce the vanadium present below plus 5 valency, the mole ratio of secondary alcohol to organic acid or aldehyde being in the range of 1 to 3:1, the water being present in said aqueous solution in an amount in the range of 3 to 20 times the weight of the vanadium compound and the atomic ratio of vanadium to phosphorus being the range of 1:1.12 to 1.16.

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**4,016,106**

## PREPARATION OF CATALYSTS OF PREDETERMINED PORE SIZE DISTRIBUTION AND PORE VOLUME

**Willard H. Sawyer, Baton Rouge, La., and Michael T. Duncan, Pontiac, Mich., assignors to Exxon Research and Engineering Company, Linden, N.J.**

**Filed Jan. 5, 1976, Ser. No. 646,490**
**Int. Cl.² B01J 21/04, 21/06, 23/24, 23/74**
**U.S. Cl. 252—455 R** **45 Claims**

1. In a process for the formation of a catalyst comprised of a Group VI-B or Group VIII metal, or both, composited with alumina by precipitation of an alumina hydrogel from a solution which contains a hydrous form of alumina in concentration ranging from about 1 to about 5 percent, based on the weight of the solution, and a compound having an anion which forms an alkaline soluble aluminum salt in an alkaline medium, the alumina hydrogel being precipitated from solution at temperatures ranging from about 15° F. to about 120° F. and at pH ranging from about 8 to about 12, and then separated from the solution,

the alumina hydrogel then being contacted with a solution of a water-soluble polymer containing from about 2 to about 24 monomer units from the group consisting of (a) polyethylene glycols, (b) polypropylene glycols, and (c) polyethylene amines sufficient to absorb the polymer into the pores of the alumina hydrogel and displace water from the pores until the weight ratio of polymer:alumina within the hydrogel ranges from about 0.5:1 to about 4:1,

the improvement which comprises

forming a slurry from the separated water-soluble polymer containing alumina hydrogel,

spray drying said polymer containing alumina hydrogel by countercurrent contact of an atomized spray of the alu-

mina hydrogel with air at temperature sufficient to form granules of boehmite,
forming a paste from the granules of polymer containing boehmite and water, the past containing above about 20 percent by weight of solids,
mulling said water-soluble polymer containing boehmite paste to provide a substantially homogeneous mass,
extruding said polymer containing boehmite paste through a die to form spaghetti-like extrudate shapes,
drying the spaghetti-like boehmite extrudate shapes to provide a solids content ranging from about 20 to about 30 percent,
marumerizing the spaghetti-like boehmite extrudate shapes to form spheres of average particle size ranging from about 1/50 to about ⅛ inch diameter, and calcining the marumerized spheres.

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## 4,016,107
## PREPARATION OF CATALYSTS OF PREDETERMINED PORE SIZE DISTRIBUTION AND PORE VOLUME

**Willard H. Sawyer, and Harry E. Robson, both of Baton Rouge, La., assignors to Exxon Research and Engineering Company, Linden, N.J.**

**Filed Jan. 5, 1976, Ser. No. 646,491**
**Int. Cl.² B01J** *21/04, 21/06, 23/24, 23/74*
**U.S. Cl. 252—455 R** **24 Claims**

1. In a process for preparing a catalyst from a Group VI-B or Group VIII metal, or both, composited with alumina by precipitation of an alumina hydrogel from a solution which contains a hydrous form of alumina and a compound having an anion that is soluble in an alkaline solution and forms and aluminum salt,
the improvement comprising
precipitating the hydrogel of alumina at temperatures ranging from about 15° F. to about 120° F. from the solution, which contains alumina in concentration ranging from about 1 to about 5 percent, based on the weight of solution, at pH ranging from about 8 to about 12,
separating the alumina hydrogel from the solution,
contacting the alumina hydrogel with a solution of a water-soluble polymer containing from about 2 to about 24 monomer units from the group consisting of (a) polyethylene glycols, (b) polypropylene glycols, and (c) polyethylene amines sufficient to absorb the polymer into the pores of the alumina hydrogel, displacing water from the pores until the weight rates of polmer:alumina within the hydrogel ranges from about 0.5:1 to about 4:1,
drying the polymer containing alumina hydrogel,
contacting the dried polymer containing alumina hydrogel with a solvent to extract and separate the polymer therefrom,
drying, and
calcining the hydrogel to form gamma alumina characterized as comprising,
when the catalyst is of size ranging from about 1/50 inch up to 1/25 inch average particle size diameter, at least about 15 percent of its total pore volume of absolute diameter within the range of about 150A to about 250A; when the catalyst is of size ranging from about 1/25 inch to about ⅛ inch average particle size diameter, at least about 15 percent of its total pore volume of absolute diameter within the range of about 175A to about 275A; wherein, in each of these catalysts of differing ranges of particle size distributions, the pore volumes resultant from pores of 50° A, and smaller, and minimized; the surface areas and pores volumes of the catalysts being interrelated with particle size, and pore size distributions, surface area ranging at least about 200 $m^2/g$ to about 600 $m^2/g$ with pore volumes ranging from about 0.8 to about 3.0 cc/g (B.E.T.).

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## 4,016,108
## PREPARATION OF CATALYSTS OF PREDETERMINED PORE SIZE DISTRIBUTION AND PORE VOLUME

**Harry E. Robson, Baton Rouge, La., assignor to Exxon Research and Engineering Company, Linden, N.J.**

**Filed Jan. 5, 1976, Ser. No. 646,492**
**Int. Cl.² B01J** *21/04, 21/06, 23/24, 23/74*
**U.S. Cl. 252—455 R** **15 Claims**

1. In a process for preparing a catalyst comprising a Group VI-B or Group VIII metal, or both, composited with alumina, the alumina being precipitated as an alumina hydrogel from a solution which contains a hydrous form of alumina and a compound having an anion soluble in an alkaline medium and which forms a soluble aluminum salt,
the improvement comprising
precipitating the hydrogel of alumina at temperatures ranging from about 15° F to about 120° F from the solution, which contains alumina in concentration ranging from about 1 to about 5 percent, based on the weight of solution, at pH ranging from about 8 to about 12,
separating the alumina hydrogel from the solution,
contacting the alumina hydrogel with a solution of a water-soluble polymer containing from about 2 to about 24 monomer units from the group consisting of (a) polyethylene glycols, (b) polypropylene glycols, and (c) polyethylene amines sufficient to absorb the polymer into the pores of the alumina hydrogel, displacing water from the pores until the weight ratio of polymer:alumina within the hydrogel ranges from about 0.5:1 to about 4:1,
drying the hydrogel, and then
calcining the dried hydrogel to form a gamma alumina catalyst composite characterized, when the catalyst is of size ranging from about 1/50 inch up to 1/25 inch average particle size diameter, at least about 15 percent of its total pore volume of absolute diameter within the range of about 150A to about 250A; when the catalyst is of size ranging from about 1/25 inch to about ⅛ inch average particle size diameter, at least about 15 percent of its total pore volume of absolute diameter within the range of about 175A to about 275A; wherein, in each of these catalysts of differing ranges of particle size distributions, the pore volumes resultant from pores of 50A, and smaller, are minimized; the surface areas and pore volumes of the catalysts being interrelated with particle size, and pore size distributions, surface areas ranging at least about 200 $m^2/g$ to about 600 $m^2/g$ with pore volumes ranging from about 0.8 to about 3.0 cc/g (B.E.T.).

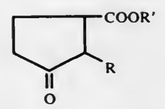
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## 4,016,109
## ALICYCLIC KETOESTER PERFUME COMPOSITIONS

**Amnon Mordechai Cohen, Amersfoort, Netherlands, assignor to Polak's Frutal Works N.V., Amersfoort, Netherlands**

**Division of Ser. No. 418,868, Nov. 26, 1973, Pat. No. 3,954,834, which is a continuation of Ser. No. 195,476, Nov. 3, 1971, abandoned. This application Apr. 27, 1976, Ser. No. 680,660**
**Claims priority, application United Kingdom, Nov. 4, 1970, 52388/70**
**Int. Cl.² C11B** *9/00*
**U.S. Cl. 252—522** **11 Claims**

1. A perfume composition containing as an active ingredient thereof an effective amount of a chemical compound having the structural formula




where R is a branched or straight chain alkyl radical having 4 to 8 carbon atoms, a cyclopentyl radical or a cyclohexyl radical and R' represents an alkyl radical having 1 or 2 carbon atoms and an inert diluent or carrier.



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## 4,016,110
## PROCESS FOR THE PREPARATION OF EXPANDABLE MICROSPHERES

**William E. Cohrs, Midland; Roland E. Gunderman, Clare, and William A. Crozier, Midland, all of Mich., assignors to The Dow Chemical Company, Midland, Mich.**

**Filed July 26, 1972, Ser. No. 275,268**
**Int. Cl.² C08J** *9/20*
**U.S. Cl. 260—2.5 B** **4 Claims**

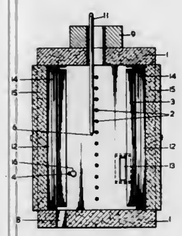
1. In a method for the preparation of expandable synthetic resinous microspheres, the method comprising
suspending in water a colloidal silica dispersing agent, a polymerizable monomeric composition, a volatile liquid expanding agent,
dispersing the volatile liquid expanding agent and monomeric composition within the water as a plurality of droplets,
polymerizing the monomeric material to form a plurality of particles, the particles having a thermoplastic resinous shell of generally spherical configuration, the particles generally symmetrically encapsulating a single liquid occlusion as a distinct and separate liquid phase within the particle, the particles being generally impenetrable to the liquid raising agent, the improvement which comprises
employing from about 0.2 to about 1 part by weight of citric acid per 100 parts by weight of monomeric composition in the substantial absence of a polymer of equimolar parts of adipic acid and diethanol amine.

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## 4,016,111
## NON-BURNING, CLASS 1 RATING, FOAMS AND A METHOD OF PRODUCING SAME

**Per Lind Wolff, Birkeroed, Denmark, and John Arthur Gooch Gent, Liphook, England, assignors to Koninklijke Emballage Industrie Van Leer B.V., Amstelveen, Netherlands**

**Filed Apr. 1, 1975, Ser. No. 564,184**
**Claims priority, application United Kingdom, Apr. 4, 1974, 15067/74**
**Int. Cl.² C08J** *9/00*
**U.S. Cl. 260—2.5 F** **9 Claims**



1. A method of preparing foamed solid aminoformaldehyde furfurylalcohol products by polymerizing a liquid furfurylalcohol containing aminoformaldehyde resin composition in the presence of an acid, characterized in using as a starting material a resin composition containing 15–90% by weight of total free and bound furfurylalcohol and having an urea: formaldehyde molar ratio of 1:1 to 1:5 and at least 10 parts by weight of a boron compound per 100 parts by weight of said resin, the boron compound being present in an amount sufficient so that the foam product will pass the muffle furnace test at 500° C., and has no second exotherm at 200° C., said boron compound being selected from the group consisting of boric acid, boron oxide, borax, boric acid esters, boron tribromide, boron trichloride, boron nitride, boron phosphate, boron trifluoride etherate, boron trifluoride methanol, boron trifluoride monoethylamine, complexes of boric acid with polyhydroxyl compounds, and mixtures thereof.

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## 4,016,112
## PROCESS FOR PRODUCTION OF FOAMED RESIN STRUCTURE

**Atsusuke Kajiura; Yuzo Aito, both of Hino; Atsushi Sugiyama; Hiroki Tamura, both of Hachioji, and Kazuma Aihara, Hino, all of Japan, assignors to Teijin Limited, Osaka, Japan**

**Continuation of Ser. No. 326,064, Jan. 23, 1973, abandoned. This application Feb. 14, 1975, Ser. No. 549,975**
**Int. Cl.² C08J** *9/08*
**U.S. Cl. 260—2.5 N** **23 Claims**

1. A process for the production of a cured foamed structure characterized by:
I. mixing to a uniformly dispersed state
A. at least one member of the group consisting of metal carbonates and metal bicarbonates,
B. at least one member of the group consisting of phosphoric acid esters and phosphorous acid esters, and
C. a curable resin composition selected from at least one member of the group consisting of an unsaturated polyester resin composition, a diallyl phthalate resin composition, and a 1,2-butadiene-containing polymer composition; and then
II. heating the mixture at a temperature of from 80° to 160° C. to form a foam, cured three-dimensionally by double bonds, with the proviso that where R and R' are butyl, the temperature may be as low as 20° C.

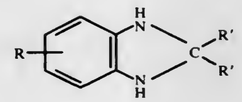
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## 4,016,113
## USE OF SCHIFF BASES AS CROSS-LINKING AGENTS FOR HIGH RESILIENCE POLYURETHANE FOAM

**Frank J. Preston, Meriden; John S. Babiec, Jr., Orange, and Clifford J. Maxwell, Milford, all of Conn., assignors to Olin Corporation, New Haven, Conn.**

**Filed Feb. 17, 1976, Ser. No. 658,234**
**Int. Cl.² C08G** *18/14*
**U.S. Cl. 260—2.5 AM** **17 Claims**

1. In a process for preparing a flexible high resilience polyurethane foam from a reaction mixture comprised of an organic polyisocyanate, a foaming agent, a reaction catalyst, and a polyether polyol reactant characterized by (1) a molecular weight of at least about 4,000, (2) a polyhydroxy alcohol nucleus having a functionability of 2–4, (3) polyoxyalkylene chain segments attached to said nucleus and (4) a ratio of primary to secondary hydroxy groups ranging from about 1.5:1 to about 6:1, the improvement which comprises including in said reaction mixture a crosslinking amount of a Schiff base represented by the formula:




wherein
R is a hydrogen or alkyl or 1–12 carbon atoms, and
each R' is independently an aliphatic hydrocarbon radical having 1–12 carbon atoms, or the moiety




is an unsubstituted or alkyl-substituted cycloaliphatic radical having 5 or 6 ring carbon atoms, the alkyl substitutent having 1–6 carbon atoms.

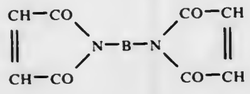
## 4,016,114
## HEAT-STABLE CELLULAR MATERIALS

Max Gruffaz, La Mulatiere, and Bernard Rollet, Lyon, both of France, assignors to Rhone-Poulenc Industries, Paris, France

Filed June 14, 1976, Ser. No. 695,403
Claims priority, application France, June 30, 1975, 75.20455
Int. Cl.² L08J 9/10
U.S. Cl. 260—2.5 N 8 Claims

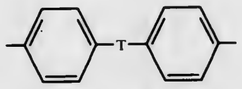
1. A cellular material based on a polymer with imide groups, characterized in that it is obtained by heating a mixture comprising:

a. a bis-maleimide of the formula



(I)

in which the symbol B represents a phenylene radical or a radical of the formula

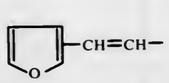


where T represents $-CH_2-$, $-O-$ or $-SO_2-$;

b. a furfuraldehyde derivative of the formula

$$\Sigma - R_1 - CO - R_1 - \Sigma' \quad \text{(II)}$$

in which the symbol $\Sigma$ represents a radical of the formula



and the symbols $R_1$ represent the valency bond or a $-CH=CH-$ group, and the symbol $\Sigma'$ represents a radical $\Sigma$, an aliphatic, cycloaliphatic or aromatic monovalent radical R containing up to 12 carbon atoms, or a $-R'-CO'R''$ radical, where R′ represents an aliphatic, cycloaliphatic or aromatic divalent radical containing up to 12 carbon atoms and R″ represents a monovalent radical R or a radical $\Sigma$; and

c. a blowing agent.

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## 4,016,115
## UNSATURATED POLYESTER RESIN COMPOSITION CONTAINING TITANIUM DIOXIDE

Hideo Miyake, and Toshio Tsuchida, both of Otsu, Japan, assignors to Toyo Boseki Kabushiki Kaisha, Osaka, Japan

Filed Sept. 26, 1975, Ser. No. 617,172
Claims priority, application Japan, Oct. 2, 1974, 49-114048
Int. Cl.² C08K 11/04
U.S. Cl. 260—2.3 15 Claims

1. An unsaturated polyester resin composition containing titanium dioxide comprising:

1. an unsaturated polyester resin containing titanium dioxide consisting of

i. an unsaturated polyester containing titanium dioxide obtained from

a. a depolycondensation product produced by depolycondensing a high molecular weight saturated polyester containing titanium dioxide by using one or more compounds selected from the group consisting of glycols, saturated dibasic acids or anhydrides thereof, unsaturated dibasic acids or anhydrides thereof, and esters or oligoesters thereof, and

b. other raw materials required for the formation of an unsaturated polyester and

ii. a copolymerizable monomer and

2. at least one compound selected from the group consisting of

A. a hydroxyalkylamine having at least one amino group and at least one hydroxyl group attached to different carbon atoms thereof,

B. a polyoxyalkyleneamine,

C. a mono- or dicarboxylate derived from the said compound (A) and

D. a mono- or dicarboxylate derived from the said compound (B),

wherein the amount of addition of the said compound (2) is in the range of from 0.01 to 1% by weight on the basis of the said unsaturated polyester resin.

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## 4,016,116
## PROCESS FOR THE PREPARATION OF POLYVINYL CHLORIDE FOAMS

Guy Poy, Lyon, France, assignor to Rhone-Poulenc S.A., Paris, France

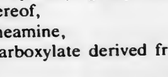
Division of Ser. No. 493,458, July 31, 1974, Pat. No. 3,975,361. This application Mar. 23, 1976, Ser. No. 669,732
Claims priority, application France, Aug. 1, 1973, 73.28211
Int. Cl.² C08J 9/30
U.S. Cl. 260—2.5 P 9 Claims

1. A process for the preparation of an open-cell polyvinyl chloride foam by introducing a gaseous fluid into a polyvinyl chloride plastisol which contains 0.5 to 10% of its weight of an organosilicon copolymer comprising units of the general formulae:

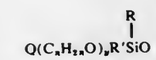


$(CH_3)_xRSiO_{0.5}$ and $Q(C_nH_{2n}O)_yR'SiO$ and $SiO_2$,

wherein R represents an alkyl group with 1 to 3 carbon atoms or a vinyl group, R′ represents a divalent hydrocarbon radical with 1 to 10 carbon atoms, Q represents an organic radical of the formulae $-OG$,



or $-OSiR_3$ in which G represents an alkyl radical with 1 to 4 carbon atoms and each R group, which may be identical or different, is as defined above, *n* represents 2, 3 or 4, the $C_nH_{2n}$ group being straight or branched and y represents a number from 4 to 60; the $C_nH_{2n}$ groups being the same or different, the ratio of the number of $(CH_3)_2RSiO_{0.5}$ units to the number of $SiO_2$ units being 0.55:1 to 0.75:1 and the ratio of the number of



units to the number of $SiO_2$ units being 0.005:1 to 0.1:1.



## 4,016,117
## BIODEGRADABLE SYNTHETIC RESIN SHEET MATERIAL CONTAINING STARCH AND A FATTY MATERIAL

Gerald Joseph Louis Griffin, London, England, assignor to Coloroll Limited, London, England

Continuation-in-part of Ser. No. 353,414, April 23, 1973, abandoned. This application Nov. 25, 1974, Ser. No. 527,038
Claims priority, application United Kingdom, May 18, 1972, 23469/72; Nov. 28, 1973, 55195/73; Mar. 7, 1974, 10267/74
Int. Cl.² C08J 3/20
U.S. Cl. 260—17.4 ST 6 Claims

1. A biodegradable synthetic polymeric composition consisting essentially of a polymer having carbon to carbon linkages and dispersed therein from 5 to 50% by weight particles of a biodegradable substance and up to 5.5% by weight of an auto-oxidizable substance containing at least one double bond which when in contact with a transition metal salt auto-oxidizes to generate a peroxide or a hydroperoxide, said substance being selected from the group consisting of a fatty acid, a fatty acid ester, a natural fat, and mixtures thereof, whereby said polymeric composition when disposed in soil containing a transition metal salt will be biodegraded at a rate faster than a similar product free from said substance.

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## 4,016,118
## POLYOLEFIN PLASTIC COMPOSITIONS

Kenzo Hamada, and Hiroshi Uchiyama, both of Hirakata, Japan, assignors to E. C. Chemical Industries & Co., Ltd. and C. Itoh & Co., Ltd., both of Osaka, Japan

Filed Aug. 12, 1975, Ser. No. 604,045
Claims priority, application Japan, Aug. 16, 1974, 49-94424
Int. Cl.² C08L 5/00
U.S. Cl. 260—17.4 SG 4 Claims

1. A polyolefin plastic composition having improved transparency and reduced molding shrinkage, which consists essentially of at least one homopolymer or copolymer of an aliphatic monoolefin containing 2 to 6 carbon atoms which has an average molecular weight of about 10,000 to 200,000, said copolymer made by polymerizing said monoolefins with one another and dibenzylidene sorbitol, the proportion of the dibenzylidene sorbitol being 0.1 to 0.7% by weight based on the total weight of the composition.

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## 4,016,119
## LIGNIN SULFONATE FOR GLASS CORD ADHESIVES

Otto C. Elmer, Akron, Ohio, assignor to The General Tire & Rubber Company, Akron, Ohio

Filed Jan. 22, 1975, Ser. No. 542,974
Int. Cl.² C08L 9/08, 61/12, 97/00
U.S. Cl. 260—17.5 3 Claims

1. A composition comprising an aqueous alkaline dispersion of from 15 to 45% by weight based upon the weight of the dispersion of a mixture of solids consisting of from 7 to 40% by weight based upon the weight of the dispersion of a rubbery vinyl pryidine terpolymer containing based upon the weight of the terpolymer from about 50 to 95% of a conjugated diolefin, about 0 to 30% of styrene and about 5 to 40% of a vinyl pyridine, and from about 0.5 to 10% by weight based upon the weight of the dispersion of a reaction product of lignin sulfonate, resorcinol and formaldehyde wherein the reaction product contains based upon the weight of the reaction product 22 to 42% of lignin sulfonate, from 27 to 47% of resorcinol and from 21 to 41% of formaldehyde.

## 4,016,120
## AQUEOUS CATIONIC POLYURETHANE HAVING BLOCKED NCO GROUPS AND PROCESS

Kazuo Matsuda; Hidemasa Ohmura, and Takeyo Sakai, all of Wakayama, Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan

Filed July 12, 1976, Ser. No. 704,612
Claims priority, application Japan, July 28, 1975, 50-91805
Int. Cl.² C08G 18/80; C08J 3/06
U.S. Cl. 260—29.2 TN 8 Claims

1. A process for preparing an aqueous cationic thermosetting polyurethane emulsion, which comprises:

1. reacting, in the liquid phase and in a ketone solvent, at a temperature of from −20° to +70° C, (A) isocyanate-terminated urethane prepolymer prepared by reacting organic polyhydroxyl component having a molecular weight in the range of from 200 to 10000 with an excess of organic polyisocyanate, with (B) an excess of polyalkylene polyamine having at least two primary or secondary amino groups, the total mole number of primary and secondary amino groups in the polyalkylene polyamine being greater than the total mole number of isocyanate groups in the isocyanate-terminated urethane prepolymer, the reaction being carried out until the presence of —NCO groups cannot be detected, whereby to form polyurethane-urea-polyamine,
2. reacting, in the liquid phase, the reaction product of step 1 with a blocked polyisocyanate having a single free isocyanate group in the molecule, at a temperature of −20° to +70° C for about 0.5 to 2 hours,
3. adding to the reaction product of step 2 an aqueous solution of an acid to form an emulsion having a pH of about 5 to about 7, and
4. treating the product of step 3 to remove the organic solvent therefrom and thereby obtaining an aqueous cationic polyurethane emulsion as a final product.

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## 4,016,121
## AQUEOUS POLYURETHANE HAVING BLOCKED NCO GROUPS AND PROCESS

Kazuo Matsuda; Hidemasa Ohmura, and Takeyo Sakai, all of Wakayama, Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan

Filed July 12, 1976, Ser. No. 704,614
Claims priority, application Japan, July 22, 1975, 50-89447
Int. Cl.² C08G 18/80; C08J 3/06
U.S. Cl. 260—29.2 TN 8 Claims

1. A process for preparing an aqueous thermosetting polyurethane emulsion, which comprises:

1. reacting, the liquid phase and in a ketone solvent, at a temperature of from −20° to +70° C., (A) isocyanate-terminated urethane prepolymer prepared by reacting organic polyhydroxyl component having a molecular weight in the range of from 200 to 10,000 with an excess of organic polyisocyanate, said polyhydroxyl component comprising from 15 to 80 weight % of polyoxyethylene glycol, with (B) an excess of polyalkylene polyamine having at least two primary or secondary amino groups, the total mole number of primary and secondary amino groups in the polyalkylene polyamine being greater than the total mole number of isocyanate groups in the isocyanate-terminated urethane, prepolymer, the reaction being carried out until the presence of —NCO groups cannot be detected, whereby to form polyurethane-urea-polyamine,
2. reacting, in the liquid phase, the reaction product of step 1 with a blocked polyisocyanate having a single free isocyanate group in the molecule, at a temperature of −20° to +70° C., for about 0.5 to 2 hours,
3. adding water to the reaction product of step 2, and
4. treating the product of step 3 to remove the organic solvent therefrom and thereby obtaining an aqueous polyurethane emulsion as a final product.

## 4,016,122
## ANIONIC AQUEOUS POLYURETHANE HAVING BLOCKED NCO GROUPS AND PROCESS

**Kazuo Matsuda; Hidemasa Ohmura, and Takeyo Sakai, all of Wakayama, Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan**

**Filed July 14, 1976, Ser. No. 705,266**
**Claims priority, application Japan, July 31, 1975, 50-93326**
**Int. Cl.² C08G** *18/80;* **C08J** *3/06*
**U.S. Cl. 260—29.2 TN** **8 Claims**

1. A process for preparing an aqueous anionic thermosetting polyurethane emulsion, which comprises:
1. reacting, in the liquid phase and in a ketone solvent, at a temperature of from −20° C to +70° C, (A) isocyanate-terminated urethane prepolymer prepared by reacting organic polyhydroxyl component having a molecular weight in the range of from 200 to 10,000 with an excess of organic polyisocyanate, with (B) an excess of polyalkylene polyamine having at least two primary or secondary amino groups, the total mole number of primary and secondary amino groups in the polyalkylene polyamine being greater than the total mole number of isocyanate groups in the isocyanate-terminated urethane prepolymer, the reaction being carried out until the presence of —NCO groups cannot be detected, whereby to form polyurethane-urea-polyamine,
2. reacting, in the liquid phase, the reaction product of step 1 with a blocked polyisocyanate having a single free isocyanate group in the molecule, at a temperature of −20° C to +70° C, for about 0.5 to 2 hours,
3. reacting the product of step 2, in the liquid phase, at a temperature of from 5° to 70° C, for from about 0.5 to 2 hours, with a cyclic dicarboxylic acid anhydride,
4. adding to the reaction product of step 3, an aqueous solution of a base to adjust the pH of the product of step 3 to be in the range of about 6 to about 9, and
5. treating the product of step 4 to remove the organic solvent therefrom and thereby obtaining an aqueous anionic polurethane emulsion as a final product.

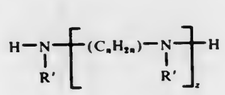
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## 4,016,123
## PROCESS FOR PREPARATION OF CATIONIC RESIN AQUEOUS EMULSIONS

**Kazuo Matsuda; Hidemasa Ohmura, both of Wakayama, and Yukihisa Niimi, Osaka, all of Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan**

**Filed July 11, 1975, Ser. No. 595,018**
**Claims priority, application Japan, July 18, 1974, 49-82618**
**Int. Cl.² C08J** *3/06;* **C08L** *75/02, 75/12*
**U.S. Cl. 260—29.2 TN** **7 Claims**

1. A process for preparing a cationic polyurethane aqueous emulsion, which comprises:
1. reacting, in the liquid phase and in a ketone solvent, at a temperature of from −20° to +70° C, (A) isocyanate-terminated urethane prepolymer prepared by reacting organic polyol having a molecular weight in the range of from 200 to 10,000 with an excess of organic polyisocyanate, with (B) an excess of polyalkylene polyamine having at least two primary or secondary amino groups, said polyalkylene polyamine having the formula



wherein *n* is an integer larger than one, *z* is an integer from 2 to 4 and R′ is hydrogen, alkyl having one to 4 carbon atoms or hydroxyalkyl having one to 4 carbon atoms, the ratio of (b) the total mole number of primary and secondary amino groups containing active hydrogen atoms in the polyalkylene polyamine to (a) the total mole number of isocyanate groups in the isocyanate-terminated urethane prepolymer being within the range of $1 < b/a \leqq 5$, the reaction being carried out until the presence of —NCO groups cannot be detected, whereby to form polyurethane-urea-polyamine,
2. reacting with the polyurethane-urea-polyamine of step 1, a substance selected from the group consisting of alkyl isocyanates having an alkyl group containing 12 to 22 carbon atoms, acyl chlorides having an alkyl group containing 12 to 22 carbon atoms and α-olefin epoxides having from 12 to 22 carbon atoms, to form an alkyl-substituted polyurethane-urea-polyamine, the amount of said substance being from 10 to 80 mole %, based on the number of moles of amino groups in the molecule of said polyurethane-urea-polyamine,
3. adding to the reaction product of step 2 an aqueous solution of an acid to form an emulsion, the amount of said acid being an amount such that the pH of polyurethane-urea-polyamine emulsion is within the range of about 5 to about 7, and
4. treating the product of step 3 to remove the organic solvent therefrom and thereby obtaining an aqueous cationic polyurethane emulsion as a final product.

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## 4,016,124
## CEMENTS COMPRISING ACRYLIC ACID/ITACONIC ACID COPOLYMER AND FLUOROALUMINOSILICATE GLASS POWDER

**Stephen Crisp, Hounslow, and Alan Donald Wilson, Liphook, both of England, assignors to National Research Development Corporation, England**

**Filed Aug. 15, 1974, Ser. No. 497,686**
**Claims priority, application United Kingdom, Aug. 21, 1973, 39383/73**
**Int. Cl.² C08K** *3/40*
**U.S. Cl. 260—29.6 M** **17 Claims**

1. A poly(carboxylate) cement pack comprising as one component a water-soluble copolymer of acrylic acid and itaconic acid, the mole ratio of acrylic acid to itaconic acid in the copolymer being from 19:1 to 2:1, the copolymer having an average molecular weight of from 5,000 to 19,000 and as another component a fluoroaluminosilicate glass powder which will react with the acrylic acid-itaconic acid copolymer in the presence of water to give a plastic mass which hardens to form a poly(carboxylate) cement.

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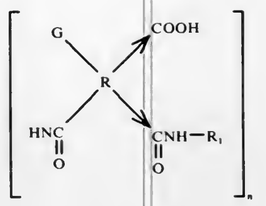
## 4,016,125
## FLUOROPOLYMER COATING COMPOSITIONS HAVING IMPROVED ADHESION

**Eustathios Vassiliou, Newark, Del., and Thomas P. Concannon, Newtown Square, Pa., assignors to E. I. Du Pont de Nemours and Co., Wilmington, Del.**

**Filed July 21, 1975, Ser. No. 597,493**
**Int. Cl.² C08L** *27/18*
**U.S. Cl. 260—29.6 F** **10 Claims**

1. A coating composition comprising
a. about 10–90%, by weight of the total of (a) and (b) solids, of a polymer of monoethylenically unsaturated hydrocarbon monomers completely substituted with fluorine atoms or a combination of fluorine atoms and chlorine atoms, having a number average molecular weight of at least 20,000;
b. about 10–90%, by weight of the total of (a) and (b) solids, of a binder which comprises
1. about 5–95%, by weight of the total of (1) and (2) solids, of an alkali metal silicate having an alkali metal oxide mol content within the range of from a trace amount to about 20% of the total number of mols of alkali metal oxide and silicon dioxide, and
2. about 5–95%, by weight of the total of (1) and (2) solids, of a salt of a polyamide acid represented by the structure





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## 4,016,126
## LAMINATED STRUCTURES AND METHODS AND COMPOSITIONS FOR PRODUCING SAME

**Giancarlo J. Fumei, Lake Grove, and James A. Karabedian, Garden City, both of N.Y., assignors to Owens-Illinois, Inc., Toledo, Ohio**

**Division of Ser. No. 573,924, May 2, 1975, abandoned, which is a continuation of Ser. No. 275,951, July 28, 1972, abandoned. This application July 31, 1975, Ser. No. 600,615**
**Int. Cl.² C08L** *31/04*
**U.S. Cl. 260—29.6 RB** **9 Claims**

1. A multi-phase adhesive composition especially adapted to bond two dissimilar materials one of which is polymeric material and the other of which is a porous hydrophilic material comprising a continuous phase of water, a major dispersed phase of a copolymer of ethylene and a terminally ethylenically unsaturated organic compound containing three to five carbon atoms, and a second minor dispersed phase comprising a solute polymer of the same chemical kind as the polymeric material to be bonded but having an average molecular weight of from about 4 to 100 percent of the average molecular weight of said polymeric material to be bonded, and said solute polymer being dissolved in a solvent for said polymer.

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## 4,016,127
## EMULSION COPOLYMERS OF ACROLEIN AND THEIR USE IN TREATING LEATHER

**Bjorn E. Larsson, Rushland, and Stanley Le Sota, Horsham, both of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.**

**Division of Ser. No. 350,573, April 12, 1973, Pat. No. 3,896,085, and a continuation-in-part of Ser. No. 160,178, July 6, 1971, abandoned. This application Jan. 31, 1975, Ser. No. 546,064**
**Int. Cl.² C08F** *216/34, 16/34, 20/02*
**U.S. Cl. 260—29.6 TA** **8 Claims**

1. An aqueous dispersion of an emulsion copolymer of
a. from about 0.25 to 4 by weight of acrolein;
b. from about 0.5 to about 10% by weight of an α,β-ethylenically unsaturated carboxylic acid or a mixture of α,β-ethylenically unsaturated carboxylic acids;
c. from 0 to about 99.25% by weight of a alkyl ($C_1$–$C_{24}$) ester of methacrylic acid or a mixture of alkyl ($C_1$–$C_{24}$) esters of methacrylic acid; and
d. up to about 99.25% by weight of a alkyl ($C_1$–$C_8$) ester of acrylic acid or a mixture of alkyl ($C_1$–$C_8$) esters of acrylic acid, the sum of (a+b+c+d) always being 100 parts by weight.

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## 4,016,128
## PREPARATION OF AQUEOUS SOLUTIONS OF QUATERNARY AMMONIUM RESINS FROM DI(TERTIARY AMINE) AND 1,4-DIHALOBUTENE-2

**Irving Serlin, Springfield, and Albert H. Markhart, Wilbraham, both of Mass., assignors to Monsanto Company, St. Louis, Mo.**

**Filed May 23, 1975, Ser. No. 580,508**
**Int. Cl.² C08L** *79/00, 87/00*
**U.S. Cl. 260—29.6 HN** **8 Claims**

1. A process for preparing an aqueous solution of a quaternary ammonium resin which comprises:
A. reacting a di(tertiary amine) with from 1 to 10 mol percent excess of a 1,4-dihalobutene-2 containing from 0.5 to 5 weight percent of a 3,4-dihalobutene-1, in aqueous medium to provide a resin content in the range of 65 to 90 weight percent,
B. steam distilling until the condensate is clear and colorless, and
C. adding a stabilizing amount of a buffer solution to maintain the pH of the resin solution in the range of 6.5 to 7.5.

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## 4,016,129
## HARDENABLE COATING COMPOSITION

**Yoshiaki Miyosawa, Hiratsuka, Japan, assignor to Kansai Paint Company, Ltd., Amagasaki, Japan**

**Filed July 29, 1975, Ser. No. 600,092**
**Claims priority, application Japan, July 30, 1974, 49-4986590; July 30, 1974, 49-4986591; July 30, 1974, 49-4986592**
**Int. Cl.² C08L** *43/04*
**U.S. Cl. 260—29.6 B** **12 Claims**

1. A hardenable coating composition which comprises an aqueous dispersion of silica-polyvinyl alcohol complex obtainable by the reaction between a dispersion of colloidal silica and a solution of polyvinyl alcohol at a temperature above 50° C.

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## 4,016,130
## PRODUCTION OF SOLID, RIGID FILLED POLYURETHANE COMPOSITES

**Thaddeus Antczak, 32431 Halmich Drive, Warren, Mich. 48092**

**Filed May 15, 1975, Ser. No. 576,371**
**Int. Cl.² C08K** *9/00*
**U.S. Cl. 260—37 N** **7 Claims**

1. A process for the production of solid, rigid filled polyurethane composites which comprises
a. preparing and maintaining separately an isocyanate component and a polyol each of which has been dried and is bubble-free,
b. adding with stirring to said isocyanate component a degreased, dust- and solid-impurity-free filler dried to a constant weight at a temperature over 100° C. and maintained under vacuum,
c. admixing the filler-isocyanate component obtained from step (b), above, with said polyol,
d. degassing under vacuum the admixture obtained in step (c), above, until no gas evolution occurs, and
e. pouring the degassed admixture obtained in step (d), above, into a suitable dry mold at atmospheric pressure to effect reaction between the isocyanate and polyol.

## 4,016,131
## PREPARATION OF UNSATURATED POLYESTER COMPOSITIONS

**Thomas Clifford Shutt, Arvada, and L. Wayne Snider, Denver, both of Colo., assignors to Vitrofil Corporation, Denver, Colo.**

**Filed Apr. 4, 1975, Ser. No. 565,238**
**Int. Cl.² C08K** *3/40*
**U.S. Cl. 260—40 R** **18 Claims**

**1.** Composition for fiber-glass reinforced plastic products comprising an admixture of unsaturated polyester and substantially pre-cleaned, dry and moisture-protected, fractured, active, finely ground powder particles of soda-containing silicate glass having a high and irregular surface area, an average particle size below about 40 mesh and an active cured polyester structurally reinforcing property.

## 4,016,132
## COLORATION OF POLYOLEFINE ARTICLES

**Gerard Lees, Harrogate, England, assignor to Imperial Chemical Industries Limited, London, England**

**Continuation-in-part of Ser. No. 403,852, Oct. 5, 1973, abandoned. This application Nov. 17, 1975, Ser. No. 632,661**
**Claims priority, application United Kingdom, Oct. 9, 1972, 46406/72**
**Int. Cl.² C08K** *9/10*
**U.S. Cl. 260—40 R** **16 Claims**

**1.** A coloured shaped article of a polymer of an unsaturated hydrocarbon or an unsaturated halogenated hydrocarbon containing from 5 to 20% of a polyester by weight of said hydrocarbon polymer as a multiplicity of small particles or fibrils distributed throughout the article, wherein colouring matter in an amount of from 0.01 to 2% by weight of said olefine polymer is present and is soluble in the polyester and is carried substantially wholly within and throughout only the polyester particles or filbrils and the weight ratio of colouring matter to polyester is at least 1:20.

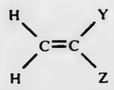
## 4,016,133
## FLUORESCENT COLORED RESIN PARTICLES AND PROCESS FOR PREPARATION THEREOF

**Yoshihiko Hyosu; Eiiti Miyashita; Noboru Kuzuba, all of Kamakura; Sadayasu Miyahara, Fujisawa, and Ryoshiro Takano, Kamakura, all of Japan, assignors to Sinloihi Co., Kamakura, Japan**

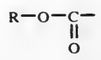
**Continuation of Ser. No. 452,375, March 18, 1974, abandoned, which is a continuation of Ser. No. 207,797, Dec. 14, 1971, abandoned. This application Sept. 3, 1975, Ser. No. 610,078**
**Int. Cl.² C08K** *5/00*
**U.S. Cl. 260—42.21** **3 Claims**

**1.** A process for the preparation of fluorescent colored resin particles which comprises copolymerizing in an aqueous medium in the presence of a water-soluble fluorescent dye which is at least one member selected from the group consisting of xanthenes, acridines, thiazoles and benzimidazoles, a mixture of monomers comprising

A. a polymerizable unsaturated monomer having a low affinity for said dye, which is selected from compounds having the formula



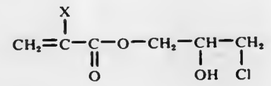
wherein Z is a member selected from the group consisting of hydrogen atom and lower alkyl groups having 1 to 4 carbon atoms and Y is a member selected from the group consisting of acetoxy and phenyl groups, phenyl groups substituted with a lower alkyl group having 1 to 4 carbon atoms, phenyl groups substituted with an alkoxy group having 1 to 2 carbon atoms, and groups



in which R is a lower alkyl group having 1 to 4 carbon atoms,

B. a polymerizable unsaturated monomer having at least one cyano group, which is selected from the group consisting of acrylonitrile and methacrylonitrile, and

C. at least one water-insoluble or barely water-soluble polymerizable unsaturated monomer containing a group having a high affinity for said dye, said monomer being selected from the group consisting of compounds having the formula



wherein X is a hydrogen atom or a methyl group,

whereby said fluorescent dye is uniformly dispersed in the resin particles.

## 4,016,134
## NOVEL COMPOSITE COMPRISING A SPECIAL GRAFT-COPOLYMER

**Sueo Machi, Takasaki; Taiji Aono, Ichihara; Yasushi Matui, Satte; Yoshiharu Hibi, and Takayuki Shinano, both of Yokohama, all of Japan, assignors to Japan Atomic Energy Research Institute, Tokyo; Maruzen Oil Co., Ltd., Osaka and Mitsuhashi Kakoki Kaisha Ltd., Tokyo, all of, Japan**

**Continuation of Ser. No. 375,880, July 2, 1973, abandoned. This application Jan. 8, 1975, Ser. No. 539,589**
**Claims priority, application Japan, July 3, 1972, 47-66437; Sept. 5, 1972, 47-88337**
**Int. Cl.² C08K** *3/30*
**U.S. Cl. 260—42.24** **4 Claims**

**1.** A composite consisting essentially of (1) from about 10 to about 50 parts by weight of a graft-copolymer prepared by graft-copolymerizing acrylic acid monomer on polyolefin and (2) from about 90 to 50 parts by weight of gypsum and/or calcium sulfite, the percent graft in said graft-copolymer being in the range of from about 0.05 to about 10% based on the total weight of the graft-polymer.

## 4,016,135
## RADIOACTIVE RAY-RESISTANT STABILIZER

**Masaaki Takahashi; Akira Ito, both of Tokyo; Shichiro Kawawata, and Jiro Ogura, both of Hitachi, all of Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Dec. 27, 1974, Ser. No. 536,986**
**Claims priority, application Japan, Dec. 27, 1973, 49-3642; Dec. 27, 1973, 49-3643**
**The portion of the term of this patent subsequent to June 29, 1993, has been disclaimed.**
**Int. Cl.² C08K** *5/01*
**U.S. Cl. 260—45.7 R** **7 Claims**

**1.** A composition consisting essentially of a polymeric resin and, as a stabilizer against radioactivity, an alkyl-substituted condensed tetracyclic compound of the generic formula:





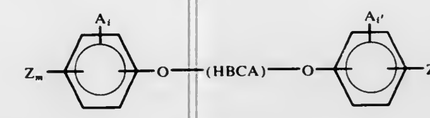
wherein, R denotes an alkyl group having one to four carbon atoms and $x$ is an integer from 1 to 4, and when $x$ is 2 or more, R may be the same or different.

## 4,016,136
## PLASTIC COMPOSITIONS

**Arnold L. Anderson, Alma, Mich., assignor to Michigan Chemical Corporation, Chicago, Ill.**

**Filed Feb. 8, 1973, Ser. No. 330,808**
**Int. Cl.² C08L** *23/00*
**U.S. Cl. 260—45.9 R** **12 Claims**

**1.** A plastic composition containing polyolefin having incorporated therein an effective amount of a flame retardant which is a compound having the formula:



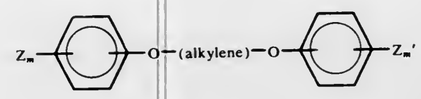
wherein Z is selected from the group consisting of bromine or chlorine; $m$ and $m'$ are integers having a value of 1–4; $i$ and $i'$ are integers having a value of 1–2; HBCA is a halo-branched chain alkylene group having from 1 to 6 carbon atoms; and A is selected from the group consisting of cyano, nitro, lower alkoxy, lower alkyl, fluorine, dialkylamino, phenyl, halo-phenyl, benzyl and halo-benzyl, with the proviso that neither $m + i$ nor $m' + i'$ is greater than 5.

## 4,016,137
## PLASTIC COMPOSITIONS

**Arnold L. Anderson, and Robert J. Nulph, both of Alma, Mich., assignors to Michigan Chemical Corporation, Chicago, Ill.**

**Continuation-in-part of Ser. No. 260,240, June 6, 1972, abandoned. This application Feb. 8, 1973, Ser. No. 330,763**
**Int. Cl.² C08L** *25/10*
**U.S. Cl. 260—45.75 R** **15 Claims**

**1.** A plastic composition comprising acrylonitrile-butadiene-styrene polymer and a flame retardant, said flame retardant consisting of a compound having the formula



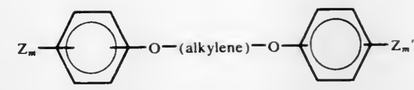
wherein (a) Z is bromine; (b) $m$ and $m'$ are independent and are integers having a value of from 1 to 5; and (c) alkylene is a straight or branched chain alkylene group having from one to six carbon atoms.

## 4,016,138
## PLASTIC COMPOSITIONS

**Arnold L. Anderson, Alma, Mich., assignor to Michigan Chemical Corporation, Chicago, Ill.**

**Continuation of Ser. No. 330,823, Feb. 8, 1973, abandoned, which is a continuation-in-part of Ser. No. 260,240, June 6, 1972, abandoned. This application Aug. 22, 1974, Ser. No. 499,727**
**The portion of the term of this patent subsequent to Apr. 5, 1994, has been disclaimed.**
**Int. Cl.² C08L** *71/04*
**U.S. Cl. 260—45.75 R** **15 Claims**

**1.** A plastic composition comprising a poly(phenylene oxide) and a flame retardant, said flame retardant consisting of a bis-phenoxy compound having the formula



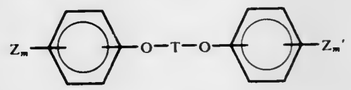
wherein (a) Z is bromine; (b) $m$ and $m'$ are independent and are integers having a value of from 1 to 5; and (c) alkylene is a straight or branched chain alkylene group having from 1 to 6 carbon atoms.

## 4,016,139
## PLASTIC COMPOSITION COMPRISING ACRYLONITRILE-BUTADIENE-STYRENE POLYMER, A BIS-PHENOXY FLAME RETARDANT AND A FLAME RETARDANT ENHANCING AGENT

**Arnold L. Anderson, and Robert J. Nulph, both of Alma, Mich., assignors to Michigan Chemical Corporation, Chicago, Ill.**

**Continuation-in-part of Ser. No. 330,763, Feb. 8, 1973, which is a continuation-in-part of Ser. No. 260,240, June 6, 1972, abandoned. This application June 16, 1975, Ser. No. 586,945**
**The portion of the term of this patent subsequent to Dec. 25, 1987, has been disclaimed.**
**Int. Cl.² C08L** *25/10*
**U.S. Cl. 260—45.75 R** **29 Claims**

**1.** A plastic composition comprising a three component system consisting of (1) acrylonitrile-butadiene-styrene polymer, (2) a bis-phenoxy compound, which functions as a flame retardant for said composition, having the formula



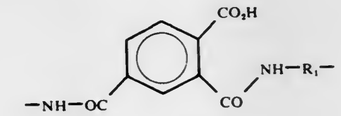
wherein (a) Z is bromine; (b) $m$ and $m'$ are independent and are integers having a value of from 1 to 5 with the proviso that the bromine atom content is from 6 to 10 bromine atoms; and (c) T is a straight or branched chain carbon group having from one to four carbon atoms, and (3) a flame retardant enhancing agent.

## 4,016,140
## AMIDE-IMIDE COPOLYMER MOLDINGS AND METHOD OF PREPARATION

**Edwin F. Morello, Hammond, Ind., assignor to Standard Oil Company, Chicago, Ill.**

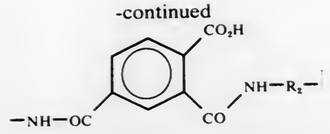
**Continuation of Ser. No. 239,823, March 30, 1972, abandoned, which is a continuation of Ser. No. 79,677, Oct. 9, 1970, abandoned. This application Dec. 30, 1974, Ser. No. 537,255**
**Int. Cl.² C08G** *73/14*; **B29F** *5/00*
**U.S. Cl. 260—47 CP** **18 Claims**

**1.** A process for preparing a molded article which consists essentially of the steps: (1) heating a copolymer consisting essentially of A units having a formula selected from the group consisting of:

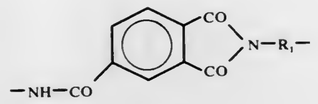


and

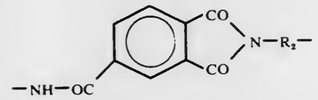
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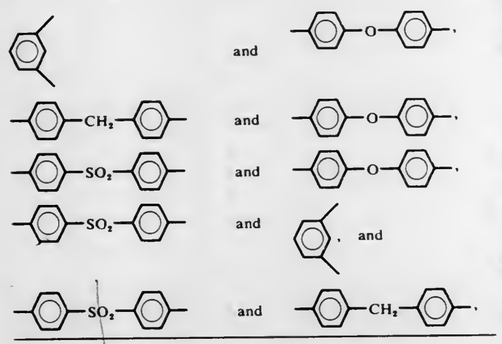
and B units having a formula selected from the group consisting of:



and



wherein $R_1$ and $R_2$ are different and are chosen from the class consisting of:



and wherein the proportions of A and B units run from about 1 mole percent A units and about 99 mole percent B units to about 99 mole percent A units and about 1 mole percent B units and wherein the $R_1$ and $R_2$ containing components of the A and B units run from about 10 mole percent $R_1$ containing component and about 90 mole percent $R_2$ containing component to about 90 mole percent of the $R_1$ containing component and about 10 mole percent of the $R_2$ containing component in the temperature range from about 300° to about 700° F. for about 0.5 to about 5 hours, and (2) thereafter applying a pressure of about 200 p.s.i. to about 30,000 p.s.i. to said copolymer while said copolymer is being heated in the temperature range from about 200° to about 750° F.

**4,016,141**

## EPOXY RESIN CONTAINING ACETOACETIC GROUPS

**Jürgen Ritz, Nierstein, and Johannes Reese, Wiesbaden-Biebrich, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt, Germany**

**Continuation of Ser. No. 239,325, March 29, 1972, abandoned. This application June 3, 1974, Ser. No. 475,965**
**Claims priority, application Germany, July 30, 1971, 2338116; Dec. 24, 1971, 2164489**
**Int. Cl.² C08G** *30/04*
**U.S. Cl. 260—47 EP** **11 Claims**

**1.** A vicinal epoxy resin containing acetoacetic groups being bound to a carbon atom of at least one opened epoxy group in which at least a part of the acetoacetic ester groups is enolized by atoms of at least one metal from groups I to VI or Ia to VIIIa of the Periodic Table according to Meyer and Mendelejeff which metal atoms are partially bound to the enolic oxygen of the acetoacetic ester group of the vicinal epoxy resin in the form of a chelate, the remaining valencies of the metal atoms are bound to at least one radical selected from the group consisting of

a. an aryl group having 6 to 10 carbon atoms,
b. an alkyl group having up to 8 carbon atoms and
c. the enolic oxygen of a monomer compound also in the form of a chelate.

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**4,016,142**

## PROCESS FOR THE CONTROL OF CARBOXYL END GROUPS IN FIBER-FORMING POLYESTERS

**William Alexander, Kingston, Canada; Alfredo Guillermo Causa, Akron, Ohio, and James Girvan Fraser, Kingston, Canada, assignors to Millhaven Fibers, Ltd., Canada**

**Filed Nov. 9, 1966, Ser. No. 592,967**
**Int. Cl.² C08G** *63/46*
**U.S. Cl. 260—75 T** **2 Claims**

**1.** A process for reducing the concentration of free carboxyl groups in a synthetic linear fibre-forming polyethylene terephthalate comprising reacting said polyethylene terephthalate in molten form with 1-butoxy glycidyl ether, whereby polyethylene terephthalate having a concentration of free carboxyl end groups of less than 30 equivalents per million grams of said polyethylene terephthalate is produced.

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**4,016,143**

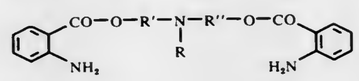
## POLYURETHANES BASED ON AROMATIC POLYAMINES

**Johannes Blahak, Cologne; Erwin Müller, and Karl Hartwig Richert, both of Leverkusen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany**

**Division of Ser. No. 440,210, Feb. 6, 1974, Pat. No. 3,975,428, which is a continuation of Ser. No. 306,783, Nov. 15, 1972, abandoned. This application May 18, 1976, Ser. No. 687,570**
**Claims priority, application Japan, May 28, 1975, 50-62869**
**Int. Cl.² C08G** *18/32, 18/14*
**U.S. Cl. 260—77.5 AM** **6 Claims**

**1.** Polyurethanes prepared by a process which comprises a reacting

a. polyisocyanates
b. higher molecular weight compounds containing active hydrogen atoms with molecular weights of from about 750 to about 10,000
c. polyamines of the formula



wherein R is a saturated or unsaturated $C_1$ to $C_{18}$ alkyl radical; $C_3$ to $C_{10}$ cycloalkyl radical; $C_7$ to $C_{11}$ aralkyl radical or $C_6$ to $C_{10}$ aryl radical; and R′ and R″ are the same or different and represent $C_2$ to $C_{30}$ alkylene radicals which may be interrupted by oxygen atoms.



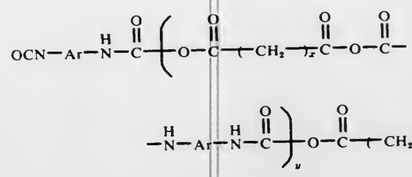
**4,016,144**

## PREPARATION OF POLYAMIDE FROM OLIGOMERIC POLY-N-CARBOXYLIC ANHYDRIDE

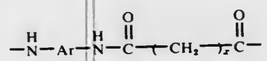
**James N. Tilley, Cheshire, Conn., assignor to The Upjohn Company, Kalamazoo, Mich.**

**Division of Ser. No. 508,990, Sept. 25, 1974, Pat. No. 3,922,295. This application Sept. 5, 1975, Ser. No. 610,742**
**Int. Cl.² C08G** *18/10, 69/00*
**U.S. Cl. 260—78 R** **10 Claims**

**1.** A process for converting an oligomeric poly N-carboxylic anhydride consisting essentially of



wherein Ar represents an arylene radical, $x$ represents an integer from 1 to 10, and y represents a number having an average value from 0 to 4 inclusive into a film forming polyamide having the recurring unit



wherein Ar and $x$ are as defined hereinabove said process comprising heating said oligomeric poly N-carboxylic anhydride at a temperature of from about 80° to about 325° C so as to remove carbon dioxide.

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**4,016,145**

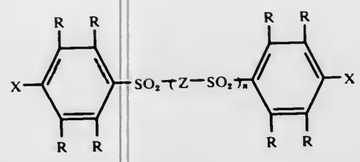
## PRODUCTION OF AROMATIC SULFIDE/SULFONE POLYMERS

**Robert W. Campbell, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.**

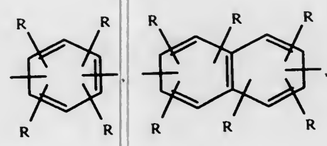
**Continuation-in-part of Ser. No. 495,450, Aug. 28, 1974, Pat. No. 3,919,177, which is a continuation-in-part of Ser. No. 416,776, Nov. 19, 1973, abandoned. This application Sept. 23, 1975, Ser. No. 616,094**
**Int. Cl.² C08F** *28/00*
**U.S. Cl. 260—79.3 M** **17 Claims**

**1.** A process for the production of high molecular weight aromatic sulfide/sulfone polymers which comprises contacting

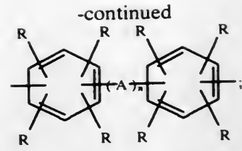
a. at least one dihalo aromatic sulfone represented by the formula



where each X is selected from the group consisting of fluorine, chlorine, bromine, and iodine; Z is a divalent radical selected from the group consisting of

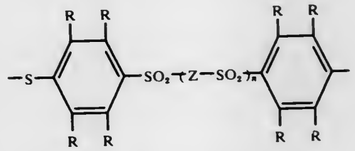


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$n$ is 0 or 1; A is selected from the group consisting of oxygen, sulfur, sulfonyl, and $CR_2$; and each R is selected from the group consisting of hydrogen and alkyl radicals having 1 to about 4 carbon atoms, the total number of carbon atoms in all of the R groups in the molecule being 0 to about 12,

b. at least one alkali metal sulfide selected from the group consisting of sodium sulfide, potassium sulfide, rubidium sulfide, and cesium sulfide,
c. at least one alkali metal carboxylate represented by the formula $R'CO_2M$ wherein R′ is a hydrocarbyl radical and M is an alkali metal, and
d. at least one organic amide, under polymerization conditions including an elevated temperature, a period of time, and proportions of reactants sufficient to cause the reactants to react with each other and from an aromatic sulfide/sulfone polymer having recurring



units, where each R, Z, and $n$ is as defined above.

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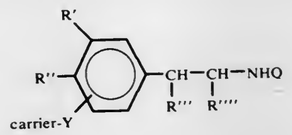
**4,016,146**

## PHENETHYLAMINE ANTIGENIC CONJUGATES, THEIR PREPARATION, ANTIBODIES, AND USE

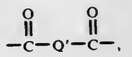
**James R. Soares, Santa Monica, Calif., assignor to Biological Developments, Inc., Encino, Calif.**

**Filed Dec. 10, 1974, Ser. No. 531,219**
**Int. Cl.² C07C** *103/52*; **C07G** *7/00*
**U.S. Cl. 260—112 R** **14 Claims**

**1.** A process for producing a synthetic antigen of formula

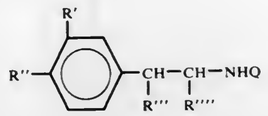


where R′ and R″ are individually selected from the class consisting of —H, —OH, and $—OCH_3$, where either R′ or R″ is $—OCH_3$, the other is —OH; R‴ is selected from the class consisting of —H and —OH; R⁗ is selected from the class consisting of —H, $—OCH_3$, and $—C_2H_5$; Q is selected from the class consisting of —H and $—CH_3$; Y is a linking group which is the residue of the reaction of a coupling agent with a reactive group derivatized into the phenyl ring and of the coupling agent with the carrier, and the carrier is a macromolecule conferring antigenicity; where said reactive group is and said Y group includes a -N = N- or a group having the formula



where Q′ is an alkylene chain having up to 20 carbon atoms; comprising

1. substituting a blocking group onto the amine of a phenylamine having the formula:



to form an amine blocked phenethylamine;
2. forming a derivative on the phenyl ring of the amine-blocked phenethylamine;
3. coupling the derivative to a carrier; and
4. removing the blocking group and reforming the amine to yield the phenethylamine conjugated to the carrier through the ring derivative.

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## 4,016,147
## METHOD FOR PREPARATION OF LOW-PHENYLALANINE PLASTEIN

**Masao Fujimaki, Tokyo; Soichi Arai, Yokohama, and Michiko Watanabe, Matsudo, all of Japan, assignors to Fuji Oil Company, Ltd., Osaka, Japan**

**Filed Jan. 16, 1976, Ser. No. 649,794**
**Claims priority, application Japan, Jan. 16, 1975, 50-7471**
**Int. Cl.² C07G** *7/00*; **C12D** *13/06*
**U.S. Cl. 260—112 R** **16 Claims**

1. A method for the preparation of low-phenylalanine plasteins comprising (a) hydrolyzing of a protein selected from the group consisting of an albumin and a globulin with an endopeptidase having affinity for the aromatic amino acid constituents of said protein and subsequently with an exopeptidase to give a hydrolyzate, (b) subjecting the resulting hydrolyzate to a gel-filtration to divide it into two fractions, the one containing the aromatic amino acid components and the other containing no or few aromatic amino acids, and (c) subjecting the latter fraction to a plastein synthesis.

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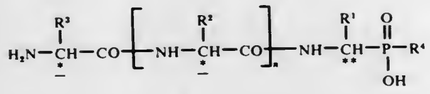
## 4,016,148
## PEPTIDE DERIVATIVES OF PHOSPHONIC AND PHOSPHINIC ACIDS AND INTERMEDIATES THEREFOR

**Frank Ratcliffe Atherton, Welwyn Garden City; Michael John Hall; Cedric Herbert Hassall, both of Welwyn; Peter Stuart Ringrose, Royston, and Robert Wilson Lambert, Welwyn, all of England, assignors to Hoffmann-La Roche Inc., Nutley, N.J.**

**Filed Jan. 19, 1976, Ser. No. 650,336**
**Claims priority, application United Kingdom, Jan. 27, 1975, 3417/75; Nov. 20, 1975, 47787/75**
**Int. Cl.² C07C** *103/52*; **C07F** *9/30*, *9/38*
**U.S. Cl. 260—112.5 R** **10 Claims**

1. A compound of the formula

(I)

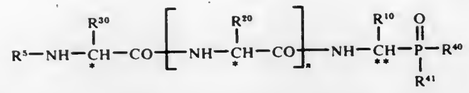


wherein $R^1$ is hydrogen, lower alkyl, lower cycloalkyl, lower alkyl substituted with lower cycloalkyl or aryl, said groups other than hydrogen being optionally substituted by one or more of amino, hydroxy, thio, methylthio, carboxy or guanidino so as to form the side chain of a naturally occurring L alpha-amino acid; $R^2$ and $R^3$ each is the side chain of an alpha-amino acid of the type normally found in proteins with the proviso that $R^3$ cannot be hydrogen when n is zero and $R^1$ is hydrogen or phenyl; $R^4$ is hydroxy or methyl; *n* is zero, 1, 2 or 3; the single asterisks denote that the configuration at the carbon atom so-marked is L; and the double asterisk denotes that when $R^1$ is other than hydrogen, the configuration at the carbon atom so-marked is R.

and pharmaceutically acceptable salts thereof,

9. A compound of the formula

(II)



wherein $R^{10}$ is hydrogen, lower alkyl, lower cycloalkyl, aryl or lower alkyl substituted with lower cycloalkyl or aryl, said groups other than hydrogen being optionally substituted by one or more of amino, hydroxy, thio, methylthio, carboxy or guanidino so as to form the side chain of a naturally occurring L alpha-amino acid; $R^{20}$ and $R^{30}$ each is the side chain of an alpha-amino acid of the type normally found in proteins with the proviso that $R^{30}$cannot be hydrogen when *n* is zero and $R^{10}$ is hydrogen or phenyl; except that any amino group or amino groups present may be in protected form utilizing a conventional amino protecting group and any other functional group which may be present is in protected form where required, $R^{40}$ is methyl or $R^{41}$, $R^{41}$ is hydroxy or lower alkoxy, $R^5$ is hydrogen or a conventional amino protecting group, *n* is zero, 1, 2 or 3; the single asterisks denote that the configuration at the carbon atom so-marked is L; and the double asterisk denotes that, when $R^1$ is other than hydrogen, the configuration at the carbon atom so-marked is R.

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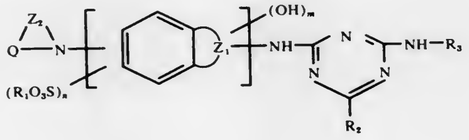
## 4,016,149
## SELECTIVE REMOVAL OF ALBUMIN FROM BLOOD FLUID AND COMPOSITIONS THEREFORE

**James Travis, and Ralph Pannell, both of Athens, Ga., assignors to Research Corporation, New York, N.Y.**

**Continuation-in-part of Ser. No. 396,036, Sept. 10, 1973, abandoned. This application Aug. 4, 1975, Ser. No. 601,676**
**Claims priority, application France, Sept. 10, 1974, 74.30595; Italy, Sept. 10, 1974, 27141/74**
**Int. Cl.² A23J** *1/00*
**U.S. Cl. 260—122** **19 Claims**

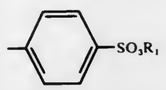
1. A method of removing albumin from substantially cell free aqueous fluids containing the same comprising the steps of

a. suspending a composition of the general formula $[SP]_x$—[CRD] wherein CRD is color reactive dye of the general formula



wherein

$R_3$ is hydrogen, alkyl, phenyl, alkoxy phenyl, alkyl phenyl, or



wherein $R_1$ is hydrogen, an alkali metal, or an alkaline earth metal, $R_2$ is halo or -O-dextran

$Z_1$ is two hydrogen atoms, or —CH=CH—CH=CH— to form a naphthyl nucleus with the phenyl nucleus to which it is attached,

$Z_2$ is one bond of a nitrogen-nitrogen bond or a hydrogen attached to the nitrogen shown only,

Q is substituted or unsubstituted aryl where $Z_2$ is hydrogen, or Q is substituted or unsubstituted aryl-N= where $Z_2$ is one bond of a double bond,

*m* is 1 or 0, *n* is 1 or 2,

provided that the substituent groups aforesaid are other than halo or heavy metal wherein heavy metal is defined as a metal falling in periodic groups other than 2A, 3A or 4A. and wherein SP is a solid support phase selected from the group comprising agarose, polyacrylamide and acrylic resin containing amino groups

and *x* is expressed as a weight ratio between 0.8 and 40,

in a buffer of at least 0.05M molarity at a pH of between 6.5 and 8.5,

b. Contacting said suspension with said albumin containing fluid to provide a suspension having albumin absorbed upon the solid phase thereof,

c. Separating the solid phase-albumin adsorbate from the aqueous phase.

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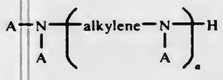
## 4,016,150
## SULFUR AND NITROGEN-CONTAINING ORGANIC COMPOSITIONS PROCESSES FOR MAKING THEM AND FUELS AND ADDITIVES CONTAINING THEM

**Herbert Frederick Wiese, deceased, late of Cleveland, Ohio, by Helen G. Wiese, executrix, Mayfield Village, Ohio, and Emil Thomas Wierber, Mayfield Village, Ohio, assignors to The Lubrizol Corporation, Cleveland, Ohio**

**Division of Ser. No. 401,494, Sept. 27, 1973, Pat. No. 3,912,641. This application May 1, 1975, Ser. No. 573,706**
**Int. Cl.² C07G** *17/00*
**U.S. Cl. 260—128** **20 Claims**

1. A process for preparing sulfur- and nitrogen-containing organic compositions which comprises reacting at a temperature above about 0° C. (A) at least one amino compound chosen from the group consisting of amines, hydroxy amines, heterocyclic amines, polyamines, hydrazines, substituted hydrazines, hydroxyl amines and ammonia, (B) carbon disulfide, and (C) at least one halogenated aliphatic hydrocarbon of at least about 25 carbon atoms, said halogenated hydrocarbon (C) having between about 0.1 and 15% halogen.

11. A sulfur- and nitrogen-containing organic composition prepared by the process which comprises reacting at a temperature above about 0° C. (A) at least one polyalkylene polyamine of the general formula



wherein a is an average of integers between 1 and about 10, each A is independently a hydrogen atom, hydrocarbyl group of a hydroxy-substituted hydrocarbyl group having up to about 30 atoms, with the proviso that two A groups can be taken together with A to form a ring of from 5 to 6 annular members and up to 12 carbon atoms and alkylene is a lower alkylene group having between 1 and 10 carbon atoms, and (C) at least one halogenated substantially aliphatic hydrocarbon of at least 25 carbon atoms, said halogenated hydrocarbon (C) having between about 0.1 and 15% halogen, to form a amino intermediate of the general formula



wherein Z is



when $x=1$; A is independently hydrogen, hydrocarbyl of from 1 up to about 30 carbon atoms with the proviso that two A groups can be taken together with A to form a ring of from 5 to 6 annular members and up to 12 carbon atoms; alkylene is as defined above; R′ is an aliphatic hydrocarbon radical from about 400 to 100,000 number average molecular weight; *a* is an average of integers of from 0 to about 5; $a+2b$ is an average of integers of from 1 to about 10; *c* is an average of integers of from 1 to about 10 and is equal to or less than the number of amino groups in the molecule; *x* is 0 or 1; *y* is 0 or 1; and $x+y$ equals 1, and then reacting said intermediate with (B) carbon disulfide.

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## 4,016,151
## PHENYL-SUBSTITUTED PHTHALAZONE AZO DYES WITH A COUPLING COMPONENT OF THE PHENOL, NAPTHOL, ACETOACETARYLIDE, PYRAZALONE, QUINOLONE, PYRIDONE, PYRIMIDONE, OR ISOQUINOLONE SERIES

**Wolfgang Lotsch, Beindersheim, Germany, assignor to Badische Anilin- & Soda-Fabrik Aktiengesellschaft, Ludwigshafen (Rhine), Germany**

**Filed Apr. 28, 1975, Ser. No. 572,420**
**Claims priority, application Germany, May 21, 1974, 2424538**
**Int. Cl.² C09B** *29/36*; **D06P** *1/52*, *1/76*
**U.S. Cl. 260—154** **9 Claims**

1. A dye of the formula



in which

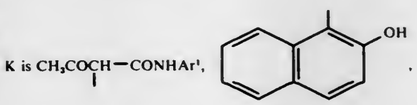
R is hydrogen; phenyl; phenyl substituted by chloro, bromo, methyl, ethyl, methoxy, ethoxy, cyano, nitro, sulfamoyl, N-phenylsulfamoyl, phenylsulfonyl, carbamoyl, N-phenylcarbamoyl, acetylamino or benzoylamino; or naphthyl;

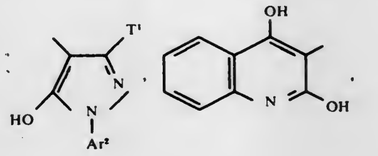
*m* is 1 to 2;

*n* is zero, 0, 1, 2, 3 or 4;

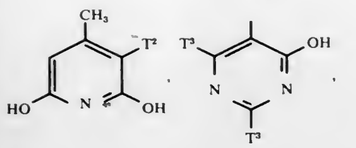
X is chloro;

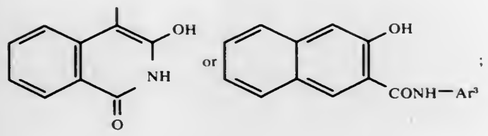
Z is chloro or bromo; and

K is 

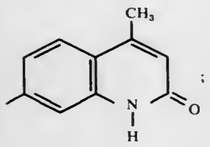


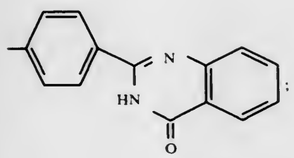
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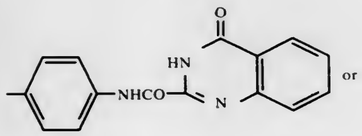


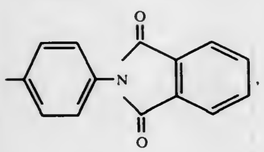


Ar¹ is phenyl or phenyl substituted by chlorine, methoxy, ethoxy, methyl, acetylamino, or benzoylamino;



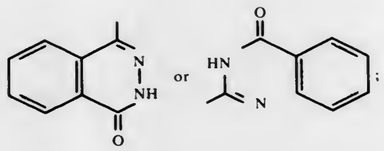




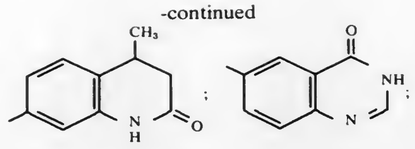


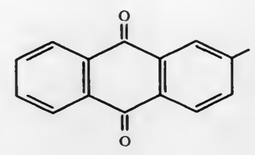
Ar² is phenyl or phenyl substituted by chlorine, methyl or sulfamoyl,

Ar³ is phenyl; phenyl substituted by chlorine, bromine, nitro, methoxy, ethoxy, alkyl of 1 to 4 carbon atoms, carbamoyl sulfamoyl, N-phenylcarbamoyl, N-chloro-, N-methyl- or N-methoxyphenylcarbamoyl, N-β-anthraquinonyl-carbamoyl, phthalimido, benzoylamino, benzoylamino substituted by chlorine, methyl, methoxy or acetylamino;



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or naphthyl;

T¹ is methyl or carbamoyl;
T² is cyano or carbamoyl; and
T³ is hydroxyl or amino.

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**4,016,152**
**AZO DYE WITH A 2,6-DIAMINO-5-CYANO-OR-5-CARBAMOYL-PYRIDINE COUPLING COMPONENT**

**Johannes Dehnert, and Gunther Lamm, both of Ludwigshafen, Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany**

**Continuation-in-part of Ser. No. 209,431, Dec. 17, 1971, abandoned. This application Aug. 26, 1974, Ser. No. 500,640**
**Claims priority, application Germany, Dec. 19, 1970, 2062717**
**Int. Cl.² C09B** *29/36;* **D06P** *3/24, 3/40, 3/52*
**U.S. Cl. 260—156** **14 Claims**

**1.** A dye of the formula



where

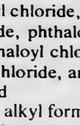
D¹ is phenyl substituted by chlorine, bromine, trifluoromethyl, methyl, ethyl, methoxy, nitro, cyano, methylsulfonyl, ethylsulfonyl, phenylsulfonyl, carbalkoxy of a total of 2 to 5 carbon atoms, carbo-β-alkoxyethoxy, said alkoxy having 1 to 4 carbon atoms or N,N-dialkyl-substituted sulfamoyl, said alkyl having 1 to 3 carbon atoms; phenylazophenyl; phenylazophenyl substituted by methyl, chlorine, bromine or nitro; benzthiazolyl; benzthiazolyl substituted by nitro, cyano, methylsulfonyl or ethylsulfonyl; benzisothiazolyl substituted by chlorine, bromine, cyano or nitro; thiazolyl substituted by cyano or nitro; thienyl substituted by methyl, cyano, nitro or carbalkoxy of a total of 2 to 5 carbon atoms; or thiadiazolyl substituted by phenyl, methyl, chlorine, bromine, methylmercapto, ethylmercapto or alkoxycarbonylethylmercapto, said alkoxy having 1 to 4 carbon atoms;

R¹ is hydrogen or alkyl of 1 to 3 carbon atoms;

X is carbamoyl or cyano;

A³ is hydrogen, alkyl of 1 to 8 carbon atoms; alkyl of 2 to 8 carbon atoms substituted by hydroxy, OCHO, $OCOCH_3$, hydroxyalkoxy of 2 to 4 carbon atoms, cyano, alkoxy of 1 to 8 carbon atoms, phenoxy or phenyl; cyclohexyl; norbornyl; phenyl; β-hydroxy-β-phenylethyl; or $(CH_2)_3(OC_2H_4)_mOT$ and T is alkyl of 1 to 4 carbon atoms, benzyl or phenyl, *m* is 1 to 2,

each A², which can be the same or different, is alkyl of 1 to 4 carbon atoms, hydroxyalkyl of 2 or 3 carbon atoms, alkoxyalkyl of 1 to 4 carbon atoms in the alkoxy and 2 or 3 carbon atoms in the alkyl, cyclohexyl or phenyl and



is pyrrolidino, piperidino, morpholino, hexamethyleneimino, piperazino, N-methylpiperazino or N-β-hydroxyethylpiperazino.

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**4,016,153**
**MONOAZO DYESTUFF MIXTURES DERIVED FROM 2-AMINO-5-NITRO-THIAZOLE AND BIS-HYDROXYALKYLAMINO ACKLANILIDES REACTED WITH ACID HALIDES AND AMIDES**

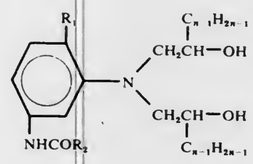
**Edgar E. Renfrew, Flemington, Pa., assignor to American Color & Chemical Corporation, Charlotte, N.C.**

**Continuation-in-part of Ser. No. 378,003, July 10, 1973, abandoned. This application Dec. 13, 1974, Ser. No. 532,398**
**Int. Cl.² C09B** *29/08, 29/26, 43/18*
**U.S. Cl. 260—158** **5 Claims**

**1.** The monoazo dye mixture consisting essentially of the reaction product of

a. diazotized 2-amino-5-nitrothiazole; and

b. a coupling component of the formula



wherein

$R_1$ is hydrogen or lower alkoxy;

$R_2$ is alkyl of 1–4 carbon, phenyl, tolyl or chlorophenyl; and

*n* is 1 or 2;

the hydroxyalkyl groups of the coupling component being reacted prior to or subsequent to coupling with at least stoichiometric quantities of both:

1. a lower alkyl chlorocarbonate, acetyl chloride, propionyl chloride, benzoyl chloride, methylbenzoyl chloride, ethylbenzoyl chloride, phthaloyl chloride, terephthaloyl chloride, isophthaloyl chloride, butyryl chloride, a lower alkylsulfonylchloride, an arylsulfonylchloride or thionyl chloride, and
2. a mono- or di-lower alkyl formamide or acetamide, at a temperature of 30°–100° C. until the reaction mixture is substantially free of unreacted coupling component.

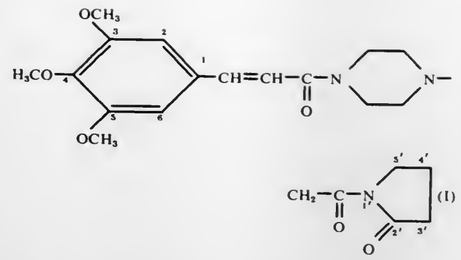
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**4,016,154**
**NOVEL DERIVATIVE OF N-(3,4,5-TRIMETHOXY CINNAMOYL) PIPERAZINE, ITS ACID ADDITION SALTS, ITS PROCESS OF PREPARATION AND ITS THERAPEUTIC APPLICATION**

**Michel J. Turin, Paris; Guy M. Raynaud, Meudon La Foret; Bernard M. Pourrias, Rueil Malmaison, and Patrick G. Guerret, Paris, all of France, assignors to Delalande S.A., Courbevoie, France**

**Filed July 15, 1975, Ser. No. 596,041**
**Claims priority, application France, July 17, 1974, 74.24831**
**Int. Cl.² C07D** *403/02*
**U.S. Cl. 260—240 J** **2 Claims**

**1.** N-(3,4,5-trimethoxy cinnamoyl)-N′-(2′-pyrrolidinone-1′-carbonylmethyl) piperazine of formula (1):



and the pharmacologically acceptable acid addition salts thereof.

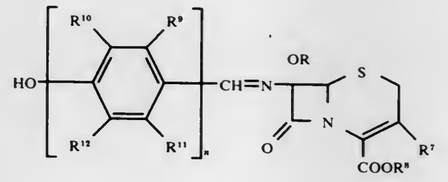
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**4,016,155**
**PROCESS FOR PREPARING CEPHALOSPORIN DERIVATIVES**

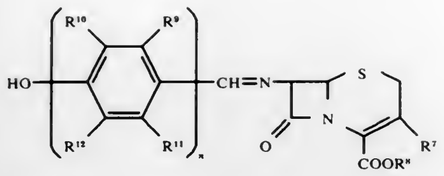
**Hiroaki Yanagisawa; Akiko Ando; Masami Fukushima, and Hideo Nakao, all of Tokyo, Japan, assignors to Sankyo Company Limited, Tokyo, Japan**

**Filed Aug. 28, 1974, Ser. No. 501,245**
**Claims priority, application Japan, Sept. 7, 1973, 48-100856**
**Int. Cl.² C07D** *501/02*
**U.S. Cl. 260—240 G** **24 Claims**

**1.** A process for preparing a compound having the formula



wherein $R^7$ represents hydrogen or a group selected from the group consisting of methyl, cyanomethyl, acetoxymethyl, propionyloxymethyl, pivaloyloxymethyl, benzoyloxymethyl, carbamoyloxymethyl, methoxymethyl, ethoxymethyl, butyloxymethyl, methylthiomethyl, ethylthiomethyl, propylthiomethyl, 2-pyridylthiomethyl, 2-(1,3,5-triazolo)thiomethyl, 3-pyrazolothiomethyl, 1-imidazolinylthiomethyl, 5-methyl-1,3,4-thiodiazolyl-2-thiomethyl and 1-methyl-1H-tetrazol-5-ylthiomethyl, $R^8$ represents a group selected from the group consisting of straight or branched lower alkyl, lower alkoxymethyl, benzyloxymethyl, lower alkanoyloxy lower alkyl, benzoyloxymethyl, cyanomethyl, 2,2,2-trichloroethyl, phthalimidomethyl, benzyl, p-methoxybenzyl, p-nitrobenzyl, benzhydryl, phenacyl, p-bromophenacyl, p-methoxyphenacyl, p-nitrophenacyl, and tri lower alkyl silyl, $R^9$ to $R^{12}$ may be the same or different and each represents hydrogen or a group selected from the group consisting of straight or branched lower alkyl, lower alkoxy, halogen, cyano and lower alkoxycarbonyl or $R^9$ and $R^{10}$ together and $R^{11}$ and $R^{12}$ together may be linked to form a ring fused with the benzene ring to which they are attached, *n* is 1 or 2 and R represents a straight or branched alkyl having from 1 to 6 carbon atoms, which comprises contacting a cephem compound having the formula



wherein $R^7$ to $R^{12}$ and $n$ have the same meanings as defined above, with a metal oxide in an inert solvent or with a quinone compound substituted with an electron attractive group, and contacting the resulting oxidation product with an alkanol having the formula

R - OH

wherein R has the same meaning as defined above, said metal oxide being one which oxidizes phenol to a quinoid form without destruction of the cephem or penam nucleus.

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## 4,016,156
## DISTYRYL COMPOUNDS

**Kurt Weber, Basel, and Geza Kormany, Allschwil, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

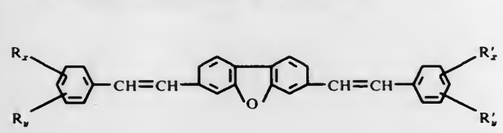
**Continuation of Ser. No. 374,141, June 27, 1973, abandoned. This application Dec. 16, 1975, Ser. No. 641,319**

**Claims priority, application Switzerland, June 30, 1972, 9854/72**

**Int. Cl.² C07D** *307/91*

**U.S. Cl. 260—240 D** **8 Claims**

1. Distyryl-dibenzofuranes of the formula



wherein $R_x$ is selected from the group consisting of sulphonic acid, benzyl ester of sulphonic acid, phenylester or alkylester of sulphonic acid with 1 to 18 carbon atoms in the alkyl part, alkylsulphone of 1 to 4 carbon atoms, phenylsulphone, a sulphonamide, a carboxylic acid, a carboalkoxy of 2 to 9 carbon atoms or a nitrile, $R_x'$ is selected from the group consisting of sulphonic acid, benzylester of sulphonic acid, phenylester or alkylester or sulphonic acid with 1 to 18 carbon atoms in the alkyl part, alkylsulphone of 1 to 4 carbon atoms, phenylsulphone, a carboxylic acid, a carboalkoxy of 2 to 9 carbon atoms, nitrile, alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms, chlorine or hydrogen, and $R_y$ and $R_y'$ independently of one another are hydrogen, sulphonic acid or a salt thereof, chlorine, alkyl of 1 to 4 carbon atoms or alkoxy of 1 to 4 carbon atoms.

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## 4,016,157
## METAL COMPLEXES OF BIS-HYDRAZONES

**Laurent Vuitel, Monthey; Francois L'Eplattenier, Therwil, and Andre´ Pugin, Riehen, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

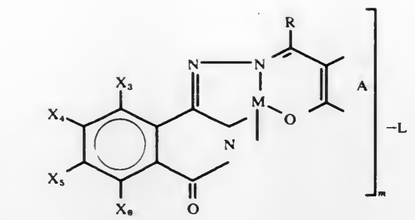
**Filed Aug. 26, 1975, Ser. No. 607,968**

**Claims priority, application Switzerland, Sept. 5, 1974, 12101/74**

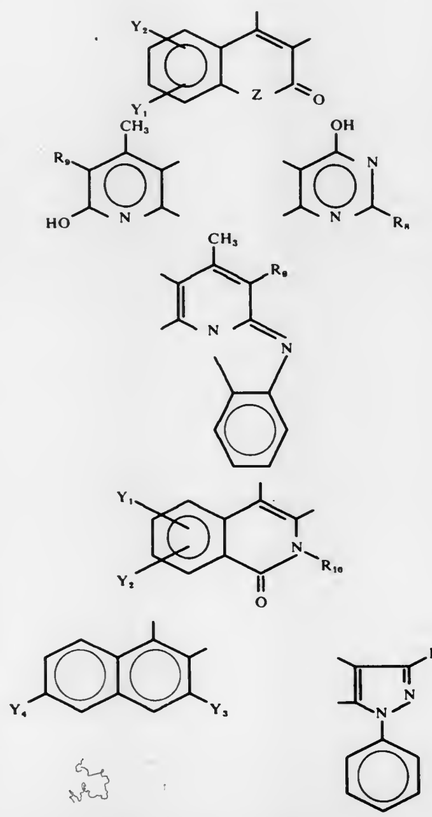
**Int. Cl.² C07D** *239/91, 405/12, 401/12*

**U.S. Cl. 260—242** **16 Claims**

1. A bis-hydrazone metal complex of the formula



wherein A denotes

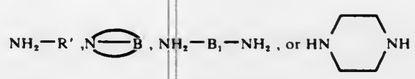


wherein M denotes a divalent transition metal, zinc or cadmium, $Y_1$ and $Y_2$ denote hydrogen, halogen, alkyl of 1–4 carbon atoms, alkoxy of 1–4 carbon atoms, or nitro; Z denotes —NH— or -oxygen-, $R_8$ denotes -OH, alkyl containing 1–4 carbon atoms, phenyl, phenyl substituted with halogen, alkyl of 1–4 carbon atoms, or alkoxy of 1–4 carbon atoms; $R_9$ denotes cyano, carboxyl, or carbamoyl; $R_{10}$ denotes hydrogen, or alkyl; $Y_3$ denotes hydrogen, carboxyl, carbamoyl, phenylcarbamoyl or alkoxycarbonyl containing 2–6 carbon atoms; $Y_4$ denotes hydrogen, halogen, methoxy, nitro or cyano; $R_{11}$ denotes alkyl of 1–4 carbon atoms, alkoxycarbonyl containing 2–5 carbon atoms, carboxyl, carbamoly,

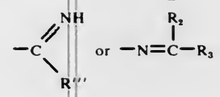




wherein $M_2$ denotes Ca, Sr, Ba or Mn; L denotes

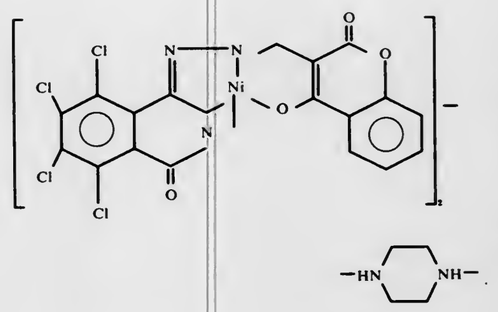


wherein R′ denotes hydrogen, hydroxyl, alkyl having 1–10 carbon atoms, phenalkyl containing 1–4 carbon atoms, cycloalkyl containing 5–6 carbon atoms, an aromatic group selected from the group consisting of phenyl, methylphenyl, chlorophenyl, or methoxyphenyl, amino, alkylamino containing 1–6 carbon atoms, or a group of the formulas



wherein $R_2$ and $R_3$ denote hydrogen, alkyl of 1–6 carbon atoms, or phenyl; R‴ denotes hydrogen, amino, alkyl containing 1–6 carbon atoms, phenyl, phenyl substituted by halogen, alkyl containing 1–4 carbon atoms or alkoxy containing 1–4 carbon atoms; R denotes hydrogen, alkyl containing 1–4 carbon atoms or phenyl; B denotes a radical which, conjointly with the N atoms, forms a heterocyclic ring selected from the group consisting of pyridine, quinoline, piperidine, or morpholine; $B_1$ denotes alkylene containing 2–10 carbon atoms, phenylene, a group —Ph—X—Ph— wherein X denotes a direct bond, —O—, —S—, methylene, ethylene, -NH-, $—SO_2—$, —CO— or —N=N—; $X_3$ denotes hydrogen, halogen, alkoxy containing 1–6 carbon atoms, nitro, carboxyl, carbamoyl, or alkanolyamino containing 2–6 carbon atoms; $X_4$ denotes hydrogen or chloro; $X_5$ denotes hydrogen, chloro, alkoxy, containing 1–6 carbon atoms, alkylmercapto containing 1–6 carbon atoms, phenalkoxy having an alkyl containing 1–4 carbon atoms or phenoxy; $X_6$ denotes hydrogen, chloro, nitro, carboxyl, carbamoyl, alkylcarbamoyl containing 2–6 carbon atoms, alkanoylamino containing 2–6 carbon atoms or phenylcarbamoyl; and m denotes the number 1–2.

16. The compound as claimed in claim 1 of the formula



## 4,016,158
## CEPHALOSPORIN DERIVATIVES

**Jacques Martel, Bondy, and René Heymes, Romainville, both of France, assignors to Roussel-UCLAF, Paris, France**

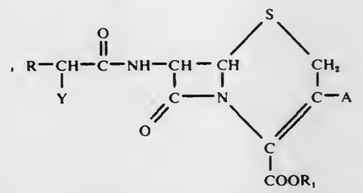
**Continuation-in-part of Ser. No. 320,493, Jan. 2, 1973, Pat. No. 3,962,223. This application Jan. 2, 1975, Ser. No. 538,189**

**Claims priority, application France, Dec. 31, 1971, 71.47758; Dec. 31, 1971, 71.47759; Dec. 31, 1971, 71.47760; Dec. 31, 1971, 71.47761; Dec. 31, 1971, 71.47762; Sept. 7, 1972, 72.31699**

**Int. Cl.² C07D** *501/60*

**U.S. Cl. 260—243 C** **7 Claims**

1. A compound selected from the group consisting of desacetoxycephalosporins of the formula



in racemic or optically active form or cis and trans forms and mixtures thereof wherein R is selected from the group consisting of aminophenyl and R′, R′ is selected from the group consisting of phenyl optionally substituted with one member of the group consisting of halogen and nitro and a 5 to 6 member heterocyclic group selected from the group consisting of thienyl and pyridyl, Y is selected from the group consisting of amino, NHCOOR″, where R″ is alkyl of 1 to 5 carbon atoms, hydrogen and hydroxy, A is selected from the group consisting of in which at least 2



of $R_2$, $R_3$ and $R_4$ are alkyl of 1 to 3 carbon atoms and the third is hydrogen or alkyl of 1 to 3 carbon atoms with the total number of carbon atoms being not greater than 5 and cycloalkyl of 3 to 7 carbon atoms and $R_1$ is selected from the group consisting of hydrogen, alkyl of 1 to 6 carbon atoms, trichloroethyl, benzyl and methoxybenzyl with the proviso that when R is aminophenyl Y is other than amino and NHCOOR″ and $R_1$ is hydrogen and when Y is amino, $R_1$ is hydrogen and the non-toxic, pharmaceutically acceptable addition salts with organic and inorganic bases and acids where appropriate.

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## 4,016,159
## ACYLAMINO-CEPHEM-CARBOXYLIC ACIDS CONTAINING AN AMIDINO OR GUANIDINO GROUP IN THE MOLECULE

**Dieter Bormann; Bernd Knabe, both of Kelkheim, Taunus; Elmar Schrinner, Wiesbaden, and Manfred Worm, Mainz, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany**

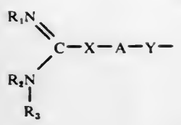
**Filed Nov. 27, 1974, Ser. No. 527,704**

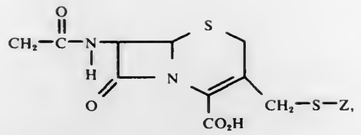
**Claims priority, application Germany, Nov. 29, 1973, 2359544**

**Int. Cl.² C07D** *501/56, 501/48*

**U.S. Cl. 260—243 C** **56 Claims**

1. An acylamino-cephem-carboxylic acid of the formula





and physiologically tolerated salts and physiologically tolerated esters thereof, wherein $R_1$, $R_2$, and $R_3$, taken alone, are hydrogen or alkyl having 1 to 8 carbon atoms; $R_1$ and $R_2$, taken together, or $R_2$ and $R_3$, taken together, are alkylene having 2 to 5 carbon atoms, alkylene having 2 to 5 carbon atoms substituted with alkyl having 1 to 4 carbon atoms or with alkyl having 1 to 4 carbon atoms interrupted by an oxygen atom, or are alkylene having 2 to 5 carbon atoms which is ortho- or spiro-fused to 5- or 6-membered cycloalkyl or oxacycloalkyl; X is a single bond or —NH—; A is phenylene, thienylene, or phenylene or thienylene substituted with alkyl having 1 to 4 carbon atoms, alkoxy having 1 to 4 carbon atoms, or halogen; Y is a single bond or —O—; and Z is is a heterocyclic ring selected from the group consisting of thienyl, furyl, pyrrolyl, imidazolyl, pyrazolyl, thiazolyl, thiazolinyl, oxazolyl, oxazolinyl, isoxazolyl, triazolyl, thiadiazolyl, oxadiazolyl, tetrazolyl thiatriazolyl, pyridyl, pyrimidyl, pyrazinyl, pyradiazinyl, thiazinyl, triazinyl, thiadiazinyl, imidazolinyl and tetrahydropyrimidyl, or Z is such a heterocyclic ring substituted by at least one member selected from the group consisting of alkyl having 1 to 15 carbon atoms, cyclopentyl, cyclohexyl, lower alkoxy, lower alkenyl, lower alkylmercapto, lower alkoxycarbonyl, lower alkoxycarbonylamino, amino, lower alkylamino, hydroxy, nitro, phenyl, lower alkoxyphenyl, halophenyl, hydroxyphenyl, aminophenyl, lower alkylphenyl, cetylphenyl, nitrophenyl, biphenylyl, pyridyl, methylpyridyl, furyl, naphthyl, quinolyl, isoquinolyl, thienyl, 2-thiazolyl, 2-pyrrolyl, 4-imidazolyl, 5-pyrazolyl, 4-isoxazolyl, and lower alkyl having 1 to 4 carbon atoms substituted by phenyl, phenoxy, lower alkoxy, or lower alkoxycarbonyl, or Z is such a heterocyclic ring ortho-fused to a benzene ring, or Z is pyridyl-N-oxide or pyridazinyl-N-oxide.

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**4,016,160**

**7-DIHALOALKANAMIDO-3-HETEROCYCLIC-THIOMETHYL-3-CEPHEM-4-CARBOXYLIC ACIDS**

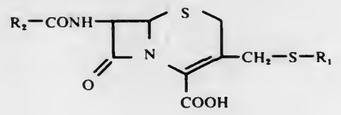
**Takao Takaya, Sakai, and Takashi Masugi, Toyonaka, both of Japan, assignors to Fujisawa Pharmaceutical Co., Ltd., Osaka, Japan**

**Filed June 18, 1975, Ser. No. 587,854**

**Int. Cl.² C07D** *501/20*

**U.S. Cl. 260—243 C** **10 Claims**

**1.** Compounds of the general formula:



wherein

$R_1$ is a triazolyl, tetrazolyl or thiadiazolyl group, which may be substituted with lower alkyl group, and

$R_2$ is dichloro(lower)alkyl group, and their nontoxic, pharmaceutically acceptable salts.

**4,016,161**

**AMINO-SUBSTITUTED 1,2,3,4,10,14b-HEXAHYDRO-PYRIDINO[1,2-a]DIBENZO[c,f]AZEPINES**

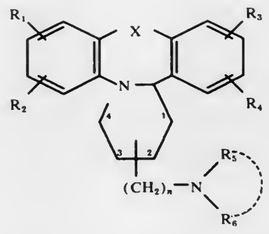
**Willem Jacob van der Burg, Heesch, Netherlands, assignor to Akzona Incorporated, Asheville, N.C.**

**Continuation of Ser. No. 463,712, April 24, 1974, Pat. No. 3,966,723. This application Jan. 14, 1976, Ser. No. 649,167**

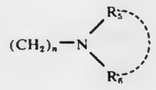
**Int. Cl.² C07D** *498/04*, *513/04*

**U.S. Cl. 260—247.1 L** **3 Claims**

**1.** A compound of the formula:



or a pharmaceutically acceptable salt thereof, wherein the group -



is present at position 2 or 3 and in which:

x is selected from oxygen and sulphur,

$R_1$, $R_2$, $R_3$ and $R_4$ represent hydrogen, hydroxy, halogen, alkyl containing 1 to 6 carbon atoms, alkoxy containing 1 to 6 carbon atoms, alkylthio containing 1 to 6 carbon atoms or trifluoromethyl,

$R_5$, $R_6$ represent hydrogen, alkyl containing 1 to 6 carbon atoms, phenylalkyl, the alkyl containing 1 to 14 carbon atoms, or $R_5$ together with $R_6$ and the nitrogen atom represent a heterocyclic 5 or 6 membered ring selected from the group consisting of pyrrolino, pyrrolidino, piperidino, oxazolidino, morpholino, and piperazino, and

*n* is the number 0, 1, 2 or 3.

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**4,016,162**

**6-MORPHOLINO-3-SUBSTITUTED PHENYL-S-TRIAZOLO[4,3-b]PYRIDAZINES**

**Elvio Bellasio, Como, and Ambrogio Campi, Milan, both of Italy, assignors to Gruppo Lepetit S.p.A., Milan, Italy**

**Continuation of Ser. No. 522,412, Nov. 11, 1974, abandoned. This application Apr. 8, 1976, Ser. No. 674,790**

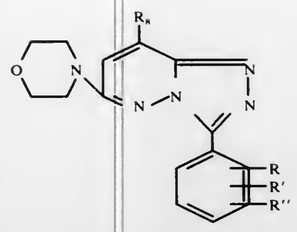
**Claims priority, application South Africa, Aug. 27, 1974, 74/5482**

**Int. Cl.² C07D** *487/04*

**U.S. Cl. 260—247.5 DP** **7 Claims**

**1.** A 6-morpholino-3-substituted phenyl-s-triazolo[4,3-b]pyridazine compound corresponding to the formula





wherein R, R′ and R″ each independently represent hydrogen, hydroxy, loweralkyl, lower alkoxy, halo or nitro, and wherein $R_n$ represents hydrogen or loweralkyl, and their pharmacologically acceptable salts.

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**4,016,163**

**MORPHOLINO-BEARING POLYALKYL-SILOXANES**

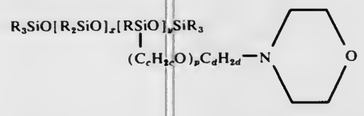
**Bernard Kanner, West Nyack, and Bela Prokai, Mahopac, both of N.Y., assignors to Union Carbide Corporation, New York, N.Y.**

**Filed June 30, 1975, Ser. No. 592,076**

**Int. Cl.² C07D** *295/10*

**U.S. Cl. 260—247.7 L** **16 Claims**

**1.** Morpholino-polyalkylsiloxanes having the average composition,



wherein: R is alkyl of one to four carbon atoms, *x* has an average value from about 0.5 to about 8; *y* has an average value from about 0.5 to about 8; *p* is zero or one; *c* is an integer having a value from two to four; and *d* is an integer having a value from two to six.

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**4,016,164**

**PROCESS FOR PURIFYING CRUDE CYANURIC ACID**

**Sidney Berkowitz, Highland Park, and John D'Angelo, Old Bridge, both of N.J., assignors to FMC Corporation, Philadelphia, Pa.**

**Continuation-in-part of Ser. No. 447,824, March 4, 1974, abandoned. This application Mar. 18, 1976, Ser. No. 668,304**

**Int. Cl.² C07D** *251/32*

**U.S. Cl. 260—248 A** **17 Claims**

**1.** A process for purifying crude cyanuric acid, which comprises:

mixing sufficient amounts of crude cyanuric acid with an aqueous phosphoric acid solution containing about 10% to about 85% phosphoric acid to form a 10% to 45% crude cyanuric acid slurry;

heating the slurry to a temperature of about 180° C to about 220° C under at least the autogenously developed pressure to digest the crude cyanuric acid;

cooling the digested cyanuric acid to precipitate the cyanuric acid crystals; and

recovering the cyanuric acid crystals.

**4,016,165**

**TRIAZINO BENZODIAZEPINES**

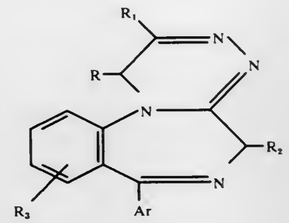
**Robert Bruce Moffett, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.**

**Filed Feb. 9, 1976, Ser. No. 656,371**

**Int. Cl.² C07D** *253/08*

**U.S. Cl. 260—248 AS** **11 Claims**

**1.** A compound of the formula IV



IV

wherein R is hydrogen or alkyl of 1 to 3 carbon atoms, inclusive; wherein $R_1$ is hydrogen or alkyl as defined above; wherein $R_2$ is hydrogen or methyl; wherein $R_3$ is hydrogen, fluoro, chloro, bromo, trifluoromethyl, or nitro; and wherein A is phenyl, o-chlorophenyl, o-fluorophenyl, 2,6-difluorophenyl, or 2-pyridyl, and the pharmacologically acceptable acid addition salts thereof.

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**4,016,166**

**1-NITROPHENYLQUINAZOLINE-2,4(1H,3H)-DIONES**

**Kanji Noda, Chikushino; Akira Nakagawa, Tosu; Terumi Hachiya, Chiyoda, and Hiroyuki Ide, Fukuoka, all of Japan, assignors to Hisamitsu Pharmaceutical Co., Inc., Japan**

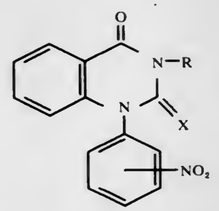
**Filed Dec. 9, 1974, Ser. No. 531,097**

**Claims priority, application Japan, Dec. 14, 1973, 48-140556; Mar. 1, 1974, 49-24999; Mar. 28, 1974, 49-35325**

**Int. Cl.² C07D** *239/95*, *239/96*

**U.S. Cl. 260—251 QA** **14 Claims**

**1.** A compound of the general formula:



wherein R is selected from the group consisting of hydrogen, lower alkyl groups having from one to 6 carbon atoms, lower alkenyl groups having from 3 to 5 carbon atoms, propargyl, cyclopropylmethyl, haloethyl, trihaloethyl, acetoxyethyl, alkoxyalkyl groups having from 2 to 4 carbon atoms, lower hydroxyalkyl groups having from 2 to 3 carbon atoms, hydroxyethoxyethyl, ethoxycarbonylmethyl and benzyl; X is selected from the group consisting of O and S.

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**4,016,167**

**N-SUBSTITUTED-6,8-DIOXAMORPHINANS**

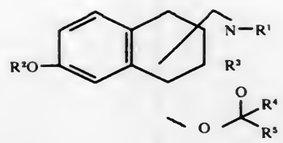
**Thomas Alfred Montzka, Manlius, and John Daniel Matiskella, Liverpool, both of N.Y., assignors to Bristol-Myers Company, New York, N.Y.**

**Filed Oct. 28, 1975, Ser. No. 626,393**

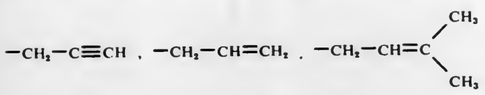
**Int. Cl.² C07D** *221/26*

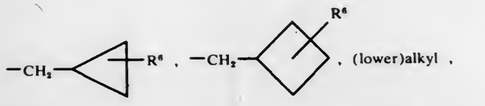
**U.S. Cl. 260—293.54** **28 Claims**

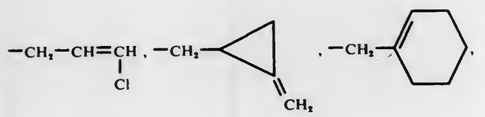
**1.** A compound having the formula

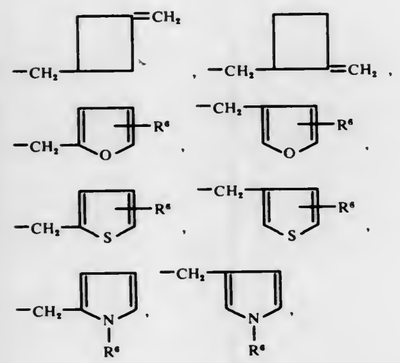


wherein $R^1$ is selected from the group comprising H,

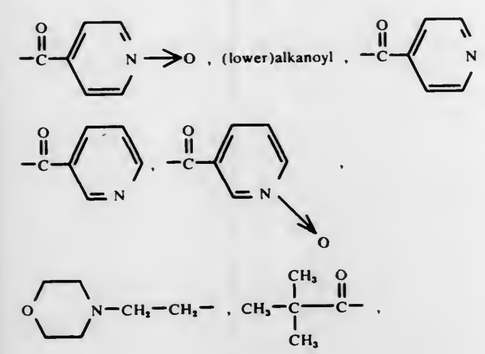






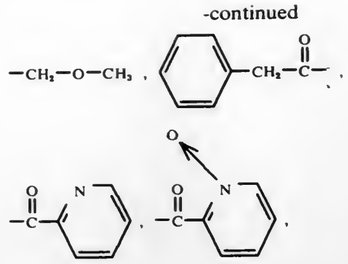


and (lower)alkenyl in which $R^6$ is H or $CH_3$, $R^2$ is selected from the group comprising H, (lower)alkyl,



L

-continued



and cinnamoyl, $R^3$ is H or (lower)alkyl and $R^4$ and $R^5$ are alike or different and each is H, (lower)alkyl or trifluoromethyl, or when $R^4$ and $R^5$ are taken together they are a carbonyl or a spirocycloalkyl of 3 to 7 carbon atoms; or a pharmaceutically acceptable acid addition salt thereof.

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**4,016,168**

**PIPERIDINE DERIVATIVES**

**Keisuke Murayama; Syoji Morimura; Takao Yoshioka; Toshimasa Toda; Eiko Mori; Hideo Horiuchi; Susumu Higashida; Katsuaki Matsui; Tomoyuki Kurumada; Noriyuki Ohta, and Hisayou Osawa, all of Tokyo, Japan, assignors to Sankyo Company Limited, Tokyo, Japan**

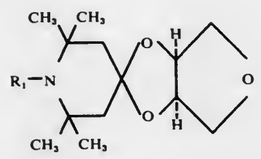
**Division of Ser. No. 405,570, Oct. 11, 1973, Pat. No. 3,899,464. This application Feb. 26, 1975, Ser. No. 553,087**

**Claims priority, application Japan, Oct. 26, 1972, 47-107408**

**Int. Cl.² C07D** *491/20*

**U.S. Cl. 260—293.58** **2 Claims**

1. A compound having the formula



wherein $R_1$ represents hydrogen atom, methyl, or acetyl.

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**4,016,169**

**PROCESS FOR PREPARING TRICHLOROTHIAZOLE**

**Gunther Beck, Leverkusen, and Dieter Arlt, Cologne, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany**

**Filed Oct. 28, 1975, Ser. No. 626,416**

**Claims priority, application Germany, Oct. 30, 1974, 2451632**

**Int. Cl.² C07D** *277/32*

**U.S. Cl. 260—302 R** **9 Claims**

1. Process for preparing trichlorothiazole, which comprises reacting 1,2-dichloroethyl-isocyanide dichloride with a sulphur chloride selected from the group consisting of disulphur dichloride and sulphur dichloride at elevated temperatures in the presence of catalytic amounts of a Friedel-Crafts catalyst.

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**4,016,170**

**OXADIAZOLYL BENZAMIDES**

**Jeffrey Nadelson, Lake Parsippany, N.J., assignor to Sandoz, Inc., E. Hanover, N.J.**

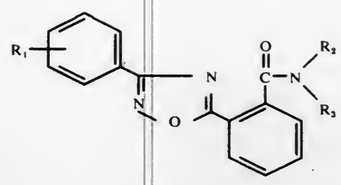
**Continuation-in-part of Ser. No. 599,851, July 28, 1975, abandoned. This application Nov. 18, 1975, Ser. No. 633,014**

**Int. Cl.² C07D** *271/06*

**U.S. Cl. 260—307 G** **6 Claims**

1. A compound of the formula:



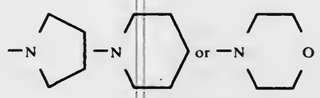


where

$R_1$ represents hydrogen, fluoro, lower alkyl having 1 to 4 carbon atoms, lower alkoxy having 1 to 4 carbon atoms, or trifluoromethyl, and

$R_2$ and $R_3$ each independently represents hydrogen or lower alkyl as defined above, and

$R_2$ and $R_3$ together with N represent



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**4,016,171**

**PROCESS FOR MAKING 2-VINYL-2-OXAZOLINES**

**Bruce P. Thill, and Janet N. Paige, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.**

**Filed Sept. 14, 1972, Ser. No. 288,914**

**Int. Cl.² C07D** *263/12*

**U.S. Cl. 260—307 F** **13 Claims**

1. A process for making a 2-vinyl-2-oxazoline comprising the steps of

A. reacting by contacting in liquid phase

1. an N-(2-haloalkyl)-3-halopropionamide having a total carbon content of from 5 to about 20 carbon atoms, with

2. at least about 2 moles of an alkali or alkaline earth metal carbonate or an alkali metal hydroxide per mole of (1) or at least about 1 mole of alkaline earth metal hydroxide per mole of (1);

step (A) being conducted under substantially anhydrous conditions and in the presence of an alkylene glycol of 2–4 carbon atoms or apolymer thereof; and

B. recovering the 2-vinyl-2-oxazoline product.

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**4,016,172**

**AZOLINDOLINES AND AZOLINDOLINE DYESTUFFS**

**Horst Harnisch, Cologne, Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Germany**

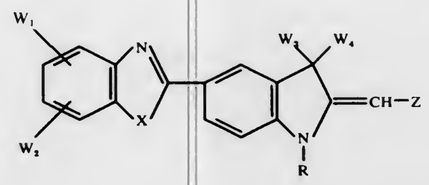
**Division of Ser. No. 179,181, Sept. 9, 1971, Pat. No. 3,840,552. This application Jan. 17, 1974, Ser. No. 434,022**

**Claims priority, application Germany, Sept. 9, 1970, 2044620**

**Int. Cl.² C07D** *263/56*

**U.S. Cl. 260—307 D** **6 Claims**

1. Azolindoline of the formula



wherein

$W_1$ is hydrogen, alkyl of 1–5 carbon atoms, cyclohexyl, phenyl, chloro, alkoxy of 1–5 carbon atoms, methylsulfonyl, ethylsulfonyl, dimethylaminosulfonyl, diethylaminosulfonyl, dimethylaminocarbonyl, diethylaminocarbonyl, methoxycarbonyl, ethoxycarbonyl, methoxyethoxycarbonyl, acetylamino, propionylamino, methylsulfonylamino, or trifluoromethyl;

$W_2$ is hydrogen or alkyl of 1–5 carbon atoms;

$W_1$ and $W_2$ additionally can be joined together to produce a fused benzene ring;

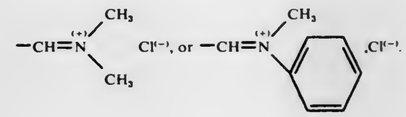
$W_3$ and $W_4$ separately are methyl or ethyl, or can be joined together to produce a cyclopentyl or a cyclohexyl ring; Ser. No. 434,022

R is alkyl of 1–5 carbon atoms, chloroethyl, bromoethyl, fluoroethyl, cyanoethyl, allyl, methoxycabonylethyl, benzyl, or phenylethyl;

X is oxygen, sulfur, or $=NR_4$;

$R_4$ is hydrogen, alkyl of 1–5 carbon atoms, chloroethyl, bromoethyl, fluoroethyl, cyanoethyl, allyl, methoxycarbonylethyl, benzyl, phenylethyl, or cyclohexyl; and

Z represents —H, —CHO,



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**4,016,173**

**OXINDOLE DIAMINES**

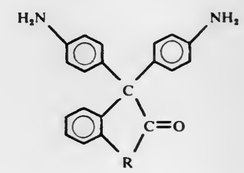
**Franklin P. Darmory, Ardsley, and Marianne DiBenedetto, Pleasantville, both of N.Y., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

**Continuation of Ser. No. 443,287, Feb. 19, 1974, abandoned, which is a continuation-in-part of Ser. No. 204,301, Dec. 2, 1971, abandoned. This application Sept. 26, 1975, Ser. No. 617,223**

**Int. Cl.² C07D** *209/38*

**U.S. Cl. 260—325 R** **2 Claims**

1. A compound having the formula:



wherein

R is a member selected from N-phenyl; N-phenyl substituted with at least one methyl, ethyl, propyl, chloro, bromo or nitro group; N-naphthyl, N-anthryl; and N-phenanthryl.

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**4,016,174**

**BENZOINDOLE PHTHALIDES**

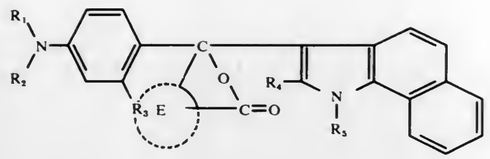
**Sheldon Farber, Appleton, Wis., assignor to NCR Corporation, Dayton, Ohio**

**Filed Apr. 10, 1975, Ser. No. 566,854**

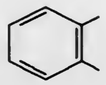
**Int. Cl.² C07D** *405/04*

**U.S. Cl. 260—326.14 R** **4 Claims**

1. A compound represented by the formula:



wherein E is:



unsubstituted and alkyl-, chloro-, dichloro-, trichloro-, tetrachloro-, bromo-, dibromo-, tribromo-, tetrabromo-, nitro-, and dialkylaminosubstituted;

$R_1$ and $R_2$ are: hyrogen, alkyl, phenyl, benzyl, and cyclohexyl but $R_1$ and $R_2$ are not both phenyl;

$R_3$ is: hydrogen, alkyl, phenyl, alkoxy, halo, dialkylamino, monoalkylamino, amino an acetylamino; and

$R_4$ and Rare: hydrogen, phenyl and alkyl wherein alkyl, all occurrences, and alkoxy have 1 to 6 carbon atoms.

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**4,016,175**

## PREPARATION OF A 2-AMINO-PYRROLINE DERIVATIVE

**Sijbrandus E. Schaafsma, Beek(L), and Leonardus H. Geurts, Sittard, both of Netherlands, assignors to Stamicarbon B.V., Geleen, Netherlands**

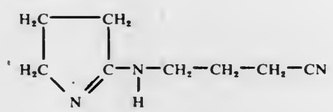
**Filed Sept. 23, 1975, Ser. No. 616,012**

**Claims priority, application Netherlands, Sept. 26, 1974, 7412695**

**Int. Cl.² C07D** *207/22*

**U.S. Cl. 260—326.62** **9 Claims**

**1.** A process for the preparation of a 2-amino-pyrroline compound, comprising the step of heating γ-amino-butyronitrile at a temperature of 75°–250° C. in an inert atmosphere to form a 2-amino-pyrroline compound of the formula:



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**4,016,176**

## ESTERS OF 4-HYDROXY-2,9-DIOXATRICYCLO[4.3.1.0$^{3,7}$] DECANES AND PROCESSES FOR THEIR PRODUCTION

**Peter Willibrord Thies, Hannover, Germany, assignor to Kali-Chemie Pharma GmbH, Hannover, Germany**

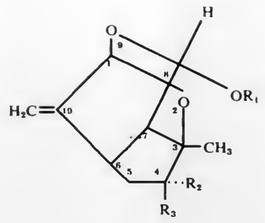
**Continuation-in-part of Ser. No. 440,038, Feb. 6, 1974, abandoned. This application Oct. 30, 1975, Ser. No. 627,081**

**Claims priority, application Germany, Feb. 8, 1973, 2306118**

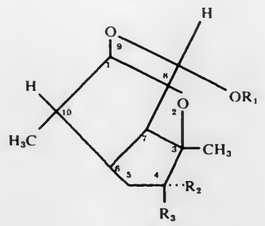
**Int. Cl.² C07D** *319/08*

**U.S. Cl. 260—340.3** **22 Claims**

**1.** A compound of the group consisting of esters of 4-hydroxy-2,9-dioxatricyclo[4.3.1.0$^{3,7}$]decanes with carbamic acids having the formula



or



in which formulae $R_1$ is alkyl of at most 4 carbon atoms and one of $R_2$ and $R_3$ is hydrogen and the other is carbamyloxy having the formula —OCONHR, in which R is hydrogen, allyl, phenyl, cyclohexyl or alkyl of at most 4 carbon atoms.

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**4,016,177**

## XANTHOGEN DISULPHIDES WITH FUNCTIONAL GROUPS

**Rudolf Mayer-Mader, and Wilhelm Göbel, both of Cologne, Germany, assignors to Bayer Aktiengesellschaft, Germany**

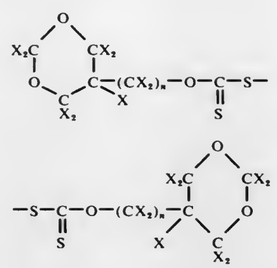
**Division of Ser. No. 440,014, Feb. 6, 1974, Pat. No. 3,926,912. This application Apr. 21, 1975, Ser. No. 570,098**

**Claims priority, application Germany, Feb. 10, 1973, 2306610; May 23, 1973, 2352937**

**Int. Cl.² C07D** *319/04*

**U.S. Cl. 260—340.7** **3 Claims**

**1.** An xanthogen disulphide of the formula



wherein X may be the same or different and is selected from the group consisting of hydrogen, alkyl having 1 to 6 carbon atoms, phenyl, naphthyl, benzyl, chlorine, bromine and iodine and each *n* is an integer of from 1 to 20.

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**4,016,178**

## SYNTHESIS OF VITAMIN E

**Ka-Kong Chan, Stanhope, and Gabriel Saucy, Essex Fells, both of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.**

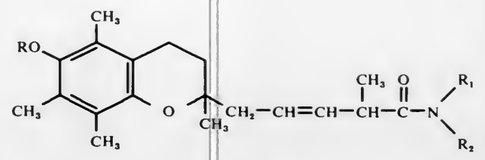
**Filed June 17, 1975, Ser. No. 587,570**

**Int. Cl.² C07D** *311/72*

**U.S. Cl. 260—345.5** **2 Claims**

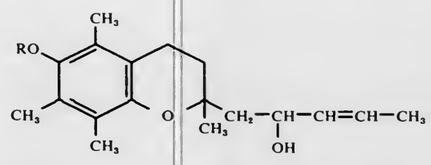
**1.** A process for producing a compound of the formula



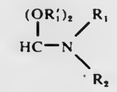


wherein R is benzyl, trialkyl silyl, t-butyl, benzhydryl, trityl, tetrahydropyranyl, alpha-lower alkoxy-lower alkyl; and $R_1$ and $R_2$ are lower alkyl;

comprising reacting at a temperature of from 100° C to 400° C in an inert organic solvent medium a compound of the formula:



wherein R is as above; with a compound of the formula:



wherein $R_1$ and R are as above; and $R_1'$ is lower alkyl.

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**4,016,179**

## CERTAIN ESTERS OF 2-SUBSTITUTED-4-HYDROXY-CYCLOPENT-2-ENONES

**Keimei Fujimoto, Kobe; Nobuo Ohno, Toyonaka; Yoshitoshi Okuno, Toyonaka; Toshio Mizutani, Toyonaka; Isao Ohno, Minoo; Masachika Hirano, Toyonaka; Nobushige Itaya, Ikeda, and Takashi Matsuo, Amagasaki, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan**

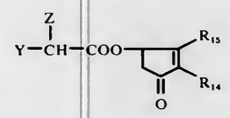
**Division of Ser. No. 378,301, July 11, 1975. This application July 16, 1975, Ser. No. 596,333**

**Claims priority, application Japan, July 11, 1972, 47-69805**

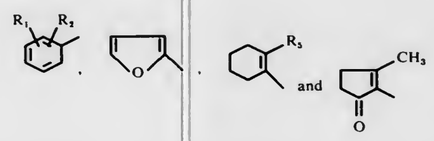
**Int. Cl.² C07D** *307/54*

**U.S. Cl. 260—347.5** **7 Claims**

**1.** A substituted acetate compound of the formula



wherein Y is selected from the group consisting of the formulae;



in which $R_1$ and $R_2$ are each hydrogen, fluorine, chlorine, methyl, methoxy, butythio or acetyl or $R_1$ and $R_2$ are attached to adjacent carbon atoms and are bonded to one another to form trimethylene, $R_5$ is hydrogen or methyl; $R_{14}$ is allyl, propargyl or benzyl; $R_{15}$ is hydrogen or methyl; and Z is ethyl, isopropyl or allyl.

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**4,016,180**

## CHEMICAL CONCENTRATION BY ADSORPTION

**Kenneth W. Baierl, Appleton, Wis., assignor to Flambeau Paper Company, Park Falls, Wis.**

**Filed June 18, 1975, Ser. No. 587,849**

**Int. Cl.² C07D** *307/49;* **B01D** *15/06, 15/08;* **C07C** *53/08*

**U.S. Cl. 260—347.9** **32 Claims**

**1.** A method of continuously concentrating a dilute liquid supply of chemicals to provide a concentrated supply of end products, said method comprising the steps of:

continuously directing a stream of said dilute supply of chemicals through a primary concentration zone containing a first adsorption media, and adsorbing at least a portion of said chemicals on the first media;

thereafter passing a first eluant through the first media for desorbing at least a portion of the adsorbed chemicals and producing a stream comprising primary stage desorbed products and first eluant;

passing said stream of primary stage desorbed products and first eluant into a fractionation column coupled with said primary concentration zone, and treating the same to produce a supply of primary stage end products more concentrated than said dilute supply, and to separate at least a substantial fraction of the first eluant from said primary stage end products, said treating including the steps of refluxing said stream of primary stage desorbed products and said eluant within the column, recycling the refluxed stream as necessary through the primary zone and column for substantially filling each of the latter with eluant, and collecting said supply of primary stage end products;

clearing said primary zone of eluant and collecting the latter for reuse;

passing a stream of said primary stage and products through a secondary concentration zone containing a second adsorption media, and adsorbing at least a portion of said end products on the second media;

thereafter passing a second eluant through the second media for desorbing at least a portion of the end products adsorbed thereon and producing a stream comprising secondary stage desorbed products and second eluant; and

treating said secondary stage desorbed products to produce a supply of final products more concentrated than said supply of primary stage end products.

**29.** A method of concentrating a dilute supply of furfural to provide a concentrated supply thereof, comprising the steps of:

directing said dilute supply of furfural to a primary concentration zone containing activated carbon,

adsorbing at least a fraction of said furfural onto said activated carbon;

desorbing said adsorbed furfural by conacting said primary zone activated carbon with methanol to produce a first supply of furfural in methanol;

treating said supply of furfural in a first fractional distillation zone in order to substantially separate the desorbed supply of furfural from the methanol and produce a primary stage supply thereof more concentrated than said dilute supply;

directing said primary stage supply of furfural to a secondary concentration zone containing activated carbon;

adsorbing at least a fraction of the primary stage supply of furfural to a secondary concentration zone containing activated carbon;

adsorbing at least a fraction of the primary stage supply of furfural directed to said secondary stage onto the activated carbon of the latter;

desorbing the furfural adsorbed in said secondary concen-

tration zone by contacting the activated carbon therewithin with methanol to produce a second supply of furfural in methanol;

concentrating said second supply of furfural in a second fractional distillation zone in order to produce a supply thereof more concentrated than said primary stage supply; and

recovering said supply of more concentrated furfural.

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**4,016,181**

## DYESTUFF PROCESS

**Charles Hung Chang, Wyomissing Hills, Pa., assignor to GAF Corporation, New York, N.Y.**

**Continuation-in-part of Ser. No. 405,307, Oct. 11, 1973, abandoned. This application Mar. 18, 1976, Ser. No. 668,049**

**Int. Cl.² C07C** *87/64*

**U.S. Cl. 260—380** **4 Claims**

**1.** In a process for preparing a 2-(haoaryl)-diamino-chrysazine the improvement which comprises, in a unitary reaction zone, the steps in combination:

1. reacting chrysazine with nitric acid in the presence of boric acid and sulfuric acid at a temperature between about 10° C. and about 50° C. to form 4,5-dinitrochrysazine in the reaction zone:
2. reacting said 4,5-dinitrochrysazine with an arylating agent selected from the group consisting of anisole, cresol, and methoxyphenol to form the corresponding 2-aryl-dinitrochrysazine at a temperature between 0° and 25° C. in said reaction zone;
3. contacting said 2aryl-dinitrochrysazine in said reaction zone with chlorine or bromine to halogenate said 2aryl moiety at a temperature between 0° and 40° C. in the presence of a catalytic amount of iodine or ferric chloride catalyst to produce the corresponding 2-(haloaryl)-dinitrochrysazine; and
4. subjecting the resultant 2-(haloaryl)-dinitrochrysazine to reducing conditions in said reaction zone in the presence of sulfuric acid at a temperature between 35° and 90° C to convert the nitro groups to amino groups and form the corresponding 2(haloaryl)-diaminochrysazine.

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**4,016,182**

## PROCESS FOR THE PRODUCTION OF AMINOANTHRAQUINONE COMPOUNDS

**Paul Buecheler, Reinach, Basel-Land, Switzerland, assignor to Sandoz Ltd., Basel, Switzerland**

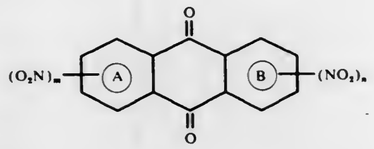
**Filed May 22, 1974, Ser. No. 472,141**

**Claims priority, application Switzerland, May 28, 1973, 7639/73**

**Int. Cl.² C09B** *1/22*

**U.S. Cl. 260—371** **4 Claims**

**1.** In a process for the reduction of a nitroanthraquinone compound of formula I:



wherein

*m* is 0, 1 or 2,

*n* is 0, 1 or 2,

the sum of $m + n$ being 1, 2 or 3, and the rings A and B are either unsubstituted or further substituted in any position unoccupied by a nitro group by hydroxy, alkyl ($C_1$–$C_6$), hydroxyalkyl ($C_1$–$C_6$), alkoxy ($C_1$–$C_4$) alkyl ($C_1$–$C_6$), hydroxyalkoxy ($C_1$–$C_4$) alkyl ($C_1$–$C_6$), phenylalkyl ($C_1$–$C_6$), cycloalkyl ($C_5$–$C_{12}$), alkyl ($C_1$–$C_6$) cycloalkyl ($C_5$–$C_{12}$), alkoxy ($C_1$–$C_4$), hydroxyalkoxy ($C_2$–$C_3$), alkoxy ($C_1$–$C_4$) alkoxy ($C_2$–$C_3$), amino, monoalkyl ($C_1$–$C_6$) amino, dialkyl ($C_1$–$C_6$) amino, arylamino, cycloalkyl ($C_5$–$C_{12}$) amino, alkyl ($C_1$–$C_6$) cycloalkyl ($C_5$–$C_{12}$) amino, N-alkyl ($C_1$–$C_6$)-N-cycloalkyl ($C_5$–$C_{12}$) amino, N-alkyl ($C_1$–$C_6$) alkyl ($C_1$–$C_6$)-N-cycloalkyl-($C_5$–$C_{12}$) amino, N-alkyl ($C_1$–$C_6$)-N-arylamino, aryl, alkyl ($C_1$–$C_6$) thio, sulpho, carboxy, sulphamoyl, carbamoyl, nitrile, halo, alkyl ($C_1$–$C_6$) carbonyl, arylcarbonyl or arylsulphonyl, wherein each aryl, aryl of arylamino, aryl of N-alkyl ($C_1$–$C_6$)-N-arylamino, aryl of arylcarbonyl and aryl of arylsulphonyl is, independently, selected from phenyl, diphenyl, substituted phenyl or diphenyl wherein the substituents of substituted phenyl or diphenyl are, independently, hydroxy, alkoxy ($C_1$–$C_6$), alkyl ($C_1$–$C_6$), halo, nitro, sulpho, carboxy, amino, monoalkyl ($C_1$–$C_6$) amino, carbamoyl and sulphamoyl, naphthyl and sulphosubstituted naphthyl,

to the corresponding amino-anthraquinone compound, the improvement consisting of reacting a compound of formula I with hydrazine in an aqueous medium, wherein the aqueous medium comprises from 50 to 100% by weight of water and wherein at least 10 mols of water are present in the aqueous medium per mol of the nitroanthraquinone compound.

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**4,016,183**

## BEAD WITH A PROJECTION

**Alfred H. Wallach, c/o Walbead Inc., 38 W. 37th St., New York, N.Y. 10018**

**Filed Apr. 17, 1972, Ser. No. 244,412**

**Int. Cl.² B32B** *9/04*

**U.S. Cl. 428—542** **6 Claims**

**1.** A bead for use with a grid having thickness and spaced rows of receiving apertures spaced apart equal to the width of the bead comprising a bead body having having at least one bead hole therethrough and an external surface, at least one projection integral with the bead body and extending from the exterior surface thereof and at right angles to the bead hole, the bead body having a longitudinal dimension equal to the spacing between the rows of receiving apertures in the grid, and the projection having a length at least equal to the thickness of the grid, and a knob on the end of the projection having a dimension related solely to and being larger than the receiving aperture in the grid such that it yieldably resists insertion in a receiving aperture in the grid so as to be retained therein, the bead body having a width greater than the dimension of knob, and the material of the bead and the dimension of the projection at the bead body renders the projection readily breakable therefrom.

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**4,016,184**

## 9-DEOXY-9,10-DIDEHYDRO-PGD, COMPOUNDS

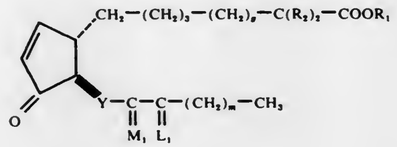
**Douglas Ross Morton, Jr., Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.**

**Filed Sept. 17, 1975, Ser. No. 614,242**

**Int. Cl.² C07C** *177/00*

**U.S. Cl. 260—408** **33 Claims**

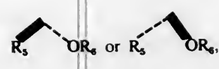
**1.** A prostaglandin analog of the formula



wherein $R_2$ is hydrogen or fluoro;

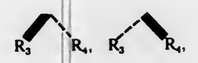
wherein Y is cis—CH=CH— or trans-CH=CH—; wherein *g* is one, 2, or 3 and *m* is one to 5, inclusive; wherein $M_1$ is



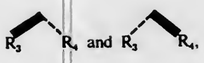


wherein $R_5$ and $R_6$ are hydrogen or methyl, with the proviso that one of $R_5$ and $R_6$ is methyl only when the other is hydrogen;

wherein $L_1$ is



or a mixture of



wherein $R_3$ and $R_4$ are hydrogen, methyl, or fluoro, being the same or different, with the proviso that one of $R_3$ and $R_4$ is fluoro only when the other is hydrogen or fluoro;

wherein $R_1$ is hydrogen, alkyl of one to 12 carbon atoms, inclusive, cycloalkyl or 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, phenyl substituted with one, two, or three chloro or alkyl of one to 3 carbon atoms, inclusive, or a pharmacologically acceptable cation.

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**4,016,185**

## PRODUCTION OF CARBOXYLIC ACIDS FROM PARAFFINS AND CARBON DIOXIDE

**John B. Wilkes, Richmond, Calif., assignor to Chevron Research Company, San Francisco, Calif.**

**Filed Dec. 11, 1975, Ser. No. 639,864**

**Int. Cl.² C07C** *51/00, 51/15*

**U.S. Cl. 260—413** **5 Claims**

**1.** A process for preparing saturated carboxylic acids by vapor-phase cracking of high-molecular-weight paraffins, having a molecular weight of at least 168 and containing from about 12 to about 40 carbon atoms, in the presence of from about 0.5 to about 5.0 mols of carbon dioxide per mol of paraffin; wherein said cracking is carried out under conditions such that carbon dioxide is not an oxidizing agent; said conditions including a temperature of from about 500° C to about 700° C and a residence time of from about 0.1 seconds to about 10 seconds.

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**4,016,186**

## β-PHENOXY OR SUBSTITUTED PHENOXY ETHANOL COMPOUNDS

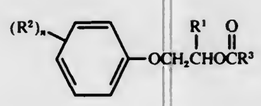
**Kiyosi Kondo, Yamato; Osamu Terada; Kohei Oshima, both of Machida; Yasuki Mori, Kawasaki, and Kenichi Mochida, Hiratsuka, all of Japan, assignors to Kyowa Hakko Kogyo Co., Ltd. and Sagami Chemical Research Center, both of Tokyo, Japan, part interest to each**

**Filed Nov. 26, 1974, Ser. No. 527,417**

**Int. Cl.² C07C** *69/76*

**U.S. Cl. 260—473 R** **8 Claims**

**1.** A substituted β-phenoxy-ethanol ester expressed by the following formula:



wherein $R^1$ is a hydrogen atom, straight-chain or branched-chain alkyl group having 1 – 6 carbon atoms, $R^2$ is a carboalkoxy group containing 1 to 6 carbon atoms in the alkyl moiety, $R^3$ is an alkyl group containing 1 to 12 carbon atom and *n* in a number from 1 to 3.

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**4,016,187**

## PHENOXY PERACETIC ACID ESTERS

**Hendrik Harm Jannes Oosterwijk, Diepenveen, Netherlands, assignor to Akzona Incorporated, Asheville, N.C.**

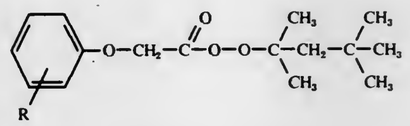
**Filed June 30, 1975, Ser. No. 592,080**

**Claims priority, application Netherlands, July 5, 1974, 7409110,**

**Int. Cl.² C07C** *179/18*

**U.S. Cl. 260—453 RZ** **4 Claims**

**1.** Peresters having the general formula:



where R represents hydrogen or an alkyl group or an alkoxy group having 1–6 C-atoms.

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**4,016,188**

## PROCESS FOR THE PREPARATION OF LOW SILANES AND SILANE ESTERS

**Hans-Joachim Kötzsch, Rheinfelden, and Hans-Joachim Vahlensieck, Wehr, both of Germany, assignors to Dynamit Nobel Aktiengesellschaft, Troisdorf, Germany**

**Continuation-in-part of Ser. No. 360,486, May 15, 1973, abandoned. This application Mar. 10, 1975, Ser. No. 556,994**

**Claims priority, application Germany, May 30, 1972, 2226265**

**Int. Cl.² C07F** *7/18;* **C01B** *33/00, 33/20, 33/04*

**U.S. Cl. 260—448.8 R** **25 Claims**

**1.** In a process for preparing a compound of the formula $H_{x+1}Si(OR)_{4-x-1}$ or one of the formula $H_{x-1}Si(OR)_{4-x+1}$ wherein R is alkyl or alkoxyalkyl wherein the alkyl portion has up to 10 carbon atoms and *x* equals 1, 2 or 3 by reacting a compound of the formula $H_xSi(OR)_{4-x}$ in the presence of a catalyst under distillation conditions, distilling over and recovering a product of the formula $H_{x+1}Si(OR)_{4-x-1}$ or a product of the formula $H_{x-1}Si(OR)_{4-x+1}$, the improvement which comprises utilizing as the catalyst an oxide, halide, chloride, carbonate, acetate, ethylate or acetyl acetonate of zinc, cadmium, magnesium, calcium, strontium or barium, metallic zinc, metallic cadmium, metallic calcium, metallic magnesium, metallic strontium or metallic barium or metallic manganese or manganese chloride, manganese carbonate or zinc, aluminum or manganese acetylacetonate or an organic nitrogen compound selected from the group consisting of primary $C_1$–$C_8$ alkylamines, secondary $C_1$–$C_8$ alkylamines, tertiary $C_1$–$C_8$ alkylamines, substituted carboxylic acid amides of $C_1$–$C_8$ alkanoic acid amides, amides of phoshoric acid, pyridine, quinoline, isoquinoline and piperidine.

## 4,016,189
## PROCESS FOR PRODUCING A GAS WHICH CAN BE SUBSTITUTED FOR NATURAL GAS

**Wolf-Dieter Muller, Frankfurt am Main; Friedrich-Wilhelm Moller, Friedrichsdorf, and Heinz Jockel, Klein-Gerau, all of Germany, assignors to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Germany**

**Filed July 22, 1975, Ser. No. 598,085**

**Claims priority, application Germany, July 27, 1974, 2436297**

**Int. Cl.² C07C** *1/04*

**U.S. Cl. 260—449.6 M** **5 Claims**

1. In a process for producing a gas which can be substituted for natural gas from a raw gas containing hydrogen and carbon oxides produced by the gasification of coal, tar or heavy residual oils under superatmospheric pressure, wherein the raw gas is cooled, purified to remove catalyst poisons, particularly sulfur compounds, and then subjected to methanation in at least two stages in contact with nickel catalysts under pressures of 5–100 bars and at temperatures in the range of 200°–500° C, the improvement which comprises reacting the product gas from the preceding methanation stage in the last methanation stage in contact with a catalyst which is indirectly cooled by purified raw gas entering said last methanation stage at a temperature below 200° C and flowing therein countercurrent to the gas to be reacted.

5. In a process for producing a gas which can be substituted for natural gas from a raw gas containing hydrogen and carbon oxides produced by the gasification of coal, tar or heavy residual oils under superatmospheric pressure, wherein the raw gas is cooled, purified to remove catalyst poisons, particularly sulfur compounds, and then subjected to methanation in at least two stages in contact with nickel catalysts under pressures of 5–100 bars and at temperatures in the range of 200°–500° C, the improvement which comprises precooling the product gas from the methanation stage preceding the last methanation stage, said last methanation stage including a reaction zone with at least one catalyst zone and catalyst-free zones connected to said catalyst zone, feeding said precooled product gas into said catalyst-free zones of said reaction zone, said precooled gas flowing in the catalyst-free zones in countercurrent and with indirect heat exchange to the gas to be reacted in said catalyst zone, and feeding the gas from the catalyst-free zones into the catalyst zone to be reacted therein.

## 4,016,190
## PROCESS FOR THE PREPARATION OF DIARYLCARBONATES

**August Böckmann; Claus Wulff; Hugo Vernaleken; Wolfgang Alewelt, all of Krefeld, and Uwe Hucks, Alpen, all of Germany, assignors to Bayer Aktiengesellschaft, Germany**

**Filed Feb. 26, 1976, Ser. No. 661,528**

**Claims priority, application Germany, Mar. 1, 1975, 2509036**

**Int. Cl.² C07C** *68/02*

**U.S. Cl. 260—463** **13 Claims**

1. A process for preparing a symmetrical diarylcarbonate which comprises reacting phosgene and phenol in the phase interface process in a diphastic mixture of aqueous alkali metal hydroxide solution and a liquid diarylcarbonate in the presence of from 0.001 to 0.1 mol of a tertiary amine or a quaternary ammonium compound, per mol of phenol and at a temperature of up to 30° C. above the solidification point of the diarylcarbonate and at a pH of from 7 to 11.

## 4,016,191
## STYRYL DYESTUFFS

**Hermann Beecken, Leverkusen, Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Germany**

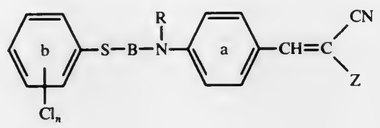
**Filed Sept. 24, 1975, Ser. No. 616,262**

**Claims priority, application Germany, Sept. 24, 1974, 2445583**

**Int. Cl.² C07C** *121/78*

**U.S. Cl. 260—465 E** **7 Claims**

1. Water-insoluble styryl dyestuff of the formula




wherein

B is $C_2$-$C_5$-alkylene; $C_2$- to $C_5$-alkylene interrupted by an oxygen atom or sulphur; or the foregoing substituted by $C_1$- to $C_4$-alkoxy, $C_1$-$C_4$-alkenyloxy, benzyloxy or phenoxy;

R is H; $C_1$-$C_4$-alkyl; $C_1$-$C_4$-alkyl substituted by halogen, CN, COOH or $C_1$-$C_4$-alkoxy; cyclopentyl, cyclohexyl; benzyl; phenethyl; phenylpropyl; phenyl; naphthyl; or phenyl or naphthyl substituted by halogen, $C_1$-$C_4$-alkyl, $C_1$-$C_4$-alkoxy, $C_1$-$C_4$-alkylmercapto, benzyl, cyclopentyl or cyclohexyl;

Z is CN, $SO_2Y$, COY, $CO_2Y$ or $CONW_1W_2$;

Y is $C_1$-$C_4$-alkyl; $C_1$-$C_4$-alkyl substituted by halogen, CN, COOH or $C_1$-$C_4$-alkoxy; cyclopentyl; cyclohexyl; benzyl; phenethyl; phenylpropyl; phenyl; naphthyl; or phenyl or naphthyl substituted by halogen, $C_1$-$C_4$-alkyl, $C_1$-$C_4$-alkoxy, $C_1$-$C_4$-alkylmercapto, benzyl, cyclopentyl or cyclohexyl;

$W_1$ and $W_2$ are H; methyl; ethyl; n-butyl; cyanoethyl; cyclohexyl; phenyl; chlorophenyl; 2-ethoxyphenyl; 4-t-butylphenyl; 4-cyclohexylphenyl; or -naphthyl;

n is 5; and wherein the ring *a* is unsubstituted or substituted by halogen, $C_1$- to $C_3$-alkyl, $C_1$ to $C_3$-alkoxy, $C_2$ to $C_5$-alkanoyloxy, $C_2$- to $C_5$-alkanoylamino, benzoyloxy, benzoyl-amino or phenoxy.

## 4,016,192
## UNSATURATED ACRYLIC ACID-OXAZOLINE REACTION PRODUCTS

**Donald A. Tomalia; Bruce P. Thill, and Thomas W. Regulski, all of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.**

**Filed Dec. 30, 1974, Ser. No. 537,215**

**Int. Cl.² C07C** *101/00*

**U.S. Cl. 260—471 A** **10 Claims**

1. An ethylenically-unsaturated reaction product produced by (a) reacting by contacting acrylic acid and 2-oxazoline or a 2-alkyl or a 2-aryl-2-oxazoline in an inert liquid reaction medium at a temperature sufficient to cause reaction between said acrylic acid and oxazoline, and (b) recovering the ethylenically-unsaturated reaction product.



## 4,016,193
## NOVEL SUBSTITUTED PHENYLACETIC ACID DERIVATIVES AND A PROCESS FOR PREPARING THEREOF

**Toshihiko Kobayashi; Hidetoshi Hiranuma; Susumu Mizogami; Hiroyoshi Nishi; Mamoru Higuchi, and Masatoshi Onoya, all of Ami, Japan, assignors to Mitsubishi Yuka Pharmaceutical Co., Ltd., Tokyo, Japan**

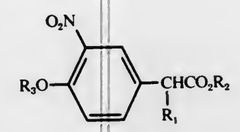
**Filed July 3, 1975, Ser. No. 592,946**

**Claims priority, application Japan, July 9, 1974, 49-78606**

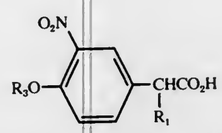
**Int. Cl.² C07C** *79/46*

**U.S. Cl. 260—471 R** **9 Claims**

1. A compound having the following formula:




wherein $R_1$ represents a hydrogen atom or lower alkyl radical having 1-4 carbon atoms, $R_2$ represents an alkyl, phenyl, alkyl phenyl wherein the alkyl has from 1 to 4 carbon atoms, halogen-substituted phenyl wherein the halogen is chlorine or bromine, or alkoxy-substituted phenyl wherein the alkoxy is methoxy or ethoxy, and $R_3$ represents an alkenyl or alkynyl radical, both of which have 3–4 carbon atoms,
and having the following formula:




wherein $R_1$ and $R_3$ have the same meaning as above, or a pharmaceutically acceptable salt thereof.

## 4,016,194
## PREPARATIVE PROCESS FOR PREPARING PHENYLENEDIACETATE DIESTERS

**John F. Knifton, Poughquag, and Robert M. Suggitt, Wappingers Falls, both of N.Y., assignors to Texaco Inc., New York, N.Y.**

**Filed Sept. 24, 1975, Ser. No. 616,227**

**Int. Cl.² C07C** *69/76*

**U.S. Cl. 260—475 SC** **12 Claims**

1. A process for converting $\alpha,\alpha'$-dihaloxylene substrates selected from the group consisting of $\alpha,\alpha'$-dichloro-p-xylene, $\alpha,\alpha'$-dichloro-O-xylene, $\alpha,\alpha'$-dichloro-m-xylene, $\alpha,\alpha'$-dibromo-p-xylene, $\alpha,\alpha'$-dibromo-O-xylene, $\alpha,\alpha'$-dibromo-m-xylene, $\alpha,\alpha'$-diiodo-p-xylene, $\alpha,\alpha'$-diido-o-xylene, $\alpha,\alpha'$-diido-m-xylene, 3,6-bis(chloromethyl) durene, 3,4-bis(chloromethyl)-cyclohexylbenzene, 3,4-bis(chloromethyl)anisole, 3,4-bis(chloromethyl)toluene, 3,5-bis(chloromethyl)chlorobenzene, 3,5-bis(chloromethyl) acetophenone, 3,6-bis(chloromethyl)acetophenone, 3,5-bis(chloromethyl)benzonitrile, and mixtures of each of these thereof, to dialkyl phenylenediacetate esters in good yields and conversions by a process of:

a. admixing each mole of said $\alpha,\alpha'$-dihaloxylene substrate to be converted to said phenylenediacetate ester with at least a catalytic amount of a homogeneous ligand-stabilized palladium(II) or nickel(II) halide catalyst consisting of two components, a palladium(II) or nickel(II) halide salt and a Group VB or VIB stabilizing ligand, said 2-component catalyst being selected from the group consisting of:

| | |
|---|---|
| $PdCl_2[P(OC_6H_5)_3]_2$ | $PdCl_2[C_{12}H_8N_2]$ |

-continued

| | |
|---|---|
| $PdCl_2[P(p\text{-}CH_3 \cdot C_6H_4)_3]_2$ | $PdCl_2[P(p\text{-}CH_3OC_6H_4)_3]_2$ |
| $PdCl_2[P(p\text{-}Cl \cdot C_6H_4)_3]_2$ | |
| $PdCl_2[(C_6H_5)_2P(CH_2)_2P(C_6H_5)_2]$ | $NiCl_2[P(p\text{-}CH_3C_6H_4)_3]_2$ |
| $PdCl_2[P(C_6H_5)_3]_2$ | $NiCl_2[As(C_6H_5)_3]_2$ |
| $PdCl_2[S(C_6H_5)_3]_2$ | $NiBr_2[P(C_6H_5)_3]_2$ |
| $PdCl_2[C_6H_5CN]_2$ | $PdBr_2[P(C_6H_5)_3]_2$ |
| $NiCl_2[P(C_6H_5)_3]_2$ | |
| $PdCl_2[As(C_6H_5)_3]_2$ | |

and at least two molar equivalents of an alcohol coreactant containing from 1 to 8 carbon atoms, to form a reaction mixture,

b. pressurizing said reaction mixture to superatmospheric pressures ranging from about 50 to 4000 psig with more than a sufficient amount of carbon monoxide to satisfy the stoichiometry of the diester reaction;

c. heating said pressurized reaction mixture from 20° to about 120° C until conversion of the $\alpha,\alpha'$-dihalides of xylene to said dialkyl phenylenediacetate takes place, and

d. isolating said phenyldiacetates contained therein.

## 4,016,195
## MONOSTYRYL-NAPHTHALENE DERIVATIVES

**Ulrich Pintschovius, Hattersheim; Erich Schinzel, Hofhelm, Taunus, and Günter Rosch, Altenhain, Taunus, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany**

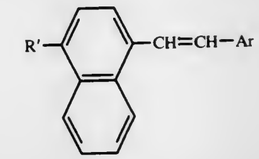
**Division of Ser. No. 453,848, March 22, 1974, Pat. No. 3,957,846, which is a division of Ser. No. 206,175, Dec. 8, 1971, Pat. No. 3,822,305. This application Feb. 13, 1976, Ser. No. 657,729**

**Claims priority, application Germany, Dec. 8, 1970, 2060228**

**Int. Cl.² C07C** *63/60, 69/76*

**U.S. Cl. 260—475 FR** **5 Claims**

1. A compound of the formula




wherein R' is carboxy, lower carboalkoxy or lower carboalkoxy substituted by lower dialkylamino or lower trialkylammonium and Ar is phenyl substituted by carboxy or lower carboalkoxy.

## 4,016,196
## BUTENOIC AND PYRUVIC ACID DERIVATIVES

**Katsura Kogure, Kawagoe; Noriyoshi Sueda, Tokyo; Sizuo Himoto, Kawagoe; Youziro Yoshino, Tokyo, and Kunio Nakagawa, Kawagoe, all of Japan, assignors to Nisshin Flour Milling Co., Ltd., Tokyo, Japan**

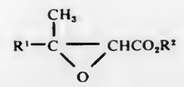
**Filed July 28, 1975, Ser. No. 599,775**

**Claims priority, application Japan, July 27, 1974, 49-85622; July 29, 1974, 49-86001**

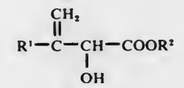
**Int. Cl.² C07C** *69/76*

**U.S. Cl. 260—476 R** **9 Claims**

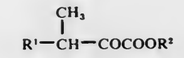
1. A process for preparing a 2-hydroxy butenoic acid or a pyruvic acid derivative comprising steps selected from the group consisting of (a) heating a glycidic ester derivative having the general formula,



wherein $R^1$ is a radical selected from the group consisting of aliphatic, alicyclic and aromatic radicals and $R^2$ is a lower alkyl group, and abtaining a 2-hydroxy butenoic acid derivative of the general formula,



werein $R^1$ and $R^2$ are as defined above, and (b) heating in the presence of an electrophilic reagent a compound selected from the group consisting of said glycidic ester derivatives and said 2-hydroxy butenoic acid derivatives and obtaining a pyruvic acid derivative of the general formula,



wherein $R^1$ and $R^2$ are as defined above.

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**4,016,197**

**4-ACETAMIDOPHENYL-p-ISOBUTYL HYDRATROPATE**

**Leandro Baiocchi, Rome, Italy, assignor to Aziende Chimiche Riunite Angelini Francesco A.C.R.A.F. S.p.A., Italy**

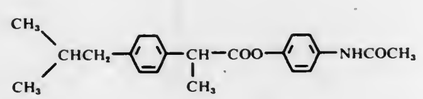
**Filed May 1, 1975, Ser. No. 573,410**

**Claims priority, application Italy, May 15, 1974, 51002/74**

**Int. Cl.² C07C** *69/76*

**U.S. Cl. 260—477** **1 Claim**

1. 4-acetamidophenyl-p-isobutyl hydrotropate (m.p. 89°–90° C) of the formula:



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**4,016,198**

**STABILIZATION OF UNSATURATED CARBOXYLIC ACID ESTERS WITH MIXTURES OF POLYALKYLENE-AMINES AND ARYLENEDIAMINES**

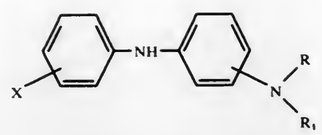
**Gene R. Wilder, Medina, Ohio, assignor to Monsanto Company, St. Louis, Mo.**

**Continuation-in-part of Ser. No. 436,438, Jan. 25, 1974, abandoned. This application Jan. 2, 1976, Ser. No. 646,280**

**Int. Cl.² C07C** *69/54*

**U.S. Cl. 260—486 R** **16 Claims**

1. A monomer composition comprising unsaturated carboxylic acid ester and, in amount effective to inhibit polymerization of the ester, and inhibitor mixture consisting essentially of polyalkyleneamine which in an acyclic aliphatic compound having amino groups attached through alkylene of 1–10 carbon atoms and arylenediamine of the formula



in which X is hydrogen, chloro, trichloromethyl, trifluoromethyl, nitro, lower alkyl, lower alkoxy, or phenoxy, R is hydrogen or alkyl, $R_1$ is alkyl or phenyl, or R and $R_1$ together with the nitrogen atom is a heterocyclic radical selected from the group consisting of pyrrolidinyl, 2,5-dimethylpyrrolidinyl, piperidino and hexahydro-1H-azepin-1-yl in which mixture the polyalkyleneamine is 10–90 parts by weight and the arylenediamine is 10–90 parts by weight per 100 parts by weight mixture.

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**4,016,199**

**COMPOUNDS CONTAINING NITROGEN AND FLUORINE**

**Royland D. Shoults, Arab, and Robert S. Yost, Huntsville, both of Ala., assignors to Rohm and Haas Company, Philadelphia, Pa.**

**Filed Apr. 2, 1963, Ser. No. 270,110**

**Int. Cl.² C07C** *69/54, 93/33*

**U.S. Cl. 260—486 H** **7 Claims**

1. Processes for the preparation of esters of acrylic and alkacrylic acids with carbinols containing difluoramino groups which comprise reacting the acid chlorides of said acids with the carbinols containing difluoramino groups in the presence of a Lewis acid catalyst at low temperatures and under reduced pressure.

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**4,016,200**

**PROCESS FOR PREPARING CARBOXYLIC ACID ESTERS FROM TOLUENE AND XYLENE**

**Takeru Onoda; Keisuke Wada, both of Yokohama, and Masayuki Otake, Tokyo, all of Japan, assignors to Mitsubishi Chemical Industries Ltd., Tokyo, Japan**

**Division of Ser. No. 556,265, March 7, 1975, Pat. No. 3,959,352. This application Feb. 17, 1976, Ser. No. 658,766**

**Int. Cl.² C07C** *67/05*

**U.S. Cl. 260—488 CD** **10 Claims**

1. In a process for preparing a carboxylic ester by reacting a hydrocarbon selected from the group consisting of toluene and xylene with an alkanoic carboxylic acid having 2 to 4 carbon atoms and molecular oxygen in the vapor phase in the presence of a supported solid catalyst of palladium metal, antimony oxide and a carboxylic acid salt of an alkali metal, an alkaline earth metal, zinc, cadmium, lead or tin, the improvement comprising: adding said antimony oxide to the support of said catalyst by dipping a carrier into an aqueous solution of a water soluble antimony compound selected from the group consisting of antimonic acid, antimonates and antimony complexes of oxalic, glycolic or tartaric acids; and calcining said dipped carrier at a temperature of from 500° – 900° C.

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**4,016,201**

**PROCESS FOR THE PREPARATION OF ACETOXYBUTANOLS**

**Christian Rasp, Cologne, and Johann Grolig, Leverkusen, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany**

**Filed June 18, 1975, Ser. No. 588,077**

**Claims priority, application Germany, June 22, 1974, 2430038**

**Int. Cl.² C07C** *67/28*

**U.S. Cl. 260—491** **3 Claims**

1. In the process for the preparation of an acetoxybutanol by hydrogenation of the corresponding acetoxybutyraldehyde in the presence of a metal of group VIII of the periodic table, wherein the acetoxybutyaldehyde is at least one of 4-acetoxybutyraldehyde, 2-acetoxybutyraldehyde, and 3-acetoxy-2-methylpropionaldehyde, the improvement which comprises carrying out the hydrogenation in the presence of methanol in an amount of 1 to 50% by weight, relative to acetoxybutyraldehyde employed.



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**4,016,202**

**1-PHENOXY-2-HYDROXY-3-ALKYNYLAMINO-PROPANES AND SALTS THEREOF**

**Herbert Köppe; Werner Kummer; Helmut Stähle, and Gojko Muacevic, all of Ingelheim am Rhein, Germany, assignors to Boehringer Ingelheim GmbH, Ingelheim am Rhein, Germany**

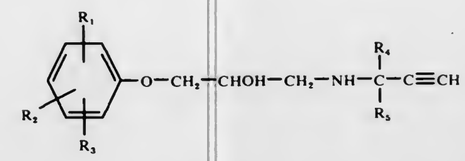
**Continuation-in-part of Ser. No. 444,713, Feb. 22, 1974, Pat. No. 3,925,446. This application Sept. 3, 1975, Ser. No. 609,998**

**Claims priority, application Germany, Feb. 28, 1973, 2309887; Jan. 26, 1974, 2403809**

**Int. Cl.² C07C** *93/06*

**U.S. Cl. 260—501.17** **15 Claims**

1. A 1-aryloxy-2-hydroxy-3-alkynylamino-propane selected from the group consisting of racemic or optically active compounds of the formula



wherein

$R_1$ is a member selected from the group consisting of hydrogen; halogen; nitro; alkyl having from 1 to 5 carbon atoms; alkoxy having from 1 to 4 carbon atoms; alkenyl having from 2 to 5 carbon atoms; alkynyl having from 2 to 5 carbon atoms; alkylamino having from 1 to 5 carbon atoms; dialkylamino having from 1 to 5 carbon atoms in each alkyl; alkoxyalkyl having from 2 to 6 carbon atoms; alkylaminoalkyl having from 2 to 6 carbon atoms; dialkylaminoalkyl having from 3 to 12 carbon atoms; $-(CH_2)_x-NH_2$ or $-(CH_2)_x-OH$, where $x$ is an integer from 0 to 3; alkynyloxy having from 3 to 6 carbon atoms; alkenyloxy having from 3 to 6 carbon atoms; $-CO-R_9$, where $R_9$ is a member selected from the group consisting of alkyl having 1 to 6 carbon atoms, phenylalkyl having 7 to 10 carbon atoms and phenyl; cycloalkyl having from 3 to 7 carbon atoms; phenyl; phenyl substituted with a substituent selected from the group consisting of halogen, lower alkyl, lower alkoxy and nitro; phenoxy; and phenoxy substituted with a substituent selected from the group consisting of halogen, lower alkyl, lower alkoxy and nitro;

$R_2$ is a member selected from the group consisting of hydrogen, halogen, alkyl having from 1 to 4 carbon atoms, alkoxy having from 1 to 4 carbon atoms, alkanoyl having from 2 to 4 carbon atoms, alkenyl having from 2 to 4 carbon atoms, amino and nitro;

$R_3$ is a member selected from the group consisting of hydrogen, halogen, alkyl having from 1 to 4 carbon atoms, alkoxy having from 1 to 4 carbon atoms and, together with $R_2$ in the ortho-position, $-CH=CH-CH=CH-$ or $-(CH_2)_n-$, where $n$ is an integer from 3 to 5;

$R_4$ is a member selected from the group consisting of hydrogen and alkyl having from 1 to 3 carbon atoms; and

$R_5$ is a member selected from the group consisting of alkyl having from 1 to 3 carbon atoms, and, together with $R_4$, $-(CH_2)_p-$, where p is an integer from 4 to 6;

and physiologically compatible acid addition salts thereof.

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**4,016,203**

**PROCESS FOR THE MANUFACTURE OF COMPOUNDS CONTAINING VINYL GROUPS**

**Hermann Rempfler, Binningen; Hans Bosshard, and Kurt Weber, both of Basel, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

**Filed June 27, 1973, Ser. No. 374,142**

**Claims priority, application Switzerland, June 30, 1972, 9852/72**

**Int. Cl.² C07C** *143/24*

**U.S. Cl. 260—505 R** **11 Claims**

1. In a process for the manufacture of compounds of the formula



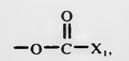
(I)

wherein A and $A_1$ independently of one another denote phenyl, naphthyl, diphenylyl, 2-phenyl-1,2,3-triazol-4-yl or pyridyl, it being possible for A and $A_1$ to contain non-chromophoric substituents, and D denotes the 4,4′-diphenylylene radical, 1,5- or 2,6-naphthylene radical or a 9,10-dihydrophenanthrene or dibenzofurane radical which is bonded to the ethylene groups in the 2,7-position, characterised in that in a first stage a compound of the formula



(II)

wherein X denotes a halogen atom, especially chlorine or bromine, the hydroxyl group or a group

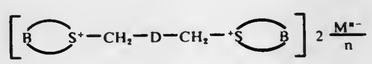


wherein $X_1$ represents an aliphatic, cycloaliphatic or aromatic hydrocarbon radical, especially an alkyl radical with 1 to 6 carbon atoms, or the phenyl radical and D has the indicated meaning, the improvement wherein the compound of formula (II) is reacted in a strongly acid medium at a temperature of about −20° C to 120° C, in a molar ratio of at least 1:2, with an organic sulphide containing 5 to 8 ring members, of the formula



(III)

wherein B represents a polymethylene group of 4 to 7 methylene groups and wherein one of these methylene groups can be replaced by a hetero-atom and wherein these methylene groups can also contain alkyl groups with 1 to 4 carbon atoms as substituents, to give a sulphonium salt of the formula



(IV)

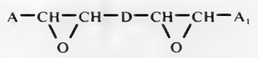
wherein M represents the anion of the strong acid used and n denotes the numbers 1 or 2; that, further, in a second stage the resulting sulphonium salt is mixed at temperatures below 20° C with 2 mols of an aldehyde of the formula

A-CHO (V)

or

$A_1$-CHO (VI)

of their mixture, in the presence of strong bases, in a strongly polar, protic or aprotic, water-miscible solvent then reacted at a temperature up to the boiling point of the solvent to give a diepoxide of the formula



and that the diepoxide of the formula (VII), thus obtained, is subjected, in a 3rd stage, to an expoxide reduction process at a temperature between 40° and 80° C with elimination of the epoxide oxygen and formation of ethylene groups.

4,016,204

## METHOD OF SYNTHESIS OF TRANS-2-PHENYLCYCLOPROPYLAMINE

**Vithal Jagannath Rajadhyaksha, Mission Viejo, Calif., assignor to Nelson Research & Development Company, Irvine, Calif.**

**Filed Oct. 31, 1975, Ser. No. 627,548**
**Int. Cl.² C07C** *63/52*
**U.S. Cl. 260—515 R** **3 Claims**

**1.** In a method for the synthesis of trans-2-phenylcyclopropanecarboxylic acid, wherein styrene is reacted with ethyl diazoacetate to form the ester, cis,trans-ethyl-2-phenylcyclopropanecarboxylate, which ester is hydrolyzed to form the corresponding acid, cis,trans-2-phenylcyclopropanecarboxylic acid, from which the trans isomer, trans-2-phenylcyclopropanecarboxylic acid is obtained by repeated crystallizations, the improvement comprising first isomerizing said cis,-trans ester to form a reaction product containing about 95% trans ester by reacting said ester with an anhydrous alkali metal alkoxide in an anhydrous alcohol and hydrolyzing said reaction product to form the trans-2-phenylcyclopropanecarboxylic acid.

4,016,205

## PROCESS FOR THE OPTICAL RESOLUTION OF DL-2-(4-HYDROXYPHENYL)GLYCINE

**Kazuo Kariyone, Kyoto; Hideo Yagi, Toyonaka, and Kazuhiko Yoshida, Hirakata, all of Japan, assignors to Fujisawa Pharmaceutical Co., Ltd., Osaka, Japan**

**Filed Sept. 12, 1975, Ser. No. 612,660**
**Claims priority, application Japan, Sept. 12, 1974, 49-105805**
**Int. Cl.² C07C** *101/30*
**U.S. Cl. 260—519** **24 Claims**

**1.** A process for the resolution of D-and L-2-(4-hydroxyphenyl)glycine which comprises treating DL-2-(4-hydroxyphenyl)glycine with d-3-bromo-2-oxo-10-bornanesulfonic acid to form a mixture of d-3-bromo-2-oxo-10-bornanesulfonic acid salts of D- and L-2-(4-hyroxyphenyl)glycine, treating the mixture with a solvent selected from the group consisting of a mixture of lower alkanol and chloroform or a mixture of lower alkanol and toluene to selectively precipitate a solvate of the d-3-bromo-2-oxo-10-bornanesulfonic acid salt of L-2-(4-hydroxyphenyl)glycine with chloroform or toluene.

**16.** A process for the resolution of D- and L-2-(4-hydroxyphenyl)glycine with comprises treating DL-2-(4-hydroxyphenyl)glycine with d-3-bromo-2-oxo-10-bornanesulfonic acid to form a mixture of d-3-bromo-2-oxo-10-bornanesulfonic acid salts of D- and L-2-(4-hydroxyphenyl) glycine, treating the mixture with an excess of isobutyl alcohol to selectively precipitate a solvate of the d-3-bromo-2-oxo-10-bornanesulfonic acid salt of L-2-(4-hydroxyphenyl) glycine with isobutyl alcohol.

4,016,206

## PROCESS FOR PREPARING PYROMELLITIC ACID

**Anatoli Onopchenko, Monroeville, and Johann G. D. Schulz, Pittsburgh, both of Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.**

**Filed Dec. 18, 1972, Ser. No. 316,422**
**Int. Cl. C07c** *63/32*
**U.S. Cl. 260—524 N** **9 Claims**

**1.** In a process wherein durene is subjected to oxidation with nitric acid at a temperature of at least about 155° for about 0.1 to about 10 hours to convert said durene to pyromellitic acid, the improvement which comprises subjecting said durene to pretreatment with a gas containing molecular oxygen in a lower carboxylic acid having from two to four carbon atoms having dissolved therein a cobalt compound corresponding to about 0.1 to about 10 per cent by weight of cobalt, based on said lower carboxylic acid, said cobalt being the sole catalyst employed, the weight ratio of said lower carboxylic acid to durene being from about 1:10 to about 10:1, at a temperature of about 80° to about 140° C. for about 10 minutes to about 20 hours sufficient to convert substantially all of the durene to the corresponding diacids thereof and to small amounts of durylic acid and triacid.

4,016,207

## HYDROLYZING DI- AND TRICARBOXY CELLULOSES WITH SULFUROUS ACID

**William Montgomery Hearon, Portland, Oreg.; John F. Witte, and Cheng Fan Lo, both of Vancouver, Wash., assignors to Boise Cascade Corporation, Boise, Idaho**

**Filed Nov. 5, 1975, Ser. No. 628,887**
**Int. Cl.² C07C** *51/00*
**U.S. Cl. 260—528** **8 Claims**

**1.** The process which comprises: a. forming a suspension in aqueous sulfurous acid containing from 0.8% by weight to that amount required to saturate the aqueous suspension with sulfurous acid under the temperaturepressure conditions of the treating reaction of a carboxy cellulose-containing feedstock of the class consisting of 2,3-dicarboxy cellulose, 2,3,6-tricarboxy cellulose, and mixtures thereof and b. treating the carboxy cellulose feedstock with the aqueous sulfurous acid at a temperature of from 100° to 200° C. for a time predetermined to hydrolyze 2,3-dicarboxy cellulose content of the feedstock to erythronic acid and glyoxylic acid and the 2,3,6-tricarboxy cellulose content thereof to meso tartaric acid and glyoxylic acid.

4,016,208

## ACID PRODUCTION

**Shigeto Suzuki, San Francisco, Calif., assignor to Chevron Research Company, San Francisco, Calif.**

**Continuation-in-part of Ser. No. 480,894, June 19, 1974, Pat. No. 3,911,003. This application Apr. 29, 1975, Ser. No. 572,780**
**The portion of the term of this patent subsequent to Oct. 7, 1992, has been disclaimed.**
**Int. Cl.² C07C** *59/06*
**U.S. Cl. 260—535 R** **7 Claims**

**7.** A process for producing hydroxyacetic acid which comprises contacting carbon monoxide with formaldehyde and a catalyst comprising HF and $HBF_4$ in a reaction zone and under conditions effective to form hydroxyacetic acid, including a temperature between 0° and 100° C and a carbon monoxide partial pressure between 10 and 4000 psig.

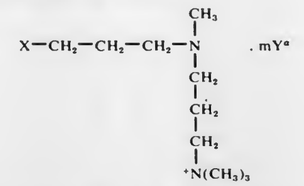
4,016,209

## 3-[N'-(3-HALOPROPYL)-N-'-METHYLAMINO]-N,N,N-TRIMETHYL-1-PROPANAMINIUM HALIDE AND ACID ADDITION SALTS THEREOF

**Arthur F. Wagner, Princeton, and Tsung-Ying Shen, Westfield, both of N.J., assignors to Merck & Co., Inc., Rahway, N.J.**

**Filed Apr. 23, 1975, Ser. No. 570,910**
**Int. Cl.² C07C** *89/30*
**U.S. Cl. 260—567.6 M** **10 Claims**

**1.** A compound of the formula:



where X is chloro, bromo, or iodo, and y is chloride, bromide, iodide or a pharmaceutically acceptable anion were *a* is the anionic charge on Y, *m* is a number such that the product of *m* and *a* is 1, and hydroholic acid addition salts thereof.



4,016,210

## CRYSTALLIZATION PROCESS

**Patrick James Horner, Welwyn Garden City, England, and John Peter Brown, Westport, Conn., assignors to Imperial Chemical Industries Limited, London, England**

**Continuation-in-part of Ser. No. 566,511, April 8, 1975, abandoned. This application Oct. 23, 1975, Ser. No. 625,124**
**Claims priority, application United Kingdom, Apr. 16, 1974, 16448/74; Apr. 16, 1974, 16444/74**
**Int. Cl.² C07C** *147/08*
**U.S. Cl. 260—607 AR** **8 Claims**

**1.** A process for the separation of bis-(4-chlorophenyl) sulphone from a crystallisation liquor comprising the reaction product obtained by reacting chlorobenzene sulphonic acid and chlorobenzene, comprising forming a crystallisation liquor, cooling the crystallisation liquor to a crystallisation temperature in the range 10° to 30° C so as to allow the bis-(4-chlorophenyl) sulphone to crystallise from the mother liquor, wherein the ratio of chlorobenzene to chlorobenzene sulphonic acid in the crystallisation liquor is such that the amount of crystallised bis-(4-chlorophenyl) sulphone is within 5 g. per 100 of the reaction product, of the maximum amount of crystallised bis-(4-chlorophenyl) sulphone obtainable at that crystallisation temperature by adjustment of the amount of chlorobenzene present.

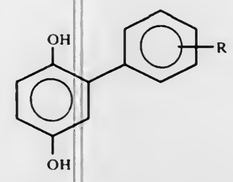
4,016,211

## STABILIZED POLYGLYCOL FOR HIGH TEMPERATURES

**Silvano Fattori; Enzo Rossi, both of San Donato Milanese, and Luigi Imparato, Milan, all of Italy, assignors to Snam Progetti S.p.A., Milan, Italy**

**Filed July 3, 1975, Ser. No. 592,728**
**Claims priority, application Italy, July 4, 1974, 24790/74**
**Int. Cl.² C07C** *43/00*
**U.S. Cl. 260—611.5** **12 Claims**

**1.** A composition comprising a polyalkyleneglycol stabilized against molecular degradation and viscosity loss at elevated temperatures by about 0.1 to about 10% by weight of an arylhydroquinone having the following general formula:



wherein R is a member of the group consisting of hydrogen, alkyl, aryl, hydroxyl, substituted hydroxyl, amine, carboxyl, substituted carboxyl, nitro and halogen.

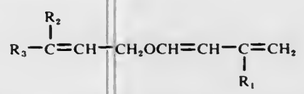
4,016,212

## PROCESS FOR THE PREPARATION OF ALDEHYDES

**Willy Leimgruber, Montclair, and Donald Herman Valentine, Jr., Westfield, both of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.**

**Continuation-in-part of Ser. No. 340,496, March 12, 1973, abandoned. This application Feb. 15, 1974, Ser. No. 442,991**
**Int. Cl.² C07C** *43/00, 43/14*
**U.S. Cl. 260—614 R** **2 Claims**

**1.** A compound of the formula



wherein $R_1$ and $R_2$ are lower alkyl; $R_3$ is hydrogen or lower alkyl.

4,016,213

## RECOVERY OF PHENOL, ACETONE AND DIMETHYL PHENYL CARBINOL FROM CUMENE OXIDATION PRODUCT

**Chuen Y. Yeh, Morristown, and Francis L. Bohn, Morris Township, Morris County, both of N.J., assignors to Allied Chemical Corporation, Morris Township, N.J.**

**Filed May 3, 1971, Ser. No. 139,875**
**Int. Cl.² C07C** *37/08*
**U.S. Cl. 260—621 C** **1 Claim**

**1.** In the process for obtaining phenol from cumene hydroperoxide, which has been obtained by liquid-phase oxidation of cumene with molecular oxygen, which involves forming a reaction mixture by continuously feeding the cumene oxidation product containing at least about 80 percent by weight of cumene hydroperoxide into a decomposer wherein the incoming hydroperoxide is diluted by cumene hydroperoxide decomposition products previously formed therein, maintaining the reaction mixture at elevated temperature, feeding to the reaction mixture a decomposition catalyst selected from the group consisting of sulfur dioxide and sulfuric acid, withdrawing reaction mixture from the decomposer, removing the decomposition catalyst from the product withdrawn from the decomposer, and fractionally distilling the resulting organic products to separately recover an acetone fraction, a phenol fraction and one or more by-product fractions, the improvement which comprises, in combination:

a. conducting the process in two decomposers through which the reaction mixture is passed serially, wherein the first decomposer is equipped with a agitator, and wherein the second decomposer is a tubular decomposer;
b. maintaining the reaction mixture in the decomposers at a temperature in the range of from 75° to 95° C.;
c. feeding the decomposition catalyst to the reaction mixture in the first decomposer in amount of from 0.002 to 0.02 percent by weight of the cumene hydroperoxide feed;
d. conducting the decomposition reaction in the absence of added water so that the reaction mixture does not contain more than about 0.3 percent by weight of water, based on the weight of the reaction mixture;
e. withdrawing reaction mixture from the first decomposer at cumene hydroperoxide concentration of between about 3 and about 6 percent by weight, based on the weight of the reaction mixture, and withdrawing reaction mixture from the second decomposer at cumene hydroperoxide concentrations not exceeding about 0.3 percent by weight, based on the weight of the reaction mixture; and
f. adding a base selected from the group consisting of alkali metal hydroxides and alkali metal phenates to the product withdrawn from the second decomposer in excess of amount required to neutralize the decomposition catalyst and sufficient to adjust the pH of the product to from 6 to 8; so that dehydration of dimethyl phenyl carbinol to form alpha-methylstyrene is substantially avoided during the decomposition and distillation steps.

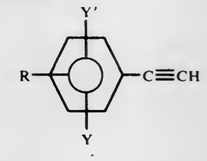
4,016,214

## PREPARATION OF ETHYNYLBENZENES

**George Henry Douglas, Malvern, and Norman J. Santora, Roslyn, both of Pa., assignors to William H. Rorer, Inc., Fort Washington, Pa.**

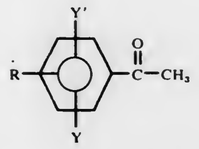
**Division of Ser. No. 523,109, Nov. 12, 1974, Pat. No. 3,952,067. This application Sept. 23, 1975, Ser. No. 615,957**
**Int. Cl.² C07C** *15/09, 15/14, 25/24, 79/10*
**U.S. Cl. 260—649 F** **9 Claims**

**1.** A process for preparing a substituted ethynylbenzene compound of the formula:

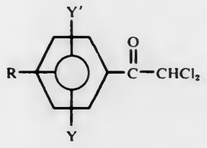


where:
R is
alkyl,
cycloalkyl,
alkylcycloalkyl,
aryl or
substituted aryl where the substituent is Y''; and
Y, Y' and Y'' are
hydrogen,
halo or
nitro
which comprises in sequence the steps of:

a. chlorinating a substituted acetophenone compound of the formula:

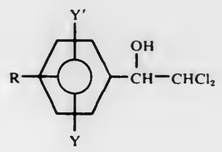


where R, Y and Y' are as described above, with elemental chlorine in the presence of iodine in an inert solvent to obtain a compound of the formula:



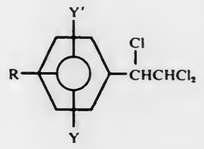
where R, Y, and Y' are as described above;

b. reducing said chlorinated product of step (a) with sodium borohydride to the corresponding benzyl alcohol of the formula:



where R, Y, and Y' are as described above;

c. halogenating said benzyl alcohol of step (b) with an agent selected from phosphorus trihalide, phosphorus pentahalide, phosphorus oxyhalide, sulfuryl halide, thionyl halide or sulfur halide to obtain a β,β,α-trichlorophenylethane compound of the formula:



where R, Y and Y' are as described above, and

d. reacting said β,β,α-trichlorophenylethane compounds of step (c) with an organolithium, organosodium, sodamide or lithium organoamide compound to obtain the desired substituted ethynylbenzene compound.

**4,016,215**

## STABILIZATION OF 1,1,1-TRICHLOROETHANE

**Susumu Otsuki; Kanichi Uchida, and Isao Miyanohara, all of Shin Nanyo, Japan, assignors to Toyo Soda Manufacturing Co., Ltd., Tokyo, Japan**

**Continuation-in-part of Ser. No. 363,495, May 24, 1973, abandoned, which is a division of Ser. No. 169,112, Aug. 4, 1971, abandoned. This application Feb. 21, 1975, Ser. No. 551,646**

**Claims priority, application Japan, Aug. 21, 1970, 45-72813**

**Int. Cl.² C07C** *17/42*

**U.S. Cl. 260—652.5 R** **7 Claims**

1. A stabilized 1,1,1-trichloroethane which is stabilized against decomposition initiated by contact with iron, which comprises:

the admixture of 1,1,1-trichloroethane and 0.001–10 volume percent of a stabilizer selected from the group consisting of styrene oxide, phenylglycidyl ether and mixtures thereof and a second stabilizer selected from the group consisting of a primary, secondary or tertiary alkanol, a 1–3 carbon atom aliphatic nitro compound, 1,4-dioxane or 1,3-dioxolane and mixtures thereof in amounts efficient to effectively stabilize said trichloroethane.

**4,016,216**

## STABILIZING 2,3-DICHLORO-1,3-BUTADIENE WITH CERTAIN N-NITROSOANILINE COMPOUNDS

**Akihiko Shimizu, and Takao Hayashi, both of Shin-nanyo, Japan, assignors to Toyo Soda Manufacturing Co., Ltd., Japan**

**Continuation-in-part of Ser. No. 444,014, Feb. 20, 1974, abandoned. This application July 31, 1975, Ser. No. 600,565**

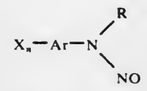
**Claims priority, application Japan, Feb. 20, 1973, 48-19783**

**The portion of the term of this patent subsequent to Mar. 22, 1994, has been disclaimed.**

**Int. Cl.² C07C** *17/42*

**U.S. Cl. 260—652.5 P** **7 Claims**

1. A composition comprising 2,3-dichloro-1,3-butadiene stabilized against polymerization with an effective amount of an aniline compound having an N-nitroso group and having the formula:



wherein Ar is phenyl; R represents a $C_{1-8}$ alkyl group or a carboxymethyl group and when R is a $C_{1-8}$ alkyl group, X is hydroxy and when R is carboxymethyl, X is a halogen or hydroxyl group and *n* is 1 or 2 to, whereby said N-nitrosoaniline is easily removed from said monomer by washing the same with an aqueous alkaline solution.

**4,016,217**

## PREPARATION OF PERFLUOROOLEFINES

**Harold Crosbie Fielding, Northwich, and Alfred John Rudge, Frodsham, both of England, assignors to Imperial Chemical Industries Limited, London, England**

**Continuation of Ser. No. 41,164, May 25, 1970, abandoned, which is a continuation of Ser. No. 537,689, March 28, 1966. This application Apr. 25, 1975, Ser. No. 571,770**

**Claims priority, application United Kingdom, Apr. 8, 1965, 14992/65**

**Int. Cl.² C07C** *17/26, 19/08*

**U.S. Cl. 260—653.1 R** **12 Claims**

1. A process for making branched, internally-unsaturated liquid perfluoroolefins that are oligomers of tetrafluoroethylene and have an empiricial formula $(C_2F_4)_n$ where *n* is an integer of 4 to 7, comprising contacting tetrafluoroethylene under anhydrous conditions with at least one fluoride which is a source of fluoride ions, said fluoride being selected from the group consisting of the normal fluorides, acid fluorides and fluorosulphinates of the metals potassium, rubidium and caesium and normal fluorides of a tetraalkylammonium ion, at a temperature of 20° C to 170° C in the presence of an inert solvent selected from the group consisting of dimethylformamide, dimethyl sulphoxide, N-methyl pyrrolidone and hexamethylphosphoramide, and recovering said branched, internally-unsaturated liquid perfluoroolefins from the reaction medium.



**4,016,218**

## ALKYLATION IN PRESENCE OF THERMALLY MODIFIED CRYSTALLINE ALUMINOSILICATE CATALYST

**Werner O. Haag, Trenton, and David H. Olson, Pennington, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.**

**Filed May 29, 1975, Ser. No. 582,025**

**Int. Cl.² C07C** *3/52*

**U.S. Cl. 260—671 R** **16 Claims**

1. A process for effecting alkylation of an aromatic hydrocarbon charge which comprises contacting said aromatic hydrocarbon charge with an olefinic hydrocarbon alkylating agent under conditions effective for accomplishing said alkylation including a reactor inlet temperature between about 575° F. and about 900° F., a reactor pressure between atmospheric and about 3000 psig, employing a mole ratio of hydrocarbon aromatic charge to olefinic hydrocarbon alkylating agent in the approximate range of 1:1 to 30:1 and a total weight hourly space velocity between about 2 and 2000 in the presence of a catalyst comprising a crystalline aluminosilicate zeolite, having more than 50 percent of the cationic sites thereof occupied by hydrogen ions, said zeolite having a silica to alumina ratio of at least about 12, a constraint index within the approximate range of 1 to 12, said catalyst having been modified by prior thermal treatment at about 1200° F. to about 1800° F. in an inert atmosphere or at about 500° F. to about 1800° F. in steam to reduce the alpha value thereof to less than about 250.

**4,016,219**

## DISPROPORTIONATION OF TOLUENE

**Warren W. Kaeding, Westfield, N.J., assignor to Mobil Oil Corporation, New York, N.Y.**

**Filed Aug. 22, 1975, Ser. No. 606,810**

**Int. Cl.² C07C** *3/62*

**U.S. Cl. 260—672 T** **13 Claims**

1. A process for effecting disproportionation of toluene to produce benzene and xylenes in which the proportion of para-xylene isomer is in excess of its normal equilibrium concentration which comprises contacting toluene under conditions effective for accomplishing said disproportionation in the presence of a catalyst comprising a crystalline aluminosilicate zeolite, said zeolite having a silica to alumina ratio of at least about 12, a constraint index within the approximate range of 1 to 12, said catalyst having been modified by the addition thereto of phosphorus in an amount of at least about 0.5 percent by weight.

**4,016,220**

## PROCESS FOR THE PREPARATION OF 9-TRICOSENE AND 9-HENEICOSENE

**Friedrich-Wilhelm Küpper, and Roland Streck, both of Marl, Germany, assignors to Chemische Werke Huels Aktiengesellschaft, Marl, Germany**

**Filed Feb. 12, 1976, Ser. No. 657,621**

**Claims priority, application Germany, Mar. 22, 1975, 2512741**

**Int. Cl.² C07C** *3/62*; **A01N** *17/14*

**U.S. Cl. 260—683 D** **12 Claims**

1. A process for preparing a compound selected from the group consisting of 9-tricosene, 9-heneicosene and mixtures thereof, which comprises metathetically reacting:

a. an alkene of at least 10 carbon atoms having an n-nonylidene radical;

b. at least one member selected from the group consisting of an alkene of at least 13 carbon atoms having an n-dodecylidene radical and an alkene of at least 15 carbon atoms having a n-tetradecylidene radical; and

c. a catalytic amount of an olefin metathesis catalyst substantially free of oligomerization and isomerization activity with respect to said reactants, said catalyst comprising a compound of a metal in Group VB to VIIB of the Periodic Table

to form said 9-tricosene, 9-heneicosene or mixtures thereof.

**4,016,221**

## IMPACT-RESISTANT RESIN COMPOSITION

**Teizo Kudo; Yoshio Hashizume; Masanori Itoh; and Makoto Shiga, all of Ohimachi, Japan, assignors to Daicel Ltd., Osaka, Japan**

**Division of Ser. No. 513,541, Oct. 10, 1974, Pat. No. 3,954,903. This application Jan. 19, 1976, Ser. No. 650,319**

**Claims priority, application Japan, Oct. 13, 1973, 48-115194**

**Int. Cl.² C08L** *67/06*

**U.S. Cl. 260—873** **9 Claims**

1. An impact-resistant ABS resin composition capable of being molded by fusing particles of said resin composition under conditions of low shear, in which the resin components consist essentially of a mixture of

A. a graft copolymer obtained by polymerizing under bulk polymerization conditions, with stirring, a solution of a rubbery component selected from the group consisting of polybutadiene and butadiene-styrene copolymer, dissolved in a mixture of vinyl aromatic monomer and vinyl cyanide monomer, until from 10 to 40 percent of said monomers are polymerized and a dispersed rubber phase is formed; and then adding the reaction mixture to water containing a dispersing agent suspended therein and completing polymerization of said monomers, with stirring, under suspension polymerization conditions to obtain a graft copolymer in which said monomers are graft copolymerized onto particles of said rubbery component wherein the average particle size of said rubbery component in the graft copolymer is in the range of 0.5 to 2.0 microns

B. a straight chain saturated polyester of a cyclic lactone selected from the group consisting of ϵ-caprolactone, pivalolactone and laurolactone, said polyester having an average molecular weight of from 1,000 to 50,000, the amount of said polyester being in the range of from 1 to 10 parts by weight, per 100 parts by weight of said graft copolymer, said polyester being added during the bulk polymerization stage, during the suspension polymerization stage, or after polymerization is complete.

**4,016,222**

## UNSATURATED PHOSPHORUS COMPOUNDS

**Walter Dursch, Konigstein, Taunus, Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany**

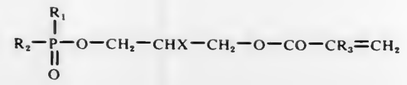
**Filed Oct. 14, 1975, Ser. No. 622,264**

**Claims priority, application Germany, Oct. 19, 1974, 2449733**

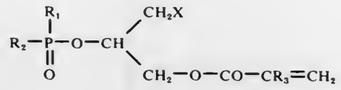
**Int. Cl.² G07F** *9/40*

**U.S. Cl. 260—932** **3 Claims**

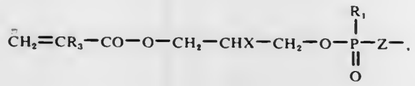
1. An unsaturated phosphorus compound of the formulae

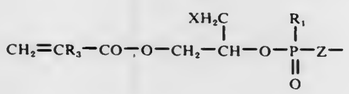


and



in which $R_1$ is a saturated or unsaturated aliphatic hydrocarbon radical of 1 to 8 carbons which may also carry chlorine, bromine, cyano, $-OR_4$, $-COOR_4$ or $-CON(R_4)_2$, $R_2$ has the same meaning as $R_1$ and additionally is a radical of one of the formulae





or



in which Z is a straight or branched chain alkylene of 1 to 8 carbons, phenylene or a xylylene which may carry chlorine, bromine or hydroxy, and Y is a straight or branched chain —O-alkyl of 2 to 8 carbons which may carry chlorine, bromine and/or hydroxy, or is a chlorine, bromine or hydroxy, $R_3$ is hydrogen or methyl, $R_4$ is hydrogen, alkyl of 1 to 8 carbons or alkenyl of 2 to 8 carbons which may carry chlorine, bromine or hydroxy, and X is chlorine, bromine or hydroxy.

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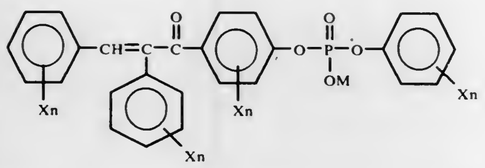
**4,016,223**

## PROSTAGLANDIN DEHYDROGENASE INHIBITING AGENTS

**Vithal J. Rajadhyaksha, Mission Viejo, Calif.; Richard A. Schroer, West Nyack, N.Y.; Phillip J. Brock, Mountain View, and Earl R. Krueger, Anaheim, both of Calif., assignors to Nelson Research & Development Company, Irvine, Calif.**

**Filed Aug. 7, 1975, Ser. No. 602,735**
**Int. Cl.² C07F 9/09; A01N 9/36**
**U.S. Cl. 260—946** **2 Claims**

**1.** Compounds having the structural formula



wherein M is H or a pharmaceutically acceptable salt; and X is selected from the group consisting of H, halogen, $NO_2$, lower alkyl and amino, and *n* is 0–5.

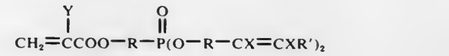
**4,016,224**

## HALOGENATED ESTERS OF PHOSPHORUS-CONTAINING ACIDS

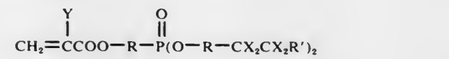
**Gaetano F. D'Alelio, 2011 E. Cedar St., South Bend, Ind. 46617**

**Division of Ser. No. 524,666, Nov. 18, 1974, Pat. No. 3,950,457, which is a division of Ser. No. 383,583, July 30, 1973, Pat. No. 3,886,236, which is a continuation-in-part of Ser. No. 179,543, Sept. 10, 1971, Pat. No. 3,780,144, which is a continuation of Ser. No. 785,335, Dec. 19, 1968, abandoned. This application Jan. 5, 1976, Ser. No. 646,503**
**Int. Cl.² C07F 9/40**
**U.S. Cl. 260—952** **10 Claims**

**1.** A phosphorus-halogen-containing compound having a formula selected from the class consisting of



and



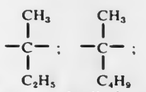
wherein

Y represents H, $CH_3$ or Cl;

X represents Cl or Br;

R′ represents H, X or R ″;

R represents a divalent hydrocarbon radical of up to 20 carbon atoms except that in the O—R—O portion the R group represents $-CH(CH_3)-$; $-C(CH_3)_2-$; $-CH(C_4H_9)-$; $-C(C_4H_9)_2-$; $-CH(C_2H_5)-$; $-CH(C_3H_7-$; $-CH(C_8H_{17})-$; $-CH(C_6H_5)-$; $-CH_2CH(C_6H_4CH_3)-$; $-CH(C_6H_{11})-$; $-CH_2CH(CH=CH_2)-$;



arylene or cycloalkylene, in which arylene and cycloalkylene groups the P is connected directly to an aromatic or cycloaliphatic ring therein; and

R″ represents a monovalent hydrocarbon radical of 1–20 carbon atoms.

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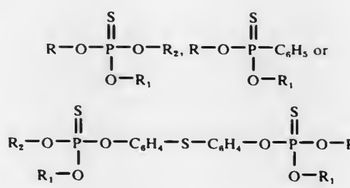
**4,016,225**

## PROCESS FOR PREPARING PHOSPHOROTHIOATES AND PHENYLPHOSPHONOTHIOATES

**Lorraine M. Kroposki, Walnut Creek, Calif., and Masao Yoshimine, Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.**

**Division of Ser. No. 361,937, May 21, 1973, Pat. No. 3,907,815, which is a continuation-in-part of Ser. No. 187,139, Oct. 6, 1971, abandoned. This application July 31, 1975, Ser. No. 600,543**
**Int. Cl.² C07C 9/165, 9/40**
**U.S. Cl. 260—973** **15 Claims**

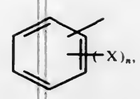
**1.** In the process of preparing a compound corresponding to the formula



wherein:

$R_1$ and $R_2$ are each independently lower alkyl; and R is





wherein:

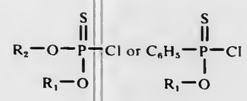
n is O, 1, 2 or 3; and

X is nitro, cyano, halo, lower alkyl, lower alkoxy, lower alkylthio or lower alkylsulfinyl, with the proviso that R does not bear more than one nitro group, lower alkylthio group or lower alkylsulfinyl group;

by reacting in an inert liquid reaction medium under neutral or alkaline conditions (a) a compound corresponding to the formula



with (b) a compound corresponding to the formula



wherein M is an alkali metal and R, $R_1$ and $R_2$ have the aforesaid meaning;

the improvement consisting of conducting the process in the presence of a small but catalytic amount of (1) a quaternary ammonium salt having a minimum solubility of at least 1 weight percent in the liquid reaction medium at 25° C and (2) 1,4-diazabicyclo[2.2.2]octane.

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**4,016,226**

## METHOD OF MAKING POROUS NUCLEAR FUEL

**Eugene Joseph Kosiancic, Richland, Wash., assignor to The Babcock & Wilcox Company, New York, N.Y.**

**Filed Feb. 10, 1975, Ser. No. 548,460**
**Int. Cl.² G21C 21/02**
**U.S. Cl. 264—.5** **2 Claims**

**1.** The method for producing a sintered ceramic pellet with a controlled porosity comprising the steps of blending ceramic nuclear fuel powder with a predetermined quantity of uranium dioxide gel spheres, pressing said blended ceramic nuclear fuel and gel spheres into a pellet, and sintering said pressed pellet to completely dissipate at least a portion of said gel spheres in order to prevent a residue deposit from forming within the pellet and to produce a selectively controlled porosity within said pellet.

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**4,016,227**

## PROCESS FOR THE ISOLATION OF POLYIMIDES IN A SOLID STATE

**Gregory L. Lines, Cheshire, and Alec Odinak, New Haven, both of Conn., assignors to The Upjohn Company, Kalamazoo, Mich.**

**Filed Feb. 7, 1972, Ser. No. 224,311**
**Int. Cl.² B29C 23/00; B29F 3/00**
**U.S. Cl. 264—14** **5 Claims**

**1.** A process for the isolation of a polyimide in a solid, non-viscous state from a reaction mixture which has been obtained by reaction of 3,3′4,4′-benzophenone tetracarboxylic dianhydride with a substantially stoichiometric amount of a mixture of toluene diisocyanate and 4,4′-methylenebis(phenyl isocyanate) in the presence of a dipolar aprotic solvent, which process comprises passing said reaction mixture through shaping means to convert said polyimide to a shape in which the exposed surface area per unit volume is as high as possible passing said shaped polyimide into water, and allowing said shaped polyimide to remain in contact with said water until solidification of said polyimide is complete.

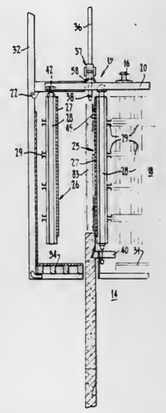
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**4,016,228**

## METHOD FOR PROGRESSIVELY CONSTRUCTING A WALL OF CEMENTITIOUS MATERIAL

**Hans Heinrich Schmidt, Doncaster, Australia, assignor to Enor Nominees Pty. Limited, Victoria, Australia**

**Division of Ser. No. 448,716, March 6, 1974, abandoned. This application Feb. 28, 1975, Ser. No. 554,235**
**Claims priority, application Australia, Mar. 7, 1973, 2511/73; Mar. 7, 1973, 2513/73**
**Int. Cl.² E04B 1/16**
**U.S. Cl. 264—33** **11 Claims**



**1.** A method for prograssively constructing a plurality of substantially vertical walls of hardened cementitious material in successive, vertically incremental castings, said method comprising:

I. providing a plurality of pairs of formwork sections in a first casting position, each pair comprising a substantially vertical frost formwork section and a facing substantially vertical second formwork section, at least on pair of formwork sections associated with each wall to be built, wherein said formwork sections define at least in part a cavity for an incremental casting which is to be made, while supporting said formwork sections by at least one retractable support from a completed incremental casting of first hardened cementitious material,

II. interlocking said first formwork sections and interlocking said second formwork sections, and therafter casting second hardenable cementitious material in said cavity and permitting same to harden,

III. thereafter disengaging said framework sections from the second hardened cementitious material, and moving each entire said first formwork sectio laterally and horizontally away from the second formwork section at least a distance to permit a person to pass between the first and second formwork sections,

IV. raising said plurality of pairs of formwork sections simultaneously from the first casting position to a vertically higher second casting position by raising a common, rigid support structure, from which all of said formwork sections are suspended, from a first support position to a second vertically higher support position while

A. supporting said common support structure on said second hardened cementitious material,

B. disengaging said retractable support from supporting contact with said hardened cementitious material,

C. interlocking said second formwork sections in a structurally rigid and stable assembly, and

D. guiding said interlocked second formwork sections by contact with at least one hardened incremental wall section of cementitious material, to maintain alignment of and to stablize said second formwork sections, and

V. repeating the above steps until the desired wall height has been achieved.

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**4,016,229**

## CLOSED-CELL CERAMIC FOAM MATERIAL

**Albert G. Tobin, Smithtown, N.Y., assignor to Grumman Aerospace Corporation, Bethpage, N.Y.**

**Filed Nov. 19, 1973, Ser. No. 417,361**
**Int. Cl.² C04B** *33/32, 35/64, 35/81*
**U.S. Cl. 264—63** **14 Claims**

**1.** A method of making a closed-pore ceramic foam material which comprises firing cenospheres having a predetermined shape in a firing cycle during which the temperature is increased from 200° F to 600° F per hour over a period of 6 to 8 hours to a maximum temperature of from about 2470° F to about 3000° F and holding the temperature at that level for 0.25 to 1.5 hours to cause the cenospheres to shrink and form a closed-pore ceramic foam having a density of at least 31 lb/ft³.

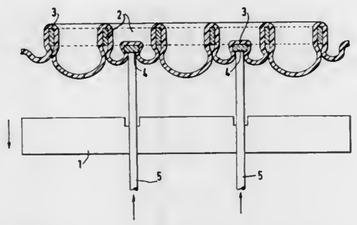
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**4,016,230**

## METHOD OF FORMING AN ARTICLE INCLUDING REINFORCING ELEMENTS ENCAPSULATED IN THERMOPLASTIC MATERIAL

**Peter Michel, Wembley, England, assignor to Brigend Investments Limited, London, England**

**Filed Jan. 14, 1975, Ser. No. 540,769**
**Claims priority, application United Kingdom, Apr. 29, 1974, 18768/74**
**Int. Cl.² B29C** *17/04*; **B29D** *3/02*
**U.S. Cl. 264—89** **5 Claims**



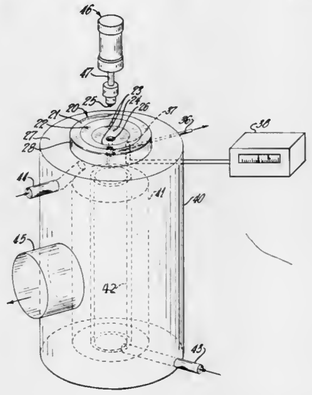
**1.** A method of forming a substantially two dimensional array of reinforcement elements completely encapsulated in a thermoplastic material, comprising the steps of: supporting said reinforcement array above a vacuum forming table on a first section of said table movable upwards from a remaining second section of said table, said first section extending completely across said table, positioning a sheet of hot thermoplastic material over said reinforcement array, applying a vacuum through said remaining second section of said table to draw said thermoplastic material down and around underneath said reinforcement above said second section of said table, retracting said first section to a position substantially flush with said second section once said thermoplastic material is capable of supporting said reinforcement above said second section, whereby said reinforcement is supported above said first and second sections by said thermoplastic material which is in contact with said second section, and then applying a vacuum through said first section to draw said thermoplastic material around and underneath said reinforcement above said first section of said table.

**4,016,231**

## METHOD FOR MOLDING ARTICLES OF THERMOPLASTIC SHEET MATERIALS

**Carl J. Hawkins, Toledo, Ohio, assignor to Rowe Industries Division of Coleman Cable & Wire Company, Toledo, Ohio**

**Continuation of Ser. No. 497,886, Aug. 16, 1974, abandoned, which is a division of Ser. No. 268,879, July 3, 1972, Pat. No. 3,830,616. This application Oct. 22, 1975, Ser. No. 624,702**
**Int. Cl.² B29C** *17/04*
**U.S. Cl. 264—92** **5 Claims**



**1.** A method of molding thermo-formable sheet material into three dimensional articles comprising;

placing a planar sheet of the thermo-formable sheet material in heat transfer relation over the cavity surface of a relatively thin mold of substantially uniform thickness having an exposed underside and conforming in shape to the article to be formed, flowing a heated fluid from directly under the mold into communication with the exposed underside of said mold opposite said cavity surface to convection heat said mold to a preselected temperature uniformly throughout, transmitting heat from said mold to said overlying sheet material,

drawing said heated sheet material into communication with the heated cavity surface of said uniform thickness mold,

retaining said drawn sheet material in communication with said mold surface and continuing to supply heat to said mold and to said drawn sheet for a preselected dwell period for establishment of a predeterminable high temperature dimensionally stable condition of said formed article, and

then forcefully cooling said mold and sheet material uniformly and withdrawing the shaped article from said mold cavity.

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**4,016,232**

## PROCESS OF MAKING LAMINATED STRUCTURAL MEMBER

**John Philip Pringle, Allen, Tex., assignor to Capital Wire and Cable, Division of U.S. Industries, Plano, Tex.**

**Continuation-in-part of Ser. No. 466,242, May 2, 1974, Pat. No. 3,956,541. This application Feb. 10, 1975, Ser. No. 548,731**
**Int. Cl.² B29J** *5/00*
**U.S. Cl. 264—112** **7 Claims**

**1.** A process for forming a flexible laminated structural member comprising:

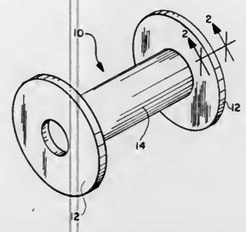
a. admixing from about 30 to about 60 weight percent of particulate thermoplastic material wherein at least 50 percent of the particles have a particle dimension of from about 1/16 inch to about ¼ inch with from aout 70 to about 40 weight percent of a particulate wood filler material to form a first mixture;



b. admixing from about 11 to about 18 weight percent of a thermosetting binder, based upon the weight of the first mixture, to the first mixture to form a resultant mixture;

c. placing a sheet material having at least one surface into a mold;

d. placing an effective amount of the resultant mixture into the mold adjacent to at least one of the surfaces of the sheet material to cover the surface to a desired depth; and



e. heating and compressing the resultant mixture and the sheet material at a temperature in the range from about 250° F. to about 450° F. and at a pressure from about 75 psi to about 350 psi for a period of time effective to enable the particulate thermoplastic material to form flexible discrete zones whereby the discrete zones bond together and said resulant mixture bonds to said sheet material to form a flexible laminated structural member.

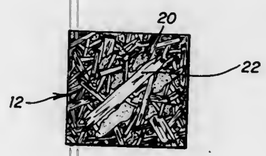
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**4,016,233**

## PROCESS OF MAKING A FLEXIBLE STRUCTURAL MEMBER

**John Philip Pringle, Allen, Tex., assignor to Capital Wire and Cable, Division of U.S. Industries, Plano, Tex.**

**Division of Ser. No. 466,242, May 2, 1974, Pat. No. 3,956,541. This application Mar. 10, 1975, Ser. No. 557,045**
**Int. Cl.² B29J** *5/02*
**U.S. Cl. 264—122** **6 Claims**



**1.** A process for forming a flexible structural member comprising:

a. admixing from about 30 to about 60 weight percent of particulate thermoplastic material wherein at least 50 percent of the particles have a particle dimension of from about 1/16 inch to about ¼ inch with from about 70 to about 40 weight percent of a particulate wood filler material to form a first mixture;

b. admixing from about 11 to about 18 weight percent of a thermosetting binder, based on the weight of the first mixture, to the first mixture to form a resultant mixture;

c. placing the resulting mixture into a mold; and

d. heating and compressing the resultant mixture at a temperature in a range from 250° F to about 450° F and at a pressure from about 75 psi to about 350 psi for a period of time effective to enable the particulate thermoplastic material to form flexible discrete zones whereby the flexible discrete zones bond together and to the particulate wood filler material and a flexible structural member is formed.



**4,016,234**

## PAPER-BACKED ACOUSTICAL TILE

**Herbert L. Warren, Arlington Heights, and Bruce A. Wittrup, Hoffman Estates, both of Ill., assignors to United States Gypsum Company, Chicago, Ill.**

**Division of Ser. No. 471,392, May 20, 1974. This application June 20, 1975, Ser. No. 588,924**
**Int. Cl.² E04B** *1/74*
**U.S. Cl. 264—129** **4 Claims**



**1.** A method for forming an acoustical tile, which comprises forming an aqueous slurry of mineral wool fibers and a binder, depositing the slurry on a paper sheet-form member, said paper sheet-form member being water absorbent, having good sound attenuation properties, and having a non-water-leachable fire-retardant material associated therewith in an amount sufficient to render said paper sheet-form member fire-retardant, drying said slurry and said sheet-form member to form a laminated structure having a mineral wool body with back surface and a face surface and with said paper sheetform member uniformly affixed and substantially coextensive with the entire back surface of said body, applying a protective coating on the face surface of said body and applying water on the paper sheet-form member, and concurrently drying said protective coating and said paper sheet-form member to form a coated acoustical tile wherein said mineral wool constitutes a major proportion by weight of said tile and wherein said coated face surface is free of concave warp.

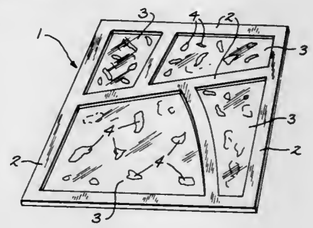
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**4,016,235**

## METHOD OF MAKING SIMULATED STAINED GLASS FROM MOLDABLE PLASTIC MATERIAL

**William P. Ferro, Bayside, Wis., assignor to KCS Industries, Inc., Milwaukee, Wis.**

**Filed Dec. 23, 1974, Ser. No. 536,921**
**Int. Cl.² B29C** *9/00*; **B29D** *17/04, 9/00*
**U.S. Cl. 264—132** **8 Claims**



**1.** A process for forming a simulated stained glass article, comprising the steps of providing an injection molding die having a die cavity bordered by a die member, forming a series of interconnected recesses in a surface of the die member with said recesses bordering isolated areas of said surface, forming a series of randomly disposed surface indentations in said isolated areas, coating a series of colored interconnected strips on a surface of a thin plastic sheet with said strips having the same configuration as said recesses, said strips bordering colored isolated zones having the same configuration as said areas and having a different color than said strips, positioning said sheet on said surface of the die member and registering said strips with said recesses and registering said zones with said areas, holding the sheet against the die member, injecting under pressure into said cavity a heated liquid resin compatible with said sheet, said sheet softening and deforming under

said heat and pressure to deform the strips into the corresponding recesses and to deform said zones into the surface indentations of the corresponding areas, and fusing the resin to said sheet to provide a simulated stained glass article having raised colored strips bordering different colored areas.

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**4,016,236**

## PROCESS FOR MANUFACTURING AROMATIC POLYMER FIBERS

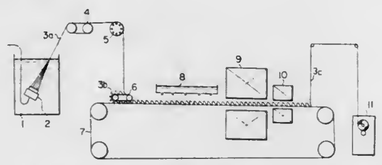
**Keisaku Nagasawa; Masashi Mitsuishi; Hiroshi Suzuki, and Tetsuo Matsushita, all of Nobeoka, Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan**

**Filed May 12, 1975, Ser. No. 576,745**

**Claims priority, application Japan, May 15, 1974, 49-53392; July 5, 1974, 49-62794**

**Int. Cl.² D01D** *5/06*

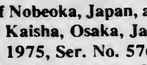
**U.S. Cl. 264—184** **9 Claims**



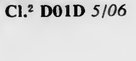
**1.** A process for manufacturing fibers by wet spinning an anisotropic dope of an aromatic polymer having aromatic mononucleus or polynucleus divalent radicals, in which chain extending bonds from each aromatic nucleus are coaxial or parallel and oppositely directed, which radicals are selected from the group consisting of

(A)

p-phenylene 

4,4'-biphenylene 

1,4-naphthylene 

2,5-pyridylene 

(B)

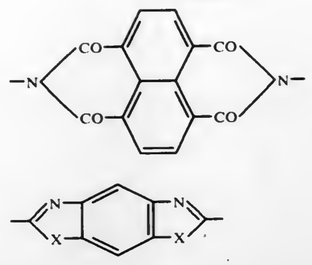
1,5-naphthylene 

2,6-naphthylene 

(C)



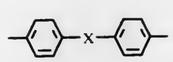
-continued



wherein X is a member selected from the group consisting of —O—, —S— and —NH—,

and

(D)



wherein X is composed of two or four enchained atoms such that the divalent radical of the formula exhibits a conjugated system as a whole and which are connected by at least one link composed of a member selected from the group consisting of —NHCO—, —NHCOCOHN— and —CONHNHCO—, the process comprising the steps of

dissolving the polymer in at least one solvent selected from the group consisting of sulfuric acid, chlorosulfuric acid, fluorosulfuric acid, dimethylacetamide, N-methylpyrrolidone, tetramethylurea, hexamethylphosphoramide, dimethylsulfoxide and tetramethylene sulfonic acid to form an anisotropic dope, the polymer having an inherent viscosity of at least 3.0 as measured at a concentration of 0.3g per 100 ml of 98% sulfuric acid at 30+ C.

b. forming filaments by extruding the dope into a coagulation bath,

c. removing the filaments from the bath,

d. depositing the filaments onto a conveyor at a rate greater than the linear speed of the conveyor,

e. washing the filaments on the conveyor, and

f. drying the resulting filaments.

the steps of the process being conducted in a manner such that the filaments are formed in the substantial absence of any tension being applied to the filaments.

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**4,016,237**

## PROCESS FOR SEPARATION OF THE RARE EARTHS BY SOLVENT EXTRACTION

**George W. Mason, Clarendon Hills, and Sonia Lewey, Joliet, both of Ill., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.**

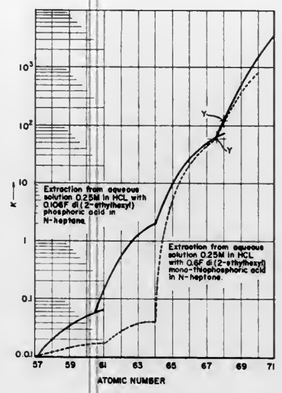
**Filed Sept. 8, 1975, Ser. No. 611,272**

**Int. Cl.² C01F** *17/00*

**U.S. Cl. 423—21** **5 Claims**

**1.** In the method for separating rare earth and yttrium elements from each other by contacting an aqueous mineral acid feed solution containing a plurality of rare earths and yttrium with a plurality of solutions of an organic extractant in a water-immiscible organic diluent whereby the elements having the highest atomic number are preferentially extracted from the feed solution and the extractability of the elements decreases with decreasing order of atomic number, contacting the extractant with a plurality of aqueous mineral acid scrub solutions whereby the rare earths are separated into fractions in the aqueous and organic solutions according to their atomic number, the lower atomic number elements preferentially concentrating in the scrub solutions in decreasing order of their atomic number and the higher atomic number elements preferentially concentrating in the organic extractant solutions in increasing order of their atomic number and collecting each fraction separately, the improvement wherein the feed






and scrub solutions are 0.1 to 2.0 M in a nonoxidizing mineral acid and the organic extractant is up to 1.0 F di(2-ethylhexyl) mono-thiophosphoric acid in a water-immiscible organic diluent whereby higher concentrations of rare earth and yttrium elements are extracted from the feed solution without forming an insoluble polymer with the extractant.

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**4,016,238**

## PROCESS FOR THE OBTENTION OF ALUMINA AND PHOSPHATE VALUES BY THE ALKALINE DECOMPOSITION OF SILICA-CONTAINING ALUMINUM PHOSPHATE ORES

**Fernando Urbina-Davalos, Rio Marne No. 14, Mexico 5, D.F., Mexico**

**Filed Aug. 29, 1975, Ser. No. 608,949**

**Int. Cl.² C01F** *7/06*; **C01B** *25/18*; **C01F** *7/14*

**U.S. Cl. 423—119** **11 Claims**

**1.** A process for the alkaline treatment of silica-containing aluminum phosphate ores for the recovery of alumina and phosphate values therefrom, which comprises in combination the steps of:

a. calcining the ore at a temperature of at least 500° C;

b. grinding the calcined ore down to a particle size of from 20 to 60 mesh (U.S. Sieve);

c. treating the calcined and ground ore with a caustic alkali lye having a concentration of at least 20% by weight of free caustic alkali to produce a suspension containing solid silica, iron oxide and other heavy metal oxides;

d. quickly filtering the suspension thus obtained to remove the solid silica and other heavy metal oxides originally contained in the ore;

e. adding a concentrated caustic alkali lye of at least 50% free caustic alkali concentration to the filtrate, in an amount sufficient to obtain a total concentration of from 10 to 15% by weight of free caustic alkali in the liquor;

f. cooling the alkaline liquor with the aid of an elutriation action to crystallize the tribasic alkali phosphate;

g. removing the thusly crystallized tribasic alkali phosphate; and

h. recovering a practically pure sodium aluminate aqueous solution which is thereafter coverted into alumina.

**9.** A process according to claim **1** including the additional steps of dissolving the tribasic alkali phosphate in water, treating the same with lime to form tricalcium phosphate and to regenerate the caustic alkali; recycling the caustic alkali solution thus obtained to the alkali treatment step of the ore upon concentration thereof; recovering the tricalcium phosphate from the liquor; reacting the same with sulfuric acid to obtain gypsum and phosphoric acid; reducing the gypsum by means of coal into lime for reutilization in the process with the production of sulfur dioxide; and using said sulfur dioxide to obtain sulfuric acid for use in the process, the lime obtained in the reduction step being also reused in the process to treat the phosphate solution.

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**4,016,239**

## RECARBONATION OF SPENT OIL SHALE

**Donald M. Fenton, Anaheim, Calif., assignor to Union Oil Company of California, Los Angeles, Calif.**

**Filed May 22, 1975, Ser. No. 579,778**

**Int. Cl.² C01F** *11/18*

**U.S. Cl. 423—155** **10 Claims**

**1.** A method for decreasing the alkalinity of spent granular oil shale which, during or following a thermal eduction, has been subjected to decarbonating temperatures in excess of about 1000° F, which comprises wetting said spent shale with at least about 10 weight-percent of an aqueous solution containing sufficient of a dissolved salt selected from the class consisting of carbonates and bicarbonates to provide at least about 50 mg/l of carbonate and/or bicarbonate ions, and thereafter contacting the wetted shale with a carbonating gas comprising at least about 0.1 psi of $CO_2$ for a sufficient time to reduce the volume of aqueous leachings obtainable therefrom, and having a pH above 9.0, to below about 10 volumes per volume of said spent shale.

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**4,016,240**

## PRODUCTION OF SYNTHETIC ANHYDRITE

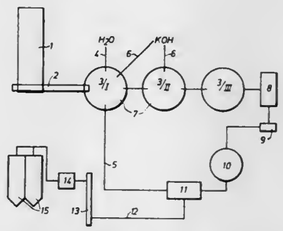
**Friedrich Hinsche, Leverkusen, and Kurt Schaupp, Cologne, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany**

**Filed May 22, 1974, Ser. No. 472,382**

**Claims priority, application Germany, June 16, 1973, 2330728**

**Int. Cl.² C04B** *11/06*

**U.S. Cl. 423—170** **10 Claims**




**1.** In the production of synthetic anhydrite wherein calcium fluoride and sulfuric acid are reacted to form hydrofluoric acid, the hydrofluoric acid is removed leaving a residue comprising synthetic insoluble anhydrite and acid, and recovering synthetic anhydrite from the residue, the improvement which comprises separating the fines from the residue, suspending said fines-free residue in water with vigorous agitation, neutralizing said residue, grinding the suspension, separating water from the suspension to leave synthetic insoluble anhydrite containing about 10 to 50% of water by weight, mixing the residual material with the previously separated fines, and thereafter allowing said mixture to set.

## 4,016,241
## PROCESS FOR REDUCING NITROGEN OXIDES FROM FLUE GAS

**Eiichiroh Nishikawa, Ohi; Takuji Itoh, Sayama, and Setsuo Kamiyama, Ohi, all of Japan, assignors to Toa Nenryo Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Sept. 16, 1975, Ser. No. 613,962**
**Claims priority, application Japan, Sept. 20, 1974, 49-108417**
**Int. Cl.² B01D** *53/34*
**U.S. Cl. 423—239** **5 Claims**

1. A process for removing nitrogen oxides from a gas mixture containing nitrogen oxides and oxygen which comprises adding to said gas mixture a reducing agent selected from the group consisting of an olefin of 2 to 6 carbon atoms, benzene and toluene, said reducing agent being added in an amount of up to about 1/20 mole percent based on oxygen in the gas and an amount ranging between about 0.1 and about 20 moles per mole of nitrogen oxide, and contacting said mixture, at a temperature within the range of about 200° to 450° C, with a catalyst comprising iridium or a compound thereof supported on a refractory carrier.

## 4,016,242
## SALTS OF THE IODINE OXYACIDS IN THE IMPREGNATION OF ADSORBENT CHARCOAL FOR TRAPPING RADIOACTIVE METHYLIODIDE

**Victor R. Deitz, Chevy Chase, and Charles H. Blachly, West Hyattsville, both of Md., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.**

**Filed Feb. 26, 1976, Ser. No. 661,572**
**Int. Cl.² B01D** *53/34*
**U.S. Cl. 423—240** **3 Claims**

1. The method of removing methyliodide$^{131}$ gas from the effluent of reactor comprising passing said effluent gas through a charcoal sorbent formed by first contacting charcoal with an aqueous mixture of a first component comprising a salt of the iodine oxyacids selected from the group consisting of periodate, iodate and hypoiodite and a second component selected from the groups consisting of iodine and iodide salt, the aqueous mixture being adjusted to a pH of about 10, and then contacting the resulting impregnated charcoal with a tertiary amine.

## 4,016,243
## HYDROGEN PEROXIDE STABILIZATION WITH 3-N-MORPHOLINYLPROPIONITRILES

**Walker Albert Strong, Wadsworth, Ohio, assignor to PPG Industries, Inc., Pittsburgh, Pa.**

**Filed June 10, 1976, Ser. No. 694,501**
**Int. Cl.² C01B** *15/02*
**U.S. Cl. 423—272** **10 Claims**

1. A stabilized aqueous hydrogen peroxide solution having between about 3 and 90 weight percent hydrogen peroxide, having dissolved therein a minor stabilizing concentration of a 3-N-morpholinylpropionitrile.

## 4,016,244
## PROCESS FOR PRODUCTION OF CUBIC BORON NITRIDE

**Kenzo Susa, Hachioji; Toshio Kobayashi, Kokubunji; Satoshi Taniguchi, Tokorozawa, and Mitsuru Ishii, Higashi-yamato, all of Japan, assignors to Hitachi, Ltd., Japan**

**Filed Jan. 23, 1975, Ser. No. 543,430**
**Claims priority, application Japan, Jan. 23, 1974, 49-9372; Feb. 27, 1974, 49-22349; May 8, 1974, 49-50301; Apr. 26, 1974, 49-46484**
**Int. Cl.² C01B** *35/14*
**U.S. Cl. 423—290** **13 Claims**

1. In the process for synthesizing cubic boron nitride by using graphitic hexagonal boron nitride as the raw material and applying to said raw material such high temperature and high pressure that cubic boron nitride is thermodynamically stable, and improvement wherein water is incorporated in the raw material in an amount of at least 3% by weight, the high pressure is applied for at least 2 minutes, the applied temperature is at least about 600° C. and the applied high pressure is at least about 50 Kbar.

## 4,016,245
## CRYSTALLINE ZEOLITE AND METHOD OF PREPARING SAME

**Charles J. Plank, Woodbury; Edward J. Rosinski, Pedricktown, both of N.J., and Mae K. Rubin, Bala Cynwyd, Pa., assignors to Mobil Oil Corporation, New York, N.Y.**

**Continuation-in-part of Ser. No. 393,767, Sept. 4, 1973, abandoned, which is a continuation-in-part of Ser. No. 358,192, May 7, 1973, abandoned. This application Nov. 29, 1974, Ser. No. 528,061**
**Int. Cl.² C01B** *33/28*; **C07F** *7/02*
**U.S. Cl. 423—328** **13 Claims**

1. A synthetic crystalline aluminosilicate zeolite having a composition in the anhydrous state, expressed in terms of mole ratios of oxids as follows:

$$(0.3\text{–}2.5)R_2O:(0\text{–}0.8)M_2O : Al_2O_3 : >8\ SiO_2$$

wherein R is an organic nitrogen-containing cation derived from ethylenediamine or pyrrolidine and M is an alkali metal cation and having an X-ray powder diffraction pattern as that shown in Table 1 of the specification, the sorption capacity of said zeolite after calcination at 600° C being characterized by the ratio of normal hexane sorption to 2-methylpentane sorption at 90° C of less than 10.

8. A method for preparing the crystalline aluminosilicate zeolite defined in claim 1 which comprises preparing a mixture containing sources of an alkali metal oxide, an organic nitrogen-containing oxide, an oxide of aluminum, an oxide of silicon and water and having a composition, in terms of mole ratios of oxides, falling within the following ranges:

| $\frac{R^+}{R^+ + M^+}$ | 0.2–1.0 |
|---|---|
| $OH^-/SiO_2$ | 0.05–0.5 |
| $H_2O/OH^-$ | 41–500 |
| $SiO_2/Al_2O_3$ | 8.8–200 |

wherein R is an organic nitrogen-containing cation derived from ethylenediamine or pyrrolidine and M is an alkali metal ion, maintaining the mixture at a temperature of at least 90° F until the crystals of said aluminosilicate are formed.

## 4,016,246
## MANUFACTURE OF SYNTHETIC ZEOLITES

**Thomas Vincent Whittam, Yarm-on-Tees, England, assignor to Laporte Industries Limited, London, England**

**Continuation-in-part of Ser. No. 889,339, Dec. 30, 1969, abandoned, which is a continuation-in-part of Ser. No. 536,310, March 22, 1966, abandoned. This application Aug. 30, 1972, Ser. No. 284,860**
**Claims priority, application United Kingdom, Apr. 9, 1965, 15104/65; Nov. 10, 1965, 47616/65**
**Int. Cl.² C01B** *33/28*
**U.S. Cl. 423—329** **8 Claims**

1. A method of preparing zeolite Y of high degree of purity and having a silica to alumina molar ratio of from greater than 3.0 up to about 6.2 which comprises (a) preparing an aqueous aluminosilicate reaction mixture by mixing an active hydrated sodium metasilicate, an alumina component and an $Na_2O$ component or an active hydrated sodium metasilicate, an alumina component, an $Na_2O$ component and other siliceous material, the reaction mixture having a composition expressed in terms of oxide molar ratios within the following ranges:



| | $Na_2O/SiO_2$ | $SiO_2/Al_2O_3$ | $H_2O/Na_2O$ |
|---|---|---|---|
| (1) | 0.28 – <0.30 | 8 – 10 | 20 – 70 |
| (2) | 0.30 – <0.31 | 8 – 12 | 20 – 70 |
| (3) | 0.31 – <0.32 | 8 – 14 | 20 – 70 |
| (4) | 0.32 – <0.34 | 8 – 16 | 12 – 90 |
| (5) | 0.34 – <0.40 | 7 – 40 | 12 – 120 |
| (6) | 0.4 – <0.7 | 5 – 50 | 12 – 120 |
| (7) | 0.7 – 1.0 | 31 – 50 | 12 – 120 |

the ratio of the active hydrated sodium metasilicate to any other siliceous material present in the aluminosilicate reaction mixture expressed on a molar silica basis lying within the range 1.0:0 to 1.0:6,000 and (b) agitating the aluminosilicate reaction mixture while heating the aluminosilicate reaction mixture at a temperature in the range of from 20° C. to 120° C. until a crystalline product is obtained.

## 4,016,247
## PRODUCTION OF CARBON SHAPED ARTICLES HAVING HIGH ANISOTROPY

**Sugio Otani, Kiryu; Shoji Watanabe, Niigata, and Tadashi Araki, Tokyo, all of Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo and Toyo Boseki Kabushiki Kaisha, Osaka, both of, Japan**

**Continuation-in-part of Ser. No. 20,050, March 16, 1970, abandoned. This application Apr. 3, 1975, Ser. No. 564,895**
**Claims priority, application Japan, Mar. 31, 1969, 44-24161**
**Int. Cl.² C01B** *31/02*, *31/04*, *31/07*
**U.S. Cl. 423—447.4** **3 Claims**

1. In a method for producing carbon shaped articles having high molecular orientation, anisotropy, and modulus of elasticity from pitch as the raw material through the process steps of forming the pitch into the required shape, subjecting the same to infusibilization, carbonization, and optionally graphitization treatments, the improvement which comprises:

forming said raw material pitch having specific properties of the carbon content in the range of from 95 to 96.5% by weight, a mean molecular weight of from 400 to 2,000, melt viscosity of from 0.4 to 700 poises at a temperature range of from 320° C to 480° C, said pitch possessing an anisotropic structure and excellent fluidity; and then carrying out said process steps of the infusibilization, carbonization, and optionally graphitization of said shaped articles, in sequence, without applying any tension whatsoever thereto during said treatments, said raw material pitch being obtained by subjecting tetrabenzophenazine to heat treatment at a temperature of from 450° to 600° C for 30 to 90 minutes.

## 4,016,248
## PROCESS FOR THE CATALYTIC CONVERSION OF $SO_2$ TO $SO_3$

**Karel Vydra, and Zdenek Hubalek, both of Bad Nauheim, Germany, assignors to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Germany**

**Continuation of Ser. No. 443,916, Feb. 19, 1974, abandoned. This application Feb. 27, 1976, Ser. No. 662,168**
**Claims priority, application Germany, Feb. 17, 1973, 2307973**
**Int. Cl.² C01B** *17/68*, *17/76*
**U.S. Cl. 423—533** **2 Claims**

1. In a process for converting the $SO_2$ content of gases containing $SO_2$ in an amount of 10.5% to 66% by volume to $SO_3$ by contact catalysis wherein:

a. a partial stream of the $SO_2$-containing gas is branched from a main stream thereof;

b. the partial stream of $SO_2$-containing gas is brought to an inlet temperature corresponding to at least the initiation temperature of a first contact-catalysis stage and the $SO_2$ in said partial stream is partially oxidized to $SO_3$ in contact with an $SO_2$-oxidation catalyst at the temperature of the $SO_2$-containing gas introduced into said first stage;

c. the partial stream of $SO_2$-containing gas partially transformed to $SO_3$ is admixed with the remainder of said main stream; and

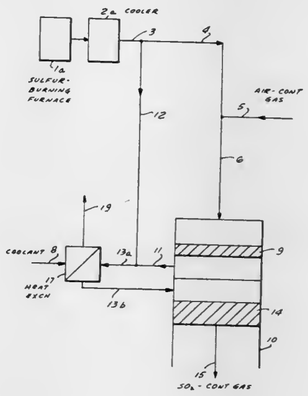
d. the mixture of the main and partial streams is brought to the operating temperature of a second contact-catalysis stage to transform $SO_2$ in the mixture to $SO_3$,

the improvement which comprises:

e. mixing air, oxygen or oxygen-enriched air free from $SO_3$ with the partial stream of $SO_2$-containing gas prior to its introduction into the first contact-catalysis stage (b) to reduce the concentration of $SO_2$ in the gas mixture treated in said first contact-catalysis stage below that at which the catalyst thereof is damaged by temperature rise due to the conversion of $SO_2$ to $SO_3$;

f. treating said mixture in said first stage until the equilibrium condition of said mixture is approximately reached;

g. the amount of oxygen introduced by said admixture of air, oxygen or oxygen-enriched air free of $SO_3$ being at least the stoichiometric amount necessary for oxidizing an $SO_2$ amount in the gas mixture in step (f) which results in a temperature rise of the gas mixture which is just below the damaging temperature of the catalyst;




h. the quantities of said partial stream and said main stream being so determined that, when the gases leaving said first stage are mixed with the main stream, the $SO_3$ content in the mixture is sufficient to prevent deterioration of the catalyst in the second stage by treating the mixture in the second stage until the equilibrium condition of the mixture is reached;

i. treating the gas stream leaving said second stage in subsequent contact-catalysis stages without admixture of $SO_2$-containing gases; and

j. said main stream (a) being at a higher temperature than the operating temperature of said second stage, said partial stream of $SO_2$-containing gas being cooled to the inlet temperature of said first stage by said mixing with air, oxygen or oxygen-enriched air, and cooling the mixture of the partially transformed gas with the remainder of said main stream in a heat exchanger prior to its introduction into said second stage.

## 4,016,249
### BONE SEEKING TECHNETIUM 99M COMPLEX

**Norman Adler, Arlington, and Leopoldo Lazaro Camin, Lexington, both of Mass., assignors to New England Nuclear Corporation, Boston, Mass.**

**Division of Ser. No. 288,577, Sept. 13, 1972, Pat. No. 3,851,044. This application Oct. 26, 1973, Ser. No. 410,086**

**Int. Cl.² A61K** *29/00, 43/00;* **G01T** *1/161*

**U.S. Cl. 424—1** **37 Claims**

1. A metabolizable radioactive bone seeking solution for intravenous administration to mammals comprising a technetium-99$^{m}$-stannous-phosphate complex, the phosphate moiety of which comprises pyrophosphate, said complex being in sterile, non-pyrogenic solution in a pharmaceutically acceptable vehicle at a pH of between 3 and 8, said phosphate moiety containing not substantially more than 25% by weight of linear polyphosphates of formulation $P_nO_{3n+1}^{-(n+2)}$ having a molecular weight greater than pyrophosphate.

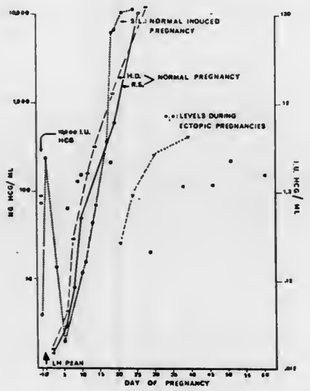
## 4,016,250
### METHOD FOR TESTING FOR PREGNANCY

**Brij B. Saxena, Englewood, N.J., assignor to Cornell Research Foundation, Inc., Ithaca, N.Y.**

**Continuation-in-part of Ser. No. 454,145, March 22, 1974, abandoned. This application Nov. 11, 1974, Ser. No. 522,760**

**Int. Cl.² G01N** *33/16*

**U.S. Cl. 424—1** **44 Claims**




1. In a method for the determination of human chorionic gonadotropin (HCG), luteinizing hormone (LH) or HCG-like material in an aqueous sample involving the steps of contacting said sample with an agent capable of selectively binding said hormone, providing a means for indicating whether said binding has taken place and observing said indicating means to determine the presence of said hormone in the sample, the improvement which comprises said agent capable of selectively binding said hormone being a plasma membrane extract from the corpus luteum of a species possessing the receptor for human chorionic gonadotropin.

## 4,016,251
### VAGINAL DRUG DISPENSING DEVICE

**Takeru Higuchi, and Anwar Hussain, both of Lawrence, Kans., assignors to Alza Corporation, Palo Alto, Calif.**

**Division of Ser. No. 281,446, Aug. 17, 1972, Pat. No. 3,903,880, which is a continuation-in-part of Ser. No. 80,531, Oct. 14, 1970, abandoned. This application May 30, 1975, Ser. No. 582,131**

**The portion of the term of this patent subsequent to Sept. 9, 1992, has been disclaimed.**

**Int. Cl.² A61K** *9/00, 47/00*

**U.S. Cl. 424—15** **22 Claims**

1. A vaginal insert comprising a reservoir for containing a drug, a drug in the reservoir, a polymeric barrier through which the drug passes by diffusion as it is released from the reservoir, the improvement wherein said barrier is an ethylene-vinyl acetate copolymer having a vinyl acetate content of 4 to 80% by weight and a melt index of about 0.1 to 1000 grams per ten minutes.

## 4,016,252
### CALCIUM PHOSPHATE GEL FOR ADSORBING VACCINES

**Edgar Hans Relyveld, Paris, France, assignor to Institut Pasteur, Paris, France**

**Continuation-in-part of Ser. No. 610,333, Sept. 4, 1975, abandoned, which is a continuation of Ser. No. 342,932, March 20, 1973, Pat. No. 3,925,545. This application Dec. 11, 1975, Ser. No. 639,926**

**Claims priority, application France, Apr. 6, 1972, 72.12036**

**Int. Cl.² A61K** *39/00, 39/02, 39/12, 47/00*

**U.S. Cl. 424—88** **9 Claims**

1. An injectable aqueous gel of calcium phosphate for adsorbing vaccines, wherein calcium and $PO_4$ ion are combined in such proportions that the weight ratio Ca/P is from 1.62 to 1.85, the settling time of the gel when containing 0.07 atom Ca per liter, being from 1 to 20 mm in 10 minutes at 20° C.

## 4,016,253
### VACCINE FOR IMMUNIZATION OF SWINE AGAINST *BORDETELLA BRONCHISEPTICA* INFECTION AND METHOD OF USE

**William P. Switzer, and Daniel O. Farrington, both of Ames, Iowa, assignors to Iowa State University Research Foundation, Inc., Ames, Iowa**

**Continuation-in-part of Ser. No. 564,546, April 2, 1975, abandoned. This application Mar. 29, 1976, Ser. No. 671,359**

**Int. Cl.² A61K** *39/02*

**U.S. Cl. 424—92** **14 Claims**

1. A vaccine in parenterally injectable dose form for administration to animals subject to *Bordetella bronchiseptica* infection, consisting essentially of an effective adjuvant in admixture with killed whole cells of the strain of *Bordetella bronchiseptica* identified by ATCC No. 31124, said vaccine dose containing from $10^9$ to $10^{11}$ cells of said strain.

## 4,016,254
### PHARMACEUTICAL FORMULATIONS

**Harry Seager, Worthing, England, assignor to Beecham Group Limited, Great Britain**

**Continuation of Ser. No. 360,828, May 16, 1973, abandoned. This application Apr. 5, 1976, Ser. No. 673,441**

**Claims priority, application United Kingdom, May 19, 1972, 23576/72**

**Int. Cl.² A61K** *9/50, 31/43, 31/79*

**U.S. Cl. 424—33** **48 Claims**

1. A powder comprising 0% to 95% of conventional pharmaceutical excipients and 5% to 100% of microcapsules, having an average diameter of from 100 $\mu$ to 300 $\mu$ and which consist of 94% to 99.9% of a $\beta$-lactam antibiotic coated by 0.1% to 6% of polyvinylpyrrolidone.



## 4,016,255
### ORAL HYGIENE COMPOSITIONS

**Geoffrey Charles Forward, Redhill, and Susan Ann Duke, Croydon, both of England, assignors to Beecham Group Limited, Great Britain**

**Filed Sept. 11, 1975, Ser. No. 612,285**

**Claims priority, application United Kingdom, Sept. 28, 1974, 42238/74**

**Int. Cl.² A61K** *7/18, 7/22*

**U.S. Cl. 424—52** **15 Claims**

1. An oral hygiene composition comprising a physiologically acceptable water-soluble fluoride compound selected from sodium fluoride, potassium fluoride, ammonium fluoride, stannous fluoride, sodium monofluorophosphate and mixtures thereof and a physiologically acceptable water-soluble ammonium compound selected from ammonium chloride, ammonium bromide, ammonium sulfate, ammonium triphosphate, ammonium dihydrogen phosphate, diammonium hydrogen phospate and mixtures thereof, the molar ratio of available ammonium ion to available fluoride in said composition being 1.2:1 or greater.

## 4,016,256
### ANTIBIOTIC TS-0822

**Nakao Ishida; Fumio Kitame, both of Sendai; Kuniko Utsushikawa, Nagoya; Tomoaki Kohama; Takuya Saito, both of Sendai, and Mikio Kikuchi, Osaka, all of Japan, assignors to Kayaku Antibiotic Research Co., Ltd., Japan**

**Filed Nov. 19, 1975, Ser. No. 633,475**

**Int. Cl.² A61K** *35/74*

**U.S. Cl. 424—121** **11 Claims**

1. The antibiotic TS-0822 in the form of colorless columnar crystals, the antibiotic in free form exhibiting main absorption bands in its infrared absorption spectrum as shown in FIG. 2, said antibiotic having an elemental analysis of about C:60.12%, H:8.94%, and N:0%, a molecular weight of about 720, a specific rotation of $[\alpha]_D^{15} + 51.3°$, (C = 0.07, $CHCl_3$), a melting point of from 151° to 153° C, an ultraviolet absorption spectrum substantially as shown in FIG. 1, and being soluble in benzene, ethyl acetate, chloroform, dichloromethane, acetone, n-butanol, ethanol, methanol, dimethyl sulfoxide, and pyridine and being insoluble or only slightly soluble in water, Tollens' reagent Molisch reagent, ferric chloride, Liebermann's reagent and ninhydrin.

## 4,016,257
### AMIDE DERIVATIVES OF ACIDS, AN ANTIBIOTIC PRODUCED BY *POLYANGIUM CELLULOSUM* VAR. *FULVUM*

**David T. Connor, Parsippany; Samuel M. Ringel, Rockaway, and Maximilian von Strandtmann, Rockaway Township, Morris County, all of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.**

**Filed Aug. 7, 1975, Ser. No. 602,844**

**Int. Cl.² A61K** *35/74*

**U.S. Cl. 424—122** **5 Claims**

1. The antibiotic substance, acid S (n-butylamine) amide, having the following characteristics:

Empirical formula: $C_{32}H_{51}NO_5$

Molecular weight: 529.7

Infrared Spectrum as shown in FIG. 1: $\nu$ max 3500–3200-$cm^{-1}$ (OH and NH), 1670$cm^{-1}$ (C = O of amide)

Mass Spectrum of the corresponding diacetate: Molecular ion at 613 corresponding to $C_{36}H_{55}NO_7$ *m/e* (relative intensity) 613 (22), 595 (18), 584 (45), 554 (18), 543 (18), 518 (54), 421 (50), 300 (100) and 283 (90).

## 4,016,258
### VASOACTIVE INTESTINAL PEPTIDE FROM FOWL

**Sami I. Said, 5323 Harry Hines Blvd., Dallas, Tex. 75235; Viktor Mutt, and Ann Nilsson, both of Medecinska Nobelinstitutet, Stockholm, Sweden**

**Filed Aug. 5, 1975, Ser. No. 602,102**

**Int. Cl.² A61K** *37/00;* **C07C** *103/52*

**U.S. Cl. 424—177** **10 Claims**

7. The novel purified polypeptide having the following structure:

His-Ser-Asp-Ala-Val-Phe-Thr-Asp-Asn-Tyr-Ser-Arg-Phe-Arg-Lys-Gln-Met-Ala-Val-Lys-Lys-Tyr-Leu-Asn-Ser-Val-Leu-Thr-$NH_2$.

10. A method for producing bronchodilation in animals and humans comprising administration by inhalation of a therapeutically effective amount of the polypeptide of claim 7.

## 4,016,259
### CONTRACEPTIVE POLYPEPTIDES

**Harry A. Kent, Jr., Athens, Ga., assignor to Research Corporation, New York, N.Y.**

**Continuation-in-part of Ser. No. 492,179, July 26, 1974, abandoned. This application May 23, 1975, Ser. No. 580,235**

**Int. Cl.² C07C** *103/52;* **A61K** *37/00*

**U.S. Cl. 424—177** **18 Claims**

10. A composition comprising a pharmaceutically acceptable carrier and at least one compound selected from the group consisting of polypeptides containing at least four, and up to about eight, amino acids, the four amino acids being:

1. selected from the group consisting of threonine, proline, arginine, lysine serine, hydroxyproline, ornithine and histidine; and
2. formed in a tetrapeptide unit, the amino terminus of which is the amino acid threonine or serine, said threonine or serine being formed in a peptide bond through its carboxyl group to the amino group of proline or hydroxyproline;

the remaining two amino acids in said tetrapeptide unit being selected from the group consisting of arginine, lysine, ornithine and histidine,

and pharmacologically acceptable salts thereof.

## 4,016,260
### NOVEL POLYPEPTIDE PRODUCED BY PSEUDOMONAS

**Tadashi Karasaki, Toyama; Chikako Hayashi, Koyabe, and Etsuko Furuichi, Toyama, all of Japan, assignors to Toyama Chemical Co., Ltd., Tokyo, Japan**

**Filed July 17, 1975, Ser. No. 596,669**

**Claims priority, application Japan, July 22, 1974, 49-83887; May 22, 1975, 50-60251**

**Int. Cl.² A61K** *35/74, 37/02;* **C12D** *9/20*

**U.S. Cl. 424—177** **23 Claims**

1. A process for producing the novel polypeptide Gamba A which comprises aerobically culturing in the presence of nutrient sources the variant strain of Pseudomonas cruciviae which is Pseudomonas sp. No. 2205 (FERM-P 2132, ATCC 3115) and recovering the resulting Gamba A polypeptide from the broth having the following physicochemical properties:

a. A polypeptide

b. Melting point: 206° C (decomp.)

c. Specific rotation: D 27 −54° (concentration 0.3% in water)

d. Ultraviolet absorption spectrum shows no specific absorption

Infrared absorption spectrum: Absorptions observed at 2.95, 3.40, 6.05, 6.55, 6.95, 7.20, 8.15 and 9.00$\mu$ as shown in FIG. I

f. Solubility in solvents: Easily soluble in water; soluble in methanol and ethanol; sparingly soluble in butanol; and insoluble in acetone, benzene, chloroform, ethyl acetate, pyridine, dioxane and dimethylformamide

g. Biuret reaction: positive,Ninhydrin reaction: negative,Or-

cinol reaction: negative,Ferric chloride reaction: negative, Sakaguchi's reaction: positive,Silver nitrate reaction: negative

h. An acidic substance

i. A white to pale yellow granular powder

j. Constitutive amino acids: A hydrolyzate obtained by treating the present substance with N-HCl under reflux for 24 hours was identified according to thin layer chromatography to confirm that at least alginine and threonine were present as constitutive amino acids

k. Since the present substance is a high molecular weight compound, no significant elementary analysis values and molecular weight (according to freezing point depression method) thereof can be measured by usual test methods.

**22.** The Gamba A polypeptide produced by the process according to claim **1.**

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## 4,016,261
## THERAPEUTIC COMPOSITION AND METHOD OF THERAPEUTICALLY TREATING WARM BLOODED ANIMALS THEREWITH

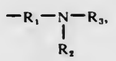
**Paul Gordon, Chicago, Ill., assignor to Strategic Medical Research Corporation, Murray, Utah**

**Division of Ser. No. 337,134, March 1, 1973, Pat. No. 3,939,145. This application Sept. 2, 1975, Ser. No. 609,723**

**Int. Cl.² A61K *31/70***

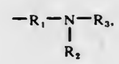
**U.S. Cl. 424—180** **46 Claims**

**1.** A novel therapeutic composition comprising a pharmaceutically acceptable carrier containing a therapeutically effective amount of at least one substance selected from the group consisting of ethereally monosubstituted monosaccharides having the formula S-O-Y, and therapeutically effective and pharmaceutically acceptable organic acid and inorganic acid salts thereof, wherein S is the residue of a monosaccharide selected from the group consisting of pentoses, hexoses and heptoses and Y is selected from the group consisting of cyclic monovalent nitrogen containing organic radicals and monovalent organic radicals having the general formula



wherein $R_1$ is a divalent organic radical having a linear carbon chain length of about 1–7 carbon atoms and $R_2$ and $R_3$ are selected from the group consisting of —H, —OH, SH, halogen and monovalent organic radicals having a linear carbon chain length of about 1–7 carbon atoms.

**20.** A method of therapeutically treating a warm blooded animal comprising therapeutically administering thereto a therapeutically effective amount of at least one substance selected from the group consisting of ethereally monosubstituted monosaccharides having the formula S—O—Y and therapeutically effective and pharmaceutically acceptable organic acid and inorganic acid salts thereof, wherein S is the residue of a monosaccharide selected from the group consisting of pentoses, hexoses and heptoses and Y is selected from the group consisting of cyclic monovalent nitrogen containing organic radicals and monovalent organic radicals having the formula



wherein $R_1$ is a divalent organic radical having a linear carbon chain length of about 1–7 carbon atoms and $R_2$ and $R_3$ are selected from the group consisting of —H, —OH, —SH, halogen and monovalent organic radicals having a linear carbon chain length of about 1–7 carbon atoms.

## 4,016,262
## THERAPEUTIC COMPOSITIONS AND METHODS EMPLOYING N(6)-DISUBSTITUTED ADENOSINE COMPOUNDS

**Erich Fauland, Mannheim-Gartenstadt; Wolfgang Kampe, Heddesheim, both of Germany; Kurt Stach, deceased, late of Mannheim-Waldhof, Germany; by Werner Plattner, executor, Linz, Austria; Harald Stork, Mannheim-Feudenheim, and Karl Dietmann, Mannheim-Vogelstang, both of Germany, assignors to Boehringer Mannheim G.m.b.H., Mannheim-Waldhof, Germany**

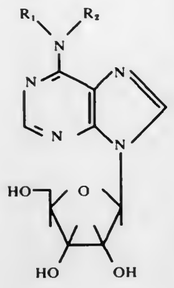
**Division of Ser. No. 482,976, June 25, 1974, Pat. No. 3,929,764. This application May 30, 1975, Ser. No. 582,529**

**Claims priority, application Germany, Aug. 1, 1973, 2338963**

**Int. Cl.² A61K *31/70***

**U.S. Cl. 424—180** **30 Claims**

**1.** Therapeutic composition for the treatment of excessively high fatty acid, triglyceride, or cholesterol contents in the serum of a mammal which composition comprises an effective amount of N(6)-disubstituted adenosine compound of the formula:



(I),

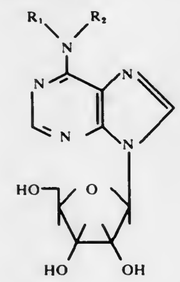
wherein

$R_1$ is alkenyl of up to 6 carbon atoms, cycloalkenyl or cycloalkenylalkyl of 5 to 10 carbon atoms in the cyclic moiety and up to 6 carbon atoms in the alkyl moiety; and

$R_2$ is alkenyl of up to 6 carbon atoms, cycloalkenyl of 5 to 10 carbon atoms, straight or branched-chain alkyl of up to 6 carbon atoms, cycloalkyl of 5 to 10 carbon atoms, bicycloalkyl of up to 10 carbon atoms, alkylcycloalkyl of from 5 to 10 carbon atoms in the cyclic moiety and up to 6 carbon atoms in the alkyl moiety; or alkyl-bicycloalkyl of up to 6 carbon atoms in the alkyl moiety and of up to 10 carbon atoms in the bicycloalkyl moiety; or a pharmacologically acceptable salt thereof

and a pharmaceutically acceptable carrier.

**2.** Method for treating a mammal afflicted with too great a concentration of fatty acids, triglycerides or cholesterol in its serum which method comprises administering to such mammal effective amounts of an N(6)-disubstituted adenosine compound of the formula:



(I),

wherein



$R_1$ is alkenyl, of up to 6 carbon atoms, cycloalkenyl or cycloalkenylalkyl of 5 to 10 carbon atoms in the cyclic moiety and up to 6 carbon atoms in the alkyl moiety; and

$R_2$ is alkenyl of up to 6 carbon atoms, cycloalkenyl of 5 to 10 carbon atoms, straight or branched-chain alkyl of up to 6 carbon atoms, cycloalkyl of 5 to 10 carbon atoms, bicycloalkyl of up to 10 carbon atoms, alkylcycloalkyl of from 5 to 10 carbon atoms in the cyclic moiety and up to 6 carbon atoms in the alkyl moiety; or alkyl-bicycloalkyl of up to 6 carbon atoms in the alkyl moiety and of up to 10 carbon atoms in the bicycloalkyl moiety; or a pharmacologically acceptable salt thereof

and a pharmaceutically acceptable carrier.

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## 4,016,263
## N-SUBSTITUTED ERYTHROMCYLAMINES AND SALTS THEREOF

**Bernd Wetzel; Eberhard Woitun; Roland Maier, all of Biberach; Wolfgang Reuter, Laupertshausen; Hanns Goeth, Biberach, and Uwe Lechner, Ummendorf, all of Germany, assignors to Boehringer Ingelheim GmbH, Ingelheim am Rhine, Germany**

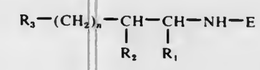
**Filed Mar. 29, 1976, Ser. No. 671,422**

**Claims priority, application Germany, Apr. 7, 1975, 2515078; Feb. 19, 1976, 2606663; Feb. 19, 1976, 2606662**

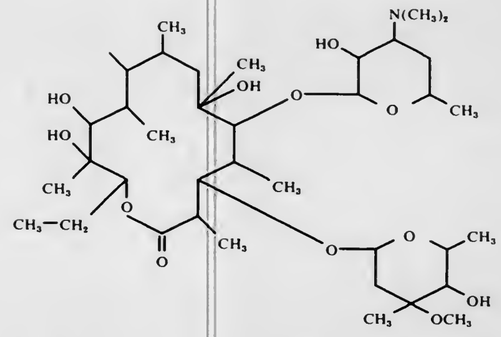
**Int. Cl.² A61K *31/70***

**U.S. Cl. 424—180** **13 Claims**

**1.** A compound of the formula



wherein E is



$R_1$ is hydrogen; straight or branched alkyl of 1to 3 carbon atoms; (alkoxy of 1 to 5 carbon atoms)- (alkyl of 1 to 3 carbon atoms); phenyl; or benzyl;

$R_2$ is hydrogen, hydroxyl, straight or branched alkyl of 1 to 3 carbon atoms; or phenyl;

$R_3$ is hydroxyl;

alkanoyloxy of 1to 5carbon atoms; benzoyloxy; straight or branched alkoxy of 1 to 5 carbon atoms; amino;-mono(alkyl of 1 5 carbon atoms)-amino;

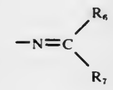
dialkyl-amino, where the sum of carbon atoms in the alkyls is from 2 to 8 inclusive;

mono(hydroxy-alkyl of 1 to 4 carbon atoms)-amino;

di(hydroxy-alkyl)-amino, where the sum of carbon atoms in the alkyls is from 2to 8, inclusive; phenyl(alkyl of 1 to 2 carbon atoms)-amino;

phenyl-amino, where the phenyl moiety may optionally have one or more halogen, alkyl of 1 to 3 carbon atoms, alkoxy of 1 to 3 carbon atoms or hydroxyl substituents attached thereto;

(alkanoyl of 1 to 5 carbon atoms)-amino; phenyl(alkanoyl of 1 to 5 carbon atoms)-amino; benzoyl-amino; methoxybenzoyl-amino; halobenzoyl-amino; carboxybenzoyl-amino; p-tolysulfonamino; -HN-$NR_4R_5$, where $R_4$ and $R_5$ are alkyl of 1 to 3 carbon atoms or, together with each other and the nitrogen atom to which they are attached, form a 5- to 6-membered heterocycle optionally comprising an additional oxygen, sulfur or nitrogen hetero-atom in the ring, and said additional nitrogen heteroatom optionally having an alkyl of 1 to 5 carbon atoms substituent attached thereto;



where $R_6$ is amino; mono(straight or branched alkyl of 1 to 8 carbon atoms)-amino; dialkyl- amino, where the sun of carbon atoms in the alkyls is from 2 to 6 inclusive; cyclohexyl-amino; N-(alkyl of 1 to 3 carbon atoms)-N-cyclohexyl-amino; dicyclohexyl- amino; methoxy(alkyl of 1 to 3 carbon atoms)-amino; dimethoxy(alkyl of 1 to 3carbon atoms)-amino; benzylamino, where the phenyl moiety may optionally have from one to three (alkoxy of 1 to 3 **29** carbon atoms)-substituents attached thereto; phenethyl-amino, where the phenyl moiety amy optionally have from one to three (alkoxy of 1 to 3 carbon atoms)-substituents attached thereto; dibenxyl-amino; di(phenethyl)-amino; benzhydryl-amino; N-methyl-N-benzyl-amino; N-phenyl- N-benzyl-amino; N-methyl-N-phenyl-amino; N-ethyl-N-phenyl-amino; piperidino; methyl- piperidino; benzyl-piperidino, pyrrol- idino; methyl-pyrrolidino; benzyl-pyrrolidino; morpholino; methyl-morpholino; benzyl-morpholino; piperazino; methyl- piperazino; benzyl-piperazino; hexamethyl- eneimino; methyl-hexamethyleneimino; benzyl-hexamethyleneimino; thiomorpholino; methyl-thiomorpholino; benzyl-thiomorpholino; heptamethyleneimino; methyl-heptamethyleneimino; or benzyl-heptamethyl- imino; and

$R_7$ is amino; cyclohexylamino; di(alkyl of 1 to 3 carbon atoms)-amino; benzyl-amino; phenethyl-amino; dibenzyl-amino; phenoxy-methyl-amino; phenoxyethyl-amino; N-phenyl-N-benzyl-amino; N-methyl-N-phenyl-amino; piperidino, benzyl-piperidino; pyrrolidino; benzyl-pyrrolidino; morpholino; benzyl-morpholino; piperazino; benzyl-piperazino; thiomorpholino; benzyl-thiomorpholino; hexamethyleneimino; benzyl-hexamethyleneimino;

hydrogen; alkyl of 1 to 3 carbon atoms; cyclohexyl, benzyl, methoxy-benzyl; phenethyl; methoxyphenethyl; thienyl; furyl; pyridyl; (alkyl of 1 to 3 carbon atoms)-thio; methoxy(alkyl of 1 to 3 carbon atoms)-thio; cyano(alkyl of 1 to 3 carbon atoms)-thio; benzyl-thio; methylbenzyl-thio; phenyl-thio; or tolyl-thio;

$R_3$ = is also-NH-A-B,

where

A is alkylene of 1 to 4 carbon atoms; and

B is alkoxy of 1 to 3 carbon atoms, di(alkyl of 1 to 3 carbon atoms)-amino or carbalkoxy of 2 to 4 carbon atoms;

thiazolyl-amino; or

pyridyl-amino; and

*n* is 0 or 1;

or a non-toxic, pharmacologically acceptable acid addition salt thereof.

**13.** The method of combatting bacterial infections in a warm-blooded host, which comprises perorally or parenterally administering to said host an effective antibacterial amount of a compound of claim **1.**

### 4,016,264
### WART TREATMENT WITH PHOSPHONOACETIC ACID OR DERIVATIVES THEREOF

**Leland L. Clark, Salt Lake City, Utah, assignor to The University of Utah, Salt Lake City, Utah**

**Filed July 14, 1975, Ser. No. 595,941**
**Int. Cl.² A61K *31/66***
**U.S. Cl. 424—198** **6 Claims**

**1.** A method for treating a wart comprising the steps of:
contacting the wart with an effective amount of a composition comprising a suitable topical carrier, an effective amount of a tissue removing agent selected from the group consisting of salicylic acid and cantharadin and from about 0.5 to 8.0% by weight of a compound selected from the group consisting of phosphonoacetic acid, the sodium, potassium, and calcium salts of phosphonoacetic acid, methylphosphonic acid and the sodium, potassium, and calcium salts of methylphosphonic acid; and
repeating the contacting step until the wart has been suitably treated.

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### 4,016,265
### SYNERGISTIC INSECTICIDAL COMPOSITIONS CONTAINING β-EXOTOXIN

**Tadahiko Inoue, Tokyo; Gosaburo Dowke, Shizuoka, and Hideo Itoh, Shimizu, all of Japan, assignors to Sandoz, Inc., E. Hanover, N.J.**

**Filed Nov. 8, 1971, Ser. No. 196,809**
**Claims priority, application Japan, Nov. 14, 1970, 45-100371**
**Int. Cl.² A01N *9/36***
**U.S. Cl. 424—200** **12 Claims**

**1.** An insecticidal composition consisting essentially of a first ingredient selected from the group consisting of β-exotoxin and metal salts thereof and a second ingredient selected from the group consisting of O,O-diethyl-O-(2-isopropyl-4-methyl-6-pyrimidyl)-thionophosphate; O,O-dimethyl, α,α,α-trichloro-1-hydroxyethyl phosphonate; α-methoxy-4H-1,3,2-benzodioxaphosphorin-2-thione; O,O-dimethyl S-(α-(ethoxycarbonyl)benzyl) phosphorodithioate; and O,O-dimethyl S-(4-chlorophenyl) phosphorothioate; said first and second ingredients being present in the ratio of about 0.1:1 to about 10:1 by weight.

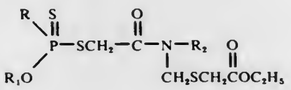
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### 4,016,266
### N-ALKYLTHIOMETHYLACETAMIDEPHOSPHORODITHIOATE INSECTICIDES

**Arnold D. Gutman, Berkeley, Calif., assignor to Stauffer Chemical Company, Westport, Conn.**

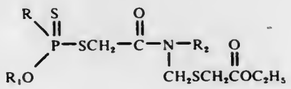
**Filed June 2, 1975, Ser. No. 582,964**
**Int. Cl.² A01N *9/36*; C07F *9/165***
**U.S. Cl. 424—211** **28 Claims**

**1.** A method for controlling insects comprising applying to the insects or the habitat thereof an insecticidally effective amount of a compound having the formula



in which R is lower alkyl or lower alkoxy and $R_1$ and $R_2$ are lower alkyl.

**14.** A compound having the formula



in which R is lower alkyl or lower alkoxy and $R_1$ and $R_2$ are lower alkyl.

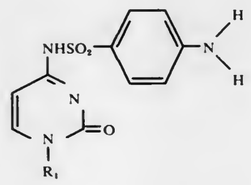
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### 4,016,267
### SULFACYTOSINE DERIVATIVES

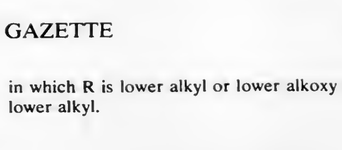
**Harry Allen Albrecht, Towaco, and John Thomas Plati, Rutherford, both of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.**

**Continuation-in-part of Ser. No. 587,452, June 16, 1975, abandoned, which is a division of Ser. No. 480,784, June 19, 1974, Pat. No. 3,923,792. This application June 7, 1976, Ser. No. 693,571**
**Int. Cl.² A61K *31/625***
**U.S. Cl. 424—229** **11 Claims**

**11.** A method for combatting bacteria comprising administering to a warmblooded animal requiring such treatment an antibacterially effective amount of a composition comprising 1 to 40 parts of a compound of the formula



wherein $R_1$ is cyclo-lower alkyl or cyclo-lower alkyl-lower alkyl;
or a pharmaceutically acceptable salt thereof, and 1 part of a compound of the formula



wherein $R^3$ is hydrogen or lower alkyl; $R^4$ is hydrogen or lower alkoxy, $R^5$ is amino, lower alkylamino, di-lower alkylamino or lower alkoxy, and $R^6$ is lower alkoxy, provided that when $R^3$ is lower alkyl, $R^4$ is hydrogen and $R^5$ is lower alkoxy,
or a pharmaceutically acceptable acid addition salt thereof.

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### 4,016,268
### METHOD OF COMBATTING GASTRIC ULCERATION

**Marvin M. Goldenberg, Norwich, and Leroy J. Honkomp, Oxford, both of N.Y., assignors to Morton-Norwich Products, Inc., Norwich, N.Y.**

**Filed Oct. 6, 1975, Ser. No. 619,691**
**Int. Cl.² A61K *31/29*, *31/60*, *31/61*, *31/625***
**U.S. Cl. 424—231** **1 Claim**

**1.** The method of combatting gastric ulceration in a host receiving perorally an anti-inflammatory agent of the group of aspirin, phenylbutazone, indomethacin or ibuprofen which consists in similarly co-administering to said host an amount of bismuth subsalicylate sufficient to combat the gastric ulcerogenic propensity of said anti-inflammatory agent.

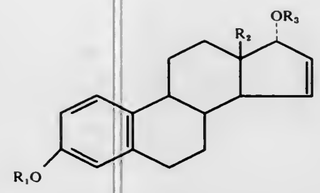


### 4,016,269
### 17α-HYDROXY-1,3,5(10),15-ESTRATETRAENES AND PROCESS FOR THEIR PRODUCTION

**Helmut Hofmeister; Klaus Annen; Rudolf Wiechert, and Henry Laurent, all of Berlin, Germany, assignors to Schering Aktiengesellschaft, Berlin & Bergkamen, Germany**

**Filed Aug. 11, 1975, Ser. No. 603,773**
**Claims priority, application Germany, Aug. 12, 1974, 2439082**
**Int. Cl.² A61K *31/58***
**U.S. Cl. 424—241** **15 Claims**

**1.** A 17α-oxy-1,3,5(10),15-estratetraene of the formula



wherein $R_1$ is a hydrogen atom, alkyl of 1–5 carbon atoms or alkanoyl of 1–5 carbon atoms; $R_2$ is ethyl and $R_3$ is a hydrogen atom, alkyl of 1–5 carbon atoms or alkanoyl of 1–5 carbon atoms or tetrahydropyranyl or tetrahydrofuryl.

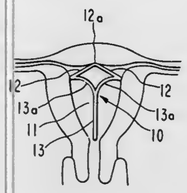
**8.** A pharmaceutical composition comprising an estrogenically effective amount of a compound of claim **1**, in unit dosage form and in admixture with a pharmaceutically acceptable carrier.

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### 4,016,270
### METHOD FOR TREATING DYSMENORRHEA WITH A UTERINE THERAPEUTIC SYSTEM

**Bruce B. Pharriss, Palo Alto; Ross R. Erickson, Sunnyvale, and Stephen A. Tillson, Los Altos, all of Calif., assignors to Alza Corporation, Palo Alto, Calif.**

**Filed Oct. 31, 1975, Ser. No. 627,591**
**Int. Cl.² A61K *31/56***
**U.S. Cl. 424—242** **19 Claims**



**1.** A method for treating dysmenorrhea in a warm blooded animal which method comprises administering to the uterus of the animal from a means sized, shaped and adapted for placement in the uterus a therapeutically effective amount of a progestational steroid for a prolonged period of time to impart relief from said dysmenorrhea.

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### 4,016,271
### 21-ADAMANTANE-1′-CARBOXYLATE STEROID COMPOSITIONS

**Gordon Hanley Phillipps, Wembley; Alan Frederick English, Hazlemere, and Gillian Helen Stribley, Northwood, all of England, assignors to Glaxo Laboratories Limited, Greenford, England**

**Continuation of Ser. No. 429,793, Jan. 2, 1974, abandoned. This application Nov. 19, 1975, Ser. No. 633,178**
**Claims priority, application United Kingdom, Jan. 3, 1973, 447/73; Jan. 3, 1973, 448/73**
**Int. Cl.² A61K *31/56***
**U.S. Cl. 424—243** **9 Claims**

**1.** Pharmaceutical and veterinary compositions in dosage unit form for the systemic treatment of immunological disorders or inflammatory disorders having a significant immunological component, each dosage unit containing more than 50 mg but not more than 500 mg of betamethasone 21-adamantane- 1′-carboxylate, dexamethasone 21-adamantane- 1′-carboxylate or a corresponding 11-ketone , and a pharmaceutical or veterinary carrier or excipient.

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### 4,016,272
### ANTHELMINTIC THIODIPHENYLAMINE CUPRIC CHLORIDE COMPLEX SALT

**Abdi Akbaev, perculor Sonkulsky, and Vera Vasilievna Ezhova, ulitsa Krupskoi, 55, kv. 6, both of, Frunze, U.S.S.R.**

**Continuation of Ser. No. 482,893, June 25, 1974, abandoned, which is a continuation of Ser. No. 319,049, Dec. 27, 1972, abandoned. This application Mar. 20, 1975, Ser. No. 560,140**
**Int. Cl.² A61K *31/555*, *31/54***
**U.S. Cl. 424—245** **4 Claims**

**1.** A method of treating helminth infestation diseases in animals which comprises administering to an animal from 0.1 to 0.3 gm per 1 kg of body weight of said animal of a complex salt of thiodiphenylamine cupric chloride of the formula:



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### 4,016,273
### SUSTAINED RELEASE FORMS OF CERTAIN OXAZEPINES FOR PARENTERAL ADMINISTRATION

**George Madison Sieger, Montvale, N.J.; James Elwood Krueger, New City; Arnold Curtis Osterberg, Pearl River, both of N.Y., and David Henry Tedeschi, Little Falls, N.J., assignors to American Cyanamid Company, Stamford, Conn.**

**Filed July 16, 1975, Ser. No. 596,488**
**Int. Cl.² A11K *31/495***
**U.S. Cl. 424—250** **8 Claims**

**6.** A method of treating central nervous system disorders in a warm-blooded animal which comprises parenterally administering to said animal a therapeutically effective amount of a pharmaceutical composition for parenteral administration containing as the main active ingredient therein at a concentration of about 50 mg./ml. to about 400 mg./ml. the pamoate salt of 2-chloro-11-(1-piperazinyl)dibenz[b,f][1,4]oxazepine or the pamoate salt of 2-chloro-11-(4-methyl-1-piperazinyl)-dibenz[b,f][1,4]oxazepine, in an injectable oil and a gelling agent at a concentration of about 10 mg/ml.

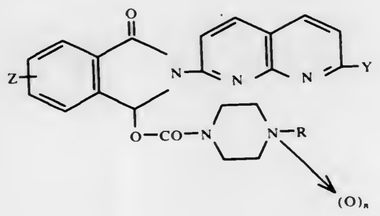
**7.** A method according to claim **6** wherein the main active ingredient is 2-chloro-11-(4-methyl-1-piperazinyl)-dibenz[b,f][1,4]oxazepine pamoate, the injectable oil is sesame oil and the gelling agent is aluminum monostearate.

## 4,016,274
## NAPHTHYRIDINE DERIVATIVES

Claude Cotrel, Paris; Cornel Crisan, Sceaux; Claude Jeanmart, Brunoy (Essonne), and Mayer Naoum Messer, Bievres (Essone), all of France, assignors to Rhone-Poulenc S.A., Paris, France

Continuation-in-part of Ser. No. 469,431, May 13, 1974, abandoned. This application Oct. 17, 1975, Ser. No. 623,359
Claims priority, application France, May 15, 1973, 73.17516; Mar. 14, 1974, 74.08728; Mar. 14, 1974, 74.08730
Int. Cl.² C07D *401/14*
U.S. Cl. 424—250 29 Claims

1. A naphthyridine derivative of the formula:



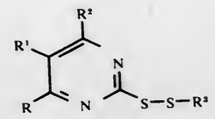
wherein Y represents hydrogen, halogen, alkyl of 1 through 4 carbon atoms, alkoxy of 1 through 4 carbon atoms, or cyano, Z represents hydrogen, halogen, alkoxy of 1 through 4 carbon atoms, nitro or trifluoromethyl, and n represents zero and R represents hydrogen, alkyl of 1 through 4 carbon atoms, alkenyl of 2 through 4 carbon atoms, alkynyl of 2 through 4 carbon atoms or hydroxyalkyl of 1 through 4 carbon atoms, or phenyl, or n represents 1 and R represents alkyl of 1 through 4 carbon atoms or hydroxyalkyl of 1 through 4 carbon atoms, and non-toxic pharmaceutically acceptable acid addition salts thereof.

## 4,016,275
## INSECTICIDAL HYDROCARBYL SULFENYLMERCAPTO PYRIMIDINES

Joseph E. Moore, Richmond, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Continuation-in-part of Ser. No. 461,578, April 17, 1974, Pat. No. 3,896,225, which is a division of Ser. No. 201,185, Nov. 22, 1971, Pat. No. 3,821,222. This application July 3, 1975, Ser. No. 592,831
Int. Cl.² A01N *9/00*; C07D *239/22*
U.S. Cl. 424—251 4 Claims

1. A method of killing insects which comprises contacting pre-adult insects with a metamorphosis-inhibiting amount of a compound of the formula



wherein R, R¹ and R² are individually hydrogen, halogen of atomic number 9 to 35, hydroxy, alkyl of 1 to 6 carbon atoms substituted with 0 to 4 halogen atoms of atomic number 9 to 35 or alkenyl of 2 to 6 carbon atoms substituted with 0 to 4 halogen atoms of atomic number 9 to 35, R³ is haloalkyl or haloalkenyl of up to 10 to carbon atoms substituted with 1 to 5 halogen atoms of atomic number 9 to 35 or phenyl substituted with 0 to 2 halogen atoms of atomic number 9 to 35 or alkyl groups of 1 to 4 carbon atoms.

## 4,016,276
## TREATMENT OF LIVER DYSFUNCTION WITH 2-AMINO-6-BENZYL-3-ETHOXYCARBONYL-4,5,6,7-TETRAHYDRO-THIENO[2,3-C]PYRIDINE HYDROCHLORIDE

Toshihiro Kobayakawa, Yoshitomi; Hiroshi Yasuda, Nakatsu; Kazuhiro Goto, Nakatsu, and Michio Nakanishi, Nakatsu, all of Japan, assignors to Yoshitomi Pharmaceutical Industries, Ltd., Osaka, Japan

Filed Apr. 17, 1975, Ser. No. 569,118
Int. Cl.² A61K *31/435*
U.S. Cl. 424—256 3 Claims

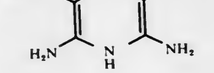
1. A method for the treatment of liver dysfunction in mammals which comprises administering to said mammals an effective amount of 2-amino-6-benzyl-3-ethoxycarbonyl-4,5,6,7-tetrahydro-thieno-[2,3-c]pyridine hydrochloride.

## 4,016,277
## 4-QUINOLINE AND 4-ISOQUINOLINE DERIVATIVES OF 2,6-DIAMINO-1,4-DIHYDROPYRIDINE

Horst Meyer, Wuppertal; Friedrich Bossert, Wuppertal-Elberfeld; Wulf Vater, Opladen, and Kurt Stoepel, Wuppertal, all of Germany, assignors to Bayer Aktiengesellschaft, Germany

Division of Ser. Nos. 454,996, March 27, 1974, Pat. No. 3,950,336, and Ser. No. 445,258, March 27, 1974, Pat. No. 3,905,747, each is a division of Ser. No. 336,483, Feb. 28, 1973, Pat. No. 3,855,231. This application Feb. 28, 1975, Ser. No. 554,135
Claims priority, application Germany, Mar. 6, 1972, 2210687
Int. Cl.² A61K *31/47*
U.S. Cl. 424—258 8 Claims

1. A pharmaceutical composition useful for effecting coronary vessel dilation and treating hypertension in humans and animals which comprises a coronary vessel dilating amount or an antihypertensive amount of a compound of the formula:



wherein

R is quinolyl or isoquinolyl, unsubstituted or substituted by one or two members selected from the group consisting of lower alkyl, lower alkoxy and halogeno; and

each of R¹ and R², taken independently of the other, is lower alkoxy, lower alkoxy(lower alkoxy), alkenyloxy of 2 to 4 carbon atoms, alkynyloxy of 2 to 4 carbon atoms, amino, lower alkylamino or di(lower alkyl)amino.

in combination with a pharmaceutically acceptable non-toxic inert diluent or carrier.

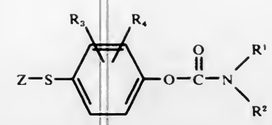
## 4,016,278
## PESTICIDAL CARBAMATES

Richard C. Koch, Niantic, Conn., and Hugh C. Richards, Canterbury, England, assignors to Pfizer Inc., New York, N.Y.

Filed July 14, 1975, Ser. No. 595,535
Claims priority, application United Kingdom, July 17, 1974, 31612/74
Int. Cl.² A01N 9/22
U.S. Cl. 424—263 10 Claims

1. A compound of the formula





wherein R¹ is alkyl having from one to five carbon atoms;

R² is selected from the group consisting of hydrogen, alkyl having from one to five carbon atoms, alkanoyl having from two to five carbon atoms and chloroacetyl;

R³ and R⁴ are each selected from the group consisting of hydrogen and alkyl having from one to five carbon atoms;

and Z is selected from the group consisting of 2-pyridyl, 3-pyridyl and 4-pyridyl.

## 4,016,279
## SPRAY COMPOSITIONS FOR INHALATION THERAPY OF BRONCHIAL DISORDERS

Rudolf Bauer, Wiesbaden, and Helmut Wick, Ingelheim, both of Germany, assignors to Boehringer Ingelheim GmbH, Ingelheim am Rhein, Germany

Continuation-in-part of Ser. No. 487,054, July 10, 1974, abandoned, which is a continuation-in-part of Ser. No. 271,558, July 13, 1972, abandoned. This application Jan. 13, 1976, Ser. No. 648,729
Claims priority, application Germany, July 13, 1971, 2134899
Int. Cl.² A61L *9/04*; A61K *9/14*, *31/46*
U.S. Cl. 424—265 4 Claims

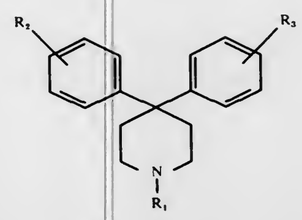
1. An inhalation spray composition for treating bronchial disorders, consisting essentially of a pharmaceutically inert liquid carrier and 0.007 to 1% by weight, based on the total weight, of N-ethyl-norscopolamine methobromide or N-methyl-scopolammonium bromide.

## 4,016,280
## 4,4-DIARYLPIPERIDINE COMPOSITIONS AND USE

Heinz Günter Menge, Constance, and Josef Klosa, Berlin, both of Germany, assignors to Byk Gulden Lomberg Chemische Fabrik GmbH, Germany

Division of Ser. No. 455,041, March 26, 1974, which is a continuation-in-part of Ser. No. 55,957, July 17, 1970, abandoned. This application May 13, 1975, Ser. No. 576,973
Claims priority, application Germany, July 17, 1969, 1936452
Int. Cl.² A61K *31/445*
U.S. Cl. 424—267 25 Claims

1. A neuroleptic or CNS-stimulating medicament composition in dosage form wich contains, as a pharmacologically-active component thereof, an effective concentration of at least one physiologically-acceptable 4,4-diarylpiperidine in admixture with a pharmaceutically-acceptable carrier, and in which at least one physiologically-acceptable 4,4-diarylpiperidine is a member selected from the group consisting of (a) a compound of the formula



wherein

$R_1$ is a member selected from the group consisting of —H, alkyl with from 1 to 6 carbon atoms, inclusive, nuclearly-substituted or unsubstituted phen(lower)alkyl, hydroxy(lower)alkyl, (lower)alkyloxo(lower)alkyl, (lower)alkoxy(lower)alkyl, nuclearly-substituted or unsubstituted phenoxy(lower)alkyl, nuclearly-substituted or unsubstituted phenyl(lower)alkoxy(lower)alkyl and nucearly-substituted or unsubstituted phenyloxo(lower)alkyl; each occurrence of "lower" denoting a carbon skeleton having from 1 to 4 carbon atoms, inclusive; and any substituent of a nuclearly-substituted benzene ring being an atom of a halogen having an atomic number from 9 to 35, inclusive; and

each of $R_3$ and $R_3$ is, independently, a member selected from the group consisting of —H and alkyl having from 1 to 4 carbon atoms, inclusive;

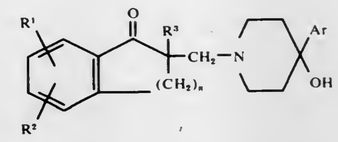
and (b) an acid-addition salt of (a).

## 4,016,281
## TETRALONE AND INDANONE COMPOUNDS

Rochus Jonas; Jürgen Uhl; Helmut Müller-Calgan, and Klaus Irmscher, all of Darmstadt, Germany, assignors to Merck Patent Gesellschaft mit beschrankter Haftung, Darmstadt, Germany

Filed Feb. 18, 1976, Ser. No. 659,132
Claims priority, application Germany, Feb. 22, 1975, 2507782; Dec. 13, 1975, 2556196
Int. Cl.² C07D *211/52*
U.S. Cl. 424—267 29 Claims

1. A tetralone or indanone compound of the formula



wherein R¹ is H, OH, alkoxy of 1–4 carbon atoms, cycloalkoxy of 3–6 carbon atoms, F, Cl, Br, $NO_2$, $NH_2$, monoalkylamino or dialkylamino, wherein the alkyl each are of 1–4 carbon atoms, alkanoyloxy of 1–6 carbon atoms or alkanoylamino of 1–4 carbon atoms; R² is H, OH, or alkoxy of 1–4 carbon atoms or R¹ and R² collectively are methylenedioxy; R³ is H or $CH_3$; Ar is phenyl or phenyl substituted by up to 5 of alkyl or alkoxy of 1–4 carbon atoms, F, Cl, Br, or $CF_3$; *n* is 1 or 2, and pharmaceutically-acceptable acid addition salts thereof.

## 4,016,282
## UREIDOACETAMIDO-PENICILLINS

Hans-Bodo König; Wilfried Schröck, both of Wuppertal-Elberfeld; Hans Disselnkötter, Cologne, and Karl Georg Metzer, Wuppertal-Elberfeld, all of Germany, assignors to Bayer Aktiengesellschaft, Germany

Division of Ser. No. 425,966, Dec. 19, 1973, Pat. No. 3,959,258, which is a division of Ser. Nos. 145,809, May 21, 1971, abandoned, and Ser. No. 145,877, May 21, 1971, abandoned. This application Apr. 16, 1975, Ser. No. 568,384
Claims priority, application Germany, May 25, 1970, 2025414; May 25, 1970, 2025415
Int. Cl.² A61K *31/43*
U.S. Cl. 424—271 31 Claims

1. A pharmaceutical composition for treating bacterial infections comprising an antibacterially effective amount of a penicillin of the formula:

## 4,016,274
## NAPHTHYRIDINE DERIVATIVES

**Claude Cotrel, Paris; Cornel Crisan, Sceaux; Claude Jeanmart, Brunoy (Essonne), and Mayer Naoum Messer, Bievres (Essone), all of France, assignors to Rhone-Poulenc S.A., Paris, France**

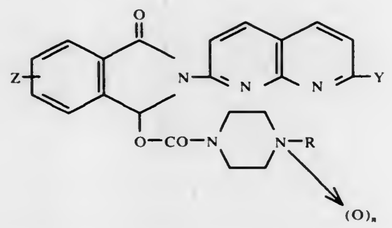
**Continuation-in-part of Ser. No. 469,431, May 13, 1974, abandoned. This application Oct. 17, 1975, Ser. No. 623,359**

**Claims priority, application France, May 15, 1973, 73.17516; Mar. 14, 1974, 74.08728; Mar. 14, 1974, 74.08730**

**Int. Cl.² C07D *401/14***

**U.S. Cl. 424—250** **29 Claims**

**1.** A naphthyridine derivative of the formula:



wherein Y represents hydrogen, halogen, alkyl of 1 through 4 carbon atoms, alkoxy of 1 through 4 carbon atoms, or cyano, Z represents hydrogen, halogen, alkoxy of 1 through 4 carbon atoms, nitro or trifluoromethyl, and n represents zero and R represents hydrogen, alkyl of 1 through 4 carbon atoms, alkenyl of 2 through 4 carbon atoms, alkynyl of 2 through 4 carbon atoms or hydroxyalkyl of 1 through 4 carbon atoms, or phenyl, or n represents 1 and R represents alkyl of 1 through 4 carbon atoms or hydroxyalkyl of 1 through 4 carbon atoms, and non-toxic pharmaceutically acceptable acid addition salts thereof.

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## 4,016,275
## INSECTICIDAL HYDROCARBYL SULFENYLMERCAPTO PYRIMIDINES

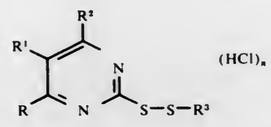
**Joseph E. Moore, Richmond, Calif., assignor to Chevron Research Company, San Francisco, Calif.**

**Continuation-in-part of Ser. No. 461,578, April 17, 1974, Pat. No. 3,896,225, which is a division of Ser. No. 201,185, Nov. 22, 1971, Pat. No. 3,821,222. This application July 3, 1975, Ser. No. 592,831**

**Int. Cl.² A01N *9/00*; C07D *239/22***

**U.S. Cl. 424—251** **4 Claims**

**1.** A method of killing insects which comprises contacting pre-adult insects with a metamorphosis-inhibiting amount of a compound of the formula



wherein R, $R^1$ and $R^2$ are individually hydrogen, halogen of atomic number 9 to 35, hydroxy, alkyl of 1 to 6 carbon atoms substituted with 0 to 4 halogen atoms of atomic number 9 to 35 or alkenyl of 2 to 6 carbon atoms substituted with 0 to 4 halogen atoms of atomic number 9 to 35, $R^3$ is haloalkyl or haloalkenyl of up to 10 to carbon atoms substituted with 1 to 5 halogen atoms of atomic number 9 to 35 or phenyl substituted with 0 to 2 halogen atoms of atomic number 9 to 35 or alkyl groups of 1 to 4 carbon atoms.

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## 4,016,276
## TREATMENT OF LIVER DYSFUNCTION WITH 2-AMINO-6-BENZYL-3-ETHOXYCARBONYL-4,5,6,7-TETRAHYDRO-THIENO[2,3-C]PYRIDINE HYDROCHLORIDE

**Toshihiro Kobayakawa, Yoshitomi; Hiroshi Yasuda, Nakatsu; Kazuhiro Goto, Nakatsu, and Michio Nakanishi, Nakatsu, all of Japan, assignors to Yoshitomi Pharmaceutical Industries, Ltd., Osaka, Japan**

**Filed Apr. 17, 1975, Ser. No. 569,118**

**Int. Cl.² A61K *31/435***

**U.S. Cl. 424—256** **3 Claims**

1. A method for the treatment of liver dysfunction in mammals which comprises administering to said mammals an effective amount of 2-amino-6-benzyl-3-ethoxycarbonyl-4,5,6,7-tetrahydro-thieno-[2,3-c]pyridine hydrochloride.

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## 4,016,277
## 4-QUINOLINE AND 4-ISOQUINOLINE DERIVATIVES OF 2,6-DIAMINO-1,4-DIHYDROPYRIDINE

**Horst Meyer, Wuppertal; Friedrich Bossert, Wuppertal-Elberfeld; Wulf Vater, Opladen, and Kurt Stoepel, Wuppertal, all of Germany, assignors to Bayer Aktiengesellschaft, Germany**

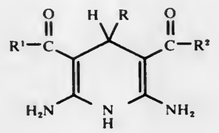
**Division of Ser. Nos. 454,996, March 27, 1974, Pat. No. 3,950,336, and Ser. No. 445,258, March 27, 1974, Pat. No. 3,905,747, each is a division of Ser. No. 336,483, Feb. 28, 1973, Pat. No. 3,855,231. This application Feb. 28, 1975, Ser. No. 554,135**

**Claims priority, application Germany, Mar. 6, 1972, 2210687**

**Int. Cl.² A61K *31/47***

**U.S. Cl. 424—258** **8 Claims**

**1.** A pharmaceutical composition useful for effecting coronary vessel dilation and treating hypertension in humans and animals which comprises a coronary vessel dilating amount or an antihypertensive amount of a compound of the formula:



wherein

R is quinolyl or isoquinolyl, unsubstituted or substituted by one or two members selected from the group consisting of lower alkyl, lower alkoxy and halogeno; and

each of $R^1$ and $R^2$, taken independently of the other, is lower alkoxy, lower alkoxy(lower alkoxy), alkenyloxy of 2 to 4 carbon atoms, alkynyloxy of 2 to 4 carbon atoms, amino, lower alkylamino or di(lower alkyl)amino.

in combination with a pharmaceutically acceptable non-toxic inert diluent or carrier.

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## 4,016,278
## PESTICIDAL CARBAMATES

**Richard C. Koch, Niantic, Conn., and Hugh C. Richards, Canterbury, England, assignors to Pfizer Inc., New York, N.Y.**

**Filed July 14, 1975, Ser. No. 595,535**

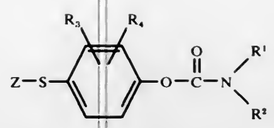
**Claims priority, application United Kingdom, July 17, 1974, 31612/74**

**Int. Cl.² A01N *9/22***

**U.S. Cl. 424—263** **10 Claims**

**1.** A compound of the formula





wherein $R^1$ is alkyl having from one to five carbon atoms;

$R^2$ is selected from the group consisting of hydrogen, alkyl having from one to five carbon atoms, alkanoyl having from two to five carbon atoms and chloroacetyl;

$R^3$ and $R^4$ are each selected from the group consisting of hydrogen and alkyl having from one to five carbon atoms; and

Z is selected from the group consisting of 2-pyridyl, 3-pyridyl and 4-pyridyl.

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## 4,016,279
## SPRAY COMPOSITIONS FOR INHALATION THERAPY OF BRONCHIAL DISORDERS

**Rudolf Bauer, Wiesbaden, and Helmut Wick, Ingelheim, both of Germany, assignors to Boehringer Ingelheim GmbH, Ingelheim am Rhein, Germany**

**Continuation-in-part of Ser. No. 487,054, July 10, 1974, abandoned, which is a continuation-in-part of Ser. No. 271,558, July 13, 1972, abandoned. This application Jan. 13, 1976, Ser. No. 648,729**

**Claims priority, application Germany, July 13, 1971, 2134899**

**Int. Cl.² A61L *9/04*; A61K *9/14, 31/46***

**U.S. Cl. 424—265** **4 Claims**

**1.** An inhalation spray composition for treating bronchial disorders, consisting essentially of a pharmaceutically inert liquid carrier and 0.007 to 1% by weight, based on the total weight, of N-ethyl-norscopolamine methobromide or N-methyl-scopolammonium bromide.

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## 4,016,280
## 4,4-DIARYLPIPERIDINE COMPOSITIONS AND USE

**Heinz Günter Menge, Constance, and Josef Klosa, Berlin, both of Germany, assignors to Byk Gulden Lomberg Chemische Fabrik GmbH, Germany**

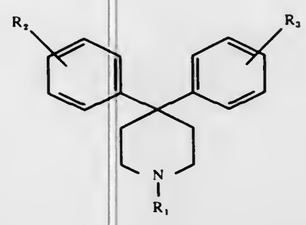
**Division of Ser. No. 455,041, March 26, 1974, which is a continuation-in-part of Ser. No. 55,957, July 17, 1970, abandoned. This application May 13, 1975, Ser. No. 576,973**

**Claims priority, application Germany, July 17, 1969, 1936452**

**Int. Cl.² A61K *31/445***

**U.S. Cl. 424—267** **25 Claims**

**1.** A neuroleptic or CNS-stimulating medicament composition in dosage form wich contains, as a pharmacologically-active component thereof, an effective concentration of at least one physiologically-acceptable 4,4-diarylpiperidine in admixture with a pharmaceutically-acceptable carrier, and in which at least one physiologically-acceptable 4,4-diarylpiperidine is a member selected from the group consisting of (a) a compound of the formula



wherein

$R_1$ is a member selected from the group consisting of —H, alkyl with from 1 to 6 carbon atoms, inclusive, nuclearly-substituted or unsubstituted phen(lower)alkyl, hydroxy(lower)alkyl, (lower)alkyloxo(lower)alkyl, (lower)alkoxy(lower)alkyl, nuclearly-substituted or unsubstituted phenoxy(lower)alkyl, nuclearly-substituted or unsubstituted phenyl(lower)alkoxy(lower)alkyl and nucearly-substituted or unsubstituted phenyloxo(lower)alkyl; each occurrence of "lower" denoting a carbon skeleton having from 1 to 4 carbon atoms, inclusive; and any substituent of a nuclearly-substituted benzene ring being an atom of a halogen having an atomic number from 9 to 35, inclusive; and

each of $R_3$ and $R_3$ is, independently, a member selected from the group consisting of —H and alkyl having from 1 to 4 carbon atoms, inclusive;

and (b) an acid-addition salt of (a).

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## 4,016,281
## TETRALONE AND INDANONE COMPOUNDS

**Rochus Jonas; Jürgen Uhl; Helmut Müller-Calgan, and Klaus Irmscher, all of Darmstadt, Germany, assignors to Merck Patent Gesellschaft mit beschrankter Haftung, Darmstadt, Germany**

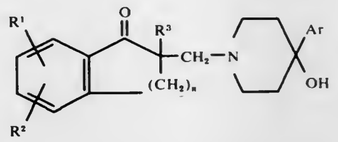
**Filed Feb. 18, 1976, Ser. No. 659,132**

**Claims priority, application Germany, Feb. 22, 1975, 2507782; Dec. 13, 1975, 2556196**

**Int. Cl.² C07D *211/52***

**U.S. Cl. 424—267** **29 Claims**

1. A tetralone or indanone compound of the formula



wherein $R^1$ is H, OH, alkoxy of 1–4 carbon atoms, cycloalkoxy of 3–6 carbon atoms, F, Cl, Br, $NO_2$, $NH_2$, monoalkylamino or dialkylamino, wherein the alkyl each are of 1–4 carbon atoms, alkanoyloxy of 1–6 carbon atoms or alkanoylamino of 1–4 carbon atoms; $R^2$ is H, OH, or alkoxy of 1–4 carbon atoms or $R^1$ and $R^2$ collectively are methylenedioxy; $R^3$ is H or $CH_3$; Ar is phenyl or phenyl substituted by up to 5 of alkyl or alkoxy of 1–4 carbon atoms, F, Cl, Br, or $CF_3$; *n* is 1 or 2, and pharmaceutically-acceptable acid addition salts thereof.

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## 4,016,282
## UREIDOACETAMIDO-PENICILLINS

**Hans-Bodo König; Wilfried Schröck, both of Wuppertal-Elberfeld; Hans Disselnkötter, Cologne, and Karl Georg Metzer, Wuppertal-Elberfeld, all of Germany, assignors to Bayer Aktiengesellschaft, Germany**

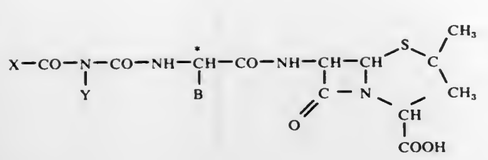
**Division of Ser. No. 425,966, Dec. 19, 1973, Pat. No. 3,959,258, which is a division of Ser. Nos. 145,809, May 21, 1971, abandoned, and Ser. No. 145,877, May 21, 1971, abandoned. This application Apr. 16, 1975, Ser. No. 568,384**

**Claims priority, application Germany, May 25, 1970, 2025414; May 25, 1970, 2025415**

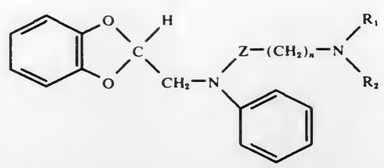
**Int. Cl.² A61K *31/43***

**U.S. Cl. 424—271** **31 Claims**

**1.** A pharmaceutical composition for treating bacterial infections comprising an antibacterially effective amount of a penicillin of the formula:



(I)



wherein
the carbon atom designated by * constitutes a center of chirality;
X is hydrogen, lowr alkyl, monohalo(lower alkyl), dihalo (lower alkyl), trihalo(lower alkyl), lower alkoxy, or cyclohexyloxy;
Y is lower alkyl; and
B is phenyl or phenyl substituted by lower alkyl, lower alkoxy, monohalo, dihalo, or lower alkylthio;
or a pharmaceuticaly acceptable nontoxic salt thereof, in combination with a pharmaceutically acceptable nontoxic, inert diluent or carrier.

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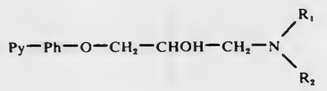
**4,016,283**

## COMPOSITION AND METHOD FOR TREATMENT OF HEART AND CIRCULATORY AILMENTS

**Knut A. Jaeggi, Basel; Franz Ostermayer, Riehen, and Herbert Schröter, Fullinsdorf, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

**Division of Ser. No. 447,118, Feb. 28, 1974, Pat. No. 3,984,436. This application Nov. 24, 1975, Ser. No. 634,809**
**Claims priority, application Switzerland, Mar. 9, 1973, 3518/75**
**Int. Cl.² A61K *31/40***
**U.S. Cl. 424—274** **2 Claims**

1. A pharmaceutical composition useful as blockers of adrenergic $\beta$-receptors in the treatment of heart and circulatory ailments comprising a therapeutically effective amount of a pyrrolyl compound of the formula I



(I)

wherein Py is 1-pyrrolyl or mono- or di-lower alkylated 1pyrrolyl, Ph is phenylene, $R_1$ is hydrogen or lower alkyl and $R_2$ is hydrogen, lower alkyl, phenyl-lower alkyl having up to 10 carbon atoms wherein the phenyl ring is unsubstituted or monosubstituted by lower alkyl, lower alkoxy, halogen or trifluoromethyl, or $R_1$ and $R_2$ together are lower alkylene, their antipodes or salts, together with a pharmaceutical excipient.

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**4,016,284**

## DERIVATIVES OF 1,3-BENZODIOXOLE, THE PREPARATION AND USE THEREOF

**Pierre M. Vanhoof, and Pierre M. Clarebout, both of Brussels, Belgium, assignors to A. Christiaens Societe Anonyme, Brussels, Belgium**

**Filed Dec. 17, 1974, Ser. No. 533,558**
**Claims priority, application United Kingdom, Dec. 17, 1973, 58292/73**
**Int. Cl.² A61K *31/36***
**U.S. Cl. 424—282** **5 Claims**

1. Derivatives of 1,3-benzodioxole of the following general formula:



in which Z represents $-CH_2-$, $R_1$ and $R_2$ which may be identical or different represent each a lower alkyl group containing 1 to 4 carbon atoms, and $R_1$ may also represent hydrogen, $n$ is equal to 1 or 2 and the pharmaceutically acceptble acid addition salts thereof.

5. A pharmaceutical composition for the treatment of heart arrhythmia which comprises as the active ingredient an amount effective to treat heart arrhythmia of a derivative according to claim 1 together with a pharmaceutical excipient.

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**4,016,285**

## ACETIC ACID DERIVATIVE HAVING CHOLERETIC AND ANTI-INFLAMMATORY ACTIVITY

**Eugene Boschetti, Venissieux; Philippe Briet; Jean-Jacques Berthelon, and Janine Chabert, all of Lyon, all of France, assignors to Lipha, Lyonnaise Industrielle Pharmaceutique, Lyon, France**

**Filed July 28, 1975, Ser. No. 599,778**
**Claims priority, application France, Aug. 5, 1974, 74.27067**
**Int. Cl.² A61K *31/35***
**U.S. Cl. 424—283** **5 Claims**

1. A pharmaceutical composition having choleretic and anti-inflammatory activity, comprising per dosage unit as an essential active ingredient from about 100 mg to about 2 g of $\alpha$-[6-(2-phenyl)-chromonyl]-acetic acid or an alkali metal salt thereof, in association with a pharmaceutically acceptable carrier or excipient therefor.

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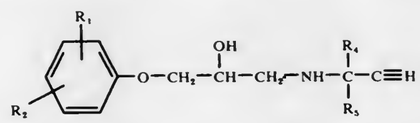
**4,016,286**

## PHARMACEUTICAL COMPOSITIONS CONTAINING A 1-PHENOXY-2-HYDROXY-3-ALKYNYLAMINO-PROPANE AND THEIR USE AS ADRENOLYTICS AND HYPOTENSIVES

**Herbert Köppe; Werner Kummer; Helmut Stähle, and Gojko Muacevic, all of Ingelheim am Rhein, Germany, assignors to Boehringer Ingelheim GmbH, Ingelheim am Rhein, Germany**

**Division of Ser. No. 444,713, Feb. 22, 1974, Pat. No. 3,925,446. This application Sept. 23, 1975, Ser. No. 615,913**
**Claims priority, application Germany, Feb. 28, 1973, 2309887; Jan. 26, 1974, 2403809**
**Int. Cl.² A61K *31/135***
**U.S. Cl. 424—304** **12 Claims**

1. A pharmaceutical dosage unit composition consisting essentially of an inert pharmaceutical carrier and an effective adrenolytic or hypotensive amount of a racemic or optically active compound of the formula



wherein
$R_1$ is $-(CH_2)_x-CN$, where X is 0, 1, 2 or 3,
$R_2$ is hydrogen, halogen or —NH—CO—NHR, where R is lower alkyl,
$R_4$ is alkyl of 1 to 3 carbon atoms, and



$R_5$ is alkyl of 1 to 3 carbon atoms or, together with $R_4$, $-(CH_2)_p-$ where $p$ is 4, 5 or 6,
or a physiologically compatible acid addition salt thereof.

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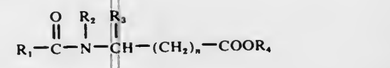
**4,016,287**

## DERMATOLOGICAL COMPOSITIONS CONTAINING AN ACYLAMINO-CARBOXYLIC ACID OR AN ALKYL ESTER THEREOF

**Hans Eberhardt, and Rolf Stefan Brickl, both of Biberach an der Riss, Germany, assignors to Boehringer Ingelheim GmbH, Ingelheim am Rhein, Germany**

**Continuation-in-part of Ser. No. 379,751, July 16, 1973, abandoned. This application July 17, 1975, Ser. No. 596,852**
**Int. Cl.² A61K *31/24***
**U.S. Cl. 424—309** **6 Claims**

1. A method of inhibiting the sebaceous gland execretion and combatting inflammations of the skin, which comprises topically applying to the skin an effective amount of a composition consisting essentially of an inert dermatological carrier and from 0.1 to 20% by weight, based on the total weight, of a compound of the formula



wherein
$R_1$ is hydrogen, alkyl of 1 to 3 carbon atoms, trifluoromethyl, phenyl, halo-phenyl, nitro-phenyl or biphenylyl,
$R_2$ is hydrogen, alkyl of 1 to 3 carbon atoms or phenyl,
$R_3$ is hydrogen, alkyl of 1 to 6 carbon atoms, methylthioethyl or benzyl,
$R_4$ is alkyl of 10 to 22 carbon atoms or, when $R_1$ is biphenylyl, also hydrogen, and
$n$ is 0, 1 or 2.

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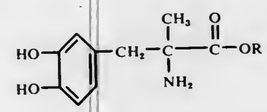
**4,016,288**

## COMPOSITIONS AND METHOD OF TREATING HYPERTENSION

**Alexander Scriabine, Ambler, and Clement A. Stone, Blue Bell, both of Pa., assignors to Merck & Co., Inc., Rahway, N.J.**

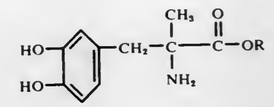
**Filed Aug. 13, 1975, Ser. No. 604,292**
**Int. Cl.² A61K *31/24, 31/195***
**U.S. Cl. 424—309** **15 Claims**

1. A method for lowering blood pressure in an animal which comprises administering to the animal a therapeutically effective amount of a composition containing a compound (A) selected from the group consistisng of L-$\alpha$-hydrazino-$\alpha$-lower-alkyl-3,4-dihydroxyphenyl propionic acid or $\alpha$-hydrazino-3,4-dihydroxyphenyl propionic acid and a pharmaceutically acceptable non-toxic salt thereof and a compound (B) having the formula:



wherein
R is a radical selected from the group consisting of 2-acetamidoethyl, $\alpha$-pivaloyloxyethyl and $\alpha$-succinimidoethyl,
or a pharmaceutically acceptable non-toxic salt thereof, and wherein the weight ratio of (A) : (B) is from about 0.05 to about 20.

9. A pharmaceutical composition comprising an inert pharmaceutically acceptable diluent and a therapeutically effective amount of a compound (A) selected from the group consisting of L-$\alpha$-hydrazino-$\alpha$-loweralkyl-3,4-dihydroxyphenyl propionic acid or $\alpha$-hydrazino-3,4-dihydroxyphenyl propionic acid and a pharmaceutically acceptable non-toxic salt thereof and a compound (B) having the formula:



wherein
R is a radical selected from the group consisting of 2-acetamidoethyl, $\alpha$-pivaloyloxyethyl and $\alpha$-succinimidoethyl,
or a pharmaceutically acceptable non-toxic salt thereof, and wherein the weight ratio of (A) : (B) is from about 0.05 to about 20.

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**4,016,289**

## MEDICINAL PREPARATION FOR TREATMENT OF VIRAL-ETIOLOGY DISEASES

**Grigory Nikolaevich Pershin, Novopeschanaya ulitsa, 19/10, kv. 75; Nadezhda Sergeevna Bogdanova, ulitsa 26 Bakinskikh Komissarov, 1, korpus 1, kv. 26; Irina Sergeevna Nikolaeva, Matveevskaya ulitsa, 1, kv. 179; Jury Fedorovich Maichuk, ulitsa Usievicha, 11, kv. 4; Roza Isaakovna Abramishvili, ulitsa Narodnogo opolchenia, 11, kv. 27; Teshabai Nazarovich Avazov, Sadovo-Chernogryazskaya ulitsa, 14/19, kv. 1; Galina Yakovlevna Uretskaya, Belyaevo-Bogorodskoe, kvartal 46-47, korpus 40, kv. 170; Svetlana Jurievna Anikina, B. Serpukhovskaya ulitsa, 70, kv. 5; Alexei Nikolaevich Grinev, Belyaevo-Bogorodskoe, kvartal 44, korpus 9, kv. 57, and Maxim Yakovlevich Kraft, Leninsky prospekt, 93, kv. 29, all of Moscow, U.S.S.R.**

**Continuation of Ser. No. 224,271, Feb. 7, 1972, abandoned. This application May 27, 1975, Ser. No. 581,413**
**Int. Cl.² A61K *31/185, 31/11, 31/12***
**U.S. Cl. 424—315** **15 Claims**

1. A medicinal preparation for the treatment of virus-caused eye and skin diseases, said preparation containing an amount effective against said virus of the bisulfite compound of 2-fluorenonyl-glyoxal in combination with an unctuous base.

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**4,016,290**

## METHOD OF ENCAPSULATING POLYAMINOPOLYCARBOXYLIC ACID CHELATING AGENTS IN LIPOSOMES

**Yueh Erh Rahman, Downers Grove, Ill., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.**

**Division of Ser. No. 415,077, Nov. 12, 1973, Pat. No. 3,932,657. This application Nov. 10, 1975, Ser. No. 630,474**
**Int. Cl.² A61K *31/195, 31/685, 47/00***
**U.S. Cl. 424—319** **4 Claims**

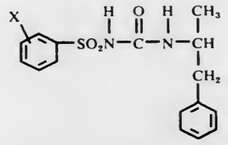
1. A method of encapsulating a polyaminopolycarboxylic acid chelating agent within liposomes comprising: drying a lipid mixture to form a thin film; wetting the lipid film with a solution containing the polyaminopolycarboxylic acid chelating agent; mixing the solution and the wetted lipid film to form a suspension of liposomes encapsulating said chelating agent; and separating said liposomes.

4,016,291
## BENZENESULFONYL UREA COMPOUNDS AND THEIR THERAPEUTIC USE

Lester Zitowitz, West Orange; Lewis A. Walter, Madison, and Arnold J. Wohl, North Caldwell, all of N.J., assignors to Schering Corporation, Kenilworth, N.J.

Division of Ser. No. 529,888, Dec. 5, 1974, which is a continuation-in-part of Ser. No. 165,588, July 23, 1971, abandoned, which is a continuation-in-part of Ser. No. 877,000, Nov. 14, 1969, abandoned, which is a continuation-in-part of Ser. No. 853,504, Aug. 27, 1969, abandoned. This application Mar. 15, 1976, Ser. No. 667,243
Int. Cl.² C07C *127/16*
U.S. Cl. 424—322 8 Claims

1. A method for the prevention and reversal of the symptoms of angina pectoris which comprises administering a therapeutically effective quantity of a compound of the formula



and the salts thereof formed with pharmaceutically acceptable bases, wherein X is methyl.

4,016,292
## PROCESS FOR IMPROVING THE COLOR STABILITY OF FRESH MEAT

David Edward Hood, 13 Taney Rd., Dundrum, Dublin 14, Ireland

Filed Sept. 3, 1974, Ser. No. 502,862
Int. Cl.² A23L *1/31*
U.S. Cl. 426—2 7 Claims

1. A process for improving the color stability of fresh meat which is to be sold as prepackaged cuts, characterized in that it comprises the steps of injecting into the vascular system of a living animal from which said meat is to be taken a dose of ascorbic acid or a salt thereof in the range of 0.25g. to 1.25g. per kg. liveweight of the animal, holding the animal for a time sufficient to attain distribution of the ascorbic acid or salt thereof through the muscle tissues, and then slaughtering the animal under bacteriologically clean conditions, whereby the the color of the meat remains stable for 6–7 days under refrigerated conditions.

4,016,293
## METHOD OF CARRYING OUT ENZYME CATALYZED REACTIONS

Robert W. Coughlin, 902 Seventh Ave., Bethlehem, Pa. 18018, and Marvin Charles, 622 N. 29 St., Allentown, Pa. 18104

Continuation-in-part of Ser. No. 228,748, Feb. 23, 1972, Pat. No. 3,928,143. This application Feb. 11, 1974, Ser. No. 441,569
Int. Cl.² C12D *13/02*
U.S. Cl. 426—42 14 Claims

1. An improved method of effecting enzymatic reactions in a reactant material which is contained in a carrier fluid by passing the carrier fluid past enzyme material attached by adsorption to a supporting material comprising:

a. passing the carrier fluid generally upwardly through a reaction zone containing finely divided particles of supporting material having a size range of about 0.01 millimeters to 5 millimeters and a density of from about 2.4 to 25 grams/cm³ to which the enzyme material is attached by adsorption, the volume of the reaction zone being sufficient to contain all of the particulate supporting material in at least an expanded condition wherein the various particles are substantially not supported upon each other,

b. maintaining an upward velocity of carrier fluid through said reaction zone sufficient to suspend and agitate the said particulate supporting material, but insufficient to carry said particulate supporting material from said reaction zone.

4,016,294
## ANIMAL FEEDS FOR HERBIVOROUS DOMESTIC ANIMALS

Elmer F. Glabe, Northbrook; Perry W. Anderson, Niles, and Stergios Laftsidis, Chicago, all of Ill., assignors to Food Technology Products, Chicago, Ill.

Division of Ser. No. 484,080, June 28, 1974, Pat. No. 3,925,559, and a continuation-in-part of Ser. No. 300,736, Oct. 25, 1972, abandoned, which is a continuation-in-part of Ser. No. 158,616, June 30, 1971, abandoned. This application Sept. 15, 1975, Ser. No. 613,068
The portion of the term of this patent subsequent to Dec. 9, 1992, has been disclaimed.
Int. Cl.² A23L *1/30;* A23K *1/16;* A23B *7/14*
U.S. Cl. 426—72 4 Claims

1. An animal feed for herbivorous animals selected from the group consisting of cattle, pigs, horses, sheep, goats and fowl containing sodium diacetate added thereto in sufficient amount to serve as an attractant and to enhance the taste threshhold of said feed, the amount of sodium diacetate being within the range of 0.1% to 1.5% by weight of the total feed, and said feed to which said sodium diacetate is added being selected from the group consisting of corn and mixed feeds containing at least 25% by weight of corn wherein said sodium diacetate is present in the endosperm of the corn.

4,016,295
## PROTEINACEOUS FOOD PRODUCT

Ian Edward Burrows, Gaddesby, and Peter Arthur Cheney, Mountsorrell, England, assignors to Pedigree Petfoods Limited, Melton Mowbray, England

Filed Oct. 17, 1974, Ser. No. 515,674
Claims priority, application United Kingdom, Oct. 18, 1973, 48665/73
Int. Cl.² A23B *4/12*
U.S. Cl. 426—43 8 Claims

1. A method of making an edible proteinaceous food product comprising the steps of:

fermenting carbohydrate in the presence of animal-derived proteinaceous material to produce acid;

adding the fermented material to a colloidal solution of a another protein, the said fermentation having been continued sufficiently to acidify and thereby precipitate said other protein in the form of a curd that entraps and binds the fermented material; separating off said curd and entrapped material; and pressing the separated material into a compact mass.

4,016,296
## ANIMAL FEED BLOCK

Stanislao A. DeSantis, Rolling Hills, Calif., assignor to Milo Don Appleman, Los Angeles, Calif., a part interest

Filed Mar. 18, 1976, Ser. No. 668,225
Int. Cl.² A23K *1/22*
U.S. Cl. 426—69 14 Claims

1. An animal feed block comprising:

about 25 to about 75% by wt. of molasses;

about 0.5 to about 5% by wt. of water absorbent clay;

about 0.2 to about 3% by wt. of water binding agent;

about 0.5 to about 10% by wt. of hard soap; and

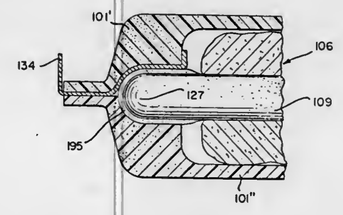
a member selected from the group consisting of natural protein source in an amount from about 5 to about 35% by wt., non-protein nitrogen source in an amount from about 2 to about 10% by wt., phosphorous source in an amout from about 0.5 to about 7% by weight calculated as phosphorous, fatty acid in an amount from about 1 to about 10% by wt., fat in an amount from about 1 to about 5% by wt., and mixtures thereof to make up 100% by weight of said feed block.



4,016,297
## ELECTRICALLY CONDUCTING FOODSTUFF COATED WITH COMPOSITION OF MATTER CONSISTING ESSENTIALLY OF GEL AND IONIZED SPECIES

Ernst Theodore Theimer, Rumson, and George E. Heinze, East Brunswick, both of N.J., assignors to Lectrofood, Inc., East Brunswich, N.J.

Continuation-in-part of Ser. No. 446,822, Feb. 28, 1974, Pat. No. 3,966,972. This application Apr. 12, 1976, Ser. No. 675,773
Int. Cl.² A23L *1/04, 3/32*
U.S. Cl. 426—90 9 Claims




1. An electrically high conducting food substance comprising:

a. Substantially diametrically opposite high conducting ends;

b. Each end having a substantially solid surface;

c. At least two electrical contacts located at said substantially diametrically opposite ends of said food substance and in contact with each of said substantially solid surfaces; and

d. At least a substantial portion of each of said substantially solid surfaces having in intimate contact therewith and as an integral part of each of said solid surfaces a composition forming a continuous phase and consisting essentially of:

i. A gel selected from the group consisting of agar, xanthan gum, tragacanth, guar gum, gum arabic and algin gum; and

ii. An edible non-toxic substantially ionized species selected from the group consisting of sodium chloride, potassium chloride, ammonium chloride, magnesium chloride, sodium glutamate, potassium glutamate, sodium alginate, potassium alginate, ammonium alginate, magnesium alginate, calcium alginate, sodium bicarbonate, potassium bicarbonate, magnesium bicarbonate, and calcium bicarbonate

wherein the weight ratio of gel to substantially ionized species is from about 1:20 up to about 20:1, said composition also being positioned to make full intimate contact between the electrically high conducting food substances and the electrical contacts whereby the contact is rendered non-arcing when an electromotive force is applied to said electrical contacts, the ratio of the surface area of said food substance coated with said composition of gel and substantially ionized species to the surface area of said food substance not coated with said composition being in the range of from 1:50 up to 1:4.

4,016,298
## CHEESE EXTENDER

Robert L. Kasik, Berwyn, and Marvin A. Peterson, Park Ridge, both of Ill., assignors to Beatrice Foods Co., Chicago, Ill.

Division of Ser. No. 455,510, March 27, 1974, Pat. No. 3,917,854. This application Oct. 20, 1975, Ser. No. 624,261
The portion of the term of this patent subsequent to Nov. 4, 1992, has been disclaimed.
Int. Cl.² 426 *657;* A23C *19/12*
U.S. Cl. 426—94 21 Claims

1. A food composition which normally contains cheese and the inclusion thereof as a cheese substitute congealed mixture of: essentially magnesium neutralized casein or potassium neutralized casein or a mixture of magnesium and potassium neutralized casein; a fat having a melting point of 130° F. or less; and water; wherein the weight ratio of the neutralized casein-to-fat is from 1:2 to 2:1 and the weight ratio of water to the combination of neutralized casein and fat is from 1:2 to 3:1.

4,016,299
## PROCESS OF COATING FOOD WITH PARTICULATE MATERIAL

Raymond E. Booth, Sandusky, Ohio, assignor to Sam Stein Associates, Inc., Sandusky, Ohio

Continuation-in-part of Ser. No. 544,323, Jan. 27, 1975, Pat. No. 3,967,583. This application Dec. 12, 1975, Ser. No. 640,235
Int. Cl.² A23L *1/00*
U.S. Cl. 426—293 3 Claims

1. The method of coating a food product with a finely divided particulate coating material comprising the steps of (1) providing a liquid coating on the food product; (2) providing a flow of said coating material to a moving belt which provides a product path centrally thereof; (3) splitting said flow and providing a bed of said material of predetermined thickness on a central portion of said product path while diverting parts of said material flow laterally on both sides of said central portion; (4) placing a food product on said central portion; (5) advancing said product and said coatingmaterial down said path; (6) moving said laterally diverted parts of material flow laterally inwardly on top of said food product; (7) discharging said coated product at the end of said path.

4,016,300
## METHOD OF HEATING MICROBIAL CELLS

Philip M. Arnold, and Emil A. Malick, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Dec. 4, 1975, Ser. No. 637,510
Int. Cl.² A23J *3/00, 1/18*
U.S. Cl. 426—429 8 Claims

1. A process for reducing the water content of a dispersion of microorganisms in an aqueous medium, said process comprising the steps of:

a. contacting a dispersion of microbial cells in an aqueous medium with a heating medium containing at least one hydrocarbon selected from a group comprising $C_3$–$C_8$ hydrocarbons at a temperature at least about 100° C for a time sufficient to dewater said cells to a water content of less than about 13 percent by weight; and

b. separating the heating medium from the microbial cells.

## 4,016,301
## ELECTRICALLY CONDUCTIBLE GELLABLE COMPOSITION WITH IONIZED SALT

**Ernst Theodore Theimer, Rumson, and George E. Heinze, East Brunswick, both of N.J., assignors to Lectrofood, Inc., East Brunswick, N.J.**

**Continuation-in-part of Ser. No. 446,822, Feb. 28, 1974, Pat. No. 3,966,972. This application Apr. 12, 1976, Ser. No. 676,392**

**Int. Cl.² A23L** *1/04*

**U.S. Cl. 426—573** **3 Claims**

1. An edible electrically high conducting composition which forms a continuous phase on setting, consisting initially of:

i. From 86 up to 99.3 weight percent water;

ii. From 0.5% up to 4.0% by weight of a material selected from the group consisting of agar, xanthan gum, tragacanth, guar gum, gum arabic and algin gum;

iii. From 0.2% up to 10.0% by weight of an edible ionized species selected from the group consisting of sodium chloride, potassium chloride, ammonium chloride, magnesium chloride, sodium glutamate, potassium glutamate, calcium glutamate, magnesium glutamate, sodium alginate, potassium alginate, calcium alginate and magnesium alginate, sodium bicarbonate, potassium bicarbonate, magnesium bicarbonate and calcium bicarbonate.

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## 4,016,302
## MARGARINE FAT BLEND

**Hans Robert Kattenberg, and Cornelis Poot, both of Vlaardingen, Netherlands, assignors to Lever Brothers Company, New York, N.Y.**

**Continuation of Ser. No. 433,953, Jan. 16, 1974, abandoned. This application Sept. 8, 1975, Ser. No. 610,957**

**Int. Cl.² A23D** *5/00*

**U.S. Cl. 426—607** **3 Claims**

1. A fat blend containing 30–80 percent of a palm-based fat selected from the group consisting of hydrogenated palm oil, unhydrogenated palm oil and the solid and liquid fractions thereof, 15–85 percent of said palm-based fat is co-randomized with one or more non-palm-based fats and liquids oils of which at least 90% of the triglycerides contain fatty acids of a mean chain length of 44/3 and higher, to provide 25–98 percent of co-randomized constituents in the fat blend, the fat blend having a ratio of 1,3-dipalmitoyl-2-cis-mono- and polyunsaturated fatty acid triglycerides to 1,2-dipalmitoyl-3-cis-mono- and polyunsaturated fatty acid triglycerides of less than 2.8, the content of fatty acid triglycerides having three saturated fatty acids of a mean chain length of 44/3 or higher being greater than the content of dipalmitoyl-cis-mono- and polyunsaturated fatty acid triglycerides minus eight percent.

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## 4,016,303
## METHOD OF FLOCKING BLOOD-CONTACTING SURFACES ON ARTIFICIAL IMPLANT DEVICES

**Victor L. Poirier, Chelmsford, and John T. Keiser, Acton, both of Mass., assignors to The United States of America, Washington, D.C.**

**Filed Aug. 6, 1975, Ser. No. 602,385**

**Int. Cl.² A61K** *5/00*; **B05D** *1/14*, *1/16*; **A61F** *1/00*

**U.S. Cl. 427—2** **9 Claims**

1. In a method for the manufacture of an artificial implant device adapted to be implanted in blood-contacting position in the body of a living creature such as a human being, said method including the steps of flocking the bloodcontacting surface of said device with fibers of a bloodcompatible polymeric material by first applying to said surface a coating of blood-compatible adhesive material and thereafter applying said fibers to the adhesive-coated surface so as to adhesively secure said fibers to said surface, the improvement whereby the bonds between said fibers and said surface are strengthened and said fibers are interlocked with each other so as to substantially reduce the possibility of fiber separation and release from said surface when said device is in implanted position, comprising the steps of applying to said flocked surface a dilute solution of said adhesive material in a solvent therefor whereby said adhesive material is preferentially attracted by capillary action to the points of contact of said




fibers with each other and with said surface, the content of said adhesive material in said solution being sufficient to coat said fibers only at said points of contact, and thereafter evaporating said solvent from said surface to thereby form secondary bonds of said adhesive material at said points of contact and leave said fibers otherwise uncoated.

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## 4,016,304
## METHOD FOR APPLYING PYROLYTIC CARBON COATINGS TO SMALL PARTICLES

**Ronald L. Beatty, Oak Ridge; Dale V. Kiplinger, Concord, and Bill R. Chilcoat, Knoxville, all of Tenn., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.**

**Continuation of Ser. No. 848,078, Aug. 6, 1969. This application June 17, 1975, Ser. No. 587,004**

**Int. Cl.² G21C** *3/06*

**U.S. Cl. 427—6** **3 Claims**

1. An improved pyrolytic carbon coating process which comprises fluidizing a mass of particles composed of an oxide, carbide, or nitride of a metal selected from the group consisting of thorium, uranium and plutonium or composed of a compound of a metal selected from the group consisting of titanium, zirconium and hafnium a minor proportion of which contains paticles having a density in the range 1-3 grams/cc and the balance consisting of particles which have a diameter two to six times larger than, and a density at least twice that of the particles in said minor proportion, depositing a pyrolytic carbon coating on said fluidized mass of particles and then separating the smaller, less dense coated particles from the larger, denser, coated particles.

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## 4,016,305
## VACUUM DEPOSITION METHOD

**Yukimasa Wakabayashi, Toda, and Shigeru Takahashi, Tokyo, both of Japan, assignors to Fujikura Kasei Co., Ltd., Tokyo, Japan**

**Filed Aug. 12, 1975, Ser. No. 604,044**

**Claims priority, application Japan, Aug. 16, 1974, 49-93208**

**Int. Cl.² B05D** *1/38*; **C23C** *13/02*, *13/04*

**U.S. Cl. 427—42** **18 Claims**

1. A method for vacuum deposition which comprises coating on the surface of a substrate to be metallized an undercoating composition comprising a hydroxy-containing vinyl polymer having a hydroxyl number of 20 to 200 and 1.1 to 5.0 equivalents, per equivalent of the hydroxyl group in the vinyl polymer, of a polyisocyanate as a filmforming component, curing the coated film, and depositing a metal or its compound on the undercoat in vacuum to form a metallic layer on said undercoat.



## 4,016,306
## PROCESS FOR FORMING A COATED FILM IN WATER

**Norio Miyagawa; Mitsuo Sato; Juichi Kobayashi, and Takashi Kobayashi, all of Nagoya, Japan, assignors to Mitsubishi Rayon Co., Ltd., Tokyo, Japan**

**Filed July 3, 1975, Ser. No. 592,893**

**Claims priority, application Japan, July 15, 1974, 48-81529; July 15, 1974, 48-81530**

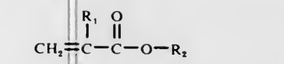
**Int. Cl.² B05D** *3/06*

**U.S. Cl. 427—54** **5 Claims**

1. A process for forming a coated film which comprises:

coating a substrate with an acrylic resin composition, which is curable upon irradiation by active rays, comprising a photopolymerization initiator and a resin component consisting of a combination of

A. an acrylic polymer obtained by polymerization of an acrylic monomer of formula I:



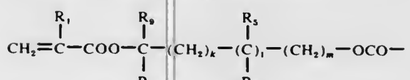
(I)

wherein $R_1$ represents hydrogen atom or methyl group, $R_2$ represents hydrogen atom, an unsubstituted or substituted alkyl group, an unsubstituted or substituted cycloalkyl group having 1 to 8 carbon atoms, or an aryl group;

B. an ethylenically unsaturated diacrylate of formula (II) or (III):



(II)



(III)

wherein $R_1$ is as defined above; $R_3$ represents a divalent aliphatic or cycloaliphatic hydrocarbon residue having 2 to 10 carbon atoms or a polyalkylene glycol residue having 1 to 10 ether bonds in the molecule; $R_4$ represents a carboxyl eliminated divalent fatty acid residue having 1 to 20 carbon atoms or an aromatic or an aliphatic hydrocarbon residue; each of $R_5$, $R_6$, $R_7$, and $R_8$ represents hydrogen atom, a substituted alkyl group having 1 to 8 carbon atoms, a cycloalkyl group or an aryl group; each of $R_9$, $R_{10}$, $R_{11}$ and $R_{12}$ represents hydrogen atom, an alkyl group having 1 to 8 carbon atoms, a cycloalkyl group or an aryl group; $n$ represents an integer of 1 to 10; and each of $k$, $l$, $m$, $j$, $p$ and $q$ represents an integer of 0 to 5; providing the coated layer with a water layer and

subjecting said combined layers to irradiation from a source of active rays to cure the coated film.

## 4,016,307
## METHOD OF SELECTIVELY METALLIZING THE DISPLAY SCREEN OF A CATHODE-RAY TUBE AND CATHODE-RAY TUBE MANUFACTURED BY SAID METHOD

**Maria Antonius Alphonsus Andreas Collaris; Antonius Wilhelmus Cornelis van Kemenade; Henricus Antonius Debruijn, and Mathieu Willem Maria Snijders, all of Eindoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed Jan. 14, 1976, Ser. No. 649,141**

**Claims priority, application Netherlands, Jan. 20, 1975, 7500616**

**Int. Cl.² B05D** *5/12*, *3/06*

**U.S. Cl. 427—54** **4 Claims**

1. A method of selectively metallizing only the phosphor regions of a pattern of phosphor regions and uncovered regions on a window portion of a cathode-ray tube, characterized in that:

a. a photosensitive layer which becomes insoluble in a solvent as a result of exposure to actinic radiation is provided over said pattern,

b. the photosensitive layer is exposed to actinic radiation via the window portion,

c. the photosensitive layer is developed by removing the parts of the layer which have remained soluble from the phosphor regions by means of the solvent,

d. the pattern is treated with a solution containing ions of a metal selected from the group consisting of Pd, Pt, Au, Ag and Cu,

e. the pattern is metallized with a metal selected from the group consisting of Ni, Ag, Co, Sn, Cu and Au in an electroless plating bath,

f. the remaining parts of the photosensitive layer are removed by means of a thermal treatment.

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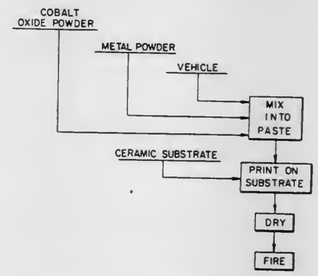
## 4,016,308
## HUMIDITY SENSOR, MATERIAL THEREFOR AND METHOD

**Lawrence E. Frazee, Norfolk, Nebr., assignor to Plessey Incorporated, Melville, N.Y.**

**Filed Apr. 9, 1975, Ser. No. 566,350**

**Int. Cl.² B05D** *5/12*

**U.S. Cl. 427—125** **5 Claims**




1. The method of making a humidity sensor comprising:

forming a screen-printable paste including, on a dry basis, at least 2 wt. % of finely divided cobalt oxide powder and a major proportion of a finely divided precious metal powder plus an organic vehicle;

printing a pattern of said material onto a ceramic substrate in the form of interdigitated fingers;

drying said pattern; and

firing said pattern at a temperature in the range of 1350° to 1550° C. for about 5 to 15 minutes, said oxide diffusing out from printed pattern areas to form a continuous hygroscopic film between said fingers.

**4,016,309**

## METHOD FOR TREATING PRINTED PAPER SHEETS FOR ILLUMINATED DISPLAY

**Hirokazu Itoh, Nishi, Japan, assignor to First-Sha Co., Ltd., Nagoya, Japan**

**Filed Dec. 15, 1975, Ser. No. 640,473**
**Int. Cl.² G09F** *13/04*; **B05D** *5/00*
**U.S. Cl. 427—161** **1 Claim**

**1.** A method for displaying light posters, comprising the steps of applying a treating liquid containing 60.0% to 80.0% by weight of liquid parafin, 0.03% to 0.05% by weight of butyl hydroxyanisole and a balance of a diluent for impregnation on back sides of light posters with the same picture images, at an ambient temperature within the range of 5° C to 30° C and at a humidity below 75%, drying said light posters, superposing said posters one on the other, placing said posters on a translucent milky white resin plate, mounting said plate with said posters thereon at the open end of a light box, covering the outer side of said plate with a superposed sheet with a transparent polyvinyl chloride, and, fastening said covering resin sheet with a number of L-shaped frame members.

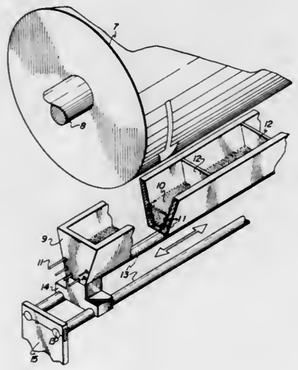
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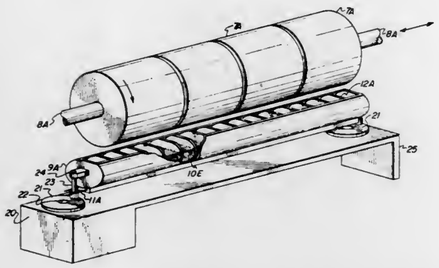
**4,016,310**

## COATER HARDWARE AND METHOD FOR OBTAINING UNIFORM PHOTOCONDUCTIVE LAYERS ON A XEROGRAPHIC PHOTORECEPTOR

**Samuel W. Ing, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

**Filed Apr. 23, 1975, Ser. No. 571,047**
**Int. Cl.² C23C** *13/02*
**U.S. Cl. 427—251** **15 Claims**





**1.** A method for batch coating xerographic substrates or bases with at least one vaporizable photoconductive coating material or component thereof applied under vacuum from one or more evaporation crucibles containing a plurality of subdivisions delimited by baffles or end plates and crucible walls and arranged in convenient proximity to the xerographic substrates or bases being coated, comprising heating and vaporizing photoconductive material from one or more crucibles simultaneously or in sequence while moving at least one of said (a) crucibles or said (b) xerographic substrates or bases in a translational manner along parallel planes with respect to each other.

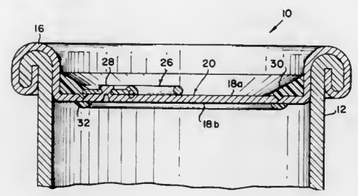
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**4,016,311**

## METHOD FOR PROTECTING METAL ENDS

**Donald H. Ellerbrock, Florissant, and Robert J. Hough, Baldwin, both of Mo., assignors to Boise Cascade Corporation, Boise, Idaho**

**Filed May 13, 1974, Ser. No. 469,524**
**Int. Cl.² B29C** *25/00*; **B29D** *9/08*; **B29F** *5/00*
**U.S. Cl. 427—287** **5 Claims**



**1.** A method for applying a protective hot melt coating to an easy-open metal end formed of an epoxy-coated aluminum alloy and adapted for closing one end of a container, said metal end having a cylindrical peripheral flange portion and a circular central portion that contains a continuous circular scoreline that defines a removable panel portion and a residual lip portion, said scoreline being formed in the external surface of said central panel portion adjacent said slightly spaced from said flange portion, which comprises the steps of

a. simultaneously rotating the metal end, in an unheated condition, about its central axia and applying to at least one of said surfaces of said central portion over at least that area thereof which is coaxially aligned with the scoreline a layer of a thermoplastic ethylene vinyl acetate hot melt material at a temperature of about 300° F., said metal end being rotated about its axis at a speed of rotation which causes the hot melt layer to form an annular configuration in coaxial alignment with said scoreline, said hot melt layer having a width dimension greater than the width of said scoreline;

b. permitting the hot melt material to at least partially solidify;

c. thereafter heating the end at a temperature of about 250° F. for about 10 seconds to effect softening and reflow of the hot melt layer to produce good wetting of the metal end surface; and

d. permitting the hot melt material to resolidify, whereby the heating of the hot melt material on said end effects an improved bond with the metal end, so that upon rupture of the scoreline to effect removal of the removable panel portion from the central portion, the hot melt layer ruptures, thereby leaving one part of the hot melt layer on the edge area of the removable panel portion and another part of the hot melt layer on the edge area of the residual lip portion.



**4,016,312**

## METHOD OF COATING A CELLULOSIC SUBSTRATE WITH AN ADHERENT POLYMERIC COATING

**Hans J. Luthardt, Voorhout, Netherlands, assignor to Akzo N.V., Arnhem, Netherlands**

**Filed May 28, 1975, Ser. No. 581,583**
**Claims priority, application Netherlands, May 30, 1974, 7407256**
**Int. Cl.² B05D** *3/10*, *7/06*, *1/36*
**U.S. Cl. 427—303** **4 Claims**

**1.** The method of covering a substrate which is at least partly cellulose with an adherent coating of a film-forming polymer of an ethylenically unsaturated ester which comprises first applying to the substrate a coating of a coagulant for the polymer, subsequently contacting the thus coated substrate with an aqueous dispersion containing a binder which will dry upon oxidation and the film-forming polymer of an ethylenically unsaturated ester in a weight ratio in the range of 10:90 to 50:50 whereby the polymer coagulates on the surface of the substrate to form a coating and thereafter drying the thus formed coating.

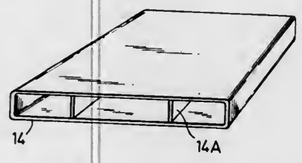
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**4,016,313**

## HEAT RESISTANT MATERIAL

**Nils G. Schrewelius, Hallstahammar, Sweden, assignor to Bulten-Kanthal Aktiebolag, Sweden**

**Filed July 28, 1975, Ser. No. 599,750**
**Claims priority, application Sweden, July 29, 1974, 7409758**
**Int. Cl.² C04B** *35/56*
**U.S. Cl. 428—35** **5 Claims**



**1.** A heat resistant fixture for use in firing kilns comprising a porous skeleton of self-bonded silicon carbide, the pores of which are substantially filled with an impregnant containing molybdenum disilicide and from 10 to 60% by weight silicon, said fixture being hollow and having a supporting surface formed thereon.

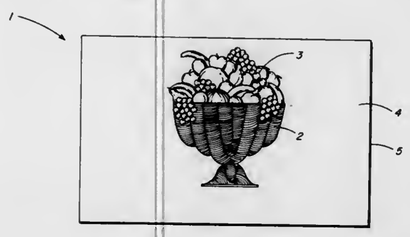
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**4,016,314**

## EMBROIDERED FRUIT BOWL WALL HANGING AND KIT FOR MAKING SAME

**Beatrice L. Cowans, and Virginia E. Hall, both of Washington, D.C., assignors to Hallco Inc., Washington, D.C.**

**Filed June 26, 1975, Ser. No. 590,488**
**Int. Cl.² A41G** *1/00*
**U.S. Cl. 428—35** **5 Claims**



**1.** An article of manufacture suitable for use as a wall hanging comprising:

a. a backing board having a face side and a back side;

b. a background burlap cover tightly stretched over the front side of the backing board and fixedly attached to the back side of the backing board;

c. a pocket situated on a portion of the background burlap cover, the face of said pocket being attached to the background burlap cover and comprising woven embroidered Strawtex in the shape of a fruit bowl and the back of said pocket comprising the portion of the background burlap cover underlying the face of the pocket; and

d. at least one artificial fruit piece disposed within said pocket and comprising cotton batting covered with Strawtex having a color similar to the fruit being simulated.

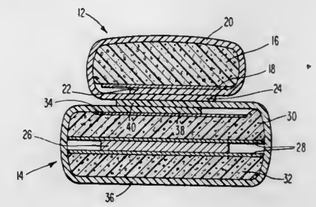
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**4,016,315**

## SHEATHED SOFT-HANDLE WITH CONCEALED LAPPED ENDS

**Marton J. Szabo, Westmont, N.J., assignor to P.H.C. Industries, Inc., Camden, N.J.**

**Filed Dec. 17, 1975, Ser. No. 641,614**
**Int. Cl.² B32B** *5/18*
**U.S. Cl. 428—68** **15 Claims**



**1.** A handgrip for a handle comprised of two discrete elongated members each including a cushioning core of flexibly resilient material surrounded by a sheath, the sheath of each member including overlapped longitudinal ends, the overlapped longitudinal ends of one sheath abutting the overlapped longitudinal ends of the other sheath, the overlapped longitudinal ends of each sheath being sealed to each other and the overlapped longitudinal ends of said one sheath being sealed to the abutting overlapped longitudinal ends of said other sheath to form a unitary handgrip with concealed lapped longitudinal ends and wherein the sheath of one discrete elongated member is thermoplastic.

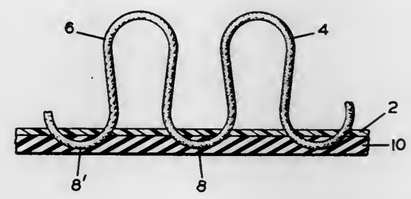
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**4,016,316**

## YARN-UNRAVELING RESISTANCE IN CARPET

**Walter J. Bohrn, Lancaster, Pa., assignor to Armstrong Cork Company, Lancaster, Pa.**

**Filed Mar. 16, 1976, Ser. No. 667,369**
**Int. Cl.² B32B** *5/00*
**U.S. Cl. 428—85** **5 Claims**

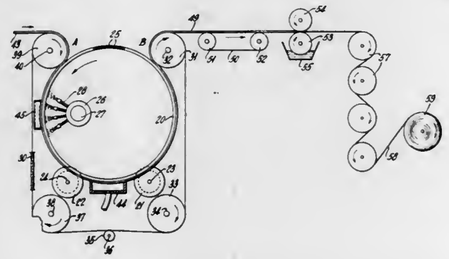


**1.** An article comprising a base structure of backing material having tufted thereinto a yarn, said yarn having large loops on one side of the backing material and smaller locps on the back side of the backing material, said small loops on the back side of the material being of yarn of relatively low breaking

strength compared to the yarn in the large loops on the front side of the backing material, and a coating material applied over the back side of the backing material and over the smaller loops on the back side of the backing material.

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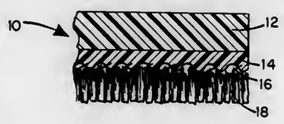
**4,016,317**
**NONWOVEN FABRIC**
**Frank Kalwaites, Gladstone, N.J., assignor to Johnson & Johnson, New Brunswick, N.J.**
**Division of Ser. No. 306,108, Nov. 13, 1972, abandoned, which is a continuation-in-part of Ser. No. 114,449, Feb. 11, 1971, abandoned. This application Mar. 6, 1975, Ser. No. 556,024**
**Int. Cl.² D04H *11/00***
**U.S. Cl. 428—88** **3 Claims**



1. A nonwoven fabric comprising a layer of staple length fibers arranged in a predetermined pattern of yarn-like fiber bundles, said bundles comprising a plurality of fiber segments with the segments being consolidated and in a substantial parallelism within each bundle, opposite ends of each fiber included within different bundles so that substantially all fiber ends protrude from one surface of the fabric, said fiber bundles defining a predetermined pattern of areas of low fiber density throughout the fabric, said bundles being located between spaced generally parallel planes generally defining the opposed surfaces of the fabric, and a binder material on one surface of the fabric adhereing fiber ends on said surface together to provide a fabric strength, the opposite surface of the fabric being substantially free of fiber ends and being completely free of binder material.

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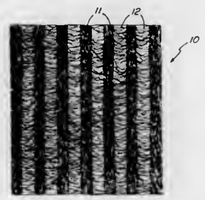
**4,016,318**
**AUTOMOTIVE CARPET MAT AND METHOD OF PREPARING SAME**
**Frank A. DiGioia, and Timothy W. Brown, both of Dalton, Ga., assignors to General Latex and Chemical Corporation, Cambridge, Mass.**
**Filed July 16, 1976, Ser. No. 705,771**
**Int. Cl.² D03D *27/00*; D04H *11/00***
**U.S. Cl. 428—95** **17 Claims**




9. A moldable automobile mat, which mat comprises:
a. a tufted carpet having a tufted face surface and a back surface;
b. a thin layer of a stiff, heat-moldable thermoplastic urethane resin having a thickness of up to about one-sixteenth to one-thirty-second of an inch, which layer is obtained from a urethane composition which consists essentially of a polyphenyl methylene diisocyanate, a polyol with a functionality of two or three, a water-scavenging agent and a dimethyl, polysiloxane compound, the isocyanate (NCO) to free hydroxyl (OH) group ratio (NCO/OH) being about 0.67, with the siloxane compound reacted with the hydroxyl groups, the layer bonded to the back surface of the carpet to secure the tufts to the carpet; and
c. a thick layer of a flexible, cross-linked, thermoset, elastomeric urethane resin secured to the stiff thermoplastic urethane resin layer, the elastomeric layer having a thickness of from about one-eighth of an inch to about three-eighths of an inch.

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**4,016,319**
**BIAXIALLY ORIENTED NONWOVEN FABRIC HAVING LONG AND SHORT FIBERS**
**Preston F. Marshall, Walpole, Mass., assignor to The Kendall Company, Boston, Mass.**
**Continuation-in-part of Ser. No. 506,843, Sept. 17, 1974, Pat. No. 3,969,561. This application Dec. 19, 1975, Ser. No. 642,669**
**Int. Cl.² B32B *5/12***
**U.S. Cl. 428—113** **11 Claims**



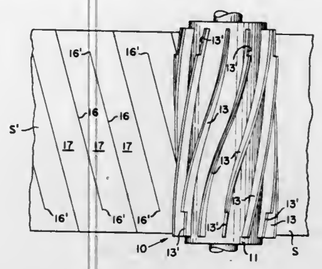

1. A biaxially oriented nonwoven fabric having long fibers and short fibers therein comprising:
areas of low fiber density and areas of high fiber density, said areas of low fiber density and high fiber density comprising long fibers one-half inch in length or more and short fibers that are less than one-half inch in length, a majority of the fibers in said low fiber density area being long fibers and having a particular configuration and being oriented in a direction substantially normal to the axis of said configuration and, a majority of the fibers in the high fiber density area that lies directly adjacent said low fiber density areas being oriented in a direction substantially parallel with the contours of said configuration of said low fiber density area, a majority of said short fibers being disposed within said high fiber density areas.

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**4,016,320**
**SLIT RAW RUBBER ARTICLE**
**Wilbur E. Harris, Indianapolis, Ind., assignor to Uniroyal Inc., New York, N.Y.**
**Continuation-in-part of Ser. No. 537,474, March 25, 1966, abandoned. This application Aug. 20, 1970, Ser. No. 65,673**
**Int. Cl.² B32B *3/10***
**U.S. Cl. 428—131** **6 Claims**

1. An article of commerce, comprising a sheet of uncured rubber or like raw material to be fed into an extruder, mill or like treating apparatus, said sheet being provided over the entire length thereof with a plurality of transverse slits spaced from one another longitudinally of said sheet, the slits in an alternating sequence beginning at the opposite side edges of said sheet and each terminating short of the respective other side edge of said sheet, and the arrangement of slits in said sheet enabling the latter, upon one end portion thereof being introduced into the bite of such a treating apparatus and thereby being subjected to a longitudinal pulling force, to separate along the slits into a continuous, relatively narrower,

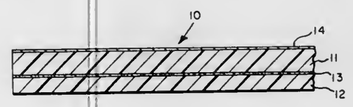





zig-zag strip so as to permit substantially uniform feed of said raw material into the treating apparatus.

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**4,016,321**
**PRINTER RIBBON SUBSTRATES**
**William Ernest McIntyre, Jr., Circleville, Ohio, assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**
**Filed Jan. 23, 1975, Ser. No. 543,449**
**Int. Cl.² B41J *31/12*; B32B *7/02*, *27/34***
**U.S. Cl. 428—216** **1 Claim**



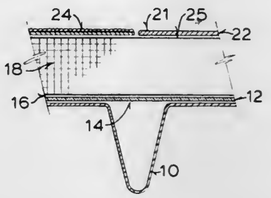

1. In a composite film base ribbon suitable for use as an ink carrying ribbon in a printing machine comprising an asymmetrically biaxially oriented, heat set polyethylene terephthalate base film having a thickness in the range of about 12 to 36 microns, one surface of which has laminated thereto, by means of an adhesive, a nylon 6/6 free from surface effect modifiers film ribbon backing having a thickness of from about 12 to 25 microns, the improvement in which said nylon film has a nylon surface to steel static coefficient of friction of less than about 0.4 as measured using a capstan friction tester and a haze value of about 4 to 8%.

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**4,016,322**
**ABLATIVE PROTECTIVE MATERIAL FOR REENTRY BODIES**
**Charles W. Haldeman, Concord, Mass., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**
**Filed Sept. 12, 1975, Ser. No. 612,873**
**Int. Cl.² B32B *7/00***
**U.S. Cl. 428—246** **3 Claims**

1. An ablative material for use with reentry vehicles and characterized by having a low plasma electron density which comprises a pressed, laminated composite of a multiplicity of alternating layers of a polytetrafluoroethylene resin and a phenolic resin impregnated cloth fabric selected from the group consisting of carbon and graphite cloth in which the total compositional content of said composite is composed of about 15.6 percent by weight carbon, about 3.4 percent by weight phenolic resin, and about 81 percent by weight polytetrafluoroethylene resin.

**4,016,323**
**METHOD AND CONSTRUCTION OF ROOF SYSTEM**
**Anton F. Volovsek, 12214 W. St. Martins Road, Franklin, Wis. 53132**
**Filed Sept. 29, 1975, Ser. No. 617,704**
**Int. Cl.² B32B *3/26*; E04D *11/02***
**U.S. Cl. 428—247** **19 Claims**



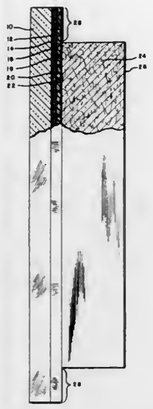

1. A method of preparing a building roof system having on its roof deck a prepared upper surface thereon, consisting of applying and affixing an impervious high strength heat resistant single sheet membrane to the adhesive primer and throughout the entire roof deck so as to tightly and completely adhere the membrane to the roof deck, said membrane having a self-adhering adhesive substance on its lower surface for effecting the adhesion of said membrane to said upper surface of said deck and having its upper surface adapted for bonding to insulating foam, said membrane having integral therein a supportive and strengthening mesh throughout and said mesh further being substantially intermediate of the surfaces of the membrane, applying directly to the top surface of the affixed and placed membrane a spray insulating foam to produce when set an even distribution of rigid urethane of a predetermined thickness, said urethane thickness being related to specific requirements of a specified U-factor for said roof system and having an exposed upper surface, subsequently applying directly to the exposed surface of the set urethane insulation a liquid sealant to a thickness exceeding 40 mils and which coats the entire exposed set insulation surface and provides a seamless film having a thickness when set which becomes a waterproof weather protecting surface final coating for the roof system.

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**4,016,324**
**SPANDREL GLASS PANEL**
**William C. Cooke, and Albert H. Agett, both of Kingsport, Tenn., assignors to ASG Industries, Inc., Kingsport, Tenn.**
**Filed July 19, 1974, Ser. No. 489,984**
**Int. Cl.² B32B *7/00*, *23/00***
**U.S. Cl. 428—248** **10 Claims**

1. A spandrel panel comprising:
a. a sheet of glass;
b. a semi-transparent metallic film coating on one face of said sheet of glass;
c. barrier means secured to said metallic film coating for preventing show through when the panel is viewed from the side thereof opposite to said metallic film coating;
d. a sheet of insulation adhered directly to said barrier means; and
e. said barrier means including:
1. at least one elastic, heat resistant paint coating applied directly to said metallic film coating,
2. a layer of cloth material adhered to said paint coating, and

3. a second paint coating applied between the first mentioned, elastic paint coating and the cloth, said second



paint coating being different from, less elastic than and less soft than the first mentioned coating.

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**4,016,325**

**GLASS FIBER REINFORCED ELASTOMERS**

**Martin C. Flautt, Granville; Kevin M. Foley, Hebron, and Richard M. Haines, Warsaw, all of Ohio, assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio**

**Filed Apr. 4, 1975, Ser. No. 565,185**

**Int. Cl.² B32B** *17/02*

**U.S. Cl. 428—268** **23 Claims**

1. A method for the manufacture of bundles of glass fibers for use in the production of glass fiber-reinforced elastomeric product comprising the steps of coating glass fibers with a size composition consisting essentially of an aqueous emulsion of a polyolefin and isopropanol, forming the coated glass fibers into a bundle and impregnating the bundle of glass fibers with an impregnating composition containing a blend of a resorcinol-aldehyde resin and at least one elastomer without subjecting the coated glass fibers to temperatures above 120° F to form an impregnated bundle.

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**4,016,326**

**LAYER COMPOSITION**

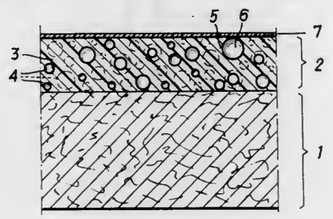
**Helmut Schaefer, Via Bernini I, Cerro Maggiore, Italy**

**Filed Apr. 1, 1975, Ser. No. 563,976**

**Claims priority, application Italy, Apr. 12, 1974, 21427/74**

**Int. Cl.² B32B** *3/26, 5/18*

**U.S. Cl. 428—306** **7 Claims**




1. A composite leather multilayer structure for shoe material and the lime comprising a natural leather carrier layer and a cover layer bonded to said leather carrier layer and consisting of a polyurethane synthetic-resin matrix having bubbles of diameters of substantially 0.009 to 0.6 mm distributed therein, said bubbles each being elastically deformable and having a shell of polyvinylidene chloride copolymer synthetic-resin thermoplastic material and enclosing a gas-filled space, said gas-filled spaces constituting 50 to 85% of the total volume of said cover layer, said cover layer having a surface remote from said carrier layer forming a leather-like pattern.

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**4,016,327**

**LAMINATED STRUCTURES AND METHODS AND COMPOSITIONS FOR PRODUCING SAME**

**Giancarlo J. Fumei, Lake Grove, and James A. Karabedian, Garden City, both of N.Y., assignors to Owens-Illinois, Inc., Toledo, Ohio**

**Division of Ser. No. 573,924, May 2, 1975, Pat. No. 3,988,521, which is a continuation-in-part of Ser. No. 275,951, July 28, 1972, abandoned. This application July 31, 1975, Ser. No. 600,614**

**Int. Cl.² B32B** *5/18, 27/00*

**U.S. Cl. 428—314** **5 Claims**

1. A laminated structure comprising: (1) a substrate of high polymeric material, (2) a substrate of a porous hydrophilic cellulosic material, and (3) a layer bonding said substrates comprising particles of a polymer of the same kind as said high polymeric material substrate (1) but of an average molecular weight of from about four to about 100 percent of said high polymeric material substrate bonded to the surface of said substrate (1) and a predominant amount of a water-dispersible adhesive preferentially adherent to said cellulosic substrate surrounding said bonded particles so as to mechanically interlock with said particles.

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**4,016,328**

**SILICONE PRESSURE-SENSITIVE ADHESIVES AND TAPES**

**Albert Emerson Horning, Troy, N.Y., assignor to General Electric Company, Waterford, N.Y.**

**Division of Ser. No. 367,960, June 7, 1973, Pat. No. 3,929,704. This application Aug. 22, 1975, Ser. No. 606,938**

**Int. Cl.² C08L** *83/04;* **C09J** *7/02*

**U.S. Cl. 428—355** **15 Claims**

1. A pressure-sensitive tape comprising a coherent unitary backing and a pressure-sensitive adhesive applied to a surface of said backing, said adhesive comprising the siloxane product of heat intercondensation of a silicone resin, a silicone gum and a catalytic amount of a curing agent therefore, said curing agent comprising before curing from about 10 to about 90% by weight of 2, 4, - dichlorobenzoyl peroxide, from about 2 to about 30% by weight of a plasticizer therefore, said plasticizer being a high boiling ester of low volatility, and for the balance an extender therefore, said extender comprising an alkylaryl or an alkylaralkyl siloxane fluid containing at least about 3% of aryl-silicon or aralkyl-silicon bonds out of the total carbon-silicon linkages.

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**4,016,329**

**MULTIFILAMENT**

**Mitsuyoshi Matsuyama, and Tetsuhiro Kusunose, both of Nobeoka, Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan**

**Continuation of Ser. No. 299,621, Oct. 11, 1972, abandoned. This application Jan. 29, 1975, Ser. No. 545,167**

**Claims priority, application Japan, Oct. 11, 1971, 46-79457; July 27, 1972, 47-87880**

**Int. Cl.² D02G** *3/00*

**U.S. Cl. 428—375** **1 Claim**

1. A non-twisted multifilament yarn comprising a polyamide material wherein each of the monofilaments has over its overall peripheral surface a number of relatively evenly and densely distributed, ripple-like undulations, the number of undulations being in the range of from 4 to 20 X 10 ⁷ per square cm when observed through an electron microscope,



the mean height of the surface undulations being in the range of $2.5 - 25 \times 10^{-5}$ mm, said monofilaments being thermally and locally bonded together at random in the longitudinal as well as lateral direction of the yarn, each of these thermal bonds extending substantially longer axially rather than later-



ally of the yarn, wherein over 90% of the constituent monofilaments represent linear interfilamentary local bonds per inch of the yarn, the linear length of each of over 80% of these bonds amounting to at least 5 mm, for providing necessary filament consistency without representing intentional interfilamental linkages of a non-torqued and non-bulked nature.

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**4,016,330**

**WATER-SOLUBLE WIRE ENAMEL**

**Deno Laganis, Schenectady, N.Y., assignor to Schenectady Chemicals, Inc., Schenectady, N.Y.**

**Division of Ser. No. 536,963, Dec. 27, 1974, Pat. No. 3,974,115, which is a continuation-in-part of Ser. No. 311,701, Dec. 7, 1972. This application Feb. 19, 1976, Ser. No. 659,352**

**Int. Cl.² B32B** *15/08;* **C08L** *67/02*

**U.S. Cl. 428—379** **20 Claims**

1. A wire coated with a composition comprising:

1. a water-soluble polyester which is a condensation product of a polycarboxylic acid and a polyhydric alcohol said polycarboxylic acid comprising (a) a tribasic carboxylic acid and (b) an aromatic dicarboxylic acid with 0 to 0.50 mol of an aliphatic or cycloaliphatic dicarboxylic acid per mol of the aromatic dicarboxylic acid, said polyhydric alcohol comprising a dihydric alcohol, the molar ratio of tribasic carboxylic acid to the other acids present being from 25/75 to 85/15, there being present an excess of hydroxyl groups over carboxyl groups in said polyester in the range of 10 to 5%.
2. hydroxymethylated diacetone acrylamide in an amount of 0.1 to 10% by weight of the total solids as a cross-linking agent for said polyester, and
3. 0.5 to 10% by weight of the total solids of a water soluble organic titanate as a synergistic cross-linker with (2).

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**4,016,331**

**COMPOSITE POLYMERIC MATERIAL FORMED WITH AN EPITAXIAL CRYSTALLINE FILM OF POLYMERIC SULFUR NITRIDE, AND METHOD OF PREPARING SAME**

**Anthony Frank Garito, Radnor; Alan J. Heeger, Wynnewood; Alan G. MacDiarmid, Drexel Hill, all of Pa.; Arthur A. Bright, North Olmstead, Ohio; Marshall J. Cohen, Philadelphia, and Chester M. Mikulski, Melrose Park, both of Pa., assignors to The Trustees of the University of Pennsylvania, Philadelphia, Pa.**

**Filed Jan. 26, 1976, Ser. No. 652,611**

**Int. Cl.² B05D** *5/12;* **B32B** *27/06;* **C23C** *13/02, 13/04*

**U.S. Cl. 428—421** **19 Claims**

1. A composite polymeric material having metallic surface properties comprising a highly-oriented thermoplastic polymeric substrate and an epitaxial crystalline film of polymeric sulfur nitride formed on the surface of said substrate, said polymeric sulfur nitride film being completely oriented parallel to the direction of orientation of said substrate and having a relatively high degree of anisotropy with respect to its electrical conductivity and optical properties.

10. A method of preparing a composite polymeric material having metallic surface properties comprising the steps of heating solid crystalline polymeric sulfur nitride to a temperature above its sublimation point to produce a vapor of said polymeric sulfur nitride, and thereafter condensing said polymeric sulfur nitride vapor onto the surface of a highly-oriented thermoplastic polymeric substrate to thereby form on said substrate an epitaxial crystalline polymeric sulfur nitride film completely oriented parallel to the direction of orientation of said substrate and having a relatively high degree of anisotropy with respect to its electrical conductivity and optical properties.

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**4,016,332**

**MERCAPTAN BLOCKED THERMOSETTING COPOLYMERS**

**Carl Clement Anderson, Menomonee Falls, Wis., and Rostyslaw Dowbenko, Gibsonia, Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.**

**Filed May 1, 1972, Ser. No. 248,846**

**Int. Cl.² C08F** *28/02;* **C08L** *67/02, 67/06*

**U.S. Cl. 428—500** **11 Claims**

1. A polymer prepared by the process comprising:

a reacting

1. a polyol, and
2. a mercaptan comprising a hydrocarbon chain of from 1 to about 18 carbon atoms which has been substituted with at least one carboxyl group to provide a mercapto-terminated reaction product;

b. reacting said mercapto-terminated reaction product with one or more ethylenically unsaturated monomers in the presence of a peroxygen or azo catalyst to form said polymer.

11. An article of manufacture comprising a substrate having a coating of the polymer of claim I applied thereon.

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**4,016,333**

**RADIATION CURABLE COATINGS HAVING NONADHERENT SURFACES**

**Joseph E. Gaske, and Nick T. Georgas, both of Chicago, Ill., assignors to DeSoto, Inc., Des Plaines, Ill.**

**Filed Oct. 25, 1974, Ser. No. 518,004**

**Int. Cl.² B05D** *3/06*

**U.S. Cl. 428—447** **13 Claims**

1. A radiation polymerizable nonaqueous emulsion adapted to deposit coatings having nonadherent surfaces comprising a radiation polymerizable polyethylenically unsaturated liquid having emulsified therein from 2–50%, based on the weight of the emulsion, of a liquid alkyl hydrogen polysiloxane.

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**4,016,334**

**METHOD OF APPLYING HIGH ADHESION ULTRAVIOLET CURABLE COATINGS AND COATED ARTICLES**

**George L. Collins, Murray Hill, and John R. Costanza, North Plainfield, both of N.J., assignors to Celanese Corporation, New York, N.Y.**

**Filed Feb. 18, 1975, Ser. No. 550,337**

**Int. Cl.² B05D** *3/06*

**U.S. Cl. 428—463** **9 Claims**

1. A process for applying an adherent coating to a substrate which comprises:

a. applying a first coating consisting essentially of an ultraviolet curable monomer having at least one ultraviolet polymerizable site of alpha beta ethylenic unsaturation, no more than about 12 carbon atoms per molecule, at least about two carbonyl groups per molecule, having no other groups interferingly reactive with the alpha beta ethylenic unsaturation ultraviolet curing mechanism, and having no unsaturation other than alpha beta ethylenic unsaturation, to a coating thickness of about at least $10^{-3}$ microns;

b. treating said coating with heat, infrared or microwave radiation;

c. applying a second coating of an ultraviolet curable coating composition over said first coating wherein said second composition comprises about 40 to about 100 percent, by weight, based upon the total second coating curable composition, of an alpha beta ethylenically unsaturated vinyl polymerizable compound having at least two sites of ultraviolet polymerizable unsaturation and up to about 60 percent, by weight, on the same basis, of another alpha beta ethylenically unsaturated vinyl polymerizable compound containing one site of ultraviolet polymerizable vinyl unsaturation, about 0.1 to about 15 percent, by weight, based upon the total curable system in said coating, of a photoinitiator; and

d. subjecting the coated substrate to ultraviolet radiation.

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**4,016,335**

## UREA-GLYOXAL-FORMALDEHYDE CELLULOSE REACTANT

**Tsai Hsiang Chao, Somerville, N.J., assignor to American Cyanamid Company, Stamford, Conn.**

**Division of Ser. No. 356,685, May 2, 1973, Pat. No. 3,903,033. This application Feb. 7, 1975, Ser. No. 548,109**

**Int. Cl.² B05D** *3/12, 3/02*

**U.S. Cl. 428—526** **6 Claims**

1. A process for producing a curable low formaldehyde releasing finish on cellulosic textile materials comprising:

applying an aqueous solution of water-soluble urea-formaldehyde-glyoxal condensation product, an accelerator and a surface active agent to a cellulosic textile,

drying the treated textile, and

pressing the dried textile at elevated temperature;

said water-soluble urea-formaldehyde-glyoxal condensation product prepared by a process comprising

reacting in an equeous medium about 1.0 mole of urea, about 1.0 mole of glyoxal and less then 2.0 moles of formaldehyde at a pH maintained between 6.2 and 6.7 and at a temperature of 40° C. until the formation of 1,3-demethylol-4,5-dihydroxy-2-imidazolidinone is essentially completed,

adding an acidic material to the reaction solution to adjust the pH between 2.0 and 3.0,

maintaining the pH between 2.0 and 3.0 and at a temperature between 40° and 90° C. for a period of at least 0.5 to 3.0 hours and

adding a base to the solution to adjust the final pH of the solution between 5.0 and 7.0.

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**4,016,336**

## MELAMINE RESIN FILMS PREPARED BY IMPREGNATING OF PAPER, CELLULOSE, FLEECE OR FABRIC

**Karl Schnee, Maintal; Dieter Tichy, Frankfurt am Main; Walter Michel, Frankfurt am Main, and Günter Gruber, Frankfurt am Main, all of Germany, assignors to Cassella Farbwerke Mainkur Aktiengesellschaft, Germany**

**Division of Ser. No. 442,644, Feb. 14, 1974, Pat. No. 3,936,547. This application Nov. 7, 1975, Ser. No. 629,765**

**Claims priority, application Germany, Feb. 24, 1973, 2309334**

**The portion of the term of this patent subsequent to Feb. 3, 1993, has been disclaimed.**

**Int. Cl.² B32B** *29/06*

**U.S. Cl. 428—530** **4 Claims**

1. A melamine resin film prepared by impregnating paper, cellulose fleece or cellulose fabric with a monomer solution of at least one member selected from the group consisting of monomeric dimethylolmelamine monomethylether, dimethylolmelamine dimethylether, trimethylolmelamine monomethylether, trimethylolmelamine dimethylether and trimethylolmelamine trimethylether and drying the thusly impregnated paper, cellulose fleece or cellulose fabric at a temperature of about 90° to about 200° C.

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**4,016,337**

## WATER-DISPERSIBLE COMPOSITION AND METHOD FOR PRODUCTION

**Jau Yann Hsu, Brookfield, Conn., assignor to Societe d'Assistance Technique Pour Produits Nestle S.A., Lausanne, Switzerland**

**Filed Feb. 13, 1976, Ser. No. 657,758**

**Int. Cl.² A23L** *1/195;* **A23C** *9/16*

**U.S. Cl. 426—99** **12 Claims**

1. A water-dispersible edible composition comprising an intimate admixture of co-agglomerates of a finely-divided non-dispersible material and a silicon dioxide flow agent, said co-agglomerates having a thin coating of an emulsion comprising edible fat and glycerol over their external surfaces.

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**4,016,338**

## GALVANIC ELEMENT

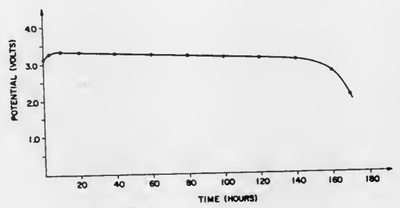
**Helmut Lauck, Glashutten, Germany, assignor to Varta Batterie Aktiengesellschaft, Hannover, Germany**

**Filed Aug. 16, 1976, Ser. No. 714,373**

**Claims priority, application Germany, Sept. 6, 1975, 2539736**

**Int. Cl.² H01M** *6/14*

**U.S. Cl. 429—149** **9 Claims**




1. A galvanic element having a negative electrode of a strongly electro-positive metal, a non-aqueous electrolyte, and a positive electrode containing silver compounds, characterized in that

the electro-chemically reducible component of the positive electrode mass includes silver carbonate.

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**4,016,339**

## SALT WATER BATTERY

**Thomas J. Gray, Armdale, and Jan Wojtowicz, Dartmouth, both of Canada, assignors to Her Majesty the Queen in right of Canada as represented by the Minister of National Defence, Ottawa, Canada**

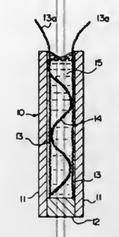
**Filed Nov. 6, 1975, Ser. No. 629,569**

**Claims priority, application Canada, Nov. 6, 1974, 213150**

**Int. Cl.² H01M** *4/02*

**U.S. Cl. 429—219** **8 Claims**

1. A battery electrode structure having a substantially flat configuration comprising a cast mass of electrochemically active material, said mass having contained therein and exposed at opposed major surfaces thereof, an open-mesh electrically conductive structure for connection to a battery terminal, said cast mass further containing an open-mesh electri-




cally conductive support member in contact with said exposed open-mesh electrically conductive structure.

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**4,016,340**

## HYDROXYL-CONTAINING POLYMERS HAVING AMINIMIDE GROUPS ATTACHED THERETO THROUGH AN ETHER LINKAGE

**Henry S. Kolesinski, Burlington; Avinash C. Mehta, Belmont, and Lloyd D. Taylor, Lexington, all of Mass., assignors to Polaroid Corporation, Cambridge, Mass.**

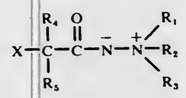
**Filed Aug. 7, 1975, Ser. No. 602,598**

**Int. Cl.² C08F** *8/30;* **C08B** *15/06, 31/08, 37/04*

**U.S. Cl. 526—7** **12 Claims**

1. A novel composition of matter comprising a polymer containing a plurality of hydroxyl groups and having aminimide groups attached to said polymer through an ether linkage.

6. The process for preparing a polyhydroxyl-containing polymer having aminimide groups attached thereto which comprises reacting a polymer containing a plurality of hydroxyl groups with a compound of the formula:



wherein each $R_1$, $R_2$ and $R_3$ are alkyl groups; X is chloro, iodo or bromo; and each $R_4$ and $R_5$ are hydrogen, lower alkyl or phenyl in an organic solvent for said polymer containing a plurality of hydroxyl groups and said compound.

12. The process for preparing a cross-linked hydroxyl-containing polymer which comprises the deamination of a polymer containing a plurality of hydroxyl groups with aminimide groups grafted thereon through an ether linkage.

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**4,016,341**

## BULK POLYMERIZATION OF VINYL CHLORIDE

**Kinya Ogawa; Kazuhiko Kurimoto; Yoshitsugu Eguchi, and Satoshi Kuwata, all of Ibaragi, Japan, assignors to Shin-Etsu Chemical Company Limited, Tokyo, Japan**

**Filed Oct. 23, 1975, Ser. No. 625,044**

**Claims priority, application Japan, Oct. 28, 1974, 49-124096**

**Int. Cl.² C08F** *3/22*

**U.S. Cl. 526—62** **27 Claims**

1. In a method for the bulk polymerization of vinyl chloride monomer or a mixture thereof with a copolymerizable monomer or monomers, the improvement which comprises coating the walls of a polymerization vessel and other surfaces coming into contact with the monomer or monomers, prior to the polymerization, with a solution of at least one phosphoric compound selected from the group consisting of phosphoric esters, polyphosphoric esters, and their alkali metal salts thereof.

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**4,016,342**

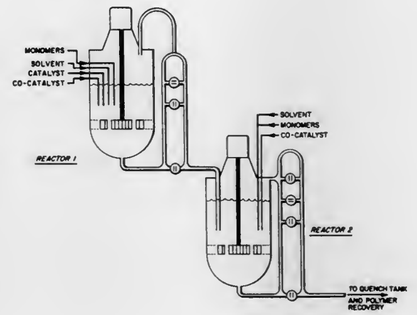
## PROCESS AND PRODUCT

**Joseph Wagensommer, Westfield, N.J., assignor to Exxon Research and Engineering Company, Linden, N.J.**

**Continuation of Ser. No. 556,088, March 7, 1975, abandoned, which is a continuation of Ser. No. 267,441, June 29, 1972, abandoned. This application Jan. 7, 1976, Ser. No. 647,151**

**Int. Cl.² C08F** *210/00, 212/00*

**U.S. Cl. 526—65** **8 Claims**




1. A continuous process for the production of elastomeric copolymers of ethylene and a higher $C_3$ to $C_{10}$ alpha-olefin, which may additionally have polymerized therewith an acyclic or alicyclic nonconjugated diolefin which comprises connecting two stirred reactors in series,

1. adding to the first reactor:

ethylene, a higher $C_3$ to $C_{10}$ alpha-olefin, or additionally said acyclic or alicyclic nonconjugated diolefin, a Ziegler-Natta type catalyst consisting of at least one transition metal component and an organoaluminum cocatalyst consisting of a dialkyl aluminum halide having the formula $R_2AlX$, where R is a monovalent hydrocarbon radical, selected from the group consisting of $C_1$ to $C_{13}$ alkyl, alkylaryl, and cycloalkyl radicals, X is a halogen having an atomic number equal to or greater than 17;

2. polymerizing a portion of the monomers in the first reactor at a temperature in the range of 0° to 100° C., at a pressure of from 0 to 1000 psig, to form a polymer cement;

3. passing said polymer cement from the first reactor to a second reactor, connected in series with said first reactor;

4. adding to said second reactor:

ethylene, said higher $C_3$ to $C_{10}$ alpha-olefin, additional acyclic or alicyclic nonconjugated diolefin and an organoaluminum cocatalyst consisting of an alkyl aluminum sesquihalide having the formula $R_mAlX_n$, where R is a monovalent hydrocarbon radical selected from the group consisting of $C_1$ to $C_{12}$ alkyl, alkylaryl, and cycloalkyl radicals, *m* and *n* are each equal to 1.5, X is a halogen having an atomic number equal to or greater than 17;

5. further polymerizing the monomers at essentially the same conditions as in the first reactor;

6. discharging the contents from the second reactor and terminating the polymerization reaction of said discharged contents; and

7. collecting and finishing the copolymer.

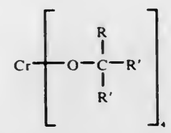
**4,016,343**

## TETRAVALENT CHROMIUM ALKOXIDE POLYMERIZATION CATALYST AND METHOD

**Raymond E. Hoff, Palatine, and Mitsuzo Shida, Barrington, both of Ill., assignors to Chemplex Company, Rolling Meadows, Ill.**

**Filed Aug. 22, 1975, Ser. No. 607,012**
**Int. Cl.² C08F** *4/78, 10/00*
**U.S. Cl. 526—96** **18 Claims**

**1.** A catalyst for polymerizing one or more 1-olefins to a high density polymer, prepared by (1) forming a mixture of a finely divided support selected from the group consisting of silica, alumina, zirconia, thoria and composites thereof and at least one tetravalent alkoxide of chromium in an amount to give about 0.1–10 weight percent chromium on said support, said alkoxide being of the formula



wherein R is hydrogen or an alkyl group of 1–6 carbon atoms, R′ is an alkyl group of 1–6 carbon atoms and all R′ may be the same or different, and (2) activating said mixture of support and alkoxide with a dry gas that contains oxygen.

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**4,016,344**

## OLEFIN POLYMERIZATION CATALYST

**Rajindar K. Kochhar, Katy, and Robert J. Rowatt, Orange, both of Tex., assignors to Gulf Research & Development Company, Pittsburgh, Pa.**

**Continuation of Ser. No. 159,043, July 1, 1971, abandoned. This application Feb. 4, 1976, Ser. No. 655,197**
**Int. Cl.² C08F** *4/66, 4/02, 10/00*
**U.S. Cl. 526—124** **10 Claims**

**1.** A process for preparing a catalyst component which comprises contacting an inorganic magnesium compound selected from the group consisting of magnesium oxide and basic magnesium carbonate with an organic peroxide in the presence of an inert solvent and at an elevated temperature of at least 20° C., recovering the peroxide-treated inorganic magnesium compound from the inert solvent, drying the peroxide-treated inorganic magnesium compound at an elevated temperature of at least 50° C., and thereafter contacting the peroxide-treated inorganic magnesium compound with a transition metal halide selected from the group consisting of those vanadium and titanium halides normally liquid at room temperature.

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**4,016,345**

## PROCESS FOR POLYMERIZING TETRAFLUOROETHYLENE IN AQUEOUS DISPERSION

**David Alan Holmes, Vienna, W. Va., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Continuation-in-part of Ser. No. 317,804, Dec. 22, 1972, abandoned. This application Mar. 24, 1976, Ser. No. 670,075**
**Int. Cl.² C08F** *14/26*
**U.S. Cl. 526—206** **1 Claim**

**1.** Process for preparing polytetrafluoroethylene resin which comprises

a. polymerizing tetrafluoroethylene in an aqueous reaction medium in the presence of a nontelogenic dispersing agent which is a fluorinated carboxylic acid or fluorinated carboxylate containing from 7 to 10 carbons atoms and which is present in an amount sufficient to maintain the polymer particles produced in a dispersed state; and in the presence of an inorganic persulfate initiator; and at a temperature of between about 95° and about 125° C; and wherein said initiator is continuously added to the reaction medium during the polymerization until between about 50% and 80% of the total amount of polytetrafluoroethylene to be formed is formed with the total amount of initiator added being no more than about **0.011** gram per liter of reaction medium,

b. followed by coagulating and drying the resin.

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**4,016,346**

## CATIONIC POLYMERIZATION PROCESS

**Ronald Thomas Wojcik, Stamford, and Erwin Richard Ruckel, Darien, both of Conn., assignors to Arizona Chemical Company, Wayne, N.J.**

**Filed Feb. 3, 1976, Ser. No. 654,687**
**Int. Cl.² C08F** *10/14*
**U.S. Cl. 526—221** **10 Claims**

**1.** A process for polymerizing α-pinene monomer or a mixture of at least 50% α-pinene and other terpene monomers which comprises the steps of: establishing a catalyst system comprising (1) a minor amount of an antimony halide, (2) a major amount of aluminum chloride or aluminum bromide or mixtures of the latter in an inert solvent, adding thereto at a temperature between about minus 30° C and about plus 30° C α-pinene monomer or a mixture of at least 50% α-pinene and other terpene monomers incrementally with agitation, adjusting and maintaining the temperature of the mixture at about minus 30° C to about plus 30° C for from about one to about 4 hours to obtain an α-pinene polymer.

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**4,016,347**

## PROCESS FOR THE PRODUCTION OF POLYMERS HAVING A BROAD MOLECULAR WEIGHT DISTRIBUTION

**Neithart Sommer; Gerhard Cuntze, both of Marl, and Wolfgang Boehmer, Oer-Erkenschwick, all of Germany, assignors to Chemische Werke Huls Aktiengesellschaft, Marl, Germany**

**Filed Aug. 8, 1975, Ser. No. 603,172**
**Claims priority, application Germany, Aug. 9, 1974, 2438322**
**Int. Cl.² C08F** *4/48, 36/06*
**U.S. Cl. 526—64** **4 Claims**

**1.** A process for the production of polymers having a broad molecular weight distribution by the continuous-adiabatic polymerization of 1,3-butadiene alone or in admixture with a comonomer in a diluent and in the presence of an organolithium catalyst which comprises feeding a stream of 1,3-butadiene and diluent at a constant flow rate of at least $1.10^{-3}$ liters/sec./cm² to an elongate reaction zone and feeding a stream of the catalyst to the inlet zone at a rate which is periodically increased and decreased with a cycle time of at least 1 sec., said flow rate and rate of change of catalyst flow rate being such that segments of reaction product along the length of the initial portion of the elongate reaction zone contain polymer having an average molecular weight which differs from the average molecular weight of the polymer in preceding and following like segments of reaction product adjacent thereto, and said reaction zone has a length to diameter ratio from about 5:1 to about 200:1 and is sufficiently elongate that said adjacent segments become remixed before the reaction product is discharged from said reaction zone.

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**4,016,348**

## REACTOR PROCESS AND APPARATUS FOR CONTINUOUS POLYMERIZATION

**George F. Adams, 2111 E. 26th St., Tulsa, Okla. 74114**

**Continuation of Ser. No. 228,241, Feb. 22, 1972, abandoned, which is a continuation of Ser. No. 845,753, July 29, 1969, abandoned. This application June 13, 1974, Ser. No. 479,173**
**Int. Cl.² C08F** *12/08, 12/16*
**U.S. Cl. 526—293** **3 Claims**

**1.** A continuous process of polymerizing a composition consisting essentially of vinyl monomers selected from the group consisting of styrene, alkyl substituted styrene, halogen substituted styrene, and mixtures thereof comprising the steps of:

continuously flowing said monomer through reaction tubing of substantially uniform cross-section in essentially one direction;

alternately dividing said flowing monomer, within said reaction tubing, into two essentially equal compartments of turning flow and thence into four essentially equal compartments of straight flow, whereby said flow periodically merges and separates along the length of said tubing to create, across a given lateral cross-section of monomer, a substantially uniform temperature maintained solely by external cooling of said reaction tubing, and to create a uniform rate of flow across said tubing until polymerized to a desired condition; and

controllably maintaining the desired temperature of said external cooling.



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**4,016,349**

## PROCESS FOR REMOVING VANADIUM RESIDUES FROM POLYMER SOLUTIONS

**James Michael McKenna, Hockessin, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Oct. 30, 1975, Ser. No. 627,460**
**Int. Cl.² C08F** *6/08*
**U.S. Cl. 528—482** **16 Claims**

**1.** A process for removing vanadium residues from a solution in an organic solvent of an α-olefin homopolymer or copolymer with one or more hydrocarbon monomers, said process comprising with steps of first contacting said solution at a temperature of about room temperature to about 140° C. with a polar liquid capable of extracting dissolved vanadium compounds and soluble in the polymer solvent under the process conditions to an extent of at most 0.5 weight percent, said polar liquid being supported on a finely divided, inert, solid material; then separating said solution from said solid material;

with the provisos that:

1. the polar liquid has at least one functional group other than carbon-carbon or carbon-hydrogen groups, and contains at least one oxygen, sulfur, nitrogen, or phosphorus atom; and
2. when the polar liquid also contains carbon-carbon groups, there is present at least one such functional group for each eight carbon atoms.

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**4,016,350**

## REDUCTION OF VINYL CHLORIDE IN FREE SPACE SURROUNDING POLYVINYL CHLORIDE POWDER

**Edwin Studley Smith, Cuyahoga Falls, and Richard A. Marshall, Akron, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio**

**Filed Nov. 20, 1975, Ser. No. 633,736**
**Int. Cl.² C08F** *6/00*
**U.S. Cl. 528—486** **6 Claims**

**1.** The method of reducing the monomeric vinyl chloride in the free space surrounding polyvinyl chloride resin powder which comprises mixing polyvinyl chloride powder with 0.4 or more parts per 100 parts of said polyvinyl chloride powder of a reactive material selected from the group consisting of p-toluenesulfonic acid, octadecyl thioglycolate and octadecyl 3-mercaptopropionate.

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**4,016,351**

## PECTIC SUBSTANCES WITH VARYING METHOXYL CONTENT AND PROCESS THEREFOR

**Emile H. Eschinasi, P.O. Box 7217, Haifa, Israel**

**Filed Feb. 4, 1976, Ser. No. 655,294**
**Int. Cl.² C08B** *37/06*
**U.S. Cl. 536—2** **15 Claims**

**1.** A process for the production of pectic substances having a methoxyl content of about 2 to about 12% from pectin bearing substances comprising combining naturally occurring pectin bearing substances and a source of calcium ions at a pH range of about 3 to 8 to temporarily immobilize and fix said pectic substances and to cause the release of superfluous sugar and soluble solids containing liquors and juices from said pectin bearing substances while achieving a simultaneous and controlled, IN SITU, demethoxylation of said pectins; and subsequently extracting and separating said pectic substances by adding an oxalic acid containing solution and removing said calcium ions as insoluble calcium oxalate salts.

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**4,016,352**

## 2,3-O-SULFINYL-CYTIDINE-5-PHOSPHATE

**Kozo Tsunoda; Tsuneo Sowa, and Kiyohide Sako, all of Miyazaki, Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan**

**Filed Mar. 13, 1975, Ser. No. 558,098**
**Claims priority, application Japan, Dec. 27, 1974, 49-148936**
**Int. Cl.² C07H** *19/10*
**U.S. Cl. 536—29** **1 Claim**

**1.** 2′,3′-O-Sulfinyl-cytidine-5′-phosphate represented by the formula



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**4,016,353**

## PROCESS FOR PRODUCING ORGANIC ACID ESTERS OF CELLULOSE

**David W. Goheen, Camas; Michael D. Fahey, Vancouver, and Harvey L. Claussen, Seattle, all of Wash., assignors to Crown Zellerbach Corporation, San Francisco, Calif.**

**Filed Apr. 14, 1975, Ser. No. 567,580**
**The portion of the term of this patent subsequent to Oct. 28, 1992, has been disclaimed.**
**Int. Cl.² C08B** *3/06, 3/20*
**U.S. Cl. 536—69** **23 Claims**

**1.** A process for forming organic acid esters of cellulose, in an efficient and rapid manner, which includes a controlled esterification reaction comprising confricating cellulose, at high consistency, in the presence of esterification chemicals, to form a confricated cellulose ester product, said confrication step including high energy, frictional interaction of said cellulose and esterification chemicals, respectively, which are maintained in relatively intimate contact one with the other, and furnishing the predominant means for providing penetration of said esterification chemicals for distribution throughout the cellulose, without substantial degradation of the confricated cellulose ester product formed.

**18.** A process for rapidly forming organic acid esters of cellulose which comprises the steps of:

a. introducing cellulose, at high consistency, and esterifica-

tion chemicals into an area formed within a high energy reactor, said area including means for confricating said high-consustency cellulose in the presence of said esterification chemicals; and

b. confricating said cellulose and esterification chemicals, respectively, said configuration step including the high energy, frictional interaction of said cellulose and esterification chemicals which are maintained at relatively intimate contact one with the other, said resultant confricated product being characterized in that said esterification chemicals have substantially penetrated, and are uniformly distributed throughout, said cellulose.

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**4,016,354**

## PREPARATION OF PHARMACOLOGICALLY ACTIVE HYDROXYALKYL STARCH

**Charles Trevour Greenwood, Watford, England, assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Oct. 6, 1975, Ser. No. 620,001**

**Claims priority, application United Kingdom, Oct. 7, 1974, 43391/74**

**Int. Cl.² C08B** *31/08*

**U.S. Cl. 536—111** **10 Claims**

1. A process of preparing a substantially inorganic salt free, colorless, pharmacologically active hydroxyalkyl starch which comprises:

a. subjecting a waxy starch composed principally of amylopectin and little or no amylose to acid hydrolysis at a temperature below the gelatinization temperature of the starch to effect a molecular size reduction while substantially retaining the granular form of the starch;

b. reacting the hydrolyzed, granular starch with a reducing agent to reduce aldehydic reducing end groups of the hydrolyzed strach to the corresponding alcohol groups under reaction conditions which prevent the dissolution of the granular starch;

c. suspending the stabilized, hydrolyzed, granular starch in a liquid medium comprising a water-miscible organic solvent, the hydrolyzed, granular starch being substantially insoluble in the liquid medium;

d. reacting the stabilized, hydrolyzed, granular starch in suspension with a starch hydroxyalkylating agent under basic pH conditions, until a hydroxyalkylated granular starch having a molecular substitution within the range from about 0.3 to about 0.9 is obtained; and

e. washing the hydroxyalkylated granular starch to obtain a substantially inorganic salt free, colorless, pharmacologically active hydroxyalkyl starch.



**4,016,355**

## DEVICE IN DIRECT CURRENT ARC FURNACES

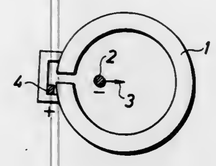
**Sven-Einar Stenkvist, Vasteras, Sweden, assignor to ASEA AB, Vasteras, Sweden**

**Filed July 10, 1975, Ser. No. 594,739**

**Claims priority, application Sweden, July 23, 1974, 7409557**

**Int. Cl.² H05B** *7/20*

**U.S. Cl. 13—11** **4 Claims**




1. A DC electric arc furnace comprising a furnace enclosure having a hearth for containing a melt, said hearth having a contact electrode for the melt, an arcing electrode positioned above the melt for forming an arc with the melt when placed in circuit therewith via said electrode, said arcing and contact electrodes being relatively offset in a horizontal direction so that the arc is normally angularly deflected with respect to a vertical direction, and means for applying a magnetic field to the arc so as to control its arcing direction.

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**4,016,356**

## HEAT RECOVERABLE ARTICLE

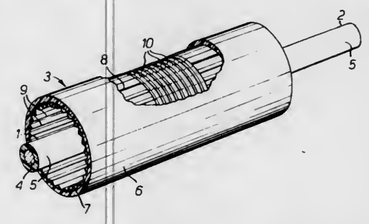
**Robert H. McLoughlin, Swindon, England, assignor to Raychem Limited, London, England**

**Continuation-in-part of Ser. No. 504,375, Sept. 9, 1974, Pat. No. 3,946,143. This application Feb. 2, 1976, Ser. No. 654,272**

**Claims priority, application United Kingdom, Sept. 10, 1973, 42483/73**

**Int. Cl.² H02G** *15/08*

**U.S. Cl. 174—35 R** **9 Claims**




1. A heat recoverable article comprising a first hollow member composed of heat-recoverable material and an annular corrugated sheath disposed therein, the sheath having longitudinal corrugations extending over substantially the whole of its length and transverse corrugations extending over only a part of its length and being transverse to said longitudinal corrugations, the region having only longitudinal corrugations being collapsible upon the imposition of radially inward recovery force of the member.

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**4,016,357**

## FLOOR STRUCTURE FOR THE ENVIRONMENT OF A MODULAR COMPUTER SYSTEM

**Thomas C. Abrahamsen, Birmingham, Mich., assignor to Burroughs Corporation, Detroit, Mich.**

**Filed July 18, 1975, Ser. No. 597,019**

**Int. Cl.² H05K** *9/00*; **E04F** *15/024*

**U.S. Cl. 174—48** **3 Claims**

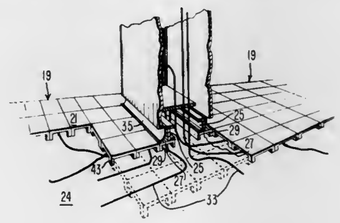
1. A site area for a computer system wherein the interconnections between the hardware units may be removed from view and displaced from the access pathways utilized by humans in attending the computer system and wherein the hardware units may be added to or substituted within the system with minimal inconvenience and disruption comprising:

a. a plurality of first elevated support members providing a base for each of the hardware units;

b. a plurality of second elevated support members secured to the first elevated support members of each hardware unit;

c. a permanent flooring in the site area;

d. the hardware units being disposed on the permanent flooring in proper relationship to one another so that the second elevated support members thereof are contactably supported by said permanent flooring;




e. means interconnecting the hardware units with the required cables and the like so that the interconnections are disposed on and along the permanent flooring;

f. a plurality of rectangularly shaped modular third elevated support members arranged in the site area intermediate and surrounding the hardware units and in abutting relationship with one another and with the first elevated support members, the arrangement of the modular third elevated support members being accompanied by slight displacements of the interconnections such that the third elevated support members straddle the interconnections; and

g. means retaining said members in said abuttable relationship relative to one another and with said second elevated support member.

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**4,016,358**

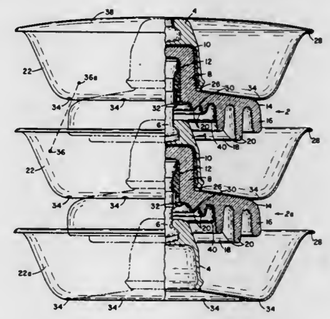
## ELECTRICAL INSULATOR WITH CONTAMINATION AND FLASH-OVER ELIMINATOR

**Clyde N. Richards, 4887 Mission Blvd., San Diego, Calif. 92109**

**Filed Mar. 11, 1976, Ser. No. 666,023**

**Int. Cl.² H01B** *17/48*

**U.S. Cl. 174—141 R** **4 Claims**




1. An improved electrical insulator adapted to be linked

together with like insulators into a chain of such insulators, said insulator having a dielectric body provided with an upper surface which has an outwardly and downwardly extending flange and a lower surface which has a plurality of downwardly extending petticoats, a lower mounting means which is conductive, which is secured within said dielectric body and which protrudes from the lower surface, and an upper mounting means, which is conductive and is secured to the top of said dielectric body to receive and hold the lower mounting means of a second insulator to be positioned above, wherein the improvement comprises: a conducting non-corrosive upper member which is secured to the upper surface of the insulator and in electrical contact with the upper mounting means whereby to dissipate high electric fields which exist between the bottom edge of the upper mounting means and the upper surface of the insulator, said upper member extending radially outward so that the outer perimeter of the upper member extends beyond the flange of the upper surface of said insulator, whereby to protect the insulator from atmospheric contamination; and a conducting non-corrosive lower member which is secured to the lower surface of the insulator and is in electrical contact with the lower mounting means whereby to dissipate high electric fields which exist between the upper portion of the lower mounting means and the lower surface of the insulator, said lower member conforming to the shape of the lower surface of the insulator;

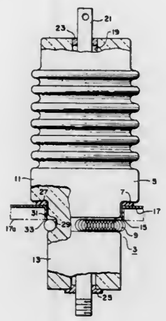
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**4,016,359**

## INSULATING BUSHING ASSEMBLY

**James R. Gamble, Greensburg, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed Nov. 28, 1975, Ser. No. 636,284**
**Int. Cl.² H01B** *17/30*
**U.S. Cl. 174—153 R** **1 Claim**



1. An insulating bushing assembly extending through an aperture in a wall of electrical apparatus, comprising:

a. An electrically insulating bushing having an enlarged portion and a reduced portion and having an annular shoulder between said portions, the reduced portion extending through the aperture and having an annular groove spaced from the shoulder;

b. an elastic gasket between the shoulder and the wall;

c. an annular coil spring in the groove and having a cross sectional diameter greater than the depth of the groove and substantially less than the width of the groove at the surface of the reduced portion, and

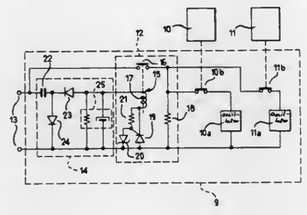
d. the spring contacting a peripheral corner of the aperture on the side of the wall opposite the gasket and external of the reduced portion to enable the spring to roll on an inturned surface portion of the groove radially inwardly of the groove with the corner as the center of spring rotation into tight contact between the groove surface and the corner in response to expansion of the gasket, whereby the elastic gasket is retained in fluid-tight compression between the bushing and the wall.

**4,016,360**

## SYSTEM FOR REMOTELY CHECKING EQUIPMENT

**Mario Cane, V. Bussoleno 99, Leumann-Collegno, Italy 10096**

**Filed Dec. 30, 1975, Ser. No. 645,414**
**Claims priority, application Italy, Dec. 31, 1974, 70798-74**
**Int. Cl.² H04M** *1/24, 11/00*
**U.S. Cl. 179—2 A** **8 Claims**



1. A system for remotely checking the operable condition of at least one piece of electrical equipment, the system comprising:

a switch means responsive to the operable condition of said one piece of electrical equipment;

an oscillator means for generating a distinctive low frequency electrical signal, its output being connected to said switch means;

a switching means in series with said switch means for selectively coupling and output signal from said oscillator means directly to a telephone line, said switching means including a controlled rectifier having a cathode, an anode and a control electrode, said anode and said control electrode being coupled respectively to the cathode and anode of a first diode, which is a Zener diode, said Zener diode having its anode connected, via a resistance, in series with an energizing coil of a relay forming at least part of said switching means;

means responsive to a call signal on the telephone line for effecting closing of said switching means upon arrival of a call signal; and

timing means for effecting opening of said switching means upon expiration of a given period of time subsequent to receipt of a call signal;

whereby a user may place a call signal on the telephone line and determine if the oscillator means is supplying a distinctive signal directly to the telephone line as an indication of the operable condition of the piece of equipment.

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**4,016,361**

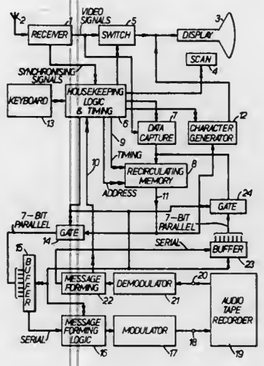
## APPARATUS FOR STORING DATA BROADCAST IN DIGITAL FORM FOR GENERATING A CHARACTER DISPLAY OR FOR RECORDING SUCH DATA FOR LATER PLAYBACK

**Kailash Narain Pandey, Cambridge, England, assignor to Texas Instruments Incorporated, Dallas, Tex.**

**Filed Sept. 2, 1975, Ser. No. 609,654**
**Claims priority, application United Kingdom, Sept. 26, 1974, 41965/74**
**Int. Cl.² H04N** *5/76*
**U.S. Cl. 358—83** **10 Claims**

1. Data handling apparatus for use in conjunction with a television receiver; said apparatus including means for selecting parts of a television signal received by said receiver, deriving data from said selected parts and applying said data at a high data rate to a main high speed storage means for the data; means for selectively reading data from said main storage means and for producing therefrom video signals for generating a legible display of the selected data; first buffer storage means for receiving data from the main storage means, a group of digits at a time; means for reading data at low speed from said buffer storage means and producing therefrom signals suitable for recording by a relatively low frequency signal recorder; means for deriving data signals from signals from a relatively low frequency signal recorder; and second buffer storage means for receiving the derived data signals and






for producing therefrom data signals at a high data rate, a group of digits at a time, and for applying said digit groups to said main storage means.

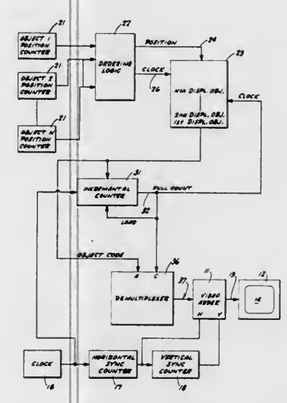
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**4,016,362**

## MULTIPLE IMAGE POSITIONING CONTROL SYSTEM AND METHOD

**Stephen D. Bristow, San Jose, and Steven T. Mayer, Auburn, both of Calif., assignor to Atari, Inc., Sunnyvale, Calif.**

**Filed Oct. 29, 1975, Ser. No. 626,665**
**Int. Cl.² H04N** *5/22;* **G08B** *23/00*
**U.S. Cl. 358—142** **16 Claims**



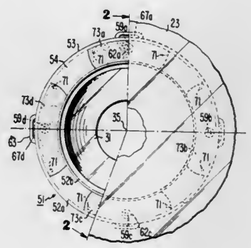

1. In a method of controlling the display of images of a plurality of objects at different locations on a video display screen scanned in successive frames by an image forming beam traversing the screen along a predetermined path, the steps of: providing data indicative of the locations at which the images are to be displayed during each frame, arranging the data for each frame according to the order of the image locations along the path of the beam, comparing the image location data with data corresponding to the position of the beam, and providing an output display signal when the position of the beam corresponds to the location at which an image is to be displayed.

**4,016,363**

## METHOD FOR ADHERING COMPONENTS PLATFORM TO CATHODE-RAY TUBE AND PRODUCT THEREOF

**Samuel Broughton Deal, Lancaster, and Donald Walter Bartch, Columbia, both of Pa., assignors to RCA Corporation, New York, N.Y.**

**Filed Mar. 15, 1976, Ser. No. 667,109**
**Int. Cl.² H04M** *5/64*
**U.S. Cl. 358—248** **6 Claims**



1. In a method for mounting an electronic component on an external surface of a cathode-ray tube comprising

a. positioning a platform against said surface of said tube,

b. applying at least one liquid thermoplastic mass between said platform and said surface,

c. applying at least one liquid irreversibly-hardenable mass between said platform and said surface,

d. solidifying said thermoplastic mass,

e. mounting said electronic component on said platform after said thermoplastic mass has hardened,

f. and completing the curing of said permanently-hardenable mass after said electronic component is mounted on said platform.

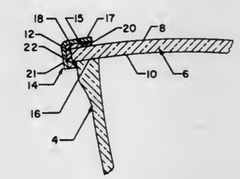
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**4,016,364**

## COLOR TELEVISION PICTURE TUBES WITH IMPROVED IMPLOSION PROTECTION SYSTEM

**Melvin F. Rogers, Western Springs, Ill., assignor to Zenith Radio Corporation, Chicago, Ill.**

**Filed Oct. 20, 1975, Ser. No. 623,853**
**Int. Cl.² H01J** *29/87*
**U.S. Cl. 358—245** **6 Claims**



1. A color television picture tube having a glass bulb with an approximately rectangular, flangeless, curved faceplate having a convex front surface through which television pictures are viewed, a concave rear surface with a phosphor screen deposited on a portion thereof, and a peripheral edge surface connecting the convex front surface and the concave rear surface of the faceplate the peripheral edge surface being contoured, that is, having sides which depart from and return to a plane connecting the four corners of the faceplate, the glass bulb also having a funnel having a convex seal land which mates with the concave inner surface of the faceplate to define a contoured sealing interface, said tube including a low-cost edgebond implosion protection system comprising:

a high tensile strength metal frame which surrounds said edge surface of said faceplate and which has a contour corresponding generally to that of said edge surface, i.e.,

a contour in which sides of the frame depart from and return to a plane connecting the four corners of the frame the direction of said departure being the same as for the faceplate edge surface; and

a cement between said frame and said edge surface of said faceplate, said frame and cement binding up said edge surface of said faceplate.

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**4,016,365**

## READOUT FOR RECORDING TYPEWRITER

**Marcel Jules Helene Staar, Brussels, Belgium, assignor to Staar Development Company, S.A., Brussels, Belgium**

**Continuation of Ser. No. 593,217, July 7, 1975, abandoned. This application Sept. 2, 1975, Ser. No. 609,580**

**Claims priority, application Belgium, July 5, 1974, 817295**

**Int. Cl.² G06K** *15/00;* **H04L** *13/00*

**U.S. Cl. 178—23 R** **16 Claims**

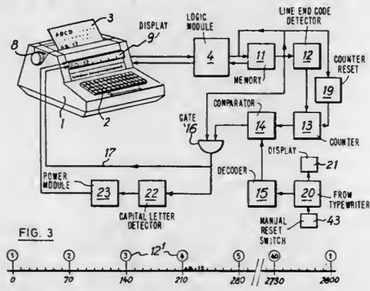



FIG. 3

**1.** In a recording typewriter having a keyboard, line control elements including a roller for carrying a sheet to be typed and adapted to be advanced or retarded for bringing a line into type position, a recording memory, and means coupling the memory and the typewriter for recording codes in the memory corresponding to multiple lines of typed characters and for typing characters corresponding to stored codes, the improvement comprising, an alpha numeric display having a plurality of character positions sufficient to display a complete line of type, means coupling the memory to the display and responsive to the stored codes for displaying the characters corresponding to a selected line of type, line selecting means operatively connected to the output of the recording memory for selecting a particular line of type to be displayed from multiple lines stored in the recording memory, said line selecting means further including reset means for selecting the first line of a multiple line text stored in the recording memory and for displaying said first line, and means connecting said line selecting means for operation responsive to said line control elements within the typewriter for varying the display line-by-line coincident with varying the position of the roller and sheet thereon.

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**4,016,366**

## COMPATIBLE STEREOPHONIC RECEIVER

**Hirotaka Kurata, Tokyo, Japan, assignor to Sansui Electric Co., Ltd., Tokyo, Japan**

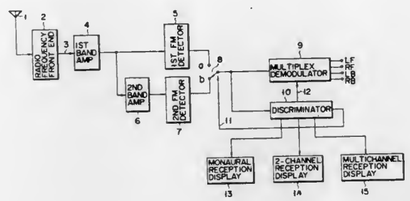
**Filed July 14, 1975, Ser. No. 595,399**

**Claims priority, application Japan, July 17, 1974, 49-84683[U]**

**Int. Cl.² H04H** *5/00*

**U.S. Cl. 179—15 BT** **8 Claims**

**1.** A compatible stereophonic receiver comprising a circuit for receiving a monaural signal, 2-channel stereophonic composite signal and multi-channel stereophonic composite signal transmitted in the frequency modulated form and generating an intermediate frequency signal including any of said signals; amplifier means for amplifying said intermediate frequency signal; frequency modulated wave detection means for detecting said included signal from the output of said amplifier means; and a multiplex demodulator coupled to said detection means and adapted to demodulate an audio signal included in any of said detected monaural signal, 2-channel stereophonic composite signal and multi-channel stereophonic composite signal, wherein said intermediate frequency signal amplifier means includes a plurality of band amplifier means each having a band width different from each other; said detection means includes at least one frequency modulated wave detector for detecting said included signal from an output of any of said band amplifier means; and said stereophonic receiver




further comprises a discriminator coupled to said frequency modulated wave detector to determine whether a signal received is a monaural signal, 2-channel stereophonic composite signal or multi-channel stereophonic composite signal, and means for selectively connecting a band amplifier means which has a band width corresponding to an output signal from the discriminator to said multiplex demodulator through a frequency modulated wave detector and for controlling said multiplex demodulator to demodulate an audio signal from the output of said frequency modulated wave detector.

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**4,016,367**

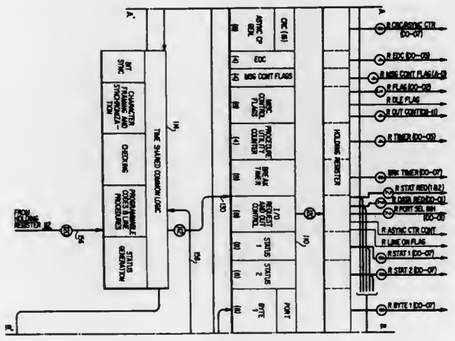
## COMMUNICATION MULTIPLEXER MODULE

**Wendell A. Law, Kaysville; William G. Barrett, Bountiful; Norman F. Priebe, and Harry D. Wise, both of Salt Lake City, all of Utah, assignors to Sperry Rand Corporation, New York, N.Y.**

**Filed Apr. 11, 1975, Ser. No. 567,480**

**Int. Cl.² H04J** *3/00*

**U.S. Cl. 179—15 A** **11 Claims**




**1.** In a communications multiplexer module for transferring messages between a host computer and a plurality of line adapters, the improvement comprising:

a memory including a plurality of addressable storage locations, one for each of said line adapters, each said addressable storage location including,

a first storage means for temporarily storing each character of a message as it is transferred between the computer and the associated line adapter, and

a second storage means for storing longitudinal redundancy check characters generated as a message is transferred through the multiplexer module;

a time shared modulo 2 adder means having first and second inputs connected to said memory for receiving said characters of said messages from said first storage means and said longitudinal redundancy check characters from said second storage means to thereby generate longitudinal redundancy check characters;

said adder means having an output connected to said memory for applying generated longitudinal redundancy check characters to said second storage means; and,

addressing means for addressing said addressable storage locations in a predetermined sequence, whereby the characters stored in the first and second storage means of a given addressable storage location are concurrently applied to said adder means and the characters stored in the first and second storage means of successive addressable storage locations are applied to said adder means in said predetermined sequence, and the longitudinal redundancy check characters generated by said adder means represent the longitudinal check characters for said messages from the beginning of said messages through and including the last one applied to said adder means.



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**4,016,368**

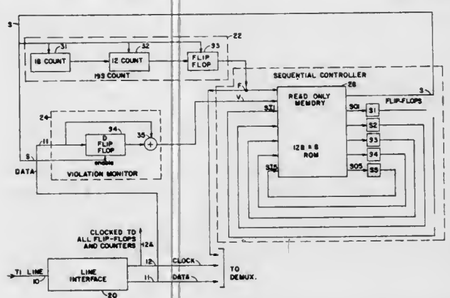
## FRAMING CIRCUIT FOR DIGITAL RECEIVER

**Garrett Gordon Apple, Jr., Huntington Beach, Calif., assignor to North Electric Company, Galion, Ohio**

**Filed Dec. 12, 1975, Ser. No. 640,334**

**Int. Cl.² H04J** *3/06*

**U.S. Cl. 179—15 BS** **16 Claims**




**1.** A framing circuit for a digital receiver in which received signals comprise a train of data bits including framing bits at regular intervals, said framing bits having a predetermined pattern, counting means to count said data bits and to produce a framing signal on a given count, violation monitor means to compare said framing bits with said predetermined pattern and to produce a violation signal upon detecting a deviation from said predetermined pattern, digital controller means operative in response to said framing and violation signals to detect and record said violation signals occurring with said framing signals, and further operative whenever a predetermined violation rate threshold is exceeded to re-established correct framing;

said digital controller means comprising a read only memory having at least one output lead and a plurality of input leads and digital storage means coupled between said output and input leads of said read only memory.

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**4,016,369**

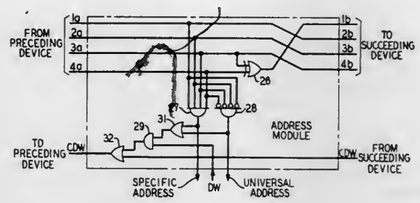
## ADDRESSING ARRANGEMENTS FOR COMMUNICATIONS NETWORKS

**Thomas Josef Pedersen, Lincroft, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed Mar. 9, 1976, Ser. No. 665,171**

**Int. Cl.² H04Q** *11/04, 3/04*

**U.S. Cl. 179—15 AL** **9 Claims**




**1.** A communication system comprising:

a main device and at least one plurality of associate devices, generating means at said main device for producing any one of a plurality of access messages, each one of the plurality of access messages uniquely corresponding to one of said associate devices in the plurality, wherein the improvement comprises:

transforming means at each of said associate devices for changing the received one of the plurality of access messages in a predetermined manner to produce a changed access message corresponding identically to another one of the plurality of access messages and for applying the changed access message to a subsequent associate device, and

logical means, at each of said associate devices in circuit relationship with said transforming means, for responding to the same one of the plurality of access messages, each one of the plurality of said logical means being provided a different one of the plurality of access messages when said generating means issues one access message due to the individual operation of each of the plurality of said transforming means in changing its received access message so as to provide the unique correspondence of a particular associate device at said main device resulting from a number of transformations unique to each associate device.

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**4,016,370**

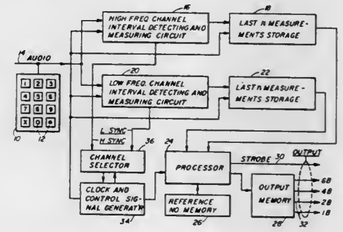
## DIGITAL TONE DECODER

**Chansak Laoteppitaks, Orange; Lincoln Henthorn, Cheshire, and Charles B. Falconer, Hamden, all of Conn., assignors to Chestel, Inc., Chester, Conn.**

**Filed Mar. 19, 1975, Ser. No. 559,744**

**Int. Cl.² H04M** *1/50*

**U.S. Cl. 179—84 VF** **23 Claims**




**1.** A decoder for use in a communication system wherein bits of information to be communicated are represented on a

communication line by a plurality of code tones of distinctive frequencies each corresponding to a respective one of said bits of information, said decoder comprising means responsive to an input signal appearing on a communication line for detecting repetitive intervals dependent on the period of said input signal and for producing a digital measurement of the length of each of said intervals, means responsive to said digital measurements for determining whether said input signal has persisted at an acceptably steady frequency within predescribed limits for a predetermined time and, if such persistence is found, for determining whether said frequency of said input signal is sufficiently close within predescribed limits to the distinctive frequency of one of said code tones as to be recognizable as such code tone and, if so, for producing a signal identifying the recognized code tone.

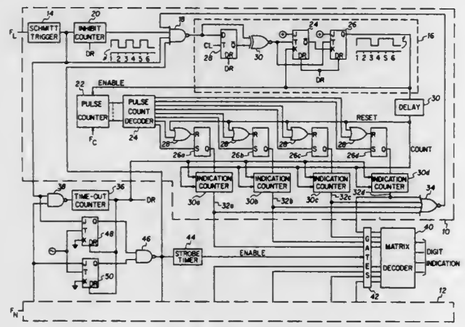
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**4,016,371**

## FREQUENCY TONE DETECTION

**Mohamad Hammad, Santa Ana, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.**

**Filed Jan. 26, 1976, Ser. No. 652,596**
**Int. Cl.² H04M *1/50***
**U.S. Cl. 179—84 VF** **14 Claims**




**1.** A frequency detector for determining which one of a plurality of frequency bands, each consisting of at least one valid frequency, contains the frequency of a frequency tone signal, comprising:

a source of clock pulses having a known frequency which is greater than that of the highest possible valid frequency;

pulse counting means for counting the number of clock pulses generated during a counting interval on a repetitive basis, the duration of each counting interval being a function of at least one cycle of the frequency tone signal, and

indication counting means for maintaining a count for each of the frequency bands of the number of counting intervals that said pulse counting means has attained a value corresponding to a valid frequency therein and generating an output signal indicative of the first frequency band to have its associated count achieve a predetermined level.

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**4,016,372**

## APPARATUS FOR A KEY TELEPHONE SYSTEM FOR ENABLING INTERCOM SUBSTATIONS TO ACCESS TRUNK LINES

**Steven Jon Hoehn, Redwood City, Calif., assignor to Litton Business Telephone Systems, Inc., Sunnyvale, Calif.**

**Filed June 16, 1975, Ser. No. 587,361**
**Int. Cl.² H04M *1/72***
**U.S. Cl. 179—99** **5 Claims**

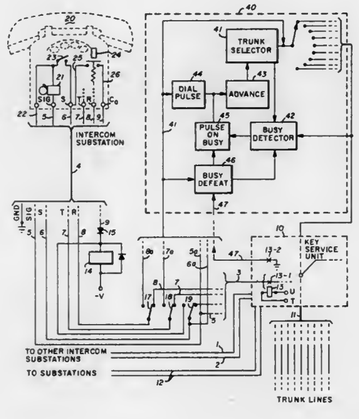
**1.** In combination with a key telephone system of the type having a plurality of telephone substations and a plurality of telephone intercom substations, said key telephone system having access to trunk telephone lines and having a key service unit for interconnecting said trunk lines with said telephone substations but not to said telephone intercom substations, an intercom circuit in said key service unit and intercom telephone lines extending between said intercom circuit and said telephone intercom substations, and audible signaling means and dial means at each of said intercom substations, and means in said key service unit of said telephone system for selecting a particular intercom substation and energizing said audible signaling means at said intercom substation, the improvement thereto comprising in combination:

intercom-to-trunk line access means coupled to said trunk lines and having an access input;

said access means including:

a. trunk selector means for coupling said input to trunk lines for establishing a communication channel between said input and one of said trunk lines;

b. advancing means responsive to pulses at an input for advancing said trunk selector means to one of said plurality of trunk lines; and




c. dial pulse means coupled to said access input for receiving dial signals at an input and applying corresponding pulses to said input of said advancing means, whereby said trunk selector means is advanced to the trunk line represented by said pulses;

a first intercom substation of said plurality of telephone intercom substations including push button switch means; and

relay means located at said access means remote from said telephone intercom substations associated with said first intercom substation and responsive to operation of said push button switch means of said first intercom substation for disconnecting an intercom line coupled to said first telephone intercom substation from said intercom circuit of said key service unit and connecting said intercom line in circuit to the input of said intercom to trunk line access means.

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**4,016,373**

## MULTICHANNEL RECORD DISC RECORDING SYSTEM

**Yukinobu Ishigaki, Yamato; Isao Ohwaki, Tokyo, and Masahiro Ohba, Yokohama, all of Japan, assignors to Victor Company of Japan, Limited, Yokohama, Japan**

**Filed Sept. 25, 1975, Ser. No. 616,876**
**Claims priority, application Japan, Sept. 26, 1974, 49-109944; July 4, 1975, 50-81767**
**Int. Cl.² G11B *3/00***
**U.S. Cl. 179—100.4 ST** **6 Claims**

**1.** A multichannel record disc recording system comprising:

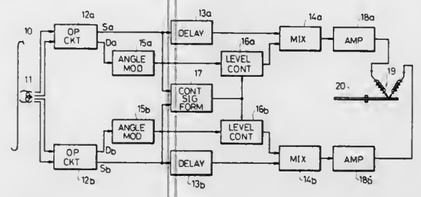
means for supplying first, second, third, and fourth channel signals;

operation means for forming a first sum signal and a first difference signal responsive to the first and second channel signals and forming a second sum signal and a second difference signal responsive to the third and fourth channel signals;

means for angle modulating the first and second difference signals;

control signal forming means for forming a control signal responsive to detection of a condition wherein the level of at least one of the first and second sum signals is higher than a first specific level and a condition wherein the level of at least one of the first and second sum signals is lower than a second specific level, said second specific level being lower than the first specific level;






control means responsive to said control signal for increasing the levels of the angle-modulated first and second difference signals;

mixing for multiplexing the first sum signal and the first level controlled angle-modulated difference signal to produce a first multiplexed signal and for multiplexing the second sum signal and the second level controlled angle-modulated difference signal to produce a second multiplexed signal; and

recording means for cutting and recording the first and second multiplexed signals in a groove of a record disc.

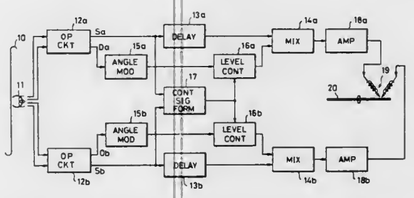
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**4,016,374**

## MULTICHANNEL RECORD DISC RECORDING SYSTEM WITH SIGNAL LEVEL CONTROL

**Yukinobu Ishigaki, Yamato, and Hiroshi Matsushima, Neyagawa, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma and Victor Company of Japan, Limited, Yokohama, both of, Japan**

**Filed June 23, 1975, Ser. No. 589,557**
**Claims priority, application Japan, June 25, 1974, 49-72542**
**Int. Cl.² G11B *3/00*; H04H *5/00***
**U.S. Cl. 179—100.4 ST** **6 Claims**




**1.** A multichannel record disc recording system comprising:

means for supplying first, second, third and fourth channel signals;

first operating means for forming a first sum signal and a first difference signal responsive to the first and second channel signals;

second operating means for forming a second sum signal and a second difference signal responsive to the third and fourth channel signals;

first modulating means for angle-modulating said first difference signal;

second modulating means for angle-modulating said second difference signal;

control signal forming means for forming a control signal responsive to a level of at least one of said first and second sum signals exceeding a predetermined level;

first level control means responsive to said control signal for controlling the level of the first angle-modulated difference signal;

second level control means responsive to said control signal for controlling the level of the second angle-modulated difference signal;

first mixing means for multiplexing the first sum signal and the first level controlled angle-modulated difference signal to obtain a first multiplexed signal;

second mixing means for multiplexing the second sum signal and the second level controlled angle-modulated difference signal to provide a second multiplexed signal; and

recording means for recording the first and second multiplexed signals in one groove of a record disc.

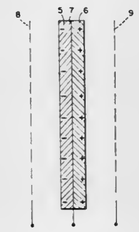
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**4,016,375**

## ELECTRET TRANSDUCER

**Jan Van Turnhout, Delft, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Mar. 11, 1975, Ser. No. 557,274**
**Claims priority, application Netherlands, Mar. 15, 1974, 7403471**
*Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976*
**Int. Cl.² H04R *19/00*; H01G *7/02***
**U.S. Cl. 179—111 E** **4 Claims**



**1.** An electrostatic transducer comprising, at least two electrodes, which are disposed opposite each other, of which one electrode forms part of a vibratory diaphragm and of which the other electrode is fixed, a disc of electret material being disposed between the electrodes and at one of the electrodes, characterized in that the electret material comprises a copolymer of tetrafluoroethylene and perfluorine (alkylvinylether), in which the alkylgroup contains from 1 to 5 carbon atoms.

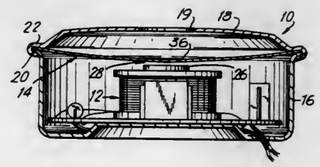
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**4,016,376**

## CONCAVE DIAPHRAGM FOR ELECTRO-ACOUSTIC TRANSDUCER

**Jacob Neuhof, Bridgeport, Conn., assignor to General Signal Corporation, Stamford, Conn.**

**Continuation of Ser. No. 538,999, Jan. 6, 1975, abandoned. This application Jan. 8, 1976, Ser. No. 647,633**
**Int. Cl.² H04R *7/22, 13/00***
**U.S. Cl. 179—115 R** **7 Claims**



**1.** An electro-acoustic transducer, comprising

a source of oscillatory current;
driving means connected to said source, including a magnetic core, and at least one winding around said core;
a diaphragm of magnetic material suspended so as to establish a concave configuration as the normal or neutral point for operation in response to said source of oscillatory current, the center of said diaphragm being adjacent one end of said core so as to define an air gap, said diaphragm being responsive to said driving means to produce an audible signal;
a casing for said transducer, said casing including a lower housing and a cover, and means on said lower housing and said cover for cooperatively mounting said diaphragm at its periphery, said means for cooperatively mounting said diaphragm including a flange, at the rim of said lower housing, inclined downwardly from the horizontal toward the center of the housing and at an angle of approximately 10°, and an inclined section in said cover which abuts the said flange and which is formed likewise at an angle of approximately 10° from the horizontal, thereby to hold the diaphragm between said flange and said inclined section in said cover so as to force the diaphragm into the aforesaid concave configuration, said diaphragm remaining in said concave configuration but being free to move in its entirety above said neutral point due to the lack of any restraining mechanical force imposed upon the diaphragm at or near its center.

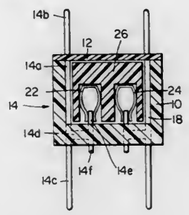
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**4,016,377**

## SLIDE SWITCH ASSEMBLY HAVING IMPROVED FIXED KNIFE BLADE TYPE CONTACT STRUCTURE

**Sadayoshi Iwasaki, Furukawa, Japan, assignor to Alps Electric Co., Ltd., Tokyo, Japan**

**Filed May 19, 1975, Ser. No. 578,482**
**Claims priority, application Japan, May 21, 1974, 49-57630**
**Int. Cl.² H01H** *15/04, 1/42*
**U.S. Cl. 200—16 F** **17 Claims**



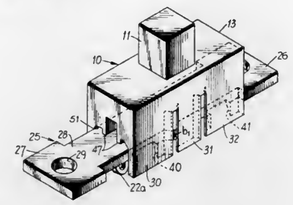

1. A switch comprising
a housing;
a holder slideably supported in the housing;
a movable contact set into the slideable holder and movable along a predetermined path, said movable contact having a contact portion of two opposed internal surfaces;
two fixed contacts fixed in place by the housing, each fixed contact having a contact portion of two opposed external contact surfaces and a lead portion connected to the contact portion as well as to two terminals which extend beyond the housing in opposite directions, the contact portions of the two fixed contacts being aligned with and spaced along the predetermined path;
whereby said movable contact is movable along the predetermined path, from a position in which the two opposed internal contact surfaces of the movable contact ohmically engage the external contact surfaces of the two fixed contacts, creating a conducting path between the fixed contacts, to a position in which the fixed contacts are disconnected.

**4,016,378**

## DETENT MEANS FOR SIMPLIFIED SLIDE SWITCH

**Ronald H. Arthur, Fort Lauderdale, Fla., assignor to AMF Incorporated, White Plains, N.Y.**

**Filed Mar. 9, 1976, Ser. No. 665,284**
**Int. Cl.² H01H** *15/04, 9/02*
**U.S. Cl. 200—16 D** **11 Claims**




1. An improved slide switch comprising
a thin insulator base member having two end portions and an intermediate portion therebetween,
a plurality of stationary contacts extending from one surface of the base member in said intermediate portion,
a plurality of terminal means for said stationary contacts,
a sliding member formed as a unitary plastic piece having an upper portion extending transversely of the intermediate portion of said base member and including on two sides thereof yieldable side skirts adapted to extend downwardly over the side edges of said intermediate portion of the base member,
barbs or latch elements at the bottom portions of said skirts for slidingly engaging the opposite surface of the base member to maintain said sliding member and base member in operable relationship,
a movable contact member disposed between the sliding member and said stationary contacts and operable in response to the sliding motion of the sliding member for selectively making and breaking contact with said stationary contacts,
boss means and boss receiving means, one of which is associated with at least an edge of said base member and the other one being associated with said yieldable side skirts,
said boss means and boss receiving means being constructed and arranged to be in registration with each other when the sliding member is in at least one desired switching position, and registration between the boss means and boss receiving means being interrupted due to yielding of at least one side skirt during motion of the sliding member away from said one desired switching position.

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**4,016,379**

## LOCK FOR SAFETY CUT-OUT SWITCHES

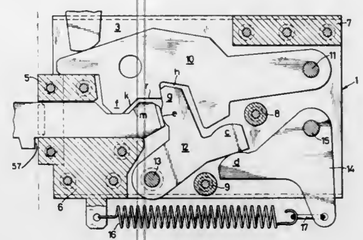
**Paul Merkle, Eschenbrunnlestr. 48, 7032 Sindelfingen, Germany**

**Filed June 11, 1975, Ser. No. 585,777**
**Claims priority, application Germany, June 12, 1974, 2428456; June 12, 1974, 2428458**
**Int. Cl.² H01H** *27/00*
**U.S. Cl. 200—44** **14 Claims**

1. A lock for a safety cut-out switches comprising
a lock housing,
a locking member within said housing engageably cooperating with the cut-out of the switch to lock the switch in a desired operational condition,
a main lever within said housing pivotally arranged to move said locking member to its locked position and having a motion tongue thereon,
a blocking lever within said housing pivotally arranged and spring loaded to block the motion of said main lever when said main lever is in its locking position,
said main lever being further arranged to block the rotation of said blocking lever when said main lever is in its unlocking position,



said blocking lever having shaped portions thereon which control the unlocking movement of said main lever with the pivotal motion of said blocking lever, and
a key which actuates the pivotal movement of said main



lever and said blocking lever by translation movement with respect to said lock housing,
said key having a notch thereon cooperating with said motion tongue on said main lever to lock said key in a position corresponding to the non-locked state of the lock.

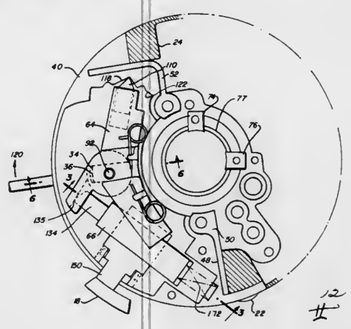
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**4,016,380**

## TURN SIGNAL AND HAZARD WARNING CONTROL APPARATUS FOR UNITARY INSERTION INTO VEHICLE STEERING COLUMN BODY

**Terry Kyle Schawinsky, South Lyon; Walter Strobl, Brighton, and Melvin William Polkinghorn, Livonia, all of Mich., assignors to International Telephone and Telegraph Corporation, New York, N.Y.**

**Filed Aug. 21, 1975, Ser. No. 606,556**
**Int. Cl.² H01H** *3/16, 9/00*
**U.S. Cl. 200—61.27** **5 Claims**




1. A combined turn signal and hazard warning mechanism adapted for insertion into the body of the steering column of a vehicle to mate with a turn lever assembly for joint pivoting therewith, said mechanism comprising a segmental walled member includng a plurality of electrical contacts and a common contact operating member operative in one direction responsive to pivotal movement of a turn signal handle of said assembly to open and close certain of said contacts and operative in another direction responsive to slide movement of a harzard warning handle to open and close certain other of said contacts, said hazard warning handle and said turn signal handle being axially spaced about said column in one quadrant thereof and in separate planes along the height of said column, means for translating the pivotal movement of said lever into reciprocal slide movement of said contact operating member, said translating means including a driving member constrained to pivotal movement, and a driven member constrained to sliding movement, an arm of said driving member engaging said driven member to slide said driven member in a first direction, a restoring spring responsive to pivotal movement of said lever in a reverse direction for sliding said driven member in the direction opposite said first direction to either a restored position with said contacts open or to an opposite position with certain of said contacts operated dependent on the position of said turn handle and said driving member.

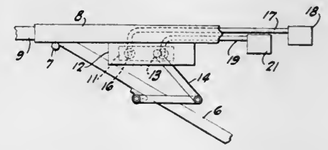
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**4,016,381**

## SWITCH ARRANGEMENT FOR DOOR CLOSERS

**William G. Rodseth, Princeton, Ill., assignor to Schlage Lock Company, San Francisco, Calif.**

**Filed July 25, 1975, Ser. No. 599,067**
**Int. Cl.² H01H** *3/16*
**U.S. Cl. 200—61.62** **10 Claims**




1. In a door closer having a housing, a rod and a rod extension rotatable in said housing about an axis, and means effecting rotation of said rod and said rod extension relative to said housing in accordance with the relative position of a door panel and a door frame on which said door closer is mounted, the combination of an electrically insulated switch casing, means for securing said switch casing to said housing around said axis, an electrically insulated rotor disposed in said casing and engaging said rod extension with a predetermined friction slip fit transmitting torque therebetween only up to a predetermined maximum, at least one pair of electrical contacts in said casing exposed to said rotor and having a notch between them, and a conducting body movable on said rotor and in one position of said rotor in said casing disposed in said notch and in engagement with said pair of electrical contacts and in another position of said rotor in said casing disposed out of engagement with said pair of electrical contacts.

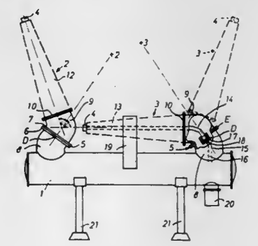
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**4,016,382**

## TRAVELLING SWITCHING BLOCK FOR METALLIC ENCAPSULATED HIGH VOLTAGE SWITCHING INSTALLATION

**Adrian W. Roth, Aarau, Switzerland, assignor to Sprecher & Schuh AG, Switzerland**

**Filed Oct. 15, 1974, Ser. No. 515,041**
**Claims priority, application Switzerland, Oct. 5, 1973, 15517/73**
**Int. Cl.² H01H** *33/54*
**U.S. Cl. 200—148 R** **8 Claims**




1. A travelling switching block for metallic encapsulated high-voltage switching installations wherein to a switching block housing there are joined together into a metal encapsulated insulated and transportable structural unit at least one input duct and one output duct, the switching block being

filled with insulating medium, the improvement comprising pivot means connecting each duct to the housing, each said duct extending upwardly in an operating position from the block housing and being movable by said pivot means into a transport position providing a small transverse profile, said pivot means including sealing means for sealing the respective duct against loss of insulating medium, each duct being supported by said pivot means such that in the transport position the duct is located at the lengthwise side of the switching block housing in the transport position, said pivot means further including a rotatable ring disk, and a stationary ring disk secured to the block housing and supporting the rotatable ring disk, said rotatable ring disk including a housing portion to which said duct is secured, each duct including an inner conductor, said switching block housing also including an inner conductor, and a coupling contact arranged in a pivot plane of said pivot means connecting the inner conductor of the duct with the inner conductor of the switching block housing.

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**4,016,383**

## SEALING DEVICE FOR AN ASSEMBLY OF ELEMENTS OF HIGH-VOLTAGE CUT-OUT DEVICES

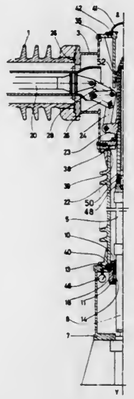
**Dante Nicoloso, Meyzieu, France, assignor to Delle-Alsthom, Villeurbanne, France**

**Filed May 2, 1975, Ser. No. 574,142**

**Claims priority, application France, May 20, 1974, 74.17453**

**Int. Cl.² H01H** *33/82*

**U.S. Cl. 200—148 F** **5 Claims**



1. In a high-voltage cut-out device including a first enclosure forming a sealed cut-out chamber, mobile elements integral with contact rods mounted within said cut-out chamber for movement between switch closed and switch open positions, a second enclosure defining a sealed auxiliary chamber, means for disconnectedly fluid tight mounting of said first enclosure onto said second enclosure and forming a communication passage therebetween and disconnectable linkage mounted within said enclosures, extending between said chambers through said passage, coupled to said mobile elements and movable between full stroke positions for operating said contact rods; the improvement wherein:

said linkage defines with respective enclosures orifices at said communication passage, and

seals are carried by said linkage for closing off said orifices to effect a fluid tight seal between said linkage and said enclosures at one linkage full stroke position to permit separation of one enclosure from the other and disconnection of said linkage between said enclosures without loss of seal of either chamber.

**4,016,384**

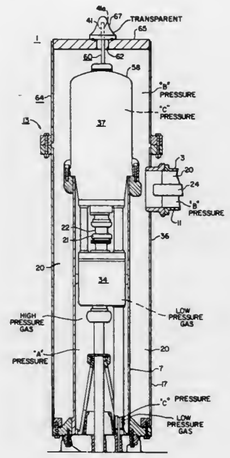
## OPERATING MECHANISM AND POSITION INDICATOR FOR A CIRCUIT INTERRUPTER

**Charles E. LeRow, Jr., Jeannette, and Ronald W. Crookston, Trafford, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed Nov. 19, 1974, Ser. No. 525,124**

**Int. Cl.² H01H** *33/00, 9/00*

**U.S. Cl. 200—148 R** **12 Claims**




1. A power-transmission circuit-breaker installation comprising, in combination:

a. a gas-type enclosed circuit-breaker module (**34**);

b. said enclosed circuit-breaker module (**34**) having a movable contact (**22**) cooperable with a stationary contact (**21**) to establish an arc and open the connected circuit;

c. an indicator-rod (**41**) responsive to movement of the movable contact (**22**) of the enclosed circuit-breaker module (**34**) in its opening and closing movements;

d. a semaphore (**41***a*) secured to and movable with the indicator-rod (**41**) to indicate visibly the open and closed-circuit positions of the circuit-breaker module (**34**);

e. a metallic grounded housing (**17**) encasing the circuit-breaker module (**34**) and having a transparent cap-portion (**67**);

f. an insulating dielectric gas (**20**) disposed within said metallic grounded housing (**64**) in region "B" for dielectric insulation between the high-potential parts of the circuit-breaker module (**34**) and the outer surrounding metallic grounded housing (**64**);

g. said indicator-rod (**41**) projecting at times within said transparent cap-portion (**67**);

h. said circuit-breaker module containing gas at a different high-pressure level A than the pressure-level of the gas within said housing B;

i. a generally tubular insulating housing (**50**) surrounding the indicator-rod (**41**) and gas-sealed to the circuit-breaker module (**34**), at a relatively-low-gas pressure level C which is lower than gas pressure level A, so that any gas from the circuit-breaker module at relatively low-gas pressure level C which creeps axially along the indicator-rod (**41**) during its linear longitudinal opening and closing motion will not be allowed to enter the gas-region B within the outer metallic grounded housing (**17**) encasing the circuit breaker module; and,

j. said indicator-rod (**41**) movable longitudinally at all times within said tubular gas-sealed insulating housing (**50**).



**4,016,385**

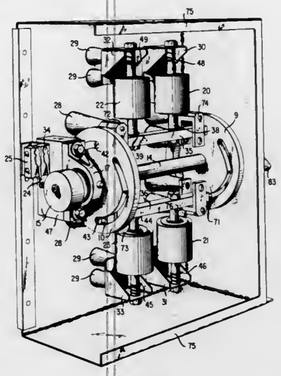
## HIGH VOLTAGE TRANSFER SWITCH WITH CAM CONTROLLED OVERLAP DURING TRANSFER

**Igor Golioto, Fairfield, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed Oct. 8, 1975, Ser. No. 620,643**

**Int. Cl.² H01H** *3/42, 33/66*

**U.S. Cl. 200—153 L** **7 Claims**



1. A transfer switch to selectively couple output terminal means to accept a load to first and second input terminal means to accept a first and second high voltage power source respectively comprising first electric contact means to interconnect said first input terminal means to said output terminal means, second electrical contact means to interconnect said second input terminal means to said output terminal means, means to operate said first and second electrical contact means including cam wheel means, rotatable shaft means to support said cam wheel means, said cam wheel means including first and second cam slots, first and second cam follower means engaged with said first and second cam slots, respectively, constraining means to constrain said first and second cam follower means to have linear motion, said first and second cam follower means connected to impart the motion of said first and second cam follower means to operate said first and second electrical contact means, said first and second cam slots having coordinated profiles so that said first and second follower bars are linearly displaced in sequence whereby one of said first and second electrical switches is engaged before the other of said electrical switches is subsequently disengaged.

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**4,016,386**

## CIRCUIT BREAKER LINE TERMINAL

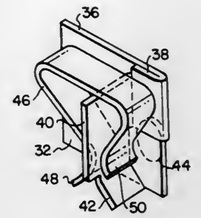
**Francis L. Gelzheiser, Fairfield, Conn., and Gerald J. DeAngelo, Ballwin, Mo., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.**

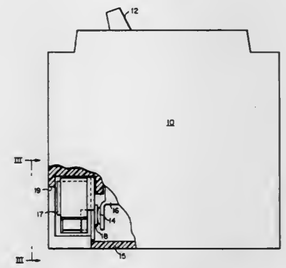
**Filed Aug. 8, 1975, Ser. No. 603,073**

**Int. Cl.² H01H** *1/50, 1/42*

**U.S. Cl. 200—250** **5 Claims**

1. A circuit breaker for use with a panel board, comprising an insulating housing including an opening in an edge wall thereof, a circuit breaker mechanism within the housing and comprising stationary and movable contacts, a plug-in-type terminal structure, the terminal structure being positioned near the opening and resiliently engageable with a stab on the panel board, the terminal structure comprising a terminal, a single integral flange on the terminal, a spring clip on the flange for holding a stab in good electrical contact against the flange when the circuit breaker is mounted on the panel board, the stationary contact being mounted on the terminal, the flange being aligned with the opening, and the spring clip





comprising resilient legs on opposite sides of the flange with the ends of the legs facing the opening.

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**4,016,387**

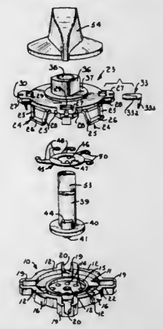
## SNAP TOGETHER SWITCH ASSEMBLY

**James B. Aberer, Lake Winnebago, Mo., assignor to Rival Manufacturing Company, Kansas City, Mo.**

**Filed June 9, 1975, Ser. No. 584,897**

**Int. Cl.² H01H** *3/08*

**U.S. Cl. 200—303** **3 Claims**



1. An electric switch assembly comprising:

a first housing section having a plurality of spaced projections extending laterally therefrom, each projection having a pair of opposite sides and an underside;

a second housing section connected to said first housing section and cooperating therewith in defining an enclosure, said second housing section presenting a plurality of pairs of shoulders overlying the respective projections;

a plurality of generally U-shaped clips each having a web extending along said underside and a pair of legs extending from said web along said opposite sides, each clip further including a pair of flanges projecting from said legs and substantially flatly engaging the respective pairs of shoulders to rigidly connect said first and second housing sections together;

a plurality of electrical contacts comprised of current conducting material, one of said contacts being adapted for connection to a power source;

means securing said contacts in stationary positions within said enclosure; and

a switch actuator having current conducting means located within said enclosure, said switch actuator being accessible for adjustment exteriorly of said enclosure to establish electrical connection between selected contacts through said current conducting means.

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**4,016,388**

**KEYBOARD SWITCH**

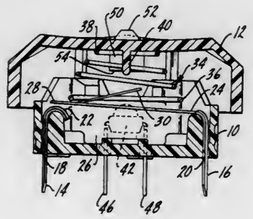
**Bernard J. Golbeck, Crystal Lake; Raymond F. Lewandowski, Mt. Prospect, and William C. Markinson, Crystal Lake, all of Ill., assignors to Oak Industries Inc., Crystal Lake, Ill.**

**Division of Ser. No. 383,385, July 27, 1973, abandoned, which is a continuation-in-part of Ser. No. 279,378, Aug. 10, 1972, abandoned. This application Jan. 27, 1975, Ser. No. 544,368**

**The portion of the term of this patent subsequent to Oct. 28, 1992, has been disclaimed.**

**Int. Cl.² H01H 9/00**

**U.S. Cl. 200—314** **8 Claims**



1. A pushbutton switch including a base, a button, cooperating means on said button and said base for mounting said button for telescopic movement toward and away from said base, spring means positioned between said button and said base and normally biasing said button away from said base, a pair of terminals extending outwardly from the base, one of said terminals supporting a relatively thin substantially flat flexible cantilever contact arm positioned within the base, said contact arm extending to a position immediately adjacent the other terminal and having an area disposed for contact with said other terminal, said contact arm having a relatively thin substantially flat flexible cantilever portion which extends outwardly from adjacent said area toward the button, means on the button positioned to contact said arm portion and apply force thereto in the direction of button movement and thus move said arm into contact with the other terminal when the button is moved relative to the base, said contact arm and arm portion having generally uniform flexibility over their entire path of movement, with said arm area beginning its movement toward said other terminal substantially simultaneously with initial engagement of said button means and said arm portion, the application force of the button being distributed along the cantilever arm portion and the cantilever contact arm, with the combined length of the cantilever arm portion and cantilever contact arm being greater than the distance between said terminals,

light indicating means mounted on the base, and light display means mounted on the button in alignment with the light indicating means on the base.

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**4,016,389**

**HIGH RATE ION PLATING SOURCE**

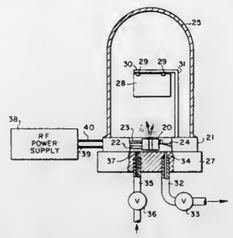
**Gerald W. White, 5835 Elm Lawn St., Dallas, Tex. 75228**

**Filed Feb. 21, 1975, Ser. No. 551,703**

**Int. Cl.² H05B 5/18**

**U.S. Cl. 219—10.49** **20 Claims**

1. In an ion generating source within a controlled environment enclosure for high particulate energy level ion plating deposition of plating material on substrates: multi-turn work coil means; power supply conductive two-line means for interconnecting RF power supply means and opposite ends of said multi-turn work coil means; said multi-turn work coil means being constructed to contain an inductive magnetic field variation responsive material susceptor within the center of said multi-turn work coil means; support means for said susceptor; an RF power supply voltage potential reference source physically connected to said multi-turn work coil means; electrically conductive material shield means generally circumferentially enclosing said multi-turn work coil means; said electri-




cally conductive material shield means separation split on one side and joined together on a vertical side opposite the separation split, to minimize inductive pickup power loss, and to inhibit coupling of RF into surrounding plasma, other than to vaporized material, where desired, above the susceptor; said electrically conductive shield means being insulated from said RF power supply voltage potential reference source and also insulated from said power supply conductive two-line means, to float, relative to RF power input and relative to said RF power supply voltage potential reference source.

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**4,016,390**

**INDUCTION HEATING APPARATUS WITH PROTECTIVE CIRCUIT ARRANGEMENT**

**Keizo Amagami; Takao Kobayashi; Yoshio Ogino, and Mitsuyuki Kiuchi, all of Kadoma, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan**

**Division of Ser. No. 415,542, Nov. 14, 1973, abandoned. This application May 22, 1975, Ser. No. 579,897**

**Claims priority, application Japan, Nov. 15, 1972, 47-114990; Nov. 16, 1972, 47-115378; Nov. 17, 1972, 47-115809; Nov. 20, 1972, 47-116923; Aug. 10, 1973, 47-90404**

**Int. Cl.² H05B 5/04**

**U.S. Cl. 219—10.49** **2 Claims**

1. An induction heating apparatus comprising:

a power supply circuit including a rectifier coupled to an alternating current power source for generating a full-wave rectified unfiltered unidirectional excitation potential;

a switching circuit including a gate-controlled switching device and a unidirectional conducting device connected in inverse parallel relation to said gate-controlled switching device;

a commutating circuit connected to said switching circuit and including an induction heating coil and a commutating capacitor connected to the excitation potential to charge and discharge electrical energy through said induction heating coil and said switching circuit, said commutating circuit having a resonant frequency;

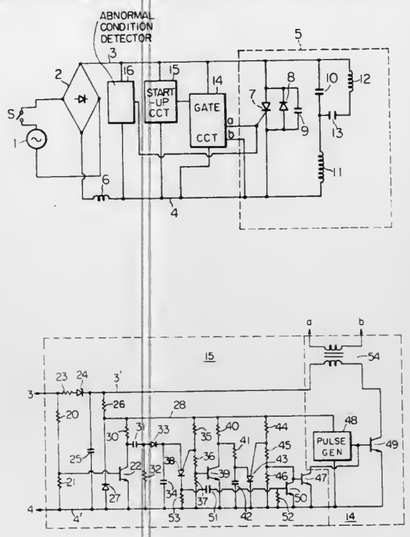
a gating circuit for gating on said gate-controlled switching device at a frequency substantially equal to the resonant frequency of said commutating circuit to allow said commutating capacitor to charge and discharge at this frequency to generate oscillation current which drives said induction heating coil;

means for detecting the zero voltage points of the full-wave rectified unfiltered unidirectional excitation potential;

inhibit means for inhibiting operation of said gating circuit;



a discharge circuit responsive to said detecting means for discharging said commutating capacitor when a predetermined number of detected zero voltage points is reached; and means operable upon the predetermined number of




the detected zero voltage points being reached to allow a predetermined interval for causing said inhibit means to be disabled so that said gating circuit is operated to charge said commutating capacitor to a level sufficient to generate said oscillation current.

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**4,016,391**

**INDUCTION HEATING APPARATUS WITH MEANS FOR IMPROVING THE DV/DT CAPABILITY OF A SILICON-CONTROLLED RECTIFIER USED THEREIN**

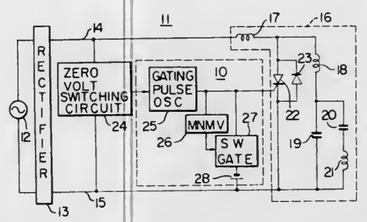
**Mitsuyuki Kiuchi, and Takumi Mizukawa, both of Kadoma, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan**

**Filed June 13, 1975, Ser. No. 586,621**

**Claims priority, application Japan, June 18, 1974, 49-70016; June 19, 1974, 49-70626; July 10, 1974, 49-79652**

**Int. Cl.² H05B 5/04**

**U.S. Cl. 219—10.49** **4 Claims**




1. The method of providing a high dv/dt capability of a silicon-controlled rectifier of a static power converter, wherein the dv/dt is the rate of rise of forward voltage applied to the anode of said silicon-controlled rectifier and wherein the control gate thereof is supplied with positive gating pulses at an ultrasonic frequency to generate a forward commutating current which drives an induction heating coil of an inverter at said ultrasonic frequency, comprising, detecting the cessation of said forward commutating current, setting a flip-flop device to an ON state upon the detection of the cessation of said forward commutating current, resetting said flip-flop device to the OFF state by said positive gating pulses, and applying a negative potential to the control gate of the silicon-controlled rectifier with respect to the cathode during the ON state of said flip-flop device.

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**4,016,392**

**PAN DETECTOR FOR INDUCTION HEATING APPARATUS**

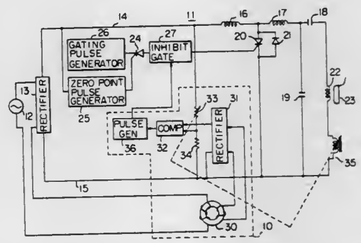
**Takao Kobayashi; Keizo Amagami; Takumi Mizukawa, and Tadao Toyooka, all of Kadoma, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan**

**Filed Jan. 28, 1975, Ser. No. 544,845**

**Claims priority, application Japan, Feb. 5, 1974, 49-15142**

**Int. Cl.² H05B 5/04**

**U.S. Cl. 219—10.49** **5 Claims**




1. An induction heating apparatus comprising, a resonant circuit including an induction heating coil inductively coupled in operation to an inductance load; means including a gate-controlled switching device and a unidirectional conducting device connected in inverse parallel relation therewith, for supplying said resonant circuit with current pulses to cause resonance in said resonant circuit at a frequency sufficient to cause heating of the inductance load coupled to said heating coil; detecting means for generating a first signal indicative of the magnitude of the inductive coupling between said inductance load and the heating coil; comparing means for generating a second signal when the first signal reaches a variable reference level; manual adjusting means for permitting the adjustment of the inductive coupling at a desired value; means for varying the variable reference level in accordance with the adjustment of the inductive coupling; and means responsive to the second signal for enabling said current pulse supplying means at intervals which are sufficiently long so that no significant heating occurs in said inductance load.

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**4,016,393**

**SYSTEM FOR LAYING PIPE**

**J. C. Birdwell, Houston, Tex., assignor to Midcon Pipeline Equipment Co., Houston, Tex.**

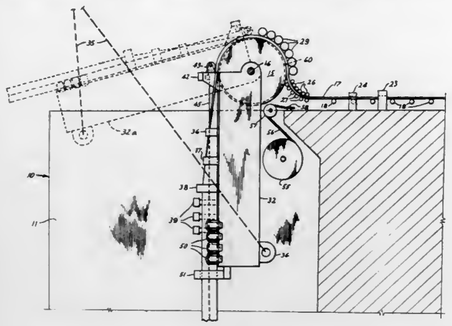
**Filed Feb. 19, 1975, Ser. No. 550,943**

**Int. Cl.² B23K 31/06; B63B 35/04**

**U.S. Cl. 219—59** **47 Claims**

1. Apparatus for continuously discharging pipe from a traveling support, comprising means supported by said traveling support for longitudinally conveying a continuous horizontally disposed flat metal strip of uniform width in a generally horizontal direction, means disposed at the discharge from said conveyor means for receiving the discharged strip and for controlling the tension of said discharged strip beyond said tension controlling means, means for directionally directing said discharged strip from said traveling support with said discharged strip being drawn from said tension controlling means by gravity, said directional directing means being adjustable to any angle between an upper horizontal position and a lower vertical position so that said strip may be directed from said traveling support in any direction from a horizontal outward direction to a vertical downward direction, and

means for forming and welding said discharged strip into a pipe while said discharged strip is directionally directed by



said directing means and in predetermined longitudinal tension between said tension controlling means and the downward bias of gravity.

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**4,016,394**

**PRODUCTION OF LONGITUDINALLY WELDED PIPE**

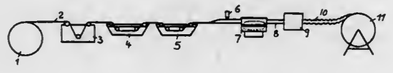
**Meinhard Hecht, Hasbergen, and Herbert Kubiak, Misburg, both of Germany, assignors to Kabel-und Metallwerke Gutehoffnungshutte Aktiengesellschaft, Germany**

**Filed Feb. 10, 1975, Ser. No. 548,616**

**Claims priority, application Germany, Feb. 8, 1974, 2406000**

**Int. Cl.² B23K** *31/06*

**U.S. Cl. 219—61** **7 Claims**



1. A process for producing longitudinally welded pipe from a metal strip wherein the metal is selected from the group consisting of copper and its alloys, comprising:

cleaning oxide from at least the edges of the metal strip with a hydrazine compound; washing the strip to remove remaining hydrazine compound; forming the strip into a pipe; are arc welding the formed pipe to produce the longitudinally welded pipe.

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**4,016,395**

**WIRE ELECTRODE FEED SYSTEM FOR ELECTRICAL DISCHARGE MACHINING**

**Frank P. Rietveld, Matthews, N.C., assignor to Colt Industries Operating Corporation, New York, N.Y.**

**Filed Dec. 12, 1974, Ser. No. 532,200**

**Int. Cl.² B23P** *1/08*

**U.S. Cl. 219—69 W** **5 Claims**

1. In an electrical discharge machining apparatus including a machine tool having a head which provides machining of a workpiece by means of a conductive electrode wire, the combination comprising:

a supply reel for the wire mounted in a freely rotatable manner on said machine tool;

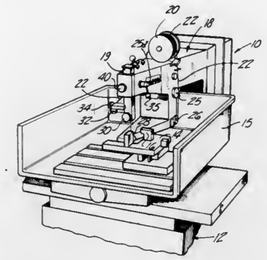
a plurality of guide rollers for retaining and transporting said wire in a continuous path to provide a cutting movement relative to the workpiece;

a pair of opposed rollers biased one toward the other, one driven and the other driving, to provide a constant and uniform pulling force on the wire to provide its continuous movement through said path as machining progresses;

a means operably connected to said driven roller for rocking it out of its juxtaposed position relative to said driving roller to provide clearance therebetween and allow for initial threading of the electrode wire;

said workpiece being mounted on a first table controllably movable in an X axial direction, said first table being further mounted on a second table for controlled movement in a Y axial direction; and

said electrode wire being maintained in a precisely adjustable, vertical path by a pair of guide rollers, each of said guide rollers having its axis of rotation orthogonal to the axis of rotation of the other, said guide rollers further mounted at points spaced from the upper and lower surfaces of said workpiece, respectively, each of said last mentioned guide rollers being adjustable and lockable in the axial direction to provide for adjustment to a precise degree of the vertical path of said wire proximate to said workpiece.



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**4,016,396**

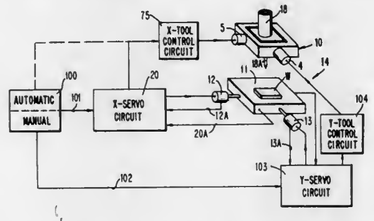
**PRECISION TOOL AND WORKPIECE POSITIONING APPARATUS**

**Javathu K. Hassan, Hopewell Junction, and Carl V. Rabstejnek, Wappingers Falls, both of N.Y., assignors to IBM Corporation, Armonk, N.Y.**

**Division of Ser. No. 395,890, Sept. 10, 1973, Pat. No. 3,904,945. This application Apr. 24, 1975, Ser. No. 571,167**

**Int. Cl.² G05B** *11/18*

**U.S. Cl. 219—121 EB** **2 Claims**




1. Apparatus for positioning a semiconductor wafer and electron beam means in a precise location relative to each other by positioning in a predetermined site said wafer and then positioning the electron beam means in a precise predetermined position relative to said site, said apparatus comprising: a stage for receiving said wafer, at least one closed loop servo system connected to said stage, positioning means for positioning said stage in a predetermined site, said positioning means including a motor for moving said stage in a predetermined line of movement; position indicating means for determining the actual position of said wafer relative to a fixed reference, and a signal output from said position indicator means indicative of said actual position of said wafer at any one time; an error generator, and means for providing to said error generator the desired position of said wafer relative to said reference; and means for inputting said error generator with said signal output from said position indicator means, and means in said error generator to produce a difference signal therefrom indicative of the difference between the actual position of said wafer and the desired position of said wafer; and means responsive to said difference signal to actuate said positioning means until said difference signal is such that said wafer is in said predetermined site; and latch stop means for latching said positioning means in said stopped position responsive to said difference signal when said wafer is in said predetermined site to stop said positioning means, and including stop switch means to interrupt said difference signal to said positioning means in response to said latch stop means, and an electrostatic deflection amplifier; said electron beam means including electrostatic deflection means to deflect an electron beam, and means coupling said electrostatic deflection means to said electrostatic deflection amplifier; said electrostatic deflection amplifier responsive to said difference signal, when said positioning means has stopped, to effect movement of said electron beam until said difference reaches a predetermined second lower value to thereby effect precise positioning of said electron beam relative to said wafer.



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**4,016,397**

**METHOD OF AND APPARATUS FOR ARC WELDING**

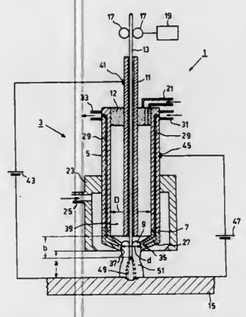
**Wilhelmus Gerardus Essers, and Gerrit Willem Tichelaar, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.**

**Continuation of Ser. No. 426,958, Dec. 20, 1973, abandoned. This application July 1, 1975, Ser. No. 592,351**

**Claims priority, application Netherlands, Oct. 31, 1973, 7314927**

**Int. Cl.² B23K** *9/00*

**U.S. Cl. 219—121 P** **6 Claims**



1. In a plasma arc welding apparatus operable with a workpiece, welding wire, current supply means and a source of plasma gas, the apparatus including a tubular housing with a nozzle and orifice at the discharge end thereof, a contact tube situated within said housing with an annular chamber defined between said housing and contact tube for plasma gas flow from said source, means for transporting said welding wire through said contact tube and nozzle orifice, said contact tube having a terminal end positioned upstream said orifice, and consumable and non-consumable electrode means for establishing welding and plasma arcs respectively, the improvement in combination therewith wherein said consumable electrode means comprises said contact tube, said welding wire extending from said tube, said current supply means in circuit with said tube, wire and said workpiece for establishing said welding arc between said extending welding wire and said workpiece, and said non-consumable electrode means is a single non-consumable electrode comprising a copper nozzle, means for cooling said nozzle, and said current supply means in circuit with said workpiece for establishing said plasma arc between said nozzle and said workpiece, said nozzle orifice has a diameter *d*, and said annular chamber upstream of and communicating with said nozzle orifice has a diameter D greater than *d*, and said orifice has a predetermined axial length forming a collar, whereby said collar acts as a ring-electrode having an inner circumferential surface from which said plasma arc emanates, and which prevents the plasma arc from climbing axially inward of the nozzle beyond said collar.

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**4,016,398**

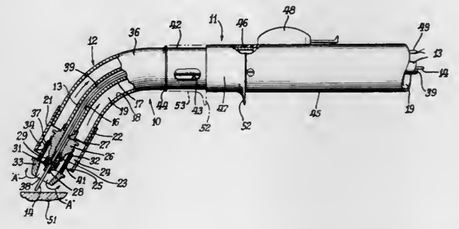
**FUME EXTRACTION CONTROL FOR WELDING GUN**

**George R. Herrick, Mazon, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.**

**Continuation of Ser. No. 412,453, Nov. 2, 1974, abandoned. This application May 1, 1975, Ser. No. 573,653**

**Int. Cl.² B23K** *9/00*

**U.S. Cl. 219—130** **3 Claims**



1. An arc welding gun fume extraction control for regulating the degree of fume intake at a workpiece arc welding zone in response to working conditions thereat, and for cooling a handle portion of the arc welding gun, comprising:

a fume intake port at a welding end of said welding gun:

a fume exhaust port at a handle end of said welding gun;

a tubular conduit through a single passageway in which both a weld wire and a shielding gas are fed from the handle end of said welding gun to said arc welding zone;

a tubular casing having a head portion disposed towards the welding end of said welding gun and a handle portion disposed away from the welding end of said welding gun, said casing being substantially concentrically encirclingly disposed in spaced apart relation with respect to said conduit and forming an elongated annular fume extraction passage between said conduit and said casing leading from said fume intake port to said fume exhause port, said tubular casing having an air inlet opening radially therethrough in a forward portion of said handle portion; and

an axially displaceable first sleeve circumscribingly mounted on said handle portion of said tubular casing and disposed about said air inlet opening whereby said air inlet opening may be adjusted to admit varying amounts of ambient air into said fume extraction passage by manually variably displacing said first sleeve with respect to said air inlet opening to thereby coordinatedly vary the degree of fume intake at said fume intake port and the amount of air intake at said air inlet opening to adjust the cooling effect of said air on said handle portion of said tubular casing.

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**4,016,399**

**FLUX-CORED WIRE FOR ELECTRIC ARC WELDING OF SOFT STEELS OR LOW-ALLOYED STEELS**

**Robert De Haeck, St. Pieters-Kapelle, Belgium, assignor to La Soudure Electrique Autogene, Procedes Arcos, Anderlecht, Belgium**

**Filed June 17, 1975, Ser. No. 587,554**

**Claims priority, application Belgium, June 17, 1974, 145490**

**Int. Cl.² B23K** *35/22*

**U.S. Cl. 219—146** **10 Claims**

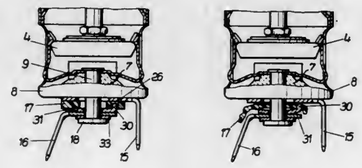
1. Flux-cored wire for automatic or semi-automatic electric arc welding of low-carbon or low-alloy steel as obtained by

using the following manufacturing process comprising the following successive steps:

1. Preparing a powder mixture of a composition falling within the following weight limits:
   - 46 to 84% of powder of the class consisting of iron and iron having up through 10% of the weight of the total powder mixture of alloy;
   - 4 to 8% of refined ferromanganese having from 80 through 85% of its composition manganese;
   - 2 to 8% of powder of the class consisting of ferrosilicon, alone, having 45% silicon, and as another category within the class a chemical consisting of calcium silicon, CaSi, up to 7% of the total powder mixture and also optionally ferrosilicon, FeSi, with the calcium silicon, CaSi, to make the rest of the particular amount within the above range of 2 to 8%;
   - 10 to 20% of powder of the class consisting of calcium fluoride, $CaF_2$, alone and as another category within the class a chemical consisting of sodium fluoride, NaF up to 10% of the total powder mixture and also optionally calcium fluoride, $CaF_2$, with the sodium fluoride, NaF, to make the rest of the particular amount within the above range of 10 to 20%;
   - 0 to 6% of powder of the class consisting of calcium carbonate, $CaCO_3$, alone and as another category within the class a chemical which consists of another alkaline earth carbonate up to 5% of the total powder mixture, and/or magnesium oxide, MgO, up to 5% of the total powder mixture and also optionally calcium carbonate, $CaCO_3$, with the other alkaline earth carbonate and/or the magnesium oxide, MgO, to make the rest of the particular amount within the above range of 0 to 6%;
   - 0 to 2% of powder of the class consisting of $SiO_2$, $Al_2O_3$, potassium feldspar and mixtures of $SiO_2$ and one of the other two;
   - 0 to 2% of potassium titanate;
2. Mixing the foregoing mixture into a 30° Be solution of soluble silicate at the rate of 4 to 12 grams of solution for 100 grams of the foregoing mixture;
3. Baking the resultant product of 600° C for from 105 through 150 minutes;
4. Introducing the resultant product within a sheath of low-carbon (from 0.03% carbon through 0.09% carbon) or low-alloy (from 0.1% of alloying metal through 10% alloying metal) steel, in the proportion of from 30 through 60 grams of the product for each 100 grams of the sheath.

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**4,016,400**
**OVERHEATING SAFETY DEVICE FOR ELECTRICAL LIGHTERS**
**Georg Seibel, Dreiechenhain, and Günther Ante, Frankfurt am Main, both of Germany, assignors to Schoeller & Co. Elektrotechnische Fabrik, both of Frankfurt, Germany**
**Filed Mar. 18, 1975, Ser. No. 559,521**
**Claims priority, application Germany, May 20, 1974, 2424885**
**Int. Cl.² H05B *1/02*; H01H *37/76*; F23Q *7/24***
**U.S. Cl. 219—264** **13 Claims**

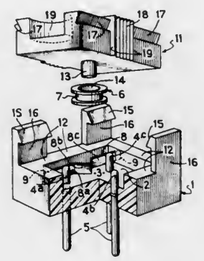




1. In an electrical cigar and cigarette lighter such as used in motor vehicles of the type having a glow heating element, an electrical power supply circuit for supplying heating current to said glow element and a circuit breaking element for limiting current through said electrical supply circuit, said lighter being subject to overheating, the improvement comprising:
   a safety device for preventing deleterious overheating, said device providing a short circuit in said power supply circuit in response to excessive temperature of said lighter so as to cause said circuit breaking element to operate to deenergize said power supply circuit, and including
   an electrical socket for said lighter;
   first and second electrical contacts on said socket and connected in said power supply circuit for supplying current to said electrical socket;
   electrical insulating means, being disposed between a portion of said first contact and a portion of said second contact, said insulating means being in heat exchange relationship with said socket and being composed of a material which has a softening point above the operating temperature of the lighter in normal operation but below the temperature at which thermal damage may occur in the vicinity of the lighter when overheating results;
   and spring biasing means for urging an element electrically connected with said first contact against said insulating means, said insulating means holding said element electrically connected to the first contact out of electrical engagement with the second contact until the softening of said insulating material of said insulating means occurs upon overheating of the lighter, the softening of the insulating material allowing the element electrically connected to the first contact means to be biased by the spring biasing means into electrical engagement with the second contact to establish a short circuit between the first and second contacts to operate the circuit breaking element.

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**4,016,401**
**SWITCHING DEVICE, IN PARTICULAR FOR A PRINTED CIRCUIT**
**Jacques Jean Delaage, Paris, France, assignor to Societe d'Etudes et de Construction de Materiel Electronique S.E.C.M.E., Paris, France**
**Filed Dec. 23, 1975, Ser. No. 643,798**
**Claims priority, application France, Dec. 30, 1974, 74.43292**
**Int. Cl.² H01H *1/06***
**U.S. Cl. 200—277** **7 Claims**



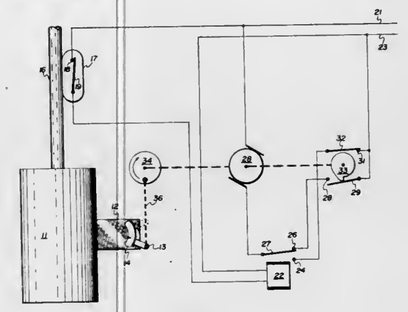
1. A switching device comprising a housing having a bottom, at least two electrically conductive studs projecting from the bottom of the housing and connected to connection members outside the housing, an annular contact means having an outside diameter exceeding the distance between said studs and movable in a path between two positions, as elastically yieldable positioning element cooperative with the contact means for maintaining the contact means in each of said positions and defining in said path a position through which a state of unstable equilibrium is passed through by the contact



means, at least one of the two positions of said contact means corresponding to the establishment of an electric circuit between said studs, actuating means combined with said contact means for bringing the contact means to a selected one of said two positions, said contact means comprising a roller having a centre aperture and a peripheral groove in which groove there is engaged the elastically yieldable element, the roller being placed flat on the bottom of the housing, the actuating means constituting a cover for the housing which cover is slidable relative to the housing and has a face confronting the bottom of the housing and a driving journal extending from said face and engaged with clearance in a centre aperture in the roller.

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**4,016,402**
**WATER HEATER CONTROL SYSTEM**
**Kenneth W. Scott, 601 Ninth St., Coronado, Calif. 92118**
**Filed Aug. 27, 1975, Ser. No. 608,092**
**Int. Cl.² F24H *1/00***
**U.S. Cl. 219—334** **4 Claims**

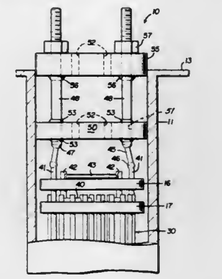


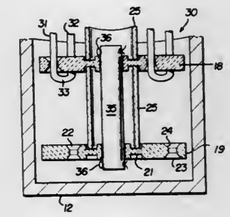
1. A water heater control system comprising:
   a water heater having a thermostat control thereon and an outflow line;
   temperature sensing means disposed in operable proximity to said outflow line and responsive to the temperature of water in said outflow line;
   thermostat setting means electrically coupled to said temperature sensing means and mechanically coupled to said thermostat control, said thermostat setting means operable for setting said thermostat control to a high temperature position when the temperature of said water in said output line reaches a predetermined low and operable for setting said thermostat to a predetermined low temperature position when said temperature of said water in said outflow line reaches a predetermined high.

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**4,016,403**
**ELECTRICAL HEATING ELEMENT**
**Lorne A. Best, West Bloomfield, Mich., assignor to National Element Inc., Troy, Mich.**
**Continuation of Ser. No. 573,739, May 1, 1975. This application Aug. 24, 1976, Ser. No. 717,729**
**Int. Cl.² H05B *3/02***
**U.S. Cl. 219—550** **20 Claims**

1. In a high temperature closed radiant tube furnace, the improvement of an electrical heating element positioned in said closed radiant tube, said radiant tube operable at temperatures in excess of 1500° F. comprising:
   a support structure having (a) a plurality of thin, flat, non-conductive plates, each plate having a plurality of spaced apertures therethrough parallel to the axis of the plate, and (b) a plurality of non-conductive spacers of a size smaller than said plates, one of said spacers being positioned between each pair of adjacent plates, and
   an electrical heating assembly having a plurality of elongated rigid electrical conductors, each extending through at least one aperture in each plate radially outwardly of said spacers, each conductor being straight between adjacent plates, each of said conductors being supported by and extending between said plates; said straight rigid conductors being free of contact with said radiant tube;

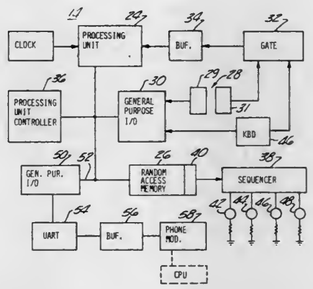




the ends of the conductors being interconnected so that the interconnected conductors define a single tortuous electrical path radially outwardly of said spacers; the conductors as interconnected maintaining said support structure in assembly.

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**4,016,404**
**CREDIT CARD VERIFIER**
**Frank Appleton, 1230 Niagara St., Flint, Mich. 48803**
**Filed Aug. 5, 1975, Ser. No. 602,105**
**Int. Cl.² G06K *7/00*, *7/08***
**U.S. Cl. 235—61.7 B** **9 Claims**



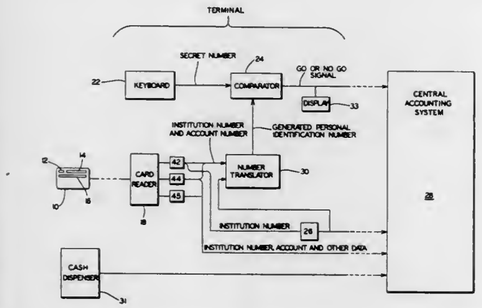

1. In combination,
   a carrier having binary information encoded in an information area matrix on said carrier, said information matrix including at least a scrambler code in a predetermined bit position and sequence in said information matrix, and a user code wherein the bit position and sequence of the user code within the information area matrix is dependent upon the numerical valve of the scrambler code, and
   a verifier, said verifier comprising means for reading said information from said information area matrix, means for

storing said information, means for determining the numerical value of said scrambler code, and means for determining the matrix bit position and sequence of said user code as a function of the numerical value of said scrambler code, means for manually entering a comparison code into said verifier, means for comparing said comparison code to said user code, and means for indicating the result of said comparison.

## 4,016,405
## CARD VALIDATION, METHOD AND SYSTEM

**Harold K. McCune, Thornville, Ohio, and Michael R. Kronewitter, Marietta, Ga., assignors to Diebold, Incorporated, Canton, Ohio**

**Filed June 9, 1975, Ser. No. 585,401**
**Int. Cl.² G06K *7/01*; H04Q *5/02***
**U.S. Cl. 235—61.7 B** **41 Claims**




**1.** Apparatus for generating a signal representing a pseudo-random number in response to first and second input signals respectively representing known numbers comprising: an addressable memory means, means responsive to said first input signal for addressing a memory location of said memory means and causing said memory means to generate a first output signal, and means for logically combining said first output signal and said second input signal for deriving another signal for addressing said memory means and causing said memory means to generate the signal representing the pseudo-random number.

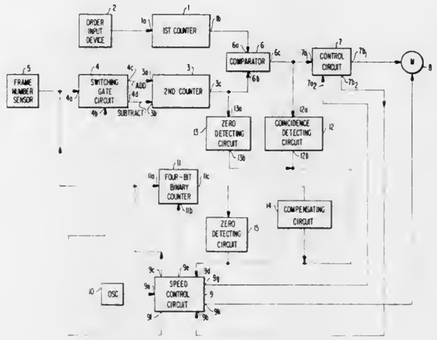
## 4,016,406
## AUTOMATIC FILM RETRIEVAL SYSTEM AND METHOD THEREFOR

**Eiji Abe; Takahisa Ohta, and Mitsuharu Urata, all of Ise, Japan, assignors to Shinko Electric Co., Ltd., Tokyo, Japan and Fuji Photo Film Co., Ltd., Minami-ashigara, Japan**

**Continuation-in-part of Ser. No. 376,267, July 3, 1973, abandoned. This application Mar. 19, 1975, Ser. No. 560,000**
**Claims priority, application Japan, July 3, 1972, 47-66464**
**Int. Cl.² G03B *23/12*; G06M *3/14***
**U.S. Cl. 235—92 MP** **3 Claims**

**1.** A system for positioning at an access position a desired frame of a roll of film adapted to be driven in either a forward or backward direction at either a high or low speed by a two-speed reversible motor, and comprising:

a. first counter means for storing the frame number of the desired frame to be positioned at the access position;
b. second counter means for counting and storing the number of the actual frame present at said access position;
c. comparator means coupled to said first and second counter means for producing a comparator output signal representative of the relative values of the numbers stored in said first and second counter means;
d. compensating circuit means for storing a predetermined number $\alpha$ corresponding to the number of frames to be driven at the low speed prior to the arrival of said desired frame at said access position;
e. means responsive to said comparator output signal and coupled to said compensating circuit means for, prior to movement of the film, algebraically adding to the count of said second counter means said predetermined number in a first sense depending upon the relative magnitudes of the counts stored in said first and second counter means;
f. coincidence-detecting means responsive to a first comparator output signal representative of an equality of counts in said first and second counter means, as the film is driven at a high speed by the motor, for producing a first coincidence signal for changing the speed of said motor and said film from the high speed to the low speed;

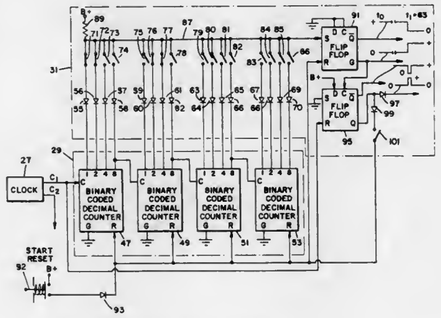



g. said adding means being responsive to said first coincidence signal for algebraically adding said predetermined number $\alpha$ in the opposite sense to the contents of said second counter means; and
h. said coincidence-detecting means being responsive to a subsequent comparator output signal representative of an equality of counts in said first and second counter means for stopping said motor and film, whereby said desired frame is driven toward said access position at the high speed until said predetermined number of frames before said access position, and whereby said desired frame is driven to said access position at said low speed for said predetermined number of frames.

## 4,016,407
## UNIVERSAL MODULAR CONTROLLER

**Roderick S. Mesecar, and Frank G. Evans, both of Corvallis, Oreg., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Sept. 19, 1975, Ser. No. 614,996**
**Int. Cl.² G06M *3/00***
**U.S. Cl. 235—92 CT** **3 Claims**




**1.** A controller device comprising:
a. a clock device:
b. a counter device having a clock input and a data output;



c. the output of said clock device connected to the clock input of said counter device;
d. at least one decoder and logic network including a decoder and a logic network;
e. the data output of said counter device connected to said decoder of said decoder and logic network;
f. said decoder including decoding means for preselecting a coding to be decoded;
g. the output of said decoder connected to the input of said logic network of said decoder and logic network;
h. the output of said logic network providing at least one control signal when the data output of said counter device corresponds with the preselected coding of said decoder of said decoder and logic network;
i. said decoder comprising a plurality of diodes and a plurality of switches;
j. said data output of said counter device comprising a plurality of data output elements;
k. a decoder element comprising a switch, a diode and a data output element being connected in series;
l. said plurality of switches, said plurality of diodes and said plurality of data output elements together forming a plurality of decoder elements that are connected in parallel to a common bus line;
m. one end of said common bus line being connected to the input of said logic network;
n. said logic network of said decoder and logic network includes first and second flip-flop devices;
o. said one end of said common bus line is connected to the set input of said first flip-flop device;
p. one of the data outputs of said first flip-flop device being connected to the clock input of said second flip-flop device;
q. a start reset means;
r. the output of said start reset means connected to the reset input of said counter and to the reset input of said first flip-flop device; and
s. whereby, when said logic network provides said at least one control signal said first flip-flop device simultaneously provides a leading edge ongoing signal at one of the data outputs and a trailing edge offgoing signal at the other data output and said second flip-flop device simultaneously provides positive and negative going pulses at its data outputs simultaneously with and in response to the leading edge of said ongoing signal of said first flip-flop device.

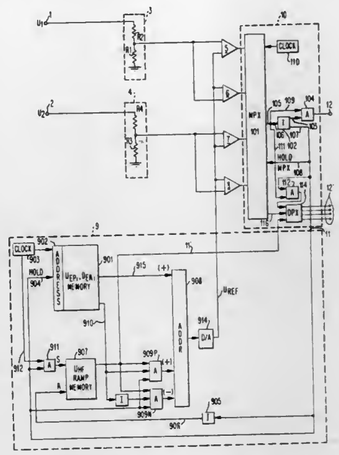
## 4,016,408
## METHOD AND ARRANGEMENT FOR SUPERVISING POWER SUPPLY SYSTEMS

**Gunther W. Koetzle, Ostfildern, Germany, assignor to International Business Machines Corporation, Armonk, N.Y.**

**Filed Dec. 8, 1975, Ser. No. 638,253**
**Claims priority, application Germany, Dec. 12, 1974, 2458736**
**Int. Cl.² G06F *11/00***
**U.S. Cl. 235—153 A** **16 Claims**

**1.** A method of supervising power supply systems supplying a plurality of supply voltages with different desired values and different acceptable extreme tolerance values, characterized in that

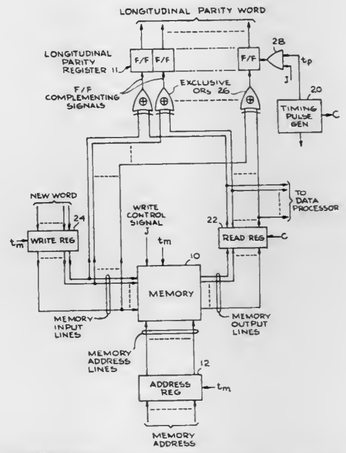
all actual values of the supply voltages are normalized by respective scale factors to a uniform nominal value,
that in a repeated tolerance checking cycle a variable reference value is generated which step by step passes through all acceptable extreme values, said extreme values being referred to nominal value, that
the normalized supply voltages is compared with their associated extreme values and a respective output signal is emitted each time the normalized actual value deviates from said nominal value by more than its associated acceptable extreme value.




## 4,016,409
## LONGITUDINAL PARITY GENERATOR FOR USE WITH A MEMORY

**Dongsung Robert Kim, Fountain Valley, Calif., assignor to Burroughs Corporation, Detroit, Mich.**

**Filed Mar. 1, 1976, Ser. No. 662,573**
**Int. Cl.² G06F *11/10*; G11C *29/00***
**U.S. Cl. 235—153 AM** **5 Claims**




**1.** In combination:
a digital memory for storing a plurality of words at selectably addressable locations thereof;
addressing means for addressing a selected word address in said memory;
said memory being responsive to said addressing means for performing a read operation during which a word is read out from said selected word address followed by a write operation during which a word applied to said memory is stored in said selected word address;
pulse generating means for generating a clock signal occurring following each read out of a word from said memory and prior to completion of said write operation;

a read register to which a word read out from said memory is applied, said read register being set up in accordance with the word read out from said memory in response to said clock signal;

a write register for applying a word to said memory during said write operation;

a longitudinal parity register for storing a longitudinal parity word corresponding to a predetermined plurality of words stored in said memory; and

longitudinal parity updating means responsive to the existing outputs of said read and write registers for applying updating signals to said longitudinal parity register;

said pulse generating means providing an updating signal during each write operation occurring subsequently to each clock signal for causing said updating signals to be applied to said longitudinal parity register for updating the longitudinal parity word stored therein in accordance with the then existing outputs of said read and write registers.

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## 4,016,410
## SIGNAL PROCESSOR WITH DIGITAL FILTER AND INTEGRATING NETWORK

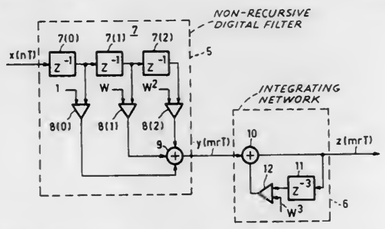
**Ludwig Désiré Johan Eggermont, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Nov. 20, 1975, Ser. No. 633,578**

**Claims priority, application Netherlands, Dec. 18, 1974, 7416480**

**Int. Cl.² G06F** *7/38, 15/34*

**U.S. Cl. 235—156** **5 Claims**




**1.** A signal processing device comprising

input means for supplying a sequence of input signals $x(n\mathrm{T})$, where n is an integer, and T a predetermined input sampling period;

digital filter means connected to said input means, and having an output for producing a sequence of binary coded auxiliary signals $y(mr\mathrm{T})$, having a predetermined sampling frequency relationship to said input signals given by

$$y(mr\mathrm{T}) = \sum_{i=0}^{r-1} W^i \, x\,[(mr-1)T]$$

wherein

W is a weighting factor;

$m = 0, 1, 2, 3 \ldots$ etc.;

$r$T is the sampling period of said auxiliary signals; and $x(mr\text{-}i)\mathrm{T} = 0$ for mr-i $< 0$; and

an integrating network having an input connected to said output of said digital filter means, and an output for generating signal samples $z(mr\mathrm{T})$ related to said auxiliary signal samples by

$$z(mr\mathrm{T}) = \sum_{j=0}^{m} W^{(m-j)r}\, y(jr\mathrm{T}) = W^r z\,[(m-1)r\mathrm{T}] + y(mr\mathrm{T})$$

where

$z\,[(m\text{-}1)r\mathrm{T}] = 0$ for all $m\text{-}1 < 0$.

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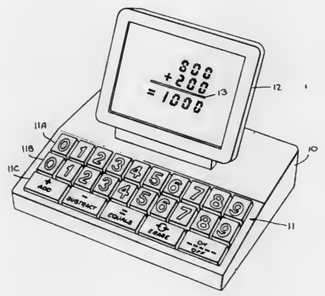
## 4,016,411
## MINI ELECTRONIC CALCULATOR WITH BLACKBOARD DISPLAY FORMAT

**Robert Genin, Bay Harbor Islands, Fla., assignor to Jardine Industries, Inc., Hong Kong, Hong Kong**

**Filed Jan. 29, 1976, Ser. No. 653,606**

**Int. Cl.² G09B** *19/02;* **G06F** *15/02*

**U.S. Cl. 235—156** **8 Claims**




**1.** A mini electronic calculator for adding or subtracting two complete numbers comprising:

A. an integrated circuit arithmetic unit having means to carry out addition and subtraction of two complete numbers entered therein;

B. a keyboard associated with the input of the unit, said keyboard having three parallel sets of keys arranged along horizontal lines, the keys of the first set being constituted by a row of digit keys marked with the digits 0 to 9 for entering the first complete number, the keys of the second set being constituted by a corresponding row of digit keys for entering the second complete number, and the keys of the third set including a plus function key, a minus function key, an equal sign key and an erase key, said erase key being coupled to the unit to clear the display in preparation for a fresh computation; and

C. an electro-optic display associated with the output of the unit, said display having three parallel groups of stations arranged along horizontal lines, the stations in the first group being digit stations for presenting the first complete number entered by successive actuation of keys in the first set, the stations in the second group being constituted by a lead station for presenting the function entered by actuating the plus or minus key, followed by digit stations for presenting the second complete number entered by successive actuation of keys in the second set, the third group being constituted by digit stations for presenting the result, whereby the display exhibits the first and second complete numbers and the result of a computation in a blackboard format, said first and second display groups each having three digit stations at corresponding locations to limit the complete numbers to three digits, the third group having four digit stations to provide the result, said arithmetic unit including means to disregard entries after three digits have been successively entered in the first group of digit stations and to disregard entries after three digits have been successively entered in the second group of digit stations.



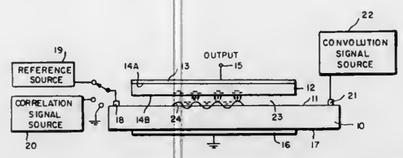
## 4,016,412
## SURFACE WAVE DEVICES FOR PROCESSING SIGNALS

**Ernest Stern, Concord, and Richard C. Williamson, Framingham, both of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.**

**Filed Mar. 5, 1975, Ser. No. 555,367**

**Int. Cl.² G06G** *7/19;* **H04R** *17/00*

**U.S. Cl. 235—181** **20 Claims**




**1.** A device for processing and storing signals comprising

a first piezoelectric substrate capable of propagating acoustic wave signals on a selected surface thereof;

at least one transducer means formed on said selected surface for generating surface acoustic waves traveling on said surface along a selected direction thereof in response to electrical signals;

a semiconductor material positioned so as to have a first surface thereof adjacent and spaced from said selected surface of said first substrate to form an interaction region which includes the region at or near said surfaces and the spatial region therebetween;

at least one of said piezoelectric substrate surface regions and said semiconductor material surface region being capable of operating as a storage element for electrons or carriers;

a layer of conductive material disposed on a second surface of said semiconductor material, said layer forming an electrode;

means for providing a first signal at said at least one transducer means to produce a first traveling acoustic wave signal along said selected surface of said first substrate;

a source of electrons or carriers;

means for applying a time-varying second signal uniformly over said interaction region when said first signal is positioned on the surface of said piezoelectric substrate at said interaction region to provide time-varying properties thereof, the interaction of said first and second signals thereby causing electrons or carriers to migrate from said source into said at least one of said storage elements in accordance with said interaction to provide an altered stationary conductivity pattern in said semiconductor material, which altered conductivity pattern remains stored in said semiconductor material for a selected time period and represents said interacted first and second signals.

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## 4,016,413
## OPTOELECTRONIC MEANS FOR ONE-DIMENSIONAL INTEGRAL TRANSFORMS OF TWO DIMENSIONAL INFORMATION

**Jenny Bramley, Falls Church, Va., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Continuation of Ser. No. 456,394, March 29, 1974, abandoned. This application Dec. 4, 1975, Ser. No. 637,784**

**Int. Cl.² G06G** *9/00;* **G02B** *5/20*

**U.S. Cl. 235—181** **14 Claims**

**5.** Apparatus for rapidly processing pictorial information comprising:

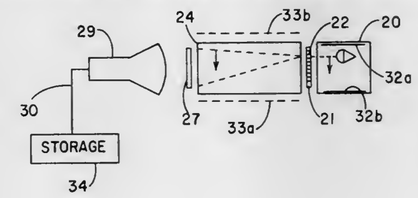
a. a source of substantially parallely arranged pictorial information illuminated one line at a time;

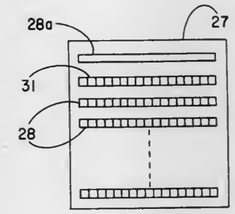
b. optoelectronic means including electronic line by line scanning means receiving light intensity output from said source of substantially parallely arranged pictorial information;

c. a light transmissive plate in contiguous relation with the output face of said optoelectronic means, said plate having parallely arranged strips, a first strip having a density of the material of said plate and succeeding strips having adjacent elemental areas of relative variable transmittivities corresponding to kernel values of an integral transform;

d. photomultiplier means adjacent said light transmissive plate receiving the total light output of said transmissive plate upon line by line scanning of said information; and

e. said line by line electronic scanning means successively sweeping the information of said illuminated line received from said optoelectronic means over said parallely arranged strips with the total amount of light transmitted



through each strip of said transmissive plate received by said photomultiplier means and the output thereof stored electronically whereby the transform coefficients of said integral transform are determined by the difference between the output of said photomultiplier means after illumination of a line of said transmissive plate and a stored bias signal.

**14.** A transmissive plate for use in a system for rapidly processing pictorial information utilizing transform coefficients of an integral transform, said transmissive plate comprising a plurality of horizontally disposed strips, a first one of said plurality of strips having a density of the material of said plate and succeeding parallely arranged strips having adjacent elemental areas of relative variable transmittivities corresponding to kernel values of an integral transform.

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## 4,016,414
## WRITING DEVICE INCORPORATING ILLUMINATING MEANS

**Scott M. Browning, 3269 Polk Ave., Ogden, Utah 84403, and Gregory F. Klomp, 2500 Fillmore, Ogden, Utah 84401**

**Filed Apr. 9, 1975, Ser. No. 566,370**

**Int. Cl.² F21V** *33/00;* **B43K** *29/10*

**U.S. Cl. 240—6.46** **7 Claims**



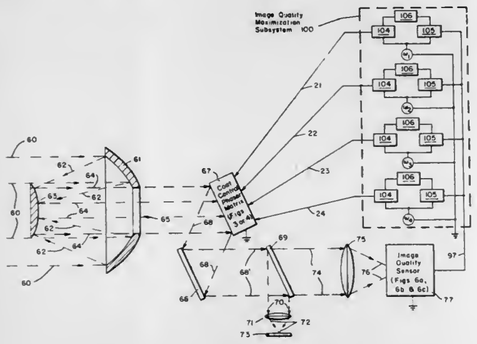
**1.** A writing device with self-contained lighting means and

including, in combination: a casing having a rearward extremity, an elongate translucent end piece secured to and within said casing and having an axial bore and a light-means-receiving and positioning socket contiguous with and rearwardly disposed with respect to said bore; light means positioned within and engaging said socket for transmitting light energy forwardly through said translucent end piece; battery means disposed in said casing and operatively engaging said light means; a closure secured to said casing at said rearward extremity; a compression spring operatively interposed between said closure and said battery means; circuit means coupled to said battery means and light means for selectively supplying electrical energy from said battery means to said light means, said circuit means including manual pressure-actuated switching structure disposed proximate said end piece; and a replaceable translucent writing implement disposed in and engaging said bore and protruding forwardly of said end piece.

## 4,016,415
## ADAPTIVE IMAGING TELESCOPE WITH LINEAR SENSING AND MOVABLE MIRROR PHASE SHIFTING

**Thomas R. O'Meara, Malibu, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.**

**Filed June 24, 1974, Ser. No. 482,188**
**Int. Cl.² G01J** *1/20*
**U.S. Cl. 250—201** **21 Claims**




1. An adaptive imaging telescope for detecting an optical image received thereby at the telescope aperture which image is communicated by an optical beam comprising in combination:

a movable mirror phase shifter, positioned at image plane of the telescope aperture, responsive to the optical beam, said phase shifter including a plurality of piezoelectric crystals spaced apart from each other a predetermined distance, each of the crystals have a bore therein, a first metallic film on the surface of the bore and a second metallic film on the outer surface of the crystal circumjacent the first metallic film;

first means optically coupled to the phase shifter, for converting said optical beam into an electrical signal which is linear in magnitude with respect to the magnitude of the electrical signal; and

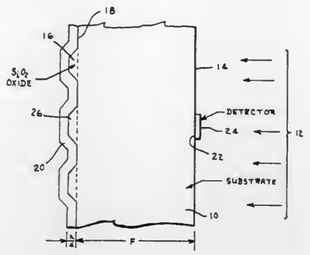
second means, electrically coupling the first means and the phase shifter, for providing phase modulation of the optical beam.

## 4,016,416
## PHASE COMPENSATED ZONE PLATE PHOTODETECTOR

**Freeman D. Shepherd, Jr., Chelmsford, and Sven A. Roosild, Framingham, both of Mass., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**

**Filed Mar. 23, 1976, Ser. No. 669,584**
**Int. Cl.² H01J** *39/12*
**U.S. Cl. 250—211 J** **7 Claims**

1. A phase compensated zone plate photodetector comprising: a base of material transparent to radiation; a plurality of coincentric rings, transparent to radiation mounted on one face of said base; a radiation reflective material overcovering

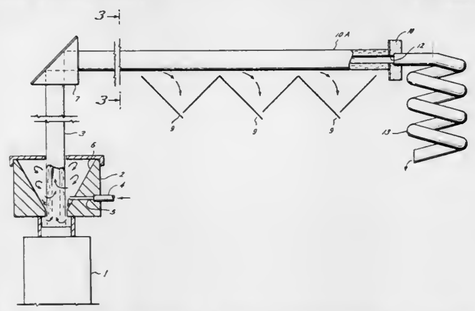



the said face of the base and rings mounted thereon, and radiation detection means for receiving reflected radiation mounted on a second face of said base.

## 4,016,417
## LASER BEAM TRANSPORT, AND METHOD

**Richard Glasscock Benton, 1300 St. Joseph Prof. Bldg., Houston, Tex. 77002**

**Filed Jan. 8, 1976, Ser. No. 647,609**
**Int. Cl.² G01N** *27/28;* **H01S** *1/00, 9/00;* **F04B** *21/00*
**U.S. Cl. 250—251** **6 Claims**



1. In a laser transport, a laser beam generator, a tubular laser beam generated thereby, means for introduction of a vapor into said beam, conveyor joints for directional control of the longitudinal movement of said beam, passageways through said conveyor joint for the passage of said vapors with the projection of said beam.

## 4,016,418
## METHOD OF RADIOACTIVITY ANALYSIS

**Donald L. Horrocks, Placentia, and Paul R. Klein, Laguna Niguel, both of Calif., assignors to Beckman Instruments, Inc., Fullerton, Calif.**

**Filed Feb. 12, 1976, Ser. No. 657,523**
**Int. Cl.² G01D** *8/00*
**U.S. Cl. 250—252** **20 Claims**

1. A method of determining the radioactive source strength of a sample of a radionuclide which emits two quanta of radiation in coincidence or near coincidence, said method comprising the steps of:

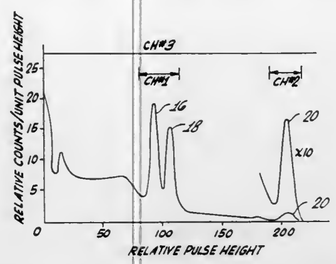
measuring only in a first counting channel of a detection instrument the radiation due to single quanta;

measuring only in a second counting channel of the detection instrument the radiation due to coincident pairs of quanta; and

computing the source strength of the sample from the results of said measuring steps;



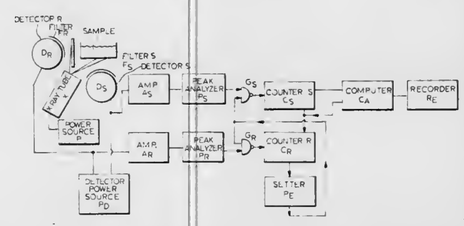
whereby the source strength may be conveniently determined on an instrument also used for routine radiation measurements.




## 4,016,419
## NON-DISPERSIVE X-RAY FLUORESCENCE ANALYZER

**Haruo Kotani, Osaka; Haruyoshi Hirata, and Yoshinori Hosokawa, both of Kyoto, all of Japan, assignors to Horiba, Ltd., Kyoto, Japan**

**Filed Aug. 26, 1975, Ser. No. 607,903**
**Claims priority, application Japan, Sept. 30, 1974, 49-113115**
**Int. Cl.² G01N** *25/00*
**U.S. Cl. 250—272** **3 Claims**

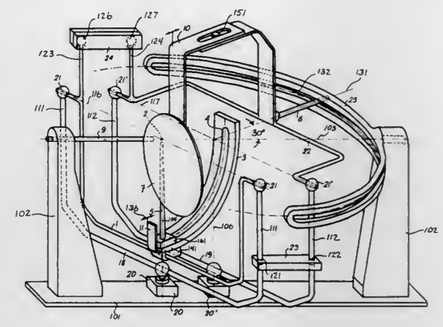



1. A non-dispersive fluorescence X-ray analyzer for measuring the concentration of an element contained in a sample, comprising an X-ray source including a power source, means for holding a sample to be analyzed and a reference sample in the path of the X-rays from said X-ray source, detecting means for each of said samples for detecting the fluorescence X-ray spectrum of the said element for which the analysis is being made from among the fluorescence X-ray spectra radiated from each sample and converting it to a series of pulse signals for each sample, a counting means connected to each detection means for counting the pulse signals from each sample, and means coupled between the respective counting means for stopping the supply of pulse signals to the counting means for the sample detecting means when the pulses counted by the counting means for the reference sample becomes equal to a predetermined number, whereby the number of pulses counted for the sample to be analyzed can be used for performing a mathematical computation to determine the concentration of the element for which the sample is being analyzed and whereby drifts of the intensity of the output of the X-ray source and drifts due to temperature changes, for example, are automatically compensated for.

## 4,016,420
## PRECESSION-TYPE X-RAY DIFFRACTION CAMERA

**Milan Rieder, Prague, Czechoslovakia, assignor to Dekanat Prirodovedecke Fakulty University Karlovy, Prague, Czechoslovakia**

**Filed May 30, 1975, Ser. No. 582,343**
**Int. Cl.² G01M** *23/20*
**U.S. Cl. 250—277 CH** **9 Claims**



1. In a precession camera for taking X-ray diffraction pictures of a crystal, a collimator for directing X-rays along a first fixed horizontal axis, first and second frames individually supported for rotation about second and third ganged vertical axes each intersecting the first axis, first and second support members individually connected to the first and second frames for rotation about fourth and fifth ganged horizontal axes individually intersecting the second and third axes and each intersecting the first axis, the interconnected frames and support members defining a two-axis sub-system, a crystal holder for supporting the crystal at the intersection of the first, third and fifth axes, an elongated element coupled to the first support member and extending perpendicular to the fourth axis to define a sixth axis, a first planar film holder supported along the first axis in the path of the X-rays and disposed perpendicular to the sixth axis, the collimator extending through the plane of the film holder, means including the element for precessing the sub-system about the first axis at a selectable angle determined by the deviation of the sixth axis from the first axis, a first circular segment connected to the second support member and having a first 90° circumferential groove therein, the first segment being oriented in a plane perpendicular to the second support member and parallel to the sixth axis, and means supporting the crystal holder for circumferential movement in the first groove.

## 4,016,421
## ANALYTICAL APPARATUS WITH VARIABLE ENERGY ION BEAM SOURCE

**Charles W. Hull, Sierra Madre; T. Wilson Whitehead, Monrovia, and Bruce N. Colby, Glendora, all of Calif., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Feb. 13, 1975, Ser. No. 549,505**
**Int. Cl.² B01D** *59/44;* **H01J** *27/00*
**U.S. Cl. 250—281** **26 Claims**

13. An analytical apparatus comprising:

a. a gas chromatograph comprising a gas chromatographic column with a gas inlet and a gas outlet;

b. a mass spectrometer comprising a variable energy ion beam source, a magnetic sector for deflecting the ions in the ion beam according to their momentum and detector means for detecting those ions within the ion beam which have been deflected by a given angle by the magnetic sector, said ion beam source comprising:

i. a repeller electrode;

ii. first, low energy, alignment electrode, having a first

alignment slit therein and coacting with said repeller electrode to define an ion-forming region therebetween;

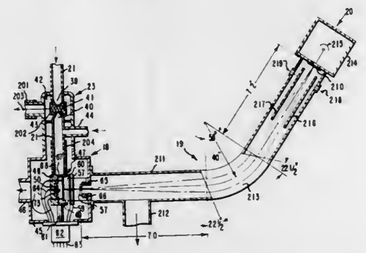
iii. inlet means for introducing gas into the ion-forming region;

iv. means for forming an electron beam in said ion-forming region;

v. an extraction electrode with an extraction slit therein;

vi. second, high energy, alignment electrode having a second alignment slit therein;

vii. an entrance electrode having an entrance slit therein separating said ion beam source from said magnetic sector, all of the aforesaid electrodes being in sequential order and all of the aforesaid slits being aligned to



define a straight path between the electron beam and the entrance slit;

viii. means for maintaining said repeller electrode at a constant potential relative to said first alignment electrode and said first alignment at a constant positive potential relative to said extraction electrode;

ix. means for maintaining said second alignment electrode at a potential more negative than and proportional to that of said extraction electrode;

x. means to maintain said extraction electrode at a positive potential relative to said entrance electrode and to vary its potential relative to said entrance electrode; and

c. an interface for connecting the gas outlet to said chromatograph to said inlet means of said ion beam source.

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**4,016,422**

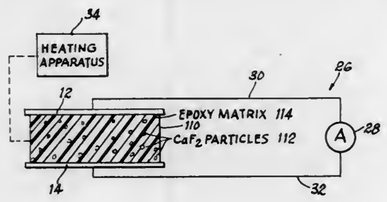
## RADIATION DOSIMETRY BY MEASUREMENT OF POLARIZATION AND DEPOLARIZATION CURRENTS

**Paul Richard Moran; Ervin B. Podgorsak, both of Madison, Wis., and David E. Fields, Oak Ridge, Tenn., assignors to Wisconsin Alumni Research Foundation, Madison, Wis.**

**Continuation of Ser. No. 346,720, April 2, 1973, which is a continuation-in-part of Ser. No. 290,726, Sept. 20, 1972, abandoned. This application May 12, 1975, Ser. No. 576,272**

**Int. Cl.² G01T** *1/16*

**U.S. Cl. 250—336** **30 Claims**




1. A method of measuring radiation,

comprising the steps of providing a dielectric body made of a dielectric material selected from a group consisting of alkaline earth fluorides, other alkaline earth halides, alkali metal fluorides, other alkali metal halides, alkaline earth oxide ceramics, and alkaline earth phosphate minerals,

exposing said dielectric body to the radiation to be measured,

providing an electrical current measuring circuit between a pair of electrodes on opposite sides of said body,

and producing a depolarization current in said measuring circuit by raising the energy level of said dielectric body,

said depolarization current being a measure of the radiation exposure.

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**4,016,423**

## INFRARED ANALYZER OF CONSTANT RADIANT ENERGY

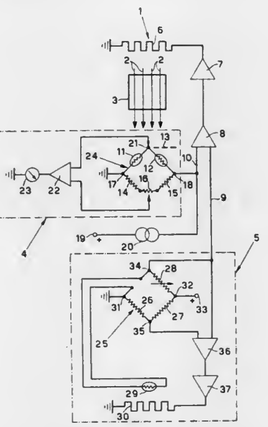
**Emilio G. Meyer, Rozzano (Milan), Italy, assignor to Leeds & Northrup Italiana S.p.A., Milan, Italy**

**Filed Jan. 20, 1976, Ser. No. 650,748**

**Claims priority, application Italy, Feb. 4, 1975, 19938/75**

**Int. Cl.² G01J** *1/00, 1/32;* **G01N** *21/24, 21/26*

**U.S. Cl. 250—343** **3 Claims**



1. Infrared analyser for determining the presence and concentration of a specific component in a liquid or gaseous sample comprising a source of radiant energy arranged to direct an infrared radiation beam against the sample to be analysed, and a detector arranged to receive said radiation beam downstream of the sample and provide a measurement of the concentration of the component under investigation in the form of an indication of the quantity of energy of infrared frequency absorbed by the said component during passage of the radiation beam through the sample, said detector comprising two thermistors both exposed to the radiation from the sample, in the case of one of them by way of screening means arranged to produce a different ohmic response by the two thermistors when energy is absorbed by said component, said thermistors being electrically connected into a balanceable bridge circuit provided with an instrument for measuring unbalance, so that said difference in ohmic response produces an unbalance in said bridge circuit which is indicative of the quantity of energy absorbed by said component and therefore of the concentration of the component in the sample under analysis, wherein said source of radiant energy is fed by the outlet of a comparator which receives as its respective inlets a reference signal of constant value and a signal which varies as a function of the sum of the instantaneous ohmic values of the two thermistors and therefore as the total radiant energy received by the detector.



**4,016,424**

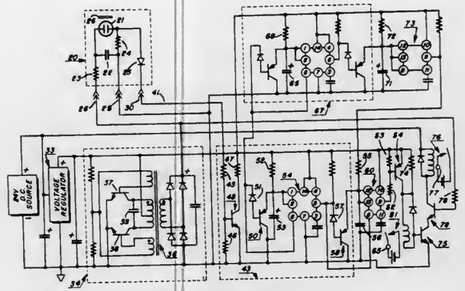
## ULTRAVIOLET RADIATION DETECTOR

**Richard Traina, Randolph Township, N.J., assignor to Alison Control Inc., Fairfield, N.J.**

**Filed Oct. 20, 1975, Ser. No. 623,809**

**Int. Cl.² G01J** *1/42*

**U.S. Cl. 250—372** **2 Claims**



1. A UV detection system comprising,

a. a Geiger-Mueller tube having anode and cathode elements,

b. an energy-limited voltage supply circuit for said tube connected between the said elements,

c. a limited energy storage network connected across the tube elements, which network in conjunction with said energy-limited supply circuit causes the tube to develop output voltage pulses having a rate directly proportional to the magnitude of photon energy and inversely proportional to the distance of the tube from a source of UV radiations,

d. means applying the tube output pulses to a normal pulse rate alarm circuit producing an output when a first predetermined pulse rate is exceeded,

e. a duration circuit responsive to the output of said normal pulse rate alarm circuit and providing an output voltage when the said first predetermined pulse rate has been exceeded for a predetermined time period,

f. alarm means actuated by the said output voltage,

g. a high pulse rate alarm circuit producing an output when a second predetermined pulse rate is exceeded, which second pulse rate is substantially higher than said first predetermined pulse rate,

h. means applying the tube output pulses to said high pulse rate alarm circuit,

i. a differentiating circuit imitiated by the output of said high pulse rate alarm circuit, said differentiating circuit providing an output voltage only when the first derivative of the tube pulse rate is zero, and

j. means responsive to the output voltage of said differentiating circuit and inhibiting actuation of said alarm means.

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**4,016,425**

## METHODS AND APPARATUS FOR OPTIMIZING THE RESPONSE OF TRANSDUCERS

**Robert L. Farquhar, Twyford, and Phillip D. Snook, Pinner, both of England, assignors to Graviner Limited, England**

**Filed Nov. 5, 1975, Ser. No. 629,015**

**Claims priority, application United Kingdom, Nov. 5, 1974, 47755/74**

**Int. Cl.² G01J** *1/42*

**U.S. Cl. 250—372** **18 Claims**

1. A method of optimising the response of a sensing device whose operation is at least in part random but has a predictable probability, comprising the steps of

defining repeated sequences of successive time instants which are fixed in time relative to a time datum,

rendering the device active at each instant of the said sequences,

holding the device active for not more than a respective activation period following each instant,

consecutive activation periods being mutually separated by recuperation time periods and all the said periods being of predetermined lengths, and




producing a warning output only when the device responds during each one of the activation periods in at least one said sequence,

the lengths and number of activation periods in each sequence being selected such as to increase the signal to noise ratio of the device.

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**4,016,426**

## AIR CUSHION ACTUATION AND MALFUNCTION DETECTION AND RECORDING CIRCUIT

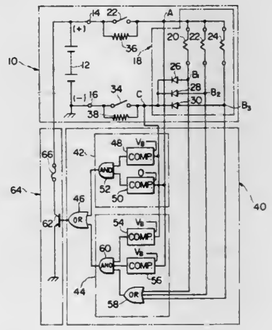
**Tetsuji Nishioka, Yokohama, Japan, assignor to Nissan Motor Co., Ltd., Japan**

**Filed Nov. 21, 1975, Ser. No. 634,270**

**Claims priority, application Japan, Nov. 29, 1974, 49-143358**

**Int. Cl.² B60R** *21/08*

**U.S. Cl. 307—10 R** **5 Claims**



1. In a passenger conveyance provided with a safety device, electrically operated actuator means for actuating the safety device, said actuator means comprising a plurality of squibs and a plurality of diodes having their anodes connected to one sides of the squibs, respectively;

a control circuit for operating said actuator means comprising first normally open condition responsive switch means connecting the other sides of the squibs to a source of direct current; second normally open condition responsive switch means connecting cathode sides of the diodes to a reference potential and first and second resistor means connected across said first and second switch means, respectively, to normally establish a first potential at a first junction between said first switch means and said actuator means, seco· potentials at second junctions between the diodes and the squibs, respectively, and a third potential at a third junction between said actuator means and said second switch means;

recorder means; and

malfunction detecting means for energizing said recorder means when the voltage at the first junction assumes substantially a relatively low value and the voltage at the third junction substantially a relatively high value or when the voltage at the first junction assumes substantially the relatively high value, the voltage at least one of the second junctions substantially the relatively low value and the voltage at the third junction substantially the relatively high value.

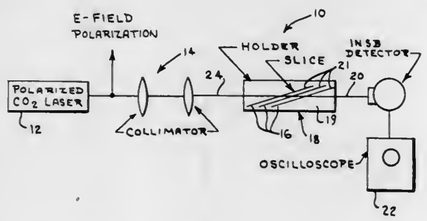
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**4,016,427**

## APPARATUS FOR PRODUCING EFFICIENT SECOND HARMONIC GENERATION AND FREQUENCY MIXING

**Andrei Szilagyi, Cambridge; Audun Hordvik, Nagog Woods, and Howard Roy Schlossberg, Lexington, all of Mass., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**

**Filed Jan. 21, 1976, Ser. No. 650,840**
**Int. Cl.² H02M** *5/04*
**U.S. Cl. 307—88.3** **15 Claims**




1. An apparatus for producing second harmonic generation comprising a laser source for producing a laser beam at a preselected frequency, at least one crystal slice, said crystal slice having a preselected thickness and orientation, said orientation fulfilling the requirement that $P_{11} = \vec{P} \cdot \hat{E}$ be a maximum when said laser beam is incident at Brewster angle and wherein $\vec{P}$ = the non-linear polarization at twice the incident frequency, $\hat{E}$ = a unit vector along the component in the plane of incidence of the electric field vector of said laser beam and $\vec{P}_{11}$ = the component of $\vec{P}$ parallel to $\hat{E}$, means for mounting said crystal slice in a preselected position and said preselected position being such that said crystal slice is in optical alignment with said laser beam and said laser beam is incident at Brewster angle.

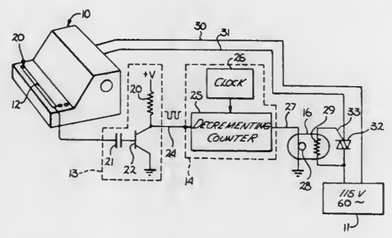
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**4,016,428**

## POWER SWITCHING CIRCUIT

**Eric D. Gutterman, Granada Hills, Calif., assignor to Allan S. Beck, Granada Hills, Calif.**

**Filed Nov. 13, 1975, Ser. No. 631,438**
**Int. Cl.² H03K** *17/00*
**U.S. Cl. 307—116** **10 Claims**




1. A power switching circuit for use with electrical appliances driveable by a power source comprising:
a. input signal means for receiving signal indicia representative of appliance operation;
b. timing means for initiating the time out of a predetermined interval, said time out commencing upon each signal indicia received by said input signal means, said timing means being coupled to said input signal means, said timing means outputting a signal responsive to said interval, said output signal being in a first state during said interval and changing to a second state following the termination of said interval;
c. a power switch connected to the electrical appliance, said power switch including control means for connecting and disconnecting the electrical appliance from the power source; and
d. isolation means for coupling the output signal of said timing means and the control means of said power switch whereby said control means disconnects the electrical appliance from the power source when the output signal of said timing means is in the second state thereof.

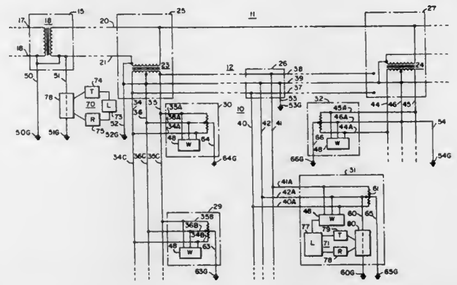
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**4,016,429**

## POWER LINE CARRIER COMMUNICATION SYSTEM FOR SIGNALING CUSTOMER LOCATIONS THROUGH GROUND WIRE CONDUCTORS

**Leonard C. Vercellotti, Verona, and Ian A. Whyte, Pittsburgh, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed Jan. 16, 1976, Ser. No. 649,774**
**Int. Cl.² H04B** *13/02*
**U.S. Cl. 307—149** **9 Claims**



1. A power line communication system for conveying carrier current signals between two locations in an electrical power system including a distribution transformer, comprising:
a first ground wire which connects an uninterrupted neutral conductor of the power system directly to real earth ground at a first of the two locations;
means including a first current transformer having a single turn primary formed by said first ground wire for inducing a first current signal in said first ground wire in response to first communication signals;
a second ground wire which connects said neutral conductor of the power system directly to real earth ground at the second of the two locations; and
means including a second current transformer having a single turn primary formed by said second ground wire for detecting a second current signal in the second ground wire which is responsive to the first current signal.

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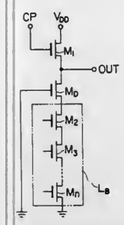
**4,016,430**

## MIS LOGICAL CIRCUIT

**Tadao Kanezuka, Tokorozawa, Japan, assignor to Hitachi, Ltd., Japan**

**Filed Dec. 23, 1975, Ser. No. 643,772**
**Claims priority, application Japan, Jan. 6, 1975, 50-000105**
**Int. Cl.² H03K** *19/08, 19/20*
**U.S. Cl. 307—205** **4 Claims**

1. A logical circuit comprising:
a logic block including at least one input terminal and an output terminal, and at least one driving insulated gate field effect transistor connected between a respective input terminal and the output terminal of said logic block; and
a depletion type insulated gate field effect transistor and a load element connected in series between a load supply voltage terminal to which a supply voltage is applied and the output of said logic block; and wherein




the gate electrode of said depletion type insulated gate field effect transistor is applied with a voltage the absolute value of which is less than the difference between the absolute value of said supply voltage and the absolute value of the threshold voltage of said depletion type insulated gate field effect transistor.

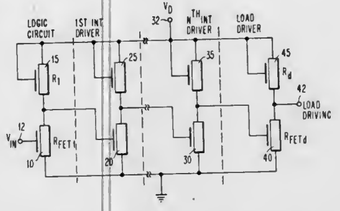
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**4,016,431**

## OPTIMAL DRIVER FOR LSI

**Robert Athanasius Henle, Clinton Corners, and Irving Tze Ho, Poughkeepsie, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Dec. 31, 1975, Ser. No. 645,765**
**Int. Cl.² H03K** *3/353, 5/159, 19/08*
**U.S. Cl. 307—208** **2 Claims**




1. In an integrated circuit structure wherein the output of a signal driver circuit contained on a monolithic chip is connected via multiple intermediate driver stages to the input of a load driving circuit, with the output capacitance of the load driver circuit being at least one hundred times greater than the output capacitance of the signal driver;
a plurality of $n$ intermediate driver stages which will minimize the total signal propogation delay between the signal driver and the load driver, where $n$ is selected to be at least five and otherwise satisfies the equation $n = \ln M$ with $M$ = capacitance of load driver/capacitance of signal driver.

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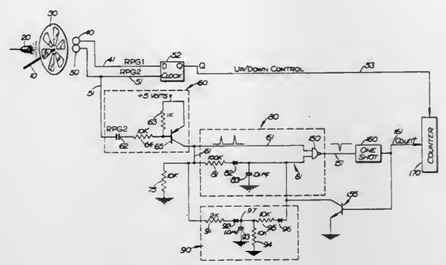
**4,016,432**

## VARIABLE RATE ROTARY PULSE GENERATOR

**Michael S. Marzalek, Cotati, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.**

**Filed Oct. 1, 1975, Ser. No. 618,547**
**Int. Cl.² H03K** *5/18*
**U.S. Cl. 307—233 A** **5 Claims**

1. Pulse generating apparatus comprising:
generating means having a rotating element for providing a first digital signal in response to the rotation of said rotating element at varying speeds;
speed sensing means coupled to the generating means for producing a control signal representing the rotational speed of the rotating element in response to the first digital signal; and




variable pulse dividing means coupled to generating means and the speed sensing means for producing a variable division ratio digital output signal which is a function of the varying pulse repetition rate of the first digital signal and the control signal.

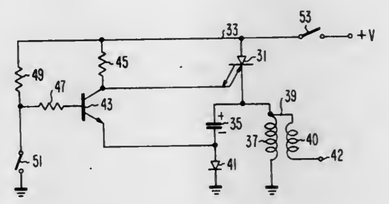
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**4,016,433**

## GTO CIRCUITS

**Ronald Robert Brooks, Hamilton Square, N.J., assignor to RCA Corporation, New York, N.Y.**

**Filed Jan. 23, 1976, Ser. No. 651,798**
**Int. Cl.² H03K** *17/72*; **F02P** *1/00*
**U.S. Cl. 307—252 C** **10 Claims**



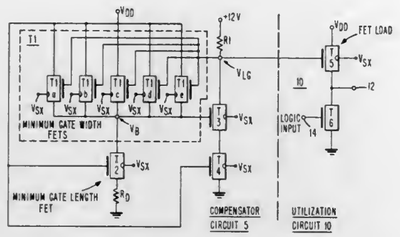

1. A switching circuit comprising:
first and second terminals across which a direct operating potential may be applied;
load means;
a gate-turn-off silicon controlled rectifier having an anode electrode connected to said first terminal, a cathode electrode connected via said load means to said second terminal, and a gate electrode;
charge storage means connected at one terminal to said cathode electrode and coupled at its other terminal to said second terminal responsive to current flow through said rectifier for accumulating a charge;
means coupled to said gate electrode of said rectifier for supplying a voltage thereto during one period of time for turning said rectifier on, and for connecting said gate electrode to said other terminal of said charge storage means during a second period of time for thereby permitting said charge storage means to discharge through a conduction path between said cathode-gate electrodes, for turning said rectifier off; and
isolating means connected between the other terminal of said charge storage means and said second terminal for substantially preventing any discharge current from flowing through said load means.

**4,016,434**

## LOAD GATE COMPENSATOR CIRCUIT

**Robert Joseph DeFilippi, Reston, Va., assignor to International Business Machines Corporation, Armonk, N.Y.**

**Filed Sept. 4, 1975, Ser. No. 610,202**
**Int. Cl.² H03K** *1/02, 1/10, 19/08, 19/40*
**U.S. Cl. 307—297** **6 Claims**




1. In an integrated circuit on a semiconductor substrate, a load gate compensator circuit comprising:

a first enhancement mode FET transistor in said substrate having its drain connected to a drain potential, its source connected to a first node, and its gate connected to an output node, said first transistor comprising a plurality of component FET devices connected in parallel, each said component device having a gate of minimum width;

a second enhancement mode FET device in said substrate having its drain connected to said first node, its source connected through a diffused resistor to ground, and its gate connected to said drain potential;

said second FET transistor having a gate region with a minimum length;

a third enhancement mode FET transistor having its drain connected to said output node, and its gate connected to said first node;

said third transistor operating as an inverting amplifier between said first node, and said output node, requiring no reference potential;

a fourth enchancement mode FET transistor having its drain connected to the source of said third transistor, its source connected to ground, and its gate connected to said drain potential;

a precision resistor connected between said output node and a relatively high potential;

whereby a load gate voltage is generated at said output node of said circuit having a magnitude responsive to variations in the processing parameters of said integrated circuit.

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**4,016,435**

## CURRENT STABILIZING ARRANGEMENT

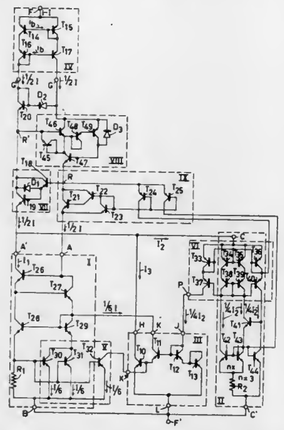
**Johannes Otto Voorman, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Feb. 26, 1975, Ser. No. 553,279**
**Claims priority, application Netherlands, Mar. 11, 1974, 7403202**
**Int. Cl.² H03K** *17/00*
**U.S. Cl. 307—296 R** **10 Claims**

1. A current stabilizing arrangement comprising:

a. a three-terminal circuit comprising an input terminal, an output terminal, a common terminal and two parallel branches connected between the input terminal and the common terminal, one branch including the collector-emitter path of a first transistor and the other branch at least the base-emitter junction of a second transistor in series with a resistor, the collector of the second transistor being connected to said output terminal of the three-terminal network and the base of the first transistor being driven by a signal derived from the input signal in such a way that for a constant current at the input terminal a current with a negative temperature coefficient appears at the output terminal,

b. a two-terminal circuit comprising first and second terminals and two parallel branches connected there between and which are coupled by means of a current dividing circuit so that the currents which flow through the two branches bear a fixed ratio to each other, at least one semiconductor junction included in the one branch and by-passed by a series connection of at least one semiconductor junction and a resistor which is included in the other branch, at least one of the two said semiconductor junctions being the base-emitter junction of a transistor, whereby between the first and second



terminals of said two-terminal circuit a current with a positive temperature coefficient appears, and

c. a current mirror circuit having an input terminal connected to the output terminal of said three-terminal circuit and also to the first terminal of said two-terminal circuit, means connecting the second terminal of the two-terminal circuit to the common terminal of said three-terminal circuit, and means connecting the output terminal of said current mirror circuit to the input terminal of the three-terminal circuit.

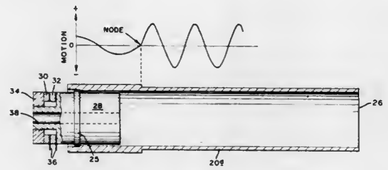
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**4,016,436**

## SONIC OR ULTRASONIC PROCESSING APPARATUS

**Andrew Shoh, Ridgefield, Conn., assignor to Branson Ultrasonics Corporation, New Canaan, Conn.**

**Filed Dec. 10, 1975, Ser. No. 639,219**
**Int. Cl.² H01L** *41/04*
**U.S. Cl. 310—8.2** **12 Claims**




1. A sonic processing apparatus comprising:

a first resonator dimensioned to be resonant in a direction along its longitudinal axis when energized with high frequency vibratory energy, and

a second resonator coaxially coupled to said first resonator substantially at a nodal region of axial vibratory motion of said first resonator for receiving said vibratory energy and being dimensioned for transmitting the energy as radial flexural waves longitudinally along the wall of said second resonator.

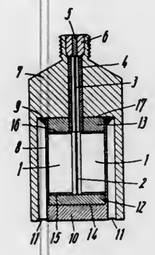


**4,016,437**

## PIEZOELECTRIC PRESSURE AND FORCE TRANSDUCERS OR ACCELEROMETERS

**Reto Calderara, Bern; Hans U. Baumgartner, Winterthur; Jan Tichý, St. Gallen, and Hans C. Sonderegger, Neftenbach, all of Switzerland, assignors to Kistler Instrumente AG, Switzerland**

**Continuation of Ser. No. 234,948, March 15, 1972. This application Jan. 28, 1976, Ser. No. 653,154**
**Claims priority, application Switzerland, Mar. 15, 1971, 3758/71**
**Int. Cl.² H01L** *41/04*
**U.S. Cl. 310—8.7** **13 Claims**



1. A piezoelectric transducer for use in force, pressure and acceleration measuring systems comprising:

at least one transducer element which is prone to twinning;

means for introducing a force to said element; and

means for applying a prestress to said element in at least one direction forming an angle of less than 27° with a direction providing a maximum difference between respective elasticity coefficients of said element for stable and unstable twin forms of said element such that the stable form obtains a thermodynamic preference according to the relationship

$$\Delta G = G - G = \tfrac{1}{2} \sum_{\lambda=1}^{6} \sum_{\mu=1}^{6} (s_{\lambda\mu} - s_{\lambda\mu}) \cdot T_\lambda \cdot T_\mu$$

wherein $G$ represents the elastic free enthalpy, $s$ represents the elastic compliance coefficients of said transducer element, and $T$ represents stress components.

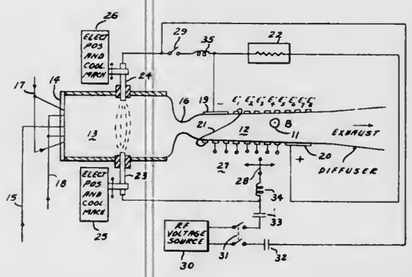
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**4,016,438**

## ENTHALPY AUGMENTATION TO MHD GENERATION

**James F. Holt, Medway, Ohio, assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**

**Filed May 27, 1975, Ser. No. 581,175**
**Int. Cl.² H02K** *45/00*
**U.S. Cl. 310—11** **1 Claim**




1. In a MHD generator having at least a thermal efficiency of approximately 20%, a combustion chamber, a MHD channel having a plurality of serially connected electrodes between positive and negative electrical output electrodes with an electrical load connected to the said positive and negative output electrodes, the improvement in the said MHD generator by enthalpy augmentation comprising:

a. a first and a second carbon electrode for providing an electrical arc discharge therebetween;

b. means for positioning the said electrodes to position the said arc discharge in the said combustion chamber;

c. means including a switch cooperating with the said plurality of electrodes and one of the said output electrodes to provide an adjustable voltage; and

d. means for connecting the said adjustable voltage to the said carbon electrodes.

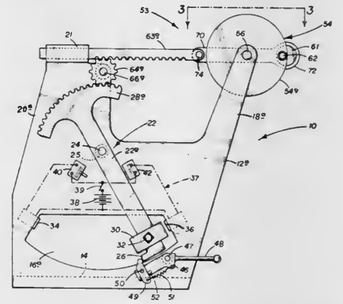
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**4,016,439**

## MAGNETICALLY ACTIVATED OSCILLATORY MOTOR

**Francis R. Sheridan, 302 - 2nd Ave., Puyallup, Wash. 98371**

**Filed Oct. 28, 1975, Ser. No. 626,473**
**Int. Cl.² H02K** *33/14*
**U.S. Cl. 310—39** **4 Claims**



1. A magnetically activated oscillatory motor comprising

a. mounting means,

b. a pendulum pivotally mounted to the mounting means,

c. a pendulum magnet mounted on the pendulum with its poles aligned to face in the direction of pendulum movement,

d. first and second electromagnets mounted on the mounting means in a fixed, spaced, relation adjacent the opposite extremities of swing of the pendulum with their poles aligned with those of the pendulum magnet and facing the like polarity pole thereof, whereby each electromagnet, when energized, functions to repel the facing pole of the pendulum magnet and urge the pendulum toward its other extremity of swing,

e. electric power means for supplying current to energize the first and second electromagnets,

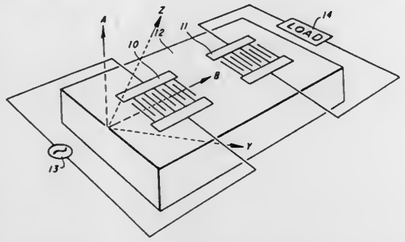
f. switch means in an electric circuit with the electric power means and the first and second electromagnets and operative to control the flow of current selectively to the first and second electromagnets, mounted on the mounting means for engagement by the pendulum when it is near the extremities of its swing to energize only the electromagnet then adjacent to the pendulum, to effect urging of the pendulum toward its other extremity of swing, and

g. drive means connected to the pendulum to transmit its oscillatory motion to a driven member.

**4,016,440**
**PARTICULARLY ORIENTED PLATE-LIKE MONOCRYSTALLINE PIEZOELECTRIC BODY AND ACOUSTIC SURFACE WAVE FILTER DEVICE EMPLOYING SAME**

**Robert S. Wagers, Richardson, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.**

**Continuation-in-part of Ser. No. 473,850, May 28, 1974, abandoned. This application May 21, 1975, Ser. No. 579,340**
**Int. Cl.² H01L** *41/04*
**U.S. Cl. 310—9.5** **5 Claims**



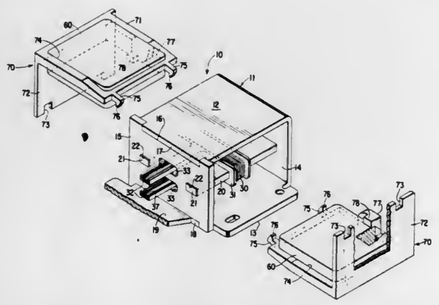

1. A piezoelectric body for use as a substrate in an acoustic surface wave filter device, said body comprising a monocrystalline member of lithium niobate of plate-like configuration and having a crystalline lattice orientation determined by a cut lying within the range of 60° – 30° (ZYW) cut so as to substantially limit the number of plate modes available for coupling, thereby enhancing the plate mode discrimination.

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**4,016,441**
**LINEAR MOTOR**

**John Addison Herr, Garwood; Wolfgang Jaffe, Roselle Park; Allan Matthew Dob, Clifton; Philip Francis Minalga, Piscataway; Kenneth Douglas Adams, Madison, and William Lee Herron, Elizabeth, all of N.J., assignors to The Singer Company, New York, N.Y.**

**Filed May 19, 1976, Ser. No. 687,858**
**Int. Cl.² H02K** *33/18*
**U.S. Cl. 310—13** **8 Claims**



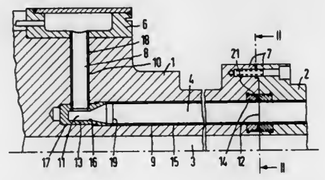
1. A linear motor comprising a ferro-magnetic metal frame including a opposed set of front and rear walls joined by an opposed set of end walls together defining a enclosure, a non-circular ferro-magnetic pole piece spanning one of said sets of opposed frame walls within said enclosure, a bobbin formed of non-magnetizable material arranged freely slidable on said pole piece within said enclosure, wire wound in a coil on said bobbin to a depth of a plurality of wire diameters, a motor output arm connected to said bobbin and extending out through a clearance aperture in said motor frame enclosure, a block of permanently magnetized material in the shape of a parallelepiped of substantially uniform thickness dimension insertible with clearance within said enclosure in the space between said pole piece and a wall of said motor frame with the uniform thickness dimension being arranged extending between said frame wall and said pole piece, and holding means formed of non-magnetic material for constraining said block of permanently magnetized material in a position against said motor frame wall so as to locate all of said clearance between the pole piece and said block of permanently magnetized material.

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**4,016,442**
**LIQUID-COOLED ROTOR OF ELECTRIC MACHINES AND METHOD OF PRODUCTION**

**Willi Eggemann, and Erich Weghaupt, both of Mulheim (Ruhr), Germany, assignors to Kraftwerk Union Aktiengesellschaft, Mulheim (Ruhr), Germany**

**Filed Dec. 16, 1974, Ser. No. 533,318**
**Claims priority, application Germany, Dec. 20, 1973, 2363644**
**Int. Cl.² H02k** *9/00*
**U.S. Cl. 310—59** **6 Claims**



1. A liquid cooled rotor for electric machines comprising shaft means, cooling liquid collecting chambers surrounding said shaft means, said shaft means including a plurality of axial bores for feeding and withdrawing cooling liquid and a plurality of radial bores connecting respective said axial bores to said cooling-liquid collecting chambers, a plurality of thin walled axial tubes and radial tubes of corrosion-resistant material forming linings for respective said axial and radial cooling-liquid bores, said tubes being in firm rolled-in press fitting sealing engagement with the surfaces defining the bores along the entire lengths thereof, and a plurality of diverting members fitted into respective said axial bores at locations whereat said radial bores divert from said axial bores, said diverting members each having an axially disposed opening and a radially disposed opening connecting said axial bores, respectively, with said radial bores.

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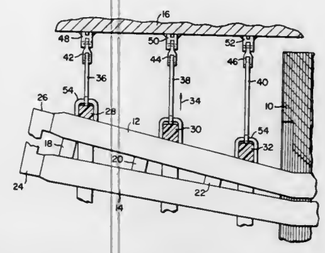
**4,016,443**
**TURBINE GENERATOR END-WINDING SUPPORT APPARATUS**

**Larry A. Johnson, Concord, Tenn., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed May 22, 1975, Ser. No. 579,754**
**Int. Cl.² H02K** *3/46*
**U.S. Cl. 310—260** **7 Claims**

1. Apparatus for supporting the end-winding conductors of a turbine generator, comprising:
a plurality of rings surrounding the outside of and secured to the end-winding conductors at different axial positions, with each ring connected to a plurality of radially extending flexture plates which are connected to the frame of the generator'' has been inserted;
the plurality of flexure plates having first and second ends and radially extending outwardly from said rings;
first means for connecting the first ends of the flexure plates to said rings; and
second means for connecting the second ends of the flexure plates to the frame of the generator, said second connecting means preventing axial and radial movement of the second flexure plate ends and permitting tangential movement of the second flexure plate ends.



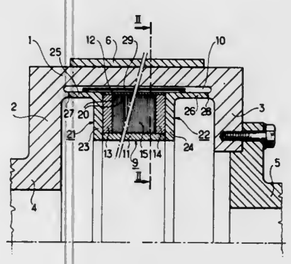


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**4,016,444**
**ROTOR FOR AN ELECTRIC MACHINE HAVING A CRYO-INDUCTOR**

**Roger Gillet, Belfort, France, assignor to Societe Generale de Constructions Electriques et Mecaniques (ALSTHOM), Paris Cedex and Electricite de France (Service National), Paris, both of, France**

**Filed Apr. 15, 1975, Ser. No. 568,239**
**Claims priority, application France, Apr. 17, 1974, 74.13313**
**Int. Cl.² H02K** *1/22*
**U.S. Cl. 310—261** **4 Claims**



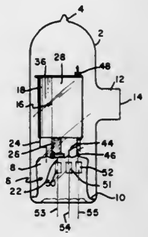
1. A rotor for an electric rotating machine comprising: a bearer cylinder made of non-magnetic material and constituting the mechanical bearer structure for the rotor, the cylinder being disposed between two portions of the rotor shaft; and a cylindrical body for supporting the rotor inductor winding and having an outside diameter less than the inside diameter of the bearer cylinder, the cylindrical body being disposed coaxially inside the bearer cylinder and being fixed at its axial ends to the bearer cylinder in a fluid-tight manner to form between the bearer cylinder and the cylindrical body an enclosed space for holding a vacuum; and characterized in that: the cylindrical body is a closed annular metallic box; insulating materials fill said annular box and have a plurality of recesses spaced along the outer periphery thereof for accommodating said inductor winding; said recesses extending radially inwardly into said box from the outer periphery thereof for a distance less than the radial thickness of the annulus formed by said box; and said rotor comprises two parts of revolution, each of whose axes of revolution coincides with the axis of the rotor, and each having a half cross-section in the shape of an angle part, a first of whose branches perpendicular to the axis of revolution is applied against and secured to an adjacent axial end of said closed metallic box, whereas the second branch parallel to the axis of revolution is fixed on the rotor by its end.

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**4,016,445**
**DEUTERIUM ARC LAMP**

**Robert L. Cassidy, Peabody; Robert J. Cosco, Amesbury, and John A. Pappas, Winthrop, all of Mass., assignors to GTE Sylvania Incorporated, Salem, Mass.**

**Filed Nov. 28, 1975, Ser. No. 636,325**
**Int. Cl.² H01J** *61/12*
**U.S. Cl. 313—185** **7 Claims**



1. A deuterium arc lamp comprising:
an hermetically sealed envelope having an ultraviolet light-transmitting portion;
a pair of electrodes in said envelope between which an arc discharge path is defined during operation of said lamp; and
deuterium gas in said envelope at an initial fill pressure in excess of that at which peak ultraviolet light intensity occurs during operation of said lamp, whereby the useful life of said lamp is substantially extended.

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**4,016,446**
**REFRACTORY-OXIDE-BASED INCANDESCIBLE RADIATORS AND METHOD OF MAKING**

**Laurence H. Cadoff, Pittsburgh, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed Jan. 31, 1975, Ser. No. 546,152**
**Int. Cl.² H01K** *1/10*
**U.S. Cl. 313—218** **13 Claims**



1. A refractory-oxide-based elongated incandescent radiator body member adapted for operation by application of a predetermined electric potential across the ends thereof, said body member comprising:
a. an elongated member principally comprising sintered refractory oxide which in a pure state appears generally light in color;
b. discrete refractory metal particles dispersed throughout said oxide in amount of from about 8 volume percent to about 20 volume percent of said member, and said member as initially sintered during fabrication thereof having sufficient resistivity that said member will not self-resistance heat to a condition of incandescence upon application of said predetermined electric potential across the ends thereof;
c. said member having been further processed after being initially sintered by heating said member under non-reactive conditions to a temperature of at least about 1400° C while simultaneously placing said member within the influence of an electric field having an intensity of at least about 5 volts/mm but insufficient to cause said member to fracture; and
d. said simultaneously heating and application of said field causing said discrete metal particles to have therebe-

tween sufficient electrical continuity to enable said member to be self-resistance heated to an incandescent state upon application of said predetermined electric potential across the ends thereof.

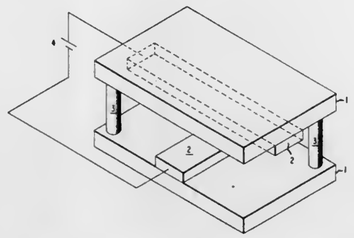
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**4,016,447**

## DIELECTRIC SUBSTRATE BEARING NICKEL BORIDE CONDUCTOR

**Frank Knowles Patterson, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Division of Ser. No. 523,473, Nov. 13, 1974, Pat. No. 3,943,168. This application Aug. 8, 1975, Ser. No. 603,168**
**Int. Cl.² H01J** *61/06*
**U.S. Cl. 313—218** **7 Claims**



1. A dielectric substrate having adherent thereto a sintered composition of finely divided inorganic powder comprising one or more nickel compounds having an overall approximate composition of

$$(Ni_3B)_a(Ni_5Si)_b$$

wherein the sum of a plus *b* is one,
*a* is in the range ⅓ to 1, and
*b* is in the range 0 to ⅔.

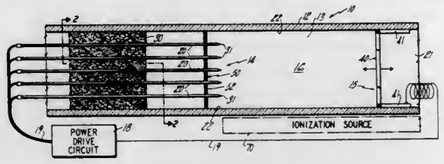
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**4,016,448**

## HIGH POWER ELECTRIC DISCHARGE METHOD AND APPARATUS FOR LASER CHEMICAL SYNTHESIS AND OTHER APPLICATIONS

**William L. Nighan, Manchester, and Walter J. Wiegand, Glastonbury, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.**

**Filed Nov. 26, 1975, Ser. No. 635,318**
**Int. Cl.² H01J** *61/28*; **H01S** *3/00*
**U.S. Cl. 313—231** **18 Claims**




1. In a convective electric discharge device having a gas convection channel with a gas passageway for the flow of gas in one direction therethrough and plasma generating means for extablishing a gas plasma in an electric discharge region of the gas passsageway, the improvement wherein the plasma generating means comprises a gas pervious cellular baffle extending transversely across substantially the entire gas passageway upstream of the electric discharge region for producing, immediately downstream thereof, a substantially uniform gas velocity profile, and turbulence generator means downstream of the cellular baffle and upstream of the electric discharge region and operable to convert said substantially uniform gas velocity profile to an approximately isotropic and uniform turbulent gas flow in the electric discharge region.

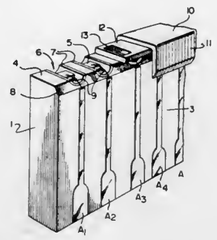
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**4,016,449**

## LIGHT EMITTING DIODE DISPLAY

**Geoffrey N. Gale, Aylmer; Edwin Denis Colbourne, Carp, and Michael J. Hollins, Ottawa, all of Canada, assignors to Bowmar Canada Limited, Ottawa, Canada**

**Filed May 19, 1975, Ser. No. 578,600**
**Claims priority, application Canada, Feb. 28, 1975, 221026**
**Int. Cl.² A47B** *88/00*, *95/00*
**U.S. Cl. 313—500** **5 Claims**



1. A display device for displaying signals in response to an external electrical circuit to which it is connected, said device comprising a thin, relatively stiff substrate which has two opposed major faces which are normal to a display face defined by an elongate and substantially planar thin edge of the substrate, a plurality of light emitting diodes positioned in spaced relationship along said display face, an electrical cathode and anode conductor pattern on at least one of said major faces having first common ends terminating proximate said display face and second common ends terminating proximate a thin edge of the substrate other than said display face and wherein said first conductor ends are in electrical interconnection with said light emitting diodes so as to energize at least selected ones of said light emitting diodes in response to said external electrical circuit.

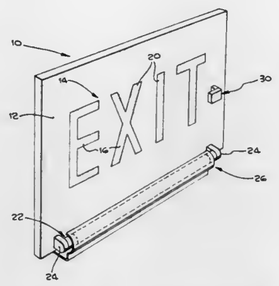
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**4,016,450**

## PHOSPHORESCENT DISPLAY SYSTEM

**Garbis S. Balekjian, P.O. Box 749, Burbank, Calif. 91503**

**Filed Jan. 8, 1976, Ser. No. 647,586**
**Int. Cl.² H05B** *37/02*
**U.S. Cl. 315—149** **7 Claims**




1. A phosphorescent display system comprising:
a phosphor material;
a source of activating radiation in operative relation with said material;
a power supply for energizing said source;
selectively actuatable control means for momentarily operatively connecting the power supply to said source;
and sensor means responsive to the luminosity of the phosphor material for actuating the control means.

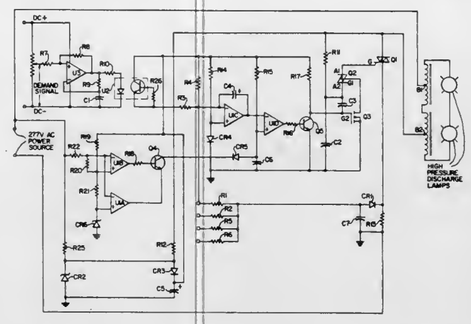


**4,016,451**

## HIGH PRESSURE DISCHARGE LAMP DIMMING CIRCUIT UTILIZING VARIABLE DUTY-CYCLE PHOTOCOUPLER

**Joseph C. Engel, Monroeville, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed Mar. 13, 1975, Ser. No. 558,109**
**Int. Cl.² H05B** *37/02*
**U.S. Cl. 315—158** **4 Claims**




1. A lighting control apparatus to provide variable intensity light from a high-pressure discharge lamp load utilizing a photocoupler actuated by a variable duty-cycle circuit which varies the ON time of an LED in response to an externally generated electrical demand signal, said apparatus comprising:
a. power control means having a signal input, a power input, and a power output, said power input being adapted to be connected to a source of AC power;
b. ballasting means having an input and an output, said ballasting means input being connected to said power control means output;
c. a discharge lamp load, said discharge lamp load being connected to the output of said ballasting means;
d. variable duty-cycle circuit means having an input and an output, said demand signal adapted to be applied to the input of said variable duty-cycle circuit means; and
e. LED-photoresistor means for providing electrical isolation between said applied demand signal and said power control means, said LED-photoresistor means having an input and an output, said LED-photoresistor means input being connected to said variable duty-cycle circuit means output to cause said LED to be ON a percentage of the time which is proportional to the value of said demand signal, and said LED-photoresistor means output being connected to said signal input of said power control means.

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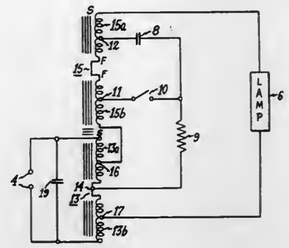
**4,016,452**

## LAMP BALLAST CIRCUIT

**Candler A. Willis, Zirconia, N.C., assignor to General Electric Company, New York, N.Y.**

**Filed Jan. 14, 1975, Ser. No. 540,881**
**Int. Cl.² H05B** *41/231*
**U.S. Cl. 315—278** **18 Claims**

1. A starting and operating circuit for gaseous discharge lamps comprising, in combination, a source of alternating current, ballasting means connected at its input side to said alternating current source, discharge lamp means connected to the output side of said ballasting means, said ballasting means comprising a pair of series connected coils each having a plurality of turns, and high voltage starting means having a series discharge loop including a predetermined number of




turns of each of said coils for providing high voltage, high frequency starting pulses on said discharge lamp means.

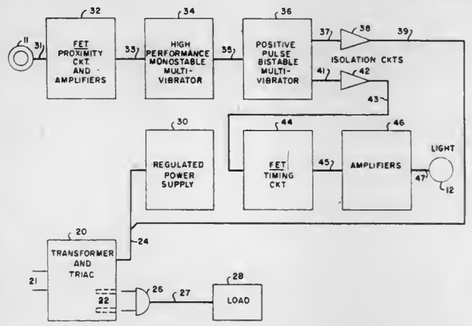
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**4,016,453**

## PROXIMITY PAD WITH CONTROLLED ILLUMINATION

**Herald Richard Moennig, 716 Inverrary Lane, Deerfield, Ill. 60015**

**Filed Mar. 15, 1976, Ser. No. 667,114**
**Int. Cl.² H05B** *37/02*, *39/06*
**U.S. Cl. 315—312** **9 Claims**




1. Apparatus comprising a control unit and a load switching unit; said load switching unit including a switching device coupled between an electric source and a load, and a control lead to the switching device from the control unit; said control unit comprising a metal touch element, an electric light, and control circuits; said control circuits having an input connection from the metal element, a first output connection to the electric light, and a second output connection to said control lead; means for normally supplying current to the electric light to energize it for a low level of illumination; means actuated each time said metal touch element is touched for changing a signal at the second output connection to switch said switching device between on and off to thereby alternately energize and de-energize the load; and means effective when the switching device is switched to off for supplying current via said first output connection to energize said electric light to a high level of illumination and to return it to the low level after a predetermined interval of time.

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**4,016,454**

## THREE LARGE SIGNAL DEFLECTION SYSTEM

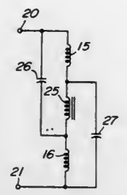
**Jacek Antoni Persidok, Addison, Ill., assignor to Motorola, Inc., Schaumburg, Ill.**

**Filed May 2, 1975, Ser. No. 574,065**
**Int. Cl.² H01J** *29/70*
**U.S. Cl. 315—409** **6 Claims**

6. In a deflection system for controlling the position of the electron beam on the face of a cathode ray tube including a relatively low frequency deflection signal for moving the beam in substantially equal steps across the face in a predetermined

direction and a relatively high frequency deflection signal for moving the beam linearly in the predetermined direction a distance less than the distance between the equal steps, the improvement comprising:

a. a pair of deflection coils interconnected and adapted to receive the high and low frequency deflection signals thereacross; and




b. inductance means electrically interposed between said deflection coils and capacitance means connected in parallel with said inductance and a respective one of said deflection coils so as to electrically connect said deflection coils in series for low frequency deflection signal operation and in parallel for high frequency deflection signal operation.

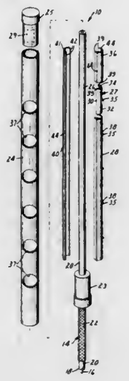
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**4,016,455**

## STATIC ELIMINATOR

**Robert W. Christiansen, Amery, Wis., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

**Filed Oct. 22, 1975, Ser. No. 624,940**
**Int. Cl.² H01T** *19/04*
**U.S. Cl. 361—222** **7 Claims**



1. A static eliminator comprising:

a cable including a central conductor adapted for connection to a source of alternating high potential and a thick cylindrical insulating sleeve around the conductor;

a plurality of conductive members each including an elongate thin walled channel generally half-cylindrical in cross section, said channel having an outer surface, an inner surface conforming to the outer surface of said insulating sleeve, opposed axially extending edges along junctures of said inner and outer surfaces which edges are spaced to afford free movement of the inner surface of the channel into engagement with the cable in a direction radial of said cable, and a needle connected to said channel and projecting outwardly from said outer surface, said needle being disposed to project generally radially away from said cable when the inner surface of said member is disposed against said insulating sleeve; and

an elongate clip formed of a flexible resilient electrically insulating material having a curved wall generally C-shaped in cross section, said curved wall having axially spaced openings adapted to receive the needles of said conductive members with said channels spaced axially along the clip, and said clip being positioned over the channels of said conductive members with said needles in said openings and over said cable with the opposed ends of said wall in engagement with said cable to releasably retain said clip and said conductive members in spaced relationship axially along said cable with the inner surfaces of said conductive members contacting the outer surface of said insulating sleeve.

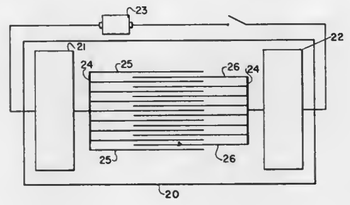
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**4,016,456**

## MULTIELECTRODE GRID FOR ALIGNING POLARIZED PARTICLES SUCH AS ASBESTOS

**Laverne S. Birks, Potomac, Md., and Mohammad Fatemi, Mc Lean, Va., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Sept. 5, 1975, Ser. No. 610,729**
**Int. Cl.² H02N** *13/00*
**U.S. Cl. 361—288** **1 Claim**




1. A multi-electrode assembly for aligning polarizable particles in a dielectric medium parallel with each other and in parallel rows which comprises:

a quartz base having a top surface;

first and second spaced conductors on top of said base surface;

a pair of spaced parallel-feed conductors on top of said base surface in parallel alignment with said first and second spaced conductors and electrically connected thereto; and

a plurality of parallel interspaced chromium electrodes on top of said base surface secured at one end to alternately to one each of said pair of parallel-feed conductors perpendicular thereto with their non-connected ends spaced from said feed conductor to which they are not connected,

said chromium electrodes having a width of substantially from 40–80 $\mu$m; a thickness of substantially from 800–2000 Angstroms and spacing between adjacent conductors of substantially 0.80 mm.

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**4,016,457**

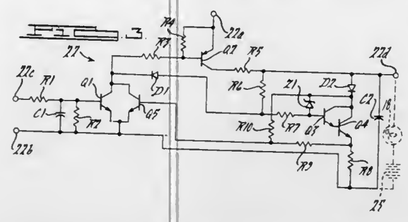
## FAILSAFE SYSTEM FOR SKID CONTROL SYSTEMS AND THE LIKE

**John S. Frait, Ann Arbor, Mich., assignor to Kelsey-Hayes Company, Romulus, Mich.**

**Division of Ser. No. 408,104, Oct. 19, 1973, Pat. No. 3,891,279. This application Apr. 10, 1975, Ser. No. 566,767**
**Int. Cl.² H02H** *3/24*
**U.S. Cl. 361—49** **6 Claims**

1. A failsafe circuit means comprising an input terminal, an output terminal, and a pair of supply terminals for respectively receiving from a single source a supply potential and a ground potential, means forming an input circuit operatively coupled with said input terminal and one of said pair of supply terminals, means forming an output circuit operatively coupled with said output terminal and the other of said pair of supply terminals, said input circuit comprising first normally conductive electronic switch means that is rendered non-conductive in response to the absence of either an input signal normally applied to said input terminal or the respective potential normally present at said one supply terminal, said output circuit means comprising a second normally conductive electronic switch means and a voltage dividing means, means operatively coupling said input circuit and said output circuit such that





said second electronic switch means is rendered non-conductive whenever either said first electronic switch means is rendered nonconductive or in response to the absence of the respective potential normally present at said other supply terminal, said voltage dividing means being operatively coupled with said output terminal for supplying at said output terminal an output signal which is a fraction of said supply potential whenever both of said electronic switch means are conducting.

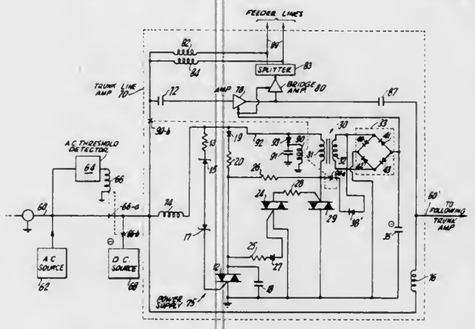
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**4,016,458**

## RADIO FREQUENCY DISTRIBUTION NETWORK STANDBY POWER SYSTEM WITH OVERVOLTAGE PROTECTION

**Norman Everhart, Richboro, Pa., assignor to Jerrold Electronics Corporation, Horsham, Pa.**

**Continuation-in-part of Ser. No. 543,452, Jan. 23, 1975, Pat. No. 3,979,644. This application Jan. 28, 1976, Ser. No. 653,088**
**Int. Cl.² H02H** *9/04*
**U.S. Cl. 361—52** **18 Claims**




1. In combination, a transformer including primary and secondary windings, controlled bidirectional switch means connected to one terminal of said transformer primary winding, rectifier means connected to said transformer secondary winding, first and second circuit terminals adapted for connection to an energy source, means for quiescently biasing said controlled bidirectional switch means to a conductive state, means responsive to the AC potential obtaining between said first and second energy receiving circuit terminals exceeding predetermined upper and lower bounds for disabling conduction in said bidirectional controlled switch means, and coupling means connected to the junction between said transformer primary winding and said controlled bidirectional switch means for supplying potential to said rectifier means when an AC overvoltage or a DC voltage condition is present between said first and second terminals.

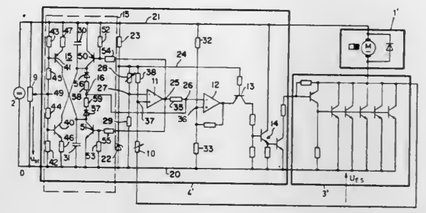
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**4,016,459**

## PROTECTIVE SYSTEM FOR INTERMITTENTLY OPERATING SEMICONDUCTOR SWITCH

**Andreas Boehringer, Stuttgart, Germany, assignor to Robert Bosch G.m.b.H., Stuttgart, Germany**

**Filed Aug. 12, 1975, Ser. No. 604,007**
**Int. Cl.² H02H** *3/20*
**U.S. Cl. 361—88** **18 Claims**



1. Protective system for an intermittently operating semiconductor switch (**3**), said switch comprising

an astable circuit means (**9, 15**) generating a cyclical ON-OFF control signal having a predetermined duty cycle and including a timing circuit (**30, 40; 42, 44, 46**) having a minimum OFF time and determining the OFF time of the control signal;

the controlled semiconductor switch (**3**) being connected to and controlled by said control signal generating means, and having its switching state controlled thereby;

said system comprising

a malfunction detection circuit generating a malfunction signal ($U_{ES}$);

and a supervisory protective circuit (**10, 11, 27, 37, 25, 35, 26**) controlled by said malfunction detection signal ($U_{ES}$) and having its output connected to, the timing circuit (**30, 40; 42, 44, 46**) to initate an OFF timing interval of at least said minimum OFF time duration determined by the timing circuit, and hence interrupt the ON control from said control signal generating means (**15**) to the controlled semiconductor switch (**3**) and providing, instead, an instantaneous OFF control signal to the controlled semiconductor switch (**3**), said minimum OFF timing interval being selectable independently of the ON-OFF timing of said cylical ON-OFF control signal generated by the astable circuit means; said astable circuit means (**9, 15**) generating the cyclical ON-OFF control signal reverting to the ON state elapse of at least the minimum OFF time interval controlled by the timing circuit thereof.

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**4,016,460**

## ELECTRONIC PROTECTION FOR POWER AMPLIFIER

**Bertold Stadler, 49 Angelhof, 6901 Wilhelmsfeld near Heidelberg, Germany**

**Filed Feb. 4, 1975, Ser. No. 546,871**
**Int. Cl.² H02H** *7/20*
**U.S. Cl. 330—207 P** **6 Claims**

1. An overload protection circuit for a power amplifier (**6**) having an input terminal and an output terminal, supply means (**2**) for supplying an input signal to said amplifier input terminal, a load (**22**), and means (**7–10**) for connecting said amplifier output terminal with said load, said overload protection circuit comprising

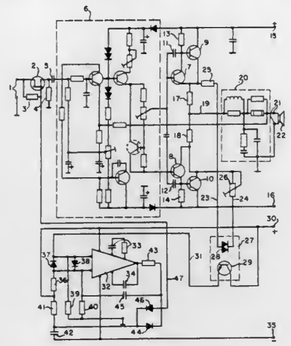
a. bistable means (**32**) operable alternately between a normal first condition and a second condition, said bistable means including a pair of input terminals and an output terminal;

b. means (**36**) for supplying a reference voltage to one input terminal of said bistable means;

c. transducer means (**27**) for supplying to the other input terminal of said bistable means a control voltage that is a function of the output voltage of said power amplifier,

said bistable means being tripped from said first condition to said second condition when said power amplifier output signal exceeds a predetermined value;

d. means (**47**) for connecting the output terminal of said bistable means with said input signal supply means, said bistable means being operable in said second condition to temporarily deactivate said input signal supply means and



thereby eliminate the overload condition appearing at the output terminal of said power amplifier, whereby said bistable means is tripped back to its first condition; and

e. timing means (**42**) for maintaining the input signal supply means (**2**) in the deactivated condition for a given period of time after the bistable means has been tripped back to it first condition.

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**4,016,461**

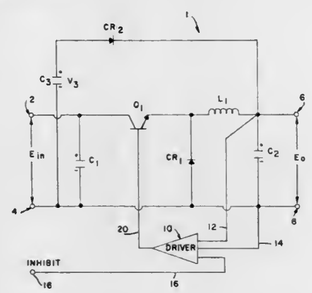
**STARTING CIRCUIT FOR SWITCHING REGULATOR**

**John Thomas Roland, Manheim, Pa., assignor to AMP Incorporated, Harrisburg, Pa.**

**Filed May 6, 1976, Ser. No. 683,971**

**Int. Cl.² G05F** *1/58*

**U.S. Cl. 361—18** **2 Claims**




**1.** In a switching regulator for controlled output voltage having an input for unregulated DC and a switching transistor connected between a charging capacitor and an output load capacitor, the improvement comprising:

an energy storing capacitor in parallel with both said charging capacitor and said switching transistor, and

a rectifier between said energy storing capacitor and said output load capacitor, whereby the energy dissipated from said charging capacitor through said switching transistor is lessened by the energy dissipated from said energy storing capacitor directly to said output load capacitor upon turn-on of said switching transistor.

**4,016,462**

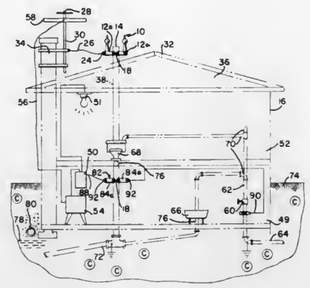
**BUILDING LIGHTNING PROTECTION SYSTEM**

**William Pavliny, 4722 N. Delphia Ave., Chicago, Ill. 60656**

**Filed Dec. 18, 1975, Ser. No. 641,881**

**Int. Cl.² H02H** *3/22*

**U.S. Cl. 361—117** **10 Claims**



**1.** In a roof-covered building with inside plumbing including a waste piping system, said system comprising a vent stack leading from within an upper portion of the building toward the roof and having a projecting end section extending through an opening in the roof from therebelow to an outside point above the roof, a soil pipe at the building site in, and forming a highly conductive ground with, the earth, and a series of interconnected waste pipes in the building between and connecting the vent stack above and the soil pipe below and completing the grounded waste piping system:

the combination with the waste piping system, of electrically conductive lightning prevention means supported in conductive relation on the projecting end section of the vent stack, the first said means including a charge-accumulating ball, conductive bracket means connecting the first said means to the stack projecting end section, and a generally upright sharp pointed, space discharge electrode atop the ball.

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**4,016,463**

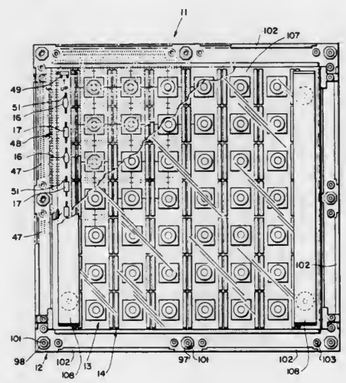
**HIGH DENSITY MULTILAYER PRINTED CIRCUIT CARD ASSEMBLY AND METHOD**

**Robert J. Beall, San Jose; Fred K. Buelow, Los Altos, and John J. Zasio, Sunnyvale, all of Calif., assignors to Amdahl Corporation, Sunnyvale, Calif.**

**Filed Oct. 17, 1973, Ser. No. 407,181**

**Int. Cl.² H02B** *1/00*

**U.S. Cl. 361—383** **4 Claims**



**1.** In a high density multi-layer printed circuit card assembly, a plurality of layers of insulating material, a plurality of spaced layers of conducting metal carried by said layers of insulating material, said layers of insulating material and said layers of conducting metal being laminated to form a card having first and second parallel planar major outer surfaces, said layers of metal having predetermined patterns, said card having a plurality of plated through holes extending through said card, said layers of conducting metal having portions in electrical contact with said plated through holes, one of said layers of conducting metal being disposed on said first major surface and serving as the component side of the card, another of said layers of conducting metal being disposed on said second major surface and serving as the wire bonding side of the card, said layer of conducting metal on the component side being formed with contact pads electrically connected to said plated through holes, a plurality of LSI chip carriers, each of said LSI chip carriers having signal, voltage and ground leads extending outwardly therefrom in a predetermined pattern and having their outer extremities lying in a plane, said layer of conducting metal on the component side also being formed with a plurality of signal, voltage and the ground pads arranged in predetermined patterns corresponding to the predetermined pattern of the outer extremities of the leads of the LSI chip carriers, said layer of conducting metal on the component side including connecting links for connecting the signal, voltage and ground pads to the contact pads, means connecting the leads of the LSI chip carriers to said signal, voltage and ground pads with the LSI chip carriers lying in a plane generally parallel to the card, said LSI chip carriers having cooling studs extending outwardly therefrom in a direction perpendicular to and away from the plane of the card, said LSI chip carriers being mounted in spaced parallel rows, a plurality of resistor packs mounted on said card in spaced parallel rows between said LSI chip carriers, and a cover secured to said card and overlying the component side of the card to provide an air channel between the card and the cover for the passage of air over the LSI chip carriers and the resistor packs in a direction parallel to the rows of LSI chip carriers and resistor packs wiring separate from the layers of metal carried by the card on the wire bonding side of the card for electrically interconnecting certain of the contact pads and serving to interconnect the LSI chip carrier into operative circuitry.



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**4,016,464**

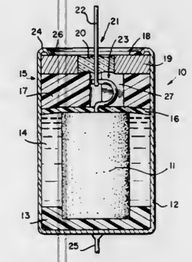
**ANODE RISER MEANS FOR A CAPACITOR**

**Gerald A. Voyles, and Paul S. Deak, both of Indianapolis, Ind., assignors to P. R. Mallory & Co., Inc., Indianapolis, Ind.**

**Continuation of Ser. No. 502,201, Aug. 30, 1974, abandoned. This application Apr. 5, 1976, Ser. No. 674,203**

**Int. Cl.² H01G** *9/00*

**U.S. Cl. 361—433** **5 Claims**



**1.** A capcitor comprising a housing having an open end, a sintered dielectric oxide film-forming metal anode means having a myriad of intercommunicating voids, a liquid type electrolyte contacting the anode means, rigid means closing the open end of the housing and edges of the housing compressively acting on the rigid means and thereby on the anode means, resilient means interposed between the anode means and the rigid means, surfaces of the resilient means contacting the anode means and the rigid means to help maintain the anode means in the fixed spatial relationship relative to the housing, and anode riser means capable of absorbing compressive forces projecting through the resilient means, the anode riser means having two distal ends and comprising at least one continuous length of metal and at least a portion of at least one length in the shape of a bight, the first distal end of the anode riser means in electrical contact with the anode means and the second distal end providing means for external termination of the anode means.

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**4,016,465**

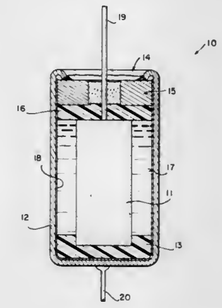
**CATHODE ELECTRODE FOR AN ELECTROLYTIC CAPACITOR AND METHOD OF MAKING SAME**

**Charles W. Walters, Indianapolis, Ind., assignor to P. R. Mallory & Co., Inc., Indianapolis, Ind.**

**Continuation of Ser. No. 495,570, Aug. 8, 1974, abandoned. This application Apr. 30, 1976, Ser. No. 681,924**

**Int. Cl.² H01G** *9/00*

**U.S. Cl. 361—433** **9 Claims**



**1.** A capacitor comprising an anode electrode, cathode electrode, and dielectric means between the anode electrode and the cathode electrode, the cathode electrode including a surface containing Cu contacted by at least semi-liquid electrolyte, and a composition on the cathode electrode surface containing at least one compound selected from the group of copper selenide, copper telluride and copper sulfide.

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**4,016,466**

**SUBMINIATURIZED ADJUSTABLE CAPACITOR**

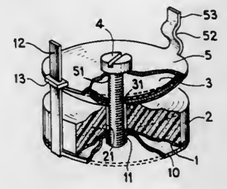
**Pierre Frappart, Montreuil-Sous-Bois, France, assignor to L.C.C.-C.I.C.E.-Compagnie Europeenne de Composants Electroniques, Paris, France**

**Filed Mar. 25, 1975, Ser. No. 561,703**

**Claims priority, application France, Mar. 29, 1974, 74.11330**

**Int. Cl.² H01G** *5/22*

**U.S. Cl. 361—278** **7 Claims**



**1.** A subminiaturized adjustable capacitor comprising:

a first electrode having a fixed non-deformable surface;

a dielectric superimposed on the first electrode;

a second electrode having a conductive mass composed at least partially of a non-metallic elastic material, the conductive mass being provided with a resilient reinforcement and with only a portion of the conductive mass being in contact with the dielectric at the minimum capacitive value;

adjuster means for controllably applying pressure to progressively deform the conductive mass of the second electrode and bring larger portions thereof into contact with the dielectric, whereby the capacitance of the capacitor can be made to vary continuously between a minimum value and a maximum value; and

a movable non-deformable plate separated from the first electrode by the dielectric and the second electrode and responsive to the controllable application of pressure by the adjuster means for movement in a direction perpendicular to the fixed non-deformable surface of the first electrode.

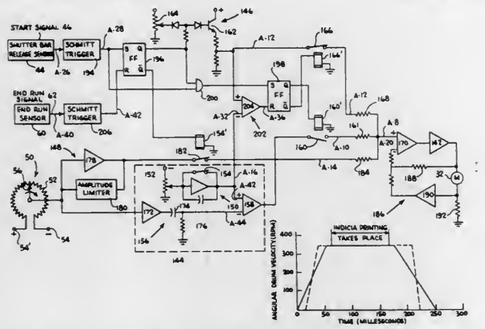
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**4,016,467**

## SERVODRIVE APPARATUS FOR DRIVING THE POSTAGE PRINTING DRUM IN A POSTAGE METER

**Richard A. Hallenbeck, Wilton, Conn., assignor to Pitney-Bowes, Inc., Stamford, Conn.**

**Filed Mar. 10, 1975, Ser. No. 556,711**
**Int. Cl.² B41F *13/24*; H02P *5/06***
**U.S. Cl. 318—604** **19 Claims**




1. In a postage meter having a postage printing drum mounted for rotation from and to a home position in single revolution increments and means for transporting individual pieces of mail, each at substantially the same speed with respect to each other, said pieces of mail being delivered into operative engagement with the incrementally rotating drum to be printed with postage at a fixed location on each of said pieces of mail, a servodrive apparatus for driving the drum and for controlling the angular velocity of the drum to be substantially equal to a preset angular velocity, said servodrive apparatus comprising:

drive means for driving the printing drum;

sensing means for sensing the angular displacement of the drum and for producing a signal proportional to the developed angular velocity;

a signal generator for producing a signal proportional to the preset angular velocity;

a comparator for receiving the signals of the signal generator and said sensing means for sensing the angular displacement of the drum and for producing a signal proportional to the developed angular velocity;

a comparator for comparing the sensed angular velocity of the drum and the preset angular velocity; and

control means operatively connected and responsive to said drum substantially at the preset angular velocity.

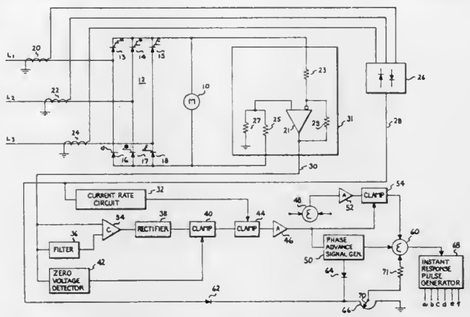
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**4,016,468**

## CONTROLLED RECTIFIER MOTOR DRIVE SYSTEM INCLUDING D.C. FAULT DETECTION AND COMMUTATION MEANS

**Carlton E. Graf, Erie, Pa., assignor to General Electric Company, Erie, Pa.**

**Filed Mar. 18, 1975, Ser. No. 559,612**
**Int. Cl.² H02K *23/66***
**U.S. Cl. 318—434** **10 Claims**




1. In a motor control system of the type in which a d.c. motor is supplied with power from an a.c. source by way of a rectifier bridge the individual rectifiers of which are rendered conductive in a prescribed sequence and at controllable times, means for detecting the existence of an improperly conducting rectifier and for providing remedial action with respect thereto comprising:

a. means for providing a first control signal in response to a substantial difference between the value of the output voltage of the bridge and the counter electromotive force of said motor;

b. means for providing a second control signal in response to a decrease in value in the alternating current supplied to said bridge from said source;

c. means for providing a third control signal in response to the value of the motor terminal voltage being at substantially zero volts; and,

d. means responsive to said first, second and third control signals to effect a change in the time of rendering conductive at least one of the rectifiers of the bridge.

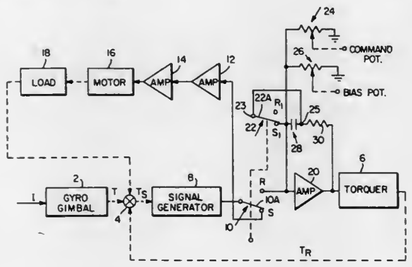
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**4,016,469**

## SENSOR INCLUDING MEANS FOR OPERATING THE SENSOR IN RATE MEASURING AND STABILIZATION MODES

**Michael J. Lanni, Ridgewood, N.J., and John Calamera, Staten Island, N.Y., assignors to The Bendix Corporation, Teterboro, N.J.**

**Filed Dec. 17, 1974, Ser. No. 533,606**
**Int. Cl.² B64C *17/02***
**U.S. Cl. 318—590** **5 Claims**




1. A sensor system, comprising:

a sensor;



sensing means for providing a signal corresponding to a sensed condition;

first and second driving means;

the first driving means including an amplifier selectively connected to the sensing means through the switching means for amplifying the signal therefrom, and a torquer connected to the amplifier and to the sensor and responsive to the amplified sensing means signal for torquing the sensor to null;

switching means connected to the sensing means and operable for selectively connecting the first and second driving means to the sensor in closed loop configuration;

the switching means including first and second ganged switches, the first switch being operable for selectively connecting the first and second driving means to the sensor, and the second switch being operable with the first switch for connecting circuit means to the amplifier for affecting operation of said amplifier; and

the circuit means including a capacitor connected to the second switch, a resistor serially connected to the capacitor and connected intermediate the amplifier and torquer, the resistor shunting out the capacitor for providing a linearized current flow when the second switch is operated with the first switch so that the second driving means is connected to the sensor in closed loop configuration, with the sensor being thereupon in the stabilization mode, and the capacitor providing a predetermined frequency response when the second switch is operated with the first switch so that the first driving means is connected to the sensor in closed loop configuration, with the sensor being thereupon in the rate measuring mode.

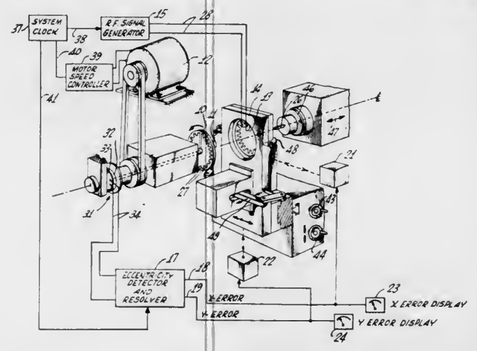
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**4,016,470**

## ELECTRICAL CENTERING AND BORING SYSTEM FOR TRANSDUCERS

**Andrew Gabor, Alamo, and Kenneth W. Cocksedge, Pleasanton, both of Calif., assignors to Xerox Corporation, Stamford, Conn.**

**Filed May 19, 1975, Ser. No. 578,454**
**Int. Cl.² B23B *49/00*; H02K *15/16***
**U.S. Cl. 318—606** **30 Claims**




1. A method of generating a signal indicative of the eccentricity of an angular position transducer element, comprising the steps of:

placing a blank transducer element in an operative relationship with a master transducer element;

rotating one of the transducer elements with respect to the other about an axis of relative rotation, the master element being deliberately eccentric with respect to the axis of relation rotation;

energizing one of the transducer elements and thereby inducing a corresponding signal in the other; and

processing the induced signal to derive therefrom an error signal indicative of the eccentricity of the blank element with respect to the axis of relative rotation.

11. Apparatus for electrically locating the center of an angular position transducer element for subsequent boring, said apparatus comprising:

means for holding a blank transducer element to be bored and a master transducer element in an operative relationship with each other;

means for rotating one of the transducer elements with respect to the other at a constant speed about an axis of relative rotation, the master transducer element being deliberately eccentric with respect to the axis of rotation;

signal generation means coupled with one of the transducer elements thereby to produce an induced signal in the other;

signal processing means couple to receive the induced signal, for deriving therefrom an eccentricity error signal indicative of any eccentricity of the blank transducer element with respect to the axis of relative rotation;

error signal resolution means for resolving the derived error signal into orthogonally related components; and

means for moving the blank transducer element in orthogonally related axes perpendicular to the axis of relative rotation until the resolved components of the error signal are zero and the blank element is therefore concentric with the axis of relative rotation.

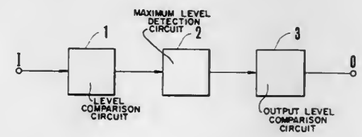
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**4,016,471**

## LEVEL DETECTION SYSTEM HAVING A BAND-PASS CHARACTERISTIC AND A SERVO SYSTEM INCLUDING THE SAME

**Seiichi Matsumoto, Yokohama, and Kazuya Hosoe, Machida, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed May 6, 1974, Ser. No. 467,578**
**Claims priority, application Japan, May 11, 1973, 48-52217**
**Int. Cl.² G05B *11/01***
**U.S. Cl. 318—629** **11 Claims**




1. A servo control system of the type in which a signal of a recurrence frequency from an input circuit, such as a modulating signal after being demodulated to obtain a signal of the same recurrence frequency is supplied to a servo system including a servo motor, thereupon said servo system being made operative, said servo control system comprising: a level comparison circuit having an input to receive said recurrence frequency signal and reference signal and also having an output;

wide-band filter means coupled electrically to the output of the comparison circuit, the filter means having a characteristic for passing therethrough a signal of the recurrence frequency and its side-band frequencies;

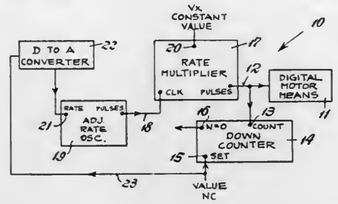
control circuit means coupled to the filter means for producing a control signal for regulating the servo motor, the circuit means having an output of a predetermined saturation characteristic;

whereby the signal from the comparison circuit is changed through the filter means into the control signal for regulating the motor.

**4,016,472**
## NON-LINEAR VELOCITY CHANGE CIRCUIT FOR CONSECUTIVE LENGTH COMMANDED DIGITAL MOTOR MEANS

**Albert C. Leenhouts, Harwinton, Conn., assignor to The Superior Electric Company, Bristol, Conn.**

**Filed Jan. 17, 1975, Ser. No. 542,057**
**Int. Cl.² G05B** *79/40*
**U.S. Cl. 318—696** **8 Claims**



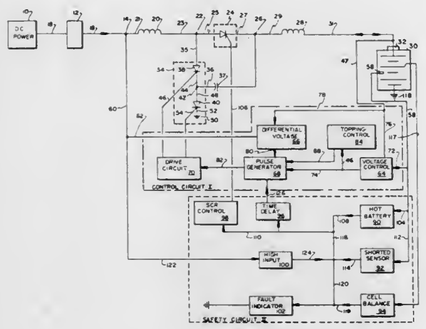

**1.** In a motion control system for producing a movement consisting of a plurality of successive lengths with there being a command for each length that includes the extent of the length as defined by the number of steps therein, comprising means for receiving the command and producing essentially the number of motor pulses corresponding to the extent at a somewhat constant rate, said command containing information only relating to the extent of the length and digital motor means for receiving the motor pulses and producing a movement corresponding thereto, the improvement comprising non-linear velocity change means including pulse rate setting means for setting the rate of the motor pulses in a length and pulse rate controlling means connected to the pulse rate setting means for receiving information of the number of pulses in a length and setting the rate of the pulses in the length in accordance with the extent of the length.

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**4,016,473**
## DC POWERED CAPACITIVE PULSE CHARGE AND PULSE DISCHARGE BATTERY CHARGER

**William Newman, Salt Lake City, Utah, assignor to Utah Research & Development Co., Inc., Salt Lake City, Utah**

**Filed Nov. 6, 1975, Ser. No. 629,285**
**Int. Cl.² H02J** *7/00*
**U.S. Cl. 320—14** **10 Claims**




**1.** A battery charger comprising:
power connector means for removable conductive connection to an external source of direct current power;
a first node conductively connected to said power connector to receive and transmit electrical energy;
a first inductor to receive, store and transmit received and stored electrical energy having an input conductively connected to said first node and an output;
a second node conductively connected to said output of said first inductor to receive and transmit electrical energy;
first switching means having an output and an input which is conductively connected to said second node, and having a first state in which said switching means is conductive to receive and transmit electrical energy received from said second node and a second state in which said switching means is nonconductive to not transmit electrical energy, said switching means automatically switching between said first state and said second state in accordance with preselected electrical signals, sensed by said switching means;
a third node conductively connected to said output of said first switching means to receive and transmit electrical energy;
a second inductor to receive, store and transmit received and stored electrical energy having an input conductively connected to said third node and having an output;
output connector means conductively connected to said output of said second inductor which is removably conductively connectable to a battery to be charged to receive and transmit electrical energy;
a capacitor conductively connected to said third node to receive, store and transmit electrical energy;
second switching means conductively connected to said capacitor and to said second node to switch said capacitor between a series circuit and parallel circuit configuration with respect to said first and second inductors;
temperature sensing means positioned to sense the temperature of the battery to be charged and generate an electrical signal reflective of said temperature;
control means conductively connected to said first node to receive electrical energy therefrom, to said temperature sensing means to receive said temperature reflective electrical signal therefrom, to said battery to receive an electrical signal reflective of the voltage across said battery, and to said second switching means to supply control signals thereto, said control means generating said control signals to repetitiously cause said capacitor to be first charged in parallel circuit through said first switching means and discharged in series with said first and second inductors to pulse charge said battery to be charged and thereafter cause a brief pulse discharge of said battery, the repetition rate of said charge and discharge pulses varying based on the state of charge of the battery to be charged as determined by said control means from the battery voltage signal and temperature reflective signal.

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**4,016,474**
## CIRCUIT FOR CONTROLLING THE CHARGING CURRENT SUPPLIED TO A PLURALITY OF BATTERY LOADS IN ACCORDANCE WITH A PREDETERMINED PROGRAM

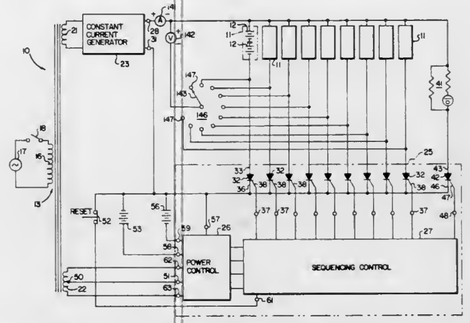
**William B. Mason, Arlington, Tex., assignor to ECC Corporation, Euless, Tex.**

**Filed Apr. 25, 1975, Ser. No. 571,535**
**Int. Cl.² H02J** *7/00*
**U.S. Cl. 320—15** **9 Claims**

**1.** In a circuit for controlling the charging current applied to a plurality of battery loads in accordance with a predetermined program including first and second terminals for connection to a current source, means for connecting one side of each of a plurality of battery loads to said first terminal and a program sequencer for selectively connecting the other side of each of said battery loads to the second terminal, the improvement wherein said program sequencer comprises:
a plurality of controlled switching devices each having first and second power electrodes and a control electrode, said first power electrode of each of said control switching devices for connecting to the other side of a corresponding battery load;
means connecting said second power electrode of said controlled switching devices to said second terminal;



programmable control means coupled to the control electrodes of said controlled switching devices for selectively impressing a triggering potential on each controlled switching device for a first predetermined time in a predetermined sequence and for repeating said sequence after a second predetermined time, said programmable control means including:
counter means having an input and a plurality of outputs exceeding the number of loads by unity and responsive to successive pulses at said input for consecutively actuating said outputs in a predetermined sequence;



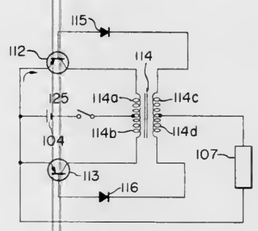

means coupling each of said controlled electrodes of said plurality of controlled switching devices to a corresponding one of a like plurality of consecutively actuable outputs of said counter means;
clock pulse generating means coupled to the input of said counter means for consecutively actuating the outputs of said counter means and including means responsive to the remaining output of said counter means for controlling the duration of the output pulses of said clock pulse generating means; and
means for connecting said programmable control means to a cource of operating potential.

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**4,016,475**
## DC TO DC CONVERTER

**Hiroshi Makino, Hirakata, Japan, assignor to West Electric Company, Ltd., Japan**

**Filed Nov. 14, 1975, Ser. No. 631,873**
**Claims priority, application Japan, Nov. 19, 1974, 49-133938**
**Int. Cl.² H02M** *3/335*
**U.S. Cl. 321—2** **5 Claims**



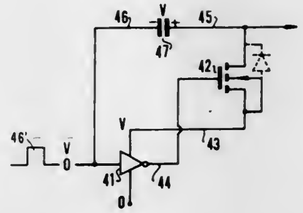

**1.** A DC to DC converter comprising:
a saturable inverter transformer having primary and secondary windings;
a push-pull oscillation circuit having a pair of transistors whose collectors are connected to opposite end terminals of the primary winding of said saturable inverter transformer respectively;
a DC source being connected between the emitters of said transistors and a midpoint of said primary winding of said saturable inverter transformer;
a condenser being connected between said secondary winding of said saturable inverter transformer and said emitters of said transistors;
a first reactance element connected in series with one terminal of the secondary winding of said saturable inverter transformer;
a resistor connected between the collector of one of said transistors and the base of the other transistor;
a first diode connected between said first reactance element and the base of one of said transistors, the easy conduction direction of said first diode being towards one side of said condenser; and
a second diode connected between the base of the other of said transistors and the other terminal of the secondary winding of said saturable inverter transformer, the easy conduction direction of said second diode being towards said one side of said condenser. (FIGS. **6** and **7**)

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**4,016,476**
## BOOSTER CIRCUITS

**Shigeru Morokawa, and Fukuo Sekiya, both of Tokorozawa, Japan, assignors to Citizen Watch Co., Ltd., Tokyo, Japan**

**Continuation of Ser. No. 397,249, Sept. 14, 1973, abandoned.**
**This application Nov. 11, 1975, Ser. No. 630,811**
**Claims priority, application Japan, Sept. 20, 1972, 47-94393; Sept. 26, 1972, 47-95751; Sept. 27, 1972, 47-96097; Oct. 5, 1972, 47-100157**
**Int. Cl.² H02M** *7/00*
**U.S. Cl. 321—15** **19 Claims**

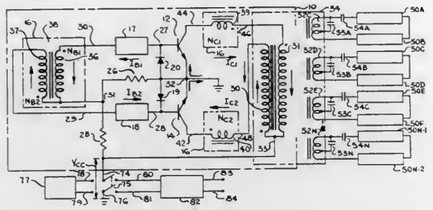



**1.** In a voltage-boosting circuit, in combinations:
input means for supplying a voltage wave alternating between a first and a second level;
a field-effect transistor provided with a semi-conductive substrate, a source electrode connected directly to said substrate, a drain electrode coupled to said substrate through a P/N junction with a predetermined threshold voltage, said drain and source electrodes being located at opposite ends of a channel region of said substrate, and a gate controlling the conductivity of said channel region;
circuit means connecting said source electrode to a point of fixed reference potential;
a first lead extending from said input means to said drain electrode for delivering said voltage wave thereto;
a series capacitor in said first lead; and
a second lead extending from said input means to said gate for delivering said voltage wave thereto in inverted relationship with the voltage wave supplied to said drain electrode through said series capacitor, the relative polarities of the voltages at said drain electrode and said gate reversing during successive alternations of said voltage wave whereby said transistor is cut off during every other alternation and conducts in the intervening alternations with resulting equalization of the voltages of said drain and source electrodes.

## 4,016,477
## NOVEL MULTI-PATH LEAKAGE TRANSFORMER AND INVERTER BALLAST

Horace Ghiringhelli, Dumont, N.J., assignor to Isodyne Inc., Nanuet, N.Y.

Filed Apr. 29, 1975, Ser. No. 572,941
Int. Cl.² H02M 7/00
U.S. Cl. 321—26 15 Claims



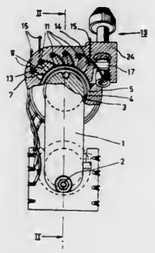
1. An inverter ballast for operating multiple electric gas discharge lamps, which comprises a power conversion circuit, and a leakage transformer having a multi-path magnetic circuit, said transformer including a primary coil operated from a single source and separate secondary coils, each said secondary coil having its own independent magnetic core circuit path and its own lamp loads.

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## 4,016,478
## HIGH-VOLTAGE TRANSFORMER

Herbert Anders; Antonius Adrianus Maria Bullens; Jan Groot; Johannes Henricus Bernardus Otten; Hendrikus Christiaan Josephus Stoof, and Carolus Leopoldus Vloemans, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Sept. 4, 1975, Ser. No. 610,447
Claims priority, application Netherlands, Sept. 5, 1974, 7411772
Int. Cl.² H02M 7/10; H01F 27/04
U.S. Cl. 321—27 R 5 Claims

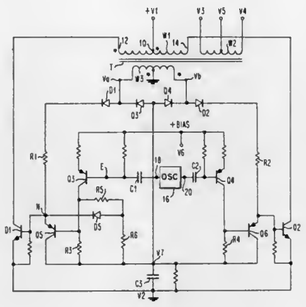


1. A high-voltage transformer comprising a ferromagnetic core, a primary winding disposed on said core, an insulating layer disposed on said winding, a secondary winding disposed on said layer, a component holder, a socket connector mounted on said holder for the output of the high-voltage to be generated, the secondary winding including a number of winding layers, insulating layers disposed between said layers, a plurality of diodes coupled between an end of the winding layer to a beginning of the subsequent winding layer respectively, all diodes being coupled in the same rectifying sense, the component holder being disposed on the secondary windings, support means being disposed on the component holders for clamping the diodes to prevent rotation about their axis, the connection wires of the diodes comprising connection pins for a part of the windings, and two tag means disposed on the component holder for clamping the connector.

## 4,016,479
## HIGH FREQUENCY POWER CONVERTER DRIVE CIRCUIT

George A. Reible, Jr., Saugerties, and George D. Sevigny, Red Hook, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 28, 1975, Ser. No. 563,239
Int. Cl.² H02M 7/537
U.S. Cl. 321—45 R 9 Claims



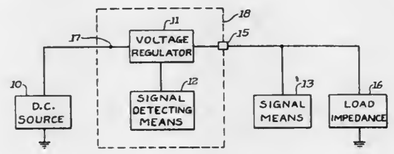
1. In a push-pull switching circuit,
a pair of conduction control means each having a controlled conduction circuit and a control input terminal,
a source of input power,
push-pull inductive means connecting said conduction control means across said source for alternative operation of said inductive means in opposite senses as one and the other of said conduction means conduct in alternation,
feedback means coupled to said inductive means to bias the first of said conduction means into conduction when the second of said conduction means turns off and to continue such bias during the continuance of conduction of said first conduction means, and vice versa,
said feedback means including means connected to block operation thereof from communicating turn-off signals to either of said control terminals,
alternating input signal means,
said coupling means adapted to communicate turn-off signals from said input signal means to said control terminals in alternation, whereby said circuit operates in push-pull oscillation at the frequency determined by said input signal means and under the power of said source.

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## 4,016,480
## DUAL FUNCTION COUPLING SYSTEM AND METHOD

Judson A. Hofmann, Schaumburg, Ill., assignor to Zenith Radio Corporation, Chicago, Ill.

Filed Mar. 4, 1974, Ser. No. 448,136
Int. Cl.² G08C 19/02; G05F 3/08
U.S. Cl. 323—8 14 Claims




11. In a signal processing system including an integrated circuit having a plurality of electronic circuit elements and a limited number of externally accessible terminals, said integrated circuit including voltage regulating means coupled to one of said terminals for maintaining a substantially constant voltage across a load impedance, the method of feeding an additional signal into said integrated circuit comprising:



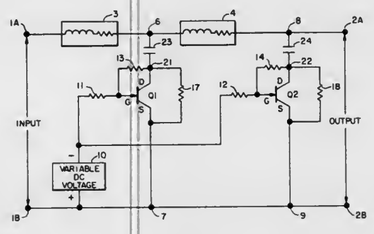
applying said signal to said one terminal and causing said voltage regulating means to make a compensating response to maintain said substantially constant load voltage; and
detecting the response of said voltage regulating means to said applied signal.

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## 4,016,481
## UNMATCHED FIELD EFFECT TRANSISTORS PROVIDING MATCHED VOLTAGE-CONTROLLED RESISTANCES

Stevan D. Bradley, East Palo Alto, Calif., assignor to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.

Filed Nov. 26, 1975, Ser. No. 635,459
Int. Cl.² H03G 3/30; H04B 1/10
U.S. Cl. 323—16 10 Claims

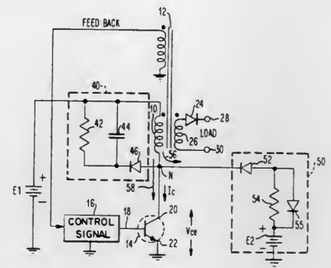



1. Apparatus providing first and second voltage-controlled resistances between associated first and second pairs of nodes thereof which are matched over a range of control voltages, comprising:
first and second field effect transistors (FET's) having gate electrodes, having drain electrodes electrically connected to first nodes of associated first and second pairs of nodes, and having source electrodes electrically connected to second nodes of associated first and second pairs of nodes, each of said FET's having a drain-to-source channel resistance that is variable as a function of a voltage that is applied across one of the gate-to-source and gate-to-drain channels thereof;
a source of DC control voltage having first and second terminals;
means electrically connecting the first terminal of said voltage source to one of the source and drain electrodes of each of said FET's and electrically connecting the second terminal of said voltage source to the gate electrode of said first FET;
a first resistor electrically connected across the channel of said second FET gate electrode and the other one of the source and drain electrodes of said second FET; and
a second resistor electrically connected between the second terminal of said voltage source and the gate electrode of said second FET, said second resistor having a resistance causing the resistances across the first and second pairs of nodes to be the same value for a prescribed common control voltage measured across the terminals of said voltage source and causing the resistance across the second pair of nodes to be substantially equal to the resistance across the first pair of nodes over a range of control voltages.

## 4,016,482
## PULSE ENERGY SUPPRESSION NETWORK

John Robert Cielo, Kingston, and John Andrew Orfitelli, New Paltz, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 31, 1975, Ser. No. 627,732
Int. Cl.² G05F 1/56; H03K 17/64
U.S. Cl. 323—17 10 Claims




1. In a switching circuit, a switch element having conducting and open circuit states,
potential means establishing current flow through said element when said element is in said conducting state,
and a clamp circuit adapted to restrain rise of potential across said switch during turnoff transition from said conducting state to said open circuit state,
said clamp comprising a diode connected in shunt across said element and poled oppositely to the direction of said current,
and bias means to establish forward current through said diode at least immediately prior to said transition, said bias means being adapted to accept recovery current from said diode as said diode is reverse biased by said potential means during said transition,
said diode having a reverse recovery time characteristic at least equal to a substantial part of said transition time whereby said diode acts as a timed clamp across said element during said transition.

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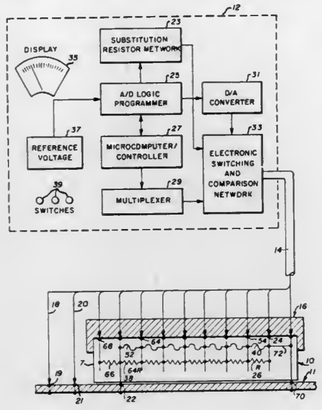
## 4,016,483
## MICROMINIATURE INTEGRATED CIRCUIT IMPEDANCE DEVICE INCLUDING WEIGHTED ELEMENTS AND CONTACTLESS SWITCHING MEANS FOR FIXING THE IMPEDANCE AT A PRESELECTED VALUE

Marvin B. Rudin, Suite R101, 555 Middlefield Road, Mount View, Calif. 94040

Continuation-in-part of Ser. No. 483,619, June 27, 1974, abandoned. This application June 9, 1975, Ser. No. 585,075
Int. Cl.² G05F 3/00
U.S. Cl. 323—74 37 Claims

1. A microminiature terminal-adjustable integrated circuit impedance device comprising:
an electrically insulating substrate;
a first input terminal and an output terminal formed on said substrate;
a plurality of impedance elements formed on said substrate and coupled together in series between said input terminal and said output terminal;
a plurality of adjustment terminals formed on said substrate, each of said adjustment terminals being respectively connected to one side of different one of said impedance elements with each side of each impedance element having an adjustment terminal connected thereto;
a plurality of electrically permanently alterable contactless voltage-responsive circuit elements formed on said substrate with each corresponding to one of said impedance elements and being connected in parallel therewith and between adjacent ones of said adjustment terminals, said

plurality of voltage-responsive circuit elements connected as aforesaid in combination with said plurality of impedance elements causing the impedance between said input terminal and said output terminal to have a first predetermined value, each said voltage-responsive circuit element normally having a first electrical characteristic and having a second electrical characteristic different




from said first electrical characteristic following the application thereacross of a predetermined voltage such that when said predetermined voltage is applied between any particular pair of said adjustment terminals, the connecting voltage-responsive circuit element is caused to assume said second electrical characteristics thereby changing the impedance between said input terminal and said output terminal to a second predetermined value.

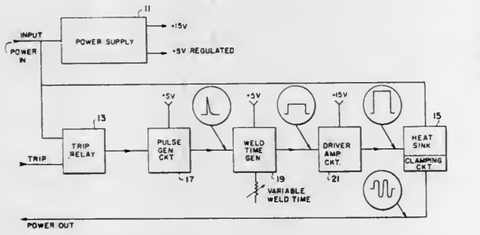
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**4,016,484**

## SOLID STATE WELD TIMER

**Reading H. Crouthamel, 742 High St., Bethlehem, Pa. 18018**

**Filed June 18, 1975, Ser. No. 587,873**
**Int. Cl.² G05F *1/56***
**U.S. Cl. 323—22 SC** **9 Claims**




1. A power control circuit for supplying a fixed duration excitation across first and second output terminals from first and second input terminals supplied with a continuous A.C. signal comprising:

conductor means for connecting said first output terminal and said first input terminal;

means for generating a trigger pulse, said means-comprising:

a single pole terminal switchable between first and second throw terminals; said pole terminal normally being connected to said first throw terminal;

trip relay means for switching said pole between said first and second throw terminals;

a capacitor connected to said pole terminal;

a resistor connected between said first throw terminal and ground;

a voltage bias source connected to said second throw terminal; and

transistor circuit means having an output terminal and connected to said capacitor for generating an output pulse at said output terminal in response to connection of said capacitor to said bias source by said trip relay means;

means for generating a rectangular waveform in response to generation of a said trigger pulse, said means including means for selectively setting the duration of said rectangular waveform; and

switching means connected between said second input terminal and said second output terminal for producing a full wave A.C. excitation across said first and second output terminals for the duration of a said rectangular waveform.

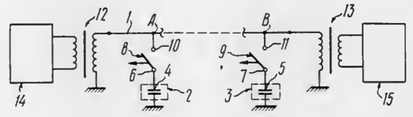
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**4,016,485**

## ARRANGEMENT FOR LIMITING DYNAMIC OVERVOLTAGES

**German Ivanovich Samorodov, prospekt Dzerzhinskogo, 30/4, kv. 6; Evgeny Nikolaevich Loiko, ulitsa Relsovaya, 21, kv. 65, both of Novosibirsk, U.S.S.R.; Orest Viktorovich Olshevsky, deceased, late of Novosibirsk, U.S.S.R.; by Valentina Mikhailovna Olshevskaya, administrator; by Alexandr Orestovich Olshevsky, administrator, both of ulitsa Meschanskaya 1, kv. 26, Moscow, U.S.S.R.; by Viktor Alexandrovich Olshevsky, administrator, and by Nina Alexandrovna Olshevskaya, administrator, both of ulitsa K.Marxa, 137, kv. 18, Krasnoyarsk, U.S.S.R.**

**Filed Mar. 2, 1976, Ser. No. 663,083**
**Int. Cl.² G05F *1/68***
**U.S. Cl. 323—101** **1 Claim**




1. An arrangement for limiting dynamic overvoltages in a long-distance power transmission line of commerical frequency, interconnecting a transmitting power system and a receiving power system, comprising:

a. two batteries of static capacitors; the outputs respectively, of said batteries of static capacitors;

b. two switching devices adapted to connect, respectively, said two batteries of static capacitors to said long-distance commercial-frequency power transmission line the moment relative swinging of said transmitting power system and said receiving power system occurs;

c. the input of one of said two switching devices being connected to said output of one of said batteries of static capacitors;

d. the input of the other one of said two switching devices being connected to the output of the other one of said two batteries of static capacitors;

e. the output of said other switching device being connected to said long-distance commercial-frequency power transmission line at a point spaced from said transmitting power system by a distance of which the wavelength equals half the wavelength of the voltage of this commercial frequency;

f. the output of said one switching device being connected to said long-distance commercial-frequency power transmission line at a point spaced from said receiving power system by a distance of which the wavelength equals half the wavelength of the voltage of this commercial frequency.

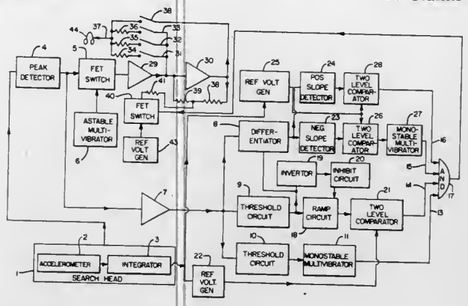


**4,016,486**

## LAND MINE DETECTOR WITH PULSE SLOPE, WIDTH AND AMPLITUDE DETERMINATION CHANNELS

**Peter M. Pecori, Alexandria, Va., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Feb. 19, 1976, Ser. No. 659,453**
**Int. Cl.² G01V *3/08***
**U.S. Cl. 324—3** **10 Claims**




1. A land mine detector comprising:

a search head;

a peak detector having an input coupled to said search head for receiving signals from said search head and having an output;

a first field effect transistor switch having a first input coupled to said output of said peak detector and having a second input and an output;

an astable multivibrator having an output coupled to said second input of said first field effect transistor switch;

a first amplifier having an input coupled to said ouput of said first field effect transistor switch and having an output;

a second amplifier having an input coupled to said output of said first amplifier and having an output coupled to a means for converting said second amplifier output into a user perceivable form;

means coupled to said second amplifier for controlling the gain of said second amplifier and thereby controlling the output as perceived by the user;

a third amplifier having an input coupled to said output of said peak detector;

an AND gate having first, second, third, and fourth inputs and having output coupled to said means to control the gain of said second amplifier;

slope determination means having an input coupled to said output of said third amplifier and having a first output coupled to said fourth input of said AND gate and a second output coupled to said third input of said AND gate;

pulse width determining means having an input coupled to said output of said third amplifier and an output coupled to said second input of said AND gate; and

pulse amplitude determining means having an input coupled to said output of said third amplifier and an output coupled to said first input of said AND gate.

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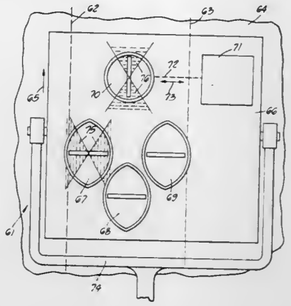
**4,016,487**

## ARRANGEMENT OF EDDY CURRENT SCANNING COILS

**Peter Neumaier, Reutlingen, Germany, assignor to Institut Dr. Friedrich Forster, Prufgeratebau, Reutlingen, Germany**

**Filed Mar. 8, 1976, Ser. No. 665,009**
**Claims priority, application Germany, Mar. 7, 1975, 2509927**
**Int. Cl.² G01R *33/12***
**U.S. Cl. 324—37** **8 Claims**

1. An arrangement of eddy current scanning coils for determining the presence of surface and near-surface defects in a metal part moving relatively thereto, each scanning coil including an exciter winding for producing eddy currents in the metal part and a receiver winding for receiving signals produced by defects, the exciter winding axis being substantially normal to the part surface being scanned and the receiver winding axis being perpendicular to the exciter winding axis, the improvement comprising:



the scanning coils being arranged in at least two groups, with the scanning coils of the groups being oriented to be effective for different angular ranges of defects; and

means provided for oscillating at least one scanning coil normally to the direction of relative movement between the scanning coils and metal part.

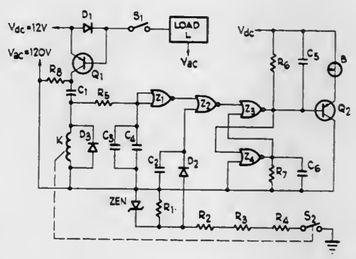
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**4,016,488**

## PULSING GROUND-TEST CIRCUIT

**William M. Stevens, Loveland, Ohio, assignor to Hill-Rom Company, Inc., Batesville, Ind.**

**Filed Oct. 4, 1974, Ser. No. 512,078**
**Int. Cl.² G01R *31/02***
**U.S. Cl. 324—51** **23 Claims**




12. A ground-test device for an appliance energized by an alternating current power source, a hot wire of the appliance to be connected to the high voltage side of the power source and a common of the appliance to be connected to ground, comprising:

activation means to intermittently cause a ground connection from the hot wire to ground to be completed;

testing means responsive to current flow conditions in said ground connection;

responding means activated by said testing means if the common of the appliance is not properly grounded or if the polarity of the connections from the power source to the hot wire and the common of the appliance are incorrect; and

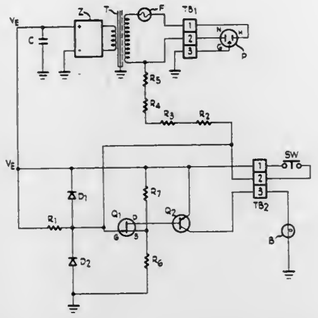
interrupting means to permit current flow through said ground connection only for a limited predetermined time.

**4,016,489**

## GROUND-TEST CIRCUIT WITH MINIMAL GROUND CURRENT

**James S. Adams, and Charles W. Cutler, both of Batesville, Ind., assignors to Hill-Rom Company, Inc., Batesville, Ind.**

**Filed Oct. 4, 1974, Ser. No. 512,313**
**Int. Cl.² G01R** *31/02*
**U.S. Cl. 324—51** **13 Claims**



**1.** A ground-test circuit for an appliance energized by an a.c. power source having the neutral thereof grounded, the chassis of the appliance to be connected to ground, comprising:

a d.c. power supply having a first side thereof connected to the chassis of the appliance, so that a second side thereof provides a d.c. test potential with respect to the chassis;

a voltage divider connected between said second side of said d.c. power supply and the neutral of the a.c. power source, said voltage divider having an intermediate terminal and a total resistance sufficiently great to limit the current flow therethrough to a desired level;

a voltage responsive device connected to said intermediate terminal of said voltage divider, the potential at said intermediate terminal being less than that required to activate said voltage responsive device, when the chassis of the appliance and the neutral of the a.c. power source are properly grounded and when the a.c. power source is connected to the appliance with the proper polarities; and

responding means being activated upon activation of said voltage responsive device when the potential at said intermediate terminal of said voltage divider rises due to ungrounding of the chassis of the appliance, the neutral of the a.c. power source floating above ground potential or incorrect wiring of the a.c. power source connections.

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**4,016,490**

## CAPACITATIVE PROXIMITY SENSING SYSTEM

**Albert Weckenmann, Ahrensburg; Lothar Haas, Siegelsdorf, and Rolf Bräutigam, Nurnberg, all of Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany**

**Filed Dec. 3, 1975, Ser. No. 637,181**
**Claims priority, application Germany, Dec. 19, 1974, 2460057**
**Int. Cl.² G01R** *27/26*
**U.S. Cl. 324—61 R** **8 Claims**

**1.** Capacitative proximity sensing system comprising

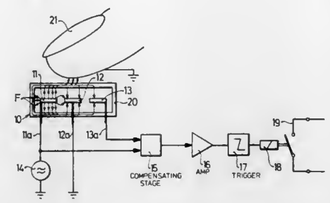
a leakage field capacitor having a support and two adjacently located planar surface electrodes (**11, 13, 31, 32**) located on the surface of the support;

a signal source (**14**) having one terminal connected to one of the electrodes (**11, 31**) whereby said one electrode will be a transmitting electrode;

a receiving and evaluation circuit (**15–18; 35, 36–42**) having one terminal connected to the other electrode (**13, 32**) whereby said other electrode will be a receiving electrode, said receiving and evaluation circuit evaluating disturbances of the field being emitted by the transmitting electrode;

the other terminal of said signal source being connected to a common ground or chassis connection;

and an electrically floating metallic shield (**20, 33**) galvanically insulated from said electrodes and from said ground or chassis connection, said shield being located with



respect to the electrodes to draw off a portion of the field generated by the transmitting electrode, when in oscillatory state,

whereby, when a grounded mass approaches said floating shield, the leakage field drawn off by said shield will increase and thus provide a signal at the receiving electrode sensing proximity of the mass, said signal being evaluated in the evaluation circuit.

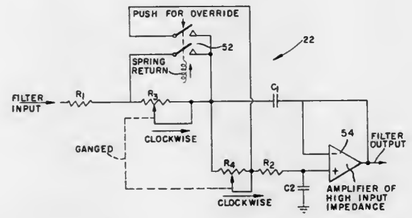
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**4,016,491**

## SINGLE KNOB ROTARY CONTROL OF METER DAMPING AND PUSH CONTROL OF DAMPING OVERRIDE

**James H. Macemon, Glen Burnie, and Charles I. Soodak, Silver Spring, both of Md., assignors to Baxter Travenol Laboratories, Inc., Deerfield, Ill.**

**Filed Apr. 22, 1976, Ser. No. 679,443**
**Int. Cl.² G01R** *1/38, 1/02*
**U.S. Cl. 324—128** **10 Claims**




**1.** In combination:

a source of noisy signal having a significant direct current component and a non-significant alternating current component;

said alternating current component having frequencies and amplitudes which, over a small period of time, are relatively constant, but which will greatly vary at different times;

adjustable means for removing a selected portion of said alternating current components from said noisy signal to produce a smoothed signal having all of the significant direct current component and a lesser amount of said non-significant alternating component than said noisy signal;

means to display the value of said smoothed signal;

said adjustable means including a manual control having dual motions;

means under the control of one of said dual motions to variably control the amount of alternating current components removed by said adjustable means in accordance with the amount of said one motion;

means under the control of the other of said dual motions to override the means under the control of one of said dual motions and to control said adjustable means for removing to remove a predetermined amount of said alternating current components.



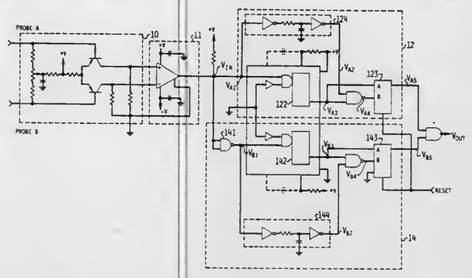
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**4,016,492**

## PULSE DISCRIMINATOR AND MISPROBE DETECTOR FOR DIGITAL LOGIC TESTER PROBE

**Edward C. Miller, Jr., Saratoga, and William J. Haydamack, San Jose, both of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.**

**Filed June 9, 1975, Ser. No. 585,423**
**Int. Cl.² G01R** *15/00, 1/06*
**U.S. Cl. 324—128** **12 Claims**



**1.** A logic circuit tester probe system comprising:

a high input impedance probe for making contact with a logic circuit node under test and producing in-phase signals in response to pulses at that node, said pulses having positive- and negative-going leading edges;

impedance matching means coupled to the probe for receiving electrical signals therefrom;

first means coupled to the impedance matching means for producing first signals in response to pulses having positive-going leading edges when the duration of the pulse is greater than a preselected value, and for producing first standby signals in response to pulses having negative-going leading edges;

second means coupled to the impedance matching means for producing second signals in response to pulses having negative-going leading edges when the duration of the pulse is greater than the preselected value, and for producing second standby signals in response to pulses having positive-going leading edges; and

output means coupled to the first and second means for rejecting pulses detected at the node having a duration less than the preselected value in response to the combination of the first signals and second standby signals or the second signals and the first standby signals.

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**4,016,493**

## SIMPLIFIED LAND LINE AND SATELLITE COMMUNICATION SWITCHING SYSTEM

**William B. Gross, Havertown, Pa., assignor to General Electric Company, Fairfield, Conn.**

**Filed Oct. 22, 1975, Ser. No. 624,955**
**Int. Cl.² H04B** *1/50, 7/185, 7/24;* **H04J** *1/10*
**U.S. Cl. 325—4** **4 Claims**

**1.** The method of switching a plurality of access lines to each other and to satellite relay channels which comprises in combination:

1. converting the signals from a first said access line to a first selected intermediate frequency lower than the frequency of a satellite relay channel and lying in a relay intermediate frequency band;

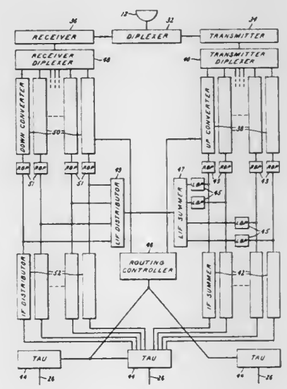
2. connecting the said first intermediate frequency signals, by frequency-selective means for transmitting signals in the relay intermediate frequency band and attenuating signals outside of the relay intermediate frequency band, to a frequency converter to change them to a first satellite relay channel frequency for relay by the satellite and

3. converting the signals from the first said access line to a second selected intermediate frequency lower than the frequency of a satellite relay channel and lying in a local intermediate frequency band outside of the relay intermediate frequency band;

4. transmitting the said second intermediate frequency signals, by frequency-selective means for transmitting signals in the local intermediate frequency band and attenuating signals outside of the local intermediate frequency band, to an intermediate frequency demodulator tuned to the said second intermediate frequency and connected to a second said access line for transmission of the said signals from the first said access line to the second said access line;

5. converting the signals from a second said access line to a third selected intermediate frequency lower than the frequency of a satellite relay channel and lying in a relay intermediate frequency band;

6. connecting the said third intermediate frequency signals, by frequency-selective means for transmitting signals in the relay intermediate frequency band and attenuating signals outside of the relay intermediate frequency band, to a frequency converter to change them to a second satellite relay channel frequency for relay by the satellite and




7. converting the signals from the second said access line to a fourth selected intermediate frequency lower than the frequency of a satellite relay channel and lying in a local intermediate frequency band outside of the relay intermediate frequency band;

8. transmitting the said fourth intermediate frequency signals, by frequency-selective means for transmitting signals in the local intermediate frequency band and attenuating signals outside of the local intermediate frequency band, to an intermediate frequency demodulator tuned to the said fourth intermediate frequency and connected to the first said access line for the transmission of the said signals from the second said access line to the first said access line;

9. converting signals at a satellite relay channel frequency to intermediate frequency signals in the relay intermediate frequency band and transmitting the said intermediate frequency signals to an intermediate frequency demodulator tuned to the said signals and connected to the said first access line for transmission of the said signals, after demodulation, to the said first access line; and

10. converting signals at a satellite relay channel frequency to intermediate frequency signals in the relay intermediate frequency band and transmitting the said intermediate frequency signals to an intermediate frequency demodulator tuned to the said signals and connected to the said

second access line for transmission of the said signals, after demodulation, to the said second access line.

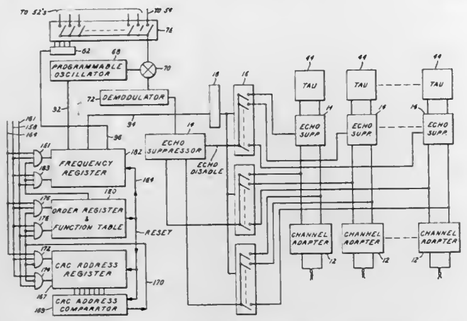
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**4,016,494**

## SATELLITE COMMUNICATION SYSTEM WITH IMPROVED CONFERENCE FACILITY

**Edward W. Moll, Norristown, Pa., assignor to General Electric Company, Fairfield, Conn.**

**Filed Nov. 11, 1975, Ser. No. 630,773**
**Int. Cl.² H04B** *7/00*
**U.S. Cl. 325—15** **2 Claims**




**1.** In a system for selective two-way communication between any two pairs of, and comprising a plurality of pairs of:

a. an oscillator tunable over an operating frequency range and modulable by an intelligence signal input paired permanently with

b. a demodulator tunable to demodulate a modulated signal in the said operating frequency range and produce an intelligence signal as on output;

and further comprising:

c. means to establish communication between a first said pair and a second said pair by tuning the modulable oscillator of the first said pair to a first frequency and tuning the demodulator of the first said pair to a second frequency, and tuning the modulable oscillator of the second said pair to the said second frequency and tuning the demodulator of the second said pair to the said first frequency;

the improvement comprising:

d. at least three independent demodulators tunable to demodulate a modulated signal in the said operating frequency range and produce an intelligence signal as an output;

e. means to connect the intelligence signal output of each independent demodulator to the intelligence signal output of a paired demodulator;

f. means to tune each independent demodulator to demodulate a modulated signal at a third frequency different from the said first and second frequencies to which are tuned the modulable oscillator and the demodulator of the pair to whose intelligence signal output the intelligence signal output of the independent demodulator is connected as recited in e);

whereby communication may be established directly among any of the pairs without relaying through any other pair.

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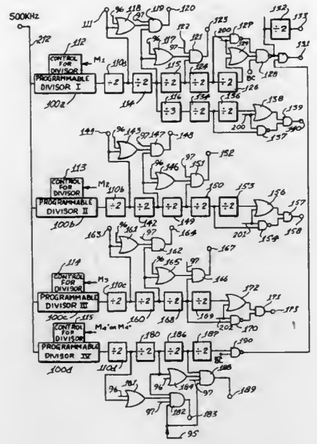
**4,016,495**

## ELECTRONIC MUSICAL INSTRUMENT USING PLURAL PROGRAMMABLE DIVIDER CIRCUITS

**William V. Machanian, Lewiston, N.Y., assignor to The Wurlitzer Company, Chicago, Ill.**

**Division of Ser. No. 475,449, June 3, 1974, abandoned. This application July 10, 1975, Ser. No. 594,743**
**Int. Cl.² H03K** *3/84*; **G10H** *5/00*
**U.S. Cl. 328—18** **6 Claims**

**1.** A tone signal generator for electronic musical instruments comprising a plurality of programmable divisor circuits each capable of dividing a given frequency input signal by a plurality of different divisors to produce a base frequency signal and a plurality of sub-harmonics thereof, input circuit means for applying a given frequency signal to each of said programmable divisor circuits, output circuits means for receiving selected one of a said plurality of different frequency signals produced by said programmable divisor circuits and control circuit means connected to said programmable divisor circuit including selector means selectively to maintain and change the divisor factors of said programmable divisor circuits.



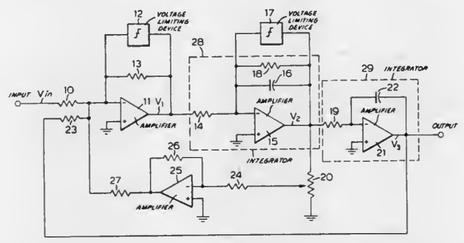

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**4,016,496**

## METHOD AND APPARATUS FOR PRODUCING RAMP SIGNALS WITH ROUNDED INFLECTION POINTS

**Peter deHertel Eastcott, Peterborough, Canada, assignor to Canadian General Electric Company Limited, Toronto, Canada**

**Filed Sept. 19, 1975, Ser. No. 615,054**
**Claims priority, application Canada, Dec. 16, 1974, 216282**
**Int. Cl.² H03K** *5/08*; **G06G** *7/18*
**U.S. Cl. 328—35** **11 Claims**




**1.** A circuit for producing an electric output signal having a waveshape the first derivative of which approximates a trapezoid, said circuit comprising:

a. switching means selectively operable to provide a first signal which varies between a zero value, and relatively positive and negative values;

b. a first integrator responsive to said first signal to provide a second signal;

c. means to limit the magnitude of said second signal; and,

d. a second integrator responsive to said second signal to provide said electric output signal.

**11.** The method of producing an electrical signal having a waveshape the first derivative of which approximates a trapezoid, said method comprising:

a. selectively providing an input signal of generally stepped voltage waveshape, which varies between a zero value and relatively positive and negative values, to a first integrator having a voltage limited output;

b. feeding the output of said first integrator into a second integrator which outputs said electrical signal; and,

c. utilizing the output of said second integrator in a feedback mode to determine which of a positive step voltage, a negative step voltage and a zero voltage should be applied to the input of said first integrator.



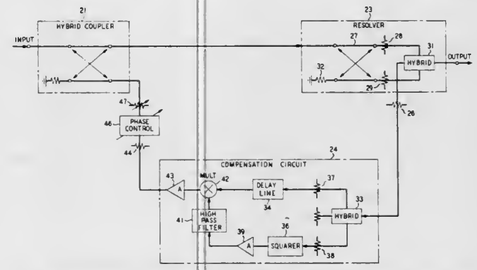
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**4,016,497**

## FEEDBACKWARD DISTORTION COMPENSATING CIRCUIT

**Hotze Miedema, Boxford, Mass., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed May 5, 1976, Ser. No. 683,320**
**Int. Cl.² H04B** *1/62*
**U.S. Cl. 328—162** **6 Claims**




**1.** A distortion compensating circuit for a signal path subject to distortion comprising:

means, connected to the output of said compensating circuit, for extracting a portion of the signal in said signal path;

means, operating on said extracted signal portion, for producing a third order output signal therefrom;

means for adjustably controlling the phase and amplitude of said third order output signal to provide a compensating signal having an opposing phase relationship with and an amplitude substantially equal to third order distortion effects present in said signal path; and

means, connected to the input of said compensating circuit, for coupling the compensating signal to said signal path to substantially eliminate said third order distortion effects from said signal path.

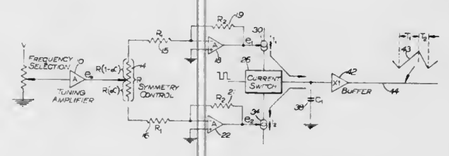
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**4,016,498**

## VARIABLE DUTY CYCLE WAVEFORM GENERATOR

**LeMoyne F. Hadley, Loveland, Colo., assignor to Hewlett-Packard Company, Palo Alto, Calif.**

**Filed Sept. 25, 1975, Ser. No. 616,725**
**Int. Cl.² H03K** *4/10*, *5/04*
**U.S. Cl. 328—181** **1 Claim**




**1.** A waveform generator circuit comprising:

means for energy storage;

switching means coupled to the means for energy storage for alternately switching a first and a second electrical current to the means for energy storage;

tuning means for producing a first electrical signal, said first electrical signal representing a selected frequency;

dividing means coupled to the tuning means for dividing said first electrical signal into a first component and a second component; and

means coupled to the dividing means for providing the first and second electrical currents in response to said first and second components of said first electrical signal, and for maintaining a constant value for the sum of the reciprocal values of said first and second control signals irrespective of the relative value of said first and second components of said first electrical signal, the sum of the reciprocal values of said first and second control signals being dependent on said first electrical signal;

said means for providing the first and second control signals comprising:

a first amplifier having inverting and non-inverting inputs and a feedback path through a first feedback impedance to the inverting input, for receiving the first component of said first electrical signal at the inverting input, said non-inverting input being tied to a first reference voltage, said first amplifier providing a first DC control voltage in response to the first component of the first electrical signal;

a first DC controlled current source coupled to said amplifier and said switching means for providing the first electrical current in response to the first DC control voltage;

a second amplifier, having inverting and non-inverting inputs and a feedback path from the output through a second feedback impedance to the inverting input, said non-inverting input being tied to a second reference voltage said second amplifier providing a second DC control voltage in response to the second component of said first electrical signal; and

a second voltage controlled current source coupled to said second amplifier and said switching means for providing the second electrical current in response to said second DC control voltage.

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**4,016,499**

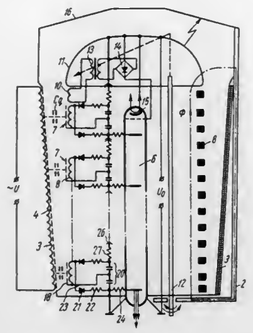
## CHARGED PARTICLE ACCELERATOR

**Gersh Itskovich Budker, ulitsa Maltseva, 6; Vasily Alexandrovich Gaponov, ulitsa Zolotodolinskaya, 9, kv. 27; Boris Mikhailovich Korabelnikov, ulitsa Geroev Truda, 23, kv. 37; Gennady Sergeevich Krainov, ulitsa Tereshkovoi, 40, kv. 32; Sergei Alexandrovich Kuznetsov, ulitsa Lyapidevskogo, 22; Nikolai Konstantinovich Kuksanov, Morskoi prospekt, 15, kv. 9; Vasily Ivanovich Kondratiev, ulitsa Pervomaiskaya, 162, kv. 5, and Rustam Abelevich Salimov, Morskoi prospekt, 7, kv. 6, all of Novosibirsk, U.S.S.R.**

**Filed July 17, 1975, Ser. No. 596,750**
**Int. Cl.² H01J** *23/00*
**U.S. Cl. 328—233** **4 Claims**

**1.** A charged particle accelerator comprising: a high-voltage generator built around a transformer; a magnetic circuit of said transformer, which magnetic circuit is sleeve-shaped; a primary winding of said transformer, arranged coaxially with and inside said magnetic circuit; a secondary, sectional winding of said transformer, arranged coaxially with said primary winding and inside said primary winding; coils making up said secondary winding; a high-voltage electrode of said secondary winding; an accelerator tube connected to said high-voltage electrode and arranged in the space enveloped by said secondary winding, coaxially with said secondary winding; a plurality of diode-capacitor rectifier circuits interconnected in se-

ries and arranged in the space between said accelerator tube and said secondary winding; each of said diode-capacitor



rectifier circuits being connected to one of said coils of the secondary winding.

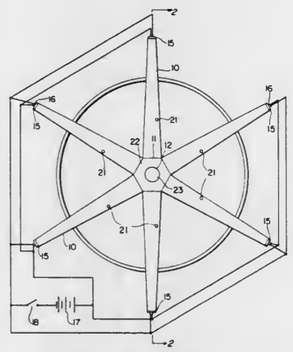
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**4,016,500**

**EXPLOSIVELY DRIVEN LASER AMPLIFIER SYSTEM**

**Herschel S. Pilloff, Oxon Hill, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Oct. 17, 1975, Ser. No. 623,278**
**Int. Cl.² H01S** *3/091, 3/20*
**U.S. Cl. 330—4.3** **3 Claims**



1. An explosively excited laser amplifier which comprises:
a housing formed of radiation-transparent material in the shape of a hexahedron;
a fluid-type laser amplifier cell supported coaxially within said housing;
a radiation-absorbing fluid within said housing and surrounding said fluid-laser amplifier cell for absorbing visible and infrared radiation of wavelengths which are not effective in pumping said amplifier due to heating of fluid in said laser amplifier cell;
a plurality of equally spaced, radially extending, pyramidally shaped, laser excitation lamps, each secured at its base end to one side of said hexagonal-shaped housing with the length and width of its base equal that of the length and width of the face of said housing to which it is secured,
each of said pyramidal-shaped lamps having its apex end cut off and enclosed by an outer end surface;
a liner of explosive material on the inner surface of the apex end of each of said radially extending, laser excitation lamps;
a noble gaseous medium filling the volume of each of said pyramidal-shaped, laser excitation lamps between said housing and said liner of explosive material on the inner surface of the outer end thereof; and
means for simultaneously detonating said liner of explosive material in each of said laser lamps.

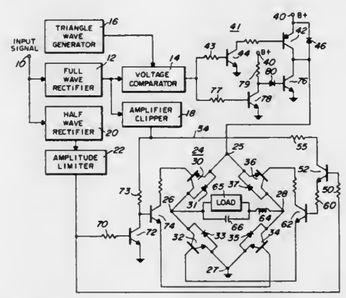
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**4,016,501**

**SWITCHING AMPLIFIER SYSTEM**

**Leon Jasinski, Fort Lauderdale, and Francis Robert Steel, Parkland, both of Fla., assignors to Motorola, Inc., Schaumburg, Ill.**

**Filed Dec. 29, 1975, Ser. No. 644,484**
**Int. Cl.² H03F** *3/38*
**U.S. Cl. 330—10** **7 Claims**




1. A switching amplifier for amplifying a bipolar wave to provide a high power output, including in combination,
pulse width modulation means for receiving the bipolar wave and for producing a single train of unipolar pulses having a constant repetition rate which is substantially greater than the highest frequency of the bipolar wave, said pulses of said train each having a duty cycle proportional to the instantaneous amplitude of the bipolar wave,
a bridge circuit having four terminals and four semiconductor switching means connecting said terminals, each of said switching means having a control terminal for rendering the same conductive,
energizing means coupled to said modulation means and to said bridge circuit for connecting supply means of a single polarity across diagonal terminals of said bridge circuit for the duration of each pulse produced by said modulation means,
control means having a first portion connected to said control terminals of a first opposite pair of said switching means for rendering the same conductive and a second portion connected to said control terminals of the other two of said switching means for rendering the same conductive, said control means including sensing means responsive to the bipolar wave for rendering said first portion operative during portions of the wave of one polarity and for rendering said second portion operative during opposite polarity portions of the wave, and
filter means connected to said terminals of said bridge circuit not connected to said energizing means for connecting a load thereto, said switching means applying current pulses to said filter means in opposite directions in response to portions of the bipolar wave which are of opposite polarities with the duration of the current pulses applied to said filter means varying with the amplitude of the bipolar wave, said filter means reducing fluctuations in the voltage applied to the load resulting from the switching action.

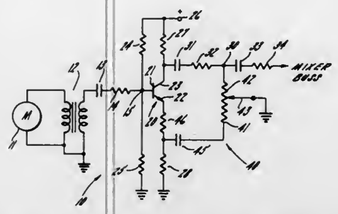


**4,016,502**

**DYNAMIC RANGE EXTENDER CIRCUIT FOR PREAMPLIFIER**

**Harro K. Heinz, Deerfield, and Bernard S. Cahill, Mount Prospect, both of Ill., assignors to Rauland-Borg Corporation, Chicago, Ill.**

**Filed June 18, 1976, Ser. No. 697,441**
**Int. Cl.² H03G** *3/30*
**U.S. Cl. 330—29** **10 Claims**



1. In an input amplifier stage for a microphone, the combination comprising a transistor having a base, emitter and collector, a direct current source, means for coupling a microphone to the base, a load circuit including a load resistor in series with the collector and an emitter resistor in series with the emitter, a stage output terminal coupled to the collector, a volume control potentiometer having emitter and output terminals and a wiper, the emitter terminal being coupled to the emitter end of the emitter resistor, the wiper being coupled to the opposite end of the emitter resistor, the output terminal of the potentiometer being coupled to the collector output terminal so that (a) when the wiper is adjacent the emitter terminal the emitter resistor is effectively shunted by a low resistance thereby increasing the gain of the transistor stage while the output terminal is substantially free of shunting effect for maximizing the output signal and so that (b) when the wiper is adjacent the potentiometer output terminal the stage output terminal is effectively shunted by a low resistance and the emitter resistor is substantially free of shunting effect for decreasing the gain of the transistor stage and minimizing the output signal, and a capacitor in the circuit which includes the emitter terminal and wiper so direct emitter current is prevented from flowing through the wiper.

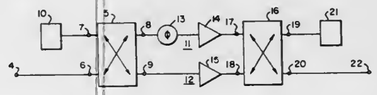
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**4,016,503**

**HIGH-RELIABILITY POWER AMPLIFIER**

**Sheldon I. Rambo, Baltimore, Md., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed July 24, 1975, Ser. No. 598,617**
**Int. Cl.² H03F** *3/68*
**U.S. Cl. 330—124 D** **5 Claims**



5. A power amplifier comprising:
a hybrid junction having a pair of input ports and an output port,
a first amplifying channel connected to one of said input ports operative to generate an input signal of a first amplitude to govern the input signal to one input port to cause said junction to conduct at its output port an output signal of a second amplitude at times when only the input signal of said first channel is applied to the hybrid junction,
a second amplifying channel connected to the other of said input ports operative to generate an input signal having an amplitude substantially equal to the first amplitude to govern the input signal to the other input port to cause said junction to conduct at its output port an output signal of said second amplitude at times when only the input signal of the second channel is applied to the hybrid junction; and
means to shift the phase of the input signal of one of said channels relative to the input signal of the other of said channels an amount sufficient to govern the input signals to the input ports to cause said junction to conduct at its output port an output signal of substantially said second amplitude at times when the input signals of both the amplifying channels are present.

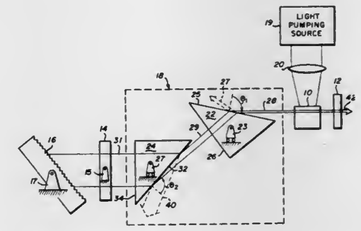
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**4,016,504**

**OPTICAL BEAM EXPANDER FOR DYE LASER**

**Gary K. Klauminzer, Palo Alto, Calif., assignor to Molectron Corporation, Sunnyvale, Calif.**

**Filed Apr. 12, 1976, Ser. No. 676,233**
**Int. Cl.² H01S** *3/08*
**U.S. Cl. 331—94.5 C** **14 Claims**




1. In a dye laser apparatus including a pair of spaced apart reflectors defining an optical cavity having a dye cell and a beam expander disposed within said cavity, and a light pumping source for optically exciting the dye to a lasing condition, an improved beam expander comprising:
a first prism having a first input surface aligned with the optical axis of the dye cell and inclined at an incidence angle of $\theta_1$ relative thereto, and a first output surface angularly related to said first input surface such that lies nearly orthogonal to light refracted from a laser beam directed along said optical axis; and
a second prism having a second input surface lying along the line of said refracted light and oriented at an incidence angle of $\theta_2$ relative thereto, and a second output surface angularly related to said second input surface such that lies nearly orthogonal to light refracted from the beam of refracted light incident on said second input surface, whereby the width of the beam of light refracted from said second input surface is expanded relative to the beam incident on the first input surface in the plane of refraction by a factor of $M_1 \times M_2$ where

$$M_1 = \left[\frac{1-(\sin^2\Theta_1)/n_1^2}{1-\sin^2\Theta_1}\right]^{1/2}$$

and

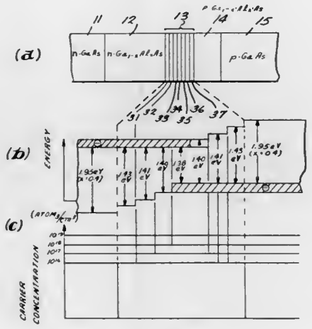
$$M_2 = \left[\frac{1-(\sin^2\Theta_2)/n_2^2}{1-\sin^2\Theta_2}\right]^{1/2}$$

and where $n_1$ and $n_2$ are respectively the refractive indexes of said first and second prisms.

## 4,016,505
## DOUBLE HETEROSTRUCTURE SEMICONDUCTOR LASER

Kunio Itoh, and Morio Inoue, both of Takatsuki, Japan, assignors to Matsushita Electronics Corporation, Oaza-Kadoma, Japan

Continuation-in-part of Ser. No. 453,150, March 20, 1974, abandoned. This application Aug. 28, 1975, Ser. No. 608,714
Claims priority, application Japan, Mar. 20, 1973, 47-32362; Mar. 20, 1973, 47-32363
Int. Cl.² H01S 3/19
U.S. Cl. 331—94.5 H 2 Claims

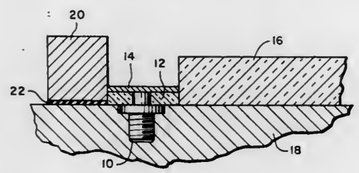



1. In a semiconductor laser of double heterostructure including an active layer of GaAs having more than two component layers, the improvement comprising: the central component layer having the highest carrier concentration and the outer component layers having lower carrier concentrations, with the further the outer component layers are from the central component layer the lower their carrier concentrations being.

## 4,016,506
## DIELECTRIC WAVEGUIDE OSCILLATOR

J. Stephen Kofol, Roseville, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Dec. 24, 1975, Ser. No. 644,245
Int. Cl.² H03B 7/14, 9/12
U.S. Cl. 331—96 20 Claims

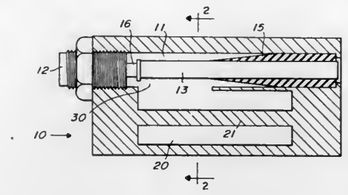


1. A microwave device comprising:
microwave producing means;
strip resonator means electrically connected to the microwave producing means and having first and second ends and wherein the strip resonator means has a length of approximately λ/2, wherein λ is the wavelength of microwaves produced by the microwave producing means; and
dielectric waveguide means having one end substantially in contact with the first end of the strip resonator means.

## 4,016,507
## SOLID STATE MICROWAVE OSCILLATOR USING COUPLED TEM TRANSMISSION LINES

Richard Calvin Havens, Scottsdale, Ariz., assignor to Motorola, Inc., Chicago, Ill.

Filed May 11, 1976, Ser. No. 685,225
Int. Cl.² H03B 7/14, 9/12
U.S. Cl. 331—96 9 Claims

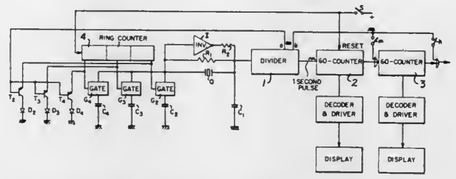


1. A solid state oscillator comprising:
a. a TEM transmission line;
b. a negative impedance semiconductor device connected at one end of said TEM transmission line for generating oscillations;
c. a lossy impedance connected to the other end of said TEM transmission line;
d. a TEM resonant transmission line with means for removing RF power therefrom; and
e. coupling means for coupling energy at a desired oscillation frequency from said TEM transmission line to said TEM resonant transmission line with the Q of the oscillator being determined by the amount of coupling.

## 4,016,508
## ELECTRONIC TIMEPIECE HAVING PLURAL CAPACITORS FOR SELECTIVELY ADJUSTING QUARTZ CRYSTAL OSCILLATOR OUTPUT FREQUENCY

Takenobu Kobori, Kawasaki, Japan, assignor to Kabushiki Kaisha Daini Seikosha, Japan

Filed Aug. 14, 1975, Ser. No. 604,779
Claims priority, application Japan, Aug. 23, 1974, 49-101018[U]
Int. Cl.² H03B 3/04, 5/36
U.S. Cl. 331—116 R 8 Claims



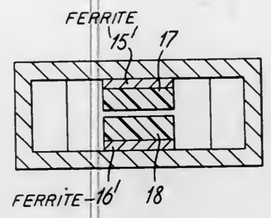

1. In an electronic timepiece: a quartz-crystal oscillator for generating a high frequency output signal; a divider connected to said quartz-crystal oscillator for receiving therefrom the high frequency output signal and dividing it to a lower frequency output signal suitable as a time base; and means for selectively adjusting the frequency of said quartz-crystal oscillator high frequency output signal comprising a plurality of capacitors each having a preselected capacitance value, and means including a manually actuatable switch for selectively electrically connecting predetermined ones of said capacitors to said quartz-crystal oscillator in accordance with the number of actuations of said switch to accordingly selectively adjust the frequency of said quartz-crystal oscillator output signal.



## 4,016,509
## WAVEGUIDE CIRCULATORS

Joseph Helszajn, Edinburgh, Scotland, assignor to National Research Development Corporation, London, England

Filed Oct. 31, 1975, Ser. No. 627,786
Claims priority, application United Kingdom, Nov. 6, 1974, 48031/74
Int. Cl.² H01P 1/38
U.S. Cl. 333—1.1 16 Claims

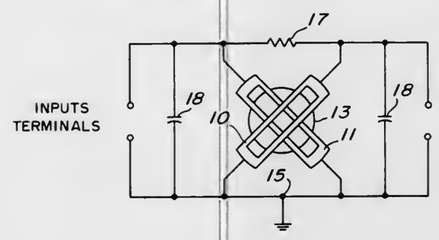


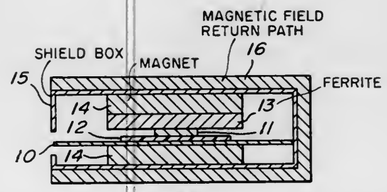

1. A three-port microwave junction circulation for use with a waveguide, including a junction member defining three ports, a gyromagnetic element within the junction member and having one surface only in electrical contact therewith, means for applying a magnetic field to traverse the gyromagnetic element in a predetermined direction, and at least one dielectric element aligned with the gyromagnetic element in the said direction, the overall dimension in the said direction of the gyromagnetic and dielectric elements taken together being substantially equal to an odd number of quarters of a wavelength, for propagation in the gyromagnetic and dielectric elements, at the centre frequency of a working range of frequencies of the circulator.

## 4,016,510
## BROADBAND TWO-PORT ISOLATOR

Eugene Walton Hodges, III, Sunrise; Francis Robert Steel, Parkland, and Ralph Thomas Enderby, Coral Springs, all of Fla., assignors to Motorola, Inc., Schaumburg, Ill.

Filed May 3, 1976, Ser. No. 682,686
Int. Cl.² H01P 1/36
U.S. Cl. 333—24.2 9 Claims




1. A broadband two-port isolator especially suited for used with high frequency radio frequency apparatus, the isolator having input and output terminals and comprising in combination:
a reference voltage source;
a first conductor means connected between the input terminal and the voltage reference source;
a second conductor means connected between the output terminal and the voltage reference source, and further having its longitudinal axis at substantially 90° to the axis of the first conductor;
means for insulating the first conductor from the second conductor;
at least one gyromagnetic element positioned in close proximity to the conductors;
magnetic means for providing a static magnetic field, the first and second conductors and the at least one gyromagnetic element being positioned inside said magnetic field and the field being normal to the plane of the at least one gyromagnetic element;
first and second capacitors each connected in parallel with a respective one of said first and second conductor means; and
resistive means connected between the input and output terminals.

## 4,016,511
## PROGRAMMABLE VARIABLE LENGTH HIGH SPEED DIGITAL DELAY LINE

John L. Ramsey, Concord, and Allen E. Post, Framingham, both of Mass., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Dec. 19, 1975, Ser. No. 642,521
Int. Cl.² H03H 7/30, 7/36; H03K 5/153, 5/159
U.S. Cl. 333—29 6 Claims

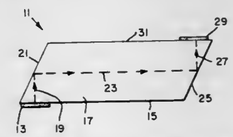



1. A variable length, high speed, digital delay line apparatus comprising in combination:
a set of serially arranged, fixed-length, digital delay units, and
a set of switching units interposed respectively between each of said set of delay units, said set of switching units having a set of switching position, said set of switching positions being one greater than the rank of the switching unit position within the delay unit chain, each switching position of said set of switching units being connected to a switching position within a switching unit of greater rank, each of said set of switching units being respectively selectable.

## 4,016,512
## WIDE BAND BULK ACOUSTIC WAVE DELAY LINE

Michael T. Wauk, II, Agoura, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed Oct. 2, 1975, Ser. No. 619,096
Int. Cl.² H03H 9/30; H01L 41/10, 41/18
U.S. Cl. 333—30 R 18 Claims




1. A wide band bulk acoustic wave delay line, comprising: a body of material capable of supporting propagating longitudinal and shear wave modes of acoustic energy, said body including at least one longitudinal-shear wave mode

converting wall defining a relatively long but relatively low-attenuation per unit time shear wave mode propagation path within said body angularly disposed with respect to the plane of said mode converting wall;

transducer means disposed on said body for converting electromagnetic wave energy to acoustic wave energy and the converse thereof, and for directing and receiving propagating longitudinal wave mode acoustic energy to and from said mode converting wall along relatively short but relatively higher attenuation per unit time longitudinal wave mode propagation paths within said body angularly disposed with respect to said plane of said mode converting wall and to said shear wave mode propagation path, the attenuation of said propagating acoustic wave energy in said body being relatively frequency dependent; and

mode conversion disturbance means in said mode propagation paths and associated with said mode converting wall for relatively frequency-independently increasing the attenuation of said propagating acoustic wave energy at said mode converting wall.

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**4,016,513**

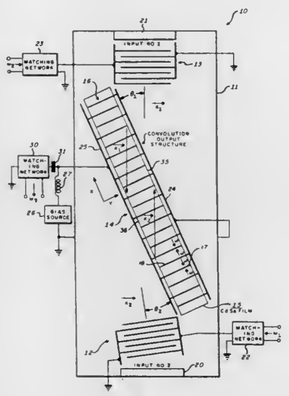
## SURFACE WAVE CONVOLVER APPARATUS

**Leland P. Solie, Acton, Mass., assignor to Sperry Rand Corporation, New York, N.Y.**

**Filed Dec. 4, 1975, Ser. No. 637,542**

**Int. Cl.² H03H** *9/26, 9/30;* **G06G** *7/19;* **H03F** *7/00*

**U.S. Cl. 333—30 R** **22 Claims**




1. A signal convolver including a body having an active surface means with piezoelectric properties for propagating first and second acoustic surface waves introduced at opposite ends thereof, comprising:

layer means having semiconductor properties and disposed on said active surface means for forming an interaction region therewith wherein first and second refracted acoustic surface waves are introduced therein in response to the propagation of said first and second acoustic surface waves,

conductive array means disposed in said interaction region and including regularly spaced electrode finger means supporting alternating unidirectional electric fields of substantially equal magnitude between successive pairs of said electrode finger means for amplifying said first and second refracted acoustic surface waves, and wherein said electrode finger means are uniformly situated at an angle, other than 90°, with respect to the directions of propagation of said first and second acoustic surface waves, and

summing means coupled to said conductive array means for sensing a sum frequency signal equal to the sum of the frequencies of said first and second refracted acoustic surface waves.

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**4,016,514**

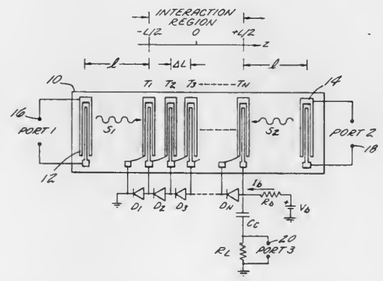
## DIODE COUPLED TAPPED ACOUSTIC DELAY LINE CORRELATOR AND CONVOLVER

**Thomas M. Reeder, Glastonbury, and Meyer Gilden, West Hartford, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.**

**Filed Oct. 9, 1973, Ser. No. 404,831**

**Int. Cl.² H03H** *9/26, 9/30;* **G06G** *7/19;* **H01L** *9/04*

**U.S. Cl. 333—30 R** **19 Claims**




11. A method for processing two electrical signals comprising the steps of

generating in a piezoelectric delay line first and second contra-flowing surface acoustic waves responsive respectively to first and second modulation waveforms,

positioning in the path of both said acoustic waves a plurality of transducers, each said transducer producing a voltage in response to the coincidence of both said acoustic waves,

applying each of said voltages to an independent nonlinear signal attenuation device connected with each of said transducers,

and summing the outputs from each of said signal attenuation devices in a load.

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**4,016,515**

## BULK ACOUSTIC WAVE DELAY LINE

**Michael T. Wauk, II, Agoura, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.**

**Filed Dec. 31, 1975, Ser. No. 645,492**

**Int. Cl.² H03H** *9/04, 9/30;* **H01L** *41/10;* **H04R** *23/00*

**U.S. Cl. 333—30 R** **9 Claims**

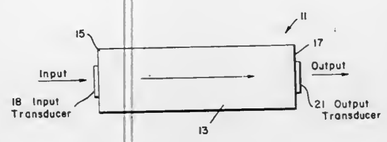
1. A bulk acoustic wave delay line, comprising:

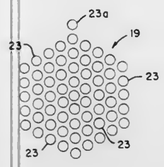
a body of material capable of supporting propagating acoustic wave energy in said body;

transducer means including input and output transducers disposed on said body in spaced relationship to each other for respectively converting electromagnetic wave energy to acoustic wave energy and the converse thereof, and for directing and receiving said propagating acoustic wave energy, said transducers each including a plurality of relatively closely spaced, symmetrically disposed and evenly dispersed conductive electrodes defining respectively first and second top-electrode array patterns, each of said array patterns defining an axis of symmetry, said second pattern being oriented to have its axis of symmetry at a predetermined offset angle with respect to said



axis of symmetry of said first pattern causing propagating acoustic wave energy from at least one of said electrodes



in said first pattern to be intercepted by at least one of said electrodes in said second pattern.

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**4,016,516**

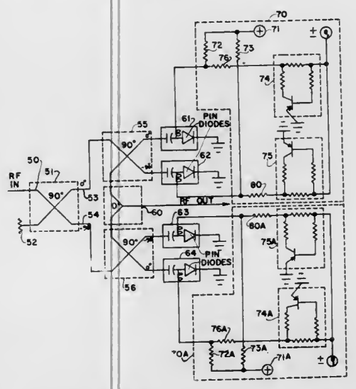
## REFLECTIVE SIGNAL CONTROLLER

**Walter A. Sauter, Malibu, and David R. Martin, Simi Valley, both of Calif., assignors to American Nucleonics Corporation, Woodland Hills, Calif.**

**Continuation-in-part of Ser. No. 473,427, May 28, 1974, abandoned. This application Dec. 4, 1975, Ser. No. 637,600**

**Int. Cl.² H01P** *1/22*

**U.S. Cl. 333—81 R** **5 Claims**




1. A signal controller for continuously varying the amplitude and polarity of an alternating signal comprising:

a first hybrid coupler including an input terminal, a termination terminal, a 0° terminal and a 90° terminal,

said input terminal of said first hybrid coupler connectable to a source of alternating signal to be controlled,

a second hybrid coupler including an input terminal, a termination terminal, a 0° terminal and a 90° terminal,

said input terminal of said second hybrid coupler connected to the 0° terminal of said first hybrid coupler,

a third hybrid coupler including an input terminal, a termination terminal, a 0° terminal and a 90° terminal,

said input terminal of said third hybrid coupler connected to the 90° terminal of said first hybrid coupler,

respective PIN diodes each having one terminal connected to a respective one of the 0° and 90° terminals of said second and third hybrid couplers;

the second terminal of each of said PIN diodes being grounded;

bias means for said PIN diodes;

said bias means comprising static first bias source for establishing the conduction of said PIN diodes for producing a minimum transfer of alternating signal throughout said signal controller,

said bias means including continuously controllable and polarity reversible second bias source to provide varying degrees of impedance mismatch of the said controller to said source of alternating signals whereby energy is reflected from said PIN diodes by reason of impedance mismatch thereof to said second and third hybrid couplers,

the termination terminals of said second and third hybrid couplers coupled together and constituting the output terminal of said signal controller.

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**4,016,517**

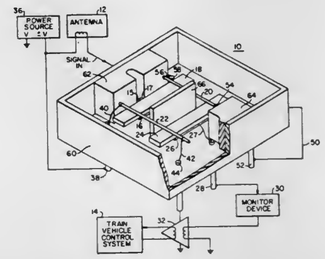
## SIGNAL BANDPASS FILTER APPARATUS

**Arun P. Sahasrabudhe, Monroeville, and Thomas C. Matty, North Huntingdon, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed Aug. 14, 1975, Ser. No. 604,740**

**Int. Cl.² H03H** *9/02, 9/26;* **B60Q** *11/00*

**U.S. Cl. 333—71** **7 Claims**




1. In a signal bandpass filter apparatus operative with an input signal having a predetermined frequency and a load device, the combination of:

first means responsive to said input signal for providing a first electrical to mechanical energy conversion;

second means operative with said first means for providing a second mechanical to electrical energy conversion;

third means operative with said second means for providing an output signal to said load device; and

fourth means connected to supply a direct current voltage signal through said first means and through said second means for determining the operational integrity of said apparatus by disabling the passage of said input signal to said load device when a predetermined failure of said apparatus occurs.

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**4,016,518**

## CIRCUIT BREAKER WITH IMPROVED SINGLE COIL ACTUATOR AND UNDERVOLTAGE RELEASE MECHANISM

**Walter W. Lang, South Beaver Township, and Alan B. Shimp, Monroeville, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed Sept. 25, 1975, Ser. No. 616,709**

**Int. Cl.² H01H** *83/12*

**U.S. Cl. 335—7** **19 Claims**

1. A circuit interrupter, comprising:

separable contacts;

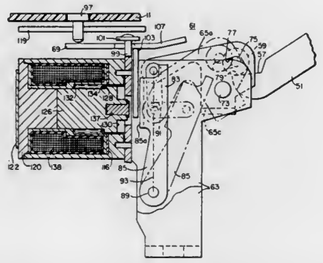
trip means operable upon actuation to effect separation of said contacts; and

a releasable actuator comprising:

an actuating member operable between first and second conditions, said actuating member actuating said trip means when operated to said second condition;

means for biasing said actuating member toward said second condition;

unitary operating means for operating said actuating member between said first and second conditions, said operating means being disposed in relation to said actuating member and responsive to a single control signal; and



control means connected to said operating means for generating said control signal, said control means being coupled to said contacts and to control terminals, said control means being responsive to overcurrent conditions through said contacts and undervoltage conditions at the control terminals to cause said operating means to operate said actuating member to said second condition, thereby effecting release of said trip means and separation of said contacts.

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**4,016,519**

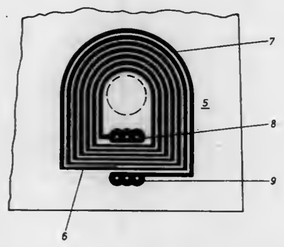
**PRINTED CIRCUIT COILS**

**Dieter Haas, Hildesheim, Germany, assignor to Blaupunkt-Werke GmbH, Hildesheim, Germany**

**Filed May 14, 1976, Ser. No. 686,520**

**Int. Cl.² H01F** *27/28*

**U.S. Cl. 336—200** **3 Claims**



**1.** A printed circuit coil of spiral configuration on the surface of a plate of insulating material composed of a layer of conducting material in a continuous spiral path with a substantially constant spacing between adjacent turns thereof and incorporating the improvement wherein a sector of said spiral including a part of each complete turn passing thereacross is of smaller path width than the remainder of said spiral path.

**4,016,520**

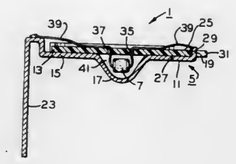
**THERMOSTAT AND ANTICIPATOR THEREFOR AND METHODS OF OPERATING AND MAKING SUCH**

**Wiley M. Hummel, Morrison, Ill., assignor to General Electric Company, Fort Wayne, Ind.**

**Filed Nov. 4, 1974, Ser. No. 520,894**

**Int. Cl.² H01H** *61/02*

**U.S. Cl. 337—100** **70 Claims**



**1.** An anticipator for controlling the cycle rate and the droop of a temperature responsive member utilized in a thermostat, the anticipator comprising means for transferring heat supplied thereto to the temperature responsive member of the thermostat, said heat transferring means including a chamber therewithin and generally isolated from ambient atmosphere to which said heat transferring means is subjected, and means enclosed within said chamber of said heat transferring means and predeterminately spaced from engagement with said heat transferring means for supplying the heat thereto.

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**4,016,521**

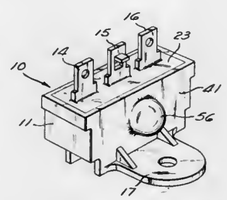
**THERMAL LIMITER**

**Joseph F. Seybold, c/o Accurate Electronics Corp., 169 S. Abbe Road, P.O. Box R, Elyria, Ohio 44035**

**Filed May 23, 1975, Ser. No. 580,230**

**Int. Cl.² H01H** *81/30*

**U.S. Cl. 337—241** **4 Claims**



**1.** A circuit control device comprising a housing of thermoplastic material, a thermally responsive element in said housing adapted to change its state of conductivity when heated to a predetermined temperature, a heater element in the housing arranged to be electrically energized to raise the temperature of said thermally responsive element, a plurality of electrical terminals selectively connected to said heater element and said thermally responsive element whereby said heater element is arranged to be energized by an electrical source of energy external of said housing and said thermally responsive element is arranged to alter a circuit connected to said terminals, said housing defining a cavity, said heater element and said thermally responsive element being disposed in said cavity, substantially all of said cavity not occupied by said elements being occupied by a gas, a wall of said housing including an outer surface adapted to undergo a physical change perceptible externally of the housing when heated to a critical flow temperature, said heater being arranged in heat transfer relationship relative to said thermally responsive element and said wall such that said outer surface of said wall reaches said critical flow temperature and said physical change occurs at substantially the same time said thermally responsive element reaches said predetermined temperature and said change in conductivity state occurs whereby visual inspection of said housing wall reveals the condition of said thermally responsive element, said heater element being adapted to heat said wall by substantial radiation energy transfer.



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**4,016,522**

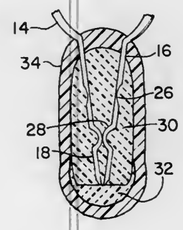
**THERMAL SWITCH DEVICE AND METHOD OF MAKING**

**Larry Lee Sharp, Schaumburg, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.**

**Filed Dec. 22, 1975, Ser. No. 642,971**

**Int. Cl.² H01H** *37/76*

**U.S. Cl. 337—403** **7 Claims**



**1.** A thermal switch device comprising a pair of electrical conductor wire members in side by side relationship to each other and having free ends extending generally in the same direction, a localized contact region on the pair of conductor wire members providing an electrically conductive path between the wire members, the free extremities of the conductor wire members being adjacent the contact region but spaced downwardly therefrom, thereby forming a lever arm portion, at least one of said conductor wire members including a spring means to bias the opposing contact regions and adjoining lever arm portions of the pair of conductor wire members away from each other, the contact region, being located intermediate the spring means and the free extremity, providing a fulcrum for the lever arm thus serving to minimize the unit force necessary to establish firm electrical contact at the contact region, the free extremities, contact region and at least a portion of the spring means being encapsulated with a nonconductive heat fusible material with the conductor wires being forced toward each other and the contact regions forced into electrical contact with each other by the encapsulating material, the nonconductive heat fusible material as well as portions of the conductor wire adjacent the spring means extending out of the encapsulated material, being coated with a rigid insulating material to totally encapsulate the heat fusible material and spaced and insulate the extending conductor wire portions from each other, wherein the encapsulating heat fusible material acting on the contact regions and lever arm applies suitable pressure to maintain electrical contact between said two conductor wire members until said heat fusible material is subjected to a predetermined temperature level, at which level the fusible material flows, releasing the stored energy in the spring means to open the circuit.

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**4,016,523**

**THERMAL SWITCH DEVICE**

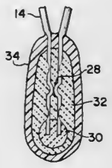
**Edward Frank Sidor, Lombard, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.**

**Filed Dec. 22, 1975, Ser. No. 642,973**

**Int. Cl.² H01H** *37/76*

**U.S. Cl. 337—403** **6 Claims**

**1.** A thermal switch device comprising a pair of conductor wire members in side by side relationship to each other and having free ends extending generally in the same direction, at least one of said wire members including a first, upper region, a second, intermediate region and a third, lower region including a free extremity of the wire member, a first spring means between the first and second regions biasing the second region outwardly relative to the first region, a second spring means between the second and third regions biasing the third region outwardly relative to the second region, a contact region on the conductor wire member located intermediate the first spring means and the third region, solid heat fusible means surrounding the second and third region and a portion of the first region serving to retain the three regions in a first position against the bias of the first spring means and further bringing the contact regions into electrical contact under the force of the energy created by the second spring means, nonconductive means surrounding the heat fusible means supporting and retaining the first upper regions in a predetermined insulated spaced relationship to each other, wherein the heat fusible means retains the conductor wire members in electrical contact with each other until said heat fusible means is exposed to a predetermined temperature level, wherein the fusible means liquifies responsive to the predetermined temperature, releasing the energy of the spring means to open the circuit between the conductor wire members and place the three regions in a second position.



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**4,016,524**

**SENSOR FOR A GAS DETECTOR, IN PARTICULAR FOR SMOKE DETECTION**

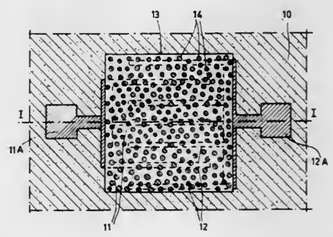
**Jean Pompei, Noisy-Le-Roi; Bernard Lacroix, Paris, and Francis Pierrot, Rueil-Malmaison, all of France, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed May 14, 1975, Ser. No. 577,314**

**Claims priority, application France, May 27, 1974, 74.18212**

**Int. Cl.² H01L** *7/00*

**U.S. Cl. 338—34** **3 Claims**

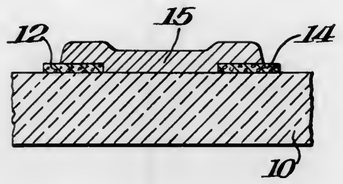


**1.** Sensor for selectively detecting at least one constituent of a gaseous mixture in contact with the sensor, the operation of this sensor being based on the variation of its electrical resistance by a reaction at the surface of the sensor, characterized in that the sensor comprises a substrate on which a layer of a semiconductor is provided to which are connected at least two electrodes and which is at least partly covered with a film of a dielectric material formed with a large number of microscopic openings.

## 4,016,525
## GLASS CONTAINING RESISTOR HAVING A SUB-MICRON METAL FILM TERMINATION

**John P. Maher, Adams, and Theodore W. Johnson, Williamstown, both of Mass., assignors to Sprague Electric Company, North Adams, Mass.**

**Filed Nov. 29, 1974, Ser. No. 528,052**
**Int. Cl.² H01C 1/012**
**U.S. Cl. 338—309** **7 Claims**

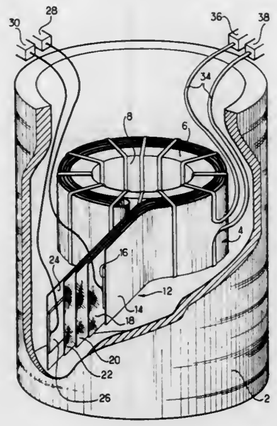



1. A resistor comprising an insulating substrate; submicron noble metal film terminations being bonded to said substrate; a glass containing resistor layer, distal portions of said resistor layer having overlapping contact with said terminations; and manganese dioxide particles being contained in and constituting at least 17 weight percent of said terminations thereby reducing residual stresses in said terminations and improving the quality of the junction between said terminations and said resistor layer.

## 4,016,526
## SUPERCONDUCTIVE SWITCH

**Brigitte Gamet, Leuville-sur-Orge, and Jean-Claude Renard, Chilly Mazarin, both of France, assignors to Compagnie Generale d'Electricite, Paris, France**

**Filed Mar. 21, 1975, Ser. No. 560,451**
**Claims priority, application France, Apr. 18, 1974, 74.13556**
**Int. Cl.² H01L 43/08**
**U.S. Cl. 338—325** **4 Claims**

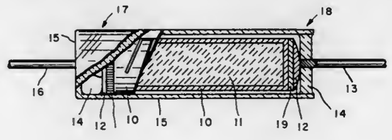



1. Superconductive switch comprising:
Two main terminals;
A superconductive winding connected between said two main terminals;
Means for keeping a cryogenic fluid in contact with said winding, so that it may be in its superconductive state;
Two control terminals;
And a control winding connected between said two control terminals and making it possible to apply to said control winding a magnetic field suitable for making it change over to its resistive state;
And characterized in that:
The conductor forming said superconductive winding is in the form of a superconductive strip whose width is substantially parallel to the axis of that winding;
A permeable strip whose width is also parallel to said axis is placed in contact with at least one face of said superconductive strip on the greatest part of the length of the latter, that permeable strip consisting of a material suitable for allowing the flowing of the cryogenic fluid in its pores so as to bring the fluid into contact with said face of the superconductive strip; and
Said superconductive strip forms a thin layer fixed onto one face of a support insulating strip, and remains at a distance from the two edges of that support strip, said permeable strip placed in contact with that thin layer having substantially the same width and being substantially coextensive with said support strip.

## 4,016,527
## HERMETICALLY SEALED FILM RESISTOR

**Gaylord L. Francis, Califon, and Amedeo J. Morelli, Randolph, both of N.J., assignors to North American Philips Corporation, New York, N.Y.**

**Filed Sept. 25, 1975, Ser. No. 616,651**
**Int. Cl.² H01C 1/02**
**U.S. Cl. 338—274** **24 Claims**



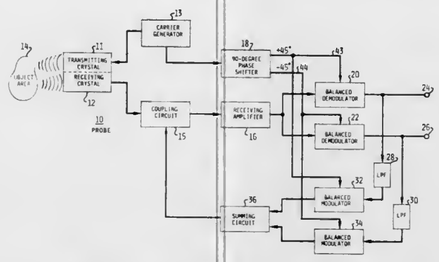

1. A hermetically sealed electrical device comprising
an electrical component comprising a core element coated with a resistive film material, and a refractory metal coating over the ends of said core element in electrical contact with said resistive film material;
a substantially cylindrical glass element surrounding said component and providing a hermetic seal;
a pair of flexible metal leads axially extending from said device; and
a coupling element between said component and said leads, comprising a solderable preform of a soft alloy for providing strain relief from the differential shrinking between said glass element and said electrical component at each end.

## 4,016,528
## MOVING TARGET DETECTOR

**Yasuhito Takeuchi, Kunitachi, Japan, assignor to Hewlett-Packard Company, Palo Alto, Calif.**

**Filed Nov. 24, 1975, Ser. No. 634,955**
**Claims priority, application Japan, Dec. 23, 1974, 49-147873**
**Int. Cl.² G01S 9/66**
**U.S. Cl. 340—1 R** **5 Claims**

1. A system for detecting moving objects within an object area of investigation by suppressing stationary components and amplifying doppler-shift components of acoustic signals reflected from stationary and moving objects within the area of investigation, said system comprising:
carrier generator means for generating a sinusoidal input carrier signal of constant amplitude and constant frequency;
signal transmitter means connected to said carrier generator means for transmitting an acoustic signal to the object area in response to said input carrier signal;
signal receiver means responsive to acoustic signals reflected from stationary and moving objects within said object area for converting said reflected acoustic signal to an analog signal having carrier, stationary and doppler-shift components;
signal coupling means having an input terminal coupled to said signal receiver means and having a feedback terminal for subtracting feedback signals received at the feedback terminal from analog signals received at the input terminal, and for producing a resultant analog signal having primarily doppler-shift components;
phase shifter means coupled to said carrier generator means and having a pair of output terminals for producing a pair

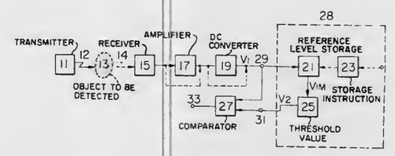



of phase-shifted carrier signals in response to said input carrier signal;
paired demodulator means each coupled to said signal coupling means and to an output terminal of said phase shifter means for producing a pair of demodulated analog signals, phase shifted with respect to each other, and having primarily doppler-shift components; and
signal feedback means coupled to said paired demodulator means and to the feedback terminal of said coupling means for providing a feedback signal to said signal coupling means, said feedback signal having primarily carrier and stationary components.

## 4,016,529
## BODY DETECTING DEVICE

**Tsuneki Inuzuka, Fuchu; Katsushi Furuichi, Yokohama; Osamu Sawamura, Yamato; Yoshimasa Kimura, Kawasaki, and Hisashi Sakamaki, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Apr. 25, 1975, Ser. No. 571,553**
**Claims priority, application Japan, May 1, 1974, 49-49219**
**Int. Cl.² G01S 9/66**
**U.S. Cl. 340—1 R** **15 Claims**

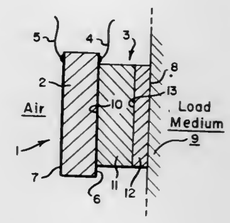



1. A device for detecting a body at a predetermined position comprising:
means for generating a detecting signal;
receiver means for receiving the signal from said signal generating means;
means for setting the value of a reference signal in response to the signal received from said receiver means in the absence of a said body at said predetermined position, to correct said reference signal in response to variations in ambient conditions, wherein said reference signal is for providing a reference for use in determining whether a said body is present at said predetermined position;
means for storing the reference signal, and
comparator means connected to compare said reference signal from said storage means with a signal received by said receiver means, wherein the output of said comparator means provides an indication of the presence or absence of said body at said predetermined position.

## 4,016,530
## BROADBAND ELECTROACOUSTIC CONVERTER

**Jeffrey H. Goll, 500 W. University Parkway, Apt. 6B, Baltimore, Md. 21210**

**Filed June 2, 1975, Ser. No. 582,763**
**Int. Cl.² H04B 11/00**
**U.S. Cl. 340—15** **13 Claims**




1. A broadband electroacoustic converter for converting between electrical signals carried on a network having a characteristic electrical impedance $R_e$ and acoustic signals carried in a load medium having a characteristic acoustic impedance $Z_a$, the signals characterized by frequencies in a range centered about a center frequency $f_o$, said electroacoustic converter comprising:
a. an electrical port through which the electrical signals may pass between the converter and the network;
b. a piezoelectric transducer comprising a thin plate of a piezoelectric material and a pair of electrodes mounted on opposing faces of the plate, the transducer having a half-wave resonance frequency $f_T$ and an active area A, the piezoelectric material being characterized by a thickness-mode electromechanical coupling constant $k_t$, a clamped dielectric constant along the thickness axis $\epsilon_t$, an acoustic phase velocity along the thickness axis $v_t$, and an acoustic impedance $Z_T$, said active area A being approximately equal to

$$\frac{k_t^2 v_t}{\pi^2 \epsilon_t f_T^2 R_e}$$

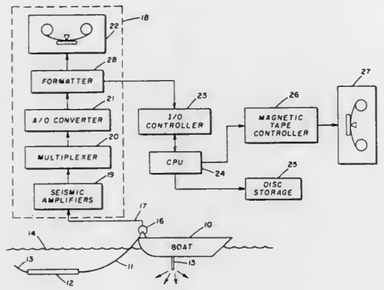
said half-wave resonance frequency $f_T$ being approximately equal to $f_o$, and said coupling constant $k_t$ being greater than 0.3;
c. electrical means connecting the electrodes of the transducer to the electrical port;
d. a double-layer acoustic coupler comprising a first plate and a second plate adjoining and in acoustic contact with one another, the thickness of each plate being approximately equal to an odd-multiple of the acoustic quarter-wave length at the frequency $f_o$ in the material of which the plate is composed, the first plate being composed of a material having an acoustic impedance approximately equal to $(Z_T^3 Z_a)^{1/4}$, the second plate being composed of a material having an acoustic impedance approximately equal to $(Z_T Z_a^3)^{1/4}$;
e. connecting means attaching the acoustic coupler to the piezoelectric transducer with one face of the first plate adjoining and in acoustic contact with one face of the transducer; and
f. an acoustical port through which acoustical signals may pass between the converter and the load medium comprising a face of the second plate.

**4,016,531**

## SYSTEM FOR RECORDING SEISMIC REFLECTION SIGNALS IN SERIAL-BY-TRACE FORMAT

**Thomas W. Cook; Wayne A. Penner; Carl A. Quaglino; Charles D. Ray, all of Dallas, and Lyndell F. Scott, Irving, all of Tex., assignors to Mobil Oil Corporation, New York City, N.Y.**

**Filed Apr. 28, 1975, Ser. No. 572,471**
**Int. Cl.² G01V** *1/24*
**U.S. Cl. 340—15.5 DP** **4 Claims**




**1.** In a method of seismic exploration wherein seismic reflection signals are recorded in a plurality of recording channels which are sequentially sampled to provide a serial output of multiplexed samples of the seismic reflection signals, the improvement comprising the steps of:

a. gathering a first set of said multiplexed samples into core memory such that the samples of said first set are reoriented serially by channel in successive address locations of said core memory,

b. transferring said serially oriented samples sequentially from said successive address locations of said core memory onto a first storage section of a cyclical storage device, the serial samples for each channel being stored on a separate recording sector in said first section,

c. repeating steps (a) and (b) for each of a plurality of sets of samples until all samples of the seismic reflection signals resulting from a single seismic pulse have been stored on recording sectors in a corresponding plurality of sections of said cyclical storage device,

d. reading sequentially out of said cyclical storage device sections those sectors of stored samples comprising a first of said plurality of channels,

e. repeating step (d) for each of said plurality of channels, and

f. recording each sector of samples serially as it is read out of said cyclical storage device in steps (d) and (e) to produce a serially oriented by trace seismic record of the seismic reflection signals.

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**4,016,532**

## EMERGENCY TRAFFIC CONTROL SYSTEM WITH SECURITY TRANSMISSION CODING

**Levi L. Rose, P. O. Box 22, Posen, Ill. 60469**

**Filed Nov. 5, 1975, Ser. No. 629,150**
**Int. Cl.² G08G** *1/00*
**U.S. Cl. 340—32** **6 Claims**

**1.** An emergency system for remotely controlling the light latches associated with traffic signal lights comprising:

a. a remotely located transmitter means including:

i. first and second RF oscillators,

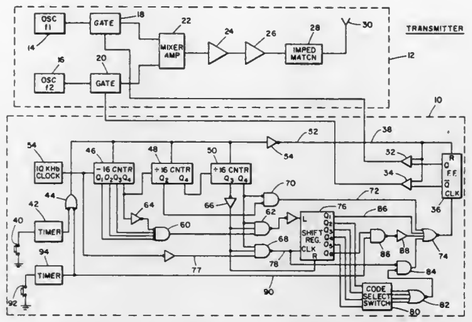
ii. means for transmitting the signals generated by said oscillators,

iii. means for generating a binary code,

iv. logic means for gating the output of said first or second oscillator to said transmitting means according to said code thereby to transmit a binary coded RF signal;

b. means for receiving the binary coded RF signals including:

i. first means for comparing said coded signal and producing an output indicative of a match,




ii. means responsive to the output from said first comparison means for enabling a first signal light latch.

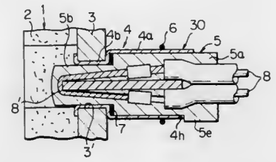
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**4,016,533**

## DEVICE FOR WARNING OF EXCESSIVE WEAR ON A BRAKE LINING

**Masakazu Ishikawa; Sadayoshi Ito; Hiroyuki Oka, all of Toyota; Kennoske Iida, Iwatsuki; Kenji Usui, Susono, and Masayoshi Asaba, Gotenba, all of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Oct. 21, 1974, Ser. No. 516,577**
**Claims priority, application Japan, Apr. 26, 1974, 49-47841[U]**
**Int. Cl.² B60R** *25/10*; **F16D** *66/02*
**U.S. Cl. 340—52 A** **3 Claims**



**1.** A device for warning of excessive brake lining wear in a disc brake for a vehicle, the device including:

a rear support plate of a disc brake for a wheel of a roadway vehicle, said plate having a brake lining attached to one side and a mounting hole extending through the plate, the other side of the plate being adapted to be exposed to the roadway during operation of a vehicle on which the disk brake is mounted;

a detecting element having a waterproof, electrically insulating body made of a fragile material, the body of the detecting element having

a first part extending through said mounting hole and projecting for a predetermined distance beyond the one side of the rear plate,

a second part projecting from the other side of the rear plate, and

means adapted to connect the detecting element to a warning circuit for warning the operator of a vehicle on which the disc brake is mounted when the brake lining becomes worn to a thickness less than said predetermined distance; wherein the improvement comprises:

the first part of the body of the detecting element being a cylinder having a first diameter; the second part of the body being a cylinder having a second diameter larger than the first diameter and a shoulder joining the first and second cylinders;



a metallic means attached to the rear plate and surrounding the second part of the fragile body for protecting said body from breakage by foreign objects when the vehicle is in operation;

said metallic means comprising a first hollow cylindrical portion covering and slidably holding the second part of the body of the detecting element and

a second hollow cylindrical portion having an outside diameter smaller than the outside diameter of the first hollow portion that slidably fits within the mounting hole through the rear plate, an inside diameter that slidably holds the cylindrical first part of the body of the detecting element, and a length equal to the thickness of the rear plate;

a shoulder joining one end of the second hollow cylindrical portion to the first hollow cylindrical portion, said shoulder bearing against the other side of the rear plate; and

an outwardly extending flange on the other end of the second hollow cylindrical portion, said flange bearing against the one side of the rear plate, whereby the second portion of the metallic means is attached to the rear plate by said shoulder and said flange, and said device further comprises

means for securing the detecting element in the metallic means and biasing means acting between the hollow cylindrical portion of the metallic means and the second part of the detecting element to prevent looseness of said detecting element in said metallic means.

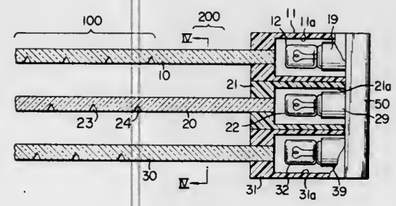
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**4,016,534**

## INDICATOR DEVICE FOR AUTOMOBILES

**Ikuya Kobayashi; Hiroshi Arai; Jun Ohta, and Minoru Izawa, all of Aichi, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Aichi, Japan**

**Filed Aug. 12, 1975, Ser. No. 603,806**
**Claims priority, application Japan, Aug. 30, 1974, 49-99744; Aug. 30, 1974, 49-99745; Sept. 19, 1974, 49-107937**
**Int. Cl.² B60Q** *1/00*
**U.S. Cl. 340—52 F** **10 Claims**




**1.** An indicator device for indicating abnormalities in apparatus such as motor vehicles which comprises:

a plurality of abnormality sensor means respectively disposed at functional parts or objects in the apparatus, each of said sensor means for detecting abnormalities at said parts and for converting the occurrence of an abnormality into an electric signal;

a plurality of corresponding display lamps respectively connected to respective abnormality sensor means;

a plurality of switching circuit means for engaging the respective display lamps in response to signals from the abnormality sensor means;

a priority sequence determination circuit means for determining a priority order among the detection signals whereby abnormalities occurring at two or more functional parts simultaneously result in one of said display lamps corresponding to the detection signal of a higher priority being selectively energized; and

a plurality of indicating elements of transparent and light transmissible material arranged in layers, each of said indicating elements having thereon light reflecting means, each display lamp each being disposed, respectively, at the edge of one of the respective indicating elements.

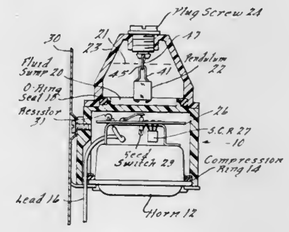
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**4,016,535**

## TILT ALARM FOR TRACTOR VEHICLE OR THE LIKE

**Robert I. Dinlocker, Lansdale, Pa., assignor to Sheller-Globe Corporation, Toledo, Ohio**

**Filed Dec. 15, 1975, Ser. No. 640,972**
**Int. Cl.² G08B** *21/00*
**U.S. Cl. 340—52 H** **13 Claims**




**1.** In a tractor like vehicle, suitable for use on lawns, gardens and the like, and including motive means for driving the tractor like vehicle by a person operating same,

the improvement comprising a special tilt alarm means for warning the operator when the vehicle is tilted in any direction beyond a predetermined desired angle of warning,

said tilt alarm means including, mounting and housing means for supporting the tilt alarm on the vehicle, a swinging pendulum magnet means operative in generally any direction,

upon swinging a predetermined amount away from its normal disposition, to cause actuation of the tilt alarm,

viscous damping fluid means, around said swinging means, for damping the movement of the swinging means to guard against premature actuation, said fluid means being non-mercury, warning indicator means for providing a warning to said operator upon said actuation caused by the swinging means,

electrical circuit means for operatively interconnecting the swinging means and the warning indicator means to enable actuation of said indicator means when said swinging means swings said predetermined amount away from its normal disposition,

said circuit means including a reed switch means generally oriented vertically such that the longitudinal axis of the reed switch and the swinging means are generally in line with one another, said reed switch means being activated when said swinging means swings said predetermined amount away from its normal disposition to thereby actuate said indicator means.

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**4,016,536**

## SPEED WARNING DEVICE

**Leo La Chapelle, Los Angeles, Calif., assignor to Frank Rembert and Leo La Chapelle, both of Los Angeles, Calif., part interest to each**

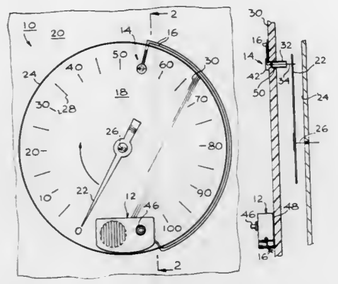
**Filed Jan. 23, 1976, Ser. No. 651,947**
**Int. Cl.² B60Q** *5/00*
**U.S. Cl. 340—62** **12 Claims**

**1.** An annunciator system for mounting in association with a speedometer or the like, comprising:

an annunciator unit having an electrical circuit operable by a switch to generate an audible signal; and

an activating switch connected in said circuit and adapted for mounting from outside an instrument adjacent a mov-

able indicator of the instrument at a selected warning position, the switch having a fine, resiliently flexible, conducting filamentary member supported from an insulated support member within the switch in a cantilever mounting and extending outwardly from a body of the switch into the path of the indicator of the instrument for



deflection by the indicator to a position of closure of said switch, the switch comprising a body having a generally cylindrical portion of reduced diameter extending along the filamentary member and a base portion of larger diameter relative to the diameter of the other portion to facilitate mounting of the switch in a hole in the cover plate of the instrument.

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**4,016,537**

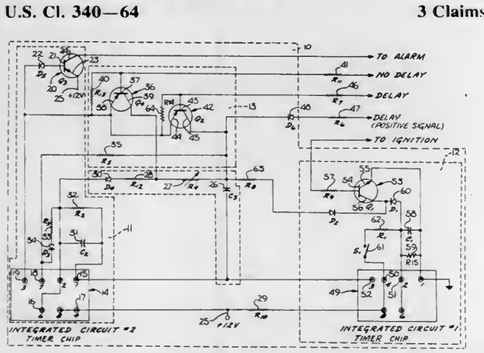
## ALARM TRIGGERING CIRCUIT

**Richard V. Ray, 7249 Petrol St., Los Angeles, Calif. 90723**

**Continuation-in-part of Ser. No. 595,763, July 14, 1975, abandoned. This application June 21, 1976, Ser. No. 697,996**

**Int. Cl.² B60R** *25/10*

**U.S. Cl. 340—64** **3 Claims**




1. In an alarm system for a motor vehicle which has a power source, an ignition system that provides a positive voltage when it is turned on and a ground when it is turned off, an alarm such as a horn or a siren, an alarm relay which is electrically coupled to the alarm, and a set of tampering switches which provide a ground when the motor vehicle is being entered into or tampered with by a would be thief, an alarm triggering circuit comprising:
   a. alarm triggering means for providing a ground to the alarm relay thereby activating the alarm;
   b. delaying means for providing a signal from the set of tampering switches to said alarm triggering means; and
   c. setting means for setting said alarm triggering means when the ignition system is turned off, said setting means including:
      1. a first timer chip having a trigger terminal, a reset terminal and an output terminal and being electrically coupled to the power source of the motor vehicle;
      2. a first resistor of a first particular resistance being electrically coupled to the ignition system;
      3. a first transistor having a base which is electrically coupled to said first resistor, an emitter which is electrically coupled directly to ground, and a collector;
      4. a first diode electrically coupled to said trigger terminal of said first timer chip and to said collector of said first transistor;
      5. a first capacitor of a first particular capacitance electrically coupled to ground and to said trigger terminal of said first timer chip;
      6. a second resistor of a second particular resistance being electrically coupled to said trigger terminal of said first timer chip; and
      7. a switch being electrically coupled to the power source of the motor vehicle and to said second resistor.

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**4,016,538**

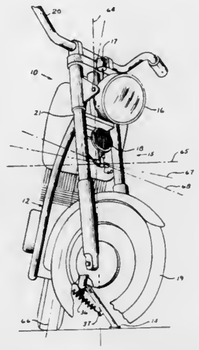
## SAFETY DEVICE FOR A MOTORCYCLE

**Marion Z. Miller, Rte. 1 Box 76A, Arcanum, Ohio 45304**

**Continuation-in-part of Ser. No. 552,155, Feb. 24, 1975, abandoned. This application Nov. 12, 1975, Ser. No. 631,407**

**Int. Cl.² B62H** *1/02*

**U.S. Cl. 340—134** **8 Claims**



1. An alerting device for a motorcycle having an ignition switch, a frame assembly and a stand movable from a down position for assisting in supporting said motorcycle to an up position out of said down position, said alerting device comprising:
   switch means mounted on said motorcycle and responsive to a change in position of said motorcycle and a change in position of said stand relative to said frame assembly;
   alerting signal means;
   a power source; and
   means for electrically connecting said switch means, said alerting signal means, said ignition switch and said power source so that said alerting signal means is energized when said ignition switch is actuated, said motorcycle is in a straightforward driving position, and said stand is downwardly from said up position to alert the operator of said motorcycle while riding that said stand is in an unsafe position.

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**4,016,539**

## ASYNCHRONOUS ARBITER

**Takashi Nanya, Tokyo, Japan, assignor to Nippon Electric Company, Ltd., Tokyo, Japan**

**Filed Sept. 10, 1974, Ser. No. 504,788**

**Claims priority, application Japan, Sept. 12, 1973, 48-103448; Sept. 12, 1973, 48-103451**

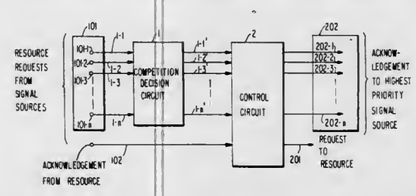
**Int. Cl.² H04Q** *9/00*

**U.S. Cl. 340—147 LP** **2 Claims**

1. An asynchronous arbiter comprising:
   a. input means including a plurality of input terminals for receiving asynchronously generated request signals from a plurality of signal sources;



   b. output means including a plurality of output terminals for providing an acknowledgement signal to the highest priority signal source;
   c. another input terminal for receiving an acknowledgement from a resource and another output terminal for providing a request to the resource;
   d. competition decision circuit means connected to said input means having a plurality of decision output terminals equal in number to the input terminals of the input means and having one-to-one correspondence thereto for setting a usual signal value tha is arbitrarily determined among first and second signal values when all of the input terminals of said input means are at said first signal value of a binary signal, while when a part or all of the input terminals of said input means become the second signal value of the binary signal, only one decision output terminal corresponding to the input terminal turned from the first signal value to the second signal value earliest among the input terminals taking the second signal value changes to an unusual signal value difference from the usual value, said competition decision circuit means preserving the order of the occurrence of the changes from the first signal value to the second signal value of the respective input terminals of the input group; wherein said competition decision circuit means comprises:
      i. a plurality of signal suppressor circuits equal in number to all the possible combinations of two taken from the number of said plurality of input terminals, each signal suppressor functioning in such a manner that when both of two input terminals of the signal suppressor circuit take a first signal value of a binary signal, both




of two output terminals of the signal suppressor circuit corresponding to its respective input terminals are set at usual signal values arbitrarily determined among first and second signal values, while when both or either one of said two input terminals of the signal suppressor circuit take a second signal value, the output terminal of the signal suppressor circuit corresponding to the input terminal turned from the first signal value to the second signal value earlier than the other among the two input terminals of the signal suppressor circuit is turned to an unusual value different from the usual value;
      ii. a plurality of logic circuits each producing at its output a logical product of its inputs;
      iii. means for connecting said input means to said signal suppressor circuits in such a manner that with regard to an arbitrarily selected pair of the input terminals in said input means the output states of said signal suppressor circuits represent which one of the two input terminals has been turned from the first signal value to the second signal value earlier than the other; and
      iv. means for connecting the output terminals of the signal suppressor circuits to the input terminals of the plurality of the logic circuits in such a manner that the output states of the plurality of the logic circuits represent which one of the input terminals in said input means has changed earliest from the first signal value to the second signal value; whereby the decision circuit means determines and stores the order of changes in values of the signals so asynchronously applied to said input group means from the plurality of signal sources; and
   e. control circuit means for generating a request signal at said another output terminal in response to any arbitrary one of the decision output terminals in the decision circuit turned from the usual value to the unusual value, and when an acknowledgement signal at said another input terminal changes in response to the signal change at said another output terminal a signal value at a particular output terminal in the output means determined with reference to the states of the decision output terminals in said decision circuit means changes in accordance with the signal change at said another input terminal whereby among a plurality of signals so asynchronously generated from a plurality of mutually independent binary signal sources as to vie with each other, the signal generated earliest is given the highest preference for transmitting the respective signals in succession to the resource, and the acknowledgement signal from the resource can be returned to the corresponding signal source.

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**4,016,540**

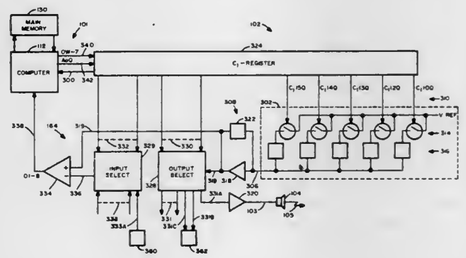
## APPARATUS AND METHOD FOR PROVIDING INTERACTIVE AUDIO COMMUNICATION

**Gilbert Peter Hyatt, P.O. Box 4584, Anaheim, Calif. 92803**

**Continuation-in-part of Ser. Nos. 101,881, Dec. 28, 1970, and Ser. No. 134,958, April 19, 1971, and Ser. No. 135,040, April 19, 1971, and Ser. No. 230,872, March 1, 1972, and Ser. No. 232,459, March 7, 1972, and Ser. No. 246,867, April 24, 1972, and Ser. No. 288,247, Sept. 11, 1972, and Ser. No. 229,213, April 13, 1972, Pat. No. 3,820,894, and Ser. No. 291,394, Sept. 22, 1972, and Ser. No. 302,771, Nov. 1, 1972. This application Jan. 22, 1973, Ser. No. 325,933**

**Int. Cl.² G06F** *3/16;* **H04M** *1/00*

**U.S. Cl. 340—172.5** **31 Claims**




1. A monolithic system for communicating with an operator, said system comprising:
   command means for generating at least one output signal, wherein said command means comprises monolithic data processor means for processing digital sound information and read only memory means for storing the sound information; and
   sound means for generating a sound message in response to the output signal, wherein said sound means comprises monolithic signal processing means for processing the output signal and transducer means for generating a sound message in response to the processed output signal.

## 4,016,541
## MEMORY UNIT FOR CONNECTION TO CENTRAL PROCESSOR UNIT AND INTERCONNECTING BUS

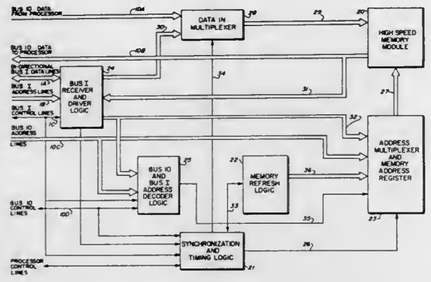
**Bruce A. Delagi, Acton; Joseph Paul Zeh, Maynard, and Rony Elia-Shaoul, Belmont, all of Mass., assignors to Digital Equipment Corporation, Maynard, Mass.**

**Continuation of Ser. No. 295,810, Oct. 10, 1972, abandoned. This application Apr. 17, 1974, Ser. No. 461,752**

*Disclosure was also published under second Trial Voluntary Protest Program on Apr. 20, 1976*

**Int. Cl.² G06F** *3/00*

**U.S. Cl. 340—172.5** **4 Claims**




1. A random access memory unit for connection to a digital computer system including a central processor unit and a bidirectional bus with data, control and address lines, the bus having a characteristic finite propogation delay time, said memory unit comprising:

A. addressable storage means, said memory unit storing and retrieving data from said addressable storage means during memory cycle operations each having a duration which is less than the characteristic propogation delay time for the bus,

B. a first port with data, control and address lines for connection to the corresponding lines in the bus,

C. a second port with data, control and address lines for direct connection to corresponding lines in the central processor unit,

D. an address multiplexer responsive to signals from said address lines at said first and second ports for passing a selected address therethrough to identify a unique location in said storage means,

E. data connection means for coupling data to and from said storage means and to and from data lines at said first and second ports,

F. control means responsive to control and address signals on the control and address lines from said first and second ports for controlling said address multiplexer.

## 4,016,542
## ELECTRONIC NOTEBOOK FOR USE IN DATA GATHERING, FORMATTING AND TRANSMITTING SYSTEM

**Leo L. Azure, Richland, Wash., assignor to Azurdata, Inc., Richland, Wash.**

**Filed Apr. 23, 1974, Ser. No. 463,400**

**Int. Cl.² G06F** *3/14, 17/06*

**U.S. Cl. 340—172.5** **74 Claims**

1. A self-contained, hand-held portable data collection device for receiving and storing character data for subsequent read-out and transmission of the character data in a desired format to a utilization means, comprising:

entry means for supplying coded signal representations of character data and controls, the character data coded signals to be stored in said device at addresses determined in accordance with control coded signals associated with the character data coded signals,

A random access memory having plural character data storage positions arranged in plural lines, each line including plural said storage positions,

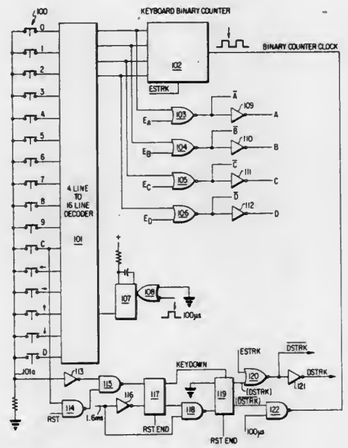
means for addressing the memory in accordance with the control coded signals for entry and storage of the character data coded signals in an addressed position,

display means for visually displaying characters represented by character data coded signals,

output connection means,

said addressing means including means for selectively addressing said memory for reading out character data coded signals stored in positions of said memory and for selectively supplying said signals read out from said memory to said display means for display thereof, and to said output connection means to be available for transmission thereof to a utilization means, and

electrical energy storing means integral with said self-contained hand-held portable data collection device for supplying electrical energy to the aforesaid means for operation of the said device, said electrical energy storing means comprising:




first and second energy storing cells, and means connecting said first and second energy storing cells normally to enable said first cell to supply electrical energy as aforesaid and to permit depletion of substantially all electrical energy stored in said first cell prior to depletion of the electrical energy stored in said second cell, said connecting means being responsive to depletion of the electrical energy stored in said first cell below a predetermined level, automatically to enable said second cell to supply energy to at least said memory means for maintaining storage of said coded signals theretofore entered and stored therein.

## 4,016,543
## PROCESSOR ADDRESS RECALL SYSTEM

**Theodore A. Franks, Cinnaminson, and Charles L. Kapeghian, Vincentown, both of N.J., assignors to Formation, Inc., Mt. Laurel, N.J.**

**Filed Feb. 10, 1975, Ser. No. 548,662**

**Int. Cl.² G06F** *11/00, 11/06*

**U.S. Cl. 340—172.5** **19 Claims**

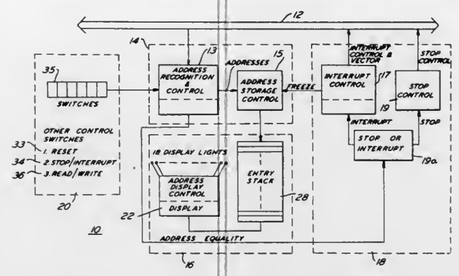
1. An address recall system coupled to a data processor system which includes a data processor, memory means and at least one peripheral unit for detecting and retrieving a predetermined number of processor system executed memory address signals, comprising:

a. switch means for generating a first set of signals corresponding to a predetermined address within said processor system;

b. control means for receiving address signals executed in said processor system and for detecting said predetermined address;



c. storing means comprising a group of registers for storing a predetermined number of said processor system executed address signals received by said control means; and,




d. means for retrieving said processor system executed address signals contained in said group of registers when said predetermined address is detected in said control means.

## 4,016,544
## MEMORY WRITE-IN CONTROL SYSTEM FOR COLOR GRAPHIC DISPLAY

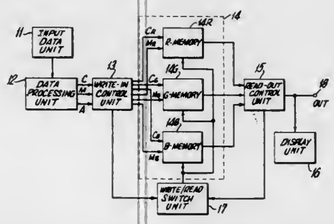
**Takaya Morita; Masao Inaba, and Yoitiro Hoshi, all of Tokyo, Japan, assignors to Tokyo Broadcasting System Inc. and Nippon Electric Company, Ltd., both of Tokyo, Japan**

**Filed June 17, 1975, Ser. No. 587,857**

**Claims priority, application Japan, June 20, 1974, 49-70421**

**Int. Cl.² G06F** *3/14*

**U.S. Cl. 340—172.5** **4 Claims**




1. A color graphic display system for displaying data supplied from a data processing unit on a display unit, said data having been stored and processed in said data processing unit in accordance with an instruction received from a data input means, said display system comprising:

memory means for storing data from said data processing unit;

means operatively interposed intermediate said data processing unit and said memory means for controlling the write-in of data in said memory means;

means operatively connected to said memory means for controlling the read-out of the data stored in said memory means;

means for supplying the read out data to said display unit;

said data from said data processing unit including color designating bits, mask command bits, and address data, and means for controlling said write-in controlling means in accordance with said mask command bits, said last-mentioned means including means for changing the content of the location in said memory means specified by said address data in accordance with said color designating bits when said mask command bits are of one logic level and for maintaining the content of said memory location unchanged when said mask command bits are of the other logic level.

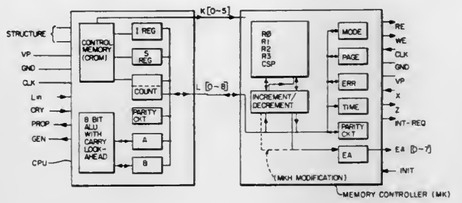
## 4,016,545
## PLURAL MEMORY CONTROLLER APPARATUS

**G. Jack Lipovski, Gainesville, Fla., assignor to Harris Corporation, Cleveland, Ohio**

**Filed July 31, 1975, Ser. No. 600,632**

**Int. Cl.² G06F** *13/00, 9/20*

**U.S. Cl. 340—172.5** **22 Claims**




1. A general purpose digital computer comprising:

a central processing unit located on a first semiconductor chip;

a plurality of memories located on a plurality of second semiconductor chips;

a plurality of memory controllers associated with, and connected to, said plurality of memories, respectively, each located on a semiconductor chip other than said first semiconductor chip;

a plurality of bidirectional lines interconnecting said central processing unit and said memory controllers for transmission of data and control bits between said central processing unit and said memory controllers;

each of said memory controllers including means for storing a mode vector which enables their associated memory for various operations;

a first logic means on each of said memory controllers for allowing said central processing unit access to their associated memory as a function of said bits on said bidirectional lines and said mode vector stored in said memory controllers.

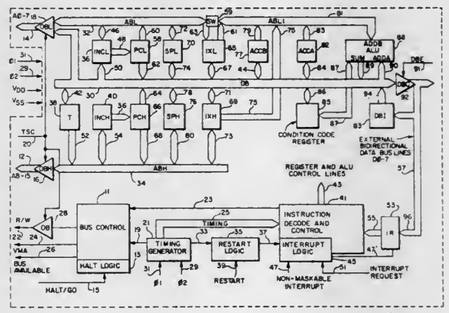
## 4,016,546
## BUS SWITCH COUPLING FOR SERIES-COUPLED ADDRESS BUS SECTIONS IN A MICROPROCESSOR

**Thomas H. Bennett; Earl F. Carlow, both of Scottsdale; Anthony E. Kouvoussis, Phoenix, all of Ariz.; Rodney H. Orgill; Charles Peddle, both of Norristown, Pa., and Michael F. Wiles, Phoenix, Ariz., assignors to Motorola, Inc., Chicago, Ill.**

**Division of Ser. No. 519,150, Oct. 30, 1974. This application Sept. 17, 1975, Ser. No. 614,033**

**Int. Cl.² G06F** *9/20*

**U.S. Cl. 340—172.5** **4 Claims**




1. A microprocessor unit comprising:

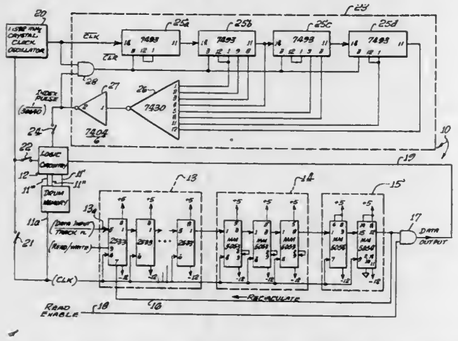
a data bus;

an address bus;

a plurality of registers coupled between said data bus and said address bus for storing digital information to effect operation of said microprocessor unit;
an arithmetic logic circuit coupled between said address bus and said data bus for performing computations on digital information to effect operation of said microprocessor unit;
control means coupled to said arithmetic logic unit and said registers for controlling transfers of data at said arithmetic logic unit and at said registers;
said address bus including first and second sections each containing a plurality of bus conductors;
a plurality of field effect transistors, each having a first electrode, a second electrode, and a gate electrode;
each of said field effect transistors having its first electrode coupled to a respective one of said bus conductors of said first section and having its second electrode coupled to a corresponding one of said bus conductors of said second section;
said control means being coupled to the gate electrodes of each of said field effect transistors for electrically coupling said bus conductors of said first section to said bus conductors of said second section under control of said control means.

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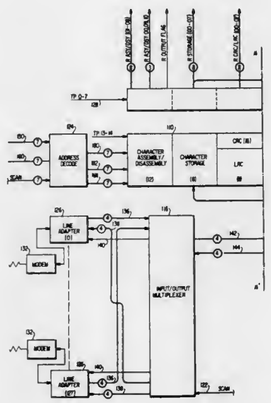
**4,016,547**
**MOS SHIFT REGISTER COMPENSATION SYSTEM FOR DEFECTIVE TRACKS OF DRUM STORAGE SYSTEM**
**Robert E. Page, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**
**Filed Jan. 22, 1976, Ser. No. 651,660**
**Int. Cl.² G06F *11/00, 13/04*; G11B *5/09***
**U.S. Cl. 340—172.5** **7 Claims**



**1.** An apparatus for compensating for the loss of a damaged data storage track on a rotating drum memory comprising:
means for logically processing data electronically coupled to all tracks on the rotating drum memory and
means for providing a memory for the data otherwise stored on a damaged track of the drum, such data being representative of reading and writing data, clock shift data and an index data to indicate initiation of a cycle the providing means including;
means coupled to the logically processing means for receiving storing and recycling the reading and writing data otherwise to be stored on a damaged reading and writing data track on the rotating drum memory,
means for clocking the data on the receiving means to shift and recycle it through the receiving means, the clocking means is coupled to feed clock pulses to the receiving means and the logically processing means when the clock track is damaged on the rotating drum memory, and
means coupled to the clocking means and the logically processing means for generating an indexing signal and feeding the indexing signal to the logically processing means when an index track is damaged on the rotating drum memory.

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**4,016,548**
**COMMUNICATION MULTIPLEXER MODULE**
**Wendell A. Law, Kaysville; William G. Barrett, Bountiful; Norman F. Priebe, and Harry D. Wise, both of Salt Lake City, all of Utah, assignors to Sperry Rand Corporation, New York, N.Y.**
**Filed Apr. 11, 1975, Ser. No. 567,261**
**Int. Cl.² G06F *3/04, 13/00, 15/20***
**U.S. Cl. 340—172.5** **10 Claims**

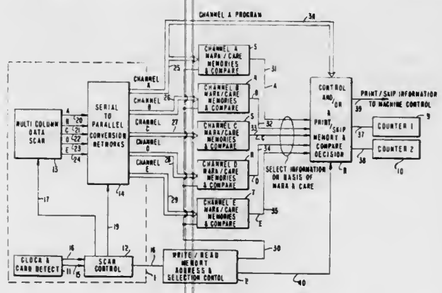


**1.** In a communications multiplexer module for transferring data between a data processor and a plurality of line adapters, the combination comprising:
an addressable memory including a plurality of addressable control word location, one location associated with each of said line adapters,
each said control word location including means for storing signals representing a control word having a data character field, an end of character field, and an input/output field;
scanning means for repetitively generating a sequence of addressing signals;
means for applying said addressing signals to said memory to read out and then read back into each of said control word locations;
multiplexer means connected to all said line adapters for receiving data therefrom one bit at a time;
means for applying said addressing signals to said multiplexer means whereby a given line adapter is selected when the control word location associated with said given line adapter is addressed;
time shared logic circuit means connected to said memory and said multiplexer means, said time shared logic circuit means including first circuit means responsive to a first combination of signals representing the input/output field of the control word presently addressed for gating a bit of data from said multiplexer means into the data character field of the control word presently addressed, as it is read back into its control word location;
means in each line adapter producing a data clock signal which is applied to, and gated through said multiplexer means with each data bit;
said time shared logic circuit means including second circuit means responsive to the data clock signal and the end of character field of the control word location being addressed to increment the end of character field,
means for transmitting the incremented end of character field to said memory for storage when the addressed control word location is read back into;
third circuit means in said time shared logic circuit means examining said end of character fields as they are read out of said memory and producing an end of character signal when the end of character field for an addressed control word location indicates that the number of bits of data entered into the data character field of the addressed control word location represents a complete data character; and
means responsive to said end of character signal for transferring said complete data character to said data processor.



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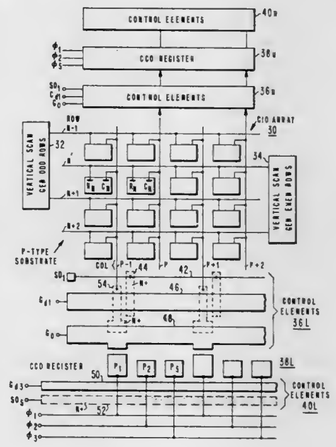
**4,016,549**
**SCANNING AND SELECTION METHODS AND APPARATUS THEREFOR**
**Mark A. Hutner, Glenview, Ill., assignor to Xerox Corporation, New York, N.Y.**
**Division of Ser. No. 409,679, Oct. 23, 1975, Pat. No. 3,975,715. This application Feb. 3, 1976, Ser. No. 654,899**
**Int. Cl.² G06F *3/12***
**U.S. Cl. 340—172.5** **4 Claims**



**1.** In an electrophotographic printing system including means for feeding a plurality of records having coded information thereon in succession, photosensitive means adapted for continuous rotation, optical means for imaging document information present on the successively fed records onto said photosensitive means, means for forming a developed electrostatic image on said photosensitive means, selectively actuated image transfer means for selectively transferring a developed electrostatic image onto a transfer member in response to activating signals and control means for activating said selectively actuated image transfer means in response to print selection information, the improvement in apparatus for selecting records which comprises:
memory means for storing coded information representing selection conditions therein and for additionally storing coded information defining a functional operation for each record having coded information thereon to be selected, said coded information defining a functional operation capable of designating at least one of a plurality of output functions for enabling at least a skip function and a selective transfer operation;
means for scanning a plurality of coded data records and producing signals indicative of the bit content of coded information thereon;
means responsive to signals indicative of the bit content of each of said plurality of coded data records and said selection conditions stored in said memory means for ascertaining whether coded information read from each of said plurality of coded data records scanned is in accordance with coded information representing selection conditions stored in said memory means and providing a selection signal indicative thereof; and
means for transforming selection signals into a functional operational signal in accordance with coded information defining a functional operation stored in said memory means and for supplying any print selection information which results therefrom to said control means to selectively actuate said transfer means at a time when document information from a record which the print selection information was developed is present at said transfer station.

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**4,016,550**
**CHARGE TRANSFER READOUT OF CHARGE INJECTION DEVICE ARRAYS**
**Paul Kessler Weimer, Princeton, N.J., assignor to RCA Corporation, New York, N.Y.**
**Filed Nov. 24, 1975, Ser. No. 634,447**
**Int. Cl.² G11C *11/40***
**U.S. Cl. 340—173 R** **26 Claims**



**1.** The combination of:
an array of charge injection devices arranged in columns and rows, said array comprising row conductors, column conductors, and charge injection devices, each such device capacitively coupled both to a row conductor and to a column conductor;
means prior to each read interval for resetting the column conductors of said array to a reference potential;
charge transfer register means; and
means responsive to the changes in potential capacitively coupled to said column conductors of said array in response to the application of a read voltage to a row conductor of said array for supplying charge signals, in parallel, to said charge transfer register means indicative of the information signals stored in said row of said array.

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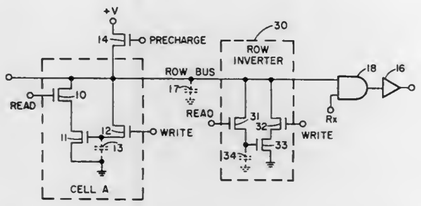
**4,016,551**
**DYNAMIC MOS MEMORY WITH REDUCED PROPAGATION DELAY**
**Richard Aladine Carberry, Sunnyvale, Calif., assignor to Data General Corporation, Southboro, Mass.**
**Filed Mar. 10, 1976, Ser. No. 665,478**
**Int. Cl.² G11C *11/40***
**U.S. Cl. 340—173 R** **5 Claims**

**1.** A dynamic MOS memory structure comprising:
a planar substrate;
a first plurality of conductively interconnected MOS memory cells, each of said cells being capable of temporarily storing one bit of digital information, said first plurality being arranged in a substantially orthogonal second plurality of rows and third plurality of columns on said planar substrate;
first selecting means for selecting one of said third plurality of columns;

means for writing said digital information into a second plurality of said interconnected memory cells located in said one of said third plurality of columns;

means for simultaneously inverting and reading said digital information from said second plurality of said interconnected memory cells;

a second plurality of row inverter means, each being conductively connected in each of said second plurality of rows respectively to a third plurality of said interconnected memory cells located in said each of said rows and responsive to operation of said inverting and reading means for temporarily storing said inverted digital information;



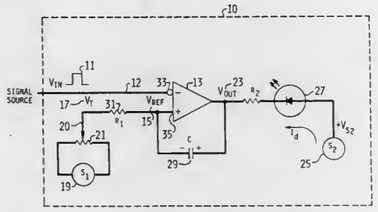

second selecting means for selecting one of said second plurality of rows and for controlling the outputting of an inverted one bit of information from said one of said memory cells common to both the selected one of said second plurality of rows and the selected one of said third plurality of columns; and

refresh means for re-inverting each bit of said inverted digital information temporarily stored in each of said second plurality of row inverter means respectively, and for restoring said each bit of said digital information into a respective one of said memory cells located in said one of said third plurality of columns.

## 4,016,552
## DUAL POLARITY PULSE DETECTION CIRCUIT WITH VARIABLE VOLTAGE THRESHOLD

**James F. Horner, Santa Clara, and William D. Jackson, San Jose, both of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.**

**Filed Sept. 12, 1975, Ser. No. 613,008**
**Int. Cl.² G08B *21/00***
**U.S. Cl. 340—253 C** **5 Claims**




1. A circuit for detecting input signals of of positive and negative polarities and displaying a stretched pulse visibly indicating the occurrence of said input signals relative to a reference signal, said circuit comprising:

threshold signal means for providing a threshold signal;

comparator means having an input, a reference and an output terminal, said input terminal being coupled to receive said input signals and said reference terminal being coupled to receive said threshold signal, the comparator means being effective for detecting the level of each of the input signals relative to the level of said reference signal and for producing at said output terminal an output pulse indicative of the input signal level relative to the reference signal level;

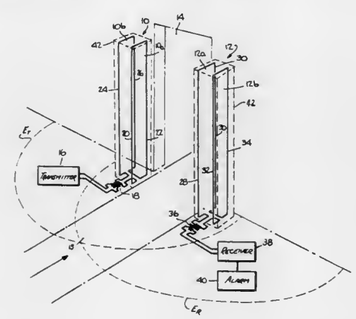
pulse stretching means capacitively coupling said output terminal to said reference terminal for providing capacitive feedback of the output pulse, said capacitively fedback output pulse combining with said threshold signal to form the reference signal, said reference signal being applied to the reference terminal causing the comparator means to produce a stretched output pulse of increased duration in response to the output pulse having a duration shorter than a predetermined value; and

display means coupled to the output terminal of said comparator means for producing discretely visible indications of said stretched output pulse.

## 4,016,553
## ARTICLE DETECTION SYSTEM WITH NEAR FIELD ELECTROMAGNETIC WAVE CONTROL

**Eugene B. Novikoff, Woodbury, and Ronald Pruzick, Commack, both of N.Y., assignors to Knogo Corporation, Hicksville, N.Y.**

**Filed June 27, 1975, Ser. No. 590,913**
**Int. Cl.² H01Q *21/00*; G08B *21/00***
**U.S. Cl. 340—280** **27 Claims**



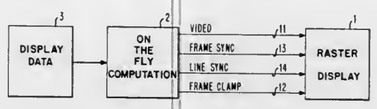

1. Antenna means for an article detection system which includes means forming an egress passageway of predetermined width through which articles to be detected must pass upon leaving a protected area and which further includes an electromagnetic wave transmitter operative to produce electromagnetic wave interrogation signals of predetermined frequency and an electromagnetic wave receiver operative in response to predetermined electromagnetic wave signal disturbances to produce alarm signals, said antenna means including means for coupling same to said transmitter and to said receiver, said antenna means being positioned adjacent said egress passageway, said antenna means further comprising at least one portion connected to at least one of said transmitter and receiver, said one portion being made up of at least two parallel loops connected in bucking relationship and having a length and spacing between them of substantially less than the wavelength of said interrogation signals and of said predetermined electromagnetic wave disturbances each of said loops having a pair of elongated parallel conductors and being connected to direct current flow in different directions in the two conductors, said loops being positioned with some of said conductors located further back away from said passageway than other conductors.



## 4,016,554
## RASTER DISPLAY APPARATUS

**Peter John Evans, and Clive Williams, both of Eastleigh, England, assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Jan. 8, 1976, Ser. No. 647,480**
**Claims priority, application United Kingdom, July 22, 1975, 30554/75**
**Int. Cl.² G06K *15/20*; G06F *3/14***
**U.S. Cl. 340—324 AD** **8 Claims**




1. Raster display apparatus comprising:

a raster display device;

means for computing line-by-line which points of the raster frame are to be displayed while a raster frame is being displayed;

means for detecting when the time for computation for a line exceeds a given time;

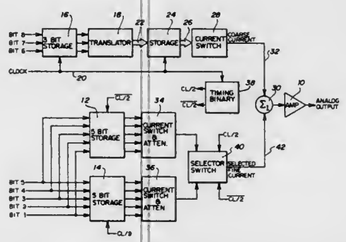
means for issuing a signal upon such detection;

means responsive to said signal to halt the raster scan for a time sufficient to complete the computation for that line.

## 4,016,555
## SIGNAL CONVERTER

**Sylvan F. Tyrrel, 443 Beverly Drive, Richardson, Tex. 75080**

**Filed Apr. 7, 1975, Ser. No. 565,869**
**Int. Cl.² H03K *13/05***
**U.S. Cl. 340—347 DA** **29 Claims**




27. A uniformalized digital-to-analog converter, comprising in combination:

a binary-to-binary translator responsive to the most significant bits of an input for generating a binary coded linear scale output,

a first current select switch responsive to the binary coded linear scale output of said translator and producing a current output varying with the input,

a second current switch responsive to the least significant bits of the input and generating a current output varying with the input thereto,

a third current switch also responsive to the least significant bits of the input and generating a current output varying with the input thereto,

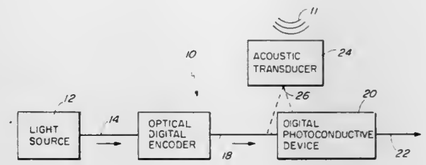
a current select switch having one input from said second current switch and a second input from said third current switch for alternately coupling one of the input currents to an output of said current select switch, and

means for summing the current output of said first current switch with the current output of the current select switch into a total current varying with the most significant and least significant bits of the input.

## 4,016,556
## OPTICALLY ENCODED ACOUSTIC TO DIGITAL TRANSDUCER

**John E. Fulenwider, Concord, Mass., assignor to GTE Laboratories Incorporated, Waltham, Mass.**

**Filed Mar. 31, 1975, Ser. No. 563,868**
**Int. Cl.² H03K *13/02***
**U.S. Cl. 340—347 P** **13 Claims**




1. An optically encoded transducer for use in a telephone handset for converting analog acoustic energy into an electrical digital pulse code comprising:

a. source of optical power for generating a beam of light along a predetermined path,

b. means disposed in the path for encoding the beam into a preselected pattern of light having a plurality of rows of alternating regions in which light is present and in which light is absent, the areas of the regions in the respective rows being related by factors of two to define a binary weighted relationship between the rows of regions,

c. an array of thin film photoconductive elements, having a plurality of rows of spaced photoconductive elements, the areas of the elements in the respective rows being related by factors of two to define a binary weighted relationship between the rows of elements, the array being disposed in the path of encoded beam such that a row of regions impinges upon a defined row of photoconductive elements, the shapes and areas of corresponding regions and elements in rows of the array and the encoded beam being substantially equal as the encoded beam impinges the array, the photoconductive elements of each row being electrically interconnected and generating a value of resistance which is related to the relative position of the light containing regions with respect to the photoconductive elements,

d. the number of photoconductive elements in any row except that having the greatest binary weighted value being twice the number of light containing regions in a corresponding row of the encoded beam so that the resistance of each row varies between a first level in which all elements are not exposed to light and a second level where one-half the elements are exposed to light,

e. means responsive to the acoustic energy for effecting relative motion between the array and the encoded beam in a direction parallel to the rows to vary the resistance of each row of elements between the first and second levels, and

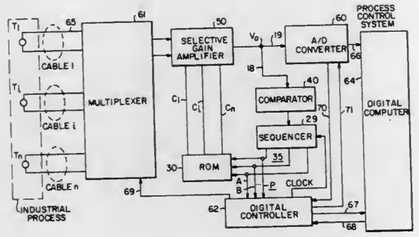
f. means for establishing a threshold level between the first and second levels and for generating first and second digital voltages for each of the plurality of rows of photoconductive elements depending upon whether the resistance level is above or below the threshold level.

**4,016,557**

## AUTOMATIC GAIN CONTROLLED AMPLIFIER APPARATUS

**William E. Zitelli, Media, and Andras I. Szabo, Export, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed May 8, 1975, Ser. No. 575,679**
**Int. Cl.² H03K** *13/02*; **H03G** *3/00*
**U.S. Cl. 340—347 AD** **2 Claims**




**1.** In a data acquisition system including a central computer and at least one remote station comprising one multiplexer connected to a plurality of points for deriving input analog signals of different amplitude ranges, an analog-to-digital converter associated with said multiplexer for providing digital data representative of said intput analog signals and means for controlling said multiplexer and analog-to-digital converter in relation to said points severally, the combination of:

adjustable gain amplifier means in said station responsive to said input analog signals as derived from said multiplexer for supplying amplified input signals to said converter;

said amplifier means including a plurality of elemental circuits each contributing at least in part to one of a plurality of definite gain settings thereof;

switching means in said station for operatively connecting a selection of said elemental circuits to establish one of said gain settings;

programmable logic memory means in said station for controlling said switching means to establish successive gain settings in accordance with a plurality of sequence instructions;

sequencer means in said station for applying to said memory means a plurality of said sequence instructions, said sequence instructions corresponding to a succession of said gain settings representing a monotonic succession of gains;

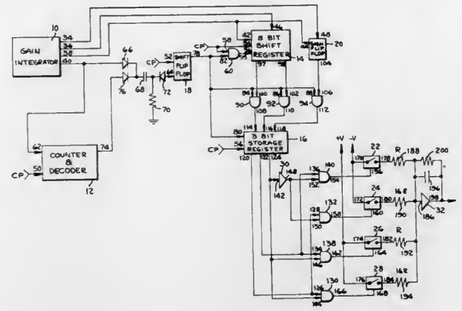
the operation of said sequencer means being initiated by said control means and gated by out-of-range condition of said amplifier means and being terminated in response to an in-range condition of said amplifier means, whereby said amplifier means automatically supplies to said converter amplified input signals of effective amplitude, said control means being adapted to transmit from said remote station to said central computer said input analog signal representative digital data and digital address data identifying the multiplexed input signals of said remote station and digitally coded data from said sequencer means characterizing the associated operative gain setting of said amplifier means in said remote station.

**4,016,558**

## APPARATUS FOR CONVERTING A PLURALITY OF SIGNALS REPRESENTATIVE OF DIGITAL BITS OF INFORMATION TO AN ANALOG SIGNAL

**Everett Reece Bishop, and Marcel Henri Leroux, both of Waynesboro, Va., assignors to General Electric Company, New York, N.Y.**

**Filed June 27, 1975, Ser. No. 590,940**
**Int. Cl.² H03K** *13/00*
**U.S. Cl. 340—347 DA** **10 Claims**




**1.** Apparatus for converting a plurality of signals representative of digital bits of information to an analog signal comprising:

a. first and second sets of shift registers for receiving the signals representative of the digital bits of information, each of said sets including a plurality of stages, wherein the last stage of each of said sets stores a signal representative of the least significant bit remaining within its respective set;

b. at least first and second switch means;

c. first and second storage means;

d. means for generating a series of timing pulses subsequent to the reception of the signals representative of the digital bits of information in said first and second sets of shift registers, the time between an initial timing pulse and a next successive timing pulse being determinative of a first predetermined period of time, and the time between each successive timing pulse and the preceeding timing pulse being determinative of successive predetermined periods of time;

e. means for applying said timing pulses to said first and second sets of shift registers and said first and second storage means, wherein each timing pulse effects the advance of the signals representative of digital bits of information left within stages other than the last stage of each set toward the respective last stage, and also effects the transfer of signals representative of the least significant bit of information left within each respective last stage of said respective first and second storage means to be stored therewithin for the respective predetermined period of time, the duration of each of the predetermined periods of time corresponding to the count of the higher order of the signals representative of the two particular bits being transferred to said respective first and second storage means;

f. means for coupling signals representative of each of successive pairs of bits of information from said first and second storage means to said first and second respective switch means to control the operation thereof for the respective predetermined periods of time;

g. an integrator; and

h. means for repetitively applying first and second signals to said integrator at respective magnitudes corresponding to the ratio between the count of each of the two bits represented by the signals being simultaneously transferred from said respective last stages of said first and second sets of shift registers at one moment, and for a duration controlled by the operation of said first and second switch means, whereby an analog signal is obtained from the output of said integrator, which analog signal is equal to the sum of the products of the magnitude of the signals applied to said integrator and the respective predetermined periods of time.

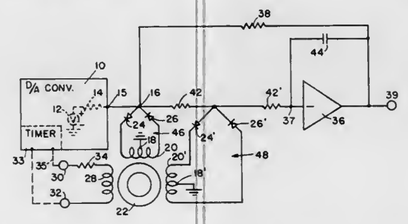


**4,016,559**

## DIGITAL-TO-ANALOG CONVERTER HAVING TRANSIENT SUPPRESSOR SYSTEM

**James J. Pastoriza, Lincoln, Mass., assignor to Analog Devices, Inc., Norwood, Mass.**

**Continuation of Ser. No. 442,734, Feb. 15, 1974, abandoned, which is a continuation of Ser. No. 219,477, Jan. 20, 1972, abandoned, which is a continuation of Ser. No. 885,110, Dec. 15, 1969, abandoned. This application Jan. 8, 1976, Ser. No. 647,431**
**Int. Cl.² H03K** *13/02*
**U.S. Cl. 340—347 DA** **7 Claims**




**4.** A digital-to-analog converter including a plurality of current-sources selectable by corresponding control switches individually activatable in accordance with the states of the respective binary bits of digital input words applied successively to said converter, the currents from the selected current sources being conductively connected to an analog signal circuit to be combined thereon to provide successive analog signals the magnitudes of which represent the successive digital input words respectively, said converter further including timing means arranged to provide a periodic momentary strobe pulse for timing the operation of all of said switches simultaneously at successive times to effect the transitions from one digital input word to the next successive digital input word, during a short time interval between said digital words, at which transition interval the magnitude of output current at said analog signal circuit typically shifts from one level to another level in accordance with the successive digital words; and output circuit means conductively coupled to said analog signal circuit for producing an output voltage corresponding to the magnitude of the current developed at said analog signal circuit;

transient suppressor apparatus responsive to and synchronized with said strobe pulse for preventing unwanted transient signals, such as voltage spikes due to asymmetries and/or effective non-simultaneity of operation of said current source switches, from causing corresponding unwanted signals in the output voltage produced by said output circuit means, said transient suppressor apparatus comprising:

a clamp circuit including first and second identical elements each having a pair of connection terminals, said element each comprising means developing between the respective pairs of terminals an electrical impedance which varies from a relatively large value, when there is no voltage across the pair of terminals and thus no conduction through said elements, to a relatively small value when there is applied across the pair of terminals a voltage of a predetermined magnitude;

means conductively connecting one terminal of each of said clamp circuit elements to said analog signal circuit;

said clamp circuit elements being normally non-conducting so that the clamp circuit does not affect the output current on said analog signal circuit;

pulse-producing means having a pair of output points and arranged when activated by a control pulse to develop between said output points and a common reference point respective pulses of positive and negative voltage of said predetermined magnitude with respect to said common reference point;

means connecting said output points respectively to the other terminals of said pairs of impedance element terminals to apply said pulse of positive and negative voltage respectively across said impedance elements, the impedances of said impedance elements with said pulse voltages applied being such that the potential of the common connection of said elements, and thus the potential of said analog signal circuit, is driven to said reference potential during the time said positive and negative pulses are applied to said impedance elements;

means directing to said pulse-producing means clock pulses derived from and synchronized with said strobe pulse to serve as said control pulses, the potential of said analog signal circuit during each clock pulse being driven to said reference potential and said impedance elements absorbing unwanted transient currents from said analog signal circuit during the time of said clock pulse;

said output circuit means including amplifier means having an input terminal conductively coupled to said analog signal circuit and an output for producing said output voltage corresponding to current directed from said analog signal circuit to said amplifier input terminal; and

memory means coupled to the output of said amplifier to hold the output signal effectively constant during the time of said clock pulse to provide for a smooth transition from one digital word to the next digital word while the potential of said analog signal circuit is driven to said reference potential to absorb unwanted transient current therefrom.

**6.** Apparatus as claimed in claim **4**, wherein said memory means comprises capacitor means connected in a negative feedback circuit between the output and the input terminal of said amplifier; and

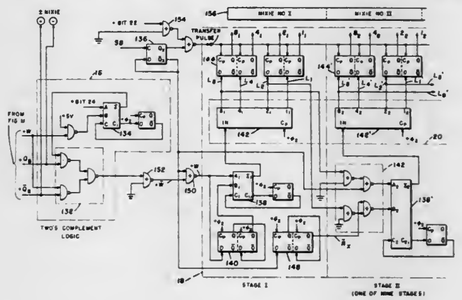
resistive means between said analog signal circuit and said amplifier input terminal to cooperate with said capacitor means to provide an integration effect permitting momentary transistory shift of the potential of said analog signal circuit to said reference potential without significant change in the output signal from said amplifier.

**4,016,560**

## FRACTIONAL BINARY TO DECIMAL CONVERTER

**Robert W. Fowler, Silver Spring, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Mar. 9, 1976, Ser. No. 665,217**
**Int. Cl.² G06F** *5/00*
**U.S. Cl. 340—347 DD** **10 Claims**




**1.** An apparatus for converting an *n*-bit binary fraction word into a word in decimal form comprising:

a read-in line on which the *n* bits of a binary fraction word are carried,
means for generating a word pulse during the *n* bits of alternating word-times,
means connected to the word pulse generator for shifting the word pulse two bits in the direction of higher significance, thereby generating a shifted pulse,
a first stage having the binary fraction word on the read-in line as an input,
a series of successive stages, connected to and in seriatim following the first stage, each successive stage having as an input a remaining binary fraction generated by its preceding stage, wherein the first stage and each successive stage comprises:
means for ANDING the input of each stage with the generated word pulse from the word-pulse generating means thereby producing a first gate input,
means for shifting the input two bits in the direction of higher significance, thereby generating a shifted input,
means for ANDing the shifted input of each stage with the shifted word pulse, thereby producing a second gate-input,
means for summing the first gate-input and the second gate-input thereby producing a summed output,
means for shifting the summed output two bits in the direction of higher significance, thereby generating the input for the next successive stage, and
means for grouping together the four most significant bits of each generated input as a binary-coded decimal, and
means for ordering the binary-coded decimals in decreasing significance for successive stages.

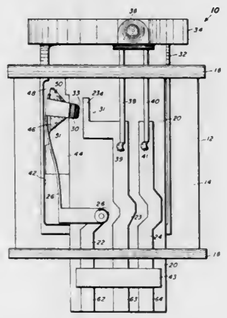
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**4,016,561**

## PUSH BUTTON SWITCH WITH INDICATOR

**Ralph L. Parker, Melbourne Beach, and Daniel B. Hoskins, Maitland, both of Fla., assignors to TRW Inc., Los Angeles, Calif.**

**Filed June 28, 1974, Ser. No. 484,062**
**Int. Cl.² G09F 9/14**
**U.S. Cl. 340—381** **10 Claims**



1. A switch comprising:
a housing;
a shaft movable into and out of said housing;
two conductive paths carried by said housing, one of said conductive paths comprising a spring clip having an end portion biased normally to one side of, and out of contact with the other of said conductive paths;
means for moving one of said conductive paths across the other of said conductive paths responsive to movement of said shaft;
an electrical circuit element energized responsive only to interconnection of said two conductive paths;
means for maintaining said circuit element energized for a period of time independent of said movement of said shaft;
means for preventing movement of said one conductive path across the other of said conductive paths during movement of said shaft out of said housing, this means comprising a cam carried by said shaft, said cam including;
a straight shoulder substantially parallel with said shaft for holding said spring clip away from said other conductive path such that said end portion thereof is held on a side of said other conductive path opposite said one side during engagement with said shoulder,
said conductive path interconnecting means including a tip along said shoulder for releasing said clip whereby said end portion moves along said other conductive path to said one side thereof;
a beveled surface for camming said end portion out of contact with said other conductive path during movement of said shaft out of said housing; and wherein said spring clip includes means for engaging said cam during movement of said shaft into and out of said housing.

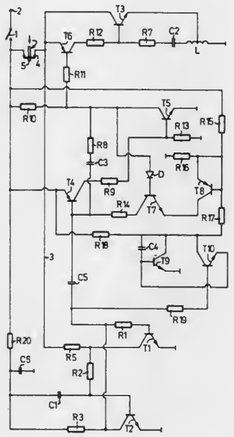
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**4,016,562**

## SWITCH-OFF DEVICE FOR ELECTRICALLY OPERATED CLOCK ALARM AND CONTROL THEREFOR

**Erich Gerum, Nurnberg, Germany, assignor to DIEHL, Nurnberg, Germany**

**Filed June 2, 1975, Ser. No. 582,908**
**Claims priority, application Germany, June 7, 1974, 2427589**
**Int. Cl.² G08B 3/10**
**U.S. Cl. 340—384 E** **6 Claims**



1. In an electrically operable alarm for a clock having first and second switches as well as a source of power therewith; an oscillatory circuit activatable by the first switch of the clock at a selectable time and operable when oscillating to cause the alarm to sound, a bistable switching sweep circuit having at least one branch and connected between one side of the source of electric power and said oscillatory circuit and having a first condition in which said oscillatory circuit is operable to oscillate when the first switch is closed and having a second condition in which said oscillatory circuit does not oscillate in response of the operation of the second switch, the improvement therewith comprising in combination: the second switch being connected in one branch of said bistable switching sweep circuit, means for momentarily opening said second switch causing said bistable switching circuit to go to said second condition and to stay in said condition until the first switch is opened and further means for permanently opening said second switch causing said bistable switching sweep circuit to stay in said second condition when said first switch is closed.



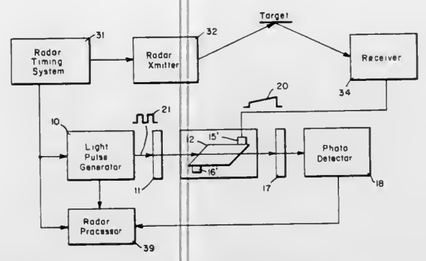
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**4,016,563**

## METHOD AND APPARATUS FOR ACOUSTO-OPTIC PULSE COMPRESSION

**Melvin E. Pedinoff, Canoga Park, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.**

**Filed May 27, 1975, Ser. No. 581,398**
**Int. Cl.² G01S 9/00; G06G 7/19**
**U.S. Cl. 343—5 SA** **16 Claims**




1. A method of changing the time scale of signal information represented by the modulation of a pulse of carrier energy, said method comprising the steps of:
a. transmitting a pulse of acoustic energy modulated to represent said information in a first time scale through an optically anisotropic medium capable of producing colinear acousto-optic diffraction;
b. transmitting a pulse of optical energy of a first predetermined polarization state through said medium colinearly with said pulse of acoustic energy while said acoustic pulse is in said medium to interact therewith in said medium to diffract said light pulse from said first polarization state to a second polarization state during the time interval of said interaction;
c. detecting only the light pulse emitted from said medium in said second polarization state to detect said signal information in a second time scale; and
d. controlling the relationship between the time duration of said pulse of acoustic energy and the time duration of said pulse of optical energy of said first predetermined polarization state to produce a predetermined relationship between said first and second time scales of said signal information as a function of said controlled relationship between said time durations of said pulses and of the relationship between the respective velocities of said acoustic and optical pulses.

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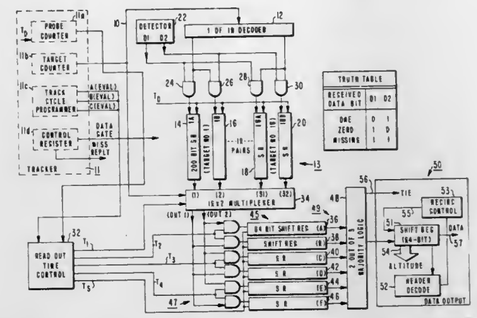
**4,016,564**

## MULTIPLE TARGET DATA RECEIVER FOR A COLLISION AVOIDANCE SYSTEM

**Walter Lee Ross, Simi Valley, Calif., assignor to RCA Corporation, New York, N.Y.**

**Filed Dec. 22, 1975, Ser. No. 643,479**
**Claims priority, application United Kingdom, Apr. 14, 1975, 15221/75**
**Int. Cl.² G01S 9/56**
**U.S. Cl. 343—6.5 LC** **5 Claims**

1. In combination,
means for receiving reply signals generated by remote stations in response to probe signals from interrogating stations, said reply signals being adapted to be received in an environment wherein signals of a type different from said reply signals may be received, all of said received signals being of predetermined duration and having a characteristic indicia of either a binary logic value of one or zero,
means for detecting said received signals and generating therefrom digital signals representing a binary bit corresponding to said logic value,
means for sampling said digital signals and generating therefrom a plurality of sampled signals, each sampled signal having a duration substantially less than said predetermined duration, and
means for comparing the relative duration of sampled signals of one logic value with that of sampled signals of the opposite value to generate a multi-bit digital output signal manifesting a first or second binary logic value, which corresponds to that of a valid received reply signal, in accordance with the longer of said compared sampled signals or manifesting a third binary logic value, which corresponds to the absence of a valid received reply signal, when the duration of said compared sampled signals is equal.



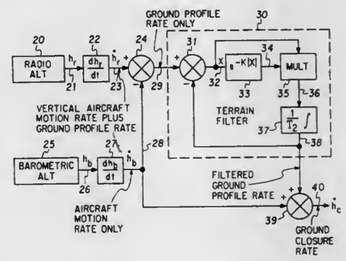

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**4,016,565**

## AIRCRAFT GROUND CLOSURE RATE FILTERING METHOD AND MEANS

**Ferman L. Walker, Cedar Rapids, Iowa, assignor to Rockwell International Corporation, El Segundo, Calif.**

**Filed Sept. 15, 1975, Ser. No. 613,380**
**Int. Cl.² G01S 9/04; G06F 15/50**
**U.S. Cl. 343—7 TA** **8 Claims**




1. Signal development means for deriving an output signal definitive of the elevation rate of change between an aircraft and underlying ground terrain comprising:
first means for developing a first signal definitive of the absolute closure rate between aircraft and underlying ground terrain,
second means for developing a second signal definitive of barometrically determined aircraft rate of change of altitude,
means for subtractively combining said first and second signals to develop a third signal definitive of the rate of change of terrain profile,
filtering means; said filtering means comprising a signal integrating means, signal correlation responsive means comprising a further signal combining means receiving said third signal and the output of said signal integrating means as respective inputs thereto and responsive to an exponential correlation therebetween to provide a corre-

lation defined output signal, said correlation defined output signal being applied as input to said signal integrating means;

the output of said signal integrating means comprising the output of said filtering means; still further signal combining means additively combining said second signal and said output of said filtering means; and

the output of said still further signal combining means comprising said output signal.

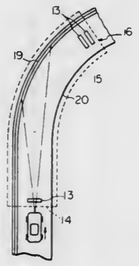
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**4,016,566**

## METHOD FOR AVOIDING UNWANTED ECHO SIGNALS AND AUTOMOTIVE RADAR EMBODYING SAME

**Norio Fujiki, Yokohama, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan**

**Filed Dec. 22, 1975, Ser. No. 643,128**
**Claims priority, application Japan, Dec. 24, 1974, 49-1561**
**Int. Cl.² G01S 9/04**
**U.S. Cl. 343—7 VM** **11 Claims**




**4.** A radar system mounted on a motor vehicle for detecting the presence of an object in front of the vehicle, comprising:

means for transmitting a beam of electromagnetic radiation;

means for receiving a signal reflected from the object;

means for sensing the presence of a predetermined zone through which the vehicle passes; and

means responsive to the sensing means for limiting the range of the reflected signal to a short range when the vehicle moves in said zone and restoring said range to a long range when the vehicle leaves the zone.

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**4,016,567**

## CCD RANGE-DOPPLER PROCESSOR

**Dennis Darcy Buss, Cambridge, Mass., assignor to Texas Instruments Incorporated, Dallas, Tex.**

**Division of Ser. No. 483,337, June 24, 1974, Pat. No. 3,942,035. This application Nov. 6, 1975, Ser. No. 629,246**
**Int. Cl.² G01S 9/42**
**U.S. Cl. 343—7.7** **13 Claims**

**1.** Doppler range processing apparatus including means for premultiplying time sampled radar signal returns to provide up-chirp multiplication of said time sampled signals;

charge transfer device shift register means having *N* storage bits for storing respective up-chirp weighted samples of said radar return signals occuring during a pulse repetition interval;

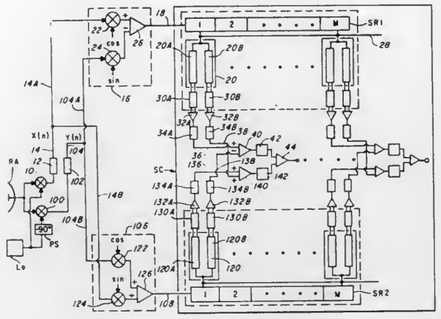
for each bit of said shift register means, first and second charge transfer device chirp Z-transform filters;

transfer means for transferring signals stored in the bits of said shift register as inputs to the respective first and second chirp filters for each respective bit;

said first chirp filters being adapted to provide in-phase weighting of said input signals thereto;

said second chirp filters being adapted to provide quadrature-phase weighting of said input signals thereto;

means connecting said filter outputs to means for summing




and squaring weighted signal outputs from said filters.

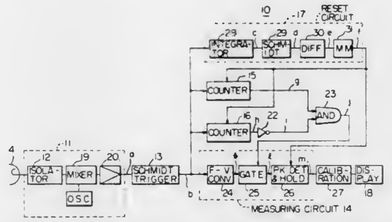
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**4,016,568**

## METHOD AND SYSTEM FOR MEASURING DOPPLER FREQUENCY SHIFT OF AN ECHO

**Mistuo Makimoto; Sadahiko Yamashita, both of Kawasaki; Yoshiharu Yano, and Junichi Yamamoto, both of Yokohama, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan**

**Filed Dec. 31, 1974, Ser. No. 537,767**
**Claims priority, application Japan, Jan. 18, 1974, 49-8896**
**Int. Cl.² G01S 9/44**
**U.S. Cl. 343—8** **10 Claims**




**1.** A method of measuring a velocity of a moving object, comprising the steps of:

transmitting a diverging beam of electromagnetic radiation in a direction so that the moving object traverses the beam of electromagnetic radiation;

receiving electromagnetic radiation reflected from the moving object, which electromagnetic radiation has an instantaneous Doppler frequency component that varies in frequency as a function of time as the moving object traverses the beam of electromagnetic radiation;

detecting the Doppler frequency component of the reflected electromagnetic radiation to develop an oscillatory Doppler signal oscillating at the Doppler frequency;

counting a predetermined number of the oscillations of the Doppler signal after the Doppler frequency component is first detected; and

detecting the maximum frequency of the Doppler oscillations which occur after the predetermined number of Doppler oscillations have been counted, which maximum frequency is representative of a velocity of the moving object.

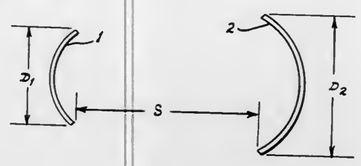


**4,016,569**

## NEAR FIELD ANTENNA BORESIGHT ALIGNMENT APPARATUS

**Edgar W. Buebel, Jr., Cockeysville, Md., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**

**Filed Oct. 3, 1975, Ser. No. 619,152**
**Int. Cl.² G01R 29/10**
**U.S. Cl. 343—703** **1 Claim**




**1.** In combination with an antenna that utilizes boresight alignment apparatus of the type wherein standard practice requires 2 $D^2/\lambda$ spacing between antenna and test antenna, D being the antenna aperture diameter and $\lambda$ being the wavelength of the antenna operating frequency, the improvement wherein the spacing between antenna and test antenna is reduced while achieving the same results as standard practice apparatus said improvement comprising

a test antenna having an aperture approximately 20 percent greater than the aperture of said antenna, said test antenna being positioned to receive radiation transmitted by said antenna at a distance therefrom of approximately 0.15 $D^2/\lambda$.

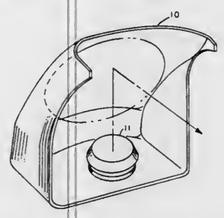
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**4,016,570**

## CONSTANT BEAM WIDTH ANTENNA REFLECTOR

**Kenneth D. Arkind, Groton, Mass., and Bernard L. Geddry, Nashua, N.H., assignors to Sanders Associates, Inc., Nashua, N.H.**

**Filed Feb. 5, 1976, Ser. No. 655,344**
**Int. Cl.² H01Q 19/12**
**U.S. Cl. 343—781 R** **8 Claims**




**1.** An antenna reflector surface described by a first curve derived by multiplying each of the cartesian coordinate defined points listed below by the focal length in inches of the reflector

TABLE 12

| X | Y |
|---|---|
| 1.2208106 inches | 1.37520 inches |
| 1.1505312 | 1.36100 |
| 1.0814748 | 1.34218 |
| 1.0150528 | 1.32120 |
| 0.9515473 | 1.29862 |
| 0.8907702 | 1.27472 |
| 0.8329097 | 1.24979 |
| 0.7777775 | 1.22401 |
| 0.7253737 | 1.19748 |
| 0.6756042 | 1.17029 |
| 0.6282809 | 1.14262 |
| 0.5834978 | 1.11459 |
| 0.5409726 | 1.08618 |
| 0.5007995 | 1.05758 |
| 0.4627903 | 1.02879 |
| 0.4268509 | 1.00000 |

TABLE 12-continued

| X | Y |
|---|---|
| 0.3928872 | 0.97102 |
| 0.3609934 | 0.94214 |
| 0.330887 | 0.91335 |
| 0.3024742 | 0.88465 |
| 0.275849 | 0.85615 |
| 0.2509172 | 0.82783 |
| 0.2273966 | 0.79970 |
| 0.2054755 | 0.77194 |
| 0.1849656 | 0.74438 |
| 0.1657728 | 0.71719 |
| 0.1478972 | 0.69038 |
| 0.1312446 | 0.66384 |
| 0.1158151 | 0.63778 |
| 0.1014206 | 0.61200 |
| 0.0882491 | 0.58651 |
| 0.0760184 | 0.56148 |
| 0.0648226 | 0.53674 |
| 0.0545676 | 0.51238 |
| 0.0453476 | 0.48829 |
| 0.0369743 | 0.46467 |
| 0.0294477 | 0.44134 |
| 0.0228619 | 0.41838 |
| 0.0170288 | 0.39571 |
| 0.0121366 | 0.37341 |
| 0.0079969 | 0.35149 |
| 0.0047041 | 0.32985 |
| 0.0022579 | 0.30850 |
| 0.0006585 | 0.28742 |
| 0.0003763 | 0.26672 |
| 0 | 0.24621 |

where the focal length of the reflector is the distance in inches from a feed illuminating said reflector to the central point of said first curve and the remainder of the reflector surface is described by a family of curves, each curve lying in its own planar surface, with the physical center of each of the family of curves coinciding with a point on said first curve and the planar surfaces containing each of the family of curves orthogonal to the plane containing said first curve and said antenna reflector surface providing constant elevation beam width for any frequency of radiation illuminating said reflector surface.

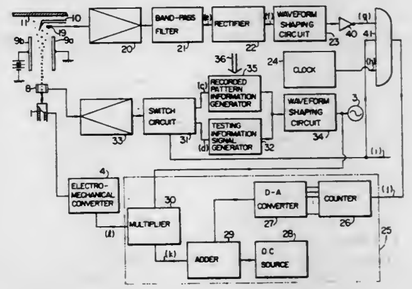
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**4,016,571**

## INK JET RECORDING APPARATUS

**Takahiro Yamada, Hitachi, Japan, assignor to Hitachi, Ltd., Japan**

**Filed Sept. 12, 1975, Ser. No. 612,960**
**Claims priority, application Japan, Sept. 17, 1974, 49-106080**
**Int. Cl.² G01D 18/00**
**U.S. Cl. 346—75** **8 Claims**




**1.** In a recording apparatus of the ink jet type including a high frequency voltage source, nozzle means supplied with ink under pressure for generating an ink stream along a predetermined path, and electro-mechanical converter means for vibrating said nozzle means to cause said ink stream to break up into a stream of regularly spaced ink droplets, a system for control of said ink droplets comprising:

first circuit means for applying to said electro-mechanical converter a voltage for vibrating said nozzle means in synchronism with the output voltage of said high frequency voltage source so as to cause said ink stream to break up into ink droplets of larger and smaller size;

a charging electrode disposed along said predetermined path at the point of separation of said droplets from said ink stream for inducing an electrical charge in said droplets;

deflection means disposed along said predetermined path downstream of said charging electrode for providing a constant electrostatic field across said predetermined path to cause deflection of said droplets to a degree depending on the electrical charge induced therein;

second circuit means for generating a recording information signal voltage of square waveform whose center is in synchronism with a predetermined phase of the output voltage of said high frequency voltage source and whose amplitude is equivalent to the charge required to impart a desired amount of deflection to a droplet in said deflection electrostatic field;

third circuit means for generating a test information signal voltage having a narrower square waveform than said recording information signal voltage and being in synchronism with the output voltage of said high frequency voltage source so as to impart a predetermined charge to said ink droplets and occur only in synchronism with the generation of said droplets of smaller size;

switching means for selectively connecting the outputs of said second and third circuit means to said charging electrodes at different time periods;

catcher means disposed along said predetermined path downstream of said deflection means to intercept ink droplets which have no induced electrical charge;

detector means for detecting said ink droplets of smaller size properly charged by the voltage of said test information signal voltage;

decision circuit means responsive to the output of said detector means for determining whether said ink droplets of smaller size are properly produced and charged by the voltage of said test information signal; and

correction circuit means responsive to the output of said decision circuit means for controlling the magnitude of the output voltage of said first circuit means to adjust the point of droplet separation from said ink stream.

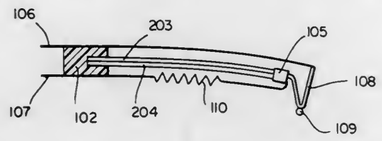
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**4,016,572**

## THERMOGRAPHIC STYLUS WITH INHERENT PRESSURE CONTROL

**James R. Hubbard, Moorestown, N.J., assignor to Graphic Controls Corporation, Buffalo, N.Y.**

**Filed Mar. 15, 1976, Ser. No. 667,029**
**Int. Cl.² G01D** *15/16*, *15/10*; **H05B** *1/00*
**U.S. Cl. 346—139 C** **13 Claims**




**1.** Thermographic apparatus for recording a line traced by a heated scribing element on a writing platen comprising:

a. a spring element including bonded metallic members having different thermal expansion coefficients and extending between a mounting block and said scribing element; and

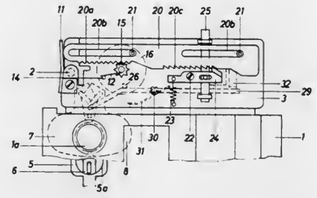
b. heating means, adapted to heat said spring and connected to an electrical circuit, said spring element and said heating means being adapted to vary the pressure of said scribing element against said platen by changes of power input to said circuit.

**4,016,573**

## SHUTTER CONTROL FOR PHOTOGRAPHIC CAMERA APPARATUS

**Dieter Mücke, Wildbad, Germany, assignor to Prontor-Werk, Alfred Gauthier GmbH, Postfach, Germany**

**Filed Sept. 8, 1975, Ser. No. 610,961**
**Claims priority, application Germany, Sept. 7, 1974, 2442939**
**Int. Cl.² G03B** *7/14*, *9/00*
**U.S. Cl. 354—26** **9 Claims**




**1.** A driving device for an automatic time aperture shutter, the opening system of which, covering the exposure opening, is movable from the closed to the open position by means of a spring drive and interposed movable masses having a relatively low speed, the spring drive of the opening system including a relatively strong spring adequate for overcoming the inertia of masses to be accelerated and coming into effect only during the initial movement phase of these masses, and a further relatively weak spring which provides a substantially uniform movement of the masses to be accelerated and acts continuously thereon.

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**4,016,574**

## PROGRAM-CONTROLLED SHUTTER

**Hiroshi Iwata, Osaka, and Katsuji Ishikawa, Daito, both of Japan, assignors to West Electric Company, Ltd., Japan**

**Filed Apr. 17, 1975, Ser. No. 569,006**
**Claims priority, application Japan, Apr. 23, 1974, 49-46280**
**Int. Cl.² G03B** *7/14*
**U.S. Cl. 354—29** **19 Claims**

**13.** A program controlled shutter for a camera lens comprisng

a. an exposure control mechanism comprising

a plurality of shutter blades having aperture defining portions, and driving means for stepwise opening and closing said shutter blades in response to the application thereto of opening and closing pulse signals;

b. photocell means for detecting the brightness of a subject;

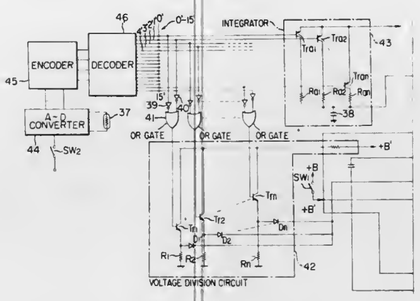
c. first converter means for converting the analog output signal from said photocell means into a digital signal;

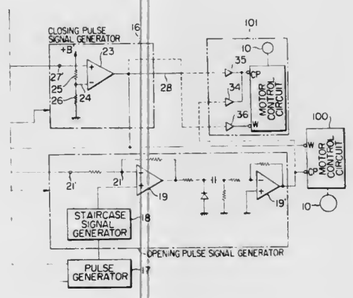
d. second converter means for converting the output from said first converter means into a binary coded decimal signal;

e. third converter means connected to said second converter means and provided with a plurality of output terminals said third converter means comprising means for generating, in response to binary coded decimal signals from said second converter, an output signal which appears selectively at one output terminal of said plurality of output terminals, said third converter means providing said output signal continuously;

f. opening pulse signal generating means for generating said opening pulse signal in response to said output signal from said third converter means and for applying said opeing pulse signal to said driving means, thereby opening said shutter blades so as to stop down the camera lens to a determined *f*-number depending upon the brightness of the subject;

g. closing pulse signal generating means operating independently of said opening pulse signal generating means for generating said closing pulse signal in response to said output signal from said third converter means and for applying said closing pulse signal to said driving means, thereby closing said shutter blades after a determined exposure time depending upon the brightness of the subject;




h. power supply means for supplying power to said exposure control mechanism, said opening and closing pulse signal generating means and to said first second and third converter means; whereby said exposure time depends upon the brightness of the subject.

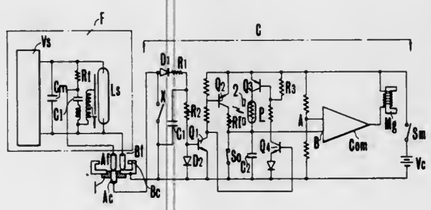
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**4,016,575**

## EXPOSURE CONTROL SYSTEM FOR FLASH PHOTOGRAPHY

**Takashi Uchiyama, Yokohama; Yukio Mashimo, Tokyo, and Zenzo Nakamura, Urawa, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Mar. 31, 1975, Ser. No. 563,463**
**Claims priority, application Japan, Apr. 3, 1974, 49-37645; July 15, 1974, 49-80841**
**Int. Cl.² G03B** *7/16*, *15/03*
**U.S. Cl. 354—33** **32 Claims**




**1.** An exposure control system for a photographic apparatus comprising:

A. an electronic flash device;

B. electrical energy storing means for flash illumination;

C. means for causing the electrical energy of said storing means to be discharged through said flash device, thereby a photographic subject is illuminated with flash light from said flash device;

D. detecting means connected to said storing means for detecting the attainment of a predetermined voltage developed by said stored charge of said storing means as the critical level for assuring the firing of said flash device;

E. shutter means for unblocking and blocking an exposure aperture to establish an exposure interval;

F. shutter adjusting means operatively connected to said shutter means for adjusting said shutter means to one of at least two settings of different exposure interval, said possible settings providing corresponding exposure intervals including one suited for taking photographs with flash illumination from said firing flash device and one not suited for making an exposure in flash mode but for use in daylight photography;

G. automatic changeover means responsive to an output signal of said detecting means and associated with said shutter adjusting means for selectively switching said adjusting means to an operative condition providing said flash exposure interval automatically in response to attainment of the voltage of said storing means to said critical voltage level of said flash device, whereby said shutter means is adjusted to the setting providing said flash exposure interval.

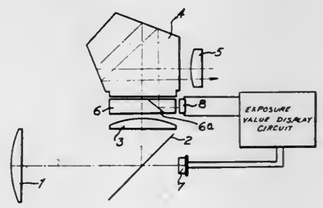
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**4,016,576**

## EXPOSURE VALUE DISPLAY FOR CAMERAS

**Katsuhiko Nomura, Kawagoe, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Japan**

**Filed July 8, 1975, Ser. No. 593,974**
**Claims priority, application Japan, July 12, 1974, 49-81542**
**Int. Cl.² G03B** *17/20*
**U.S. Cl. 354—55** **4 Claims**




**1.** In a camera, objective means for receiving light from an object which is to be photographed, viewfinder means for providing an image of the object which is to be photographed, luminous display means for displaying a luminous exposure value, and reflector means having with respect to said objective means, said luminous display means, and said viewfinder means a position for reflecting to said viewfinder means both an image of the object which is to be photographed as well as an image of the exposure value provided by said luminous display means, whereby the operator when looking into the viewfinder will see the exposure value superimposed on the image of the object which is to be photographed, said reflector means including a lower reflector situated behind said objective means for reflecting from the latter into said viewfinder means an image of the object which is to be photographed and an upper reflector situated higher than said lower reflector but beneath said viewfinder means with said luminous display means being situated at the same elevation as said upper reflector for directing to the latter light from the luminous exposure value, and said upper reflector directing into said viewfinder means an image of said luminous display value, said upper reflector being situated between said lower reflector and said viewfinder means, a focusing means being situ-

ated between said upper and lower reflectors for receiving from said lower reflector an image of the object to be photographed and for focusing said image with respect to said viewfinder means, said upper reflector being situated between said focusing means and said viewfinder means and being in the form of a semi-transparent reflector for reflecting light from said luminous display means as well as for providing for passage of light from said focusing means to said viewfinder means.

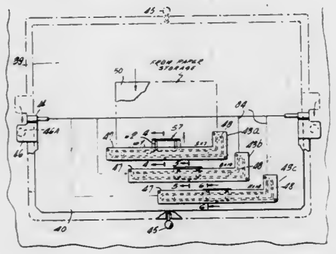
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**4,016,577**

## PHOTOPRINTING AND PROCESSING DEVICE

**Philip E. Hensy, Plantation, and Morey R. Zuber, Fort Lauderdale, both of Fla., assignors to Visual Graphics Corporation, Tamarack, Fla.**

**Filed July 7, 1975, Ser. No. 593,879**
**Int. Cl.² G03B** *29/00, 27/58*
**U.S. Cl. 354—78** **9 Claims**



1. A combined camera and processing device comprising an elongated base, an indicia carrying section at one end of said base, an exposing section at the other end of the base, a light source for the indicia carrying section, optical means to direct the light coming from the indicia carrying section into the exposing section, a light tight exposing chamber in the exposing section, a window in the said chamber, a transparent plate in said window to receive the light from the indicia carrying section therethrough, a pressure plate overlying the transparent plate, a source of photosensitive material in communication with the interior of the exposing chamber, stop members carried by the pressure plate to orient photosensitive material upon the transparent plate, a control panel at the exposing section end of the camera, and at least one processor for the photosensitive material adjacent to and in communication with the interior of the exposure chamber to receive and process exposed photosenstive material.

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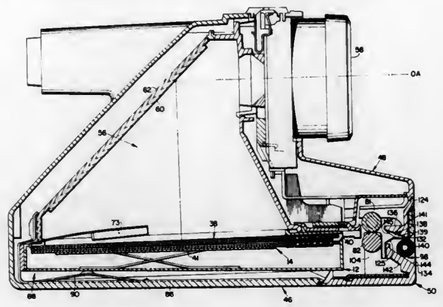
**4,016,578**

## PROCESSING FLUID FLOW CONTROL DEVICE FOR SELF DEVELOPING CAMERA

**Harvey S. Friedman, Natick, Mass., assignor to Polaroid Corporation, Cambridge, Mass.**

**Filed Jan. 13, 1976, Ser. No. 648,672**
**Int. Cl.² G03B** *17/50*
**U.S. Cl. 354—86** **20 Claims**

1. Photographic apparatus comprising:
means for spreading a mass of fluid in a substantially thin layer between a pair of sheet materials, said fluid spreading means including a pair of elongated juxtaposed pressure-applying members between which the sheet materials may be advanced in superposed relationship; and
means for reducing the thickness of the layer of fluid spread between the superposed sheet materials by said fluid spreading means in the vicinity of both opposed longitudinal edges of the superposed sheet materials relative to the thickness of the layer of the fluid spread between the superposed sheet materials by said fluid spreading means adjacent their longitudinal center portions, said fluid thickness reducing means being positioned to engage the leading transverse edges of the superposed sheet materials as they emerge from between said pressure-applying



members while a major portion of the sheet materials still remain on the opposite side of said pressure-applying members from said fluid thickness reducing means.

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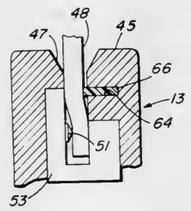
**4,016,579**

## FLASH MOUNTING MEANS FOR CAMERA WITH FOLDING VIEWFINDER

**John A. Lewis, Jr., Stoneham, Mass., assignor to Polaroid Corporation, Cambridge, Mass.**

**Filed Apr. 21, 1975, Ser. No. 569,749**
**Int. Cl.² G03B** *15/03, 13/02*
**U.S. Cl. 354—126** **4 Claims**





4. A camera for use with a flash array of the type including a connection blade having terminals on at least one side thereof, said camera comprising:
a camera housing;
a viewfinder mounted on said camera housing for movement between collapsed and erected positions and including a viewfinder cap pivotally mounted near one end thereof for pivotal movement between collapsed and erected positions and a spring for urging the viewfinder into its erected position, said viewfinder cap including a socket within said viewfinder cap near an end thereof opposite said one end, and means for defining a slot in said viewfinder cap communicating with said socket and through which the blade of such a flash array is adapted to be inserted into said socket;
a plug of insulating material having a set of contacts thereon adapted to engage the terminals on one side of the blade of such a flash array, said plug being configured to be located within said socket with said set of contacts thereon positioned near one side of said socket to engage such terminals;
a plug retaining clip for retaining said plug in its position within said socket, said plug retaining clip being bent over at its ends to form securing ears;
a pair of posts within said viewfinder cap to which said securing ears are attached for securing said retaining clip to said viewfinder cap, said viewfinder cap and said posts being formed as an integrally molded structure; and
a resilient friction tab mounted in said viewfinder cap and extending into said socket from a side thereof opposite said one side for engaging the opposite side of the blade to urge said blade towards said contacts thereby increasing the gripping force on the blade to prevent its ejection from the socket when said viewfinder cap is urged into its erected position under the influence of said spring.



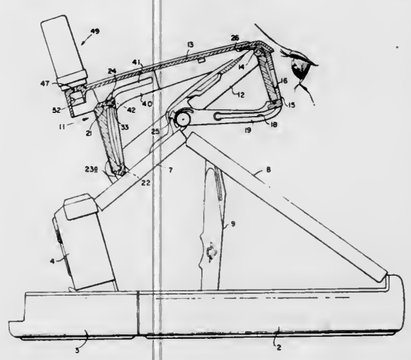
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**4,016,580**

## FOLDING VIEWFINDING AND FLASH MOUNTING ASSEMBLY

**Patrick L. Finelli, Sudbury, Mass., assignor to Polaroid Corporation, Cambridge, Mass.**

**Filed Apr. 21, 1975, Ser. No. 569,750**
**Int. Cl.² G03B** *15/03, 13/06*
**U.S. Cl. 354—126** **7 Claims**



1. A viewfinder and flash mounting assembly capable of being readily mounted on a camera during the construction thereof and comprising, in combination, a base member adapted to form a portion of the housing of the camera, a pair of spaced parallel arms formed integrally with and extending from said base member, a viewfinder cap, an eye lens assembly, means pivotally mounting ends of said cap and said eye lens assembly to ends of said arms for rotation about a common first axis, means guidingly coupling said eye lens assembly to an intermediate portion of said arms for movement between erect and collapsed positions, spring means acting between said cap and said base member for urging said cap toward an erect position, means forming a flash receptacle in said cap at an end remote from said first axis, a flexible connector cable joined to said receptacle and adapted to be connected to a corresponding cable in the camera, an objective lens assembly, means mounting said objective lens assembly on said cap at an end thereof adjacent said receptacle for guided movement between an erect and a collapsed position, and means for pivotally mounting said objective lens assembly on said base member comprising a pair of pivot pins formed integral with said objective lens assembly, a pair of posts formed integral with said base member, and a coupling clip, one of said posts being formed with a recess adapted to receive and constrain one of said pins for rotation about a second axis, the other of said pins being formed with an open slot adapted to receive the other of said pins, and said coupling clip comprising means adapted to be fastened over said post and cover said slot after said pin is in place to constrain said pin for rotation about said second axis.

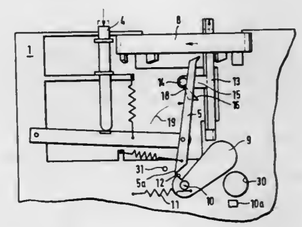
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**4,016,581**

## SHUTTER DRIVE SYNCHRONOUSLY SET WITH FILM FRAME AND FLASH CUBE SET

**Karl Heinz Lange, Bunde, Germany, assignor to Balda-Werke, Germany**

**Filed Sept. 12, 1975, Ser. No. 612,998**
**Claims priority, application Germany, Sept. 26, 1974, 2446084**
**Int. Cl.² G03B** *15/03*
**U.S. Cl. 354—144** **14 Claims**



10. In a camera of the type including a housing and a shuttered objective, flash cube assembly, and film transport assembly mounted in the housing, the improvement comprising a shutter release assembly mounted in the camera housing, and means mounted in said camera housing for synchronously resetting the shutter release assembly and for rotating the flash cube assembly as film is transported by the film transport assembly to show a next unexposed frame of film, said means including an intermediate wheel rotatably mounted to said housing adapted for operative coupling with and rotative driving by said film transport assembly, means for rotating said flash cube assembly, said flash cube assembly rotating means mounted within said intermediate wheel for cooperative interengagement with said intermediate wheel, the axes of rotation of said intermediate wheel and said flash cube assembly being non-concentric.

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**4,016,582**

## PHOTOGRAPHIC SYSTEM ACCOMMODATING INDEPENDENT INSERTION AND REMOVAL OF BATTERY AND FILM ASSEMBLAGES

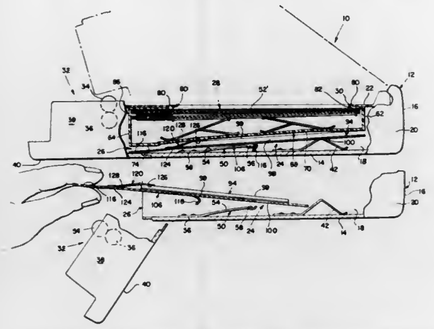
**Richard R. Wareham, Marblehead, Mass., assignor to Polaroid Corporation, Cambridge, Mass.**

**Filed June 9, 1975, Ser. No. 584,989**
**Int. Cl.² G03B** *17/26;* **H01M** *2/02*
**U.S. Cl. 354—275** **17 Claims**

1. A photographic system comprising:
means for effecting a photographic exposure, said means requiring a source of electrical energy for operation thereof and having a chamber therein defining an exposure plane and adapted for receipt of a film assemblage, the chamber additionally including electrical contacts for connecting to the source of electrical energy;
a film assemblage having opposed outside major surfaces adapted for receipt within the chamber with at least one outside major surface thereof in substantial coincidence

with respect to said exposure plane, said film assemblage being readily insertable and withdrawable from said chamber;

a source of electrical energy having opposed outside major surfaces for stationing within the chamber in electrically conductive relation with respect to the electrical contacts therein wherein one outside major surface of said energy source nests in substantial juxtaposition with respect to the other major surface of said film assemblage subse-



quent to the insertion of said film assemblage and energy source within the chamber; and

means for releasably retaining said energy source within the chamber upon insertion thereof in order to permit the independent insertion and withdrawal of said film assemblages from the chamber without simultaneously removing said energy source therefrom so that said energy source may be selectively removed from the chamber subsequent to the removal of any one of said film assemblages.

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**4,016,583**

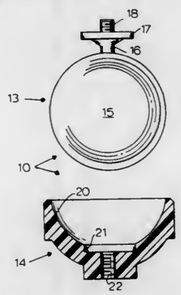
**CAMERA STEADYING DEVICE**

**Calvin B. Yeates, 21158 Bank Mill Road, Saratoga, Calif. 95070**

**Filed June 24, 1975, Ser. No. 589,662**

**Int. Cl. G03b** *17/56*

**U.S. Cl. 354—293** **6 Claims**



**1.** A camera steadying device for use with a tripod or tripod head having a projecting threaded stud and a camera with an interiorly-threaded receptacle for said stud, including in combination:

a first member for ready and easy attachment to and detachment from a said tripod providing a cup with a stud-receiving interiorly threaded receptacle extending through a bottom portion thereof,

a second member for ready and easy attachment to and detachment from a said camera having a camera-attachment threaded projection for fitting in the camera's said interiorly-threaded receptacle and a ball portion depending from said projection for fitting rotatably in said cup for support thereby without attachment thereto, said ball portion being accessible to the hands of the user after being fitted in said cup with the camera on it, said second member being freely rotatable in said first member and instantly removable therefrom and being held in place during use by one hand of the user at any desired position, with some portion of the hand engaging said first member and other portions engaging said second member,

whereby the camera can be supported by the tripod without attachment thereto and hence can instantly be separated therefrom.

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**4,016,584**

**SHUTTER CHARGE DEVICE FOR LENS SHUTTER IN A CAMERA HAVING A FOCAL PLANE SHUTTER AND PERMITTING LENS INTERCHANGE**

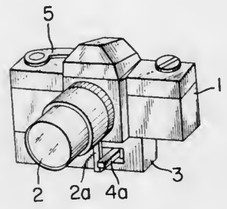
**Akihiko Sato, and Yoshiyuki Nakano, both of Tokyo, Japan, assignors to Nippon Kogaku K.K., Tokyo, Japan**

**Filed Nov. 12, 1975, Ser. No. 631,306**

**Claims priority, application Japan, Nov. 28, 1974, 49-135917[U]**

**Int. Cl.² G03B** *11/00*

**U.S. Cl. 354—295** **6 Claims**



**1.** A shutter charge device for a lens shutter incorporated with a lens and lens barrel and having a shutter charge lever projecting outwardly of the lens barrel, the shutter charge device being mountable and dismountable on a camera which has a focal plane shutter and a connector member provided on a film advance shaft, the shutter charge device comprising:

a charge member engageable with said shutter charge lever to displace the latter and charge said lens shutter; and

movement transmitting means adapted to be coupled to said connector member upon mounting of said shutter charge device to said camera to transmit the movement of said connector member to said charge member during film advance operation in said camera thereby to displace said shutter charge lever and charge said lens shutter.

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**4,016,585**

**CENTER FILLING VARIABLE VOLUME FILM DRUM**

**Robert E. Chapman, Ann Arbor, Mich., assignor to Photo Systems, Inc., Dexter, Mich.**

**Filed Aug. 14, 1975, Ser. No. 604,690**

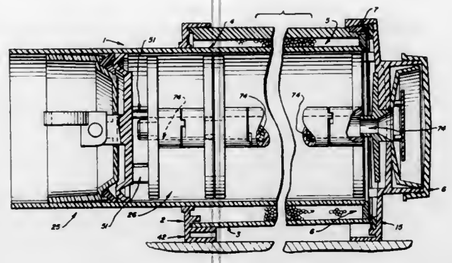
**Int. Cl.² G03D** *13/02*

**U.S. Cl. 354—331** **9 Claims**

**1.** A variable volume film drum for processing photographic material including a container having two open ends for holding said material, a lockable piston adapted to be inserted in one end of said container and movable therein to any location and a fluid control assembly adapted to cover the remaining open end of said container for introducing fluids, the improvement comprising:



conduit means extending down the longitudinal axis of said



container for providing an enclosed path for fluids to enter said container.

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**4,016,586**

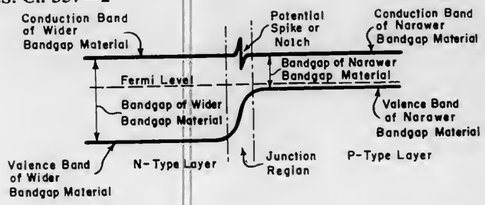
**PHOTOVOLTAIC HETEROJUNCTION DEVICE EMPLOYING A WIDE BANDGAP MATERIAL AS AN ACTIVE LAYER**

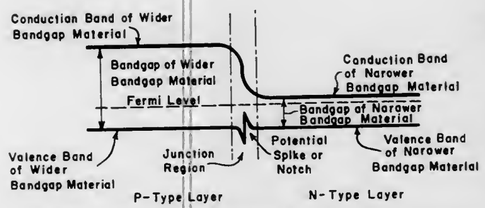
**Richard L. Anderson, Syracuse; Jack K. Clifton, New City, both of N.Y.; James V. Masi, Huntington, and Seymour Merrin, Fairfield, both of Conn., assignors to Innotech Corporation, Norwalk, Conn.**

**Continuation of Ser. No. 455,309, March 27, 1974. This application Jan. 6, 1976, Ser. No. 646,935**

**Int. Cl.² H01L** *45/100*

**U.S. Cl. 357—2** **12 Claims**




**1.** A semiconductive heterojunction photovoltaic device of the type comprising a pair of layers of semiconductor materials disposed in contact with one another and forming a junction therebetween, one of said layers exhibiting N-type conductivity and the other exhibiting P-type conductivity, and the material of each of said layers characterized by a bandgap separating a conduction energy level band from a valence energy level band and by an electron affinity; and means for electrically contacting each of said layers; said device characterized in that:

the bandgap of the material of one of said semiconductor layers is more than about twice the bandgap of the material of the other of said semiconductor layers; and

the electron affinity of the material having the larger bandgap is substantially equal to or less than the electron affinity of the layer having the smaller bandgap material for providing reduced junction impedance to carrier flow.

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**4,016,587**

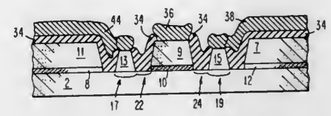
**RAISED SOURCE AND DRAIN IGFET DEVICE AND METHOD**

**Francisco H. De La Moneda, Reston, Va., assignor to International Business Machines Corporation, Armonk, N.Y.**

**Filed Dec. 3, 1974, Ser. No. 529,193**

**Int. Cl.² H01L** *29/78, 29/06, 29/04*

**U.S. Cl. 357—23** **12 Claims**



**1.** An insulated gate field effect transistor comprising:

a silicon substrate of a first conductivity type having a surface;

a first epitaxial region of a second conductivity type, grown on said surface of said substrate so as to project above said surface;

a second epitaxial region of said second conductivity type, grown on said surface of said substrate so as to project above said substrate and be spaced from said first epitaxial region;

a first insulating layer on the surface of said substrate and located between said first and said second epitaxial regions;

a first conductive layer deposited over said first insulating layer;

said first epitaxial region serving as the source, said second epitaxial region serving as the drain, and said conductivity layer serving as the gate of an insulated gate field effect transistor;

a second insulating layer substantially thicker than said first insulating layer, separating said first conductive layer from said first and second epitaxial regions, for reducing the source-to-gate and drain-to-gate capacitance;

said first and second epitaxial regions forming shallow P-N junctions with said substrate whereby the resulting IGFET device has a low junction capacitance and the source and drain regions have a low sheet resistivity.

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**4,016,588**

**NON-VOLATILE SEMICONDUCTOR MEMORY DEVICE**

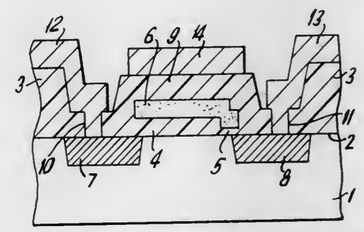
**Shuichi Ohya, and Masanori Kikuchi, both of Tokyo, Japan, assignors to Nippon Electric Company, Ltd., Tokyo, Japan**

**Filed Dec. 24, 1975, Ser. No. 644,056**

**Claims priority, application Japan, Dec. 27, 1974, 50-1867; Dec. 27, 1974, 50-1869; Dec. 27, 1974, 50-1871; Dec. 27, 1974, 50-1872; Dec. 27, 1974, 50-1873; Dec. 27, 1974, 50-1876**

**Int. Cl.² H01L** *29/78*

**U.S. Cl. 357—23** **6 Claims**



**1.** In an avalanche injection type semiconductor memory device comprising a semiconductor substrate of one conductivity type, source and drain regions of the opposite conductivity type formed on the surface of said semiconductor sub-

strate, a first insulating film formed over the channel area of said semiconductor substrate between said source and drain regions, a floating gate formed on said first insulating film, a second insulating film covering said floating gate, and a control gate formed on said second insulating film, the improvement which comprises: said first insulating film having a thin portion having a lesser thickness than the remaining portion thereof, said thin portion of said first insulating film being provided in the vicinity of at least one of said source and drain regions.

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**4,016,589**

## SEMICONDUCTOR DEVICE

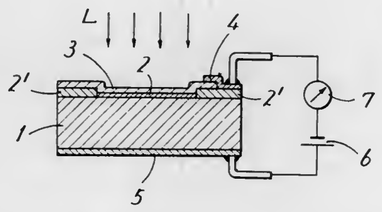
**Shigeru Tanimura; Nobuaki Miura, and Osamu Asano, all of Kyoto, Japan, assignors to Omron Tateisi Electronics Co., Ltd., Kyoto, Japan**

**Continuation-in-part of Ser. No. 304,809, Nov. 8, 1972, abandoned. This application Mar. 26, 1974, Ser. No. 455,008**

**Claims priority, application Japan, Nov. 10, 1971, 46-90139; Mar. 10, 1972, 47-25021**

**Int. Cl.² H01L** *27/14, 31/00, 29/48, 29/56*

**U.S. Cl. 357—30** **29 Claims**




1. A photosensitive semiconductor device comprising:
a composite including:
a substrate of a semiconductor selected from the group consisting of Si, Ge and GaAs,
an insulating layer deposited in substantially uniform thickness on said semiconductor substrate, the material layer being selected from the group consisting of $SiO_2$, $Si_3N_4$ and $GeO_2$, and said insulating layer being in the range of from 27A to 500A in thickness,
a tin oxide layer deposited on said insulating layer,
metal electrodes deposited on said tin oxide layer and the substrate,
said composite having a barrier with rectifying and photoelectric characteristics between said substrate and said tin oxide layer,
means connected to said electrodes for applying a reverse bias voltage across the composite less than the reverse breakdown voltage thereof,
said composite being adapted for receiving radiation energy at said barrier, and
means connected to said electrodes for withdrawing a photosensitive electrical output from between said tin oxide layer and said substrate,
whereby said device exhibits a radiation energy response characteristic which is a function of the level of said applied reverse bias voltage and is substantially increased for a thickness of said insulating layer within said range relatively to a thickness outside of said range.

**4,016,590**

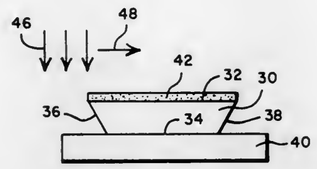
## ELECTROMAGNETIC RADIATION DETECTOR

**Robert F. Baur, Lynn; David M. Comey, Concord, and Gene A. Robillard, Stoneham, all of Mass., assignors to Honeywell Inc., Minneapolis, Minn.**

**Filed Nov. 7, 1975, Ser. No. 629,836**

**Int. Cl.² H01L** *27/14*

**U.S. Cl. 357—30** **7 Claims**




1. An electromagnetic radiation detector comprising:
a body of detector material;
first and second opposing surfaces of the body, the first surface being adapted to receive eletromagnetic radiation; and
a first side sloping generally inwardly from the first surface to the second surface.

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**4,016,591**

## SEMICONDUCTOR CONTROLLED RECTIFIER

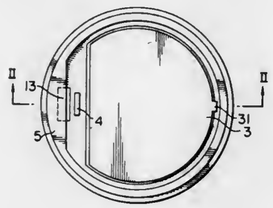
**Yoshio Terasawa, Hitachi, Japan, assignor to Hitachi, Ltd., Japan**

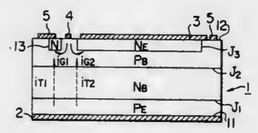
**Filed Oct. 15, 1974, Ser. No. 515,029**

**Claims priority, application Japan, Oct. 17, 1973, 48-115909**

**Int. Cl.² H01L** *29/74*

**U.S. Cl. 357—38** **13 Claims**




1. A semiconductor controlled rectifier comprising:
a semiconductor substrate having a pair of opposite principal surfaces and four contiguous layers between said principal surfaces having alternatively different conduction types, PN junctions being formed between the adjacent ones of said four layers, at least one of said principal surfaces being formed by exposed surfaces of one of the outermost layers of said four layers and the intermediate layer adjacent thereto;
a pair of main electrodes disposed on said principal surfaces in ohmic contact with said outermost layers respectively;
a gate electrode disposed on said one principal surface in contact with said intermediate layer;



an auxiliary region in said intermediate layer having a conduction type reverse to that of said intermediate layer, a smaller area than that of said one outermost layer and a surface exposed in said one principal surface, said gate electrode being positioned between said one outermost layer and said auxiliary region and being spaced apart from both thereof;
an auxiliary electrode disposed on said one principal surface at a portion thereof in contact with said auxiliary region and at the remaining portion thereof in contact with said intemediate layer, said remaining portion of said auxiliary electrode including a part positioned by a predetermined space apart from said main electrode which is in ohmic contact with said one outermost layer and a part spaced by way of said auxiliary region from a portion of said intermediate layer in contact with said gate electrode; and
means for short-circuiting the exposed portion of the PN junction formed between said one outermost layer and said intermediate layer at a location remote from said gate electrode.

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**4,016,592**

## LIGHT-ACTIVATED SEMICONDUCTOR-CONTROLLED RECTIFIER

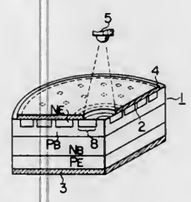
**Tsutomu Yatsuo, and Nobutake Konishi, both of Hitachi, Japan, assignors to Hitachi, Ltd., Japan**

**Filed Mar. 4, 1975, Ser. No. 555,279**

**Claims priority, application Japan, Mar. 15, 1974, 49-29135**

**Int. Cl.² H01L** *29/74*

**U.S. Cl. 357—38** **13 Claims**




1. A light-activated semiconductor-controlled rectifier device comprising:
a semiconductor substrate having a pair of main surfaces located on opposite sides of said substrate and at least four successive layers of alternately different conductivity, said four layers having a plurality of PN junctions formed between adjacent ones of said layers, one of said main surfaces including at least the exposed surfaces of one outer layer and the one intermediate layer adjacent to said one outer layer, the other of said main surfaces including at least the exposed surface of the other outer layer; said one outer layer including a first portion having a plurality of through apertures substantially uniformly distributed over said first portion, said one intermediate layer being exposed to said one main surface through said apertures of said one outer layer, and a second portion completely separated from said first portion by said one intermediate layer therebetween;
a first continuous, single-piece main electrode provided on said one main surface and in ohmic contact with at least the surface of said first portion, with that part of the surface of said one intermediate layer which is exposed through said through apertures, with the surface of said second portion at its periphery and with that part of the surface of said exposed portion of said one intermediate layer which is adjacent to said second portion;
a second main electrode provided on said other main surface and in ohmic contact with at least the surface of said other outer layer; and
a photo signal radiating means provided in the vicinity of the surface of said second portion of said one main surface for turning on said device.

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**4,016,593**

## BIDIRECTIONAL PHOTOTHYRISTOR DEVICE

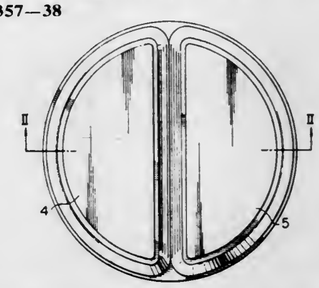
**Nobutake Konishi; Tsutomu Yatsuo; Tatsuya Kamei; Masahiro Okamura, and Takuzo Ogawa, all of Hitachi, Japan, assignors to Hitachi, Ltd., Japan**

**Filed June 3, 1975, Ser. No. 583,406**

**Claims priority, application Japan, June 7, 1974, 49-64084**

**Int. Cl.² H01L** *29/74*

**U.S. Cl. 357—38** **15 Claims**

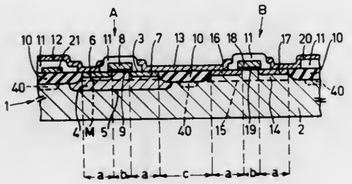



1. A bidirectional photo thyristor device comprising:
a semiconductor substrate having first and second principal surfaces opposite to one another and a side surface extending from said first principal surface to said second principal surface, said substrate including first and second substrate portions, each of which includes
a first semiconductor layer of a first conductivity type one surface of which extends to said first principal surface,
a second semiconductor layer of a second conductivity type, opposite said first conductivity type, disposed in contact with and defining a first PN junction with said first semiconductor layer, and
a third semiconductor layer of said first conductivity type, disposed in contact with and defining a second PN junction with said second semiconductor layer, one surface of said third semiconductor layer extending to the second principal surface of said substrate;
said first substrate portion further including a fourth semiconductor layer of said second conductivity type formed in a first surface portion of said one surface of said first semiconductor layer and defining therewith a fourth PN junction which extends to said first principal surface of said substrate;
said second substrate portion further including a fifth semiconductor layer of said second conductivity type formed in a first surface portion of said one surface of said third semiconductor layer and defining therewith a fifth PN junction which extends to said second principal surface of said substrate;
said substrate further including a recess extending from said first principal surface toward said second principal surface and being disposed between the first and second substrate portions of said substrate so as to expose said first and second semiconductor layers;
first main electrode means disposed upon the first principal surface of said substrate so as to be in contact with said first and fourth semiconductor layers of said first substrate portion and the first semiconductor layer of said second substrate portion;
second main electrode means, disposed upon the second principal surface of said substrate so as to be in contact with the third semiconductor layer of said first substrate portion and the third and fifth semiconductor layers of said second substrate portion; and
means for illuminating the surfaces of said first and second substrate portions which are exposed by said recess with a light trigger signal for controlling switching operations of said first and second substrate portions.

## 4,016,594
## SEMICONDUCTOR DEVICE AND METHOD OF MANUFACTURING THE DEVICE

**Joseph Shappir, Technion City, Ill., assignor to U.S. Philips Corporation, New York, N.Y.**

**Continuation of Ser. No. 245,243, April 18, 1972, abandoned. This application Apr. 8, 1974, Ser. No. 458,527**
**Claims priority, application Netherlands, June 8, 1971, 7107805**
**Int. Cl.² H01L** *27/02, 27/12*
**U.S. Cl. 357—41** **9 Claims**

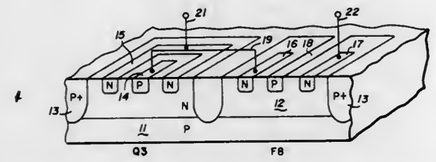



1. A semiconductor device having a semiconductor body comprising at least one insulated gate field effect transistor, said body comprising a first region of a first type conductivity and a second region of a second type conductivity adjoining the surface and forming a p-n junction with the first region, said insulated gate field effect transistor having spaced source and drain zones of the first type conductivity in the second region and adjoining the surface, at least one gate electrode layer extending over the space between the source and drain zones and being separated from the semiconductor body by an insulating layer, a pattern of electrically insulating material at least partly inset in the semiconductor body and comprising a portion entirely surrounding the second region at the surface, the outer dimensions of said second region being defined solely by said inset pattern portion and by the p-n junction between the first and the second regions which adjoins said portion of the inset pattern, the source and drain zones also adjoining the inset pattern, said first region having a further part adjoining the surface outside said inset pattern portion, and a second circuit element comprising at least one surface zone of the second conductivity type in said further part of the first region and adjoining said inset pattern, said second region of the second type conductivity having a doping profile such that in a zone adjoining the surface the doping concentration increases to a maximum value from the surface to the interior.

## 4,016,595
## FIELD EFFECT TRANSISTOR SWITCHING CIRCUIT

**James B. Compton, Cupertino, Calif., assignor to National Semiconductor Corporation, Santa Clara, Calif.**

**Division of Ser. No. 474,004, May 28, 1974, Pat. No. 3,916,222. This application Sept. 2, 1975, Ser. No. 609,443**
**Int. Cl.² H01L** *27/02*
**U.S. Cl. 357—43** **1 Claim**

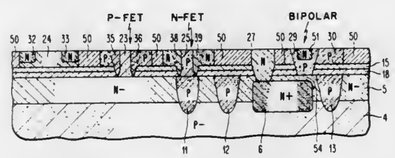



1. A combination transistor structure and FET structure on the same substrate comprising:
a substrate of a first conductivity type material,
an epitaxial layer of a second conductivity type material grown on said substrate,
isolation regions of said first conductivity type dividing the structure into isolated areas and extending into said substrate,
a transistor formed in a first area wherein said substrate serves as the collector comprising,
an emitter of said first conductivity type diffused into said epitaxial layer, and
a base region of said second conductivity type diffused into said epitaxial layer separated from said emitter, said base being diffused at a higher concentration than said epitaxial layer,
a field effect transistor formed in a second area comprising,
a gate region of said first conductivity type diffused into said epitaxial layer and extending to said isolation region, and
a source and a drain region of said second conductivity type diffused into said epitaxial layer on either side of said region, said source and drain regions being diffused at a higher concentration than said epitaxial layer,
electrical conductor means interconnecting said emitter region and said source region, the collector of said transistor connected to the channel region under said gate by means of said substrate, and
external contacts for said transistor base region and for said FET drain region.

## 4,016,596
## HIGH PERFORMANCE INTEGRATED BIPOLAR AND COMPLEMENTARY FIELD EFFECT TRANSISTORS

**Ingrid Emese Magdo, and Steven Magdo, both of Hopewell Junction, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Division of Ser. No. 588,524, June 19, 1975, Pat. No. 3,955,269. This application Jan. 26, 1976, Ser. No. 652,268**
**Int. Cl.² H01L** *27/02, 29/72, 27/04, 27/12*
**U.S. Cl. 357—43** **7 Claims**



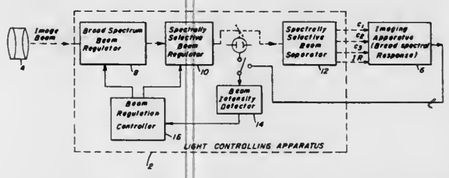

1. A semiconductor integrated circuit comprising:
a monocrystalline semiconductor substrate of a first conductivity type;
a first monocrystalline layer of a second conductivity type disposed over said substrate;
a subcollector region of said second conductivity type extending from said substrate into said first layer and below the upper surface thereof;
second and third regions of said first conductivity type extending from said substrate to the upper surface of said first layer, said second region surrounding said subcollector region, the conductivity level of said second region being greater than that of said third region;
a dielectric layer disposed over said first monocrystalline layer having openings therein over said subcollector region, said third region and at another location over said first monocrystalline layer;
a second layer disposed over said dielectric layer and in said openings;
said second layer including monocrystalline regions over the portions of said first monocrystalline layer exposed by said openings, polycrystalline regions over said dielectric layer in areas contiguous to each said monocrystalline region, and dielectric isolation regions separating each said contiguous polycrystalline/monocrystalline regions from every other contiguous polycrystalline/monocrystalline region;
a bipolar transistor of said second conductivity type formed in said monocrystalline region over said subcollector;
field effect transistors of second and first channel types formed in said monocrystalline regions over said third region and said another location, respectively; and
a polycrystalline silicon resistor formed in a polycrystalline region disposed over said dielectric layer.



## 4,016,597
## COLOR VIDEO CAMERA WITH SELECTIVELY EXPANDED SENSITIVITY

**Peter L. P. Dillon, and James J. DePalma, both of Pittsford, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Sept. 11, 1975, Ser. No. 612,512**
**Int. Cl.² H04N** *9/04, 5/30*
**U.S. Cl. 358—41** **9 Claims**



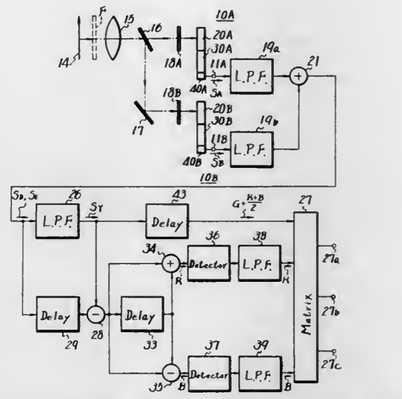

1. In a color video camera having means for defining an image beam of light reflected from a scene, apparatus comprising:
a. at least one broad spectral response imaging device arranged in the path of the image beam;
b. intensity measuring means for producing a signal relating to image beam intensity;
c. a beam regulation controller for receiving the intensity signal from said measuring means and for producing at least one control signal corresponding to said intensity signal;
d. a spectrally selective image beam regulator having means for selectively blocking portions of the image beam which are outside the visible spectrum in response to a control signal from said beam regulation controller; and
e. a spectrally selective beam separator including filter means for separating the image beam, prior to arrival at said imaging device, according to three primary wavelength ranges which are a preselected basis for defining visible-light color images, said filter means permitting infrared light to pass with light of at least one said primary wavelength ranges whereby transmission of an infrared component of the image beam to influence said imaging device(s) is regulated by said image beam regulator and such regulation is related to image intensity by the control action of said beam regulation controller.

## 4,016,598
## SOLID STATE CAMERA HAVING PLURAL IMAGE SENSORS

**Seisuke Yamanaka, Mitaka, Japan, assignor to Sony Corporation, Tokyo, Japan**

**Filed Mar. 26, 1975, Ser. No. 562,347**
**Claims priority, application Japan, Mar. 29, 1974, 49-35276; Apr. 25, 1974, 49-46941**
**Int. Cl.² H04N** *9/04*
**U.S. Cl. 358—41** **6 Claims**

1. A solid state color camera comprising:
a plurality of image sensors, each having a plurality of picture-sensing units spaced apart by an alignment pitch of $\tau_H$,
a number of color filters, each having color stripe elements extending in a horizontal direction and being aligned vertically to correspond to respective horizontal rows of said image sensors,
means for displaying an image simultaneously on each of said image sensors through respective ones of said color filters,
means for positions the image on each sensor with a displacment of $\tau_{HIN}$ in a given direction with respect to at least one other of said sensors where N equals the number of image sensors in said camera,
means coupled to said picture sensing units for sequentially

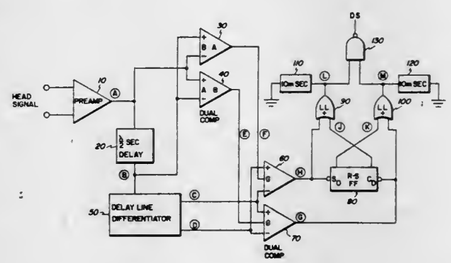



reading said image being displayed on said sensors in said given direction at a given read-out frequency and said reading means producing respective output signals,
means associated with said reading means for shifting the read-out phases thereof by 2 $\pi_{IS}$,
means coupled to said reading means for mixing their respective output signals therefrom, and
means for deriving luminance and chrominance signals from said mixing means.

## 4,016,599
## ANTI-SHOULDERING READ CIRCUIT FOR MAGNETIC DISK MEMORY

**Paul Sherer, Costa Mesa, Calif., assignor to Xerox Corporation, Stamford, Conn.**

**Filed Mar. 19, 1976, Ser. No. 668,367**
**Int. Cl.² G11B** *5/09*
**U.S. Cl. 360—53** **10 Claims**




1. A circuit for detecting valid peaks of an input signal comprising:
means for delaying said input signal to produce a delayed signal,
means responsive to said input signal and said delayed signal for generating a gating signal,
means coupled to said delaying means and responsive to said delayed signal for producing a derivative signal,
means coupled to said means for producing said derivative signal and said means for generating a gating signal and to gate said derivative signal, and

flip-flop circuit means coupled to said gate means and responsive thereto to generate output signals indicative of the presence of positive and negative peaks in said input signals.

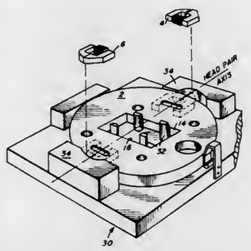
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**4,016,600**

## CARRIER FOR MOUNTING PAIRS OF MAGNETIC HEADS TO A DRUM-TYPE TAPE SCANNING UNIT

**Thomas G. Kirn, Rochester, NY, assignor to Eastman Kodak Company, Rochester, N.Y.**

**Filed Oct. 14, 1975, Ser. No. 621,937**
**Int. Cl.² G11B** *21/24, 5/56*
**U.S. Cl. 360—109** **4 Claims**




**1.** For use with a head drum of the type which (1) is employed in units for scanning magnetic tape with a cooperating pair of magnetic heads, and (2) has a drum section which is rotatable about an axis and is provided with an associated axis indicating means at a face thereof for defining two parallel reference lines at preselected fixed distances from said axis, a carrier for mounting such a pair of heads to such face of the drum section, comprising:

a flat member having defined at opposite sides thereof a pair of respective head sites which establish a head pair axis extending therebetween, said member having formed therein a slot characterized by two guide edges which, at least over operative parts thereof, are substantially straight and are substantially perpendicular to said head pair axis, said edges being arranged at respective distances from the midpoint between said head sites corresponding to such preselected distances to closely engage in a sliding relationship such axis indicating means, thereby blocking relative translational motion of said member over said drum section along the head pair axis while permitting relative translational motion perpendicular to that axis to allow for dihedral carrier alignment; and

means for adjustably fastening said flat member to such a drum section.

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**4,016,601**

## INTEGRATED MAGNETIC HEAD HAVING POLE-PIECES OF A REDUCED FRONTAL WIDTH

**Jean-Pierre Lazzari, Montfort L'Amaury, France, assignor to Compagnie Internationale pour l'Informatique, Louveciennes, France**

**Filed July 22, 1975, Ser. No. 598,000**
**Claims priority, application France, Jan. 10, 1975, 75.00652**
**Int. Cl.² G11B** *5/22, 5/25, 5/20, 5/12*
**U.S. Cl. 360—122** **5 Claims**

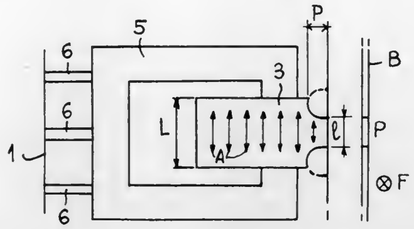
**1.** An integrated magnetic head structure comprising in combination:

a substrate having a front edge;

a pair of overlying pole-piece magnetic layers, each having an easy axis of anisotropy in a direction parallel to said front edge, supported on said substrate;

a dielectric non-magnetic layer positioned between said magnetic layers and thus defining a magnetic gap;

a flat conductor winding coil, also supported on said substrate and having a front branch inserted between said pole-piece layers at a distance spaced rearwardly from said front edge and said dielectric non-magnetic layer, the lateral width of said pole-piece layers at said front edge




being less than the width of the remaining portions of said pole-piece layers with the front lateral edge of said pole-piece layers extending from the front lateral edges rearwardly in a smooth concave curve and joining the rear lateral edges at a location spaced rearwardly of said front edge a lesser distance than said front branch.

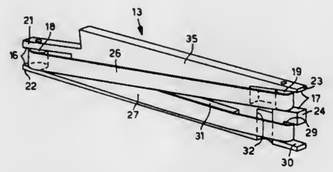
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**4,016,602**

## CARTRIDGE FOR ENDLESS MAGNETIC-TAPE LOOP AND DEVICE FOR RECORDING AND/OR READING THEREOF

**Nicolo Giolitti, Ivrea (Turin), and Michele Bovio, Banchette (Turin), both of Italy, assignors to Ing. C. Olivetti & C., S.p.A., Ivrea (Turin), Italy**

**Filed July 8, 1975, Ser. No. 594,156**
**Claims priority, application Italy, July 15, 1974, 69243/74**
**Int. Cl.² G11B** *23/06;* **B65H** *17/48*
**U.S. Cl. 360—132** **2 Claims**




**1.** A small dimension cartridge for an endless tape loop for use in a small calculating or accounting unit or the like, comprising:

a. a container;

b. a substantially parallelepiped plate mounted inside said container and including first and a second short sides and first and a second long sides longer than said short sides;

c. first and second guide means mounted on said plate at said first short side and having the longitudinal axes thereof lying in a plane substantially parallel to said short sides;

d. third guide means mounted on said plate at said second short side and having the longitudinal axis thereof lying in a plane substantially parallel to said short sides, wherein said first and third guide means define therebetween a first tape path disposed substantially diagonally with respect to said plate around which a plurality of lengthening tape coils are wound and wherein said second and said third guide means define therebetween a second tape path substantially parallel to said long sides and around which a connecting coil of said tape is wound connecting the innermost coil with the outermost coil of said first tape path; and

e. at least one access aperture in said container in correspondence with said second tape path and across which



the tape is accessible to effect the driving, recording and/or reading thereof.

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**4,016,603**

## DISK STORAGE APPARATUS HAVING SIGNALS RECORDED IN A SPECIFIC FORMAT

**Hjalmar Holmboe Ottesen, Oslo, Norway, assignor to International Business Machines Corporation, Armonk, N.Y.**

**Filed May 30, 1975, Ser. No. 582,515**
**Int. Cl.² G11B** *5/82, 17/22*
**U.S. Cl. 360—135** **34 Claims**

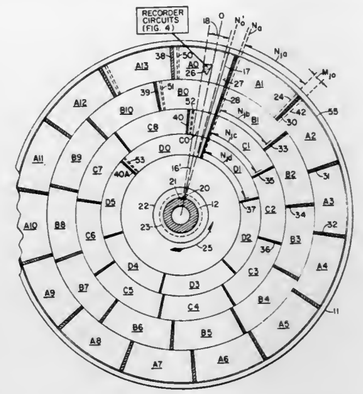
**1.** A circular planar magnetic storage disk having a plurality of substantially concentric record track location indicating signals,

the improvement including in combination:

said indicating signals being disposed in a plurality of radially defined groups;

said indicating signals in each said radial group for indicating respective record tracks in each said group being in circumferentially spaced-apart sets of radially aligned signals; and

circumferential spacing between predetermined circumferentially adjacent ones of said radially aligned signals disposed at a predetermined radial position in each said group being circumferentially spaced a substantially identical lineal distance along the respective indicated record tracks.



# DESIGN PATENTS

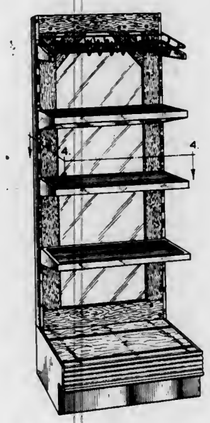
## GRANTED APRIL 5, 1977

### ERRATA

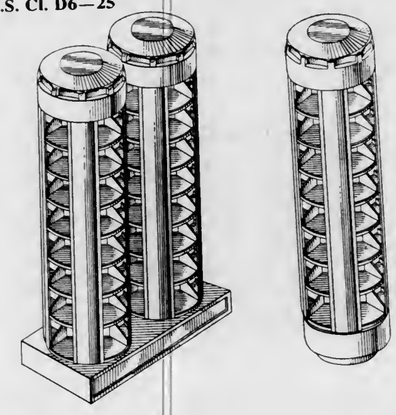
| For CLASS | See PATENT NO. |
|---|---|
| 008-364 | 243,929 |
| 016-065 | 243,951 |
| 025-064 | 243,953 |
| 014-043 | 243,956 |
| 064-011 B | 243,957 |
| 064-011 B | 243,958 |
| 014-046 | 243,959 |
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| 014-058 | 243,961 |
| 015-131 | 243,972 |
| 024-017 | 243,973 |



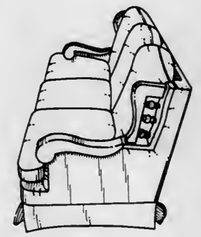
243,891
**DISPLAY STAND FOR BAKERY PRODUCTS OR THE LIKE**
Alan K. Snyder, River Forest, Ill., assignor to Chicago Display Company
Filed Apr. 7, 1976, Ser. No. 674,394
Term of patent 14 years
Int. Cl. D20—*02*
U.S. Cl. D6—24



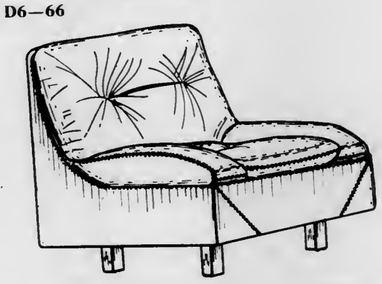
243,892
**ARTICLE DISPLAY STAND**
Roger G. Ferriter, Yonkers, and Fred Howard, New York, both of N.Y., assignors to Wix Corporation, Gastonia, N.C.
Filed May 6, 1976, Ser. No. 683,847
Term of patent 14 years
Int. Cl. D6—*04*; D20—*02*
U.S. Cl. D6—25



243,893
**SOFA**
Lester Beall, Jr., High Point, N.C., assignor to Treno Line Furniture Corporation, Amsterdam, N.Y.
Filed Sept. 25, 1975, Ser. No. 616,741
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—63



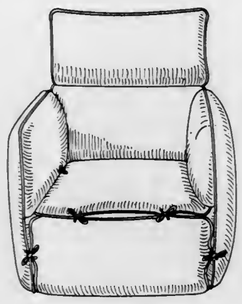
243,894
**SEAT**
Giovanni Offredi, Milan, Italy, assignor to Fratelli Saporiti, Besnate (Varese), Italy
Filed Mar. 18, 1975, Ser. No. 559,450
Claims priority, application Italy, Sept. 19, 1974, 60913/74; Sept. 19, 1974, 60914/74; Sept. 19, 1974, 60915/74
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—66



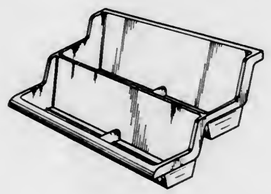
243,895
**CUSHIONED SLING CHAIR**
Lynn L. Powell, Lincolnton, N.C., assignor to Burris Industries, Incorporated, Lincolnton, N.C.
Filed Nov. 24, 1975, Ser. No. 634,484
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—66



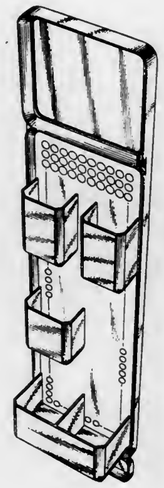
243,896
CHAIRS
Otto Zapf, Eschborn, Germany, assignor to Knoll International, Inc., Greenwich, Conn.
Division of Ser. No. 376,746, July 5, 1973, Pat. No. D240,783.
This application Oct. 24, 1974, Ser. No. 517,632
Claims priority, application Germany, Feb. 28, 1973, 73MR8137; Mar. 3, 1973, 73MR8139
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—71



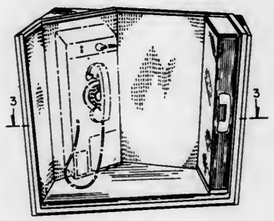
243,897
RECORD DISPLAY BIN
Brian James Smith, Hamilton, Australia, assignor to London Merchandisers Pty. Limited, Hamilton, Australia
Filed May 16, 1975, Ser. No. 578,016
Claims priority, application Australia, Jan. 30, 1975, 66392/75
Term of patent 14 years
Int. Cl. D6—*04*; D20—*02*
U.S. Cl. D6—130



243,898
STORAGE RACK FOR LOCKERS OR THE LIKE
Frank Micciche, Floral Park, N.Y., assignor to Frank Micciche, Floral Park, N.Y.
Filed Dec. 23, 1974, Ser. No. 535,833
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—131

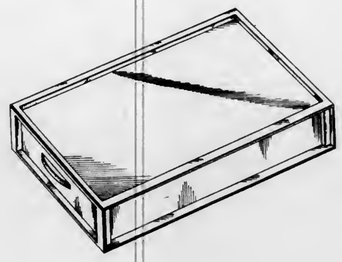


243,899
SHELF FOR COIN OPERATED TELEPHONES
Lajos Novak, 298 Rivervale Road, Rivervale, N.J.
Filed Apr. 7, 1976, Ser. No. 674,475
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—133





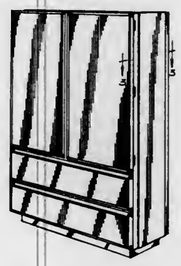
243,900
CABINET FOR PHOTOGRAPHIC SHEET PRODUCTS
William Paul Boyd, Macedon, and Mark John Morse, Ontario, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.
Filed Nov. 17, 1975, Ser. No. 632,753
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—158



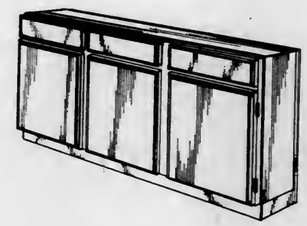
243,901
CHEST
Roland P. Carter, Lynchburg, Va., assignor to The Lane Company, Inc., Altavista, Va.
Filed Sept. 10, 1975, Ser. No. 611,962
Term of patent 7 years
Int. Cl. D6—*04*
U.S. Cl. D6—160



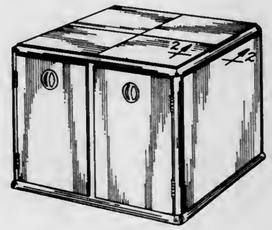
243,902
ARMOIRE
Roland P. Carter, Lynchburg, Va., assignor to The Lane Company, Inc., Altavista, Va.
Filed Sept. 10, 1975, Ser. No. 611,963
Term of patent 7 years
Int. Cl. D6—*04*
U.S. Cl. D6—164



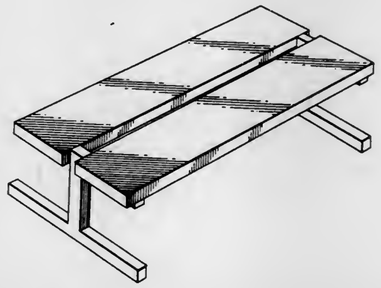
243,903
BUFFET
Roland P. Carter, Lynchburg, Va., assignor to The Lane Company, Inc., Altavista, Va.
Filed Sept. 10, 1975, Ser. No. 611,968
Term of patent 7 years
Int. Cl. D6—*04*
U.S. Cl. D6—164



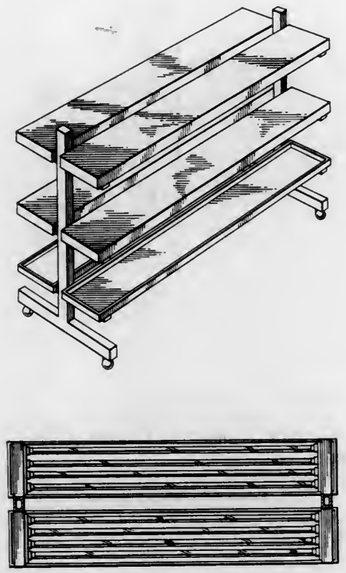
243,904
SQUARE COMMODE
Roland P. Carter, Lynchburg, Va., assignor to The Lane Company, Inc., Altavista, Va.
Filed Sept. 10, 1975, Ser. No. 611,967
Term of patent 7 years
Int. Cl. D6—*04*
U.S. Cl. D6—168



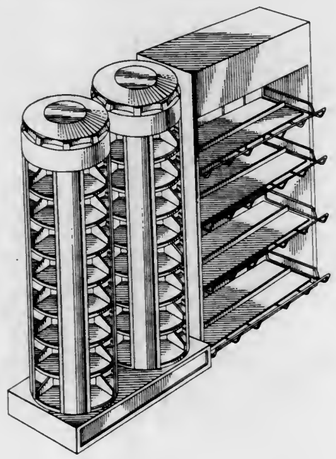
243,905
PLANT GROWTH APPARATUS
R. Louis Ware, 2108 Middlefork Road, Northfield, Ill. 60093
Filed Oct. 2, 1975, Ser. No. 618,894
Term of patent 14 years
Int. Cl. D6—*99*
U.S. Cl. D6—183



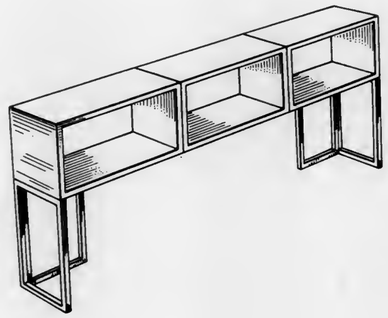
243,906
PLANT GROWTH APPARATUS
R. Louis Ware, 2108 Middlefork Road, Ill. 60093
Filed Oct. 2, 1975, Ser. No. 618,896
Term of patent 14 years
Int. Cl. D6—*99*
U.S. Cl. D6—183



243,907
ARTICLE DISPLAY STAND
Roger G. Ferriter, Yonkers, and Fred Howard, New York, both of N.Y., assignors to Wix Corporation
Filed May 6, 1976, Ser. No. 683,841
Term of patent 14 years
Int. Cl. D6—*04*; D20—*02*
U.S. Cl. D6—188



243,908
STORAGE UNIT
Paul J. Neff, Mississauga, Canada, assignor to Neff Kitchen Manufacturers Limited, Brampton, Canada
Filed July 18, 1975, Ser. No. 596,938
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—190



243,909
COMBINED SEAT AND BACKREST
Gregory S. Gabourie, Ajax, Canada, assignor to Global Upholstery Company Limited, Canada
Filed June 2, 1975, Ser. No. 582,874
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D6—197

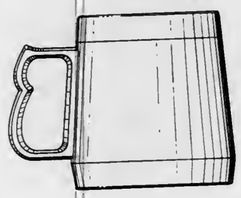




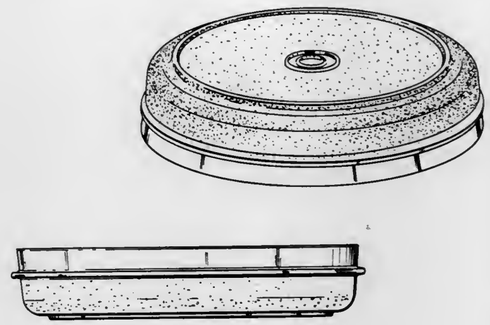
243,910
TUMBLER
Kathryn S. Herpel, Pittsburgh, Pa., assignor to Brockway Glass Company, Inc., Brockway, Pa.
Filed Nov. 24, 1975, Ser. No. 634,470
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—6



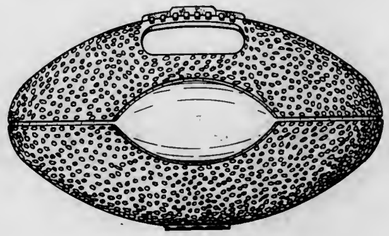
243,911
DRINKING MUG
Stanley R. Thorud, Anoka, Minn., assignor to Dart Industries Inc., Los Angeles, Calif.
Filed Aug. 14, 1975, Ser. No. 604,578
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—9



243,912
SERVING PLATE OR THE LIKE
Robert H. C. M. Daenen, Hekelgem, Belgium, assignor to Dart Industries Inc., Los Angeles, Calif.
Filed July 11, 1975, Ser. No. 595,199
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—23



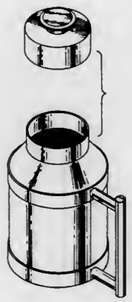
243,913
LUNCHPAIL OR SIMILAR ARTICLE
Robert Charles Miles, 2414 Rochester Road, Royal Oak, Mich. 48073
Filed May 27, 1975, Ser. No. 581,000
Term of patent 14 years
Int. Cl. D3—*01*
U.S. Cl. D7—76



243,914
CONTAINER FOR FOOD OR THE LIKE
Zenichi Marubashi, Isezaki, and Yoshikuni Kinoshita, Tokyo, both of Japan, assignors to Maruka Shokuhin Kabushiki Kaisha, Isezaki and Ryohsei Plastic Industry Co., Ltd., Tokyo, both of, Japan
Filed Oct. 10, 1975, Ser. No. 621,563
Claims priority, application Japan, July 15, 1975, 50-29331
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—76



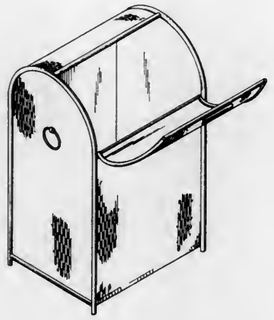
243,915
BARBECUE COAL SNUFFER
Whitney Wilhelmy, P.O. Box 746, Kings Beach, Calif. 95719
Filed Dec. 8, 1975, Ser. No. 638,527
Term of patent 14 years
Int. Cl. D7—*04*; D23—*03*
U.S. Cl. D7—129



243,916
SPOON OR SIMILAR ARTICLE
Ronald A. Guodace, Yalesville, Conn., assignor to International Silver Company, Meriden, Conn.
Filed June 5, 1975, Ser. No. 583,996
Term of patent 14 years
Int. Cl. D7—*03*
U.S. Cl. D7—137



243,917
CLOTHES HAMPER
Barbara Adler Katzander, New York, NY, assignor to Joseph A. Kaplan & Sons, Inc., Yonkers, N.Y.
Filed May 8, 1975, Ser. No. 575,816
Term of patent 14 years
Int. Cl. D7—*07*; D9—*04*
U.S. Cl. D7—163

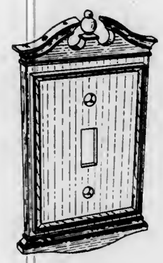


243,918
WALL PLATE
Joan Klatil Creamer, Warwick, R.I., assignor to General Electric Company
Filed Dec. 23, 1974, Ser. No. 536,282
Term of patent 14 years
Int. Cl. D8—*09*
U.S. Cl. D8—351





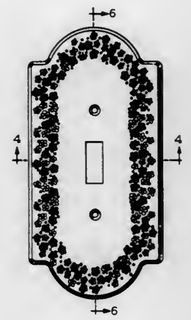

243,919
WALL PLATE
Joan Grieb, Westfield, N.J., assignor to General Electric Company
Filed Oct. 20, 1975, Ser. No. 624,083
Term of patent 14 years
Int. Cl. D8—*09*
U.S. Cl. D8—350



243,920
WALL PLATE
Leonard Fine, Brooklyn, N.Y., assignor to General Electric Company
Filed Oct. 20, 1975, Ser. No. 624,087
Term of patent 14 years
Int. Cl. D8—*09*
U.S. Cl. D8—350



243,921
WALL PLATE
Joan K. Creamer, Warwick, R.I., assignor to General Electric Company
Filed Oct. 10, 1975, Ser. No. 621,271
Term of patent 14 years
Int. Cl. D8—*09*
U.S. Cl. D8—351




243,922
WALL PLATE
Joan Grieb, New York, N.Y., assignor to General Electric Company
Filed Oct. 20, 1975, Ser. No. 624,036
Term of patent 14 years
Int. Cl. D8—*09*
U.S. Cl. D8—351



243,923
WALL PLATE
Joan Klatil Creamer, Warwick, R.I., assignor to General Electric Company
Filed Aug. 29, 1974, Ser. No. 501,920
Term of patent 14 years
Int. Cl. D8—*09*
U.S. Cl. D8—351



243,924
WALL PLATE
Joan Klatil Creamer, Warwick, R.I., assignor to General Electric Company
Filed Aug. 29, 1974, Ser. No. 502,248
Term of patent 14 years
Int. Cl. D8—*09*
U.S. Cl. D8—351



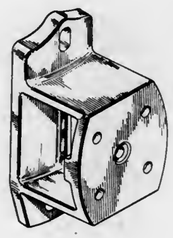
243,925
WALL PLATE
Joan Klatil Creamer, Warwick, R.I., assignor to General Electric Company
Filed Nov. 18, 1974, Ser. No. 524,914
Term of patent 14 years
Int. Cl. D8—*09*
U.S. Cl. D8—351



243,926
UTILITY POLE SIDE INSULATOR BRACKET
Joseph W. Dimiceli, San Rafael, and Edgardo R. Labra, Corte Madera, both of Calif., assignors to Utilities Hardware, Inc., Richmond, Calif.
Filed Apr. 5, 1976, Ser. No. 673,425
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—364

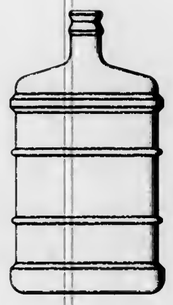


243,927
UTILITY POLE SQUARE INSULATOR BRACKET
Joseph W. Dimiceli, San Rafael, and Edgardo R. Labra, Corte Madera, both of Calif., assignors to Utilities Hardware, Inc., Richmond, Calif.
Filed Apr. 5, 1976, Ser. No. 673,404
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—364

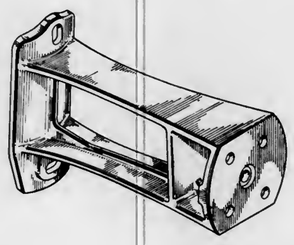




243,928
BOTTLE
Carl E. Frahm, and Shirley E. Frahm, both of 1428 Oak Meadow Road, Arcadia, Calif. 91106
Filed June 25, 1975, Ser. No. 590,385
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—86



243,929
UTILITY POLE SLANTED INSULATOR BRACKET
Joseph W. Dimiceli, San Rafael, and Edgardo R. Labra, Corte Madera, both of Calif., assignors to Utilities Hardware, Inc., Richmond, Calif.
Filed Apr. 5, 1976, Ser. No. 673,461
Term of patent 14 years
Int. Cl. D08—*08*
U.S. Cl. D8—364



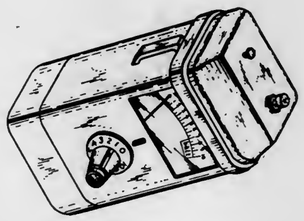
243,930
WRISTWATCH
Arthur Cruse, Dallas, Tex., assignor to E. Gluck Corporation, New York, N.Y.
Continuation-in-part of Ser. No. 497,944, Aug. 16, 1974, Pat. No. Des. 238,341. This application May 12, 1975, Ser. No. 576,480
The portion of the term of this patent subsequent to Jan. 6, 1990, has been disclaimed.
Term of patent 14 years
Int. Cl. D10—*02*
U.S. Cl. D10—38



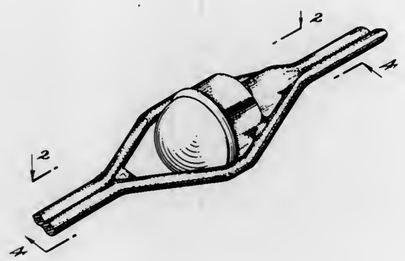
243,931
SPHERICAL SPIRIT LEVEL
Richard A. Pitkin, and Stanley T. Beale, both of 814 N. Hollywood Way, Burbank, Calif. 91505
Filed Aug. 7, 1975, Ser. No. 602,548
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—69



243,932
FIELD STRENGTH METER
Maurice Warren, Oxnard, Calif., assignor to Vec/Trak Research & Development Corporation, Elmsford, N.Y.
Filed July 1, 1975, Ser. No. 592,111
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—78



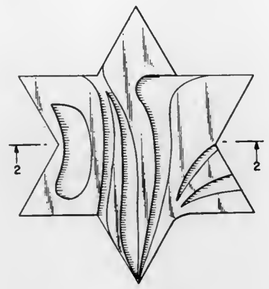
243,933
SIGNAL LIGHT FOR EMERGENCY HIGHWAY USE OR THE LIKE
Fred Johns, 19921 Canyon Drive, Yorba Linda, Calif. 92686
Filed July 16, 1975, Ser. No. 596,510
Term of patent 14 years
Int. Cl. D26—*06*
U.S. Cl. D10—111



243,934
JEWELRY FINDING OR THE LIKE
Harry Rimberg, 175 Willoughby St., Brooklyn, N.Y. 11201
Filed Sept. 26, 1975, Ser. No. 616,923
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D11—70



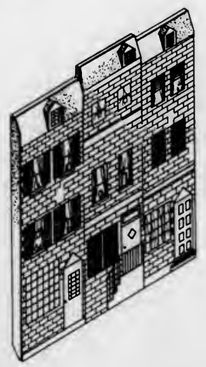
243,935
JEWELRY FINDING OR THE LIKE
Harry Rimberg, 175 Willoughby St., Brooklyn, N.Y. 11201
Filed Sept. 26, 1975, Ser. No. 617,019
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D11—70



243,936
PENDANT
Mario Balestra, Bassano del Grappa (Vicenza), Italy, assignor to Giovanni Balestra & Figle S.p.A., Bassano del Grappa (Vicenza), Italy
Filed July 16, 1975, Ser. No. 596,270
Claims priority, application Italy, Jan. 17, 1975, 64203/75
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. 11—81



243,937
FACE FOR A PLANTER
Tanya Paretchan, 6508 Enola St., Philadelphia, Pa. 19111
Filed Mar. 11, 1976, Ser. No. 665,912
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D11—149

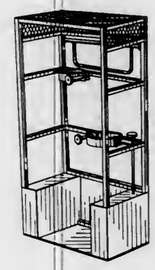




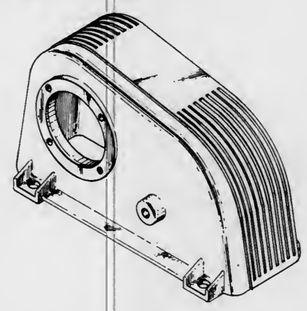
243,938
ARTICLE OF SCULPTURE
Robert H. Aymar, 2888 Rte. 97, Glenwood, Md. 21738
Filed Dec. 9, 1975, Ser. No. 639,203
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D11—160



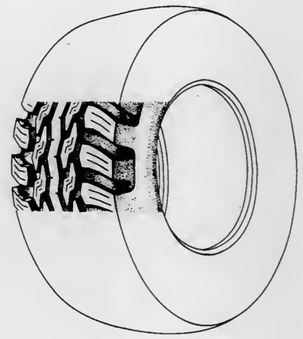
243,939
MOBILE RACK FOR GAS CYLINDERS
Albert C. Martin, Carlton, Kans. 67429
Division of Ser. No. 424,721, Dec. 14, 1973, Pat. No. Des. 237,750. This application July 16, 1975, Ser. No. 596,382
Term of patent 14 years
Int. Cl. D12—*02*
U.S. Cl. D12—32



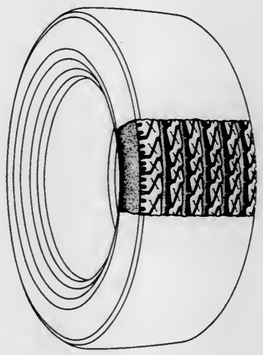
243,940
WINCH HOUSING COVER
Encho Janaki Kuzarov, Milwaukie, Oreg., assignor to Warn Industries, Inc., Kent, Wash.
Filed Sept. 23, 1975, Ser. No. 615,977
Term of patent 14 years
Int. Cl. D12—*05*
U.S. Cl. D12—60



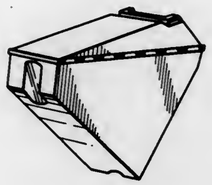
243,941
TIRE
Douglas P. Koeppel, Tallmadge, Ohio, assignor to The Goodyear Tire & Rubber Company
Filed Dec. 29, 1975, Ser. No. 644,671
Term of patent 14 years
Int. Cl. D12—*15*
U.S. Cl. D12—146



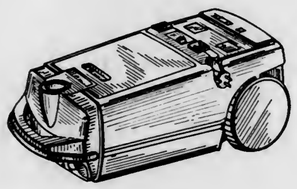
243,942
TIRE
Henri Verdier, Beauregard-L'Eveque, France, assignor to Compagnie Generale des Etablissements Michelin, raison sociale Michelin & Cie, Clermont-Ferrand, France
Filed Dec. 4, 1975, Ser. No. 637,738
Claims priority, application France, June 6, 1975, 75.486
Term of patent 14 years
Int. Cl. D12—*15*
U.S. Cl. D12—145



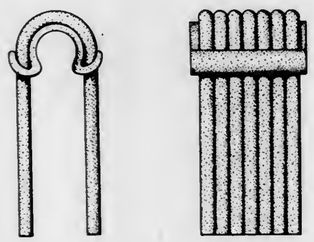
243,943
CONTAINER FOR BICYCLES
James E. Harris, Hermitage, Tenn., and Norman K. Whitaker, Clarkston, Ga., assignors to Aladdin Industries, Incorporated, Chicago, Ill.
Filed Jan. 15, 1976, Ser. No. 649,366
Term of patent 14 years
Int. Cl. D12—*11*
U.S. Cl. D12—158



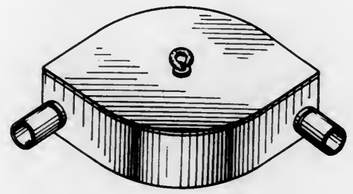
243,944
VACUUM CLEANER
Rudolph Bernard Zijlstra, Zeelst, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.
Filed Jan. 30, 1975, Ser. No. 545,720
Claims priority, application Switzerland, Aug. 13, 1974, 59278/74
Term of patent 14 years
Int. Cl. D15—*05*
U.S. Cl. D15—52



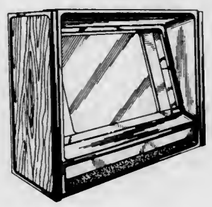
243,945
NYLON COVERED WIRE AGRICULTURAL FLAIL FOR USE ON SUGAR BEET HARVESTING MACHINE
John A. Diehl, Apt. 205 S., 2111 Jeff. Davis Hwy., Arlington, Va. 22202
Filed May 29, 1975, Ser. No. 581,868
Term of patent 14 years
Int. Cl. D15—*03*
U.S. Cl. D15—28



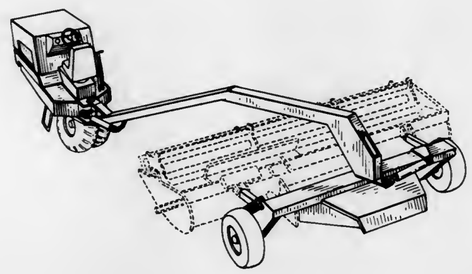
243,946
IDLER CORNER FOR CHAIN TYPE POULTRY FEEDERS
Gerald L. Kitson, 9709 Belding Road, Rockford, Mich. 49341
Division of Ser. No. 271,819, July 14, 1972, abandoned. This application Sept. 20, 1974, Ser. No. 507,610
The portion of the term of this patent subsequent to Aug. 7, 1987, has been disclaimed.
Term of patent 14 years
Int. Cl. D15—*99*
U.S. Cl. D15—199



243,947
MICROFILM READER DISPLAY PANEL
Edward R. Wadleigh, Star Route Box 279, Hemet, Calif. 92343
Filed Sept. 19, 1975, Ser. No. 614,988
Term of patent 14 years
Int. Cl. D16—*03*
U.S. Cl. D16—14

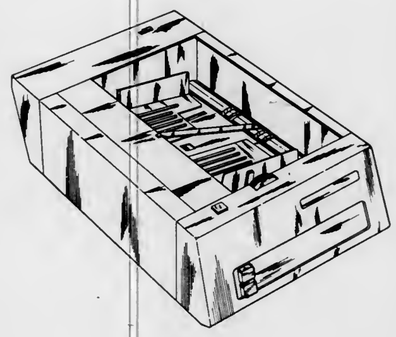


243,948
COMBINED TRACTOR AND TRAILING IMPLEMENT FOR SUPPORTING A CROP HEADER
Cecil L. Case, and David P. Fritz, both of Newton, Kans., assignors to Hesston Corporation, Hesston, Kans.
Filed Aug. 21, 1975, Ser. No. 606,530
Term of patent 14 years
Int. Cl. D15—*03*
U.S. Cl. D15—26





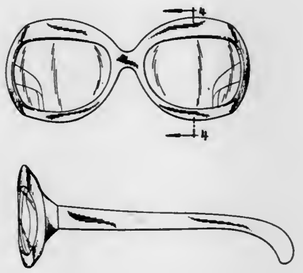
243,949
DOCUMENT FEEDER OR THE LIKE
Richard J. Olson, Pittsford, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.
Filed Oct. 9, 1975, Ser. No. 620,985
Term of patent 14 years
Int. Cl. D16—*03*
U.S. Cl. D16—31



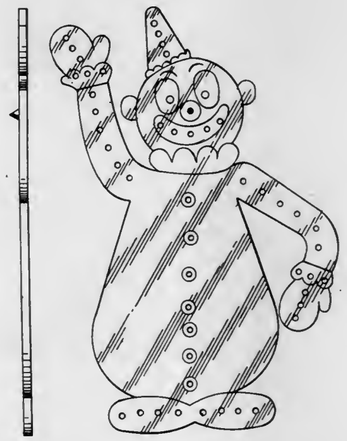
243,950
MACHINE FOR TEACHING THE MANNER IN WHICH A CLOCK INDICATES TIME
Toyotsugu Ogasawara, Tokyo, Japan, assignor to Tomy Kogyo Co., Inc., Tokyo, Japan
Filed Nov. 24, 1975, Ser. No. 634,791
Term of patent 14 years
Int. Cl. D19—*07*
U.S. Cl. D19—64



243,951
PAIR OF SPECTACLES
Anthony Shindler, Brookline, Mass., assignor to American Optical Corporation, Southbridge, Mass.
Filed Feb. 9, 1976, Ser. No. 656,495
Term of patent 14 years
Int. Cl. D16—*06*
U.S. Cl. D16—65



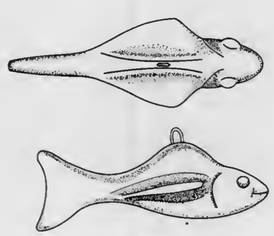
243,952
CHILD'S COMPASS
William J. Bryant, 2251 Washington Ave., San Leandro, Calif. 94577
Filed June 30, 1975, Ser. No. 591,827
Term of patent 14 years
Int. Cl. D19—*06*
U.S. Cl. D19—38



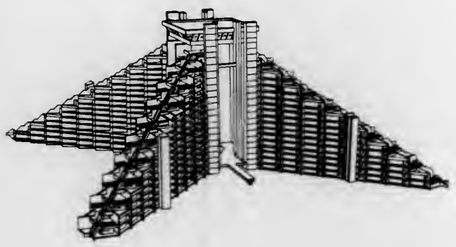
243,953
SAFETY LADDER FOR ABOVE THE GROUND SWIMMING POOL
Peter F. Gannon, Troy, Mich., assignor to Vinyl-Fab Industries, Ferndale, Mich.
Filed Aug. 15, 1973, Ser. No. 388,583
Term of patent 14 years
Int. Cl. D25—*99*
U.S. Cl. D25—64



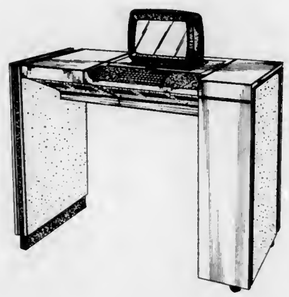
243,954
DOWN RIGGER WEIGHT
Edward M. Raquel, 22500 Thirty-Three Mile Road, Armada, Mich. 48005
Filed Mar. 15, 1976, Ser. No. 667,095
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—30



243,955
BUILDING
Peter R. Kosinski, 215 Bishop St., New Haven, Conn. 06511
Filed June 14, 1974, Ser. No. 479,412
Term of patent 14 years
Int. Cl. D25—*03*
U.S. Cl. D25—5



243,956
DATA PROCESSING CONSOLE
Richard G. Clayton, Detroit; Thomas C. Abrahamsen, Birmingham, both of Mich.; Jack K. Beduhn, Westlake Village, and Norman P. Guetschoff, Jr., Newbury Park, both of Calif., assignors to Burroughs Corporation, Detroit, Mich.
Filed Dec. 19, 1975, Ser. No. 642,493
Term of patent 14 years
Int. Cl. D14—*02*
U.S. Cl. D14—43

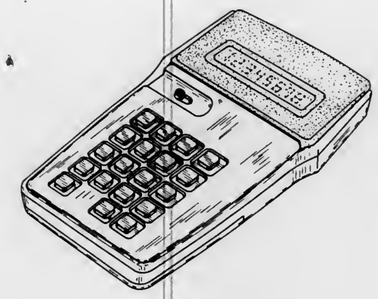


243,957
ELECTRONIC CALCULATING MACHINE
Kenichi Matsuda, Osaka, Japan, assignor to Sharp Kabushiki Kaisha, Japan
Filed Apr. 25, 1975, Ser. No. 571,703
Claims priority, application Japan, Oct. 23, 1974, 49-37301
Term of patent 14 years
Int. Cl. D18—*01*
U.S. Cl. D64—11 B

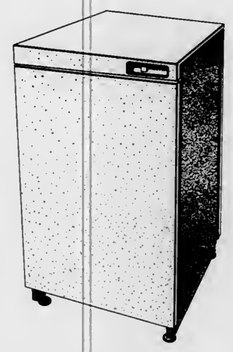




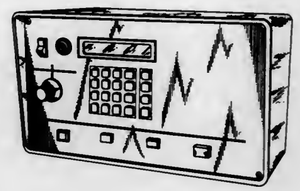
243,958
ELECTRONIC CALCULATING MACHINE
Katsumi Jinbo, Osaka, Japan, assignor to Sharp Kabushiki Kaisha, Japan
Filed July 16, 1975, Ser. No. 596,416
Claims priority, application Japan, Jan. 18, 1975, 50-2673
Term of patent 14 years
Int. Cl. D18—*01*
U.S. Cl. D64—11 B



243,959
DISK MEMORY
Richard G. Clayton, Detroit; Thomas C. Abrahamsen, Birmingham; John M. Blue, Troy, all of Mich., and Jack K. Beduhn, Westlake Village, Calif., assignors to Burroughs Corporation, Detroit, Mich.
Filed Dec. 19, 1975, Ser. No. 642,486
Term of patent 14 years
Int. Cl. D14—*02*
U.S. Cl. D14—46



243,960
DIGITAL CONTROLLER FOR MACHINE TOOLS
Gerald V. Roch, Indianapolis, Ind., and James P. Wiles, Olean, N.Y., assignors to Hurco Manufacturing Company, Inc.
Filed Mar. 5, 1975, Ser. No. 555,453
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D15—138



243,961
TELEPHONE INSTRUMENT
Karl Buchin; Werner Grosse; Wolfgang Klein; Alfred Wloch, and Manfred Seide, all of Berlin, Germany, assignors to Deutsche Telephonwerke und Kabelindustrie Aktiengesellschaft, Berlin, Germany
Filed Feb. 7, 1975, Ser. No. 548,152
Claims priority, application Germany, Dec. 12, 1974, 954096
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—58



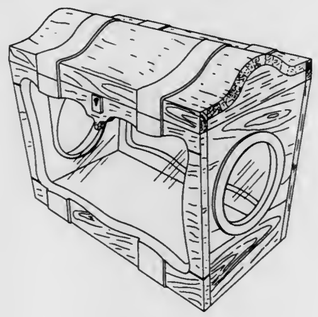
243,962
CIGARETTE LIGHTER
Kenjiro Goto, Tokyo, Japan, assignor to Mansei Kogyo Kabushiki Kaisha, Saitama, Japan
Filed Mar. 24, 1975, Ser. No. 561,261
Term of patent 14 years
Int. Cl. D27—*05*
U.S. Cl. D27—42



243,963
OPERATING ASSEMBLY FOR A CIGARETTE LIGHTER
Frank H. Stephens, Jr., Atlanta, Ga., assignor to Scripto, Inc., Atlanta, Ga.
Filed Oct. 14, 1975, Ser. No. 622,114
Term of patent 3.5 years
Int. Cl. D27—*05*
U.S. Cl. D27—42



243,964
VIVARIUM
Danny E. Deaton, Rte 3, Box 362, Pinson, Ala. 35126
Filed May 4, 1976, Ser. No. 683,014
Term of patent 14 years
Int. Cl. D30—*02*
U.S. Cl. D30—1



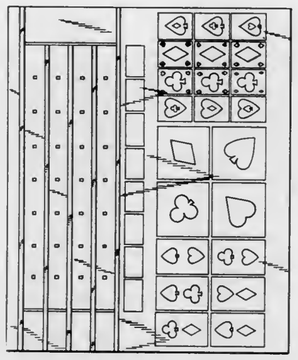
243,965
DOLL HEAD
Antonieta Chirinos Howard, 6320 Albro Lane, Alexandria, Va. 22312
Filed July 15, 1975, Ser. No. 596,061
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—4 R



243,966
DOLL
Betty Burt, 6987 York Road, Parma Heights, Ohio 44130, and Virginia A. Dart, 8050 Elmhurst Drive, Brecksville, Ohio 44141
Filed Mar. 11, 1976, Ser. No. 665,881
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—4 R

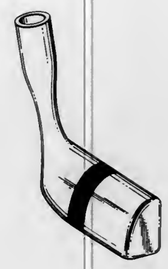


243,967
GAME BOARD
Henty Venn Money, 254 Marine Parade, Swanbourne, Australia
Filed Dec. 31, 1974, Ser. No. 537,858
Claims priority, application Australia, July 8, 1974, 65291/74
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 SS

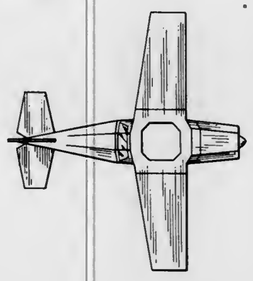




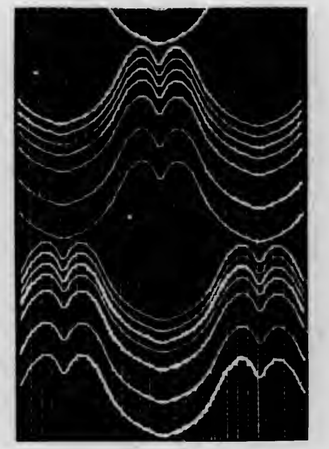
243,968
GOLF CLUB HEAD
Richard Whittaker, 302 S. Croton Ave., New Castle, Pa. 16101
Filed Sept. 8, 1975, Ser. No. 611,353
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 GH



243,969
TOY AIRPLANE
Larry Pitts, 669 W. Campus Circle, Fort Lauderdale, Fla. 33312
Filed May 21, 1975, Ser. No. 579,413
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 HH



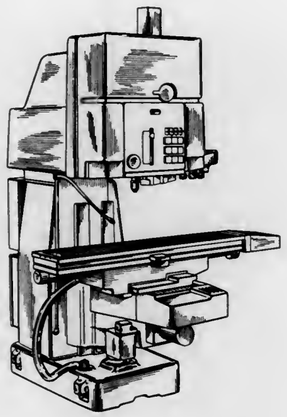
243,970
CURTAIN MATERIAL (NO. 505)
Peter E. Schroeder, c/o Gardisette International AG, Pilatusstrasse 38, Lucerne, Switzerland
Filed Mar. 20, 1975, Ser. No. 560,523
Claims priority, application Germany, Oct. 25, 1974, 706
Term of patent 14 years
Int. Cl. D5—*05*
U.S. Cl. D47—6 E



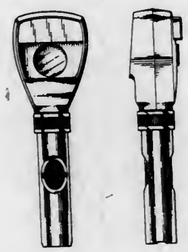
243,971
CANDLE HOLDER
Chauncey T. Thompson, Trenton, N.J., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest
Filed June 27, 1975, Ser. No. 591,086
Term of patent 14 years
Int. Cl. D26—*01*
U.S. Cl. D48—2



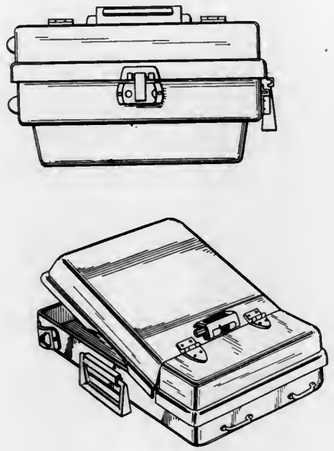
243,972
MILLING MACHINE
George A. Kucyna, Yonkers, and Anthony P. Montalbano, Glen Cove, both of N.Y., assignors to Autonumerics, Inc., Hauppage, N.Y.
Filed Jan. 22, 1976, Ser. No. 651,291
Term of patent 14 years
Int. Cl. D15—*09*
U.S. Cl. D15—131



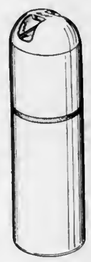
243,973
RETINOSCOPE
Arthur J. Pulos, Fayetteville, and Paul B. Sweeney, Syracuse, both of N.Y., assignors to Welch Allyn, Inc., Skaneateles Falls, N.Y.
Filed Mar. 1, 1976, Ser. No. 662,602
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D24—17



243,974
COMBINED BRIEFCASE AND CLIPBOARD
Charles W. Tracy, Tallahassee, Fla., assignor to Sargent-Sowell, Inc., Grand Prairie, Tex.
Filed June 3, 1974, Ser. No. 476,003
Term of patent 14 years
Int. Cl. D3—*01*
U.S. Cl. D87—5 B



243,975
WATERTIGHT CONTAINER FOR SMALL PERSONAL ARTICLES
Bjorn Olof Hjalmar Persson, Bergsgatan 21 B, S-832 00 Froson, Sweden
Filed Apr. 30, 1975, Ser. No. 573,001
Claims priority, application Sweden, Oct. 31, 1974, 741792
Term of patent 14 years
Int. Cl. D3—*02*
U.S. Cl. D87—1 R



# LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 5TH DAY OF APRIL, 1977

NOTE—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).


A. Christiaens Societe Anonyme: *See*—
Vanhoof, Pierre M.; and Clarebout, Pierre M., 4,016,284.
AB Volvo Penta: *See*—
Pichl, Heinz, 4,015,429.
Abbott Machine Co., Inc.: *See*—
Abbott, Samuel L., 4,015,316.
Abbott, Samuel L., to Abbott Machine Co., Inc. Combination tension and slub catching device. 4,015,316, Cl. 28-64.000.
Abe, Eiji; Ohta, Takahisa; and Urata, Mitsuharu, to Shinko Electric Co., Ltd.; and Fuji Photo Film Co., Ltd. Automatic film retrieval system and method therefor. 4,016,406, Cl. 235-92.0MP.
Aberer, James B., to Rival Manufacturing Company. Snap together switch assembly. 4,016,387, Cl. 200-303.000.
Abermeth, Hubert: *See*—
Ganter-Ullmann, Karl; Neussel, Paul; Abermeth, Hubert; Wahnschaffe, Jurgen; and Klier, Heiner, 4,015,485.
Aboaf, Joseph Adam; Broadie, Robert Wallace; and Pliskin, William Aaron, to International Business Machines Corporation. Integrated circuit isolation structure and method for producing the isolation structure. 4,016,017, Cl. 148-187.000.
Abrahamsen, Thomas C., to Burroughs Corporation. Floor structure for the environment of a modular computer system. 4,016,357, Cl. 174-48.000.
Abramishvili, Roza Isaakovna: *See*—
Pershin, Grigory Nikolaevich; Bogdanova, Nadezhda Sergeevna; Nikolaeva, Irina Sergeevna; Maichuk, Jury Fedorovich; Abramishvili, Roza Isaakovna; Avazov, Teshabai Nazarovich; Uretskaya, Galina Yakovlevna; Anikina, Svetlana Jurievna; Grinev, Alexei Nikolaevich; and Kraft, Maxim Yakovlevich, 4,016,289.
Access Control Systems Pty. Ltd.: *See*—
Horvath, Stephen, 4,015,869.
ACF Industries, Incorporated: *See*—
Rollins, Dallas W.; Randolph, Robert W.; and Garner, Gerald D., 4,015,751.
Acheson, Willard P.; Huygen, Hans H. A.; and Trump, Robert P., to Gulf Research & Development Company. Shale oil recovery process. 4,015,664, Cl. 166-259.000.
ACR Electronics, Inc.: *See*—
Williams, Wayne E., 4,015,810.
Adachi, Yoshiharu, to Aisin Seiki Kabushiki Kaisha. Brake control device. 4,015,881, Cl. 303-114.000.
Adams, George F. Reactor process and apparatus for continuous polymerization. 4,016,348, Cl. 526-293.000.
Adams, James S.; and Cutler, Charles W., to Hill-Rom Company, Inc. Ground-test circuit with minimal ground current. 4,016,489, Cl. 324-51.000.
Adams, Kenneth Douglas: *See*—
Herr, John Addison; Jaffe, Wolfgang; Dob, Allan Matthew; Minalga, Philip Francis; Adams, Kenneth Douglas; and Herron, William Lee, 4,016,441.
Adams, Sally Lee: *See*—
Persinski, Leonard J.; Cook, Michael M.; and Adams, Sally Lee, 4,015,991.
Adler, Norman; and Camin, Leopoldo Lazaro, to New England Nuclear Corporation. Bone seeking technetium 99m complex. 4,016,249, Cl. 424-1.000.
Advanced Decision Handling, Inc.: *See*—
Hall, Arthur D., III, 4,015,366.
Aero-Dyne Manufacturing, Inc.: *See*—
Culpepper, Clifford, Jr., 4,015,927.
AES Technology Systems, Inc.: *See*—
Evans, Robert H.; and Wochinski, Ronald F., 4,015,523.
Agence Nationale de Valorisation de la Recherche (ANVAR): *See*—
Galland, Jacques; Boutard nee Gabillet, Dominique; and Chene, Jacques, 4,015,950.
Agett, Albert H.: *See*—
Cooke, William C.; and Agett, Albert H., 4,016,324.
Ahiko, Isami, to Suzuei Co. Ltd. Floatable oil fence. 4,015,431, Cl. 61-1.00F.
Ahmed, Nazeer, to Western Electric Company, Inc. Formation and utilization of compound billet. 4,015,765, Cl. 228-131.000.
Aihara, Kazuma: *See*—
Kajiura, Atsusuke; Aito, Yuzo; Sugiyama, Atsushi; Tamura, Hiroki; and Aihara, Kazuma, 4,016,112.
Air Filters, Inc.: *See*—
Howard, Laurence M.; and Schaaf, Robert, 4,015,961.
Air LB: *See*—
Blanchet, Lucien, 4,015,889.
Airco, Inc.: *See*—
Pietrucha, Victor F.; Minard, Michael E.; and Ozmec, Gordon J., 4,015,440.
Airwick Industries, Inc.: *See*—
Hennart, Claude, 4,015,970.
Aisin Seiki Kabushiki Kaisha: *See*—
Adachi, Yoshiharu, 4,015,881.
Aito, Yuzo: *See*—
Kajiura, Atsusuke; Aito, Yuzo; Sugiyama, Atsushi; Tamura, Hiroki; and Aihara, Kazuma, 4,016,112.
Ajinomoto Co., Inc.: *See*—
Mitsugi, Koji; Sano, Konosuke; Yokozeki, Kenzo; Yamada, Kazuhiko; Noda, Ichiro; Kagawa, Teruhiko; Eguchi, Chikahiko; Yasuda, Naohiko; Tamura, Fumihide; and Togo, Kazushi, 4,016,037.
Akbaev, Abdi; and Ezhova, Vera Vasilievna. Anthelmintic thiodiphenylamine cupric chloride complex salt. 4,016,272, Cl. 424-245.000.
Akeson, Richard C.; and Hockenbury, Robert W., to Twin Disc, Incorporated. Digital electronic controller for power transmission. 4,015,488, Cl. 74-866.000.
Aktiebolaget Electrolux: *See*—
Andersson, Bror Lennarth; and Fahlvik, Nils Arne, 4,015,935.
Jonsson, Arne Ingvar; Malmstrom, Olov Valdemar; and Tibell, Bengt Gunnar Julius, 4,015,614.
Aktiebolaget SAMEFA: *See*—
Horvallius, Torgny William, 4,015,339.
Aktiengesellschaft Adolph Saurer: *See*—
Oesterle, Gerhard, 4,015,640.
Aktieselskabet Brodrene Hartmann: *See*—
Petersen, Jorgen Nilaus, 4,015,766.
Akustik Miljo AB: *See*—
Siden, Lars, 4,015,867.
Akzo N.V.: *See*—
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Akzona Incorporated: *See*—
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van der Burg, Willem Jacob, 4,016,161.
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Schroder, Peter, 4,015,840.
Albrecht, Gerhard: *See*—
Eyb, Wolfgang; Soffge, Friedhelm; Piper, Ortwin; and Albrecht, Gerhard, 4,015,303.
Albrecht, Harry Allen; and Plati, John Thomas, to Hoffmann-La Roche Inc. Sulfacytosine derivatives. 4,016,267, Cl. 424-229.000.
Albrecht, Wolfgang; and Dorling, Rolf, to L. & C. Steinmuller GmbH. Anchorage of a lining in a cast iron reactor pressure vessel. 4,015,742, Cl. 220-9.00A.
Alcan Aluminum Corporation: *See*—
Daver, Edul M., 4,015,947.
Alewelt, Wolfgang: *See*—
Bockmann, August; Wulff, Claus; Vernaleken, Hugo; Alewelt, Wolfgang; and Hucks, Uwe, 4,016,190.
Alexander, Danrick W., to Continental Oil Company. Hydraulic materials handling system. 4,015,625, Cl. 137-355.200.
Alexander, William; Causa, Alfredo Guillermo; and Fraser, James Girvan, to Millhaven Fibers, Ltd. Process for the control of carboxyl end groups in fiber-forming polyesters. 4,016,142, Cl. 260-75.00T.
Alfa-Laval AB: *See*—
Thylefors, Henric Wilhelm, 4,015,773.
Alison Control Inc.: *See*—
Traina, Richard, 4,016,424.
Allen, Donald J.: *See*—
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Allied Chemical Corporation: *See*—
Yeh, Chuen Y.; and Bohn, Francis L., 4,016,213.
Allis-Chalmers Corporation: *See*—
Zach, George O., Jr., 4,015,486.
Alps Electric Co., Ltd.: *See*—
Iwasaki, Sadayoshi, 4,016,377.
Alside, Inc.: *See*—
Epstein, George; and Mollman, Robert E., 4,015,374.
Epstein, George; and Mollman, Robert E., 4,015,391.
Alza Corporation: *See*—
Higuchi, Takeru; and Hussain, Anwar, 4,016,251.
Pharriss, Bruce B.; Erickson, Ross R.; and Tillson, Stephen A., 4,016,270.
Amagami, Keizo; Kobayashi, Takao; Ogino, Yoshio; and Kiuchi, Mitsuyuki, to Matsushita Electric Industrial Co., Ltd. Induction heating apparatus with protective circuit arrangement. 4,016,390, Cl. 219-10.490.
Amagami, Keizo: *See*—
Kobayashi, Takao; Amagami, Keizo; Mizukawa, Takumi; and Toyooka, Tadao, 4,016,392.

Amano, Haruyuki: *See—*
Hayashida, Yoshihiro; and Amano, Haruyuki, 4,015,693.

Ambardanishvili, Tristan Silovanovich; Dundua, Vakhtang Justinovich; and Kolomiitsev, Mikhail Alexandrovich. Source of ionizing radiation. 4,016,095, Cl. 252-301.10R.

Amdahl Corporation: *See—*
Beall, Robert J.; Buelow, Fred K.; and Zasio, John J., 4,016,463.

American Color & Chemical Corporation: *See—*
Renfrew, Edgar E., 4,016,153.

American Cyanamid Company: *See—*
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American Hospital Supply Corporation: *See—*
Choksi, Pradip V.; and Steidley, Roy B., 4,015,400.
St. Amand, Elmer F.; and Thornbury, Thomas R., 4,015,401.

American Mobile Corporation: *See—*
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American Nucleonics Corporation: *See—*
Sauter, Walter A.; and Martin, David R., 4,016,516.

American Optical Corporation: *See—*
Deeg, Emil W.; and Krohn, David A., 4,015,965.

American Pelletizing Corporation: *See—*
Perrine, Paul M., 4,015,973.

American Pulverizer Company: *See—*
Miller, Donald G., 4,015,783.

AMF Incorporated: *See—*
Arthur, Ronald H., 4,016,378.

Ammco Tools, Inc.: *See—*
Kamin, Arthur; Evans, Clifford A.; and Freborg, Lehner C., 4,015,481.

Amos, Richard Wayne, to Van Zandt Precision Products, Inc. Cartridge storing and loading device for a revolver. 4,015,358, Cl. 42-87.000.

AMP Incorporated: *See—*
Roland, John Thomas, 4,016,461.

Amsted Industries Incorporated: *See—*
Ashley, Allan J., 4,015,908.

Amtex, Inc.: *See—*
Johnson, Daniel W., 4,015,444.

Analog Devices, Inc.: *See—*
Pastoriza, James J., 4,016,559.

Anders, Herbert; Bullens, Antonius Adrianus Maria; Groot, Jan; Otten, Johannes Henricus Bernardus; Stoof, Hendrikus Christiaan Josephus; and Vloemans, Carolus Leopoldus, to U.S. Philips Corporation. High-voltage transformer. 4,016,478, Cl. 321-27.00R.

Anderson, Arnold L., to Michigan Chemical Corporation. Plastic compositions. 4,016,136, Cl. 260-45.90R.

Anderson, Arnold L.; and Nulph, Robert J., to Michigan Chemical Corporation. Plastic compositions. 4,016,137, Cl. 260-45.75R.

Anderson, Arnold L., to Michigan Chemical Corporation. Plastic compositions. 4,016,138, Cl. 260-45.75R.

Anderson, Arnold L.; and Nulph, Robert J., to Michigan Chemical Corporation. Plastic composition comprising acrylonitrile-butadiene-styrene polymer, a bis-phenoxy flame retardant and a flame retardant enhancing agent. 4,016,139, Cl. 260-45.75R.

Anderson, Carl Clement; and Dowbenko, Rostyslaw, to PPG Industries, Inc. Mercaptan blocked thermosetting copolymers. 4,016,332, Cl. 428-500.000.

Anderson, James C. Caged nut. 4,015,650, Cl. 151-41.760.

Anderson, John Dale; and Lutz, Bruce Leo. Stack-forming machine having tilting press. 4,015,520, Cl. 100-215.000.

Anderson, Perry W.: *See—*
Glabe, Elmer F.; Anderson, Perry W.; and Laftsidis, Stergios, 4,016,294.

Anderson, Richard L.; Clifton, Jack K.; Masi, James V.; and Merrin, Seymour, to Innotech Corporation. Photovoltaic heterojunction device employing a wide bandgap material as an active layer. 4,016,586, Cl. 357-2.000.

Andersson, Bror Lennarth; and Fahlvik, Nils Arne, to Aktiebolaget Electrolux. Method and apparatus for feeding and discharging a continuously operating autoclave. 4,015,935, Cl. 21-2.000.

Andersson, Lars Åke Vilhelm. Firearm bolt. 4,015,357, Cl. 42-16.000.

Ando, Akiko: *See—*
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Andress, Harry J., to Mobil Oil Corporation. Organic compositions containing borate and phosphonate derivatives as detergents. 4,016,092, Cl. 252-32.500.

Andrews, Donald. Hook baiting machine. 4,015,359, Cl. 43-4.000.

Anglian Water Authority: *See—*
Smith, Fred, 4,016,097.

Anikanov, Nikolai Ivanovich; Baburin, Evgeny Arkadievich; Grachev, Leonid Pavlovich; Zax, Grigory Iosifovich; Radutsky, Grigory Avramovich; Frumkin, Mikhail Evseevich; and Kheifets, Rafail Efimovich. Apparatus for bundling stacks of newspapers. 4,015,404, Cl. 53-218.000.

Anikina, Svetlana Jurievna: *See—*
Pershin, Grigory Nikolaevich; Bogdanova, Nadezhda Sergeevna; Nikolaeva, Irina Sergeevna; Maichuk, Jury Fedorovich; Abramishvili, Roza Isaakovna; Avazov, Teshabai Nazarovich; Uretskaya, Galina Yakovlevna; Anikina, Svetlana Jurievna; Grinev, Alexei Nikolaevich; and Kraft, Maxim Yakovlevich, 4,016,289.

Annen, Klaus: *See—*
Hofmeister, Helmut; Annen, Klaus; Wiechert, Rudolf; and Laurent, Henry, 4,016,269.

Antczak, Thaddeus. Production of solid, rigid filled polyurethane composites. 4,016,130, Cl. 260-37.00N.

Ante, Gunther: *See—*
Seibel, Georg; and Ante, Gunther, 4,016,400.

Aono, Shigeo; Ikeura, Kenji; and Hata, Yoshitaka, to Nissan Motor Co., Ltd. Spark-advance control apparatus for internal combustion engine. 4,015,565, Cl. 123-117.00D.

Aono, Taiji: *See—*
Machi, Sueo; Aono, Taiji; Matui, Yasushi; Hibi, Yoshiharu; and Shinano, Takayuki, 4,016,134.

Aono, Toshiaki: *See—*
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Aoshima, Takaaki: *See—*
Yoshinaka, Akira; Aoshima, Takaaki; and Sugita, Yoshimitsu, 4,016,006.

Apple, Garrett Gordon, Jr., to North Electric Company. Framing circuit for digital receiver. 4,016,368, Cl. 179-15.0BS.

Apple, Glenn Dwight, to Du Pont de Nemours, E. I., and Company. Sampling probe and method. 4,015,479, Cl. 73-422.00R.

Appleman, Milo Don: *See—*
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Appleton, Frank. Credit card verifier. 4,016,404, Cl. 235-61.70B.

Aquasol, Inc.: *See—*
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Arai, Hiroshi: *See—*
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Arai, Soichi: *See—*
Fujimaki, Masao; Arai, Soichi; and Watanabe, Michiko, 4,016,147.

Araki, Tadashi: *See—*
Otani, Sugio; Watanabe, Shoji; and Araki, Tadashi, 4,016,247.

Argyris, Pericles Alexandre; and Williams, William Randolph, to Rockwell International Corporation. Stop means for valves. 4,015,817, Cl. 251-288.000.

Arizona Chemical Company: *See—*
Wojcik, Ronald Thomas; and Ruckel, Erwin Richard, 4,016,346.

Arkind, Kenneth D.; and Geddry, Bernard L., to Sanders Associates, Inc. Constant beam width antenna reflector. 4,016,570, Cl. 343-781.00R.

Arlt, Dieter: *See—*
Beck, Gunther; and Arlt, Dieter, 4,016,169.

Armstrong, Allen E. Bicycle brake with force modifying means. 4,015,690, Cl. 188-24.000.

Armstrong Cork Company: *See—*
Bohrn, Walter J., 4,016,316.
Nute, Ernest B., Jr.; and Wasson, Kenneth L., 4,015,811.

Armstrong, Lee R., to United Technologies Corporation. Sub-cyclic measurements of speed and time for internal combustion engine horsepower indication. 4,015,467, Cl. 73-116.000.

Armstrong, Lee R.: *See—*
Stick, Philip P.; Willenbecher, James F.; and Armstrong, Lee R., 4,015,466.

Arnold, Philip M.; and Malick, Emil A., to Phillips Petroleum Company. Method of heating microbial cells. 4,016,300, Cl. 426-429.000.

Arthaud, Jacques. Device for mounting on a machine to allow the machine to be used as a saw. 4,015,499, Cl. 83-752.000.

Arthur, Ronald H., to AMF Incorporated. Detent means for simplified slide switch. 4,016,378, Cl. 200-16.00D.

Arzberger, William A.; and Lalumiere, Edward J., to Jet Spray Cooler, Inc. Hot coffee dispenser. 4,015,749, Cl. 222-70.000.

Asaba, Masayoshi: *See—*
Ishikawa, Masakazu; Ito, Sadayoshi; Oka, Hiroyuki; Iida, Kennoske; Usui, Kenji; and Asaba, Masayoshi, 4,016,533.

Asahi Kasei Kogyo Kabushiki Kaisha: *See—*
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Nagasawa, Keisaku; Mitsuishi, Masashi; Suzuki, Hiroshi; and Matsushita, Tetsuo, 4,016,236.
Tsunoda, Kozo; Sowa, Tsuneo; and Sako, Kiyohide, 4,016,352.

Asahi Kogaku Kogyo Kabushiki Kaisha: *See—*
Nomura, Katsuhiko, 4,016,576.

Asai, Takeji; and Yamazumi, Kaishu, to Kabushiki Kaisha Fujikoshi. Method for heat treatment of high alloy steel in a nonexplosive atmosphere. 4,016,011, Cl. 148-16.000.

Asano, Osamu: *See—*
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ASEA AB: *See—*
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ASG Industries, Inc.: *See—*
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Ashikawa, Mikio: *See—*
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Ashley, Allan J., to Amsted Industries Incorporated. Multiple-piece crankshaft. 4,015,908, Cl. 403-274.000.

Askew, Herbert Frank: *See—*
Jayne, Gerald John Joseph; Askew, Herbert Frank; and Harrington, Colin John, 4,016,088.

Aspro, Inc.: *See—*
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Atari, Inc.: *See—*
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Atherton, Frank Ratcliffe; Hall, Michael John; Hassall, Cedric Herbert; Ringrose, Peter Stuart; and Lambert, Robert Wilson, to Hoffmann-La Roche Inc. Peptide derivatives of phosphonic and phosphinic acids and intermediates therefor. 4,016,148, Cl. 260-112.50R.

Atomic Energy of Canada Limited: *See—*
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Aubin, Bernard: *See—*
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Auto Specialties Manufacturing Company: *See—*
Graafsma, Richard S.; and Nehrig, R. Harlan, 4,015,825.

Autocrat Corporation: *See—*
Wirth, George H.; and Derby, Sherwin L., 4,015,579.

Automobiles Peugeot: *See—*
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Avazov, Teshabai Nazarovich: *See—*
Pershin, Grigory Nikolaevich; Bogdanova, Nadezhda Sergeevna; Nikolaeva, Irina Sergeevna; Maichuk, Jury Fedorovich; Abramishvili, Roza Isaakovna; Avazov, Teshabai Nazarovich; Uretskaya, Galina Yakovlevna; Anikina, Svetlana Jurievna; Grinev, Alexei Nikolaevich; and Kraft, Maxim Yakovlevich, 4,016,289.

Aziende Chimiche Riunite Angelini Francesco A.C.R.A.F. S.p.A.: *See—*
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Azurdata, Inc.: *See—*
Azure, Leo L., 4,016,542.

Azure, Leo L., to Azurdata, Inc. Electronic notebook for use in data gathering, formatting and transmitting system. 4,016,542, Cl. 340-172.500.

B. F. Goodrich Company, The: *See—*
Kim, Heung Tai, 4,015,833.
Nehmey, Sam Donald, 4,015,926.
Wanstreet, Gregory E., 4,015,623.
Wanstreet, Gregory E.; and Plaat, C. Lucas, 4,015,624.

Babcock & Wilcox Company, The: *See—*
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Van Fossen, Don B., 4,015,636.

Babiec, John S., Jr.: *See—*
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Baburin, Evgeny Arkadievich: *See—*
Anikanov, Nikolai Ivanovich; Baburin, Evgeny Arkadievich; Grachev, Leonid Pavlovich; Zax, Grigory Iosifovich; Radutsky, Grigory Avramovich; Frumkin, Mikhail Evseevich; and Kheifets, Rafail Efimovich, 4,015,404.

Bachner, Ernst: *See—*
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Bacon, Roger J., to FMC Corporation. Mower with shock mounts. 4,015,407, Cl. 56-255.000.

Badische Anilin- & Soda-Fabrik Aktiengesellschaft: *See—*
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Bagg, Greville Euan Gordon; Cook, John; Dingle, Leslie Ernest; Edwards, Henry; and Ziebland, Hans, to National Research Development Corporation. Manufacture of composite materials. 4,016,031, Cl. 162-213.000.

Baggaley, Jon Clemens, to Tonecraft Limited. Dispensing and display device. 4,015,885, Cl. 312-42.000.

Bahrman, Clinton F.; and Welch, Thomas Ross, to Bahrman, Clinton F. Shock absorber lock. 4,015,862, Cl. 280-754.000.

Baierl, Kenneth W., to Flambeau Paper Company. Chemical concentration by adsorption. 4,016,180, Cl. 260-347.900.

Baiocchi, Leandro, to Aziende Chimiche Riunite Angelini Francesco A.C.R.A.F. S.p.A. 4-Acetamidophenyl-p-isobutyl hydratropate. 4,016,197, Cl. 260-477.000.

Baker, Clinton F. Combined sickle guard unit and attachment mounting means. 4,015,409, Cl. 56-312.000.

Baker, Clinton F. Hay loader. 4,015,726, Cl. 214-77.00R.

Baker, Dennis Stanley; and Davies, Glyndwr John, to Glacier Metal Company Limited, The. Plain bearings. 4,015,949, Cl. 428-653.000.

Balda-Werke: *See—*
Lange, Karl Heinz, 4,016,581.

Baldry, Peter R.: *See—*
Roth, Howard; Baldry, Peter R.; Kaufman, Harold B., Jr.; McCarthy, John P.; and Wallenfels, Kurt, 4,015,518.

Balekjian, Garbis S. Phosphorescent display system. 4,016,450, Cl. 315-149.000.

Balke, Karl Heinz. Domestic or tradesman's knife. 4,015,331, Cl. 30-355.000.

Ball, Henry F. Stabilizing subsoil moisture under light structures. 4,015,432, Cl. 61-35.000.

Barannik, Valery Pavlovich; and Kolesnikov, Arkady Georgievich. Method of producing fertilizers from sea-like waters. 4,015,971, Cl. 71-31.000.

Barker, Noble G.; Corwin, John E.; Myers, Jimmy D.; and Yates, Jan B., to Caterpillar Tractor Co. Material handling apparatus. 4,015,728, Cl. 214-138.00G.

Barr, Irwin R., to United States of America, Air Force. High density armor piercing projectile. 4,015,528, Cl. 102-52.000.

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Law, Wendell A.; Barrett, William G.; Priebe, Norman F.; and Wise, Harry D., 4,016,548.

Barry, Anthony Dermot, to John A. Wood Limited. Construction of tank. 4,015,384, Cl. 52-224.000.

Bartch, Donald Walter: *See—*
Deal, Samuel Broughton; and Bartch, Donald Walter, 4,016,363.

Bartenfeld, William Chelsea; Bryant, Clifford Aldene; and Newman, Wilbur Koontz, Sr., to West Point Pepperell, Inc. Apparatus and method for selective multi-color dyeing of individual yarns and producing therefrom a predetermined complex design in a tufted carpet. 4,015,550, Cl. 112-79.00A.

Barton, Robert M.: *See—*
Parquet, Donald J.; Pedersen, Carl O.; and Barton, Robert M., 4,015,729.

BASF Aktiengesellschaft: *See—*
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Battelle Memorial Institute: *See—*
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Battigelli, Jean A.: *See—*
Levecque, Marcel; Battigelli, Jean A.; and Plantard, Dominique, 4,015,963.
Levecque, Marcel; Battigelli, Jean A.; and Plantard, Dominique, 4,015,964.

Bauer, Rudolf; and Wick, Helmut, to Boehringer Ingelheim GmbH. Spray compositions for inhalation therapy of bronchial disorders. 4,016,279, Cl. 424-265.000.

Baumgartner, Hans U.: *See—*
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Baumgartner Papiers S.A.: *See—*
Pasche, Rene C., 4,015,610.

Baur, Robert F.; Comey, David M.; and Robillard, Gene A., to Honeywell Inc. Electromagnetic radiation detector. 4,016,590, Cl. 357-30.000.

Baxter Laboratories, Inc.: *See—*
Martinez, F. Jesus; and Schnell, William J., 4,016,081.

Baxter Travenol Laboratories, Inc.: *See—*
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Bayer Aktiengesellschaft: *See—*
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Konig, Hans-Bodo; Schrock, Wilfried; Disselnkotter, Hans; and Metzer, Karl Georg, 4,016,282.
Mayer-Mader, Rudolf; and Gobel, Wilhelm, 4,016,177.
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Bayerische Leichtmetallwerk Graf Bluecher von Wahlstatt KG: *See—*
Schober, Franz, 4,015,461.

Baylor College of Medicine: *See—*
Normann, Nils A., 4,015,590.

BBC Brown Boveri & Company Limited: *See—*
Sahm, Peter R.; and Nicoll, Andrew R., 4,016,014.

Beach Precision Parts Co.: *See—*
Grote, George A., 4,015,959.

Beall, Robert J.; Buelow, Fred K.; and Zasio, John J., to Amdahl Corporation. High density multilayer printed circuit card assembly and method. 4,016,463, Cl. 361-383.000.

Beatrice Foods Co.: *See—*
Kasik, Robert L.; and Peterson, Marvin A., 4,016,298.

Beatty, Ronald L.; Kiplinger, Dale V.; and Chilcoat, Bill R., to United States of America, Energy Research and Development Administration. Method for applying pyrolytic carbon coatings to small particles. 4,016,304, Cl. 427-6.000.

Beaty, Thomas, Jr.; and Samander, Asib S. Automatic palletizer method and apparatus. 4,015,723, Cl. 214-6.00P.

Beaty, Thomas, Jr.; and Samander, Asib S. Automatic palletizer method and apparatus. 4,015,732, Cl. 214-152.000.

Beaver, Tony J., to Cervical Traction Company, Inc. (Entire). Portable cervical traction apparatus. 4,015,597, Cl. 128-75.000.

Beck, Allan S.: *See—*
Gutterman, Eric D., 4,016,428.

Beck, Erich. Conversion of plastic waste into extrudable pellets. 4,015,781, Cl. 241-46.110.

Beck, Gunther; and Arlt, Dieter, to Bayer Aktiengesellschaft. Process for preparing trichlorothiazole. 4,016,169, Cl. 260-302.00R.

Beck, James M., to U.S. Cap & Closure, Inc. Spout for swivel-spout dispensing closures. 4,015,756, Cl. 222-534.000.

Beck, Sidney Marion; and Gilmour, Campbell Moore, to Idaho Research Foundation, Inc. Electrolytic field respirometer. 4,016,065, Cl. 204-275.000.

Beckman Instruments, Inc.: *See—*
Horrocks, Donald L.; and Klein, Paul R., 4,016,418.

Beecham Group Limited: *See—*
Forward, Geoffrey Charles; and Duke, Susan Ann, 4,016,255.
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Beecken, Hermann, to Bayer Aktiengesellschaft. Styryl dyestuffs. 4,016,191, Cl. 260-465.00E.

Bell & Howell Company: *See—*
Neff, Joseph J., 4,015,521.
Wells, Thomas R., 4,015,900.

Bell Telephone Laboratories, Incorporated: *See—*
Golioto, Igor, 4,016,385.

Lesh, Nathan George, deceased; Merchants National Bank of Allentown, executor; Morabito, Joseph Michael; and Thomas, John Henry, III, 4,016,050.
Miedema, Hotze, 4,016,497.
Pedersen, Thomas Josef, 4,016,369.

Bellasio, Elvio; and Campi, Ambrogio, to Gruppo Lepetit S.p.A. 6-Morpholino-3-substituted phenyl-S-triazolo[4,3-b]pyridazines. 4,016,162, Cl. 260-247.5DP.

Beloit Corporation: *See*—
Sokolow, Nickolas N., 4,015,916.

Bemis Company, Inc.: *See*—
Johnson, Harold K., 4,015,515.

Bender Machine Works, Inc.: *See*—
Schmid, Rolyn A., 4,015,618.

Bendix Corporation, The: *See*—
Lanni, Michael J.; and Calamera, John, 4,016,469.

Benjamin, J. Malvern, Jr. Photoplethysmographs. 4,015,595, Cl. 128-2.05V.

Bennett, Robert. Dip tube powder spray control device. 4,015,753, Cl. 222-193.000.

Bennett, Thomas H.; Carlow, Earl F.; Kouvoussis, Anthony E.; Orgill, Rodney H.; Peddle, Charles; and Wiles, Michael F., to Motorola, Inc. Bus switch coupling for series-coupled address bus sections in a microprocessor. 4,016,546, Cl. 340-172.500.

Benton, Richard Glasscock. Laser beam transport, and method. 4,016,417, Cl. 250-251.000.

Benya, John S., to United States of America, Navy. Fleet angle system and method of level winding. 4,015,798, Cl. 242-157.100.

Beretta, Oscar, to Societe Anonyme a Responsabilite Limitee: Technifil. Containers made in metallic wires. 4,015,743, Cl. 220-19.000.

Bergfelt, Nils H.: *See*—
Small, Edward A.; Edwards, Richard H.; Eufusia, Eugene A.; Clary, Robert M.; and Bergfelt, Nils H., 4,015,558.

Bergling, Charles Gunnar Birger, to Esab-Hebe AB. Method and apparatus for conveying metal plates. 4,015,702, Cl. 198-486.000.

Berglund, Kjell; and Nordlund, Signar. Means for changing the position of a load-carrying component of a transport unit. 4,015,735, Cl. 214-313.000.

Bergwerksverband GmbH: *See*—
Munzner, Heinrich; Heimbach, Heinrich; Korbacher, Werner; Peters, Werner; Juntgen, Harald; Knoblauch, Karl; and Zundorf, Dieter, 4,015,956.

Berkowitz, Sidney; and D'Angelo, John, to FMC Corporation. Process for purifying crude cyanuric acid. 4,016,164, Cl. 260-248.00A.

Bernard, Walter. Bicycle storage rack. 4,015,718, Cl. 211-5.

Bernstein, Phillip: *See*—
Toy, Henry; Bernstein, Phillip; and Van der Zwaan, Johan C., 4,015,507.

Berthelon, Jean-Jacques: *See*—
Boschetti, Eugene; Briet, Philippe; Berthelon, Jean-Jacques; and Chabert, Janine, 4,016,285.

Bertram, Johannes; and Wolzenburg, Heinz, to Hoesch Werke Aktiengesellschaft. Center-free one-row wire ball bearing. 4,015,884, Cl. 308-216.000.

Best, Lorne A., to National Element Inc. Electrical heating element. 4,016,403, Cl. 219-550.000.

Betensky, Ellis I., to Fimacon Associates. Illumination system for continuous path enlarger. 4,015,902, Cl. 355-60.000.

Bethlehem Steel Corporation: *See*—
Roche, John J.; and Hunsicker, Glenn L., 4,015,476.

Bidwell, Robert E.: *See*—
Kurtz, Leonard D.; and Bidwell, Robert E., 4,015,603.

Biggs, Lester G., to United States of America, Air Force. Reusable shipping container assembly. 4,015,710, Cl. 206-386.000.

Bihrle, William, Jr. Aerodynamic spin control device for aircraft. 4,015,800, Cl. 244-76.00R.

Bindicator Company: *See*—
Levine, Walter E., 4,015,319.

Bio-Rad Laboratories, Inc.: *See*—
Lewin, Nathan; and Mangiardi, Vito J., 4,015,939.

Biological Developments, Inc.: *See*—
Soares, James R., 4,016,146.

Birdwell, J. C., to Midcon Pipeline Equipment Co. System for laying pipe. 4,016,393, Cl. 219-59.000.

Birks, Laverne S.; and Fatemi, Mohammad, to United States of America, Navy. Multielectrode grid for aligning polarized particles such as asbestos. 4,016,456, Cl. 361-288.000.

Bishop, Everett Reece; and Leroux, Marcel Henri, to General Electric Company. Apparatus for converting a plurality of signals representative of digital bits of information to an analog signal. 4,016,558, Cl. 340-347.0DA.

Bitzer, Diethelm; and Lohmann, Dieter, to Ciba-Geigy Corporation. Process for producing diffusion layers of carbides, nitrides and/or carbonitrides. 4,016,013, Cl. 148-16.500.

Blachly, Charles H.: *See*—
Deitz, Victor R.; and Blachly, Charles H., 4,016,242.

Blackwell, Curtis R., to Reeves Roofing Equip. Co., Inc. Tar kettle. 4,015,588, Cl. 126-343.50A.

Blahak, Johannes; Muller, Erwin; and Richert, Karl Hartwig, to Bayer Aktiengesellschaft. Polyurethanes based on aromatic polyamines. 4,016,143, Cl. 260-77.5AM.

Blair, Robert B.: *See*—
Webb, Harry B.; Lee, James W.; and Blair, Robert B., 4,015,538.

Blanchet, Lucien, to Air LB. Shunt for providing a direct electrical connection. 4,015,889, Cl. 339-19.000.

Blaupunkt-Werke GmbH: *See*—
Haas, Dieter, 4,016,519.

Blodgett, Fredrick M., Jr.; and Schuyler, Peter B., to General Electric Company. Burst dispersion control. 4,015,508, Cl. 89-12.000.

Boberg, Gunnar: *See*—
Riede, Gerhard; and Boberg, Gunnar, 4,016,082.

BOC Limited: *See*—
Hall, Robert Gilmore, 4,015,780.

Bockmann, August; Wulff, Claus; Vernaleken, Hugo; Alewelt, Wolfgang; and Hucks, Uwe, to Bayer Aktiengesellschaft. Process for the preparation of diarylcarbonates. 4,016,190, Cl. 260-463.000.

Boehmer, Wolfgang: *See*—
Sommer, Neithart; Cuntze, Gerhard; and Boehmer, Wolfgang, 4,016,347.

Boehringer, Andreas, to Robert Bosch G.m.b.H. Protective system for intermittently operating semiconductor switch. 4,016,459, Cl. 361-88.000.

Boehringer Ingelheim GmbH: *See*—
Bauer, Rudolf; and Wick, Helmut, 4,016,279.
Eberhardt, Hans; and Brickl, Rolf Stefan, 4,016,287.
Koppe, Herbert; Kummer, Werner; Stahle, Helmut; and Muacevic, Gojko, 4,016,202.
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Fauland, Erich; Kampe, Wolfgang; Stach, Kurt, deceased; Plattner, Werner, executor; Stork, Harald; and Dietmann, Karl, 4,016,262.

Bogdanova, Nadezhda Sergeevna: *See*—
Pershin, Grigory Nikolaevich; Bogdanova, Nadezhda Sergeevna; Nikolaeva, Irina Sergeevna; Maichuk, Jury Fedorovich; Abramishvili, Roza Isaakovna; Avazov, Teshabai Nazarovich; Uretskaya, Galina Yakovlevna; Anikina, Svetlana Jurievna; Grinev, Alexei Nikolaevich; and Kraft, Maxim Yakovlevich, 4,016,289.

Bohn, Francis L.: *See*—
Yeh, Chuen Y.; and Bohn, Francis L., 4,016,213.

Bohrn, Walter J., to Armstrong Cork Company. Yarn-unraveling resistance in carpet. 4,016,316, Cl. 428-85.000.

Boise Cascade Corporation: *See*—
Ellerbrock, Donald H.; and Hough, Robert J., 4,016,311.
Hearon, William Montgomery; Witte, John F.; and Lo, Cheng Fan, 4,016,207.

Boissier, Pierre, to Usines et Acieries de Sambre et Meuse. Manhole assembly with removable cover, especially for a carriageway. 4,015,373, Cl. 52-20.000.

Bokros, Jack C.; and Slivenko, Victor, to General Atomic Company. Blood access device. 4,015,601, Cl. 128-214.00R.

Bolle, Warren Robert: *See*—
Vroom, Henry J.; Bolle, Warren Robert; Schneider, Herbert; and Swerdling, Burton, 4,015,586.

Bond, John Alan; Cheyne, George Martin Frazer; and Rayner, Adrien Patrick, to Imperial Chemical Industries Limited. Explosive charge. 4,015,526, Cl. 102-21.600.

Bond, John W., Jr., to United States of America, Army. Hypervelocity spallators. 4,015,535, Cl. 102-92.300.

Bonnema, Jentje; and Simon, Henri J. H., to Stamicarbon N.V. Process for recovering ammonium sulphate from aqueous solutions of ammonium sulphate which contain organic compounds. 4,015,946, Cl. 23-300.000.

Booth, Raymond E., to Sam Stein Associates, Inc. Process of coating food with particulate material. 4,016,299, Cl. 426-293.000.

Borden, George Wayne: *See*—
Trecker, David John; Borden, George Wayne; and Smith, Oliver Wendell, 4,016,059.

Bordiga, Alejandro Lorenzo Carlos. Device for propelling boats. 4,015,556, Cl. 115-39.000.

Borg-Warner Corporation: *See*—
Mathews, George P., 4,015,692.

Borisov, Vladimir Mikhailovich; Goldshtein, Boris Grigorievich; Goppen, Albert Adlofovich; Eletsky, Vladimir Alexeevich; Sherman, Viktor Lvovich; Bush, Kherbert Zhanovich; Ryashentsev, Nikolai Pavlovich; and Timoshenko, Evgeny Mikhailovich. Electric hammer. 4,015,671, Cl. 173-117.000.

Borkat, Franklin R.: *See*—
Silva, John; Garrett, Robert A.; Borkat, Franklin R.; and Young, Frank, 4,015,677.

Bormann, Dieter; Knabe, Bernd; Schrinner, Elmar; and Worm, Manfred, to Hoechst Aktiengesellschaft. Acylamino-cephem-carboxylic acids containing an amidino or guanidino group in the molecule. 4,016,159, Cl. 260-243.00C.

Borrow, Edgar W. Liquid dispensing apparatus. 4,015,646, Cl. 141-34.000.

Boschetti, Eugene; Briet, Philippe; Berthelon, Jean-Jacques; and Chabert, Janine, to Lipha, Lyonnaise Industrielle Pharmaceutique. Acetic acid derivative having choleretic and anti-inflammatory activity. 4,016,285, Cl. 424-283.000.

Bosma, Rumoldus Matthijs Marinos Johannes: *See*—
Leurs, Gerardus Cornelis; Bosma, Rumoldus Matthijs Marinos Johannes; and Pouw, Theodorus Johannes Antonius, 4,015,754.

Bossert, Friedrich: *See*—
Meyer, Horst; Bossert, Friedrich; Vater, Wulf; and Stoepel, Kurt, 4,016,277.

Bosshard, Hans: *See*—
Rempfler, Hermann; Bosshard, Hans; and Weber, Kurt, 4,016,203.

Bott, John A. Vehicle article carrier. 4,015,760, Cl. 224-42.10D.

Bourree, Guy; and Pontier, Claude, to Societe Generale de Constructions Electriques et Mecaniques (ALSTHOM). Logic passing device for automatic railway piloting. 4,015,807, Cl. 246-187.00B.

Boutard nee Gabillet, Dominique: *See*—
Galland, Jacques; Boutard nee Gabillet, Dominique; and Chene, Jacques, 4,015,950.

Bovio, Michele: *See*—
Giolitti, Nicolo; and Bovio, Michele, 4,016,602.

Bower, Allen M., to Emco Wheaton Inc. Pressure relief valve. 4,015,627, Cl. 137-494.000.

Bowmar Canada Limited: *See*—
Gale, Geoffrey N.; Colbourne, Edwin Denis; and Hollins, Michael J., 4,016,449.

Bradley-Moore, Patrick Ralph. Nuclear medicine system for imaging radiation. 4,015,592, Cl. 128-2.00A.

Bradley, Stevan D., to GTE Automatic Electric Laboratories Incorporated. Unmatched field effect transistors providing matched voltage-controlled resistances. 4,016,481, Cl. 323-16.000.

Bramley, Jenny, to United States of America, Army. Optoelectronic means for one-dimensional integral transforms of two dimensional information. 4,016,413, Cl. 235-181.000.

Brammer, Klaus: *See*—
Kunze, Lutz; Knapp, Kurt; and Brammer, Klaus, 4,015,338.

Brand, Harold E. Support stanchion. 4,015,827, Cl. 256-59.000.

Branson Ultrasonics Corporation: *See*—
Shoh, Andrew, 4,016,436.

Brautigam, Rolf: *See*—
Weckenmann, Albert; Haas, Lothar; and Brautigam, Rolf, 4,016,490.

Braytenbah, Andrew S.; and Jaegtnes, Karl O., to Westinghouse Electric Corporation. Electric power plant and turbine acceleration control system for use therein. 4,015,430, Cl. 60-644.000.

Brewer Engineering Laboratories, Inc.: *See*—
Brewer, Given A., 4,015,326.

Brewer, Given A., to Brewer Engineering Laboratories, Inc. Method of mounting a strain gage to a surface. 4,015,326, Cl. 29-460.000.

Brickl, Rolf Stefan: *See*—
Eberhardt, Hans; and Brickl, Rolf Stefan, 4,016,287.

Briet, Philippe: *See*—
Boschetti, Eugene; Briet, Philippe; Berthelon, Jean-Jacques; and Chabert, Janine, 4,016,285.

Brigend Investments Limited: *See*—
Michel, Peter, 4,016,230.

Bright, Arthur A.: *See*—
Garito, Anthony Frank; Heeger, Alan J.; MacDiarmid, Alan G.; Bright, Arthur A.; Cohen, Marshall J.; and Mikulski, Chester M., 4,016,331.

Bright, Robert G. Channel-shaped sealing, finishing and guiding strips. 4,015,398, Cl. 52-716.000.

Bristol-Myers Company: *See*—
Montzka, Thomas Alfred; and Matiskella, John Daniel, 4,016,167.

Bristow, Stephen D.; and Mayer, Steven T., to Atari, Inc. Multiple image positioning control system and method. 4,016,362, Cl. 358-142.000.

British Leyland UK Limited: *See*—
Finch, Peter Molyneux, 4,015,861.

Broadie, Robert Wallace: *See*—
Aboaf, Joseph Adam; Broadie, Robert Wallace; and Pliskin, William Aaron, 4,016,017.

Brock, Phillip J.: *See*—
Rajadhyaksha, Vithal J.; Schroer, Richard A.; Brock, Phillip J.; and Krueger, Earl R., 4,016,223.

Broijl, Berend: *See*—
van der Plas, Nicolaas; and Broijl, Berend, 4,015,413.

Bron, Jean-Daniel: *See*—
Gruetter, Walter; and Bron, Jean-Daniel, 4,015,844.

Brooks, Ronald Robert, to RCA Corporation. GTO circuits. 4,016,433, Cl. 307-252.00C.

Brooks, William T., to United States of America, Air Force. Fuel grain for spherical boost-sustain rocket motor. 4,015,427, Cl. 60-253.000.

Brouthers, Paul E., to Dan Wesson Arms, Inc. Gun sight. 4,015,354, Cl. 42-1.00S.

Brouwer, Gerardus Johannes; and Gerrits, Theodorus Petrus Hubertus, to Brouwer Turf Equipment Limited. Sod undercutting knife. 4,015,666, Cl. 172-19.000.

Brouwer Turf Equipment Limited: *See*—
Brouwer, Gerardus Johannes; and Gerrits, Theodorus Petrus Hubertus, 4,015,666.

Brown, Glenn E. Anaesthesic system. 4,015,598, Cl. 128-188.000.

Brown, John Peter: *See*—
Horner, Patrick James; and Brown, John Peter, 4,016,210.

Brown, Laurence A.; Hagedorn, Floyd T.; and Waltz, Foster V., Jr., to Libbey-Owens-Ford Company. Apparatus for bending glass sheets to relatively sharp angles. 4,015,969, Cl. 65-289.000.

Brown Oil Tools, Inc.: *See*—
Cochran, Chudleigh B., 4,015,662.

Brown, Omar L., to Fraze, Ermal C. Easy-open ecology end. 4,015,744, Cl. 220-269.000.

Brown, Owen J., Jr. Herbicide tank trailer. 4,015,549, Cl. 111-8.000.

Brown, Robert W.: *See*—
Wellman, Russel E.; and Brown, Robert W., 4,016,099.

Brown, Timothy W.: *See*—
DiGioia, Frank A.; and Brown, Timothy W., 4,016,318.

Browning, Charles E.; and Reinhart, Theodore J., Jr., to United States of America, Air Force. Low flow, vacuum bag curable prepreg material for high performance composite systems. 4,016,022, Cl. 156-285.000.

Browning, Scott M.; and Klomp, Gregory F. Writing device incorporating illuminating means. 4,016,414, Cl. 240-6.460.

Brunet, Patrick J. C., to Zuccolo, Rochet & Cie. Metal straps formed by interconnected links. 4,015,423, Cl. 59-82.000.

Brunswick Corporation: *See*—
Fitzner, Arthur O., 4,015,564.

Bryant, Clifford Aldene, to West Point Pepperell, Inc. Dye pan mounting for apparatus for multi-color dyeing of yarn ends. 4,015,453, Cl. 68-202.000.

Bryant, Clifford Aldene: *See*—
Bartenfeld, William Chelsea; Bryant, Clifford Aldene; and Newman, Wilbur Koontz, Sr., 4,015,550.

BTR Industries Limited: *See*—
Howorth, Ronald, 4,015,390.

Buck K.G., Firma: *See*—
Schiessl, Alois; and Krone, Hartmut, 4,015,355.

Budker, Gersh Itskovich; Gaponov, Vasily Alexandrovich; Korabelnikov, Boris Mikhailovich; Krainov, Gennady Sergeevich; Kuznetsov, Sergei Alexandrovich; Kuksanov, Nikolai Konstantinovich; Kondratiev, Vasily Ivanovich; and Salimov, Rustam Abelevich. Charged particle accelerator. 4,016,499, Cl. 328-233.000.

Buebel, Edgar W., Jr., to United States of America, Air Force. Near field antenna boresight alignment apparatus. 4,016,569, Cl. 343-703.000.

Buecheler, Paul, to Sandoz Ltd. Process for the production of aminoanthraquinone compounds. 4,016,182, Cl. 260-371.000.

Buelow, Fred K.: *See*—
Beall, Robert J.; Buelow, Fred K.; and Zasio, John J., 4,016,463.

Bullens, Antonius Adrianus Maria: *See*—
Anders, Herbert; Bullens, Antonius Adrianus Maria; Groot, Jan; Otten, Johannes Henricus Bernardus; Stoof, Hendrikus Christiaan Josephus; and Vloemans, Carolus Leopoldus, 4,016,478.

Bulova Watch Company, Inc.: *See*—
Van Haaften, Egbert, 4,015,422.

Bulten-Kanthal Aktiebolag: *See*—
Schrewelius, Nils G., 4,016,313.

Burgess, John E., to Cleveland Marine Limited. Cable stripping machines with linked cutting and driving wheels. 4,015,497, Cl. 83-425.200.

Buril, Robert T. Hanger device. 4,015,809, Cl. 248-217.200.

Buro Patent AG: *See*—
Pircher, Herbert; and Hambuch, Johannes, 4,015,680.

Burroughs Corporation: *See*—
Abrahamsen, Thomas C., 4,016,357.
Durney, David John, 4,015,764.
Kim, Dongsung Robert, 4,016,409.
Kondur, Nicholas, Jr., 4,015,699.
Templeton, William B., 4,015,701.

Burrous, William R. Screw removal tool. 4,015,490, Cl. 81-180.00R.

Burrows, Ian Edward; and Cheney, Peter Arthur, to Pedigree Petfoods Limited. Proteinaceous food product. 4,016,295, Cl. 426-43.000.

Bush, Kherbert Zhanovich: *See*—
Borisov, Vladimir Mikhailovich; Goldshtein, Boris Grigorievich; Goppen, Albert Adlofovich; Eletsky, Vladimir Alexeevich; Sherman, Viktor Lvovich; Bush, Kherbert Zhanovich; Ryashentsev, Nikolai Pavlovich; and Timoshenko, Evgeny Mikhailovich, 4,015,671.

Bushnell, Sherman W., Jr. Portable multi-stage mechanical list. 4,015,686, Cl. 182-148.000.

Business Efficiency Aids, Inc.: *See*—
Zurwelle, Rolf, 4,015,350.

Buss, Dennis Darcy, to Texas Instruments Incorporated. CCD range-doppler processor. 4,016,567, Cl. 343-7.700.

Butler Automatic, Inc.: *See*—
Meihofer, Edward F., 4,015,794.

Buttler, Carl T., to Marquis, Kenneth E. Door lock employing interlocking hinge plates. 4,015,868, Cl. 292-302.000.

Button, John Charles Gladstone, to Chrysler United Kingdom Limited. Vehicle seat assemblies. 4,015,877, Cl. 297-341.000.

Butts, Ernest Otto; and Laurus, Felix F., to Hambro Structural Systems Ltd. Joist. 4,015,396, Cl. 52-690.000.

Byk Gulden Lomberg Chemische Fabrik GmbH: *See*—
Menge, Heinz Gunter; and Klosa, Josef, 4,016,280.

Byrne, John P.: *See*—
Kinsell, Robert C.; Noe, James C.; and Byrne, John P., 4,015,438.

C. Evans & Sons Limited: *See*—
Gostling, Peter Eric, 4,015,395.

C. Itch & Co., Ltd.: *See*—
Hamada, Kenzo; and Uchiyama, Hiroshi, 4,016,118.

Cabaud, Aime, to Comatel - Comptoir European de Materiel Electronique. Apparatus for locating connectors onto a circuit board. 4,015,322, Cl. 29-739.000.

Cadoff, Laurence H., to Westinghouse Electric Corporation. Refractory-oxide-based incandescible radiators and method of making. 4,016,446, Cl. 313-218.000.

Cahill, Bernard S.: *See*—
Heinz, Harro K.; and Cahill, Bernard S., 4,016,502.

Calamera, John: *See*—
Lanni, Michael J.; and Calamera, John, 4,016,469.

Calderara, Reto; Baumgartner, Hans U.; Tichy, Jan; and Sonderegger, Hans C., to Kistler Instrumente AG. Piezoelectric pressure and force transducers or accelerometers. 4,016,437, Cl. 310-8.700.

Cale, Roland E., to Schaefer Equipment Company. Railway car brake rigging linkage. 4,015,697, Cl. 188-209.000.

Calgon Corporation: *See*—
Persinski, Leonard J.; Cook, Michael M.; and Adams, Sally Lee, 4,015,991.

Cameron Iron Works, Inc.: *See—*
Szymczak, Edward J., 4,015,864.
Camin, Leopoldo Lazaro: *See—*
Adler, Norman; and Camin, Leopoldo Lazaro, 4,016,249.
Campbell, John D.: *See—*
Womble, William H.; and Campbell, John D., 4,015,801.
Campbell, Robert W., to Phillips Petroleum Company. Production of aromatic sulfide/sulfone polymers. 4,016,145, Cl. 260-79.30M.
Campi, Ambrogio: *See—*
Bellasio, Elvio; and Campi, Ambrogio, 4,016,162.
Canada, Her Majesty the Queen in right of, as represented by the Minister of National Defence: *See—*
Gray, Thomas J.; and Wojtowicz, Jan, 4,016,339.
Canadian General Electric Company Limited: *See—*
Eastcott, Peter deHertel, 4,016,496.
Cane, Mario. System for remotely checking equipment. 4,016,360, Cl. 179-2.00A.
Canon Kabushiki Kaisha: *See—*
Hirose, Ryusho, 4,015,895.
Inuzuka, Tsuneki; Furuichi, Katsushi; Sawamura, Osamu; Kimura, Yoshimasa; and Sakamaki, Hisashi, 4,016,529.
Matsumoto, Seiichi; and Hosoe, Kazuya, 4,016,471.
Uchiyama, Takashi; Mashimo, Yukio; and Nakamura, Zenzo, 4,016,575.
Capital Wire and Cable, Division of U.S. Industries: *See—*
Pringle, John Philip, 4,016,232.
Pringle, John Philip, 4,016,233.
Carberry, Richard Aladine, to Data General Corporation. Dynamic MOS memory with reduced propagation delay. 4,016,551, Cl. 340-173.00R.
Carl Schenck AG: *See—*
Giers, Alfred J., 4,015,480.
Carlow, Earl F.: *See—*
Bennett, Thomas H.; Carlow, Earl F.; Kouvoussis, Anthony E.; Orgill, Rodney H.; Peddle, Charles; and Wiles, Michael F., 4,016,546.
Carlson, Elmer A., to International Telephone and Telegraph Corporation. Heating system. 4,015,928, Cl. 431-74.000.
Caron, Ronald N.; and Shapiro, Stanley, to Olin Corporation. Preparation of high strength copper base alloy. 4,016,010, Cl. 148-12.70C.
Carrieri, Louis F., to Gulf & Western Manufacturing Company. High response unloading valve. 4,015,620, Cl. 137-115.000.
Carroll, John P., to Living Walls Inc. Combined leveling bracket and shock absorber for cabinet. 4,015,808, Cl. 248-188.400.
Carter, Harris G., Jr.: *See—*
Kibler, Kenneth G.; and Carter, Harris G., Jr., 4,015,658.
Cashin Systems Corporation: *See—*
Spooner, Robert J.; and Dillon, Oscar W., 4,015,494.
Cassella Farbwerke Mainkur Aktiengesellschaft: *See—*
Schnee, Karl; Tichy, Dieter; Michel, Walter; and Gruber, Gunter, 4,016,336.
Cassidy, Robert L.; Cosco, Robert J.; and Pappas, John A., to GTE Sylvania Incorporated. Deuterium arc lamp. 4,016,445, Cl. 313-185.000.
Castrol Limited: *See—*
Jayne, Gerald John Joseph; Askew, Herbert Frank; and Harrington, Colin John, 4,016,088.
Caterpillar Tractor Co.: *See—*
Barker, Noble G.; Corwin, John E.; Myers, Jimmy D.; and Yates, Jan B., 4,015,728.
Cole, Carroll Richard, 4,015,669.
Gee, James E.; and Stedman, Robert N., 4,015,348.
Herrick, George R., 4,016,398.
Cattermole, David Christopher, to Elliott Brothers (London) Limited. Tripod arrangements. 4,015,806, Cl. 248-168.000.
Causa, Alfredo Guillermo: *See—*
Alexander, William; Causa, Alfredo Guillermo; and Fraser, James Girvan, 4,016,142.
Cavazza, Claudio, to Sigma-Tau Industrie Farmaceutiche/Riunite S.p.A. Dispensing closure for a container. 4,015,758, Cl. 222-457.500.
Cavenar, Clarence William, to W & W Steel Company. Control apparatus for a length determining machine. 4,016,072, Cl. 209-74.00R.
Celanese Corporation: *See—*
Collins, George L.; and Costanza, John R., 4,016,334.
LaNieve, Herman L., 4,015,924.
Centre de Recherches Metallurgiques-Centrium voor Research in de Metallurgie: *See—*
Respen, Yves Jean; Cosse, Paul Andre; and Economopoulos, Mario, 4,016,015.
Centre de Recherches Metallurgiques-Centrum voor Research in de Metallurgie: *See—*
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Certain-teed Products Corporation: *See—*
Heilmayr, Peter F., 4,015,925.
Cervical Traction Company, Inc. (Entire): *See—*
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Chabert, Janine: *See—*
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Chagan, Alan M.: *See—*
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Chalfant Sewing Fabricators, Inc.: *See—*
Chalfant, Thomas W., 4,015,380.
Chalfant, Thomas W., to Chalfant Sewing Fabricators, Inc. Truck loading dock seal. 4,015,380, Cl. 52-173.0DS.
Chamberlin, Donald W., to FMC Corporation. Can filling apparatus. 4,015,645, Cl. 141-34.000.
Champion International Corporation: *See—*
Norris, Alan H., 4,016,019.
Chan, Ka-Kong; and Saucy, Gabriel, to Hoffmann-La Roche Inc. Synthesis of vitamin E. 4,016,178, Cl. 260-345.500.
Chang, Charles Hung, to GAF Corporation. Dyestuff process. 4,016,181, Cl. 260-380.000.
Chao, Tsai Hsiang, to American Cyanamid Company. Urea-glyoxal-formaldehyde cellulose reactant. 4,016,335, Cl. 428-526.000.
Chapelet, Gilbert: *See—*
Durand, Jean-Pierre; Aubin, Bernard; Dawans, Francois; and Chapelet, Gilbert, 4,015,952.
Chapman, Robert E., to Photo Systems, Inc. Center filling variable volume film drum. 4,016,585, Cl. 354-331.000.
Charles Churchill Limited: *See—*
Hodgson, Brian, 4,015,510.
Charles, Marvin: *See—*
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Cheek, Robert L.: *See—*
Young, Walter L.; Douglas, C. J.; Connally, Carl A.; and Cheek, Robert L., 4,016,028.
Chemcut Corporation: *See—*
Goffredo, Daniel L.; and Shakley, Conrad Dale, 4,015,706.
Chemische Werke Huels Aktiengesellschaft: *See—*
Kupper, Friedrich-Wilhelm; and Streck, Roland, 4,016,220.
Chemische Werke Huls Aktiengesellschaft: *See—*
Sommer, Neithart; Cuntze, Gerhard; and Boehmer, Wolfgang, 4,016,347.
Wulf, Horst-Dieter; List, Ferdinand; Orlowski, Friedrich-August; Wilke, Norbert; and Pflegerl, Emmerich, 4,015,943.
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Chen, David Wan-Ching: *See—*
Chen, Helen Ho-Chiu; and Chen, David Wan-Ching, 4,015,778.
Chen, Helen Ho-Chiu; and Chen, David Wan-Ching. Multifunctional folding chair. 4,015,778, Cl. 273-136.00G.
Chene, Jacques: *See—*
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Cheney, Peter Arthur: *See—*
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Chestel, Inc.: *See—*
Laoteppitaks, Chansak; Henthorn, Lincoln; and Falconer, Charles B., 4,016,370.
Cheung, Nelson, to Signode Corporation. Tensioning tool with self-energizing gripper plug. 4,015,643, Cl. 140-93.400.
Chevron Research Company: *See—*
Hess, Patrick H., 4,015,995.
Moore, Joseph E., 4,016,275.
Suzuki, Shigeto, 4,016,208.
Wilkes, John B., 4,016,185.
Cheyne, George Martin Frazer: *See—*
Bond, John Alan; Cheyne, George Martin Frazer; and Rayner, Adrien Patrick, 4,015,526.
Chilcoat, Bill R.: *See—*
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Choksi, Pradip V.; and Steidley, Roy B., to American Hospital Supply Corporation. Method of opening medical liquid container with separable outer and inner closures. 4,015,400, Cl. 53-3.000.
Chong, Robert S. Y., to Merry Whirler Manufacturing Corporation. Cable dispenser. 4,015,795, Cl. 242-85.000.
Chosy, Eugene: *See—*
Hulverson, Adrian F.; and Chosy, Eugene, 4,015,876.
Chow, Philip Y., to Lin Offshore Engineering, Inc. Construction and launch barge and method of producing and installing offshore structures. 4,015,554, Cl. 114-65.00R.
Christena, Ray C., to Vulcan Materials Company. Separation and recovery of polychlorinated phenols. 4,016,047, Cl. 203-6.000.
Christensen, John L. Apparatus for coupling and uncoupling pipe sections. 4,015,661, Cl. 166-77.500.
Christian, Dorothy A. Safety canopy for crib. 4,015,297, Cl. 5-97.000.
Christiansen, Robert W., to Minnesota Mining and Manufacturing Company. Static eliminator. 4,016,455, Cl. 361-222.000.
Christie, Joe William. Split-sleeve pipe device with integral seal and insulator. 4,015,634, Cl. 138-99.000.
Christman, Robert D.; Lasher, Jordan S.; Paraskos, John A.; and Yanik, Stephen J., to Gulf Research & Development Company. Multiple stage hydrodesulfurization process including partial feed oil by-pass of first stage. 4,016,069, Cl. 208-210.000.
Christman, Robert D.; Lasher, Jordan S.; Paraskos, John A.; and Yanik, Stephen J., to Gulf Research & Development Company. Multiple stage hydrodesulfurization process with extended downstream catalyst life. 4,016,070, Cl. 208-210.000.
Chrysler United Kingdom Limited: *See—*
Button, John Charles Gladstone, 4,015,877.
Chu, Joseph Y. C.; and Gunther, W. H. H., to Xerox Corporation. Process for preparation of solid phase dispersion of photoconductive materials. 4,016,058, Cl. 204-158.00R.
Ciba-Geigy Corporation: *See—*
Bitzer, Diethelm; and Lohmann, Dieter, 4,016,013.
Darmory, Franklin P.; and DiBenedetto, Marianne, 4,016,173.
Jaeggi, Knut A.; Ostermayer, Franz; and Schroter, Herbert, 4,016,283.





Koller, Stefan; Lapple, Arnulf Ruediger; and Pacher, Marielise, 4,015,933.
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Rempfler, Hermann; Bosshard, Hans; and Weber, Kurt, 4,016,203.
Robertson, George Heddle; and Stirling, John Andrew, 4,015,999.
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Cielo, John Robert; and Orfitelli, John Andrew, to International Business Machines Corporation. Pulse energy suppression network. 4,016,482, Cl. 323-17.000.
Cincinnati Milacron, Inc.: *See—*
Pfister, Stanley Arthur, 4,015,487.
Citation Companies, Inc., The: *See—*
DeBruyn, William T., 4,015,367.
Citizen Watch Co., Ltd.: *See—*
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Clark Door Company, Inc.: *See—*
Cook, Sanford L., 4,015,386.
Clark, George B., to Dow Chemical Company, The. Header block for tubular membrane permeator modules. 4,016,078, Cl. 210-94.000.
Clark, Leland L., to University of Utah, The. Wart treatment with phosphonoacetic acid or derivatives thereof. 4,016,264, Cl. 424-198.000.
Clark, Michael Nicholson, to United Kingdom of Great Britain and Northern Ireland, Secretary of State for Environment in Her Britannic Majesty's Government of the. Expansion joints. 4,015,302, Cl. 14-16.500.
Clark, Richard E.: *See—*
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Clary, Robert M.: *See—*
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Cleveland Marine Limited: *See—*
Burgess, John E., 4,015,497.
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Clipson, Stuart A.; and Lemkin, Jack L., to Midland-Ross Corporation. Stackable storage bin. 4,015,713, Cl. 206-509.000.
Cobb, James Dean: *See—*
Cooper, William H., Jr.; and Cobb, James Dean, 4,015,722.
Cochran, Chudleigh B., to Brown Oil Tools, Inc. Well tool which changes reciprocating movement to rotary motion. 4,015,662, Cl. 166-104.000.
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Cohen, Amnon Mordechai, to Polak's Frutal Works N.V. Alicyclic ketoester perfume compositions. 4,016,109, Cl. 252-522.000.
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Cohrs, William E.; Gunderman, Roland E.; and Crozier, William A., to Dow Chemical Company, The. Process for the preparation of expandable microspheres. 4,016,110, Cl. 260-2.50B.
Colbourne, Edwin Denis: *See—*
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Colby, Bruce N.: *See—*
Hull, Charles W.; Whitehead, T. Wilson; and Colby, Bruce N., 4,016,421.
Cole, Carroll Richard, to Caterpillar Tractor Co. Circle mounting bar and circle assembly for a motor grader. 4,015,669, Cl. 172-796.000.
Colgate-Palmolive Company: *See—*
Knohl, Herbert, 4,015,448.
Win, Maung Hla; DiSalvo, Walter Anthony; and Kenney, Edward Joseph, 4,016,040.
Collaris, Maria Antonius Alphonsus Andreas; van Kemenade, Antonius Wilhelmus Cornelis; Debruijn, Henricus Antonius; and Snijders, Mathieu Willem Maria, to U.S. Philips Corporation. Method of selectively metallizing the display screen of a cathode-ray tube and cathode-ray tube manufactured by said method. 4,016,307, Cl. 427-54.000.
Collins, George L.; and Costanza, John R., to Celanese Corporation. Method of applying high adhesion ultraviolet curable coatings and coated articles. 4,016,334, Cl. 428-463.000.
Collis, Martin S.: *See—*
Hayward, John S.; Collis, Martin S.; Eckerson, John D.; and Rosenblood, Lorne K., 4,015,300.
Coloroll Limited: *See—*
Griffin, Gerald Joseph Louis, 4,016,117.
Colson, Andrew Elliott, Jr. In-ground swimming pool and apparatus and method for constructing same. 4,015,379, Cl. 52-169.100.
Colt Industries Operating Corporation: *See—*
Rietveld, Frank P., 4,016,395.
Colvin, Ronald L.; and Williams, James H., to United States of America, Air Force. Multiple level fluid bearing track assembly. 4,015,880, Cl. 302-31.000.
Comatel - Comptoir European de Materiel Electronique: *See—*
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Combustion Engineering, Inc.: *See—*
Musick, Charles Ronald, 4,016,034.
Schuss, Jack A., 4,015,548.
Comey, David M.: *See—*
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Commissariat a l'Energie Atomique: *See—*
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Compagnie Generale d'Electricite: *See—*
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Compagnie Industrielle des Telecommunications Cit-Alcatel: *See—*
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Compagnie Internationale pour l'Informatique: *See—*
Lazzari, Jean-Pierre, 4,016,601.
Compton, James B., to National Semiconductor Corporation. Field effect transistor switching circuit. 4,016,595, Cl. 357-43.000.
Concannon, Thomas P.: *See—*
Vassiliou, Eustathios; and Concannon, Thomas P., 4,016,125.
Conlon, Daniel R. Holding device for laboratory ware. 4,015,940, Cl. 23-259.000.
Connally, Carl A.: *See—*
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Connolly, Edward A., to Fraser Sweatman, Inc. Analgesic apparatus. 4,015,617, Cl. 137-88.000.
Connor, David T.; Ringel, Samuel M.; and von Strandtmann, Maximilian, to Warner-Lambert Company. Amide derivatives of acids, an antibiotic produced by *Polyangium cellulosum* var. *fulvum*. 4,016,257, Cl. 424-122.000.
Conradi, Mark S.: *See—*
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Consolidation Coal Company: *See—*
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Continental Gummi-Werke Aktiengesellschaft: *See—*
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Continental Oil Company: *See—*
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Contreras, Boris L., to Pittman Products, Inc. Regulator first stage for underwater diving. 4,015,630, Cl. 137-505.250.
Cook, John: *See—*
Bagg, Greville Euan Gordon; Cook, John; Dingle, Leslie Ernest; Edwards, Henry; and Ziebland, Hans, 4,016,031.
Cook, Michael M.: *See—*
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Cook, Sanford L., to Clark Door Company, Inc. Fire-retardant low temperature insulating building panel. 4,015,386, Cl. 52-232.000.
Cook, Thomas W.; Penner, Wayne A.; Quaglino, Carl A.; Ray, Charles D.; and Scott, Lyndell F., to Mobil Oil Corporation. System for recording seismic reflection signals in serial-by-trace format. 4,016,531, Cl. 340-15.5DP.
Cooke, William C.; and Agett, Albert H., to ASG Industries, Inc. Spandrel glass panel. 4,016,324, Cl. 428-248.000.
Cooper, William H., Jr.; and Cobb, James Dean, to McKenney's, Inc. Stacking machine and method. 4,015,722, Cl. 214-6.00D.
Cornell Research Foundation, Inc.: *See—*
Finn, Robert K.; Tannahill, Alex L.; and Laptewicz, Joseph E., Jr., 4,016,085.
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Cornellier, Maurice H. Safety guard for rotary-type cutter. 4,015,408, Cl. 56-295.000.
Corwin, John E.: *See—*
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Cosco, Robert J.: *See—*
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Cosse, Paul Andre: *See—*
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Costanza, John R.: *See—*
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Cotrel, Claude; Crisan, Cornel; Jeanmart, Claude; and Messer, Mayer Naoum, to Rhone-Poulenc S.A. Naphthyridine derivatives. 4,016,274, Cl. 424-250.000.
Coughlin, Robert W.; and Charles, Marvin. Method of carrying out enzyme catalyzed reactions. 4,016,293, Cl. 426-42.000.
Coupe, Neville Burton, to Denley-Tech Limited. Apparatus for delivering liquid and removing liquid from a container. 4,015,942, Cl. 23-259.000.
Court, Charles T.; and Miller, Jessie H., to Newcourt, Inc. Door or panel seal. 4,015,368, Cl. 49-488.000.
Cowans, Beatrice L.; and Hall, Virginia E., to Hallco Inc. Embroidered fruit bowl wall hanging and kit for making same. 4,016,314, Cl. 428-35.000.
Cox, Randal A. Hay bale handling machine. 4,015,739, Cl. 214-766.000.
Craig, James T., Jr.; and Park, Arthur, to Standard Oil Company (Indiana). Directional drilling system. 4,015,673, Cl. 175-61.000.
Crawford, Chester C. Petroleum coke composition. 4,015,977, Cl. 75-3.000.
Crisan, Cornel: *See—*
Cotrel, Claude; Crisan, Cornel; Jeanmart, Claude; and Messer, Mayer Naoum, 4,016,274.

Crisp, Stephen; and Wilson, Alan Donald, to National Research Development Corporation. Cements comprising acrylic acid/itaconic acid copolymer and fluoroaluminosilicate glass powder. 4,016,124, Cl. 260-29.60M.

Crookston, Ronald W.: *See—*
LeRow, Charles E., Jr.; and Crookston, Ronald W., 4,016,384.

Crouthamel, Reading H. Solid state weld timer. 4,016,484, Cl. 323-22.0SC.

Crowley, Francis X. Concrete tank of precast concrete panels with pretensioning beam means. 4,015,383, Cl. 52-224.000.

Crown Zellerbach Corporation: *See—*
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Crozier, William A.: *See—*
Cohrs, William E.; Gunderman, Roland E.; and Crozier, William A., 4,016,110.

Csillag, Charles, to Personal Products Company. Absorbent product with side leakage control means. 4,015,604, Cl. 128-287.000.

Culpepper, Clifford, Jr., to Aero-Dyne Manufacturing, Inc. Automatic high-low burner operation. 4,015,927, Cl. 431-5.000.

Cunningham, Hugh; Raetzsch, Carl W.; Rich, George L.; and Driskill, John D., to PPG Industries, Inc. Diaphragm cell cathode structure. 4,016,064, Cl. 204-256.000.

Cuntze, Gerhard: *See—*
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Curtis, Gary Martin, to Illinois Tool Works Inc. Buckle with a visual tension indicator. 4,015,311, Cl. 24-23.00R.

Cutler, Charles W.: *See—*
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Daicel, Ltd.: *See—*
Sakaguchi, Yasuhiro; Koike, Junichi; and Kubo, Takehisa, 4,016,083.

Daimler-Benz Aktiengesellschaft: *See—*
Kunze, Lutz; Knapp, Kurt; and Brammer, Klaus, 4,015,338.

D'Alelio, Gaetano F. Halogenated esters of phosphorus-containing acids. 4,016,224, Cl. 260-952.000.

Damascus Steel Casting Company: *See—*
Moore, Harry M., Jr., 4,015,460.

Dan Wesson Arms, Inc.: *See—*
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D'Angelo, John: *See—*
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Danko, John D.; and St. John, Richard C., to Aspro, Inc. Brake construction. 4,015,694, Cl. 188-106.00A.

Darmory, Franklin P.; and DiBenedetto, Marianne, to Ciba-Geigy Corporation. Oxindole diamines. 4,016,173, Cl. 260-325.00R.

Darvishian, Arthur. Higher efficiency wind motor with receptors of diminished drag characteristics. 4,015,911, Cl. 416-119.000.

Data General Corporation: *See—*
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Daicel Ltd.: *See—*
Kudo, Teizo; Hashizume, Yoshio; Itoh, Masanori; and Shiga, Makoto, 4,016,221.

Daus, Wolfgang, to Messer Griesheim GmbH. Process for cooling cryocables using a hydrogen slush. 4,015,437, Cl. 62-76.000.

Daver, Edul M., to Alcan Aluminum Corporation. Production of sintered aluminum alloy articles from particulate premixes. 4,015,947, Cl. 75-201.000.

Davies, Glyndwr John: *See—*
Baker, Dennis Stanley; and Davies, Glyndwr John, 4,015,949.

Davis, Elbert W. Work lifting and supporting device. 4,015,820, Cl. 254-4.00B.

Davison, Thomas W.: *See—*
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Dawans, Francois: *See—*
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DCA Food Industries Inc.: *See—*
Roth, Howard; Baldry, Peter R.; Kaufman, Harold B., Jr.; McCarthy, John P.; and Wallenfels, Kurt, 4,015,518.

De La Moneda, Francisco H., to International Business Machines Corporation. Raised source and drain IGFET device and method. 4,016,587, Cl. 357-23.000.

Deak, Paul S.: *See—*
Voyles, Gerald A.; and Deak, Paul S., 4,016,464.

Deal, Samuel Broughton; and Bartch, Donald Walter, to RCA Corporation. Method for adhering components platform to cathode-ray tube and product thereof. 4,016,363, Cl. 358-248.000.

Dean, Robert, to Spiral-Craft. Step bracket. 4,015,687, Cl. 182-220.000.

DeAngelo, Gerald J.: *See—*
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Debruijn, Henricus Antonius: *See—*
Collaris, Maria Antonius Alphonsus Andreas; van Kemenade, Antonius Wilhelmus Cornelis; Debruijn, Henricus Antonius; and Snijders, Mathieu Willem Maria, 4,016,307.

DeBruyn, William T., to Citation Companies, Inc., The. Window sash positioner. 4,015,367, Cl. 49-451.000.

Deeg, Emil W.; and Krohn, David A., to American Optical Corporation. Method of making artificial intraocular lenses with holes. 4,015,965, Cl. 65-23.000.

DeFilippi, Robert Joseph, to International Business Machines Corporation. Load gate compensator circuit. 4,016,434, Cl. 307-297.000.

De Haeck, Robert, to La Soudure Electrique Autogene, Procedes Arcos. Flux-cored wire for electric arc welding of soft steels or low-alloyed steels. 4,016,399, Cl. 219-146.000.

Dehnert, Heinz, to Hugo Sachs Elektronik Kommanditgesellschaft. Apparatus for detecting and indicating electrical body potentials. 4,015,596, Cl. 128-2.06R.

Dehnert, Johannes; and Lamm, Gunther, to BASF Aktiengesellschaft. Azo dye with a 2,6-diamino-5-cyano-or-5-carbamoyl-pyridine coupling component. 4,016,152, Cl. 260-156.000.

Deitz, Victor R.; and Blachly, Charles H., to United States of America, Energy Research and Development Administration. Salts of the iodine oxyacids in the impregnation of adsorbent charcoal for trapping radioactive methyliodide. 4,016,242, Cl. 423-240.000.

Dekanat Prirodovedecke Fakulty University Karlovy: *See—*
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Deknatel Inc.: *See—*
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Delaage, Jacques Jean, to Societe d'Etudes et de Construction de Materiel Electronique S.E.C.M.E. Switching device, in particular for a printed circuit. 4,016,401, Cl. 200-277.000.

Delagi, Bruce A.; Zeh, Joseph Paul; and Elia-Shaoul, Rony, to Digital Equipment Corporation. Memory unit for connection to central processor unit and interconnecting bus. 4,016,541, Cl. 340-172.500.

Delalande S.A.: *See—*
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Delle-Alsthom: *See—*
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Dellinger, Eugene L.; and Loubier, Robert J. Orthodontic band forming method and apparatus. 4,015,333, Cl. 32-14.00A.

Delta Scientific Corporation: *See—*
Kushner, Jack; and Zwirblis, Henry G., 4,015,914.

Demarthe, Jean-Michel; Georgeaux, Andre; and Sonntag, Alain, to Societe Miniere et Metallurgique de Penarroya. Method of obtaining copper from sulphurized concentrates. 4,016,056, Cl. 204-108.000.

Demarthe, Jean-Michel: *See—*
Gandon, Louis; and Demarthe, Jean-Michel, 4,016,054.

De Mets, Albert, to Konstruktiewerkhuizen, DeMets N.V. Continuously operating preliminary press or finishing press for the manufacture of particle boards, such as chip boards, fiber boards and the like. 4,015,921, Cl. 425-371.000.

Denley-Tech Limited: *See—*
Coupe, Neville Burton, 4,015,942.

DePalma, James J.: *See—*
Dillon, Peter L. P.; and DePalma, James J., 4,016,597.

Derby, Sherwin L.: *See—*
Wirth, George H.; and Derby, Sherwin L., 4,015,579.

De Remigis, Joseph, to Sentrol Systems Ltd. Optical shoe assembly for use with a multi-sensor optical head. 4,015,904, Cl. 356-243.000.

DeSantis, Stanislao A., to Appleman, Milo Don, a part interest. Animal feed block. 4,016,296, Cl. 426-69.000.

DeSoto, Inc.: *See—*
Gaske, Joseph E.; and Georgas, Nick T., 4,016,333.

Dezawa, Shin-ichiro; and Tamai, Yasuo, to Fuji Photo Film Co., Ltd. Process of producing ferromagnetic materials. 4,016,057, Cl. 204-130.000.

DiBenedetto, Marianne: *See—*
Darmory, Franklin P.; and DiBenedetto, Marianne, 4,016,173.

Dick, John O., to United States of America, Navy. Two channel optical fuzing system. 4,015,530, Cl. 102-70.20P.

Diebold, Incorporated: *See—*
Graef, Harry T.; Hansen, Kenneth R.; and Morrison, Larry A., 4,015,537.
McCune, Harold K.; and Kronewitter, Michael R., 4,016,405.

DIEHL: *See—*
Gerum, Erich, 4,016,562.

Diesel Kiki Co., Ltd.: *See—*
Okura, Rikuo; and Suzuki, Yasuhide, 4,015,573.

Dietmann, Karl: *See—*
Fauland, Erich; Kampe, Wolfgang; Stach, Kurt, deceased; Plattner, Werner, executor; Stork, Harald; and Dietmann, Karl, 4,016,262.

Dietrick, Gerald P. Device for removing water from hydraulic fluid. 4,015,369, Cl. 51-2.00R.

Dietz, Dennis R.: *See—*
Miller, James G.; Clark, Richard E.; Conradi, Mark S.; Dietz, Dennis R.; and Heyman, Joseph S., 4,015,464.

Dietze, Wolfgang; Reuschel, Ronrad; and Kasper, Andreas, to Siemens Aktiengesellschaft. Apparatus for the manufacture of tubular bodies of semiconductor material. 4,015,922, Cl. 425-471.000.

Difflipp, Kurt: *See—*
Preuss, Friedrich; and Difflipp, Kurt, 4,015,522.

DiGioia, Frank A.; and Brown, Timothy W., to General Latex and Chemical Corporation. Automotive carpet mat and method of preparing same. 4,016,318, Cl. 428-95.000.

Digital Equipment Corporation: *See—*
Delagi, Bruce A.; Zeh, Joseph Paul; and Elia-Shaoul, Rony, 4,016,541.

Dillinger, Lester L. Drilling or reaming machine. 4,015,304, Cl. 15-104.10R.

Dillon, Oscar W.: *See—*
Spooner, Robert J.; and Dillon, Oscar W., 4,015,494.

Dillon, Peter L. P.; and DePalma, James J., to Eastman Kodak Company. Color video camera with selectively expanded sensitivity. 4,016,597, Cl. 358-41.000.

DiMatteo, Paul L., to Dynell Electronics Corporation. Method of transferring a person from a reclined position to a seated position. 4,016,005, Cl. 134-30.000.

Dingle, Leslie Ernest: *See—*
Bagg, Greville Euan Gordon; Cook, John; Dingle, Leslie Ernest; Edwards, Henry; and Ziebland, Hans, 4,016,031.



Dinlocker, Robert I., to Sheller-Globe Corporation. Tilt alarm for tractor vehicle or the like. 4,016,535, Cl. 340-52.00H.

DiSalvo, Walter Anthony: *See—*
Win, Maung Hla; DiSalvo, Walter Anthony; and Kenney, Edward Joseph, 4,016,040.

Disselnkotter, Hans: *See—*
Konig, Hans-Bodo; Schrock, Wilfried; Disselnkotter, Hans; and Metzer, Karl Georg, 4,016,282.

Ditzel, Heins; and Ditzel, Werner. Indexing devices. 4,015,513, Cl. 90-57.000.

Ditzel, Werner: *See—*
Ditzel, Heins; and Ditzel, Werner, 4,015,513.

Dixie Yarns, Inc.: *See—*
Hurst, William Dan; Huffman, Donald E.; King, Hermon A.; and Puckett, Jack, 4,015,314.

Dob, Allan Matthew: *See—*
Herr, John Addison; Jaffe, Wolfgang; Dob, Allan Matthew; Minalga, Philip Francis; Adams, Kenneth Douglas; and Herron, William Lee, 4,016,441.

Dobler, Karl Ulrich; Jakob, Wolfgang; Eltzschig, Klaus; and Ubel, Helmut, to International Standard Electric Corporation. System for the demand-dependent control of guided vehicles. 4,015,804, Cl. 246-5.000.

Dr. Hesse & Cie. Spezialfabrik fur Galvanotechnik: *See—*
Jung, Horst; Sassenroth, Karl-Wilhelm; and Ferenczy, Nikolaus, 4,015,992.

Dr. Ing. h.c.f. Porsche Aktiengesellschaft, Firma: *See—*
Eyb, Wolfgang; Soffge, Friedhelm; Piper, Ortwin; and Albrecht, Gerhard, 4,015,303.

Domain Industries, Inc.: *See—*
Grevich, John J., 4,016,026.

Domnitz, David K.; and Osborne, Billy R., to W. R. Grace & Co. Apparatus and method for loading block-like articles into a receptacle. 4,015,402, Cl. 53-29.000.

Dorling, Rolf: *See—*
Albrecht, Wolfgang; and Dorling, Rolf, 4,015,742.

Douglas, C. J.: *See—*
Young, Walter L.; Douglas, C. J.; Connally, Carl A.; and Cheek, Robert L., 4,016,028.

Douglas, George Henry; and Santora, Norman J., to William H. Rorer, Inc. Preparation of ethynylbenzenes. 4,016,214, Cl. 260-649.00F.

Dow Chemical Company, The: *See—*
Clark, George B., 4,016,078.
Cohrs, William E.; Gunderman, Roland E.; and Crozier, William A., 4,016,110.
Johnsen, Kenneth E., 4,015,317.
Kroposki, Lorraine M.; and Yoshimine, Masao, 4,016,225.
Thill, Bruce P.; and Paige, Janet N., 4,016,171.
Tomalia, Donald A.; Thill, Bruce P.; and Regulski, Thomas W., 4,016,192.

Dow, Norris F.: *See—*
Halton, Murray; Dow, Norris F.; Dow, Richard M.; and Hillebrand, Michael J., 4,015,637.

Dow, Richard M.: *See—*
Halton, Murray; Dow, Norris F.; Dow, Richard M.; and Hillebrand, Michael J., 4,015,637.

Dowbenko, Rostyslaw: *See—*
Anderson, Carl Clement; and Dowbenko, Rostyslaw, 4,016,332.

Dowke, Gosaburo: *See—*
Inoue, Tadahiko; Dowke, Gosaburo; and Itoh, Hideo, 4,016,265.

Draper, Charles W.; and Legatti, Raymond H., to Square D Company. Electrical device with retractable grounding pin and indicating means. 4,015,888, Cl. 339-14.00P.

Dravo Corporation: *See—*
Jordan, Joseph L., 4,016,073.
Selmeczi, Joseph G.; Marlin, Donald H.; and Kestner, Daniel W., 4,015,997.

Dreissigacker, Peter D.; and Dreissigacker, Richard A. Backpack frame having shoulder and hip supports with flexible connection to hip support. 4,015,759, Cl. 224-25.00A.

Dreissigacker, Richard A.: *See—*
Dreissigacker, Peter D.; and Dreissigacker, Richard A., 4,015,759.

Drews, Ulrich; Winkelmann, Lothar; and Werner, Peter, to Robert Bosch G.m.b.H. Stabilized fuel injection system. 4,015,563, Cl. 123-32.0EH.

Driskill, John D.: *See—*
Cunningham, Hugh; Raetzsch, Carl W.; Rich, George L.; and Driskill, John D., 4,016,064.

DSO "Bulgarski Darjavni Jeleznitzi": *See—*
Stanev, Tzvyatko Penchev, 4,015,675.

Duke, Edward D.: *See—*
Shore, Daniel B.; and Duke, Edward D., 4,015,681.

Duke, Susan Ann: *See—*
Forward, Geoffrey Charles; and Duke, Susan Ann, 4,016,255.

Dumbaugh, George D., to Vibranetics, Inc. Adjustable drive vibratory device. 4,015,705, Cl. 198-770.000.

Duncan, Michael T.: *See—*
Sawyer, Willard H.; and Duncan, Michael T., 4,016,106.

Dundua, Vakhtang Justinovich: *See—*
Ambardanishvili, Tristan Silovanovich; Dundua, Vakhtang Justinovich; and Kolomiitsev, Mikhail Alexandrovich, 4,016,095.

Dunne, Samuel B., to Fosco Fabricators, Inc. Changeable message highway sign machine. 4,015,349, Cl. 40-33.000.

Du Pont de Nemours, E. I., and Company: *See—*
Apple, Glenn Dwight, 4,015,479.
Gajjar, Bharat Jaybhadra, 4,015,451.
Holmes, David Alan, 4,016,345.
Hull, Charles W.; Whitehead, T. Wilson; and Colby, Bruce N., 4,016,421.
Jaffe, Edward Ephraim, 4,015,998.
McIntyre, William Ernest, Jr., 4,016,321.
McKenna, James Michael, 4,016,349.
Patterson, Frank Knowles, 4,016,447.
Rohde, Vernon Carl, 4,015,775.
Vassiliou, Eustathios; and Concannon, Thomas P., 4,016,125.

Durand, Jean-Pierre; Aubin, Bernard; Dawans, Francois; and Chapelet, Gilbert, to Institut Francais du Petrole, des Carburants et Lubrifiants et Entreprise de Recherches et d'Activities Petrolieres Elf. Liquid hydrocarbon compositions of improved behavior in the cold and containing diene polymers. 4,015,952, Cl. 44-80.000.

Durant, Dick Q.: *See—*
McKinney, Howard F.; Higginbotham, Nathan L.; and Durant, Dick Q., 4,015,341.

Durney, David John, to Burroughs Corporation. Solid state chip insertion apparatus. 4,015,764, Cl. 227-118.000.

Dursch, Walter, to Hoechst Aktiengesellschaft. Unsaturated phosphorus compounds. 4,016,222, Cl. 260-932.000.

Duskin Franchise Co., Ltd.: *See—*
Komatsu, Toshiyoshi, 4,015,305.

Dynamit Nobel Aktiengesellschaft: *See—*
Kotzsch, Hans-Joachim; and Vahlensieck, Hans-Joachim, 4,016,188.

Dynatech Corporation: *See—*
Mitchiner, Robert K.; and Russell, Wayne A., 4,015,606.

Dynell Electronics Corporation: *See—*
DiMatteo, Paul L., 4,016,005.

E. C. Chemical Industries & Co., Ltd.: *See—*
Hamada, Kenzo; and Uchiyama, Hiroshi, 4,016,118.

E. J. Brooks Company: *See—*
Moberg, Sigurd M., 4,015,456.

Eastcott, Peter deHertel, to Canadian General Electric Company Limited. Method and apparatus for producing ramp signals with rounded inflection points. 4,016,496, Cl. 328-35.000.

Eastman Kodak Company: *See—*
Dillon, Peter L. P.; and DePalma, James J., 4,016,597.
Kirn, Thomas G., 4,016,600.

Eaton, James W., to Masonite Corporation. Building wall panel system. 4,015,392, Cl. 52-533.000.

Ebauches S.A.: *See—*
Rochat, Daniel-Francois, 4,015,418.

Eberhardt, Hans; and Brickl, Rolf Stefan, to Boehringer Ingelheim GmbH. Dermatological compositions containing an acylamino-carboxylic acid or an alkyl ester thereof. 4,016,287, Cl. 424-309.000.

ECC Corporation: *See—*
Mason, William B., 4,016,474.

Eckerson, John D.: *See—*
Hayward, John S.; Collis, Martin S.; Eckerson, John D.; and Rosenblood, Lorne K., 4,015,300.

Economopoulos, Mario; and Respen, Yves Jean, to Centre de Recherches Metallurgiques-Centrum voor Research in de Metallurgie. Producing rolled steel products. 4,016,009, Cl. 148-12.00B.

Economopoulos, Mario: *See—*
Respen, Yves Jean; Cosse, Paul Andre; and Economopoulos, Mario, 4,016,015.

Edwards, Henry: *See—*
Bagg, Greville Euan Gordon; Cook, John; Dingle, Leslie Ernest; Edwards, Henry; and Ziebland, Hans, 4,016,031.

Edwards, Richard H.: *See—*
Small, Edward A.; Edwards, Richard H.; Eufusia, Eugene A.; Clary, Robert M.; and Bergfelt, Nils H., 4,015,558.

Egelhof, Dieter: *See—*
Schiel, Christian; Egelhof, Dieter; and Wolf, Karl, 4,016,033.

Eggemann, Willi; and Weghaupt, Erich, to Kraftwerk Union Aktiengesellschaft. Liquid-cooled rotor of electric machines and method of production. 4,016,442, Cl. 310-59.000.

Eggermont, Ludwig Desire Johan, to U.S. Philips Corporation. Signal processor with digital filter and integrating network. 4,016,410, Cl. 235-156.000.

Eguchi, Chikahiko: *See—*
Mitsugi, Koji; Sano, Konosuke; Yokozeki, Kenzo; Yamada, Kazuhiko; Noda, Ichiro; Kagawa, Teruhiko; Eguchi, Chikahiko; Yasuda, Naohiko; Tamura, Fumihide; and Togo, Kazushi, 4,016,037.

Eguchi, Yoshitsugu: *See—*
Ogawa, Kinya; Kurimoto, Kazuhiko; Eguchi, Yoshitsugu; and Kuwata, Satoshi, 4,016,341.

Eisenhut, Bert R.: *See—*
Silver, Robert L.; and Eisenhut, Bert R., 4,015,714.

El Chico Corporation: *See—*
Pomara, Johnny B., Jr., 4,015,517.

Elastomeric Products Inc.: *See—*
Pennell, Paul H., 4,015,851.

Electricite de France (Service National): *See—*
Gillet, Roger, 4,016,444.

Eletsky, Vladimir Alexeevich: *See—*
Borisov, Vladimir Mikhailovich; Goldshtein, Boris Grigorievich; Goppen, Albert Adlofovich; Eletsky, Vladimir Alexeevich; Sherman, Viktor Lvovich; Bush, Kherbert Zhanovich; Ryashentsev, Nikolai Pavlovich; and Timoshenko, Evgeny Mikhailovich, 4,015,671.

Elia-Shaoul, Rony: *See—*
Delagi, Bruce A.; Zeh, Joseph Paul; and Elia-Shaoul, Rony, 4,016,541.

Elings, Virgil B.; and Phillips, David T. Apparatus and method for measuring cardiac output. 4,015,593, Cl. 128-2.05V.

Ellerbrock, Donald H.; and Hough, Robert J., to Boise Cascade Corporation. Method for protecting metal ends. 4,016,311, Cl. 427-287.000.

Elliott Brothers (London) Limited: *See—*
Cattermole, David Christopher, 4,015,806.

Elmer, Otto C., to General Tire & Rubber Company, The. Lignin sulfonate for glass cord adhesives. 4,016,119, Cl. 260-17.500.

Elsbett, Gunter: *See—*
Elsbett, Ludwig; and Elsbett, Gunter, 4,015,577.

Elsbett, Ludwig; and Elsbett, Gunter. Reciprocable piston internal combustion engine, especially diesel engine. 4,015,577, Cl. 123-188.00M.

Eltzschig, Klaus: *See—*
Dobler, Karl Ulrich; Jakob, Wolfgang; Eltzschig, Klaus; and Ubel, Helmut, 4,015,804.

Emco Wheaton Inc.: *See—*
Bower, Allen M., 4,015,627.

Enderby, Ralph Thomas: *See—*
Hodges, Eugene Walton, III; Steel, Francis Robert; and Enderby, Ralph Thomas, 4,016,510.

Engel, Joseph C., to Westinghouse Electric Corporation. High pressure discharge lamp dimming circuit utilizing variable duty-cycle photocoupler. 4,016,451, Cl. 315-158.000.

Engel, Walter; Senn, Werner; and Steinemann, Max, to Werkzeugmaschinenfabrik Oerlikon-Buhrle AG. Explosive projectile with projectile body. 4,015,534, Cl. 102-87.000.

Engelhard Minerals & Chemicals Corporation: *See—*
Thakur, Babu N., 4,015,931.

Engineered Metal Products Company, Inc.: *See—*
Wunsche, Edgar, 4,015,834.

English, Alan Frederick: *See—*
Phillipps, Gordon Hanley; English, Alan Frederick; and Stribley, Gillian Helen, 4,016,271.

Enor Nominees Pty. Limited: *See—*
Schmidt, Hans Heinrich, 4,016,228.

Enterprise Brass Works: *See—*
Nelson, Lowell F., 4,015,647.

Epstein, George; and Mollman, Robert E., to Alside, Inc. Angled cap member for simulated cedar shake construction. 4,015,374, Cl. 52-57.000.

Epstein, George; and Mollman, Robert E., to Alside, Inc. Simulated cedar shake construction. 4,015,391, Cl. 52-520.000.

Erickson, Earl R. Portable device for lifting and moving an object. 4,015,736, Cl. 214-390.000.

Erickson, Ross R.: *See—*
Pharriss, Bruce B.; Erickson, Ross R.; and Tillson, Stephen A., 4,016,270.

Ericson, Alvin E., to Union Carbide Corporation. Apparatus for making reinforced wicket hole directionally tear prone. 4,015,917, Cl. 425-290.000.

Erlich, Shlomo. Cigarette box or package. 4,015,769, Cl. 229-44.0CB.

Esab-Hebe AB: *See—*
Bergling, Charles Gunnar Birger, 4,015,702.

Eschinasi, Emile H. Pectic substances with varying methoxyl content and process therefor. 4,016,351, Cl. 536-2.000.

Essers, Wilhelmus Gerardus; and Tichelaar, Gerrit Willem, to U.S. Philips Corporation. Method of and apparatus for arc welding. 4,016,397, Cl. 219-121.00P.

Essiccatoi Fava S.p.A.: *See—*
Fava, Enrico, 4,015,378.

Etablissements Carpano & Pons: *See—*
Thenon, Christian; and Pelletier, Bernard, 4,015,792.

Etat Francais: *See—*
Lenotre, Michel Pierre Alphonse, 4,016,018.

Eufusia, Eugene A.: *See—*
Small, Edward A.; Edwards, Richard H.; Eufusia, Eugene A.; Clary, Robert M.; and Bergfelt, Nils H., 4,015,558.

Evans, Clifford A.: *See—*
Kamin, Arthur; Evans, Clifford A.; and Freborg, Lehner C., 4,015,481.

Evans, Frank G.: *See—*
Mesecar, Roderick S.; and Evans, Frank G., 4,016,407.

Evans, Harold O., to United States of America, Air Force. Caseless ammunition round with spin stabilized metal flechette and disintegrating sabot. 4,015,527, Cl. 102-38.000.

Evans, Peter John; and Williams, Clive, to International Business Machines Corporation. Raster display apparatus. 4,016,554, Cl. 340-324.0AD.

Evans, Robert H.; and Wochinski, Ronald F., to AES Technology Systems, Inc. Method and apparatus for feeding and printing documents. 4,015,523, Cl. 101-233.000.

Everhart, Norman, to Jerrold Electronics Corporation. Radio frequency distribution network standby power system with overvoltage protection. 4,016,458, Cl. 361-52.000.

Ewarts Limited: *See—*
Hayes, Stephen, 4,015,631.

Exxon Research and Engineering Company: *See—*
Robson, Harry E., 4,016,108.
Sawyer, Willard H.; and Duncan, Michael T., 4,016,106.
Sawyer, Willard H.; and Robson, Harry E., 4,016,107.
Wagensommer, Joseph, 4,016,342.

Eyb, Wolfgang; Soffge, Friedhelm; Piper, Ortwin; and Albrecht, Gerhard, to Dr. Ing. h.c.f. Porsche Aktiengesellschaft, Firma. Support element for a bridge. 4,015,303, Cl. 14-75.000.

Ezhova, Vera Vasilievna: *See—*
Akbaev, Abdi; and Ezhova, Vera Vasilievna, 4,016,272.

Fa. H. Krantz: *See—*
Kreitz, Hans, 4,015,452.

Fahey, Michael D.: *See—*
Goheen, David W.; Fahey, Michael D.; and Claussen, Harvey L., 4,016,353.

Fahlvik, Nils Arne: *See—*
Andersson, Bror Lennarth; and Fahlvik, Nils Arne, 4,015,935.

Fairchild Industries Inc.: *See—*
Maieli, Joseph R.; Rosenthal, Gordon; and Torrillo, Domenick T., 4,015,787.

Falconer, Charles B.: *See—*
Laoteppitaks, Chansak; Henthorn, Lincoln; and Falconer, Charles B., 4,016,370.

Falk, David O.: *See—*
Norton, Charles J.; and Falk, David O., 4,016,086.

Farber, Sheldon, to NCR Corporation. Benzoindole phthalides. 4,016,174, Cl. 260-326.14R.

Farquhar, Robert L.; and Snook, Phillip D., to Graviner Limited. Methods and apparatus for optimizing the response of transducers. 4,016,425, Cl. 250-372.000.

Farrington, Daniel O.: *See—*
Switzer, William P.; and Farrington, Daniel O., 4,016,253.

Fastner, Thorwald; Mayrhofer, Max; and Bachner, Ernst, to Vereinigte Osterreichische Eisen- und Stahlwerke-Alpine Montan Aktiengesellschaft. Process and apparatus for continuously casting strands of unkilled or semi-killed steel. 4,015,655, Cl. 164-66.000.

Fatemi, Mohammad: *See—*
Birks, Laverne S.; and Fatemi, Mohammad, 4,016,456.

Fattor, Arthur. Solar heating apparatus. 4,015,585, Cl. 126-271.000.

Fattori, Silvano; Rossi, Enzo; and Imparato, Luigi, to Snam Progetti S.p.A. Stabilized polyglycol for high temperatures. 4,016,211, Cl. 260-611.500.

Fauland, Erich; Kampe, Wolfgang; Stach, Kurt, deceased; by Plattner, Werner, executor; Stork, Harald; and Dietmann, Karl, to Boehringer Mannheim G.m.b.H. Therapeutic compositions and methods employing N(6)-disubstituted adenosine compounds. 4,016,262, Cl. 424-180.000.

Fava, Enrico, to Essiccatoi Fava S.p.A. Device for clamping flat panels against metal section uprights, particularly for lining drying chambers. 4,015,378, Cl. 52-127.000.

Feerick, Jay J. Gas-operated firearm. 4,015,512, Cl. 89-190.000.

Fenestra: *See—*
Noyes, Harry M., 4,015,382.

Fenske, John W.: *See—*
Simons, John R.; and Fenske, John W., 4,015,665.

Fenster, Larry A. Applicator pads. 4,015,306, Cl. 15-209.00R.

Fenton, Donald M., to Union Oil Company of California. Recarbonation of spent oil shale. 4,016,239, Cl. 423-155.000.

Ferenczy, Nikolaus: *See—*
Jung, Horst; Sassenroth, Karl-Wilhelm; and Ferenczy, Nikolaus, 4,015,992.

Ferriter, Roger G., to Wix Corporation. Container. 4,015,767, Cl. 229-16.00R.

Ferro, William P., to KCS Industries, Inc. Method of making simulated stained glass from moldable plastic material. 4,016,235, Cl. 264-132.000.

Fielding, Harold Crosbie; and Rudge, Alfred John, to Imperial Chemical Industries Limited. Preparation of perfluoroolefines. 4,016,217, Cl. 260-653.10R.

Fields, David E.: *See—*
Moran, Paul Richard; Podgorsak, Ervin B.; and Fields, David E., 4,016,422.

Filisky, John J., Jr.: *See—*
Sousamian, William; and Filisky, John J., Jr., 4,015,698.

Fimacon Associates: *See—*
Betensky, Ellis I., 4,015,902.

Finch, Peter Molyneux, to British Leyland UK Limited. Steering wheels. 4,015,861, Cl. 280-750.000.

Finelli, Patrick L., to Polaroid Corporation. Folding viewfinding and flash mounting assembly. 4,016,580, Cl. 354-126.000.

Finn, Robert K.; Tannahill, Alex L.; and Laptewicz, Joseph E., Jr., to Cornell Research Foundation, Inc. Production of heteropolysaccharide by fermentation of methanol. 4,016,085, Cl. 252-8.50C.

Firestone Tire & Rubber Company, The: *See—*
Higbee, Wallace Carson, 4,015,796.

First-Sha Co., Ltd.: *See—*
Itoh, Hirokazu, 4,016,309.

Fischer & Porter Co.: *See—*
Herzl, Peter J., 4,015,472.
Sitkewich, W. Jorge, 4,015,477.

Fischer, Ronald H.; and Milstein, Donald, to Mobil Oil Corporation. Process for demetalation and desulfurization of petroleum oils. 4,016,067, Cl. 208-89.000.

Fishburn, Robert Anthony; and Ravault, Frank Ernest George, to Foseco International Limited. Bonding of particulate materials. 4,015,979, Cl. 75-25.000.

Fitzner, Arthur O., to Brunswick Corporation. Ignition system for internal-combustion engines having timing stabilizing means. 4,015,564, Cl. 123-117.00R.

Flachbarth, Charles T.; and Myers, John L., to Textron, Inc. Service poles and accessories. 4,015,397, Cl. 52-713.000.

Flambeau Paper Company: *See—*
Baierl, Kenneth W., 4,016,180.

Flautt, Martin C.; Foley, Kevin M.; and Haines, Richard M., to Owens-Corning Fiberglas Corporation. Glass fiber reinforced elastomers. 4,016,325, Cl. 428-268.000.





FMC Corporation: *See—*
Bacon, Roger J., 4,015,407.
Berkowitz, Sidney; and D'Angelo, John, 4,016,164.
Chamberlin, Donald W., 4,015,645.

Foley, Kevin M.: *See—*
Flautt, Martin C.; Foley, Kevin M.; and Haines, Richard M., 4,016,325.

Folsom, Lawrence R.; O'Brien, John F.; Gaboriault, Roger E.; Haberstroh, August J.; and Mancuso, Ettore J., Jr., to General Electric Company. Feeder. 4,015,511, Cl. 89-33.0SF.

Food Technology Products: *See—*
Glabe, Elmer F.; Anderson, Perry W.; and Laftsidis, Stergios, 4,016,294.

Forbes Jones, Robin Mackay; and Petersen, Walter Adrian, to International Nickel Company, Inc., The. Clad metal tubes. 4,016,008, Cl. 138-140.000.

Forenade Fabriksverken: *See—*
Tisell, Claes-Gustav Erik Yngve; Lundell, Karl Erik Bjorn; Horner, Sven Henry Nilsson; Thorstensson, Gustav Yngve; and Karlstedt, Gustav Sven Erik, 4,015,860.

Formation, Inc.: *See—*
Franks, Theodore A.; and Kapeghian, Charles L., 4,016,543.

Forster, Hermann; Schluter, Wilhelm; and Sterr, Horst, to Lodige, Wilhelm; Lodige, Fritz; and Lucke, Josef. Apparatus for applying glue to fiber material. 4,015,829, Cl. 259-9.000.

Fort Howard Paper Company: *See—*
Sobota, John T., 4,016,030.

Forward, Geoffrey Charles; and Duke, Susan Ann, to Beecham Group Limited. Oral hygiene compositions. 4,016,255, Cl. 424-52.000.

Fosco Fabricators, Inc.: *See—*
Dunne, Samuel B., 4,015,349.

Foseco International Limited: *See—*
Fishburn, Robert Anthony; and Ravault, Frank Ernest George, 4,015,979.

Foster Wheeler Energy Corporation: *See—*
Yousoufian, Hrant Harry, 4,015,562.

Fowler, Robert W., to United States of America, Navy. Fractional binary to decimal converter. 4,016,560, Cl. 340-347.0DD.

Fowles, Edwin, to Hilti Aktiengesellschaft. Formation of lugs on ingot moulds. 4,015,814, Cl. 249-174.000.

Fox, Albert H., to Fox, Bryce J.; and Fox, Edna R., part interest to each. Intake system with focusing means. 4,015,575, Cl. 123-141.000.

Fox, Bryce J.: *See—*
Fox, Albert H., 4,015,575.

Fox, Edna R.: *See—*
Fox, Albert H., 4,015,575.

Fozzard, George B.; and Paul, Robert A., to Phillips Petroleum Company. Separation of phenol-cyclohexanone azeotrope by extractive distillation with adipic acid diester. 4,016,049, Cl. 203-60.000.

Frahm, Carl E.; and Frahm, Shirley E. Valve construction. 4,015,632, Cl. 137-801.000.

Frahm, Carl E.; and Frahm, Shirley E. Collapsible carrying case. 4,015,741, Cl. 220-6.000.

Frahm, Shirley E.: *See—*
Frahm, Carl E.; and Frahm, Shirley E., 4,015,632.
Frahm, Carl E.; and Frahm, Shirley E., 4,015,741.

Frait, John S., to Kelsey-Hayes Company. Failsafe system for skid control systems and the like. 4,016,457, Cl. 361-49.000.

Francis, Gaylord L.; and Morelli, Amedeo J., to North American Philips Corporation. Hermetically sealed film resistor. 4,016,527, Cl. 338-274.000.

Frankel, S. Arthur; McGuire, George E.; and Wuthrich, Robert O., to Zimmer, U.S.A. Inc. Device for mixing bone cement. 4,015,945, Cl. 23-292.000.

Franks, Theodore A.; and Kapeghian, Charles L., to Formation, Inc. Processor address recall system. 4,016,543, Cl. 340-172.500.

Frappart, Pierre, to L.C.C.-C.I.C.E.-Compagnie Europeenne de Composants Electroniques. Subminiaturized adjustable capacitor. 4,016,466, Cl. 361-278.000.

Fraser, James Girvan: *See—*
Alexander, William; Causa, Alfredo Guillermo; and Fraser, James Girvan, 4,016,142.

Fraser Sweatman, Inc.: *See—*
Connolly, Edward A., 4,015,617.

Fraze, Ermal C.: *See—*
Brown, Omar L., 4,015,744.

Frazee, Lawrence E., to Plessey Incorporated. Humidity sensor, material therefor and method. 4,016,308, Cl. 427-125.000.

Freborg, Lehner C.: *See—*
Kamin, Arthur; Evans, Clifford A.; and Freborg, Lehner C., 4,015,481.

Fresnel, Jean-Marie; and Trosset, Daniele, to Battelle Memorial Institute. Method and apparatus for governing the reaction rate of enzymatic reactions. 4,016,044, Cl. 195-115.000.

Friedman, Harvey S., to Polaroid Corporation. Processing fluid flow control device for self developing camera. 4,016,578, Cl. 354-86.000.

Friesenbichler, Eduard. Railway switch or railway crossing. 4,015,805, Cl. 246-458.000.

Fruehauf Corporation: *See—*
Hulverson, Adrian F.; and Chosy, Eugene, 4,015,876.

Frumkin, Mikhail Evseevich: *See—*
Anikanov, Nikolai Ivanovich; Baburin, Evgeny Arkadievich; Grachev, Leonid Pavlovich; Zax, Grigory Iosifovich; Radutsky, Grigory Avramovich; Frumkin, Mikhail Evseevich; and Kheifets, Rafail Efimovich, 4,015,404.

Fuel Injection Development Corporation: *See—*
Leshner, Ervin; and Leshner, Michael D., 4,015,569.
Leshner, Ervin; and Leshner, Michael D., 4,015,572.

Fuji Oil Company, Ltd.: *See—*
Fujimaki, Masao; Arai, Soichi; and Watanabe, Michiko, 4,016,147.

Fuji Photo Film Co., Ltd.: *See—*
Abe, Eiji; Ohta, Takahisa; and Urata, Mitsuharu, 4,016,406.
Dezawa, Shin-ichiro; and Tamai, Yasuo, 4,016,057.
Oishi, Yasushi; and Hinata, Masanao, 4,015,989.
Saeki, Keiso; and Matsukawa, Hiroharu, 4,016,098.
Shiba, Keisuke; Hirose, Takeshi; Hayashi, Jun; and Aono, Toshiaki, 4,015,988.

Fujiki, Norio, to Nissan Motor Co., Ltd. Method for avoiding unwanted echo signals and automotive radar embodying same. 4,016,566, Cl. 343-7.0VM.

Fujikura Kasei Co., Ltd.: *See—*
Wakabayashi, Yukimasa; and Takahashi, Shigeru, 4,016,305.

Fujimaki, Masao; Arai, Soichi; and Watanabe, Michiko, to Fuji Oil Company, Ltd. Method for preparation of low-phenylalanine plastein. 4,016,147, Cl. 260-112.00R.

Fujimoto, Keimei; Ohno, Nobuo; Okuno, Yoshitoshi; Mizutani, Toshio; Ohno, Isao; Hirano, Masachika; Itaya, Nobushige; and Matsuo, Takashi, to Sumitomo Chemical Company, Limited. Certain esters of 2-substituted-4-hydroxy-cyclopent-2-enones. 4,016,179, Cl. 260-347.500.

Fujisawa Pharmaceutical Co., Ltd.: *See—*
Kariyone, Kazuo; Yagi, Hideo; and Yoshida, Kazuhiko, 4,016,205.
Takaya, Takao; and Masugi, Takashi, 4,016,160.
Tamura, Saburo; Takematsu, Tetsuo; and Haruta, Hisae, 4,015,975.

Fujiwara, Kunitaka: *See—*
Miyamoto, Kozo; and Fujiwara, Kunitaka, 4,015,937.

Fukuma, Nobuo; and Matsubara, Hideyuki, to Toyota Jidosha Kogyo Kabushiki Kaisha. Cam-controlled grinding method. 4,015,372, Cl. 51-281.00R.

Fukuroi, Takeo, to Yoshida Kogyo Kabushiki Kaisha. Interlockable sliders. 4,015,457, Cl. 70-68.000.

Fukushima, Masami: *See—*
Yanagisawa, Hiroaki; Ando, Akiko; Fukushima, Masami; and Nakao, Hideo, 4,016,155.

Fulenwider, John E., to GTE Laboratories Incorporated. Optically encoded acoustic to digital transducer. 4,016,556, Cl. 340-347.00P.

Fumei, Giancarlo J.; and Karabedian, James A., to Owens-Illinois, Inc. Laminated structures and methods and compositions for producing same. 4,016,126, Cl. 260-29.6RB.

Fumei, Giancarlo J.; and Karabedian, James A., to Owens-Illinois, Inc. Laminated structures and methods and compositions for producing same. 4,016,327, Cl. 428-314.000.

Furuichi, Etsuko: *See—*
Karasaki, Tadashi; Hayashi, Chikako; and Furuichi, Etsuko, 4,016,260.

Furuichi, Katsushi: *See—*
Inuzuka, Tsuneki; Furuichi, Katsushi; Sawamura, Osamu; Kimura, Yoshimasa; and Sakamaki, Hisashi, 4,016,529.

Furukawa, Nobuhiko: *See—*
Morishita, Kazuyoshi; and Furukawa, Nobuhiko, 4,015,347.

G. Lufft Metallbarometerfabrik: *See—*
Pott, Otto Friedrich, 4,015,463.

Gabor, Andrew; and Cocksedge, Kenneth W., to Xerox Corporation. Electrical centering and boring system for transducers. 4,016,470, Cl. 318-606.000.

Gaboriault, Roger E.: *See—*
Folsom, Lawrence R.; O'Brien, John F.; Gaboriault, Roger E.; Haberstroh, August J.; and Mancuso, Ettore J., Jr., 4,015,511.

GAF Corporation: *See—*
Chang, Charles Hung, 4,016,181.

Gajjar, Bharat Jaybhadra, to Du Pont de Nemours, E. I., and Company. Warp knit fabric. 4,015,451, Cl. 66-195.000.

Gale, Geoffrey N.; Colbourne, Edwin Denis; and Hollins, Michael J., to Bowmar Canada Limited. Light emitting diode display. 4,016,449, Cl. 313-500.000.

Galland, Jacques; Boutard nee Gabillet, Dominique; and Chene, Jacques, to Agence Nationale de Valorisation de la Recherche (ANVAR). Surface treatment process for steels and article. 4,015,950, Cl. 428-648.000.

Gallet, Bernard; and Venot, Robert, to Commissariat a l'Energie Atomique. Fuel assembly support column for a nuclear reactor diagrid. 4,016,035, Cl. 176-87.000.

Gamble, James R., to Westinghouse Electric Corporation. Insulating bushing assembly. 4,016,359, Cl. 174-153.00R.

Gambro AG: *See—*
Riede, Gerhard; and Boberg, Gunnar, 4,016,082.

Gamet, Brigitte; and Renard, Jean-Claude, to Compagnie Generale d'Electricite. Superconductive switch. 4,016,526, Cl. 338-325.000.

Gandon, Louis; and Demarthe, Jean-Michel, to Imetal. Hydrometallurgical treatment process for extracting constituent metal values from ferro-nickel. 4,016,054, Cl. 204-105.00R.

Gandon, Louis; Jean, Roger; and Solar, Serge, to Societe Metallurgique Le Nickel SLN. Method of extracting constituent metal values from polymetallic nodules from the sea. 4,016,055, Cl. 204-106.000.

Ganter-Ullmann, Karl; Neussel, Paul; Abermeth, Hubert; Wahnschaffe, Jurgen; and Klier, Heiner, to Klockner-Humboldt-Deutz Aktiengesellschaft. Crank shaft for a multi-cylinder short stroke internal combustion engine. 4,015,485, Cl. 74-596.000.

Gaponov, Vasily Alexandrovich: *See*—
Budker, Gersh Itskovich; Gaponov, Vasily Alexandrovich; Korabelnikov, Boris Mikhailovich; Krainov, Gennady Sergeevich; Kuznetsov, Sergei Alexandrovich; Kuksanov, Nikolai Konstantinovich; Kondratiev, Vasily Ivanovich; and Salimov, Rustam Abelevich, 4,016,499.

Garito, Anthony Frank; Heeger, Alan J.; MacDiarmid, Alan G.; Bright, Arthur A.; Cohen, Marshall J.; and Mikulski, Chester M., to University of Pennsylvania, The Trustees of the. Composite polymeric material formed with an epitaxial crystalline film of polymeric sulfur nitride, and method of preparing same. 4,016,331, Cl. 428-421.000.

Garner, Gerald D.: *See*—
Rollins, Dallas W.; Randolph, Robert W.; and Garner, Gerald D., 4,015,751.

Garrett Corporation, The: *See*—
Kinsell, Robert C.; Noe, James C.; and Byrne, John P., 4,015,438.

Garrett, Robert A.: *See*—
Silva, John; Garrett, Robert A.; Borkat, Franklin R.; and Young, Frank, 4,015,677.

Garry, Robert F., to United States of America, Navy. Process for making chip carriers using anodized aluminum. 4,015,987, Cl. 96-36.200.

Gaske, Joseph E.; and Georgas, Nick T., to DeSoto, Inc. Radiation curable coatings having nonadherent surfaces. 4,016,333, Cl. 428-447.000.

Gates Rubber Company, The: *See*—
McPhee, Donald J.; and Newberry, Mark A., 4,015,918.

Geddry, Bernard L.: *See*—
Arkind, Kenneth D.; and Geddry, Bernard L., 4,016,570.

Gee, James E.; and Stedman, Robert N., to Caterpillar Tractor Co. Ripper assembly for tractor drawn scraper. 4,015,348, Cl. 37-124.000.

Gehrmann, Klaus; Ohorodnik, Alexander; Lohmar, Elmar; and Riechmann, Wernfried, to Hoechst Aktiengesellschaft. Distillative purification of 2,5-dioxo-1-oxa-2-phospholanes. 4,016,048, Cl. 203-49.000.

Gelardi, Anthony L.; and Mathus, Gregory, to Morningstar Corporation of Cambridge, The. Tape cartridge. 4,015,790, Cl. 242-55.19A.

Geldzahler, Charles; and Sodhi, Satwant S., to Starlite Chemicals, Inc. Additives for bright plating nickel, cobalt and nickel-cobalt alloys. 4,016,051, Cl. 204-43.00T.

Gelzheiser, Francis L.; and DeAngelo, Gerald J., to Westinghouse Electric Corporation. Circuit breaker line terminal. 4,016,386, Cl. 200-250.000.

General Atomic Company: *See*—
Bokros, Jack C.; and Slivenko, Victor, 4,015,601.

General Dynamics Corporation: *See*—
Slysh, Paul; and Siden, LeRoy E., 4,015,653.

General Electric Company: *See*—
Bishop, Everett Reece; and Leroux, Marcel Henri, 4,016,558.
Blodgett, Fredrick M., Jr.; and Schuyler, Peter B., 4,015,508.
Folsom, Lawrence R.; O'Brien, John F.; Gaboriault, Roger E.; Haberstroh, August J.; and Mancuso, Ettore J., Jr., 4,015,511.
Graf, Carlton E., 4,016,468.
Gross, William B., 4,016,493.
Horning, Albert Emerson, 4,016,328.
Hummel, Wiley M., 4,016,520.
Moll, Edward W., 4,016,494.
Redington, Rowland W.; and Henkes, John L., Jr., 4,015,836.
Schumacher, Frank A., 4,015,442.
Willis, Candler A., 4,016,452.
Ziemba, Richard Thomas, 4,015,531.

General Latex and Chemical Corporation: *See*—
DiGioia, Frank A.; and Brown, Timothy W., 4,016,318.

General Mills Chemicals, Inc.: *See*—
MacKay, Kenneth D.; and Sudderth, R. Brantley, 4,015,980.

General Signal Corporation: *See*—
Neuhof, Jacob, 4,016,376.

General Tire & Rubber Company, The: *See*—
Elmer, Otto C., 4,016,119.

Genin, Robert, to Jardine Industries, Inc. Mini electronic calculator with blackboard display format. 4,016,411, Cl. 235-156.000.

Gent, John Arthur Gooch: *See*—
Wolff, Per Lind; and Gent, John Arthur Gooch, 4,016,111.

Georgas, Nick T.: *See*—
Gaske, Joseph E.; and Georgas, Nick T., 4,016,333.

Georgeaux, Andre: *See*—
Demarthe, Jean-Michel; Georgeaux, Andre; and Sonntag, Alain, 4,016,056.

Gerhardt, Leslie L. Apparatus for stabilizing a mobile home roof. 4,015,376, Cl. 52-23.000.

Gerrits, Theodorus Petrus Hubertus: *See*—
Brouwer, Gerardus Johannes; and Gerrits, Theodorus Petrus Hubertus, 4,015,666.

Gerum, Erich, to DIEHL. Switch-off device for electrically operated clock alarm and control therefor. 4,016,562, Cl. 340-384.00E.

Geurts, Leonardus H.: *See*—
Schaafsma, Sijbrandus E.; and Geurts, Leonardus H., 4,016,175.

Ghiringhelli, Horace, to Isodyne Inc. Novel multi-path leakage transformer and inverter ballast. 4,016,477, Cl. 321-26.000.

Gibson, Christian D.; and Hart, Kenneth F., to Raymond Corporation, The. Material-handling apparatus. 4,015,738, Cl. 214-674.000.

Gibson, Ross E. Maze-type puzzle. 4,015,852, Cl. 273-153.00R.

Gieles, Antonius Cornelis Maria: *See*—
Kleuters, Wilhelm Josef; and Gieles, Antonius Cornelis Maria, 4,015,473.

Giers, Alfred J., to Carl Schenck AG. Balancing method and apparatus. 4,015,480, Cl. 73-462.000.

Gilbert, Richard, to Stanley Tools Limited. Wood planes. 4,015,649, Cl. 145-11.000.

Gilden, Meyer: *See*—
Reeder, Thomas M.; and Gilden, Meyer, 4,016,514.

Gillet, Roger, to Societe Generale de Constructions Electriques et Mecaniques (ALSTHOM); and Electricite de France (Service National). Rotor for an electric machine having a cryo-inductor. 4,016,444, Cl. 310-261.000.

Gilmour, Campbell Moore: *See*—
Beck, Sidney Marion; and Gilmour, Campbell Moore, 4,016,065.

Giolitti, Nicolo; and Bovio, Michele, to Ing. C. Olivetti & C., S.p.A. Cartridge for endless magnetic-tape loop and device for recording and/or reading thereof. 4,016,602, Cl. 360-132.000.

Glabe, Elmer F.; Anderson, Perry W.; and Laftsidis, Stergios, to Food Technology Products. Animal feeds for herbivorous domestic animals. 4,016,294, Cl. 426-72.000.

Glacier Metal Company Limited, The: *See*—
Baker, Dennis Stanley; and Davies, Glyndwr John, 4,015,949.

Glaesel, Gottfried, to Heco Electric GmbH. Identification member for electrical terminals. 4,015,890, Cl. 339-113.00B.

Glaxo Laboratories Limited: *See*—
Phillipps, Gordon Hanley; English, Alan Frederick; and Stribley, Gillian Helen, 4,016,271.

Gobel, Wilhelm: *See*—
Mayer-Mader, Rudolf; and Gobel, Wilhelm, 4,016,177.

Goeth, Hanns: *See*—
Wetzel, Bernd; Woitun, Eberhard; Maier, Roland; Reuter, Wolfgang; Goeth, Hanns; and Lechner, Uwe, 4,016,263.

Goff, Richard Everett, Jr.; Guay, Normand Daniel; and Priestley, Joseph Amos, to Johnson & Johnson. Cushioned narrow woven tubular fabric. 4,015,641, Cl. 139-384.00R.

Goffredo, Daniel L.; and Shakley, Conrad Dale, to Chemcut Corporation. Connecting modules for an etching system. 4,015,706, Cl. 198-780.000.

Goheen, David W.; Fahey, Michael D.; and Claussen, Harvey L., to Crown Zellerbach Corporation. Process for producing organic acid esters of cellulose. 4,016,353, Cl. 536-69.000.

Golbeck, Bernard J.; Lewandowski, Raymond F.; and Markinson, William C., to Oak Industries Inc. Keyboard switch. 4,016,388, Cl. 200-314.000.

Golden, Steven T. Drapery pleating and finishing machine. 4,015,748, Cl. 223-32.000.

Goldenberg, Marvin M.; and Honkomp, Leroy J., to Morton-Norwich Products, Inc. Method of combatting gastric ulceration. 4,016,268, Cl. 424-231.000.

Goldshtein, Boris Grigorievich: *See*—
Borisov, Vladimir Mikhailovich; Goldshtein, Boris Grigorievich; Goppen, Albert Adlofovich; Eletsky, Vladimir Alexeevich; Sherman, Viktor Lvovich; Bush, Kherbert Zhanovich; Ryashentsev, Nikolai Pavlovich; and Timoshenko, Evgeny Mikhailovich, 4,015,671.

Golioto, Igor, to Bell Telephone Laboratories, Incorporated. High voltage transfer switch with cam controlled overlap during transfer. 4,016,385, Cl. 200-153.00L.

Goll, Jeffrey H. Broadband electroacoustic converter. 4,016,530, Cl. 340-15.000.

Goodyear Tire & Rubber Company, The: *See*—
Harris, James T., 4,015,652.
Smith, Edwin Studley; and Marshall, Richard A., 4,016,350.

Goppen, Albert Adlofovich: *See*—
Borisov, Vladimir Mikhailovich; Goldshtein, Boris Grigorievich; Goppen, Albert Adlofovich; Eletsky, Vladimir Alexeevich; Sherman, Viktor Lvovich; Bush, Kherbert Zhanovich; Ryashentsev, Nikolai Pavlovich; and Timoshenko, Evgeny Mikhailovich, 4,015,671.

Goransson, Pehr Gunnar Heine, to Rottneros Bag System AB. Tubes for the production of carrier bags with lateral accordion folds. 4,015,635, Cl. 138-119.000.

Gordon, Paul, to Strategic Medical Research Corporation. Therapeutic composition and method of therapeutically treating warm blooded animals therewith. 4,016,261, Cl. 424-180.000.

Gordon, Richard J.: *See*—
Wright, Harold G.; and Gordon, Richard J., 4,015,737.

Gostling, Peter Eric, to C. Evans & Sons Limited. Puncheon unit for builders scaffolding. 4,015,395, Cl. 52-637.000.

Goto, Kazuhiro: *See*—
Kobayakawa, Toshihiro; Yasuda, Hiroshi; Goto, Kazuhiro; and Nakanishi, Michio, 4,016,276.

Gottsdanker, Robert M. Testing apparatus. 4,015,343, Cl. 35-22.00R.

Gould Inc.: *See*—
Kelm, Roger William, 4,015,708.

Graafsma, Richard S.; and Nehrig, R. Harlan, to Auto Specialties Manufacturing Company. Tiltable jack. 4,015,825, Cl. 254-101.000.

Grachev, Leonid Pavlovich: *See*—
Anikanov, Nikolai Ivanovich; Baburin, Evgeny Arkadievich; Grachev, Leonid Pavlovich; Zax, Grigory Iosifovich; Radutsky, Grigory Avramovich; Frumkin, Mikhail Evseevich; and Kheifets, Rafail Efimovich, 4,015,404.

Graef, Harry T.; Hansen, Kenneth R.; and Morrison, Larry A., to Diebold, Incorporated. Interior railway transportation system. 4,015,537, Cl. 104-91.000.

Graf, Carlton E., to General Electric Company. Controlled rectifier motor drive system including d.c. fault detection and commutation means. 4,016,468, Cl. 318-434.000.





Graf, Martin, to Grob & Co. Aktiengesellschaft. Heddle frame on which the lateral supports are detachably connected to the frame staves. 4,015,638, Cl. 139-91.000.

Graham, Robert H., to R. A. Pearson Company. Plug pad inserting apparatus for carton forming machines. 4,015,516, Cl. 93-36.300.

Graham, Thomas Andrew. Bookholder. 4,015,813, Cl. 248-452.000.

Grand Machining Company: *See*—
Romano, Ralph, 4,015,503.

Granite, Bernard H. Device for reducing polymers or the like to substantially uniform small size pieces. 4,015,782, Cl. 241-62.000.

Grantham, Frederick W. Continuous laundry drying apparatus. 4,015,930, Cl. 432-105.000.

Grantham, Frederick W. Extractor for airborne particulate matter. 4,015,957, Cl. 55-227.000.

Graphic Controls Corporation: *See*—
Hubbard, James R., 4,016,572.

Graviner Limited: *See*—
Farquhar, Robert L.; and Snook, Phillip D., 4,016,425.

Gray, Thomas J.; and Wojtowicz, Jan, to Canada, Her Majesty the Queen in right of, as represented by the Minister of National Defence. Salt water battery. 4,016,339, Cl. 429-219.000.

Grayston, Judson M., to Machinery Brokers, Inc. Grinding wheel assembly. 4,015,371, Cl. 51-168.000.

Green, Howard; and Rheinwald, James G., to Massachusetts Institute of Technology. Process for serially culturing keratinocytes. 4,016,036, Cl. 195-1.800.

Greenwood, Charles Trevour, to United States of America, Navy. Preparation of pharmacologically active hydroxyalkyl starch. 4,016,354, Cl. 536-111.000.

Greer Hydraulics, Inc.: *See*—
Zahid, Abduz, 4,015,819.

Gretag Aktiengesellschaft: *See*—
Keller, Edwin, 4,015,703.

Grevich, John J., to Domain Industries, Inc. Segmented heater for band sealers. 4,016,026, Cl. 156-555.000.

Greyson, Jerome; and Stiso, Sisto Nicholas, to Miles Laboratories, Inc. Device and method for the determination of the specific gravity or osmolality of a liquid. 4,015,462, Cl. 73-32.00R.

Griffin, Gerald Joseph Louis, to Coloroll Limited. Biodegradable synthetic resin sheet material containing starch and a fatty material. 4,016,117, Cl. 260-17.4ST.

Griffoul, Marcel P.: *See*—
Orth, Charles D.; and Griffoul, Marcel P., 4,015,776.

Grinev, Alexei Nikolaevich: *See*—
Pershin, Grigory Nikolaevich; Bogdanova, Nadezhda Sergeevna; Nikolaeva, Irina Sergeevna; Maichuk, Jury Fedorovich; Abramishvili, Roza Isaakovna; Avazov, Teshabai Nazarovich; Uretskaya, Galina Yakovlevna; Anikina, Svetlana Jurievna; Grinev, Alexei Nikolaevich; and Kraft, Maxim Yakovlevich, 4,016,289.

Grob & Co. Aktiengesellschaft: *See*—
Graf, Martin, 4,015,638.
Koch, Bernhard R., 4,015,639.

Grolig, Johann: *See*—
Rasp, Christian; and Grolig, Johann, 4,016,201.

Gronbach, Wilhelm. Hinge with compressions spring for counterbalancing weight of leaves. 4,015,309, Cl. 16-190.000.

Groot, Jan: *See*—
Anders, Herbert; Bullens, Antonius Adrianus Maria; Groot, Jan; Otten, Johannes Henricus Bernardus; Stoof, Hendrikus Christiaan Josephus; and Vloemans, Carolus Leopoldus, 4,016,478.

Gross, William B., to General Electric Company. Simplified land line and satellite communication switching system. 4,016,493, Cl. 325-4.000.

Grote, George A., to Beach Precision Parts Co. In-line filter for gases. 4,015,959, Cl. 55-274.000.

Groupement pour les Activities Atomiques et Advancees "GAAA": *See*—
Meyer, Andre, 4,016,096.

Gruber, Gunter: *See*—
Schnee, Karl; Tichy, Dieter; Michel, Walter; and Gruber, Gunter, 4,016,336.

Gruetter, Walter; and Bron, Jean-Daniel, to J. Bobst & Fils, S.A. Sheet conveying device for a platen press. 4,015,844, Cl. 271-266.000.

Gruffaz, Max; and Rollet, Bernard, to Rhone-Poulenc Industries. Heat-stable cellular materials. 4,016,114, Cl. 260-2.50N.

Grumman Aerospace Corporation: *See*—
Tobin, Albert G., 4,016,229.
Vroom, Henry J.; Bolle, Warren Robert; Schneider, Herbert; and Swerdling, Burton, 4,015,586.

Grunau Company, Inc.: *See*—
Simons, John R.; and Fenske, John W., 4,015,665.

Gruppo Lepetit S.p.A.: *See*—
Bellasio, Elvio; and Campi, Ambrogio, 4,016,162.

GTE Automatic Electric Laboratories Incorporated: *See*—
Bradley, Stevan D., 4,016,481.

GTE Laboratories Incorporated: *See*—
Fulenwider, John E., 4,016,556.

GTE Sylvania Incorporated: *See*—
Cassidy, Robert L.; Cosco, Robert J.; and Pappas, John A., 4,016,445.

Guay, Normand Daniel: *See*—
Goff, Richard Everett, Jr.; Guay, Normand Daniel; and Priestley, Joseph Amos, 4,015,641.

Guerret, Patrick G.: *See*—
Turin, Michel J.; Raynaud, Guy M.; Pourrias, Bernard M.; and Guerret, Patrick G., 4,016,154.

Gulf Research & Development Company: *See*—
Acheson, Willard P.; Huygen, Hans H. A.; and Trump, Robert P., 4,015,664.
Christman, Robert D.; Lasher, Jordan S.; Paraskos, John A.; and Yanik, Stephen J., 4,016,069.
Christman, Robert D.; Lasher, Jordan S.; Paraskos, John A.; and Yanik, Stephen J., 4,016,070.
Kochhar, Rajindar K.; and Rowatt, Robert J., 4,016,344.
Onopchenko, Anatoli; and Schulz, Johann G. D., 4,016,206.

Gulf & Western Manufacturing Company: *See*—
Carrieri, Louis F., 4,015,620.

Gunderman, Roland E.: *See*—
Cohrs, William E.; Gunderman, Roland E.; and Crozier, William A., 4,016,110.

Gunnerman, Rudolf Wilhelm. Fuel pellets and method for making them from organic fibrous materials. 4,015,951, Cl. 44-10.00E.

Gunther, W. H. H.: *See*—
Chu, Joseph Y. C.; and Gunther, W. H. H., 4,016,058.

Gutman, Arnold D., to Stauffer Chemical Company. N-Alkylthiomethylacetamidephosphorodithioate insecticides. 4,016,266, Cl. 424-211.000.

Gutridge, Jack E.; and Raidt, Patricia A., to Pullman Incorporated. Convertible headrest for sleeping cars. 4,015,542, Cl. 105-322.000.

Gutterman, Eric D., to Beck, Allan S. Power switching circuit. 4,016,428, Cl. 307-116.000.

H. J. Langen & Sons Ltd.: *See*—
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Haag, Werner O.; and Olson, David H., to Mobil Oil Corporation. Alkylation in presence of thermally modified crystalline aluminosilicate catalyst. 4,016,218, Cl. 260-671.00R.

Haas, Dieter, to Blaupunkt-Werke GmbH. Printed circuit coils. 4,016,519, Cl. 336-200.000.

Haas, Lothar: *See*—
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Haberman, Louis B. Parabolic solar energy heat exchanger. 4,015,584, Cl. 126-271.000.

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Hakanson, Karin, to Levi Strauss & Co. Method of skewing twill fabric to avoid leg twist. 4,015,318, Cl. 28-72.00R.

Haldeman, Charles W., to United States of America, Air Force. Ablative protective material for reentry bodies. 4,016,322, Cl. 428-246.000.

Hall, Arthur D., III, to Advanced Decision Handling, Inc. Highly automated agricultural production system. 4,015,366, Cl. 47-1.00R.

Hall, Michael John: *See*—
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Hall, Robert Gilmore, to BOC Limited. Powder forming. 4,015,780, Cl. 241-23.000.

Hall, Virginia E.: *See*—
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Hallenbeck, Richard A., to Pitney-Bowes, Inc. Servodrive apparatus for driving the postage printing drum in a postage meter. 4,016,467, Cl. 318-604.000.

Halton, Murray; Dow, Norris F.; Dow, Richard M.; and Hillebrand, Michael J., to N.F. Doweave, Inc. Triaxial fabric forming machine and components thereof. 4,015,637, Cl. 139-11.000.

Hamada, Kenzo; and Uchiyama, Hiroshi, to E. C. Chemical Industries & Co., Ltd.; and C. Itch & Co., Ltd. Polyolefin plastic compositions. 4,016,118, Cl. 260-17.4SG.

Hamada, Mitsuharu, to Nissan Motor Co., Ltd. Transportation system and vehicles therefor. 4,015,539, Cl. 104-130.000.

Hambro Structural Systems Ltd.: *See*—
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Hambuch, Johannes: *See*—
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Hammad, Mohamad, to Rockwell International Corporation. Frequency tone detection. 4,016,371, Cl. 179-84.0VF.

Hanff, Ludovic F. Automatic watering device. 4,015,616, Cl. 137-78.000.

Hanff, Roy A. Apparatus for improving fuel-air mixture. 4,015,574, Cl. 123-141.000.

Hanopole, Irwin, to Magla Products. Floating net display apparatus. 4,015,719, Cl. 211-133.000.

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Hansen, Robert L.: *See—*
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Hardman, James A. Oil free compressor. 4,015,915, Cl. 417-490.000.
Harmon, Kenneth E.; and Mayers, John L., to United States of America, Air Force. Bolted paired vanes for turbine. 4,015,910, Cl. 415-217.000.
Harnisch, Horst, to Bayer Aktiengesellschaft. Azolindolines and azolindoline dyestuffs. 4,016,172, Cl. 260-307.00D.
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Harris, James T., to Goodyear Tire & Rubber Company, The. Tire and rim assembly. 4,015,652, Cl. 152-379.100.
Harris, Wilbur E., to Uniroyal Inc. Slit raw rubber article. 4,016,320, Cl. 428-131.000.
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Hawkins, Carl J., to Rowe Industries Division of Coleman Cable & Wire Company. Method for molding articles of thermoplastic sheet materials. 4,016,231, Cl. 264-92.000.
Hawthorne, Arthur L.; and Hazen, David R., to Consolidation Coal Company. Apparatus for unitizing a pair of augers. 4,015,674, Cl. 175-91.000.
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Hayward, John S.; Collis, Martin S.; Eckerson, John D.; and Rosenblood, Lorne K. Flotation jacket. 4,015,300, Cl. 9-341.000.
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Heilmayr, Peter F., to Certain-teed Products Corporation. Extrusion equipment and especially die structure for making plastic siding. 4,015,925, Cl. 425-461.000.
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Horvallius, Torgny William, to Aktiebolaget SAMEFA. Measuring tool for frameworks. 4,015,339, Cl. 33-288.000.
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Howard, Laurence M.; and Schaaf, Robert, to Air Filters, Inc. Filter bag and coupling. 4,015,961, Cl. 55-378.000.
Howard, Willard L.; and Rogers, Ryland F., to Xerox Corporation. Anti-gravitational cascade development for electrostatic processors. 4,015,561, Cl. 118-654.000.
Howorth, Ronald, to BTR Industries Limited. Glazing structures. 4,015,390, Cl. 52-495.000.
Hsu, Jau Yann, to Societe d'Assistance Technique Pour Produits Nestle S.A. Water-dispersible composition and method for production. 4,016,337, Cl. 426-99.000.
Hubalek, Zdenek: *See*—
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Hubbard, James R., to Graphic Controls Corporation. Thermographic stylus with inherent pressure control. 4,016,572, Cl. 346-139.00C.
Hucks, Uwe: *See*—
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Hughes, Alvin W. Emulsifier for sausage batter and the like. 4,015,784, Cl. 241-162.000.
Hugo Sachs Elektronik Kommanditgesellschaft: *See*—
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Hull, Charles W.; Whitehead, T. Wilson; and Colby, Bruce N., to Du Pont de Nemours, E. I., and Company. Analytical apparatus with variable energy ion beam source. 4,016,421, Cl. 250-281.000.
Hulverson, Adrian F.; and Chosy, Eugene, to Fruehauf Corporation. Wedge type trailer body. 4,015,876, Cl. 296-28.00M.
Hummel, Wiley M., to General Electric Company. Thermostat and anticipator therefor and methods of operating and making such. 4,016,520, Cl. 337-100.000.
Humphrey Instruments, Inc.: *See*—
Humphrey, William E., 4,015,899.
Humphrey, William E., to Humphrey Instruments, Inc. Eye test apparatus with physician routed patient input adjustment to variable optical elements. 4,015,899, Cl. 351-17.000.
Hunsicker, Glenn L.: *See*—
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Hurst, Eric Kenneth, to Lewis Woolf Griptight Limited. Infants feeding bottle. 4,015,740, Cl. 215-11.00C.
Hurst, William Dan; Huffman, Donald E.; King, Hermon A.; and Puckett, Jack, to Dixie Yarns, Inc. Yarn tape deweaving method and apparatus. 4,015,314, Cl. 28-17.000.
Hussain, Anwar: *See*—
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Hutchison, John Blundell. Termination of electric cables. 4,015,329, Cl. 29-628.000.
Hutner, Mark A., to Xerox Corporation. Scanning and selection methods and apparatus therefor. 4,016,549, Cl. 340-172.500.
Huygen, Hans H. A.: *See*—
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Hyatt, Gilbert Peter. Apparatus and method for providing interactive audio communication. 4,016,540, Cl. 340-172.500.
Hyosu, Yoshihiko; Miyashita, Eiiti; Kuzuba, Noboru; Miyahara, Sadayasu; and Takano, Ryoshiro, to Sinloihi Co. Fluorescent colored resin particles and process for preparation thereof. 4,016,133, Cl. 260-42.210.
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Ikeda, Hiroshi: *See*—
Ishida, Yaichi; Ikeda, Hiroshi; and Hiraishi, Shigetoshi, 4,015,990.
Ikegami, Yoshio; Kimura, Hirohumi; and Kohge, Tadashi, to Kobe Steel Ltd. Method and apparatus for treating the terminal of a wire-like object in a wire-like object take-up apparatus. 4,015,785, Cl. 242-25.00A.
Ikeura, Kenji: *See*—
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Innotech Corporation: *See*—
Anderson, Richard L.; Clifton, Jack K.; Masi, James V.; and Merrin, Seymour, 4,016,586.
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Inoue, Tadahiko; Dowke, Gosaburo; and Itoh, Hideo, to Sandoz, Inc. Synergistic insecticidal compositions containing β-exotoxin. 4,016,265, Cl. 424-200.000.
Institut Dr. Friedrich Forster, Prufgeratebau: *See*—
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Institut Francais du Petrole, des Carburants et Lubrifiants et Entreprise de Recherches et d'Activities Petrolieres Elf: *See*—
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Inuzuka, Tsuneki; Furuichi, Katsushi; Sawamura, Osamu; Kimura, Yoshimasa; and Sakamaki, Hisashi, to Canon Kabushiki Kaisha. Body detecting device. 4,016,529, Cl. 340-1.00R.
Iowa State University Research Foundation, Inc.: *See*—
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Ipri, Alfred Charles, to RCA Corporation. Method of simultaneously forming a polycrystalline silicon gate and a single crystal extension of said gate in silicon on sapphire MOS devices. 4,016,016, Cl. 148-175.000.
Irmscher, Klaus: *See*—
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Ishida, Nakao; Kitame, Fumio; Utsushikawa, Kuniko; Kohama, Tomoaki; Saito, Takuya; and Kikuchi, Mikio, to Kayaku Antibiotic Research Co., Ltd. Antibiotic TS-0822. 4,016,256, Cl. 424-121.000.
Ishida, Yaichi; Ikeda, Hiroshi; and Hiraishi, Shigetoshi, to Mitsubishi Paper Mills, Ltd. Color photographic lightsensitive material. 4,015,990, Cl. 96-84.0UV.



Ishigaki, Yukinobu; Ohwaki, Isao; and Ohba, Masahiro, to Victor Company of Japan, Limited. Multichannel record disc recording system. 4,016,373, Cl. 179-100.4ST.
Ishigaki, Yukinobu; and Matsushima, Hiroshi, to Matsushita Electric Industrial Co., Ltd.; and Victor Company of Japan, Limited. Multichannel record disc recording system with signal level control. 4,016,374, Cl. 179-100.4ST.
Ishiguro, Moriyuki: *See*—
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Ishikawa, Masakazu; Ito, Sadayoshi; Oka, Hiroyuki; Iida, Kennoske; Usui, Kenji; and Asaba, Masayoshi, to Toyota Jidosha Kogyo Kabushiki Kaisha. Device for warning of excessive wear on a brake lining. 4,016,533, Cl. 340-52.00A.
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Ito, Ryuji; and Komatsu, Mitsuaki, to Kabushiki Kaisha Komatsu Seisakusho. Control system for power train and auxiliary equipment driven from a common prime mover. 4,015,482, Cl. 74-15.840.
Ito, Sadayoshi: *See*—
Ishikawa, Masakazu; Ito, Sadayoshi; Oka, Hiroyuki; Iida, Kennoske; Usui, Kenji; and Asaba, Masayoshi, 4,016,533.
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Itoh, Hirokazu, to First-Sha Co., Ltd. Method for treating printed paper sheets for illuminated display. 4,016,309, Cl. 427-161.000.
Itoh, Kunio; and Inoue, Morio, to Matsushita Electronics Corporation. Double heterostructure semiconductor laser. 4,016,505, Cl. 331-94.50H.
Itoh, Masanori: *See*—
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Itoh, Takane, to Nissan Motor Co., Ltd. Gas turbine engine fuel control system. 4,015,425, Cl. 60-39.28T.
Itoh, Takuji: *See*—
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Iwasaki, Sadayoshi, to Alps Electric Co., Ltd. Slide switch assembly having improved fixed knife blade type contact structure. 4,016,377, Cl. 200-16.00F.
Iwata, Hiroshi; and Ishikawa, Katsuji, to West Electric Company, Ltd. Program-controlled shutter. 4,016,574, Cl. 354-29.000.
Izawa, Minoru: *See*—
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J. Bobst & Fils, S.A.: *See*—
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J. M. Voith GmbH: *See*—
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Jackovitz, John F.; and Pantier, Earl A., to Westinghouse Electric Corporation. Method of preparing high capacity nickel electrode powder. 4,016,091, Cl. 252-182.100.
Jackson, William D.: *See*—
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Jade Corporation, The: *See*—
Keizer, Alan S., 4,015,763.
Jaeggi, Knut A.; Ostermayer, Franz; and Schroter, Herbert, to Ciba-Geigy Corporation. Composition and method for treatment of heart and circulatory ailments. 4,016,283, Cl. 424-274.000.
Jaegtnes, Karl O.: *See*—
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Jaffe, Edward Ephraim, to Du Pont de Nemours, E. I., and Company. 2,9-Dichloroquinacridone pigment compositions. 4,015,998, Cl. 106-288.00Q.
Jaffe, Wolfgang: *See*—
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Jardine Industries, Inc.: *See*—
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Jarvinen, Ilkka; Salmela, Erkki; and Kaikkonen, Antero, to Upo Osakeyhtio. Device for producing expansions in plastics pipes and pipe components. 4,015,923, Cl. 425-393.000.
Jasinski, Leon; and Steel, Francis Robert, to Motorola, Inc. Switching amplifier system. 4,016,501, Cl. 330-10.000.
Jastrzebski, Andrzej. Collapsible multilevel building. 4,015,377, Cl. 52-66.000.
Jay, Ronald Frank, to Technicon Instruments Corporation. Sample supply apparatus and method for automatic analysis systems. 4,015,938, Cl. 23-230.00R.
Jayne, Gerald John Joseph; Askew, Herbert Frank; and Harrington, Colin John, to Castrol Limited. Hydraulic fluids. 4,016,088, Cl. 252-78.300.
Jean, Roger: *See*—
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Jeter, Sheldon M., to Milliken Research Corporation. Tufting needle. 4,015,551, Cl. 112-222.000.
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Johns-Manville Corporation: *See*—
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Johnsen, Kenneth E., to Dow Chemical Company, The. Process for sizing textile fibers for use on water jet looms. 4,015,317, Cl. 28-72.600.
Johnson, C. Evan, to Hitachi Magnetics Corporation. Fishing line release mechanism. 4,015,362, Cl. 43-43.110.
Johnson, Daniel W., to Amtex, Inc. Method of knitting a two-way non-run ventilated fabric. 4,015,444, Cl. 66-42.000.
Johnson, Harold K., to Bemis Company, Inc. Apparatus for inserting liners in bags. 4,015,515, Cl. 93-8.00W.
Johnson & Johnson: *See*—
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Kalwaites, Frank, 4,016,317.
Millet, Marcus Jacob, 4,015,709.
Johnson, Larry A., to Westinghouse Electric Corporation. Turbine generator end-winding support apparatus. 4,016,443, Cl. 310-260.000.
Johnson, Ronald, to Lawrence Peska Associates, Inc. Elevator system safety brace device. 4,015,689, Cl. 187-62.000.
Johnson, Theodore W.: *See*—
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Johnson, W. Grant. Valve for an oral evacuator system. 4,015,336, Cl. 32-33.000.
Jonas, Rochus; Uhl, Jurgen; Muller-Calgan, Helmut; and Irmscher, Klaus, to Merck Patent Gesellschaft mit beschrankter Haftung. Tetralone and indanone compounds. 4,016,281, Cl. 424-267.000.
Jones, Robert N., to Xerox Corporation. Composite xerographic photoreceptor with injecting contact layer. 4,015,985, Cl. 96-1.500.
Jonsson, Arne Ingvar; Malmstrom, Olov Valdemar; and Tibell, Bengt Gunnar Julius, to Aktiebolaget Electrolux. Apparatus for washing sanitary conveniences such as bed pans and the like. 4,015,614, Cl. 134-152.000.
Jordan, Joseph L., to Dravo Corporation. Process for sludge disposal and circular landfill system. 4,016,073, Cl. 210-24.000.
Jordan, Richard C.: *See*—
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Joseph Lucas Limited: *See*—
Warner, Peter Stuart, 4,015,483.
Jos. Schneider & Co.: *See*—
Sonnet, Gunther, 4,015,896.
Junak, Edward M. Ignition system. 4,015,576, Cl. 123-148.00E.
Jung, Horst; Sassenroth, Karl-Wilhelm; and Ferenczy, Nikolaus, to Dr. Hesse & Cie. Spezialfabrik fur Galvanotechnik. Process for activating a non-conductive substrate and composition therefor. 4,015,992, Cl. 106-1.000.
Juntgen, Harald: *See*—
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Kaeding, Warren W., to Mobil Oil Corporation. Disproportionation of toluene. 4,016,219, Cl. 260-672.00T.
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Kagawa, Teruhiko: *See—*
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Kagaya, Yutaka, to Silver Seiko Co., Ltd. Patterning system for a knitting machine. 4,015,446, Cl. 66-75.200.
Kahan, William; and Peer, Thomas Richard, to Singer Company, The. Automated home knitting machine with means for controlling the knitting of design rows. 4,015,445, Cl. 66-75.200.
Kaikkonen, Antero: *See—*
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Kaiser Aluminum & Chemical Corporation: *See—*
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Kajiura, Atsusuke; Aito, Yuzo; Sugiyama, Atsushi; Tamura, Hiroki; and Aihara, Kazuma, to Teijin Limited. Process for production of foamed resin structure. 4,016,112, Cl. 260-2.50N.
Kali-Chemie Pharma GmbH: *See—*
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Kalwaites, Frank, to Johnson & Johnson. Nonwoven fabric. 4,016,317, Cl. 428-88.000.
Kamei, Tatsuya: *See—*
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Kamin, Arthur; Evans, Clifford A.; and Freborg, Lehner C., to Ammco Tools, Inc. Bubble balancer. 4,015,481, Cl. 73-483.000.
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Kanezuka, Tadao, to Hitachi, Ltd. MIS logical circuit. 4,016,430, Cl. 307-205.000.
Kankaanpaa, Matti, to Valmet Oy. Suction roll for transferring a web away from a press section. 4,016,032, Cl. 162-305.000.
Kanner, Bernard; and Prokai, Bela, to Union Carbide Corporation. Morpholino-bearing polyalkylsiloxanes. 4,016,163, Cl. 260-247.70L.
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Karasaki, Tadashi; Hayashi, Chikako; and Furuichi, Etsuko, to Toyama Chemical Co., Ltd. Novel polypeptide produced by pseudomonas. 4,016,260, Cl. 424-177.000.
Kariyone, Kazuo; Yagi, Hideo; and Yoshida, Kazuhiko, to Fujisawa Pharmaceutical Co., Ltd. Process for the optical resolution of DL-2-(4-hydroxyphenyl)glycine. 4,016,205, Cl. 260-519.000.
Karlsson, Lars-Erik, to Nilcon Engineering AB. Machine to arrange a noise insulation between two concrete elements. 4,016,024, Cl. 156-378.000.
Karlstedt, Gustav Sven Erik: *See—*
Tisell, Claes-Gustav Erik Yngve; Lundell, Karl Erik Bjorn; Horner, Sven Henry Nilsson; Thorstensson, Gustav Yngve; and Karlstedt, Gustav Sven Erik, 4,015,860.
Kasik, Robert L.; and Peterson, Marvin A., to Beatrice Foods Co. Cheese extender. 4,016,298, Cl. 426-94.000.
Kasper, Andreas: *See—*
Dietze, Wolfgang; Reuschel, Ronrad; and Kasper, Andreas, 4,015,922.
Kattenberg, Hans Robert; and Poot, Cornelis, to Lever Brothers Company. Margarine fat blend. 4,016,302, Cl. 426-607.000.
Kaufman, Harold B., Jr.: *See—*
Roth, Howard; Baldry, Peter R.; Kaufman, Harold B., Jr.; McCarthy, John P.; and Wallenfels, Kurt, 4,015,518.
Kaufmann, Helmut: *See—*
Leisner, Ernst; Ulbricht, Wolfgang; and Kaufmann, Helmut, 4,015,815.
Kawai, Hiroji: *See—*
Tokumoto, Shin-Ichi; Tanaka, Eiji; Ogisu, Kenji; and Kawai, Hiroji, 4,016,052.
Kawai, Mitsuo, to Toyota Jidosha Kogyo Kabushiki Kaisha. Fuel control apparatus for an automobile engine equipped with an electronically controlled fuel injection system and an exhaust gas purifying system. 4,015,428, Cl. 60-277.000.
Kawakami, Kiminari: *See—*
Saito, Katashi; Kawakami, Kiminari; and Ishiguro, Moriyuki, 4,015,982.
Kawawata, Shichiro: *See—*
Takahashi, Masaaki; Ito, Akira; Kawawata, Shichiro; and Ogura, Jiro, 4,016,135.
Kayaku Antibiotic Research Co., Ltd.: *See—*
Ishida, Nakao; Kitame, Fumio; Utsushikawa, Kuniko; Kohama, Tomoaki; Saito, Takuya; and Kikuchi, Mikio, 4,016,256.
KCS Industries, Inc.: *See—*
Ferro, William P., 4,016,235.
Keiser, John T.: *See—*
Poirier, Victor L.; and Keiser, John T., 4,016,303.
Keizer, Alan S., to Jade Corporation, The. Alignment pawl for film-carrier advance mechanism. 4,015,763, Cl. 226-55.000.
Kelf, Michael A., to United States of America, Navy. Stable platform shipping container. 4,015,715, Cl. 206-521.000.
Keller, Alfred. Protecting system for roadway adjacent areas. 4,015,682, Cl. 181-33.00E.
Keller, Edwin, to Gretag Aktiengesellschaft. Sheet material transport system. 4,015,703, Cl. 198-624.000.
Kelm, Roger William, to Gould Inc. Button cell storage and merchandising package. 4,015,708, Cl. 206-333.000.
Kelsey-Hayes Company: *See—*
Frait, John S., 4,016,457.
Kendall Company, The: *See—*
Marshall, Preston F., 4,016,319.
McWhorter, Daniel M., 4,015,605.
Kenney, Edward Joseph: *See—*
Win, Maung Hla; DiSalvo, Walter Anthony; and Kenney, Edward Joseph, 4,016,040.
Kent, Harry A., Jr., to Research Corporation. Contraceptive polypeptides. 4,016,259, Cl. 424-177.000.
Kerfoot, Franklin W., Jr.: *See—*
Lieb, Nathaniel H.; Kerfoot, Franklin W., Jr.; and Wallace, Richard A., 4,015,489.
Kerr, Ralph O., to Petro-Tex Chemical Corporation. Catalyst preparative method. 4,016,105, Cl. 252-437.000.
Kessler, Gerald. Double-insulated glass window with insulating spacer. 4,015,394, Cl. 52-616.000.
Kestner, Daniel W.: *See—*
Selmeczi, Joseph G.; Marlin, Donald H.; and Kestner, Daniel W., 4,015,997.
KEURO Maschinenbau Gesellschaft mit beschrankter Haftung & Co., Kommanditgesellschaft: *See—*
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Kheifets, Rafail Efimovich: *See—*
Anikanov, Nikolai Ivanovich; Baburin, Evgeny Arkadievich; Grachev, Leonid Pavlovich; Zax, Grigory Iosifovich; Radutsky, Grigory Avramovich; Frumkin, Mikhail Evseevich; and Kheifets, Rafail Efimovich, 4,015,404.
Kibler, Kenneth G.; and Carter, Harris G., Jr., to United States of America, Air Force. Apparatus for electric enhancement of heat transfer. 4,015,658, Cl. 165-96.000.
Kikuchi, Masanori: *See—*
Ohya, Shuichi; and Kikuchi, Masanori, 4,016,588.
Kikuchi, Mikio: *See—*
Ishida, Nakao; Kitame, Fumio; Utsushikawa, Kuniko; Kohama, Tomoaki; Saito, Takuya; and Kikuchi, Mikio, 4,016,256.
Kilian, Werner: *See—*
Meckel, Werner; and Kilian, Werner, 4,015,320.
Kim, Dongsung Robert, to Burroughs Corporation. Longitudinal parity generator for use with a memory. 4,016,409, Cl. 235-153.0AM.
Kim, Heung Tai, to B. F. Goodrich Company, The. Extruder screw. 4,015,833, Cl. 259-191.000.
Kimura, Hirohumi: *See—*
Ikegami, Yoshio; Kimura, Hirohumi; and Kohge, Tadashi, 4,015,785.
Kimura, Yoshimasa: *See—*
Inuzuka, Tsuneki; Furuichi, Katsushi; Sawamura, Osamu; Kimura, Yoshimasa; and Sakamaki, Hisashi, 4,016,529.
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Hurst, William Dan; Huffman, Donald E.; King, Hermon A.; and Puckett, Jack, 4,015,314.
Kinney, Alfred W., to Phillips Petroleum Company. Production of a variegated product. 4,015,644, Cl. 141-9.000.
Kinnison, Daniel E. Digger attachment. 4,015,672, Cl. 173-160.000.





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Kintanar, Jane, to Lawrence Peska Associates, Inc., a part interest. Cosmetic gloves. 4,016,027, Cl. 2-159.000.
Kiplinger, Dale V.: *See—*
Beatty, Ronald L.; Kiplinger, Dale V.; and Chilcoat, Bill R., 4,016,304.
Kirn, Thomas G., to Eastman Kodak Company. Carrier for mounting pairs of magnetic heads to a drum-type tape scanning unit. 4,016,600, Cl. 360-109.000.
Kisor, Thaddeus William, to RCA Corporation. Carrier for semiconductor components. 4,015,707, Cl. 206-328.000.
Kistler Instrumente AG: *See—*
Calderara, Reto; Baumgartner, Hans U.; Tichy, Jan; and Sonderegger, Hans C., 4,016,437.
Kitai, Kiyoshi; Ogihara, Masuo; Sato, Kouzo; and Shinozaki, Nobuo, to Seiko Koki Kabushiki Kaisha. Alarm time setting notifying mechanism for a clock or the like. 4,015,417, Cl. 58-22.700.
Kitame, Fumio: *See—*
Ishida, Nakao; Kitame, Fumio; Utsushikawa, Kuniko; Kohama, Tomoaki; Saito, Takuya; and Kikuchi, Mikio, 4,016,256.
Kiuchi, Mitsuyuki; and Mizukawa, Takumi, to Matsushita Electric Industrial Co., Ltd. Induction heating apparatus with means for improving the dv/dt capability of a silicon-controlled rectifier used therein. 4,016,391, Cl. 219-10.490.
Kiuchi, Mitsuyuki: *See—*
Amagami, Keizo; Kobayashi, Takao; Ogino, Yoshio; and Kiuchi, Mitsuyuki, 4,016,390.
Klauminzer, Gary K., to Molectron Corporation. Optical beam expander for dye laser. 4,016,504, Cl. 331-94.50C.
Klein, Paul R.: *See—*
Horrocks, Donald L.; and Klein, Paul R., 4,016,418.
Kleuters, Wilhelm Josef; and Gieles, Antonius Cornelis Maria, to U.S. Philips Corporation. Mass flowmeter for a gaseous medium, for example air. 4,015,473, Cl. 73-205.00L.
Klier, Heiner: *See—*
Ganter-Ullmann, Karl; Neussel, Paul; Abermeth, Hubert; Wahnschaffe, Jurgen; and Klier, Heiner, 4,015,485.
Klitz, Ronald J., to J. I. Case Company. Drive range and lock control system. 4,015,679, Cl. 180-66.00R.
Klockner-Humboldt-Deutz Aktiengesellschaft: *See—*
Ganter-Ullmann, Karl; Neussel, Paul; Abermeth, Hubert; Wahnschaffe, Jurgen; and Klier, Heiner, 4,015,485.
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Klosa, Josef: *See—*
Menge, Heinz Gunter; and Klosa, Josef, 4,016,280.
Knabe, Bernd: *See—*
Bormann, Dieter; Knabe, Bernd; Schrinner, Elmar; and Worm, Manfred, 4,016,159.
Knapp, Charles A., to United States of America, Army. Illuminative and incendiary explosive munitions. 4,015,529, Cl. 102-66.000.
Knapp, Kurt: *See—*
Kunze, Lutz; Knapp, Kurt; and Brammer, Klaus, 4,015,338.
Knifton, John F.; and Suggitt, Robert M., to Texaco Inc. Preparative process for preparing phenylenediacetate diesters. 4,016,194, Cl. 260-475.0SC.
Knoblauch, Karl: *See—*
Munzner, Heinrich; Heimbach, Heinrich; Korbacher, Werner; Peters, Werner; Juntgen, Harald; Knoblauch, Karl; and Zundorf, Dieter, 4,015,956.
Knogo Corporation: *See—*
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Knohl, Herbert, to Colgate-Palmolive Company. Support stocking. 4,015,448, Cl. 66-185.000.
Knorr-Bremse GmbH: *See—*
Pollinger, Hans; Prahl, Franz; and Schorwerth, Mathias, 4,015,691.
Kobayakawa, Toshihiro; Yasuda, Hiroshi; Goto, Kazuhiro; and Nakanishi, Michio, to Yoshitomi Pharmaceutical Industries, Ltd. Treatment of liver dysfunction with 2-amino-6-benzyl-3-ethoxycarbonyl-4,5,6,7-tetrahydro-thieno[2,3-c]pyridine hydrochloride. 4,016,276, Cl. 424-256.000.
Kobayashi, Ikuya; Arai, Hiroshi; Ohta, Jun; and Izawa, Minoru, to Toyota Jidosha Kogyo Kabushiki Kaisha. Indicator device for automobiles. 4,016,534, Cl. 340-52.00F.
Kobayashi, Juichi: *See—*
Miyagawa, Norio; Sato, Mitsuo; Kobayashi, Juichi; and Kobayashi, Takashi, 4,016,306.
Kobayashi, Takao; Amagami, Keizo; Mizukawa, Takumi; and Toyooka, Tadao, to Matsushita Electric Industrial Co., Ltd. Pan detector for induction heating apparatus. 4,016,392, Cl. 219-10.490.
Kobayashi, Takao: *See—*
Amagami, Keizo; Kobayashi, Takao; Ogino, Yoshio; and Kiuchi, Mitsuyuki, 4,016,390.
Kobayashi, Takashi: *See—*
Miyagawa, Norio; Sato, Mitsuo; Kobayashi, Juichi; and Kobayashi, Takashi, 4,016,306.
Kobayashi, Toshihiko; Hiranuma, Hidetoshi; Mizogami, Susumu; Nishi, Hiroyoshi; Higuchi, Mamoru; and Onoya, Masatoshi, to Mitsubishi Yuka Pharmaceutical Co., Ltd. Novel substituted phenylacetic acid derivatives and a process for preparing thereof. 4,016,193, Cl. 260-471.00R.
Kobayashi, Toshio: *See—*
Susa, Kenzo; Kobayashi, Toshio; Taniguchi, Satoshi; and Ishii, Mitsuru, 4,016,244.
Kobe Steel Ltd.: *See—*
Ikegami, Yoshio; Kimura, Hirohumi; and Kohge, Tadashi, 4,015,785.
Kobori, Takenobu, to Kabushiki Kaisha Daini Seikosha. Electronic timepiece having plural capacitors for selectively adjusting quartz crystal oscillator output frequency. 4,016,508, Cl. 331-116.00R.
Koch, Bernhard R., to Grob & Co. Aktiengesellschaft. Heddle frame with laterally displaced lateral supports. 4,015,639, Cl. 139-92.000.
Koch, Richard C.; and Richards, Hugh C., to Pfizer Inc. Pesticidal carbamates. 4,016,278, Cl. 424-263.000.
Kochhar, Rajindar K.; and Rowatt, Robert J., to Gulf Research & Development Company. Olefin polymerization catalyst. 4,016,344, Cl. 526-124.000.
Koehring Company: *See—*
Kruder, George A., 4,015,832.
Koella, Ernest, III, to Platt Saco Lowell Limited. Trash collecting system for open-end spinning machine. 4,016,004, Cl. 134-21.000.
Koerbel, Claus E.; and McIntyre, Kenneth M., to Lunar Industries, Inc. Door valet. 4,015,871, Cl. 294-19.00R.
Koetzle, Gunther W., to International Business Machines Corporation. Method and arrangement for supervising power supply systems. 4,016,408, Cl. 235-153.00A.
Kofink, Siegfried, to J. Eberspacher. Electromagnetic pumping device for liquids. 4,015,912, Cl. 417-417.000.
Kofol, J. Stephen, to Honeywell Inc. Dielectric waveguide oscillator. 4,016,506, Cl. 331-96.000.
Koft, Emil, Jr., to Mobil Oil Corporation. Metal alkylphenate sulfides of reduced corrosiveness and method of preparing same. 4,016,093, Cl. 252-42.700.
Kogure, Katsura; Sueda, Noriyoshi; Himoto, Sizuo; Yoshino, Youziro; and Nakagawa, Kunio, to Nisshin Flour Milling Co., Ltd. Butenoic and pyruvic acid derivatives. 4,016,196, Cl. 260-476.00R.
Kohama, Tomoaki: *See—*
Ishida, Nakao; Kitame, Fumio; Utsushikawa, Kuniko; Kohama, Tomoaki; Saito, Takuya; and Kikuchi, Mikio, 4,016,256.
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Koike, Junichi: *See—*
Sakaguchi, Yasuhiro; Koike, Junichi; and Kubo, Takehisa, 4,016,083.
Kokko, Gerald. Spare tire locking mechanism. 4,015,761, Cl. 224-42.240.
Kolesinski, Henry S.; Mehta, Avinash C.; and Taylor, Lloyd D., to Polaroid Corporation. Hydroxyl-containing polymers having aminimide groups attached thereto through an ether linkage. 4,016,340, Cl. 526-7.000.
Kolesnikov, Arkady Georgievich: *See—*
Barannik, Valery Pavlovich; and Kolesnikov, Arkady Georgievich, 4,015,971.
Koller, Stefan; Lapple, Arnulf Ruediger; and Pacher, Marielise, to Ciba-Geigy Corporation. Process for dyeing blended fabrics. 4,015,933, Cl. 8-21.00A.
Kolomiitsev, Mikhail Alexandrovich: *See—*
Ambardanishvili, Tristan Silovanovich; Dundua, Vakhtang Justinovich; and Kolomiitsev, Mikhail Alexandrovich, 4,016,095.
Komatsu, Mitsuaki: *See—*
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Komatsu, Toshiyoshi, to Duskin Franchise Co., Ltd. Mop holder. 4,015,305, Cl. 15-150.000.
Kommanditbolaget Pemac Invention AB & Co.: *See—*
Wadensten, Carl Tommy, 4,015,712.
Kondo, Kiyosi; Terada, Osamu; Oshima, Kohei; Mori, Yasuki; and Mochida, Kenichi, to Kyowa Hakko Kogyo Co., Ltd.; and Sagami Chemical Research Center, part interest to each. β-Phenoxy or substituted phenoxy ethanol compounds. 4,016,186, Cl. 260-473.00R.
Kondratiev, Vasily Ivanovich: *See—*
Budker, Gersh Itskovich; Gaponov, Vasily Alexandrovich; Korabelnikov, Boris Mikhailovich; Krainov, Gennady Sergeevich; Kuznetsov, Sergei Alexandrovich; Kuksanov, Nikolai Konstantinovich; Kondratiev, Vasily Ivanovich; and Salimov, Rustam Abelevich, 4,016,499.
Kondur, Nicholas, Jr., to Burroughs Corporation. Alphanumeric serial printer with a flexible membrane printing element. 4,015,699, Cl. 197-57.000.
Kongelka, Robert M., to Superior Valve Company. Safety yoke for high pressure gases. 4,015,865, Cl. 285-198.000.
Konig, Hans-Bodo; Schrock, Wilfried; Disselnkotter, Hans; and Metzer, Karl Georg, to Bayer Aktiengesellschaft. Ureidoacetamidopenicillins. 4,016,282, Cl. 424-271.000.
Koninklijke Emballage Industrie Van Leer B.V.: *See—*
Wolff, Per Lind; and Gent, John Arthur Gooch, 4,016,111.
Konishi, Nobutake; Yatsuo, Tsutomu; Kamei, Tatsuya; Okamura, Masahiro; and Ogawa, Takuzo, to Hitachi, Ltd. Bidirectional photothyristor device. 4,016,593, Cl. 357-38.000.
Konishi, Nobutake: *See—*
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Konno, Mitsutaka: *See—*
Horiye, Masakazu; Sasaki, Kenichi; and Konno, Mitsutaka, 4,015,568.
Konoma, Kunihiko; and Satou, Kaname, to Minolta Camera Kabushiki Kaisha. Four element lens system. 4,015,897, Cl. 350-209.000.
Konstruktiewerkhuizen, DeMets N.V.: *See—*
De Mets, Albert, 4,015,921.

Koppe, Herbert; Kummer, Werner; Stahle, Helmut; and Muacevic, Gojko, to Boehringer Ingelheim GmbH. 1-Phenoxy-2-hydroxy-3-alkynylamino-propanes and salts thereof. 4,016,202, Cl. 260-501.170.

Koppe, Herbert; Kummer, Werner; Stahle, Helmut; and Muacevic, Gojko, to Boehringer Ingelheim GmbH. Pharmaceutical compositions containing a 1-phenoxy-2-hydroxy-3-alkynylamino-propane and their use as adrenolytics and hypotensives. 4,016,286, Cl. 424-304.000.

Koppers Company, Inc.: *See—*
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Van Ackeren, Joseph; and Tucker, Linwood G., 4,016,046.

Korabelnikov, Boris Mikhailovich: *See—*
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Korbacher, Werner: *See—*
Munzner, Heinrich; Heimbach, Heinrich; Korbacher, Werner; Peters, Werner; Juntgen, Harald; Knoblauch, Karl; and Zundorf, Dieter, 4,015,956.

Korkut, Mehmet D. Semi-submersible drill barge. 4,015,552, Cl. 114-265.000.

Kormany, Geza: *See—*
Weber, Kurt; and Kormany, Geza, 4,016,156.

Kosiancic, Eugene Joseph, to Babcock & Wilcox Company, The. Method of making porous nuclear fuel. 4,016,226, Cl. 264-.500.

Koski, John Alexander; Lissner, Rudolf Werner; and Roberts, Spencer Donald, to International Business Machines Corporation. Adaptive reel-to-reel tape control system. 4,015,799, Cl. 242-203.000.

Koss, Dieter G.: *See—*
MacFarlane, Walter J.; and Koss, Dieter G., 4,015,310.

Kossak, Joseph J., to Oxy-Dry Sprayer Corporation. Apparatus for cleaning rotating cylindrical surfaces. 4,015,307, Cl. 15-256.520.

Kostrzewa, Michael: *See—*
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Kotani, Haruo; Hirata, Haruyoshi; and Hosokawa, Yoshinori, to Horiba, Ltd. Non-dispersive X-ray fluorescence analyzer. 4,016,419, Cl. 250-272.000.

Kotzsch, Hans-Joachim; and Vahlensieck, Hans-Joachim, to Dynamit Nobel Aktiengesellschaft. Process for the preparation of low silanes and silane esters. 4,016,188, Cl. 260-448.80R.

Kouvoussis, Anthony E.: *See—*
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Koyanagi, Mitsumasa: *See—*
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Kraft, Maxim Yakovlevich: *See—*
Pershin, Grigory Nikolaevich; Bogdanova, Nadezhda Sergeevna; Nikolaeva, Irina Sergeevna; Maichuk, Jury Fedorovich; Abramishvili, Roza Isaakovna; Avazov, Teshabai Nazarovich; Uretskaya, Galina Yakovlevna; Anikina, Svetlana Jurievna; Grinev, Alexei Nikolaevich; and Kraft, Maxim Yakovlevich, 4,016,289.

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Krainov, Gennady Sergeevich: *See—*
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Kreitz, Hans, to Fa. H. Krantz. Interrupting the rotary movement of a guide roller. 4,015,452, Cl. 68-175.000.

Krekler, Marion M. Tab puller and slide fastener protector. 4,015,312, Cl. 24-205.15H.

Krohn, David A.: *See—*
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Krone, Hartmut: *See—*
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Kronewitter, Michael R.: *See—*
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Kroposki, Lorraine M.; and Yoshimine, Masao, to Dow Chemical Company, The. Process for preparing phosphorothioates and phenylphosphonothioates. 4,016,225, Cl. 260-973.000.

Kroy Industries Inc.: *See—*
Paque, Michael W., 4,015,700.

Kruder, George A., to Koehring Company. Extruder screws. 4,015,832, Cl. 259-191.000.

Krueger, Earl R.: *See—*
Rajadhyaksha, Vithal J.; Schroer, Richard A.; Brock, Phillip J.; and Krueger, Earl R., 4,016,223.

Krueger, James Elwood: *See—*
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Kubiak, Herbert: *See—*
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Kubo, Takehisa: *See—*
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Kudo, Teizo; Hashizume, Yoshio; Itoh, Masanori; and Shiga, Makoto, to Daicel Ltd. Impact-resistant resin composition. 4,016,221, Cl. 260-873.

Kufrin, Frederick W.: *See—*
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Kuksanov, Nikolai Konstantinovich: *See—*
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Kumazawa, Kikuo, to Hiryokagaku Kenkyusho. Method for determination of total nitrogen and heavy nitrogen content. 4,015,936, Cl. 23-230.0PC.

Kummer, Werner: *See—*
Koppe, Herbert; Kummer, Werner; Stahle, Helmut; and Muacevic, Gojko, 4,016,202.
Koppe, Herbert; Kummer, Werner; Stahle, Helmut; and Muacevic, Gojko, 4,016,286.

Kunze, Lutz; Knapp, Kurt; and Brammer, Klaus, to Daimler-Benz Aktiengesellschaft. Method and apparatus for control measurement of a motor vehicle frame and or aggregates connected thereto. 4,015,338, Cl. 33-228.000.

Kupper, Friedrich-Wilhelm; and Streck, Roland, to Chemische Werke Huels Aktiengesellschaft. Process for the preparation of 9-tricosene and 9-heneicosene. 4,016,220, Cl. 260-683.00D.

Kuptsova, Alla Ivanovna: *See—*
Rogova, Svetlana Tanovna; Pikunov, Mikhail Vladimirovich; Kuptsova, Alla Ivanovna; Obukhova, Galina Zakharovna; Karalnik, Dmitry Mikhailovich; and Rybakov, Anatoly Ivanovich, 4,015,981.

Kurata, Hirotaka, to Sansui Electric Co., Ltd. Compatible stereophonic receiver. 4,016,366, Cl. 179-15.0BT.

Kurata, Motoji, to Japan Medical Supply Co., Ltd. Test tube assembly. 4,015,941, Cl. 23-259.000.

Kureha Kagaku Kogyo Kabushiki Kaisha: *See—*
Otani, Sugio; Watanabe, Shoji; and Araki, Tadashi, 4,016,247.
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Kurimoto, Kazuhiko: *See—*
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Kurimoto, Masashi: *See—*
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Kuroishi, Kenjiro: *See—*
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Kurokawa, Masayuki, to Nittetsu Curtainwall Corporation, a part interest. Shelf assembly. 4,015,545, Cl. 108-107.000.

Kurtz, Leonard D.; and Bidwell, Robert E., to Deknatel Inc. Surgical drainage system with pressure indicator. 4,015,603, Cl. 128-276.000.

Kurumada, Tomoyuki: *See—*
Murayama, Keisuke; Morimura, Syoji; Yoshioka, Takao; Toda, Toshimasa; Mori, Eiko; Horiuchi, Hideo; Higashida, Susumu; Matsui, Katsuaki; Kurumada, Tomoyuki; Ohta, Noriyuki; and Osawa, Hisayou, 4,016,168.

Kushner, Jack; and Zwirblis, Henry G., to Delta Scientific Corporation. Metering pump wherein tubular pump is responsive to force impulses. 4,015,914, Cl. 417-478.000.

Kusunose, Tetsuhiro: *See—*
Matsuyama, Mitsuyoshi; and Kusunose, Tetsuhiro, 4,016,329.

Kuwata, Satoshi: *See—*
Ogawa, Kinya; Kurimoto, Kazuhiko; Eguchi, Yoshitsugu; and Kuwata, Satoshi, 4,016,341.

Kuznetsov, Sergei Alexandrovich: *See—*
Budker, Gersh Itskovich; Gaponov, Vasily Alexandrovich; Korabelnikov, Boris Mikhailovich; Krainov, Gennady Sergeevich; Kuznetsov, Sergei Alexandrovich; Kuksanov, Nikolai Konstantinovich; Kondratiev, Vasily Ivanovich; and Salimov, Rustam Abelevich, 4,016,499.

Kuznetsova, Alexandra Moiseevna: *See—*
Miller, Viktor Yakovlevich; Kandakov, Gennady Petrovich; and Kuznetsova, Alexandra Moiseevna, 4,015,547.

Kuzuba, Noboru: *See—*
Hyosu, Yoshihiko; Miyashita, Eiiti; Kuzuba, Noboru; Miyahara, Sadayasu; and Takano, Ryoshiro, 4,016,133.

Kwok, Clyde C. K., to Rippingille, E. V., Jr. Fluid oscillator and pulsating shower head employing same. 4,015,779, Cl. 239-102.000.

Kyowa Hakko Kogyo Co., Ltd.: *See—*
Kondo, Kiyosi; Terada, Osamu; Oshima, Kohei; Mori, Yasuki; and Mochida, Kenichi, 4,016,186.

L.C.C.-C.I.C.E.-Compagnie Europeenne de Composants Electroniques: *See—*
Frappart, Pierre, 4,016,466.

L. & C. Steinmuller GmbH: *See—*
Albrecht, Wolfgang; and Dorling, Rolf, 4,015,742.

La Soudure Electrique Autogene, Procedes Arcos: *See—*
De Haeck, Robert, 4,016,399.

Lace, Melvin A.; and Pelletier, Fernand F., to Motorola, Inc. Reversible cartridge tape player system with side drive. 4,015,789, Cl. 242-55.19R.

La Chapelle, Leo, to Rembert, Frank; and La Chapelle, Leo, part interest to each. Speed warning device. 4,016,536, Cl. 340-62.000.

Lacroix, Bernard: *See—*
Pompei, Jean; Lacroix, Bernard; and Pierrot, Francis, 4,016,524.

La Fleur, Lee. Heat sealing unit and method of making same. 4,016,021, Cl. 156-154.000.

Laftsidis, Stergios: *See—*
Glabe, Elmer F.; Anderson, Perry W.; and Laftsidis, Stergios, 4,016,294.





Laganis, Deno, to Schenectady Chemicals, Inc. Water-soluble wire enamel. 4,016,330, Cl. 428-379.000.

Laidig, Jonathan J., to Laidig Silo Unloaders, Inc. Sweep auger for bottom silo unloaders. 4,015,734, Cl. 214-17.0DA.

Laidig Silo Unloaders, Inc.: *See—*
Laidig, Jonathan J., 4,015,734.

Laing, Nikolaus. Device for receiving or emitting radiation energy. 4,015,583, Cl. 126-270.000.

Lalumiere, Edward J.: *See—*
Arzberger, William A.; and Lalumiere, Edward J., 4,015,749.

Lambert, Robert Wilson: *See—*
Atherton, Frank Ratcliffe; Hall, Michael John; Hassall, Cedric Herbert; Ringrose, Peter Stuart; and Lambert, Robert Wilson, 4,016,148.

Lamm, Gunther: *See—*
Dehnert, Johannes; and Lamm, Gunther, 4,016,152.

Lancaster, Woodrow A.; Jebb, William T.; and Chagan, Alan M. Diving suit and neck seal therefor. 4,015,295, Cl. 2-2.10R.

Lang, Walter W.; and Shimp, Alan B., to Westinghouse Electric Corporation. Circuit breaker with improved single coil actuator and undervoltage release mechanism. 4,016,518, Cl. 335-7.000.

Lange, Karl Heinz, to Balda-Werke. Shutter drive synchronously set with film frame and flash cube set. 4,016,581, Cl. 354-144.000.

Langen, Marinus J. M., to H. J. Langen & Sons Ltd. Wrap-around carton forming machine. 4,015,403, Cl. 53-195.000.

Langguth, Arthur F., to United States of America, Navy. Retriever. 4,015,873, Cl. 294-66.00R.

LaNieve, Herman L., to Celanese Corporation. Spinning apparatus providing for essentially constant extensional strain rate. 4,015,924, Cl. 425-455.00F.

Lanni, Michael J.; and Calamera, John, to Bendix Corporation, The. Sensor including means for operating the sensor in rate measuring and stabilization modes. 4,016,469, Cl. 318-590.000.

Laoteppitaks, Chansak; Henthorn, Lincoln; and Falconer, Charles B., to Chestel, Inc. Digital tone decoder. 4,016,370, Cl. 179-84.0VF.

Laporte Industries Limited: *See—*
Whittam, Thomas Vincent, 4,016,246.

Lapple, Arnulf Ruediger: *See—*
Koller, Stefan; Lapple, Arnulf Ruediger; and Pacher, Marielise, 4,015,933.

Laptewicz, Joseph E., Jr.: *See—*
Finn, Robert K.; Tannahill, Alex L.; and Laptewicz, Joseph E., Jr., 4,016,085.

Larsson, Bjorn E.; and Le Sota, Stanley, to Rohm and Haas Company. Emulsion copolymers of acrolein and their use in treating leather. 4,016,127, Cl. 260-29.6TA.

Laser Industries, Ltd.: *See—*
Sharon, Uzi, 4,015,906.

Lasher, Jordan S.: *See—*
Christman, Robert D.; Lasher, Jordan S.; Paraskos, John A.; and Yanik, Stephen J., 4,016,069.
Christman, Robert D.; Lasher, Jordan S.; Paraskos, John A.; and Yanik, Stephen J., 4,016,070.

Lask, Helmut: *See—*
Holst, Arno; Kostrzewa, Michael; and Lask, Helmut, 4,015,611.

Lauck, Helmut, to Varta Batterie Aktiengesellschaft. Galvanic element. 4,016,338, Cl. 429-149.000.

Laurent, Henry: *See—*
Hofmeister, Helmut; Annen, Klaus; Wiechert, Rudolf; and Laurent, Henry, 4,016,269.

Laurus, Felix F.: *See—*
Butts, Ernest Otto; and Laurus, Felix F., 4,015,396.

Lauzier, Rene. Adjustable mounting assembly for railing. 4,015,826, Cl. 256-59.000.

Law, Wendell A.; Barrett, William G.; Priebe, Norman F.; and Wise, Harry D., to Sperry Rand Corporation. Communication multiplexer module. 4,016,367, Cl. 179-15.00A.

Law, Wendell A.; Barrett, William G.; Priebe, Norman F.; and Wise, Harry D., to Sperry Rand Corporation. Communication multiplexer module. 4,016,548, Cl. 340-172.500.

Lawrence Peska Associates, Inc.: *See—*
Johnson, Ronald, 4,015,689.
Kintanar, Jane, 4,016,027.
McCarthy, Peter, 4,015,327.
Rogers, William F., 4,015,608.
Sedlak, Joseph, 4,015,363.

Laxo, Darryl E., to United States of America, Navy. Pressure control and fluid venting system for a pressurized container. 4,015,621, Cl. 137-173.000.

Lazzari, Jean-Pierre, to Compagnie Internationale pour l'Informatique. Integrated magnetic head having pole-pieces of a reduced frontal width. 4,016,601, Cl. 360-122.000.

Leca Trading & Concession A/S: *See—*
Kamstrup-Larsen, Harry, 4,015,929.

Lechner, Uwe: *See—*
Wetzel, Bernd; Woitun, Eberhard; Maier, Roland; Reuter, Wolfgang; Goeth, Hanns; and Lechner, Uwe, 4,016,263.

Lectrofood, Inc.: *See—*
Theimer, Ernst Theodore; and Heinze, George E., 4,016,297.
Theimer, Ernst Theodore; and Heinze, George E., 4,016,301.

Lee, James W.: *See—*
Webb, Harry B.; Lee, James W.; and Blair, Robert B., 4,015,538.

Lee, Yuan Ho. Cut-off stock feeding device for an automatic high speed cold nut former. 4,015,301, Cl. 10-76.00T.

Leeds & Northrup Italiana S.p.A.: *See—*
Meyer, Emilio G., 4,016,423.

Leenhouts, Albert C., to Superior Electric Company, The. Non-linear velocity change circuit for consecutive length commanded digital motor means. 4,016,472, Cl. 318-696.000.

Lees, Gerard, to Imperial Chemical Industries Limited. Coloration of polyolefine articles. 4,016,132, Cl. 260-40.00R.

Lefeuvre, Andre: *See—*
Stcherbatcheff, Georges; and Lefeuvre, Andre, 4,015,870.

Lefeuvre, Antoine Augustin Joseph, to Societe d'Etudes et de Realisations Industrielles. Processing of emulsions. 4,016,076, Cl. 210-61.000.

Legatti, Raymond H.: *See—*
Draper, Charles W.; and Legatti, Raymond H., 4,015,888.

Leimgruber, Willy; and Valentine, Donald Herman, Jr., to Hoffmann-La Roche Inc. Process for the preparation of aldehydes. 4,016,212, Cl. 260-614.00R.

Leisner, Ernst; Ulbricht, Wolfgang; and Kaufmann, Helmut, to Robert Bosch G.m.b.H. Contamination-resistant valve for high-temperature, high-pressure applications. 4,015,815, Cl. 251-191.000.

Lemkin, Jack L.: *See—*
Clipson, Stuart A.; and Lemkin, Jack L., 4,015,713.

Lenotre, Michel Pierre Alphonse, to Etat Francais. Method of preparing priming explosives. 4,016,018, Cl. 149-17.000.

Lenz, Leonard L., to American Mobile Corporation. Apparatus for aligning a mobile lift work platform. 4,015,685, Cl. 182-145.000.

Leonard Gould & Company Limited: *See—*
Nichols, Cyril, 4,015,716.

L'Eplattenier, Francois: *See—*
Vuitel, Laurent; L'Eplattenier, Francois; and Pugin, Andre, 4,016,157.

Lerner, Edward; and Ventura, John A. Electromagnetically actuatable metering valve for successive delivery of measured volumes of fluid from a fluid reservoir. 4,015,755, Cl. 222-442.000.

Leroux, Marcel Henri: *See—*
Bishop, Everett Reece; and Leroux, Marcel Henri, 4,016,558.

LeRow, Charles E., Jr.; and Crookston, Ronald W., to Westinghouse Electric Corporation. Operating mechanism and position indicator for a circuit interrupter. 4,016,384, Cl. 200-148.00R.

Leschonski, Kurt; and Rumpf, Hans, to Leschonski, Kurt. Wet centrifugal separator for gas. 4,015,958, Cl. 55-235.000.

Lesh, Nathan George, deceased; by Merchants National Bank of Allentown, executor; Morabito, Joseph Michael; and Thomas, John Henry, III, to Bell Telephone Laboratories, Incorporated. Conduction system for thin film and hybrid integrated circuits. 4,016,050, Cl. 204-15.000.

Leshner, Ervin; and Leshner, Michael D., to Fuel Injection Development Corporation. Fuel metering and vaporizing system for internal combustion engines. 4,015,569, Cl. 123-133.000.

Leshner, Ervin; and Leshner, Michael D., to Fuel Injection Development Corporation. Charge forming system for internal combustion engines. 4,015,572, Cl. 123-139.0AW.

Leshner, Michael D.: *See—*
Leshner, Ervin; and Leshner, Michael D., 4,015,569.
Leshner, Ervin; and Leshner, Michael D., 4,015,572.

Le Sota, Stanley: *See—*
Larsson, Bjorn E.; and Le Sota, Stanley, 4,016,127.

Leurs, Gerardus Cornelis; Bosma, Rumoldus Matthijs Marinos Johannes; and Pouw, Theodorus Johannes Antonius, to Hoechst Aktiengesellschaft. Dosing device with pneumatic discharge for flowable solids. 4,015,754, Cl. 222-194.000.

Levecque, Marcel; Battigelli, Jean A.; and Plantard, Dominique, to Saint-Gobain Industries. Method and apparatus for forming fibers by toration. 4,015,963, Cl. 65-5.000.

Levecque, Marcel; Battigelli, Jean A.; and Plantard, Dominique, to Saint-Gobain Industries. Method and apparatus for making fibers from thermoplastic materials. 4,015,964, Cl. 65-5.000.

Lever Brothers Company: *See—*
Kattenberg, Hans Robert; and Poot, Cornelis, 4,016,302.
van Kampen, Daniel Marten, 4,016,041.

Leverton, Peter, to Nu-Line Products (Engineering) Limited. Locking unit for immobilizing vehicles. 4,015,455, Cl. 70-19.000.

Levi Strauss & Co.: *See—*
Hakanson, Karin, 4,015,318.

Levine, Walter E., to Bindicator Company. Method for manufacturing an ultrasonic transducer. 4,015,319, Cl. 29-25.350.

Lewandowski, Raymond F.: *See—*
Golbeck, Bernard J.; Lewandowski, Raymond F.; and Markinson, William C., 4,016,388.

Lewey, Sonia: *See—*
Mason, George W.; and Lewey, Sonia, 4,016,237.

Lewin, Nathan; and Mangiardi, Vito J., to Bio-Rad Laboratories, Inc. Competitive binding thyroid assay with improved bound-free separation step. 4,015,939, Cl. 23-230.00B.

Lewis, Harry R., Jr., to Standard Oil Company (Indiana). Subsea oil and gas production manifold system. 4,015,660, Cl. 166-.500.

Lewis, John A., Jr., to Polaroid Corporation. Flash mounting means for camera with folding viewfinder. 4,016,579, Cl. 354-126.000.

Lewis Woolf Griptight Limited: *See—*
Hurst, Eric Kenneth, 4,015,740.

Liautaud, James P. Catheter needle assembly. 4,015,600, Cl. 128-214.00R.

Libbey-Owens-Ford Company: *See—*
Brown, Laurence A.; Hagedorn, Floyd T.; and Waltz, Foster V., Jr., 4,015,969.
Revells, Robert G.; Olson, Earl J.; and Sutton, Charles W., 4,015,968.

Lichti, Robert D. Centrifugal braking device. 4,015,696, Cl. 188-189.000.

Lieb, Nathaniel H.; Kerfoot, Franklin W., Jr.; and Wallace, Richard A., to Star Dental Manufacturing Co., Inc. Dental handpiece and wrench therefor. 4,015,489, Cl. 81-55.000.

Liechti, Hans Wilhelm; and Markert, Jurgen, to Ciba-Geigy Corporation. Process for the dyeing of synthetic textile material. 4,015,934, Cl. 8-41.00C.

Lieser, Karl, to Hermann Werner, a Kommanditgesellschaft. Machine for grinding of peripheral surfaces on work pieces. 4,015,370, Cl. 51-90.000.

Lin Offshore Engineering, Inc.: *See*—
Chow, Philip Y., 4,015,554.

Lindsay, Fredrick H. Floor frame assembly for a mobile building. 4,015,375, Cl. 52-143.000.

Lines, Gregory L.; and Odinak, Alec, to Upjohn Company, The. Process for the isolation of polyimides in a solid state. 4,016,227, Cl. 264-14.000.

Lipha, Lyonnaise Industrielle Pharmaceutique: *See*—
Boschetti, Eugene; Briet, Philippe; Berthelon, Jean-Jacques; and Chabert, Janine, 4,016,285.

Lipovski, G. Jack, to Harris Corporation. Plural memory controller apparatus. 4,016,545, Cl. 340-172.500.

Liquid Crystal Products, Inc.: *See*—
Suzuki, Fred K.; and Davison, Thomas W., 4,015,591.

Lissner, Rudolf Werner: *See*—
Koski, John Alexander; Lissner, Rudolf Werner; and Roberts, Spencer Donald, 4,015,799.

List, Ferdinand: *See*—
Wulf, Horst-Dieter; List, Ferdinand; Orlowski, Friedrich-August; Wilke, Norbert; and Pflegerl, Emmerich, 4,015,943.

Litton Business Telephone Systems, Inc.: *See*—
Hoehn, Steven Jon, 4,016,372.

Liu, Benjamin Y. H.; Jordan, Richard C.; and Willeke, Klaus, to University of Minnesota, The Regents of the. Solar heat collector. 4,015,582, Cl. 126-270.000.

Living Walls Inc.: *See*—
Carroll, John P., 4,015,808.

Lloyd, Wayne B., to Westinghouse Electric Corporation. Target sighting device. 4,015,905, Cl. 356-248.000.

Lo, Cheng Fan: *See*—
Hearon, William Montgomery; Witte, John F.; and Lo, Cheng Fan, 4,016,207.

Lodge, Guy Bryan. Fluid applicators. 4,015,907, Cl. 401-48.000.

Lodige, Fritz: *See*—
Forster, Hermann; Schluter, Wilhelm; and Sterr, Horst, 4,015,829.
Lodige, Wilhelm; Lodige, Fritz; and Lucke, Josef, 4,015,830.

Lodige, Wilhelm; Lodige, Fritz; and Lucke, Josef. Apparatus for applying glue to chips, fibers and the like. 4,015,830, Cl. 259-25.000.

Lodige, Wilhelm: *See*—
Forster, Hermann; Schluter, Wilhelm; and Sterr, Horst, 4,015,829.

Lohmann, Dieter: *See*—
Bitzer, Diethelm; and Lohmann, Dieter, 4,016,013.

Lohmar, Elmar: *See*—
Gehrmann, Klaus; Ohorodnik, Alexander; Lohmar, Elmar; and Riechmann, Wernfried, 4,016,048.

Loiko, Evgeny Nikolaevich: *See*—
Samorodov, German Ivanovich; Loiko, Evgeny Nikolaevich; Olshevsky, Orest Viktorovich, deceased; Olshevskaya, Valentina Mikhailovna, administrator; Olshevsky, Alexandr Orestovich, administrator; Olshevsky, Viktor Alexandrovich, administrator; and Olshevskaya, Nina Alexandrovna, administrator, 4,016,485.

Lotsch, Wolfgang, to Badische Anilin- & Soda-Fabrik Aktiengesellschaft. Phenyl-substituted phthalazone azo dyes with a coupling component of the phenol, napthol, acetoacetarylide, pyrazolone, quinolone, pyridine, pyrimidone or isoquinolone series. 4,016,151, Cl. 260-154.000.

Loubier, Robert J.: *See*—
Dellinger, Eugene L.; and Loubier, Robert J., 4,015,333.

Louchis, Stavros D.: *See*—
Stankovich, Ivan D.; and Louchis, Stavros D., 4,016,053.

Love, Richard R. Overwidth device for flat bed truck or trailer. 4,015,858, Cl. 280-656.000.

Lowther, Frank Eugene, to Union Carbide Corporation. Corona reaction method and apparatus. 4,016,060, Cl. 204-176.000.

Loznak, Edward J.; and Wood, Eugene L. Impaling transfer process and apparatus. 4,015,872, Cl. 294-61.000.

Lubrizol Corporation, The: *See*—
Wiese, Herbert Frederick, deceased; Wiese, Helen G., executrix; and Wierber, Emil Thomas, 4,016,150.

Luchi, Vinicio. Knitted fabrics having pattern effects. 4,015,443, Cl. 66-9.00R.

Lucke, Josef: *See*—
Forster, Hermann; Schluter, Wilhelm; and Sterr, Horst, 4,015,829.
Lodige, Wilhelm; Lodige, Fritz; and Lucke, Josef, 4,015,830.

Lunar Industries, Inc.: *See*—
Koerbel, Claus E.; and McIntyre, Kenneth M., 4,015,871.

Lundell, Karl Erik Bjorn: *See*—
Tisell, Claes-Gustav Erik Yngve; Lundell, Karl Erik Bjorn; Horner, Sven Henry Nilsson; Thorstensson, Gustav Yngve; and Karlstedt, Gustav Sven Erik, 4,015,860.

Luthardt, Hans J., to Akzo N.V. Method of coating a cellulosic substrate with an adherent polymeric coating. 4,016,312, Cl. 427-303.000.

Lutter, Arnold. Device for separating flange pipes. 4,015,324, Cl. 29-239.000.

Lutz, Bruce Leo: *See*—
Anderson, John Dale; and Lutz, Bruce Leo, 4,015,520.

MacDiarmid, Alan G.: *See*—
Garito, Anthony Frank; Heeger, Alan J.; MacDiarmid, Alan G.; Bright, Arthur A.; Cohen, Marshall J.; and Mikulski, Chester M., 4,016,331.

Macemon, James H.; and Soodak, Charles I., to Baxter Travenol Laboratories, Inc. Single knob rotary control of meter damping and push control of damping override. 4,016,491, Cl. 324-128.000.

MacFarlane, Walter J.; and Koss, Dieter G., to Stanley Works, The. Pendant for drapery traverse rod. 4,015,310, Cl. 16-87.40R.

Machanian, William V., to Wurlitzer Company, The. Electronic musical instrument using plural programmable divider circuits. 4,016,495, Cl. 328-18.000.

Machi, Sueo; Aono, Taiji; Matui, Yasushi; Hibi, Yoshiharu; and Shinano, Takayuki, to Japan Atomic Energy Research Institute; Maruzen Oil Co., Ltd.; and Mitsuhashi Kakoki Kaisha Ltd. Novel composite comprising a special graft-copolymer. 4,016,134, Cl. 260-42.240.

Machinery Brokers, Inc.: *See*—
Grayston, Judson M., 4,015,371.

MacKay, Kenneth D.; and Sudderth, R. Brantley, to General Mills Chemicals, Inc. Use of fluorinated $\beta$-diketones in the solvent extraction of zinc. 4,015,980, Cl. 75-120.000.

MacLean, Charles A. Chess-like game. 4,015,849, Cl. 273-131.0KC.

Magdo, Ingrid-Emese; and Magdo, Steven, to International Business Machines Corporation. High performance integrated bipolar and complementary field effect transistors. 4,016,596, Cl. 357-43.000.

Magdo, Steven: *See*—
Magdo, Ingrid Emese; and Magdo, Steven, 4,016,596.

Magla Products: *See*—
Hanopole, Irwin, 4,015,719.

Maher, John P.; and Johnson, Theodore W., to Sprague Electric Company. Glass containing resistor having a sub-micron metal film termination. 4,016,525, Cl. 338-309.000.

Maichuk, Jury Fedorovich: *See*—
Pershin, Grigory Nikolaevich; Bogdanova, Nadezhda Sergeevna; Nikolaeva, Irina Sergeevna; Maichuk, Jury Fedorovich; Abramishvili, Roza Isaakovna; Avazov, Teshabai Nazarovich; Uretskaya, Galina Yakovlevna; Anikina, Svetlana Jurievna; Grinev, Alexei Nikolaevich; and Kraft, Maxim Yakovlevich, 4,016,289.

Maieli, Joseph R.; Rosenthal, Gordon; and Torrillo, Domenick T., to Fairchild Industries Inc. Aircraft wing. 4,015,787, Cl. 244-42.0DA.

Maier, Roland: *See*—
Wetzel, Bernd; Woitun, Eberhard; Maier, Roland; Reuter, Wolfgang; Goeth, Hanns; and Lechner, Uwe, 4,016,263.

Maillard, Gilbert, to Manufacture de Machines du Haut-Rhin S.A. Revolver cylinder for the ejection of rimless cartridge cases. 4,015,356, Cl. 42-68.000.

Makimoto, Mistuo; Yamashita, Sadahiko; Yano, Yoshiharu; and Yamamoto, Junichi, to Matsushita Electric Industrial Co., Ltd. Method and system for measuring doppler frequency shift of an echo. 4,016,568, Cl. 343-8.000.

Makino, Hiroshi, to West Electric Company, Ltd. DC to DC converter. 4,016,475, Cl. 321-2.000.

Malick, Emil A.: *See*—
Arnold, Philip M.; and Malick, Emil A., 4,016,300.

Malick, Frank. Elastic stocking. 4,015,296, Cl. 2-239.000.

Malinowski, Eugene J.; and Zyck, Raymond J., to TRW Inc. Method and apparatus for shaping an airfoil. 4,015,509, Cl. 90-13.500.

Mallory, Edwin E.; and Tolan, John R., to Milliken Research Corporation. Cutter. 4,015,498, Cl. 83-564.000.

Malmstrom, Olov Valdemar: *See*—
Jonsson, Arne Ingvar; Malmstrom, Olov Valdemar; and Tibell, Bengt Gunnar Julius, 4,015,614.

Maltz, Martin S.: *See*—
Schoonover, Philip C.; and Maltz, Martin S., 4,015,983.

Mancuso, Ettore J., Jr.: *See*—
Folsom, Lawrence R.; O'Brien, John F.; Gaboriault, Roger E.; Haberstroh, August J.; and Mancuso, Ettore J., Jr., 4,015,511.

Mandell, Ronald D., to Sta-Rite Industries, Inc. Assembly for sealing and pressure equalization of a submersible housing. 4,015,633, Cl. 138-89.000.

Mangel, Karl. Master door operator for vertically movable elevator gates and landing doors. 4,015,688, Cl. 187-52.0LC.

Mangiardi, Vito J.: *See*—
Lewin, Nathan; and Mangiardi, Vito J., 4,015,939.

Manne, John E. Crown form and method. 4,015,332, Cl. 32-12.000.

Manufacture de Machines du Haut-Rhin S.A.: *See*—
Maillard, Gilbert, 4,015,356.

Manurhin-Automatic, S.A.: *See*—
Peter, Fernand, 4,015,491.

Marathon Oil Company: *See*—
Norton, Charles J.; and Falk, David O., 4,016,086.

Marion, Charles P., to Texaco Development Corporation. Recovery of particulate carbon from synthesis gas. 4,016,102, Cl. 252-373.000.

Marion, Charles P., to Texaco Development Corporation. Recovery of particulate carbon from synthesis gas. 4,016,103, Cl. 252-373.000.

Marion, Charles P., to Texaco Development Corporation. Recovery of particulate carbon from synthesis gas. 4,016,104, Cl. 252-373.000.

Marion County Muscular Dystrophy Foundation: *See*—
Ryan, John Patrick; and Hart, Jack B., 4,015,725.

Markert, Jurgen: *See*—
Liechti, Hans Wilhelm; and Markert, Jurgen, 4,015,934.

Markhart, Albert H.: *See*—
Serlin, Irving; and Markhart, Albert H., 4,016,128.





Markinson, William C.: *See*—
Golbeck, Bernard J.; Lewandowski, Raymond F.; and Markinson, William C., 4,016,388.

Markofsky, Sheldon B.; and Wood, Louis L., to W. R. Grace & Co. Process and composition for breaking emulsions. 4,016,101, Cl. 252-344.000.

Marlin, Donald H.: *See*—
Selmeczi, Joseph G.; Marlin, Donald H.; and Kestner, Daniel W., 4,015,997.

Marquis, Kenneth E.: *See*—
Buttler, Carl T., 4,015,868.

Marsh, Lawrence B., to Marsh-McBirney, Inc. Spherical electromagnetic water current velocity sensor with protruding electrodes. 4,015,471, Cl. 73-194.0EM.

Marsh-McBirney, Inc.: *See*—
Marsh, Lawrence B., 4,015,471.

Marsh, Ronald W.; and Marulic, Walter J., to Pullman Incorporated. Operating mechanism for double sliding doors. 4,015,866, Cl. 292-36.000.

Marshall, Preston F., to Kendall Company, The. Biaxially oriented nonwoven fabric having long and short fibers. 4,016,319, Cl. 428-113.000.

Marshall, Richard A.: *See*—
Smith, Edwin Studley; and Marshall, Richard A., 4,016,350.

Martel, Jacques; and Heymes, Rene, to Roussel-UCLAF. Cephalosporin derivatives. 4,016,158, Cl. 260-243.00C.

Martenson, Donald S. Fireplace heater. 4,015,581, Cl. 126-121.000.

Martin, David R.: *See*—
Sauter, Walter A.; and Martin, David R., 4,016,516.

Martinez, F. Jesus; and Schnell, William J., to Baxter Laboratories, Inc. Staged membrane diffusion device and membrane support. 4,016,081, Cl. 210-321.00B.

Marulic, Walter J.: *See*—
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Mathews, George P., to Borg-Warner Corporation. Automatic slack adjuster. 4,015,692, Cl. 188-79.50K.

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Matiskella, John Daniel: *See*—
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Matsushita Electric Industrial Co., Ltd.: *See*—
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McDonough, Cletus G. Multilayered circuit assembly including an eyelet for making weldable connections and a method of making said assembly. 4,015,328, Cl. 29-625.000.

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McWhorter, Daniel M., to Kendall Company, The. Drainage receptacle. 4,015,605, Cl. 128-294.000.

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Meyer, Horst; Bossert, Friedrich; Vater, Wulf; and Stoepel, Kurt, to Bayer Aktiengesellschaft. 4-Quinoline and 4-isoquinoline derivatives of 2,6-diamino-1,4-dihydropyridine. 4,016,277, Cl. 424-258.000.
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Morrow, Warren P., to United States of America, Army. Energy generator for rotating projectiles. 4,015,532, Cl. 102-70.2GA.
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Murrle, Kurt, to Pforzheimer Uhren-Rohwerke Rudolf Wehmer. Mainspring mechanism and spring barrel assembly. 4,015,421, Cl. 58-86.000.
Musgrave, Daniel D. Method of forming barrier wire. 4,015,506, Cl. 89-1.00A.
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Niederst, Jean-Pierre; and Holzinger, Karl, to Herbert Kannegiesser Kommanditgesellschaft. Device for producing molded articles from foamable plastics. 4,015,920, Cl. 425-451.900.
Nighan, William L.; and Wiegand, Walter J., to United Technologies Corporation. High power electric discharge method and apparatus for laser chemical synthesis and other applications. 4,016,448, Cl. 313-231.000.
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Omron Tateisi Electronics Co., Ltd.: *See—*
Tanimura, Shigeru; Miura, Nobuaki; and Asano, Osamu, 4,016,589.
O'Neill, Wilbur J., to Westinghouse Electric Corporation. Diving helmet assembly. 4,015,294, Cl. 2-2.10R.
Ongaro Dynamics Incorporated: *See—*
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Ongaro, Theodore, to Ongaro Dynamics Incorporated. System for measuring and correcting vibrations generated in vehicular tires. 4,016,020, Cl. 156-75.000.
Onoda, Takeru; Wada, Keisuke; and Otake, Masayuki, to Mitsubishi Chemical Industries Ltd. Process for preparing carboxylic acid esters from toluene and xylene. 4,016,200, Cl. 260-488.0CD.

Onopchenko, Anatoli; and Schulz, Johann G. D., to Gulf Research & Development Company. Process for preparing pyromellitic acid. 4,016,206, Cl. 260-524.00N.
Onoya, Masatoshi: *See—*
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Small, Edward A.; Edwards, Richard H.; Eufusia, Eugene A.; Clary, Robert M.; and Bergfelt, Nils H., 4,015,558.
Oquita, Ramiro. Pinata having weakened bottom wall and means for breaking same. 4,015,364, Cl. 46-11.000.
O'Reilly, Agnes C.: *See—*
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Oshima, Kohei: *See—*
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Otake, Masayuki: *See—*
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Otani, Sugio; Watanabe, Shoji; and Araki, Tadashi, to Kureha Kagaku Kogyo Kabushiki Kaisha; and Toyo Boseki Kabushiki Kaisha. Production of carbon shaped articles having high anisotropy. 4,016,247, Cl. 423-447.400.
Otsuki, Shoji; Kuroishi, Kenjiro; and Ohara, Eiji. Twisting machine. 4,015,415, Cl. 57-34.00R.
Otsuki, Susumu; Uchida, Kanichi; and Miyanohara, Isao, to Toyo Soda Manufacturing Co., Ltd. Stabilization of 1,1,1-trichloroethane. 4,016,215, Cl. 260-652.50R.
Otten, Johannes Henricus Bernardus: *See—*
Anders, Herbert; Bullens, Antonius Adrianus Maria; Groot, Jan; Otten, Johannes Henricus Bernardus; Stoof, Hendrikus Christiaan Josephus; and Vloemans, Carolus Leopoldus, 4,016,478.
Ottesen, Hjalmar Holmboe, to International Business Machines Corporation. Disk storage apparatus having signals recorded in a specific format. 4,016,603, Cl. 360-135.000.
Owens-Corning Fiberglas Corporation: *See—*
Flautt, Martin C.; Foley, Kevin M.; and Haines, Richard M., 4,016,325.
Hill, Homer G., 4,015,994.
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Paal, Gabor; and Wustenhagen, Jurgen F., to International Business Machines Corporation. Method of developing and stripping positive photoresist. 4,015,986, Cl. 96-36.000.
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Page, Robert E., to United States of America, Navy. Mos shift register compensation system for defective tracks of drum storage system. 4,016,547, Cl. 340-172.500.
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Pandey, Kailash Narain, to Texas Instruments Incorporated. Apparatus for storing data broadcast in digital form for generating a character display or for recording such data for later playback. 4,016,361, Cl. 358-83.000.
Pandick Press, Inc.: *See—*
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Papworth, Charles A. Tank cleaning apparatus. 4,015,613, Cl. 134-102.000.
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Parise & Sons, Inc.: *See—*
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Park, Arthur: *See—*
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Parker, Ralph L.; and Hoskins, Daniel B., to TRW Inc. Push button switch with indicator. 4,016,561, Cl. 340-381.000.
Parquet, Donald J.; Pedersen, Carl O.; and Barton, Robert M., to J. I. Case Company. Automatic control system for backhoe. 4,015,729, Cl. 214-138.00R.
Pasche, Rene C., to Baumgartner Papiers S.A. Cigarette filter tip. 4,015,610, Cl. 131-9.000.
Pastoriza, James J., to Analog Devices, Inc. Digital-to-analog converter having transient suppressor system. 4,016,559, Cl. 340-347.0DA.
Patenge, Tilo: *See—*
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Patterson, Frank Knowles, to Du Pont de Nemours, E. I., and Company. Dielectric substrate bearing nickel boride conductor. 4,016,447, Cl. 313-218.000.
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Paul, William A. Application of gasket-forming material to workpieces. 4,015,560, Cl. 118-323.000.
Paules, Eugene H. Apparatus and method for converting refuse to useful energy. 4,015,546, Cl. 110-8.00A.
Pauletich, Joseph. Snow field sound imploder. 4,015,684, Cl. 181-120.000.
Pauluis, Gerard J. C. A.; and Miller, Alistair I., to Atomic Energy of Canada Limited. Dual temperature deuterium extraction process. 4,015,944, Cl. 23-270.50W.
Pauwels, Edward M. Game apparatus. 4,015,848, Cl. 273-126.00R.
Pavlik, Frank J.; and Hansen, Robert L., to Minnesota Mining and Manufacturing Company. Film-forming polymer modified with a fluoroaliphatic radical containing compound and hair styling composition thereof. 4,015,612, Cl. 132-7.000.
Pavliny, William. Building lightning protection system. 4,016,462, Cl. 361-117.000.
Pawelczyk, Werner, to Hermann Berstorff Maschinenbau GmbH. Multi-roll calender for rubber or synthetic plastics materials. 4,015,919, Cl. 425-367.000.
Peche, Jack, to Richman, Achille George, a part interest. Coupling device for pneumatic brake lines. 4,015,720, Cl. 213-1.300.
Pecori, Peter M., to United States of America, Army. Land mine detector with pulse slope, width and amplitude determination channels. 4,016,486, Cl. 324-3.000.
Peddle, Charles: *See—*
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Pemberton, Donald Stuart, to Rist's Wires & Cables Limited. Electrical connector. 4,015,891, Cl. 339-217.00S.
Pennell, Paul H., to Elastomeric Products Inc. Rubber grip for tennis racket handles. 4,015,851, Cl. 273-75.000.
Penner, Wayne A.: *See—*
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Svendsen, Lars Gundro, 4,016,042.
Perkins, Charles M. Chair construction for long use comfort. 4,015,878, Cl. 297-385.000.
Perrine, Paul M., to American Pelletizing Corporation. Limestone-expanding clay granules and method of making them. 4,015,973, Cl. 71-63.000.
Perry, George J., to NCR Corporation. Bill stacker. 4,015,842, Cl. 271-185.000.
Pershin, Grigory Nikolaevich; Bogdanova, Nadezhda Sergeevna; Nikolaeva, Irina Sergeevna; Maichuk, Jury Fedorovich; Abramishvili, Roza Isaakovna; Avazov, Teshabai Nazarovich; Uretskaya, Galina Yakovlevna; Anikina, Svetlana Jurievna; Grinev, Alexei Nikolaevich; and Kraft, Maxim Yakovlevich. Medicinal preparation for treatment of viral-etiology diseases. 4,016,289, Cl. 424-315.000.
Persidok, Jacek Antoni, to Motorola, Inc. Three large signal deflection system. 4,016,454, Cl. 315-409.000.
Persinski, Leonard J.; Cook, Michael M.; and Adams, Sally Lee, to Calgon Corporation. Low fluid loss cementing compositions containing hydrolyzed acrylamide/2-acrylamido-2-methylpropane sulfonic acid derivative copolymers and their use. 4,015,991, Cl. 106-90.000.
Personal Products Company: *See—*
Csillag, Charles, 4,015,604.
Peter, Fernand, to Manurhin-Automatic, S.A. Turret lathe. 4,015,491, Cl. 82-2.00R.
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Petersen, Jorgen Nilaus, to Aktieselskabet Brodrene Hartmann. Package of fiber material or other resilient material for receiving fragile articles, particularly eggs. 4,015,766, Cl. 229-2.5EC.
Petersen, Walter Adrian: *See—*
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Peterson, Everett A. Electronic sealing apparatus. 4,016,025, Cl. 156-380.000.
Peterson, Laurence I., to Rohm and Haas Company. Anesthetic delivery system. 4,015,599, Cl. 128-188.000.
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Petrov, Dmitry Andreevich; and Tumanov, Alexei Tikhonovich. Device for making single-crystal products. 4,015,657, Cl. 164-361.000.
Petzold, Wolfgang, to Schering Aktiengesellschaft. Arrangement for galvanization and chemical treatment of articles. 4,015,831, Cl. 259-81.00R.
Pfister, Stanley Arthur, to Cincinnati Milacron, Inc. Index mechanism. 4,015,487, Cl. 74-813.00L.
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Pharriss, Bruce B.; Erickson, Ross R.; and Tillson, Stephen A., to Alza Corporation. Method for treating dysmenorrhea with a uterine therapeutic system. 4,016,270, Cl. 424-242.000.
Philip, Morris. Method and apparatus for positively feeding yarn. 4,015,447, Cl. 66-132.00R.
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Phillipps, Gordon Hanley; English, Alan Frederick; and Stribley, Gillian Helen, to Glaxo Laboratories Limited. 21-Adamantane-1'-carboxylate steroid compositions. 4,016,271, Cl. 424-243.000.
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Pierrot, Francis: *See—*
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Pietrucha, Victor F.; Minard, Michael E.; and Ozmec, Gordon J., to Airco, Inc. Apparatus for depositing carbon dioxide snow. 4,015,440, Cl. 62-166.000.
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Rogova, Svetlana Tanovna; Pikunov, Mikhail Vladimirovich; Kuptsova, Alla Ivanovna; Obukhova, Galina Zakharovna; Karalnik, Dmitry Mikhailovich; and Rybakov, Anatoly Ivanovich, 4,015,981.
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Pintschovius, Ulrich; Schinzel, Erich; and Rosch, Gunter, to Hoechst Aktiengesellschaft. Monostyryl-naphthalene derivatives. 4,016,195, Cl. 260-475.0FR.
Piper, Ortwin: *See—*
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Pluschkell, Wolfgang; and Wisnewski, Heinrich, to Hoesch Werke Aktiengesellschaft. Method of and device for stripping off a lost measuring head detachably placed upon a measuring lance. 4,015,475, Cl. 73-343.00R.
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Pollinger, Hans; Prahl, Franz; and Schorwerth, Mathias, to Knorr-Bremse GmbH. Disc brake for railway vehicles. 4,015,691, Cl. 188-59.000.
Pomara, Johnny B., Jr., to El Chico Corporation. Food processing device. 4,015,517, Cl. 99-355.000.
Pompei, Jean; Lacroix, Bernard; and Pierrot, Francis, to U.S. Philips Corporation. Sensor for a gas detector, in particular for smoke detection. 4,016,524, Cl. 338-34.000.
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Poot, Cornelis: *See—*
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Pope, Kenneth Elvin. Anti-skid control system. 4,015,695, Cl. 188-181.00A.
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Popeil, Samuel J.; and Ruiz, Lorenzo Anthony, to Popeil Brothers, Inc. Cutting board case and knife set. 4,015,330, Cl. 30-124.000.
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PPG Industries, Inc.: *See*—
Anderson, Carl Clement; and Dowbenko, Rostyslaw, 4,016,332.
Cunningham, Hugh; Raetzsch, Carl W.; Rich, George L.; and Driskill, John D., 4,016,064.
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Meuresch, Herbert; Padar, Steven; and Zimmerhackel, Franz, 4,015,757.
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Preuss, Friedrich; and Difflipp, Kurt, to Roland Offsetmaschinenfabrik Faber & Schleicher AG. Multicolor sheet-fed printing press. 4,015,522, Cl. 101-183.000.
Price, John G. Apparatus for slitting belt material. 4,015,791, Cl. 242-56.200.
Priebe, Norman F.: *See*—
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Primo, Angelo M. Zostera seaweed articles and methods of preparing and utilizing same. 4,016,084, Cl. 252-8.100.
Pringle, John Philip, to Capital Wire and Cable, Division of U.S. Industries. Process of making laminated structural member. 4,016,232, Cl. 264-112.000.
Pringle, John Philip, to Capital Wire and Cable, Division of U.S. Industries. Process of making a flexible structural member. 4,016,233, Cl. 264-122.000.
Prins N.V.: *See*—
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Profet, Anthony G., to Templeton, Kenly & Company. Jack safety stop. 4,015,824, Cl. 254-89.00R.
Prokai, Bela; and Kanner, Bernard, to Union Carbide Corporation. Organosilicone polymer solutions. 4,016,000, Cl. 106-316.000.
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Pugin, Andre: *See*—
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Pullman Incorporated: *See*—
Gutridge, Jack E.; and Raidt, Patricia A., 4,015,542.
Marsh, Ronald W.; and Marulic, Walter J., 4,015,866.
Pulte, William J. House with unfinished bonus space. 4,015,385, Cl. 52-236.000.
Purex Corporation Ltd.: *See*—
Williams, William H., 4,015,683.
Quaglino, Carl A.: *See*—
Cook, Thomas W.; Penner, Wayne A.; Quaglino, Carl A.; Ray, Charles D.; and Scott, Lyndell F., 4,016,531.
R. A. Pearson Company: *See*—
Graham, Robert H., 4,015,516.
R. Stahl Aufzuege GmbH: *See*—
Schumacher, Gunter; Tef, Peter; and Wiester, Max, 4,015,835.
Rabstejnek, Carl V.: *See*—
Hassan, Javathu K.; and Rabstejnek, Carl V., 4,016,396.
Radnoti, Desmond Arpad. Electrode shield. 4,016,063, Cl. 204-195.00R.
Radutsky, Grigory Avramovich: *See*—
Anikanov, Nikolai Ivanovich; Baburin, Evgeny Arkadievich; Grachev, Leonid Pavlovich; Zax, Grigory Iosifovich; Radutsky, Grigory Avramovich; Frumkin, Mikhail Evseevich; and Kheifets, Rafail Efimovich, 4,015,404.
Raetzsch, Carl W.: *See*—
Cunningham, Hugh; Raetzsch, Carl W.; Rich, George L.; and Driskill, John D., 4,016,064.
Rahman, Yueh Erh, to United States of America, Energy Research and Development Administration. Method of encapsulating polyaminopolycarboxylic acid chelating agents in liposomes. 4,016,290, Cl. 424-319.000.
Raidt, Patricia A.: *See*—
Gutridge, Jack E.; and Raidt, Patricia A., 4,015,542.
Rajadhyaksha, Vithal J.; Schroer, Richard A.; Brock, Phillip J.; and Krueger, Earl R., to Nelson Research & Development Company. Prostaglandin dehydrogenase inhibiting agents. 4,016,223, Cl. 260-946.000.
Rajadhyaksha, Vithal Jagannath, to Nelson Research & Development Company. Method of synthesis of trans-2-phenylcyclopropylamine. 4,016,204, Cl. 260-515.00R.
Rambo, Sheldon I., to Westinghouse Electric Corporation. High-reliability power amplifier. 4,016,503, Cl. 330-124.00D.
Ramond, Louis Maurice. Frame for various cycles. 4,015,854, Cl. 280-281.00R.
Ramsey, John L.; and Post, Allen E., to United States of America, Air Force. Programmable variable length high speed digital delay line. 4,016,511, Cl. 333-29.000.
Randolph, Ellwood A. Dilution device. 4,015,628, Cl. 137-566.000.
Randolph, Robert W.: *See*—
Rollins, Dallas W.; Randolph, Robert W.; and Garner, Gerald D., 4,015,751.
Rank Xerox Ltd.: *See*—
Mitsumasu, Sakae, 4,015,841.
Rasmussen, Carl M. Camper jack. 4,015,822, Cl. 254-45.000.
Rasp, Christian; and Grolig, Johann, to Bayer Aktiengesellschaft. Process for the preparation of acetoxybutanols. 4,016,201, Cl. 260-491.000.
Rauland-Borg Corporation: *See*—
Heinz, Harro K.; and Cahill, Bernard S., 4,016,502.
Rausch, Richard E., to UOP Inc. Catalytic reforming with an activated bimetallic catalytic composite. 4,016,068, Cl. 208-139.000.
Ravault, Frank Ernest George: *See*—
Fishburn, Robert Anthony; and Ravault, Frank Ernest George, 4,015,979.
Ray, Charles D.: *See*—
Cook, Thomas W.; Penner, Wayne A.; Quaglino, Carl A.; Ray, Charles D.; and Scott, Lyndell F., 4,016,531.
Ray, Richard V. Alarm triggering circuit. 4,016,537, Cl. 340-64.000.
Raychem Limited: *See*—
McLoughlin, Robert H., 4,016,356.
Raymond Corporation, The: *See*—
Gibson, Christian D.; and Hart, Kenneth F., 4,015,738.
Raynaud, Guy M.: *See*—
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RCA Corporation: *See*—
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Ipri, Alfred Charles, 4,016,016.
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Ross, Walter Lee, 4,016,564.
Stone, Robert Porter, 4,015,315.
Weimer, Paul Kessler, 4,016,550.
Reader, Trevor D.: *See*—
Nash, John E.; and Reader, Trevor D., 4,015,335.
Rear, Ian Graeme. Fluid operated hammer. 4,015,670, Cl. 173-15.000.
Reber, Walter. Hay-making machine. 4,015,412, Cl. 56-370.000.
Redington, Rowland W.; and Henkes, John L., Jr., to General Electric Company. Mammography table. 4,015,836, Cl. 269-322.000.
Reece, Marvin P.: *See*—
Rosan, Jose, Sr.; and Reece, Marvin P., 4,015,504.
Reed, Robert D., to John Zink Company. Laminar flow flame arrestor. 4,015,954, Cl. 48-192.000.
Reeder, Thomas M.; and Gilden, Meyer, to United Technologies Corporation. Diode coupled tapped acoustic delay line correlator and convolver. 4,016,514, Cl. 333-30.00R.
Reese, Johannes: *See*—
Ritz, Jurgen; and Reese, Johannes, 4,016,141.
Reeves Roofing Equip. Co., Inc.: *See*—
Blackwell, Curtis R., 4,015,588.
Regan, Barrier F.: *See*—
Regan, Glen B.; and Regan, Barrier F., 4,016,089.
Regan, Glen B.; and Regan, Barrier F. Denture cleaning concentrate. 4,016,089, Cl. 252-106.000.
Regie Nationale des Usines Renault: *See*—
Stcherbatcheff, Georges; and Lefeuvre, Andre, 4,015,870.
Regulski, Thomas W.: *See*—
Tomalia, Donald A.; Thill, Bruce P.; and Regulski, Thomas W., 4,016,192.
Reible, George A., Jr.; and Sevigny, George D., to International Business Machines Corporation. High frequency power converter drive circuit. 4,016,479, Cl. 321-45.00R.
Reinhart, Theodore J., Jr.: *See*—
Browning, Charles E.; and Reinhart, Theodore J., Jr., 4,016,022.
Relyveld, Edgar Hans, to Institut Pasteur. Calcium phosphate gel for adsorbing vaccines. 4,016,252, Cl. 424-88.000.



Rembert, Frank: *See*—
La Chapelle, Leo, 4,016,536.
Rempfler, Hermann; Bosshard, Hans; and Weber, Kurt, to Ciba-Geigy Corporation. Process for the manufacture of compounds containing vinyl groups. 4,016,203, Cl. 260-505.00R.
Renard, Jean-Claude: *See*—
Gamet, Brigitte; and Renard, Jean-Claude, 4,016,526.
Renfrew, Edgar E., to American Color & Chemical Corporation. Monoazo dyestuff mixtures derived from 2-amino-5-nitro-thiazole and bis-hydroxyalkylamino acklanilides reacted with acid halides and amides. 4,016,153, Cl. 260-158.000.
Research Corporation: *See*—
Kent, Harry A., Jr., 4,016,259.
Travis, James; and Pannell, Ralph, 4,016,149.
Respen, Yves Jean; Cosse, Paul Andre; and Economopoulos, Mario, to Centre de Recherches Metallurgiques-Centrium voor Research in de Metallurgie. Rolled steel rod or bar. 4,016,015, Cl. 148-39.000.
Respen, Yves Jean: *See*—
Economopoulos, Mario; and Respen, Yves Jean, 4,016,009.
Reuschel, Ronrad: *See*—
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Wetzel, Bernd; Woitun, Eberhard; Maier, Roland; Reuter, Wolfgang; Goeth, Hanns; and Lechner, Uwe, 4,016,263.
Revells, Robert G.; Olson, Earl J.; and Sutton, Charles W., to Libbey-Owens-Ford Company. Glass sheet supporting and conveying apparatus. 4,015,968, Cl. 65-289.000.
Rezac, Howard Dwight. Truck unloading device. 4,015,727, Cl. 214-82.000.
Rheinstahl AG: *See*—
Roosen, Willi, 4,015,541.
Rheinwald, James G.: *See*—
Green, Howard; and Rheinwald, James G., 4,016,036.
Rhone-Poulenc Industries: *See*—
Gruffaz, Max; and Rollet, Bernard, 4,016,114.
Rhone-Poulenc S.A.: *See*—
Cotrel, Claude; Crisan, Cornel; Jeanmart, Claude; and Messer, Mayer Naoum, 4,016,274.
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Rice, Howard E., Jr. Multiplication learning aid device. 4,015,345, Cl. 35-31.00E.
Rice, Woodrow R.: *See*—
Nelson, Eugene A.; and Rice, Woodrow R., 4,015,602.
Rich, George L.: *See*—
Cunningham, Hugh; Raetzsch, Carl W.; Rich, George L.; and Driskill, John D., 4,016,064.
Richards, Clyde N. Electrical insulator with contamination and flash-over eliminator. 4,016,358, Cl. 174-141.00R.
Richards, Hugh C.: *See*—
Koch, Richard C.; and Richards, Hugh C., 4,016,278.
Richardson, Dudley G.: *See*—
Ross, Joseph H.; and Richardson, Dudley G., 4,015,887.
Richardson, James E.; and Swain, Stephen C., to Medical Dispenser Company, The. Tablet package for use in chronologically dispensing tablets. 4,015,717, Cl. 206-534.000.
Richert, Karl Hartwig: *See*—
Blahak, Johannes; Muller, Erwin; and Richert, Karl Hartwig, 4,016,143.
Richman, Achille George: *See*—
Peche, Jack, 4,015,720.
Rickmers, Clifford P., to Hoover Company, The. Vacuum bleed system for a vacuum cleaner or the like. 4,015,308, Cl. 15-339.000.
Ricoh Co., Ltd.: *See*—
Tabata, Yasuhiro, 4,015,892.
Riechmann, Wernfried: *See*—
Gehrmann, Klaus; Ohorodnik, Alexander; Lohmar, Elmar; and Riechmann, Wernfried, 4,016,048.
Riede, Gerhard; and Boberg, Gunnar, to Gambro AG. Device for the diffusion of substances between two fluids via semi-permeable diaphragms. 4,016,082, Cl. 210-321.00B.
Rieder, Milan, to Dekanat Prirodovedecke Fakulty University Karlovy. Precession-type x-ray diffraction camera. 4,016,420, Cl. 250-277.0CH.
Rietveld, Frank P., to Colt Industries Operating Corporation. Wire electrode feed system for electrical discharge machining. 4,016,395, Cl. 219-69.00W.
Ringel, Samuel M.: *See*—
Connor, David T.; Ringel, Samuel M.; and von Strandtmann, Maximilian, 4,016,257.
Ringrose, Peter Stuart: *See*—
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Kwok, Clyde C. K., 4,015,779.
Rist's Wires & Cables Limited: *See*—
Pemberton, Donald Stuart, 4,015,891.
Ritz, Jurgen; and Reese, Johannes, to Hoechst Aktiengesellschaft. Epoxy resin containing acetoacetic groups. 4,016,141, Cl. 260-47.0EP.
Rival Manufacturing Company: *See*—
Aberer, James B., 4,016,387.
Robert Bosch G.m.b.H.: *See*—
Boehringer, Andreas, 4,016,459.
Drews, Ulrich; Winkelmann, Lothar; and Werner, Peter, 4,015,563.
Leisner, Ernst; Ulbricht, Wolfgang; and Kaufmann, Helmut, 4,015,815.
Stumpp, Gerhard, 4,015,571.
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Weckenmann, Albert; Haas, Lothar; and Brautigam, Rolf, 4,016,490.
Roberts, Spencer Donald: *See*—
Koski, John Alexander; Lissner, Rudolf Werner; and Roberts, Spencer Donald, 4,015,799.
Robertson, George Heddle; and Stirling, John Andrew, to Ciba-Geigy Corporation. Pigment compositions. 4,015,999, Cl. 106-308.00Q.
Robillard, Gene A.: *See*—
Baur, Robert F.; Comey, David M.; and Robillard, Gene A., 4,016,590.
Robinet, Sylvia J. Refrigeration apparatus. 4,015,441, Cl. 62-402.000.
Robson, Harry E., to Exxon Research and Engineering Company. Preparation of catalysts of predetermined pore size distribution and pore volume. 4,016,108, Cl. 252-455.00R.
Robson, Harry E.: *See*—
Sawyer, Willard H.; and Robson, Harry E., 4,016,107.
Rochat, Daniel-Francois, to Ebauches S.A. Timepiece with digital time display. 4,015,418, Cl. 58-23.00R.
Roche, John J.; and Hunsicker, Glenn L., to Bethlehem Steel Corporation. Scanning pyrometer system. 4,015,476, Cl. 73-355.00R.
Rockwell International Corporation: *See*—
Argyris, Pericles Alexandre; and Williams, William Randolph, 4,015,817.
Hammad, Mohamad, 4,016,371.
Walker, Ferman L., 4,016,565.
Rocton, Lucien, to Compagnie Industrielle des Telecommunications Cit-Alcatel. Connector for optical fibres. 4,015,894, Cl. 350-96.00C.
Rodseth, William G., to Schlage Lock Company. Switch arrangement for door closers. 4,016,381, Cl. 200-61.620.
Rogers, Melvin F., to Zenith Radio Corporation. Color television picture tubes with improved implosion protection system. 4,016,364, Cl. 358-245.000.
Rogers, Ryland F.: *See*—
Howard, Willard L.; and Rogers, Ryland F., 4,015,561.
Rogers, William F., to Lawrence Peska Associates, Inc., a part interest. Laryngectomy lung protector. 4,015,608, Cl. 128-351.000.
Rogova, Svetlana Tanovna; Pikunov, Mikhail Vladimirovich; Kuptsova, Alla Ivanovna; Obukhova, Galina Zakharovna; Karalnik, Dmitry Mikhailovich; and Rybakov, Anatoly Ivanovich. Tooth filling alloy. 4,015,981, Cl. 75-134.00B.
Rohde, Vernon Carl, to Du Pont de Nemours, E. I., and Company. Method of gradient separation. 4,015,775, Cl. 233-26.000.
Rohm and Haas Company: *See*—
Larsson, Bjorn E.; and Le Sota, Stanley, 4,016,127.
Peterson, Laurence I., 4,015,599.
Shoults, Royland D.; and Yost, Robert S., 4,016,199.
Roland, John Thomas, to AMP Incorporated. Starting circuit for switching regulator. 4,016,461, Cl. 361-18.000.
Roland Offsetmaschinenfabrik Faber & Schleicher AG: *See*—
Preuss, Friedrich; and Difflipp, Kurt, 4,015,522.
Roll, Edward: *See*—
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Rollet, Bernard: *See*—
Gruffaz, Max; and Rollet, Bernard, 4,016,114.
Rollins, Dallas W.; Randolph, Robert W.; and Garner, Gerald D., to ACF Industries, Incorporated. Quick change fluidizing outlet assembly. 4,015,751, Cl. 222-195.000.
Romano, Ralph, to Grand Machining Company. Capped wheel nut. 4,015,503, Cl. 85-35.000.
Romberg, Felix B. Wire stretcher and fastener. 4,015,823, Cl. 254-72.000.
Roosen, Willi, to Rheinstahl AG. Bogie draft links. 4,015,541, Cl. 105-199.00R.
Roosild, Sven A.: *See*—
Shepherd, Freeman D., Jr.; and Roosild, Sven A., 4,016,416.
Rosan Hydraulics Inc.: *See*—
Rosan, Jose, Sr.; and Reece, Marvin P., 4,015,504.
Rosan, Jose, Sr.; and Reece, Marvin P., to Rosan Hydraulics Inc. Self-boring fastener and methods of use thereof. 4,015,504, Cl. 85-42.000.
Rosch, Gunter: *See*—
Pintschovius, Ulrich; Schinzel, Erich; and Rosch, Gunter, 4,016,195.
Rose, Levi L. Emergency traffic control system with security transmission coding. 4,016,532, Cl. 340-32.000.
Rosenblood, Lorne K.: *See*—
Hayward, John S.; Collis, Martin S.; Eckerson, John D.; and Rosenblood, Lorne K., 4,015,300.
Rosenthal, Gordon: *See*—
Maieli, Joseph R.; Rosenthal, Gordon; and Torrillo, Domenick T., 4,015,787.
Rosinski, Edward J.: *See*—
Plank, Charles J.; Rosinski, Edward J.; and Rubin, Mae K., 4,016,245.
Ross, Anthony J.; and Ross, James A. Vehicle trailer hitch. 4,015,857, Cl. 280-495.000.
Ross, James A.: *See*—
Ross, Anthony J.; and Ross, James A., 4,015,857.
Ross, Joseph H.; and Richardson, Dudley G. Lamp circuit connector for trailers. 4,015,887, Cl. 339-6.00R.
Ross, Walter Lee, to RCA Corporation. Multiple target data receiver for a collision avoidance system. 4,016,564, Cl. 343-6.5LC.

Rossi, Enzo: *See—*
Fattori, Silvano; Rossi, Enzo; and Imparato, Luigi, 4,016,211.

Roth, Adrian W., to Sprecher & Schuh AG. Travelling switching block for metallic encapsulated high voltage switching installation. 4,016,382, Cl. 200-148.00R.

Roth, Howard; Baldry, Peter R.; Kaufman, Harold B., Jr.; McCarthy, John P.; and Wallenfels, Kurt, to DCA Food Industries Inc. Apparatus for forming a variety of shaped bodies with an internal filling. 4,015,518, Cl. 99-450.600.

Rottneros Bag System AB: *See—*
Goransson, Pehr Gunnar Heine, 4,015,635.

Roussel-UCLAF: *See—*
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Rowatt, Robert J.: *See—*
Kochhar, Rajindar K.; and Rowatt, Robert J., 4,016,344.

Rowe Industries Division of Coleman Cable & Wire Company: *See—*
Hawkins, Carl J., 4,016,231.

Roxberry, Richard C., to Port Authority of N.Y. & N.J., The. Electromagnetic transportation system. 4,015,540, Cl. 104-148.0LM.

Rubin, Mae K.: *See—*
Plank, Charles J.; Rosinski, Edward J.; and Rubin, Mae K., 4,016,245.

Ruckel, Erwin Richard: *See—*
Wojcik, Ronald Thomas; and Ruckel, Erwin Richard, 4,016,346.

Rudge, Alfred John: *See—*
Fielding, Harold Crosbie; and Rudge, Alfred John, 4,016,217.

Rudin, Marvin B. Microminiature integrated circuit impedance device including weighted elements and contactless switching means for fixing the impedance at a preselected value. 4,016,483, Cl. 323-74.000.

Ruiz, Lorenzo Anthony: *See—*
Popeil, Samuel J.; and Ruiz, Lorenzo Anthony, 4,015,330.

Rumpf, Hans: *See—*
Leschonski, Kurt; and Rumpf, Hans, 4,015,958.

Runte, Robert Ralph; and Mau, Theodore A., to Runte, Robert Ralph. Handicapping circuit for electronic games. 4,015,846, Cl. 273-85.00R.

Ruozi, Aldo. Cotton stalk and root shredder with re-bedder. 4,015,667, Cl. 172-133.000.

Russell, Mitchell John. Bingo dice game. 4,015,850, Cl. 273-135.00B.

Russell, Wayne A.: *See—*
Mitchiner, Robert K.; and Russell, Wayne A., 4,015,606.

Ryan, John Patrick; and Hart, Jack B., to Marion County Muscular Dystrophy Foundation. Pivotable and extendable apparatus for lifting a person to and from a vehicle. 4,015,725, Cl. 214-75.00R.

Ryashentsev, Nikolai Pavlovich: *See—*
Borisov, Vladimir Mikhailovich; Goldshtein, Boris Grigorievich; Goppen, Albert Adlofovich; Eletsky, Vladimir Alexeevich; Sherman, Viktor Lvovich; Bush, Kherbert Zhanovich; Ryashentsev, Nikolai Pavlovich; and Timoshenko, Evgeny Mikhailovich, 4,015,671.

Rybakov, Anatoly Ivanovich: *See—*
Rogova, Svetlana Tanovna; Pikunov, Mikhail Vladimirovich; Kuptsova, Alla Ivanovna; Obukhova, Galina Zakharovna; Karalnik, Dmitry Mikhailovich; and Rybakov, Anatoly Ivanovich, 4,015,981.

Saeki, Keiso; and Matsukawa, Hiroharu, to Fuji Photo Film Co., Ltd. Process for hardening microcapsules. 4,016,098, Cl. 252-316.000.

Sagami Chemical Research Center: *See—*
Kondo, Kiyosi; Terada, Osamu; Oshima, Kohei; Mori, Yasuki; and Mochida, Kenichi, 4,016,186.

Sahasrabudhe, Arun P.; and Matty, Thomas C., to Westinghouse Electric Corporation. Signal bandpass filter apparatus. 4,016,517, Cl. 333-71.000.

Sahm, Peter R.; and Nicoll, Andrew R., to BBC Brown Boveri & Company Limited. High temperature alloy. 4,016,014, Cl. 148-32.000.

Said Sami I.; Mutt, Viktor; and Nilsson, Ann. Vasoactive intestinal peptide from fowl. 4,016,258, Cl. 424-177.000.

St. Amand, Elmer F.; and Thornbury, Thomas R., to American Hospital Supply Corporation. Method of forming closure system for medical liquid container. 4,015,401, Cl. 53-29.000.

Saint-Gobain Industries: *See—*
Levecque, Marcel; Battigelli, Jean A.; and Plantard, Dominique, 4,015,963.
Levecque, Marcel; Battigelli, Jean A.; and Plantard, Dominique, 4,015,964.

St. John, Richard C.: *See—*
Danko, John D.; and St. John, Richard C., 4,015,694.

Saito, Katashi; Kawakami, Kiminari; and Ishiguro, Moriyuki, to Nippon Kokan Kabushiki Kaisha. Mold for continuous casting process. 4,015,982, Cl. 75-156.500.

Saito, Takuya: *See—*
Ishida, Nakao; Kitame, Fumio; Utsushikawa, Kuniko; Kohama, Tomoaki; Saito, Takuya; and Kikuchi, Mikio, 4,016,256.

Sakaguchi, Yasuhiro; Koike, Junichi; and Kubo, Takehisa, to Daicel, Ltd. Spirally-wound membrane-type separator module capable of reversing the direction of liquid flow. 4,016,083, Cl. 210-433.00M.

Sakai, Takeyo: *See—*
Matsuda, Kazuo; Ohmura, Hidemasa; and Sakai, Takeyo, 4,016,120.
Matsuda, Kazuo; Ohmura, Hidemasa; and Sakai, Takeyo, 4,016,121.
Matsuda, Kazuo; Ohmura, Hidemasa; and Sakai, Takeyo, 4,016,122.

Sakamaki, Hisashi: *See—*
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Sakata Shokai Ltd.: *See—*
Miyamoto, Kozo; and Fujiwara, Kunitaka, 4,015,937.

Sako, Kiyohide: *See—*
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Salimov, Rustam Abelevich: *See—*
Budker, Gersh Itskovich; Gaponov, Vasily Alexandrovich; Korabelnikov, Boris Mikhailovich; Krainov, Gennady Sergeevich; Kuznetsov, Sergei Alexandrovich; Kuksanov, Nikolai Konstantinovich; Kondratiev, Vasily Ivanovich; and Salimov, Rustam Abelevich, 4,016,499.

Salmela, Erkki: *See—*
Jarvinen, Ilkka; Salmela, Erkki; and Kaikkonen, Antero, 4,015,923.

Sam Stein Associates, Inc.: *See—*
Booth, Raymond E., 4,016,299.

Samander, Asib S.: *See—*
Beaty, Thomas, Jr.; and Samander, Asib S., 4,015,723.
Beaty, Thomas, Jr.; and Samander, Asib S., 4,015,732.

Samorodov, German Ivanovich; Loiko, Evgeny Nikolaevich; Olshevsky, Orest Viktorovich, deceased; by Olshevskaya, Valentina Mikhailovna, administrator; by Olshevsky, Alexandr Orestovich, administrator; by Olshevsky, Viktor Alexandrovich, administrator; and by Olshevskaya, Nina Alexandrovna, administrator. Arrangement for limiting dynamic overvoltages. 4,016,485, Cl. 323-101.000.

Samuelson, Hans Olof, to Mo och Domsjo Aktiebolag. Process for delignifying and bleaching cellulose pulp. 4,016,029, Cl. 162-31.000.

Sanders Associates, Inc.: *See—*
Arkind, Kenneth D.; and Geddry, Bernard L., 4,016,570.

Sandoz, Inc.: *See—*
Inoue, Tadahiko; Dowke, Gosaburo; and Itoh, Hideo, 4,016,265.
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Sandoz Ltd.: *See—*
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Sankyo Company Limited: *See—*
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Sano, Konosuke: *See—*
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Sansui Electric Co., Ltd.: *See—*
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Santora, Norman J.: *See—*
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Sasaki, Kenichi: *See—*
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Sasaki, Mitsuru: *See—*
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Sassenroth, Karl-Wilhelm: *See—*
Jung, Horst; Sassenroth, Karl-Wilhelm; and Ferenczy, Nikolaus, 4,015,992.

Sasson, Eli. Perpetual calendar. 4,015,351, Cl. 40-110.000.

Sato, Akihiko; and Nakano, Yoshiyuki, to Nippon Kogaku K.K. Shutter charge device for lens shutter in a camera having a focal plane shutter and permitting lens interchange. 4,016,584, Cl. 354-295.000.

Sato, Koitsu: *See—*
Nakagawa, Yunosuke; and Sato, Koitsu, 4,016,090.

Sato, Kouzo: *See—*
Kitai, Kiyoshi; Ogihara, Masuo; Sato, Kouzo; and Shinozaki, Nobuo, 4,015,417.

Sato, Mitsuo: *See—*
Miyagawa, Norio; Sato, Mitsuo; Kobayashi, Juichi; and Kobayashi, Takashi, 4,016,306.

Sato, Toshiaki, to Unitika Ltd. Transfer system. 4,015,536, Cl. 104-88.000.

Satomi, Takeo; Hino, Naganori; Tateishi, Koshi; Hirano, Masachika; Mukai, Kunio; Nodera, Katsuji; and Sasaki, Mitsuru, to Sumitomo Chemical Company, Limited. Amido phosphorothiolates. 4,015,974, Cl. 71-87.000.

Satou, Kaname: *See—*
Konoma, Kunihiko; and Satou, Kaname, 4,015,897.

Saucy, Gabriel: *See—*
Chan, Ka-Kong; and Saucy, Gabriel, 4,016,178.

Sauter, Walter A.; and Martin, David R., to American Nucleonics Corporation. Reflective signal controller. 4,016,516, Cl. 333-81.00R.

Sawamura, Osamu: *See—*
Inuzuka, Tsuneki; Furuichi, Katsushi; Sawamura, Osamu; Kimura, Yoshimasa; and Sakamaki, Hisashi, 4,016,529.

Sawyer, Willard H.; and Duncan, Michael T., to Exxon Research and Engineering Company. Preparation of catalysts of predetermined pore size distribution and pore volume. 4,016,106, Cl. 252-455.00R.

Sawyer, Willard H.; and Robson, Harry E., to Exxon Research and Engineering Company. Preparation of catalysts of predetermined pore size distribution and pore volume. 4,016,107, Cl. 252-455.00R.





Saxena, Brij B., to Cornell Research Foundation, Inc. Method for testing for pregnancy. 4,016,250, Cl. 424-1.000.

Scandril Offshore, Inc.: *See—*
Tarrant, D. Jarratt, 4,015,434.

Schaaf, Robert: *See—*
Howard, Laurence M.; and Schaaf, Robert, 4,015,961.

Schaafsma, Sijbrandus E.; and Geurts, Leonardus H., to Stamicarbon B.V. Preparation of a 2-amino-pyrroline derivative. 4,016,175, Cl. 260-326.620.

Schaefer Equipment Company: *See—*
Cale, Roland E., 4,015,697.

Schaefer, Helmut. Layer composition. 4,016,326, Cl. 428-306.000.

Schaller, Helmut F. K. Injection molded stick for stringed musical instrument bow. 4,015,501, Cl. 84-282.000.

Schaupp, Kurt: *See—*
Hinsche, Friedrich; and Schaupp, Kurt, 4,016,240.

Schawinsky, Terry Kyle; Strobl, Walter; and Polkinghorn, Melvin William, to International Telephone and Telegraph Corporation. Turn signal and hazard warning control apparatus for unitary insertion into vehicle steering column body. 4,016,380, Cl. 200-61.270.

Scheinecker, Alois; and Holleis, Gunter, to Vereinigte Osterreichische Eisen- und Stahlwerke-Alpine Montan Aktiengesellschaft. Strand guiding means for guiding a strand continuously cast in a continuous casting plant. 4,015,656, Cl. 164-282.000.

Scheler, Holger, to Hagenuk vormals Neufeldt & Kuhnke GmbH. Programmable device for mechanically executing work processes. 4,015,721, Cl. 214-1.0BB.

Schenectady Chemicals, Inc.: *See—*
Laganis, Deno, 4,016,330.

Schering Aktiengesellschaft: *See—*
Hofmeister, Helmut; Annen, Klaus; Wiechert, Rudolf; and Laurent, Henry, 4,016,269.
Petzold, Wolfgang, 4,015,831.

Schering Corporation: *See—*
Zitowitz, Lester; Walter, Lewis A.; and Wohl, Arnold J., 4,016,291.

Schiel, Christian; Egelhof, Dieter; and Wolf, Karl, to J. M. Voith GmbH. Distribution means for aqueous slurry in papermaking machines. 4,016,033, Cl. 162-343.000.

Schiessl, Alois; and Krone, Hartmut, to Buck K.G., Firma. Incendiary projectile and manual launcher. 4,015,355, Cl. 42-1.00F.

Schinzel, Erich: *See—*
Pintschovius, Ulrich; Schinzel, Erich; and Rosch, Gunter, 4,016,195.

Schirmer, Kurt Ernest. Upright wide angle stereo ophthalmoscope. 4,015,898, Cl. 351-6.000.

Schladitz, Hermann J. Heat pipe. 4,015,659, Cl. 165-105.000.

Schlage Lock Company: *See—*
Rodseth, William G., 4,016,381.

Schlossberg, Howard Roy: *See—*
Szilagyi, Andrei; Hordvik, Audun; and Schlossberg, Howard Roy, 4,016,427.

Schluter, Wilhelm: *See—*
Forster, Hermann; Schluter, Wilhelm; and Sterr, Horst, 4,015,829.

Schmaus, Siegfried H. A. Direct-acting pressure sensor. 4,015,478, Cl. 73-418.000.

Schmid, Rolyn A., to Bender Machine Works, Inc. Apparatus for automatically mixing and circulating cleaning solutions through dairy equipment. 4,015,618, Cl. 137-93.000.

Schmidt, Hans Heinrich, to Enor Nominees Pty. Limited. Method for progressively constructing a wall of cementitious material. 4,016,228, Cl. 264-33.000.

Schmidt, Norbert T. Round building with combined center support tube and flue structure. 4,015,381, Cl. 52-199.000.

Schnee, Karl; Tichy, Dieter; Michel, Walter; and Gruber, Gunter, to Cassella Farbwerke Mainkur Aktiengesellschaft. Melamine resin films prepared by impregnating of paper, cellulose, fleece or fabric. 4,016,336, Cl. 428-530.000.

Schneider, Herbert: *See—*
Vroom, Henry J.; Bolle, Warren Robert; Schneider, Herbert; and Swerdling, Burton, 4,015,586.

Schnell, William J.: *See—*
Martinez, F. Jesus; and Schnell, William J., 4,016,081.

Schober, Franz, to Bayerische Leichtmetallwerk Graf Bluecher von Wahlstatt KG. Closed drop forging die. 4,015,461, Cl. 72-358.000.

Schoeller & Co. Elektrotechnische Fabrik: *See—*
Seibel, Georg; and Ante, Gunther, 4,016,400.

Schoonover, Philip C.; and Maltz, Martin S., to Xerox Corporation. Method of erasing manifold images. 4,015,983, Cl. 96-1.00M.

Schorwerth, Mathias: *See—*
Pollinger, Hans; Prahl, Franz; and Schorwerth, Mathias, 4,015,691.

Schreiber, Gus. Blood transfusion filters. 4,016,077, Cl. 210-77.000.

Schreiber, Wolfgang, to Henkel & Cie G.m.b.H. Process for the recovery of proteins from aqueous solutions of proteins. 4,016,039, Cl. 195-66.00R.

Schrewelius, Nils G., to Bulten-Kanthal Aktiebolag. Heat resistant material. 4,016,313, Cl. 428-35.000.

Schrinner, Elmar: *See—*
Bormann, Dieter; Knabe, Bernd; Schrinner, Elmar; and Worm, Manfred, 4,016,159.

Schrock, Wilfried: *See—*
Konig, Hans-Bodo; Schrock, Wilfried; Disselnkotter, Hans; and Metzer, Karl Georg, 4,016,282.

Schroder, Peter, to Albert-Frankenthal AG. Device for testing sheets delivered from a folding apparatus associated with rotary printing presses. 4,015,840, Cl. 271-64.000.

Schroer, Richard A.: *See—*
Rajadhyaksha, Vithal J.; Schroer, Richard A.; Brock, Phillip J.; and Krueger, Earl R., 4,016,223.

Schroter, Herbert: *See—*
Jaeggi, Knut A.; Ostermayer, Franz; and Schroter, Herbert, 4,016,283.

Schuimer, Jan P.: *See—*
Mensink, Cor A.; and Schuimer, Jan P., 4,015,609.

Schulein, Joseph. Vehicle display assembly. 4,015,557, Cl. 116-42.000.

Schulz, Johann G. D.: *See—*
Onopchenko, Anatoli; and Schulz, Johann G. D., 4,016,206.

Schumacher, Frank A., to General Electric Company. Household refrigerator having a door cooling apparatus. 4,015,442, Cl. 62-449.000.

Schumacher, Gunter; Tef, Peter; and Wiester, Max, to R. Stahl Aufzuege GmbH. Shock absorbers for elevators. 4,015,835, Cl. 267-124.000.

Schuss, Jack A., to Combustion Engineering, Inc. Distributed programmable control system. 4,015,548, Cl. 110-101.00C.

Schuurs, Antonius H. W. M.; Van Weemen, Bauke K.; and Wolters, Gerrit, to Akzona Incorporated. Enzymatic immunological method for the determination of antigens and antibodies. 4,016,043, Cl. 195-103.50R.

Schuyler, Peter B.: *See—*
Blodgett, Fredrick M., Jr.; and Schuyler, Peter B., 4,015,508.

Scott, Chester A. Tiltable headboard. 4,015,298, Cl. 5-327.00B.

Scott, Kenneth W. Water heater control system. 4,016,402, Cl. 219-334.000.

Scott, Lyndell F.: *See—*
Cook, Thomas W.; Penner, Wayne A.; Quaglino, Carl A.; Ray, Charles D.; and Scott, Lyndell F., 4,016,531.

Scott, William R. Color displaying fatigue sensor. 4,015,465, Cl. 73-91.000.

Scranton Manufacturing Company, Inc.: *See—*
Wright, Harold G.; and Gordon, Richard J., 4,015,737.

Scriabine, Alexander; and Stone, Clement A., to Merck & Co., Inc. Compositions and method of treating hypertension. 4,016,288, Cl. 424-309.000.

Seager, Harry, to Beecham Group Limited. Pharmaceutical formulations. 4,016,254, Cl. 424-33.000.

Sears, James H.; and Holloway, James Newton, Jr., to Owens-Corning Fiberglas Corporation. Apparatus for coating continuously produced filaments. 4,015,559, Cl. 118-259.000.

Sedlak, Joseph, to Lawrence Peska Associates, Inc., a part interest. Fishing lure. 4,015,363, Cl. 43-42.220.

Seibel, Georg; and Ante, Gunther, to Schoeller & Co. Elektrotechnische Fabrik. Overheating safety device for electrical lighters. 4,016,400, Cl. 219-264.000.

Seiko Koki Kabushiki Kaisha: *See—*
Kitai, Kiyoshi; Ogihara, Masuo; Sato, Kouzo; and Shinozaki, Nobuo, 4,015,417.

Seki, Masao, to Tokyo Gas Company Limited. Method for controlling the capacity of a blower and a device for controlling the pressure in a liquefied gas storage tank utilizing said method. 4,015,436, Cl. 62-48.000.

Sekiya, Fukuo: *See—*
Morokawa, Shigeru; and Sekiya, Fukuo, 4,016,476.

Selmeczi, Joseph G.; Marlin, Donald H.; and Kestner, Daniel W., to Dravo Corporation. Process for stabilizing aqueous coal sludges. 4,015,997, Cl. 106-287.00R.

Semon, Albert L. Rotary plug valve. 4,015,816, Cl. 251-285.000.

Sengewald, Karl Heinz. Packaging bag of thermoplastic synthetic plastic film. 4,015,771, Cl. 229-62.000.

Senn, Werner: *See—*
Engel, Walter; Senn, Werner; and Steinemann, Max, 4,015,534.

Sentrol Systems Ltd.: *See—*
De Remigis, Joseph, 4,015,904.

Serlin, Irving; and Markhart, Albert H., to Monsanto Company. Preparation of aqueous solutions of quaternary ammonium resins from di(tertiary amine) and 1,4-dihalobutene-2. 4,016,128, Cl. 260-29.6HN.

Setina, John R. Vertical sliding automobile partition having curved track mounted on front of shield plate. 4,015,875, Cl. 296-24.00R.

Severin, Ernest O., to Aquasol, Inc. Automatic chlorine and pH control apparatus for swimming pools. 4,016,079, Cl. 210-96.00R.

Sevigny, George D.: *See—*
Reible, George A., Jr.; and Sevigny, George D., 4,016,479.

Seybold, Joseph F. Thermal limiter. 4,016,521, Cl. 337-241.000.

Shakley, Conrad Dale: *See—*
Goffredo, Daniel L.; and Shakley, Conrad Dale, 4,015,706.

Shapiro, Eugene: *See—*
Winter, Joseph; Shapiro, Eugene; and Smith, Warren F., 4,015,459.

Shapiro, Stanley: *See—*
Caron, Ronald N.; and Shapiro, Stanley, 4,016,010.

Shappir, Joseph, to U.S. Philips Corporation. Semiconductor device and method of manufacturing the device. 4,016,594, Cl. 357-41.000.

Sharon, Uzi, to Laser Industries, Ltd. Method and apparatus for aligning an invisible beam particularly a laser bear. 4,015,906, Cl. 356-138.000.

Sharp, Larry Lee, to Illinois Tool Works Inc. Thermal switch device and method of making. 4,016,522, Cl. 337-403.000.

Shaw, Clarence W., to J. Ray McDermott & Co., Inc. Marine pipelaying apparatus. 4,015,435, Cl. 61-108.000.

Shell Oil Company: *See—*
Verschuur, Eke, 4,015,731.
Womack, Fred A.; and Jahns, Daniel F., 4,015,469.

Sheller-Globe Corporation: *See—*
Dinlocker, Robert I., 4,016,535.

Shen, Tsung-Ying: *See—*
Wagner, Arthur F.; and Shen, Tsung-Ying, 4,016,209.

Shenoha, James L., to Norwood Marking & Equipment Company. Imprinter and actuator therefor. 4,015,525, Cl. 101-333.000.

Shepard, Henry M. Sawmill. 4,015,648, Cl. 144-326.00R.

Shepherd, Freeman D., Jr.; and Roosild, Sven A., to United States of America, Air Force. Phase compensated zone plate photodetector. 4,016,416, Cl. 250-211.00J.

Sherer, Paul, to Xerox Corporation. Anti-shouldering read circuit for magnetic disk memory. 4,016,599, Cl. 360-53.000.

Sheridan, Francis R. Magnetically activated oscillatory motor. 4,016,439, Cl. 310-39.000.

Sherman, Viktor Lvovich: *See—*
Borisov, Vladimir Mikhailovich; Goldshtein, Boris Grigorievich; Goppen, Albert Adlofovich; Eletsky, Vladimir Alexeevich; Sherman, Viktor Lvovich; Bush, Kherbert Zhanovich; Ryashentsev, Nikolai Pavlovich; and Timoshenko, Evgeny Mikhailovich, 4,015,671.

Shiba, Keisuke; Hirose, Takeshi; Hayashi, Jun; and Aono, Toshiaki, to Fuji Photo Film Co., Ltd. Multilayer color photographic light-sensitive material. 4,015,988, Cl. 96-69.000.

Shibata, Mituo. Method for settling anchoring device in the ground. 4,015,433, Cl. 61-53.600.

Shida, Mitsuzo: *See—*
Hoff, Raymond E.; and Shida, Mitsuzo, 4,016,343.

Shija, Makoto: *See—*
Kudo, Teizo; Hashizume, Yoshio; Itoh, Masanori; and Shiga, Makoto, 4,016,221.

Shimizu, Akihiko; and Hayashi, Takao, to Toyo Soda Manufacturing Co., Ltd. Stabilizing 2,3-dichloro-1,3-butadiene with certain N-nitrosoaniline compounds. 4,016,216, Cl. 260-652.50P.

Shimp, Alan B.: *See—*
Lang, Walter W.; and Shimp, Alan B., 4,016,518.

Shin-Etsu Chemical Company Limited: *See—*
Ogawa, Kinya; Kurimoto, Kazuhiko; Eguchi, Yoshitsugu; and Kuwata, Satoshi, 4,016,341.

Shinano, Takayuki: *See—*
Machi, Sueo; Aono, Taiji; Matui, Yasushi; Hibi, Yoshiharu; and Shinano, Takayuki, 4,016,134.

Shinko Electric Co., Ltd.: *See—*
Abe, Eiji; Ohta, Takahisa; and Urata, Mitsuharu, 4,016,406.

Shinohara, Sakuta. Combustion engine with dual function motor element and rotary valve for cyclical fuel and exhaust metering. 4,015,424, Cl. 60-39.600.

Shinozaki, Nobuo: *See—*
Kitai, Kiyoshi; Ogihara, Masuo; Sato, Kouzo; and Shinozaki, Nobuo, 4,015,417.

Shiraiwa, Masatoyo; Tokumitsu, Ichiro; Takemura, Toshisada; Hatano, Satoshi; and Yamaguchi, Hiroshi, to Idemitsu Sekiyukagaku Kabushiki Kaisha (Idemitsu Petrochemical Co., Ltd.). Method for rapid cooling of thermally cracked gases of hydrocarbons and apparatus for carrying out the method. 4,016,066, Cl. 208-48.00Q.

Shoh, Andrew, to Branson Ultrasonics Corporation. Sonic or ultrasonic processing apparatus. 4,016,436, Cl. 310-8.200.

Sholly, William C., Jr., to Warner & Swasey Textile Machine Company, The. Monitored twist control apparatus and method. 4,015,414, Cl. 57-34.0HS.

Shonkwiler, Forest M. Convertible adjustable tilting bed for vehicles. 4,015,879, Cl. 298-14.000.

Shore, Daniel B.; and Chatterjea, Probir K., to International Harvester Company. Clutch-brake steering mechanism for tractors. 4,015,619, Cl. 137-102.000.

Shore, Daniel B.; and Duke, Edward D., to International Harvester Company. Ground driven hydraulic emergency steering system. 4,015,681, Cl. 180-133.000.

Shoults, Royland D.; and Yost, Robert S., to Rohm and Haas Company. Compounds containing nitrogen and fluorine. 4,016,199, Cl. 260-486.00H.

Showa Denko Kabushiki Kaisha: *See—*
Matsushima, Tomoo; Odajima, Tsutou; Tsuruki, Junzo; and Yoshida, Yasuo, 4,015,978.

Shutt, Thomas Clifford; and Snider, L. Wayne, to Vitrofil Corporation. Preparation of unsaturated polyester compositions. 4,016,131, Cl. 260-40.00R.

Siden, Lars, to Akustik Miljo AB. Device for latching a door in a pre-determined position or rotation. 4,015,867, Cl. 292-262.000.

Siden, LeRoy E.: *See—*
Slysh, Paul; and Siden, LeRoy E., 4,015,653.

Sidor, Edward Frank, to Illinois Tool Works Inc. Thermal switch device. 4,016,523, Cl. 337-403.000.

Sieger, George Madison; Krueger, James Elwood; Osterberg, Arnold Curtis; and Tedeschi, David Henry, to American Cyanamid Company. Sustained release forms of certain oxazepines for parenteral administration. 4,016,273, Cl. 424-250.000.

Siemens Aktiengesellschaft: *See—*
Dietze, Wolfgang; Reuschel, Ronrad; and Kasper, Andreas, 4,015,922.

Sigma-Tau Industrie Farmaceutiche/Riunite S.p.A.: *See—*
Cavazza, Claudio, 4,015,758.

Signode Corporation: *See—*
Cheung, Nelson, 4,015,643.

Silva, John; Garrett, Robert A.; Borkat, Franklin R.; and Young, Frank, to United States of America, Navy. Automatic patient weighing system. 4,015,677, Cl. 177-165.000.

Silver, Robert L.; and Eisenhut, Bert R., to Triple E Corporation. Material handling box having a side hopper and door. 4,015,714, Cl. 206-511.000.

Silver Seiko Co., Ltd.: *See—*
Kagaya, Yutaka, 4,015,446.

Simon, Francois. Device for the measurement of the radial force sustained by a rotary organ. 4,015,468, Cl. 73-136.00R.

Simon, Henri J. H.: *See—*
Bonnema, Jentje; and Simon, Henri J. H., 4,015,946.

Simons, John R.; and Fenske, John W., to Grunau Company, Inc. Concealed sprinkler head. 4,015,665, Cl. 169-40.000.

Sines, Randy D. Automatic cue ball separating and return assembly for billiard tables. 4,015,845, Cl. 273-11.00C.

Singer Company, The: *See—*
Herr, John Addison; Jaffe, Wolfgang; Dob, Allan Matthew; Minalga, Philip Francis; Adams, Kenneth Douglas; and Herron, William Lee, 4,016,441.
Kahan, William; and Peer, Thomas Richard, 4,015,445.
Masselle, Francis L., 4,015,342.
Orth, Charles D.; and Griffoul, Marcel P., 4,015,776.
Treder, Charles F., 4,015,777.

Sinloihi Co.: *See—*
Hyosu, Yoshihiko; Miyashita, Eiiti; Kuzuba, Noboru; Miyahara, Sadayasu; and Takano, Ryoshiro, 4,016,133.

Sitkewich, W. Jorge, to Fischer & Porter Co. Linear displacement transducer. 4,015,477, Cl. 73-398.00R.

Siverson, Lilian Ellen. Recording sphygmomanometer sphygpressure graph. 4,015,594, Cl. 128-2.05G.

SKF Industrial Trading and Development Company, B.V.: *See—*
Taylor, Geoffrey, 4,015,883.

Slavik, Valter; and Meisser, Marc, to Heberlein & Co. AG. Bobbin changing apparatus. 4,015,786, Cl. 242-35.50A.

Slivenko, Victor: *See—*
Bokros, Jack C.; and Slivenko, Victor, 4,015,601.

Slysh, Paul; and Siden, LeRoy E., to General Dynamics Corporation. Panel deployment system. 4,015,653, Cl. 160-213.000.

Small, Edward A.; Edwards, Richard H.; Eufusia, Eugene A.; Clary, Robert M.; and Bergfelt, Nils H., to Optical Coating Laboratory, Inc. Vapor deposition apparatus. 4,015,558, Cl. 118-6.000.

Smith, Edwin Studley; and Marshall, Richard A., to Goodyear Tire & Rubber Company, The. Reduction of vinyl chloride in free space surrounding polyvinyl chloride powder. 4,016,350, Cl. 528-486.000.

Smith, Fred, to Anglian Water Authority. Process and apparatus for forming silicate products. 4,016,097, Cl. 252-313.00S.

Smith, Oliver Wendell: *See—*
Trecker, David John; Borden, George Wayne; and Smith, Oliver Wendell, 4,016,059.

Smith, Palmer L. Hay or crop saving attachment for mobile pick-up baler. 4,015,410, Cl. 56-364.000.

Smith, Warren F.: *See—*
Winter, Joseph; Shapiro, Eugene; and Smith, Warren F., 4,015,459.

Smith, William Van. Stabilizer mechanism. 4,015,856, Cl. 280-446.00B.

Snam Progetti S.p.A.: *See—*
Fattori, Silvano; Rossi, Enzo; and Imparato, Luigi, 4,016,211.

Snider, L. Wayne: *See—*
Shutt, Thomas Clifford; and Snider, L. Wayne, 4,016,131.

Snijders, Mathieu Willem Maria: *See—*
Collaris, Maria Antonius Alphonsus Andreas; van Kemenade, Antonius Wilhelmus Cornelis; Debruijn, Henricus Antonius; and Snijders, Mathieu Willem Maria, 4,016,307.

Snook, Phillip D.: *See—*
Farquhar, Robert L.; and Snook, Phillip D., 4,016,425.

Soares, James R., to Biological Developments, Inc. Phenethylamine antigenic conjugates, their preparation, antibodies, and use. 4,016,146, Cl. 260-112.00R.

Sobota, John T., to Fort Howard Paper Company. Calendering paper containing thermoplastic contaminants. 4,016,030, Cl. 162-199.000.

Societe Anonyme a Responsabilite Limitee: Technifil: *See—*
Beretta, Oscar, 4,015,743.

Societe d'Assistance Technique Pour Produits Nestle S.A.: *See—*
Hsu, Jau Yann, 4,016,337.

Societe d'Etudes et de Construction de Materiel Electronique S.E.C.M.E.: *See—*
Delaage, Jacques Jean, 4,016,401.

Societe d'Etudes et de Realisations Industrielles: *See—*
Lefeuvre, Antoine Augustin Joseph, 4,016,076.

Societe Generale de Constructions Electriques et Mecaniques (ALSTHOM): *See—*
Bourree, Guy; and Pontier, Claude, 4,015,807.
Gillet, Roger, 4,016,444.

Societe Metallurgique Le Nickel SLN: *See—*
Gandon, Louis; Jean, Roger; and Solar, Serge, 4,016,055.

Societe Miniere et Metallurgique de Penarroya: *See—*
Demarthe, Jean-Michel; Georgeaux, Andre; and Sonntag, Alain, 4,016,056.

Sodhi, Satwant S.: *See—*
Geldzahler, Charles; and Sodhi, Satwant S., 4,016,051.

Soffge, Friedhelm: *See—*
Eyb, Wolfgang; Soffge, Friedhelm; Piper, Ortwin; and Albrecht, Gerhard, 4,015,303.

Sokol, Charles S.: *See—*
Steigelmann, Edward F.; and Sokol, Charles S., 4,015,955.

Sokolow, Nickolas N., to Beloit Corporation. Heating and stratification device for an injection molding machine. 4,015,916, Cl. 425-242.00R.





Solar, Serge: *See—*
Gandon, Louis; Jean, Roger; and Solar, Serge, 4,016,055.

Solie, Leland P., to Sperry Rand Corporation. Surface wave convolver apparatus. 4,016,513, Cl. 333-30.00R.

Sommer, Neithart; Cuntze, Gerhard; and Boehmer, Wolfgang, to Chemische Werke Huls Aktiengesellschaft. Process for the production of polymers having a broad molecular weight distribution. 4,016,347, Cl. 526-64.000.

Sommerville, S. Smith. Liquid-fuel vaporizer. 4,015,570, Cl. 123-133.000.

Sonderegger, Hans C.: *See—*
Calderara, Reto; Baumgartner, Hans U.; Tichy, Jan; and Sonderegger, Hans C., 4,016,437.

Sonnet, Gunther, to Jos. Schneider & Co. Reflecting-lens objective. 4,015,896, Cl. 350-201.000.

Sonntag, Alain: *See—*
Demarthe, Jean-Michel; Georgeaux, Andre; and Sonntag, Alain, 4,016,056.

Sony Corporation: *See—*
Tokumoto, Shin-Ichi; Tanaka, Eiji; Ogisu, Kenji; and Kawai, Hiroji, 4,016,052.
Yamanaka, Seisuke, 4,016,598.

Soodak, Charles I.: *See—*
Macemon, James H.; and Soodak, Charles I., 4,016,491.

Sousamian, William; and Filisky, John J., Jr., to Sousamian, William. Actuating mechanism for pressurized fluid brake system and fail-safe locking device therefor. 4,015,698, Cl. 188-265.000.

Southern Pacific Land Co.: *See—*
Wilkins, Vernon H., 4,016,075.

Sowa, Tsuneo: *See—*
Tsunoda, Kozo; Sowa, Tsuneo; and Sako, Kiyohide, 4,016,352.

Spence-Bate, Harry Arthur Hele. Photographic film positioning mechanism. 4,015,901, Cl. 355-53.000.

Spencer, Harvey J., to Paper Converting Machine Company. Method and apparatus for handling substacks of business forms to develop balanced stacks. 4,015,724, Cl. 214-6.500.

Sperry Rand Corporation: *See—*
Law, Wendell A.; Barrett, William G.; Priebe, Norman F.; and Wise, Harry D., 4,016,367.
Law, Wendell A.; Barrett, William G.; Priebe, Norman F.; and Wise, Harry D., 4,016,548.
Solie, Leland P., 4,016,513.

Spiral-Craft: *See—*
Dean, Robert, 4,015,687.

Spooner, Robert J.; and Dillon, Oscar W., to Cashin Systems Corporation. Cold cut slicing system. 4,015,494, Cl. 83-76.000.

Sprague Electric Company: *See—*
Maher, John P.; and Johnson, Theodore W., 4,016,525.

Sprecher & Schuh AG: *See—*
Roth, Adrian W., 4,016,382.

Square D Company: *See—*
Draper, Charles W.; and Legatti, Raymond H., 4,015,888.

Sta-Rite Industries, Inc.: *See—*
Mandell, Ronald D., 4,015,633.

Staar Development Company, S.A.: *See—*
Staar, Marcel Jules Helene, 4,016,365.

Staar, Marcel Jules Helene, to Staar Development Company, S.A. Readout for recording typewriter. 4,016,365, Cl. 178-23.00R.

Stach, Kurt, deceased: *See—*
Fauland, Erich; Kampe, Wolfgang; Stach, Kurt, deceased; Plattner, Werner, executor; Stork, Harald; and Dietmann, Karl, 4,016,262.

Stadler, Bertold. Electronic protection for power amplifier. 4,016,460, Cl. 330-207.00P.

Stahle, Helmut: *See—*
Koppe, Herbert; Kummer, Werner; Stahle, Helmut; and Muacevic, Gojko, 4,016,202.
Koppe, Herbert; Kummer, Werner; Stahle, Helmut; and Muacevic, Gojko, 4,016,286.

Stamicarbon B.V.: *See—*
Schaafsma, Sijbrandus E.; and Geurts, Leonardus H., 4,016,175.

Stamicarbon N.V.: *See—*
Bonnema, Jentje; and Simon, Henri J. H., 4,015,946.

Standard Oil Company: *See—*
Morello, Edwin F., 4,016,140.
Steigelmann, Edward F.; and Sokol, Charles S., 4,015,955.

Standard Oil Company (Indiana): *See—*
Craig, James T., Jr.; and Park, Arthur, 4,015,673.
Lewis, Harry R., Jr., 4,015,660.

Stanev, Tzvyatko Penchev, to DSO "Bulgarski Darjavni Jeleznitzi". Method of measuring a railway-vehicle load. 4,015,675, Cl. 177-1.000.

Stankovich, Ivan D.; and Louchis, Stavros D., to Kaiser Aluminum & Chemical Corporation. Feeding particulate matter. 4,016,053, Cl. 204-67.000.

Stankowitz, Arthur J. Platform support structure. 4,015,543, Cl. 108-27.000.

Stanley Tools Limited: *See—*
Gilbert, Richard, 4,015,649.

Stanley Works, The: *See—*
MacFarlane, Walter J.; and Koss, Dieter G., 4,015,310.

Stanton, William: *See—*
Michaels, Herbert; Stanton, William; and Roll, Edward, 4,015,344.

Star Dental Manufacturing Co., Inc.: *See—*
Lieb, Nathaniel H.; Kerfoot, Franklin W., Jr.; and Wallace, Richard A., 4,015,489.
Nash, John E.; and Reader, Trevor D., 4,015,335.

Starlite Chemicals, Inc.: *See—*
Geldzahler, Charles; and Sodhi, Satwant S., 4,016,051.

Stauffer Chemical Company: *See—*
Gutman, Arnold D., 4,016,266.
Stern, Sidney Simon, 4,015,439.

Stauffer, William O., to Kaiser Aluminum & Chemical Corporation. Beneficiation of metal scrap. 4,016,003, Cl. 134-19.000.

Stcherbatcheff, Georges; and Lefeuvre, Andre, to Regie Nationale des Usines Renault; and Automobiles Peugeot. Front protection device for motor vehicles. 4,015,870, Cl. 293-32.000.

Stedman, Robert N.: *See—*
Gee, James E.; and Stedman, Robert N., 4,015,348.

Steel, Francis Robert: *See—*
Hodges, Eugene Walton, III; Steel, Francis Robert; and Enderby, Ralph Thomas, 4,016,510.
Jasinski, Leon; and Steel, Francis Robert, 4,016,501.

Steidley, Roy B.: *See—*
Choksi, Pradip V.; and Steidley, Roy B., 4,015,400.

Steigelmann, Edward F.; and Sokol, Charles S., to Standard Oil Company. Fluid separation process and membrane. 4,015,955, Cl. 55-16.000.

Steinemann, Max: *See—*
Engel, Walter; Senn, Werner; and Steinemann, Max, 4,015,534.

Stenert, Alois, to Hoesch Werke Aktiengesellschaft. Anti-friction bearing. 4,015,882, Cl. 308-1.00A.

Stenkvist, Sven-Einar, to ASEA AB. Device in direct current arc furnaces. 4,016,355, Cl. 13-11.000.

Stenzel, Wallace I.; Kufrin, Frederick W.; and Allen, Donald J., to Waukee Engineering Co. Firecheck. 4,015,953, Cl. 48-192.000.

Stern, Ernest; and Williamson, Richard C., to Massachusetts Institute of Technology. Surface wave devices for processing signals. 4,016,412, Cl. 235-181.000.

Stern, Sidney Simon, to Stauffer Chemical Company. Cooling process for subambient and above ambient temperatures. 4,015,439, Cl. 62-114.000.

Sterr, Horst: *See—*
Forster, Hermann; Schluter, Wilhelm; and Sterr, Horst, 4,015,829.

Stevens, William M., to Hill-Rom Company, Inc. Pulsing ground-test circuit. 4,016,488, Cl. 324-51.000.

Stick, Philip P.; Willenbecher, James F.; and Armstrong, Lee R., to United Technologies Corporation. Determination of number of teeth on an internal combustion engine flywheel. 4,015,466, Cl. 73-116.000.

Stirling, John Andrew: *See—*
Robertson, George Heddle; and Stirling, John Andrew, 4,015,999.

Stiso, Sisto Nicholas: *See—*
Greyson, Jerome; and Stiso, Sisto Nicholas, 4,015,462.

Stoepel, Kurt: *See—*
Meyer, Horst; Bossert, Friedrich; Vater, Wulf; and Stoepel, Kurt, 4,016,277.

Stolzer, Paul, to KEURO Maschinenbau Gesellschaft mit beschrankter Haftung & Co., Kommanditgesellschaft. Bow saw machine. 4,015,500, Cl. 83-755.000.

Stone, Clement A.: *See—*
Scriabine, Alexander; and Stone, Clement A., 4,016,288.

Stone, Robert Porter, to RCA Corporation. Method of setting cathode-G1 spacing. 4,015,315, Cl. 29-25.160.

Stoof, Hendrikus Christiaan Josephus: *See—*
Anders, Herbert; Bullens, Antonius Adrianus Maria; Groot, Jan; Otten, Johannes Henricus Bernardus; Stoof, Hendrikus Christiaan Josephus; and Vloemans, Carolus Leopoldus, 4,016,478.

Stork, Harald: *See—*
Fauland, Erich; Kampe, Wolfgang; Stach, Kurt, deceased; Plattner, Werner, executor; Stork, Harald; and Dietmann, Karl, 4,016,262.

Stork Werkspoor Sugar B.V.: *See—*
Hoks, Dirk, 4,016,001.

Strategic Medical Research Corporation: *See—*
Gordon, Paul, 4,016,261.

Streck, Roland: *See—*
Kupper, Friedrich-Wilhelm; and Streck, Roland, 4,016,220.

Stribley, Gillian Helen: *See—*
Phillipps, Gordon Hanley; English, Alan Frederick; and Stribley, Gillian Helen, 4,016,271.

Strobl, Walter: *See—*
Schawinsky, Terry Kyle; Strobl, Walter; and Polkinghorn, Melvin William, 4,016,380.

Stromberg-Carlson Corporation: *See—*
Petrangelo, Amedio D., 4,015,745.

Strong, Jack C. Pick for string instruments. 4,015,502, Cl. 84-322.000.

Strong, Walker Albert, to PPG Industries, Inc. Hydrogen peroxide stabilization with 3-n-morpholinylpropionitriles. 4,016,243, Cl. 423-272.000.

Strubhar, Malcolm K., to Mobil Oil Corporation. Method of subterranean steam generation by in situ combustion of coal. 4,015,663, Cl. 166-258.000.

Struble, Dale L., to Union Products, Incorporated. Latching assembly for cap door. 4,015,454, Cl. 70-2.000.

Stubbmann, Albert, to Kohner, Inc. Child's toy. 4,015,365, Cl. 46-47.000.

Stumpp, Gerhard, to Robert Bosch G.m.b.H. Fuel-air mixture controller for internal combustion engines. 4,015,571, Cl. 123-139.0AW.

Sudderth, R. Brantley: *See—*
MacKay, Kenneth D.; and Sudderth, R. Brantley, 4,015,980.

Sueda, Noriyoshi: *See—*
Kogure, Katsura; Sueda, Noriyoshi; Himoto, Sizuo; Yoshino, Youziro; and Nakagawa, Kunio, 4,016,196.

Sugano, Takuo; and Mori, Yoshifumi, to Hayashi, Kentaro, President, University of Tokyo. Compound semiconductor optical integrated circuit having isolation zones for light transmission. 4,015,893, Cl. 350-96.0WG.

Suggitt, Robert M.: *See—*
Knifton, John F.; and Suggitt, Robert M., 4,016,194.

Sugimoto, Kaname; Hirao, Mamoru; Kurimoto, Masashi; and Miyake, Eikichi, to Hayashibara Company. Process for preparing maltoses from starches. 4,016,038, Cl. 195-31.00R.

Sugita, Yoshimitsu: *See—*
Yoshinaka, Akira; Aoshima, Takaaki; and Sugita, Yoshimitsu, 4,016,006.

Sugiyama, Atsushi: *See—*
Kajiura, Atsusuke; Aito, Yuzo; Sugiyama, Atsushi; Tamura, Hiroki; and Aihara, Kazuma, 4,016,112.

Suiker Unie Holding B.V.: *See—*
Hoks, Dirk, 4,016,001.

Sumitomo Chemical Company, Limited: *See—*
Fujimoto, Keimei; Ohno, Nobuo; Okuno, Yoshitoshi; Mizutani, Toshio; Ohno, Isao; Hirano, Masachika; Itaya, Nobushige; and Matsuo, Takashi, 4,016,179.
Satomi, Takeo; Hino, Naganori; Tateishi, Koshi; Hirano, Masachika; Mukai, Kunio; Nodera, Katsuji; and Sasaki, Mitsuru, 4,015,974.

Summers, Cherry Sue. Baby walker enclosure. 4,015,853, Cl. 280-87.02W.

Superior Electric Company, The: *See—*
Leenhouts, Albert C., 4,016,472.

Superior Valve Company: *See—*
Kongelka, Robert M., 4,015,865.

Susa, Kenzo; Kobayashi, Toshio; Taniguchi, Satoshi; and Ishii, Mitsuru, to Hitachi, Ltd. Process for production of cubic boron nitride. 4,016,244, Cl. 423-290.000.

Sutton, Charles W.: *See—*
Revells, Robert G.; Olson, Earl J.; and Sutton, Charles W., 4,015,968.

Suzuei Co. Ltd: *See—*
Ahiko, Isami, 4,015,431.

Suzuki, Akira; Miura, Hiroshi; Matsuda, Saburo; and Ohsawa, Takashi, to Tanabe Seiyaku Co., Ltd. Method of preparing a controlled release liquid pharmaceutical composition. 4,016,100, Cl. 252-316.000.

Suzuki, Fred K.; and Davison, Thomas W., to Liquid Crystal Products, Inc. Cholesteric liquid crystalline phase material-dye composition and venapuncture method employing the composition. 4,015,591, Cl. 128-2.00R.

Suzuki, Hiroshi: *See—*
Nagasawa, Keisaku; Mitsuishi, Masashi; Suzuki, Hiroshi; and Matsushita, Tetsuo, 4,016,236.

Suzuki, Shigeto, to Chevron Research Company. Acid production. 4,016,208, Cl. 260-535.00R.

Suzuki, Yasuhide: *See—*
Okura, Rikuo; and Suzuki, Yasuhide, 4,015,573.

Svendsen, Lars Gundro, to Pentapharm A.G. Substrate for the quantitative determination of enzymes. 4,016,042, Cl. 195-103.50R.

Swain, Stephen C.: *See—*
Richardson, James E.; and Swain, Stephen C., 4,015,717.

Swerdling, Burton: *See—*
Vroom, Henry J.; Bolle, Warren Robert; Schneider, Herbert; and Swerdling, Burton, 4,015,586.

Swift and Company Limited: *See—*
Webb, Harry B.; Lee, James W.; and Blair, Robert B., 4,015,538.

Switzer, William P.; and Farrington, Daniel O., to Iowa State University Research Foundation, Inc. Vaccine for immunization of swine against *Bordetella bronchiseptica* infection and method of use. 4,016,253, Cl. 424-92.000.

Symmank, William D., to J. I. Case Company. Adjustable boom for material handling implement. 4,015,730, Cl. 214-141.000.

Szabo, Andras I.: *See—*
Zitelli, William E.; and Szabo, Andras I., 4,016,557.

Szabo, Marton J., to P.H.C. Industries, Inc. Sheathed soft-handle with concealed lapped ends. 4,016,315, Cl. 428-68.000.

Szatkowski, Richard R., deceased (Szatkowski, Richard X., administrator), to Szatkowski, Richard X. Disposable pallet. 4,015,544, Cl. 108-51.300.

Szatkowski, Richard X.: *See—*
Szatkowski, Richard R., deceased, 4,015,544.

Szatkowski, Richard X., administrator: *See—*
Szatkowski, Richard R., deceased, 4,015,544.

Szilagyi, Andrei; Hordvik, Audun; and Schlossberg, Howard Roy, to United States of America, Air Force. Apparatus for producing efficient second harmonic generation and frequency mixing. 4,016,427, Cl. 307-88.300.

Szymczak, Edward J., to Cameron Iron Works, Inc. Well apparatus. 4,015,864, Cl. 285-133.00A.

Tabata, Yasuhiro, to Ricoh Co., Ltd. Optical scanning system for slitwise exposure. 4,015,892, Cl. 350-6.000.

Takahashi, Masaaki; Ito, Akira; Kawawata, Shichiro; and Ogura, Jiro, to Kureha Kagaku Kogyo Kabushiki Kaisha. Radioactive ray-resistant stabilizer. 4,016,135, Cl. 260-45.70R.

Takahashi, Shigeru: *See—*
Wakabayashi, Yukimasa; and Takahashi, Shigeru, 4,016,305.

Takami, Masaho. Apparatus for automatically binding package. 4,016,023, Cl. 156-359.000.

Takano, Ryoshiro: *See—*
Hyosu, Yoshihiko; Miyashita, Eiiti; Kuzuba, Noboru; Miyahara, Sadayasu; and Takano, Ryoshiro, 4,016,133.

Takaya, Takao; and Masugi, Takashi, to Fujisawa Pharmaceutical Co., Ltd. 7-Dihaloalkanamido-3-heterocyclic-thiomethyl-3-cephem-4-carboxylic acids. 4,016,160, Cl. 260-243.00C.

Takematsu, Tetsuo: *See—*
Tamura, Saburo; Takematsu, Tetsuo; and Haruta, Hisae, 4,015,975.

Takemura, Toshisada: *See—*
Shiraiwa, Masatoyo; Tokumitsu, Ichiro; Takemura, Toshisada; Hatano, Satoshi; and Yamaguchi, Hiroshi, 4,016,066.

Takeuchi, Yasuhito, to Hewlett-Packard Company. Moving target detector. 4,016,528, Cl. 340-1.00R.

Tamai, Yasuo: *See—*
Dezawa, Shin-ichiro; and Tamai, Yasuo, 4,016,057.

Tamarin, Bernard J. Packaging. 4,015,770, Cl. 229-51.00C.

Tamura, Fumihide: *See—*
Mitsugi, Koji; Sano, Konosuke; Yokozeki, Kenzo; Yamada, Kazuhiko; Noda, Ichiro; Kagawa, Teruhiko; Eguchi, Chikahiko; Yasuda, Naohiko; Tamura, Fumihide; and Togo, Kazushi, 4,016,037.

Tamura, Hiroki: *See—*
Kajiura, Atsusuke; Aito, Yuzo; Sugiyama, Atsushi; Tamura, Hiroki; and Aihara, Kazuma, 4,016,112.

Tamura, Saburo; Takematsu, Tetsuo; and Haruta, Hisae, to Fujisawa Pharmaceutical Co., Ltd. Compositions containing alkyl 2-nitro-5-(2',4'-dichlorophenoxy)-thiobenzoates, and method of use thereof. 4,015,975, Cl. 71-100.000.

Tanabe Seiyaku Co., Ltd.: *See—*
Suzuki, Akira; Miura, Hiroshi; Matsuda, Saburo; and Ohsawa, Takashi, 4,016,100.

Tanaka, Eiji: *See—*
Tokumoto, Shin-Ichi; Tanaka, Eiji; Ogisu, Kenji; and Kawai, Hiroji, 4,016,052.

Taniguchi, Satoshi: *See—*
Susa, Kenzo; Kobayashi, Toshio; Taniguchi, Satoshi; and Ishii, Mitsuru, 4,016,244.

Tanimura, Shigeru; Miura, Nobuaki; and Asano, Osamu, to Omron Tateisi Electronics Co., Ltd. Semiconductor device. 4,016,589, Cl. 357-30.000.

Tannahill, Alex L.: *See—*
Finn, Robert K.; Tannahill, Alex L.; and Laptewicz, Joseph E., Jr., 4,016,085.

Tarrant, D. Jarratt, to Scandril Offshore, Inc. Leg and guide construction for use in jackup barges. 4,015,434, Cl. 61-91.000.

Tateishi, Koshi: *See—*
Satomi, Takeo; Hino, Naganori; Tateishi, Koshi; Hirano, Masachika; Mukai, Kunio; Nodera, Katsuji; and Sasaki, Mitsuru, 4,015,974.

Tawakol, A. Assem, to International Telephone and Telegraph Corporation. Valve with self-retaining valve seat. 4,015,818, Cl. 251-307.000.

Taylor, Daniel G., to Minneapolis War Memorial Blood Bank. Dual centrifuge and sample container. 4,015,774, Cl. 233-26.000.

Taylor, Geoffrey, to SKF Industrial Trading and Development Company, B.V. Annular sealing members and assemblies incorporating them. 4,015,883, Cl. 308-187.100.

Taylor, James A. Combined tape measure and marking device. 4,015,337, Cl. 33-138.000.

Taylor, Lloyd D.: *See—*
Kolesinski, Henry S.; Mehta, Avinash C.; and Taylor, Lloyd D., 4,016,340.

Taylor, Miller. Guide pulley for wide belts. 4,015,484, Cl. 74-230.300.

TEC Systems, Inc.: *See—*
Treleven, Robert E., 4,015,340.

Technicon Instruments Corporation: *See—*
Jay, Ronald Frank, 4,015,938.

Technisch Ontwikkelingsbureau van Elten B.V.: *See—*
van Elten, Gerrit Jan; and Hurkmans, Antonius, 4,015,519.

Tedeschi, David Henry: *See—*
Sieger, George Madison; Krueger, James Elwood; Osterberg, Arnold Curtis; and Tedeschi, David Henry, 4,016,273.

Tef, Peter: *See—*
Schumacher, Gunter; Tef, Peter; and Wiester, Max, 4,015,835.

Teijin Limited: *See—*
Kajiura, Atsusuke; Aito, Yuzo; Sugiyama, Atsushi; Tamura, Hiroki; and Aihara, Kazuma, 4,016,112.

Temple, Stephen. Kite with an improved rudder. 4,015,803, Cl. 244-153.00R.

Templeton, Kenly & Company: *See—*
Profet, Anthony G., 4,015,824.

Templeton, William B., to Burroughs Corporation. Apparatus for driving a document through an encoder station. 4,015,701, Cl. 197-127.00R.

Tennant, James R. Newspaper streamliner. 4,015,843, Cl. 271-240.000.

Terada, Osamu: *See—*
Kondo, Kiyosi; Terada, Osamu; Oshima, Kohei; Mori, Yasuki; and Mochida, Kenichi, 4,016,186.

Terasawa, Yoshio, to Hitachi, Ltd. Semiconductor controlled rectifier. 4,016,591, Cl. 357-38.000.

Terragnoli, John. Muffin slicer and perforator. 4,015,492, Cl. 83-2.000.

Texaco Development Corporation: *See—*
Marion, Charles P., 4,016,102.
Marion, Charles P., 4,016,103.
Marion, Charles P., 4,016,104.
Watts, Lewis William, Jr., 4,015,976.





Texaco Inc.: *See—*
Knifton, John F.; and Suggitt, Robert M., 4,016,194.

Texas Instruments Incorporated: *See—*
Buss, Dennis Darcy, 4,016,567.
Pandey, Kailash Narain, 4,016,361.
Wagers, Robert S., 4,016,440.

Textron, Inc.: *See—*
Flachbarth, Charles T.; and Myers, John L., 4,015,397.

Thakur, Babu N., to Engelhard Minerals & Chemicals Corporation. Bonded-abrasive wire saw. 4,015,931, Cl. 125-21.000.

Theimer, Ernst Theodore; and Heinze, George E., to Lectrofood, Inc. Electrically conducting foodstuff coated with composition of matter consisting essentially of gel and ionized species. 4,016,297, Cl. 426-90.000.

Theimer, Ernst Theodore; and Heinze, George E., to Lectrofood, Inc. Electrically conductible gellable composition with ionized salt. 4,016,301, Cl. 426-573.000.

Thenon, Christian; and Pelletier, Bernard, to Etablissements Carpano & Pons. Device for alternately winding flexible bands and the like between two rolls. 4,015,792, Cl. 242-67.400.

Theobald, Marvin G.; and Olson, Richard G., to National Can Corporation. Method and apparatus for securing inserts to containers. 4,015,325, Cl. 29-451.000.

Thies, Peter Willibrord, to Kali-Chemie Pharma GmbH. Esters of 4-hydroxy-2,9-dioxatricyclo[4.3.1.0$^{3,7}$] decanes and processes for their production. 4,016,176, Cl. 260-340.300.

Thill, Bruce P.; and Paige, Janet N., to Dow Chemical Company, The. Process for making 2-vinyl-2-oxazolines. 4,016,171, Cl. 260-307.00F.

Thill, Bruce P.: *See—*
Tomalia, Donald A.; Thill, Bruce P.; and Regulski, Thomas W., 4,016,192.

Thomas, Edward L. Fastener positioning device. 4,015,746, Cl. 221-263.000.

Thomas, John Henry, III: *See—*
Lesh, Nathan George, deceased; Merchants National Bank of Allentown, executor; Morabito, Joseph Michael; and Thomas, John Henry, III, 4,016,050.

Thompson, Neil Jay, to Johns-Manville Corporation. Ceiling system and prefabricated overhead building assembly using this system. 4,015,389, Cl. 52-475.000.

Thordarson, Inc.: *See—*
Thordarson, Petur, 4,015,626.

Thordarson, Petur, to Thordarson, Inc. Constant flow valve for low flow rates. 4,015,626, Cl. 137-375.000.

Thornbury, Thomas R.: *See—*
St. Amand, Elmer F.; and Thornbury, Thomas R., 4,015,401.

Thorstensson, Gustav Yngve: *See—*
Tisell, Claes-Gustav Erik Yngve; Lundell, Karl Erik Bjorn; Horner, Sven Henry Nilsson; Thorstensson, Gustav Yngve; and Karlstedt, Gustav Sven Erik, 4,015,860.

Thorud, Richard A.: *See—*
Witt, Robert H.; Horner, Herbert F., Jr.; and Thorud, Richard A., 4,015,406.

Thurmann, Wilhelm. Apparatus and method of forwarding sheet from paper or similar material. 4,015,838, Cl. 270-61.00F.

Thylefors, Henric Wilhelm, to Alfa-Laval AB. Centrifuge for separating solids from liquids. 4,015,773, Cl. 233-20.00A.

Tibell, Bengt Gunnar Julius: *See—*
Jonsson, Arne Ingvar; Malmstrom, Olov Valdemar; and Tibell, Bengt Gunnar Julius, 4,015,614.

Tichelaar, Gerrit Willem: *See—*
Essers, Wilhelmus Gerardus; and Tichelaar, Gerrit Willem, 4,016,397.

Tichy, Dieter: *See—*
Schnee, Karl; Tichy, Dieter; Michel, Walter; and Gruber, Gunter, 4,016,336.

Tichy, Jan: *See—*
Calderara, Reto; Baumgartner, Hans U.; Tichy, Jan; and Sonderegger, Hans C., 4,016,437.

Tilley, James N., to Upjohn Company, The. Preparation of polyamide from oligomeric poly-N-carboxylic anhydride. 4,016,144, Cl. 260-78.00R.

Tillie, Etienne Lucien, to Tramex S.A. Prefabricated structural elements for partitions and walls of buildings and partitions and walls consisting of such elements. 4,015,387, Cl. 52-309.170.

Tillson, Stephen A.: *See—*
Pharriss, Bruce B.; Erickson, Ross R.; and Tillson, Stephen A., 4,016,270.

Timoshenko, Evgeny Mikhailovich: *See—*
Borisov, Vladimir Mikhailovich; Goldshtein, Boris Grigorievich; Goppen, Albert Adlofovich; Eletsky, Vladimir Alexeevich; Sherman, Viktor Lvovich; Bush, Kherbert Zhanovich; Ryashentsev, Nikolai Pavlovich; and Timoshenko, Evgeny Mikhailovich, 4,015,671.

Tinkham, Sherman L. Air boat. 4,015,555, Cl. 115-1.00C.

Tinnel, Robert. Water bed. 4,015,299, Cl. 5-370.000.

Tisell, Claes-Gustav Erik Yngve; Lundell, Karl Erik Bjorn; Horner, Sven Henry Nilsson; Thorstensson, Gustav Yngve; and Karlstedt, Gustav Sven Erik, to Forenade Fabriksverken. Vehicle seat safety harness. 4,015,860, Cl. 280-747.000.

Toa Nenryo Kogyo Kabushiki Kaisha: *See—*
Nishikawa, Eiichiroh; Itoh, Takuji; and Kamiyama, Setsuo, 4,016,241.

Tobin, Albert G., to Grumman Aerospace Corporation. Closed-cell ceramic foam material. 4,016,229, Cl. 264-63.000.

Toda, Toshimasa: *See—*
Murayama, Keisuke; Morimura, Syoji; Yoshioka, Takao; Toda, Toshimasa; Mori, Eiko; Horiuchi, Hideo; Higashida, Susumu; Matsui, Katsuaki; Kurumada, Tomoyuki; Ohta, Noriyuki; and Osawa, Hisayou, 4,016,168.

Togo, Kazushi: *See—*
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Tokico Ltd.: *See—*
Hayashida, Yoshihiro; and Amano, Haruyuki, 4,015,693.

Tokumitsu, Ichiro: *See—*
Shiraiwa, Masatoyo; Tokumitsu, Ichiro; Takemura, Toshisada; Hatano, Satoshi; and Yamaguchi, Hiroshi, 4,016,066.

Tokumoto, Shin-Ichi; Tanaka, Eiji; Ogisu, Kenji; and Kawai, Hiroji, to Sony Corporation. Electrodeposition process. 4,016,052, Cl. 204-64.00T.

Tokyo Broadcasting System Inc.: *See—*
Morita, Takaya; Inaba, Masao; and Hoshi, Yoitiro, 4,016,544.

Tokyo Gas Company Limited: *See—*
Seki, Masao, 4,015,436.

Tolan, John R.: *See—*
Mallory, Edwin E.; and Tolan, John R., 4,015,498.

Tomalia, Donald A.; Thill, Bruce P.; and Regulski, Thomas W., to Dow Chemical Company, The. Unsaturated acrylic acid-oxazoline reaction products. 4,016,192, Cl. 260-471.00A.

Tompkins, Leo L., to Xenco Ltd. Temperature control system utilizing naturally occurring energy sources. 4,015,962, Cl. 62-2.000.

Tomy Kogyo Co., Inc.: *See—*
Ogasawara, Toyotsugu, 4,015,346.

Tonecraft Limited: *See—*
Baggaley, Jon Clemens, 4,015,885.

Topper, George William. Pipe mating tool. 4,015,323, Cl. 29-237.000.

Toro Company, The: *See—*
Witt, Robert H.; Horner, Herbert F., Jr.; and Thorud, Richard A., 4,015,406.

Torrillo, Domenick T.: *See—*
Maieli, Joseph R.; Rosenthal, Gordon; and Torrillo, Domenick T., 4,015,787.

Toy, Henry; Bernstein, Phillip; and Van der Zwaan, Johan C., to United States of America, Navy. Ejection system. 4,015,507, Cl. 89-1.50F.

Toyama Chemical Co., Ltd.: *See—*
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Toyo Boseki Kabushiki Kaisha: *See—*
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Tramex S.A.: *See—*
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Travis, James; and Pannell, Ralph, to Research Corporation. Selective removal of albumin from blood fluid and compositions therefore. 4,016,149, Cl. 260-122.000.

Trecker, David John; Borden, George Wayne; and Smith, Oliver Wendell, to Union Carbide Corporation. Method for curing ink and coating compositions of acrylated epoxidized soybean oil amine compounds. 4,016,059, Cl. 204-161.000.

Treder, Charles F., to Singer Company, The. Thermostatic expansion valve capsule. 4,015,777, Cl. 236-92.00B.

Treleven, Robert E., to TEC Systems, Inc. Ultraviolet drying apparatus. 4,015,340, Cl. 34-4.000.

Triple E Corporation: *See—*
Silver, Robert L.; and Eisenhut, Bert R., 4,015,714.

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Tsuda, Masatoshi. Copper-base solder. 4,015,948, Cl. 75-157.500.

Tsukamoto, Masahide; Ohtsuka, Tetsuro; Morimoto, Kazuhisa; and Murakami, Yoshinobu, to Matsushita Electric Industrial Co., Ltd. Electro-optical device. 4,016,094, Cl. 252-299.000.

Tsukumo, Zenzaburo, to NTN Toyo Bearing Company Ltd. Bobbin hanger. 4,015,797, Cl. 242-130.200.

Tsunoda, Kozo; Sowa, Tsuneo; and Sako, Kiyohide, to Asahi Kasei Kogyo Kabushiki Kaisha. 2,3-O-sulfinyl-cytidine-5-phosphate. 4,016,352, Cl. 536-29.000.

Tsuruki, Junzo: *See*—
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Twin Disc, Incorporated: *See*—
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Urbina-Davalos, Fernando. Process for the obtention of alumina and phosphate values by the alkaline decomposition of silica-containing aluminum phosphate ores. 4,016,238, Cl. 423-119.000.

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Vallak, Hannes, to Vallak, Enn. Method for removing heat-insulating material from an ingot mold before the removal of the ingot. 4,016,002, Cl. 134-6.000.

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van der Burg, Willem Jacob, to Akzona Incorporated. Amino-substituted 1,2,3,4,10,146-hexahydro-pyridino[1,2-a]dibenzo[c,f]azepines. 4,016,161, Cl. 260-247.10L.

van der Lely, Ary: *See*—
van der Lely, Cornelis; and van der Lely, Ary, 4,015,411.

van der Lely, Cornelis; and van der Lely, Ary. Raking machines. 4,015,411, Cl. 56-366.000.

van der Plas, Nicolaas; and Broijl, Berend. Agricultural implement for raking or spreading crop lying on the ground having an improved frame. 4,015,413, Cl. 56-370.000R.

Van der Zwaan, Johan C.: *See*—
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van Elten, Gerrit Jan; and Hurkmans, Antonius, to Technisch Ontwikkelingsbureau van Elten B.V. Apparatus for storing cheese loaves and for periodically turning them upside down. 4,015,519, Cl. 99-452.000.

Van Fossen, Don B., to Babcock & Wilcox Company, The. Ceramic refractory covering members. 4,015,636, Cl. 138-149.000.

Van Haaften, Egbert, to Bulova Watch Company, Inc. Solid-state electronic watch assembly. 4,015,422, Cl. 58-88.00R.

Vanhoof, Pierre M.; and Clarebout, Pierre M., to A. Christiaens Societe Anonyme. Derivatives of 1,3-benzodioxole, the preparation and use thereof. 4,016,284, Cl. 424-282.000.

van Kampen, Daniel Marten, to Lever Brothers Company. Process of making granular enzymes of reduced stickiness. 4,016,041, Cl. 195-68.000.

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Vassiliou, Eustathios; and Concannon, Thomas P., to Du Pont de Nemours, E. I., and Company. Fluoropolymer coating compositions having improved adhesion. 4,016,125, Cl. 260-29.60F.

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Vercellotti, Leonard C.; and Whyte, Ian A., to Westinghouse Electric Corporation. Power line carrier communication system for signaling customer locations through ground wire conductors. 4,016,429, Cl. 307-149.000.

Vereinigte Osterreichische Eisen- und Stahlwerke-Alpine Montan Aktiengesellschaft: *See*—
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Voyles, Gerald A.; and Deak, Paul S., to P. R. Mallory & Co., Inc. Anode riser means for a capacitor. 4,016,464, Cl. 361-433.000.

Vroom, Henry J.; Bolle, Warren Robert; Schneider, Herbert; and Swerdling, Burton, to Grumman Aerospace Corporation. Solar water heater. 4,015,586, Cl. 126-271.000.

Vuitel, Laurent; L'Eplattenier, Francois; and Pugin, Andre, to Ciba-Geigy Corporation. Metal complexes of bis-hydrazones. 4,016,157, Cl. 260-242.000.

Vulcan Iron Works, Inc.: *See*—
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Vydra, Karel; and Hubalek, Zdenek, to Metallgesellschaft Aktiengesellschaft. Process for the catalytic conversion of $SO_2$ to $SO_3$. 4,016,248, Cl. 423-533.000.

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Wada, Yasuo; Usui, Hiroo; Koyanagi, Mitsumasa; and Ashikawa, Mikio, to Hitachi, Ltd. Method for fabricating a silicon device utilizing ion-implantation and selective oxidation. 4,016,007, Cl. 148-1.500.

Wadensten, Carl Tommy, to Kommanditbolaget Pemac Invention AB & Co. Basket adapted to be stacked in or on top of another substantially identical basket. 4,015,712, Cl. 206-507.000.

Wagensommer, Joseph, to Exxon Research and Engineering Company. Process and product. 4,016,342, Cl. 526-65.000.

Wagers, Robert S., to Texas Instruments Incorporated. Particularly oriented plate-like monocrystalline piezoelectric body and acoustic surface wave filter device employing same. 4,016,440, Cl. 310-9.500.

Wagner, Arthur F.; and Shen, Tsung-Ying, to Merck & Co., Inc. 3-[N'-(3-Halopropyl)-N'-methylamino]-N,N,N-trimethyl-1-propanaminium halide and acid addition salts thereof. 4,016,209, Cl. 260-567.60M.

Wahl, Josef, to Robert Bosch G.m.b.H. Electronic ignition control system for internal combustion engines. 4,015,566, Cl. 123-117.00R.

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Wakabayashi, Yukimasa; and Takahashi, Shigeru, to Fujikura Kasei Co., Ltd. Vacuum deposition method. 4,016,305, Cl. 427-42.000.

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Walker, Ferman L., to Rockwell International Corporation. Aircraft ground closure rate filtering method and means. 4,016,565, Cl. 343-7.0TA.

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Walters, Charles W., to P. R. Mallory & Co., Inc. Cathode electrode for an electrolytic capacitor and method of making same. 4,016,465, Cl. 361-433.000.

Waltz, Foster V., Jr.: *See*—
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Wanstreet, Gregory E., to B.F. Goodrich Company, The. Tire valve with pressure release means. 4,015,623, Cl. 137-224.000.

Wanstreet, Gregory E.; and Plaat, C. Lucas, to B.F. Goodrich Company, The. Tire valve. 4,015,624, Cl. 137-224.000.

Ward, William R., Jr., to Owens-Illinois, Inc. Method for shearing and turning the glass gob. 4,015,967, Cl. 65-133.000.

Wareham, Richard R., to Polaroid Corporation. Photographic system accommodating independent insertion and removal of battery and film assemblages. 4,016,582, Cl. 354-275.000.

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Warren, William H. Egg carrier. 4,015,704, Cl. 198-652.000.

Warrington, Henry G., to Vulcan Iron Works, Inc. Cable tensioning assembly. 4,015,821, Cl. 254-29.00A.

Warwick, Charles Herbert. Panel with core and method of constructing. 4,015,393, Cl. 52-615.000.

Wasa, Kiyotaka; Hosomi, Fumio; and Hayakawa, Shigeru, to Matsushita Electric Industrial Co., Ltd. Method of making resistive films. 4,016,061, Cl. 204-192.00F.
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Watkins, Kenneth Ray; and Wenk, Robert John, to United States Gypsum Company. Fortified gypsum granule. 4,015,972, Cl. 71-31.000.
Watts, Lewis William, Jr., to Texaco Development Corporation. N-acetyl L-polychlorobenzamide herbicides. 4,015,976, Cl. 71-118.000.
Wauk, Michael T., II, to Hughes Aircraft Company. Wide band bulk acoustic wave delay line. 4,016,512, Cl. 333-30.00R.
Wauk, Michael T., II, to Hughes Aircraft Company. Bulk acoustic wave delay line. 4,016,515, Cl. 333-30.00R.
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Weaver, Edward A., to Owens-Illinois, Inc. Manufacture of X-ray absorbing glass composition by a float glass process. 4,015,966, Cl. 65-65.00A.
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# CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS

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| B 257,143 | 4,000,111 | Mar. 16, 1976 | Dec. 28, 1976 |
| B 270,274 | 3,982,223 | Feb. 17, 1976 | Sep. 21, 1976 |
| B 270,351 | 3,997,893 | Mar. 30, 1976 | Dec. 14, 1976 |
| B 271,743 | 4,001,195 | Mar. 16, 1976 | Jan. 4, 1977 |
| B 276,026 | 3,992,405 | Feb. 3, 1976 | Nov. 16, 1976 |
| B 279,415 | 4,000,697 | Mar. 16, 1976 | Jan. 4, 1977 |
| B 279,969 | 3,986,073 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 281,162 | 4,009,481 | Mar. 23, 1976 | Feb. 22, 1977 |
| B 283,941 | 3,995,313 | Feb. 3, 1976 | Nov. 30, 1976 |
| B 288,757 | 4,001,072 | Mar. 30, 1976 | Jan. 4, 1977 |
| B 301,143 | 3,991,107 | Jan. 27, 1976 | Nov. 9, 1976 |
| B 302,160 | 3,985,774 | Feb. 3, 1976 | Oct. 12, 1976 |
| B 306,668 | 3,985,713 | Feb. 3, 1976 | Oct. 12, 1976 |
| B 307,698 | 3,993,763 | Feb. 3, 1976 | Nov. 23, 1976 |
| B 308,659 | 3,981,947 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 311,450 | 3,988,976 | Mar. 9, 1976 | Nov. 2, 1976 |
| B 311,779 | 4,013,481 | Feb. 10, 1976 | Mar. 22, 1977 |
| B 313,280 | 4,003,591 | Apr. 6, 1976 | Jan. 18, 1977 |
| B 326,211 | 3,988,272 | Mar. 23, 1976 | Oct. 26, 1976 |
| B 328,065 | 4,014,752 | Mar. 30, 1976 | Mar. 29, 1977 |
| B 328,077 | 4,014,860 | Apr. 13, 1976 | Mar. 29, 1977 |
| B 328,116 | 4,000,774 | Mar. 9, 1976 | Jan. 4, 1977 |
| B 330,719 | 4,001,121 | Mar. 16, 1976 | Jan. 4, 1977 |
| B 330,736 | 3,996,299 | Feb. 3, 1976 | Dec. 7, 1976 |
| B 332,442 | 4,001,231 | Mar. 30, 1976 | Jan. 4, 1977 |
| B 333,110 | 3,989,867 | Mar. 16, 1976 | Nov. 2, 1976 |
| B 333,247 | 4,001,201 | Mar. 16, 1976 | Jan. 4, 1977 |
| B 333,838 | 4,006,263 | Mar. 23, 1976 | Feb. 1, 1977 |
| B 335,783 | 4,013,744 | Mar. 30, 1976 | Mar. 22, 1977 |
| B 336,754 | 3,989,805 | Mar. 16, 1976 | Nov. 2, 1976 |
| B 337,023 | 4,013,188 | Mar. 30, 1976 | Mar. 22, 1977 |
| B 337,823 | 4,002,746 | Mar. 23, 1976 | Jan. 11, 1977 |
| B 339,194 | 3,982,215 | Feb. 3, 1976 | Sep. 21, 1976 |
| B 339,446 | 4,001,067 | Feb. 24, 1976 | Jan. 4, 1977 |
| B 340,170 | 4,000,444 | Mar. 30, 1976 | Dec. 28, 1976 |
| B 344,669 | 4,013,655 | Mar. 16, 1976 | Mar. 22, 1977 |
| B 347,661 | 3,999,218 | Mar. 16, 1976 | Dec. 21, 1976 |
| B 348,433 | 3,984,405 | Feb. 3, 1976 | Oct. 5, 1976 |
| B 349,370 | 3,989,684 | Jan. 27, 1976 | Nov. 2, 1976 |
| B 351,455 | 4,001,309 | Feb. 24, 1976 | Jan. 4, 1977 |
| B 354,222 | 4,012,305 | Mar. 23, 1976 | Mar. 15, 1977 |
| B 354,959 | 3,995,996 | Feb. 17, 1976 | Dec. 7, 1976 |
| B 356,187 | 3,981,222 | Jan. 20, 1976 | Sep. 21, 1976 |
| B 356,470 | 4,014,789 | Mar. 23, 1976 | Mar. 29, 1977 |
| B 357,526 | 4,001,319 | Mar. 23, 1976 | Jan. 4, 1977 |
| B 358,260 | 3,989,661 | Mar. 30, 1976 | Nov. 2, 1976 |
| B 358,427 | 3,989,896 | Feb. 3, 1976 | Nov. 2, 1976 |
| B 359,768 | 4,013,684 | Mar. 30, 1976 | Mar. 22, 1977 |
| B 359,901 | 3,981,729 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 361,954 | 4,014,753 | Apr. 6, 1976 | Mar. 29, 1977 |
| B 363,565 | 4,004,821 | Mar. 30, 1976 | Jan. 25, 1977 |
| B 364,797 | 3,996,131 | Feb. 17, 1976 | Dec. 7, 1976 |
| B 367,092 | 4,014,920 | Apr. 13, 1976 | Mar. 29, 1977 |
| B 367,305 | 3,998,640 | Mar. 2, 1976 | Dec. 21, 1976 |
| B 367,621 | 3,989,589 | Feb. 3, 1976 | Nov. 2, 1976 |
| B 369,221 | 3,985,834 | Feb. 24, 1976 | Oct. 12, 1976 |
| B 369,373 | 4,013,683 | Mar. 23, 1976 | Mar. 22, 1977 |
| B 369,379 | 4,013,754 | Mar. 30, 1976 | Mar. 22, 1977 |
| B 370,309 | 3,989,640 | Jan. 20, 1976 | Nov. 2, 1976 |
| B 371,095 | 4,005,074 | Mar. 23, 1976 | Jan. 25, 1977 |
| B 371,635 | 4,010,290 | Mar. 23, 1976 | Mar. 1, 1977 |
| B 371,912 | 3,995,738 | Mar. 2, 1976 | Dec. 7, 1976 |
| B 372,016 | 3,989,685 | Mar. 9, 1976 | Nov. 2, 1976 |
| B 372,232 | 4,000,967 | Mar. 16, 1976 | Jan. 4, 1977 |
| B 372,722 | 3,998,925 | Mar. 9, 1976 | Dec. 21, 1976 |
| B 373,354 | 3,989,870 | Jan. 27, 1976 | Nov. 2, 1976 |
| B 374,553 | 4,008,394 | Mar. 30, 1976 | Feb. 15, 1977 |
| B 374,588 | 3,985,899 | Jan. 27, 1976 | Oct. 12, 1976 |
| B 376,749 | 4,014,856 | Mar. 30, 1976 | Mar. 29, 1977 |
| B 378,513 | 3,981,750 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 378,760 | 4,001,477 | Mar. 9, 1976 | Jan. 4, 1977 |
| B 379,177 | 3,981,976 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 380,137 | 4,014,802 | Mar. 23, 1976 | Mar. 29, 1977 |
| B 381,006 | 4,009,447 | Apr. 6, 1976 | Feb. 22, 1977 |
| B 381,709 | 3,984,587 | Jan. 13, 1976 | Oct. 5, 1976 |
| B 381,985 | 3,990,775 | Feb. 3, 1976 | Nov. 9, 1976 |
| B 382,120 | 4,013,639 | Mar. 23, 1976 | Mar. 22, 1977 |
| B 383,697 | 4,008,211 | Feb. 17, 1976 | Feb. 15, 1977 |
| B 384,225 | 3,998,523 | Mar. 16, 1976 | Dec. 21, 1976 |
| B 384,330 | 3,985,613 | Jan. 27, 1976 | Oct. 12, 1976 |
| B 384,654 | 3,992,681 | Feb. 24, 1976 | Nov. 16, 1976 |
| B 385,024 | 3,994,911 | Feb. 10, 1976 | Nov. 30, 1976 |
| B 385,483 | 3,993,684 | Feb. 17, 1976 | Nov. 23, 1976 |
| B 385,631 | 3,982,924 | Jan. 27, 1976 | Sep. 28, 1976 |
| B 386,257 | 3,981,915 | Feb. 3, 1976 | Sep. 21, 1976 |
| B 386,673 | 3,993,717 | Feb. 3, 1976 | Nov. 23, 1976 |
| B 386,828 | 3,992,440 | Feb. 3, 1976 | Nov. 16, 1976 |
| B 387,337 | D 243,157 | Mar. 16, 1976 | Jan. 25, 1977 |
| B 388,675 | 4,012,459 | Mar. 30, 1976 | Mar. 15, 1977 |
| B 389,155 | 4,000,970 | Mar. 30, 1976 | Jan. 4, 1977 |
| B 389,304 | 3,986,829 | Jan. 27, 1976 | Oct. 19, 1976 |
| B 390,031 | 3,985,799 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 390,408 | 3,992,426 | Feb. 3, 1976 | Nov. 16, 1976 |
| B 390,979 | 4,003,850 | Mar. 23, 1976 | Jan. 18, 1977 |
| B 391,473 | 3,988,370 | Mar. 2, 1976 | Oct. 26, 1976 |
| B 391,797 | 3,988,046 | Mar. 9, 1976 | Oct. 26, 1976 |
| B 391,828 | 4,014,933 | Apr. 6, 1976 | Mar. 29, 1977 |
| B 391,844 | 3,999,165 | Mar. 16, 1976 | Dec. 21, 1976 |
| B 392,798 | 3,996,249 | Mar. 30, 1976 | Dec. 7, 1976 |
| B 394,248 | 3,989,764 | Jan. 27, 1976 | Nov. 2, 1976 |
| B 394,350 | 3,982,200 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 394,742 | 4,009,285 | Apr. 13, 1976 | Feb. 22, 1977 |
| B 395,554 | 3,998,156 | Mar. 9, 1976 | Dec. 21, 1976 |
| B 395,975 | 4,001,085 | Mar. 2, 1976 | Jan. 4, 1977 |
| B 396,164 | 3,989,590 | Feb. 3, 1976 | Nov. 2, 1976 |
| B 396,377 | D 243,148 | Apr. 6, 1976 | Jan. 25, 1977 |
| B 397,674 | 3,998,438 | Mar. 16, 1976 | Dec. 21, 1976 |
| B 398,084 | 3,996,239 | Feb. 3, 1976 | Dec. 7, 1976 |
| B 398,220 | 3,990,834 | Feb. 3, 1976 | Nov. 9, 1976 |
| B 398,488 | 3,987,991 | Feb. 24, 1976 | Oct. 26, 1976 |
| B 399,098 | 3,997,665 | Feb. 24, 1976 | Dec. 14, 1976 |
| B 399,632 | 4,001,046 | Mar. 9, 1976 | Jan. 4, 1977 |
| B 399,908 | 3,983,323 | Jan. 13, 1976 | Sep. 28, 1976 |
| B 400,871 | 3,988,893 | Feb. 17, 1976 | Nov. 2, 1976 |
| B 401,042 | D 242,197 | Mar. 16, 1976 | Nov. 9, 1976 |
| B 401,221 | 4,014,791 | Apr. 6, 1976 | Mar. 29, 1977 |
| B 402,162 | 3,994,902 | Mar. 2, 1976 | Nov. 30, 1976 |
| B 402,328 | 3,995,545 | Apr. 6, 1976 | Dec. 7, 1976 |
| B 402,553 | 3,983,219 | Feb. 17, 1976 | Sep. 28, 1976 |
| B 402,657 | 4,013,665 | Apr. 6, 1976 | Mar. 22, 1977 |
| B 402,929 | 3,991,251 | Feb. 3, 1976 | Nov. 9, 1976 |
| B 403,076 | 4,014,917 | Apr. 20, 1976 | Mar. 29, 1977 |
| B 403,243 | 3,996,232 | Mar. 30, 1976 | Dec. 7, 1976 |
| B 403,326 | 4,001,212 | Mar. 23, 1976 | Jan. 4, 1977 |
| B 403,477 | 3,995,315 | Feb. 3, 1976 | Nov. 30, 1976 |
| B 403,507 | 3,982,095 | Feb. 10, 1976 | Sep. 21, 1976 |
| B 403,766 | 3,994,834 | Feb. 10, 1976 | Nov. 30, 1976 |
| B 403,883 | 4,001,481 | Mar. 23, 1976 | Jan. 4, 1977 |
| B 405,726 | 3,981,241 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 406,546 | D 242,966 | Mar. 16, 1976 | Jan. 11, 1977 |
| B 407,205 | 4,000,966 | Mar. 16, 1976 | Jan. 4, 1977 |
| B 407,737 | 3,992,546 | Feb. 3, 1976 | Nov. 16, 1976 |
| B 407,812 | 4,010,006 | Mar. 23, 1976 | Mar. 1, 1977 |
| B 408,123 | 4,014,887 | Apr. 13, 1976 | Mar. 29, 1977 |
| B 409,848 | 3,983,270 | Jan. 27, 1976 | Sep. 28, 1976 |
| B 410,074 | 4,001,303 | Feb. 24, 1976 | Jan. 4, 1977 |
| B 410,694 | 3,995,530 | Mar. 23, 1976 | Dec. 7, 1976 |
| B 411,471 | 3,982,933 | Feb. 17, 1976 | Sep. 28, 1976 |
| B 411,624 | 4,001,205 | Mar. 16, 1976 | Jan. 4, 1977 |
| B 411,765 | 3,993,428 | Feb. 24, 1976 | Nov. 23, 1976 |
| B 412,068 | 3,981,244 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 412,124 | 4,007,000 | Mar. 23, 1976 | Feb. 8, 1977 |
| B 413,379 | 4,001,325 | Mar. 9, 1976 | Jan. 4, 1977 |
| B 414,028 | 3,993,738 | Feb. 17, 1976 | Nov. 23, 1976 |
| B 414,266 | 3,993,614 | Feb. 10, 1976 | Nov. 23, 1976 |
| B 414,481 | 3,982,979 | Jan. 20, 1976 | Sep. 28, 1976 |
| B 414,971 | D 242,208 | Feb. 10, 1976 | Nov. 9, 1976 |
| B 415,021 | 3,994,173 | Mar. 2, 1976 | Nov. 30, 1976 |

# CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

| DOCUMENT NUMBER | PATENT NUMBER | PUB. DATE | ISSUE DATE | DOCUMENT NUMBER | PATENT NUMBER | PUB. DATE | ISSUE DATE |
|---|---|---|---|---|---|---|---|
| B 415,122 | 3,997,503 | Feb. 10, 1976 | Dec. 14, 1976 | B 440,632 | 4,014,955 | Apr. 13, 1976 | Mar. 29, 1977 |
| B 415,590 | 4,009,317 | Mar. 23, 1976 | Feb. 22, 1977 | B 440,633 | 4,000,116 | Feb. 10, 1976 | Dec. 28, 1976 |
| B 416,257 | 4,001,335 | Mar. 16, 1976 | Jan. 4, 1977 | B 440,858 | 3,993,670 | Feb. 3, 1976 | Nov. 23, 1976 |
| B 416,589 | 3,990,363 | Jan. 27, 1976 | Nov. 9, 1976 | B 441,543 | 4,014,755 | Mar. 23, 1976 | Mar. 29, 1977 |
| B 417,014 | 3,981,851 | Jan. 13, 1976 | Sep. 21, 1976 | B 441,723 | 3,988,249 | Mar. 16, 1976 | Oct. 26, 1976 |
| B 417,164 | 4,001,360 | Mar. 2, 1976 | Jan. 4, 1977 | B 441,789 | 4,001,449 | Mar. 30, 1976 | Jan. 4, 1977 |
| B 417,349 | 3,985,076 | Mar. 9, 1976 | Oct. 12, 1976 | B 442,163 | D 242,192 | Mar. 16, 1976 | Nov. 9, 1976 |
| B 417,498 | 4,013,471 | Mar. 23, 1976 | Mar. 22, 1977 | B 442,295 | 4,000,477 | Mar. 16, 1976 | Dec. 28, 1976 |
| B 418,489 | 3,989,592 | Jan. 13, 1976 | Nov. 2, 1976 | B 442,431 | 4,011,260 | Mar. 23, 1976 | Mar. 8, 1977 |
| B 419,173 | 3,999,728 | Mar. 9, 1976 | Dec. 28, 1976 | B 442,810 | 3,997,533 | Feb. 24, 1976 | Dec. 14, 1976 |
| B 419,582 | 3,989,681 | Mar. 2, 1976 | Nov. 2, 1976 | B 442,866 | 3,982,351 | Feb. 24, 1976 | Sep. 28, 1976 |
| B 420,176 | 4,001,017 | Mar. 16, 1976 | Jan. 4, 1977 | B 442,953 | 4,002,657 | Mar. 23, 1976 | Jan. 11, 1977 |
| B 420,321 | 3,990,645 | Mar. 30, 1976 | Nov. 9, 1976 | B 442,970 | 3,989,890 | Feb. 3, 1976 | Nov. 2, 1976 |
| B 420,472 | 3,993,934 | Feb. 24, 1976 | Nov. 23, 1976 | B 443,163 | 3,981,242 | Feb. 3, 1976 | Sep. 21, 1976 |
| B 421,373 | 4,001,326 | Mar. 23, 1976 | Jan. 4, 1977 | B 443,446 | D 242,494 | Apr. 6, 1976 | Nov. 23, 1976 |
| B 421,608 | 4,013,806 | Mar. 23, 1976 | Mar. 22, 1977 | B 443,563 | 3,996,204 | Feb. 24, 1976 | Dec. 7, 1976 |
| B 421,975 | 3,994,693 | Mar. 2, 1976 | Nov. 30, 1976 | B 443,647 | 3,990,737 | Feb. 17, 1976 | Nov. 9, 1976 |
| B 422,063 | 3,994,835 | Feb. 3, 1976 | Nov. 30, 1976 | B 443,712 | 3,982,233 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 422,156 | 4,010,401 | Mar. 23, 1976 | Mar. 1, 1977 | B 444,078 | 4,014,854 | Mar. 23, 1976 | Mar. 29, 1977 |
| B 423,365 | 3,996,186 | Feb. 17, 1976 | Dec. 7, 1976 | B 444,294 | 4,013,634 | Mar. 30, 1976 | Mar. 22, 1977 |
| B 423,404 | 3,990,958 | Mar. 2, 1976 | Nov. 9, 1976 | B 444,437 | 3,995,171 | Mar. 9, 1976 | Nov. 30, 1976 |
| B 423,441 | 3,997,137 | Feb. 17, 1976 | Dec. 14, 1976 | B 445,166 | 4,001,252 | Mar. 2, 1976 | Jan. 4, 1977 |
| B 423,867 | 3,990,844 | Feb. 3, 1976 | Nov. 9, 1976 | B 445,459 | 3,988,889 | Feb. 3, 1976 | Nov. 2, 1976 |
| B 423,883 | 3,986,871 | Jan. 27, 1976 | Oct. 19, 1976 | B 445,493 | 3,994,903 | Mar. 2, 1976 | Nov. 30, 1976 |
| B 424,354 | D 242,416 | Feb. 10, 1976 | Nov. 23, 1976 | B 445,690 | 3,999,584 | Feb. 3, 1976 | Dec. 28, 1976 |
| B 424,989 | 3,990,569 | Feb. 3, 1976 | Nov. 9, 1976 | B 446,107 | 4,001,276 | Mar. 9, 1976 | Jan. 4, 1977 |
| B 425,193 | 4,002,107 | Mar. 23, 1976 | Jan. 11, 1977 | B 446,956 | 4,014,765 | Apr. 13, 1976 | Mar. 29, 1977 |
| B 425,285 | 4,014,676 | Apr. 13, 1976 | Mar. 29, 1977 | B 447,000 | 3,984,419 | Feb. 3, 1976 | Oct. 5, 1976 |
| B 425,462 | 3,998,396 | Mar. 9, 1976 | Dec. 21, 1976 | B 447,440 | 3,991,724 | Feb. 17, 1976 | Nov. 16, 1976 |
| B 425,588 | 3,985,111 | Jan. 13, 1976 | Oct. 12, 1976 | B 449,892 | 3,997,919 | Mar. 23, 1976 | Dec. 14, 1976 |
| B 426,157 | 4,013,714 | Mar. 23, 1976 | Mar. 22, 1977 | B 449,988 | 4,014,794 | Mar. 30, 1976 | Mar. 29, 1977 |
| B 426,227 | 3,999,028 | Mar. 2, 1976 | Dec. 21, 1976 | B 450,196 | 3,997,701 | Feb. 10, 1976 | Dec. 14, 1976 |
| B 426,266 | 3,998,839 | Mar. 2, 1976 | Dec. 21, 1976 | B 450,413 | 4,007,463 | Mar. 23, 1976 | Feb. 8, 1977 |
| B 426,274 | 4,014,949 | Jan. 20, 1976 | Mar. 29, 1977 | B 450,521 | 3,982,838 | Feb. 17, 1976 | Sep. 28, 1976 |
| B 426,424 | 3,993,742 | Feb. 3, 1976 | Nov. 23, 1976 | B 450,701 | 3,991,084 | Mar. 16, 1976 | Nov. 9, 1976 |
| B 426,639 | 3,992,539 | Feb. 3, 1976 | Nov. 16, 1976 | B 450,708 | 3,989,724 | Mar. 9, 1976 | Nov. 2, 1976 |
| B 426,819 | 3,995,868 | Feb. 17, 1976 | Dec. 7, 1976 | B 450,870 | 3,998,951 | Mar. 16, 1976 | Dec. 21, 1976 |
| B 427,883 | 3,982,277 | Jan. 20, 1976 | Sep. 21, 1976 | B 450,967 | 3,983,055 | Jan. 13, 1976 | Sep. 28, 1976 |
| B 427,946 | 4,006,161 | Mar. 23, 1976 | Feb. 1, 1977 | B 451,248 | 3,997,758 | Mar. 2, 1976 | Dec. 14, 1976 |
| B 428,103 | 4,000,211 | Feb. 10, 1976 | Dec. 28, 1976 | B 451,308 | 3,991,037 | Feb. 17, 1976 | Nov. 9, 1976 |
| B 428,271 | 3,987,415 | Mar. 23, 1976 | Oct. 19, 1976 | B 451,396 | 4,000,450 | Apr. 13, 1976 | Dec. 28, 1976 |
| B 428,408 | 3,995,252 | Mar. 2, 1976 | Nov. 30, 1976 | B 451,438 | Re. 29,066 | Mar. 2, 1976 | Dec. 7, 1976 |
| B 428,877 | 3,984,649 | Jan. 27, 1976 | Oct. 5, 1976 | B 451,534 | 3,986,033 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 429,018 | 3,990,061 | Feb. 10, 1976 | Nov. 2, 1976 | B 452,034 | 4,002,367 | Mar. 23, 1976 | Jan. 11, 1977 |
| B 429,027 | 4,001,260 | Mar. 23, 1976 | Jan. 4, 1977 | B 452,138 | 4,004,278 | Mar. 23, 1976 | Jan. 18, 1977 |
| B 429,157 | 3,990,628 | Jan. 27, 1976 | Nov. 9, 1976 | B 452,293 | 4,014,726 | Mar. 30, 1976 | Mar. 29, 1977 |
| B 429,434 | 3,989,223 | Feb. 17, 1976 | Nov. 2, 1976 | B 452,501 | 4,001,111 | Mar. 16, 1976 | Jan. 4, 1977 |
| B 430,157 | 3,992,465 | Feb. 17, 1976 | Nov. 16, 1976 | B 452,672 | 3,981,602 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 430,172 | 3,982,563 | Jan. 13, 1976 | Sep. 28, 1976 | B 452,879 | 4,001,089 | Mar. 16, 1976 | Jan. 4, 1977 |
| B 430,213 | 4,013,514 | Mar. 30, 1976 | Mar. 22, 1977 | B 452,883 | 3,981,735 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 430,276 | 3,982,171 | Jan. 20, 1976 | Sep. 21, 1976 | B 452,915 | 4,013,933 | Mar. 30, 1976 | Mar. 22, 1977 |
| B 430,287 | D 242,489 | Feb. 10, 1976 | Nov. 23, 1976 | B 452,938 | 3,994,719 | Feb. 17, 1976 | Nov. 30, 1976 |
| B 430,326 | 4,003,581 | Mar. 23, 1976 | Jan. 18, 1977 | B 452,944 | 4,009,773 | Mar. 30, 1976 | Mar. 1, 1977 |
| B 430,334 | 3,981,677 | Jan. 27, 1976 | Sep. 21, 1976 | B 453,031 | 3,998,678 | Mar. 16, 1976 | Dec. 21, 1976 |
| B 431,072 | 3,985,610 | Jan. 20, 1976 | Oct. 12, 1976 | B 453,067 | 4,005,394 | Mar. 23, 1976 | Jan. 25, 1977 |
| B 431,334 | 3,988,095 | Mar. 16, 1976 | Oct. 26, 1976 | B 453,238 | 3,997,063 | Mar. 2, 1976 | Dec. 14, 1976 |
| B 431,713 | 4,000,167 | Feb. 10, 1976 | Dec. 28, 1976 | B 453,432 | 4,000,514 | Mar. 16, 1976 | Dec. 28, 1976 |
| B 431,785 | 3,999,950 | Feb. 24, 1976 | Dec. 28, 1976 | B 453,533 | 3,997,744 | Feb. 17, 1976 | Dec. 14, 1976 |
| B 431,797 | 4,007,290 | Mar. 30, 1976 | Feb. 8, 1977 | B 453,616 | 3,987,376 | Jan. 27, 1976 | Oct. 19, 1976 |
| B 432,049 | 3,995,123 | Mar. 23, 1976 | Nov. 30, 1976 | B 453,759 | 3,989,790 | Jan. 27, 1976 | Nov. 2, 1976 |
| B 432,140 | 3,999,163 | Mar. 23, 1976 | Dec. 21, 1976 | B 453,960 | 4,014,701 | Apr. 13, 1976 | Mar. 29, 1977 |
| B 432,265 | 4,013,480 | Mar. 23, 1976 | Mar. 22, 1977 | B 454,283 | 3,995,153 | Feb. 3, 1976 | Nov. 30, 1976 |
| B 432,594 | 4,003,404 | Mar. 30, 1976 | Jan. 18, 1977 | B 454,833 | 4,008,733 | Mar. 30, 1976 | Feb. 22, 1977 |
| B 432,969 | 3,997,017 | Mar. 2, 1976 | Dec. 14, 1976 | B 455,425 | 3,990,060 | Feb. 3, 1976 | Nov. 2, 1976 |
| B 432,991 | 3,991,669 | Mar. 2, 1976 | Nov. 16, 1976 | B 455,481 | 3,991,092 | Feb. 24, 1976 | Nov. 9, 1976 |
| B 433,094 | 3,987,768 | Jan. 27, 1976 | Oct. 26, 1976 | B 455,486 | 4,001,353 | Mar. 16, 1976 | Jan. 4, 1977 |
| B 433,707 | 4,013,594 | Mar. 23, 1976 | Mar. 22, 1977 | B 455,686 | 4,001,156 | Mar. 2, 1976 | Jan. 4, 1977 |
| B 433,892 | 4,016,061 | Apr. 6, 1976 | Apr. 5, 1977 | B 455,759 | 3,984,242 | Feb. 24, 1976 | Oct. 5, 1976 |
| B 433,930 | 4,012,324 | Mar. 23, 1976 | Mar. 15, 1977 | B 455,806 | 3,998,919 | Mar. 23, 1976 | Dec. 21, 1976 |
| B 434,206 | 3,994,610 | Feb. 3, 1976 | Nov. 30, 1976 | B 456,069 | 3,998,991 | Mar. 9, 1976 | Dec. 21, 1976 |
| B 434,441 | D 242,849 | Mar. 16, 1976 | Dec. 28, 1976 | B 456,148 | 3,984,269 | Jan. 13, 1976 | Oct. 5, 1976 |
| B 435,481 | 4,000,892 | Mar. 9, 1976 | Jan. 4, 1977 | B 456,153 | 3,997,992 | Mar. 9, 1976 | Dec. 21, 1976 |
| B 435,570 | 4,000,908 | Mar. 16, 1976 | Jan. 4, 1977 | B 456,384 | 4,014,859 | Apr. 6, 1976 | Mar. 29, 1977 |
| B 435,617 | 4,001,234 | Mar. 16, 1976 | Jan. 4, 1977 | B 456,579 | 3,993,715 | Feb. 10, 1976 | Nov. 23, 1976 |
| B 436,724 | 3,991,856 | Feb. 24, 1976 | Nov. 16, 1976 | B 456,869 | 4,001,277 | Mar. 9, 1976 | Jan. 4, 1977 |
| B 437,209 | 4,001,193 | Feb. 3, 1976 | Jan. 4, 1977 | B 456,900 | 3,996,262 | Feb. 3, 1976 | Dec. 7, 1976 |
| B 437,559 | 3,993,287 | Feb. 3, 1976 | Nov. 23, 1976 | B 456,905 | 4,013,431 | Mar. 23, 1976 | Mar. 22, 1977 |
| B 437,596 | 3,985,638 | Jan. 27, 1976 | Oct. 12, 1976 | B 457,547 | 3,996,397 | Feb. 17, 1976 | Dec. 7, 1976 |
| B 437,894 | 4,001,015 | Mar. 2, 1976 | Jan. 4, 1977 | B 457,850 | 3,993,586 | Feb. 10, 1976 | Nov. 23, 1976 |
| B 437,986 | 4,011,399 | Apr. 20, 1976 | Mar. 8, 1977 | B 457,862 | 3,987,195 | Jan. 27, 1976 | Oct. 19, 1976 |
| B 438,048 | 4,001,394 | Mar. 23, 1976 | Jan. 4, 1977 | B 457,886 | 3,988,498 | Jan. 13, 1976 | Oct. 26, 1976 |
| B 438,484 | 3,992,451 | Feb. 17, 1976 | Nov. 16, 1976 | B 457,931 | 4,001,229 | Mar. 16, 1976 | Jan. 4, 1977 |
| B 438,882 | 3,983,719 | Feb. 24, 1976 | Oct. 5, 1976 | B 458,500 | 3,997,805 | Feb. 24, 1976 | Dec. 14, 1976 |
| B 438,916 | 3,983,050 | Jan. 13, 1976 | Sep. 28, 1976 | B 458,617 | 3,984,422 | Feb. 3, 1976 | Oct. 5, 1976 |
| B 439,542 | 3,982,199 | Jan. 27, 1976 | Sep. 21, 1976 | B 458,964 | 3,996,615 | Mar. 2, 1976 | Dec. 7, 1976 |
| B 439,778 | 4,001,455 | Feb. 3, 1976 | Jan. 4, 1977 | B 459,190 | 4,010,786 | Mar. 30, 1976 | Mar. 8, 1977 |
| B 440,548 | 4,001,271 | Mar. 16, 1976 | Jan. 4, 1977 | B 459,381 | 4,000,017 | Mar. 9, 1976 | Dec. 28, 1976 |



# CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

| DOCUMENT NUMBER | PATENT NUMBER | PUB. DATE | ISSUE DATE | DOCUMENT NUMBER | PATENT NUMBER | PUB. DATE | ISSUE DATE |
|---|---|---|---|---|---|---|---|
| B 459,597 | 3,996,711 | Feb. 17, 1976 | Dec. 14, 1976 | B 476,267 | 4,005,068 | Apr. 6, 1976 | Jan. 25, 1977 |
| B 459,811 | 3,982,173 | Jan. 20, 1976 | Sep. 21, 1976 | B 476,372 | 3,985,771 | Feb. 24, 1976 | Oct. 12, 1976 |
| B 459,821 | 4,005,954 | Mar. 30, 1976 | Feb. 1, 1977 | B 476,542 | 4,013,549 | Mar. 30, 1976 | Mar. 22, 1977 |
| B 460,388 | 3,989,448 | Jan. 27, 1976 | Nov. 2, 1976 | B 476,568 | 3,999,456 | Mar. 16, 1976 | Dec. 28, 1976 |
| B 460,441 | 3,981,828 | Jan. 13, 1976 | Sep. 21, 1976 | B 476,577 | 3,982,070 | Jan. 20, 1976 | Sep. 21, 1976 |
| B 460,846 | 3,985,817 | Feb. 24, 1976 | Oct. 12, 1976 | B 476,681 | 3,986,181 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 461,184 | 3,992,482 | Feb. 17, 1976 | Nov. 16, 1976 | B 476,776 | 3,998,715 | Mar. 23, 1976 | Dec. 21, 1976 |
| B 461,250 | 4,000,768 | Mar. 16, 1976 | Jan. 4, 1977 | B 476,967 | 3,995,206 | Mar. 9, 1976 | Nov. 30, 1976 |
| B 461,336 | 3,982,231 | Feb. 3, 1976 | Sep. 21, 1976 | B 477,252 | 3,985,759 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 461,352 | 3,981,681 | Jan. 13, 1976 | Sep. 21, 1976 | B 477,481 | 3,991,076 | Feb. 3, 1976 | Nov. 9, 1976 |
| B 461,685 | 4,013,661 | Mar. 30, 1976 | Mar. 22, 1977 | B 477,584 | D 242,855 | Apr. 6, 1976 | Dec. 28, 1976 |
| B 461,752 | 4,016,541 | Apr. 20, 1976 | Apr. 5, 1977 | B 477,597 | 3,993,912 | Feb. 17, 1976 | Nov. 23, 1976 |
| B 461,874 | 3,982,276 | Jan. 27, 1976 | Sep. 21, 1976 | B 477,892 | 4,010,355 | Mar. 30, 1976 | Mar. 1, 1977 |
| B 462,030 | 4,009,342 | Mar. 23, 1976 | Feb. 22, 1977 | B 478,234 | 4,010,421 | Mar. 30, 1976 | Mar. 1, 1977 |
| B 462,386 | 3,988,188 | Jan. 13, 1976 | Oct. 26, 1976 | B 478,739 | 3,992,253 | Feb. 17, 1976 | Nov. 16, 1976 |
| B 462,424 | 3,989,602 | Feb. 24, 1976 | Nov. 2, 1976 | B 479,175 | 3,985,700 | Feb. 17, 1976 | Oct. 12, 1976 |
| B 462,828 | 3,998,395 | Mar. 9, 1976 | Dec. 21, 1976 | B 479,242 | 3,983,074 | Feb. 17, 1976 | Sep. 28, 1976 |
| B 462,893 | 3,984,253 | Feb. 24, 1976 | Oct. 5, 1976 | B 479,502 | 3,999,030 | Mar. 16, 1976 | Dec. 21, 1976 |
| B 463,322 | 3,989,982 | Jan. 20, 1976 | Nov. 2, 1976 | B 479,681 | D 242,672 | Mar. 16, 1976 | Dec. 14, 1976 |
| B 463,388 | 3,992,605 | Feb. 10, 1976 | Nov. 16, 1976 | B 479,969 | 4,001,132 | Mar. 9, 1976 | Jan. 4, 1977 |
| B 463,473 | 4,002,068 | Mar. 23, 1976 | Jan. 11, 1977 | B 480,114 | 4,001,327 | Mar. 2, 1976 | Jan. 4, 1977 |
| B 463,591 | 4,015,051 | Mar. 30, 1976 | Mar. 29, 1977 | B 480,251 | 4,008,700 | Mar. 23, 1976 | Feb. 22, 1977 |
| B 463,671 | 3,985,385 | Jan. 13, 1976 | Oct. 12, 1976 | B 480,287 | 4,006,029 | Mar. 30, 1976 | Feb. 1, 1977 |
| B 464,027 | 3,999,390 | Mar. 16, 1976 | Dec. 28, 1976 | B 480,292 | 3,994,011 | Mar. 16, 1976 | Nov. 23, 1976 |
| B 464,290 | 3,990,307 | Feb. 3, 1976 | Nov. 9, 1976 | B 480,350 | 3,994,164 | Feb. 10, 1976 | Nov. 30, 1976 |
| B 464,491 | 4,015,612 | Mar. 30, 1976 | Apr. 5, 1977 | B 480,384 | 3,999,737 | Mar. 23, 1976 | Dec. 28, 1976 |
| B 464,587 | 3,991,091 | Feb. 3, 1976 | Nov. 9, 1976 | B 480,452 | 3,994,923 | Feb. 10, 1976 | Nov. 30, 1976 |
| B 464,593 | 3,997,659 | Mar. 9, 1976 | Dec. 14, 1976 | B 480,473 | 3,995,608 | Mar. 2, 1976 | Dec. 7, 1976 |
| B 465,145 | 3,981,148 | Jan. 27, 1976 | Sep. 21, 1976 | B 480,604 | 3,985,251 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 465,202 | 3,989,757 | Feb. 24, 1976 | Nov. 2, 1976 | B 480,625 | 3,996,227 | Feb. 24, 1976 | Dec. 7, 1976 |
| B 465,393 | 3,987,390 | Jan. 27, 1976 | Oct. 19, 1976 | B 480,662 | 3,988,382 | Mar. 2, 1976 | Oct. 26, 1976 |
| B 465,688 | 3,989,770 | Jan. 27, 1976 | Nov. 2, 1976 | B 480,740 | 3,996,431 | Mar. 2, 1976 | Dec. 7, 1976 |
| B 465,955 | 3,997,502 | Feb. 3, 1976 | Dec. 14, 1976 | B 480,749 | 3,999,207 | Mar. 9, 1976 | Dec. 21, 1976 |
| B 466,304 | 4,007,095 | Mar. 23, 1976 | Feb. 8, 1977 | B 480,987 | 4,001,459 | Mar. 30, 1976 | Jan. 4, 1977 |
| B 466,318 | 3,999,115 | Mar. 9, 1976 | Dec. 21, 1976 | B 481,048 | 3,998,542 | Mar. 16, 1976 | Dec. 21, 1976 |
| B 466,390 | 3,983,349 | Feb. 24, 1976 | Sep. 28, 1976 | B 481,190 | 4,013,468 | Mar. 30, 1976 | Mar. 22, 1977 |
| B 466,419 | 4,011,087 | Mar. 23, 1976 | Mar. 8, 1977 | B 481,600 | 3,981,235 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 466,444 | 3,986,039 | Jan. 20, 1976 | Oct. 12, 1976 | B 481,737 | 3,982,057 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 466,906 | 3,993,037 | Mar. 16, 1976 | Nov. 23, 1976 | B 481,778 | 4,001,385 | Mar. 30, 1976 | Jan. 4, 1977 |
| B 466,929 | 3,991,195 | Jan. 27, 1976 | Nov. 9, 1976 | B 481,930 | 3,992,717 | Feb. 24, 1976 | Nov. 16, 1976 |
| B 467,250 | 3,997,428 | Feb. 3, 1976 | Dec. 14, 1976 | B 481,989 | 4,008,337 | Mar. 23, 1976 | Feb. 15, 1977 |
| B 467,328 | 3,997,599 | Mar. 9, 1976 | Dec. 14, 1976 | B 482,058 | 4,001,398 | Mar. 2, 1976 | Jan. 4, 1977 |
| B 467,412 | 3,981,265 | Jan. 13, 1976 | Sep. 21, 1976 | B 482,660 | 3,995,026 | Feb. 10, 1976 | Nov. 30, 1976 |
| B 467,486 | 3,991,725 | Mar. 16, 1976 | Nov. 16, 1976 | B 482,709 | 3,985,733 | Feb. 24, 1976 | Oct. 12, 1976 |
| B 467,971 | 3,983,453 | Jan. 13, 1976 | Sep. 28, 1976 | B 482,907 | 3,984,811 | Jan. 20, 1976 | Oct. 5, 1976 |
| B 468,052 | 3,988,335 | Feb. 10, 1976 | Oct. 26, 1976 | B 483,247 | 4,001,889 | Apr. 13, 1976 | Jan. 4, 1977 |
| B 468,100 | 3,995,107 | Mar. 9, 1976 | Nov. 30, 1976 | B 483,256 | 3,981,723 | Feb. 10, 1976 | Sep. 21, 1976 |
| B 468,330 | 4,001,475 | Mar. 16, 1976 | Jan. 4, 1977 | B 483,268 | 3,995,215 | Mar. 9, 1976 | Nov. 30, 1976 |
| B 468,350 | 3,981,922 | Jan. 13, 1976 | Sep. 21, 1976 | B 483,606 | 3,986,990 | Jan. 27, 1976 | Oct. 19, 1976 |
| B 468,421 | 4,014,739 | Mar. 30, 1976 | Mar. 29, 1977 | B 483,615 | 3,988,637 | Jan. 27, 1976 | Oct. 26, 1976 |
| B 468,603 | 4,003,839 | Mar. 23, 1976 | Jan. 18, 1977 | B 483,746 | 4,014,923 | Mar. 23, 1976 | Mar. 29, 1977 |
| B 469,036 | 4,005,926 | Mar. 16, 1976 | Feb. 1, 1977 | B 483,762 | 3,993,608 | Feb. 10, 1976 | Nov. 23, 1976 |
| B 469,468 | 4,000,220 | Mar. 16, 1976 | Dec. 28, 1976 | B 483,865 | 3,985,693 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 469,947 | 3,984,153 | Jan. 20, 1976 | Oct. 5, 1976 | B 484,029 | 3,983,558 | Feb. 10, 1976 | Sep. 28, 1976 |
| B 470,170 | 3,986,410 | Jan. 13, 1976 | Oct. 19, 1976 | B 484,067 | 3,992,374 | Feb. 17, 1976 | Nov. 16, 1976 |
| B 470,305 | 4,014,043 | Apr. 6, 1976 | Mar. 22, 1977 | B 484,068 | 3,994,937 | Mar. 2, 1976 | Nov. 30, 1976 |
| B 470,348 | 3,981,929 | Jan. 13, 1976 | Sep. 21, 1976 | B 484,121 | 3,997,770 | Mar. 16, 1976 | Dec. 14, 1976 |
| B 470,576 | 3,997,507 | Feb. 24, 1976 | Dec. 14, 1976 | B 484,269 | 4,000,159 | Feb. 10, 1976 | Dec. 28, 1976 |
| B 470,601 | 3,985,655 | Mar. 9, 1976 | Oct. 12, 1976 | B 484,332 | 3,986,540 | Mar. 2, 1976 | Oct. 19, 1976 |
| B 470,798 | 3,987,480 | Jan. 20, 1976 | Oct. 19, 1976 | B 484,365 | 3,983,578 | Jan. 27, 1976 | Sep. 28, 1976 |
| B 470,853 | 4,002,101 | Mar. 23, 1976 | Jan. 11, 1977 | B 484,419 | 4,001,292 | Mar. 9, 1976 | Jan. 4, 1977 |
| B 470,899 | 3,996,441 | Mar. 2, 1976 | Dec. 7, 1976 | B 484,437 | 4,013,740 | Mar. 30, 1976 | Mar. 22, 1977 |
| B 470,900 | 4,001,213 | Mar. 2, 1976 | Jan. 4, 1977 | B 484,482 | 3,994,017 | Mar. 23, 1976 | Nov. 23, 1976 |
| B 470,945 | 4,014,848 | Apr. 13, 1976 | Mar. 29, 1977 | B 484,769 | 3,999,498 | Mar. 16, 1976 | Dec. 28, 1976 |
| B 471,116 | 4,001,318 | Feb. 17, 1976 | Jan. 4, 1977 | B 485,051 | 3,992,418 | Feb. 17, 1976 | Nov. 16, 1976 |
| B 471,221 | 3,981,974 | Jan. 13, 1976 | Sep. 21, 1976 | B 485,060 | 3,983,067 | Feb. 17, 1976 | Sep. 28, 1976 |
| B 471,405 | 3,993,576 | Feb. 10, 1976 | Nov. 23, 1976 | B 485,169 | 3,989,791 | Mar. 16, 1976 | Nov. 2, 1976 |
| B 471,494 | 3,993,660 | Mar. 16, 1976 | Nov. 23, 1976 | B 485,188 | 4,001,170 | Mar. 16, 1976 | Jan. 4, 1977 |
| B 471,579 | 3,985,689 | Jan. 13, 1976 | Oct. 12, 1976 | B 485,401 | 3,985,859 | Jan. 27, 1976 | Oct. 12, 1976 |
| B 471,617 | 3,994,871 | Feb. 10, 1976 | Nov. 30, 1976 | B 485,575 | 3,996,565 | Feb. 24, 1976 | Dec. 7, 1976 |
| B 471,681 | 4,012,844 | Apr. 13, 1976 | Mar. 22, 1977 | B 485,926 | 4,006,357 | Mar. 23, 1976 | Feb. 1, 1977 |
| B 471,735 | 3,989,408 | Feb. 3, 1976 | Nov. 2, 1976 | B 486,280 | 3,983,130 | Feb. 3, 1976 | Sep. 28, 1976 |
| B 471,836 | 4,000,150 | Feb. 24, 1976 | Dec. 28, 1976 | B 486,614 | 3,995,835 | Feb. 17, 1976 | Dec. 7, 1976 |
| B 472,241 | 3,992,453 | Feb. 17, 1976 | Nov. 16, 1976 | B 486,678 | 4,001,273 | Mar. 2, 1976 | Jan. 4, 1977 |
| B 472,256 | 3,985,789 | Jan. 13, 1976 | Oct. 12, 1976 | B 486,828 | 3,989,651 | Mar. 2, 1976 | Nov. 2, 1976 |
| B 472,284 | 3,982,078 | Jan. 13, 1976 | Sep. 21, 1976 | B 487,062 | D 241,256 | Feb. 10, 1976 | Nov. 9, 1976 |
| B 472,591 | 4,013,029 | Apr. 6, 1976 | Mar. 22, 1977 | B 487,078 | 4,012,895 | Mar. 30, 1976 | Mar. 22, 1977 |
| B 472,760 | 4,001,330 | Apr. 13, 1976 | Jan. 4, 1977 | B 487,133 | 3,989,826 | Jan. 27, 1976 | Nov. 2, 1976 |
| B 473,039 | 3,985,747 | Feb. 10, 1976 | Oct. 12, 1976 | B 487,260 | 3,990,610 | Jan. 27, 1976 | Nov. 9, 1976 |
| B 473,040 | 3,985,738 | Feb. 10, 1976 | Oct. 12, 1976 | B 487,411 | 3,983,579 | Feb. 24, 1976 | Sep. 28, 1976 |
| B 473,813 | 3,989,071 | Mar. 9, 1976 | Nov. 2, 1976 | B 487,423 | 3,998,810 | Mar. 2, 1976 | Dec. 21, 1976 |
| B 473,972 | 3,984,043 | Jan. 13, 1976 | Oct. 5, 1976 | B 487,427 | 3,995,788 | Mar. 2, 1976 | Dec. 7, 1976 |
| B 474,573 | 3,988,375 | Jan. 20, 1976 | Oct. 26, 1976 | B 487,467 | 4,014,847 | Apr. 13, 1976 | Mar. 29, 1977 |
| B 474,747 | 3,997,704 | Feb. 24, 1976 | Dec. 14, 1976 | B 488,111 | 3,985,765 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 475,236 | 3,989,990 | Feb. 3, 1976 | Nov. 2, 1976 | B 488,395 | 3,982,245 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 475,385 | 4,001,071 | Mar. 9, 1976 | Jan. 4, 1977 | B 488,634 | 3,982,158 | Jan. 20, 1976 | Sep. 21, 1976 |
| B 475,681 | 3,983,332 | Jan. 20, 1976 | Sep. 28, 1976 | B 488,756 | 3,991,810 | Mar. 16, 1976 | Nov. 16, 1976 |

# CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

| DOCUMENT NUMBER | PATENT NUMBER | PUB. DATE | ISSUE DATE | DOCUMENT NUMBER | PATENT NUMBER | PUB. DATE | ISSUE DATE |
|---|---|---|---|---|---|---|---|
| B 488,836 | 4,013,121 | Mar. 30, 1976 | Mar. 22, 1977 | B 498,500 | 3,982,241 | Jan. 20, 1976 | Sep. 21, 1976 |
| B 489,290 | 3,998,081 | Feb. 17, 1976 | Dec. 21, 1976 | B 498,775 | 3,993,868 | Mar. 2, 1976 | Nov. 23, 1976 |
| B 489,328 | 3,990,088 | Jan. 20, 1976 | Nov. 2, 1976 | B 498,820 | 3,996,670 | Mar. 9, 1976 | Dec. 14, 1976 |
| B 489,331 | 3,996,175 | Feb. 17, 1976 | Dec. 7, 1976 | B 498,951 | 3,996,907 | Mar. 2, 1976 | Dec. 14, 1976 |
| B 489,485 | D 243,266 | Apr. 13, 1976 | Feb. 1, 1977 | B 499,171 | 3,985,192 | Jan. 27, 1976 | Oct. 12, 1976 |
| B 489,550 | 4,000,710 | Mar. 16, 1976 | Jan. 4, 1977 | B 499,209 | 3,995,907 | Feb. 24, 1976 | Dec. 7, 1976 |
| B 489,685 | 3,984,085 | Feb. 24, 1976 | Oct. 5, 1976 | B 499,227 | 3,981,344 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 490,067 | 3,986,600 | Jan. 27, 1976 | Oct. 19, 1976 | B 499,324 | 4,001,375 | Mar. 16, 1976 | Jan. 4, 1977 |
| B 490,547 | 3,999,439 | Feb. 24, 1976 | Dec. 28, 1976 | B 499,352 | 3,981,391 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 490,551 | D 243,168 | Apr. 6, 1976 | Jan. 25, 1977 | B 499,370 | 4,013,544 | Mar. 30, 1976 | Mar. 22, 1977 |
| B 490,589 | 3,990,680 | Feb. 3, 1976 | Nov. 9, 1976 | B 499,718 | 3,990,058 | Jan. 27, 1976 | Nov. 2, 1976 |
| B 490,623 | 3,996,964 | Mar. 2, 1976 | Dec. 14, 1976 | B 499,786 | 4,000,663 | Mar. 16, 1976 | Jan. 4, 1977 |
| B 490,647 | 3,985,196 | Feb. 24, 1976 | Oct. 12, 1976 | B 500,171 | 3,997,262 | Mar. 30, 1976 | Dec. 14, 1976 |
| B 490,806 | 3,989,486 | Feb. 3, 1976 | Nov. 2, 1976 | B 500,176 | 3,995,316 | Feb. 3, 1976 | Nov. 30, 1976 |
| B 490,812 | 3,998,842 | Mar. 30, 1976 | Dec. 21, 1976 | B 500,408 | D 242,721 | Mar. 16, 1976 | Dec. 14, 1976 |
| B 490,946 | 3,993,652 | Feb. 17, 1976 | Nov. 23, 1976 | B 500,945 | 3,996,817 | Feb. 24, 1976 | Dec. 14, 1976 |
| B 490,995 | 3,995,031 | Feb. 3, 1976 | Nov. 30, 1976 | B 500,959 | 4,014,853 | Apr. 13, 1976 | Mar. 29, 1977 |
| B 491,032 | 3,981,892 | Feb. 10, 1976 | Sep. 21, 1976 | B 500,981 | 3,984,681 | Jan. 27, 1976 | Oct. 5, 1976 |
| B 491,052 | 3,985,790 | Mar. 2, 1976 | Oct. 12, 1976 | B 501,122 | 3,981,385 | Feb. 17, 1976 | Sep. 21, 1976 |
| B 491,111 | 3,997,916 | Feb. 17, 1976 | Dec. 14, 1976 | B 501,181 | 3,984,761 | Feb. 10, 1976 | Oct. 5, 1976 |
| B 491,455 | 3,991,167 | Feb. 3, 1976 | Nov. 9, 1976 | B 501,253 | 3,994,015 | Feb. 3, 1976 | Nov. 23, 1976 |
| B 491,501 | 3,984,914 | Jan. 13, 1976 | Oct. 12, 1976 | B 501,317 | 3,985,643 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 491,618 | 4,007,950 | Mar. 16, 1976 | Feb. 15, 1977 | B 501,379 | 4,013,696 | Mar. 30, 1976 | Mar. 22, 1977 |
| B 491,650 | 3,999,044 | Mar. 9, 1976 | Dec. 21, 1976 | B 501,415 | 3,982,051 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 491,673 | 3,994,770 | Feb. 17, 1976 | Nov. 30, 1976 | B 501,482 | 4,012,650 | Jan. 13, 1976 | Mar. 15, 1977 |
| B 491,776 | 3,986,298 | Mar. 16, 1976 | Oct. 19, 1976 | B 501,503 | 4,001,640 | Mar. 2, 1976 | Jan. 4, 1977 |
| B 491,883 | 3,984,412 | Feb. 3, 1976 | Oct. 5, 1976 | B 501,540 | 3,985,694 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 491,906 | D 242,223 | Feb. 10, 1976 | Nov. 9, 1976 | B 501,975 | 3,998,466 | Mar. 2, 1976 | Dec. 21, 1976 |
| B 492,039 | 3,997,541 | Feb. 24, 1976 | Dec. 14, 1976 | B 501,993 | 3,981,606 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 492,093 | 4,003,658 | Mar. 23, 1976 | Jan. 18, 1977 | B 502,151 | 3,998,614 | Mar. 23, 1976 | Dec. 21, 1976 |
| B 492,120 | 3,995,692 | Feb. 24, 1976 | Dec. 7, 1976 | B 502,161 | 4,000,500 | Mar. 2, 1976 | Dec. 28, 1976 |
| B 492,301 | 3,981,073 | Jan. 13, 1976 | Sep. 21, 1976 | B 502,289 | 3,982,274 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 492,373 | 4,010,908 | Mar. 30, 1976 | Mar. 8, 1977 | B 502,381 | D 242,231 | Mar. 16, 1976 | Nov. 9, 1976 |
| B 492,688 | 3,983,415 | Jan. 20, 1976 | Sep. 28, 1976 | B 502,540 | 3,983,698 | Jan. 13, 1976 | Oct. 5, 1976 |
| B 492,716 | 3,998,739 | Mar. 2, 1976 | Dec. 21, 1976 | B 502,571 | D 242,433 | Apr. 6, 1976 | Nov. 23, 1976 |
| B 492,774 | 4,001,843 | Mar. 9, 1976 | Jan. 4, 1977 | B 502,589 | 3,989,652 | Jan. 27, 1976 | Nov. 2, 1976 |
| B 492,902 | 3,993,859 | Feb. 24, 1976 | Nov. 23, 1976 | B 502,652 | 3,989,186 | Feb. 24, 1976 | Nov. 2, 1976 |
| B 492,946 | 3,991,303 | Jan. 27, 1976 | Nov. 9, 1976 | B 502,667 | 3,991,431 | Feb. 24, 1976 | Nov. 16, 1976 |
| B 493,254 | D 243,267 | Apr. 13, 1976 | Feb. 1, 1977 | B 502,973 | 3,982,161 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 493,370 | 3,984,792 | Mar. 16, 1976 | Oct. 5, 1976 | B 502,993 | 3,992,489 | Feb. 17, 1976 | Nov. 16, 1976 |
| B 493,463 | 4,013,510 | Mar. 23, 1976 | Mar. 22, 1977 | B 503,029 | 3,986,879 | Jan. 27, 1976 | Oct. 19, 1976 |
| B 493,474 | 4,013,565 | Mar. 23, 1976 | Mar. 22, 1977 | B 503,345 | 4,001,235 | Feb. 24, 1976 | Jan. 4, 1977 |
| B 493,501 | 3,988,061 | Feb. 3, 1976 | Oct. 26, 1976 | B 503,371 | 4,009,401 | Mar. 30, 1976 | Feb. 22, 1977 |
| B 493,686 | 4,008,338 | Mar. 23, 1976 | Feb. 15, 1977 | B 503,436 | 3,988,819 | Feb. 24, 1976 | Nov. 2, 1976 |
| B 493,955 | 3,989,830 | Mar. 9, 1976 | Nov. 2, 1976 | B 503,456 | 4,007,702 | Mar. 23, 1976 | Feb. 15, 1977 |
| B 493,981 | 3,990,165 | Mar. 9, 1976 | Nov. 9, 1976 | B 503,521 | 3,999,646 | Mar. 16, 1976 | Dec. 28, 1976 |
| B 494,234 | 3,983,808 | Feb. 10, 1976 | Oct. 5, 1976 | B 503,579 | 3,989,680 | Feb. 10, 1976 | Nov. 2, 1976 |
| B 494,339 | 4,001,255 | Mar. 16, 1976 | Jan. 4, 1977 | B 503,618 | 3,997,782 | Mar. 9, 1976 | Dec. 14, 1976 |
| B 494,383 | 3,991,289 | Feb. 3, 1976 | Nov. 9, 1976 | B 503,742 | 3,989,756 | Feb. 17, 1976 | Nov. 2, 1976 |
| B 494,669 | 3,991,104 | Feb. 3, 1976 | Nov. 9, 1976 | B 503,776 | 4,016,000 | Mar. 23, 1976 | Apr. 5, 1977 |
| B 494,691 | 3,987,457 | Mar. 16, 1976 | Oct. 19, 1976 | B 503,780 | 3,990,055 | Mar. 16, 1976 | Nov. 2, 1976 |
| B 494,806 | 3,989,210 | Feb. 3, 1976 | Nov. 2, 1976 | B 503,817 | 3,988,307 | Jan. 13, 1976 | Oct. 26, 1976 |
| B 494,944 | 3,992,469 | Feb. 17, 1976 | Nov. 16, 1976 | B 504,056 | 3,993,923 | Feb. 24, 1976 | Nov. 23, 1976 |
| B 495,185 | 3,999,166 | Mar. 9, 1976 | Dec. 21, 1976 | B 504,061 | 3,987,534 | Mar. 16, 1976 | Oct. 26, 1976 |
| B 495,331 | 4,000,456 | Mar. 16, 1976 | Dec. 28, 1976 | B 504,156 | 3,999,048 | Mar. 23, 1976 | Dec. 21, 1976 |
| B 495,402 | 3,983,988 | Feb. 17, 1976 | Oct. 5, 1976 | B 504,169 | 3,981,219 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 495,408 | 4,000,222 | Feb. 3, 1976 | Dec. 28, 1976 | B 504,404 | 3,996,499 | Feb. 24, 1976 | Dec. 7, 1976 |
| B 495,489 | 3,984,571 | Feb. 3, 1976 | Oct. 5, 1976 | B 504,405 | 4,007,401 | Apr. 13, 1976 | Feb. 8, 1977 |
| B 495,550 | 3,993,666 | Feb. 3, 1976 | Nov. 23, 1976 | B 504,439 | 3,999,398 | Mar. 16, 1976 | Dec. 28, 1976 |
| B 495,554 | 3,993,665 | Feb. 3, 1976 | Nov. 23, 1976 | B 504,503 | 3,999,210 | Mar. 9, 1976 | Dec. 21, 1976 |
| B 495,759 | 3,989,998 | Feb. 3, 1976 | Nov. 2, 1976 | B 504,582 | 4,005,138 | Mar. 30, 1976 | Jan. 25, 1977 |
| B 495,781 | 4,013,699 | Mar. 23, 1976 | Mar. 22, 1977 | B 504,778 | 3,986,650 | Feb. 24, 1976 | Oct. 19, 1976 |
| B 495,903 | 3,995,997 | Feb. 17, 1976 | Dec. 7, 1976 | B 504,877 | 3,997,564 | Feb. 24, 1976 | Dec. 14, 1976 |
| B 496,430 | 3,991,140 | Feb. 10, 1976 | Nov. 9, 1976 | B 504,899 | 3,991,273 | Mar. 9, 1976 | Nov. 9, 1976 |
| B 496,431 | 3,985,894 | Jan. 13, 1976 | Oct. 12, 1976 | B 505,126 | 3,981,745 | Feb. 10, 1976 | Sep. 21, 1976 |
| B 496,487 | 3,982,261 | Jan. 20, 1976 | Sep. 21, 1976 | B 505,221 | 4,013,627 | Mar. 30, 1976 | Mar. 22, 1977 |
| B 496,500 | 3,985,962 | Feb. 3, 1976 | Oct. 12, 1976 | B 505,582 | 4,001,659 | Mar. 23, 1976 | Jan. 4, 1977 |
| B 496,502 | 3,987,444 | Jan. 20, 1976 | Oct. 19, 1976 | B 505,689 | 3,987,631 | Mar. 2, 1976 | Oct. 26, 1976 |
| B 496,792 | 3,999,959 | Feb. 17, 1976 | Dec. 28, 1976 | B 505,813 | 3,985,175 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 496,964 | 3,999,219 | Apr. 20, 1976 | Dec. 21, 1976 | B 506,144 | 3,991,147 | Feb. 10, 1976 | Nov. 9, 1976 |
| B 496,999 | 3,983,804 | Jan. 27, 1976 | Oct. 5, 1976 | B 506,148 | 3,988,319 | Feb. 3, 1976 | Oct. 26, 1976 |
| B 497,021 | 3,985,039 | Jan. 13, 1976 | Oct. 12, 1976 | B 506,167 | 3,990,652 | Feb. 10, 1976 | Nov. 9, 1976 |
| B 497,194 | 3,988,267 | Feb. 3, 1976 | Oct. 26, 1976 | B 506,286 | 3,982,085 | Jan. 20, 1976 | Sep. 21, 1976 |
| B 497,292 | 3,994,052 | Feb. 3, 1976 | Nov. 30, 1976 | B 506,461 | 3,987,348 | Jan. 20, 1976 | Oct. 19, 1976 |
| B 497,293 | 4,011,412 | Mar. 30, 1976 | Mar. 8, 1977 | B 506,566 | 3,985,402 | Jan. 20, 1976 | Oct. 12, 1976 |
| B 497,473 | 3,990,839 | Feb. 3, 1976 | Nov. 9, 1976 | B 506,624 | 3,999,695 | Mar. 9, 1976 | Dec. 28, 1976 |
| B 497,571 | 4,009,997 | Mar. 23, 1976 | Mar. 1, 1977 | B 506,648 | 3,994,857 | Feb. 3, 1976 | Nov. 30, 1976 |
| B 497,584 | 3,988,184 | Feb. 24, 1976 | Oct. 26, 1976 | B 506,744 | 3,981,176 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 497,702 | 3,996,589 | Mar. 2, 1976 | Dec. 7, 1976 | B 506,760 | 4,012,835 | Apr. 13, 1976 | Mar. 22, 1977 |
| B 497,780 | 3,997,500 | Feb. 24, 1976 | Dec. 14, 1976 | B 506,839 | 4,005,389 | Mar. 23, 1976 | Jan. 25, 1977 |
| B 497,853 | 3,987,934 | Feb. 17, 1976 | Oct. 26, 1976 | B 506,840 | 4,002,928 | Mar. 23, 1976 | Jan. 11, 1977 |
| B 497,896 | D 243,091 | Apr. 6, 1976 | Jan. 18, 1977 | B 506,916 | 3,986,140 | Feb. 3, 1976 | Oct. 12, 1976 |
| B 497,960 | 3,991,325 | Jan. 20, 1976 | Nov. 9, 1976 | B 506,926 | 3,993,232 | Feb. 17, 1976 | Nov. 23, 1976 |
| B 498,208 | 4,001,480 | Apr. 13, 1976 | Jan. 4, 1977 | B 507,087 | 3,991,389 | Feb. 17, 1976 | Nov. 9, 1976 |
| B 498,288 | 4,013,657 | Mar. 23, 1976 | Mar. 22, 1977 | B 507,131 | 4,000,499 | Mar. 2, 1976 | Dec. 28, 1976 |
| B 498,775 | 3,993,868 | Mar. 2, 1976 | Nov. 23, 1976 | B 507,166 | 4,014,738 | Apr. 13, 1976 | Mar. 29, 1977 |
| B 498,205 | 3,989,611 | Feb. 10, 1976 | Nov. 2, 1976 | B 507,396 | 3,995,167 | Feb. 10, 1976 | Nov. 30, 1976 |



# CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

| DOCUMENT NUMBER | PATENT NUMBER | PUB. DATE | ISSUE DATE | DOCUMENT NUMBER | PATENT NUMBER | PUB. DATE | ISSUE DATE |
|---|---|---|---|---|---|---|---|
| B 507,476 | 3,994,680 | Feb. 10, 1976 | Nov. 30, 1976 | B 517,957 | D 243,089 | Apr. 6, 1976 | Jan. 18, 1977 |
| B 507,647 | 3,982,240 | Jan. 27, 1976 | Sep. 21, 1976 | B 518,076 | 4,014,914 | Mar. 30, 1976 | Mar. 29, 1977 |
| B 508,118 | 3,992,283 | Feb. 17, 1976 | Nov. 16, 1976 | B 518,226 | 3,993,509 | Feb. 10, 1976 | Nov. 23, 1976 |
| B 508,119 | 3,992,285 | Feb. 17, 1976 | Nov. 16, 1976 | B 518,326 | 4,008,282 | Mar. 23, 1976 | Feb. 15, 1977 |
| B 508,369 | 3,985,847 | Jan. 13, 1976 | Oct. 12, 1976 | B 518,656 | 3,989,732 | Feb. 17, 1976 | Nov. 2, 1976 |
| B 508,639 | 4,004,194 | Mar. 23, 1976 | Jan. 18, 1977 | B 518,859 | 3,989,971 | Feb. 3, 1976 | Nov. 2, 1976 |
| B 508,817 | 3,989,891 | Feb. 3, 1976 | Nov. 2, 1976 | B 518,999 | 3,990,323 | Feb. 3, 1976 | Nov. 9, 1976 |
| B 508,878 | 3,994,117 | Feb. 3, 1976 | Nov. 30, 1976 | B 519,095 | 3,993,621 | Feb. 24, 1976 | Nov. 23, 1976 |
| B 508,940 | 3,981,321 | Feb. 17, 1976 | Sep. 21, 1976 | B 519,355 | 4,014,829 | Apr. 13, 1976 | Mar. 29, 1977 |
| B 508,961 | 3,987,477 | Feb. 3, 1976 | Oct. 19, 1976 | B 519,377 | 3,987,223 | Jan. 27, 1976 | Oct. 19, 1976 |
| B 509,043 | 3,996,767 | Feb. 24, 1976 | Dec. 14, 1976 | B 519,446 | 3,985,815 | Feb. 24, 1976 | Oct. 12, 1976 |
| B 509,165 | 3,999,155 | Mar. 2, 1976 | Dec. 21, 1976 | B 519,485 | 3,991,134 | Feb. 10, 1976 | Nov. 9, 1976 |
| B 509,185 | 3,989,996 | Feb. 3, 1976 | Nov. 2, 1976 | B 519,486 | 3,992,481 | Feb. 17, 1976 | Nov. 16, 1976 |
| B 509,238 | 3,982,399 | Feb. 24, 1976 | Sep. 28, 1976 | B 519,487 | 3,992,337 | Feb. 17, 1976 | Nov. 16, 1976 |
| B 509,474 | 3,997,260 | Feb. 17, 1976 | Dec. 14, 1976 | B 519,599 | 3,995,350 | Feb. 17, 1976 | Dec. 7, 1976 |
| B 509,586 | 4,006,645 | Feb. 3, 1976 | Feb. 8, 1977 | B 519,623 | 4,012,049 | Apr. 6, 1976 | Mar. 15, 1977 |
| B 509,606 | 3,989,986 | Feb. 3, 1976 | Nov. 2, 1976 | B 519,680 | 4,014,660 | Mar. 30, 1976 | Mar. 29, 1977 |
| B 509,772 | 3,999,004 | Mar. 16, 1976 | Dec. 21, 1976 | B 519,932 | 3,988,618 | Feb. 3, 1976 | Oct. 26, 1976 |
| B 509,819 | 4,014,712 | Apr. 13, 1976 | Mar. 29, 1977 | B 519,979 | 3,982,067 | Feb. 3, 1976 | Sep. 21, 1976 |
| B 510,184 | D 242,784 | Apr. 6, 1976 | Dec. 21, 1976 | B 520,063 | 3,989,934 | Mar. 2, 1976 | Nov. 2, 1976 |
| B 510,278 | 4,008,972 | Mar. 30, 1976 | Feb. 22, 1977 | B 520,075 | 3,989,935 | Feb. 24, 1976 | Nov. 2, 1976 |
| B 510,281 | 3,993,215 | Mar. 9, 1976 | Nov. 23, 1976 | B 520,076 | 3,989,936 | Mar. 2, 1976 | Nov. 2, 1976 |
| B 510,346 | D 242,207 | Feb. 10, 1976 | Nov. 9, 1976 | B 520,082 | 3,989,937 | Mar. 23, 1976 | Nov. 2, 1976 |
| B 510,458 | 4,000,221 | Feb. 10, 1976 | Dec. 28, 1976 | B 520,115 | 4,003,072 | Mar. 23, 1976 | Jan. 11, 1977 |
| B 510,521 | 3,990,656 | Mar. 2, 1976 | Nov. 9, 1976 | B 520,227 | 4,002,823 | Mar. 30, 1976 | Jan. 11, 1977 |
| B 510,588 | 3,981,539 | Jan. 27, 1976 | Sep. 21, 1976 | B 520,256 | 3,985,730 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 510,677 | 3,989,541 | Feb. 24, 1976 | Nov. 2, 1976 | B 520,277 | 3,995,635 | Feb. 17, 1976 | Dec. 7, 1976 |
| B 510,682 | 4,000,978 | Mar. 30, 1976 | Jan. 4, 1977 | B 520,341 | 3,992,028 | Mar. 16, 1976 | Nov. 16, 1976 |
| B 510,836 | 4,013,795 | Mar. 23, 1976 | Mar. 22, 1977 | B 520,384 | 3,986,592 | Jan. 27, 1976 | Oct. 19, 1976 |
| B 510,850 | 3,989,841 | Feb. 3, 1976 | Nov. 2, 1976 | B 520,514 | 3,988,308 | Mar. 9, 1976 | Oct. 26, 1976 |
| B 510,855 | 3,981,059 | Jan. 27, 1976 | Sep. 21, 1976 | B 520,534 | 3,997,119 | Feb. 17, 1976 | Dec. 14, 1976 |
| B 511,907 | 3,999,622 | Mar. 30, 1976 | Dec. 28, 1976 | B 520,543 | 3,986,768 | Jan. 27, 1976 | Oct. 19, 1976 |
| B 510,998 | 3,992,336 | Feb. 10, 1976 | Nov. 16, 1976 | B 520,546 | 4,001,133 | Mar. 2, 1976 | Jan. 4, 1977 |
| B 511,002 | 3,998,717 | Mar. 2, 1976 | Dec. 21, 1976 | B 520,613 | 3,991,341 | Mar. 16, 1976 | Nov. 9, 1976 |
| B 511,099 | 3,990,162 | Feb. 3, 1976 | Nov. 9, 1976 | B 520,658 | 3,998,778 | Mar. 9, 1976 | Dec. 21, 1976 |
| B 511,156 | 3,981,364 | Jan. 27, 1976 | Sep. 21, 1976 | B 520,878 | 4,014,849 | Apr. 6, 1976 | Mar. 29, 1977 |
| B 511,346 | 3,984,072 | Jan. 27, 1976 | Oct. 5, 1976 | B 520,884 | 4,000,433 | Mar. 16, 1976 | Dec. 28, 1976 |
| B 511,407 | 3,981,485 | Feb. 10, 1976 | Sep. 21, 1976 | B 520,924 | 3,982,113 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 511,454 | 3,982,333 | Feb. 24, 1976 | Sep. 28, 1976 | B 520,928 | 3,983,617 | Jan. 13, 1976 | Oct. 5, 1976 |
| B 511,665 | 4,001,037 | Mar. 2, 1976 | Jan. 4, 1977 | B 520,952 | 4,000,876 | Mar. 16, 1976 | Jan. 4, 1977 |
| B 511,885 | 3,981,346 | Jan. 27, 1976 | Sep. 21, 1976 | B 520,995 | 4,009,996 | Mar. 23, 1976 | Mar. 1, 1977 |
| B 511,886 | 3,989,991 | Feb. 3, 1976 | Nov. 2, 1976 | B 521,025 | 3,998,838 | Mar. 23, 1976 | Dec. 21, 1976 |
| B 511,909 | 3,981,183 | Feb. 17, 1976 | Sep. 21, 1976 | B 521,044 | 3,983,435 | Feb. 24, 1976 | Sep. 28, 1976 |
| B 512,324 | 3,985,084 | Feb. 17, 1976 | Oct. 12, 1976 | B 521,045 | 3,983,433 | Feb. 24, 1976 | Sep. 28, 1976 |
| B 512,547 | 3,984,193 | Jan. 13, 1976 | Oct. 5, 1976 | B 521,046 | 3,983,434 | Feb. 24, 1976 | Sep. 28, 1976 |
| B 512,745 | 3,981,294 | Jan. 13, 1976 | Sep. 21, 1976 | B 521,125 | 3,994,865 | Feb. 10, 1976 | Nov. 30, 1976 |
| B 512,779 | 4,014,897 | Apr. 13, 1976 | Mar. 29, 1977 | B 521,126 | 3,997,510 | Feb. 10, 1976 | Dec. 14, 1976 |
| B 512,818 | 3,997,363 | Apr. 6, 1976 | Dec. 14, 1976 | B 521,127 | 3,996,201 | Feb. 17, 1976 | Dec. 7, 1976 |
| B 512,849 | 3,982,141 | Feb. 3, 1976 | Sep. 21, 1976 | B 521,128 | 3,997,511 | Feb. 10, 1976 | Dec. 14, 1976 |
| B 512,964 | 3,995,279 | Feb. 10, 1976 | Nov. 30, 1976 | B 521,324 | 3,983,143 | Jan. 27, 1976 | Sep. 28, 1976 |
| B 513,014 | 3,991,113 | Feb. 10, 1976 | Nov. 9, 1976 | B 521,480 | 3,982,665 | Jan. 13, 1976 | Sep. 28, 1976 |
| B 513,027 | 3,995,143 | Feb. 17, 1976 | Nov. 30, 1976 | B 521,600 | 3,981,458 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 513,134 | 4,006,764 | Mar. 23, 1976 | Feb. 8, 1977 | B 521,612 | 4,000,251 | Mar. 9, 1976 | Dec. 28, 1976 |
| B 513,280 | 3,988,211 | Jan. 20, 1976 | Oct. 26, 1976 | B 521,620 | 3,983,749 | Jan. 27, 1976 | Oct. 5, 1976 |
| B 513,368 | 3,982,138 | Feb. 3, 1976 | Sep. 21, 1976 | B 521,643 | 3,997,567 | Mar. 2, 1976 | Dec. 14, 1976 |
| B 513,706 | 3,986,064 | Jan. 13, 1976 | Oct. 12, 1976 | B 521,711 | 3,989,835 | Feb. 10, 1976 | Nov. 2, 1976 |
| B 513,756 | 3,993,869 | Feb. 3, 1976 | Nov. 23, 1976 | B 521,793 | 3,996,981 | Feb. 24, 1976 | Dec. 14, 1976 |
| B 513,781 | 4,001,324 | Feb. 24, 1976 | Jan. 4, 1977 | B 521,984 | 3,983,220 | Feb. 17, 1976 | Sep. 28, 1976 |
| B 513,789 | 3,981,599 | Feb. 3, 1976 | Sep. 21, 1976 | B 521,985 | 4,012,404 | Mar. 23, 1976 | Mar. 15, 1977 |
| B 513,791 | 4,008,608 | Mar. 30, 1976 | Feb. 22, 1977 | B 521,986 | 3,981,607 | Feb. 3, 1976 | Sep. 21, 1976 |
| B 514,259 | 4,013,649 | Mar. 23, 1976 | Mar. 22, 1977 | B 522,009 | 3,995,444 | Feb. 17, 1976 | Dec. 7, 1976 |
| B 514,687 | 3,986,522 | Jan. 27, 1976 | Oct. 19, 1976 | B 522,038 | 3,993,119 | Feb. 3, 1976 | Nov. 23, 1976 |
| B 515,135 | 3,990,085 | Feb. 17, 1976 | Nov. 2, 1976 | B 522,227 | 3,992,904 | Mar. 30, 1976 | Nov. 23, 1976 |
| B 515,303 | 3,987,939 | Jan. 20, 1976 | Oct. 26, 1976 | B 522,309 | 3,991,603 | Feb. 3, 1976 | Nov. 16, 1976 |
| B 515,368 | 4,014,733 | Apr. 6, 1976 | Mar. 29, 1977 | B 522,354 | 3,984,959 | Jan. 20, 1976 | Oct. 12, 1976 |
| B 515,452 | 3,995,243 | Feb. 10, 1976 | Nov. 30, 1976 | B 522,446 | 4,001,194 | Mar. 30, 1976 | Jan. 4, 1977 |
| B 515,455 | 3,982,149 | Jan. 27, 1976 | Sep. 21, 1976 | B 522,537 | 3,999,587 | Mar. 30, 1976 | Dec. 28, 1976 |
| B 515,642 | 4,001,258 | Feb. 24, 1976 | Jan. 4, 1977 | B 522,567 | 3,996,238 | Feb. 17, 1976 | Dec. 7, 1976 |
| B 515,908 | 3,984,676 | Jan. 20, 1976 | Oct. 5, 1976 | B 522,568 | D 242,785 | Apr. 6, 1976 | Dec. 21, 1976 |
| B 516,002 | 3,988,638 | Jan. 13, 1976 | Oct. 26, 1976 | B 522,577 | 3,982,123 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 516,032 | 3,986,634 | Jan. 27, 1976 | Oct. 19, 1976 | B 522,629 | 4,001,155 | Mar. 16, 1976 | Jan. 4, 1977 |
| B 516,047 | 3,985,741 | Feb. 10, 1976 | Oct. 12, 1976 | B 523,226 | 4,006,367 | Mar. 23, 1976 | Feb. 1, 1977 |
| B 516,060 | 3,983,572 | Feb. 17, 1976 | Sep. 28, 1976 | B 523,696 | 3,986,071 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 516,069 | 3,986,208 | Mar. 16, 1976 | Oct. 12, 1976 | B 523,885 | 3,981,040 | Feb. 17, 1976 | Sep. 21, 1976 |
| B 516,296 | 3,984,404 | Feb. 3, 1976 | Oct. 5, 1976 | B 523,952 | 3,988,707 | Mar. 23, 1976 | Oct. 26, 1976 |
| B 516,537 | 3,996,784 | Feb. 17, 1976 | Dec. 14, 1976 | B 524,026 | 3,992,206 | Feb. 10, 1976 | Nov. 16, 1976 |
| B 516,564 | 3,993,931 | Feb. 17, 1976 | Nov. 23, 1976 | B 524,121 | 3,982,536 | Feb. 3, 1976 | Sep. 28, 1976 |
| B 516,609 | 3,994,486 | Feb. 24, 1976 | Nov. 30, 1976 | B 524,179 | 3,985,872 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 516,625 | 4,013,542 | Mar. 30, 1976 | Mar. 22, 1977 | B 524,464 | 3,985,580 | Feb. 10, 1976 | Oct. 12, 1976 |
| B 516,804 | 3,991,209 | Mar. 23, 1976 | Nov. 9, 1976 | B 524,806 | 4,000,065 | Mar. 2, 1976 | Dec. 28, 1976 |
| B 516,825 | 3,988,885 | Feb. 3, 1976 | Nov. 2, 1976 | B 524,849 | 4,014,938 | Mar. 23, 1976 | Mar. 29, 1977 |
| B 517,273 | D 242,798 | Mar. 16, 1976 | Dec. 21, 1976 | B 525,133 | 3,996,481 | Mar. 23, 1976 | Dec. 7, 1976 |
| B 517,504 | 3,999,855 | Mar. 9, 1976 | Dec. 28, 1976 | B 525,204 | 4,001,109 | Mar. 16, 1976 | Jan. 4, 1977 |
| B 517,668 | 4,013,423 | Apr. 6, 1976 | Mar. 22, 1977 | B 525,809 | 3,985,040 | Feb. 24, 1976 | Oct. 12, 1976 |
| B 517,762 | 3,986,065 | Mar. 16, 1976 | Oct. 12, 1976 | B 525,961 | 3,985,557 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 517,858 | 4,000,999 | Feb. 17, 1976 | Jan. 4, 1977 | B 526,106 | 3,990,073 | Jan. 27, 1976 | Nov. 2, 1976 |
| B 517,956 | D 243,088 | Apr. 6, 1976 | Jan. 18, 1977 | B 526,190 | 3,982,129 | Feb. 17, 1976 | Sep. 21, 1976 |

# CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

| DOCUMENT NUMBER | PATENT NUMBER | PUB. DATE | ISSUE DATE | DOCUMENT NUMBER | PATENT NUMBER | PUB. DATE | ISSUE DATE |
|---|---|---|---|---|---|---|---|
| B 526,279 | 4,013,138 | Apr. 13, 1976 | Mar. 22, 1977 | B 535,268 | 3,999,045 | Mar. 30, 1976 | Dec. 21, 1976 |
| B 526,289 | 3,992,641 | Feb. 24, 1976 | Nov. 16, 1976 | B 535,386 | 3,981,150 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 526,388 | 3,992,017 | Feb. 3, 1976 | Nov. 16, 1976 | B 535,391 | 3,981,386 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 526,445 | 3,984,978 | Jan. 20, 1976 | Oct. 12, 1976 | B 535,411 | 3,990,543 | Feb. 24, 1976 | Nov. 9, 1976 |
| B 526,447 | 4,000,052 | Feb. 24, 1976 | Dec. 28, 1976 | B 535,437 | 3,997,555 | Feb. 24, 1976 | Dec. 14, 1976 |
| B 526,510 | 3,989,708 | Jan. 20, 1976 | Nov. 2, 1976 | B 535,448 | 3,997,123 | Mar. 16, 1976 | Dec. 14, 1976 |
| B 526,654 | 4,011,534 | Mar. 23, 1976 | Mar. 8, 1977 | B 535,466 | 3,981,309 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 526,942 | 4,013,700 | Mar. 30, 1976 | Mar. 22, 1977 | B 535,813 | 3,981,819 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 526,997 | 3,985,695 | Jan. 13, 1976 | Oct. 12, 1976 | B 535,928 | 3,981,466 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 527,040 | 4,013,515 | Mar. 23, 1976 | Mar. 22, 1977 | B 536,009 | 3,982,112 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 527,054 | 3,981,559 | Feb. 17, 1976 | Sep. 21, 1976 | B 536,082 | 3,997,783 | Mar. 16, 1976 | Dec. 14, 1976 |
| B 527,171 | 3,998,248 | Mar. 9, 1976 | Dec. 21, 1976 | B 536,322 | 4,001,272 | Mar. 23, 1976 | Jan. 4, 1977 |
| B 527,187 | 3,995,202 | Feb. 17, 1976 | Nov. 30, 1976 | B 536,403 | 3,998,341 | Mar. 23, 1976 | Dec. 21, 1976 |
| B 527,333 | 3,999,732 | Mar. 23, 1976 | Dec. 28, 1976 | B 536,511 | 3,995,989 | Mar. 9, 1976 | Dec. 7, 1976 |
| B 527,669 | 3,982,206 | Jan. 13, 1976 | Sep. 21, 1976 | B 536,675 | 3,985,773 | Jan. 20, 1976 | Oct. 12, 1976 |
| B 527,693 | 3,995,233 | Feb. 3, 1976 | Nov. 30, 1976 | B 536,923 | 4,007,828 | Mar. 30, 1976 | Feb. 15, 1977 |
| B 527,788 | D 242,337 | Feb. 10, 1976 | Nov. 16, 1976 | B 536,935 | 3,985,729 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 527,972 | 4,000,016 | Mar. 9, 1976 | Dec. 28, 1976 | B 537,058 | 4,000,969 | Mar. 23, 1976 | Jan. 4, 1977 |
| B 527,999 | 3,981,682 | Feb. 3, 1976 | Sep. 21, 1976 | B 537,102 | 3,981,829 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 528,297 | 4,001,138 | Mar. 16, 1976 | Jan. 4, 1977 | B 537,709 | 3,981,368 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 528,303 | 3,991,023 | Feb. 10, 1976 | Nov. 9, 1976 | B 537,711 | 3,985,748 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 528,401 | 3,991,619 | Feb. 3, 1976 | Nov. 16, 1976 | B 537,722 | 3,985,423 | Feb. 3, 1976 | Oct. 12, 1976 |
| B 528,756 | 3,990,476 | Feb. 3, 1976 | Nov. 9, 1976 | B 537,903 | 3,986,492 | Jan. 20, 1976 | Oct. 19, 1976 |
| B 528,761 | 3,982,221 | Feb. 10, 1976 | Sep. 21, 1976 | B 538,472 | 3,992,884 | Feb. 3, 1976 | Nov. 23, 1976 |
| B 528,962 | 3,989,666 | Feb. 24, 1976 | Nov. 2, 1976 | B 538,491 | 3,982,928 | Feb. 17, 1976 | Sep. 28, 1976 |
| B 528,966 | 3,989,667 | Feb. 24, 1976 | Nov. 2, 1976 | B 538,686 | 3,982,199 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 529,156 | 3,989,158 | Jan. 13, 1976 | Nov. 2, 1976 | B 538,753 | 3,993,642 | Feb. 10, 1976 | Nov. 23, 1976 |
| B 529,194 | 4,000,776 | Mar. 23, 1976 | Jan. 4, 1977 | B 539,374 | 3,996,229 | Mar. 9, 1976 | Dec. 7, 1976 |
| B 529,214 | 4,013,004 | Apr. 20, 1976 | Mar. 22, 1977 | B 539,746 | 3,983,423 | Feb. 17, 1976 | Sep. 28, 1976 |
| B 529,659 | 3,996,875 | Feb. 24, 1976 | Dec. 14, 1976 | B 540,078 | 3,984,701 | Jan. 13, 1976 | Oct. 5, 1976 |
| B 529,836 | 3,994,345 | Feb. 3, 1976 | Nov. 30, 1976 | B 540,218 | 3,986,108 | Feb. 10, 1976 | Oct. 12, 1976 |
| B 529,925 | 4,014,003 | Mar. 30, 1976 | Mar. 22, 1977 | B 540,632 | 3,981,600 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 529,974 | 3,987,098 | Feb. 17, 1976 | Oct. 19, 1976 | B 540,703 | 4,013,206 | Apr. 13, 1976 | Mar. 22, 1977 |
| B 530,174 | 3,993,635 | Feb. 24, 1976 | Nov. 23, 1976 | B 540,767 | 3,986,010 | Mar. 16, 1976 | Oct. 12, 1976 |
| B 530,255 | 3,996,103 | Mar. 2, 1976 | Dec. 7, 1976 | B 540,872 | 3,982,135 | Jan. 20, 1976 | Sep. 21, 1976 |
| B 530,263 | 4,009,736 | Mar. 30, 1976 | Mar. 1, 1977 | B 540,888 | 4,005,528 | Mar. 30, 1976 | Feb. 1, 1977 |
| B 530,285 | 4,013,903 | Apr. 6, 1976 | Mar. 22, 1977 | B 541,015 | 3,993,208 | Jan. 27, 1976 | Nov. 23, 1976 |
| B 530,303 | 4,006,029 | Mar. 23, 1976 | Feb. 1, 1977 | B 541,376 | 3,981,690 | Feb. 17, 1976 | Sep. 21, 1976 |
| B 530,318 | 3,985,752 | Jan. 13, 1976 | Oct. 12, 1976 | B 541,415 | 3,982,080 | Feb. 3, 1976 | Sep. 21, 1976 |
| B 530,437 | 4,014,857 | Apr. 13, 1976 | Mar. 29, 1977 | B 541,464 | 3,995,424 | Feb. 17, 1976 | Dec. 7, 1976 |
| B 530,569 | 3,999,865 | Mar. 16, 1976 | Dec. 28, 1976 | B 541,496 | 3,982,232 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 530,580 | 4,001,151 | Mar. 2, 1976 | Jan. 4, 1977 | B 541,501 | 4,005,826 | Apr. 13, 1976 | Feb. 1, 1977 |
| B 530,605 | 3,989,064 | Feb. 3, 1976 | Nov. 2, 1976 | B 541,517 | 3,986,156 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 530,709 | 4,012,944 | Apr. 6, 1976 | Mar. 22, 1977 | B 541,710 | 3,994,472 | Feb. 24, 1976 | Nov. 30, 1976 |
| B 530,813 | 3,986,131 | Feb. 17, 1976 | Oct. 12, 1976 | B 542,135 | 3,986,939 | Feb. 10, 1976 | Oct. 19, 1976 |
| B 530,873 | 4,001,016 | Feb. 17, 1976 | Jan. 4, 1977 | B 542,158 | 3,981,886 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 530,925 | 3,983,161 | Feb. 24, 1976 | Sep. 28, 1976 | B 542,226 | 3,993,748 | Feb. 24, 1976 | Nov. 23, 1976 |
| B 531,096 | 3,984,415 | Feb. 10, 1976 | Oct. 5, 1976 | B 542,258 | 4,013,536 | Mar. 23, 1976 | Mar. 22, 1977 |
| B 531,267 | 3,997,040 | Feb. 24, 1976 | Dec. 14, 1976 | B 543,078 | 3,995,687 | Feb. 17, 1976 | Dec. 7, 1976 |
| B 531,425 | 3,992,595 | Feb. 3, 1976 | Nov. 16, 1976 | B 543,941 | 3,985,528 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 531,566 | 3,997,820 | Mar. 16, 1976 | Dec. 14, 1976 | B 544,034 | 3,997,175 | Feb. 17, 1976 | Dec. 14, 1976 |
| B 531,686 | 3,990,017 | Mar. 23, 1976 | Nov. 2, 1976 | B 544,476 | 3,993,585 | Feb. 24, 1976 | Nov. 23, 1976 |
| B 531,753 | 3,988,843 | Mar. 2, 1976 | Nov. 2, 1976 | B 544,899 | 3,994,962 | Feb. 17, 1976 | Nov. 30, 1976 |
| B 531,929 | 3,986,067 | Jan. 20, 1976 | Oct. 12, 1976 | B 544,961 | 3,983,492 | Jan. 13, 1976 | Sep. 28, 1976 |
| B 532,005 | 3,992,397 | Feb. 24, 1976 | Nov. 16, 1976 | B 545,050 | 3,982,073 | Jan. 20, 1976 | Sep. 21, 1976 |
| B 532,140 | 4,001,299 | Mar. 2, 1976 | Jan. 4, 1977 | B 545,265 | D 243,090 | Apr. 13, 1976 | Jan. 18, 1977 |
| B 532,319 | 3,990,292 | Feb. 3, 1976 | Nov. 9, 1976 | B 545,299 | 4,001,259 | Feb. 24, 1976 | Jan. 4, 1977 |
| B 532,326 | 3,993,959 | Mar. 23, 1976 | Nov. 23, 1976 | B 545,344 | 4,012,746 | Mar. 30, 1976 | Mar. 15, 1977 |
| B 532,424 | D 242,292 | Feb. 10, 1976 | Nov. 9, 1976 | B 545,464 | 3,992,387 | Feb. 10, 1976 | Nov. 16, 1976 |
| B 532,476 | 3,992,756 | Feb. 3, 1976 | Nov. 23, 1976 | B 545,630 | 3,981,337 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 532,477 | 4,014,895 | Apr. 13, 1976 | Mar. 29, 1977 | B 545,777 | 4,004,906 | Jan. 27, 1976 | Jan. 25, 1977 |
| B 532,679 | 4,010,706 | Apr. 6, 1976 | Mar. 8, 1977 | B 545,856 | 4,006,939 | Mar. 30, 1976 | Feb. 8, 1977 |
| B 532,901 | 3,984,318 | Jan. 13, 1976 | Oct. 5, 1976 | B 545,935 | 3,990,337 | Jan. 27, 1976 | Nov. 9, 1976 |
| B 532,969 | 3,981,706 | Jan. 13, 1976 | Sep. 21, 1976 | B 545,945 | 3,995,260 | Jan. 27, 1976 | Nov. 30, 1976 |
| B 532,976 | 4,000,837 | Mar. 23, 1976 | Jan. 4, 1977 | B 546,097 | 3,999,309 | Mar. 23, 1976 | Dec. 28, 1976 |
| B 533,056 | 3,983,969 | Jan. 13, 1976 | Oct. 5, 1976 | B 546,295 | 3,987,070 | Jan. 20, 1976 | Oct. 19, 1976 |
| B 533,259 | 3,999,556 | Feb. 24, 1976 | Dec. 28, 1976 | B 546,426 | 3,982,063 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 533,454 | 3,996,566 | Mar. 2, 1976 | Dec. 7, 1976 | B 546,631 | 3,983,729 | Feb. 3, 1976 | Oct. 5, 1976 |
| B 533,580 | 3,982,255 | Feb. 3, 1976 | Sep. 21, 1976 | B 546,665 | 3,990,062 | Jan. 20, 1976 | Nov. 2, 1976 |
| B 533,652 | 4,000,196 | Mar. 23, 1976 | Dec. 28, 1976 | B 546,677 | 4,015,654 | Apr. 6, 1976 | Apr. 5, 1977 |
| B 533,734 | 3,984,799 | Jan. 27, 1976 | Oct. 5, 1976 | B 546,911 | 3,981,058 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 533,968 | 3,986,576 | Jan. 27, 1976 | Oct. 19, 1976 | B 546,922 | 3,987,742 | Mar. 16, 1976 | Oct. 26, 1976 |
| B 534,016 | 3,983,381 | Feb. 3, 1976 | Sep. 28, 1976 | B 547,016 | 3,999,741 | Mar. 23, 1976 | Dec. 28, 1976 |
| B 534,313 | 3,981,675 | Jan. 27, 1976 | Sep. 21, 1976 | B 547,208 | 4,001,218 | Feb. 24, 1976 | Jan. 4, 1977 |
| B 534,314 | 3,981,786 | Feb. 10, 1976 | Sep. 21, 1976 | B 547,547 | 3,997,670 | Feb. 24, 1976 | Dec. 14, 1976 |
| B 534,333 | 3,981,480 | Feb. 17, 1976 | Sep. 21, 1976 | B 547,994 | 3,990,081 | Jan. 20, 1976 | Nov. 2, 1976 |
| B 534,334 | D 242,722 | Mar. 16, 1976 | Dec. 14, 1976 | B 548,028 | 3,991,517 | Feb. 3, 1976 | Nov. 16, 1976 |
| B 534,443 | 3,989,970 | Jan. 27, 1976 | Nov. 2, 1976 | B 548,058 | 3,983,050 | Feb. 17, 1976 | Sep. 28, 1976 |
| B 534,574 | 3,995,624 | Feb. 24, 1976 | Dec. 7, 1976 | B 548,155 | 3,981,477 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 534,591 | 3,991,141 | Feb. 17, 1976 | Nov. 9, 1976 | B 548,440 | 3,993,401 | Feb. 3, 1976 | Nov. 23, 1976 |
| B 534,680 | 4,014,904 | Apr. 20, 1976 | Mar. 29, 1977 | B 548,302 | 3,983,414 | Feb. 17, 1976 | Sep. 28, 1976 |
| B 534,767 | 3,982,180 | Feb. 3, 1976 | Sep. 21, 1976 | B 548,440 | 3,993,401 | Feb. 3, 1976 | Nov. 23, 1976 |
| B 534,915 | 4,012,668 | Mar. 23, 1976 | Mar. 15, 1977 | B 548,462 | D 242,283 | Feb. 10, 1976 | Nov. 9, 1976 |
| B 534,991 | 3,983,517 | Jan. 27, 1976 | Sep. 28, 1976 | B 548,688 | 3,995,984 | Mar. 9, 1976 | Dec. 7, 1976 |
| B 535,076 | 3,981,718 | Jan. 20, 1976 | Sep. 21, 1976 | B 548,719 | 3,990,553 | Feb. 17, 1976 | Nov. 9, 1976 |
| B 535,209 | 4,001,873 | Mar. 16, 1976 | Jan. 4, 1977 | B 548,978 | 3,998,139 | Mar. 9, 1976 | Dec. 21, 1976 |
| B 535,256 | 3,999,150 | Mar. 23, 1976 | Dec. 21, 1976 | B 549,198 | 3,981,975 | Jan. 13, 1976 | Sep. 21, 1976 |



CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

| DOCUMENT NUMBER | PATENT NUMBER | PUB. DATE | ISSUE DATE | DOCUMENT NUMBER | PATENT NUMBER | PUB. DATE | ISSUE DATE |
|---|---|---|---|---|---|---|---|
| B 549,244 | 3,981,125 | Jan. 27, 1976 | Sep. 21, 1976 | B 563,419 | 3,999,051 | Mar. 23, 1976 | Dec. 21, 1976 |
| B 549,394 | 3,981,611 | Jan. 27, 1976 | Sep. 21, 1976 | B 563,722 | 3,990,925 | Jan. 13, 1976 | Nov. 9, 1976 |
| B 549,931 | 3,986,141 | Jan. 20, 1976 | Oct. 12, 1976 | B 563,780 | 3,987,769 | Feb. 3, 1976 | Oct. 26, 1976 |
| B 549,964 | 3,995,899 | Feb. 24, 1976 | Dec. 7, 1976 | B 563,932 | 4,000,638 | Mar. 23, 1976 | Jan. 4, 1977 |
| B 550,693 | 3,982,194 | Jar. 20, 1976 | Sep. 21, 1976 | B 564,252 | 4,001,293 | Mar. 2, 1976 | Jan. 4, 1977 |
| B 550,744 | 3,993,550 | Feb. 17, 1976 | Nov. 23, 1976 | B 564,255 | 4,015,996 | Mar. 30, 1976 | Apr. 5, 1977 |
| B 550,810 | 4,000,910 | Mar. 23, 1976 | Jan. 4, 1977 | B 564,314 | 3,984,996 | Jan. 20, 1976 | Oct. 12, 1976 |
| B 551,133 | 3,996,740 | Mar. 2, 1976 | Dec. 14, 1976 | B 564,902 | 4,001,351 | Mar. 23, 1976 | Jan. 4, 1977 |
| B 551,463 | 3,996,254 | Feb. 17, 1976 | Dec. 7, 1976 | B 565,180 | 3,981,685 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 551,527 | 3,982,599 | Jan. 13, 1976 | Sep. 28, 1976 | B 565,275 | 3,990,299 | Apr. 6, 1976 | Nov. 9, 1976 |
| B 551,809 | 3,996,743 | Feb. 24, 1976 | Dec. 14, 1976 | B 565,717 | 3,999,138 | Apr. 13, 1976 | Dec. 21, 1976 |
| B 551,952 | Re. 29,059 | Mar. 2, 1976 | Dec. 7, 1976 | B 565,754 | 4,011,626 | Mar. 30, 1976 | Mar. 15, 1977 |
| B 552,006 | 3,992,129 | Feb. 3, 1976 | Nov. 16, 1976 | B 566,464 | 3,996,367 | Feb. 3, 1976 | Dec. 7, 1976 |
| B 552,489 | 3,994,864 | Feb. 10, 1976 | Nov. 30, 1976 | B 566,556 | 3,998,511 | Mar. 23, 1976 | Dec. 21, 1976 |
| B 552,498 | 3,983,139 | Jan. 13, 1976 | Sep. 28, 1976 | B 566,572 | 3,988,590 | Mar. 16, 1976 | Oct. 26, 1976 |
| B 552,508 | 4,001,250 | Mar. 16, 1976 | Jan. 4, 1977 | B 566,585 | 4,001,083 | Mar. 2, 1976 | Jan. 4, 1977 |
| B 552,629 | 3,994,773 | Mar. 23, 1976 | Nov. 30, 1976 | B 567,058 | 3,985,188 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 552,709 | 4,001,467 | Mar. 23, 1976 | Jan. 4, 1977 | B 567,076 | 4,011,187 | Mar. 23, 1976 | Mar. 8, 1977 |
| B 552,932 | 3,989,292 | Feb. 3, 1976 | Nov. 2, 1976 | B 567,158 | 3,988,073 | Mar. 23, 1976 | Oct. 26, 1976 |
| B 553,421 | 4,001,146 | Mar. 23, 1976 | Jan. 4, 1977 | B 567,207 | 3,991,689 | Apr. 13, 1976 | Nov. 16, 1976 |
| B 553,460 | 3,990,019 | Feb. 3, 1976 | Nov. 2, 1976 | B 567,435 | 3,995,724 | Feb. 3, 1976 | Dec. 7, 1976 |
| B 553,584 | 3,992,456 | Feb. 17, 1976 | Nov. 16, 1976 | B 567,854 | 3,985,038 | Feb. 3, 1976 | Oct. 12, 1976 |
| B 553,629 | 3,999,242 | Feb. 24, 1976 | Dec. 28, 1976 | B 567,892 | 4,000,855 | Mar. 16, 1976 | Jan. 4, 1977 |
| B 554,039 | 3,999,944 | Feb. 24, 1976 | Dec. 28, 1976 | B 568,226 | 3,992,698 | Feb. 24, 1976 | Nov. 16, 1976 |
| B 554,164 | 4,001,465 | Mar. 9, 1976 | Jan. 4, 1977 | B 568,770 | 3,982,213 | Feb. 10, 1976 | Sep. 21, 1976 |
| B 554,283 | 3,981,152 | Jan. 27, 1976 | Sep. 21, 1976 | B 569,125 | 3,986,980 | Feb. 24, 1976 | Oct. 19, 1976 |
| B 554,291 | 4,001,209 | Mar. 9, 1976 | Jan. 4, 1977 | B 569,293 | 4,004,149 | Mar. 30, 1976 | Jan. 18, 1977 |
| B 554,380 | 4,001,147 | Mar. 9, 1976 | Jan. 4, 1977 | B 569,501 | 3,999,250 | Mar. 9, 1976 | Dec. 28, 1976 |
| B 554,594 | 3,985,960 | Jan. 20, 1976 | Oct. 12, 1976 | B 569,519 | 3,993,133 | Feb. 3, 1976 | Nov. 23, 1976 |
| B 554,655 | 4,015,048 | Feb. 24, 1976 | Mar. 29, 1977 | B 569,646 | 3,985,222 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 554,848 | 4,001,265 | Feb. 24, 1976 | Jan. 4, 1977 | B 569,859 | 3,994,160 | Mar. 9, 1976 | Nov. 30, 1976 |
| B 554,939 | 3,994,013 | Feb. 10, 1976 | Nov. 23, 1976 | B 570,172 | 3,987,763 | Feb. 3, 1976 | Oct. 26, 1976 |
| B 555,146 | 4,007,636 | Apr. 20, 1976 | Feb. 15, 1977 | B 570,615 | 3,998,570 | Mar. 23, 1976 | Dec. 21, 1976 |
| B 555,437 | 3,991,152 | Feb. 3, 1976 | Nov. 9, 1976 | B 570,862 | 3,991,639 | Feb. 24, 1976 | Nov. 16, 1976 |
| B 555,456 | 3,993,423 | Mar. 30, 1976 | Nov. 23, 1976 | B 571,219 | 3,991,388 | Feb. 24, 1976 | Nov. 9, 1976 |
| B 555,772 | 3,982,641 | Jan. 13, 1976 | Sep. 28, 1976 | B 571,638 | 4,001,244 | Mar. 9, 1976 | Jan. 4, 1977 |
| B 556,057 | 3,985,349 | Jan. 13, 1976 | Oct. 12, 1976 | B 571,659 | 3,995,186 | Apr. 13, 1976 | Nov. 30, 1976 |
| B 556,496 | 3,990,244 | Mar. 16, 1976 | Nov. 9, 1976 | B 572,642 | 3,990,715 | Feb. 10, 1976 | Nov. 9, 1976 |
| B 556,897 | 3,992,972 | Feb. 3, 1976 | Nov. 23, 1976 | B 572,726 | 4,015,020 | Feb. 24, 1976 | Mar. 29, 1977 |
| B 557,153 | 3,991,603 | Feb. 3, 1976 | Nov. 16, 1976 | B 573,033 | 3,995,224 | Mar. 23, 1976 | Nov. 30, 1976 |
| B 557,274 | 4,016,375 | Mar. 23, 1976 | Apr. 5, 1977 | B 573,114 | 4,014,843 | Apr. 6, 1976 | Mar. 29, 1977 |
| B 557,299 | 3,990,357 | Feb. 3, 1976 | Nov. 9, 1976 | B 573,991 | 4,013,704 | Mar. 30, 1976 | Mar. 22, 1977 |
| B 557,621 | 3,990,800 | Feb. 3, 1976 | Nov. 9, 1976 | B 573,994 | 4,000,641 | Mar. 23, 1976 | Jan. 4, 1977 |
| B 557,721 | 4,013,435 | Mar. 23, 1976 | Mar. 22, 1977 | B 574,128 | 3,982,961 | Feb. 17, 1976 | Sep. 28, 1976 |
| B 557,856 | 3,991,019 | Feb. 10, 1976 | Nov. 9, 1976 | B 574,616 | 4,000,424 | Mar. 2, 1976 | Dec. 28, 1976 |
| B 558,220 | 3,990,009 | Jan. 27, 1976 | Nov. 2, 1976 | B 574,996 | 3,989,718 | Feb. 17, 1976 | Nov. 2, 1976 |
| B 558,251 | 3,981,289 | Jan. 13, 1976 | Sep. 21, 1976 | B 575,583 | 4,000,928 | Mar. 16, 1976 | Jan. 4, 1977 |
| B 558,813 | 3,989,188 | Feb. 3, 1976 | Nov. 2, 1976 | B 575,757 | 3,981,170 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 558,818 | 3,983,762 | Jan. 13, 1976 | Oct. 5, 1976 | B 575,761 | 4,013,123 | Apr. 13, 1976 | Mar. 22, 1977 |
| B 558,819 | 3,990,160 | Feb. 3, 1976 | Nov. 9, 1976 | B 575,776 | 4,013,124 | Apr. 20, 1976 | Mar. 22, 1977 |
| B 558,973 | 3,981,126 | Feb. 10, 1976 | Sep. 21, 1976 | B 575,851 | 3,985,826 | Feb. 10, 1976 | Oct. 12, 1976 |
| B 559,111 | 3,984,854 | Feb. 24, 1976 | Oct. 5, 1976 | B 576,385 | 4,009,498 | Mar. 30, 1976 | Mar. 1, 1977 |
| B 559,142 | 4,001,124 | Mar. 2, 1976 | Jan. 4, 1977 | B 576,859 | 3,991,526 | Feb. 24, 1976 | Nov. 16, 1976 |
| B 559,394 | 4,016,094 | Apr. 20, 1976 | Apr. 5, 1977 | B 576,903 | 3,995,032 | Feb. 3, 1976 | Nov. 30, 1976 |
| B 559,441 | 4,013,609 | Mar. 23, 1976 | Mar. 22, 1977 | B 578,447 | 3,982,658 | Jan. 20, 1976 | Sep. 28, 1976 |
| B 559,631 | 4,011,406 | Mar. 23, 1976 | Mar. 8, 1977 | B 579,104 | 3,982,081 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 559,697 | 3,995,770 | Mar. 16, 1976 | Dec. 7, 1976 | B 579,116 | 3,986,227 | Feb. 3, 1976 | Oct. 19, 1976 |
| B 559,700 | 4,001,189 | Mar. 23, 1976 | Jan. 4, 1977 | B 579,153 | 4,013,745 | Mar. 30, 1976 | Mar. 22, 1977 |
| B 559,701 | 4,001,190 | Mar. 23, 1976 | Jan. 4, 1977 | B 579,806 | 3,995,318 | Feb. 3, 1976 | Nov. 30, 1976 |
| B 559,737 | 3,984,668 | Jan. 20, 1976 | Oct. 5, 1976 | B 580,379 | 4,000,796 | Apr. 6, 1976 | Jan. 4, 1977 |
| B 559,954 | 3,982,673 | Feb. 3, 1976 | Sep. 28, 1976 | B 580,826 | 3,988,391 | Feb. 17, 1976 | Oct. 26, 1976 |
| B 560,261 | 3,987,493 | Mar. 16, 1976 | Oct. 19, 1976 | B 580,921 | 3,984,054 | Jan. 13, 1976 | Oct. 5, 1976 |
| B 560,488 | 3,989,940 | Mar. 16, 1976 | Nov. 2, 1976 | B 581,843 | 4,000,562 | Mar. 16, 1976 | Jan. 4, 1977 |
| B 560,717 | 3,982,034 | Feb. 10, 1976 | Sep. 21, 1976 | B 583,051 | 3,990,714 | Feb. 3, 1976 | Nov. 9, 1976 |
| B 560,765 | 3,983,389 | Feb. 3, 1976 | Sep. 28, 1976 | B 583,089 | 3,982,174 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 561,062 | D 242,248 | Feb. 10, 1976 | Nov. 9, 1976 | B 583,712 | 3,995,064 | Feb. 10, 1976 | Nov. 30, 1976 |
| B 561,165 | 4,013,002 | Mar. 30, 1976 | Mar. 22, 1977 | B 584,520 | 3,981,149 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 561,166 | 4,011,809 | Mar. 30, 1976 | Mar. 15, 1977 | B 584,997 | 4,000,030 | Mar. 9, 1976 | Dec. 28, 1976 |
| B 561,365 | 4,005,078 | Apr. 13, 1976 | Jan. 25, 1977 | B 585,247 | 3,989,914 | Feb. 3, 1976 | Nov. 2, 1976 |
| B 561,387 | 3,985,706 | Feb. 10, 1976 | Oct. 12, 1976 | B 585,731 | 3,993,603 | Feb. 3, 1976 | Nov. 23, 1976 |
| B 561,405 | 4,003,770 | Mar. 30, 1976 | Jan. 18, 1977 | B 586,215 | 3,985,302 | Jan. 20, 1976 | Oct. 12, 1976 |
| B 561,712 | 3,992,126 | Feb. 17, 1976 | Nov. 16, 1976 | B 586,380 | 3,983,885 | Mar. 2, 1976 | Oct. 5, 1976 |
| B 561,732 | 3,991,460 | Feb. 3, 1976 | Nov. 16, 1976 | B 586,387 | 3,981,311 | Feb. 3, 1976 | Sep. 21, 1976 |
| B 561,764 | 3,984,634 | Jan. 27, 1976 | Oct. 5, 1976 | B 586,663 | 3,992,080 | Feb. 3, 1976 | Nov. 16, 1976 |
| B 561,770 | 4,000,366 | Mar. 16, 1976 | Dec. 28, 1976 | B 587,118 | Re. 29,067 | Mar. 2, 1976 | Dec. 7, 1976 |
| B 561,784 | 3,984,710 | Jan. 27, 1976 | Oct. 5, 1976 | B 587,786 | 3,991,204 | Feb. 17, 1976 | Nov. 9, 1976 |
| B 562,413 | 4,000,930 | Mar. 16, 1976 | Jan. 4, 1977 | B 587,936 | 3,999,052 | Mar. 23, 1976 | Dec. 21, 1976 |
| B 562,462 | 3,985,836 | Jan. 13, 1976 | Oct. 12, 1976 | B 589,179 | 4,001,102 | Mar. 23, 1976 | Jan. 4, 1977 |
| B 562,519 | 4,013,125 | Mar. 30, 1976 | Mar. 22, 1977 | B 589,687 | 3,995,349 | Mar. 23, 1976 | Dec. 7, 1976 |
| B 562,601 | 3,998,360 | Mar. 16, 1976 | Dec. 21, 1976 | B 589,966 | 3,985,828 | Feb. 17, 1976 | Oct. 12, 1976 |
| B 562,698 | 3,983,972 | Jan. 13, 1976 | Oct. 5, 1976 | B 590,158 | 3,985,163 | Feb. 10, 1976 | Oct. 12, 1976 |
| B 562,813 | 3,985,491 | Feb. 3, 1976 | Oct. 12, 1976 | B 590,159 | 3,985,164 | Feb. 3, 1976 | Oct. 12, 1976 |
| B 563,070 | 3,996,230 | Mar. 9, 1976 | Dec. 7, 1976 | B 590,502 | 4,001,171 | Mar. 23, 1976 | Jan. 4, 1977 |
| B 563,165 | 4,000,977 | Mar. 9, 1976 | Jan. 4, 1977 | B 591,141 | 4,013,631 | Mar. 23, 1976 | Mar. 22, 1977 |
| B 563,244 | 3,983,562 | Jan. 27, 1976 | Sep. 28, 1976 | B 592,143 | 3,984,713 | Jan. 27, 1976 | Oct. 5, 1976 |
| B 563,301 | 3,995,589 | Feb. 17, 1976 | Dec. 7, 1976 | B 592,146 | 4,001,084 | Mar. 2, 1976 | Jan. 4, 1977 |
| B 563,412 | 3,992,127 | Feb. 24, 1976 | Nov. 16, 1976 | B 592,658 | 4,001,164 | Mar. 23, 1976 | Jan. 4, 1977 |

# CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

| DOCUMENT NUMBER | PATENT NUMBER | PUB. DATE | ISSUE DATE | DOCUMENT NUMBER | PATENT NUMBER | PUB. DATE | ISSUE DATE |
|---|---|---|---|---|---|---|---|
| B 593,781 | 4,015,953 | Mar. 16, 1976 | Apr. 5, 1977 | B 747,785 | 3,981,899 | Feb. 10, 1976 | Sep. 21, 1976 |
| B 594,871 | 3,999,245 | Mar. 16, 1976 | Dec. 28, 1976 | B 750,679 | 4,007,049 | Mar. 23, 1976 | Feb. 8, 1977 |
| B 596,692 | 3,992,349 | Feb. 17, 1976 | Nov. 16, 1976 | B 843,038 | 3,981,785 | Feb. 3, 1976 | Sep. 21, 1976 |
| B 597,410 | 4,000,925 | Mar. 30, 1976 | Jan. 4, 1977 | B 845,044 | 4,001,338 | Mar. 30, 1976 | Jan. 4, 1977 |
| B 657,438 | 3,985,701 | Jan. 20, 1976 | Oct. 12, 1976 | B 848,336 | 3,993,752 | Mar. 30, 1976 | Nov. 23, 1976 |

# LIST OF DEFENSIVE PUBLICATIONS

APPLICANTS TO WHOM

DEFENSIVE PUBLICATIONS WERE ISSUED ON THE 5TH DAY OF APRIL, 1977

Published at the request of the applicant or owner in accordance with the Notice of Dec. 16, 1969, 869 O. G. 687.

Atlantic Richfield Company: *See*—
Dieter, Jerry A.; and Strand, Robert C., T957,004.
Ballard, Denis George Harold; and Jones, Eric, to Imperial Chemical Industries Limited. Separation of diluent from polymerization reaction mixture. T957,010, 4-5-77, Cl. 526-130.000.
Chitwood, James L. Dyeing process. T957,001, 4-5-77, Cl. 8-2.000.
Continental Oil Company: *See*—
Freshour, Kenneth D., T957,003.
Dieter, Jerry A.; and Strand, Robert C., to Atlantic Richfield Company. Electrophoretic deposition of styrene-maleic anhydride copolymers. T957,004, 4-5-77, Cl. 204-181.000.
Freshour, Kenneth D., to Continental Oil Company. Method of cleaning PVC reactors. T957,003, 4-5-77, Cl. 134-4.000.
Gorman, John E. Block copolymer particle forming process. T957,005, 4-5-77, Cl. 264-140.000.
Hunt, William Edward: *See*—
Reid, Michael Gerald; and Hunt, William Edward, T957,006.
Imperial Chemical Industries Limited: *See*—
Ballard, Denis George Harold; and Jones, Eric, T957,010.
International Business Machines Corporation: *See*—
Jordan, Paul V.; and Sechler, Robert F., T957,007.
Jahn, Robert G. Non-blocking oxygen-resistant vinylidene chloride polymer coating compositions. T957,009, 4-5-77, Cl. 428-327.000.
Jones, Eric: *See*—
Ballard, Denis George Harold; and Jones, Eric, T957,010.
Jordan, Paul V.; and Sechler, Robert F., to International Business Machines Corporation. Voltage-mode logic circuitry with improved input/output characteristics. T957,007, 4-5-77, Cl. 307-213,000.
Meyer, James W. Photographic image transfer element and process. T957,002, 4-5-77, Cl. 96-29.00D.
RCA Corporation: *See*—
Sheng, Abel Ching Nam, T957,008.
Reid, Michael Gerald; and Hunt, William Edward. Original document rearrangement apparatus for use in recirculating feeders. T957,006, 4-5-77, Cl. 271-3.100.
Sechler, Robert F.: *See*—
Jordan, Paul V.; and Sechler, Robert F., T957,007.
Sheng, Abel Ching Nam, to RCA Corporation. Switching circuit with accurate current threshold. T957,008, 4-5-77, Cl. 307-252.00N.
Strand, Robert C.: *See*—
Dieter, Jerry A.; and Strand, Robert C., T957,004.

# LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 5TH DAY OF APRIL, 1977

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Akzona Incorporated: *See*—
Schuurs, Antonius Hermanus Wilhelmus Maria; and van Weemen, Bauke Klaas, Re. 29,169.
Berry, C. Raymond: *See*—
Dye, Richard A.; and Berry, C. Raymond, Re. 29,173.
Burke, Roger E., to Union Camp Corporation. Coating composition and novel complexer therefor. Re. 29,170, Cl. 260-404.500.
DeLucia, Victor E., to Torr Laboratories, Inc. Pressurized relay assembly. Re. 29,174, Cl. 335-151.000.
Dye, Richard A.; and Berry, C. Raymond, to Santa Barbara Research Center. Laser transmitter system. Re. 29,173, Cl. 331-94.5PE.
Eastman Kodak Company: *See*—
Heseltine, Donald W.; Jenkins, Philip W.; and Mee, John D., Re. 29,168.
Heseltine, Donald W.; Jenkins, Philip W.; and Mee, John D., to Eastman Kodak Company. Photographic elements with light absorbing layers. Re. 29,168, Cl. 96-84.00R.
Hughes Aicraft Company: *See*—
Lutz, Michael A., Re. 29,172.
Jenkins, Philip W.: *See*—
Heseltine, Donald W.; Jenkins, Philip W.; and Mee, John D., Re. 29,168.
Lloyd, Samuel Harry, III, to Santa Fe International Corporation. Twin hull variable draft drilling vessel. Re. 29,167, Cl. 114-264.000.
Lutz, Michael A., to Hughes Aicraft Company. Voltage-dividing DC circuit breaker and method. Re. 29,172, Cl. 361-3.000.
Mee, John D.: *See*—
Heseltine, Donald W.; Jenkins, Philip W.; and Mee, John D., Re. 29,168.
Sansui Electric Co., Ltd.: *See*—
Takahashi, Susumu, Re. 29,171.
Santa Barbara Research Center: *See*—
Dye, Richard A.; and Berry, C. Raymond, Re. 29,173.
Santa Fe International Corporation: *See*—
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Williams, Ernest D. Rose plant. 4,036, 4-5-77, Cl. 7.000.
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Novak, Lajos. Shelf for coin operated telephones. 243,899, 4-5-77, Cl. D6-133.000.

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**CLASS 58**

22.7 4,015,417
23 BA 4,015,420
23 R 4,015,418
4,015,419
86 4,015,421
88 R 4,015,422

**CLASS 59**

82 4,015,423

**CLASS 60**

39.28 R 4,015,426
39.28 T 4,015,425
39.6 4,015,424
253 4,015,427
277 4,015,428
298 4,015,429
644 4,015,430

**CLASS 61**

1 F 4,015,431
35 4,015,432
53.6 4,015,433
91 4,015,434
108 4,015,435

**CLASS 62**

2 4,015,962
48 4,015,436
76 4,015,437
88 4,015,438
114 4,015,439
166 4,015,440
402 4,015,441
449 4,015,442

**CLASS 65**

5 4,015,963
4,015,964
4,015,965
23 4,015,966
65 A 4,015,967
133 4,015,968
289 4,015,969

**CLASS 66**

9 R 4,015,443
42 4,015,444
75.2 4,015,445
4,015,446
132 R 4,015,447
185 4,015,448
195 4,015,449
4,015,450
4,015,451

**CLASS 68**

175 4,015,452
202 4,015,453

**CLASS 70**

2 4,015,454
19 4,015,455
34 4,015,456
68 4,015,457
364 R 4,015,458

**CLASS 71**

11 4,015,970
31 4,015,971
4,015,972
63 4,015,973
87 4,015,974
100 4,015,975
118 4,015,976

**CLASS 72**

45 4,015,459
97 4,015,460
358 4,015,461

**CLASS 73**

32 R 4,015,462
61 R 4,015,464
73 4,015,463
91 4,015,465
116 4,015,466
4,015,467
136 R 4,015,468
151 4,015,469
194 A 4,015,470
194 B 4,015,472
194 EM 4,015,471
205 L 4,015,473
229 4,015,474
343 R 4,015,475
355 R 4,015,476
398 R 4,015,477
418 4,015,478
422 R 4,015,479
462 4,015,480
483 4,015,481

**CLASS 74**

15.84 4,015,482
230 4,015,483
230.3 4,015,484
596 4,015,485
753 4,015,486
813 L 4,015,487
866 4,015,488

**CLASS 75**

3 4,015,977
10 A 4,015,978
25 4,015,979
120 4,015,980
134 B 4,015,981
156.5 4,015,982
157.5 4,015,948
201 4,015,947

**CLASS 81**

55 4,015,489
180 R 4,015,490

**CLASS 82**

2 R 4,015,491

**CLASS 83**

2 4,015,492
13 4,015,493
76 4,015,494
103 4,015,495
425.2 4,015,497
466.1 4,015,496
564 4,015,498
752 4,015,499
755 4,015,500

**CLASS 84**

282 4,015,501
322 4,015,502

**CLASS 85**

35 4,015,503
42 4,015,504
77 4,015,505

**CLASS 89**

1 A 4,015,506
1.5 F 4,015,507
12 4,015,508
33 SF 4,015,511
190 4,015,512

**CLASS 90**

13.5 4,015,509
20.5 4,015,510
57 4,015,513

**CLASS 93**

1 C 4,015,514
8 W 4,015,515
36.3 4,015,516

**CLASS 96**

1 M 4,015,983
1.5 4,015,984
4,015,985
36 4,015,986
36.2 4,015,987
69 4,015,988
77 4,015,989
84 R Re.29,168
84 UV 4,015,990

**CLASS 99**

355 4,015,517
450.6 4,015,518
452 4,015,519

**CLASS 100**

215 4,015,520

**CLASS 101**

99 4,015,521
183 4,015,522
233 4,015,523
247 4,015,524
333 4,015,525

**CLASS 102**

21.6 4,015,526
38 4,015,527
52 4,015,528
66 4,015,529
70.2 GA 4,015,532
70.2 P 4,015,530
70.2 R 4,015,531
81 4,015,533
87 4,015,534
92.3 4,015,535

**CLASS 104**

88 4,015,536
91 4,015,537
97 4,015,538
130 4,015,539
148 LM 4,015,540

**CLASS 105**

199 R 4,015,541
322 4,015,542

**CLASS 106**

1 4,015,992
90 4,015,991
4,015,993
99 4,015,994
287 R 4,015,997
287 S 4,015,995
288 4,015,996
288 Q 4,015,998
308 Q 4,015,999
316 4,016,000

**CLASS 108**

27 4,015,543
51.3 4,015,544
107 4,015,545

**CLASS 110**

8 A 4,015,546
56 4,015,547
101 C 4,015,548

**CLASS 111**

8 4,015,549

**CLASS 112**

79 A 4,015,550
222 4,015,551

**CLASS 114**

16 E 4,015,553
65 R 4,015,554
264 Re.29,167
265 4,015,552

**CLASS 115**

1 C 4,015,555
39 4,015,556

**CLASS 116**

42 4,015,557

**CLASS 118**

6 4,015,558
259 4,015,559
323 4,015,560
654 4,015,561

**CLASS 122**

483 4,015,562

**CLASS 123**

32 EH 4,015,563
117 D 4,015,565
117 R 4,015,564
4,015,566
122 E 4,015,567
124 R 4,015,568
133 4,015,569
4,015,570
139 AW 4,015,571
4,015,572
140 MP 4,015,573
141 4,015,574
4,015,575
148 E 4,015,576
188 M 4,015,577

**CLASS 124**

7 4,015,578

**CLASS 125**

21 4,015,931

**CLASS 126**

63 4,015,579
65 4,015,580
121 4,015,581
270 4,015,582
4,015,583
271 4,015,584
4,015,585
4,015,586
286 4,015,587
343.5 A 4,015,588
344 4,015,589

**CLASS 127**

16 4,016,001

**CLASS 128**

1 D 4,015,590
2 A 4,015,592
2 R 4,015,591
2.05 G 4,015,594
2.05 V 4,015,593
4,015,595
2.06 R 4,015,596
75 4,015,597
188 4,015,598
4,015,599
214 R 4,015,600
4,015,601
234 4,015,602
276 4,015,603
287 4,015,604
294 4,015,605
303.1 4,015,606
350 R 4,015,607
351 4,015,608
419 PG 4,015,609

**CLASS 131**

9 4,015,610
268 4,015,611

**CLASS 132**

7 4,015,612

**CLASS 134**

6 4,016,002
19 4,016,003
21 4,016,004
30 4,016,005
102 4,015,613
152 4,015,614
196 4,015,615

**CLASS 137**

78 4,015,616
88 4,015,617
93 4,015,618
102 4,015,619
115 4,015,620
173 4,015,621
223 4,015,622
224 4,015,623
4,015,624
355.2 4,015,625
375 4,015,626
494 4,015,627
505.25 4,015,630
566 4,015,628
578 4,015,629
625.33 4,015,631
801 4,015,632

**CLASS 138**

89 4,015,633
99 4,015,634
119 4,015,635
140 4,016,008
149 4,015,636

**CLASS 139**

11 4,015,637
91 4,015,638
92 4,015,639
192 4,015,640
384 R 4,015,641
438 4,015,642

**CLASS 140**

93.4 4,015,643

**CLASS 141**

9 4,015,644
34 4,015,645
4,015,646
206 4,015,647

**CLASS 144**

326 R 4,015,648

**CLASS 145**

11 4,015,649

**CLASS 148**

1.5 4,016,006
4,016,007
12 B 4,016,009
12.7 C 4,016,010
16 4,016,011
16.5 4,016,012
4,016,013
32 4,016,014
39 4,016,015
175 4,016,016
187 4,016,017

**CLASS 149**

17 4,016,018

**CLASS 151**

41.76 4,015,650

**CLASS 152**

356 4,015,651
379.1 4,015,652

**CLASS 156**

64 4,016,019
75 4,016,020
154 4,016,021
285 4,016,022
359 4,016,023
378 4,016,024
380 4,016,025
555 4,016,026

**CLASS 159**

48 L 4,016,028

**CLASS 160**

213 4,015,653

**CLASS 162**

31 4,016,029
199 4,016,030
213 4,016,031
305 4,016,032
343 4,016,033

**CLASS 164**

4 4,015,654
66 4,015,655
282 4,015,656
361 4,015,657

**CLASS 165**

96 4,015,658
105 4,015,659

**CLASS 166**

.5 4,015,660
77.5 4,015,661
104 4,015,662
258 4,015,663
259 4,015,664

**CLASS 169**

40 4,015,665

**CLASS 172**

19 4,015,666
133 4,015,667
260 4,015,668
796 4,015,669

**CLASS 173**

15 4,015,670
117 4,015,671
160 4,015,672

**CLASS 174**

35 R 4,016,356
48 4,016,357
141 R 4,016,358
153 R 4,016,359

**CLASS 175**

61 4,015,673
91 4,015,674

**CLASS 176**

22 4,016,034
87 4,016,035

**CLASS 177**

1 4,015,675
5 4,015,676
165 4,015,677
244 4,015,678

**CLASS 178**

23 R 4,016,365

**CLASS 179**

2 A 4,016,360
15 A 4,016,367
15 AL 4,016,369
15 BS 4,016,368
15 BT 4,016,366
84 VF 4,016,370
4,016,371
99 4,016,372
100.4 ST Re.29,171
4,016,373
4,016,374
111 E 4,016,375
115 R 4,016,376

**CLASS 180**

66 R 4,015,679
98 4,015,680
133 4,015,681

**CLASS 181**

33 E 4,015,682
36 R 4,015,683
120 4,015,684

**CLASS 182**

145 4,015,685
148 4,015,686
220 4,015,687

**CLASS 187**

52 LC 4,015,688
62 4,015,689

**CLASS 188**

24 4,015,690
59 4,015,691
79.5 K 4,015,692
79.5 P 4,015,693
106 A 4,015,694
181 A 4,015,695
189 4,015,696
209 4,015,697
265 4,015,698

**CLASS 195**

1.8 4,016,036
29 4,016,037
31 R 4,016,038
66 R 4,016,039
68 4,016,040
4,016,041
103.5 A Re.29,169
103.5 R 4,016,042
4,016,043
115 4,016,044

**CLASS 197**

57 4,015,699
84 R 4,015,700
127 R 4,015,701

**CLASS 198**

486 4,015,702
624 4,015,703
652 4,015,704
770 4,015,705
780 4,015,706

**CLASS 200**

16 D 4,016,378
16 F 4,016,377
44 4,016,379
61.27 4,016,380
61.62 4,016,381
148 F 4,016,383
148 R 4,016,382
4,016,384
153 L 4,016,385
250 4,016,386
277 4,016,401
303 4,016,387
314 4,016,388

**CLASS 202**

242 4,016,045
248 4,016,046

**CLASS 203**

6 4,016,047
49 4,016,048
60 4,016,049

**CLASS 204**

15 4,016,050
43 T 4,016,051
64 T 4,016,052
67 4,016,053
105 R 4,016,054
106 4,016,055
108 4,016,056
130 4,016,057
158 R 4,016,058
161 4,016,059
176 4,016,060
192 E 4,016,062
192 F 4,016,061
195 R 4,016,063
256 4,016,064
275 4,016,065

**CLASS 206**

328 4,015,707
333 4,015,708
366 4,015,709
386 4,015,710
413 4,015,711
507 4,015,712
509 4,015,713
511 4,015,714
521 4,015,715
4,015,716
534 4,015,717

**CLASS 208**

48 Q 4,016,066
89 4,016,067
139 4,016,068
210 4,016,069
4,016,070

**CLASS 209**

39 4,016,071
74 R 4,016,072

**CLASS 210**

24 4,016,073
31 C 4,016,074
42 R 4,016,075
61 4,016,076
77 4,016,077
94 4,016,078
96 R 4,016,079
284 4,016,080
321 B 4,016,081
4,016,082
433 M 4,016,083

**CLASS 211**

119.02 4,015,718
133 4,015,719

**CLASS 213**

1.3 4,015,720

**CLASS 214**

1 BB 4,015,721
6 D 4,015,722
6 P 4,015,723
6.5 4,015,724
16.1 ED 4,015,733
17 DA 4,015,734
75 R 4,015,725
77 R 4,015,726
82 4,015,727
138 G 4,015,728
138 R 4,015,729
141 4,015,730
152 4,015,731
4,015,732
313 4,015,735
390 4,015,736
501 4,015,737
674 4,015,738
766 4,015,739

**CLASS 215**

11 C 4,015,740

**CLASS 219**

10.49 4,016,389
4,016,390
4,016,391
4,016,392
59 4,016,393
61 4,016,394
69 W 4,016,395
121 EB 4,016,396
121 P 4,016,397
130 4,016,398
146 4,016,399
264 4,016,400
334 4,016,402
550 4,016,403

**CLASS 220**

6 4,015,741
9 A 4,015,742
19 4,015,743
269 4,015,744
320 4,015,745

**CLASS 221**

263 4,015,746

**CLASS 222**

1 4,015,747
70 4,015,749
103 4,015,750
193 4,015,753
194 4,015,754
195 4,015,751
402.16 4,015,752
4,015,757
442 4,015,755
457.5 4,015,758
534 4,015,756

**CLASS 223**

32 4,015,748

**CLASS 224**

25 A 4,015,759
42.1 D 4,015,760
42.24 4,015,761
45 S 4,015,762

**CLASS 226**

55 4,015,763

**CLASS 227**

118 4,015,764

**CLASS 228**

131 4,015,765

**CLASS 229**

2.5 EC 4,015,766
16 R 4,015,767
17 R 4,015,768
44 CB 4,015,769
51 C 4,015,770
62 4,015,771

**CLASS 233**

20 A 4,015,772
4,015,773
26 4,015,774
4,015,775

**CLASS 235**

61.7 B 4,016,404
4,016,405
92 CT 4,016,407
92 MP 4,016,406
153 A 4,016,408
153 AM 4,016,409
156 4,016,410
4,016,411
181 4,016,412
4,016,413

**CLASS 236**

92 B 4,015,776
4,015,777

**CLASS 239**

102 4,015,779

**CLASS 240**

6.46 4,016,414

**CLASS 241**

23 4,015,780
46.11 4,015,781
62 4,015,782
73 4,015,783
162 4,015,784

**CLASS 242**

25 A 4,015,785
35.5 A 4,015,786
55.19 A 4,015,790
55.19 R 4,015,789
55.2 4,015,788
56.2 4,015,791
67.4 4,015,792
74 4,015,793
75.44 4,015,794
85 4,015,795
107.4 A 4,015,796
130.2 4,015,797
157.1 4,015,798
203 4,015,799

**CLASS 244**

42 DA 4,015,787
76 R 4,015,800
145 4,015,801
153 R 4,015,802
4,015,803

**CLASS 246**

5 4,015,804
187 B 4,015,807
458 4,015,805

**CLASS 248**

168 4,015,806
188.4 4,015,808
217.2 4,015,809
311.1 4,015,810
343 4,015,811
394 4,015,812
452 4,015,813

**CLASS 249**

174 4,015,814

**CLASS 250**

201 4,016,415
211 J 4,016,416
251 4,016,417
252 4,016,418
272 4,016,419
277 CH 4,016,420
281 4,016,421
336 4,016,422
343 4,016,423
372 4,016,424
4,016,425

**CLASS 251**

191 4,015,815
285 4,015,816
288 4,015,817
307 4,015,818
339 4,015,819

**CLASS 252**

8.1 4,016,084
8.5 C 4,016,085
8.55 D 4,016,086
32.5 4,016,092
40.7 4,016,087
42.7 4,016,093
78.3 4,016,088
102 4,016,090
106 4,016,089
182.1 4,016,091
299 4,016,094
301.1 R 4,016,095
301.1 W 4,016,096
313 S 4,016,097
316 4,016,098
4,016,099
4,016,100
344 4,016,101
373 4,016,102
4,016,103
4,016,104
437 4,016,105
455 R 4,016,106
4,016,107
4,016,108
522 4,016,109

**CLASS 254**

4 B 4,015,820
29 A 4,015,821
45 4,015,822
72 4,015,823
89 R 4,015,824
101 4,015,825

**CLASS 256**

59 4,015,826
4,015,827

**CLASS 259**

6 4,015,828
9 4,015,829
25 4,015,830
81 R 4,015,831
191 4,015,832
4,015,833

**CLASS 260**

2.3 4,016,115
2.5 AM 4,016,113
2.5 B 4,016,110
2.5 F 4,016,111
2.5 N 4,016,112
4,016,114
2.5 P 4,016,116
17.4 SG 4,016,118
17.4 ST 4,016,117
17.5 4,016,119
29.2 TN 4,016,120
4,016,121
4,016,122
4,016,123
29.6 B 4,016,129
29.6 F 4,016,125
29.6 HN 4,016,128
29.6 M 4,016,124
29.6 RB 4,016,126
29.6 TA 4,016,127
37 N 4,016,130
40 R 4,016,131
4,016,132
42.21 4,016,133
42.24 4,016,134
45.7 R 4,016,135
45.75 R 4,016,137
4,016,138
4,016,139
45.9 R 4,016,136
47 CP 4,016,140
47 EP 4,016,141
75 T 4,016,142
77.5 AM 4,016,143
78 R 4,016,144
79.3 M 4,016,145
112 R 4,016,146
4,016,147
112.5 R 4,016,148
122 4,016,149
128 4,016,150
154 4,016,151
156 4,016,152
158 4,016,153
240 D 4,016,156
240 G 4,016,155
240 J 4,016,154
242 4,016,157
243 C 4,016,158
4,016,159
4,016,160
247.1 L 4,016,161
247.5 DP 4,016,162
247.7 L 4,016,163
248 A 4,016,164
248 AS 4,016,165
251 QA 4,016,166
293.54 4,016,167
293.58 4,016,168
302 R 4,016,169
307 D 4,016,172
307 F 4,016,171
307 G 4,016,170
325 R 4,016,173
326.14 R 4,016,174
326.62 4,016,175
340.3 4,016,176
340.7 4,016,177
345.5 4,016,178
347.5 4,016,179
347.9 4,016,180
371 4,016,182
380 4,016,181
404.5 Re.29,170
408 4,016,184
413 4,016,185
448.8 R 4,016,188
449.6 M 4,016,189
453 RZ 4,016,187
463 4,016,190
465 E 4,016,191
471 A 4,016,192
471 R 4,016,193
473 R 4,016,186
475 FR 4,016,195
475 SC 4,016,194
476 R 4,016,196
477 4,016,197
486 H 4,016,199
486 R 4,016,198
488 CD 4,016,200
491 4,016,201
501.17 4,016,202
505 R 4,016,203
515 R 4,016,204
519 4,016,205
524 N 4,016,206
528 4,016,207
535 R 4,016,208
567.6 M 4,016,209
607 AR 4,016,210
611.5 4,016,211
614 R 4,016,212
621 C 4,016,213
649 F 4,016,214
652.5 P 4,016,216
652.5 R 4,016,215



653.1 R 4,016,217
671 R 4,016,218
672 T 4,016,219
683 D 4,016,220
932 4,016,222
946 4,016,223
952 4,016,224
973 4,016,225

**CLASS 264**

.5 4,016,226
14 4,016,227
33 4,016,228
63 4,016,229
89 4,016,230
92 4,016,231
112 4,016,232
122 4,016,233
129 4,016,234
132 4,016,235
184 4,016,236

**CLASS 266**

275 4,015,834

**CLASS 267**

124 4,015,835

**CLASS 269**

322 4,015,836

**CLASS 270**

58 4,015,837
61 F 4,015,838

**CLASS 271**

37 4,015,839
64 4,015,840
173 4,015,841
185 4,015,842
240 4,015,843
266 4,015,844

**CLASS 273**

11 C 4,015,845
75 4,015,851
85 R 4,015,846
121 R 4,015,847
126 R 4,015,848
131 KC 4,015,849
135 B 4,015,850
136 G 4,015,778
153 R 4,015,852

**CLASS 280**

87.02 W 4,015,853
281 R 4,015,854
415 A 4,015,855
446 B 4,015,856
495 4,015,857
656 4,015,858
714 4,015,859
747 4,015,860
750 4,015,861
754 4,015,862

**CLASS 281**

33 4,015,863

**CLASS 285**

133 A 4,015,864
198 4,015,865

**CLASS 292**

36 4,015,866
262 4,015,867
302 4,015,868
341.16 4,015,869

**CLASS 293**

32 4,015,870

**CLASS 294**

19 R 4,015,871
61 4,015,872
66 R 4,015,873

**CLASS 295**

36 R 4,015,874

**CLASS 296**

24 R 4,015,875
28 M 4,015,876

**CLASS 297**

341 4,015,877
385 4,015,878

**CLASS 298**

14 4,015,879

**CLASS 302**

31 4,015,880

**CLASS 303**

114 4,015,881

**CLASS 307**

10 R 4,016,426
88.3 4,016,427
116 4,016,428
149 4,016,429
205 4,016,430
208 4,016,431
233 A 4,016,432
252 C 4,016,433
296 R 4,016,435
297 4,016,434

**CLASS 308**

1 A 4,015,882
187.1 4,015,883
216 4,015,884

**CLASS 310**

8.2 4,016,436
8.7 4,016,437
9.5 4,016,440
11 4,016,438
13 4,016,441
39 4,016,439
59 4,016,442
260 4,016,443
261 4,016,444

**CLASS 312**

42 4,015,885
107 4,015,886

**CLASS 313**

185 4,016,445
218 4,016,446
4,016,447
231 4,016,448
500 4,016,449

**CLASS 315**

149 4,016,450
158 4,016,451
278 4,016,452
312 4,016,453
409 4,016,454

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434 4,016,468
590 4,016,469
604 4,016,467
606 4,016,470
629 4,016,471
696 4,016,472

**CLASS 320**

14 4,016,473
15 4,016,474

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26 4,016,477
27 R 4,016,478
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3 4,016,486
37 4,016,487
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4 4,016,493
15 4,016,494

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18 4,016,495
35 4,016,496
162 4,016,497
181 4,016,498
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10 4,016,501
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94.5 H 4,016,505
94.5 PE Re.29,173
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24.2 4,016,510
29 4,016,511
30 R 4,016,512
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200 4,016,519

**CLASS 337**

100 4,016,520
241 4,016,521
403 4,016,522
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**CLASS 338**

34 4,016,524
274 4,016,527
309 4,016,525
325 4,016,526

**CLASS 339**

6 R 4,015,887
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113 B 4,015,890
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381 4,016,561
384 E 4,016,562

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6.5 LC 4,016,564
7 TA 4,016,565
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96 WG 4,015,893
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209 4,015,897

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17 4,015,899

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27 R 4,015,900

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26 4,016,573
29 4,016,574
33 4,016,575
55 4,016,576
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295 4,016,584
331 4,016,585

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60 4,015,902
72 4,015,903

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243 4,015,904
248 4,015,905

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62 4,016,341
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2 4,016,351
29 4,016,352
69 4,016,353
111 4,016,354

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| D6— | 24 | 243,891 | | | 243,906 | | 351 | 243,918 | | 111 | 243,933 | | 28 | 243,945 | D27— | 42 | 243,962 |
| | 25 | 243,892 | | 188 | 243,907 | | | 243,921 | D11— | 70 | 243,934 | | 52 | 243,944 | | | 243,963 |
| | 63 | 243,893 | | 190 | 243,908 | | | 243,922 | | | 243,935 | | 131 | 243,972 | D30— | 1 | 243,964 |
| | 66 | 243,894 | | 197 | 243,909 | | | 243,923 | | 149 | 243,937 | | 138 | 243,960 | D34— | 4 R | 243,965 |
| | | 243,895 | D7— | 6 | 243,910 | | | 243,924 | | 160 | 243,938 | | 199 | 243,946 | | | 243,966 |
| | 71 | 243,896 | | 9 | 243,911 | | | 243,925 | D12— | 32 | 243,939 | D16— | 14 | 243,947 | | 5 GH | 243,968 |
| | 130 | 243,897 | | 23 | 243,912 | | 364 | 243,926 | | 60 | 243,940 | | 31 | 243,949 | | 5 SS | 243,967 |
| | 131 | 243,898 | | 76 | 243,913 | | | 243,927 | | 145 | 243,942 | | 65 | 243,951 | | 15 HH | 243,969 |
| | 133 | 243,899 | | | 243,914 | | | 243,929 | | 146 | 243,941 | D19— | 38 | 243,952 | D47— | 6 E | 243,970 |
| | 158 | 243,900 | | 129 | 243,915 | D9— | 86 | 243,928 | | 158 | 243,943 | | 64 | 243,950 | D48— | 2 | 243,971 |
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| | | 243,903 | | | | | | | | | | | | | | | |
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## CLASSIFICATION OF PLANTS

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P.— | 7 | 4,036 | | 19 | 4,034 | | 20 | 4,037 | | 85 | 4,032 | | | 4,033 | | 88 | 4,035 |

## DEFENSIVE PUBLICATIONS APPLICATIONS

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8— | 2 | T957,001 | 134— | 4 | T957,003 | 264— | 140 | T957,005 | 307— | 213 | T957,007 | | | | | | |
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# GEOGRAPHICAL INDEX OF RESIDENCE OF INVENTORS

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| 1 : | 4,015,791 | | 4,015,748 | | 4,016,428 | | 4,016,436 | | 4,015,481 | | 4,016,522 |
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| | 4,015,299 | | 4,015,873 | | 4,016,537 | | 4,015,527 | | 4,015,643 | | 4,015,973 |
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| | 4,015,400 | | 4,015,995 | 8 : | 4,015,576 | | 4,016,378 | | 4,015,863 | | 4,015,739 |
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## DEFENSIVE PUBLICATIONS APPLICATIONS

[Notice of Dec. 16, 1969, 869 O.G. 6877]

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34 : T957,008
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U. S. GOVERNMENT PRINTING OFFICE : O - 1977

# OFFICIAL GAZETTE of the UNITED STATES PATENT and TRADEMARK OFFICE

April 12, 1977 Volume 957 Number 2


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# PATENT AND TRADEMARK OFFICE NOTICES

## Recombinant DNA

*Suspension of Accelerated Processing of Patent Applications for Recombinant DNA Research Inventions*

On January 10, 1977, the Patent and Trademark Office issued a notice, published in the Federal Register of January 13, 1977, 42 FR 2712–2713, which provided for the accelerated processing of patent applications for inventions relating to Recombinant DNA, including those that contribute to safety of research in the field.

In order that the Federal Interagency Committee for Recombinant DNA Research may consider recommendations concerning research conducted by the private sector in this field, that part of the referenced notice dealing with accelerated processing of patent applications for Recombinant DNA research inventions is suspended until further notice.

That part of the referenced notice dealing with accelerated processing of patent applications relating to safety of research in this field will remain in force.

Dated: March 3, 1977.

RENE D. TEGTMEYER,
*Acting Commissioner of Patents and Trademarks.*

Approved: March 3, 1977.
BETSY ANCKER-JOHNSON,
*Assistant Secretary for Science and Technology.*

[FR Doc. 77-6908; Filed 3-8-77; 8:45 am]

## Proposal for Distribution of Trademark Section 8 and 15 Index Cards to Private Firm

The Patent and Trademark Office received a request from TCR Service, Inc. for index cards which indicate the acceptance of an affidavit under Section 8 and the acknowledgment of an affidavit under Section 15. These cards are currently used by the Patent and Trademark Office to update the Search Room records and then the cards are destroyed.

TCR Service, Inc. has agreed that if the Patent and Trademark Office will provide them with the cards, they will maintain the cards for a six month period after receipt and make them available without charge to any person desiring to use them. After six months, the cards will be destroyed.

Any person having an objection to this proposed procedure should notify the Commissioner of Patents and Trademarks within 60 days from the date of this notice. After that time, the Patent and Trademark Office will announce their decision.

BERNARD A. MEANY,
*Assistant Commissioner for Trademarks.*

Mar. 15, 1977.

## Registration to Practice

The following are names of persons applying for registration to practice before the United States Patent and Trademark Office. Information tending to affect the eligibility of said applicants on moral, ethical, or other grounds, should be furnished the Commissioner of Patents and Trademarks on or before May 6, 1977.

Carter, Robert S., 5600 Whitehaven, Bellaire, Tex. 77401
Gaston, Leslie H., 2500 Q St. NW., Washington, D.C. 20007
Hickey, Bryan F., 109 Sandy Creek Ct., Rte, 4, Greer, S.C. 29651
Hogeboom, Robert C., 19 Fourwinds Dr., #1002, Downsview, Ontario, Canada
Permut, Steven L., McGarry & Waters, Frey Bldg., Grand Rapids, Mich. 49503
Schutzman, Lee A., 5009 Linette Lane, Annandale, Va. 22003
Weir, Stanley M., P.O. Box 365, Santa Clara, Calif. 95052
Weiser, Morris L., 3246 Bedford Ave., Brooklyn, N.Y. 11210

LUTRELLE F. PARKER,
*Chairman, Committee on Enrollment.*

## Trademark Manual of Examining Procedure, 1st Ed.

CHANGE NOTICE
Series No. 3-1
(Follows Change 1-3)

References: TMEP sections 602, 602.01, 602.02, 602.03 and 603 — March 15, 1977

PRACTICE BEFORE, AND CORRESPONDENCE WITH, THE PATENT AND TRADEMARK OFFICE

The sections referred to above are being re-written in their entireties, with considerable matter being added in view of the rule changes effective February 1, 1976. The sections as re-written read as follows:

602 *Persons who may practice before Office in trademark matters.*

*Rule 2.12.* Persons who may practice before the Patent and Trademark Office in trademark cases.

(a) Attorneys at law: Any person who is a member in good standing of the bar of the Supreme Court of the United States or of the highest court of any State, Territory, or the District of Columbia, and is not under any order of any court suspending, enjoining, restraining, disbarring, or otherwise restricting him in the practice of law, may represent others before the Patent and Trademark Office in trademark cases. No application for recognition to practice in trademark cases by attorneys at law is required.

(b) Non-lawyers: Persons who are not attorneys at law as specified in paragraph (a) of this rule are not recognized to practice before the Patent and Trademark Office in trademark cases, except that persons not attorneys at law who were recognized to practice before the Patent and Trademark Office under these rules prior to January 1, 1957, will be recognized as agents to continue practice in trademark cases in the Patent and Trademark Office.

(c) Foreign attorneys and agents: Any foreign attorney or agent not a resident of the United States who shall file proof to the satisfaction of the Commissioner that he is registered and in good standing before the patent or trademark office of the country in which he resides and practices, may be recognized to represent applicants located in such country before the United States Patent and Trademark Office in the presentation and prosecution of trademark applications: *Provided,* That the patent or trademark office of such country allows substantially reciprocal privileges to those permitted to practice in trademark cases before the United States Patent and Trademark Office. Such recognition shall continue only during the period that the conditions specified obtain.

(d) Recognition of any person under this rule is not to be construed as sanctioning or authorizing the performance of any acts regarded in the jurisdiction where performed as the unauthorized practice of law.

(e) No persons other than those mentioned in paragraphs (a), (b), and (c) of this rule will be permitted to practice before the Patent and Trademark Office in trademark cases. Any person may appear for himself, or for a firm of which he is a member, or for a corporation or association of which he is an officer and which he is authorized to represent, if such person, firm, corporation, or association is a party to the proceeding.

(f) Persons otherwise entitled to be recognized to practice under this rule may, nevertheless, be refused recognition for cause.

No application for recognition to practice (that is, to represent others) in trademark cases before the Office is necessary. No examination is given by the Office for eligibility to practice in trademark cases, nor does the Office maintain any register to list persons entitled to practice in connection with trademark cases. Attorneys at law may represent others (that is, practice) before the Patent and Trademark Office in connection with trademark matters on the basis of their being attorneys at law. Non-lawyers are not permitted to practice except under particular circumstances as specified in Rule 2.12. Firms may not practice as firms or by firm name; only individual persons are entitled to be recognized to practice and represent others.

It is desirable from the viewpoint of both the applicant and the Office that persons who represent parties in trademark cases be attorneys at law, and the rules are designed with that in mind. Use of the term "agent" in connection with a representative in a trademark case is only appropriate under exceptional circumstances as specified in Rule 2.12.

602.01 *Power of attorney not required for attorneys at law.*

It is not necessary for an attorney at law to file a power of attorney or any other special authorization in a trademark case. An attorney at law who is satisfactorily identified as such will be accepted as a representative of a party in a trademark matter on the basis of his being an attorney at law.

If an attorney at law files a power of attorney from the party he represents, such power will be accepted; however, to be acceptable as a power of attorney, the power must identify an individual attorney or individual attorneys by their names, not merely specify the name of a firm of attorneys. A power which specifies the name of a firm of attorneys will not be regarded as a power by the Office; it will merely be treated as a mailing address and a direction that correspondence be sent to such firm at its address. (See TMEP section 603.) The reason for this practice is that an attorney at law in his capacity as a representative is held responsible for his actions under the Code of Professional Responsibility of the American Bar Association, and such Code has applicability to individual persons, not to "firms." (See TMEP section 602.02.)

602.02 *Standards of Conduct, and Signature and Certificate of Attorney.*

*Rule 2.13.* Professional conduct. Attorneys and other persons appearing before the Patent and Trademark Office in trademark cases must conform to the standards of ethical and professional conduct set forth in the Code of Professional Responsibility of the American Bar Association as amended February 24, 1970, insofar as such code is not inconsistent with these rules. A copy of the said code is available for inspection in the Office of the Solicitor, U.S. Patent and Trademark Office, Room 11C04, Building 3, Crystal Plaza, 2021 Jefferson Davis Highway, Arlington, Va. Copies of the code are available upon request to the American Bar Center, 1155 East 60th Street, Chicago, Ill. 60637.

*Rule 2.15.* Signature and certificate of attorney or other representative. Every paper filed by an attorney at law or other person representing an applicant or party to a proceeding in the Patent and Trademark Office must bear the signature of such attorney at law or other person except those papers which are required to be signed by the applicant or party. The signature of an attorney at law or such other person to a paper filed by him, or the filing of any paper by him, constitutes a certificate that the paper has been read; that its filing is authorized; that to the best of his knowledge, information, and belief there is good ground to support it; and that it is not interposed for delay.

By amendment of Rule 2.13 as of July 2, 1971, the Code of Professional Responsibility of the American Bar Association is designated by the Office as the standard of conduct for those practicing before the Office in trademark matters. (See 36 F.R. 12616; 890 O.G. TM 60.) The purpose of using the code is to provide a definite and uniform standard of conduct for practitioners before the Office; the code in conjunction with the provision of Rule 2.15 that an attorney or other representative shall sign and thereby certify each action he takes, will eliminate uncertainty as to the person taking the action and the responsibility of such person.

602.03 *Revocation or withdrawal of authorization.*

*Rule 2.19.* Revocation of power of attorney or of other authorization to represent. Authority to represent an applicant or a party to a proceeding may be revoked at any stage in the proceedings of a case upon notification to the Commissioner; and when it is so revoked, the Office will communicate directly with the applicant or party to the proceeding or with such other qualified person as may be authorized. The Patent and Trademark Office will notify the person affected of the revocation of his authorization.

If a proper written power of attorney has been filed in a trademark application, it may be revoked by applicant by a written revocation, and in such event the Office will acknowledge the revocation and will not thereafter recognize such attorney in that case unless he is again specifically appointed.

However, either with or without a power of attorney on file, a change in representation can be made by an action which is signed by a different properly authorized person plus a request to change the address for correspondence. In this way, decisions as to representation, which are primarily the responsibility of the applicant and his attorney or other representative, are transmitted to the Office without any action normally being needed by the Office. See TMEP section 603.

An attorney at law or other representative can withdraw from representation of an applicant in an application, but such withdrawal should not be done in a manner which would prejudice applicant.

603 *Correspondence, with whom held.*

See Rule 2.18. For amendment of such rule effective February 1, 1976, see 40 F.R. 6361, Feb. 11, 1975 (932 O.G. TM 40, Mar. 11, 1975) and 41 F.R. 756, Jan. 5, 1976 (943 O.G. TM 2, Feb. 3, 1976).

When a trademark application is filed, an address (consisting of a name and a street address) where correspondence from the Office will be sent, is placed on the face of the file wrapper by a clerk in the Office. Correspondence will be sent to any address of applicant's selection, and when the name and address of an attorney appears in the papers, it will be assumed that applicant wishes to receive correspondence from the Office concerning the application at that address. If an application is accompanied by a transmittal letter on a letterhead which identifies an attorney or a firm of attorneys, the name and address on the letterhead will be used as the correspondence address, unless there is included in addition a specific request to "Send correspondence to (a named individual)." If an application is written on professional paper which identifies the name and address of an attorney or a firm of attorneys, such name and address will be placed on the file wrapper as applicant's correspondence address. If a power of attorney designates an attorney or attorneys and an address, or if a form which has the appearance of a power of attorney designates the name and address of a firm of attorneys, such designation will be used as the correspondence address. These entries are made upon the filing of an application, without the signature of the attorney, since an application is a document which must be signed by the applicant and is not an action of the attorney. See Rule 2.15.

The correspondence address which is placed on the file wrapper when the application is filed is not changed unless there is a written request by applicant or his representative to do so. If a power of attorney has been filed, a subsequently filed power of attorney will be regarded as a written request to change the address, even if there is no revocation of the power; but in other situations, specific language is needed which can reasonably be interpreted to be a request to change the address. See TMEP section 602.03. The Office does not acknowledge requests to change the correspondence address; the change is merely entered on the file wrapper by a clerk in the Office. The filing of "associate powers of attorney" or similar papers has no effect; such papers do not alter the correspondence address already established, and such papers are not acknowledged by the Office.

During the prosecution of a trademark application, every action must be signed by an individual attorney or other authorized representative using his individual name, although a firm name might also appear on the action. Any action which is so signed will be accepted regardless of whether the person who has signed is the same person who signed other actions or is different from persons who have signed other actions. Even though the signer is different, however, the Office will continue to send correspondence to the mailing

address already established unless there is a written request to change such address. Thus, if papers are filed by more than one attorney or other representative, the Office will reply but will send the reply to the mailing address already established until there is a written request to change. Double correspondence will not be undertaken either with applicant and applicant's attorney or with more than one attorney or representative. Where circumstances call for it, the Examiner may designate an extra copy of a communication to be sent to a second person, but this procedure will not be repeated on the next communication.

The only action an Examiner need take in relation to attorneys or representatives is to assure that the person who signs each action either is an attorney at law (which normally can be assumed from the attorney's own statement or indentification) or is another proper type of party with written authorization. See Rule 2.17.

BERNARD A. MEANY,
*Assistant Commissioner for Trademarks.*

Mar. 15, 1977.

## Trademark Manual of Examining Procedure, 1st Ed.

CHANGE NOTICE
Series No. 3–2
(Follows Change 3–1)

References: TMEP sections 804.02, 804.03, 804.04, 804.04(a), 804.04(b), and 804.04(d). March 15, 1977

IDENTIFICATIONS, AND THE INTERNATIONAL LIST OF GOODS AND SERVICES

The sections referred to above are being rewriten in their entireties in order to clarify the manner in which the International List of Goods and Services is to be used in connection with evaluation of identifications of goods and services in trademark applications and to elaborate on broadness of terms in identifications. The subject matter of the Notice Published in OFFICIAL GAZETTE of August 3, 1971,* dealing with the use of the international list, which was set forth in original TMEP section 804.03, is incorporated in these rewritten sections, and that Notice is superseded by these sections as rewritten.

The re-written sections read as follows:

804.02 *Broadness of terms used in specifying goods and services.*

When setting forth the goods or services in an application, the applicant frequently likes to choose broad terms by which to identify the goods or services. The Office also prefers broad terms, when the terminology is appropriate, in order to avoid long lists of detailed items. Long lists are a burden to the Office to handle and check and they are expensive to print; also they may be unfair to applicants because of being subject to inadvertent omissions and frequent changes in contents. On the other hand, the basis of an application is use of the mark on the goods or services set out in the application. The requirement for use of the mark is not necessarily violated by broad terms, for when a mark is used on a number of items which make up a homogeneous group, a term which identifies the group as a whole would be understood as encompassing products of the same general type which are commercially related. This being true, then, even though a term is broad, it will be known with reasonable certainty what products are intended to be covered, and it will be reasonable from a commercial viewpoint to consider that the mark has been used for all the related products which fall in the designated group. Using this approach, in *In re Port Huron Sulphite & Paper Co.*, 120 USPQ 343 (TT&A Bd. 1959), the term "paper" was approved because of actual use of the mark on various types of papers; in *In re Armstrong Cork Company*, 180 USPQ 335 (TT&A Bd. 1973), "furniture" was not considered too broad to assume use as to all items normally covered by such term; and in *In re Dynamit Nobel AG*, 169 USPQ 499 (TT&A Bd. 1971), "ammunition" was permitted because its scope was assumed to be understood.

In considering all identifications, but especially the appropriateness of broad terms, the Examiner must consider the following guidelines:

(1) A term which clearly includes particular items which are classified in more than one class is not acceptable. (For example, "artists' materials.")

(2) A term which is too indefinite to enable proper examination to be made would not be acceptable. (For example, "metallic parts.") In such a situation the Examiner may seek further information under Rule 2.61(b). See TMEP sections 1105.02 and 1105.02(a).

(3) An identification would be unacceptable if it were inconsistent with the goods or services disclosed by the specimens, or if the ordinary meaning of the identification were at variance with the goods or services disclosed by the specimens or otherwise disclosed by the record. (For example, "decalcomanias" are not adequately identified by the term "publications." See also *Ex parte Consulting Engineer Publishing Co.*, 115 USPQ 240 (Comr. Pats. 1957).)

(4) Wording included in a mark could require limitation of the identification. (For example, "beer" may not be included in the identification where the mark is "Newark 'Olde Town' Ale." *Ex parte The Consumers Brewing Co.*, 55 USPQ 426 (Comr. Pats. 1942). But see also TMEP section 404.04(e) for circumstances under which limitation would not be necessary.)

(5) The mere fact that a decision (or decisions) holds that a likelihood of confusion exists in relation to certain narrowly identified items does not necessarily mean that all broad identifications which would include such items must be amended to the specific narrow items mentioned in the decision or decisions.

(6) An identification which can be understood when read in association with the title of the class in which it is placed and is otherwise satisfactory, should not be required to be further qualified by amendment. (For example, "mufflers" in the clothing class would not require further modification to indicate that articles of clothing are intended; similarly the term "house organ" in the class for printed publications would not need further qualification.) See TMEP sections 1401.07 and 1401.08.

With broad identifications, as with any identification which includes more than one item, there is a question as to the amount of proof (normally by way of specimens) which is necessary to assure the Examiner that the mark has been used on "all" the items in the application. See TMEP sections 808.01(a) and 804.06. It has never been the practice of the Office to require specimens of use for every item in an application. Consideration is given to the fact that applicant has stated that the facts set forth in the application are true, and also to the degree of commercial relationship between the products. With broad terms which identify a group of products which are similar and consistent in their commercial character, it is reasonable to assume that even if the mark has not been used on every item in the group, use on some of the items would be likely to result in confusion with regard to the other items. For a closely related group, a specimen on one item of the group would be sufficient. As the closeness of the relationship becomes less certain, specimens of use on more than one item might be necessary to be persuasive of generalized use. The nature of the mark also may be considered, for it is so well known as not to require proof that "house" marks are in fact placed on all the goods which a company produces, whereas a "product" mark which is appropriate only for a specific commodity is used only on that commodity.

The appropriateness of any broad identification depends upon the facts in the particular case, but use of terms as broad as the circumstances justify is desirable. When an appropriate broad term is available, it should be used by applicant and accepted by the Examiner.

Any uncertainly as to the acceptability of the terms in identifications should be first discussed with the Division Supervisor, and if unresolved, should be submitted for the decision of the Director of the Trademark Examining Operation, who may delegate the everyday responsibility for resolving these questions to the Examiner who is responsible for classification matters. The Classification Examiner is also authorized to discuss with Supervisors and Examiners situations which the Classification Examiner observes during review of the applications which have been forwarded for publication. A list of terms which as a result of these procedures have been considered to be acceptable under suitable circumstances, will be compiled and made available to Examiners and the public, whenever practicable.

Final refusals based on a requirement concerning identifications of goods or services must be reviewed by the Director of the Trademark Examining Operation so as to achieve the highest uniformity.

804.03 *International alphabetical list as guide.*

In furtherance of the guidelines set forth in TMEP sections 804.01 and 804.02, Examiners should use as a reference for identifications of goods and services, the items listed in the Alphabetical List of Goods and Services which is contained in the volume entitled "International Classification of Goods and Services to Which Trademarks Are Applied" (published by the World Intellectual Property Organization, also known as WIPO). The items in the list should be accepted as identifications whenever circumstances permit. A great many of the items will be sufficiently definite to be acceptable. However, in view of the fact that the terms in the present list were developed essentially as a basis for classifying goods and services and not from the viewpoint of proper form to serve as identifications of specific goods and services, some items may not be sufficiently definite. The list itself indicates at its beginning that it should not be assumed that every item will be a suitable identification as it stands.

The primary purpose of using the international Alphabetical List as a reference for identifications is to provide a published source of names of goods and services to which applicants can resort with some degree of assurance that the terms will be accepted by Examiners in the Patent and Trademark Office. The availability of such a source should help reduce and simplify the requirements of Examiners as to identifications of goods and services, and should be of assistance in establishing justifiably broad identifications, thereby shortening prosecution time and reducing unconstructive discussion.

The principles for determining the degree of definiteness needed in identifications in order to permit proper examination (see TMEP sections 804.02 and 804.04) are to be applied to all terminology whether it is in the international Alphabetical List or not. However, items which appear in the international Alphabetical List should be given the benefit of any doubt and should be accepted whenever that can reasonably be done, in the interest of establishing the list as a source of satisfactory identifications.

See *In re Safeway Products Inc.*, 192 USPQ 155 (TT&A Bd. 1976); *In re Air Products and Chemicals, Inc.*, 192 USPQ 84 (TT&A Bd. 1976), on reconsideration 192 USPQ 157 (TT&A Bd. 1976).

804.04 *Need for greater definiteness in identifications of goods and services.*

Whenever after applying the guidelines in TMEP sections 804.01, 804.02 and 804.03 as to broadness in identifying goods and services, the Examiner considers it necessary to request a more definite identification, the Examiner should explain clearly but concisely the reason for the request. See TMEP sections 1105.02 and 1105.02(a). Some well-recognized reasons for requesting a more definite identification are set out in the sub-sections of this section.

804.04(a) *More than one class involved.*

If a broad term used by applicant clearly includes particular items which are classified in more than one class in the Classification of Goods and Services, the term must be amended to limit the items to one class. An example of such a term would be "artists' materials." Another example would be the designation "tables," which would include such diverse and differently classified types as operating tables, draftsmen's tables and dining tables. However, the conclusion that a term would clearly include particular items which are classified in more than one class should be reasonable in the light of commercial relationships between goods or services. For example, see the terms "paper," "furniture" and "ammunition," in *In re Port Huron Sulphite & Paper Co.*, 120 USPQ 343 (TT&A Bd. 1959); *In re Armstrong Cork Company*, 180 USPQ 335 (TT&A Bd. 1973); and in *In re Dynamit Nobel AG*, 169 USPQ 499 (TT&A Bd. 1974), respectively. In each of these cases the terms might seem to include certain items classified elsewhere but in fact such items are so specialized in character that they are not generally understood as being included in the broad term.

A filing fee is required for each class, and only goods classified in the designated class may be included. Rule 2.86.

For combining classes in one application, see Rule 2.87 and TMEP section 1113.

804.04(b) *Lack of clarity.*

If a term is so vague or indefinite that what it is intended to identify cannot be understood, and proper examination is hindered, the term must be amended to be sufficiently clear. An example would be the term "metallic parts." An instance is also found in *In re Societe des Parfums Schiaparelli*, 122 USPQ 349 (TT&A Bd. 1959), where clarification of the term "beauty products" was held to be necessary because the term does not have a commonly understood meaning as referring to a known and commercially related group of items. In making inquiry, refer to Rule 2.61(b) and TMEP section 1105.02.

804.04(d) *Inaccuracy.*

If the identification is inconsistent with the goods or services which are indicated by the specimens, or if the ordinary meaning of the language of the identification designates goods or services which would be at variance with what is disclosed by the specimens or any other part of the record, amendment to make the identification accurate will be necessary. For example, "decalcomanias" are not adequately or accurately identified by the term "publications." In *In re Toro Manufacturing Corporation*, 174 USPQ 241 (TT&A Bd. 1972), where the goods were a specialized article known as "grass-catcher bags for lawn-mowers," such use did not justify the broad term "bags" which would encompass goods diverse from and commercially unrelated to applicant's specialized article. See also *Merchanising Promotions* v. *Hastings & Co., Inc.*, 110 USPQ 256 (Comr. Pats. 1956); *Kiekhaefer Corporation* v. *Willys-Overland Motors, Inc. etc.*, 111 USPQ 105 (CCPA 1956), "internal combustion engine" amended to "outboard motor;" *Ex parte Consulting Engineer Publishing Co.*, 115 USPQ 240 (Comr. Pats. 1957), "periodical" amended to "monthly news bulletin;" *Nopco Chemical Company* v. *Kay-Fries Chemicals, Inc.*, 124 USPQ 113 (TT&A Bd. 1960); and *In re Samuel M. Gertman Co., Inc.*, 180 USPQ 336 (TT&A Bd. 1973), "fresh dressed poultry" amended to "frozen ready to eat poultry."

BERNARD A. MEANY,
*Assistant Commissioner for Trademarks.*

Mar. 15, 1977.

## Guidelines for Implementation of Recently Revised Rules

Recently a number of rules relating to Patent Examining and Appeal Procedures were revised. The new rules were published in the Federal Register at 42 F.R. 5588 on January 28, 1977, and in the OFFICIAL GAZETTE at 955 O.G. 1054 on February 22, 1977. The following guidelines are being published to describe the procedures which are being followed in implementing 37 CFR sections 1.11, 1.97–1.99, 1.109, 1.194, 1.291 and 1.292.

*Files Open to the Public*

Section 1.11(b) is applicable only to those reissue applications filed on or after March 1, 1977. Those reissue applications already on file will not be automatically open to inspection but a liberal policy will be followed by the Office of the Solicitor in granting petitions for access to such applications.

(NOTE.—These sections as changed will be incorporated into the Manual text in Rev. 3 of the Manual.)

(NOTE.—These sections as changed will be incorporated into the Manual text in Rev. 3 of the Manual.)

*This Notice as originally published was entitled "Preface to the Trademark O.G. Notices," with a sub-headed portion entitled "Identification of Goods and Services in Trademark Applications." The Notice was first issued under data of June 16, 1971 and first printed in 36 Fed. Reg. 13232, July 16, 1971, and in the OFFICIAL GAZETTE of August 13, 1971 (889 O.G. TM 2). That portion of the Notice sub-headed "Identification of Goods and Services in Trademark Applications" was re-issued under date of January 13, 1972 with an amendment of the part pertaining to fees for the international list, and as amended was reprinted in the OFFICIAL GAZETTE of February 8, 1972 (895 O.G. TM 54).

For those reissue applications filed on or after March 1, 1977, the following procedure will be observed:

1) The filing of reissue applications will be announced in the OFFICIAL GAZETTE and will include certain identifying data as specified in section 1.11(b). Any member of the general public may request access to a particular reissue application filed after March 1, 1977. Since no record of such request is intended to be kept, an oral request will suffice.
2) The reissue application files will be maintained in the examining groups and inspection thereof will be supervised by group personnel. Although no general limit is placed on the amount of time spent reviewing the files, the Office may impose limitations, if necessary, e.g., where the application is actively being processed.
3) Where the reissue application has left the examining group for administrative processing, requests for access should be directed to the appropriate supervisory personnel in the Division or Branch where the application is currently located.
4) Requests for copies of papers in the reissue application file must be in writing addressed to the Commissioner of Patents and Trademarks, Washington, D.C. 20231 and may be either mailed or delivered to the Office mailroom. The price for copies made by the Office is thirty cents per page.

*Prior Art Statements*

This notice supersedes the notices of August 12, 1974 (926 O.G. 2) and May 19, 1975 (935 O.G. 902) relating to citations of prior art. Although new sections 1.97 through 1.99 are not effective until July 1, 1977, and are not mandatory upon applicants, they provide an ideal mechanism for complying with the duty of disclosure under 37 CFR 1.56. The statements should be submitted in accordance with the following guidelines:

1) Prior art statements should be submitted at the time of filing the application or within three months thereafter and may be separate from the specification or incorporated therein. The statement shall serve as a representation that the person preparing it has included therein what he believes to be the closest prior art of which he is aware and shall not be construed as a representation that no better art exists or that a search has been made. If the first action in the application is received prior to three months after filing of the application and no prior art statement has been submitted, the prior art statement may be submitted with the response to the first action and be considered timely.
2) The statement shall include a listing of the patents, publications or other information which the preparer of the statement wishes to cite and a concise explanation of the relevance of each listed item. Copies of the pertinent portions of all listed documents shall be supplied along with the statement, both when incorporated into the specification and when filed separately. If two or more patents or publications considered material are substantially identical, a copy of a representative one shall be included with the statement and others may merely be listed with an indication of which are considered to be substantially identical.
3) A translation of the pertinent portions of foreign language patents or publications considered material should be transmitted if an existing translation is readily available to the applicant. It will be sufficient, however, to transmit an equivalent English language patent or publication so long as it is identified as an equivalent.

Where the applicant has submitted copies of prior art in accordance with these guidelines in a prior application, reference to the prior application and the submission therein will be sufficient for the continuing application as far as the copies are concerned. As far as the statement per se is concerned, the relevance of the prior art to the claimed subject matter must be indicated if it differs from its relevance as explained in the prior application.

4) If prior to the issuance of a patent an applicant, pursuant to his duty of disclosure under 37 CFR 1.56, wishes to bring to the attention of the Office additional patents, publications or other information not previously submitted, the additional information should be submitted to the Office with reasonable promptness. It may be included in a supplemental prior art statement or may be incorporated into other communications to be considered by the examiner. Any transmittal of additional information shall be accompanied by explanations of relevance and by copies in accordance with the requirements aforementioned. The transmittal should include a statement explaining why the prior art was not earlier submitted.

While the Patent and Trademark Office will not knowingly ignore any prior art which might anticipate or suggest the claimed invention, no assurance can be given that cited art or other information not submitted in accordance with these guidelines will be considered by the examiner.

After the claims have been indicated as allowable by the examiner, e.g., by the mailing of an Ex parte Quayle action, a notice of allowability (PTOL–327), an examiner's amendment (PTOL–37), or a Notice of Allowance (PTOL–85), any citations submitted will be placed in the file. Since prosecution has ended, however, such submissions will not ordinarily be considered by the examiner unless the citation is accompanied by:

(*a*) A proposed amendment cancelling or further restricting at least one independent claim and narrowing the scope of protection sought;
(*b*) A timely affidavit under 37 CFR 1.131 with respect to the material cited; or
(*c*) A statement by the applicant or his attorney or agent that, in the judgment of the person making the statement, the prior art or other information cited raises a serious question as to the patentability of the claimed subject matter, or is closer prior art than that of record.

If the material is submitted after the base issue fee has has been paid, it must also be accompanied by a petition under 37 CFR 1.183 requesting a waiver of 37 CFR 1.312. Such petition, if granted, would result in review of the art by the examiner and possible entry of the amendment.

In each instance where an examiner considers, but does not cite on form PTO–892, specific prior art referred to in a paper placed in the application file, the examiner will place a notation adjacent to the reference according to the following:

> If included in the specification, the examiner will write his or her initials adjacent to any references checked and enter "checked" in the left margin opposite the initials. If presented in a separate paper or in the remarks of an amendment, the examiner's initials and "checked" will be entered adjacent to the citations or wherever possible to indicate clearly those checked.

*Reasons for Allowance*

One of the primary purposes of the change in Section 1.109 is to improve the quality and reliability of issued patents by providing a complete file history which should clearly reflect, as much as is reasonably possible, the reasons why the application was allowed. Such information facilitates evaluation of the scope and strength of a patent by the patentee and the public and may help avoid or simplify litigation of a patent.

The practice of stating the reasons for allowance is not new and the rule merely formalizes the examiner's existing authority to do so and provides applicants an opportunity to comment upon any such statement of the examiner.

When the examiner determines that it is necessary or desirable, a "Statement of Reasons for Allowance" will be prepared. The "Statement" will usually be an attachment to either a notice of allowability (PTOL–327) or Examiner's Amendment (PTOL–37). Any comments considered necessary by applicant must be submitted no later than the issue fee and should preferably *accompany* the issue fee. Submission with the issue fee avoids any delay in the processing of the application and avoids the necessity to associate the comments with the application while it is in issue except at the time the file must be pulled to record the payment of the issue fee. Such comments will be entered in the application file by the Allowed Files Branch with an appropriate notation on the "contents" list of the file wrapper, but will not be reviewed by the examiner.



*Oral Hearings Before Board of Appeals*

Section 1.194 clarifies the circumstances in which oral hearings should be requested and provides for oral arguments by, or on behalf of, primary examiners in certain appeals.

Under Section 1.194, the following procedures will be in effect:

1) In accordance with Section 1.192, appellants who desire an oral hearing must request the same at the time of filing the appeal brief.
2) If appellant has requested an oral hearing and the primary examiner intends to present an oral argument, the last paragraph of the examiner's answer will indicate this intention.
3) Notice of the oral hearing will be given to the appellant and, at the same time, to the primary examiner in those cases in which the primary examiner has indicated an intention to present an oral argument.
4) After an oral hearing has been confirmed and the date set as provided in Section 1.194(c), the application file will be delivered to the examiner via the appropriate Group Director at least one week prior to the date of the hearing for those cases in which the examiner is expected to be present at the hearing. In those cases where the Board requests the presentation of an oral argument by, or on behalf of, the primary examiner, the appellant will be so notified. The Board's request for an oral argument may, where appropriate, indicate specific points or questions to which the argument should be particularly directed. The application file wil be returned to the Board before the hearing.
5) In those appeals in which an oral hearing has been confirmed and either the primary examiner or the Board has indicated a desire for oral argument, such oral argument may be presented whether or not appellant appears.

*Protests and Public Use Proceedings*

Amended sections 1.291 and 1.292 give greater recognition to the value of written protests and public use petitions and are intended as an aid in avoiding the issuance of invalid patents.

Under sections 1.291(b) and (c) and 1.292(b), the following procedures will be observed:

1) Only in those instances where it has not been possible to serve protest papers upon the applicant, attorney or agent should duplicates of the papers submitted be provided. In this case the appropriate examining group will attempt to get the duplicate copy to the applicant, attorney or agent. However, every effort should be made by the protester to effect service.
2) Citations of prior art and any papers related thereto may be entered in the file after a patent has been granted by submitting them to the attention of the Record Room, where they will be entered without comment by the Office. If after diligent effort it has not been possible to serve the prior art citations and related papers on the patentee, his attorney or agent, duplicate copies should be submitted in which case the Record Room will attempt to get the duplicate copy to the owner of record.
3) When public use petitions and accompanying papers are submitted they, or a notice in lieu thereof, will be entered in the application file. Duplicate copies should be submitted only when, after diligent effort, it has not been possible for petitioner to serve a copy of the petition on the applicant, his attorney or agent in which case the Office of the Solicitor will attempt to get the duplicate copy to the applicant, his attorney or agent.
4) To ensure consideration by the examiner, protests should be timely submitted, i.e., before final rejection or allowance. Consideration of protests filed after final rejection or allowance will depend upon the relevance of the prior art documents and the point in time at which they are submitted. Documents which clearly anticipate or render obvious one or more claims will not knowingly be ignored. If protests are not timely submitted or if they fail to comply with section 1.291(a) as to the submission of a copy of each prior art document relied upon, they will be acknowledged and referred to the examiner having charge of the subject matter involved for entry in the application file and such consideration as seems warranted.

In each instance where an examiner considers but does not cite on form PTO–892 specific prior art referred to in a protest, the examiner will place a notation in the protest paper adjacent to the reference which will include his or her initials and the term "checked."

Additional future guidelines as to protest procedures may be developed after gaining experience with the new practice.

C. MARSHALL DANN,
Mar. 18, 1977. *Commissioner of Patents and Trademarks.*

## Patent Suits

**Notices under 35 U.S.C. 290; Patent Act of 1952**

**3,187,234,** Muranaka, Yamamoto, Hamberg and Ikegami, SELECTIVE SIGNAL-RESPONSIVE CIRCUIT; **3,747,228,** Y. Yamamoto, INTERVIEW MACHINE, **filed** Oct. 28, 1976, D.C., C.D. Calif. (Los Angeles), Doc. CV76–3354, *Yujiro Yamamoto, etc.* v. *Dictaphone Corporation et al.*

**3,236,709,** R. J. Carver, TIRE RECAPPING PROCESS, **filed** Nov. 22, 1976, D.C., W.D.N.Y. (Buffalo), Doc. 76–541, *Bandag, Incorporated* v. *Lewis General Tires, Incorporated.*

**3,329,512,** Shipley, Jr. and Gulla, CHEMICAL DEPOSITION OF COPPER AND SOLUTIONS THEREFOR, **filed** Oct. 22, 1976, D.C. Conn. (Hartford), Doc. H76–413, *Shipley Co. Inc.* v. *MacDermid, Inc.*

**3,371,455,** G. C. Fox, SWIMMING POOL STRUCTURE, **filed** July 22, 1976, D.C.N.J. (Trenton), Doc. 76–1420, *Fox Pool Corp.* v. *Paul Lewis, doing business as American Pools.*

**3,398,689,** R. W. Allington, APPARATUS PROVIDING A CONSTANT-RATE TWO COMPONENT FLOW STREAM, **filed** Nov. 23, 1976, D.C., N.D. Ill. (Chicago), Doc. 76–4340, *Instrumentation Specialties Co.* v. *Waters Associates, Inc. et al.*

**3,557,469,** D.C. Edgington, GRAPHIC ARTS FILM DRYER; **3,800,434,** Edgington and Edgington, GRAPHIC ARTS FILM DRYER, **filed** Oct. 8, 1975, D.C., N.D. Ill. (Chicago), Doc. 75c3386, *Donald C. Edgington et al.* v. *Buckingham Graphics, Inc. et al.* Pursuant to stipulation all matters settled. Cause dismissed with prejudice, July 19, 1976.

**3,659,284,** W. T. Rusch, TELEVISION GAMING APPARATUS; **3,659,285,** Baer, Rusch, Harrison, TELEVISION GAMING APPARATUS AND METHOD, **filed** Sept. 22, 1975, D.C., N.D. Ill. (Chicago), Doc. 75c3153, *The Magnavox Co. et al.* v. *Sears, Roebuck & Co.* Enter order dismissing cause without prejudice and without costs, June 10, 1976. **Same, filed** Nov. 18, 1975, D.C., N.D. Ill. (Chicago), Doc.75c3933, *Atari, Inc.* v. *The Magnavox Company et al.* Enter on consent in favor of defendants and against plaintiff, June 9, 1976.

**3,659,285.** (See 3,659,284.)

**3,747,228.** (See 3,187,234.)

**3,762,648,** Deines, Trenary, Smith and Hickman, SPRAY NOZZLE; **3,801,019,** Trenary and Smith, same; **3,958,756,** Trenary, Smith, Ruehmann, Elkins, Erwin and Treadwell, SPRAY NOZZLES, **filed** Nov. 1, 1976, D.C., S.D. Fla. (Miami), Doc. 76–1931–C–JLK, *Teledyne Industries, Inc.* v. *Windmere Products, Inc. et al.*

**3,800,434.** (See 3,557,469.)

**3,801,019.** (See 3,762,648.)

**3,845,349,** T. Liebman, LINE SYNCHRONIZED STROBE LIGHT, **filed** Feb. 25, 1975, D.C., C.D. Calif. (Los Angeles), Doc. CV75–625 AAH, *Theodore Liebman et al.* v. *American Lighting Specialties.* Filed consent decree and judgment and order thereon that plaintiff is owner of said patent, that defendant has infringed on said patent and said defendant is enjoined from further use, sale of said patent and that judg-

ment is entered in favor of plaintiff and against defendant, Jan. 9, 1976.

**3,868,434,** Westphal and Heining, POLYMER COMPOSITION AND PROCESS, **filed** Jan. 21, 1976, D.C. Del. (Wilmington), Doc. 76–37, *Cosden Oil & Chemical Company* v. *Foster Grant Co., Inc.*

**3,870,953,** Boatman and Hall, IN CIRCUIT ELECTRONIC COMPONENT TESTER, **filed** Dec. 1, 1976, D.C., N.D. Calif. (San Francisco), Doc. C–76–2691–WWS, *Zehntel, Inc.* v. *Testline Instruments, Inc.*

**3,918,646,** Diaz and Rangel-Garza, IRRIGATION SYSTEMS BY TRICKLING, **filed** Nov. 12, 1976, D.C., C.D. Calif. (Los Angeles), Doc. CV76–3541–RMT, *Jaime Leal-Diaz et al.* v. *AG-Drip Sales, Inc. et al.*

**3,932,690,** G. E. Gliemeroth, TRANSPARENT, PHOTOTROPIC LAMINATE, **filed** Mar. 15, 1976, D.C.N.J. (Newark), Doc. 76–474, *Raceway Components, Inc.* v. *H. H. Robertson Company.*

**3,932,696,** Fork, Lindner, Kelley and Albrecht, UNDER FLOOR ACCESS HOUSING UTILIZING A TROUGH SPACE OF A CELLULAR FLOORING UNIT, **filed** May 6, 1976, D.C.N.J. (Newark), Doc. 76–840, *Raceway Components, Inc. et al.* v. *H. H. Robertson Company.*

**3,938,756.** (See 3,762,648.)

**3,967,752,** D. F. Cudzik, EASY-OPEN WALL; **3,967,753,** same, **filed** Nov. 12, 1976, D.C., N.D. Ill. (Chicago), Doc. 76c4198, *Reynolds Metals Company* v. *The Continental Group, Inc.*

**3,967,753.** (See 3,967,752.)

**Re. 25,360,** E. G. Rice, COMBINATION STOCKINGS AND PANTY, **filed** June 25, 1975, D.C.N.C. (Charlotte), Doc. C–C–75–206, *Tights, Inc.* v. *Admiration Hosiery Mill, Inc.* Stipulation of dismissal, Nov. 23, 1976.

### Erratum

Under Patent Suits in the OFFICIAL GAZETTE of December 21, 1976, volume 953, page 881, the paragraph beginning with 3,708,967 and the paragraph beginning with 3,826,068 should be deleted. Also 3,859,776 (See 3,708,967) should be deleted.

# PATENT NOTICES

## Certificates of Correction for the Week of Apr. 12, 1977

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| P.P. 3,971 | 3,926,742 | 3,966,979 | 3,983,149 | 3,992,895 | 3,996,986 | 4,001,890 | 4,005,386 |
| Re. 28,840 | 3,928,890 | 3,967,937 | 3,983,246 | 3,992,909 | 3,997,132 | 4,002,163 | 4,005,390 |
| Re. 29,051 | 3,929,566 | 3,968,765 | 3,983,300 | 3,993,427 | 3,997,495 | 4,002,270 | 4,005,591 |
| Re. 29,126 | 3,940,014 | 3,969,550 | 3,984,342 | 3,993,678 | 3,997,579 | 4,002,343 | 4,005,604 |
| D. 241,698 | 3,940,706 | 3,970,419 | 3,984,665 | 3,993,683 | 3,997,604 | 4,002,519 | 4,005,801 |
| D. 243,073 | 3,941,869 | 3,970,544 | 3,984,980 | 3,993,835 | 3,997,610 | 4,002,886 | 4,005,827 |
| 3,560,184 | 3,944,675 | 3,972,789 | 3,985,035 | 3,993,898 | 3,997,792 | 4,003,131 | 4,006,044 |
| 3,712,542 | 3,947,474 | 3,972,874 | 3,985,651 | 3,993,903 | 3,997,932 | 4,003,343 | 4,006,143 |
| 3,788,321 | 3,948,466 | 3,973,807 | 3,985,800 | 3,993,914 | 3,998,223 | 4,003,376 | 4,006,285 |
| 3,793,053 | 3,949,088 | 3,974,995 | 3,987,565 | 3,994,442 | 3,998,275 | 4,003,815 | 4,006,346 |
| 3,848,532 | 3,952,421 | 3,975,120 | 3,987,835 | 3,994,572 | 3,998,354 | 4,003,892 | 4,006,355 |
| 3,855,267 | 3,952,874 | 3,975,287 | 3,988,553 | 3,994,814 | 3,999,448 | 4,003,973 | 4,006,428 |
| 3,856,921 | 3,954,827 | 3,975,952 | 3,989,070 | 3,994,833 | 3,999,810 | 4,004,016 | 4,006,471 |
| 3,867,531 | 3,956,461 | 3,976,748 | 3,989,323 | 3,995,637 | 3,999,850 | 4,004,174 | 4,006,504 |
| 3,880,935 | 3,956,627 | 3,977,842 | 3,990,048 | 3,995,836 | 3,999,969 | 4,004,236 | 4,006,506 |
| 3,885,699 | 3,957,173 | 3,977,989 | 3,990,315 | 3,996,049 | 4,000,276 | 4,004,434 | 4,006,529 |
| 3,886,973 | 3,958,898 | 3,978,319 | 3,991,111 | 3,996,054 | 4,000,493 | 4,004,673 | 4,006,618 |
| 3,887,439 | 3,958,962 | 3,979,425 | 3,991,426 | 3,996,115 | 4,000,593 | 4,004,759 | 4,006,842 |
| 3,888,043 | 3,959,268 | 3,979,528 | 3,991,444 | 3,996,172 | 4,000,633 | 4,004,830 | 4,006,936 |
| 3,903,162 | 3,959,369 | 3,980,153 | 3,991,576 | 3,996,253 | 4,000,665 | 4,004,903 | 4,007,338 |
| 3,906,054 | 3,959,500 | 3,980,406 | 3,991,637 | 3,996,272 | 4,000,667 | 4,005,024 | 4,007,557 |
| 3,907,108 | 3,960,837 | 3,980,440 | 3,991,749 | 3,996,295 | 4,000,668 | 4,005,244 | 4,007,801 |
| 3,910,950 | 3,961,868 | 3,982,009 | 3,992,511 | 3,996,341 | 4,000,854 | 4,005,263 | 4,008,341 |
| 3,919,902 | 3,963,170 | 3,983,067 | 3,992,593 | 3,996,778 | 4,000,944 | 4,005,295 | |
| 3,922,886 | 3,966,028 | 3,983,102 | 3,992,642 | 3,996,942 | 4,001,775 | 4,005,319 | |

### Disclaimers

3,938,012.—*Vincent J. Patti,* Norridge, Ill. VARIABLE CAPACITOR. Patent dated Feb. 10, 1976. Disclaimer filed Feb. 14, 1977, by the assignee, *Standex International Corporation.*

Hereby enters this disclaimer to claims 10 and 11 of said patent.

3,987,168.—*Hellmut Hoeffmann,* Wuppertal, *Ingeborg Hammann,* Cologne, *Bernhard Homeyer,* Opladen, and *Wilhelm Stendel,* Wuppertal, Germany. O-ALKYL-O-[1-CYANO-ALKYL - 5 - SUBSTITUTED-MERCAPTO-TRIAZOL(3) YL] - (THIONO) - PHOSPHORIC(PHOSPHONIC) ACID ESTERS OR ESTER-AMIDES. Patent dated Oct. 19, 1976. Disclaimer filed Feb. 14, 1977, by the assignee, *Bayer Aktiengesellschaft.*

Hereby enters this disclaimer to claims 1, 2, 4 and 6 to 10 of said patent.

### Disclaimer and Dedication

3,365,646.—*Franklin C. Brewster,* Franklin Park, Ill. ELECTRONIC APPARATUS. Patent dated Jan. 23, 1968. Disclaimer and dedication filed Jan. 3, 1977, by the assignee, *Motorola, Inc.*

Hereby disclaims and dedicates to the Public claim 1 of said patent.

## PATENT EXAMINING CORPS

**RENE D. TEGTMEYER, Assistant Commissioner**
**WILLIAM FELDMAN, Deputy Assistant Commissioner**

### CONDITION OF PATENT APPLICATIONS AS OF FEBRUARY 26, 1977

| PATENT EXAMINING GROUPS | Actual Filing Date of Oldest New Case Awaiting Action |
|---|---|
| **CHEMICAL EXAMINING GROUPS** | |
| GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices. | 7-2-76 |
| GENERAL ORGANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director. Heterocyclic, Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides. | 6-22-76 |
| HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes. | 3-18-76 |
| COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—R. FRIEDMAN, Director. Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography. | 4-22-76 |
| SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—H. S. VINCENT, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes. | 3-1-76 |
| **ELECTRICAL EXAMINING GROUPS** | |
| INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Illumination; Horology; Acoustics; Recorders; Weighing Scales. | 10-15-75 |
| SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director. Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material. | 1-12-76 |
| INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts. | 1-9-76 |
| RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—N. ANSHER, Director. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating. | 9-7-76 |
| ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring. | 4-2-76 |
| DESIGNS, GROUP 290—C. D. QUARFORTH, Director. Industrial Arts; Household, Personal and Fine Arts. | 9-10-75 |
| **MECHANICAL EXAMINING GROUPS** | |
| HANDLING AND TRANSPORTING MEDIA, GROUP 310—D. J. STOCKING, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment. | 3-26-76 |
| MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus: Plastics Working Apparatus; Plastic Block and Earthenware Apparatus: Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks. | 8-2-76 |
| AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—G. M. FORLENZA, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth-Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination. | 5-3-76 |
| HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—B. R. GAY, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication. | 4-2-76 |
| GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—M. M. NEWMAN, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors; Miscellaneous Hardware; Locks; Building Structures: Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Coating; Textiles; Apparel and Shoes; Sewing Machines. | 7-22-76 |

**Expiration of patents:** The patents within the range of numbers indicated below expire during March 1977, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 2,926,352 to 2,931,037, inclusive
Plant Patents..... Numbers 1,919 to 1,925, inclusive



# REISSUES

APRIL 12, 1977

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in *italics* indicates additions made by reissue.

**Re. 29,175**

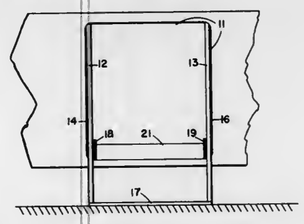
## COMPACT LIFT FOR VAN

**Kenneth A. Tauer, 9801 Robin Oak Rd., Minnetonka, Minn. 55343**

**Original No. 3,826,386, dated July 30, 1974, Ser. No. 346,349, Mar. 30, 1973. Continuation-in-part of Ser. No. 322,732, Jan. 11, 1973, abandoned. Application for reissue June 21, 1976, Ser. No. 698,296**

**Int. Cl.² B60G *1/48***

**U.S. Cl. 214—77 R** **5 Claims**




1. In an automobile having a van-type body, including body door openings provided with doors, a lift installed therein comprising:

a pair of linkage mechanisms secured to said body at one said door opening, each one of said pair of linkage mechanisms including:

a suspension arm hingingly secured to said body at one end and depending therefrom in a substantially vertical direction;

similar upper and lower pivot arms, each pivoted at one end to the lower end of said suspension arm at points spaced by a selected distance;

a vertical support connected by pivots at two points to the other ends of said pivot arms, said two points being spaced by said selected distance, whereby said upper and lower pivot arms, and a portion of said suspension arm and of said vertical support constitute a pantograph;

a guide arm pivoted at one end in one of said pivot arms and at the other end in the van structure; said lift also comprising:

a platform pivoted to and carried by said linkage mechanism;

means for powering said lift;

a cable connected to said platform and to said means for powering; and

a minor linkage connected to one of said pivot arms and to said cable whereby said platform can be raised and lowered and moved between horizontal and vertical positions.

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**Re. 29,176**

## PRODUCT PRESSURIZED COMPRESSED AIR DISPENSER

**Herbert H. Loeffler, Arlington, Mass., assignor to Arthur D. Little, Inc., Cambridge, Mass.**

**Original No. 3,910,465, dated Oct. 7, 1975, Ser. No. 520,946, Nov. 4, 1974. Application for reissue Feb. 17, 1976, Ser. No. 658,669**

**Int. Cl.² B67D *5/54***

**U.S. Cl. 222—389** **15 Claims**

1. A dispenser for dispensing a fine spray by means of compressed air, comprising:

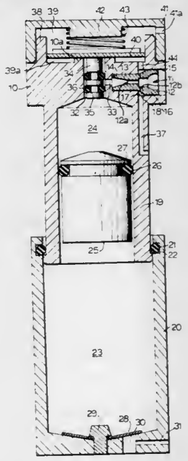
a body having a dispensing nozzle means therein for mixing and dispensing a fluent product and compressed air,

a piston-cylinder means depending from said body and having a fixed member in said body and a movable member movable relative to said fixed member for compressing air therebetween, said fixed member having a fluent product containing recess therein opening toward said movable member,

a product pressurizing piston in said product containing recess having an end exposed toward said movable member,

said body having a product flow path therethrough from said product containing recess to said nozzle means and a product control valve means in said product flow path for controlling flow of product therethrough,

said body further having a compressed air flow path therethrough to said nozzle means and compressed air valve



means in said compressed air flow path which is opened near the end of the movement of said movable means for releasing compressed air at a predetermined pressure into said compressed air flow path, and

a product valve actuator coupled to said product valve, said compressed air flow path opening to said product valve actuator and said product valve actuator being movable in response to the pressure of the compressed air for opening said product valve,

whereby when the movable member is moved toward the fixed member for compressing air the compressed air acts on said product pressurizing piston for pressurizing the product, and compressed air at a predetermined pressure is released to said flow path, said valve actuator is moved to open said product valve.

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**Re. 29,177**

## SOLAR TORQUE COMPENSATION FOR A SATELLITE

**Theodore Donald Michaelis, Medford, N.J., assignor to RCA Corporation, New York, N.Y.**

**Original No. 3,838,344, dated Oct. 1, 1974, Ser. No. 319,366, Dec. 29, 1972. Application for reissue June 23, 1975, Ser. No. 589,520**

**Claims priority, application United Kingdom, Mar. 20, 1972, 12935/72**

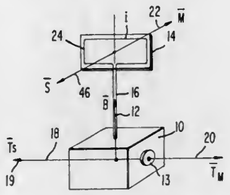
**Int. Cl.² B64G *1/00***

**U.S. Cl. 244—166** **3 Claims**

1. An attitude control system for a [ spin ] stabilized spacecraft to compensate for torques due to solar pressure,

said spacecraft having a panel with a set of solar cells adapted to receive solar radiant energy for conversion to electrical power, said panel being arranged for deployment from the spacecraft including means for orienting the panel toward the sun, the improvement comprising:

a. electromagnetic means included in said panel for generating a magnetic flux having a magnetic field extending normal to the plane of said panel for reacting with the magnetic field of the earth, said electromagnetic means comprising a single electromagnetic air core coil having




at least one turn of wire disposed in the peripheral portion of said solar cell panel, and in a plane parallel with the plane of said solar panel, and

b. means for energizing said electromagnetic means in response to solar energy received on said solar panel such that a magnetic flux therefrom reacts with the magnetic field of the earth to produce a magnetic torque substantially of equal magnitude and opposite direction to the torque developed on said spacecraft by the solar pressure of the solar radiant energy on said panel.

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**Re. 29,178**

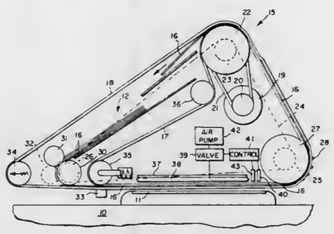
**SHEET RECIRCULATOR**

**Richard H. Colwill, 1007 Hellam St., Monterey, Calif. 93940**

**Original No. 3,937,454, dated Feb. 10, 1976, Ser. No. 578,084, May 16, 1974. Application for reissue May 14, 1976, Ser. No. 686,511**

**Int. Cl.² B65H** *3/06, 29/12*

**U.S. Cl. 271—6** **11 Claims**




1. In apparatus for feeding document sheets in order from a supply stack to the viewing region of a copier and back to said supply stack, the improvement comprising:

a. means arranged above said viewing region for forming a circulation path for said sheets, said path being generally triangular in vertical cross section;

b. means for supporting said supply stack at an incline along a first side of said path;

c. a second side of said path being arranged to extend from the lower region of said first said of said path across said viewing region;

d. a third side of said path being arranged to extend from said second side of said path upward to the upper region of said supply stack;

e. means for successively removing the bottom sheet of said supply stack from said lower region of said supply stack;

f. means for advancing said removed sheets successively in order into said second side of said path;

g. means for synchronizing said advance of said removed sheets with operations of said copier for copying said sheets in said viewing region;

h. means for advancing said copied sheets successively in order from said second side of said path through said third side of said path;

i. means for advancing said copied sheets successively in order to superposed relation over the top sheet of said supply stack; and

j. said means for advancing said removed sheets and said copied sheets comprises a pair of endless belts, drive means for said endless belts, [ and ] *an* outer one of said belts is substantially transparent, [ an inner one of said belts is substantially opaque, ] said inner belt passes under said supply stack, said outer belt passes over said supply stack, and said belts travel together through said second and third sides of said path.

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**Re. 29,179**

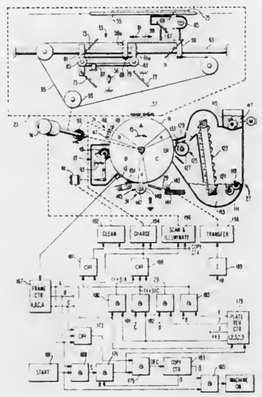
**REPRODUCTION APPARATUS INCORPORATING ALTERNATE REDEVELOPMENT AND REIMAGING CYCLES FOR MULTIPLE COPIES**

**Ronald V. Davidge, Boulder, Colo.; George W. Hobgood, Austin, Tex.; Carl A. Queener; Jesse W. Spears, both of Boulder, Colo., and Bernard G. Thompson, Longmont, Colo., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Original No. 3,736,055, dated May 29, 1973, Ser. No. 209,326, Dec. 17, 1971. Application for reissue May 22, 1975, Ser. No. 580,009**

**Int. Cl.² G03G** *15/00*

**U.S. Cl. 355—14** **13 Claims**



1. An electrostatic transfer reproduction apparatus incorporating an electrophotographic plate having at least one image area thereon which travels in a first direction in a closed loop past a plurality of processing stations comprising:

mounting means for mounting a master for optical projection;

an imaging [ processing ] station for projecting a light image of said mounted master onto said image area of said plate as said image area travels therepast creating a latent image on said image area, said imaging [ processing ] station including;

an actuable moving optical projecting system for projecting said light image while moving in said first direction from a home position;

actuable drive means for moving said optical projection system in said first direction from said home position and for returning said optical projection system to said home position;



a developer [ processing ] station for applying electrostatically charged developer material onto said image area thereby developing said latent image whenever said image area travels therepast;

a transfer [ processing ] station for transferring each developed image from said image area onto a substrate when said image area travels therepast;

an actuable [ processing ] station actuable for removing a latent image on said image area as said image area travels therepast;

position sensing means for sensing the position of said at least one image area with respect to said processing stations;

cycle control means responsive to said sensing means for actuating said optical projection system and said drive means when said image area travels past said imaging [ processing ] station on a first pass thereby creating a latent image of the mounted master on said image area, for deactuating said actuable [ processing ] station and said optical projection system when said image area travels past said actuable [ processing ] station and said image [ processing ] station on at least one next subsequent pass following said first pass thereby retaining said latent image created during said first pass and for actuating said actuable [ processing ] station and said optical projecting system and drive means when said image area travels past said actuable [ processing ] station and said imaging [ processing ] station following said at least one next subsequent pass thereby creating a further latent image of said mounted master on said image area, the latent image on said at least one image area being developed at said developer [ processing ] station and transferred at said transfer [ processing ] station at least two times before removal thereof at said actuable [ processing ] station.

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**Re. 29,180**

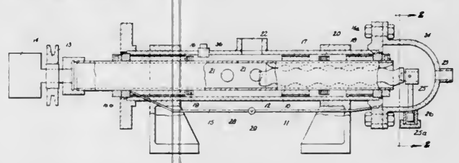
**MOINEAU PUMP WITH ROTATING OUTER MEMBER**

**Wallace Clark, 1830 S. German Church Road, Indianapolis, Ind. 46239**

**Original No. 3,932,072, dated Jan. 13, 1976, Ser. No. 504,354, Sept. 9, 1974. Continuation-in-part of Ser. No. 411,162, Oct. 30, 1973, abandoned. Application for reissue Apr. 2, 1976, Ser. No. 673,272**

**Int. Cl.² F01C** *1/10;* **F04C** *1/06;* **F16C** *25/00, 3/14*

**U.S. Cl. 418—48** **6 Claims**



1. A pump constituted of a gear pair made up of an inner member having at least one external helical thread, and an outer member having internal helical threads, there being one more internal helical thread in the outer member than the number of external helical threads on the inner member, a radial arm non-rotatably secured at one of its ends to said inner member, and fixed means limiting the other end of said radial arm to reciprocatory and oscillatory motion, said outer member being free to rotate on its true axis, said outer member being fixed in a tubular casing extending beyond said inner and outer members and constituting a drive shaft, said casing having at least one aperture for the passage of fluid being pumped, and being disposed within a housing, said casing being supported for rotation within said housing in bearings, said housing having a port at each end of said gear pair, whereby the direction of pumping may be reversed by reversing the direction of rotation of said drive shaft.

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**Re. 29,181**

**METHOD OF PREPARING PRINTED CIRCUIT BOARDS WITH TERMINAL TABS**

**Charles H. Dixon, III, Waukesha, Wis., assignor to RBP Chemical Corporation, Milwaukee, Wis.**

**Original No. 3,926,699, dated Dec. 16, 1975, Ser. No. 534,034, Dec. 18, 1974. Continuation-in-part of Ser. No. 479,705, June 17, 1974, abandoned, which is a division of Ser. No. 322,040, Jan. 8, 1973, Pat. No. 3,841,905, which is a continuation-in-part of Ser. No. 90,908, Nov. 19, 1970, abandoned. Application for reissue June 4, 1976, Ser. No. 693,053**

**Int. Cl.² C23F** *1/02*

**U.S. Cl. 156—656** **7 Claims**




1. The method of rapidly stripping a layer of metal selected from the group consisting of lead-tin solder and tin from a layer of copper on a fiberglass circuit board without adversely affecting the copper and fiberglass, said process comprising the steps of exposing the solder to a composition comprising the ammonium bifluoride in the range of 10% to 25% by weight, hydrogen peroxide in the range of 1% to 5% by weight, and water in the range of 89% to 70% by weight for a time sufficient to remove the solder, and rinsing the said composition from the copper after the solder has been effectively stripped and before the copper and plastic have been adversely affected.

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**Re. 29,182**

**ORAL COMPOSITION FOR CALCULUS RETARDATION**

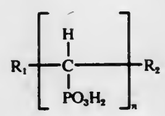
**Homer W. McCune, Wyoming, and Nathaniel B. Tucker, Glendale, both of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio**

**Original No. 3,488,419, dated Jan. 6, 1970, Ser. No. 731,312, May 22, 1968. Continuation-in-part of Ser. No. 693,713, Dec. 27, 1967, abandoned, which is a continuation-in-part of Ser. No. 668,702, Sept. 18, 1967, abandoned, which is a continuation-in-part of Ser. No. 512,548, Dec. 8, 1965, abandoned. Application for reissue June 14, 1976, Ser. No. 696,019**

**Int. Cl.² A61K** *7/16*

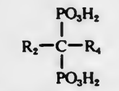
**U.S. Cl. 424—49** **21 Claims**

1. [ An oral ] *A dentifrice* composition effective in inhibiting the formation of dental calculus without adversely affecting tooth structure, comprising (1) from about .01% to about 10% by weight of a polyphosphonate selected from the group consisting of those of the formulae:




(I)

or




(II)

wherein $R_1$ and $R_2$ are each hydrogen or $CH_2OH$; n is an integer of from 3 to 10; $R_3$ is hydrogen, alkyl containing from 1 to about 20 carbon atoms, alkenyl containing from 2 to about 20 carbon atoms, phenyl, naphthyl, phenylethyl, benzyl, halogen, amino, dimethylamino, diethylamino, N-hydroxy-N-ethylamino, acetylamino, $-CH_2COOH$ $-CH_2PO_3H_2$, $-CH(PO_3H_2)(OH)$ or $-CH_2CH(PO_3H_2)_2$ $R_4$ is hydrogen, lower alkyl, amino, benzyl, halogen, hydroxyl $-CH_2COOH$, $CH_2PO_3H_2$, or $-CH_2CH_2PO_3H_2$; or

a pharmaceutically acceptable salt thereof, and (2) [ a carrier suitable for use in the oral cavity, ] *from about 0.5% to 95% by weight of an abrasive material*, the pH of the compositon being within the range from about 5.0 to 11.0, *said composition being free of calcium abrasives which would yield enough soluble calcium to significantly impair the anticalculus activity of said polyphosphonate.*

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**Re. 29,183**

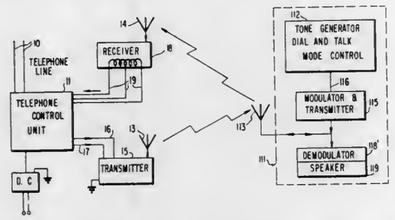
**TELEPHONE RANGE EXPANDER**

**Gene Greneker, III, 2546 Wilson Woods Drive, Decatur, Ga. 30033**

**Original No. 3,721,771, dated Mar. 20, 1973, Ser. No. 884,505, Dec. 12, 1969. Application for reissue Aug. 19, 1974, Ser. No. 498,638**

**Int. Cl.² H04M** *3/06*

**U.S. Cl. 179—41 A** **16 Claims**




*11. Extension telephone apparatus for remotely using a telephone line at a subscriber's station comprising:*

*a mobile unit including:*

*mobile transmitter means,*

*mobile receiver means;*

*tone means for alternatively generating a first tone and a second tone; and*

*selector means for selectively connecting said tone means to said mobile transmitter means to cause said tones generated by said tone means to be transmitted through said mobile transmitter means; and,*

*a control unit at the subscriber's station including:*

*control transmitter means for transmitting to said mobile receiver means signals on said telephone line;*

*control receiver means for receiving said first and second tones transmitted by said mobile transmitter means;*

*filter switch means connected to said control receiver means and operable in response to receipt of said first tone;*

*stepping switch means responsive to operation of said filter switch means having normal, first and second operated positions;*

*ringing circuit means operatively associated with said normal position of said stepping switch means and said control transmitter means for generating ringing signals in response to ringing signals on the telephone line and causing said control transmitter means to transmit said generated ringing signals;*

*dialing means operatively associated with said first position of said stepping switch means for applying dialing pulses to the telephone line in response to receipt of said second tone by said control receiver; and*

*talk means operatively associated with said second position of said stepping switch means for connecting said control transmitter means to the telephone line and energizing said control transmitter means.*

# PLANT PATENTS

## GRANTED APRIL 12, 1977

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

**4,038**

**FLOWERING CRAB APPLE TREE**

**James W. Zampini, Perry, Ohio, assignor to Lake County Nursery Exchange, Inc., Perry, Ohio**

**Filed Apr. 20, 1976, Ser. No. 678,538**

**Int. Cl.² A01H** *5/03*

**U.S. Cl. Plt.—34** **1 Claim**

1. A new and distinct variety of flowering Malus crab apple tree, substantially as herein shown and described, characterized particularly by an upright, semi-dwarf growth habit, an arching and weeping effect of the branches, attractive pinkish colored flowers and abundant bright dark red colored fruits that may hang all winter, and which has apparent resistance to diseases which are common to most Malus species.

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**4,039**

**GERANIUM PLANT NAMED PEARLIE MAE RED**

**Griffith J. Buck, Ames, Iowa, assignor to Iowa State University Research Foundation, Inc., Ames, Iowa**

**Filed May 3, 1976, Ser. No. 680,151**

**Int. Cl.² A01H** *5/00*

**U.S. Cl. Plt.—68** **1 Claim**

1. A new and distinct geranium cultivar substantially as herein shown and described, characterized by its profuse production of very large umbel-form inflorescence, its ability to flower throughout the year under glass, its generally shorter time requirement for initiation of inflorescence, and its ability to grow vigorously and flower profusely under high humidity and temperature conditions.

**4,040**

**GERANIUM PLANT NAMED HAZEL**

**Griffith J. Buck, Ames, Iowa, assignor to Iowa State University Research Foundation, Inc., Ames, Iowa**

**Filed May 3, 1976, Ser. No. 680,152**

**Int. Cl.² A01H** *5/00*

**U.S. Cl. Plt.—68** **1 Claim**

1. A new and distinct geranium cultivar substantially as herein shown and described, characterized by its abundant production of large umbel-form clusters of very large florets, the intense smoky rose coloring of its flowers, and its resistance to breakage by rain and wind.

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**4,041**

**GERANIUM PLANT NAMED MARIAN**

**Griffith J. Buck, Ames, Iowa, assignor to Iowa State University Research Foundation, Inc., Ames, Iowa**

**Filed May 3, 1976, Ser. No. 680,153**

**Int. Cl.² A01H** *5/00*

**U.S. Cl. Plt.—68** **1 Claim**

1. A new and distinct variety of geranium plant substantially as herein shown and described, characterized by its vigorous, upright and much branched growth habit, its continuous and abundant flower production, and the tendency of its flower color to intensify under high temperature and high light conditions.

# PATENTS

## GRANTED APRIL 12, 1977

### ERRATA

| For CLASS | See PATENT NO. |
|---|---|
| 403–404 | 4,016,703 |
| 141–226 | 4,016,910 |
| 273–001 R | 4,016,937 |
| 273–134 AT | 4,016,939 |
| 280–674 | 4,016,950 |
| 209–002 | 4,016,978 |
| 209–074 R | 4,016,979 |
| 246–182 B | 4,017,044 |
| 428–675 | 4,017,265 |
| 428–600 | 4,017,266 |
| 029–407 | 4,017,267 |
| 062–160 | 4,017,286 |
| 536–050 | 4,017,460 |
| 526–019 | 4,017,469 |
| 428–601 | 4,017,480 |
| 427–257 | 4,017,493 |
| 340–174 TF | 4,017,604 |
| 358–196 | 4,017,676 |
| 358–127 | 4,017,677 |
| 358–128 | 4,017,678 |
| 358–111 | 4,017,679 |
| 358–242 | 4,017,680 |
| 358–171 | 4,017,681 |
| 358–167 | 4,017,682 |
| 361–088 | 4,017,765 |
| 361–083 | 4,017,766 |
| 361–117 | 4,017,767 |
| 361–399 | 4,017,768 |
| 361–419 | 4,017,769 |
| 361–399 | 4,017,770 |
| 361–357 | 4,017,771 |
| 361–428 | 4,017,772 |
| 361–433 | 4,017,773 |

# PATENTS

## GRANTED APRIL 12, 1977

NOTE—A cross reference listing of applications published under the second Trial Voluntary Protest Program is located in the back of this Issue. These entries will be in numerical order by document publication number.

## GENERAL AND MECHANICAL

### 4,016,604
### STERILE BACK SURGICAL GOWN WITH ANCHORED BELT POUCH

**Karen E. Welke, Roseville, Minn., assignor to Will Ross, Inc., Milwaukee, Wis.**

**Filed May 24, 1976, Ser. No. 689,194**
**Int. Cl.² A41D** *13/00*
**U.S. Cl. 2—51** **5 Claims**



**1.** In a sterile back surgical gown of the type in which there is a vertical back opening line, an inner back panel with a free edge parallel to the opening line, a closure panel having an open position wherein it is folded back on itself along a fold line parallel to the opening line with its free vertical edge toward one side of the gown, the closure panel being movable to an unfolded closed position wherein it extends across the opening line and overlaps the inner back panel with its free edge toward the other side of the gown to provide a sterile back for the gown, a first belt having a fixed end attached to the gown on said other side and forwardly of the free edge of the closure panel when the closure panel is in its closed position and a free end, a back belt that is tyable to the first belt and has a fixed end attached to the closure panel and a free end, a pocket on the closure panel that has an open end, the fixed end of the back belt being attached to the closure panel in the area covered by the pocket, the back belt being withdrawably stored in the pocket with only its free end protruding from the open end, and an elongated protective pouch having an open end and a closed end removably covering the free end of the back belt, said pouch having a portion including the open end thereof extending into said pocket, the improvement wherein: the pouch extends laterally beyond the free edge of the closure panel to define a holding portion facing an adjacent portion of said one side of the gown; and there is a releasable fastening means between the holding portion and adjacent gown portion.

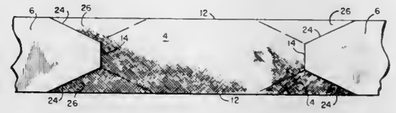
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### 4,016,605
### BELT ASSEMBLY

**Donald Wyman Corey, Wilbraham, Mass., assignor to Buxton, Inc., Agawam, Mass.**

**Filed Aug. 13, 1976, Ser. No. 714,243**
**Int. Cl.² A41F** *3/02*
**U.S. Cl. 2—338** **4 Claims**

**1.** A belt assembly comprising an elongated backing strip, a first layer of material attached to said backing strip, said first layer comprising a plurality of material pieces disposed end-to-end, each of said pieces being flexible and octagonally shaped with two longest sides being parallel to each other and coincident with either longitudinal edge of said backing strip, two end edges of said piece being normal to said two longest sides of said piece, a second layer of material attached to said first layer, said second layer comprising a plurality of material pieces disposed end-to-end and in staggered relation to said



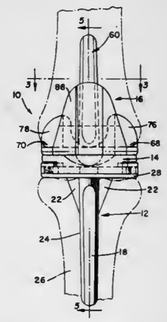
pieces of said first layer, said second layer pieces being flexible and of the same configuration as said first layer pieces.

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### 4,016,606
### KNEE JOINT PROSTHESIS

**David George Murray, and James Henry Somerset, both of Syracuse, N.Y., assignors to Research Corporation, New York, N.Y.**

**Filed July 14, 1975, Ser. No. 595,739**
**Int. Cl.² A61F** *1/24*
**U.S. Cl. 3—1.911** **8 Claims**



**1.** A knee joint prosthesis comprising a tibial component; a tibial component insert; and a femoral component; said tibial component comprising an anchoring stem portion, one end of said stem portion adapted to be received in a longitudinal bore in a patient's tibia, the other end of said stem portion being integral with a table, the top surface of which is generally normal to the stem portion and having lateral edge flanges.

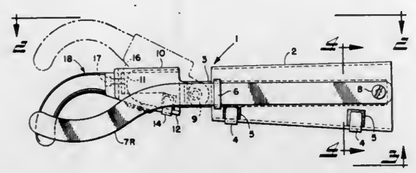
said tibial component insert comprising a plate shaped to be received on the tibial component table in locking engagement with the table edge flanges and the upper surface thereof having a centrally positioned spheroidal depression surrounded by a plane surface;

said femoral component comprising a stem, one end of said stem adapted to be received in a longitudinal bore in a patient's femur, the other end of said stem being integral with a depending generally spheroidal surface having generally the same radius as the radius of the spheroidal depression in said insert, said spheroidal surface having lateral shoulders each of which has a flat surface which engages the plane surface of the insert when the stems of the tibial and femoral components are in longitudinal alignment and a generally cylindrical surface having a radius of curvature about the axis of pivotal motion of the spheroidal surface with the spheroidal depression to permit rearward swing motion of the tibial component relative to the femoral component and relative axial rotation of said components.

## 4,016,607
## ARTIFICIAL HAND

Eino Pihlaja, 101 Machar Avenue, Thunder Bay P, Ontario, Canada

Filed July 30, 1976, Ser. No. 710,028
Int. Cl.² A61F 1/06
U.S. Cl. 3—12 11 Claims

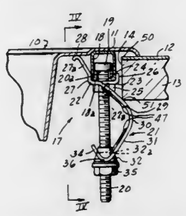


1. An artificial hand for an amputee having at least a portion of the metacarpus comprising a forearm gripping portion and a metacarpus gripping portion which are pivotally connected together on opposite sides to define pivots for positioning along opposite sides of the wrist; said forearm gripping portion having affixed on one side thereof a forwardly projecting thumb-like member; said metacarpus gripping portion having forwardly projecting curved finger-like members which upon movement of the metacarpus gripping portion about said pivots opens and closes said finger-like members with respect to said thumb-like member for respectively receiving and gripping an object therebetween.

## 4,016,608
## SNAP FASTENERS FOR DROP-IN ASSEMBLIES

Aman Ullah Khan, Stevensville, Mich., assignor to Whirlpool Corporation, St. Joseph, Mich.

Filed Sept. 30, 1974, Ser. No. 510,397
Int. Cl.² E03C 1/18
U.S. Cl. 4—187 A 4 Claims



1. In a module construction having wall means forming an aperture and a modular package for insertion into said aperture, retainer means which allow insertion of said package into said aperture and retain said package against said wall means after said insertion, said retainer means comprising:

a support means adapted to be connected to the package;

stud means engaging said support means and extending downwardly therefrom;

a spring cam;

connection means connecting said spring cam to said stud and said support means;

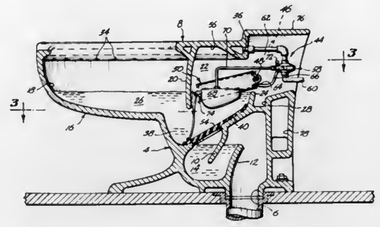
said spring cam comprising first and second camming surfaces inclined relative to one another and a curved knee portion joining said first and second camming surfaces said first camming surface acting against said wall means to move said spring cam to an unobstructing position to allow said insertion, and said second camming surface acting against said wall means to obstruct removal of said package after insertion and thereby retain said package in said aperture; and

an alignment means extending from said spring cam and said stud means beyond said support means to engage against a surface of said package.

## 4,016,609
## FLUSH OPERATED SANITARY FACILITY

J. Thomas Graham, Rte. 6, Box 6343, Bainbridge Island, Wash. 98110

Filed May 14, 1975, Ser. No. 577,213
Int. Cl.² E03D 1/00, 3/00, 5/00
U.S. Cl. 4—10 9 Claims



1. In a sanitary facility, means defining a receiving bowl for liquid and/or solid excrement, having a discharge valve in the bottom portion thereof, means for controlling flow through the valve, including a pivotally mounted water receptacle which is operative to open the valve to flow when said receptacle is relatively inclined about its pivotal axis in a first position, and to close the valve to flow when said receptacle is relatively inclined about its pivotal axis in a second position relatively angularly spaced from said first position, means for supplying water to the bowl to form a pool of carrier liquid therein when the valve is closed, a control valve which is adapted to be interconnected to a source of pressurized water, control means which are responsive to the level of water in the bowl to close and open the control valve to flow as the water level rises and falls, respectively, hand or foot operated means for yieldably biasing the receptacle into the first relatively inclined position thereof, to open the discharge valve in the bowl to flow, and means providing a connection between the control valve and the receptacle whereby the receptacle is supplied with water when the control valve is open to flow, said receptacle being eccentrically mounted about its pivotal axis to pivot between the first and second positions thereof against the bias thereon, when the water accumulates to a predetermined level in the receptacle, thus closing the bowl discharge valve to flow, and there being means on the receptacle for discharging the water from the same when the receptacle assumes the second position thereof, to restore the receptacle to a neutral condition when the bowl discharge valve is closed.

## 4,016,610
## COMBINATION BED AND DESK

Emil Ordonez, Las Vegas, Nev., assignor to Raymond Lee Organization, Inc., a part interest

Filed Sept. 15, 1975, Ser. No. 613,127
Int. Cl.² A47B 83/00
U.S. Cl. 5—2 R 1 Claim

1. A combination bed and desk, comprising:

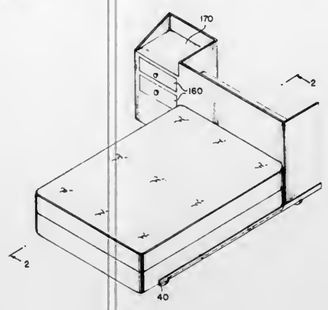
a horizontal bed;

a vertical headboard attached to the front of the bed;

a bureau with a shelf and drawers located at one end of the headboard with the drawers being operable when pulled rearwardly and the shelf facing rearwardly;

a desk extending forwardly of the headboard and attached to it, so that the headboard forms the back of the desk;

a horizontal writing platform of approximately the width of the bed and slidably located in the desk so as to be slidable forwardly and rearwardly with respect to the headboard; and



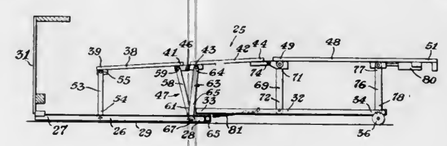
a locking device cooperating with the platform and desk to fix the platform in the position to which it has been slid.



## 4,016,611
## SOFA BED AND MECHANISM THEREFOR

M. Fillmore Harty, Bloomfield Hills, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed Apr. 2, 1976, Ser. No. 673,338
Int. Cl.² A47C 17/10
U.S. Cl. 5—13 5 Claims

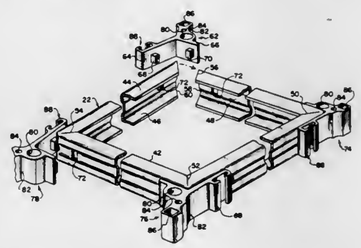


1. A convertible couch mechanism, the convertible couch mechanism having a first or base member adapted to be disposed upon a floor or like support means, the first or base member having a back end and a front end, a first leg member having a first or pivot end and a second or support end, the first end of the first leg member being pivotly affixed to the base member at a location adjacent the back end and remote from the front end, a second or sliding member, the second or sliding member having a back end and a front end, the back end of the sliding member being slidably supported by the first or base member, the second or front end of the sliding member being supported or supportable by a floor or like support means, a first sleeping surface support means having a back end and a front end, the back end of the first sleeping support surface being pivotally affixed to the second end of the first leg, a second sleeping support surface having a back end and a front end, the back end of the second sleeping support surface being pivotally affixed to the front end of the first sleeping support surface, a second leg means pivotally affixed to first and second sleeping support means at the front and back ends respectively, the second leg means permitting rotation of the first and second support means about their pivotal connection by a rotation of about 90° to permit the first and second sleeping support means to be disposed in a generally parallel face-to-face relationship or alternately in general coplanar relationship, a third sleeping support means having a back end and a front end, the front and back ends of the second and third sleeping support means being pivotally affixed to permit rotation of the second support means at least about 90° about the back end of the third support means to permit rotation of the second sleeping support from the plane of the third sleeping surface support to a plane 90° thereto, the axes of pivotal connection between the first and second sleeping support surfaces and second and third sleeping support surfaces being generally parallel, a third leg means having a first end and a second end, the second end being pivotally affixed to the back end of the third sleeping support means, the first end being pivotally affixed to the front end of the second or sliding member, a fourth leg means having a first end and a second end, the first end of the fourth leg means being pivotally attached to the front end of the second or sliding member and the second end of the fourth leg means being pivotally affixed to the third sleeping surface support means at a location generally between the front end and the back end of the third sleeping surface support means, the second or sliding member, the third sleeping surface support means, third and fourth legs forming generally a parallelogram, thereby providing a mechanism which, in a folded or closed position, discloses the first and second sleeping supports in a generally vertical face-to-face relationship adjacent the first end of the base member and in the open position discloses the first, second and third sleeping supports in a generally planar configuration spaced from the base member and the sliding member.

## 4,016,612
## BED FRAME FOR HOSPITAL-TYPE BED

Peter Barile, Sr., 10381 Gulfshore Drive, Naples, Fla. 33940

Filed Nov. 19, 1975, Ser. No. 633,449
Int. Cl.² A47C 19/02, 19/22
U.S. Cl. 5—200 C 12 Claims



1. A bed frame of open rectangular configuration defined by four right angularly meeting rail sections providing four corners, said rail sections being formed of at least one rail member, a bracket member positioned around each corner, the two rail sections at each corner having right angularly orientated bracket receiving surfaces, each bracket including a pair of generally right angularly directed legs lying against the right angularly orientated bracket receiving surfaces of the rail sections forming the corresponding corner, fastener means securing each leg to the corresponding bracket receiving surface for a locking of the bracket to the corner forming rail sections, at least a first one of said bracket legs having an extension thereon projecting laterally outward from the adjoining rail section, said extension including fixture attachment means for receiving and vertically orientating at least one fixture generally perpendicular to the bed frame and immediately outward thereof.

## 4,016,613
## BALANCED BUMPER MEANS FOR FURNITURE

Roland Benoit, and Richard H. Duprey, both of Danielson, Conn., assignors to InterRoyal Corporation, New York, N.Y.

Filed Nov. 24, 1975, Ser. No. 634,399
Int. Cl.² A47C 21/00
U.S. Cl. 5—317 R 4 Claims

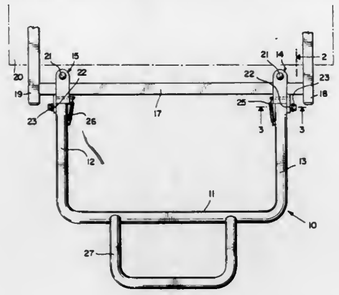
1. A bumper structure for hospital beds having legs with a cross bar therebetween comprising:

a pair of brackets for attachments to the cross bar at the front end of the bed;

a generally U-shaped bumper member having free ends each of which is secured to each of said brackets correspondingly; pivot members disposed between said brack-

ets and said U-shaped bumper member enabling accurate movement of said U-shaped member from lower extended position to upwardly raised position;

biasing means secured to a said bracket and a free end of said U-shaped bumper member adjacent said pivot member, said spring means automatically lowering said U-



shaped member to said lower extended position when said member is below a predetermined angular position with relation to the bed and automatically raising said U-shaped member to said upwardly raised position when said member is above a predetermined angular position with relation to the bed.

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**4,016,614**
**COMBINED REAMER AND SCREWDRIVER**
**Henry Press, 3-14 Lyncrest Ave., Fair Lawn, N.J. 07410**
**Filed Apr. 29, 1975, Ser. No. 572,637**
**Int. Cl.² B25F** *1/00*
**U.S. Cl. 7—14.1 R** **8 Claims**

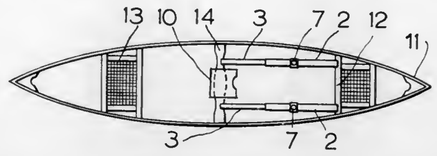


1. A combination tool which is both a screwdriver and a reamer or deburrer, which consists essentially of a handle and a blade which are unitary and essentially permanently fixed with respect to each other, which is free from moving or movable parts, said blade being of hard-tool quality metal; said blade having a widening portion adjacent the handle and an elongated shaft portion extending from the widening portion; sharp edge means formed along the entire length of said portions for reaming or deburring internal edges of cut conduit or tubing; and a screwdriver bit formed on the blade at the end of the shaft portion which is remote from the handle.

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**4,016,615**
**CANOE PORTAGING KIT**
**Glen A. Main, 9699 Esplanade, Windsor, Ontario, Canada (N8R 1J7)**
**Filed Nov. 3, 1975, Ser. No. 628,140**
**Int. Cl.² A45F** *3/15*
**U.S. Cl. 9—1.4** **2 Claims**

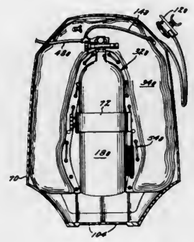
1. A kit for facilitating the portaging of canoes, comprising a pair of identical, spring loaded, telescoping carrying rods, one end of each being removably attached to the center bar of the canoe, while the other end of each is similarly attached to the front edge of the rear seat of the canoe or to an independent strut spaced from and on either side of said center bar; each of said rods consisting of a rigid outer tube of metal or plastic; an inner tube of such material which fits slidably into said outer tube; two opposite rows of identically spaced and located holes in the wall of said outer tube for inserting a pin




through said outer tube; a short spring located within said outer tube, one end of which rests upon said pin while the other end is in contact with the enclosed end of the inner tube; and a pair of identical notches, each notch located in the outer end of both said tubes, said notches being wide enough to contain therein the center bar, the front edge of the rear seat of the canoe, or the independent strut on either side of the center bar; and a cushion of soft material which is slipped over said center bar to provide comfort to the person carrying the canoe.

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**4,016,616**
**DIVER FLOTATION APPARATUS**
**William D. Walters, Costa Mesa, Calif., assignor to Lawrence S. Scott, Seal Beach, Calif.**
**Continuation of Ser. No. 295,508, Oct. 6, 1972, abandoned, which is a continuation-in-part of Ser. No. 152,112, June 11, 1971, abandoned. This application June 12, 1975, Ser. No. 586,505**
**Int. Cl.² B63C** *11/30*
**U.S. Cl. 9—339** **6 Claims**



3. Diver flotation apparatus comprising:

a back pack adapted to mount an air supply;

collapsible container means on said back pack and located over the back of the wearing diver, said container means defining a chamber for receiving air to both upwardly and downwardly adjust the overall buoyancy of the diver and his equipment, said container means being wholly disposed along the outer perimeter of said back pack;

flexible lacing securing said container means to said back pack thereby to enable relative movement between said container means and said back pack under wave action;

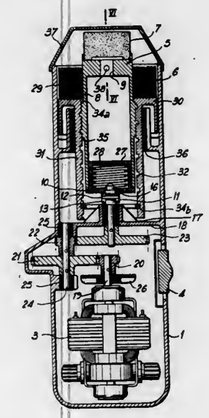
filling means on said back pack adapted to be coupled to said air supply and operative to apply air to said chamber, and including a valve operative by the diver to regulate the quantity of air passing from said air supply to said chamber; and

venting means including a valve operative by the diver to vent air from said chamber to the outside environment to thereby adjust the positive buoyancy of the diver and his equipment.



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**4,016,617**
**ELECTRICALLY OPERABLE APPARATUS FOR THE APPLICATION OF A TREATING PRODUCT**
**Francis Cardus, 39-41, rue de la Glaciere, Paris, France**
**Filed Dec. 31, 1975, Ser. No. 645,909**
**Claims priority, application France, Jan. 6, 1975, 75.00265**
**Int. Cl.² A47L** *23/06*; **A46B** *13/02*
**U.S. Cl. 15—4** **7 Claims**



1. In electrically operable apparatus for the application of a treating product and selectively for subsequent buffing up of the surface treated and the working of the treating product thereinto, having a working head comprising a central applicator element for the product to be applied, an annular rotary brushing and rubbing element disposed about said central applicator element, one of said elements being axially movable with respect to the other of said elements to permit bringing said one of said elements into an axially projecting working position, an electric driving motor, a rotary driving shaft coupled to said motor, one of said elements being coupled to said driving shaft, the improvement which consists in that:

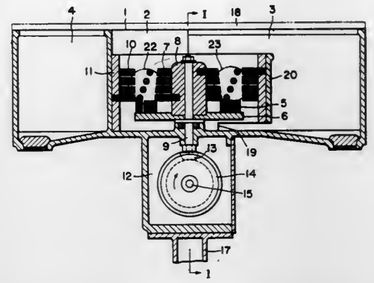
a. said motor is adapted to be rotatable in a first and in a second direction, and

b. said two elements are coupled by a coupling system adapted to cause axial displacement of said one of said elements with respect to the other of said elements, in one axial direction and then in the other axial direction, as a result of reversing the direction of rotation of said element coupled to said driving shaft.

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**4,016,618**
**GOLF BALL WASHING MACHINE**
**Tadashi Kobayashi, 1560-2 Tenma, Fuji, Shizuoka, Japan**
**Filed Feb. 26, 1976, Ser. No. 661,694**
**Int. Cl.² A63B** *47/04*
**U.S. Cl. 15—21 A** **5 Claims**

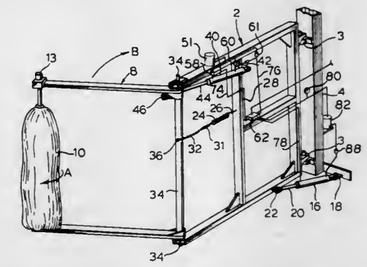
1. A golf ball washing machine, comprising a body having a circular golf ball wash chamber at the center of which are rotatably provided a lower brush disc and a central brush cylinder coaxially therewith, the inner peripheral surface of



said wash chamber being detachably provided with a flexible belt-like brush plate.

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**4,016,619**
**CAR WASHING APPARATUS HAVING SLOW SPEED RELIEF**
**Ivan J. Barber, Mississauga, and Calvin Whetham, Weston, both of Canada, assignors to The Allen Group Inc., Melville, N.Y.**
**Filed Oct. 2, 1975, Ser. No. 618,742**
**Int. Cl.² B60S** *3/00*
**U.S. Cl. 15—53 AB** **4 Claims**



1. Car washing apparatus having slow speed relief for washing the front, sides and rear of a car as it moves along a car path at a speed above a predetermined speed and comprising:

a horizontally projecting primary arm having first and second ends, said primary arm being pivotally supported on said first end at one side of the path of said car and extending rearwardly from said first end along said path;

a horizontally projecting secondary arm pivotally supported on one end from said second end of said primary arm and normally extending substantially transversely over said path;

bias means biasing said secondary arm to said normal position;

a brush carried on the free end of said secondary arm and rotatable about a vertical axis;

a primary arm fluid cylinder connected to said primary arm to retract and extend said primary arm, said primary arm cylinder having first and second ends;

a secondary arm fluid cylinder connected between said primary and secondary arms, said secondary arm cylinder having first and second ends and being operative in response to travel of said brush along said car path at said predetermined speed to retract its piston at a sufficient rate to develop a predetermined pressure in its second end, and upon unfolding of said secondary arm under the influence of said bias means to develop a selected pressure in said first end thereof;

control valve means having a working fluid inlet port and first and second working fluid outlet ports, said control valve means further including first and second pressure control ports, said valve means being operative in response to said selected pressure in said second pressure control port, to communicate said working fluid inlet port with said first working fluid outlet port, and in response to said predetermined pressure in said first pressure control port to communicate said working fluid inlet port with said second outlet port;

a pressure source connected with said inlet port;

a secondary cylinder reservoir;

first conduit means connecting said second end of said secondary arm cylinder with said reservoir and said first pressure control port and including relief means for relieving pressure from said second end to said reservoir upon folding of said secondary arm on said primary arm at a sufficiently slow rate to develop a pressure in said second end less than said predetermined pressure;

second conduit means connecting said first working fluid outlet port with said second end of said primary cylinder;

third conduit means connecting said second outlet port with said first end of said primary cylinder to retract said cylinder upon pressurization thereof; and

fourth conduit means connecting said first end of said secondary cylinder with said second control fluid port for delivery to said control port of said selected pressure upon unfolding of said secondary arm whereby contact of a car moving along said path with said brush above said predetermined speed will develop said predetermined pressure in said second end of said secondary cylinder to apply said predetermined pressure to said first control port to operate said control valve means and communicate said working fluid inlet port with said first end of said primary cylinder to retract said primary arm to draw said brush across the front of said car and as said secondary arm unfolds passing a position perpendicular to said path of said car said bias means will commence unfolding said secondary arm on said primary arm to push said brush rearwardly along the side of said car while directing fluid through said fourth conduit to develop said selected pressure in said second control port to activate said control valve means and communicate said working fluid inlet port with said first outlet port to extend said primary cylinder to extend said primary arm accordingly to urge said brush inwardly across the rear of said car as it clears the rear corner thereof.

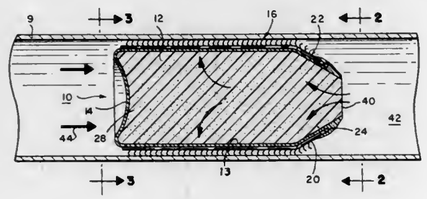
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**4,016,620**

## PIPELINE CLEANING PIG

**Marvin D. Powers, Houston, Tex., assignor to Pipeline Dehydrators, Inc., Houston, Tex.**

**Filed May 22, 1975, Ser. No. 580,109**
**Int. Cl.² B08B 9/04**
**U.S. Cl. 15—104.06 R** **7 Claims**




1. A pipeline scrapping pig comprising:

a cylindrical body made of resilient, open-cell foam,

a flexible, impervious jacket substantially completely covering the foam, said jacket having an opening in at least one end of the pig, and

abrasive means substantially completely covering the outer surface of said jacket, said abrasive means comprising a web backing, and

steel bristles projecting outwardly from said backing.

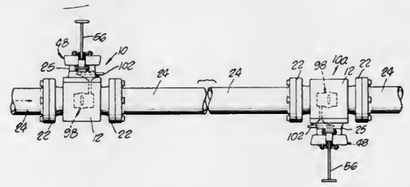
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**4,016,621**

## DEVICE AND METHOD FOR LAUNCHING AND/OR RETRIEVING PIPELINE SCRAPERS

**Maurice Slegers, Lakewood, and John D. Muchow, Cerritos, both of Calif., assignors to Willis Oil Tool Co., Long Beach, Calif.**

**Filed June 6, 1975, Ser. No. 584,375**
**Int. Cl.² B08B 9/04**
**U.S. Cl. 15—104.06 A** **10 Claims**




1. In a device for launching and/or retrieving a pig for cleaning out a fluid-conveying pipeline, the combination of:

a housing structure forming (1) coaxial inlet and outlet ports for incorporation of the housing structure in the pipeline, (2) a valve chamber between the two ports and (3) a pig magazine dimensioned to house the pig and opening onto the valve chamber with the axis of the magazine extending laterally of the two ports;

a valve member in the valve chamber and cooperating therewith to form a continuous flow passage between the inlet and outlet ports;

a passage through the valve member,

one end of said passage being a cavity to hold the pig;

means at the opposite end of the passage to prevent escape of the pig therethrough whle permitting fluid flow therethrough between the two ports,

said valve member being rotatable about an axis perpendicular to the axis of the two ports in a plane of rotation that includes the axis of the magazine and the axes of the two ports to permit rotating said cavity into register with the magazine and at least one of the two ports selectively;

a normally closed closure for the magazine to permit access to the magazine from the exterior of the housing structure; and

a valve seat forming a flow passage between the magazine and the valve chamber and being cooperative with the valve member to seal off the magazine from the valve chamber.

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**4,016,622**

## BATH SPONGE

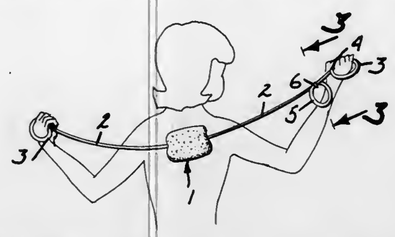
**Carl H. Eisenman, 1609 E. 27th St., Minneapolis, Minn. 55407**

**Filed July 14, 1975, Ser. No. 595,572**
**Int. Cl.² A47K 7/02**
**U.S. Cl. 15—222** **1 Claim**

1. A bath sponge comprising; a generally rectangular body of sponge-like hydrophilic material, an elongated flexible cord extending longitudinally through said body, said cord having closed loops at its opposite ends defining primary handle elements longitudinally spaced from said body, means for tying said ends of the cord in looped formation, means for restricting movement of said body longitudinally of said cord and comprising a pair of stop elements each operatively engaging a respective end of said body, said stop elements being spaced apart longitudinally of said cord a distance less than the normal longitudinal dimension of said body, whereby the



body adjacent said cord is compressed between said stop elements, the opposite ends of said body defining recesses containing said stop elements, said cord being formed to




provide a third loop intermediate said body and one of said primary handle elements to define a secondary handle element, and a tie member holding said cord looped to provide said secondary handle element.

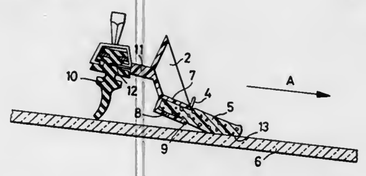
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**4,016,623**

## WINDSHIELD CLEANING DEVICE FOR MOTOR VEHICLES

**Hans Willi Nixdorf, 105a Bockumerstrasse, Dusseldorf, Germany**

**Filed Nov. 19, 1975, Ser. No. 633,563**
**Int. Cl.² B60S 1/46**
**U.S. Cl. 15—250.03** **14 Claims**




1. Windshield cleaning device for use in conjunction with a reciprocable wiper blade of a motor vehicle comprising: an essentially trough-shaped receptacle having wall means defining an inner chamber for the accommodation of cleansing means and having an opening on at least one side in a direction away from the windshield, mounting means projecting from the receptacle at the side facing away from the at least one open side of the inner chamber, for the releasable attachment of the device to one side of the wiper blade, an applicator means disposed adjacent the opening along an outer edge of said wall means defining a space between said applicator means and said wall means to allow water to enter therebetween to contact said cleansing means, which applicator means receives from the inner chamber the cleansing means dissolved by the water and applies it to the windshield wiped by the wiper blade, the device being so mounted on the wiper blade that the applicator means effectively lies upon the windshield when the receptacle and applicator means precede the wiper blade in the direction of movement, and is lifted away from the windshield when the wiper blade is moved in the opposite direction.

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**4,016,624**

## POULTRY CUT-UP MACHINE

**Eugene G. Martin, Ephrata, and Harold C. Martin, Leola, both of Pa., assignors to Victor F. Weaver, Inc., New Holland, Pa.**

**Filed Oct. 17, 1975, Ser. No. 623,301**
**Int. Cl.² A22C 21/00**
**U.S. Cl. 17—11** **55 Claims**

43. A method of separating dressed poultry carcasses into certain normal commercial components comprising the steps,

1. extending such components from the portion of the carcass to which they are connected by ball and socket joints to tension the connecting tendons of said joints,

2. severing at least the major connecting tendons by which said components are connected to said carcass, and

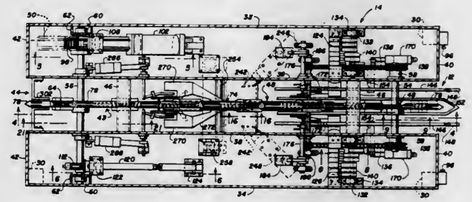
3. moving said components relative to said portions of the carcass to which they are connected in separative direction, thereby to separate said ball of the joints from the socket therefor to effect separation of said components from the back of said carcass in a manner by which they are free of bone fragments.

47. A machine operable automatically to dismember dressed poultry carcasses into separate components thereof and comprising in combination:

a. a frame having inlet and exit ends,

b. a conveyor supported by said frame and having a span movable along a path between said inlet and exit ends of said frame,

c. a series of elongated support members for poultry carcasses on said conveyor respectively arranged to be inserted longitudinally into poultry carcasses uniformly from one end thereof and directly engaging one surface of the backs of said carcasses,



d. clamping means carried by said conveyor and activated by said conveyor following the mounting of carcasses upon said support members to be moved into engagement with the opposite surface of the back of each carcass in opposition to said support members and thereby firmly clamp said backs of said carcasses between said support members and clamping means during movement of said carcasses from said inlet end of said frame toward said exit end thereof, and

e. carcass disecting means positioned along the path of movement of said span of said conveyor and operable sequentially to separate components of said carcasses from said backs thereof while said backs are clamped as described.

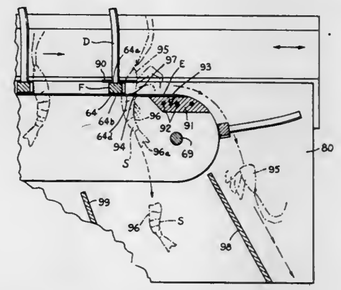
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**4,016,625**

## APPARATUS FOR SIZING AND DEHEADING SHRIMP

**Edwin B. Mitchell, P.O. Box 1042, Beaufort, S.C. 29902**

**Continuation of Ser. No. 512,452, Oct. 7, 1976, abandoned.**
**This application July 19, 1976, Ser. No. 706,832**
**Int. Cl.² A22C 29/02**
**U.S. Cl. 17—71** **8 Claims**




1. A shrimp deheading apparatus comprising:

a stationary blade;

conveyor means carrying shrimp positioned for reception

against said blunt blade adjacent a joint between a head and a body portion; and

an abutment carried by said conveyor means pushing the head of each shrimp toward said stationary blade, said abutment passing thereby causing said heads to be sheared off adjacent said joint separating said head and body.

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**4,016,626**

## APPARATUS FOR SIMULTANEOUSLY TEXTURIZING AND CUTTING CONTINUOUS YARNS

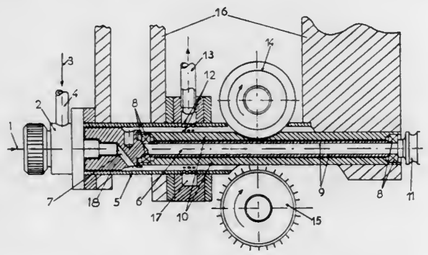
**René Guillermin, Bron; Jean Joly, Craponne, and Sylvio Sangalli, Caluire, all of France, assignors to Rhone-Poulenc-Textile, Paris, France**

**Division of Ser. No. 583,913, June 5, 1975. This application Jan. 20, 1976, Ser. No. 650,796**

**Claims priority, application France, June 10, 1974, 74.20252**

**Int. Cl.² D01G *1/00*; D02G *1/20*, *1/16*, *1/12***

**U.S. Cl. 19—.46** **5 Claims**



1. Apparatus for continuously texturizing and cutting at least one multifiliment continuous yarn, wherein the yarn is texturized by fluid pressure, said apparatus comprising:

an injecting device which includes at least one orifice for feeding said multifiliment yarn into the apparatus and one orifice for introducing a texturizing fluid;

a cylindrical tube connected to the injecting device wherein the cylindrical tube has a constant cross-section and includes lateral orifices for exhausting the fluid and is connected at one end with the injecting device;

a revolving spindle positioned in the cylindrical tube wherein the revolving spindle includes a rotating part adjacent the injection device wherein the rotating part is provided with an internal feed tube through which passes the multifiliment yarn and a fixed sleeve around which the yarn is wound to form a stuffed pack of yarn between the fixed sleeve and cylindrical tube;

at least one cutting means for cutting the pack of yarn wound on the sleeve into a plurality of staple fibers, and means for stripping the staple fibers from the sleeve.

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**4,016,627**

## NEEDLE BAR SECURING MEANS ON CHAIN GILL MACHINES

**Jean Frederic Herubel, Guebwiller, France, assignor to N. Schlumberger & Cie, Guebwiller, France**

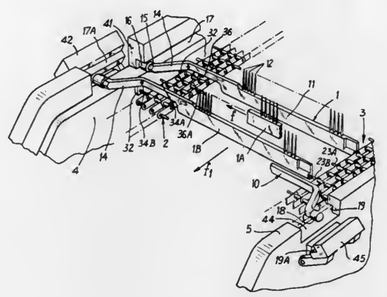
**Filed July 8, 1975, Ser. No. 594,059**

**Claims priority, application France, July 15, 1974, 74.24479**

**Int. Cl.² D01G *19/10***

**U.S. Cl. 19—127** **6 Claims**

1. A chain gill machine comprising a pair of laterally spaced apart endless chains each movable in a path of travel substantially parallel to the path of travel of the other said chain and each said chain having an inner lateral face directed toward the inner lateral face of the other said chain and an outer lateral face directed away from the other said chain, a plurality of substantially parallel elongated needle bars extending transversely of and removably mounted on said chains, each of said needle bars having a first end, a second end and an extension bent relative to the bar extending between said first and said second ends and extending laterally outwardly from said first end, said extension having a free end spaced laterally outwardly from the first end of said needle bar, said first end of each said needle bar being pivotally connected to the laterally outer face of one of said chains and said second end of each said needle bar being pivotally connected to the laterally inner face of the other one of said chains, said first and second ends being pivotally connected about axes extending transversely of the direction of the path of travel of said chains, the pivotal connection of said first and second ends to said chains comprising a first bore associated with said first end and a second bore formed in said second end of each said needle bar



and a first pivot located in one of said chains and engageable within said first bore and a second pivot located in the other one of said chains and engageable within said second bore, said first and second pivots connecting said first and second ends of each said needle bar each extending transversely of said chains in the same lateral direction therefrom, and means spaced laterally outwardly from each of said chains and forming a fixed cam groove facing toward the outer lateral face of the adjacent said chain and disposed in parallel relation to the adjacent said chain, and the free end of said extension being engaged in one of said fixed cam grooves and being movable therethrough with the free end of said extension being positioned relative to the base of said fixed cam groove so that said needle bar from which said extension extends is secured against movement in the axial direction of its pivotal connection to said chain adjacent said fixed cam groove whereby said needle bar is retained in pivotal connection with said chains.

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**4,016,628**

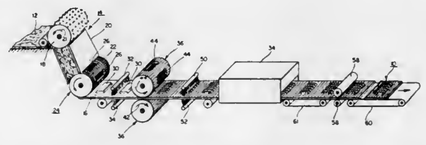
## METHOD AND APPARATUS FOR FORMING ABSORBENT ARTICLES

**Charles C. Kolbach, Media, Pa., assignor to Scott Paper Company, Philadelphia, Pa.**

**Division of Ser. No. 360,124, May 14, 1973, Pat. No. 3,860,002. This application Aug. 12, 1974, Ser. No. 496,622**

**Int. Cl.² D04H *1/70***

**U.S. Cl. 19—148** **5 Claims**



1. An apparatus capable of use in forming an absorbent, air-laid, nonwoven fibrous web having regions of different basis weights therein, said apparatus including a fiberizing means for separating fibers from a feed mat and entraining said separated fibers in air to form an air suspension of fibers, a formation chamber including a passageway into which said air suspension of fibers is directed, said passageway having a downstream end which is closed by a movable forming surface, regions of said forming surface underlying said passageway constituting a forming area in which the web is formed; the improvement wherein:

A. said forming surface including a plurality of discrete, three-dimensional compartments which are spaced from each other and which include foraminous bottom walls, said forming surface further including other foraminous sections completely circumscribing the three-dimensional compartments;

B. a plurality of vacuum boxes being spaced from each other and having open ends underlying respective three-dimensional compartments, the other foraminous sections extending beyond the open ends of said vacuum boxes;

C. first vacuum connection means communicating with said vacuum boxes for permitting the establishment of a desired pressure drop through the bottom walls of the three-dimensional compartments;

D. second vacuum connection means communicating with the other foraminous sections of the forming surface for permitting the establishment of a desired pressure drop through said other foraminous sections of said forming surface; and

E. drive means for moving the forming surface and vacuum boxes at the same speed through the forming area for maintaining the open end of each vacuum box in alignment with a respective three-dimensional compartment in said forming area, whereby, in the forming area, the pressure drop established through the bottom walls of the three-dimensional compartments can be selected substantially independently of the pressure drop established through the other foraminous sections of the forming surface.



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**4,016,629**

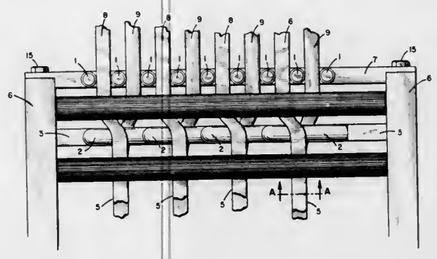
## FIBER BLENDING MECHANISM

**Roger S. Brown, New Orleans; Charles L. Shepard, Chalmette, and Laurey J. Richard, Metairie, all of La., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.**

**Filed May 22, 1975, Ser. No. 580,093**

**Int. Cl.² D01G *5/00***

**U.S. Cl. 19—243** **6 Claims**



1. An apparatus for the blending of fibers installed in the back drafting zone of a conventional drawing frame and comprising in combination:

a. a means of guiding alternating cotton and synthetic fiber slivers, said means comprising:

1. a series of vertical cylindrical pins;

2. a horizontal bar to which said pins are attached;

3. a vertical frame to which said horizontal bar is affixed at said horizontal bar ends;

4. a base plate to support said vertical frame;

b. a first set of drafting rolls located parallel to and forward of said guiding means, to receive said synthetic fiber sliver from said guiding means;

c. a frame to which said first set of drafting rolls are mounted;

d. an angular cross-over guiding means, located parallel to and forward of the first set of drafting rolls, said cross-over guiding means angled and positioned to separate, deflect and perfectly overlay the alternating cotton and synthetic slivers into composite slivers;

e. a second set of drafting rolls located parallel to and forward of the cross-over guiding means, said second set of drafting rolls receiving the composite slivers from the angled guiding means and drafting them into a homogeneous blend;

f. the frame of (c) for mounting said second set of drafting rolls.

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**4,016,630**

## OVERLOAD PREVENTING DEVICES IN CRUSHERS

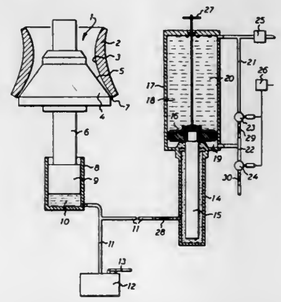
**Berndt Harry Bengtsson, Lindome, and Sten Anders Harald Bremmer, Arbra, both of Sweden, assignors to Svedala-Arbra AB, Sweden**

**Filed June 30, 1975, Ser. No. 591,623**

**Claims priority, application Sweden, July 2, 1974, 7408697**

**Int. Cl.² B02C *2/04***

**U.S. Cl. 241—207** **14 Claims**

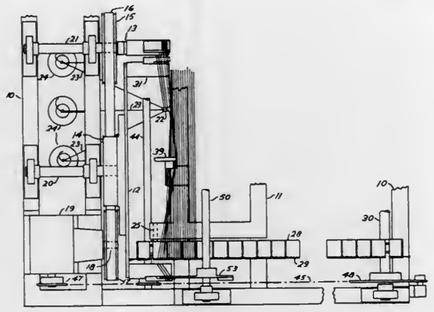


1. A crusher comprising a crusher cone and a crushing liner defining a crusher nip therebetween, a substantially vertical pressure cylinder having an upper and a lower space, the crusher cone having a central supporting member extending into said upper space and being supported for axial movement in said upper space on pressure fluid contained therein, means connected to said lower space for controllably supplying thereto and discharging therefrom pressure fluid in dependence on the pressure exerted on the crusher cone by material to be crushed in said nip, whereby the elevation of the crusher cone and the width of the nip are adjusted; a damping means comprising a damping cylinder, a conduit having a constricted passage and providing a continuous communication for said pressure fluid between said lower space of the pressure cylinder and the damping cylinder, said damping means comprising first piston means movably mounted in said damping cylinder to interact with pressure fluid in said damping cylinder and thereby, through said constricted passage, with the pressure fluid in the pressure cylinder and thus with said central supporting member of the crusher cone, said damping means also comprising preloading means acting with a substantially constant pressure on said piston against the action of said pressure fluid both during normal operation and during overload thereof.

## 4,016,631
## APPARATUS AND METHOD FOR TRAVERSING A STRAND

**Paul Morrison Cole, 1213 Hillside Blvd., Carrcroft, Wilmington, Del. 19803**

**Filed Feb. 10, 1976, Ser. No. 656,975**
**Int. Cl.² D04H** *3/05*
**U.S. Cl. 28—1 CL** **24 Claims**



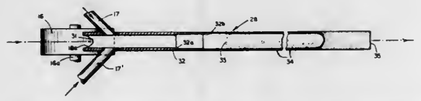
1. An apparatus for traversing a strand between two spaced rows of strand-restraining elements moving together in the same approximate direction to form a web, said apparatus comprising:
a strand supply source;
a guide between said rows for receiving the strand from said supply source;
a strand-engaging member orbiting each row of strand-restraining elements for slideably engaging the strand near said guide and traversing said strand toward one and then the other row while forming a loop during each traverse and positioning the loop around at least one of said strand-restraining elements; and
means for releasing said loop from said strand-engaging member.

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## 4,016,632
## STRAND TREATMENT

**Robert K. Stanley, Media, Pa., assignor to Textured Yarn Co., Inc., Kennett Square, Pa.**

**Continuation of Ser. No. 473,443, May 28, 1974, abandoned, which is a division of Ser. No. 376,890, July 5, 1973, Pat. No. 3,952,385, which is a continuation-in-part of Ser. Nos. 343,644, March 22, 1973, Pat. No. 3,840,950, and Ser. No. 124,213, March 15, 1971, Pat. No. 3,753,275, which is a continuation-in-part of Ser. No. 822,429, May 7, 1969, Pat. No. 3,570,083, which is a continuation-in-part of Ser. No. 678,428, Oct. 26, 1967, Pat. No. 3,462,814, and Ser. No. 302,758, July 31, 1963, Pat. No. 3,376,622. This application Nov. 18, 1975, Ser. No. 633,009**
**Int. Cl.² D02G** *1/20, 1/16, 1/12*
**U.S. Cl. 28—72.11** **10 Claims**



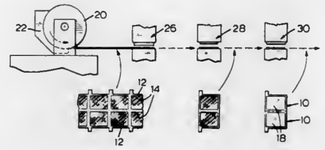
1. Method of crimping a textile strand, comprising nipping said textile strand from opposite sides in the vicinity of the entrance to a strand-confining region having an exit therefrom and thereby feeding the strand toward the entrance, and jetting fluid onto the strand between the nipping location and the entrance in an oblique downstream direction, confining said jetted fluid between said jetting step and said region, and thereby forwarding the strand into the entrance to the confining region, and confining the strand from the jetting step to the confining region, and releasing said jetted fluid downstream of its confinement.

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## 4,016,633
## BATTERY PLATE GRID

**Carleton H. Smith, 34 North Drive, Islington, and Kenneth G. Dunning, 413 Vancouver Crescent, Oshawa, both of Canada**

**Division of Ser. No. 497,742, Aug. 15, 1974, abandoned. This application Feb. 6, 1976, Ser. No. 655,758**
**Int. Cl.² B23P** *13/00*
**U.S. Cl. 29—2** **3 Claims**



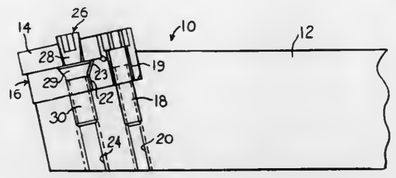
1. A method of making flat lead storage battery plate grids that have a perimeter frame and a lattice network within the frame, the lattice network being of lesser thickness than the perimeter frame and having the planes of its opposed faces spaced between the planes of the opposed faces of the perimeter frame comprising the steps of:
casting a continuous series of grid plates between a continuously rotating patterned drum and a rigid smooth surfaced shoe;
flattening said grip plates whereby to achieve a grid plate wherein the plane of one face of the lattice work is coplaner with one face of the perimeter frame;
displacing the lattice network to locate the planes of both opposed faces thereof between the opposed faces of the perimeter frame; and
separating the grid plates of said series.

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## 4,016,634
## INDEXABLE INSERT TYPE CUTTING TOOLHOLDERS

**William E. Barnes, Mount Clemens, Mich., assignor to Empire Tool Company, Memphis, Mich.**

**Filed Apr. 19, 1976, Ser. No. 678,111**
**Int. Cl.² B26D** *1/00*
**U.S. Cl. 29—96** **2 Claims**



1. In an indexable insert type cutting tool holder having a steel shank and a pocket in said shank for carrying an indexable insert therein, the pocket being defined by floor and wall surfaces, the floor being formed at a predetermined rake angle with respect to the orientation of the shank, and the wall surface being essentially perpendicular to the floor, and said insert having a plurality of peripheral cutting edges and a central aperture therein by which it is held in place in said toolholder the improvement of a cartridge fitted in the pocket in said shank, the cartridge including a bottom wall surface and a rear face which are respectively in abutment with essentially the entirety of the floor and face surfaces in the pocket of the shank in order to shield such pocket surface from nicks and dents, the cartridge further including a step in its upper surface defining a pocket to receive the insert and an enlarged head portion extending away from the pocket floor surface of the shank at a direction essentially perpendicular thereto, the enlarged head including an aperture therethrough mating with a threaded aperture in the floor of the shank pocket, and a retainer member extending through the head aperture and being threadedly received in the floor aperture to secure the cartridge in position; said cartridge being formed of a high speed steel harder than that of said shank but less than that of said insert, said cartridge retaining its hardness even when heated to cherry red heat, and means for fastening said insert securely in place in said cartridge pocket, including a threaded fastener extending through the central aperture of the insert and into both a mating fastener aperture in the cartridge and a mating fastener aperture in the shank, the cartridge aperture including a frusto-conical countersink in the pocket adjacent the insert, with the countersink being offset toward the enlarged head with respect to the center of the remainder of the fastener aperture in the cartridge, and the threaded means for fastening the insert including a lock pin having an enlarged major head portion in engagement with the central apertured portion of the insert and an intermediate enlarged frusto-conical portion which engages the countersink in the cartridge, with the cartridge countersink providing a fulcrum point adjacent the insert to reduce the lever arm between such fulcrum point and the region of contact between the insert and the major head portion.

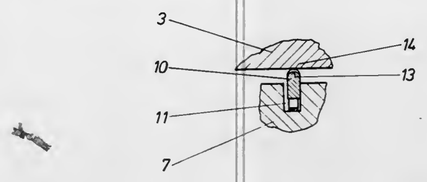


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## 4,016,635
## METHOD OF MANUFACTURING PISTON SEALING STRIPS OF ROTARY PISTON MACHINES

**Wulf Leitermann, Bad Wimpfen, and Hans-Georg Zimmermann, Heilbronn, both of Germany, assignors to Audi NSU Auto Union Aktiengesellschaft, Neckarsulm and Wankel GmbH, Lindau Bodensee, both of, Germany**

**Filed July 15, 1975, Ser. No. 596,156**
**Claims priority, application Germany, July 19, 1974, 2434838**
**Int. Cl.² B23P** *15/06*
**U.S. Cl. 29—156.6** **4 Claims**



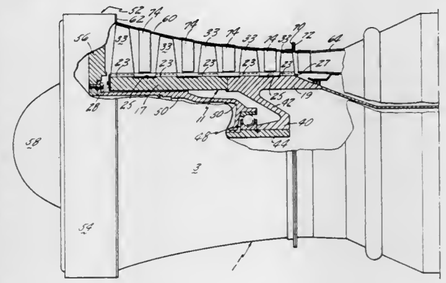
1. A method of manufacturing arcuate sealing strips for the side faces of piston of rotary piston machines, the strips having a maximum and a minimum permissible radius of curvature comprising the steps of; winding a metal band having a cross-section of the sealing strips in a spiral roll the outer radius of which being equal to or smaller than the maximum permissible radius of curvature of the sealing strips and the inner radius of which being equal to or greater than the minimum permissible radius of curvature of the sealing strips, applying a wear-resistant layer to one end face of the roll, unwinding the roll and cutting up the band into individual sealing strips each having a radius of curvature within the maximum and minimum tolerance limits.

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## 4,016,636
## COMPRESSOR CONSTRUCTION

**Raymond P. Schneider, North Palm Beach; James F. Marshall, Lake Park, and Maclean Crowell, Jupiter, all of Fla., assignors to United Technologies Corporation, Hartford, Conn.**

**Division of Ser. No. 491,030, July 23, 1974. This application Nov. 26, 1975, Ser. No. 635,558**
**Int. Cl.² B23P** *15/04*
**U.S. Cl. 29—156.8 R** **2 Claims**



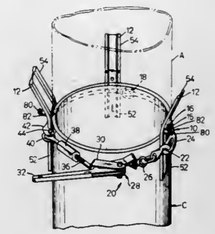
1. A method of forming a compressor comprising:
1. forming a drum rotor,
2. placing a plurality of axial slots around the periphery of said drum rotor,
3. aligning a stator case having fixed circumferential rows of vanes therein with said drum rotor,
4. forming blade sticks, each having a plurality of blades along its length with an elongated root,
5. placing each blade stick in said stator case with blades between the vanes of said stator case and with its root aligned with a slot on said drum rotor,
6. moving said stator case and blade sticks relative to said drum rotor so that the blade roots of said blade sticks are positioned within the slots of the drum rotor.

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## 4,016,637
## APPARATUS FOR ALIGNING PIPES

**Donald E. Swensen, Valders, Wis. 54245**

**Filed Mar. 29, 1976, Ser. No. 671,079**
**Int. Cl.² B23P** *19/00;* **B23K** *37/04*
**U.S. Cl. 29—281.4** **5 Claims**



1. A removable alignment jig for use in axially aligning and supporting pipes in abutting end-to-end relationship to facilitate their being secured together, said jig comprising: clamping means for clampingly engaging a first pipe near but axially spaced from an end thereof in rigid non-slideable engagement, said clamping means including a flexible band having opposite ends, a clamp assembly connected to one end of said flexible band and means for releasably engaging said clamp assembly with the other end of said flexible band, said flexible band comprising at least two substantially rigid curvilinear members and hinge means for hingedly securing said members together, and a plurality of guide means for slideably receiving an end of

a second pipe while said clamping means clampingly engages said first pipe and for guiding and supporting said second pipe in axial abutting alignment with said first pipe, said plurality of guide means each being rigidly secured to said flexible band and positioned in spaced relationship with respect to each other, said guide means each including an elongated portion extendable along and beyond the said end of said first pipe in parallel non-sliding relationship and an elongated outwardly diverging end portion extendable beyond the said end of said first pipe for slideably receiving said end of said second pipe when said clamping means is engaged around said end of said first pipe for aligning said second pipe with respect to said first pipe as said second pipe is moved axially toward said first pipe and for supporting said pipes in abutting end-to-end relationship thereafter.

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**4,016,638**

## DEVICE FOR ASSEMBLING THE STORAGE PLATES AND INSULATING PLATES OF LEAD-ACID BATTERIES

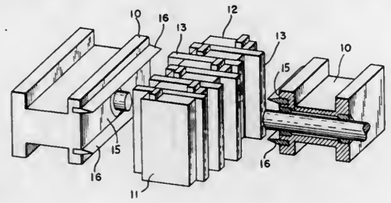
**Jürgen Klein, Brilon, Germany, assignor to Accumulatorenwerk Hoppecke Carl Zoellner & Sohn, Cologne, Germany**

**Filed Dec. 22, 1975, Ser. No. 642,772**

**Claims priority, application Germany, Dec. 20, 1974, 2460418**

**Int. Cl.² H01M** *2/00*

**U.S. Cl. 29—730** **3 Claims**



1. A device for positioning the storage plates and insulating plates of lead-acid storage batteries for the assembly of battery cells in such a way that the longitudinally larger insulating plates form a uniform lateral overhang on both lateral sides, the device comprising in combination:

plate means for supporting the storage plates and insulating plates in a generally vertical orientation;

two longitudinally spaced positioning members having abutment faces in parallel opposite alignment, at a distance corresponding substantially to the length of the insulating plates, thereby positioning the latter;

at least one positioning knife protruding inwardly from each positioning member to a distance substantially equal to the intended lateral overhang of the insulating plates relative to the storage plates, so that opposing knife edges define between them a longitudinal distance which is substantially equal to the lesser length of the storage plates, thereby centrally positioning the storage plates with respect to the insulating plates, and whereby the edge portions of the insulating plates have notches cut into them by the protruding positioning knives; and

means for longitudinally retracting and advancing at least the knives themselves, for the insertion and removal of the insulating plates.

**4,016,639**

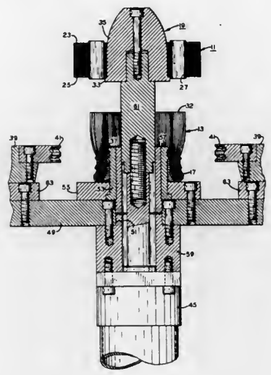
## APPARATUS AND METHOD FOR STRIPPING WINDINGS FROM A STATOR

**Frank R. Dombrowski, Kingston, and Raymond L. Larson, Sycamore, both of Ill., assignors to General Electric Company, Fort Wayne, Ind.**

**Filed Jan. 23, 1975, Ser. No. 543,505**

**Int. Cl.² B23Q** *17/00;* **B26D** *1/04*

**U.S. Cl. 29—762** **15 Claims**



1. Apparatus for stripping from a dynamoelectric machine stator a plurality of windings thereof with one of a pair of opposite generally annular groupings of end turns severed therefrom, said apparatus comprising means movable between a mounting position and a displaced position for seating the stator and supporting it in both the mounting and displaced positions, means for gripping engagement with the other of the end turns when said seating and supporting means is in the mounting position to generally maintain the windings against displacement from the mounting position, means for actuating said gripping means into the engagement with said other end turns, and means operable independently of said actuating means for driving said seating and supporting means from the mounting position toward the displaced position so as to conjointly move the stator relative to the windings and effect the stripping of the windings from the stator when said gripping means is engaged with the other end turns.

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**4,016,640**

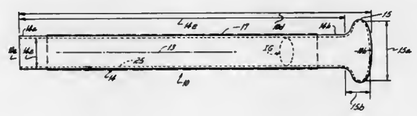
## METHOD OF FABRICATING AND INSTALLING THE GRIP OF A HAND-HELD IMPLEMENT

**Robert E. Briggs, Cincinnati, Ohio, assignor to 'Totes' Incorporated, Loveland, Ohio**

**Filed Aug. 27, 1975, Ser. No. 608,348**

**Int. Cl.² B23P** *11/02*

**U.S. Cl. 29—450** **8 Claims**



1. A method of providing a grip on the handle of a hand-held implement, said implement having a free end type handle, and said grip being comprised of a tubular member open at one end and a boot integral with said tubular member that closes its other end, said method comprising

dipping, into an elastomeric latex, a male mandrel having said grip's approximately as-produced and before-installation size, geometry, and exterior surface characteristics to form said grip, said grip being provided with an average internal girth between about 5 and about 50% less than the average external girth of said handle for that portion of said handle on which said grip is to be mounted, an average wall thickness of between about 0.01 inches and about 0.10 inches, a percentage elongation at break between about 400 and about 1000%, a tensile strength at break between about 2000 psi and about 6000 psi, and a modulus at 200% elongation between about 100 psi and about 500 psi,

stripping the latex skin from said mandrel after said skin has cured, said skin being turned inside out as same is stripped, thereby orienting the as-produced grip's exterior surface on the outside of said grip,

exposing the exterior surface of said grip to a vacuum sufficient to expand said grip throughout its longitudinal axis, said expansion being sufficient to permit said implement's handle to be inserted therein without touching the interior surface of said grip while the exterior surface is exposed to said vacuum,

orienting the free end of said implement's handle adjacent the open end of said grip,

inserting said implement's handle into said grip free end first until said free end bottoms out adjacent said grip's boot, bottoming out of said free end adjacent said boot serving to properly position said handle relative to said grip, and

thereafter releasing said vacuum from the exterior of said grip, same permitting said grip to contract into a friction fit relation with said implement's handle.



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**4,016,641**

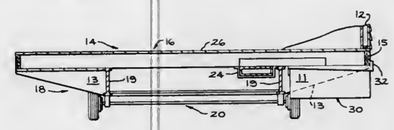
## METHOD OF ADAPTING A MOBILE HOME FOR AN AIR CONDITIONER

**Roy W. Abbott, Louisville, Ky., assignor to General Electric Company, Louisville, Ky.**

**Division of Ser. No. 541,665, Jan. 16, 1975, Pat. No. 3,973,939. This application Mar. 8, 1976, Ser. No. 664,664**

**Int. Cl.² B23P** *21/00*

**U.S. Cl. 29—469** **9 Claims**



1. The method of adapting a mobile home having at least one zone to be air conditioned, a base structure, air distribution means associated with said base structure including air outlets positioned in said zone, for removably receiving a self contained air conditioning unit in air delivering alignment with said air distribution means which comprises:

securing an adaptor plate mounting means to said base structure for removably receiving said air conditioning unit;

connecting an air delivery system between said adaptor plate and said air distribution means.

5. The method of air conditioning a mobile home having at least one zone to be air conditioned, a base structure, air distribution means associated with said base structure including air outlets positioned in said zone, for removably receiving a self-contained air conditioning unit in air delivering alignment with said air distribution means which comprises:

securing an adaptor plate mounting means to said base structure for removably receiving said air conditioning unit;

connecting air delivering means between said adaptor plate and said air distribution means; and

inserting said air conditioning unit in said adaptor plate so that said air conditioning unit is in alignment with said air delivering means for circulating air into said mobile home zones through said air distribution means.

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**4,016,642**

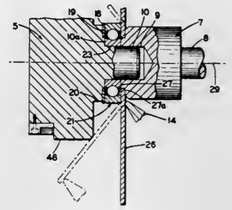
## METHOD OF MAKING CLUTCH HOUSING AND BEARING ASSEMBLY

**Derald H. Kraft, Canton, and Richard C. St. John, North Canton, both of Ohio, assignors to Aspro, Inc., Canton, Ohio**

**Filed Aug. 4, 1975, Ser. No. 601,346**

**Int. Cl.² B21D** *39/00;* **B23P** *11/00*

**U.S. Cl. 29—509** **12 Claims**



1. The method of making a clutch housing and bearing assembly including the steps of

a. assembling side by side bearing means and a flat sheet metal disc having a central hole formed therein;

b. clamping the assembled bearing means and disc at a central portion of the disc around the disc hole between relatively axially movable and rotatable headstock and tailstock die means;

c. rotating the die means, and the disc and bearing means clamped by the die means;

d. pressure rolling, forming and ironing rotating annular disc metal portions surrounding the clamped central portion against portions of the bearing means to form a bearing housing which at least partially surrounds the bearing means, and to form retaining means which secures the bearing means within the bearing housing;

e. continuing the pressure rolling, forming and ironing of the rotating annular disc portions beyond the bearing housing against flange forming means provided on the headstock die means to form a cup-shaped clutch housing having an annular clutch shoe engaging flange terminating in an open end; and

f. then while continuing rotation of the die means, trimming the open end of said clutch housing flange to a predetermined length.

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**4,016,643**

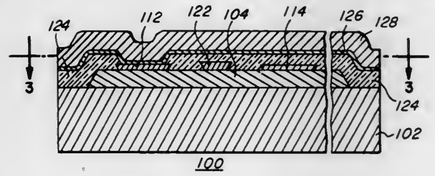
## OVERLAY METALLIZATION FIELD EFFECT TRANSISTOR

**Robert A. Pucel, Needham, and James A. Benjamin, Boxford, both of Mass., assignors to Raytheon Company, Lexington, Mass.**

**Division of Ser. No. 518,692, Oct. 29, 1974, abandoned. This application Apr. 12, 1976, Ser. No. 676,033**

**Int. Cl.² B01J** *17/00*

**U.S. Cl. 29—571** **4 Claims**



1. The method comprising the steps of:

providing a substrate of semiconductor material;

growing an epitaxial layer on said substrate;
covering said epitaxial layer with a first insulating layer;
removing portions of said first insulating layer from said epitaxial layer in first and second predetermined patterns;
depositing first and second metal layers in said first and second predetermined patterns;
covering said first and second metal layers and said first insulating layers with a second insulating layer;
removing portions of said second insulating layer and said first insulating layer from regions interspersed between portions of said first and second metal layers;
depositing a third metal layer upon said epitaxial layer in said interspersed regions; to form Schottky barrier contacts
removing the remaining portions of said first and second insulating layers;
covering portions of said first, second, and third metal layers with a third insulating layer;
removing portions of said third insulating layer above a predetermined one of said first, second and third metal layers; and
depositing a fourth metal layer, said fourth metal layer being patterned to interconnect portions of said predetermined one of said first, second, and third metal layers.

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**4,016,644**
**METHODS OF FABRICATING LOW PRESSURE SILICON TRANSDUCERS**
**Anthony D. Kurtz, Englewood, N.J., assignor to Kulite Semiconductor Products, Inc., Ridgefield, N.J.**
**Division of Ser. No. 451,860, March 18, 1974, abandoned. This application Jan. 14, 1976, Ser. No. 648,957**
**Int. Cl.² B01J** *17/00*
**U.S. Cl. 29—583** **10 Claims**

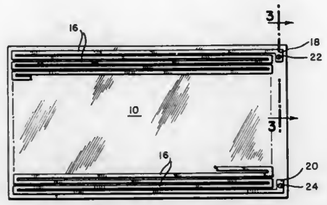



1. The method of fabricating a transducer comprising the steps of:
a. diffusing a plurality of piezoresistive patterns on a surface of a single n-type silicon wafer,
b. bonding a thin glass sheet to the surface of said wafer opposite to that surface upon which said patterns are diffused,
c. separating each of said patterns to form a plurality of individual patterns, and
d. glass bonding each individual pattern on a separate diaphragm of silicon, of non-critical electrical properties as compared to said n-type wafer to form a plurality of separate diaphragm transducer structures, whereby said portion of said glass sheet on said individual pattern is bonded to said separate diaphragm of silicon.

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**4,016,645**
**ELECTRIC HEATER PLATE AND TERMINAL THEREOF**
**William C. Cooke, Kingsport, Tenn., assignor to ASG Industries, Inc., Kingsport, Tenn.**
**Division of Ser. No. 466,466, May 2, 1974, Pat. No. 3,895,218. This application Feb. 21, 1975, Ser. No. 551,589**
**Int. Cl.² H05B** *3/00*; **H01C** *17/28*
**U.S. Cl. 29—611** **3 Claims**

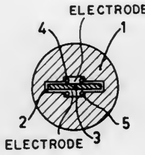
1. The method of manufacturing an electrical heater plate having an electrically conductive grid and terminals disposed in terminal areas comprising bonding a layer of silver to one surface of a sheet of tempered glass, said silver extending only over the terminal areas of the glass sheet, coating the one surface of said sheet including all of said terminal areas with a metal coating, applying an enamel resist to said coating in the pattern of an electrical grid including said terminal areas, while providing an opening through said enamel resist at the location of each of said terminal areas exposing part of the




metal coating therebeneath, and removing said metal coating in all areas not covered by said resist including the metal coating exposed by said openings at said terminal areas whereby to expose the silver through the metal coating.

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**4,016,646**
**METHOD OF MAKING A RESISTOR**
**Franz Lucien Ghislain Pirotte, Brussels, Belgium, assignor to U.S. Philips Corporation, New York, N.Y.**
**Filed Nov. 20, 1975, Ser. No. 633,577**
**Claims priority, application Netherlands, Dec. 16, 1974, 7416327**
**Int. Cl.² H01C** *17/02*
**U.S. Cl. 29—613** **6 Claims**




1. A method of manufacturing an electrical resistor comprising the steps of
providing a body of resistance material having electrodes;
providing leads having ends clamped against said electrodes;
enveloping said body together with said ends of said leads with a formed mass of electrically non-conducting material which shrinks during sintering; and sintering said mass.

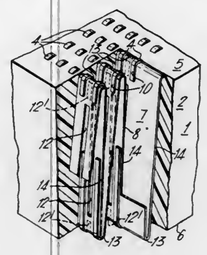
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**4,016,647**
**METHOD OF FORMING A MATRIX CONNECTOR**
**Hermanus Petrus Johannes Gilissen, Vlijmen, Netherlands, assignor to AMP Incorporated, Harrisburg, Pa.**
**Division of Ser. No. 490,621, July 22, 1974, Pat. No. 3,934,959. This application Oct. 3, 1975, Ser. No. 619,553**
**Int. Cl.² H02G** *15/00*
**U.S. Cl. 29—629** **3 Claims**

1. A method of forming a matrix connector of the type having an insulating elastomer body with opposing surfaces containing a multiplicity of spaced contacts wherein opposing contacts are interconnected by conductors extending through the body, said method comprising the steps of:
a. forming a series of spaced apertures across the width of a length of insulating lamina at spaced longitudinal intervals;
b. providing sets of discontinuous conductive strips at spaced longitudinal intervals along either side of the lamina with portions of sets on opposite sides overlapping and spanning the apertures;



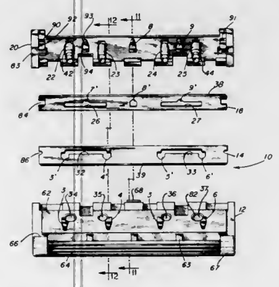
c. electrically interconnecting the overlapped sets of conductive strips through the apertures;
d. folding the lamina in concertina fashion so that each set of conductive strips extend externally around a fold and each electrically interconnected sets extending around opposing folds;



e. providing partially cured elastomer material around each limb of the concertina form; and
f. compressing the concertina form longitudinally to effect extrusion of the elastomer into the troughs of the concertina form and curing the elastomer to a homogeneous mass.

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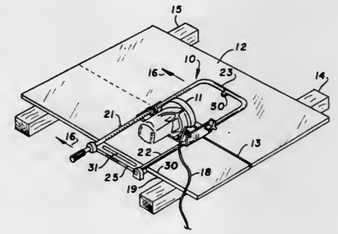
**4,016,648**
**SAFETY RAZOR**
**Evan Nai-keung Chen, and Edward A. Beddall, both of Fairfield, Conn., assignors to Warner-Lambert Company, Morris Plains, N.J.**
**Filed Aug. 13, 1975, Ser. No. 604,505**
**Int. Cl.² B26B** *21/06*
**U.S. Cl. 30—47** **6 Claims**



1. A safety razor comprising:
a. a plastic blade seat member including a transversely elongated guard surface, a platform and a first plurality of integral support posts having lands thereon and extending from said platform;
b. a first razor blade on said blade seat platform member, said first blade including a cutting edge spaced upwardly and rearwardly of said guard surface, and a plurality of perforations formed therethrough, said first plurality of support posts extending through the perforations in said first blade;
c. a second razor blade in abutting engagement with said lands of said first plurality of support posts, said second blade including a cutting edge spaced upwardly and rearwardly of the cutting edge of said first blade, and a plurality of perforations formed therethrough;
d. a plastic cap member on said second blade, said cap member including a surface for supporting said second blade, a second plurality of integral support posts having lands thereon extending from said support surface through the perforations in said second blade, said cap post lands in abutting engagment with the top surface of said first blade; and
e. means interconnecting said cap and blade seat members for permanently bonding said first and second blades between said cap post lands and blade seat platform and said blade seat post lands and said cap support surface respectively.

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**4,016,649**
**CIRCULAR SAW GUIDE**
**James R. Kloster, Edina, Minn., assignor to Kloster Pattern Company, Minneapolis, Minn.**
**Filed June 11, 1976, Ser. No. 695,012**
**Int. Cl.² B27B** *9/04*
**U.S. Cl. 30—373** **7 Claims**




1. Guide frame means for portable powered hand saws and including:
a. retainer means comprising a generally U shaped frame member having a pair of opposed lateral edges in a first cross-member extending between said legs and disposed at one end thereof;
b. edge guide means comprising a second cross-member extending between said legs and disposed in opposed relationship to said first cross-member and having an inwardly facing edge with an inwardly extending flange overlying said inwardly facing edge, with said inwardly extending flange having a work support surface on the underside thereof;
c. saw cradle means mounted for adjustable position along said lateral legs and having portable powered hand saw clamping means on the upper surface thereof, and having a saw receiving bore formed therethrough for accommodating a saw blade therein; and
d. support means mounted upon said first cross-member and having a work engaging surface supporting said guide frame means at an elevation substantially along a plane through said work supporting surface of said inwardly extending flange.

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**4,016,650**
**IMPRESSION TRAY FOR DENTAL PURPOSES**
**Bernd W. Leusner, Leverkusen, and Hans-Hermann Schulz, Leichlingen, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany**
**Filed Oct. 31, 1975, Ser. No. 628,460**
**Claims priority, application Germany, Nov. 15, 1974, 2454216**
**Int. Cl.² A61C** *9/00*
**U.S. Cl. 32—17** **7 Claims**

1. An impression tray for dental purposes which comprises a lower-jaw tray and an upper-jaw tray each having a shape adapted to the shape of the jaw, one of the jaw-trays being

provided with a bite surface having depressions and the other jaw tray being provided with a bite surface having openings,



the openings and depressions being situated in such locations that they are in register when the two jaw-trays meet.

## 4,016,651

## DEVICE FOR IMPLANTING AN ARTIFICIAL ENDOSSEOUS ELEMENT OF CERAMICS AND AN IMPLANT METHOD FOR USE OF THE DEVICE

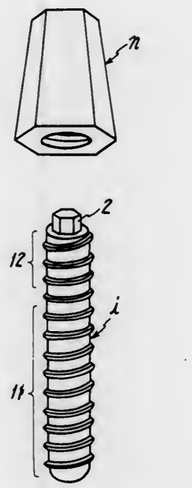
**Haruyuki Kawahara, Moriguchi, and Masaya Hirabayashi, Yokaichi, both of Japan, assignors to Kyoto Ceramic Co., Ltd., Kyoto, Japan**

**Filed Feb. 18, 1975, Ser. No. 550,186**

**Claims priority, application Japan, Sept. 25, 1974, 49-110730**

**Int. Cl.² A61C** *13/00*

**U.S. Cl. 32—10 A** **22 Claims**



1. A device for implanting an artificial endosseous element containing:

an implant screw pin, said pin being of a radio opaque ceramic and having an external threading, said pin including a portion to be threaded into a bone structure and a protruded portion to be protruded from the upper surface of said bone structure when said pin is threaded into the bone structure, said pin being provided with a tool-attaching portion at the top of said protrusion, and

a nut element made of ceramic, said nut element being substantially larger in diameter than said pin, said nut element being threaded onto said protruded portion of said pin until the underside of said nut element engages with the upper surface of said bone structure thereby tightly holding said pin in said bone structure.

## 4,016,652

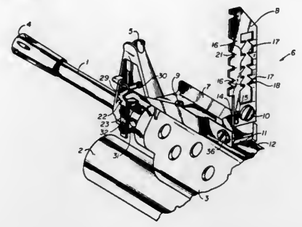
## BI-AXIAL LEAF SIGHT

**Urban Frederick Stratman, Taylor Ridge, Ill., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Nov. 24, 1975, Ser. No. 634,673**

**Int. Cl.² F41G** *1/06, 1/10, 1/48*

**U.S. Cl. 33—254** **3 Claims**



1. A sighting system for hand held launchers of low velocity grenades including:

a first front vertically extending sight post member in substantive alignment with the longitudinal axis of the base of the launcher,

a second front sight post member laterally offset from the first sight post member, said first and second front sight posts being vertically offset a predetermined distance, and

a rear leaf sight member of predetermined height having pre-calibrated range indicia and corresponding sighting means thereon, said range indicia and sighting means being separated into two vertically oriented segments laterally displaced from each other, the first indicia segment and sighting means being substantially centrally and vertically located and including a plurality of sight defining means for selective alignment with the first sight post member for aiming at near to intermediate range targets, the second indicia segment segment and sighting means being on one side of said leaf sight member pre-calibrated and marked to indicate target distances in the intermediate to distant range, said second indicia segment and sighting means including a plurality of sight defining means being selectively alignable with said second front sight for aiming at targets in said intermediate to distant range.

## 4,016,653

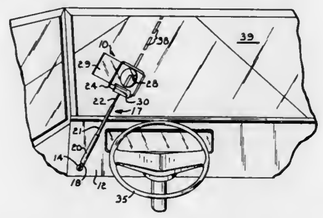
## SIGHTING DEVICE FOR A VEHICLE

**Joseph E. Bartlett, 215 S. Parker Ave., Olathe, Kans. 66601**

**Filed July 11, 1975, Ser. No. 595,327**

**Int. Cl.² G01C** *21/04;* **B60Q** *1/26*

**U.S. Cl. 33—264** **1 Claim**



1. A sighting device for installation in the driver's compartment of a vehicle to assist in the driving of the vehicle, said sighting device comprising:

an elongate, adjustable arm member having an inner end being adapted for connection to a support within the driver's compartment of the vehicle to mount said arm member therein, said arm member being adjustable to vary the horizontal and vertical position of its outer end;



a sight member mounted on said outer end of the arm member, said sight member presenting an opening therein for alignment with a reference target located remotely of the vehicle to permit said reference target to be sighted through said opening, thereby providing an indication of the position of the vehicle relative to said reference target;

a tinted transparent panel; and

means for mounting said panel on said sight member at a position to substantially overlie said opening, said means comprising a clamp plate mounted on said sight member and having an edge biased toward said sight member to retain said panel between said clamp plate and sight member.

## 4,016,654

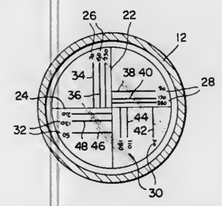
## RANGE FINDER

**Patrick Tepedino, Port Jefferson Station, N.Y., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest**

**Filed Jan. 26, 1976, Ser. No. 652,208**

**Int. Cl.² G01C** *3/24*

**U.S. Cl. 33—277** **2 Claims**



1. A range finder comprising a tube having an eye end and an object end, both ends of said tube being open for visual sighting therethrough, sight means mounted in the object end of said tube, said sight means comprising a plurality of base lines transverse to the longitudinal axis of said tube a fixed distance from said eye opeing, each base line also intersecting one another, thereby dividing said sight means into sections, each section having a plurality of sight lines parallel to and extending above their respective base lines, readable indicia for designating the range of an object adjacent said sight lines each of said sight lines in each of said sections representing a different range, said indicia being parallel and readable with respect to the base line subtending the section in which said indicia are positioned, said sight lines being spaced above said base line by a factor comprising the tangent of an object of known dimension being sighted and the distance of such object to said eye opening, each sight line in each section being spaced a different distance from each other and from their respective base lines said parallel sight lines being arranged in each section so that said sight lines indicating relatively short distances are mixed with the sight line indicating longer distances to thereby avoid crowding of said sight lines and confusion of said indicia adjacent said sight lines, said tube being rotatable on its longitudinal axis for aligning the sight lines and indicia of each section with a distant object so that said object may be sighted through one base line and sight line and the indicia adjacent such sight line read.

## 4,016,655

## BORING RIG ALIGNMENT APPARATUS AND METHOD

**Morgan LeVon Crow, Dallas, Tex., assignor to Dresser Industries, Inc., Dallas, Tex.**

**Filed July 30, 1975, Ser. No. 600,324**

**Int. Cl.² G01C** *15/00*

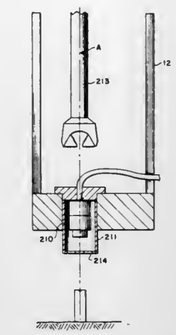
**U.S. Cl. 33—286** **8 Claims**

1. Apparatus for providing optical alignment of a boring rig over a survey point, comprising:

housing means containing camera means arranged for sighting along a line coinciding with the drilling axis of a boring rig;

pivotable suspension means connecting said camera means to said housing means and selectively adapted to allow said camera to swing freely; and,

target plate means secured to the lower side of said housing



means and containing a target arranged to intersect the drilling axis of a boring rig.

## 4,016,656

## METHOD AND ARRANGEMENT FOR THE NATURAL VITAMINIZING OF GRAIN

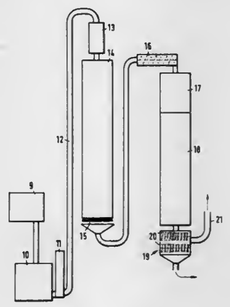
**Alfred Batscheider, Porza, Lugano, Switzerland, and Jiri Bernasek, Hamburg, Germany, assignors to Alfred Batscheider, Porza, Lugano, Switzerland**

**Filed Apr. 28, 1975, Ser. No. 572,254**

**Claims priority, application Germany, Apr. 30, 1974, 2420910**

**Int. Cl.² F26B** *7/00*

**U.S. Cl. 34—12** **35 Claims**



1. A method for the natural vitaminizing of grain, comprising holding said grain in the temperature range of about 25° to 35° C for a period of about 5 to 30 hours while maintaining the moisture content of said grain in the moisture content range of about 18 to 24 percent by weight; and thereafter drying said grain to a moisture content of about 14 to 16 percent by weight.

## 4,016,657

## HEAT PUMP FREEZE DRYING SYSTEM

**Arjun Dev Passey, now by change of name Chand Arjun Passey, 3760 Gottingen St., Apartment B-201, Halifax, N. S., Canada (B3K 5K5)**

**Division of Ser. No. 162,607, July 14, 1971, abandoned. This application Oct. 4, 1973, Ser. No. 403,437**

**Int. Cl.² F26B** *13/30*

**U.S. Cl. 34—92** **47 Claims**

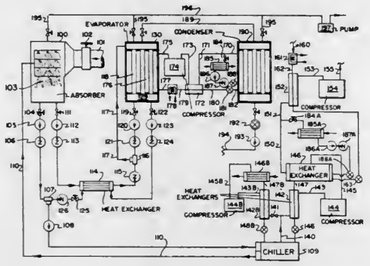
1. A freeze-drying system for freeze-drying a material, said material comprising a substance to be removed to effect freeze-drying of said material, which system substantially eliminates need to supply heat from an external heat source

for freeze-drying said material; said system comprising in combination:

a. a drying chamber wherein is maintained a vapor pressure below the triple point pressure of substance to be removed to effect freeze-drying of said material;

b. a means for passing the said material through said drying chamber for freeze-drying thereof during said passage;

c. an evacuation means for continuously removing vapor from said drying chamber as it is generated in said chamber in the freeze-drying of said material, said evacuation means comprising an absorber through which a liquid absorbent medium is continuously passed, said absorbent medium being at a sufficiently low temperature to provide in said absorber a vapor pressure lower than in said chamber whereby to cause the vapor to pass from said drying chamber to said absorber where it is absorbed in said absorbent medium; an evaporator in which absorbed substance is continuously evaporated from the absorbent medium passing therethrough from said absorber at a rate similar to that at which said vapor is absorbed in said absorbent medium in said absorber, by heat exchange with condensing first refrigerant; a condenser in which vapor from said evaporator is condensed by heat exchange with evaporating first refrigerant; a first heat pump means adapted to compress at least a portion of



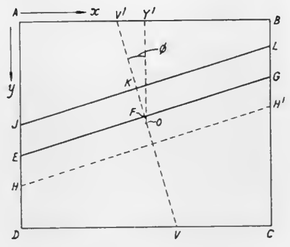

first refrigerant vapor from said condenser, pass first refrigerant vapor so compressed to said evaporator and pass condensed first refrigerant from said evaporator through an expansion valve to said condenser, said first heat pump means including a cooling means for removing excess heat from said first refrigerant to maintain heat balance in said evaporator and in said condenser; a chiller in which the absorbent medium from said evaporator is cooled to restore the absorbent medium to the proper temperature for said absorber for passage to said absorber, by heat exchange with evaporating second refrigerant; and a means to maintain the absorbent medium in circulation between said absorber, evaporator, and chiller; and a means to purge the noncondensible gases from the system;

d. a second heat pump means adapted to compress at least a portion of second refrigerant vapor from said chiller, pass the second refrigerant vapor so compressed to a heat exchange means for supplying heat to effect freeze-drying of said material in said drying chamber and pass condensed second refrigerant from heat exchange means through an expansion valve to said chiller, said second heat pump means including a cooling means for removing excess heat from said second refrigerant to maintain heat balance in said heat exchange means and in said chiller.

**4,016,658**
**VIDEO GROUND-BASED FLIGHT SIMULATION APPARATUS**

**Arthur Paul Porter, Haywards Heath; James William Morris, Lewes, and Roy Alfred George Gasson, Crawley, all of England, assignors to Redifon Limited, England**

**Continuation of Ser. No. 239,192, March 29, 1972, abandoned. This application Dec. 24, 1974, Ser. No. 536,242**
**Claims priority, application United Kingdom, Apr. 2, 1971, 8509/71**
**Int. Cl.² G09B *9/08***
**U.S. Cl. 35—12 N** **5 Claims**




1. In ground-based flight simulation apparatus including a dummy cockpit and associated flight computer and visual display means including a television system for producing a scanned image in a picture area visible from said cockpit, the improvement comprising circuit means for providing a control signal for controlling the television picture visibility during the line and frame scanning of said image so as to produce first, second, third and fourth boundaries spaced apart within the picture area of said scanned image and to thereby define first, second, third, fourth, and fifth visibility zones, controlled-gain signal amplifier means for providing a full-visibility visual image in the picture area of the third zone defined between the second boundary and third boundary, zero-visibility visual images in the picture areas of the first and fifth zones lying outside of said first boundary and outside of said fourth boundary, respectively, and progressively reduced visibility visual images in the picture areas of the second and fourth zones extending from said second boundary to said first boundary, and from said third boundary to said fourth boundary, respectively, and circuit means controlled from the flight computer for rotating all of said boundaries about the center of the picture area in accordance with computed aircraft roll and for displacing said first and second boundaries and said third and fourth boundaries in accordance with computed aircraft pitch and height, so as to vary the separation between said first boundary and said second boundary and the separation between said third boundary and said fourth boundary and thus adjust the widths of said second and fourth zones of progressively reduced visibility visual images.

**4,016,659**
**FOCAL SCANNING AID**

**Denis F. Merrigan, 1467 Kathleen St., Newbury Park, Calif. 91320**

**Filed Dec. 29, 1975, Ser. No. 644,711**
**Int. Cl.² G09B *17/04***
**U.S. Cl. 35—35 B** **2 Claims**

1. A focal scanning aid comprising:

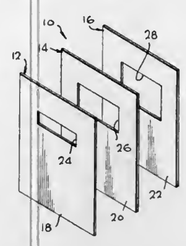
a set of first, second and third mats, each of said mats being of sufficient size to cover at least a portion of a printed page, each of said mats being of substantially rectangular shape and having a substantially black matte surface thereon;

first, second and third rectangular apertures respectively in said first, second and third mats, said first, second and third apertures each having substantially the same width



which is sufficient to expose a full column width of printed material;

said first aperture in said first mat being of such height that an unskilled reader can scan three lines of printed material exposed therethrough in a single scan pass, said second aperture in said second mat having a greater height so that a more skilled reader can scan six lines of printed

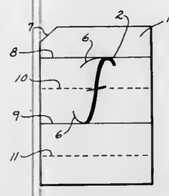



material exposed therethrough in a single pass, and said third aperture in said third mat being of greater height than said second aperture and being of such height that only a reader of near maximum reading skills can scan printed material exposed therethrough in a single scan pass so that said focal scanning aid progressively trains readers to scan larger quantities of material.

**4,016,660**
**EDUCATIONAL SYSTEM ALPHABET CARDS**

**Barbara Salvatore Ingalls, Rte. 1, Walworth, Wis. 53184**

**Filed Aug. 1, 1975, Ser. No. 601,200**
**Int. Cl.² G09B *11/04***
**U.S. Cl. 35—71** **4 Claims**



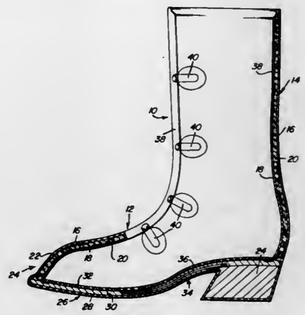

1. In an educational system, a set of cards each having on its face a letter of the alphabet in cursive form at a distinctive level different than said face and having a printed form of the same letter disposed in coinciding relation to a portion of said cursive form with the connectors, smoothers and decorations of the cursive form when present at a level distinctively different from said printed form.

**4,016,661**
**WESTERN-TYPE BOOT PAC WITH INSULATED WATERPROOF CONSTRUCTION**

**Allen Ben Tibbitts, Box 162, Teton, Idaho 83451**

**Filed Nov. 5, 1975, Ser. No. 629,619**
**Int. Cl.² A43B *1/10***
**U.S. Cl. 36—4** **2 Claims**

1. An article of footwear for use by a wearer engaged in outdoor activities during inclement or very cold weather conditions and requiring periods of horseback riding in which the wearer must place his feet in saddle stirrups and exert downward pressure on the stirrups in the arch area of each foot in order to maintain his position in the saddle, said article of footwear including a foot enclosing portion and a leg enclosing portion for enclosing the foot and the lower portion of the leg of the wearer, said foot enclosing portion including a riding toe of tapering and pointed construction simulative of a western style riding toe to facilitate insertion of the foot enclosing portion into a stirrup and to facilitate removal therefrom without accidental entanglement, a sole extending rearwardly from the riding toe and including a high arch supporting area immediately in front of the breast of a high riding heel to facilitate retention of a stirrup in the high arch supporting area, a rigid shank in said high arch supporting area with the forward end of the shank terminating at the forward end of the high arch supporting area and substantially rearwardly of the riding toe whereby the forward portion of the foot enclosing portion remains flexible, said sole, heel, high arch supporting

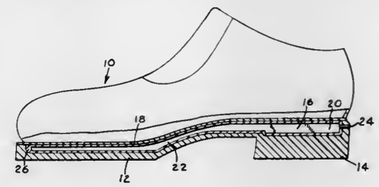



area, riding toe and the remainder of the foot enclosing portion and the leg enclosing portion including an outer layer of flexible, resilient, waterproof material of unitary construction and an inner layer of fabric material, said leg enclosing portion and the portion of the foot enclosing portion above the sole including an intermediate layer of flexible, resilient, foam cellular insulating material, said sole including an intermediate layer in the form of a shape sustaining midsole having the rigid shank mounted fixedly therein to distribute forces exerted on the stirrup over a large surface area of the bottom of the foot of a wearer.

**4,016,662**
**SHOE CONSTRUCTION**

**Charles Thompson, 745 Pennsylvania Ave., Brooklyn, N.Y. 11207**

**Filed Aug. 3, 1976, Ser. No. 711,241**
**Int. Cl.² A43B *13/20***
**U.S. Cl. 36—29** **7 Claims**

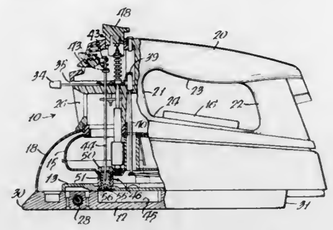



1. A shoe construction comprising an upper portion attached to an innersole, an outer sole and a heel beneath said innersole or wall located between said soles and between said innersole and said heel about the peripheries thereof defining an enclosed cavity between said soles and between said innersole and said heel, a hollow flexible sack located with said cavity, a pressurized fluid within said sack, at least two separated areas of said inner sole being fixedly secured to adjacent abutting areas of said sack, the remaining areas of said inner sole being disposed unfastened to said sack.

## 4,016,663
## ELECTRIC PRESSING IRON

Melvin N. Cline, Orange, Calif.; Robert John Augustine, Downers Grove, and Donald John Westphal, South Elgin, both of Ill., assignors to Sunbeam Corporation, Chicago, Ill.

Filed May 21, 1976, Ser. No. 688,858
Int. Cl.² D06F 75/06
U.S. Cl. 38—77.83 5 Claims

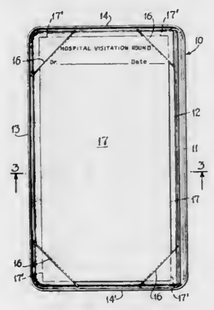


1. In an electric steam pressing iron the combination comprising a sole plate having a cavity formed in the upper surface thereof, a cover over said cavity forming with said sole plate a steam generating chamber, a water reservoir overlying said sole plate, a valve assembly to control the flow of water ffom the reservoir to said steam chamber, said valve assembly engaged with the bottom of said reservoir and having a base secured to said cover, a valve seat threadably received in said base to retain said reservoir with respect to said base, a movable valve member to control water flow, said valve seat having a passageway extending therethrough with an intermediate shouldered portion against which said valve member abuts to prevent water flow, a portion of said passageway extending from said shouldered portion to said steam chamber being of reduced diameter, said reduced diameter being formed in part by an annular synthetic jewel.

## 4,016,664
## POCKET HOLDER FOR INTERCHANGEABLE WORKSHEETS

Arthur E. Kaufmann, Summit, N.J., assignor to William F. Blake, Inc., Summit, N.J.

Filed Apr. 22, 1976, Ser. No. 679,239
Int. Cl.² A45C 11/04; G09F 3/20
U.S. Cl. 40—10 R 8 Claims

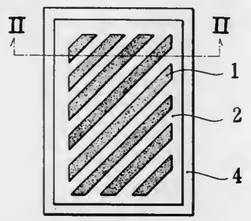



1. A holder for interchangeable worksheets comprising a generally rectangular backing member which is relatively stiff but has a degree of planar flexibility, a generally rectangular worksheet mounting member having the same length and slightly narrower width than said backing member, said mounting and backing members being secured together along one long side and opposed short sides thereof to provide a pocket therebetween, said holder has dimensions of about 3¾ inches × 6¼ inches thereby adapting the same to freely fit conventional shirt breast pockets as well as inner jacket pockets, the outer surface of said backing member having a roughened, suede-like surface, to thereby prevent accidental displacement of said holder from said shirt or jacket pockets, and said mounting member having diagonal cut-outs adjacent the four corners thereof facilitating insertion of the corners of a worksheet beneath said mounting member and support of the remainder of said worksheet superimposed on said mounting member.

## 4,016,665
## SIGNBOARD USING MARCROMOLECULAR ELASTOMER HAVING ADHESIVE LAYER

Mitsushi Sakota, 4-9-8, Kibogaoka, Chikusa, Nagoya, Japan

Filed July 25, 1975, Ser. No. 599,172
Claims priority, application Japan, July 31, 1974, 49-88384; June 21, 1975, 50-76302
Int. Cl.² G09F 7/00
U.S. Cl. 40—135 14 Claims

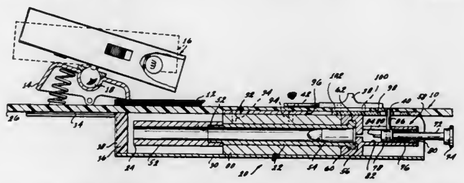



1. A signboard which can be applied to substantially any type of surface which comprises a flexible antiweathering macromolecular sheet composed of rubber or synthetic resin, a colored paint coated on the front surface of said sheet to form a design or message and a self-sticking adhesive on the back surface of said sheet composed principally of a mixture of rubber and asphalt.

## 4,016,666
## CLIPBOARD INCORPORATING WEAPON

Charles A. Finn, 2808 Todd, and Albert Duckworth, 712 1/2 S. Pacific, both of Oceanside, Calif. 92054

Filed May 6, 1976, Ser. No. 683,887
Int. Cl.² F41C 9/00; F41H 1/00
U.S. Cl. 42—1 J 17 Claims



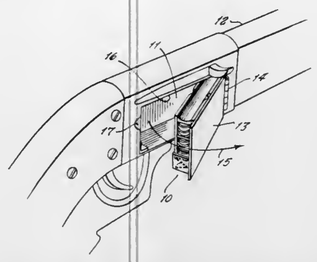
1. The improvement in a clipboard for purposes of defense, comprising:
   a. said clipboard including a flat sheet and means to secure papers on the upper face thereof,
   b. a weapon secured to said clipboard, said weapon having a barrel and being adapted when actuated to project a disabling agency out of a first end of said barrel, said first end of said barrel being directed toward a first end of said clipboard whereby when said clipboard first end is directed toward a person said barrel first end is also directed toward that person, and
   c. said weapon having a trigger for firing said weapon in position to be actuated by one holding said clipboard.



## 4,016,667
## SIDE SPRING DOOR ACTION

John P. Forbes, Box 355, Newport, N.H. 03773

Filed Mar. 31, 1976, Ser. No. 672,411
Int. Cl.² F41C 25/00
U.S. Cl. 42—6 2 Claims

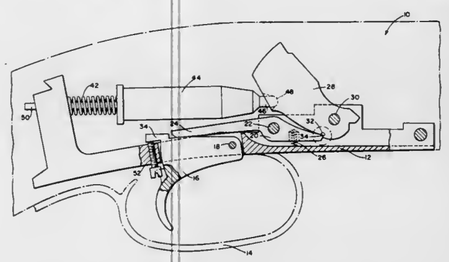


1. A side spring door action for a firearm, comprising in combination, a magazine behind a barrel of a firearm, a sideward opening to said magazine, said opening being closeable by means of a sidewardly pivotable door about a hinge, an inner side of said door carrying an action, said action including a clip supported within a frame secured to a rear side of said door, said clip including a pair of compression coil springs bearing against an underside of a plate upon which projectiles of a firearm are loaded by moving said plate against said compression coil springs.

## 4,016,668
## FIRING MECHANISM FOR FIREARM

Gerald Joseph Frazier, Melrose, Mass., assignor to Frazier Gun Co., Melrose, Mass.

Filed Jan. 15, 1976, Ser. No. 649,412
Int. Cl.² F41C 19/00
U.S. Cl. 42—69 R 4 Claims

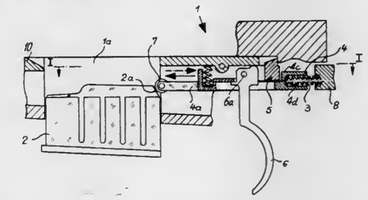


1. A firing mechanism for a gun comprising; a base; a firing hammer mounted on said base to move from beyond a cocked position to a firing position at which the hammer strikes a firing pin; a cam-receiving socket in said hammer; firing spring and cam means having moving contacting surfaces and a rounded driving end mounted between said base and said hammer such that said rounded driving end engages said cam-receiving socket in ball and socket relation for urging said hammer from said cocked position toward said firing position; a sear-receiving notch in said hammer having a sear-bearing wall terminating in a sear-bearing corner; a sear mounted on said base having a hammer-bearing surface terminating in a hammer-bearing corner complementarily to the bearing portions of the sear receiving notch; said sear mounted on said base with said hammer-bearing surface and said sear-bearing corner in contact with each other when the firing mechanism is in the cocked position and said hammer-bearing surface presenting an acute angle in relation to its path of motion whereby the force of said firing spring on said hammer, at least in part, holds said sear in the cocked position; sear spring means for urging said hammer-bearing corner of said sear into said sear receiving notch; trigger means for moving said sear to release said sear from said notch to fire said gun; said hammer-bearing corner spaced from said sear-bearing corner by a dimension substantially equal to the distance the sear-bearing corner travels, when the trigger is pulled prior to substantially completely encountering the frictional resistance of the moving contacting surfaces of said firing spring and cam means; whereby firing said gun is accomplished with reduced force and trigger motion without impairment of safety.

## 4,016,669
## FIREARM HAVING TRIGGER BLOCKING MECHANISM

Rolf Gminder, Altoberndorf (Neckar), Germany, assignor to Mauser-Jagdwaffen GmbH, Germany

Filed Jan. 24, 1975, Ser. No. 543,891
Claims priority, application Germany, Jan. 30, 1974, 7403023[U]
Int. Cl.² F41C 17/08
U.S. Cl. 42—70 A 5 Claims



1. A firearm, comprising a housing, a gun barrel mounted on said housing, a magazine opening in said housing adjacent said gun barrel, a trigger pivotally mounted on said housing adjacent said magazine opening, a slider movable on said housing adjacent the magazine opening and said trigger and having a magazine contact portion positionable in the magazine opening and a trigger blocking portion positionable at a location to block the movement of the trigger when said magazine contact portion is in the magazine opening, said slider being displaceable upon insertion of a magazine into the opening to contact said magazine contact portion to shift said contact portion and said slider out of the opening and to position said trigger blocking portion in a position away from said trigger, so that said trigger can be moved, and biasing means for biasing said slider in a direction toward the magazine opening, said magazine contact portion including two spaced apart arms having a roller therebetween engageable with the magazine.

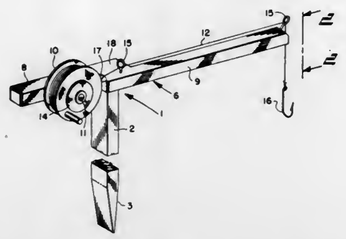
## 4,016,670
## ICE FISHING DEVICE

Eino Pihlaja, 101 Machar Ave., and Risto Hirvasoja, 20 Peter St., both of Thunder Bay P, Ontario, Canada

Filed July 29, 1976, Ser. No. 709,794
Int. Cl.² A01K 97/12
U.S. Cl. 43—17 4 Claims

1. An ice fishing device comprising a generally vertical mast member adapted to have its lower end portion anchored in a mound of packed wet snow or ice adjacent to an ice fishing hole; a rod and reel member having an elongated rod portion with a line guide at its end and having a handle portion on which a reel is rotatably supported for drawing in or letting out a fish line wound around said reel through said line guide and longitudinally along said rod portion; and hinge means pivotally connecting the upper end of said mast member to said rod and reel member in spaced relation to the center of gravity of the latter so that the latter assumes, by gravity, a normal

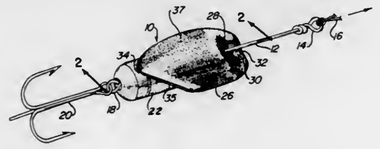
fishing position whereat said line guide is spaced above the ice fishing hole and so that a downward pull on the fish line extending downwardly from said line guide by a fish striking or hooked by a baited fishhook at the lower end of said fish line



will swing the rod and reel member about said hinge means to signal the fisherman to reel the fish in; said handle portion being laterally offset from said rod portion; and said reel being supported on said handle portion in alignment with said rod portion.

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**4,016,671**
**FISHING LURE**
**Paul F. Larsen, 1025 Sitka Court, Loveland, Colo. 80537**
**Filed Dec. 18, 1975, Ser. No. 642,020**
**Int. Cl.² A01K** *85/00*
**U.S. Cl. 43—42.17** **9 Claims**

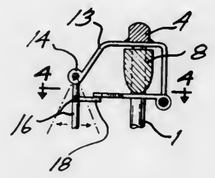


1. A fishing lure comprising:
an elongated shaft;
connecting means defined at one end of said shaft for securing a fish hook;
coupling means defined at the other end of said shaft for securing a line;
bearing means on said shaft between said connecting and coupling means;
and a generally spoon-shaped blade having an aperture located near the head end portion thereof and in which said shaft is received to position said blade between said bearing means and said coupling means with a cavity of said spoon facing said shaft, said head end portion being scooped shaped, in reverse of the generally spoon shape of said blade, to cause the tail end portion of said blade to tilt outwardly from said shaft when said lure is drawn relatively through water, the forwardmost marginal portion of said head end portion being bent away from said shaft, and the shape of said blade including means causing the blade to revolve about said shaft when said lure is so drawn.

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**4,016,672**
**GUILLOTINE TYPE ANIMAL TRAP**
**Armand Joncas, P.P. Dequen, St. Francois de Salle, County of Roberval, Quebec, Canada (G0W 1M0)**
**Filed Jan. 30, 1976, Ser. No. 653,651**
**Claims priority, application Canada, Feb. 7, 1975, 219578**
**Int. Cl.² A01M** *23/30*
**U.S. Cl. 43—78** **4 Claims**

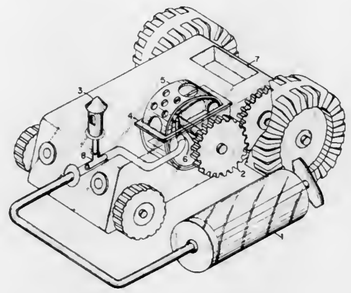
1. An animal trap comprising a frame including a pair of posts arranged in laterally spaced-apart relationship to form a gate for an animal, a transverse guillotine member slidable along said posts for movement between an elevated open position and a fallen closed position, a pair of springs connected to the opposite ends of said transverse guillotine member on opposite sides of said gate and biasing said transverse guillotine member towards the fallen closed position thereof, a latch secured to the frame and arranged to hold the transverse guillotine member in the elevated open position against the bias of the springs, and a trigger device for unlatching said latch, said trigger device comprising a loop pivotally suspended from said frame about an axis extending longitudinally of said transverse guillotine member on one side thereof and having an animal intercepting bottom edge section substantially stretching from one to the other of said posts, said latch including a pair of interengaging fingers, one of said fingers



being pivoted to said frame about another axis extending parallel to said first-named axis and on the opposite side of said transverse guillotine member relative to said first-named axis, said one finger adapted to extend across the underside of said transverse guillotine member in the holding position thereof and the other of said fingers being rigidly secured to said loop at a distance spaced from the pivotal axis of said loop and engaging under said first-named finger to releasably support the latter in said holding position, said fingers forming a pair of superposed lateral projections disengageable from each other upon pivoting of said loop in either angular direction about said first-named axis, said trap further including a ratchet locking device interconnecting said guillotine member to said frame and adapted to releasably lock said guillotine member in the closed position thereof.

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**4,016,673**
**BUBBLE PULL TOY**
**Chris Constance, 1 Ramsey Road, Great Neck, N.Y. 11023**
**Filed May 19, 1975, Ser. No. 578,999**
**Int. Cl.² A63H** *33/28*
**U.S. Cl. 46—6** **3 Claims**



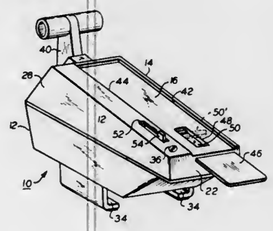
1. A bubble toy comprising a housing supported for movement on wheels, a cylindrically shaped thin annular wheel surface drivingly connected to one said housing wheels, said annular surface wheel comprising an annular perforated web, rotatable about a horizontal axis, said web being perforated with holes of varying size openings, said annular wheel being in contact with a bubble solution held in a bath supported on



said housing, jet means on said housing and located within said wheel to supply a jet of air toward certain of said annular wheel openings in that portion of said annular wheel which has been rotated to a general horizontal position whereby said jet means causes production of a plurality of bubbles upwardly and outwardly as said annular wheel is rotated.

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**4,016,674**
**MINIATURE TOY VEHICLE LAUNCHER FOR LAUNCHING A TOY VEHICLE UNDER THE INFLUENCE OF GRAVITY**
**Charles Resnick, Great Neck, N.Y., and Fred Zant, Boonton, N.J., assignors to Lesney Products Corporation, Moonachie, N.J.**
**Filed Mar. 18, 1976, Ser. No. 668,038**
**Int. Cl.² A63H** *18/16*
**U.S. Cl. 46—202** **18 Claims**

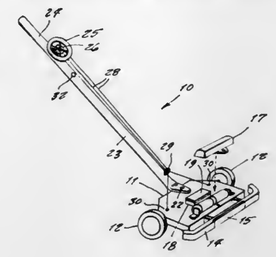


1. A toy vehicle launcher for the launching of a toy vehicle propelled under influence of gravity, comprising:
a. platform means adapted for the support of the toy vehicle in an inclined position;
b. means movable relative to said platform means from a first position to hold the toy vehicle onto said platform means to a second position to release the toy vehicle thereby to permit it to roll off said platform means under the influence of gravity;
c. setting means coupled with said movable means to position said movable means into said hold position;
d. means coupled with said setting means for urging said movable means into said release position, said setting means including means to overcome said urging means to hold said movable means in the hold position, slide means operatively associated with said setting means including second urging means and movable in response to the force of the urging of said second-mentioned urging means to lock said movable means in the hold position, and release means operatively associated with said slide means to move said slide means against the urging force of said second urging means to unlock said movable means thereby permitting said first urging means to move said movable means to the release position.

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**4,016,675**
**PUSH TOY**
**Howard Drucker, 35 Great Rock Road, Sherbon, Mass. 01770**
**Continuation-in-part of Ser. No. 535,214, Dec. 23, 1974, Pat. No. 3,940,881. This application Oct. 17, 1975, Ser. No. 623,560**
**Int. Cl.² A63H** *17/36*
**U.S. Cl. 46—205** **11 Claims**

1. A toy combination comprising a push toy and a removable toy, said push toy including a carriage, a pair of wheels rotatably mounted to said carriage, said wheels supporting said carriage, a control stick pivotally mounted to said carriage, at least a portion of said stick constituting a handle, steering means mounted to said stick and connected to said carriage, said steering means providing relative movement



between said stick and said carriage, and means for magnetically attaching said removable toy and said push toy.

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**4,016,676**
**PLANTER AND METHOD OF MAKING SAME**
**Edward T. Bennick, Jr., Rte. 3, Box 683, Lincolnton, N.C. 28092**
**Filed Mar. 12, 1976, Ser. No. 666,465**
**Int. Cl.² A01G** *9/02*
**U.S. Cl. 47—66** **10 Claims**



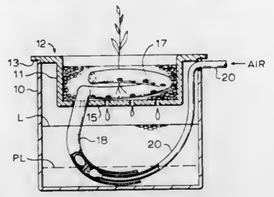
1. A method of forming a planter having an earthen like exterior surface configuration, said method comprising the steps of:
a. providing a volume of earthen material;
b. forming a cavity in said volume of earthen material;
c. introducing into said cavity a filler material consisting of a quantity of liquid plastic material;
d. allowing said liquid plastic material to cure by expanding to a rigid cellular form throughout said cavity to conform to the surface configuration thereof while adhering to a thin layer of said earthen material at the wall of said cavity; and
e. forming an opening in said cured plastic material for receiving a plant.

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**4,016,677**
**AIR PULSED HYDROPONIC UNIT**
**Helmut Julinot, 3455 Havenwood Ave., House 30, Mississauga, Ontario, Canada**
**Filed May 7, 1975, Ser. No. 575,124**
**Int. Cl.² A01G** *31/00*
**U.S. Cl. 47—64** **1 Claim**

1. A hydroponic unit comprising:
a tray for holding aggregate;
at least one drainage aperture in said tray;
a reservoir for nutrient solution arranged to hold nutrient solution between a predetermined lower level and a predetermined upper level;
said upper level being below the level of aggregate in said tray;
said reservoir being located to receive liquid passing downwardly through said drainage aperture;
a liquid conduit having a lower end open in the reservoir

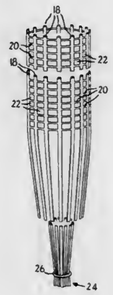
below said lower predetermined level, and an upper end having at least one aperture opening into said tray;
said liquid conduit including an extent continuously rising from below said lower predetermined level to a location as high as said at least one aperture which opens into said tray;
the cross-section of said liquid conduit being chosen so that




air bubbles may extend across the cross-section of the tube;
an air conduit introduced into the liquid conduit through the lower open end of the liquid conduit,
said air conduit having an open end located in said liquid conduit below said lower predetermined level in a portion of said continuously rising extent whereby bubbles created by air released by the air conduit, rise in said extent.

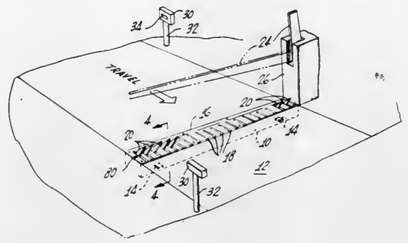
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**4,016,678**
**SEEDLING TRANSPLANT CONTAINERS**
**Ronald Leslie Larsen, Minneapolis, Minn., assignor to Conwed Corporation, St. Paul, Minn.**
**Continuation-in-part of Ser. No. 436,215, Jan. 24, 1974, abandoned. This application May 5, 1975, Ser. No. 574,263**
**Int. Cl.² A01G** *9/02*
**U.S. Cl. 47—77** **8 Claims**




1. A seedling transplant container comprising:
a. a plastic net cylinder having sets of spaced longitudinal and transverse strands;
b. said longitudinal and transverse strands being integrally joined together at their mutual intersections;
c. an end region of said cylinder wherein said transverse strands are omitted;
d. said end region having omitted transverse strands being at least as long as the radius of said cylinder; and
e. means which pinch together the longitudinal strands in the region having omitted transverse strands whereby at least a truncated conical shape is formed at the end of a substantially cylindrical shape.

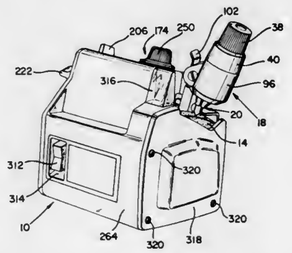
**4,016,679**
**TRAFFIC CONTROL APPARATUS**
**Clarence L. Ellefson, deceased, late of Burbank, Calif. (by Charlotte Vivian Ellefson, executrix), assignor to Rusco Industries, Inc., Los Angeles, Calif.**
**Filed May 19, 1975, Ser. No. 579,030**
**Int. Cl.² E01F** *13/00*
**U.S. Cl. 49—49** **8 Claims**




1. In combination:
a hollow rectangular housing having a top opening;
a plate covering said top opening, said plate having a plurality of parallel slots extending from one longitudinal edge and terminating adjacent the opposite edge;
spaced brackets welded to the bottom surface of said plate,
a shaft rotatably supported by said brackets;
gear means having a housing secured to the bottom surface of said plate,
said gear means being operatively coupled to said shaft at one end thereof;
a bar of substantially the length of said shaft;
rigid connecting members securing said bar and said shaft in fixed spaced relation with said bar parallel to said shaft;
a plurality of sleeves slidably positioned on and rotatable on said shaft,
a respective tooth integral with each sleeve, and
a respective finger integral with each sleeve,
and a respective tension spring connected at one end to each finger,
the remaining ends of all said springs being connected to said bar.

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**4,016,680**
**SHARPENER FOR TWIST DRILLS INCLUDING GRINDING WHEEL DRESSING MEANS**
**Robert Gordon Moores, Jr., Cockeysville, and Richard Eugene Walton, II, Baltimore, both of Md., assignors to The Black and Decker Manufacturing Company, Towson, Md.**
**Division of Ser. No. 456,946, April 1, 1974, Pat. No. 3,930,342. This application Sept. 12, 1975, Ser. No. 612,914**
**Int. Cl.² B24B** *3/28, 53/04*
**U.S. Cl. 51—5 D** **16 Claims**



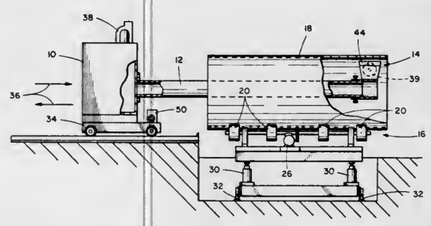

1. An apparatus for grinding twist drills or the like comprising:
a frame;



grinding wheel means supported by said frame;
holding means operable to either hold the leading end of a twist drill in contact with a surface of said grinding wheel means, or hold a dressing tool for dressing the grinding wheel means;
a pivot rod defining a longitudinal axis;
means to mount said holding means on said pivot rod;
supporting means for alternately supporting said pivot rod in:
a. a first mode wherein said pivot rod is spirally rotatable about said longitudinal axis so as to rotatingly move said pivot rod along said axis thereby causing said holding means to move in a spiral manner to progressively move the leading end of the bit laterally over the surface of said grinding wheel means whereby the wear on the surface of said grinding wheel means is minimized when the leading end of the twist drill or the like is ground on said surface; and, in a
b. second mode wherein said pivot rod is movable linearly along said longitudinal axis thereby causing said holding means to progressively move a dressing tool laterally across said surface whereby said surface is dressed when a dressing tool is held in said holding means and moved linearly across said surface; and,
mode selection means for engaging and selectively placing said supporting means in one of said modes.

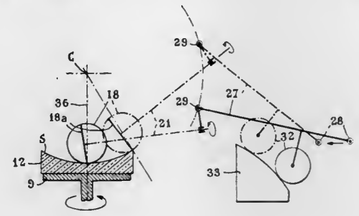
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**4,016,681**
**SURFACE TREATMENT DEVICE FOR LARGE DIAMETER PIPE SECTIONS**
**Raymond M. Leliaert, South Bend, Ind., assignor to Wheelabrator-Frye, Inc., Mishawaka, Ind.**
**Filed Dec. 11, 1975, Ser. No. 639,909**
**Int. Cl.² B24C** *3/14, 3/16*
**U.S. Cl. 51—9 M** **8 Claims**




1. A device for surface treatment of the inside and outside of large diameter cylinders comprising:
a. projecting means including a centrifugal blast wheel for projecting particulate against the surface of said cylinder as it rotates, means integral with said projecting means for recovering the projected particulate and a compliant seal disposed about the opening to said projecting means to confine the particulate to the projecting means,
b. means for supporting said cylinder including
i. means for rotating said cylinder about a horizontal axis,
ii. means for moving said cylinder between a first position where said wheel will treat the outside of said cylinder and a second position where said wheel will treat the inside of said cylinder,
c. means mounting said projecting means for movement into and out of proximity with the surface of said cylinder to be treated.

**4,016,682**
**COPYING MACHINE NOTABLY FOR GRINDING CONCAVE SURFACES**
**Serge Legendre, Epinay sur Seine, France, assignor to Essilor International (Compagnie Generale d'Optique), Joinville le Pont, France**
**Filed June 10, 1975, Ser. No. 585,561**
**Claims priority, application France, June 20, 1974, 74.21438**
**Int. Cl.² B24B** *13/00, 17/02*
**U.S. Cl. 51—50 PC** **5 Claims**



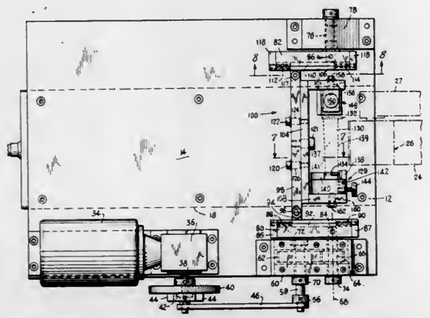

1. A grinding machine of the copying type for making a concave surface on an article, comprising a working table, an interchangeable templet having a concave surface identical with the concave surface to be obtained, said concave surface having associated therewith a mean sphere centered to an axis substantially perpendicular to the concave surface centrally of said concave surface and having a radius of a value substantially equal to the mean value of the radii of curvature of the desired concave surface, a pair of supports for said templet and said article, respectively, mounted side by side on the working table and driven for synchronous rotation about two parallel axes, the axis of rotation of the templet support being coincident with the axis of said concave surface, a movable copying head, a feeler carried by said copying head and shaped to be able to make a pin point contact with the concave surface of the templet, a rotatably driven grinding wheel carried by said copying head, said feeler and grinding wheel having identical convex curved working surfaces each having a centre of symmetry, the two centres of symmetry defining a straight line extending at right angles to the axes of rotation of said templet and article supports, said copying head being movable between a first position in which the centres of symmetry of said feeler and grinding wheel are located on the axes of rotation of said templet and article supports respectively, and a second position in which said centres of symmetry are spaced from the axes of rotation of said templet and article supports, and guide means for imparting to said movable copying head, as it moves from said first position to said second position, a component of movement of rotation about a fixed axis passing substantially through the centre of said mean sphere of the templet concave surface, said fixed axis being parallel to said straight line defined by the two centres of symmetry of said feeler and grinding wheel, the distance between said straight line and said fixed axis being variable.

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**4,016,683**
**TURBINE BLADE EDGE GRINDER**
**Salvatore J. Cretella, 180 Fitch St., North Haven, Conn. 06473**
**Filed Oct. 23, 1975, Ser. No. 625,071**
**Int. Cl.² B24B** *21/00*
**U.S. Cl. 51—143** **10 Claims**

1. A machine for resurfacing portions of a turbine blade, comprising in combination:
a. a machine bed,
b. a resurfacing device carried on the bed, comprising a drum and an abrasive member extending around said drum,
c. powered means for driving said device,
d. a carriage carried by the bed,

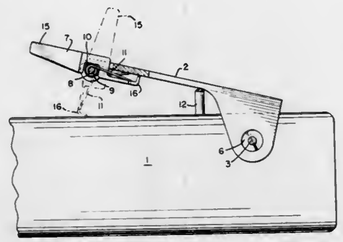
e. a clamping fixture turnable about an axis on the carriage, having a clamp adapted to hold a turbine blade being resurfaced,
f. means for reversely rocking said fixture about said axis,
g. means for moving the carriage over the bed in directions toward and away from the resurfacing device whereby the blade can be brought into engagement with said device while being simultaneously turned, thereby to resurface the blade along a curved contour, and
h. mounting means for the clamping fixture,



i. said mounting means comprising a pair of end bearings and aligned shafts carried respectively by said bearings, and further including a pair of slides located near opposite ends of the fixture and pivot means connecting each slide to the fixture, for enabling simultaneous lateral adjustment of the fixture and tilting adjustment thereof with respect to the axis of the aligned shafts,
j. said pivot means thereby enabling independent movement of the slides without danger of binding thereof.

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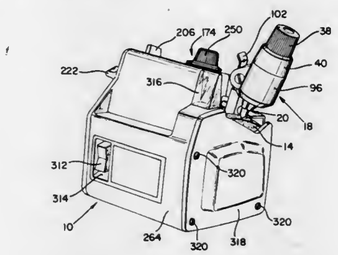
**4,016,684**
**SAFETY LEVER LOCK**
**Paul Urda, South Waverly, Pa., assignor to Ingersoll-Rand Company, Woodcliff Lake, N.J.**
**Filed Nov. 5, 1975, Ser. No. 629,051**
**Int. Cl.² B24B** *24/00*
**U.S. Cl. 51—170 R** **2 Claims**



1. An operating lever for hand tools and the like comprising:
an elongated lever member pivotally attached at one end to a tool handle for hand activating a power control means;
said tool handle being generally cylindrical in shape having an axial dimension greater than its diameter;
said elongated lever extending generally axially along said tool handle and having a shape generally conformable to said tool handle without substantial radial projection;
said tool handle having a diameter small enough to be held in one hand and said operating lever being able to be operated by the same hand;
a stop means pivotally disposed on said elongated lever member at its other end;
said stop means comprising a lever extending tab and a tool body contacting tab disposed radially about a pin means;
said lever extending portion and said tab body contacting portion being essentially coplaner; and
said stop means being positioned for ready deflection by the operator's thumb from a first position wherein said stop means is positioned substantially perpendicular to the axis of said elongated lever member and prevents said lever member from rotating, to a second position of said stop means substantially parallel to and coplanar with the axis of said lever means in which position said lever means may be rotated to engate said activating control means, whereby the operator may conveniently and comfortably hold and operate said tool without the danger of accidental tool operation.

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**4,016,685**
**SHARPENER FOR TWIST DRILLS EQUIPPED WITH A CHUCK AND DRILL BIT LOCATOR**
**Robert Gordon Moores, Jr., Cockeysville, and Richard Eugene Walton, II, Baltimore, both of Md., assignors to The Black and Decker Manufacturing Company, Towson, Md.**
**Division of Ser. No. 456,946, April 1, 1974, Pat. No. 3,930,342. This application Sept. 12, 1975, Ser. No. 612,913**
**Int. Cl.² B24B** *3/26*
**U.S. Cl. 51—219 R** **4 Claims**



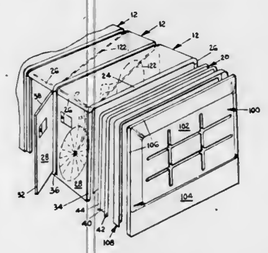
3. In a drill bit sharpener, the subcombination of chucking means adapted to retain a drill bit being sharpened, means for mounting the chucking means in juxtaposition to a grinding wheel, means for adjusting the mounting means transversely of the axis of rotation of the grinding wheel, and selfadjusting locating means carried by the chucking means and engaging the flute wall of the drill bit being sharpened for locating the drill bit at a predetermined disposition with respect to the grinding wheel irrespective of the diameter of said drill bit within a predetermined drill bit diameter range.

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**4,016,686**
**STORAGE ENCLOSURE FOR SMALL VEHICLES**
**Richard W. Hartger, Grand Rapids, and Richard W. Figgins, Orchard Lake, both of Mich., assignors to Richard W. Harger and Harold V. Hartger, both of Grand Rapids, Mich.**
**Filed Sept. 2, 1975, Ser. No. 609,558**
**Int. Cl.² E04H** *6/08*
**U.S. Cl. 52—65** **23 Claims**

1. Storage apparatus for small vehicles such as bicycles and motorcycles comprising at least one protective storage unit having generally opposite, lateral side edges, at least one roof member, a pair of generally opposite end members, and rigid channel means along at least one of said side edges of said storage unit for joining said roof and end members together and supporting said roof and end members in a protective structure over a supporting surface; said channel means including first wall means for joining said roof and end members to said channel means, second wall means for joining said storage unit to at least one of (1) another of said storage units, (2) a side closure, and (3) a wall or other generally upstanding surface, said first and second wall means defining a drainage channel therebetween which opens outwardly away from the interior of said unit for draining water off said unit; said roof and end members each including securing means on the other of said opposing side edges for joining said respective member to another of said channel means whereby said storage unit may be used individually or joined to other storage units in side-by-side fashion; hinge means for hingedly securing at least one of said end members to said channel means at one end of said storage unit for access to the interior of said unit; said channel means including a flange extending outwardly along the length thereof for securing said roof and end members thereto; said roof member extending the entire length of

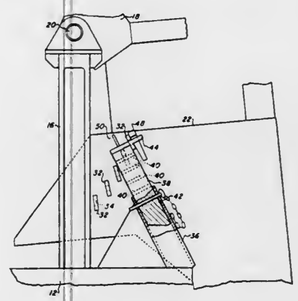




said storage unit between said end members and curving downwardly at either end immediately above said end members; said one hinged end member including an inwardly extending flange along either lateral edge and an end flange extending inwardly toward the interor of said unit at the upper end of said one end member; said hinge means secured between said channel flange and one of said side flanges of said one end member allowing said end member to be opened and closed; said channel flange including a slot receiving said upper end flange of said one end member when said one end member is closed.

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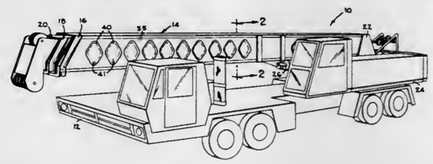
**4,016,687**
**ANGULAR ADJUSTMENT FOR DRILL RIG MAST**
**T. W. Griffith, Dallas, and Arthur T. Taylor, Carrollton, both of Tex., assignors to Gardner-Denver Company, Dallas, Tex.**
**Continuation of Ser. No. 527,120, Nov. 25, 1974, abandoned. This application Nov. 13, 1975, Ser. No. 631,771**
**Int. Cl.² E04H** *12/34*
**U.S. Cl. 52—116** **6 Claims**



1. In a drilling rig:
a frame;
an elongated mast mounted for pivotal movement on said frame from a transport position to a plurality of angular drilling positions between said transport position and a substantially vertical drilling position with respect to said frame;
actuating means connected to said mast for pivotally moving said mast from said transport position to one of said plurality of angular drilling positions; and,
a plurality of stop members disposed on and projecting from opposite lateral sides of said mast and adapted to be engaged by cooperative means disposed on said frame for automatically stopping said mast in a predetermined one of said plurality of angular drilling positions in response to movement of said mast from said transport position toward said vertical drilling position.

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**4,016,688**
**EXTENSIBLE CRANE BOOM STRUCTURE**
**Joseph B. Tiffin; Daniel G. Quinn, and Evart J. Vroonland, all of Cedar Rapids, Iowa, assignors to FMC Corporation, San Jose, Calif.**
**Filed May 27, 1975, Ser. No. 581,172**
**Int. Cl.² B66C** *23/04*
**U.S. Cl. 52—118** **4 Claims**



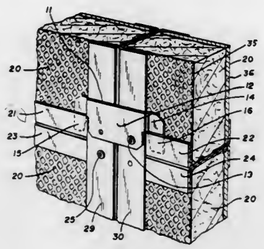
1. An extensible crane boom assembly having telescopically interfitting boom sections that include a base section, an intermediate section slidably fitted within the base section, and a top section slidably fitted within the intermediate section; each boom section having four elongated angle chords with normally disposed flanges that are positioned to define the longitudinal corner edges of a box-like configuration, and four elongated plates extending between adjacent angle chords and welded thereto to form the sides, top and bottom of the boom section; each of said elongated plates which form the side webs of the boom section being of uniform thickness and having a top edge, a bottom edge, a pair of side surfaces that are located in spaced apart parallel planes at the juctures of the side surfaces with said top and bottom edges, and a plurality of shaped portions being formed within the plates at locations intermediate the top and bottom edges to space those portions of the plate laterally from said parallel planes, said shaped portions being located at spaced intervals longitudinally of the plate, each shaped portion having a regular geometrical pattern that forms a laterally projecting protuberance on one side of the plate and a corresponding depression on the opposite side of the plate, said shaped portion geometrical pattern being a frustum of a pyramid with a generally diamond-shaped base thereby stiffening the plate between adjacent shaped portions and between these shaped portions and adjacent top and bottom edges of the plate to resist buckling, said plate between adjacent shaped portions having side surfaces within the parallel planes from the top edge to the bottom edge of the plate and providing longitudinal spacing between parallel diagonal lines that coincide with adjacent edges of adjacent shaped portions, each of said shaped portions having an interior panel that is offset from and parallel with the spaced apart parallel planes, some of said interior panels having central openings therein to reduce the weight of the plate.

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**4,016,689**
**SOUND ABSORBING PANEL SYSTEM AND METHOD FOR CONNECTING PANELS**
**Alan C. Wendt, Barrington, Ill., assignor to United States Gypsum Company, Chicago, Ill.**
**Filed Jan. 20, 1976, Ser. No. 650,589**
**Int. Cl.² E04B** *1/82*
**U.S. Cl. 52—145** **7 Claims**

1. A sound absorbing panel system comprising a plurality of juxtaposed, separate sound absorbing panels attached to-

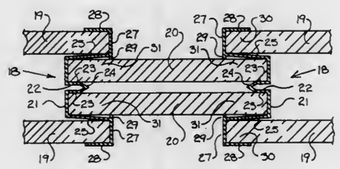
gether at their frame portions by clips; said sound absorbing panels comprising a sound absorbing material held by a frame extending around at least one vertical and at least one horizontal outer edge of the sound absorbing material, and said frame having at least one projecting lip portion; said clip comprising a front plate having opposing end sections, offset members extending backwardly from the opposing end sections, and opposing securing members extending downwardly from the back of the offset members; and, said panels being held together to form a single panel by said frame portions of adjacent panels being secured together by the front plate of said clip spanning the front or rear of the frame portions of adjacent panels and said opposing securing members extending one each inside the projecting lip portions of the frames of adjacent sound absorbing panels.



## 4,016,690
## STRUCTURAL MEMBERS FOR PANEL WALL AND GLAZING SYSTEMS

**Cletus Richardson, 3419A Winnebago, St. Louis, Mo. 63118**

**Filed Apr. 21, 1975, Ser. No. 570,248**
**Int. Cl.² E04H** *1/00*
**U.S. Cl. 52—238** **7 Claims**

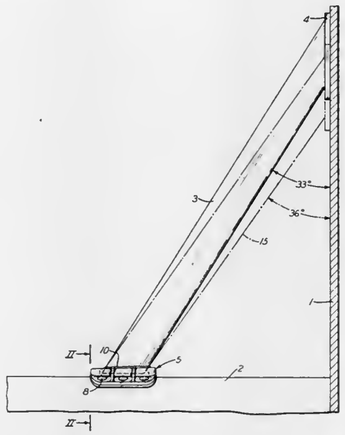


1. A structural member for supporting a plurality of panels in a panel wall lay up: each structural member comprising a body formed of substantially rigid material having uniform thickness and having a base wall formed with spaced apart side walls at the opposite margins, a rib on said base wall, said rib being of less length than said side walls and said rib and side walls projecting to the same side of said base wall and forming a pair of adjacent channels, said rib having an apex positioned for directing margins of a pair of wall panels into said channels, said rib holding the wall panels against said side walls in spaced relation; and means cooperating and being integral with each of said side walls for forming other channels for receiving the margins of additional wall panels, each said cooperating means being formed with a face wall engaged with said side wall and a flange spaced outwardly from a side wall and directed reversely thereto to form said other channels opening oppositely to the first mentioned channels, said side walls being angularly divergent as measured from said base wall so as to present to the margins of the wall panels a wedging surface on its opposite sides common to all of the channels, each of said flanges being of less dimension than said side walls to expose a portion of said side walls for directing the margins of a pair of wall panels into said other channels, each of said face walls engaged with said side walls being formed with a lip extending into the adjacent channel of said pair of adjacent panels to compensate for the angular divergence of said side walls and close the gap with an adjacent panel.

## 4,016,691
## REVERSIBLE FOOT FOR RAILWAY HOPPER CAR INCLINED BRACES

**Roland E. Cale, Cortland, Ohio, assignor to Schaefer Equipment Company, Warren, Ohio**

**Filed Apr. 23, 1975, Ser. No. 570,758**
**Int. Cl.² B61D** *7/00, 5/00, 17/00;* **E02D** *27/50;* **105** *247;248;249;250;251;252;253;399;406;407;411;420;404;4-09;410*
**U.S. Cl. 52—298** **3 Claims**



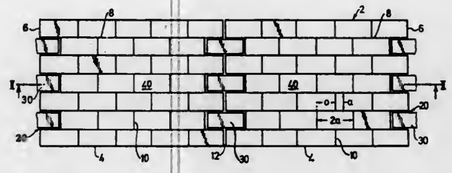
1. A reversible foot for connecting to a railway hopper car crossridge the lower end of an inclined brace, said foot being a metal forging arched transversely to fit over a crossridge and having holes in its opposite sides for fasteners to hold it in place, the foot having a central vertical opening therein extending lengthwise of the foot for receiving the lower end of an inclined brace, said opening having spaced inclined end walls converging upwardly at two different predetermined angles for location beside the opposite inclined surfaces of the lower end of a brace in said opening inclined at one of said angles, with an end wall of said opening disposed substantially parallel to the upper inclined surface of the lower end of the brace, the inclination of the other of said end walls being such that if the shoe is turned end for end to receive a different brace inclined at the other of said predetermined angles said other end wall will lie substantially parallel to the upper inclined surface of the lower end of said different inclined brace, and the foot being adapted to be welded to the lower end of whichever inclined brace is disposed in said opening.



## 4,016,692
## COMPOSITE PAVING STRUCTURES AND LAYING UNITS THEREFOR

**Reinhard Jordan, Baden-Baden, and Fritz von Langsdorff, Stuttgart, both of Germany, assignors to F. von Langsdorff Bauverfahren GmbH, Rastaat, Germany**

**Continuation of Ser. No. 407,253, Oct. 17, 1973, abandoned. This application Apr. 25, 1975, Ser. No. 571,520**
**Claims priority, application Germany, Oct. 20, 1972, 2251621; Dec. 5, 1972, 2259493; July 25, 1973, 2337816**
**Int. Cl.² E04C** *1/10*
**U.S. Cl. 52—314** **41 Claims**

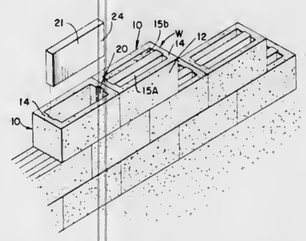


1. A composite paving structure for traffic areas or other graded or inclined ground surfaces, comprising an assembly of juxtaposed laying units and linking stones, each said laying unit being a relatively large unitary slab transportable as a unit by being gripped mechanically at opposite lateral sides thereof, said slab having preformed therein elongate rupture zones subdividing it into adjoined stones and along which after being laid it is breakable under stress into laterally interengaged individual stones, each said laying unit having in at least one lateral side thereof at least one recess extending its full height and substantially corresponding in facial shape and size to one said individual stone or a fraction or multiple thereof, each said unit being laid with at least one lateral side thereof lying at and along, and having therein at least one said recess each of which confronts a said recess in, a lateral side of at least one other said unit, each set of said confronting recesses being filled by at least one said linking stone inserted thereinto and which interconnects the respective juxtaposed laying units by extending across the gap between them, each said linking stone having the same height as the laying unit and having substantially the facial shape and size of one said individual stone or of a fraction or multiple thereof.

## 4,016,693
## INSULATED MASONRY BLOCK

**Millard R. Warren, Knoxville, Tenn., assignor to Warren Insulated Bloc, Inc., Knoxville, Tenn.**

**Filed Aug. 22, 1975, Ser. No. 606,934**
**Int. Cl.² E04B** *2/00, 5/04*
**U.S. Cl. 52—405** **5 Claims**

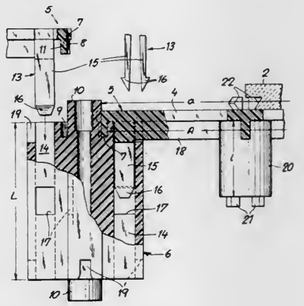


1. A masonry block comprising:
a pair of spaced opposed side walls forming only a single cavity therebetween, said cavity being open at its top and bottom ends;
said side walls defining the outer side periphery portions of said block, and having mutually facing inner surfaces;
at least two opposed web walls extending between said side walls;
said web walls being integral with said side walls and having inner surfaces extending between the inner surfaces of said side walls;
said web walls including channel-forming means situated intermediate the ends of said inner web surfaces for forming channels extending in a top-to-bottom, said channels being mutually convergent in a downward direction;
insulative plate means of thermally insulative, compressible material disposed in said cavity with the ends thereof being mounted in said channels;
said plate means having an uncompressed, end-to-end dimension which is longer than the distance between the lower ends of said convergent channels, so that with said plate means being disposed in said channels the ends of said plate means are compressed to snugly frictionally engage said channels;
said insulative plate means being situated intermediate said side walls to divide said cavity into a pair of air cells separating said insulative plate means from said side walls, said air cells each being open at their open at their top and bottom ends.

## 4,016,694
## SNAP-CONNECTABLE LATTICE ASSEMBLY FOR ELECTRICAL-CIRCUIT TILES

**Helmut Mauell, Ansembourgallee 23, 562 Velbert, Germany**

**Filed June 12, 1975, Ser. No. 586,413**
**Claims priority, application Germany, June 12, 1974, 2428291**
**Int. Cl.² H02B** *15/04*
**U.S. Cl. 52—475** **16 Claims**



1. A lattice assembly comprising:
a plurality of generally planar rigid cellforming lattice elements each having a connection portion formed with an outwardly directed support surface and with a tab projecting laterally from the plane of the respective element, connection portions of adjacent lattice elements meeting at corners of the cells;
a plurality of anchors each at a respective corner and each formed with a plurality of recesses each shaped to snugly receive a respective tab and with an upstanding abutment body adapted to snugly engage a respective support surface on engagement of the respective tab in the respective recess;
means for securing each of said portins to a respective anchor with the respective surface snugly engaging the respective abutment body and the respective tab snugly received in the respective recess, said means including resiliently deflectable barbed projections on each of said lattice elements and respective sockets in each of said anchors releasably receiving a respective barbed projection; and

a plurality of mosaic tiles of polygonal outline secured to said elements and anchors and each covering a respective cell.

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**4,016,695**

## STRUCTURAL ASSEMBLIES

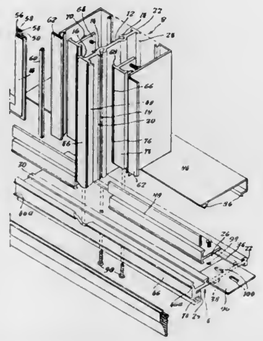
**Richard Lewis Stoakes, "Clouds", Northdown Road, Woldingham, Surry, England**

**Continuation of Ser. No. 529,054, Dec. 3, 1974, abandoned. This application May 5, 1976, Ser. No. 683,251**

**Claims priority, application United Kingdom, Dec. 5, 1973, 56288/73**

**Int. Cl.² E04B** *5/52*; **F16B** *1/00*

**U.S. Cl. 52—476** **6 Claims**



1. A curtain wall structure comprising, in combination, a series of rigid elongate members attached together in the form of a frame structure, at least two contiguous spaces being provided by the elongate members in the structure to receive infill elements, and sealing means for the peripheries of said infill elements at the boundaries of said spaces, said sealing means comprising a flexible sealing gasket for each said space in the form of a closed loop of a strip-like material, locating elements in a forward region of said frame structure at the periphery of the associated space engaging said gasket, said locating elements at least at a common boundary between each contiguous pair of said spaces comprising a central portion extending along said common boundary and forward portions projecting laterally oppositely away from said central portion, front faces of said forward portions being spaced apart and a recess being provided between said front faces, each forward portion having a respective flexible sealing gasket mounted on it, a forward element of said sealing gasket covering said front face of its forward portion and an inner marginal element of said sealing gasket extending into said recess, the opposed inner marginal elements of the gaskets of said contiguous pair of spaces being compressed against each other in said recess and opposed sides of the recess providing locking engagement faces that the gasket inner portions are urged against by the force of their mutual compression for locking the gaskets in place on said frame structure elements, further resilient sealing means being provided at the rear of the infill elements between said elements and the frame structure.

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**4,016,696**

## TIE ROD HOLE PLUG IN COMBINATION WITH A WALL HOLE

**Richard C. Mess, Washington Township, Montgomery County, Ohio, and Dusan Tausanovitch, Northport, N.Y., assignors to The Dayton Sure-Grip & Shore Co., Miamisburg, Ohio**

**Filed Apr. 4, 1975, Ser. No. 565,000**

**Int. Cl.² E04F** *19/00*; **E04G** *23/02*

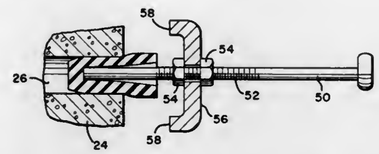
**U.S. Cl. 52—514** **6 Claims**

1. In combination with a wall having a hole formed therein as the result of the removal of a tie rod therefrom, an improved tie rod hole plug received in said hole comprising:

a. a main body section having prior to insertion into said hole an outside dimension in a plane perpendicular to the longitudinal axis of said plug greater than the correspondng inside dimension of said hole whereby said body portion exerts a radially outward sealing force against the surface defining said hole which increases in response to forces tending to push said plug outwardly from said hole,

b. said plug gripping said surface of said hole solely by reason of said radial expansion of said plug after insertion thereof into said hole,

c. a nose section formed integrally with said main body section and having an outside dimension adjacent a leading end thereof in a plane perpendicular to said longitudinal axis of said plug less than said inside dimension of said hole,



d. said nose section tapering from said leading end thereof to said main body section,

e. said leading end of said tapered nose section being substantially flat,

f. the outer surface of said main body and nose sections being substantially smooth and free of grooves and ribs,

g. means defining a tool-receiving socket extending axially of said plug within said main body section thereof and being closed at said leading end of said nose section, and

h. said tool-receiving socket being substantially void of plug-expending means.

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**4,016,697**

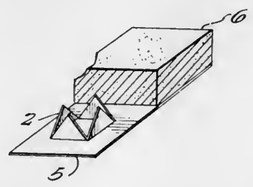
## CONSTRUCTION UNIT

**Richard Ericson, Park Ridge, Ill., assignor to United States Gypsum Company, Chicago, Ill.**

**Continuation of Ser. No. 864,625, Oct. 8, 1969, abandoned. This application Jan. 27, 1975, Ser. No. 544,638**

**Int. Cl.² E04C** *2/00*; **E04B** *1/16*

**U.S. Cl. 52—622** **9 Claims**



1. A load-bearing structural unit comprising a hardened cementitious body portion of high compressional strength and a substantially continuous sheetlike tensile member integral with and contiguous to said body portion extending substantially over the entire area of said body portion and disposed at a substantial distance beyond a substantially centrally located plane of said unit and a structural stress resistant bonding joint between said tensile member and said body portion, said bonding joint comprising a plurality of closely spaced portions of said tensile member embedded and extended into said body portion in the direction of said substantially centrally located plane, said portions of said tensile member embedded into said body portion comprising prongs integral with and at substantially right angles to said sheetlike tensile member and extending from the periphery of holes in said tensile member and the total area of said prongs is at least about 2% of the total area of said tensile member, substantially each of said holes are positioned in a row, along with other holes, parallel to the length of said unit and in another row at right angles to said length, all rows are positioned in a right angularly disposed reticulated cross hatch relationship, whereby the holes at the intersection of any pair of adjacent and parallel rows of holes lengthwise and crosswise of said tensile member are in a boxlike configuration, and continuous strips of nonperforated portions of said sheetlike tensile member extending between the said rows of said holes parallel and at right angles to said length.



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**4,016,698**

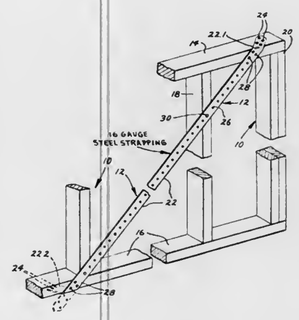
## BRACING FOR STUD WALLS

**Delmar R. Rogers, Shakopee, Minn., assignor to United Steel Products Co., Montgomery, Minn.**

**Continuation-in-part of Ser. No. 447,296, March 1, 1974, abandoned. This application June 30, 1975, Ser. No. 591,875**

**Int. Cl.² E04C** *2/38*, *3/18*

**U.S. Cl. 52—656** **3 Claims**




1. In combination, a wooden stud wall for a building and the like and a diagonal brace for tensile loading for the wall to prevent the wall from sagging under a racking load, the stud wall having horizontally extending and vertically spaced top and sole plates between which are fastened spaced and upright studs, the wall having end studs between the terminal ends of the top and sole plates, the brace comprising an elongate and flat metal strap with a plurality of preformed holes spaced from each other along the length thereof, the metal strap extending continuously from the top plate to the sole plate and extending diagonally across the studs and the top and sole plates on one side of the stud wall and being nailed to each of the studs crossed and to the sides of the top and sole plates, the ends of the metal strap being bent over into flush engagement with the upper and lower surfaces of the top and sole plates and extending obliquely across such plate surfaces, the upper end of the metal strap being bent around the corner between the side and top surface of the top plate at a location closely adjacent the terminal end of the top plate, and the upper end of the strap lying on the top plate in superposed relation to the upper end of the end stud of the stud wall, and the upper and lower ends of the metal strap being secured flush against the plates by nails driven vertically through the preformed holes and solidly into the plates.

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**4,016,699**

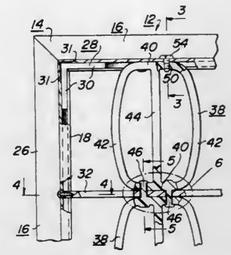
## DECORATIVE GRILLE STRUCTURE

**Arnold Hurvitz, 327 Rosemary Lane, Narbeth, Pa. 19072**

**Filed Aug. 27, 1975, Ser. No. 608,075**

**Int. Cl.² E06B** *7/08*

**U.S. Cl. 52—663** **2 Claims**



1. A decorative grille structure comprising, a frame having four side members connected together at their ends in the form of a rectangle, each of said side members having an identical substantially C-shaped channel section, the channel section of each of the side members includes a base, legs extending from the base, and feet extending toward each other from the ends of the legs with the ends of the feet being spaced apart, and a plurality of L-shaped corner connectors each having a pair of legs, the side members being connected together by the L-shaped corner connectors with each leg at each corner connector fitting tightly within the channel section at the end of a side member, a plurality of spaced, parallel rods extending between and secured to two opposed parallel side members, each of the rods having an end portion extending into the channel section of the two opposed side members between the feet of the channel section, and a screw extending through a hole in the base of each channel section and threaded into a hole in the respective end portion of the rod to secure the rod to the side member, and a plurality of decorative grille elements mounted in rows between adjacent rods and between each of the other two parallel side members and an adjacent rod, each of said grille elements having top and bottom ends including attachment means comprising a pin integral with and projecting from the grille element and a hole in the grille element spaced from the pin, each of the grille elements which extend to a rod being connected therewith by having the pin of its attachment means extend through the rod to the hole of the attachment means of a grille element on the other side of the rod and each of the grille elements which extends to one of the other side members has an end extending into and being secured to the channel section of the side member between the feet of the channel section with the pin of its attachment means removed, and a screw extending through the base of the channel section and being threaded into the hole of the attachment means of the grille element to secure the grille element to the side member.

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**4,016,700**

## STRUCTURAL SHEET METAL BAR MEMBER FOR USE IN HEAT INSULATING BUILDING PARTS

**Hans Carl Magnus Blomstedt, Stockholm, Sweden, assignor to Interoc Fasad Aktiebolag, Koping, Sweden**

**Filed Oct. 9, 1975, Ser. No. 621,059**

**Claims priority, application Sweden, Oct. 16, 1974, 7413045**

**Int. Cl.² E04C** *3/09*

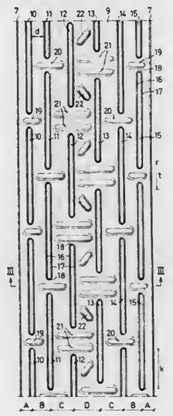
**U.S. Cl. 52—735** **7 Claims**

1. A sheet metal bar member for use as a distancekeeping, stiffening and load-supporting structural framing element in heat insulating building parts of the general class comprising two panels held together in spaced relationship by a framing and having the interspace between them at least partially filled with a heat insulating material,

said bar member comprising a pair of flange portions paralleling and serving as attachments for said panels and an integral web between said flange portions, the plane of said web being substantially at right angles to the planes of the panels,

said web portion being perforated by open slits extending in the longitudinal direction of said bar member,

said slits being arranged in at least four laterally spaced longitudinal rows, the distance between adjacent ends of said slits in each said slit row being at most one half of the slit length, and said slits in adjacent rows being staggered and overlapping each other with a part of their length corresponding to at least the distance between the most adjacent edges of the slits in the two slit rows in question, wherein each of said slits is bordered at least along both its longitudinal sides by edge portions bent out approximately at right angle from the plane of the web portion



and projecting to a height over the surrounding web surface corresponding to several times the sheet metal thickness, wherein first elongate through-like embossments are pressed out of the plane of the web portion to extend transversely between adjacent slit ends in each slit row, said first embossments being doubled between the slit ends in in at least some of the slit rows and each having a sufficient length in the direction of width of the web portion to extend almost up to the adjacent slit row on either side of the slit row in question, and wherein second elongate trough-like embossments are pressed out of the plane of the web portion to extend at a slightly oblique angle to the longitudinal direction of the bar member between at least two of the slit rows of the web portion, whereby said web portion is stiffened with reduced thickness of the sheet metal needed for forming the bar member and heat transfer across said web between said flange is reduced.

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**4,016,701**

**CONTROLLED EXPANSION SUSPENDED CEILING GRID MEMBER**

**John O. Beynon, Waterloo, Canada, assignor to Ceiling and Drywall Products Limited, Waterloo, Canada**

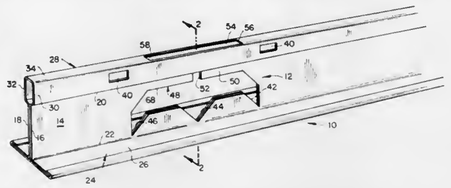
**Filed Nov. 24, 1975, Ser. No. 634,643**

**Claims priority, application Canada, Nov. 18, 1975, 239918**

**Int. Cl.² E04C** *3/30*; **E04B** *1/68*

**U.S. Cl. 52—735** **23 Claims**

**1.** A controlled expansion suspended ceiling grid beam for a suspended panel ceiling comprising a web having spaced-apart marginal edges, a flange having a panel supporting surface provided along one of said marginal edges, a bead being provided along the other of said marginal edges, said bead having substantially planar spaced-apart sidewalls which are continuous at least along the upper and lower bead portions and an interconnecting substantially planar top wall, said bead sidewalls being unconnected at the bead's base and an expansion accommodating portion for accommodating thermal expansion at a predetermined location in said beam comprising three substantially evenly spaced-apart notches cut in the web having lower and upper ends, said lower end of each notch being in the form of an apex and located at least near to the plane defined by the panel supporting surface of the flange, the web above said notches being severed in a manner to provide a web severance bridging the upper ends of said notches which leaves a first strip of the web extending along the bead's base, the bead's top wall having slot means cut



therein, said slot means being substantially centrally located over the middle notch of said three notches with said slot means extending to adjacent points above the notches on each side of the middle notch, said three notches permitting said flange to bend in the area of each said notch apex whereby said flange folds downwardly away from said bead to accommodate thermal expansion in said beam, said slot means essentially freeing the bead's sidewalls as they lie in their respective planes from transverse connection over the slot means' length to adapt said side walls to buckle laterally out of their respective planes as said flange is folded, said slot means adapting said bead to collapse and maintain its longitudinal alignment without offsetting the longitudinal alignment of said flange apart from the downwardly folding flange portion.

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**4,016,702**

**METHOD FOR MANUFACTURING A HEAT-INSULATING CLOSED STRUCTURE**

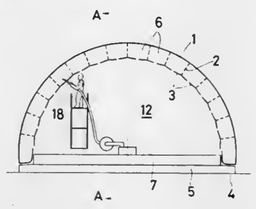
**Hiroshi Nakada, and Yukio Kosuge, both of Tokyo, Japan, assignors to Showa Denko Kabushiki Kaisha, Tokyo, Japan**

**Filed Oct. 24, 1975, Ser. No. 625,379**

**Claims priority, application Japan, Oct. 29, 1974, 49-123884; Aug. 13, 1975, 50-97481**

**Int. Cl.² E04B** *1/00*

**U.S. Cl. 52—743** **4 Claims**



**1.** A method for the manufacture of a heat-insulating closed structure, which comprises the steps of:

forming a composite membrane having an inner membrane, which is formed of a gas-impervious and transparent substance having small holes at appropriate intervals thereof, disposed a distance from the inside of an outer membrane, which is formed of a gas impervious substance, through the medium of spacers;

fastening said composite membrane to a heat-insulating floor member in an edge-to-edge manner;

applying pressure to the space enclosed by said composite membrane and said heat-insulating floor member for



thereby inflating the composite membrane and allowing it to stand up on its own;

injecting a foaming dope into the cavity defined between the inner membrane and the outer membrane from the interior of said structure and through said small holes of said inner membrane; and allowing the foaming dope to foam and set, whereby the use of said transparent inner membrane facilitates the monitoring of said injection of said dope from the interior of said structure.

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**4,016,703**

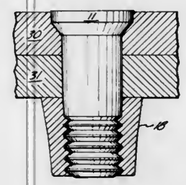
**COMBINATION OF A WEDGE HEAD PIN FASTENER AND OVERLAPPED WORK PIECES**

**Louis A. Champoux, Seattle; Joseph G. Falcioni, Tacoma, both of Wash., and Morton Mendels, Torrance, Calif., assignors to The Boeing Company, Seattle, Wash.**

**Division of Ser. No. 400,334, Sept. 24, 1973, abandoned. This application Apr. 10, 1975, Ser. No. 566,905**

**Int. Cl.² F16B** *35/06*, *5/00*

**U.S. Cl. 403—404** **17 Claims**



**1.** A combination, comprising: a plurality of overlapped work members having an opening extending therethrough, a portion of said opening being a countersink, said countersink having first and second countersink sections, said first countersink section being positioned axially inwardly from said second countersink section and having a greater angle with respects to the axis of said opening than said second countersink section and said second countersink section having a taper angle of from 5° to 35°;

a fastening pin which comprises: a head having first and second tapered sections for engagement with said first and second countersink sections respectively, said first tapered section having a substantially larger taper angle than said second tapered section, said first tapered section having a taper angle sufficiently large to substantially prevent pull-through of said pin fastener in said opening upon engagement of said first tapered section with said first countersink section, said second tapered section having a taper angle of from 5° to 35°, said pin and said opening being sized such that an interference fit of from 0.002 to 0.008 inches results between at least a portion of said second tapered section and said second countersink section when said fastening pin is operatively positioned in said opening; and

a shank depending from said head and receivable in said opening.

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**4,016,704**

**METHOD AND APPARATUS FOR ENCAPSULATING CONTAINER WITH TUBULAR WRAPPING MEMBER**

**Masaaki Fujio, 8, 3-15 Aoyamadai, Suita, Osaka, Japan**

**Filed July 2, 1975, Ser. No. 592,528**

**Int. Cl.² B65B** *9/00*, *53/00*, *61/00*

**U.S. Cl. 53—3** **10 Claims**

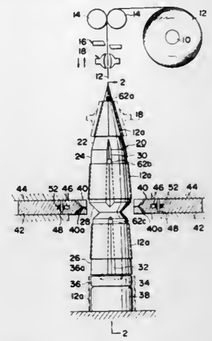
**1.** A method of encapsulating a container with a tubular wrapping member comprising the steps of:

a. concentrically aligning an elongate guide member with a container to be encapsulated to position one end of the guide member proximate to the container;

b. feeding a substantially continuous tubular wrapping member towards the guide member;

c. cutting the tubular wrapping member into substantially equal portions having predetermined lengths;

d. placing said wrapping member portions successively onto the other end of said guide member; and



e. advancing said wrapping member portions along said guide member towards said one end by engaging the trailing edges of said wrapping member portions and pushing the same until said wrapping member portions are transferred onto successive containers which have been brought into alignment with said guide member.

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**4,016,705**

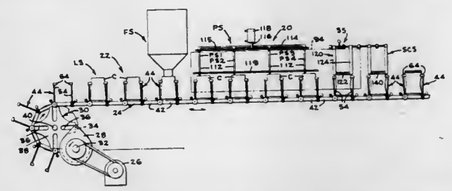
**METHOD AND APPARATUS FOR PURGING AIR FROM CONTAINERS**

**Donald C. Wilson; Samuel A. Mencacci, both of San Jose, and Jurgen H. Strasser, Mountain View, all of Calif., assignors to FMC Corporation, San Jose, Calif.**

**Filed Nov. 1, 1974, Ser. No. 520,085**

**Int. Cl.² B65B** *31/02*

**U.S. Cl. 53—11** **16 Claims**



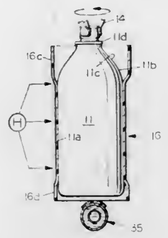
**15.** A method of purging air from an open ended container, the method comprising the steps of maintaining an open bottomed steam tunnel with the steam flowing downward out of said tunnel through the bottom thereof at a velocity of at least 0.5 feet per second, moving the open ended container in a path through the steam in a direction transverse of the flow direction of the steam, baffling the area spaced above but adjacent to the open end of the container to cause the steam-air mixture to flow transversely outwardly from the container, and directing the low velocity steam downwardly for entraining the steam-air mixture to draw the mixture away from the open end of the container and out of the bottom of the tunnel.

**4,016,706**

## METHOD OF CONTROLLING SHRINKAGE OF A SLEEVE WRAP ON A CONTAINER

**Frederick William Braker, Toledo; Russell William Heckman, Perrysburg; George Allen Nickey, Toledo, and Terry Clair Potter, Sylvania, all of Ohio, assignors to Owens-Illinois, Inc., Toledo, Ohio**

**Filed Mar. 31, 1976, Ser. No. 672,229**
**Int. Cl.² B65B** *53/06, 21/24, 21/26*
**U.S. Cl. 53—14** **18 Claims**



1. The method of shrinking a heat shrinkable plastic sleeve form onto a container, said container having a major diameter body portion and one or more substantially smaller portions of minor diameter including a finish portion defining a mouth opening to the container, comprising the steps of

providing containers in upright position at a loading station,

grasping the containers by their upper finish portions at the loading station by a chuck device carried on a conveyor,

moving the conveyor past a source of sleeves slightly larger in size than the major diameter of the container and made of a polyolefin plastic material that is pre-oriented circumferentially at least for 30% or greater shrinkage upon heating,

assembling a sleeve of said material axially over the container, the sleeve being of a height dimension so as to extend from adjacent the finish portion of the container to adjacent the other end thereof,

conveying the container and sleeve in an oven maintained at elevated temperature sufficient to shrink said material of the sleeve onto the container,

rotating the container and sleeve about their central axis while in the oven at a rate of rotation that is sufficient to generate a centrifugal force component on the sleeve so as to maintain the plastic of the sleeve overlying said minor diameter portions of the container erect and billowed out for a time while the portion of said sleeve adjacent the major diameter portion of the container is shrunken thereon, and

thereafter shrinking the balance of the sleeve onto the adjacent minor diameter portions of the rotating container so as to wrap the container below the finish portion thereof with a snug fitting conforming covering of the plastic on the exterior of the container.

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**4,016,707**

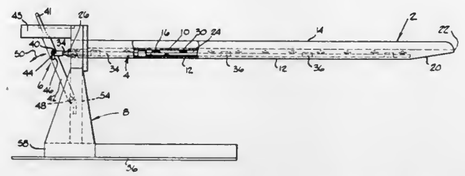
## METHOD OF VACUUM PACKAGING COMPRESSIBLE MATERIALS AND APPARATUS

**John Edward Puchosic, McPherson, Kans., assignor to Johns-Manville Corporation, Denver, Colo.**

**Filed Mar. 3, 1976, Ser. No. 663,373**
**Int. Cl.² B65B** *1/26, 63/02*
**U.S. Cl. 53—24** **14 Claims**

1. In method of packaging a compressible material having a generally cylindrical configuration wherein said compressible material is placed inside a tubular container made from a flexible fluid impervious material, a partial vacuum is created inside said container by withdrawing air from the container to compress the compressible material inside the container, and a restraining sleeve is applied around said compressed container to maintain the compressible material in a compressed state when said partial vacuum is lost, the improvement comprising:

closing any open ends of said container after said compressible material has been placed therein, creating a seal around a portion of the exterior of said flexible container,



making one or more perforations in the flexible fluid impervious material within said sealed area and withdrawing air from inside the container through said perforations until said compressible material has been compressed to a diameter less than the size of said retaining sleeve, and there after applying said restraining sleeve.

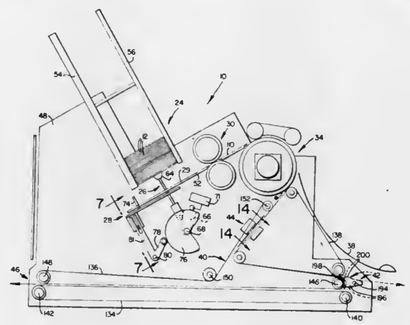
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**4,016,708**

## ENVELOPE PROCESSING MACHINE

**John R. DeHart, Coral Gables, Fla., assignor to Docutronix, Inc., Homestead, Fla.**

**Continuation-in-part of Ser. No. 496,977, Aug. 13, 1974, abandoned. This application Aug. 13, 1975, Ser. No. 604,249**
**Int. Cl.² B65B** *43/30*
**U.S. Cl. 53—381 R** **41 Claims**



1. A machine for processing an envelope including two panels having connected edges comprising means for advancing the envelope along a generally predetermined path, and cutter assembly for engaging the advancing envelope and severing only one of the panels inwardly of at least one associated connected edge thereof and along a line of severance generally parallel to the one associated connected edge, said cutter assembly including at least one rotary cutting unit, said cutting unit having a cutter wheel supported for rotation about an axis extending transversely of said path and an anvil wheel supported for rotation about an axis parallel to the axis of said cutter wheel and having an annular groove in its peripheral surface receiving an associated peripheral edge portion of said cutter wheel therein, said groove having a cross sectional configuration substantially complementing the cross sectional configuration of said associated peripheral edge as viewed in a radial plane, said peripheral edge portion and said groove defining a nip therebetween, and means for maintaining said associated peripheral portion in spaced relation to said anvil wheel within said groove.

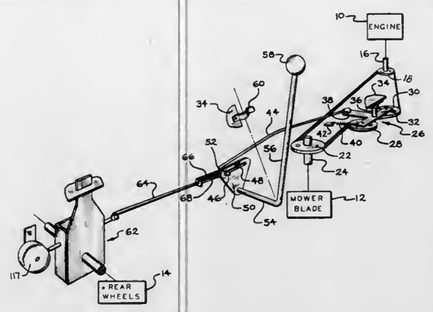


**4,016,709**

## SAFETY SYSTEM FOR LAWN MOWERS

**Hans Hauser, Fredericktown, and Devin R. Cline, Mount Vernon, both of Ohio, assignors to The J. B. Foote Foundry Co., Fredericktown, Ohio**

**Filed June 23, 1975, Ser. No. 589,192**
**Int. Cl.² A01D** *35/26*
**U.S. Cl. 56—10.2** **16 Claims**




1. In combination, a lawn mower having a wheel for supporting the mower above the ground, a rotatable blade, and means for driving said blade, a first toothed member rotatable with said wheel, and means associated with said toothed member for disconnecting said drive means from said blade when said toothed member rotates in one direction.

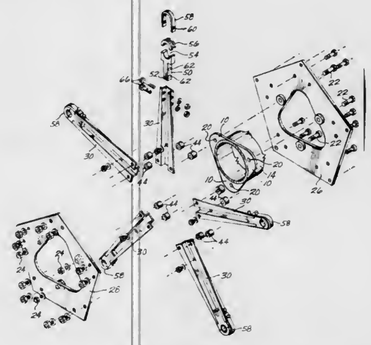
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**4,016,710**

## BAT SUPPORT SPIDER FOR A HARVESTER REEL

**Donald L. May, and Archie E. Neal, both of Garfield, Wash., assignors to J. E. Love Company, Garfield, Wash.**

**Filed May 12, 1976, Ser. No. 685,717**
**Int. Cl.² A01D** *57/02*
**U.S. Cl. 56—220** **4 Claims**



1. A bat support spider for a harvester reel of a type comprising an elongated thin walled center tube of substantial diameter having good resistance to bending and mounting means for the bat support spider comprising a plurality of radial mounting lobes spaced apart circumferentially about the tube, to which the bat support spider is attached, said bat support spider comprising:

a hub assembly comprising first and second hub plate members together forming a plurality of corner portions, said hub plate members extending radially of the center tube and being spaced apart axially when in use:

a plurality of radial bat support arms equal in number to said corner portions, each said bat support arm having a base portion of channel form in cross section comprising a pair of radial gussets in coplanar parallelism, a radial web spaced axially from said gussets, and a pair of generally axially extending flanges interconnected between the web and the gussets, with the base portion of each said bat support arm being located between the first and second plates at a related corner portion, and said first hub plate member being contiguous the web of the arm and the second hub plate member being contiguous the gussets of said arm; and

fastener means for connecting said arms to said first and second hub plate members, comprising bolt fastener means extending through the web of each arm and the first hub plate member at the related corner portion, and additional bolt means extending through both hub plate members and the arm gussets at locations radially inwardly of the first bolt means, and tubular spacer means for each said additional bolt means, positioned to substantially fill the axial space between the first hub plate member and the gussets, through which the second bolt means extends.

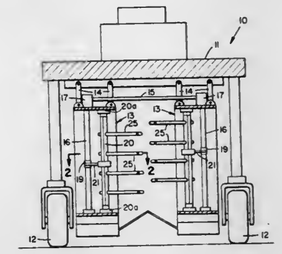
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**4,016,711**

## VINE-FRUIT HARVESTING MACHINE WITH INCLINED-TIP STRIKER RODS

**Gerald L. Claxton, Fresno, Calif., assignor to Up-Right, Inc., Berkeley, Calif.**

**Filed June 9, 1975, Ser. No. 585,103**
**Int. Cl.² A01D** *46/00*
**U.S. Cl. 56—330** **10 Claims**



1. In a grape-harvesting machine having a frame adapted to straddle and move along a row of grapevines, a vertical striker rod support shaft carried by said frame at one side of the longitudinal centerline of said machine, an elongated striker rod mounted at one end thereof to said shaft for oscillation of said rod about said one end upon oscillation of said shaft about its vertical axis, said striker rod extending generally horizontally from said shaft and extending rearwardly of said machine and inwardly towards the longitudinal centerline of said machine and having an elongated tip portion at the end opposite from said one end thereof, means for oscillating said shaft at a predetermined rate about its vertical axis and through a limited horizontal arc to move said tip portion to said longitudinal centerline of said machine and away therefrom during each cycle of oscillation of said shaft, and means for moving said machine forwardly at a uniform speed such that said machine moves forwardly a predetermined distance during each full cycle of oscillation of said shaft, the improvement comprising:

means preventing rotation of said rod about its longitudinal axis,

said rod being normally straight throughout the major portion of its length and said straight portion thereof being made of resilient material,

said elongated tip portion of said rod extending from said major portion thereof, said tip portion being generally horizontal and being inclined to said major portion at a horizontal angle on the side of said rod towards the longitudinal centerline of said machine equal to approximately 180° plus the angle between said longitudinal centerline and said straight portion of said rod when said tip portion

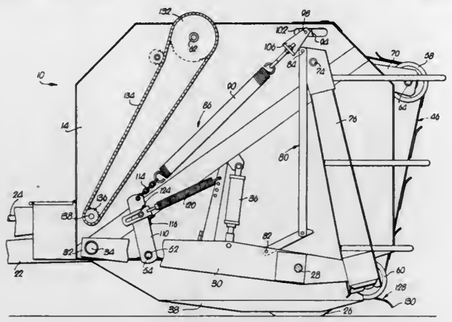
is at said longitudinal centerline, said tip portion having a length substantially equal to said predetermined distance that said machine moves forwardly during a full cycle of oscillation of said striker rod support shaft.

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**4,016,712**
**MACHINE FOR FORMING HIGH DENSITY ROUND BALES**

**Melvin Victor Gaeddert, Newton, and Bobby Dwayne McWhirt, Hesston, both of Kans., assignors to Hesston Corporation, Hesston, Kans.**

**Filed Feb. 25, 1976, Ser. No. 661,158**
**Int. Cl.² A01D** *39/00*
**U.S. Cl. 56—341** **13 Claims**



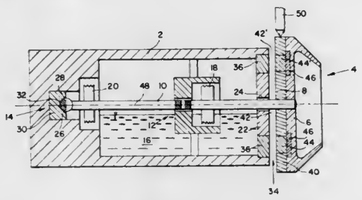
1. In a round bale forming machine:
a pair of opposed bale-engaging members cooperating to at least partially define a chamber in which a bale is formed by rolling a progressively increasing supply of crop material between said members;
means mounting said members for movement away from one another as the bale grows in size within said chamber to expand the latter for accomodating such growth; and
mechanism common to both of said members for rendering the latter equally yieldably resistant to said movement and each responsive to force changes in the other.

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**4,016,713**
**DRIVE FOR HIGH-SPEED AXLES OR SHAFTS OF SPINDLES**

**Alfred Läuger, Immenstaad, and Jochen Schrade, Markdorf, both of Germany, assignors to Dornier System GmbH, Germany**

**Filed July 2, 1975, Ser. No. 592,399**
**Claims priority, application Germany, Aug. 23, 1974, 2440455**
**Int. Cl.² D01H** *1/12*; **F16C** *19/30*
**U.S. Cl. 57—100** **2 Claims**



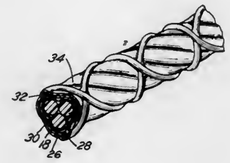
1. In a drive for a high-speed axle or shaft of a spindle including a spinning can having a radially-extending wall mounted at one end of a rotatable shaft, a parallel housing wall positioned opposite said can with a gap between them, and a spiral groove cap-type bearing in said housing and in which the other end of said shaft is mounted,
the improvement comprising direct-current drive motor means with electronic commutation, said motor having a stator ring with segment winding mounted in said wall of said housing,
permanent magnet means in said radially-extending wall of said spinning can, said magnet means being magnetized in the direction of the longitudinal shaft axis,
and disc means connecting said magnets, whereby the magnetic field is closed and the magnetic field pressure flow may be transmitted.

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**4,016,714**
**STRING CONSTRUCTION**

**Julian Titsworth Crandall, Ashaway, and Steven Julian Crandall, Quonochontaug, both of R.I., assignors to Ashaway Line & Twine Mfg. Co., Ashaway, R.I.**

**Filed May 21, 1975, Ser. No. 579,612**
**Int. Cl.² D02G** *3/36*, *3/38*, *3/44*
**U.S. Cl. 57—149** **9 Claims**



1. A string construction comprising as it essential ingredients a thermoplastic core, a first coating on said core consisting of a cured cationic lubricating agent, and a second coating comprising a thermoplastic resin surrounding and bonded to said first coating.

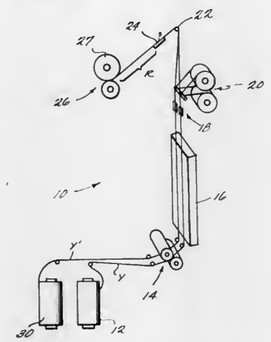
6. In the string of claim 1, an armor sheath of thermoplastic surrounding said second coating, and a further coating of said thermoplastic resin surrounding said armor sheath and integrated with said sheath and said second coating.

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**4,016,715**
**HIGH STRETCH YARN TEXTURING, DYEING AND PACKAGE PRODUCTION**

**Joe F. London, Jr., Greensboro, N.C., assignor to Burlington Industries, Inc., Greensboro, N.C.**

**Filed Oct. 14, 1975, Ser. No. 622,118**
**Int. Cl.² D02G** *1/20*
**U.S. Cl. 57—157 TS** **5 Claims**



1. A method of high stretch yarn texturing and yarn package preparation comprising the steps of
a. false twist texturing a continuous filament yarn at a false twisting station,



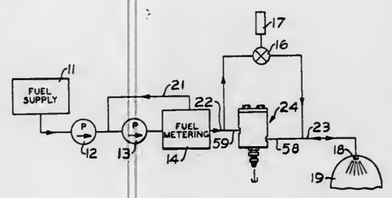
b. directing said false twist textured continuous filament yarn from said false twisting station generally downwardly and toward a take-up assembly including a dye spring,
c. overfeeding said yarn to said take-up assembly, the overfeed being greater than 30 percent, so that said yarn may relax before being taken up by said die spring and so that the skein shrinkage of said yarn after dyeing will be maximized, and interlacing said yarn filaments while directing them downwardly and overfeeding them to said take-up assembly, to produce a yarn package, and
d. package dyeing the yarn package so produced.

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**4,016,716**
**GAS TURBINE ENGINE DUMP VALVE**

**Duane E. Evans, Peoria; Thomas M. Tabor, East Peoria, and David A. Tyler, Peoria, all of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.**

**Filed Apr. 20, 1970, Ser. No. 30,081**
**Int. Cl.² F02G** *3/00*; **F02C** *9/04*
**U.S. Cl. 60—39.09 R** **11 Claims**




1. A fuel system for a gas turbine engine comprising a fuel supply, fuel metering means, pump means connecting said supply to said metering means, a fuel supply valve including an inlet port and an outlet port, said valve operable to selectively open or close communication between said inlet and outlet ports, a nozzle for introducing fuel to a combustion chamber, a fuel line connecting said metering means to said inlet port, a second fuel line connecting said outlet port to said nozzle, and a dump valve, said dump valve comprising a body having drain, inlet, and pilot ports and a valve seat circumscribing an opening communicating said inlet and drain ports of said dump valve, a spool slidably mounted in said body and having a valve tip engagable with said seat, means spring loading said spool to normally resiliently engage said tip with said seat, means communicating said inlet and pilot ports of said dump valve with said first and second opposed faces of said spool to expose same to pressures at said inlet and pilot ports of said dump valve, said first face being disposed such that force due to pressure acting thereon is directed to aid the force of the spring loading means, said second face being disposed such that force due to pressure acting thereon is directed to oppose the force of said spring loading means, and means connecting said pilot and inlet ports of said dump valve to said inlet and outlet ports of said supply valve.

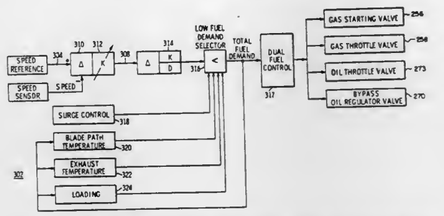
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**4,016,717**
**MATCHING RESPONSE OF A BLADE PATH TEMPERATURE LIMIT SIGNAL TO CHARACTERISTICS OF A GAS TURBINE**

**Jack R. Smith, Pittsburgh, and Leonard H. Burrows, Gibsonia, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed Feb. 19, 1975, Ser. No. 551,202**
**Int. Cl.² F02C** *9/08*
**U.S. Cl. 60—39.28 R** **10 Claims**

6. Apparatus for controlling fuel flow to a turbine including:
a. input means for receiving representations of information concerning predetermined turbine operating parameters;
b. speed control means, including means for generating a turbine speed setpoint, operably related to said input means for developing a speed error for use in adjusting fuel flow;
c. temperature control means, including means for generating a blade path temperature error which changes at a first rate under a first condition when the measured temperature is above the setpoint and at a second rate under a second condition when the measured temperature is



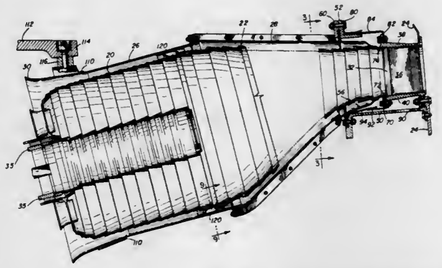

below the setpoint, operably related to said input means, for developing a temperature limit for use in adjusting fuel flow; and
d. selector means, operably related to said speed control means, said temperature control means and the turbine, for selecting in accordance with a predetermined criteria said speed error or said temperature limit for use in adjusting fuel flow.

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**4,016,718**
**GAS TURBINE ENGINE HAVING AN IMPROVED TRANSITION DUCT SUPPORT**

**Lawrence J. Lauck, South Windsor, Conn., assignor to United Technologies Corporation, Hartford, Conn.**

**Filed July 21, 1975, Ser. No. 597,876**
**Int. Cl.² F02C** *7/20*, *3/00*
**U.S. Cl. 60—39.32** **12 Claims**



1. In combination in an axial flow gas turbine engine having a combustion section including a plurality of burners disposed circumferentially about the engine axis for receiving and mixing compressed air and fuel in a combustion process to produce propulsive gases which are transmitted from the plurality of burners through a plurality of circumferentially disposed transition ducts between the respective burners and a turbine inlet at the turbine section, the improvement comprising:
an outer support ring connected to the plurality of transition ducts and positioned in the engine coaxially of the engine axis, the outer ring circumscribing the transition ducts radially outside of the ducts;
an inner support ring connected to a plurality of transition ducts and positioned in the engine coaxially of the engine axis, the inner ring extending around the engine axis radially within the circumaxially disposed transition ducts;
a plurality of struts extending from the outer support ring to the inner support ring, the struts being interdigitated between the transition ducts; and

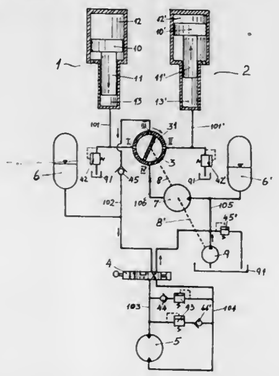
one of the support rings being fixedly secured in the engine between the combustion and turbine sections for holding the transition ducts in the engine, and the other of the support rings being suspended in the engine by the struts from said one of the support rings, said other of the support rings thereby being free to expand and contract radially in the engine with the transition ducts.

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## 4,016,719
## HYDROSTATIC TRANSMISSION SYSTEM

**Amotz Yavnai, Kiriat Bialik, Israel, assignor to Technion Research and Development Foundation, Ltd., Haifa, Israel**

**Filed Mar. 30, 1976, Ser. No. 672,019**
**Claims priority, application Israel, Mar. 30, 1975, 46964**
**Int. Cl.² F15B *1/02***
**U.S. Cl. 60—416** **6 Claims**



1. A hydrostatic transmission system comprising a hydraulic circuit consisting of a high-pressure section and a low-pressure section, which together include a free-piston engine having at least two cylinders each having one engine piston to which is connected a pump piston, said engine piston being rigidly connected to said pump piston for the purpose of joint axial motion;

at least one rotary motor or linear actuator adapted to be driven by the hydraulic fluid pressurized by said piston pumps;

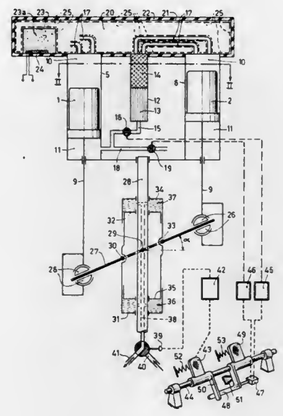
valve means for directing the hydraulic fluid to and from said motor or actuator;

means for controlling the operation of said free-piston engine, said controlling means comprising a rotary distributor and a rotary, auxiliary hydraulic motor of the positive displacement type in the low-pressure section of the circuit, said auxiliary hydraulic motor being provided with transmission means for driving said rotary distributor at the number of revolutions governed by the frequency of said free-piston engine, said rotary distributor being provided with ports for alternately connecting each pump cylinder in turn to the high-pressure section and to the low-pressure section of the hydraulic circuit in such an order that each pump is connected to the high-pressure section during at least part of its pumping stroke from the stroke's beginning, and to the low pressure section during the entire length of its return stroke.

## 4,016,720
## HOT-GAS RECIPROCATING ENGINE

**Roelf Jan Meijer, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Mar. 22, 1976, Ser. No. 669,323**
**Claims priority, application Netherlands, Apr. 1, 1975, 7503828**
**Int. Cl.² F02G *1/06***
**U.S. Cl. 60—524** **1 Claim**



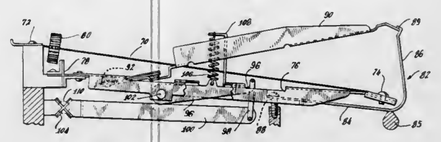
1. A hot-gas reciprocating engine comprising at least three double-acting pistons which are each reciprocable in an associated cylinder and which each separate therein a space of variable volume and lower temperature during operation from a space of variable volume and higher temperature during operation, the space of lower temperature in each cylinder being connected, via at least one of a plurality of regenerators and at least one of a plurality of heat-exchangers, to the space of higher temperature in one of the other cylinders, the volume variations of each space of higher temperature leading in phase those of the space of lower temperature connected thereto; at least one heating device for supplying heat to the heat exchangers, which device comprises at least one reservoir which contains a heat-storing material which can be heated and which material is in heat-exchanging relationship with the heat exchangers during operation; a respective drive rod coupled to each of the pistons, which co-operates, by way of a sliding body, with a swash-plate which is tiltably mounted on a rotatable shaft; and means for tilting the swash-plate to increase or decrease its inclination relative to the shaft in order to increase or decrease, respectively, the stroke of the pistons; characterized in that each space of lower temperature is also connected, via one of the regenerators and one of the heat exchangers, to one of the spaces of higher temperature, in which space the volume variations lag in phase behind those in the space of lower temperature connected thereto, the connections between each space of lower temperature and the two spaces of higher temperature connected thereto including valves which are operated by means for selectively opening one of the two connections, which means for opening, when opening the connections between the spaces of lower temperature and the spaces of higher temperature wherein the volume variations occur which lag in phase behind those in the relevant space of lower temperature, causes the means for tilting the swash-plate to be operated to tilt the plate further in the direction to increase its inclination, the means for tilting the plate being operable independently of the means for selectively opening one of the two connections.



## 4,016,721
## POSITIONING DEVICE USING NEGATIVE SPRING-RATE TENSIONING MEANS

**David A. Richardson, Sheldonville, and Robert J. Robinson, Lexington, both of Mass., assignors to The Foxboro Company, Foxboro, Mass.**

**Division of Ser. No. 444,824, Feb. 22, 1974, Pat. No. 3,940,935, which is a continuation of Ser. No. 239,906, March 31, 1972, abandoned. This application Sept. 15, 1975, Ser. No. 613,229**
**Int. Cl.² F03G *7/06***
**U.S. Cl. 60—528** **5 Claims**



1. Positioning apparatus comprising: an elongate element formed of electrically conductive material which changes length with changes in temperature;

support means providing two spaced element-receiving means;

said support means including a motion member to be moved in response to the changes in length of said element;

means securing respective spaced portions of said elongate element directly to said element-receiving means free of electrical insulating material, said support means providing an electrically conductive path which in cooperation with said electrically conductive element establishes a closed loop adapted to carry electrical current; and

winding means inductively coupled to said closed loop to develop an alternating magnetic field passing through said closed loop, said winding means and said closed loop together forming a transformer with said winding means serving as the transformer primary winding and said closed loop serving as a single-turn transformer secondary winding;

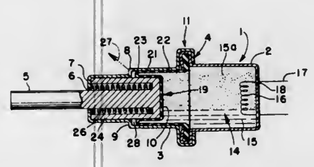
the electrical voltage induced in said single-turn closed-loop secondary winding by said alternating magnetic field being effective to develop current therein of controllable magnitude, so as to control the temperature of the section of said elongate element between said spaced portions.

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## 4,016,722
## SAFETY BLOW-OUT PROTECTION FOR FLUID ACTUATORS

**Otto C. Niederer, Sr., Madison, Ohio, assignor to Gould Inc., Chicago, Ill.**

**Filed May 2, 1975, Ser. No. 573,984**
**Int. Cl.² F03G *7/06***
**U.S. Cl. 60—531** **19 Claims**



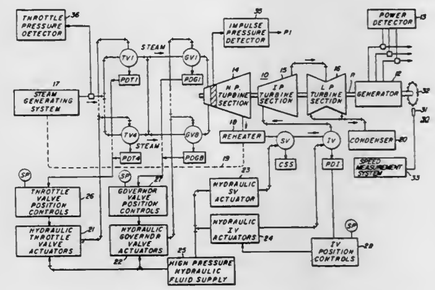
1. A fluid actuator device, comprising a body, an extensible means in sealed engagement with said body for forming a variable volume pressure chamber, said extensible means being movable with respect to said body to effect changes in the volume of said pressure chamber and thus to convert normal pressure variations in said pressure chamber to mechanical energy, said extensible means comprising a diaphragm, means for controllably relieving pressure in said pressure chamber when an abnormal pressure level occurs therein in excess of a predetermined level, said means for controllably relieving comprising means for facilitating controlled fracturing of said diaphragm.

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## 4,016,723
## SPEED MEASUREMENT SYSTEM FOR TURBINE POWER PLANT

**Earl T. Farley, Altamonte Springs, Fla., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed Oct. 21, 1975, Ser. No. 624,351**
**Int. Cl.² F01K *13/02***
**U.S. Cl. 60—660** **11 Claims**



1. A system for controlling the operation of a power plant in accordance with selected criteria including rotational speed, comprising:

a turbine in which an elastic fluid imparts rotation to an output shaft;

valve means for controlling the flow of elastic fluid to the turbine;

means for generating displacement pulses as a function of incremental shaft rotation;

means governed by each generated displacement pulse to generate at least one additional pulse;

means to count each generated displacement pulse and additional pulse occurring during identical predetermined time intervals;

means to generate a binary representation in accordance with the total pulse count, said representation being a direct count of a shaft speed rate for a time interval greater than each said predetermined time interval, and

means including the binary representation to control the operation of the valve means.

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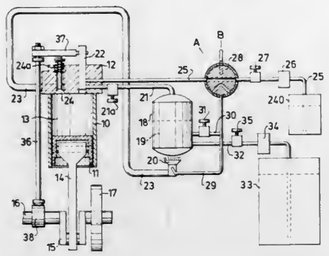
## 4,016,724
## STEAM ENGINE

**Hans Ingemar Reimertz Karlsson, Vintervagen 17, Stockholm-Jarfalla, Sweden (S-175 40)**

**Filed Jan. 30, 1976, Ser. No. 653,829**
**Claims priority, application Sweden, Jan. 31, 1975, 7501076**
**Int. Cl.² F01K *25/06***
**U.S. Cl. 60—672** **15 Claims**

1. A steam or vapor engine, comprising a vapor generating apparatus producing vapor of at least a given temperature; at least one cylinder with a member working in the cylinder; pipes and valves for supplying said vapor from the vapor generating apparatus to a closed chamber formed in the cylinder; pipes and valves for exahausting vapor from the cylinder chamber after a working stroke; and an apparatus for supply-

ing to said chamber substantially simultaneously with the vapor an additive which has a lower temperature than said



given temperature and which rapidly expands at the temperature of the vapor.

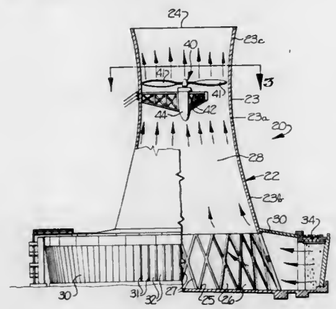
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**4,016,725**

## APPARATUS FOR RECAPTURING LOST ENERGY IN A THERMOELECTRIC GENERATING PLANT

**Edward C. Fiss, 5436 Topping Place, Charlotte, N.C. 28209**

**Filed June 20, 1975, Ser. No. 588,730**
**Int. Cl.² F02C *1/04*; F01K *23/04***
**U.S. Cl. 60—690** **5 Claims**



1. In a thermoelectric generating plant utilizing heat to generate electric energy and having a recirculating water system in which the water is heated during passage through the plant and must be cooled before recirculation to the plant thus causing a heat loss and resultant loss of energy; the combination therein of means for recapturing a portion of the normally lost energy comprising:

a natural air draft, cooling tower defining a generally vertically extending passageway for the flow of air therethrough from the bottom thereof to the top thereof and being disposed in said recirculating water system for receiving the heated water and passing the heated water through the flow of air at generally the bottom of said passageway for cooling the heated water and heating the air to cause a natural draft flow of air up through said passageway;

rotor means positioned in said passageway of said cooling tower for being rotated by the natural draft flow of air therethrough; and

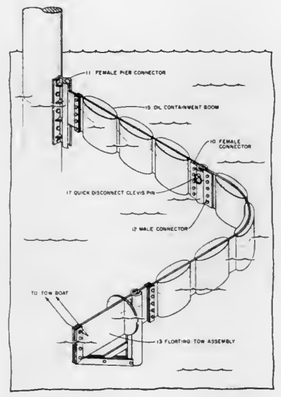
electric generating means connected with said rotor means for being driven thereby to generate electric energy by the rotation of said rotor means and thus recapture a portion of the normally lost energy from said plant.

**4,016,726**

## CONNECTOR HINGE FOR OIL CONTAINMENT BOOMS

**Francis J. Campbell, Stanford, and Douglas J. Graham, San Francisco, both of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Aug. 21, 1975, Ser. No. 606,696**
**Int. Cl.² E02B *15/04***
**U.S. Cl. 61—1 F** **16 Claims**




1. In combination with an oil spill containment boom, a connector hinge comprising:

a. a hollow cylindrical female portion tapered along its length and longitudinally attached to a first sheet member, said hollow cylindrical female portion having a slot extending along its longitudinal axis opposite said longitudinally attached first sheet member;

b. a hollow cylindrical male portion longitudinally attached to a second sheet member and formed to fit loosely within said hollow cylindrical female portion, said hollow cylindrical male portion having a slot extending along its longitudinal axis opposite said longitudinally attached second sheet member;

c. a resilient gasket disposed in said hollow cylindrical female portion and extending through said slot of said hollow cylindrical male portion, said resilient gasket positioned in said hollow cylindrical male portion to form an oil-tight seal between said hollow cylindrical female portion and said cylindrical male portion, said cylindrical male portion being disposed within said cylindrical female portion forming said connector hinge;

d. wherein said hollow cylindrical female portion is tapered to aid in disposition of said cylindrical male portion within said cylindrical female portion and formed with a cavity having a size which allows said male member to move freely along the length of the female portion thereby permitting said oil spill containment booms to follow tidal variations.

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**4,016,727**

## DRAIN TROUGH MEMBER AND ITS CONNECTOR

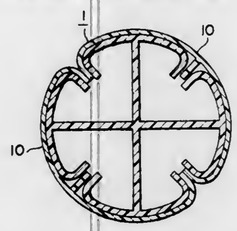
**Tomikazu Osaka, and Morihisa Otsuka, both of Fukui, Japan, assignors to Fukuvi Chemical Industry Co., Ltd., Japan**

**Filed Mar. 4, 1975, Ser. No. 555,247**
**Claims priority, application Japan, Mar. 18, 1974, 49-031481[U]**
**Int. Cl.² E02B *11/00***
**U.S. Cl. 61—11** **1 Claim**

1. A drain trough comprising, a plurality of longitudinally arranged plastic round pipes, each pipe having a plurality of



circumferentially spaced slits formed in an outer wall of the pipe and extending along a longitudinal direction of the pipe, and a plurality of plastic connectors of lesser longitudinal length than each of said pipes connecting next adjacent pipes and positioned circumferentially about circumferential portions of next adjacent pipes and each respectively having a cross-sectional shape of an arc of a circle and at least two ribs at the longitudinally extending ends of said connectors extending toward the center of the arc, each pipe having a partition wall within and extending continuously from an end of the pipe to its other end along a longitudinal direction of the pipe to divide in cross section an inside space of the pipe into



several circumferentially spaced, longitudinally extending independent compartments, said partition wall having longitudinally extending portions integrally attached to inside wall portions of the plastic round pipe, each pipe additionally having longitudinally extending straps at the longitudinally extending edges of the slits extending inwardly of the pipe, wherein at least one connector is attached to the side walls of end portions of two pipes connected therewith, said ribs of the connector are firmly inserted into the slits, and the number of slits in a cross section of the outer wall of the pipe being equal to the number of the compartments formed in the pipe and communicating with a corresponding compartment.

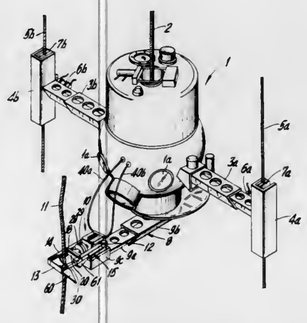
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**4,016,728**

## DEVICE FOR SEVERING UNDERWATER CABLES

**Burton Hoster Mason, P.O. Box 504, Covington, La. 70433**

**Filed Nov. 19, 1975, Ser. No. 633,549**
**Int. Cl.² B63C *11/00*; B26B *3/00***
**U.S. Cl. 61—69 R** **29 Claims**



1. A device to sever cables comprising, a body having a first end portion, a second end portion opposed thereto and a pair of spaced opposed side portions being disposed between said first and second end portions, one side portion interconnecting said end portions and the other side portion being connected to the first end portion and spaced from the second end portion, means adaptably formed with said first end portion to attach said device to a horizontally rotatable arm so as to provide circumferential travel to said device, a pair of parallel opposed facing blade track means, each of said track means being formed with one each of said side portions, blade means being horizontally disposed in said body and facing said second end portion and being formed with a pair of blade guide means for slidable engagement with respective track means so that said blade means is movable from said first end portion to said second end portion, and blade drive means adaptably mounted to said body at said first end and interconnected to said blade means to drive said blade means from said first end portion to said second end portion and cable passage means being integrally formed with a vertically disposed face of said second end portion and a vertically disposed face of said other side portion spaced from said second end portion to permit passage of a vertically disposed cable upon circumferential travel of said device towards said cable, said cable being positioned within the body of said device between said opposed end and side portions.

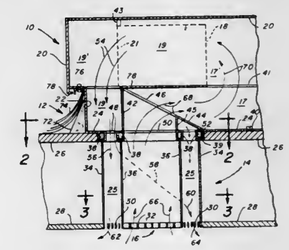
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**4,016,729**

## CURB-DUCT FOR ROOF TOP AIR CONDITIONERS

**Louis E. Cherry, Tulsa, Okla., assignor to John Zink Company, Tulsa, Okla.**

**Filed Apr. 28, 1975, Ser. No. 572,272**
**Int. Cl.² A25D *23/12***
**U.S. Cl. 62—259** **8 Claims**



1. An air conditioning system adapted to receive and supply conditioned air from a roof top mounting opening to ceiling of a room below, comprising:

a. a rectangular shallow pan divided into two contiguous chambers one surrounding the other, means for sealable mounting said pan on said roof top, each of said chambers having at least one opening in the bottom thereof, the two opening together matching said mounting opening in said roof, conduit means extending from said chambers to said ceiling of said room;

b. means associated with said pan for supporting and fastening said air conditioning system to the top of said pan;

c. ceiling fixture means in said room, including air inlet means and air outlet means and including means to connect to each of said air inlet and outlet means one of said conduit means.

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**4,016,730**

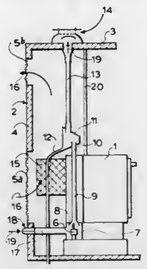
## REFRIGERATORS

**Paul Hendrik DeVilliers, 224 Anderson St., Pretoria, South Africa**

**Filed Jan. 31, 1975, Ser. No. 546,142**
**Claims priority, application South Africa, Feb. 5, 1974, 74/0741**
**Int. Cl.² F23B *15/00*; F23L *17/02***
**U.S. Cl. 62—476** **12 Claims**

1. An absorber type refrigerator having a burner means adapted to burn a fuel with air, which comprises shielding means adapted to substantially totally enclose the burner means to inhibit adverse effects of draughts upon the burner means, a flue leading upwards from the shielding means and having an upper exit to the ambient air provided with means adapted to produce a reduction of pressure from the ambient

air, inlet connection means adapted to provide access for the ambient air to the interior of the shielding means, and means at the entrance of the inlet connection means adapted to prevent any reduction of pressure from the ambient air to the interior of the inlet connection means in draughty conditions



of the ambient air, in which the means adapted to prevent pressure reduction at the entrance to the inlet connection means comprises at least one flat plate centrally spanning the interior of the connection means and projecting out of the entrance of the connection means into the ambient air, said plate being oriented substantially vertically.

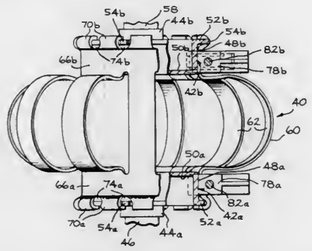
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**4,016,731**

## FLEXIBLE COUPLING ASSEMBLY

**Charles F. Foushee, Fern Creek, Ky., assignor to General Electric Company, Louisville, Ky.**

**Filed Nov. 20, 1975, Ser. No. 633,783**
**Int. Cl.² F16D** *3/52*
**U.S. Cl. 64—15 B** **4 Claims**



1. A flexible coupling assembly for connecting a driving member to a driven member comprising:

a. a first circular end plate for attachment to the driving member for rotation therewith,

b. a second circular end plate spaced from the first end plate for attachment to the driven member for rotation therewith, said first and second end plates each having a circular flat surface and at least one lug extending beyond the flat surface,

c. a one-piece flexible plastic molded body having (i) a collar portion at each end engaging the circular flat surface of the first and second end plates respectively, said collar portions each having two bosses for receiving fastening means to secure the collars to the first and second end plates respectively, (ii) a notched area to receive the respective lugs, and (iii) a plurality of spaced outwardly bowed ribs interconnecting the collar portions and spanning the space between the first and second end plates, and

d. fastening means holding the two bosses of each collar portion together to thereby secure the molded body to the first and second end plates.

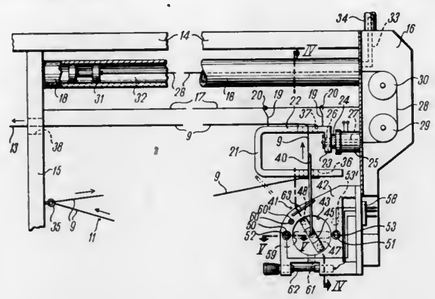
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**4,016,732**

## FILAMENT MONITORING DEVICE

**Eberhard Merkle, Stuttgart, Germany, assignor to Wilh. Bleyle KG, Stuttgart, Germany**

**Filed July 18, 1975, Ser. No. 597,148**
**Claims priority, application Germany, Aug. 7, 1974, 2438006**
**Int. Cl.² D04B** *35/12*
**U.S. Cl. 66—163** **9 Claims**



1. A filament monitoring device for a knitwear manufacturing machine having an energizable drive drive therefore, the device comprising a filament guide for conducting a filament therethrough and arranged to be guided out of an operating position thereof when a predetermined filament tension is exceeded thereby causing the machine drive to be deenergized, a compressed air cylinder, a return piston reciprocable in said cylinder and arranged to return the filament guide into said operating position in such a manner as not to break the filament, means for automatically reenergizing the machine drive when said filament guide has been returned into said operating position, a slide member, a tie member connecting said slide member to said piston, means for guiding said slide member into and out of said operating position and magnet means including an armature for holding said slide member in said operating position when said filament tension is below a predetermined value, said slide member carrying only said filament guide and said armature.

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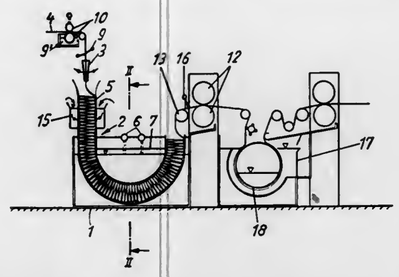
**4,016,733**

## DEVICE FOR THE WET TREATMENT OF MATERIAL LENGTHS IN SEVERAL TREATMENT BOWLS

**Heinz Fleissner, Egelsbach near Frankfurt am Main, Germany, assignor to Vepa AG, Switzerland**

**Continuation of Ser. No. 291,064, Sept. 21, 1972, abandoned. This application June 21, 1974, Ser. No. 481,831**
**Claims priority, application Germany, Sept. 21, 1971, 2146990; Nov. 16, 1971, 2156765; Feb. 14, 1972, 2206872; Feb. 21, 1972, 2208053; Mar. 24, 1972, 2214267; May 5, 1972, 2222125**
**Int. Cl.² D06B** *3/02, 21/00*
**U.S. Cl. 68—9** **32 Claims**

1. A device for the wet treatment of material lengths, which comprises several treatment bowls containing treatment liquids one of which is designed as a high efficiency wash bowl with a bowl preceding said high efficiency wash bowl serving as a plain steeping bowl through which the material passes slowly and in a folded state through a treatment liquid; a perforated drum wash bowl being used as the high efficiency wash bowl and a J-box positioned within another bowl being employed as a steeping bowl; said J-box having a knee portion, a long intake leg portion, and a delivery leg portion, the knee portion being located in said another bowl which is filled with a treatment liquid up to a certain level; said J-box also having upper and lower curved walls which are surrounded by the another bowl and the clearance between the walls being constant with said curved walls also being liquid-permeable; means being provided for wetting the material length with liquid located in front of a means for plaiting said material; said plaiting means acting to plait the material length into the long intake leg of the J-box in folds which completely fill the clearance between the upper and lower J-box walls, until a certain height of material is reached and consequently a certain weight of material pile has been achieved, the weight being sufficient so that the resulting material pile is automatically pushed throught he knee portion of the J-box and out above the liquid level in the delivery leg to a dripping height;



and a drawoff roller installed immediately above at an opening for material delivery from the J-box; said means for wetting the material length including a spraying assembly arranged in front of the plaiting means with fresh water pipes arranged to spray liquid onto both sides of the material length and a drain socket which is directly connected with a waste water channel; said spraying assembly including also a container having several deflector rollers therein, each of said rollers being followed by a squeeze unit including rollers and near which said fresh water sparay pipes are arranged at both sides of the material.

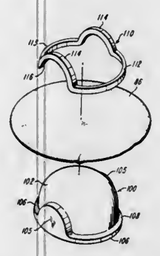
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**4,016,734**

## SAFETY HELMET WITH INDIVIDUALIZED HEAD-CONTOURED INTER-LINER

**William G. Morton, 22 Rue Royale, Kettering, Ohio 45429**

**Division of Ser. No. 570,712, April 23, 1975, which is a continuation-in-part of Ser. No. 360,950, May 16, 1973, Pat. No. 3,882,546, which is a continuation-in-part of Ser. No. 323,195, Jan. 12, 1973. This application June 14, 1976, Ser. No. 695,793**
**Int. Cl.² C14B** *1/00*
**U.S. Cl. 69—8** **3 Claims**



1. A device for stretching a piece of leather to form a cap-like headpiece liner for a safety helmet, comprising a first mold member having a dome-shaped mold surface, means forming a shoulder projecting outwardly from the base of said mold surface, said shoulder having a pair of upwardly projecting U-shaped portions on opposite sides of said mold surface, a second mold member having an annular mold surface conforming generally to the contour of said shoulder of said first mold member, and said first mold member cooperates with said second mold member to stretch said piece of leather for providing said liner with a dome-shaped head covering portion and a base flange portion projecting outwardly from said head covering portion.

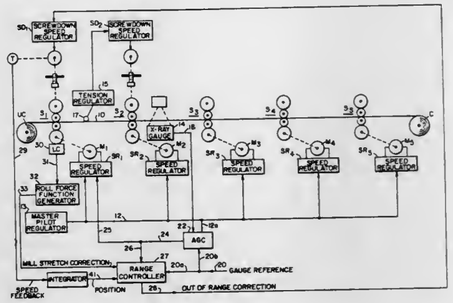
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**4,016,735**

## RANGE CONTROL FOR AN AUTOMATIC GAUGE CONTROL SYSTEM OF A ROLLING MILL

**Robert S. Peterson, Williamsville, N.Y., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed Sept. 23, 1975, Ser. No. 616,109**
**Int. Cl.² B21B** *37/06*
**U.S. Cl. 72—9** **2 Claims**



1. In a system for controlling the gauge of strip material issuing from a rolling mill having at least one first rollstand driven at a predetermined rolling speed with a predetermined roll gap; the combination of:

automatic gauge control means responsive to strip gauge sensed after said first rollstand for controlling the feeding speed of material into said first rollstand, said automatic gauge control means having an operative range;

range control means responsive to an out-of-range condition of said automatic gauge conrol means for generating a range correction signal; and

means for altering the roll gap of said first rollstand in relation to said range correction signal, thereby to eliminate said out-of-range condition and enable operation of said automatic gauge control means within said operative range.

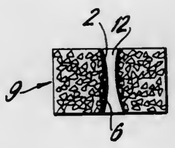
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**4,016,736**

## LUBRICANT PACKED WIRE DRAWING DIES

**Lynn Cloyd Carrison, Columbus, and Robert George Wetzel, Chesterland, both of Ohio, assignors to General Electric Company, Columbus, Ohio**

**Filed June 25, 1975, Ser. No. 590,155**
**Int. Cl.² B21C** *3/02, 9/00*
**U.S. Cl. 72—41** **18 Claims**



1. A wire drawing die comprising a mass having a centrally-located double tapered hole extending therethrough with micro-rough walls having pores, said mass comprising predominately a material selected from the group consisting of compacted polycrystalline diamond, compacted polycrystalline cubic boron nitride and mixtures thereof, wherein said mass has been compacted at a pressure of at least about 40

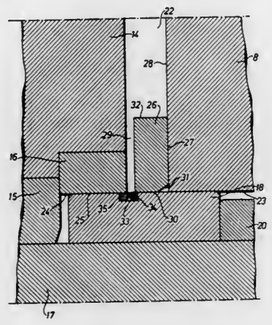
kilobars, and wherein substantially only the pores which are exposed at the surface of said micro-rough walls in said hole are densely packed with a lubricant for wire drawing.

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**4,016,737**
**HIGH PRESSURE PRESS**

**Sven-Göran Gustafsson; Hans Gunnar Larsson; Kjell Lilja, all of Vasteras; Bertil Lundback; Jan Nilsson, both of Robertsfors, and Pertti Syvakari, Helsingborg, all of Sweden, assignors to Allmanna Svenska Elektriska Aktiebolaget, Vasteras, Sweden**

**Filed Dec. 11, 1975, Ser. No. 639,830**
**Claims priority, application Sweden, Dec. 6, 1974, 7415296**
**Int. Cl.² B21D** *22/10*
**U.S. Cl. 72—60** **3 Claims**



1. Press for hydrostatic extrusion having a press chamber to enclose a pressure medium, which press chamber is formed of a high pressure cylinder, a pressure generating piston, a die and a die support and seals, in which there is a metallic sealing ring in the high pressure cylinder, the outer cylindrical surface of said metallic sealing ring making contact with the cylinder and one end surface of said sealing ring making contact with the die support, the die support having a groove in the end surface, said groove being concentric with the sealing ring and having an outer diameter of at least the same size as the inner diameter of said metallic sealing ring making contact with the die support outside the groove when the container is closed, and a sealing ring in said groove abutting the inner edge of the metallic sealing ring at the end in contact with the die support.

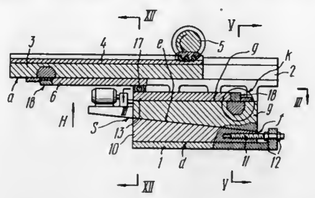
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**4,016,738**
**TRAVERSE WEDGE FORMING MACHINE**

**Alexandr Vladimirovich Puchko, ulitsa Sedykh, 64, kv. 2; Valery Alexandrovich Klushin, ulitsa Prityts kogo, 52, kv. 25; Georgy Vasilievich Andreev, ulitsa Orlovskaya, 81, kv. 51; Eduard Matveevich Gorbunov, ulitsa Koltsova, 26, kv. 111; Evgeny Markellovich Makushok, ulitsa Sovetskaya, 2, kv. 3; Valery Yakovlevich Schukin, ulitsa Akademicheskaya, 11a, kv. 7, and Vladimir Mironovich Segal, ulitsa V.Khoruzhei, 35, kv. 74, all of Minsk, U.S.S.R.**

**Filed Apr. 27, 1976, Ser. No. 680,810**
**Int. Cl.² B21H** *7/18*
**U.S. Cl. 72—90** **11 Claims**

1. A transverse wedge forming machine, comprising a housing; longitudinal slideways enclosed in said housing; a movable plate mounted in said longitudinal slideways; a fixed plate mounted in said housing for movement towards said movable plate and parallel thereto; two wedge-shaped forming tools mounted concordantly to said longitudinal slideways; one of said forming tools being arranged on said movable plate, each of said tools comprising components having tool tops and end faces, one tool top being directed toward movement the transfer of said movable plate during the forming operation; the other one of said forming tools being mounted on said fixed plate, its top being directed toward the side opposite to the direction of the first forming tool; a clearance between said forming tools to receive a part being formed; said components being disposed in a single row in a direction normal to said



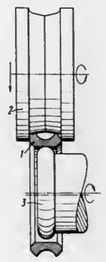
longitudinal slideways; the tops of adjacent components being directed at the opposite sides; a device mounted on said fixed plate for transferring a part being formed from an end face of the previous component of said forming tool to the end face of the next component from the side of its top.

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**4,016,739**
**METHOD OF SHAPING RING BLANKS**

**Vladimir Viktorovich Lapin, ulitsa Khlopina 7, korpus 2, kv. 18, Leningrad; Boris Sergeevich Bulgakov, ulitsa Sharikopodshipnikovaya 36/18, kv. 291, Moscow; Konstantin Nikolaevich Bogoyavlensky, ulitsa Khlopina 7, korpus 2, kv. 12, Leningrad; Jury Lvovich Rozhdestvensky, Ierusalimsky proezd 4, kv. 12, Moscow; Simon Pavlovich Granosky, Volzhsky bulvar 30, kv. 39, Moscow; Genrikh Semenovich Maizelis, Leninsky prospekt 90, kv. 176, Moscow; Vladimir Ivanovich Lazutin, ulitsa Zoologicheskaya 30, kv. 3, Moscow, and Ilya Alexandrovich Sauskan, ulitsa 7 Parkovaya 33, korpus 1, kv. 27, Moscow, all of U.S.S.R.**

**Filed Dec. 8, 1975, Ser. No. 638,975**
**Int. Cl.² B21H** *1/12*
**U.S. Cl. 72—105** **4 Claims**



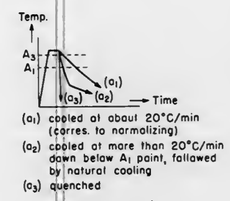
1. A method of shaping ring blanks, such as raceways, to produce a ring blank or raceway having fibers which bend around the race and having a prescribed profile for the inner cylindrical surface thereof, comprising the step of: reducing the initial ring blank on two sides with the aid of deforming tools, the initial ring blank having a plain cylindrical inner surface and a preprofiled outer surface so selected that the outer profile is substantially identical to said prescribed inner profile, and said deforming tools being so selected that the plain cylindrical inner surface of the ring blank is acted upon by a tool having said prescribed profile whereas the outer surface of the blank is acted upon by a plain tool.



**4,016,740**
**METHOD AND AN APPARATUS FOR THE MANUFACTURE OF A STEEL SHEET**

**Hisashi Gondo; Hiroshi Takechi; Tsuyoshi Kawano, all of Kisarazu; Hiroaki Masui, and Kazuo Kovama, both of Kimitsu, all of Japan, assignors to Nippon Steel Corporation, Tokyo, Japan**

**Continuation of Ser. No. 428,825, Dec. 27, 1973, abandoned. This application Aug. 22, 1975, Ser. No. 606,783**
**Int. Cl.² B21B** *9/00*
**U.S. Cl. 72—128** **16 Claims**



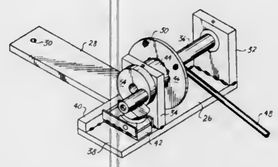

1. A method for the manufacture of a steel sheet, steel strip and the like subjected to a heat treatment from a hot rolled coil, said sheet having a thickness of as low as 1.2 mm and as high as 12.7 mm which comprises uncoiling the hot rolled coil, heating said uncoiled strip at temperatures below 1300° C., subjecting the same to a forced cooling down to temperatures below the $A_1$ point at a cooling rate of at least 20° C/min., and positively imparting a stress upon said strip during the heat treatment.

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**4,016,741**
**BRACELET DOMER**

**Spencer B. Sitter, Rte. 3, Box 86N, Santa Fe, N. Mex. 87501**

**Filed Dec. 29, 1975, Ser. No. 644,633**
**Int. Cl.² B21D** *17/02, 22/02*
**U.S. Cl. 72—415** **16 Claims**

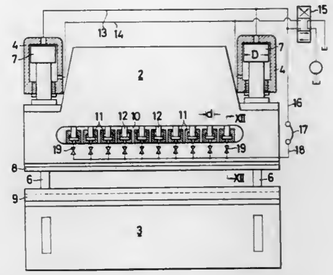


1. A machine to form a domed bracelet from a flat ductile metal blank comprising:
   a. a base,
   b. a lever connected to the base,
   c. a pin connected to the lever,
   d. a convex hammer journaled to the pin on the lever,
   e. a concave anvil on the base positioned so that the convex hammer mates therewith,
   f. said lever being means for forcing the convex hammer against the concave anvil in mating relationship,
   g. both hammer and anvil having a toroidal surface,
   h. each of said toroidal surfaces having a minor chord and a major circle,
   j. with clearance between the two surfaces at least as great as the thickness of the blank,
   k. the crank pin parallel to the minor chord of both of the toroidal surfaces of the dies, and
   m. the convex hammer moving through a path which is in the same plane of the major circle of both toroidal surfaces.

**4,016,742**
**PRESS-FORMING APPARATUS**

**Seiji Shiokawa, 110-6 Matsumoto, Mishima, Shizuoka, Japan**

**Filed Sept. 15, 1975, Ser. No. 613,310**
**Int. Cl.² B21D** *5/02*
**U.S. Cl. 72—465** **3 Claims**



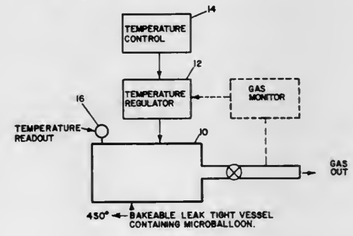
1. A press-forming apparatus comprising a pair of C-shaped side frames disposed at a constant spacing parallel to each other, the side frames having a lower and an upper portion, a fixed frame fixed to the lower portion of said pair of side frames and having an upper surface, a female die mounted on the upper surface of the fixed frame, a pair of main hydraulic cylinders fixedly mounted on the upper portion of said pair of side frames, the main hydraulic cylinders having a piston, a movable frame supported above the fixed frame by the pistons of the pair of main hydraulic cylinders and having a lower surface, a male die mounted on the lower surface of the movable frame, a space in the movable frame adjacent and along the lower surface thereof, a plurality of deflection cylinders mounted in the space and arranged in a row, each deflection cylinder having a ram, the total cross sectional area of the rams of the deflection cylinders being substantially the same as that of the pistons of the pair of main hydraulic cylinders, and means for connecting the fluid paths of the main hydraulic cylinders with the fluid paths of the deflection cylinders whereby the fluid paths are in communication.

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**4,016,743**
**VARIABLE LEAK GAS SOURCE**

**Timothy M. Henderson, and Gilbert H. Wuttke, both of Ann Arbor, Mich., assignors to KMS Fusion, Inc., Ann Arbor, Mich.**

**Filed Oct. 4, 1974, Ser. No. 513,332**
**Int. Cl.² G01D** *21/00*
**U.S. Cl. 73—1 R** **3 Claims**




3. A method of obtaining a variable calibrated leak source of gas which comprises:
   a. storing at a predetemined temperature a quantity of hollow, glass, gas-filled, microspheres ranging in size from 10 to 300 micrometers in a confined chamber having a controlled outlet, said gas having the characteristic of permeating through glass and being present in said spheres in a predetermined and known quantity,

b. heating said chamber and said contained spheres above said predetermined temperature to cause the egress of gas by permeation through the walls of said microspheres into said chamber,

c. controlling the heating temperature of said chamber to control the quantity of gas discharging from said spheres, and

d. utilizing said gas quantity by opening said controlled outlet for calibration.

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**4,016,744**

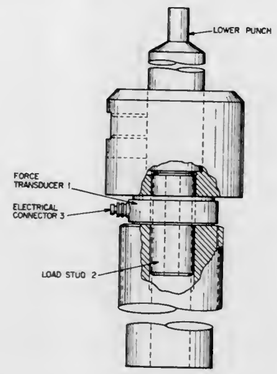
## APPLIED INSTRUMENTATION PROVIDING TABLETTING COMPRESSION FORCE

**Joseph James Williams, West Caldwell, N.J., assignor to Hoffmann-La Roche Inc., Nutley, N.J.**

**Division of Ser. No. 581,459, May 28, 1975. This application Feb. 17, 1976, Ser. No. 658,209**

**Int. Cl.² G01N** *3/32*

**U.S. Cl. 73—11** **11 Claims**




1. An arrangement for deriving in digital form the true maximum compression force developed in a tablet press for each tabletting event comprising:

means, mounted on a portion of the press experiencing the compression force developed during tabletting, for generating a first signal representative of the compression force developed by the press for each tabletting event;

means for deriving from said first signal a second signal representative of the true maximum compression force developed for each tabletting event; and

means coupled to said deriving means for providing the signal representative of the true maximum developed compression force of each tabletting event in digital form.

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**4,016,745**

## MONITORING ELECTRICAL APPARATUS AGAINST OVERHEATING BY THE USE OF COATING COMPOSITIONS CONTAINING THERMOPARTICULATABLE DIAZONIUM SALTS

**James D. B. Smith, Turtle Creek, and David C. Phillips, Pittsburgh, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Division of Ser. No. 568,224, April 15, 1975, Pat. No. 3,979,353. This application June 1, 1976, Ser. No. 691,682**

**Int. Cl.² C08K** *5/01*; **C08L** *63/00*; **G01N** *7/00*

**U.S. Cl. 73—19** **34 Claims**

1. A method of protecting electrical apparatus from damage due to overheating and for thereafter determining the location of said overheating, said apparatus including a gas stream and a monitor for detecting particles in said gas stream and for emitting a signal when said particles are detected comprising:

A. preparing a composition which comprises about 20 to about 250 phr of at least one diazonium salt solid and stable at 50° C and a solution of a resinous carrier curable and stable at 60° C and unreactive with said diazonium salt;

B. applying said composition to said electrical apparatus at positions exposed to said gas stream;

C. evaporating said solvent and curing said resinous carrier; and,

D. monitoring said gas stream for the presence of particles therein.

22. A thermal detection system for electrical apparatus cooled by a gas stream comprising (A) a coating of a solid layer of a resinous carrier containing about 20 to about 250 phr of an unreacted diazonium salt which is solid and stable at 50° C, said coating being on a portion of said electrical apparatus exposed to said gas stream and (B) a monitor for detecting the presence of particles in said gas stream.

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**4,016,746**

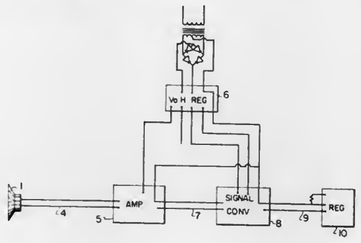
## SYSTEM AND DETECTOR FOR MEASURING BY MEANS OF SOUND THE LITER WEIGHT OF THE MATERIAL IN SATELLITE COOLERS FOR ROTATIVE OVENS

**Ricardo Paredes-Galvan, Escobedo sur 733, Ste. 201, Monterrey, Nuevo Leon, Mexico**

**Filed July 28, 1975, Ser. No. 599,885**

**Int. Cl.² G01N** *9/00*

**U.S. Cl. 73—32 R** **4 Claims**




1. A system measuring the weight of materials such as clinkers which pass from an oven to a cooler through a discharge pipe by means of sound, comprising in combination, a microphone placed to determine sound amplitude of the materials passing through said discharge pipe from the oven to the cooler, a frequency selective amplifier, and output means coupled to the amplifier to display variations in sound amplitude to thereby indicate the weight of said materials.

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**4,016,747**

## METHOD OF AND APPARATUS FOR CHECKING THE CYLINDRICITY OF A TEST SURFACE

**Hristo Kirilov Radev, Sofia, Bulgaria, assignor to VMEI "Lenin" -NIS, Sofia, Bulgaria**

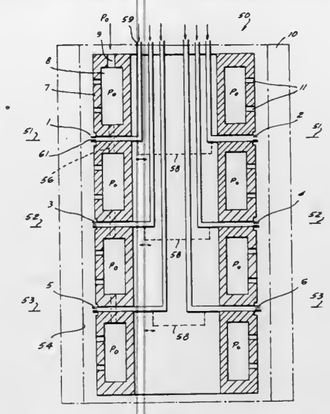
**Filed Mar. 17, 1976, Ser. No. 667,547**

**Claims priority, application Bulgaria, Mar. 17, 1975, 29338**

**Int. Cl.² G01B** *13/16*, *13/19*

**U.S. Cl. 73—37.9** **5 Claims**

1. In an apparatus for checking the deviation from cylindricity of each of a plurality of axially spaced cross-sectional locations of a test surface of a first cylinder having a means axis, a hollow cylindrical second cylinder having a reference surface complementary to the test surface of the first cylinder, the reference surface exhibiting a plurality of circumferentially spaced apertures extending into the hollow interior of the second cylinder, the apertures in the reference surface being symmetrically distributed about the axis of the second cylinder, means communicating with the interior of the second cylinder for propelling an air stream symmetrically out of the apertures of the reference surface to support the second cylinder coaxially with the mean axis of the first cylinder with the reference surface in confronting relation with the test surface, a plurality of distance sensing means, means for supporting the sensing means in axial spaced relation along the second cylinder to indicate the instantaneous distance between each sensing means and the confronting portion of the test surface, and means for individually adjusting the radial position of each of the sensing means with respect to the axis of the second cylinder.



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**4,016,748**

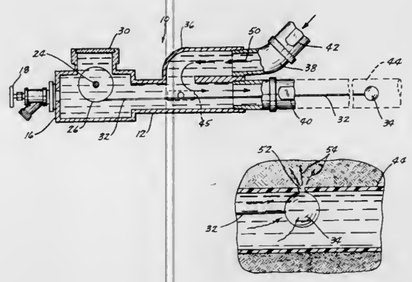
## PIPELINE AND LEAK LOCATER AND METHOD

**Virgil C. Boyens, R.R. 1, Denison, Iowa 51442**

**Filed Nov. 10, 1975, Ser. No. 630,694**

**Int. Cl.² G01M** *3/28*

**U.S. Cl. 73—40.5 R** **11 Claims**



1. A method of detecting a leak in a conduit, said method comprising;

flowing a fluid through said conduit at super-atmospheric pressure,

placing within said conduit a floatable leak sensor which is responsive to pressure, velocity and turbulence differentials caused by a leak in said conduit,

moving said leak sensor through said conduit along with said fluid, said floatable leak sensor automatically stopping movement through said conduit at the location of a leak in said conduit.





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**4,016,749**

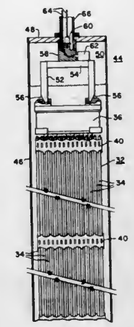
## METHOD AND APPARATUS FOR INSPECTION OF NUCLEAR FUEL RODS

**William J. Wachter, R.D. 1, English Road, Wexford, Pa. 15090**

**Continuation of Ser. No. 376,697, July 5, 1973, abandoned. This application July 14, 1975, Ser. No. 595,577**

**Int. Cl.² G01M** *3/04*

**U.S. Cl. 73—45.5** **19 Claims**



1. A method of detecting defects in nuclear fuel rods immersed in a liquid, said fuel rods containing fuel pellets and a fluid, said method comprising the steps of inducing a change in the relative pressures of said liquid and said fluid, and detecting mechanical vibration of said fuel rods induced by emission into the liquid of material expelled from a rod.

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**4,016,750**

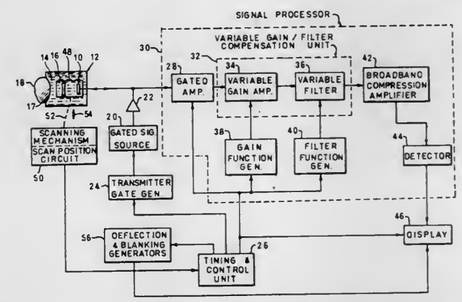
## ULTRASONIC IMAGING METHOD AND APPARATUS

**Philip S. Green, Atherton, Calif., assignor to Stanford Research Institute, Menlo Park, Calif.**

**Filed Nov. 6, 1975, Ser. No. 629,594**

**Int. Cl.² G01N** *29/00*

**U.S. Cl. 73—67.5 R** **18 Claims**




1. In an ultrasonic system for the examination of the interior of objects, such as body parts, the combination comprising,

means for insonification of an object under examination with a broadband ultrasonic wave signal,

means for receiving echo signals from discontinuities over a range of depths within the insonified object and for converting the same to electrical signals,

means for filtering said electrical signals by bandpass filter means having a filter transmission factor as a function of frequency which is variable, and

means for compensating for depth dependent changes in the spectral distribution of the echo signals by time varying the filter transmission factor versus frequency characteristic of the bandpass filter means in accordance with the depth of the discontinuity from which the echo signal is reflected.

**4,016,751**

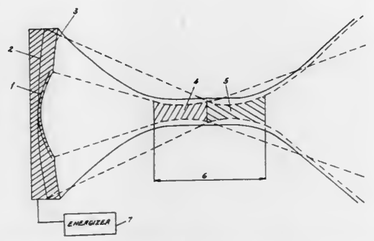
## ULTRASONIC BEAM FORMING TECHNIQUE

**George Kossoff, Northbridge, Australia, assignor to The Commonwealth of Australia Care of the Department of Health, Phillip, Australia**

**Continuation-in-part of Ser. No. 397,004, Sept. 13, 1973, abandoned. This application Sept. 29, 1975, Ser. No. 617,980**

**Int. Cl.² G01N** *29/00*

**U.S. Cl. 73—71.5 US** **3 Claims**




1. Apparatus for reducing the width of a beam of ultrasonic energy, generated by a transducer, over an extended distance, comprising:

means for focusing a first portion of said beam at a first distance from said transducer; and

means for simultaneously focusing at least one additional portion of said beam, coaxial with said first portion, at a distance from said transducer different from said first distance;

whereby a coaxial composite beam having a multi-curved converging wavefront is produced and said energy is concentrated in a line of focus;

wherein said means for focusing the portions of said beam at different distances from the transducer comprise a multi-curved surface on said transducer.

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**4,016,752**

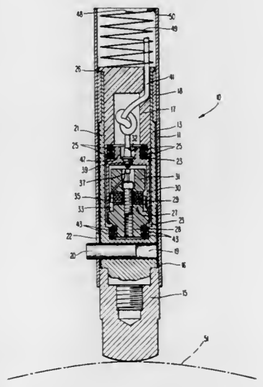
## VIBRATION PROBE FOR DETECTING THE RADIAL DISPLACEMENT OF ROTATING SHAFT

**Thomas H. Carey, Chester, Pa., assignor to Columbia Research Laboratories, Inc., Woodlyn, Pa.**

**Filed Jan. 7, 1976, Ser. No. 647,048**

**Int. Cl.² G01H** *1/00*

**U.S. Cl. 73—71** **2 Claims**



1. A vibration probe for detecting the radial displacement of a rotating shaft comprising in combination: a hollow sleeve member having first and second ends; main housing means disposed within said hollow sleeve member and formed to have a substantial part protruding from said first end of said hollow sleeve member to come in contact with said rotating shaft, said main housing means further formed to have a cavity, with top and bottom ends, therein; spring loading means disposed to cause said substantial part to protrude from said first end; accelerometer assembly means formed to have a first shoulder and a first protrusion extending therefrom and further formed to have a second shoulder and a second protrusion extending therefrom; said accelerometer means disposed in said cavity; at least first, second, third and fourth O rings, with said first and second O rings disposed to be stacked around said first protrusion to provide a seperation means between said first shoulder of said accelerometer assembly means and said first end of said cavity and with said third and fourth O rings disposed to be stacked around said second protrusion to provide a separation means between said second shoulder of said accelerometer assembly means and said second end of said cavity, whereby when energy is applied to said main housing means, by said rotating shaft through moving the protruding part, above a certain frequency, the effective frequency of energy applied to said accelerometer assembly means is altered because of some of said energy being absorbed by said O rings.

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**4,016,753**

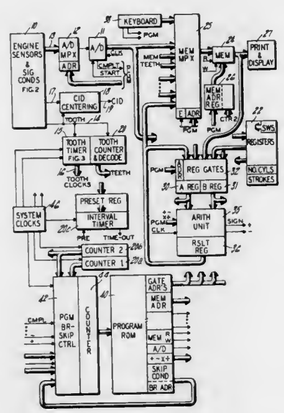
## SUB-CYCLIC SPEED AND CYCLIC TIME MEASUREMENTS FOR INTERNAL COMBUSTION ENGINE HORSEPOWER INDICATION

**James F. Willenbecher, East Windsor; Philip P. Stick, Enfield, and Rinaldo R. Tedeschi, Newington, all of Conn., assignors to United Technologies Corporation, Hartford, Conn.**

**Filed May 7, 1976, Ser. No. 684,219**

**Int. Cl.² G01L** *5/26*

**U.S. Cl. 73—116** **4 Claims**




1. Apparatus for providing indications of speed of an internal combustion engine at two points in time spaced across a significant portion of an acceleration profile of the engine while accelerating, together with an accurate measure of the elapsed time between the two speed measurements, comprising:

means for registering an indication of a threshold speed, above which measurements relating to acceleration of the engine may be made and for presenting a threshold manifestation indicative thereof:

speed sensing means, adapted to be disposed for response to a mechanical rotation of a portion of the engine through successive known angles which are a small fraction of a full revolution of the engine, for successively providing measured data manifestations of the time elapsed during angular revolution of the engine through said known angles;

an interval timer operative in response to start and stop command input signals applied thereto to commence timing of an interval and to cease timing of an interval, and to provide an elapsed time manifestation indicative of the interval of time measured thereby;

cycle sensing means adapted to be disposed for response to motion of a member of said engine in timed relation to the cycles of said engine as said engine rotates through angles at least an order of magnitude greater than said small angles and providing a cycle signal in response thereto; and

processing means responsive to said measured data manifestations and said threshold manifestation for sensing a first succeeding occurrence of said cycle signal after the engine speed equals the threshold speed, and responsive to said first succeeding occurrence of said cycle signal to provide a start command input signal to said interval timer and to register said measured speed manifestation, and responsive to a subsequent one of said cycle signals to provide a stop command input signal to said interval timer and to register said measured data manifestation.



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**4,016,754**

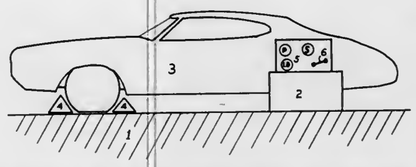
## TESTING DEVICE FOR WHEELED AUTOMOTIVE VEHICLES

**John W. Wiss, 3316 Brookdale Drive, Pittsburgh, Pa. 15241**

**Continuation-in-part of Ser. No. 280,865, Aug. 15, 1972, Pat. No. 3,826,129. This application July 30, 1974, Ser. No. 493,168**

**Int. Cl.² G01M** *15/00*

**U.S. Cl. 73—117.3** **17 Claims**




1. A testing device for wheeled automotive vehicles comprising:

first support means for engaging and restraining nonrotating elements of a vehicle, such as axle, nondriving wheel, and frame members;

nonrotating second support means for slidably engaging the tread surface of said vehicle's driving tires;

means for interposing a fluid between said second support means and said tires;

means for measuring force between said first and second support means.

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**4,016,755**

## METHOD AND DEVICE FOR DYNAMICALLY MEASURING BRAKE FORCES

**Paul-Henry Botvid Anderberg, Hollviksnas; Hans Gunnar Günther Hambitzer, Lund, and Nils Börje Lennart Sander, Malmo, all of Sweden, assignors to Svenska Aktiebolaget Bromsregulator, Malmo, Sweden**

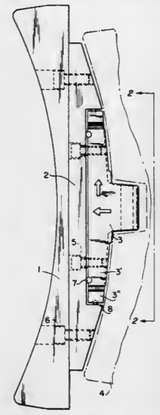
**Filed Aug. 26, 1975, Ser. No. 607,811**

**Claims priority, application Sweden, Sept. 6, 1974, 7411284**

**Int. Cl.² G01L** *5/28*

**U.S. Cl. 73—121** **2 Claims**

1. Dynamic brake force measuring means comprising in combination, a brake mechanism including a braking block and a braking friction material for contacting a rotating member preferably a railway wheel, a measuring part immovably affixed to said braking block at selected positions with said measuring part having at least two elastically deformable sections extending from the affixed positions responsive to deform respectively to brake forces transmitted thereto by said braking friction material through said braking block in different coordinate directions signifying radial and tangential brake forces, separate strain gauge means affixed respectively to said two deformable sections for reading out separately the



forces appearing in said different coordinate directions dynamically during the braking operation thereby to derive separate radial and tangential brake forces at different speeds and loads and braking forces, and directional force transmitting members respectively bearing on both said two deformable sections and braking block in said coordinate directions to transmit dynamic braking forces between said braking block and said measuring part deformable sections.

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**4,016,756**

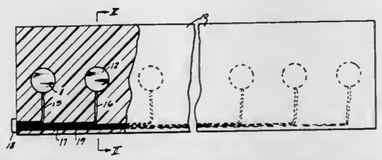
## NIP LOAD SENSING DEVICE

**Donald E. Kunkle, Beloit, Wis., assignor to Beloit Corporation, Beloit, Wis.**

**Filed June 8, 1972, Ser. No. 260,806**

**Int. Cl.² G01L** *5/16*

**U.S. Cl. 73—141 A** **7 Claims**




1. A mechanism for measuring nip load between opposed pressure rolls comprising in combination,

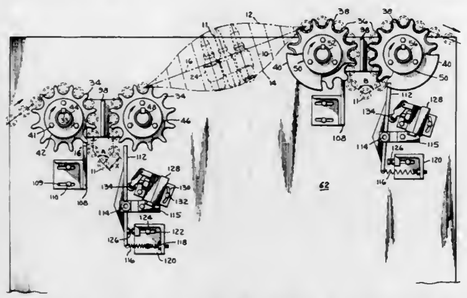
an elongate thin straight load sensing bar having a length to be coextensive with a nip to be tested, said bar being of substantially uniform thickness along its length,

a plurality of spaced load sensing cells embedded in said bar at spaced locations aligned with each other in a straight line so as to be centered in the nip with the bar centered between the rolls forming the nip and having an electrical characteristic which is a function of the stress on the bar across the nip, and electrical leads connected to each of the load sensing cells for connection to an indicator means for indicating the change in said electrical characteristic so that the nip load can be determined at each said locations along the nip at a predetermined overall force between rolls.

## 4,016,757
## APPARATUS FOR TESTING FLEXIBILITY OF AMMUNITION LINK BELTS

Vincent R. Elliott, Raytown, Mo., assignor to Remington Arms Company, Inc., Bridgeport, Conn.

Filed Nov. 5, 1975, Ser. No. 629,142
Int. Cl.² G01M 13/00
U.S. Cl. 73—167 11 Claims

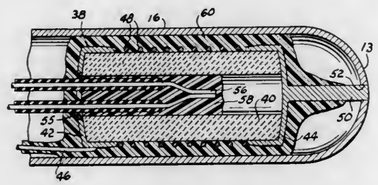


1. Apparatus for testing the flexibility of ammunition link belts, comprising in combination:
means for feeding an ammunition link belt longitudinally through a predetermined path which includes a first dependent loop in which the belt is longitudinally reversed in direction with a first side of the belt facing the outside of said first loop, a span in which the belt is twisted about its longitudinal axis, and a second dependent loop in which the belt is longitudinally reversed in direction with a second side of the belt facing the outside of said second loop;
and sensor means constructed and arranged for detecting enlargement of either of said loops from a normal size, incident upon feeding through said loops of relatively inflexible portions of the belt.

## 4,016,758
## THERMAL GAUGE PROBE

Julian S. Taylor, 8300 SW. 8, Oklahoma City, Okla. 73108

Filed Sept. 9, 1975, Ser. No. 611,755
Int. Cl.² G01F 1/68
U.S. Cl. 73—204 8 Claims

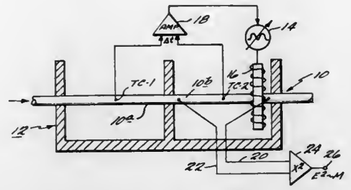


1. A thermal gauge probe, comprising:
an elongated tubular stem having a closed end portion, said stem being adapted to be inserted at its closed end portion into a fluid stream contained by a wall;
a resistance heater coil axially disposed within said stem and connected with a source of electrical energy supplying a constant voltage of preselected value to said heater coil;
a thermocouple within said stem and having its junction axially disposed within said resistance heater coil; and
tubelike electrical nonconducting material surrounding the thermocouple junction and supporting said heater coil in spaced relation with respect to the inner wall surface of said stem,
whereby the electromotive force generated by said thermocouple in response to the temperature of said heater coil is inversely proportional to the rate of heat dissipation from the outer surface area of said stem to the surrounding fluid.

## 4,016,759
## FLUID FLOWMETER

William C. Baker, Hampton, and John J. Chapman, Virginia Beach, both of Va., assignors to Teledyne, Inc., Los Angeles, Calif.

Filed Sept. 18, 1975, Ser. No. 614,654
Int. Cl.² G01F 1/68
U.S. Cl. 73—204 21 Claims

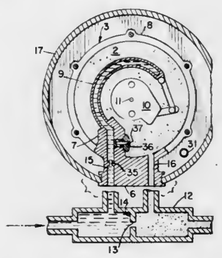


1. Apparatus for measuring fluid flow, comprising:
at least one conduit through which fluid passes;
a heat sink through which said conduit projects, said heat sink including a partition for separating said conduit into first and second conduit portions;
means for heating said first portion of the conduit, said heat sink preventing the second portion of the conduit from being heated when said first portion is heated;
means joined to the exterior of said conduit at said first and second conduit portions for sensing the temperature of the conduit at said portions and for producing output signals representative of the temperatures sensed;
means responsive to said output signals produced by the temperature sensing means for varying power supplied to said heating means in order to maintain a constant difference in temperature between two of said sensing means; and
means for developing an additional output signal proportional to the power supplied to the heating means and representative of the mass flowrate of fluid passing through said conduit.

## 4,016,760
## DIFFERENTIAL FLOWMETER

Thomas D. Taylor, Roanoke, Va., assignor to Graham-White Manufacturing Co., Salem, Va.

Filed Dec. 17, 1975, Ser. No. 641,825
Int. Cl.² G01F 1/34
U.S. Cl. 73—205 R 7 Claims



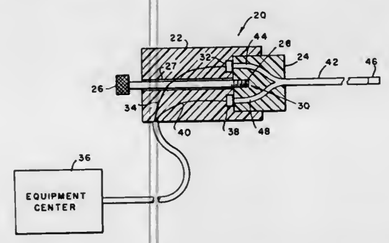
1. A differential flowmeter comprising a fluid-tight casing, a pressure chamber contained in said casing, an element sealed in said chamber and expansible and contractible in response to differentials in internal and external pressures thereon, said element internally and said chamber being separately connected to a fluid line on opposite sides of a restriction therein for receiving line fluid therefrom and therethrough applying directly to said element different pressures in said line upstream and downstream of said restriction, and an equalizing valve in said pressure chamber between said chamber and the upstream connection of the pressure responsive element to the fluid line for limiting the differential pressures on the element to a predetermined maximum.



## 4,016,761
## OPTICAL TEMPERATURE PROBE

Thomas C. Rozzell, Annandale, Va.; Curtis Johnson, Sanda, Utah; Carl Durney, and James Lords, both of Salt Lake City, Utah, assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Apr. 18, 1974, Ser. No. 461,834
Int. Cl.² G01K 11/12; G01J 5/60
U.S. Cl. 73—356 11 Claims

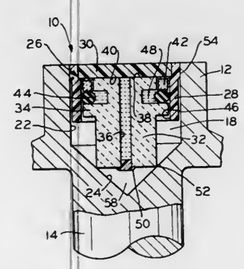


1. A temperature probe which is adapted to be implanted in a material whose temperature is to be measured comprising:
an optic fiber bundle having first and second groups of optic fibers which are physically separated at one end of said bundle;
a temperature sensitive element adapted to be implanted in said material to be measured and in close proximity to the other end of said bundle;
means for maintaining said element in an airtight relationship to said other end of said bundle, said element having light reflective properties which are responsive to temperature changes; and
light source adjacent to said first group of optic fibers at said one end of said bundle, and a light responsive element adjacent the second group of optic fibers at said one end of said bundle.

## 4,016,762
## TEMPERATURE INDICATOR

William J. Payne, Greensburg, Pa., assignor to Modulus Corporation, Chagrin Falls, Ohio

Filed Sept. 2, 1975, Ser. No. 609,374
Int. Cl.² G01K 11/12
U.S. Cl. 73—358 12 Claims

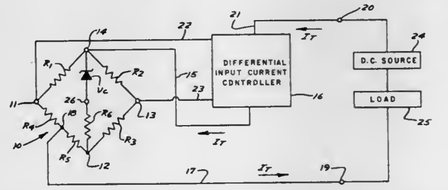


1. A temperature indicator comprising:
a first member subject to temperature fluctuations and having a head with a recess extending into said head;
a fluid holding member having a window and disposed within said recess such that said window is visible;
an indicator area and a light-absorbing indicator fluid disposed in said fluid holding member;
said indicator area being separated from said window with at least a portion of said fluid disposed between said indicator area and said window;
means to drain said fluid from the space between said indicator area and said window upon the reaching of a predetermined temperature; whereby
said indicator area will be visible through said window at a predetermined temperature thereby giving a visual indication of the fact that such predetermined temperature has been reached.

## 4,016,763
## TWO WIRE CURRENT TRANSMITTER RESPONSIVE TO A RESISTIVE TEMPERATURE SENSOR INPUT SIGNAL

Earl A. Grindheim, Minneapolis, Minn., assignor to Rosemount Inc., Eden Prairie, Minn.

Division of Ser. No. 14,748, Feb. 24, 1970, Pat. No. 3,859,594, which is a continuation-in-part of Ser. No. 661,988, Aug. 21, 1967, abandoned. This application Sept. 27, 1974, Ser. No. 510,026
*Disclosure was also published under second Trial Voluntary Protest Program on Apr. 13, 1976*
Int. Cl.² G01K 7/24
U.S. Cl. 73—362 AR 11 Claims



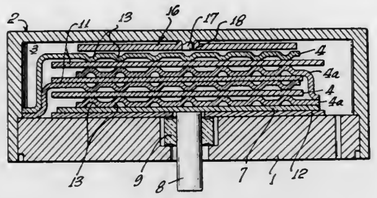
1. A resistance-to-current converter system comprising:
a. a sensing resistor responsive to a variable physical condition to be indicated,
b. a bridge including said resistor, said bridge having input and output junctions and being balanced only when said resistor has a predetermined value, whereby the bridge voltage developed at said output junctions is a function of the deviation of the resistor from said predetermined value as a result of a change in said physical condition,
c. a D-C amplifier whose input circuit is connected to the output junctions of said bridge whereby the impedance in the output circuit of the amplifier varies as a function of said bridge voltage,
d. a direct-voltage source providing an operating voltage both for said bridge and said amplifier,
e. a load connected in series with said source and having an output current flow therethrough resulting from variations in said resistor and hence indicative of said condition,
f. a voltage regulator,
g. a pair of wires connecting said series-connected source and load through said regulator across both the output circuit of said amplifier and the input junctions of said bridge, whereby the operating voltage of said amplifier is stabilized despite variations in said output current flow through said load resulting from variations in the value of said resistor,
h. a feedback resistor connected in series with said load to produce a feedback voltage, and
i. means to feed said feedback voltage into the arm of said bridge containing said sensing resistor in series opposition to the voltage produced by the sensing resistor to rebalance the bridge, whereby the output current is accurately proportional to changes in said resistor.

**4,016,764**

## TEMPERATURE COMPENSATED, HIGH RESOLUTION PRESSURE TRANSDUCER BASED ON CAPACITANCE CHANGE PRINCIPLES

**John H. Rice, Cumberland, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed July 19, 1976, Ser. No. 706,657**
**Int. Cl.² G01L 9/12**
**U.S. Cl. 73—398 C** **12 Claims**



1. Capacitive transducer apparatus for measuring and sensing ambient environmental pressure variations comprising:
- a plurality of disc-like capacitor plates disposed a spaced distance one from the other,
- resilient means associated with said plates for yieldably maintaining said spaced distance,
- a dielectric substance within said space,
- voltage means for capacitively charging said plates,
- a diaphragm member having a disc-like extent disposed over said plates,
- a disc-like piston member coaxially secured to said disc-like extent, said member being substantially coextensive with said plates and being disposed in firm contact with one of the said plates at a spaced distance from said diaphragm,
- said disc-like extent being exposed to said environment whereby ambient pressure-produced diaphragm movements are distributively transmitted through said load piston to uniformly move said plates and vary their capacitance, and
- capacitance output means.

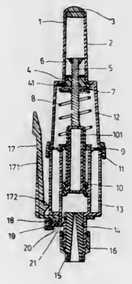
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**4,016,765**

## PIPETTE CONTROLLER WITH GRADUATE READING PLUNGER

**Tsao-Piao Lee, No. 89-1, Chang Chun Road, 2nd Fl., Taipei, China /Taiwan (104)**

**Filed May 7, 1976, Ser. No. 684,258**
**Int. Cl.² B01L 3/02; G01N 1/14**
**U.S. Cl. 73—425.6** **10 Claims**



6. A pipette controller comprising:
- a cylinder having, at its base, a first port provided with a rubber seal and a collet for tightly connecting with the mouthpiece of a pipette inserted therein, and a second port communicating with the atmosphere via a channel;
- a cap member of substantially U-shaped vertical section coaxially mounted on the upper end of the cylinder;
- a piston capable of reciprocation inside the cylinder; and
- a threaded rod having one end connected to the piston and the other end threadedly connected with a plunger assembly extending through an opening on the top of the cap member, said plunger assembly having a radial flange on the lower end thereof and a coiled spring biasing said flange against the inner upper side of said cap member, said spring wound around the threaded rod between said flange and said cylinder for normally maintaning the upper end of the plunger assembly projected outside the cap member and providing restoring force therefor;

said plunger assembly including:
- a hollow tubular member of transparent material;
- a lid closing the upper end of the tubular member;
- a nut member fixedly connected to the lower end of the tubular member, a threaded opening extending through the nut member for threadedly engaging and guiding the upper end of the threaded rod such that the upper end of the threaded rod will be caused to ascend or descend with respect to the wall of the tubular member when the plunger is turned in clockwise or counter clockwise direction;
- a set of graduations spaced on the surface of the wall of the tubular member in cooperation with an indicating means provided on the upper-most end of the threaded rod inside the tubular member to indicate the volume of the liquid being sucked in by the travel of the piston, whereby the volume of the liquid to be pipetted may be preset by turning the plunger to have the indicating means coincide with a selected one of the graduation lines; and
- an operable lever assembly connected to close said channel for controlling the natural drainage of the liquid from the inserted pipette.

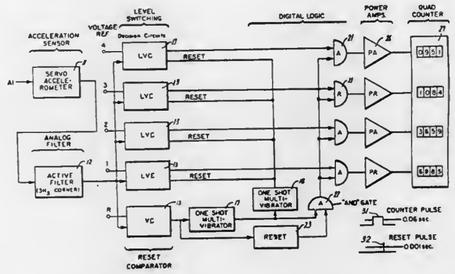
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**4,016,766**

## COUNTING ACCELEROMETER APPARATUS

**Harold D. Morris, Orinda, Calif., assignor to Systron Donner Corporation, Concord, Calif.**

**Continuation of Ser. No. 137,209, April 26, 1971, abandoned, which is a continuation-in-part of Ser. No. 841,271, July 14, 1969, abandoned. This application Nov. 30, 1973, Ser. No. 420,537**
**Int. Cl.² G01P 15/08**
**U.S. Cl. 73—517 R** **27 Claims**




1. In a counting accelerometer, a single means for sensing acceleration for producing an output signal substantially linearly proportional to acceleration, filter means for receiving the output signal and for filtering out spurious information contained in the output signal, a plurality of electronic decision circuits, each of said decision circuits having a pair of inputs and an output, one of the inputs in each of the decision circuits being coupled to the output of the filtering means, a reference for each of said decision circuits connected to the other input of the respective decision circuit, said references having different values, counting means for registering each time each decision circuit makes a determination that the output signal from the single means for sensing acceleration exceeds each reference, and means for causing delayed resetting of each of the decision circuits after the information carried by the decision circuits has been registered in the counting means, said means for causing delayed resetting for each of the decision circuits including means for preventing the resetting of the decision circuit after the output signal of the means for sensing acceleration has reached a value greater than a predetermined reference value until the output signal of the means for sensing acceleration returns to a value less than the predetermined reference value.



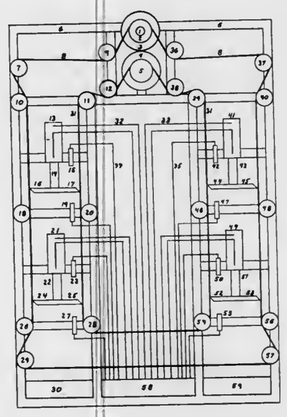
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**4,016,767**

## ENERGY ENGINE NUMBER TWO

**Robert Wayne Bradley, 27751 No. 46 Sidney Drive, Euclid, Ohio 44132**

**Filed Sept. 11, 1975, Ser. No. 612,482**
**Int. Cl.² F16H 21/16**
**U.S. Cl. 74—25** **4 Claims**



1. A device for converting reciprocal motion to rotary motion comprising,
- first and second continuous loops of chain,
- each of said chain loops being connected to rotary means, means inter-connecting said rotary means for unitary output including means to reverse the output direction of one of said rotary means,
- input means,
- said input means including at least one reciprocating member,
- each reciprocating member having a first driving connection with the first chain loop and a second driving connection with the second chain loop, each drive connection being a one-way drive chain drive connection; said first drive connections being positioned for driving in one direction of reciprocation and the second drive connections being positioned for driving in the opposite direction of rotation,
- whereby reciprocating motion is converted to rotary motion during both directions of reciprocation.

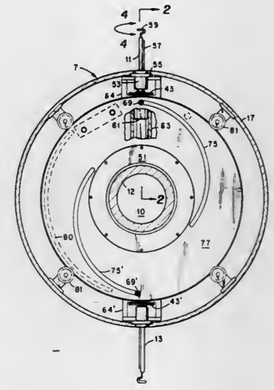
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**4,016,768**

## TRAVERSING PROBE SYSTEM

**Douglas N. Mashburn, Knoxville; Richard H. Stevens, Oak Ridge, and Harold C. Woodall, Kingston, all of Tenn., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.**

**Filed Mar. 15, 1976, Ser. No. 667,005**
**Int. Cl.² F16H 21/00**
**U.S. Cl. 74—23** **10 Claims**



1. Probe positioning apparatus comprising:
- a. a member having a surface of revolution and rotatable about an axis of the same;
- b. a sensing probe mounted to said member and disposed normal to said axis, said probe being slidable along its axis and rotatable about its axis.
- c. a first ring gear rigidly secured to said member and coaxial therewith,
- d. a second ring gear rotatably supported by said member and coaxial therewith,
- e. means coupling said second ring gear and said probe, for rotating said probe about its axis when said second ring gear is rotated,
- f. a cam plate rotatably supported by said member and coupled to said probe, for imparting slidable movement to said probe when said member is rotated relative to said cam plate,
- g. first drive means for rotating said first ring gear, and
- h. second drive means for rotating said second ring gear.

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**4,016,769**

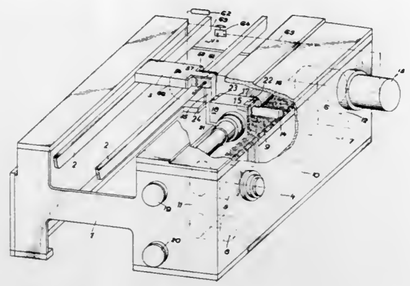
## INDEXING DRIVE FOR TRANSFER LINES

**Gerhard Fröschle, Kongen, Germany, assignor to Cross Europa-Werk GmbH, Wendlingen, Germany**

**Filed Jan. 16, 1975, Ser. No. 541,570**
**Int. Cl.² F16H 19/06**
**U.S. Cl. 74—37** **6 Claims**

1. In an indexing drive for transfer lines of the type having a timed-bar driver supported for reciprocating movement on a frame and couplable to at least one timed-bar, a longitudinally displaceable drive element driven by a drive source substantially parallel to the plane of movement of the timed bar, means supporting said drive element for linear reciprocating movement, means continuously coupling the drive element to the timed-bar driver, at least two associated surfaces at said coupling means, said surfaces extending transversely to the direction of said reciprocating movement, connecting means constantly and sealingly pressing said surfaces together, means

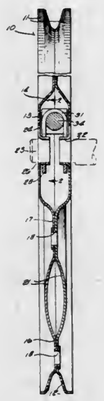
causing a medium under pressure to impinge on said surfaces at their plane of contact, and a sensing device continuously



monitoring said pressure impingement and responsive to a pressure decrease to emit a signal.

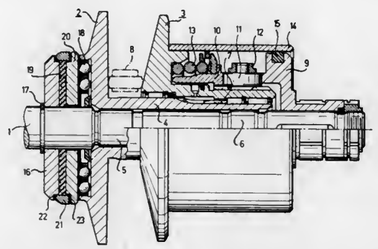
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**4,016,770**
**PULLEY ASSEMBLY**
**Edward W. Enters, Fredonia, Wis., assignor to Gilson Bros. Co., Plymouth, Wis.**
**Filed Nov. 3, 1975, Ser. No. 628,188**
**Int. Cl.² F16H** *55/54, 55/36;* **F16B** *2/02;* **B25G** *3/20*
**U.S. Cl. 74—230.3** **9 Claims**



1. In an assembly of a pulley and shaft and a coupling between the pulley and shaft, the improvement in which the coupling comprises a clamp having radially deformable jaws embracing said shaft and a jaw actuator for moving said jaws toward said shaft to clamp the pulley to the shaft, said clamp having a keyhole-shaped shaft-receiving opening, said clamp having free-ended levers extending transversely from the jaws and to which said jaw actuator is connected.

**4,016,771**
**MOUNTING FOR A CONE PULLEY TRANSMISSION**
**Heinrich Berens, Bad Homburg, and Stefan Füle, Bad Nauheim, both of Germany, assignors to P.I.V. Antrieb Werner Reimers Kommanditgesellschaft, Bad Homburg, Germany**
**Filed Sept. 29, 1975, Ser. No. 617,708**
**Claims priority, application Germany, Oct. 9, 1974, 2449819**
**Int. Cl. F16h** *11/06, 55/56;* **F16c** *27/00*
**U.S. Cl. 74—230.17 M** **7 Claims**



1. In a mounting for a cone pulley transmission that includes a shaft; a first and a second pulley disc axially slidably mounted on the shaft; means coupling the first pulley disc to the second pulley disc for rotation in unison with respect to the shaft; a support disc axially fixedly mounted on the shaft; an axial anti-friction bearing mounted on the shaft in engagement with the first pulley disc and situated between the first pulley disc and the support disc; and a pressing device urging the pulley discs towards one another and coupling the pulley discs to the shaft; the improvement comprising

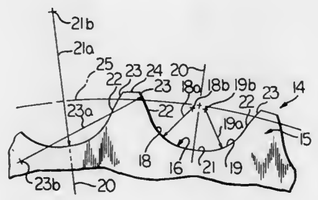
a. a radially oriented bearing disc mounted on said shaft and being in engagement with said anti-friction bearing; said bearing disc being spaced from and being movable with respect to, said support disc;

b. a radially oriented deformable intermediate layer disposed between and in face-to-face engagement with, said suppot disc and said bearing disc; and

c. means for tightly enclosing said intermediate layer at all sides for preventing said intermediate layer from undergoing, during operation, a permanent radial deformation.

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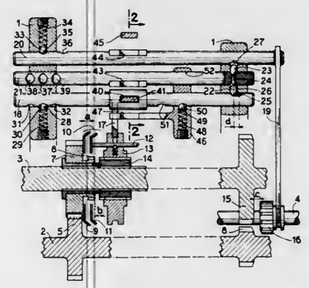
**4,016,772**
**SPROCKET MEMBER CONFIGURATION**
**Donald E. Clemens, Tremont, and Glenn M. Haslett, Peoria, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.**
**Filed Sept. 22, 1975, Ser. No. 615,446**
**Int. Cl.² F16H** *55/30;* **B62D** *55/08*
**U.S. Cl. 74—243 R** **10 Claims**



1. In a chain drive sprocket member having a plurality of teeth defining a pitch circle having a radius of approximately 20 inches, an improved pocket configuration between said teeth having opposite flank surfaces at opposite sides of the pocket radial centerline each defined by a pocket radius centered on a point spaced radially inwardly of said pitch circle and spaced circumferentially from said pocket radial centerline, and an arcuate root surface defined by a radius centered on a point on said pocket radial centerline and spaced outwardly of said pitch circle.

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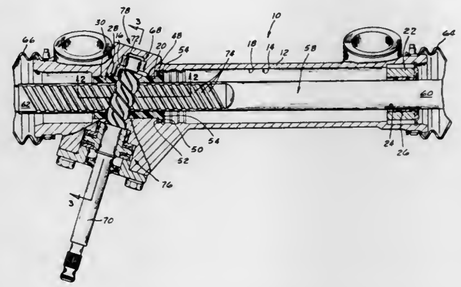
**4,016,773**
**SYNCHRONIZED GEARBOXES HAVING AT LEAST ONE NON-SYNCHRONIZED SPEED**
**Jacques Galas, Puteaux, and Daniel Marie, Conflans, both of France, assignors to Automobiles Peugeot, Paris and Regie Nationale des Usines Renault, Boulogne-Billancourt, both of, France**
**Filed Feb. 21, 1975, Ser. No. 551,687**
**Claims priority, application France, Mar. 6, 1974, 74.07565**
**Int. Cl.² F16H** *3/22, 3/16*
**U.S. Cl. 74—333** **6 Claims**



1. In a gearbox comprising a case and the following elements mounted in the case: a first shaft, a second shaft, at least one set of synchronized gears comprising a first gear rotatably mounted on said first shaft and a second gear integral with said second shaft, a first movable gear engaging means combined with said first gear and comprising a synchronizer for synchronizing the rotation of said first gear with the rotation of said first shaft and coupling means for coupling said first gear with said first shaft to rotate with said first shaft, first shifting means combined with said first gear engaging means for shifting said first gear engaging means between a neutral position, a first position in which first position said synchronizer is rendered operative and a second position in which second position said coupling means is rendered operative, said second position being beyond said first position relative to said neutral position, an unsynchronized second set of gears comprising a third gear integral with said first shaft and a fourth gear integral with said second shaft, a second gear engaging means cooperative with said second set of gears and comprising a rotatable gear pinion capable of being shifted to an operative position of engagement between said third and fourth gears, and second shifting means combined with said second gear engaging means for shifting said gear pinion to said operative position; the improvement comprising intermediate means movably mounted on said first shifting means, selector means capable of cooperating simultaneously with said second shifting means and said intermediate means, releasable means for fixing said intermediate means to said first shifting means, said selector means being capable of shifting said first shifting means through the agency of said intermediate means a sufficient extent to cause said first gear engaging means to move from said neutral to said first position substantially before said selector means has shifted said gear pinion to said operative position through the agency of said second shifting means, and means for releasing said releasable means when said first gear engaging means have reached said first position and thereby precluding further movement of said first gear engaging means while said selector means continues to shift said gear pinion into said operative position through the agency of said second shifting means, said selector means being capable of cooperating solely with said first shifting means to the exclusion of said intermedite means and said second shifting means when it is desired to engage said first set of gears.

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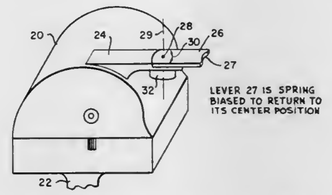
**4,016,774**
**RACK AND PINION STEERING GEAR**
**Donald J. Baker, and Robert W. Jackson, both of South Bend, Ind., assignors to The Bendix Corporation, South Bend, Ind.**
**Filed Dec. 19, 1975, Ser. No. 642,290**
**Int. Cl.² F16H** *1/18, 19/04, 1/04;* **B62D** *1/20*
**U.S. Cl. 74—424.6** **16 Claims**



1. In a rack and pinion and steering gear assembly, a housing defining a longitudinal bore and a cross bore therewithin, said longitudinal bore being stepped to define larger and smaller sections with a shoulder therebetween, said cross bore intersecting said longitudinal bore at the smaller diameter section of the latter, a pinion rotatably mounted in said cross bore at the intersection of the latter with said longitudinal bore, a rack slidably supported in said longitudinal bore by said smaller section of the latter, and meshing with said pinion, an annular bearing member located in the smaller portion of the longitudinal bore for supporting said rack, said annular bearing having an opening for receiving said pinion, and resilient means acting against said bearing means to yieldably urge the latter and therefore said rack toward said pinion, whereby the bias exerted by said resilient means against said annular bearing yieldably maintains said rack in meshing engagement with said pinion.

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**4,016,775**
**FINGER ACTUATED CONTROLLER**
**E. Frank Carlson, Maple Valley, Wash., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**
**Filed July 11, 1974, Ser. No. 487,697**
**Int. Cl.² G05G** *9/00*
**U.S. Cl. 74—471 XY** **3 Claims**




1. In an aircraft having a control lever controlling a throttle control, said control lever having a top portion knob-shaped for easy grasping by a pilot of the aircraft, the addition of a control device comprising:

a support arm having at least two sides and positioned along a longitudinal axis mounted at one end of said top portion and extending away therefrom;

a finger-operated elongated member pivotally mounted

near one end thereof about a pivot point on said support arm and positioned along the same longitudinal axis as said support arm;

centering means connected to said finger-operated member for automatically returning it to said pivot point after said member has been moved about said pivot point to either side of said support arm, said finger-operated member having a free end which is arcuate-shaped to comfortably receive the finger of a pilot;

a position transducer located beneath said support arm;

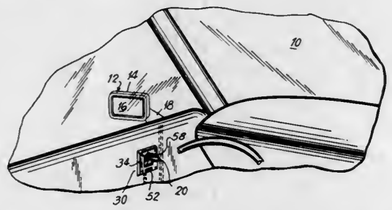
linking means connecting said elongated member with said transducer, whereby movement of said finger of said elongated member about said pivot point provides a control input to said transducer proportional to said movement.

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**4,016,776**
**REMOTELY CONTROLLED EXTERNALLY MOUNTED MOTOR VEHICLE MIRROR**

**Jesse R. Hollins, 40 Stoner Ave., Great Neck, N.Y. 11021**

**Filed Aug. 22, 1975, Ser. No. 606,795**
**Int. Cl.² F16C** *1/12*
**U.S. Cl. 74—501 M** **8 Claims**



1. An improved remotely controlled externally mounted motor vehicle mirror comprising a motor vehicle, a door adjacent to where the driver of the motor vehicle sits, a mirror assembly including a mirror affixed to the outside of said door, means stationary with said door for selectively adjusting the position of said mirror including a member, and means for placing said selective adjusting means in a desired reference position including means for limiting the movement of said member in a vertical and horizontal direction whereby said mirror can be placed in a desired reference position.

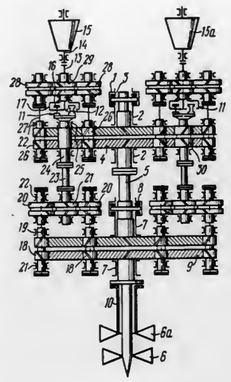
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**4,016,777**
**SHIP REDUCTION GEAR FOR CONTRAROTATING SCREWS**

**Nikolai Stepanovich Ryzhkov, ulitsa L. Golikova, 4, kv. 152; Viktor Petrovich Nikolaev, prospekt Stachek, 216, kv. 8; Viktor Alexeevich Krylov, ulitsa Khrustitskogo, 110, kv. 31; Leonid Yakovlevich Ioffe, ulitsa Gogolya, 21, kv. 26; Veniamin Vasilievich Krotov, ulitsa Stolkosti, 41, korpus 1, kv. 175, and Jury Adolfovich Derzhavets, ulitsa Orbeli, 25, korpus 4, kv. 27, all of Leningrad, U.S.S.R.**

**Filed Jan. 9, 1975, Ser. No. 539,841**
**Int. Cl.² F16H** *37/06*
**U.S. Cl. 74—665 K** **2 Claims**

1. A ship reduction gear for two contra-rotating propeller screws (6, 6*a*), comprising: a housing (1); two gears (4, 9) arranged in said housing; an internal propeller shaft (5) rigidly connected with one (4) of said gears; an external propeller shaft (10) coaxial with said internal shaft and rigidly connected with the other (9) of said gears; said shafts carrying the screws and serving as the output elements of the ship reduction gear; at least one differential (11) installed in said housing and including a driving element (12) which is the input element of the ship reduction gear, and two driven elements (16, 17); kinematic chains (29 to 26 and 21 to 18), respectively connecting said driven elements with said gears (4, 9), each of said kinematic chains including first two pairs of gears (18, 26) permanently meshing with respective ones of said gears (4, 9) of the shafts, second two pairs of gears (20, 28), two shafts (19, 27), said first pairs of gears being fitted on one of their ends, and said second pairs of gears being fitted on their



other ends, and pinions (21, 29) connected with respective ones of said driven elements (16, 17) and permanently meshing with said second pairs of gears; whereby the power flow transmitted to the reduction gear is divided into four flows, two flows per each of said gears (4, 9) of the shafts (5, 10).

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**4,016,778**
**WORM DRIVE HYDRAULIC AUTOMATIC TRANSMISSION**

**John W. von Greyerz, 55 W. Rahn Road, Dayton, Ohio 45429**

**Filed Apr. 4, 1975, Ser. No. 564,875**
**Int. Cl.² F16H** *47/04*
**U.S. Cl. 74—687** **3 Claims**

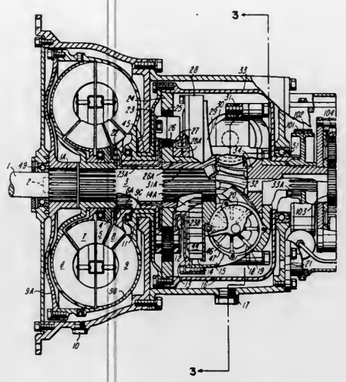
1. A fluid-driven worm drive automatic transmission capable of providing low motor to drive wheel ratios and substantially reducing differential gear reductions and having as distinct operational units a fluid drive torque converter, a hydraulically driven and controlled worm drive unit and a gear box unit, said transmission including an output shaft driven by said fluid-controlled worm drive unit and turbine-driven first planetary gear system with connected carrier and associated engine driven primary pump attached thereto at one end, and a primary pump-driven second planetary gear system with carrier and connected oil pump having an annulus gear attached at the other end of said output shaft in a position adjacent to said torque converter, thereby providing a base for driving at least two pinion gears, said pinion gears causing rotation of a sun gear of said second planetary gear system and its attached oil pump at a speed faster than that of said driven first planetary carrier and associated primary pump during operation thereof, whereby:

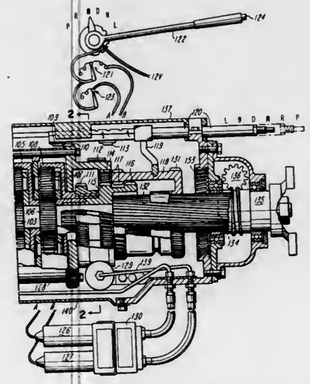
the rotational speed of said sun gear of said second planetary gear system and its connected oil pump is directly proportional to the rotational speed of both said driven first planet carrier and said output shaft;

the torque required to drive said first planetary gears and oil pump is applied to said output shaft by said second planetary annulus gear and output shaft return housing; and

said second planetary gear system drives its oil pump with added speed during acceleration and wherein said second planetary gear system is connected to a rotatable pump hub having retractable vanes within an ellipsoid-shaped housing having an intake chamber and an exhaust chamber at each end of said ellipsoid to provide dual intake and exhaust areas each of which has connected thereto an oil motor with appropriate connecting feedlines, said oil







pump housing, oil feedlines and oil motors being connected to said first planet worm carrier.

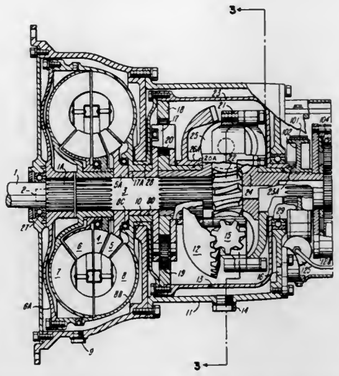
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**4,016,779**
**WORM DRIVE AUTOMATIC TRANSMISSION**

**John W. von Greyerz, 55 W. Rahn Road, Dayton, Ohio 45429**

**Filed Apr. 4, 1975, Ser. No. 564,877**
**Int. Cl.² F16H** *37/06*
**U.S. Cl. 74—724** **5 Claims**

1. A mechanically-driven worm drive transmission capable of responding to changed load conditions while providing low motor to drive wheel ratios, said transmission having an internal worm drive output shaft connected at one end to a mechanically gear-driven worm drive unit through a first turbine-driven planetary gear system having a carrier connected to and driven by the turbine of a torque converter and at the other end a second planetary gear system having a carrier driven by the primary pump of said torque converter and annulus gear providing a base, adjacent to said torque converter, for driving at least two associated pinion gears which in turn rotate a sun gear and separate worm driven ring gear, whereby the speed of rotation of said latter two gears exceeds that of both said driven second planet carrier and its associated engine-driven primary pump, whereby the speed of rotation of said sun gear and its connected worm drive ring



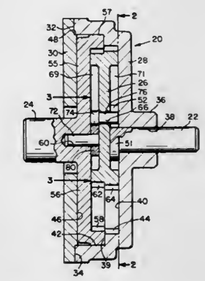
gear is directly proportional to that of said first turbine-driven planet carrier and output shaft.

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**4,016,780**
**HYPOTROCHOIDAL CLUSTER GEAR DRIVES**

**Sandor J. Baranyi, Ithaca, N.Y., assignor to Trochoidal Gear Technology, Inc., Ithaca, N.Y.**

**Filed Mar. 3, 1975, Ser. No. 554,903**
**Int. Cl.² F16H** *1/28*
**U.S. Cl. 74—804** **10 Claims**



1. A gear unit comprising

a housing,

two axially-aligned shafts, both of which are journaled in said housing,

two internal gears mounted in said housing coaxially with said shafts, and slightly offset from each other along the common axis of said shafts,

one of said internal gears being fixed in said housing, and the other being secured to one of said shafts, and having thereon a circumferential outer peripheral surface,

a crank secured to the other of said shafts,

said other internal gear being rotatably journaled on its outer peripheral surface in said housing,

a cluster gear,

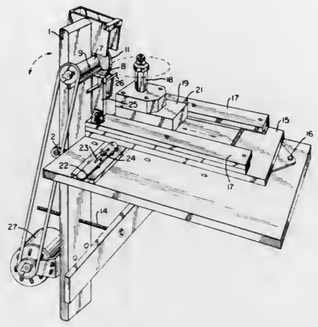
said cluster gear comprising two externally-toothed gears of different diameters, respectively, one of which meshes with said fixed internal gear and the other of which meshes with said other internal gear,

said cluster gears being coaxial but having their common axis parallel to but offset from the axis of said shafts, and

a crank pin secured to said crank coaxially with said cluster gear and connecting said crank to said cluster gear.

**4,016,781**
## DEVICE FOR GUMMING AND SHARPENING CIRCLE SAWS

**Alex Dudley, 220 Edgewood Road, Lansing, Mich. 48910**
**Filed Aug. 4, 1975, Ser. No. 574,362**
**Int. Cl.² B23D** *63/14*
**U.S. Cl. 76—40** **3 Claims**



3. A circular saw blade sharpening apparatus comprising, in combination, a vertical rocker panel with a rotatable drive shaft carrying a cutting disc; a motor for powering said drive shaft; a rocker arm on which said vertical panel is balanced; means for securing said panel against further progress toward saw holding structure, in cooperating means with,

a. a saw blade supporting structure comprising an elongated base table, means for securing said table to a bench; ways allowing a block carrying a saw holding arbor to travel to and from said vertical panel, means for securing the travel of said block at a desired point,

b. manually operable saw tooth locating means, means for locking said locating means in place,

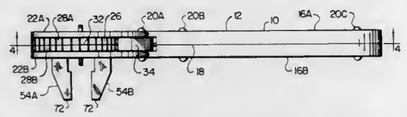
c. means for locking said saw blade on said saw holding arbor,

wherein said vertical rocker panel is freely balanced on said rocker arm and carries said cutting disc in close proximity to a horizontally disposed saw blade that is freely rotatable on said saw holding arbor.

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**4,016,782**
## ADJUSTABLE RATCHET WRENCH

**Henry L. Guimarin, Rte. 3, Box 337, Grapevine, Tex. 76051**
**Filed Sept. 12, 1975, Ser. No. 612,949**
**Int. Cl.² B25B** *13/46*
**U.S. Cl. 81—63** **1 Claim**



1. An improved adjustable ratchet wrench comprising:

a body formed of two complementary side pieces and defining an elongated handle portion and two parallel, spaced apart members each terminating in a generally circular enlarged ratchet holding head;

a circular ratchet member having a plurality of ratchet teeth about its periphery and hub portions of reduced diameter extending from opposing sides;

each of said ratchet holding heads including co-axial circular openings receiving one of the hub portions of said ratchet member and supporting said ratchet member for rotation;

a generally triangular shaped pawl member mounted between said spread apart members and pivotal between first and second positions in which first and second abutments selectively engage said ratchet teeth to selectively control the direction in which said ratchet member can be rotated;

spring means co-operatively associated with a third abutment for biasing said pawl member into said first and second positions;

a double acting lead screw having an intergal thumb wheel

said ratchet member including a centrally disposed rectangular opening for receiving said double acting lead screw and means for supporting said lead screw at its ends for rotation about an axis coinciding with a diameter of said ratchet disk;

said ratchet disk including two complimentary disk portions each including an outer rim with ratchet teeth formed thereon, one said hub portions, a pair of opposed notches positioned along a first diameter of the disk defining said means for supporting said lead screw, a pair of opposed slots positioned along a second diameter of said disk normal to said first diameter for receiving said thumb wheel and means effective when the disk portions are positioned in opposed relationship for preventing rotation of one disk relative to the other;

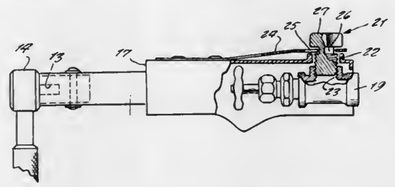
a pair of opposed jaw members each having a threaded base and carried by said lead screw for movement selectively toward and away from each other dependent upon the direction of rotation of the lead screw;

opposed faces of said jaw members including two obliquely angled planes defining a spread V shape extending from the free end of the jaw member toward said base a limited distance.

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**4,016,783**
## VALVE WRENCH

**George Spector, 233 Broadway, Rm. 3615, and Sergio Casino, c/o George Spector, 233 Broadway, Rm. 3615, both of New York, N.Y. 10007**
**Filed Aug. 25, 1975, Ser. No. 602,666**
**Int. Cl.² B25B** *13/48*
**U.S. Cl. 81—71** **6 Claims**



1. In a valve wrench, the combination of a housing integral with one end of a handle, said handle attached at its other end to a sidewardly extending socket wrench, said housing having an opening on an underside thereof for receiving a fitting, a forward end of said housing having an opening so said fitting protrudes outwardly therefrom, and a stabilizer bolt extending through a top wall of said housing for engaging a threaded opening along a side of said fitting.

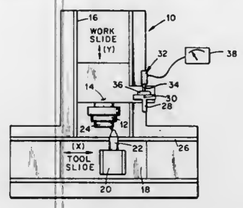
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**4,016,784**
## TOOL SETTING DEVICE

**Raymond J. Brown, Clinton, Tenn., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.**
**Filed Jan. 5, 1976, Ser. No. 646,705**
**Int. Cl.² B23B** *7/00*
**U.S. Cl. 82—2 R** **3 Claims**

1. A machine tool setting device for use with a numerically controlled machine utilizing a machine tool in an X-Y axes coordinate system for machining a workpiece, consisting of a single linear variable displacement transducer having a displaceable stylus projecting therefrom, a T-shaped member having an axis of rotation in line with and perpendicular to the plane of displacement of said stylus, said T-shaped member being disposed in a contiguous relationship with said stylus for displacement thereof in response to contact of the T-shaped



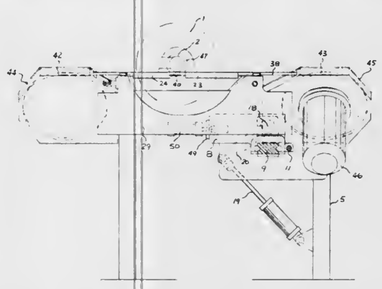


member with said machine tool during relative movement therebetween in either the X or Y direction, and voltage responsive means coupled to said transducer for indicating the actual position of the machine tool along the axis the relative movement is occurring relative to a predetermined desired tool position along the same axis.

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**4,016,785**
## ROLL SLITTER

**Charles Treffner, and Peter Treffner, both of 43 Yangoora Road, Belmore, Sydney, New South Wales, Australia (2192)**
**Filed Sept. 26, 1975, Ser. No. 617,268**
**Claims priority, application Australia, Sept. 30, 1974, 9083/74**
**Int. Cl.² B23B** *37/00, 3/04*
**U.S. Cl. 82—53** **10 Claims**



1. Apparatus for slitting a wound roll of sheet material into two parts comprising:

means for mounting and rotating said roll about its axis,

cutting means comprising a pair of parallel, spaced apart, rectilinear knife blades disposed in planes perpendicular to the axis of said roll, and a band saw blade disposed between said knife blades,

knife blade support means including a mounting frame, and a blade carrier band affixed to and held in tension between two spaced apart points on said mounting frame, said knife blades being fixedly mounted on said blade carrier band,

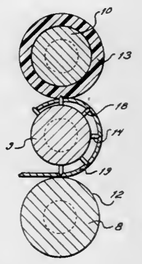
means to move said saw blade longitudinally with respect to said knife blades so as to remove swarf from between said knife blades,

means for providing relative movement between said mounting frame and said roll such that said cutting means comes into cutting engagement with said roll.

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**4,016,786**
## METHOD OF AND APPARATUS FOR STAMPING OUT SHEET MATERIAL BLANKS

**Siegfried Körner, Dresden, Germany, assignor to VEB polygraph Leipzig Kombinat fur Polygraphische Maschinen und Ausrustungen, Leipzig, Germany**
**Filed Dec. 16, 1974, Ser. No. 533,168**
**Claims priority, application Germany, Dec. 17, 1973, 3117537**
**Int. Cl.² B26D** *3/08, 1/56*
**U.S. Cl. 83—9** **7 Claims**

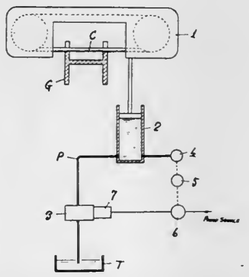


1. A method of stamping out sheet material blanks, comprising the first step of advancing a sheet material to a first location; the second step of cutting only partly through the sheet material with cutting tools along the outline of the desired blank; the third step of advancing the sheet material and cutting tools without displacement of said sheet material and cutting tools relative to each other jointly to a second location; the fourth step of cutting completely through the sheet material along said outline at the second location; and the fifth step of removing the severed blank and the surrounding scrap separately from one another.

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**4,016,787**
## METHOD FOR CONTROLLING THE CUTTING FEED SPEED OF A SAW FRAME OF BAND-SAWING MACHINE OR SIMILAR MACHINE

**Tadahiro Sugimoto, Amagasaki, Japan, assignor to Daitoseiki Co. Ltd., Osaka, Japan**
**Division of Ser. No. 529,105, Dec. 3, 1974, Pat. No. 3,991,644.**
**This application June 20, 1975, Ser. No. 588,952**
**Claims priority, application Japan, Dec. 4, 1973, 48-136663; Mar. 11, 1974, 49-28346**
**Int. Cl.² B26D** *5/04;* **B23D** *53/04*
**U.S. Cl. 83—13** **2 Claims**



1. A method of controlling the cutting feed speed of a saw frame of a band-sawing machine, comprising detecting a change of cutting resistance to the saw blade by detecting a change of pressure in the oil pressure cylinder supporting the saw frame, transforming the change of pressure into a voltage change, and electrically driving a flow control valve provided

in the pressure oil discharge circuit of the oil pressure cylinder which supports the saw frame in response to said detected voltage change for changing the cutting feed speed of the saw frame in response to the change of cutting resistance in order to maintain the cutting resistance to the saw blade at an optimum cutting resistance.

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**4,016,788**

## CONVEYOR SYSTEMS

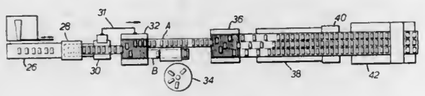
**Peter D. Hardy, Welwyn Garden City, England, assignor to The Metal Box Company Limited, Reading, England**

**Filed July 17, 1975, Ser. No. 596,753**

**Claims priority, application United Kingdom, July 19, 1974, 32062/74; July 19, 1974, 32061/74; July 19, 1974, 32033/74**

**Int. Cl.² B26D** *7/06*; **B65G** *47/26*

**U.S. Cl. 83—72** **9 Claims**



1. A conveyor handling system, comprising

means defining at least two paths along which articles travel,

diverter means located in an intermediate portion of both said paths and operative to effect transfer between said paths,

first sensing means located downstream of the diverter means for sensing the rate at which the articles arrive along each said path,

comparison means responsive to the first sensing means to cause the diverter means to direct the articles between the paths in such a sense as to maintain the rates of flow of articles along said paths downstream of the diverter means substantially equal,

second sensing means located upstream of the diverter means to sense the passage of articles along said paths and past a common datum line, and

a control unit responsive to the second sensing means to determine whether there is sufficient space for each article to be transferred transversely of the direction of motion to an adjacent path without reducing a predetermined minimum spacing requirement for the article in each path, and if there is insufficient space to effect a transfer, to inhibit the diverter means from performing such a transfer.

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**4,016,789**

## DRIVE FOR ROTATABLE CUTTER MECHANISMS

**Herbert W. Helm, Hollidaysburg, Pa., assignor to F. L. Smithe Machine Company, Inc., Duncansville, Pa.**

**Division of Ser. No. 515,534, Oct. 16, 1974, Pat. No. 3,939,723. This application Nov. 3, 1975, Ser. No. 628,145**

**Int. Cl.² B26D** *3/14*

**U.S. Cl. 83—355** **7 Claims**

1. A drive mechanism for a rotatable cutter mechanism arranged to cut notches in a moving web comprising,

a cutter shaft rotatably mounted on a platform,

a cutter mechanism secured to said cutter shaft and arranged upon rotation of said cutter shaft to cut notches in a web moving on said platform,

a drive shaft rotatably mounted adjacent to said cutter shaft,

a helical gear non-rotatably mounted on said drive shaft,

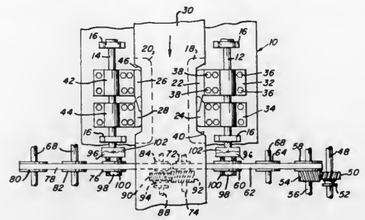
a second helical gear meshing with said first helical gear,

a pulley member non-rotatably connected to said drive shaft,

a second pulley member non-rotatably connected to said second helical gear,

endless connecting means reeved about said first and second pulleys and arranged to transmit rotation from said second helical gear to said cutter drive shaft, and

means for moving one of said first and second helical gears axially relative to each other while said helical gears remain in meshing relation with each other to radially



displace one of said helical gears relative to the other and thereby change the phase register of said cutter mechanism.

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**4,016,790**

## REGULATION OF ELECTRONICALLY OPERATED QUALITY CONTROL EQUIPMENT

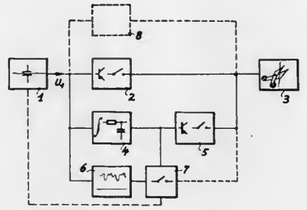
**Ernst Felix, and Hans Locher, both of Uster, Switzerland, assignors to Zellweger, Ltd., Uster, Switzerland**

**Division of Ser. No. 486,600, July 8, 1974, Pat. No. 3,971,272, which is a continuation of Ser. No. 118,100, Feb. 23, 1971, abandoned, which is a continuation of Ser. No. 400,340, Sept. 30, 1964, abandoned. This application Apr. 23, 1976, Ser. No. 679,682**

**Claims priority, application Switzerland, Oct. 1, 1963, 12138/63**

**Int. Cl.² B26D** *5/12*, *5/38*

**U.S. Cl. 83—371** **3 Claims**



1. A yarn clearer comprising:

sensing means along the path of travel of the yarn to be cleared providing an electrical signal representative of the controlled quality of the yarn;

error correcting means such as a yarn cutter interposed in the path of travel of the yarn to be cleared;

a first electrical channel electrically coupled between said sensing means and said error correcting means to receive the electrical signal from said sensing means;

a threshold switch in said first channel, said threshold switch being the only threshold means in said first channel controlling the passage of a signal through said first channel to said error correcting means, said threshold switch set to pass only signals from said sensing means to said error correcting means which are indicative of yarn thickness of undesired magnitude;

a second electrical channel independent of said first channel electrically coupled between said sensing means and said error correcting means, to receive the electrical signal from said sensing means;

integrating means in said second channel, said integrating means only passing signals of given frequency of occurrence or duration, and

a second threshold switch in said second electrical channel, said second threshold switch receiving any signal passed by said integrating means, said second threshold switch being the only threshold switch controlling the passage of a signal through said second channel to said error correcting means and set to pass integrated signals of given magnitude, whereby the yarn clearer may independently correct either yarn defects of given magnitude or yarn defects occuring over a given length of yarn.



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**4,016,791**

## AUTOMATIC RHYTHM PLAYING APPARATUS

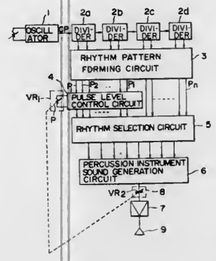
**Masahiko Koike, Hamamatsu, Japan, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Hamamatsu, Japan**

**Filed Feb. 25, 1975, Ser. No. 552,733**

**Claims priority, application Japan, Mar. 2, 1974, 49-24678; May 31, 1974, 49-63008**

**Int. Cl.² G10F** *1/00*

**U.S. Cl. 84—1.03** **6 Claims**



1. An automatic rhythm producing apparatus comprising:

a rhythm pattern forming means for producing a plurality of rhythm pattern signals in the form of pulse trains;

a pulse level control circuit for variably controlling the pulse level of one or more predetermined rhythm pattern signals supplied thereto among the output rhythm pattern signals of said rhythm pattern forming means;

a rhythm selection circuit for selecting and outputting a particular rhythm pattern signal or signals from said level control circuit and said rhythm pattern forming means;

a percussion instrument sound generation circuit for producing, in response to the output signals from said rhythm selection circuit, a desired rhythm sound signal; and

a means for controlling the entire level of said rhythm sound signal, said means responsive to and operating in counter interlocking relationship with said level control circuit such that when said pulse level of one or more predetermined rhythm pattern signals is varied by said pulse level control circuit, said level of said rhythm sound signal is varied inversely.

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**4,016,792**

## MONOPHONIC ELECTRONIC MUSICAL INSTRUMENT

**Ray B. Schrecongost, Park Ridge, Ill., assignor to Hammond Corporation, Chicago, Ill.**

**Filed Mar. 4, 1974, Ser. No. 448,020**

**Int. Cl.² G10H** *5/06*

**U.S. Cl. 84—1.01** **12 Claims**

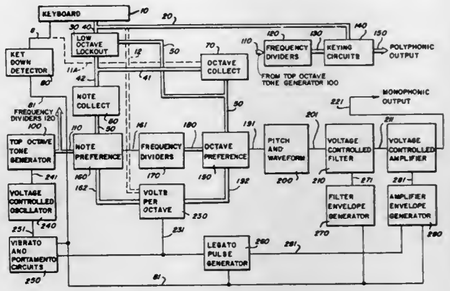
1. A single note selecting storage circuit for an electronic musical instrument having tone generators which deliver output tone signals of an octave, said single note selecting storage circuit comprising:

a plurality of switch means operably designatable of a desired octaval note name and number in a predetermined series of octaves;

note name selector means coupled to said switch means for receiving an octave of predetermined tone signals from said generator and delivering a first tone signal therefrom representative of a particular note name of said octave in response to an operated one of said switch means, said particular note name being the same as the note name designated by said operated one of said switch means;

at least one one-half frequency divider means connected to said note name selector means for frequency-dividing the first tone signal delivered therefrom into a second tone signal which is an octave lower than said first tone signal; and

octave selector means operatively coupled to said switch



means for receiving said first and second tone signals from said note name selector means and said frequency divider means respectively and delivering an output signal of one of said first and second tone signals having an octaval number, corresponding to the octaval number operably designated in said switch means upon operation of said operated one of said switch means.

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**4,016,793**

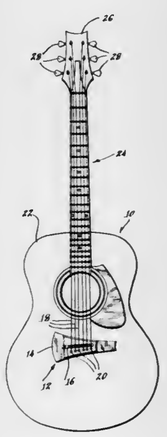
## BRIDGE FOR STRINGED MUSICAL INSTRUMENT

**Michael Kasha, Tallahassee, Fla., assignor to Norlin Music, Inc., Lincolnwood, Ill.**

**Filed May 12, 1975, Ser. No. 576,282**

**Int. Cl.² G10D** *3/04*

**U.S. Cl. 84—307** **7 Claims**



1. In a stringed musical instrument having lower frequency or bass strings and higher frequency or treble strings, vibrations of the strings being coupled through a bridge to a soundboard, the mechanical compliance between the bridge and the soundboard at each point along the bridge from the bass end thereof to the treble end thereof being dependent on the frequency being coupled by the bridge to the soundboard at that point, a bridge having:

a first predetermined width at the bass end thereof, said width being sufficient to effectively couple the lowest frequency vibrations to be coupled by said bridge;

a second predetermined width at the treble end thereof, said

second width being less than said first width and being sufficient to effectively couple the highest frequency vibrations to be coupled by said bridge; and

a width at each point intermediate said bass and treble ends which is both sufficient to effectively couple the frequency coupled at that point and is selected such that the mechanical compliance between the bridge and the soundboard is substantially the same at all points along the bridge.

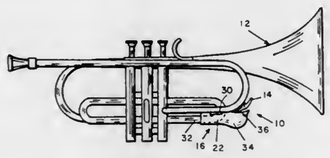
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**4,016,794**

## MUSICAL INSTRUMENT SALIVA COLLECTOR

**Lee A. Brown, 216 Kingsway, Temple Terrace, Fla. 33617**

**Filed Oct. 8, 1975, Ser. No. 620,510**
**Int. Cl.² G10D 7/10**
**U.S. Cl. 84—397** **6 Claims**




1. A cup-like device designed for use with a musical instrument including at least one tube having an aperture formed therein and a water-key formed on the tube movable between a first and second position to selectively open and close the aperture to collect saliva and other liquids emitted from the water-key when in the first position, said device comprising a substantially rectangular enclosure having a substantially bulbous configuration on the forward portion thereof, the forward portion of said enclosure being arcuate in shape to form said bulbous configuration to substantially surround the water-key within said enclosure when in either the first or second position and fastening means formed on said enclosure to engage the tube of the musical instrument such that said fastening means detachably attaches said device to the musical instrument.

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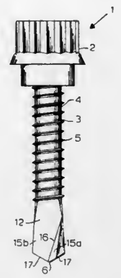
**4,016,795**

## SELF-DRILLING SCREWS

**Peter John Gill, Wolverhampton, England, assignor to GKN Screws & Fasteners Limited, Warley, England**

**Division of Ser. No. 549,688, Feb. 13, 1975. This application Oct. 20, 1975, Ser. No. 623,612**
**Int. Cl.² F16B 25/00**
**U.S. Cl. 85—41** **1 Claim**

1. A self-drilling fastener comprising a head, a shank including an externally screw-threaded part adjacent the head and a drill point at the end of the shank remote from the head for drilling through relatively thick metal, said drill point occupying a relatively long portion of the shank and including a pair of diametrically opposed straight flutes being substantially limited to said drill point, said flutes being inclined in opposite directions at equal acute angles to the axis of the shank, each flute being defined by a leading face and trailing face inclined relative to each other at an angle of approximately 120°, and meeting each other along a straight line inclined to said axis, said straight line and said axis being askew with respect to each other, and a pair of planar faces at the free end of the drill point, said planar faces being oppositely disposed with respect to the axis of the shank and equally angularly inclined thereto, said planar faces intersecting each other on a line of intersection passing through the axis and disposed at or closely adjacent an imaginary cross-over point where said straight




lines of said straight flutes most nearly approach each other across the axis of the shank, the line of intersection also being slightly angularly spaced, as measured about the axis of the shank, in advance of the cutting edge of each flute, and a lip clearance angle being provided behind the cutting edge of each flute by the slope of the planar face away from said line of intersection.

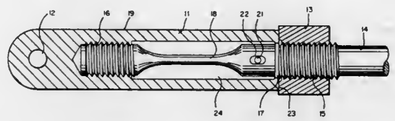
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**4,016,796**

## WEAPON RETENTION DEVICE

**Jack D. Brannan, Bloomington, Minn., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Mar. 29, 1976, Ser. No. 671,235**
**Int. Cl.² F41F 3/04**
**U.S. Cl. 89—1.806** **10 Claims**




1. A retention device for releaseably retaining a missile to a launching apparatus, said retention device comprising:

a cylindrical member having first and second ends, a central bore, and a slot which communicates with said second end;

an elongated tensile link having first and second ends, a region of reduced tensile strength, means for attachment of said first end of said link within said central bore, and a transverse hole located between said region of reduced tensile strength and said second end;

a link preloading element having means for attachment to said elongated tensile link, and a bearing surface for engagement against said second end of said cylindrical member;

said first end of said elongated tensile link being retained within said cylindrical member central bore, and said link preloading element being attached to said elongated tensile link at a point between said hole and said second end of said link; and

an anti-torque pin penetrating said elongated tensile link through said hole, and said pin also penetrating said cylindrical member through said slot in said second end of said cylindrical member for preventing relative rotation between said tensile link and said cylindrical member.

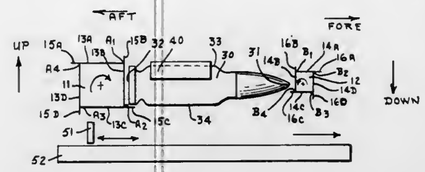


**4,016,797**

## DUMP BAR TRANSFER MECHANISM

**William E. Lock, 183 Wygant Road, Horseheads, N.Y. 14845**

**Filed June 18, 1976, Ser. No. 697,661**
**Int. Cl.² F41D 9/00**
**U.S. Cl. 89—34** **8 Claims**




1. A dump bar transfer mechanism, adapted for use in accurately removing a plurality of rounds of ammunition from a moving horizontal conveyor that is carrying said rounds of ammunition, and urging the removed rounds of ammunition into a horizontally-positioned, partitioned stationary tray, wherein each round of ammunition has a fore end, an aft end, an upwardly facing external surface portion, and a downwardly facing external surface portion having a fore end and an aft end, and wherein the moving conveyor and the stationary tray are in equal spaced-apart relationship, comprising:

a. a plurality of rotatable dump bars, in parallel spaced relationship to each other, interposed between the moving conveyor and the stationary tray, wherein each said dump bar of said plurality has a plurality of intersecting planar surfaces, with each surface having an extension;

b. and, means for selectively rotating each said rotatable dump bar, with said rotating means operatively associated with each said rotatable dump bar.

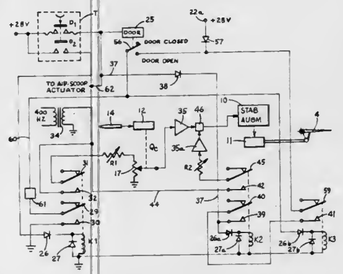
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**4,016,798**

## GUN TO RUDDER INTERCONNECT SYSTEM

**Sus Inouye, Los Angeles, Calif., assignor to Northrop Corporation, Los Angeles, Calif.**

**Filed Aug. 25, 1975, Ser. No. 607,384**
**Int. Cl.² B64D 7/04**
**U.S. Cl. 89—37.5 R** **10 Claims**




1. In an aircraft with an off-center gun having an off-center recoil producing a directional type moment on said aircraft when fired and a movable pilot-controlled control surface producing aircraft flight deflection about substantially the same axis as said directional moment; means for compensating for said moment comprising:

a. an interconnect system operatively connected between a trigger of said gun and said control surface;

b. said interconnect system having means for deflecting said surface separate from the pilot-controlled surface movement and in a direction to counteract said moment; and

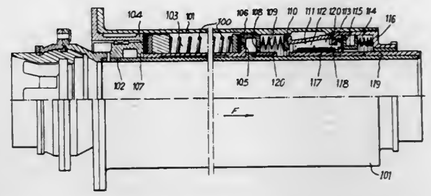
c. means for operatively energizing said interconnect system responsive to the pulling of said trigger.

**4,016,799**

## SHOCK ABSORBER FOR FIREARMS AND THE LIKE

**Gildas Le Pierres, La Ferte Alais, France, assignor to International Vibration Engineering, Boutigny-sur-Essonne, France**

**Filed Feb. 26, 1975, Ser. No. 553,157**
**Claims priority, application France, Feb. 27, 1974, 74.06614; Sept. 17, 1974, 74.31379**
**Int. Cl.² F41F 19/00**
**U.S. Cl. 89—42 B** **19 Claims**




1. In a shock absorber device for automatic weapons firing in bursts wherein all the shots in a burst with the exception of the first shot are fired during the return movement into the initial position of the weapon, which device comprises a support member, a recoiling member which is axially movable relative to said support member from a rest position to an extreme recoil position, elastic restoring means between said support member and said recoiling member for bringing said latter into said rest position, and braking means placed between said support member and said recoiling member for braking the latter during the recoil movements caused by the first shot of a burst, said braking means having at most a reduced effectiveness during the recoil movements caused by all the other shots of said burst,

the improvement wherein said braking means comprise force transmitting means carried on said recoiling member for sliding movement between a front abutment on said recoiling member and a rear abutment on said recoiling member, and means for causing said force transmitting means to move, when between said abutments, at a lower speed than that at which it moves when in contact with one of said abutments during movement of said recoiling member.

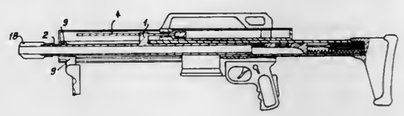
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**4,016,800**

## PORTABLE FIREARM WITH A RETRACTABLE BARREL

**Maurice Rusbach, Vernier Geneva, Switzerland, assignor to Sarmac S.A., Geneva, Switzerland**

**Filed Nov. 29, 1974, Ser. No. 528,392**
**Claims priority, application Switzerland, Dec. 28, 1973, 18209/73**
**Int. Cl.² F41C 7/10, 21/18**
**U.S. Cl. 89—177** **9 Claims**



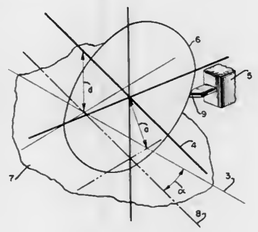

1. A firearm having a stock, a barrel carried by the stock for movement lengthwise of the barrel relative to the stock between an extended firing position and a retracted carrying position, a recoil brake carried by the stock for braking the recoil stroke of the barrel relative to the stock when a shot is fired, a manually operable mechanical connection device between the barrel and the recoil brake for selectively connecting the barrel to the recoil brake in said extended position of the barrel, a manually operated mechanical connection device between the barrel and the stock for selectively con-

necting the barrel to the stock to retain the barrel in said retracted position of the barrel relative to the stock, the first-mentioned connection device comprising a movable stop carried by and movable relative to said barrel, said recoil brake having a rod that extends parallel to said barrel, and means for selectively moving said stop into and out of the path of said rod with said rod and barrel remaining parallel to each other as said rod and barrel move relative to each other upon movement of said barrel toward said retracted position.

## 4,016,801
## METHOD FOR FORMING THREADS

**J. D. Ditson, Asbury, N.J., assignor to Ingersoll-Rand Company, Woodcliff Lake, N.J.**

**Filed Sept. 30, 1974, Ser. No. 510,478**
**Int. Cl.² B23C** *3/32*
**U.S. Cl. 90—11.42** **6 Claims**

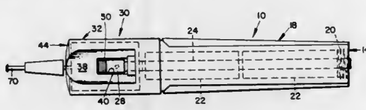


1. The method of generating a continuous non-symmetrical thread of a given pitch on a cylindrical workpiece by a modified process of thread whirling comprising:
rotating the workpiece about a first axis corresponding to the axis of the workpiece;
making a continuous cut around a surface of said cylindrical workpiece by means of a point cutting tool rotating about a second axis offset from and non-parallel to said first axis, said tool is in essentially continuous contact with said workpiece; and
effecting relative linear motion between said workpiece and said rotating tool parallel to said first axis and in spaced relationship with the rotation of said workpiece corresponding to the pitch of the threaded form.

## 4,016,802
## SCRIBING TOOL

**Gerard P. O'Connell, Holyoke, Mass., assignor to Baltimore Brushes, Inc., Boston, Mass., a part interest**

**Filed Oct. 6, 1975, Ser. No. 619,623**
**Int. Cl.² B23C** *1/20*
**U.S. Cl. 90—12 R** **1 Claim**

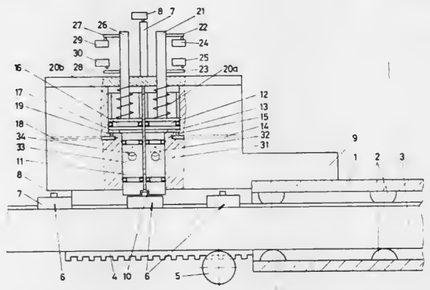


1. A writing instrument comprising:
an elongated tubular casing having a hollow interior closed at its rearward end by a rearward end wall and opened at its forward end,
a tubular motor housing having a hollow interior closed at its forward end by an apertured forward end wall and closed inboard of its rearward end by an apertured rearward wall;
the forward end of the casing being nestably receivable within the rearward end of the motor housing,
a flat on the motor housing exterior having a through-slot leading to the motor housing interior,
a motor nested within the motor housing interior,
a power source nested within the casing interior,
a spring seated within the casing interior adjacent the rearward end thereof in biasing relationship with the power source,
a switch bus extendable in the casing and motor housing interiors through the aperture in the rearward and having an offset laterally-extending rearward tail seating against the spring and a forward tail extending outwardly through the aperture in the rearward wall of the motor housing and through the through-slot of the motor housing and biasable into and out of contacting relation with the motor in switch on and switch off positions respectively,
a contact ring extendable through the rearward wall of the motor housing for interconnecting the motor and power source, and
an etching tool projecting outwardly through said aperture of said forward end wall from and having a driven relationship with the motor for rotation when the switch bus is in switch-on position and non-rotation when the switch-bus is in switch-off position.

## 4,016,803
## SERVO DEVICE

**Svend Ove Soby, Sonderborg, Denmark, assignor to Danfoss A/S, Nordborg, Denmark**

**Filed Nov. 10, 1975, Ser. No. 630,293**
**Claims priority, application Germany, Nov. 12, 1974, 2453561**
**Int. Cl.² F15B** *15/26*
**U.S. Cl. 91—43** **7 Claims**



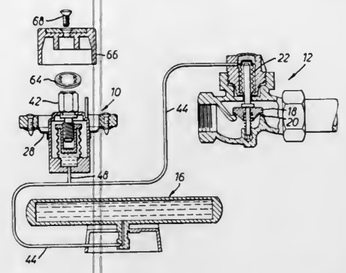
1. A servo device comprising movable and stationary members, hydraulic servo motor means for moving said movable member along a path in either of two selected directions, a transversely extending stop unit attached to said movable member, a rib on said stop unit, fluid pressure operated first and second adjacently arranged stop members movable transversely relative to said path, said stop members jointly defining a recess having a width generally equal to the width of said rib for cooperating with said rib to prevent movement of said movable member, first valve and circuit means for supplying a working fluid to said servo motor means, said first circuit means having throttle valve means formed between said stationary member and at least one of said stop members for throttling the fluid flow from said first valve to said servo motor means, first switch means operated by said stop members to open said first valve when said stop members are in initial up positions and to close said first valve when both of said stop members are in final down positions resting on said stop unit, second valve and circuit means for moving each of said stop members to initial positions which clear said rib and actuate said first switch means, second switch means actuated by said stop unit for closing said second valve to cause said stop members to descend until one rests in an intermediate position on said rib wherein throttling occurs in said first circuit and the other rests in a final position on said stop unit.



## 4,016,804
## THERMOSTATIC CONTROL UNIT FOR RADIATOR VALVES

**Kvetoslav Turecek, Brampton, Canada, assignor to Danfoss A/S, Nordborg, Denmark**

**Filed Dec. 22, 1975, Ser. No. 642,790**
**Int. Cl.² F01B** *19/00*
**U.S. Cl. 92—34** **3 Claims**

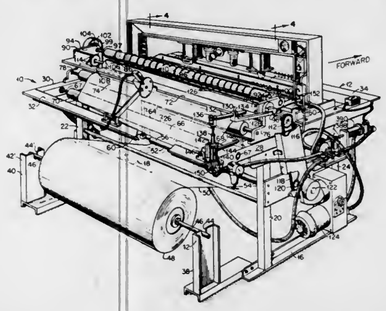


1. A thermostatic control unit for radiator valves comprising, a cylindrically shaped casing having an upper collar portion defining a hole, a bellows in said casing having the lower end thereof fixedly attached to said casing, port means in said casing providing fluid communication between the interior of said bellows and the exterior of said casing, a movable nut attached to the upper end of said bellows, a calibration screw extending through said hole and threadedly engaging said nut for moving it to vary the internal volume defined by said bellows, abutment lug means extending from said collar, stop lug means carried by said screw so as to be rotatable therewith, washer means surrounding said screw having outer lug means engageable with said abutment lug means and inner lug means engageable with said stop lug means.

## 4,016,805
## METHOD FOR THE MANUFACTURE OF DUNNAGE BAG LINERS

**Clinton R. Hollis, Camden, Ark., assignor to International Paper Company, New York, N.Y.**

**Continuation-in-part of Ser. No. 447,763, March 4, 1974, Pat. No. 3,921,506. This application Mar. 31, 1975, Ser. No. 563,831**
**Int. Cl.² B31B** *41/00*
**U.S. Cl. 93—35 VL** **5 Claims**

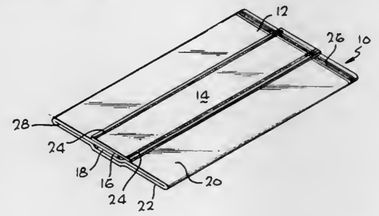


1. In a method for the manufacture of inflatable liners of discrete length for dunnage bags or the like from a continuous length of air-impervious tubular material flattened into sheet form comprising top and bottom layers, the steps of
storing said sheet material in position for dispensing in a forward direction,
disposing the leading end of said material in the nip between a pair of feed rolls, at least one of which is movable between positions of pressure engagement and disengagement with said material in said nip,
connecting said feed rolls in driving relationship to one another and continuously rotating said rolls at all times during the manufacture of said liners,
moving said movable roll into pressure engagement with said material in said nip,
rotating at least one of said feed rolls to move said material forwardly to a cut-off station where said material is disposed proximate to a knife means,
supporting said material transverse to its forward movement at a location between its storage location and said feed rolls in engagement with an elognated surface and below an elongated friction means aligned with said elongated surface and which is movable between positions of pressure engagement and disengagement with said material on said elongated surface,
after a predetermined length of said material has moved past said cut-off station, simultaneously moving said movable feed roll toward its position of disengagement with said material, moving said movable friction means toward its position of engagement with said material to stop the forward movement thereof,
clamping said material between opposed surfaces along elongated spaced apart locations on opposite sides of said knife means, each of said locations extending transversely of he forward direction of movement of said material,
thereafter severing said material fully across its dimension transverse to its direction of forward movement, and
sealing to one another the layers of the trailing end of the severed length of material along a line extending fully across the material transversely of its direction of forward movement.

## 4,016,806
## METHOD AND APPARATUS FOR MAKING TRANSVERSE CLOSURE SEALS IN COMPOSITE THERMOPLASTIC BAG STOCK

**Samuel J. Schuster, 617 Vallombrosa, Pasadena, Calif. 91107**

**Filed Apr. 5, 1976, Ser. No. 673,916**
**Int. Cl.² B31B** *1/84*
**U.S. Cl. 93—35 R** **17 Claims**

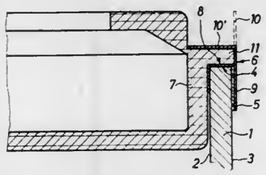


1. Apparatus for making high integrity, transverse closure heat seals in continuous, tubular thermoplastic bag stock of diverse transverse cross-section thickness and/or composition, the bag stock having opposed faces, the apparatus comprising:
means defining a feed path for guiding the bag stock;
a first low temperature, transverse heat seal bar disposed along the feed path for applying heat to one of the faces of the stock to at least partially seal the bag stock, said first heat seal bar adapted to coact with an opposed resilient back-up surface;
a second low temperature, transverse heat seal bar spaced apart from the first heat seal bar and disposed along the feed path for applying heat to the other face of the bag stock along a transversely-extending area at least partially coinciding with the seal applied by the first heat seal bar first to complete the transverse closure seal, the second heat seal bar adapted to coact with an opposed, resilient back-up surface;

means for intermittently advancing the bag stock in a direction from the first heat seal bar towards the second heat seal bar along the feed path between dwell periods;
means operatively associated with the bag stock advancing means for reciprocating the first heat seal bar toward and away from the feed path in timed relation with the intermittent advancement of the bag stock to effect the first seal during dwell periods; and
means operatively associated with the bag stock advancing means for reciprocating the second heat seal bar toward and away from the feed path in timed relation with the intermittent advancement of the bag stock to effect the second seal during dwell periods.

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**4,016,807**
**BOX AND METHOD OF COVERING A BOX EDGE**
**Walter Schellenberg, Diepoldsau, Switzerland, assignor to Max Sandherr AG, Switzerland**
**Filed Apr. 6, 1976, Ser. No. 674,105**
**Claims priority, application Switzerland, Apr. 23, 1975, 5163/75**
**Int. Cl.² B31B *1/00***
**U.S. Cl. 93—39 C** **7 Claims**

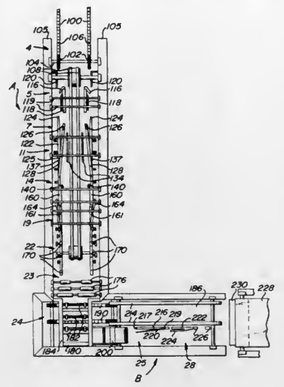


1. A method of covering the exposed edge of a box having an open end comprising the steps of
placing a heat-shrinkable adhesive plastic foil strip around the peripheral area of the open end of the box adjacent to the box edge with a portion of the width of the foil strip projecting beyond the box edge; and
heating the projecting portion of the strip to cause the projecting portion to shrink and to bend inwardly over the box edge substantially at a right angle to the box wall and to thereby cover the box edge.

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**4,016,808**
**METHOD AND APPARATUS FOR MAKING EXPANSIBLE GUSSET ENVELOPES**
**Louis H. Young, 401 Caranel Circle, Penn Valley, Pa. 15675**
**Continuation-in-part of Ser. No. 603,400, Aug. 11, 1975. This application Feb. 9, 1976, Ser. No. 656,094**
**Int. Cl.² B31B *29/26***
**U.S. Cl. 93—62** **17 Claims**

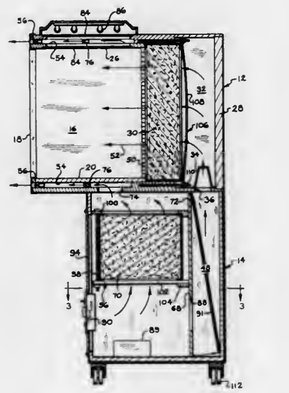
17. A method for fabricating an expansible gusset envelope from a blank having first and second panels hinged together along triple transverse fold lines which define inwardly collapsible bottom gusset sections therebetween, and flaps hinged to the side of one of said panels along triple longitudinal fold lines which define inwardly collapsible side gusset sections therebetween, and tabs hinged to one of said gusset sections along a line hinging the other of said gusset sections to the first panel with adjacent tabs hinged to each other along a medial fold line detached from said other gussets, comprising the steps of:
a. folding the pair of gusset sections to which the tabs are hinged inwardly about the medial fold line thereof,
b. bending back the tabs into overlying disposition with the adjacent portion of the gusset sections to which they are hinged,
c. crimping the tabs along the line hinging them together to form a saddle having its fold line oriented transverse to the medial fold line in the underlying gusset section, including a triangular corner gusset in the underlying gusset section,
d. folding the other of the gusset sections inwardly about the medial fold line thereof and tucking the other of said



gusset sections into glued disposition with the saddles, and
e. glueing the flaps and the other panel into adhesive disposition with each other so as to overlie the first panel with all gusset sections inwardly collapsed with closed corner gussets.

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**4,016,809**
**CLEAN AIR WORKBENCH**
**Philip R. Austin, Livonia, Mich., assignor to Contamination Control Laboratories, Inc., Livonia, Mich.**
**Filed July 16, 1975, Ser. No. 596,267**
**Int. Cl.² F23J *11/00***
**U.S. Cl. 98—115 LH** **9 Claims**



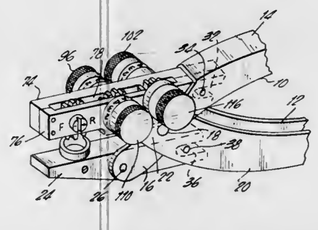
1. A workbench comprising a work platform having a work area defined by a plurality of walls that are open at the front of the work area at a leading edge to provide access to the work area, the rear wall of said plurality of walls being permeable for passage of air, air nozzle means extending around said work area at said leading edge for directing a curtain of air



forward of said work area, and air supply means for supplying air to said permeable wall and to said air nozzle means so that air can be directed forward through said work area as laminar flow and air can be directed from said air nozzle means as a curtain surrounding the laminar flow of air from said work area, interior portions of said walls being transparent and contain illumination apparatus for illuminating said work area, and said air supply means includes perimeter air ducts that extend through said walls to said air nozzle means, said portions forming a part of said perimeter air ducts so that passage of air therethrough will serve to cool said illumination apparatus.

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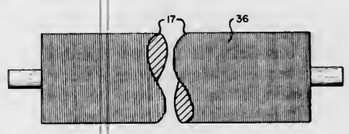
**4,016,810**
**JEWELRY IMPRINTING DEVICE**
**Leslie Szikla, 63-34 Saunders St., Rego Park, N.Y. 11374**
**Continuation-in-part of Ser. No. 487,166, July 10, 1974, abandoned, which is a continuation of Ser. No. 272,342, July 17, 1972, abandoned. This application Mar. 19, 1975, Ser. No. 559,662**
**Int. Cl.² B44B *5/00***
**U.S. Cl. 101—4** **13 Claims**



1. A tool for stamping symbols on jewelry comprising: a pliers having a pair of handle members, said members moveable between a first open position and a second clamping position, a jaw element mounted on each of said handle members, a plurality of marking wheels in one of said jaw elements, an axle mounted on said one jaw element, said marking wheels being mounted on said axle, said axle comprising means for permitting the marking wheels to move vertically with respect to the axis of said axle and each other whereby the curvature of the jewelry is compensated for, a plurality of cog wheels in said one jaw element equal in number to the number of marking wheels, each of said cog wheels being in cooperating relationship with a different one of said marking wheels, and means for rotating said cog wheels individually to move selected ones of said marking wheels.

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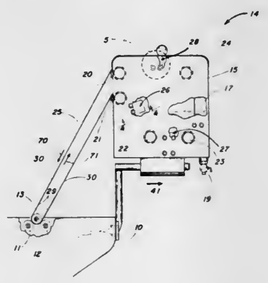
**4,016,811**
**GROOVED ROLLER DAMPENER**
**Eugene N. Zavodny, Riverside, assignor to Rockwell International Corporation, Pittsburgh, Pa.**
**Filed Aug. 20, 1975, Ser. No. 606,113**
**Int. Cl.² B41F *7/24***
**U.S. Cl. 101—148** **2 Claims**



1. A mechanism for dampening a plate on the plate cylinder of a lithographic printing press comprising a reservoir of dampening fluid spaced from said plate cylinder, roller means for transferring a continuous supply of dampening fluid in the form of a thin film from said reservoir to the plate on said plate cylinder including at least one roller having a smooth, continuous, resilient surface, a transfer roller journalled parallel to said one roller with the surface of said transfer roller being in contact and forming a coacting nip with said one roller, the surface of said transfer roller being metallic and hydrophilic and having closely spaced, continuous, spiral grooves formed therein, means for driving said one roller at a surface speed equal to the surface speed of said plate cylinder, and separate means for rotating said transfer roller at variable surface speeds different from the surface speed of said one roller to thereby meter the volume of dampening fluid transferred from said transfer roller to the surface of said one roller as the latter leaves the said nip.

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**4,016,812**
**DEVICE FOR CLEANING INK FROM A PRINTING APPARATUS**
**David V. Lauk, 2233 Sussex Lane, Apt. 1010, Indianapolis, Ind. 46219, and Lloyd W. Bills, 8268 E. 40th Place, Indianapolis, Ind. 46226**
**Filed June 13, 1975, Ser. No. 586,568**
**Int. Cl.² B41F *35/04***
**U.S. Cl. 101—425** **5 Claims**



1. A device for cleaning ink from rollers on a printing apparatus comprising:
a container for holding ink solvent;
a printing apparatus having said container mounted thereon, said printing apparatus includes a frame with at least three rollers of which two are adjacent transfer rollers and with the remaining, removeably mounted third roller normally engaged during printing with said transfer rollers and rotatably mounted to said frame immediately above and between said transfer rollers;
mounting means on said container being operable to mount said container to said printing apparatus;
a continuous ink transfer web extending around and having a first surface in contact with one of said three rollers, said web having a second surface opposite of said first surface with said second surface in contact with two of said three rollers, said web transferring ink from said three rollers to said first surface and said second surface of said web as said three rollers are rotated:
roller means mounted on said container and in contact with said web being operable to direct said web into said ink solvent; and,
wiping means mounted on said container and in contact with said first surface and said second surface of said web being operable to wipe ink solvent off said first surface and said second surface of said web;
said wiping means includes a pair of brushes mounted to said container and within said ink solvent, said brushes are spaced apart with said web passing therebetween, said brushes are in contact with said first surface and said second surface of said web brushing ink from said web;
said wiping means further includes a pair of elongated scraping members mounted to said container and located exteriorly of said ink solvent, said members are spaced

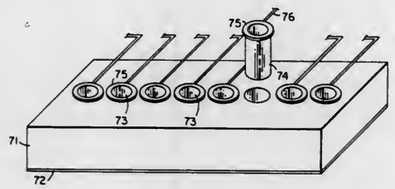
apart with said web passing therebetween, said members are in contact with said first surface and said second surface of said web scraping liquid off of said web.

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**4,016,813**
**ELECTROSTATIC LINE PRINTER**

**Gerald L. Pressman, San Jose, Calif., and John V. Casanova, Racine, Wis., assignors to Electroprint, Inc., Cupertino, Calif.**

**Continuation of Ser. No. 442,278, Feb. 13, 1974, abandoned, which is a continuation of Ser. No. 281,907, Aug. 18, 1972, abandoned, which is a continuation of Ser. No. 864,022, Oct. 6, 1969, Pat. No. 3,689,935. This application Jan. 21, 1975, Ser. No. 542,756**
**Int. Cl.² G01D *15/10***
**U.S. Cl. 101—426** **22 Claims**



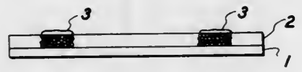

1. An electrostatic printing process comprising the steps of:
projecting electrically charged particles to flow along a path by means of an overall electrical projection field established between the source of charged particles and a particle accelerating electrode;
establishing an array of individual short range electrical fields in the path of the projected particles;
selectively controlling individual short range electrical fields in the array by means of a transmitted pattern of individual selected electrical signals corresponding to a pattern to be reproduced, the short range fields being controllable to cause blocking or permit passing of the projected particles through the array; and
employing the projected particles emerging from the array to print a pattern on a print receiving medium which corresponds to the pattern of selected electrical signals.

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**4,016,814**
**PLANOGRAPHIC PRINTING MASTER**

**Richard L. Schank, Webster, N.Y., and Richard G. Crystal, Los Altos, Calif., assignors to Xerox Corporation, Stamford, Conn.**

**Filed Apr. 13, 1973, Ser. No. 351,130**
**Int. Cl.² B41N *1/14*; B41C *1/10***
**U.S. Cl. 101—467** **14 Claims**

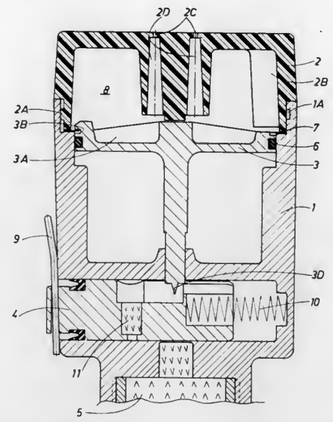



1. A method of producing a printing master comprising:
a. providing a suitable substrate,
b. coating said substrate with a layer of an uncured silicone gum composition, said composition containing an activating proportion of a blowing agent,
c. depositing a particulate image pattern on said layer,
d. curing said layer to an ink releasable condition, whereby said blowing agent is activated causing blowing in said image areas, and
e. removing particles from said image pattern to reveal ink receptive foamed image areas corresponding to said deposited image pattern.

**4,016,815**
**DEPTH CHARGE IGNITER**

**Jan Bjork, Bjarred, and Kjell Ake Bertil Holmgren, Trelleborg, both of Sweden, assignors to Aktiebolaget Thulinverken, Landskrona, Sweden**

**Filed Oct. 29, 1975, Ser. No. 626,767**
**Claims priority, application Sweden, Nov. 1, 1974, 7413765**
**Int. Cl.² F42B *21/00*; F42C *15/10***
**U.S. Cl. 102—7** **7 Claims**




1. A depth charge igniter with means for setting the detonation depth, comprising a piston movable in a housing and provided with a firing pin for hitting a percussion cap, the piston being acted on by the surrounding water pressure in its direction of motion towards the percussion cap, characterised by a shear ring holding the piston to the housing and arranged to be sheared off at a certain water pressure thus setting the piston free to move in the said direction under the influence of a spring means, and means whereby the circumferential length of the shear ring in engagement between the piston and the housing is adjustable for obtaining the desired detonation depth comprising respectively rotatable structure engaging said piston with said ring, and means on said piston overlapping a variable portion of the circumference of said ring in response to the extent of relative rotation.

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**4,016,816**
**SHELL ESPECIALLY FOR MORTARS**

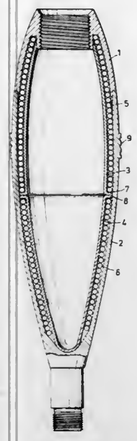
**Bengt Håkan Larsson, Eskilstuna, and Hans Erik Valdemar Karlsson, Sollentuna, both of Sweden, assignors to Forenade Fabriksverken, Eskilstuna, Sweden**

**Filed July 21, 1975, Ser. No. 597,687**
**Int. Cl.² F42B *13/48***
**U.S. Cl. 102—67** **3 Claims**

1. A shell, especially for mortars, comprising a casing of circular cross-sectional shape having a front end and a rear end and consisting of an inner layer, an outer layer and an intermediate layer disposed between said inner and outer layers comprising a plurality of splinter bodies, circumferentially extending guide elements on the outer surface of said outer layer intermediate the ends of said casing, said inner layer and said intermediate layer extending axially behind said guide elements toward said casing rear end and at least one annular flange projecting radially outward from said inner layer through said intermediate layer and disposed at an axial



location intermediate said guide elements and said casing rear end, said annular flange having an outwardly projecting, peripheral end surface in abutting engagement with the inside of said outer layer.

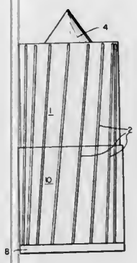



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**4,016,817**
**BULLET FOR HUNTING SHOTGUNS**

**Moisés Arciniega Blanco, Telemaco, 18, Madrid-27, Spain**

**Filed Oct. 10, 1975, Ser. No. 621,618**
**Int. Cl.² F42B *11/02***
**U.S. Cl. 102—92.4** **11 Claims**

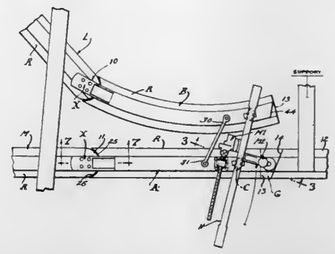



1. A bullet for hunting shotguns, said bullet comprising:
a conical tip member having a pointed forward end and an interiorly threaded base end;
a cylindrical intermediate element separate from said tip member and having in the outer surface thereof a plurality of inclined grooves, said intermediate element having a forward end joining said base end of said tip member and a base end;
a rear cylindrical element separate from said intermediate element and having in the outer surface thereof a plurality of inclined grooves, said rear element having a forward end joining said base end of said intermediate element and an inwardly and concavely recessed base end; and
threaded pin means, having a head positioned in said recessed base end of said rear element, extending longitudinally through said rear element and said intermediate element and threaded into said threaded base end of said tip member, for connecting said tip member, said intermediate element and said rear element into a unitary projectile.

**4,016,818**
**MONORAIL SWITCH**

**Floyd P. Ellzey, 2301 Marshallfield Lane, Redondo Beach, Calif. 90278**

**Filed Sept. 2, 1975, Ser. No. 609,229**
**Int. Cl.² E01B *25/26***
**U.S. Cl. 104—103** **4 Claims**



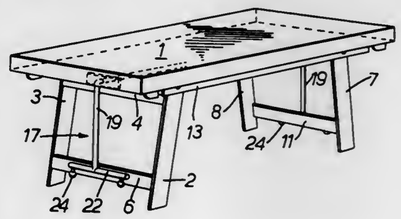
1. An articulated self-aligning switch for elevated monorail track, and including; a pair of swinging switch beams with bearing means pivotally mounting the switch beams to the terminal ends of a main line track beam and a lateral track beam respectively, link means coupling the pair of switch beams to swing together and in spaced relation to each other and into and out of alignment with a continuing main line track beam, a retractile gate secured to ways and shiftable into and out of working position between the end faces of either of said pair of swinging switch beams and the end face of the continuing main line track beam, said retractile gate having substantially the same beam cross section with rails for truck support as the aforesaid switch and other track beams thereby to establish track continuity, and means replaceably retracting the gate from said working position to release the switch beams for selective positioning.

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**4,016,819**
**TABLE TROLLEY**

**Donald William Cowling, 14 Dover St., North Clayton, Victoria, Australia (3168)**

**Filed Aug. 6, 1975, Ser. No. 602,527**
**Claims priority, application Australia, Aug. 7, 1974, 8447/74; Oct. 16, 1974, 74420/74**
**Int. Cl.² A47B *3/02***
**U.S. Cl. 108—19** **12 Claims**




1. A table comprising:
a table top having opposite sides and opposite ends;
a first set of legs having a pair of leg members generally located at opposite ends of the table for supporting said table top in a generally horizontal position, each pair of leg members being located along a line extending between said sides of the table top; and
a second set of legs having a pair of leg members generally located at opposite ends of said table, said table top being pivotally attached to said second set of legs along an axis extending between said ends of the table top generally perpendicular to said lines for movement from said generally horizontal position to a position in which said table top is generally vertical when said table top is supported by said second set of legs,

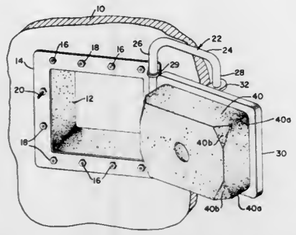
said first set of legs being displaceably coupled to said table top for facilitating pivotal movement of said table top.

## 4,016,820

### CLOSURE ASSEMBLY FOR A FURNACE

**Richard C. Johnson, and Kenneth E. Lee, both of Dansville, N.Y., assignors to Foster Wheeler Energy Corporation, Livingston, N.J.**

**Filed Nov. 17, 1975, Ser. No. 632,891**
**Int. Cl.² F23M 7/00**
**U.S. Cl. 110—173 R** **8 Claims**



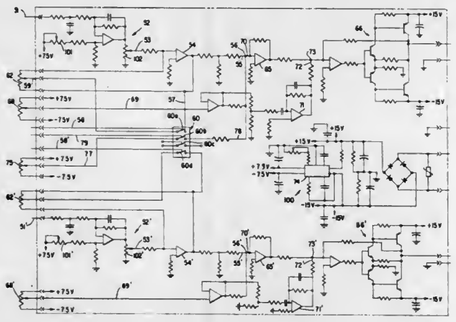
**1.** A closure assembly for an access opening in a furnace wall, said assembly comprising:
- a shell member;
- a plug member having a portion extending in said shell member and a portion adapted to extend in said access opening;
- a stepped bore extending through said plug member and defining a shoulder between its ends;
- a rod affixed at one end to the inner wall of said shell member and extending within said bore;
- a nut threadedly engaging said rod within said bore and bearing against said shoulder to secure said plug member to said shell member;
- an insert positioned in that portion of said bore not occupied by said rod, said insert being of the same material as said plug member; and
- mounting means for pivotably mounting said shell member to said furnace wall for movement between a closed and open positions relative to said access opening.

## 4,016,821

### ELECTRONIC CONTROL OF BIGHT, FEED AND FEED BALANCE IN A SEWING MACHINE

**Philip Francis Minalga, Piscataway, N.J., assignor to The Singer Company, New York, N.Y.**

**Filed July 16, 1975, Ser. No. 596,683**
**Int. Cl.² D05B 3/02**
**U.S. Cl. 112—158 E** **16 Claims**



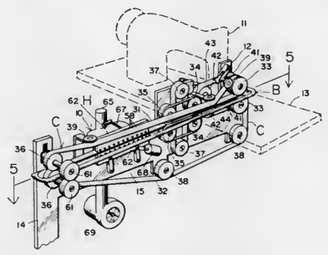
**1.** In a sewing machine having stitch-forming instrumentalities positionally controlled over a predetermined range between stitches to produce a pattern of feed and of bight controlled stitches; logic means for storing pattern stitch information in digital form; means operating in timed relation with the sewing machine for recovering selected digital pattern stitch information from said logic means; feed digital-to-analog converter means and bight digital-to-analog coverter means for generating positional feed and bight analog signals, respectively, related to said selected digital pattern stitch information; and feed closed loop servo means including reversible electric motor and bight closed loop servo means including reversible electric motor responsive to said feed and bight analog signals, respectively, for positioning said stitch-forming instrumentalities to produce a pattern of stitches corresponding to the selected digital pattern stitch information; wherein the improvement comprises:
- signal control operational amplifier means interposed between said feed digital-to-analog converter means and said feed closed loop servo means, and between said bight digital-to-analog coverter means and said bight closed loop servo means, each of said operational amplifier means having a feedback circuit including a rheostat;
- switch means effective on operator command to insert a wiper on said rheostat in bypass arrangement in said feedback circuits, whereby the gain of said operational amplifier means may be varied the analog signal received from said feed and said bight digital-to-analog converter means and transferred, respectively, to said feed and said bight closed loop servo means.

## 4,016,822

### SEAM FOLDING AND PRESSING ATTACHMENT FOR SEWING MACHINES

**Antonio Pugliese, Miami, Fla., assignor to Shap, Inc., Opa Locka, Fla.**

**Filed Nov. 20, 1975, Ser. No. 633,854**
**Int. Cl.² D05B 27/00**
**U.S. Cl. 112—217** **10 Claims**



**1.** A seam folding attachment for sewing machines comprising conveyor means for carrying two super-imposed layers of cloth upon which a seam is sewn by the sewing machine, power operated means operating said conveyor means, supporting means mounted along said conveyor means and positioned between said layers of cloth and supporting said cloths, said supporting means having a pair of elongated members in substantially spaced parallel relation extending along said conveyor means, means securing said support means in proximity of said sewing machine at a position prior to the needle sewing said seam, said elongated members being positioned between said layers of cloth on either side of said seam, spreading means mounted on one of said elongated members in the path of said seam separating the seam plies and positioning said seam plies in a plane and substantially at right angle to that of said cloths, and folding means mounted in proximity to said spreading means folding said separated seam plies on the cloth thereby forming four superimposed layers of cloth extending from said seam.

## 4,016,823

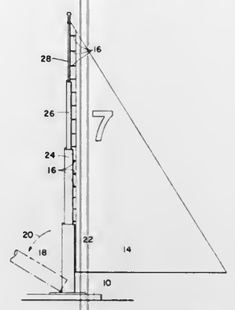
### RETRACTABLE SAILBOAT MAST

**Robert S. Davis, 405 W. 3rd St., Homer, Ill. 61849**

**Filed May 21, 1976, Ser. No. 688,597**
**Int. Cl.² B63B 15/00**
**U.S. Cl. 114—90** **9 Claims**

**1.** A retractable sailboat mast comprising a plurality of tubular elements telescopingly slidingly engaged within one another, detenting means for compressively releasably detenting adjacent tubular elements when said adjacent tubular elements are extended outwardly from one another along a common longitudinal axis thereof, aligning means for rotationally aligning said plurality of tubular elements to one another, each of said plurality of tubular elements having a slot in the walls thereof, the longitudinal axis of said slot extending parallel to said common longitudinal axis, said slot





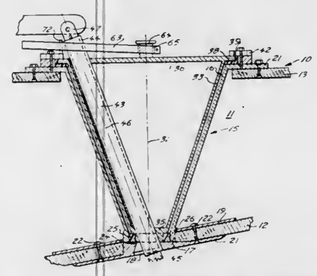
of said each of said plurality of tubular elements co-axially aligned, sail supporting means for providing lateral support to a sail, said sail supporting means positioning a portion of said sail adjacent said slot, mast supporting means for removably and pivotably securing said retractable sailboat mast to a deck of a sailing vessel.

## 4,016,824

### RUDDER POST TUBE ASSEMBLY

**Olav Thyvold, 2891 Craigowan Road, Victoria, British Columbia, Canada (V9B 1M9)**

**Filed Oct. 14, 1975, Ser. No. 622,378**
**Int. Cl.² B63H 25/06**
**U.S. Cl. 114—165** **5 Claims**



**1.** A rudder tube assembly for sailing craft comprising:
- a. a cylindrical rudder post tube for rotatably supporting a rudder post of a rudder assembly,
- b. means for mounting the tube in the craft for rotation such that the tube axis describes, when rotated, at least a portion of the curved surface of an inverted cone having an axis lying in the longitudinal vertical plane of the craft for enabling the rudder post to be angularly oriented relative to said plane,
- c. means for releasably locking the tube against rotation.

## 4,016,825

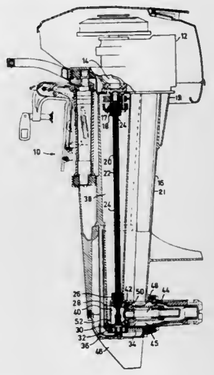
### DEVICE FOR DRIVING A BOAT PROPELLER AND COOLING WATER PUMP

**Heinz Pichl, Bergfallsvagen 3, Uppsala 75256, Sweden**

**Filed Sept. 30, 1975, Ser. No. 618,130**
**Int. Cl.² B63H 21/26**
**U.S. Cl. 115—17** **15 Claims**

**1.** A power device for a propeller and a cooling water pump in an outboard motor comprising a crankshaft and an intermediate shaft for driving a propeller shaft, characterized in that between the crankshaft and the intermediate shaft is arranged a reversible gear device, in that the intermediate shaft is hollow and in that a pump shaft for powering a cooling water pump impeller is rigidly attached to the crankshaft and rotatably passes through the hollow intermediate shaft.

**10.** In an upright power leg for a boat drive comprising a housing including an upper end portion, an intermediate portion and a lower propeller housing portion, an intermediate shaft in said housing having an upper end and extending downwardly from its upper end through said intermediate portion and having a lower end disposed in said lower housing portion, a propeller shaft in said lower housing portion, gear means in said lower housing portion drivingly connecting said propeller



shaft to said lower end of said intermediate shaft, a motor drive shaft in said upper end portion, and forward and reverse gear means in said housing connecting said drive shaft to said upper end of said intermediate shaft, the combination of a cooling water pump impeller disposed in said lower housing portion, and a pump shaft directly connected in said upper end portion to said motor drive shaft and extending through said intermediate portion of said housing and drivingly connected to said water pump impeller.

## 4,016,826

### WATER SPIDER

**David H. Sanders, Hamlin, Tex., assignor to M. H. Sanders et al., Hamlin, Tex.**

**Filed Apr. 5, 1976, Ser. No. 673,714**
**Int. Cl.² B63H 16/00**
**U.S. Cl. 115—26** **20 Claims**



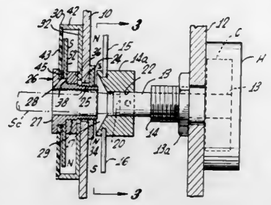
**1.** A water vehicle comprising:
- a. two crank shafts,
- b. each crankshaft having
  - i. axle stubs on each end, and
  - ii. two cranks arranged port and starboard between the axle stubs,
  - iii. the cranks having an opposed throw from the axle stub,
- c. treadle boards arranged one port and one starboard,
- d. the port treadle board journaled to the port crank of each crankshaft,
- e. the starboard treadle board journaled to the starboard crank of each crankshaft,
- f. a float mounted on each axle stub, and
- g. each float having an outboard face thereon, and
- h. paddles on said outboard face of each float.

**4,016,827**

## MAGNETICALLY COUPLED INDICATOR MEANS FOR CONTROL SETTING

**James F. Lawrence, Jr., 13161 Barrett Hill Circle, Santa Ana, Calif. 92705**

**Filed Sept. 12, 1975, Ser. No. 612,930**
**Int. Cl.² H01C *1/01***
**U.S. Cl. 116—129 D** **2 Claims**



1. In a magnetically coupled dial and pointer indicator adapted to reveal the rotary position of an instrument circuit control rotor concealed inside an instrument vessel mounted on a support and controlled in position by a rotatably adjustable shaft extending through a wall of the vessel,

bar magnet means fixed on an end portion of said shaft, exteriorly of said vessel, said bar magnet means extending generally radially from opposite sides of said shaft and having outer extremities of respectively opposite polarity, said bar magnet means being configured and oriented to have a magnetic circuit producing a magnetic flux loop extending between said extremities and having an intermediate region thereof extending substantially unidirectionally transversely across the prolonged axis of said shaft, generally perpendicularly thereto,

a non-magnetic indicator housing for said pointer indicator spacedly fixed with respect to said instrument vessel, with a back, and a transparent cover, said housing being positioned with its back facing said end portion of said shaft, said housing being so positioned relatively to said end portion of said shaft and said extremities of said bar magnet means that said intermediate region of said flux loop is substantially contained inside said housing,

said pointer indicator comprising a longitudinally magnetized pointer in said housing,

means on said housing mounting said pointer to rotate freely on an axis generally aligned with said shaft, and in a plane generally perpendicular to such axis, within said intermediate region of said flux loop,

a fixed calibrated scale associated with said housing and cooperable with said pointer; and

said pointer and housing having a passageway therethrough, aligned with said shaft, to provide for extending a tool therethrough to engage and rotate said shaft.

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**4,016,828**

## APPARATUS FOR BLOOD FILM PREPARATION

**Francis William Maher, Jr., Milford, and Vladimir Valentine Pirc, Norwalk, both of Conn., assignors to The Perkin-Elmer Corporation, Norwalk, Conn.**

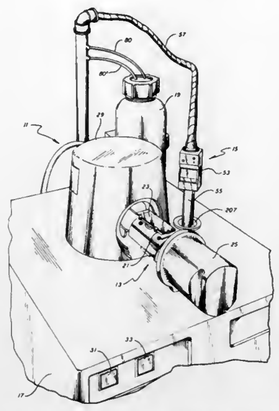
**Filed Mar. 22, 1976, Ser. No. 669,015**
**Int. Cl.² B05C *11/08***
**U.S. Cl. 118—6** **27 Claims**

1. Apparatus for preparing a thin film of blood on a planar substrate for diagnostic evaluation comprising:

a. means defining an enclosed chamber;

b. spinning means disposed within said chamber and adapted to receive a substrate on which a blood specimen is deposited; and

c. means for providing a curtain of flowing liquid within said chamber surrounding said substrate while spinning whereby blood particles and aerosol thrown from said substrate will be intercepted and collected by said liquid curtain.



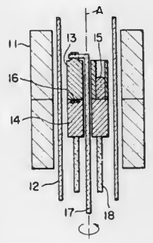
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**4,016,829**

## APPARATUS FOR CRYSTAL GROWTH

**Kazuhiro Ito; Yuichi Ono; Kiichi Ueyanagi, all of Hachioji; Makoto Morioka, and Masao Kawamura, both of Tokyo, all of Japan, assignors to Hitachi, Ltd., Japan**

**Filed Feb. 26, 1974, Ser. No. 445,898**
**Claims priority, application Japan, Feb. 26, 1973, 48-22072**
**Int. Cl.² B01J *17/04***
**U.S. Cl. 118—64** **12 Claims**



1. An apparatus for crystal growth in the liquid phase comprising:

an electric furnace means for producing temperature differences vertically and for providing a plurality of isothermal curved planes vertically spaced from each other within said furnace;

a reactor defining a chamber which is within and is heated by said electric furnace;

a jig assembly means which is set in said reactor chamber and which includes an upper part and a lower part, the lower part being fixed and being arranged to hold on its upper surface a plurality of substrates, said lower part having means for positioning said substrates whereby a planar surface of each of said substrates on which the liquid phase crystal growth is to be made extends tangentially to an isothermal plane, said means for positioning said plurality of substrates including means for positioning the planar surface of at least one substrate aslant with respect to any position perpendicular or parallel to the vertical axis of said jig assembly means or to the center plane defined between the upper and lower parts of the jig assembly means, and the upper part having reservoir means for containing a solution for crystal growth; and

control means to bring the solution for the growth in said reservoir means of said upper part into contact with said planar surface of each of said substrates and then to separate said solution and said planar surface.



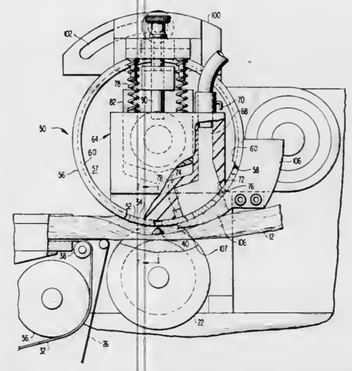
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**4,016,830**

## APPARATUS FOR DISPENSING SPACED DEPOSITS OF PARTICULATE MATERIAL

**John H. Sexstone, Anchorage, Ky., assignor to Brown & Williamson Tobacco Corporation, Louisville, Ky.**

**Filed July 16, 1975, Ser. No. 596,374**
**Int. Cl.² B05C *19/00***
**U.S. Cl. 118—406** **23 Claims**



1. Apparatus for dispensing metered amounts of particulate material in spaced deposits comprising:

a. a rotatable transport member for transporting discrete amounts of said particulate material, said transport member being comprised of a vertically disposed cylindrical rim having a plurality of spaced openings therethrough to receive and dispense particulate material placed therein;

b. particulate material supply means comprised of a downwardly directed chamber engaging a portion of said cylindrical rim, said rim being exposed to the interior of said chamber allowing flow of said particulate material into said openings while said openings are in the confines of said chamber; and

c. control means for rotatably positioning said chamber in relation to the interior of said cylindrical rim to selectively alter the flow of particulate material from said chamber into said openings.

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**4,016,831**

## APPARATUS FOR APPLYING A FOAM BACKING TO FABRIC

**Forrest T. James, Burlington, and Stephen L. Guy, Greensboro, both of N.C., assignors to Burlington Industries, Inc., Greensboro, N.C.**

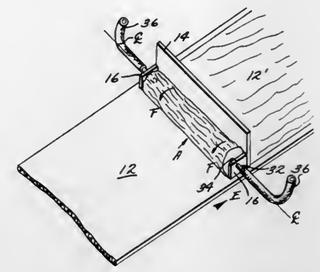
**Filed Apr. 7, 1975, Ser. No. 565,704**
**Int. Cl.² B05C *3/18***
**U.S. Cl. 118—415** **6 Claims**

1. Apparatus for applying a foam coating to a fabric to provide a backing therefor, comprising

a. means for defining a fluid-foam pillow of a predetermined volume on a web of fabric to be backed, the volume having a top, bottom, front, back, and two sides, and said means for defining the fluid-foam pillow comprising means for confining the front and sides of the pillow, the fabric web supporting the bottom of the pillow,

b. means for passing fabric of said web past said foam pillow, said pillow generally rolling about an axis which is transverse with respect to said web as said fabric web is moved with respect thereto,

c. means for allowing only a portion of the foam in said pillow to pass with said web as it moves past said pillow, and



d. means for continuously replenishing the foam material in said pillow to substantially maintain said predetermined volume thereof by introducing a flow of foam into said pillow at least two spaced points in the interior of said pillow, said flow being introduced generally along said transverse axis of said pillow, one of said points being on either side of said pillow.

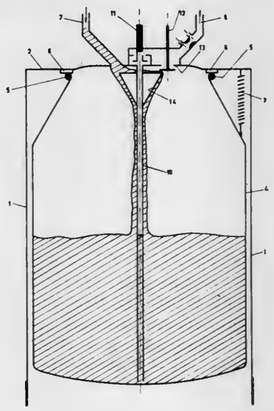
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**4,016,832**

## APPARATUS FOR DETERMINING THE QUANTITY OF MILK AND FOR DRAWING A SAMPLE DURING THE MILKING OF COWS

**Philippus Pope Kiestra, Uilensprong 17, De Tijnje, Netherlands**

**Filed Sept. 4, 1975, Ser. No. 610,265**
**Claims priority, application Netherlands, Sept. 6, 1974, 7411888**
**Int. Cl.² A01J *9/00***
**U.S. Cl. 119—14.14** **4 Claims**



1. An apparatus for determining the quantity of milk and for drawing a milk sample during the milking of cows, characterized by a frame (1) having an upper wall (2), an upwardly open milk container (4) being suspended by means of springs (3) to the lower surface of said upper wall, which container is engageable by its upper edge (5) via a seal (6) against the upper wall of the frame, said upper wall having two connections (7, 8) within the upper edge of the milk container, which are adapted for connection (7) to the hose of a milking cluster and to the milk conduit (8) respectively, two valves (11, 12)

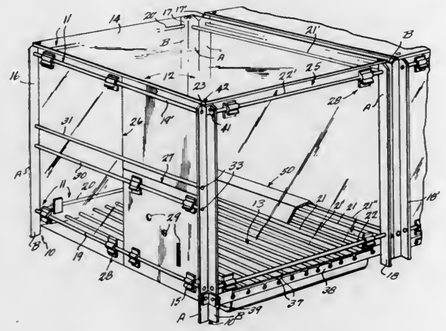
being provided at the position of the connection to the milk conduit, one valve (11) controlling the connection between a tube (10) extending from the upper wall (2) of the frame within the container (4) to close to the container bottom and the milk conduit (8) and the other valve (12) controls the connection between the volume in the container (4) outside the tube (10) and the milk conduit (8), the first-mentioned valve (11) realizing in the closed position a connection (16) between the tube (10) and the atmosphere.

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## 4,016,833
## MODULAR ANIMAL CAGE

**Ronald C. Ray, Edgewater, Md., assignor to Tech Serv Inc., Beltsville, Md.**

**Filed July 24, 1975, Ser. No. 598,870**
**Int. Cl.² A01K *1/02***
**U.S. Cl. 119—17** **10 Claims**



1. A modular animal cage comprising
a. four elongated upstanding corner post members,
b. eight rods arranged in sets of two, said two rods of each set being vertically spaced from each other to provide an upper rod and a lower rod, and extending generally horizontally between and connecting a corner post member to an adjacent corner post member, each set of rods forming a skeletal side,
c. said rods and post members together comprising a first skeletal module having a general rectangular prism outline configuration,
d. a panel member forming a side wall portion, and
e. resilient fastening means for readily detachably connecting said panel member to each of the rods of a set, said means comprising a fastener device on said panel for receiving the upper of the two rods of a set, and a fastener device on said panel for receiving the lower of the two rods of a set.

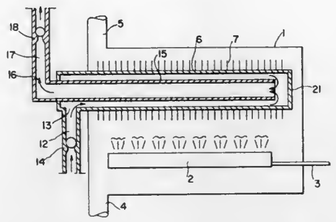
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## 4,016,834
## BOILER WITH CONDENSER

**Poul Wilfred Jensen, Hornbaek, Denmark, assignor to AGA Radiator AB, Helsingborg, Sweden**

**Filed Sept. 22, 1975, Ser. No. 615,510**
**Claims priority, application Sweden, Sept. 27, 1974, 7412220**
**Int. Cl.² F22B *15/00, 23/02***
**U.S. Cl. 122—264** **19 Claims**

1. An arrangement for the heating of a liquid, a liquid mixture or a liquid suspension to boiling and for the condensation of steam created during the boiling, comprising:
a heating means,
a boiler arranged to receive heat from the heating means, said boiler having an inlet opening,
a condenser having an inlet and an outlet, said condenser inlet being located in the boiler and in open communication with the interior of the boiler such that fluid entering the boiler inlet flows at least part of the way through the boiler before entering the condenser inlet,
and including flow directing means for directing the fluid in the direction from the boiler inlet through the boiler and into and through the condenser,
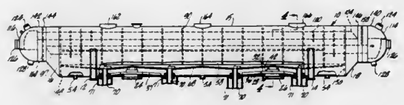


and wherein the condenser comprises an inner tube, said inner tube being surrounded by an outer tube, the space between these tubes forming the boiler.

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## 4,016,835
## MOISTURE SEPARATOR-REHEATER

**Abraham L. Yarden, and Robert A. Weisberg, both of Los Angeles, Calif., assignors to Southwestern Engineering Company, Los Angeles, Calif.**

**Filed Aug. 1, 1975, Ser. No. 601,079**
**Int. Cl.² F22G *1/00*; F28F *13/00***
**U.S. Cl. 122—483** **19 Claims**



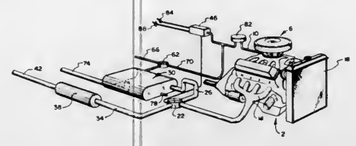
1. A moisture separator-reheater comprising
a cylindrical, horizontally disposed shell;
inlet means at the bottom of said shell for receiving moisture laden steam into said shell;
outlet means at the top of said shell for discharging dried, heated steam from said shell;
at least one tube bundle extending longitudinally through an upper portion of said shell;
drainage means extending longitudinally and centrally through a lower portion of said shell;
a plurality of moisture separators extending in two banks longitudinally through said shell, said banks diverging from said drainage means upwardly to each side of said tube bundle;
baffle means for dividing flow through said inlet means toward each bank of said separators; and
flow distribution means for directing the divided flow longitudinally through said shell, each flow distribution means including a plurality of plates perpendicular to the divided flow, said plates being staggered to separately direct portions of the divided flow at different levels along the banks of said separators.



## 4,016,836
## HYDRIDE FUEL SYSTEM

**Donald B. MacKay, Spanish Fork; Brian C. Nielson; Dale L. Henriksen, both of Orem; Roger Evan Billings, Provo; Harold M. Simons, Orem, and Paul P. Hindmarsh, Provo, all of Utah, assignors to Billings Energy Research Corporation, Provo, Utah**

**Filed Sept. 8, 1975, Ser. No. 611,229**
**Int. Cl.² F02B *43/00***
**U.S. Cl. 123—3** **31 Claims**



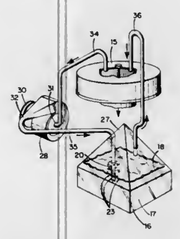
1. A hydride fuel system for supplying hydrogen gas to a combustion unit which includes a mixing unit for mixing hydrogen gas with air for introduction into the combustion unit, and an exhaust manifold for carrying exhaust gases from the combustion unit, said system comprising
a hydride storage tank which includes a housing and at least one container disposed in the housing for holding hydride material, said container being disposed to enable the flow thereabout of fluid introduced into the tank,
means for delivering exhaust gases from the manifold into the hydride storage tank to thereby heat hydride material in the container and cause the hydride material to release hydrogen gas,
an exhaust system for carrying exhaust gases from the manifold into the atmosphere,
means for controlling the pressure of the hydrogen gas in said container,
means for conveying hydrogen gas from the container to the mixing unit,
means for introducing hydrogen gas into the container, and
means for discharging exhaust gases from the hydride storage tank.

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## 4,016,837
## VAPOR INTAKE SYSTEM FOR INTERNAL COMBUSTION ENGINES

**Fred A. Wentworth, Jr., 20 Heights Road, Stratham, N.H. 03885**

**Continuation-in-part of Ser. No. 430,252, Jan. 2, 1974, Pat. No. 3,867,819. This application Oct. 17, 1974, Ser. No. 515,527**
**Int. Cl.² F02D *19/00***
**U.S. Cl. 123—25 R** **8 Claims**



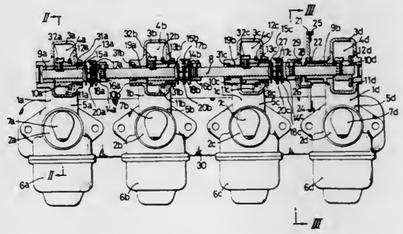
1. In an internal combustion engine having an air intake system, an output drive system and a vapor generating system for adding water vapor to the air intake system, the improvement in said vaopr generating system comprising:
a. blower means having an inlet connection and an outlet connection;
b. a closed container for water;
c. a first conduit having a first end connected to said outlet connection and a second end connection to a pipe extending below water level in said container;
d. a second conduit having a first end connected to said container above water level and a second end connected to the air intake system of said engine; and,
e. a third conduit having a first end connected to the air intake system of said engine and a second end connected to said inlet connection, whereby said blower means repeatedly recirculation air from said air intake system back to said air intake system through water in said container in order to maintain a controlled humidity condition in said intake system.

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## 4,016,838
## APPARATUS FOR OPENING AND CLOSING CONTROL OF A MULTI-CARBURETOR ARRANGEMENT

**Yuichi Yoshioka, Asaka, and Tsugio Sanka, Wako, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha and Kabushiki Kaisha Keihin Seiki Seisakusho, both of Tokyo, Japan**

**Filed Feb. 18, 1976, Ser. No. 658,993**
**Claims priority, application Japan, Feb. 20, 1975, 50-22506[U]**
**Int. Cl.² F02M *13/04***
**U.S. Cl. 123—59 PC** **9 Claims**



1. Apparatus for the opening and closing control of a plurality of carburetors each having a respective casing containing a throttle valve, said apparatus comprising a simple drum shaft extending in the casings of the plurality of carburetors and rotatable therein, a single common valve operation member coupled to said drum shaft for turning the same, a plurality of throttle shafts mounted on said drum shaft in respective casings, means connecting each of said throttle shafts to the respective throttle valve in the associated carburetor for operating the throttle valve upon turning of the drum shaft, and two bearing members in two of said carburetors rotatably supporting said drum shaft.

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## 4,016,839
## METHOD FOR FUELING COMBUSTION ENGINES

**Clyde M. Morton, 11525 S. Ramona, Hawthorne, Calif. 90250**

**Division of Ser. No. 547,790, Feb. 7, 1975. This application Aug. 14, 1975, Ser. No. 604,498**
**The portion of the term of this patent subsequent to Feb. 17, 1993, has been disclaimed.**
**Int. Cl.² F02B *1/08***
**U.S. Cl. 123—69 R** **48 Claims**

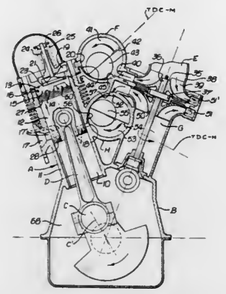
1. A method of fueling a two stroke internal combusion engine which has a cylinder chamber and piston therein productive of a combustion area when the piston is at top dead center, and wherein the piston is reciprocatably mounted in the chamber for operation through a power stroke and a compression stroke, means for introducing a fuel-air mixture supply adjacent one end of the chamber, means for introducing a scavenging air supply adjacent the other end of the chamber and an exhaust means from said chamber,
said method comprising sequentially providing supplies

respectively of voltatile, cold, gaseous fuel-air mixture and scavenging air for the cylinder chamber at an initial pressure, greater than atmospheric

creating a pressure in the cold gaseous fuel-air mixture supply relatively higher than said initial pressure,

trapping a charge of the cold gaseous fuel-air mixture under said relatively higher pressure in an amount sufficient to drive the piston through the power stroke,

releasing said cold gaseous fuel-air mixture to the cylinder chamber when the piston is at bottom dead center and



while the piston is traveling through a portion of the compression stroke,

creating a relatively high pressure in the scavenging air supply,

injecting a quantity of scavenging air under pressure into the cylinder chamber after the end of the power stroke in an amount sufficient to over fill said chamber,

then cutting off the scavenging air supply to the cylinder chamber before the piston reaches the compression stroke.

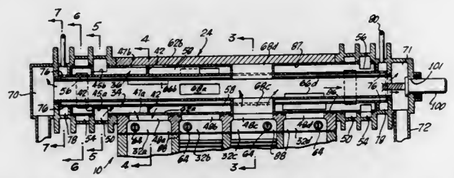
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**4,016,840**

**ROTARY-VALVE DEVICE FOR INTERNAL-COMBUSTION ENGINES**

**John E. Lockshaw, 519 Las Riendas Drive, Fullerton, Calif. 92635**

**Filed May 5, 1975, Ser. No. 574,236**
**Int. Cl.² F02M** *25/06*
**U.S. Cl. 123—75 B** **13 Claims**



1. A single rotary-valve device for a four stroke internal-combustion engine, arranged to simultaneously release separate rich and lean fuel mixtures therefrom into each combustion chamber of said engine, wherein the device comprises:

an elongated tubular drum defined by an outer wall housing;

an exhaust-manifold means disposed within said tubular drum for rotation therewith;

a fuel-intake system disposed in said drum and having a rich-fuel-intake means and a lean-fuel-intake means;

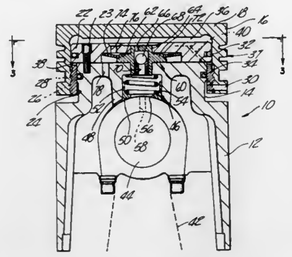
a cooling means positioned between said exhaust-manifold means and said fuel-intake system.

**4,016,841**

**VARIABLE COMPRESSION RATIO PISTON**

**Albert M. Karaba, Muskegon; Alexander P. Brouwers, Bloomfield Hills, and Thomas J. Pearsall, Grand Haven, all of Mich., assignors to Teledyne Industries, Inc., Los Angeles, Calif.**

**Filed Sept. 10, 1975, Ser. No. 611,863**
**Int. Cl.² F02B** *75/04*
**U.S. Cl. 123—78 B** **15 Claims**



1. In an internal combustion engine, a piston having an inner and an outer member telescopically received by said inner member, said members being movable in response to reciprocation of the piston with respect to a combustion chamber of the engine, a first fluid chamber and a second fluid chamber varying in volume in response to said relative movement and to variations in the quantity of fluid therein, means supplying fluid to said chambers, said means comprising a first passage in said piston connecting with said first fluid chamber, a one way inlet valve disposed in said first passage and a second unrestricted passage in said piston directly connecting said first chamber with said second chamber said second passage being the only means of communication between said first chamber and said second chamber.

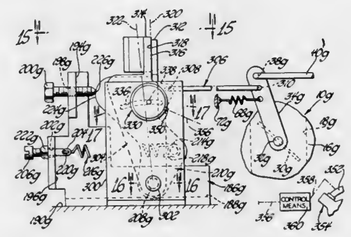
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**4,016,842**

**RESILIENT THROTTLE STOP MEANS**

**Milton J. Kittler, 6701 Kasba Circle, Scottsdale, Ariz. 85253**

**Filed Nov. 8, 1974, Ser. No. 522,236**
**Int. Cl.² F02D** *11/02*; **G05G** *5/04*
**U.S. Cl. 123—98** **12 Claims**



1. Resilient throttle stop apparatus, comprising resilient means, and connecting means for operatively connecting said resilient means to a throttle valve of related throttle controlled induction passage means, said connecting means comprising functional lost-motion means effective to cause said resilient means to exhibit added resilient resistance to further opening movement of said throttle valve by associated throttle lever means after said throttle valve has been opened to a preselected degree, said resilient means comprising spring means, said spring means being preloaded as to cause said added resilient resistance to be of a preselected minimum value upon initiation of said further opening movement, and further comprising second lever means, pivot means carrying said second lever means, said connecting means operatively interconnecting said throttle lever means and said second lever means, said spring means having one end thereof operatively connected to said second lever means and an other end thereof operatively connected to a stationary spring seat, said connecting means being effective to cause rotation in a first direction of said second lever means upon said initiation of said further opening movement, and said spring means being effective to resiliently resist rotation of said second lever means in said first direction.



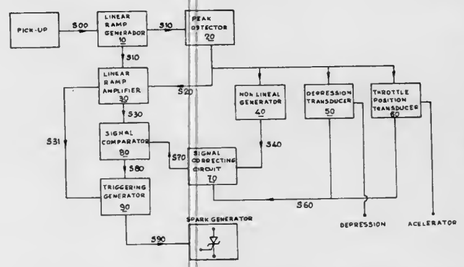
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**4,016,843**

**IGNITION DEVICES FOR AUTOMOBILES**

**Juan Antonio Castaños Dorrego, Madrid, Spain, assignor to Fabrica Espanola Magnetos, S.A., Madrid, Spain**

**Continuation-in-part of Ser. No. 461,918, April 18, 1974, abandoned. This application May 23, 1975, Ser. No. 580,336**
**Claims priority, application Spain, Feb. 20, 1974, 423432**
**Int. Cl.² F02P** *5/04*; **F02B** *3/00*
**U.S. Cl. 123—117 R** **3 Claims**




1. An electronically controlled ignition system for obtaining optimum spark advance comprising:

a. a transducer means which continuously monitors engine speed and generates electrical pulses having a frequency proportional to the engine speed;

b. a first ramp generating means for translating said electrical pulses to a first electrical signal having constant slope and an amplitude proportional to the period between said electrical pulses;

c. a peak detecting means for sampling said first electrical signal, detecting the peak voltage thereof, and emitting a second electrical signal carrying engine speed information in the form of a squared signal;

d. a non-linear function generator means having stored therein predetermined optimum spark advance information relative to engine speed for sampling and modifying said second electrical signal to emit a third electrical signal having therein said peak voltages adjusted by said predetermined spark advance information;

e. a signal comparing means for comparing said first and third electrical signals and emitting a fourth signal in the form of a pulse at such times as the voltages of the first and third electrical signals are equal; and

f. a spark generating means activated responsive to said fourth signal.

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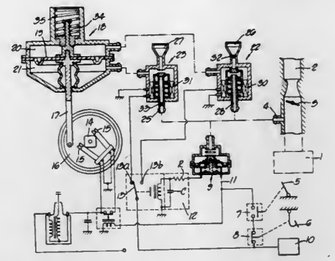
**4,016,844**

**OPERATION CONTROL SYSTEM FOR VEHICLE ENGINE**

**Minoru Tanaka, Chohu; Akihisa Nakamura, Tokyo, and Hisakazu Fushimi, Saitama, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed July 8, 1975, Ser. No. 594,037**
**Claims priority, application Japan, July 10, 1974, 49-78211; July 17, 1974, 49-81148**
**Int. Cl.² F02P** *5/02*
**U.S. Cl. 123—117 A** **3 Claims**

1. In a spark ignition timing control system for an internal combustion engine driving a vehicle, the engine having an intake passage, a throttle valve in the intake passage, and a distributor having a movable spark adjusting member, the vehicle having a brake actuator and having a throttle control member for the engine, the improvement comprising, in combination: a cruising detector serving to detect cruising of the vehicle, said detector including a first electrical switch opened by actuation of the brake actuator, a second electrical switch



closed by actuation of the throttle control member, a third electrical switch closed by a strong vacuum condition in the intake passage downstream from the throttle valve, and time delay means, all three said switches and said time delay means being connected in series, said cruising detector being operated after all three said switches have been closed for a predetermined time interval, and means responsive to operation of said cruising detector to cause the movable spark adjusting member to advance the spark.

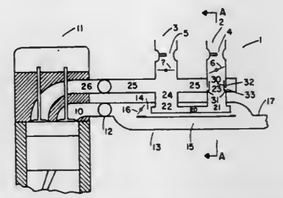
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**4,016,845**

**FUEL INDUCTION SYSTEM**

**Frederick J. Marsee, Clawson, Mich., assignor to Ethyl Corporation, Richmond, Va.**

**Continuation-in-part of Ser. No. 498,951, Aug. 20, 1974, and Ser. No. 508,087, Sept. 23, 1974, Pat. No. 3,972,324, and Ser. No. 498,960, Aug. 20, 1974, Pat. No. 3,971,352, which is a continuation-in-part of Ser. No. 439,912, Feb. 6, 1974, abandoned. This application Oct. 20, 1975, Ser. No. 624,730**
**Int. Cl.² F02M** *31/00*
**U.S. Cl. 123—122 AC** **9 Claims**



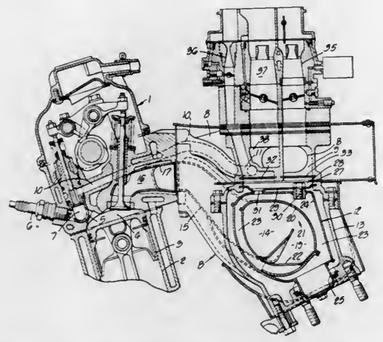
1. A spark-ignited multicylinder internal combustion engine having improved cylinder-to-cylinder fuel distribution and cold starting ability, said engine comprising means for atomizing gasoline into a carburetor barrel, intake passage means for delivering air/fuel mixture to each of said multi-cylinders, an enclosed container having an inlet and an outlet, first passage means connecting said carburetor barrel to said inlet, second passage means connecting said outlet to said intake passage means, liquid fuel trap means inside said first passage means adapted to trap liquid fuel running down the inside wall of said first passage means, said first passage means having at least one small opening in said inside wall, said small opening forming a passage from said trap means into said intake passage means whereby liquid fuel passes directly, without passing through heating means, from said trap means into said intake passage means by-passing said container.

**4,016,846**

## INTAKE AND EXHAUST MANIFOLD SYSTEM FOR INTERNAL COMBUSTION ENGINE

**Soichi Nakano, Kawagoe; Yasumichi Ohama, Mitaka, and Masao Watanabe, Asaka, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed July 16, 1975, Ser. No. 596,469**
**Claims priority, application Japan, July 18, 1974, 49-81693**
**Int. Cl.² F02M *31/08*; F02B *19/10***
**U.S. Cl. 123—122 AB** **4 Claims**



**1.** In a multi-cylinder internal combustion engine of the type having an auxiliary combustion chamber associated with each main combustion chamber and connected thereto by a torch opening, the improvement comprising, in combination: an intake manifold including a primary intake chamber having a lower wall, a secondary intake chamber having a lower wall, and an auxiliary intake chamber having upper and lower walls, means to supply air-fuel mixture to said intake chambers, first passage means for connecting said primary and secondary intake chambers to the main combustion chambers, second passage means for connecting the auxiliary intake chamber to the auxiliary combustion chambers, an exhaust manifold disposed below said intake manifold and including a housing having walls defining an upward facing opening, said lower wall of said primary intake chamber and said lower wall of said auxiliary intake chamber being in heat exchange relationship with said housing opening, whereby exhaust gases within said housing act to heat the air-fuel mixtures in said primary chamber and said auxiliary chamber, said lower wall of said secondary intake chamber being formed by said upper wall of said auxiliary intake chamber to dispose said auxiliary intake chamber substantially below said secondary intake chamber, whereby transfer of heat to the air-fuel mixture in said secondary chamber is minimized.

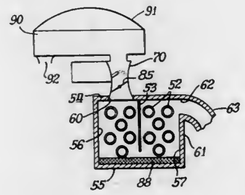
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**4,016,847**

## INERTIA FUEL SEPARATOR AND VAPORIZER

**Frank J. Rychlik, 5200 N. Reserve, Chicago, Ill. 60656**

**Filed Jan. 16, 1975, Ser. No. 541,632**
**Int. Cl.² F02M *31/00***
**U.S. Cl. 123—122 AA** **3 Claims**



**1.** A fuel/air induction system for an internal combustion engine having a plurality of combustion cylinders compising:

an intake manifold for distributing a fuel/air mixture to the engine cylinders;

a downdraft carburetor for delivering an enriched fuel/air mixture to said manifold;

a heated vaporization chamber having a top member, side members, and a bottom member, and having said top member formed with an intake aperture to allow the fuel air mixture to enter the chamber for vaporizing liquid fuel contained therewithin a plurality of heat exchange tubes mounted within said chamber and extending between said side members and adapted to be connected to an exhaust gas heat source of said internal combustion engine;

first conduit means connected to said intake aperture for supplying fuel from said carburetor into said chamber said chamber also having one side member formed with an outlet aperture near said top member;

second conduit means connected to said outlet aperture to deliver vaporized fuel from said chamber to said intake manifold;

baffle means mounted within said chamber and extending between said side members and from said top member nearly to the bottom member of said chamber and effective to obstruct the passage of liquid droplets of fuel from said intake aperture into said and outlet aperture;

first throttle valve means mounted within said second conduit means and operable to control the flow of vaporized fuel therethrough;

third conduit means connected to said intake manifold for delivering pure air into said manifold; and

second throttle valve means mounted within said third conduit means and operable to control the flow of air therethrough for thereby controlling engine operation.

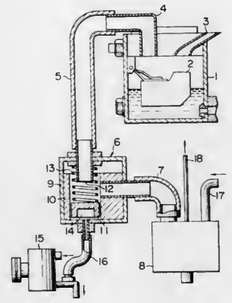
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**4,016,848**

## AIR-VENT SYSTEM FOR A CARBURETOR

**Takanori Nagai, Toyota, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan**

**Filed May 29, 1975, Ser. No. 581,732**
**Claims priority, application Japan, Jan. 31, 1975, 50-13014**
**Int. Cl.² F02M *37/00***
**U.S. Cl. 123—136** **3 Claims**



**1.** A vent system for a float chamber of a carburetor comprising a carburetor housing portion defining a float chamber therein, a vent port provided in said housing portion, a fuel vapour absorptive vessel-like charcoal cannister having inlet and outlet ports, a control valve having inlet and outlet ports, a first passage means which connects said vent port to said inlet port of said control valve, a second passage means which connects said outlet port of said control valve to said inlet port of said fuel vapour adsorptive vessel, and an air pump provided with a delivery port and driven by an associated engine which operates with said carburetor, said control valve defining a through passage therein which connects said inlet and outlet ports thereof and having a valve element which selectively tranverses said through passage to substantially intercept said through passage, an air chamber means which is connected with the delivery port of said air pump and biases said valve element to traverse and close said through passage when it is supplied with air pressure above a predetermined level, and a spring means which biases said valve element toward an open position to counter-act said air chamber means.



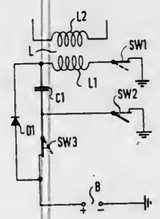
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**4,016,849**

## APPARATUS FOR INCREASING THE IGNITION VOLTAGE OF INTERNAL COMBUSTION ENGINES

**Peter Pan Lei, Taipei, Taiwan, China /Taiwan, assignor to Gerd Krommes, Wuppertal, Germany**

**Filed June 23, 1975, Ser. No. 589,414**
**Claims priority, application Germany, June 25, 1974, 2430389; July 22, 1974, 2435159**
**Int. Cl.² F02P *1/00*; H05B *37/02***
**U.S. Cl. 123—148 DC** **11 Claims**



**1.** In an apparatus for producing an ignition voltage for an internal combustion engine, including an ignition coil having primary and secondary windings, a battery, and a circuit including ignition switching means connecting said battery to said primary winding, said ignition switching means being connected in series with said primary winding in said circuit; the improvement wherein said circuit further comprises a capacitor, means for connecting said capacitor in series with said battery when said ignition switching means are open, for charging said capacitor, and means for connecting said capacitor in series with said battery, primary winding and ignition switching means when said ignition switching means are closed, whereby the sum of the voltage of said battery and the voltage across the capacitor is applied to said primary winding, resulting in increased current flow in said primary winding and thereby increased storage of magnetic energy in said ignition coil for increasing the voltage storage of said ignition coil when said ignition switching means is opened.

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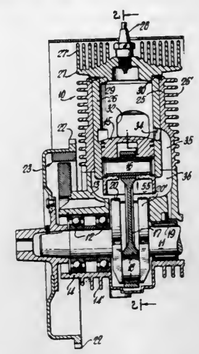
**4,016,850**

## PORTED CYLINDER CONSTRUCTION FOR A TWO-CYCLE ENGINE

**James L. Bloemers, Fond du Lac, Wis., assignor to Brunswick Corporation, Skokie, Ill.**

**Division of Ser. No. 444,767, Feb. 22, 1974. This application Mar. 7, 1975, Ser. No. 556,557**
**Int. Cl.² F02F *1/10***
**U.S. Cl. 123—193 C** **10 Claims**

**1.** A cylinder construction for a two-cycle engine utilizing crankcase compression of combustible mixture and side-ported exhaust, comprising a cylinder-body member having a cylindrical bore between a crankcase end and a head end, and having a side port between said ends, and a cylindrical sleeve-liner member closely fitted to the body-member bore and having an exhaust side port in registration with the side-port of said body member, said liner member having another side port intermediate said ends and offset from the exhaust side port, one of said members at its body-to-liner interface surface also having an elongate groove extending continuously between the region of said other side port and the crankcase end of said body member, whereby the groove defines with said body a transfer passage for combustible mixture from the crankcase end to the bore of said sleeve liner.



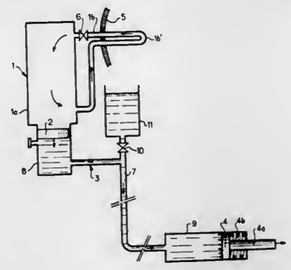
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**4,016,851**

## SAFETY CONTROL METHOD AND DEVICE FOR LIMITING THE TEMPERATURE OF A FLUID TO A GIVEN UPPER VALUE

**Jean Simon René Rouam, Pulseux-en-France, France, assignor to Societe d'Etudes de Machines Thermiques, Saint Denis, France**

**Filed Aug. 22, 1974, Ser. No. 499,530**
**Claims priority, application France, Sept. 6, 1973, 73.32201**
**Int. Cl.² F02B *77/08***
**U.S. Cl. 123—198 D** **17 Claims**



**1.** In an internal combustion engine including an exhaust manifold, a safety device for controlling the temperature of the exhaust gas in said exhaust manifold, comprising:

a pilot member forming a detecting sensor for measuring the exhaust gas temperature; a servo-motor operated by said pilot member and keyed in phase-locked relationship to this temperature; a control member operated by said servo-motor for adjusting a parameter conditioning said temperature, said pilot member being a dilatometer comprising a vessel filled with a liquid having a high boiling point and coefficient of thermal expansion, said vessel comprising a tank and piping mounted in by-passing relationship on said tank, one portion of said piping being located in the flow path of said exhaust gas the temperature of which is to be measured, said pilot member comprising an actuator-like element displaceable under the action of thermal expansion of said liquid; a hydraulic circuit relay connected to said dilatometer and to said servo-motor, said servo-motor comprising a hydraulic power ram actuator having a movable element, said movable element being displaceably operated by said hydraulic circuit relay and acting upon said control member, and said one portion of said piping being positioned inside of

the exhaust manifold of said engine; and means actuated by said control member for controlling fuel flow rate fed to said engine by reducing this flow rate as soon as the exhaust gas temperature tends to exceed a given upper limit value.

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**4,016,852**

## APPARATUS FOR PREVENTING AFTER-BURNING IN INTERNAL COMBUSTION ENGINE

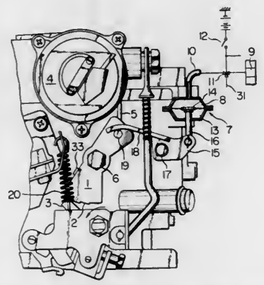
**Masami Konishi, Toyota, and Hiromichi Yanagihara, Susono, both of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan**

**Filed Aug. 11, 1975, Ser. No. 603,356**

**Claims priority, application Japan, Apr. 19, 1975, 50-048022**

**Int. Cl.² F02M *19/12***

**U.S. Cl. 123—198 DB** **7 Claims**



1. A fuel supply apparatus adapted for use with an internal combustion engine having ignition switch means, said apparatus comprising an air intake manifold having movable throttle and choke valves associated therewith, a fast idle cam operatively associated with the throttle valve for moving same into a fast idle position during warmup of the engine, and an automatic choke mechanism operatively coacting between the choke valve and the fast idle cam for substantially closing the choke valve and for moving the fast idle cam into a fast idle position during warmup of an engine, the improvement comprising control means operatively interconnected to said fast idle cam for forceably moving same away from said fast idle position to permit the throttle valve to be returned from its fast idle position into a substantially closed position upon stoppage of the engine when the automatic choke mechanism is set in a fast idle condition, said control means including pressure-responsive actuator means operatively connected with said fast idle cam, passage means communicating with said pressure-responsive actuator means for supplying a pressure fluid thereto to permit actuation thereof in response to the pressure level of said fluid, changeover valve means associated with said passage means to control the flow therethrough and being shiftable in response to opening and closing of the ignition switch means, first passageway means communicating said valve means with the surrounding atmosphere, and second passageway means communicating said valve means with said air intake manifold, whereby said valve means permits said pressure-responsive actuator means to selectively alternately communicate with said first and second passageway means so that actuation of said actuator means effects movement of said fast idle cam for permitting said throttle valve to be returned from its fast idle position to its closed position.

**4,016,853**

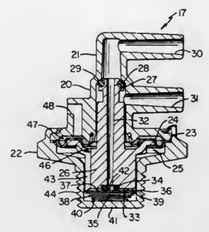
## CONTROL SYSTEM AND IMPROVED PNEUMATICALLY OPERATED TEMPERATURE CONTROLLED VALVE CONSTRUCTION THEREFOR OR THE LIKE

**Harley V. Bible, Maryville, Tenn., assignor to Robertshaw Controls Company, Richmond, Va.**

**Division of Ser. No. 499,176, Aug. 21, 1974, Pat. No. 3,963,042. This application Mar. 31, 1976, Ser. No. 672,523**

**Int. Cl.² F02P *5/04***

**U.S. Cl. 123—198 R** **10 Claims**



1. In an internal combustion engine control system having a source of vacuum and a vacuum operated control device, the improvement comprising a vacuum operated temperature controlled valve construction for initially interconnecting said source to said device only when said construction senses a certain temperature, said construction having means for only disconnecting said source from said device when the value of said source falls below a certain level thereof regardless of sensed temperature, said construction having temperature operated pilot valve means for actuating the same to an open condition thereof when said certain temperature is sensed.

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**4,016,854**

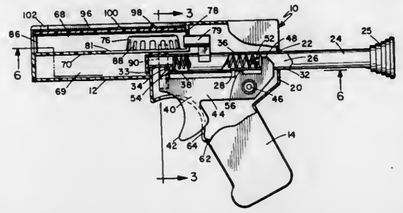
## SPRING TYPE BOTTLE CAP PISTOL

**James A. Lehman, 1312 - 12th Ave., San Diego, Calif. 92101**

**Filed Sept. 22, 1975, Ser. No. 615,567**

**Int. Cl.² F41B *15/00***

**U.S. Cl. 124—27** **9 Claims**



7. A pistol for propelling projectiles comprising:
a projectile having bottle cap shape defining an inverted cavity with an annular downwardly extending peripheral wall;
a firing chamber receiving said projectile;
a handle connected to said firing chamber;
impeller means movably connected to said firing chamber and operative between a cocked position and through a firing stroke for imparting a propelling force on the projectile at the point of impact therewith;
compound spinning means operatively associated with said impeller means and active for imparting a spin to the projectile at the point of impact between said impeller means and the projectile, and active to apply a further spin producing force on the projectile as the same emerges from said firing chamber;
a trigger movably assembled to said handle means and operative for releasing said impeller means from said cocked position; and



restraining means operatively connected to said trigger means and adapted for engaging and holding an inside surface of said peripheral wall of the projectile in said firing chamber until said trigger means is moved, and said restraining means then disengaging from the projectile to release the same for firing.

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**4,016,855**

## GRINDING METHOD

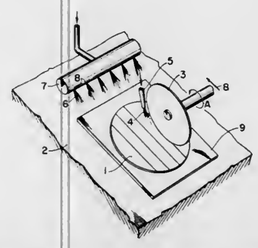
**Tsutomu Mimata, Tokyo, Japan, assignor to Hitachi, Ltd., Japan**

**Filed Aug. 28, 1975, Ser. No. 608,733**

**Claims priority, application Japan, Sept. 4, 1974, 49-100920**

**Int. Cl.² B28D *1/04***

**U.S. Cl. 125—13 R** **10 Claims**



1. A method for segmenting a plate-like material into a plurality of individual pellets comprising the steps of:
a. forming grooves in the surface of said plate-like material by scribing said surface with a rotating grinder blade while causing washing fluid to flow over the entire surface of said plate-like material; and
b. simultaneously with step (a), spraying a cooling fluid at the contact portion of said blade and the groove surface portion of said plate-like material.

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**4,016,856**

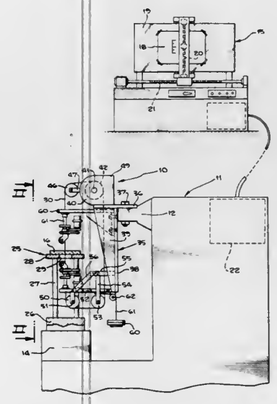
## WIRE CUTTING MACHINE

**Howard B. McLaughlin, Hollywood, Calif., assignor to Laser Technology, Inc., N. Hollywood, Calif.**

**Filed Oct. 1, 1975, Ser. No. 618,519**

**Int. Cl.² B28D *1/08***

**U.S. Cl. 125—21** **4 Claims**



1. A machine for cutting a preselected shape in a work piece and having an elongate wire cutting member defining a cutting axis and adapted to be associated with a work table and a tool support frame comprising in combination;
means on the work table for holding a work piece in a cutting zone defined by said axis of said wire cutting member and for moving the work piece in X and Y directions relative to said cutting axis in accordance with a preselected shape;
means on the frame for guiding the elongate wire cutting member in a Z direction through said cutting zone;
said guiding means including elongated tubular members secured to said frame above and below the cutting zone of said work piece and rotatable grooved pulleys at ends of said tubular members adjacent the cutting zone of the work piece, the wire member passing through said tubular members and the bottom of the groove of the pulleys being tangential to the cutting zone axis;
and means pivotally mounting each pulley between the cutting zone of said work piece and the end of its associated tubular member for supporting said wire member to minimize lateral deflection of said wire member at the cutting zone,
said pivotal mounting means for each pulley including a drive wheel carried by said end of said associated tubular member and operably connected to a servo-drive means,
support means for said servo-drive means on said associated tubular member,
said servo-drive means and drive wheels associated therewith simultaneously and correspondingly turning said pulleys about the axis of said wire cutting member in accordance with the direction of movement of the work piece whereby said wire cutting member in the cutting zone is supported against lateral deflection of the wire member by the work piece.

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**4,016,857**

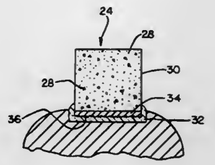
## EPOXY BOND DIAMOND SAW

**George H. Hall, P.O. Box 244, Westford, Mass. 01886**

**Continuation of Ser. No. 513,716, Oct. 10, 1974, abandoned. This application Nov. 24, 1975, Ser. No. 634,828**

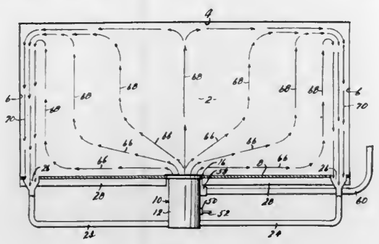
**Int. Cl.² B28D *1/08***

**U.S. Cl. 125—21** **3 Claims**



1. A wire saw comprising in combination:
an elongated metallic wire body of sufficient flexibility to be formed into a laterally flexible endless loop capable of being driven around at least a pair of sheaves;
a plurality of blocks of composite comminuted abrasive in a bonding matrix mounted in spaced-apart relation to one another along said body; and
a plurality of layers of flexible metal, each layer being metallurgically bonded to a corresponding one of said blocks and sandwiched between said body and said corresponding block so as to extend substantially completely between each of said corresponding blocks and said body, each of said layers being bonded to the periphery of said body by an elastically pliant, epoxy-based adhesive.

**4,016,858**
**FLOOR FURNACE HEATING SYSTEM**
**Clifford A. Scogin, 427 Vassar, Sugar Creek, Mo. 64053**
**Filed July 10, 1975, Ser. No. 594,596**
**Int. Cl.² F24B** *7/00*
**U.S. Cl. 126—116 B** **3 Claims**

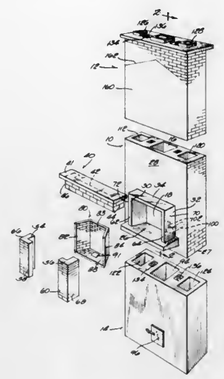


1. A floor furnace comprising:
a. a housing open at top and bottom,
b. means operable to suspend said housing beneath the floor of a room space to be heated, in sealed communication with an aperture formed in said floor,
c. a power driven fan disposed operatively in the bottom opening of said housing and operable to delivery air upwardly through said housing,
d. a combustion chamber supported within said housing to form an annular air passage therebetween through which air delivered by said fan must travel,
e. means for burning fuel within said combustion chamber,
f. air directing means disposed within said air passage and operable to impart a horizontal whirling motion to air moving upwardly through said air passage as it is heated by said combustion chamber, whereby air emerging upwardly from said air passage and floor aperture into said room space is caused by centrifugal force to flow generally horizontally outwardly from said aperture over a major portion of the area of said room space, at or adjacent the floor thereof,
g. an outer housing of greater horizontal cross-sectional area than said first-named housing suspended from said floor aperture, and in which said first-named housing and said combustion chamber are in turn suspended, said outer housing extending below said first-named housing and being closed at its lower end,
h. means sealing the upper end of the air space between said outer and first-named housings, and
i. means for admitting air to said last-named air space.

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**4,016,859**
**PRE-CAST FIREPLACE AND FLUE ASSEMBLY**
**Edmund A. Landowski, 1712 Spring St., Schofield, Wis. 54476**
**Filed Jan. 2, 1976, Ser. No. 645,973**
**Int. Cl.² F24B** *1/18*
**U.S. Cl. 126—120** **6 Claims**

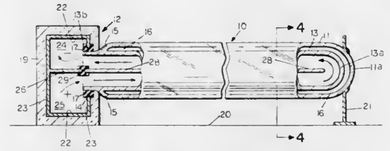
1. A preformed concrete fireplace comprising a chimney stack having a central flue, wall means defining a recess in said stack communicating with said flue, a hearth projecting outwardly from said stack section and above the bottom of the stack and said hearth together with said recess defining a combustion chamber including a ledge integrally formed with said stack section and projecting outwardly from said stack section above said hearth and wall means connecting said



hearth with said ledge, said ledge forming a support for a mantle.

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**4,016,860**
**TUBULAR SOLAR ENERGY COLLECTION SYSTEM UTILIZING AIR MEDIA**
**Kenneth L. Moan, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio**
**Filed Jan. 12, 1976, Ser. No. 648,355**
**Int. Cl.² F24J** *3/02*
**U.S. Cl. 126—270** **21 Claims**



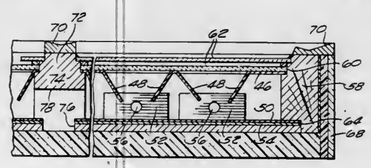
1. A solar energy collection apparatus comprising
a manifold having exterior wall means and a central internal wall means dividing it into separate first and second compartments,
aperture means in said exterior wall means communicating with said first and second compartments and extending across said central wall means,
at least one elongated solar collector having a closed end and an open end comprised of an outer glass tube closed at its one end and an inner tube of lesser O.D. than the I.D. of said outer tube and closed at its one end, there being a space between the inner and outer tubes, a peripheral surface of the inner tube comprising an energy absorbing surface extending substantially the length of the inner tube, the outer and inner tubes being integrally joined together adjacent their other ends opposite said closed ends sealing the space therebetween, said space being evacuated to subatmospheric pressure,
means sealing the solar collector in the aperture of the manifold, the open end of said solar collector communicating with both said first and second compartments of the manifold and extending across said central wall means,
elongated web means disposed internally of said inner tube of the solar collector, and substantially in registry with said central wall means of the manifold,
means sealingly connecting the end of said web means



adjacent the aperture to the central wall means, thereby connecting the first and second compartments of the manifold into the inner tube of the solar collector, the other opposite end of said web means extending axially into the inner tube and spaced from the closed end of the latter, whereby the first and second compartments of the manifold are connected to each other in the inner tube of the solar collector near the closed end thereof,
a gas filling both compartments of said manifold, and the inner tube of said solar collector, and
means for propelling said gas in said manifold from one compartment thereof through the solar collector from its other end to its one end and return and into the other compartment of the manifold.

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**4,016,861**
**SOLAR HEATING SYSTEM**
**Max F. Taylor, Rte. 1, Whitewater, Wis. 53190**
**Filed July 2, 1975, Ser. No. 592,499**
**Int. Cl.² F24J** *3/02*
**U.S. Cl. 126—270** **9 Claims**

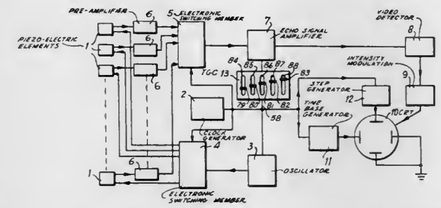


1. A solar heat collector comprising a unitary top plate having a plurality of spaced apart downwardly extending tabs formed from the material of said top plate, there being a plurality of openings in said top plate each located between a corresponding pair of said tabs, a unitary bottom plate having a plurality of spaced apart upwardly extending tabs formed from the material of said bottom plate, there being a plurality of openings in said bottom plate each located between a corresponding pair of said tabs, frame means supporting said top and bottom plates in spaced apart relationship with the tabs intermeshed to form a plurality of heating chambers each bounded by a pair of said downwardly extending tabs and a pair of said upwardly extending tabs, first and second means covering the openings in said top and bottom plates and an air inlet and outlet in said frame to permit a stream of air to be moved through said heating chambers and wherein said first means is transparent.

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**4,016,862**
**ECHOSCOPE FOR EXAMINATION OF OBJECTS**
**Charles T. Lancee, Westeinde 17, Waarder, and Gerardus van Zwieten, Klompenmakerij 42, Smitshoek, both of Netherlands**
**Continuation-in-part of Ser. No. 428,769, Dec. 27, 1973, abandoned. This application June 16, 1975, Ser. No. 587,385**
**Claims priority, application Netherlands, Dec. 28, 1972, 7217703**
**Int. Cl.² A61B** *10/00*
**U.S. Cl. 128—2 V** **20 Claims**

1. In an echoscope for examination of objects with the aid of an ultrasound beam, comprising at least one electro-acoustic element for transmitting and receiving ultrasonic pulses during a transmission-reception period; an amplifier with time-dependent gain control cooperating with the electro-acoustic element for amplifying the echo signals supplied by said element; a control voltage generator connected to said amplifier for supplying a control voltage thereto to determine the signal gain as a function of time; adjusting means in said control voltage generator for permitting changing the magnitude of the control voltage as a function of time in n consecutive time intervals of the transmission-reception period, which are bounded by the interval points of time $t_1, t_2, \ldots t_i, t_j, t_k, \ldots t_{n-1}, t_n$; and a display connected to the echo signal amplifier for the visual display of the echo signals received during each transmission-reception period, the improvement of the control voltage generator comprising a) at least two adjustable voltage sources, each of which cooperates with the adjusting means for arbitrarily setting the voltages ($e_i$, $e_j$) of said sources prevailing at the corresponding interval points of time ($t_i$ and $t_j$ respectively) between a minimum and a maximum value; b) a differential amplifier for each of the time intervals connected to the adjustable voltage sources corresponding to the



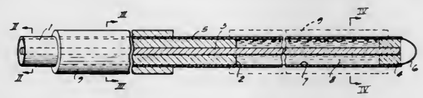
interval points of time bounding said time interval; c) integrator means for supplying the control voltage to the echo signal amplifier, said integrator means cooperating with the differential amplifiers to integrate the output voltages ($e_j - e_i$) of said differential amplifiers during the respective time interval ($t_i$ to $t_j$) with an integrator time constant $(RC)_j$; and d) switching means cooperating with said integrator means for successively integrating the difference voltages ($e_j - e_i$) during consecutive time intervals ($t_j - t_i$), said time intervals ($t_j - t_i$) corresponding to the respective integrator time constants $(RC)_j$ according to the relation

$$\frac{t_j - t_i}{(RC)_j} = \ldots\ldots = \frac{t_2 - t_1}{(RC)_2} = \frac{t_1}{(RC)_1},$$

with $i$=0,1,2, . . . ., $n$-1, and $j$=$i$+1. --

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**4,016,863**
**TISSUE TONOMETER DEVICE FOR USE IN MEASURING GAS IN BODY TISSUE**
**John W. Brantigan, 7723 Forest Drive, NE., Seattle, Wash. 98115**
**Filed Aug. 27, 1975, Ser. No. 608,157**
**Int. Cl.² A61B** *5/00*
**U.S. Cl. 128—2 G** **10 Claims**

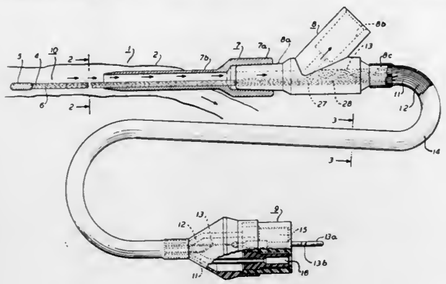


1. A catheter device incorporating the diffusion membrane principle to obtain samples of gases from the tissue of a patient for use with analyzing apparatus wherein the improvement comprises:
a catheter device having a plugged lumen forming a solid proximal portion,
a distal portion having a sealed chamber therein,
a diffusion membrane permeable to gases but impermeable to liquids forming the outer wall of said chamber, and
said chamber being filled with a chemically inert tonometering liquid for equilibration with body tissue gases and of sufficient volume for analysis by blood gas analyzing equipment available in most hospitals.

## 4,016,864
## BLOOD GAS CATHETER

**Ulrich Sielaff, and Wilfried R. Peickert, both of Madison, Wis., assignors to Airco, Inc., Montvale, N.J.**

**Continuation-in-part of Ser. No. 493,939, Aug. 1, 1974, abandoned. This application Sept. 8, 1975, Ser. No. 611,473**
**Int. Cl. A61B** *5/00*
**U.S. Cl. 128—2 G** **18 Claims**



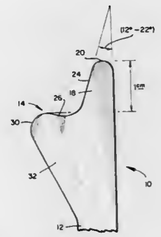
1. A device for sampling gases dissolved in the blood of a living subject, comprising in combination:
a catheter having distal and proximal ends,
means disposed at the distal end of said catheter comprising a tubular gas permeable membrane primarily of material highly permeable to gas but substantially impermeable to blood, constructed for insertion through a cannula percutaneously into the blood vessel in a direction extending along the principal axis thereof, said tubular membrane including a continuous gas permeable conduit, at least a portion of the lateral walls of said conduit being constructed and arranged during percutaneous deposition of said tubular membrane to make contact with the blood of said subject,
means comprising a housing at the proximal end of said catheter including input and output gas receptacles respectively constructed and arranged for connection in circuit relation to a source of carrier gas at said input receptacle and to gas receiving means at said output receptacle,
said conduit having input and output terminals respectively connected through separate connecting means to said input and output gas receptacles.

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## 4,016,865
## CERVICAL-VAGINAL SPATULA

**Richard N. Fredricks, 201 E. 28th St., New York, N.Y. 10016**

**Filed Sept. 17, 1975, Ser. No. 614,314**
**Int. Cl.² A61B** *10/00, 17/22*
**U.S. Cl. 128—002 B** **7 Claims**



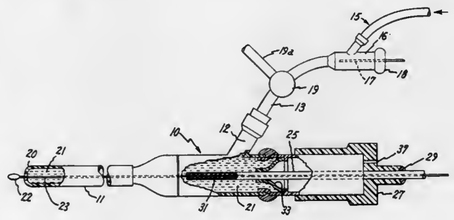
1. A cervical sampling scraper comprising a planar body including a stem and means for scraping the wall of the cervical canal in the region of the transition zone to obtain a sampling of cells of endocervical origin, said scraping means including a wedge shaped protuberance, the protuberance projecting from one end of the stem, the protuberance including a rounded distal tip, the tip having a diameter approximating the diameter of a normal cervical canal at the cervical portio, the protuberance further including a first straight lateral scraping edge being coincident with an edge of the stem, a second scraping edge extending from the tip at a diverging angle of at least 12° from the first scraping edge and terminating at a base portion of the protuberance, the scraping edges being spaced from one another at the base of the protuberance a distance approximating twice the diameter of the normal cervical canal at the cervical portio and the protuberance extending from the tip to the base a distance of at least one centimeter, limiting means for controlling depth of penetration of the protuberance into the cervical canal, said limiting means including a supportive web projecting laterally from the step adjacent the protuberance, said web having a squamous sampling edge extending substantially transverse to the axis of the stem, said sampling edge having a concave portion being coterminous with the second diverging scraping edge, whereby the protuberance may be fully inserted into and effectively distend a cervical canal with the exertion of a minimal wedge pressure to scrape a deposit of endocervical cell material from the cervical wall with the sampling edge cradling the cervical lip to simultaneously remove a deposit of the squamous material upon rotative manipulation of the stem.

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## 4,016,866
## IMPLANTABLE ELECTROCHEMICAL SENSOR

**Richard W. Lawton, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.**

**Filed Dec. 18, 1975, Ser. No. 641,833**
**Int. Cl.² A61B** *5/00*
**U.S. Cl. 128—2 E** **4 Claims**



1. A specific ion sensor for in vivo use which can be calibrated in situ without withdrawing blood from a patient which comprises
a. an elongated insulated sensing electrode having an electrochemically active portion at one end exposed for contact with blood in a patient's blood vessel and having its other end exposed for connection to recording equipment,
b. a guard tube receiving and enclosing a portion of the length of the sensing electrode removed from the electrochemically active portion thereof,
c. a catheter receiving and enclosing a portion of the length of the tube and the sensing electrode and having an open leading end and additionally having a side port and having a trailing end through which the said other end of the sensing electrode extends,
d. sensing electrode positioning means connected to the sensing electrode at a point removed from the electrochemically active portion for moving the electrode axially relative to the catheter to position the said active portion within the open end of the catheter for calibration purposes and to position said active portion outside the open end of the catheter for in vivo measurement purposes,
e. drip line means communicating with the catheter through the side port for delivering electrolyte into the catheter at pressure greater than that of a patient's blood at the open end of the catheter,



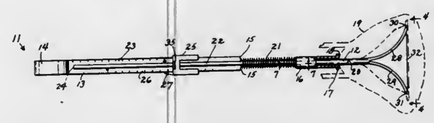
f. a reference electrode positioned partially in the drip line means for functional contact with electrolyte flowing to the catheter and having a portion disposed outside the drip line means for connection to recording equipment,
g. flexible sealing means secured to the catheter between the side port and the trailing end of the catheter and pressure sealing against an annular portion of the tube to prevent electrolyte flow and blood reflux in the direction of the trailing end of the catheter beyond a predetermined point, and
h. sealing means within the guard tube and in contact with an annular portion of the sensing electrode therein to prevent flow of electrolyte through the guard tube.

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## 4,016,867
## UTERINE CALIPER AND DEPTH GAUGE

**Loyd L. King, Benton City; Robert G. Wheeler, Richland, and Thomas M. Fish, Kennewick, all of Wash., assignors to The United States of America as represented by the Secretary of the Department of Health, Education and Welfare, Washington, D.C.**

**Filed Apr. 27, 1976, Ser. No. 680,705**
**Int. Cl.² A61B** *5/10*
**U.S. Cl. 128—2 S** **10 Claims**



1. A uterine caliper and sound comprising an elongated body having a longitudinally split distal end and means to measure uterine width at the fundus comprising a pair of opposed outwardly resiliently biased caliper wings at said distal end, said wings constituting said split distal end, and said elongated body having a longitudinal scale portion, spring-loaded cervical stop means movably mounted on said body, depth indicator means rigidly connected to said cervical stop means and extending over said scale portion, width indicator means slidably mounted on said scale portion, and control means operatively interconnecting said width indicator means with said caliper wings to control the separation of said caliper wings in accordance with the position of said width indicator means on said scale portion and so that the wings can at times be closed for insertion into a uterus and can thereafter be released to internally engage the lateral walls of the uterus.

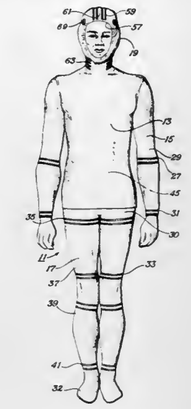
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## 4,016,868
## GARMENT FOR IMPEDANCE PLETHYSMOGRAPH USE

**Robert D. Allison, Rte. 4, Box 4325, Belton, Tex. 76513**

**Filed Nov. 25, 1975, Ser. No. 635,259**
**Int. Cl.² A61B** *5/04*
**U.S. Cl. 128—2.1 E** **12 Claims**

1. An apparatus for providing electrical contact with a body for impedance plethsmograph measurements comprising:
a garment of nonconductive elastic fabric for clothing tightly a portion of the body; and
a plurality of electrodes, insulated electrically from each other and located at selected intervals in pairs for the attachment of instruments to measure blood flow in the body; the electrodes being elastic fabric impregnated with conductive material and woven into the nonconductive



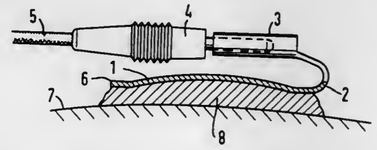
portions of the garment, providing a uniform interior and exterior surface of the garment.

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## 4,016,869
## SIGNAL COLLECTOR SYSTEM

**Helmut Reichenberger, Brand, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany**

**Filed Oct. 30, 1975, Ser. No. 627,465**
**Claims priority, application Germany, Nov. 18, 1974, 2454567**
**Int. Cl.² A61B** *5/04*
**U.S. Cl. 128—2.1 E** **6 Claims**



1. In a signal collector system, particularly for electrical body signals and the like, including at least one electrode connectable to a signal cable; and an electrically conductive paste positioned on said electrode at an application location, said electrode comprising means for extensively eliminating effects of forces and torques acting on said electrode in the applying position thereof, said paste forming a contact paste and adhesive for the electrode on said body, the improvement comprising: said contact paste comprising polyethylene glycol (PEG) as the base material thereof, said base material comprising mixtures of polyethylene glycol with at least one portion being fluid at body temperature and another portion being relatively solid at body temperature, said one portion of said mixture having a molecular weight of about 400 and said another portion having a molecular weight of about 6000.

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## 4,016,870
## ELECTRONIC ACUPUNCTURE POINT FINDER

**Chuck Lock, 144 - 6th Ave., San Francisco, Calif. 94118**

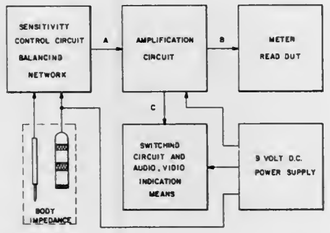
**Filed Oct. 14, 1975, Ser. No. 622,050**
**Int. Cl.² A61B** *5/05;* **A61H** *39/02*
**U.S. Cl. 128—2.1 C** **4 Claims**

1. In an electronic acupuncture point finder having a point finder probe, a grabber electrode, means, such as an audio or visual means, for indicating to an operator a change in body

impedance as the point finder probe is passed over the patient's skin, and a voltage supply means, the improvement comprising

a balancing network including at least two pairs of fixed impedance elements connected across said voltage supply means for effecting a voltage division between each of said pair of impedance elements,

a selective amplifier circuit connected across said balancing network between each pair of fixed impedance elements thereof, said selective amplifier circuit having at least two inputs and means for comparing the electrical signals to said two inputs and selectively producing an amplifier signal only when the difference between said inputs are of a preselected value, and




a sensitivity adjustment circuit electrically interconnecting said point finder probe and grabber electrode to one input of said selective amplifier circuit, said sensitivity adjustment circuit having circuit means for adjusting the voltage level to the input of said amplifier circuit to which said sensitivity adjustment circuit is connected for any given body impedance presented between said point finder probe and grabber electrode whereby said amplifier circuit is only turned on for producing an amplified signal when said body impedance is below a preselected value,

said means for indicating an impedance change to an operator being driven by the amplified signal from said selective amplifier circuit.

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**4,016,871**

## ELECTRONIC SYNCHRONIZER-MONITOR SYSTEM FOR CONTROLLING THE TIMING OF MECHANICAL ASSISTANCE AND PACING OF THE HEART

**Peter Schiff, Box 117, Schwenksville, Pa. 19473**

**Filed Mar. 6, 1975, Ser. No. 556,153**
**Int. Cl.² A61B** *5/04*
**U.S. Cl. 128—2.06 R** **12 Claims**

1. Means for accurately controlling the operation of an assistance device having first and second operating states utilized to assist and augment the beating of the heart of a patent under treatment comprising:

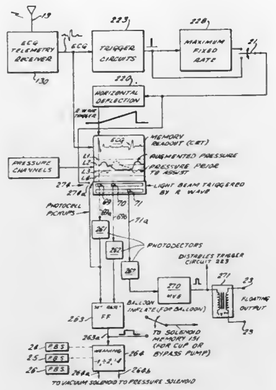
display means including a cathode ray tube and means for generating a timing bar which sweeps across one predetermined portion of the tube face along an imaginary straight line path at a rate related to the patient's present heart beat;

first and second photocells positioned remote from said tube face;

first and second optical pick-up means and means for slidably positioning said first and second pick-up means at any location along said path;

first and second fiber optic bundles each being respectively connected between one of said first and second pick-ups and one of said first and second photocells whereby each photocell is activated as the timing bar passes its associated pick-up;

circuit means controlled by activation of said first and second photocells for alternately shifting said assistance device to its first and second operating states wherein the initiation of each operating state is dependent upon the relative positions of said pick-ups along said path.



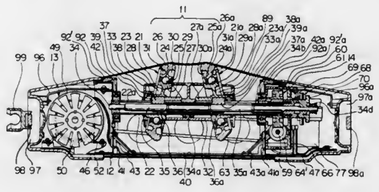

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**4,016,872**

## MASSAGING APPARATUS

**Yukio Yamamura; Takafumi Hamabe, and Haruo Sugai, all of Hikone, Japan, assignors to Matsushita Electric Works, Ltd., Osaka, Japan**

**Filed Feb. 20, 1976, Ser. No. 659,925**
**Claims priority, application Japan, Feb. 26, 1975, 50-24360**
**Int. Cl.² A61H** *7/00*
**U.S. Cl. 128—44** **15 Claims**



1. A massaging apparatus comprising a support means, a driving shaft pivoted to said support means, means for driving said driving shaft, massaging means mounted to said driving shaft eccentrically as inclined with respect to the axis of the driving shaft, and a massaging range adjusting means including another shaft rotated together with said driving shaft and moving said massaging means along the axis of the driving shaft.

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**4,016,873**

## PNEUMATIC IMPACTER

**Otis F. Anderson, P.O. Box 723, Winfield, Kans. 67156**

**Filed Apr. 1, 1976, Ser. No. 672,596**
**Int. Cl.² A61H** *23/00*
**U.S. Cl. 128—54** **8 Claims**

1. A pneumatically actuated impacter for use in chiropractic therapy comprising:

a. a reservoir for containing compressed air, said reservoir having a fitting removably connectible to a source of compressed air and an adjustable pressure relief valve for regulating the pressure therein;

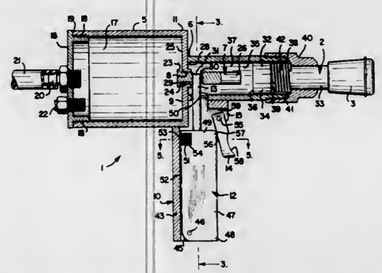
b. a hollow cylinder mounted on said reservoir, extending therefrom, and terminating in a front end having an axial opening therethrough, said cylinder having a cylinder annular shoulder formed in said opening at said front end facing said reservoir;



c. a plunger reciprocably mounted in said cylinder, said plunger having a piston at one end, a shank portion extending through said axial opening, and an impact end remote from said piston end, said impact end having a resilient cap thereon, and said plunger having a plunger annular shoulder between said piston and said shank portion, said plunger shoulder facing said cylinder shoulder;

d. a recoil spring sleeved onto said shank portion with respective opposite ends engaging said cylinder and said plunger shoulders, said recoil spring urging said plunger toward said reservoir;

e. a channel shaped handle member having a central web extending laterally outwardly from said cylinder and reservoir, and having spaced apart, parallel flanges extending toward said cylinder front end;



f. a wall separating said reservoir from said cylinder, said wall having a flow aperture therethrough, said aperture having a valve seat formed on the reservoir side thereof;

g. a linearly translatable valve member having a head portion seatable on said valve seat and an elongated stem extending toward said front end, said stem being in close sliding contact with said flow aperture walls and having a flow passage formed thereon for communicating compressed air from said reservoir to said cylinder;

h. an elongated valve lever pivotally mounted on said handle and having one end engaging said valve stem to translate said valve from a seated position to an unseated position;

i. a trigger member pivotally mounted on said handle and having a surface engaging said valve lever to facilitate pivoting thereof; and

j. a return spring positioned between said valve lever and said handle to normally urge said valve lever to retain said valve head in a seated position.

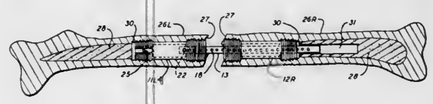
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**4,016,874**

## THREE-PART INTRAMEDULLARY BONE-SETTING PIN

**Ernest J. Maffei, 1681 James St., Syracuse, N.Y. 13203, and David W. Patch, 101 Clareview Drive, Clay, N.Y. 13041**

**Filed May 19, 1976, Ser. No. 688,056**
**Int. Cl.² A61F** *5/04;* **A61B** *17/18*
**U.S. Cl. 128—92 BC** **6 Claims**



1. A three-part bone-setting spline pin for aligning and mutually non-rotatably securing together two portions of a fractured elongated bone, comprising: two tubular outer members adapted to be inserted through an incision at the point of fracture into the intramedullary passage in respective bone portions on either side of the fracture, each outer member having a plurality of radially projecting self tapping threads adapted to be screwed into gripping relation with the cortex of the bone portion around the intramedullary passage of a respective bone portion, and a third central rodlike aligning member of a length substantially equal to the length between the threads at the distal end of the one outer member and the threads at the distal end of the other outer member when the outer members are brought into end-to-end juxtaposition, the third member having a multisided cross-sectional shape, each outer member having for at least a portion of its length a reduced axial passage therethrough of a cross-sectional shape corresponding to that of the third member for containing therein the third member with a sliding fit, whereby the outer members are each screwed within the bony cortex of respective bone portions and then the third member inserted in the multisided passage of one outer member and then reciprocated into the passage of the other member when the bone portions are aligned.

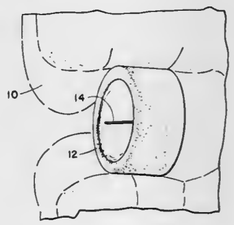
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**4,016,875**

## PENIS LOCKING AND LACERATING VAGINAL INSERT

**Alston L. Levesque, Burlingame, Calif., assignor to Raymond Lee Organization, Inc., New York, N.Y.**

**Filed Apr. 8, 1976, Ser. No. 675,114**
**Int. Cl.² A61F** *13/00*
**U.S. Cl. 128—132 R** **2 Claims**




1. A penis locking and lacerating device, comprising:

a plurality of rigid members,

each of the rigid members forming a lateral enlargement of each side of the rigid member,

a plurality of housing members,

each of the housing members forming a slot at each side of the housing member within which one of the enlargements of the rigid members may be received,

means of sealing the housing member slot after insertion of the rigid member enlargement, whereby the rigid member is permanently locked within the housing member,

spring means of yieldably pressing the rigid members distal to the housing member,

a slot formed in an internal surface of the rigid housing,

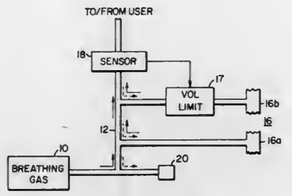
a blade mounted within the slot in the internal surface of the rigid housing, and

means of pivoting the blade attached to the blade and mounted within the internal surface of the housing member.

## 4,016,876
## BREATHING APPARATUS

**Frank E. Martin, Chester; John R. Colston, Annapolis, and Norman E. Smith, Pasadena, all of Md., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Division of Ser. No. 413,413, Nov. 6, 1973, Pat. No. 3,913,576.**
**This application July 30, 1975, Ser. No. 600,751**
**Int. Cl.² A62B 7/02; A61M 16/00**
**U.S. Cl. 128—142 R** **4 Claims**




1. Breathing apparatus comprising:
a. means for providing a user with a gas to be breathed;
b. a gas saver means for the capture of the initial portion of the user's exhaled breath;
c. carbon dioxide sensing means for sensing the carbon dioxide content of the user's exhaled breath and operable to provide an output signal indicative thereof;
d. means responsive to said output signal for preventing further capture of said exhaled breath during the time it is being exhaled, when the carbon dioxide content thereof attains a predetermined level;
e. means for discharging said exhaled breath to atmosphere after said predetermined level has been attained.

## 4,016,877
## FIBROUS COLLAGEN DERIVED WEB HAVING HEMOSTATIC AND WOUND SEALING PROPERTIES

**Mamerto M. Cruz, Jr., Pennington, N.J.; John H. Tenery, Fort Worth, Tex., and LaVerne C. Tressler, Trenton, N.J., assignors to Avicon, Inc., Fort Worth, Tex.**

**Filed Feb. 23, 1976, Ser. No. 660,065**
**Int. Cl.² A61L 51/00**
**U.S. Cl. 128—156** **9 Claims**

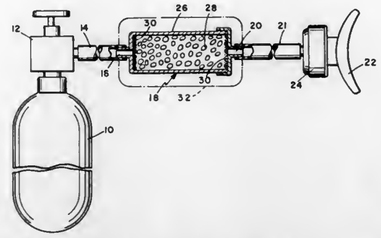
1. The method of forming a hemostat-adhesive, liquid-laid, non-woven web dressing for severed biological surfaces from hemostat-adhesive fibers consisting of an ionizable, water-insoluble, partial acid salt of collagen, the partial acid salt of collagen containing from about 50 to 90% of the theoretical stoichiometric amount of ionizable acid, the steps of preparing a slurry of the fibers in a water-miscible organic liquid containing a small proportion of an ionizable acid, the proportion of acid being sufficient to prevent leaching of acid from the partial salt of collagen, sheeting the fibers to form a web, removing excess liquid from the web, subjecting the web to a uniform pressure between 7 and 70,3 gm. per sq. cm. and thereafter freeze drying the web.

## 4,016,878
## HEATER AND HUMIDIFIER FOR BREATHING APPARATUS

**David Castel, San Diego, and Stephen E. Suess, La Jolla, both of Calif., assignors to Foundation for Ocean Research, San Diego, Calif.**

**Filed June 27, 1975, Ser. No. 590,820**
**Int. Cl.² A61M 16/00**
**U.S. Cl. 128—212** **18 Claims**

1. A heater and humidifier for adding heat and moisture in a controlled amount to a breathing gas, such as air, for use in a human breathing apparatus, comprising:
means for providing a supply of hydrogen and oxygen breathing gas with the hydrogen being less than three percent of the combined mixture,
a heater unit having inlet means for connection to said gas source means and an outlet for connection to a breathing utilization element,

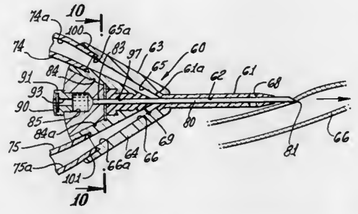



valve means coupled to said heater unit for controlling the flow of hydrogen and breathing gas,
and catalyst means in said heater unit for providing combustion of the hydrogen in the breathing gas adding heat and moisture to the gas passing out through the breathing element.

## 4,016,879
## MULTI-MODE CANNULATING APPARATUS

**Eli K. Mellor, Burbank, Calif., assignor to Dynasciences Corporation, Los Angeles, Calif.**

**Continuation-in-part of Ser. No. 390,542, Aug. 22, 1973, Pat. No. 3,875,938. This application Apr. 7, 1975, Ser. No. 565,436**
**The portion of the term of this patent subsequent to Apr. 8, 1992, has been disclaimed.**
**Int. Cl.² A61M 5/00**
**U.S. Cl. 128—214.4** **2 Claims**



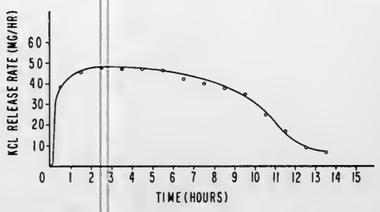

1. In cannulating apparatus, the combination comprising:
a. an axially extending tubular body defining a blood flow passage and having a forward stem portion insertible into a blood vessel, said body defining two side ports and including two stub ducts defining forwardly tapering bores communicating at their forward ends with said side ports for conducting blood flowing between said passage and auxiliary tubing connectible at rearward ends of said ducts, said body also defining a rear port in alignment with said axis,
b. an elastomer plug carried by said body in alignment with said rear port and projecting to the junction of said side ports and said flow passage, said plug defining forwardly tapering inner wall portions of said side ports,
c. rearwardly removable structure extending axially within said passage and axially through said plug, said structure having a vessel puncturing forward tip, and
d. said side ports intersecting said passage at a location relatively close to the forward end of said stem portion.



## 4,016,880
## OSMOTICALLY DRIVEN ACTIVE AGENT DISPENSER

**Felix Theeuwes, Los Altos, and Nalinkant C. Damani, Sunnyvale, both of Calif., assignors to Alza Corporation, Palo Alto, Calif.**

**Filed Mar. 4, 1976, Ser. No. 663,665**
**Int. Cl.² A61M 31/00**
**U.S. Cl. 128—260** **11 Claims**

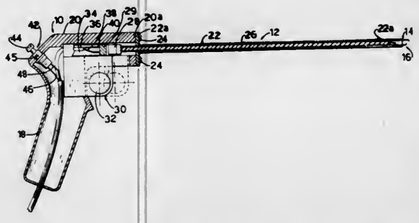



1. An osmotically driven active agent dispenser for use in an aqueous environment comprising:
a. a core of an osmotically effective pressure generating active agent composition; and
b. a substantially inexpandable wall having a substantially intact surface enclosing the core, said wall being substantially impermeable to the active agent composition and having a controlled permeability to water and including,
c. means responsive to the pressure generated within the dispenser by imbibition of water from the environment by the core through the wall to create and form at least one exit passageway in situ in the wall through which the active agent composition in solution is pumped osmotically from the core into the environment at a substantially predetermined, substantially constant rate.

## 4,016,881
## INSTRUMENT FOR USE IN LAPAROSCOPIC TUBAL CAUTERIZATION

**Jacques E. Rioux, Ste. Foy; Gerald Turp, and Francois Jacques, both of Neufchatel, all of Canada, assignors to Centre de Recherche Industrielle du Quebec, Ste. Foy, Canada**

**Continuation-in-part of Ser. No. 378,935, July 13, 1973, Pat. No. 3,938,527. This application May 27, 1975, Ser. No. 580,752**
**Claims priority, application Canada, July 4, 1973, 175625**
**Int. Cl.² A61B 17/36; A61N 3/04**
**U.S. Cl. 128—303.17** **5 Claims**

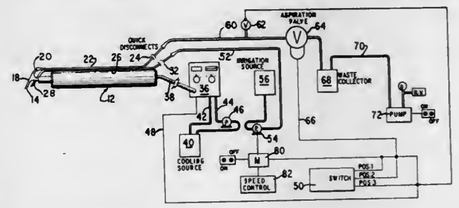



1. An instrument for use in laparoscopic tubal cauterization whereby a fallopian tube is completely blocked by coagulation, comprising:
a. an elongated narrow sheath having one open end;
b. an electrically insulated separator means slidably mounted in said sheath, said separator means having diametrically opposite electrode-receiving grooves extending longitudinally thereof; said sheath and said separator means being made of plastic material; and
c. a pair of bipolar electrodes secured in said grooves, one end portion of each said electrode defining a prong extending outwardly from said open end of said sheath, said prongs being spaced from one another to define a first tube-receiving position whereby a tube may be grasped between said prongs, said prongs being movable to a second tube-squeezing position in response to said separator means being slidably retracted in said sheath whereby a grasped tube is squeezed by said prongs as said prongs contact said sheath end and are closed on said tube, each said prong including inwardly bent extremities defining fangs for grasping said tube, the planes of said fangs along the longitudinal axis of said separator means being offset one relative to the other to prevent said fangs from contacting one another when in said second tube-squeezing position, and each said prong including a heat shrinkable sleeve made of insulating material, the inner face of each prong including a non-insulating portion for allowing electrical discharge to said tube during cauterization; the opposite end of each said electrode including means for electrical connection to an external source of cauterizing current.

## 4,016,882
## NEUROSONIC ASPIRATOR AND METHOD

**Alan Broadwin, Brooklyn, N.Y.; Steven N. Weiss, Laguna Niguel, Calif., and Stanley H. Enker, Lawrence, N.Y., assignors to Cavitron Corporation, New York, N.Y.**

**Filed Mar. 5, 1975, Ser. No. 555,474**
**Int. Cl.² A61B 17/32**
**U.S. Cl. 128—305** **5 Claims**




1. A procedure for rapidly removing neurological tissue that has been exposed to view comprising the steps of: vibrating a tool tip that has a longitudinal axis at an ultrasonic frequency and in a manner such that substantially all of said vibration is transverse to the longitudinal axis of the tip;
sweeping the tip back and forth over the surface of and in contact with the exposed tissue, said sweeping motion of the tip occurring in a plane generally parallel to said transverse vibration to disintegrate the tissue layer by layer; and,
aspirating said disintegrated tissue simultaneously with said sweeping step.

## 4,016,883
## MEDICAL CLAMP FOR OCCLUDING INTRACRANIAL BLOOD VESSELS

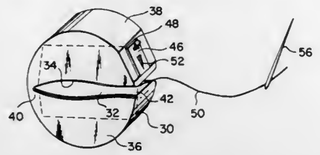
**Sanford J. Wright, Jr., 2000 Baltimore Road, Rockville, Md. 20850**

**Filed Nov. 11, 1975, Ser. No. 624,302**
**Int. Cl.² A61B 17/12, 17/08**
**U.S. Cl. 128—325** **31 Claims**

1. A medical clamp for controlled occlusion of a body vessel, comprising
a. vessel engaging means for applying pressure to generally opposed sides of a body vessel, said vessel engaging means including a pair of members having first and second vessel engaging surfaces, respectively;
b. connecting means for connecting said members to permit movement of said members between a first position in which said vessel engaging surfaces are spaced apart to receive a vessel and a second position in which said vessel

engaging surfaces are spaced sufficiently close to occlude a vessel placed therebetween;

c. pressure controlling means connected with said vessel engaging means for controlling the pressure applied to a vessel by controlling movement of said vessel engaging surfaces between said first and second positions and for holding said vessel engaging surfaces in any selected




position intermediate said first and second positions, said pressure controlling means including

1. a flexible line having one portion thereof fixedly connected to said vessel engaging means, and
2. line securing means for selectively securing another portion of said flexible line to said vessel engaging means to hold said members in the selected intermediate position.

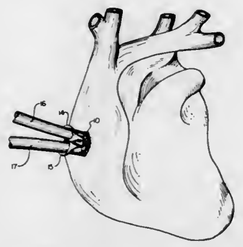
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**4,016,884**

**ATRIOTOMY ACCESS DEVICE**

**Clifford S. Kwan-Gett, 2208 E. 900 South, Salt Lake City, Utah 84108**

**Filed July 2, 1975, Ser. No. 592,405**
**Int. Cl.² A61M *25/02***
**U.S. Cl. 128—348** **9 Claims**



1. An atriotomy access device comprising:

a. an adaptor body consisting of a resilient, compressible polymeric foam material which is tapered inwardly from front to back and which has extending through the width thereof from front to back at least one but not more than two incisions; and

b. a tab section attached to the adaptor body having an elastomeric band connected thereto which, when the adaptor body is inserted into the atrium, will wrap around the atrial tissue adjacent to the incision in the atrium and be anchored to said tab thereby sealing the adaptor body to the atrium incision walls in an air and fluid tight relationship.

6. A method of anchoring an atriotomy access device into the atrium of a heart which comprises:

a. making an incision into the right atrium of the heart,

b. inserting therein an adaptor body consisting of a substantially resilient, compressible polymeric foam material, said adaptor body being tapered inwardly from front to back and having one or more incisions extending through the width thereof from front to back; and

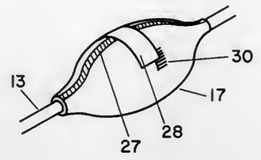
c. forming an air and fluid tight seal between the atrium incision and adaptor body by winding an elastomeric band attached to a tab section forming part of the adaptor body around the atrial tissues surrounding the incision and attaching said band to said tab section.

**4,016,885**

**PRESSURE INDICATORS FOR INFLATABLE CUFF-TYPE CATHETERS**

**James D. Bruner, Englewood, Colo., assignor to Sandoz, Inc., E. Hanover, N.J.**

**Filed June 30, 1975, Ser. No. 591,601**
**Int. Cl.² A61M *16/00*, *25/00***
**U.S. Cl. 128—349 B** **3 Claims**




1. An inflatable cuff-type catheter for insertion into a body passage comprising in combination a flexible tube having distal and proximal ends, at least one gas inflatable cuff encircling the flexible tube near the distal end and having opposite ends sealed thereto; a branched tube connected at an inner end to the interior of the cuff; and an inflation means and a pressure indicator means connected in series to the cuff through the outer end of the branch tube for access outside the body passage, the indicator means comprising an expandable chamber having an open-ended spring wound about the mid-section of the chamber, which spring is adapted to expand with the chamber to indicate, by a predetermined setting on the surface thereof, the gas pressure within the inflatable cuff.

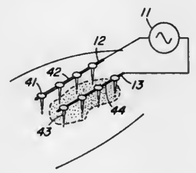
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**4,016,886**

**METHOD FOR LOCALIZING HEATING IN TUMOR TISSUE**

**James D. Doss, and Charles W. McCabe, both of Los Alamos, N. Mex., assignors to The United States of America as represented by The United States Energy Research and Development Administration, Washington, D.C.**

**Filed Nov. 26, 1974, Ser. No. 527,469**
**Int. Cl.² A61N *1/32***
**U.S. Cl. 128—422** **2 Claims**




1. A method of treating tumorous tissue in situ comprising heating substantially only the said tumorous tissue by placing at least two electrodes in operative relationship, passing radio frequency current having a frequency less than 1 MHz substantially directly through the tumorous tissue, forming and placing electrodes to shape the field of said radio frequency current by inserting in the patient's body a plurality of electrically conductive pins on either side of tumorous tissue with the distance between opposite pins being inversely proportional to the required radio frequency field intensity and current; electrically interconnecting said pins on one side of said tumorous tissue; electrically interconnecting said pins on the other side of said tumorous tissue; and applying said radio frequency current to said interconnected pins on both sides of said tumorous tissue.



**4,016,887**

**TWO-STAGE TOBACCO SMOKE FILTER**

**Miroslav Uroshevich, 2505 Fleetwood Ave., Cincinnati, Ohio 45211**

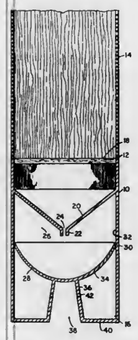
**Filed June 21, 1973, Ser. No. 372,182**
**Int. Cl.² A24D *1/06***
**U.S. Cl. 131—261 R** **5 Claims**

1. Apparatus for filtering tobacco smoke, comprising:

a generally tubular element connectable at an upstream end to a tobacco-containing body and defining a generally cylindrical chamber through which tobacco smoke is drawn toward a downstream end of said element;

funnel means adjacent the upstream end of said tubular element, said funnel means terminating downstream in an apex forming an axial capillary orifice for accelerating smoke in a high velocity stream toward the downstream end of said tubular element, said funnel means forming in cooperation with the interior wall of said tubular element an expansion chamber into which said stream is discharged whereby said smoke is decelerated in said expansion chamber;

a parabolic disc for collecting particulate material, said parabolic disc being positioned downstream of said orifice, the axis of said parabolic disc being in the path of smoke discharged from said orifice, said parabolic disc having a periphery closely spaced from the interior walls of said tubular element, whereby said smoke is again



accelerated to flow at high velocity around said periphery, thereby inducing turbulence adjacent the downstream side of said parabolic disc and causing the deposition of particulate material thereon;

means downstream of said parabolic disc for defining an additional expansion chamber and a flow path to the exterior of said tubular element, said means comprising a transverse circular end disc positioned in the downstream end of said tubular element and having a central opening therein, and a tube extending from said central opening to the downstream face of said parabolic disc, said additional chamber being defined by the said circular disc, said parabolic disc, said tubular element and said tube, said tube having side openings defining a flow path from the said additional expansion chamber to the interior of said tube.

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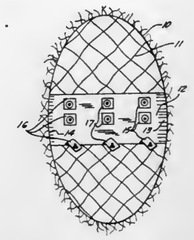
**4,016,888**

**ADJUSTABLE WIGS**

**Alan Michael Smiley, North Miami, Fla., assignor to Revlon, Inc., New York, N.Y.**

**Filed Feb. 18, 1976, Ser. No. 659,133**
**Int. Cl.² A41G *3/00***
**U.S. Cl. 132—53** **5 Claims**

1. Means for reducing the size of a wig cap in combination with a stretch foundation fitting the head, said stretch foundation comprising a nylon mesh and a netting crown which stretches from side to side across the crown of the user's head, said means comprising three sets of closures, each set consisting of two fixed fasteners and one movable fastener, one fixed fastener being positioned near one edge of the netting crown, the movable fastener being attached to a strip which is attached at the opposite edge of the netting crown, and the



second fixed fastener being positioned substantially in the middle of the netting crown in substantial linear relationship to the first fixed fastener and the movable fastener, one of said sets of closures being positioned on one side of the foundation, the second at the other side, and the third in the middle.

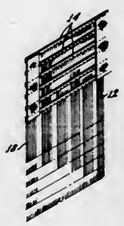
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**4,016,889**

**HAIRPIECE**

**Mary M. Cowles, 529 Ross Drive, Escondido, Calif. 92025**

**Filed Feb. 21, 1975, Ser. No. 551,899**
**Int. Cl.² A41G *3/00***
**U.S. Cl. 132—56** **2 Claims**



1. A hairpiece for forming bangs on an existing hairdo or to supplement existing bangs of an existing hairdo comprising;

a relatively flat band of a length sufficient to support a number of strands of hair in a planar fashion of a sufficient amount to provide bangs to an existing hairdo, said band being yieldable and formable across the contour of the forehead,

hair means permanently bound by sewing and glueing and forming a bang of a sufficient width with a sufficient number of hair strands to selectively form a bang,

a plurality of such bands being substantially parallel with one another such that said strands are overlapping and with said bands being connected together by suitable vertical strips at least on each end of said bands with said strips being substantially perpendicular to said bands to provide a more fuller and pleasing look for the bang, and

means forming part of at least one of said bands to enable the hairpiece to be attached to the existing hairdo; and

said bangs so attached forming a full or partial bang for a more pleasing effect for the hairdo.

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**4,016,890**

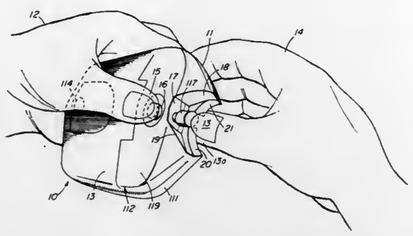
**POWER-DRIVEN FINGERNAIL FILE**

**Joseph J. Fiorenza, Sr., Fort Lauderdale, Fla., and Irving Kalikow, Swampscott, Mass., assignors to Joseph J. Fiorenza, Oakland Park, Fla.**

**Filed Dec. 29, 1975, Ser. No. 644,614**
**Int. Cl.² A45D *29/04***
**U.S. Cl. 132—75.6** **4 Claims**

1. A portable, power-driven fingernail file which comprises a hollow body adapted to be held in one hand, a motor housed within the body and actuated by means of a switch on the

exterior of the body, an outer recess in the body formed in part by a pair of spaced-apart upwardly curved bottom walls



and an abrading member positioned between said curved bottom walls and rotated by said motor.

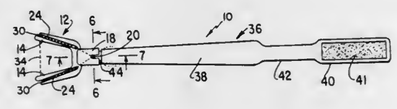
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**4,016,891**

**DENTAL FLOSS HOLDER FOR DETACHABLE SECUREMENT TO TOOTHBRUSH HANDLE AND THE LIKE FOR SUPPORTING A STRIP OF FLOSS IN TAUT CONDITION READY FOR USE**

**Sam Kupperman, Chicago, and Dennis I. Kupperman, Glenview, both of Ill., assignors to R B Toy Development Co., Skokie, Ill.**

**Filed July 17, 1975, Ser. No. 596,735**
**Int. Cl.² A45D *44/18***
**U.S. Cl. 132—84 A** **3 Claims**



1. In combination a handle supporting a toothbrush at one end and means for supporting a precut strip or length of dental floss in position ready for use at the opposite end, said means comprising a forked member having a pair of spaced diverging arms and a tubular extension at the inner end of said forked member forming a socket and in which the socket has a slot at the mouth thereof, said spaced arms extending rearwardly of said tubular extension and at an inclined plane with respect to said extension with each of said arms having a longitudinal groove on one of the surfaces and a transversely extending groove on the undersurface, a precut dental floss strip adapted to be strung on said forked member and to extend into the longitudinal and transverse grooves of said arms and extend between said arms with the opposite ends of said strip adjacent the tubular extension, said tubular extension adapted to be detachably secured to the end of said handle, with the opposite ends of said strip being held locked within said socket between said tubular extension and said handle end with at least one of the opposite ends of said strip passing through said slot and with the portion of the strip between the arms maintained in a tensioned and taut condition, said forked member inclined at an angle with respect to the longitudinal plane of the handle.

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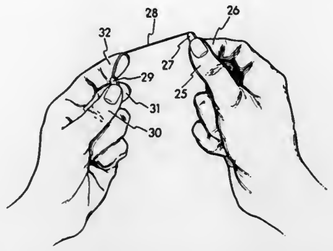
**4,016,892**

**DENTAL FLOSS HOLDER**

**Ingram S. Chodorow, Stamford, Conn., assignor to Placontrol, Inc., Briarcliff Manor, N.Y.**

**Filed June 24, 1974, Ser. No. 482,131**
**Int. Cl.² A61C *15/00***
**U.S. Cl. 132—91** **10 Claims**

1. A dental flossing apparatus formed as a plurality of consecutively spaced flossing units, the apparatus comprising a continuous strand of dental floss and a plurality of said flossing units secured to said strand, each of said flossing units comprising a pair of said gripping means, each of said flossing units spaced apart from adjacent units axially along said strand by a predetermined first distance, each two gripping means of each of said flossing units being spaced apart a second distance substantially greater than the first distance, each gripping



means being a three dimensional member having length, axially along the strand, and width and thickness dimensions transversely of length suitable to be held between a thumb and forefinger of a person's hand, wherein said thickness and width are generally constant along the length of said gripping members.

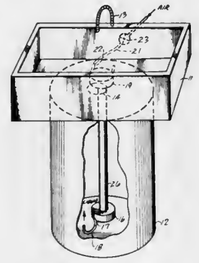
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**4,016,893**

**SOLVENT PUMPING SYSTEM**

**Donald C. Scott, 761 W. La Deney, Ontario, Calif. 91762**

**Continuation-in-part of Ser. No. 531,054, Dec. 9, 1974, abandoned. This application Oct. 22, 1975, Ser. No. 624,704**
**Int. Cl.² F04B *17/00*; B08B *3/00***
**U.S. Cl. 134—115 R** **19 Claims**



1. A solvent recirculation system comprising:
a solvent tank;
a sink mounted on top of the solvent tank including a drain for draining solvent from the sink back to the tank;
a centrifugal liquid pump mounted in the tank below the normal solvent level, and having an inlet spaced above the bottom of the tank, a cover with an opening therein for the inlet, and a tangential liquid outlet;
a centrifugal air turbine mounted in the tank above the normal solvent level, and having a tangential air inlet with the same rotational sense as the liquid outlet and an opening for the air outlet;
an air impeller in the air turbine;
a liquid impeller in the liquid pump;
a fixed tubular housing having a cross-sectional area that is smaller than the area covered by each impeller in a plane perpendicular to the axis of rotation and interconnecting the liquid pump and air turbine;
a drive shaft in the tubular housing interconnecting the air impeller and the liquid impeller;
means for mounting the drive shaft in the tubular housing for rotation; and
a liquid spout over the sink connected to the liquid outlet of the pump.

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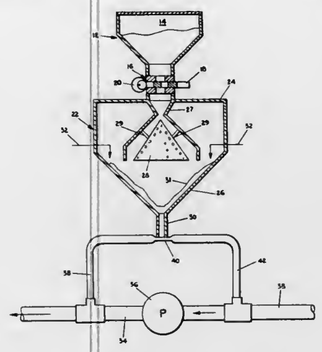


**4,016,894**

**DRAG REDUCING COMPOSITION AND METHOD**

**Bruce B. Baldwin, East Grand Rapids, and Robert N. Hammer, East Lansing, both of Mich., assignors to Belknap Corporation, Grand Rapids, Mich.**

**Filed Aug. 28, 1975, Ser. No. 608,766**
**Int. Cl.² F17D *1/16***
**U.S. Cl. 137—13** **11 Claims**



1. A process for reducing hydrodynamic drag of a turbulent aqueous stream comprising the step of injecting into the turbulent aqueous stream a mixture of a finely divided free flowing hygroscopic drag reducing powder, which tends to agglomerate when dissolved in water, and a colloidal size moisture repelling hydrophobic powder, the hydrophobic powder coating the hygroscopic powder and being of such size and being present in the mixture in amounts sufficient to effectively inhibit the caking of the hygroscopic powder under normal storage conditions, to promote free flow of the hygroscopic powder and to control the rate at which the hygroscopic powder dissolves in the aqueous water stream so as to minimize agglomeration of the hygroscopic powder during dissolution thereof.

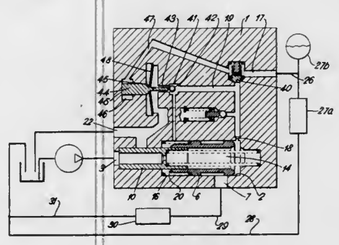
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**4,016,895**

**FLOW CONTROL VALVE**

**Ludwig Budecker, Frankfurt, Germany, assignor to International Telephone and Telegraph Corporation, New York, N.Y.**

**Filed Aug. 29, 1975, Ser. No. 608,844**
**Claims priority, application Germany, Aug. 30, 1974, 2441662**
**Int. Cl.² G05D *15/00***
**U.S. Cl. 137—101** **8 Claims**



1. A flow control valve for controlling the output of first and second delivery ports thereof in response to the output of a pump at the input thereof, said control valve comprising, in combination:
a valve body having an inlet port for receiving the output of said pump and said valve body having a discharge port thereon;
said valve body having a stepped bore therein extending from said inlet port and into said valve body and wherein the reduced diameter portion of said stepped bore is adjacent said inlet port;
a first piston slidably mounted in the other portion of said bore and translatable therein and said first piston having an axial bore therethrough;
a second piston slidably mounted in said reduced diameter portion of said stepped bore and extending into said axial bore of said first piston in telescopic relationship therewith, said second piston being translatable in said reduced portion of said stepped bore and said axial bore of said first piston, and said second piston having an axial bore extending therethrough which terminates in a restricted opening at the inner end thereof;
means for urging said pistons away from each other;
a first passageway coupling said first delivery port to a restricted opening in a wall portion of said stepped bore adjacent the inner end of said other portion of said stepped bore wherein said first delivery port communicates with said axial bore of said first piston;
a second passageway coupling said second delivery port to an opening at an intermediate portion of said other portion of said stepped bore wherein said second delivery port communicates with said axial bore of said first piston when said first piston is translated a given distance toward said second piston in response to the output pressure of said pump exceeding a predetermined value; and,
a third passageway coupling said discharge port of said valve body to an opening at an intermediate wall portion of said reduced portion of said stepped bore, wherein said discharge port communicates with said inlet opening when said second piston is translated a given distance toward said first piston in response to the output pressure of said pump exceeding a given maximum value.

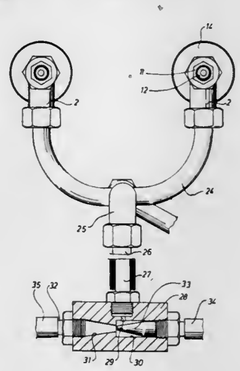
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**4,016,896**

**DEVICE FOR THE DE-AIRING OF A LIQUID SYSTEM, PREFERABLY A SYSTEM FOR HYDRAULIC BRAKES**

**Eino Heikki Oikarinen, Torehatts Backe 9, S-417 28 Goteborg, Sweden**

**Filed Nov. 7, 1975, Ser. No. 630,049**
**Claims priority, application Sweden, Nov. 8, 1974, 7414038**
**Int. Cl.² F16K *45/02***
**U.S. Cl. 137—205** **4 Claims**



1. A device for de-airing a liquid system having de-airing nipples designed as valves which when turned will open, said device comprising: a pumping device adapted to exclusively create a continuous vacuum; at least one duct connected to said pumping device and having one end to be connected to

one of the de-airing nipples; a connecting piece mounted on said one end of said duct; turning means associated with said connecting piece for engagement with the respective de-airing nipple when the latter is connected to said duct to thereby open the valve; and vacuum-influenced tightening means for tightening the connection between said duct and the respective de-airing nipple.

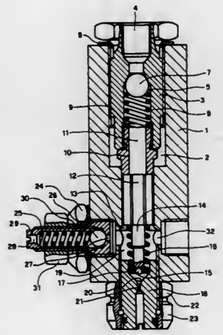
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**4,016,897**

## PRESSURE AND FLOW-REGULATING VALVE FOR AUTOMATIC OR SEMIAUTOMATIC-CYCLE LUBRICATING SYSTEM

**Zeo Asioli, Via Fosdondo, 54, Correggio, Italy**

**Filed Feb. 6, 1976, Ser. No. 656,073**
**Claims priority, application Italy, Feb. 10, 1975, 42506/75**
**Int. Cl.² G05D** *7/01*
**U.S. Cl. 137—107** **4 Claims**



1. A pressure and flow regulating valve for use as part of an automatic or semiautomatic cycle lubricating system of motor vehicles, machine tools and machines in general by insertion in a path which conveys lubricating oil from a pump to oil dispensing valves in the lubricating system and which is adapted to communicate, directly via an extension conduit means, with oil contained in a feed tank for the pump, the valve comprising, in combination a valve body provided with an axial bore extending therethrough, having an inlet, an upstream section, an intermediate section, a downstream section and an outlet defining a drain; an insert element positioned in said upstream section of said bore and having an axial aperture therein; a first coil spring in said upstream section of said bore and having one end thereof positioned on an upstream surface of said insert element; a ball biased by said first coil spring to close and inlet for preventing return of oil coming from the pump; an oil flow regulating piston having a piston rod with an end carrying a spherical cap and a longitudinally extending section having a cross-section, whose area is smaller than said intermediate section of said axial bore slidably inserted in said intermediate section of said bore for allowing oil to flow in spaces about the periphery of said longitudinally extending section of said piston; a feeding chamber downstream of said longitudinally extending section of said oil flow regulating piston and defined by at least a portion of said downstream section of said bore for receiving oil flowing in the space about said extending section; two openings through said body, one of them for attachment of a maximum pressure regulating device which is to allow excess feed oil in every cycle to flow into the tank, the other one for attachment of conduit means which is to convey oil from the feeding chamber into the dispensing valves; a second coil spring positioned in said feeding chamber around said piston rod with one of its ends positioned against an annular downstream surface of said piston for biasing said piston towards an annular downstream surface of said insert element so as to obstruct oil flow, said second coil spring extending downstream and having a diameter smaller than that of said longitudinally extending section of said piston, an axially adjustable plug positioned in said downstream section of said bore, said second coil spring having its second end resting against a truncated-conical narrowing downstream passage of a cylindrical chamber and formed in an upstream face of said axially adjustable plug so as to create a closure seat for an axial bore which extends through said plug, and seat being positioned to receive said spherical cap on said end of said piston rod so as to permit oil to discharge into the tank via said axial bore in said plug; whereby the axial bore in said plug is of reduced diameter by virtue of the truncated-conical narrowing passage so as to permit gradual starting up of the pump at the beginning of each feed cycle, to get desired pressure in the feed conduit means to the dispensing valves and further, during each feed stop stroke of the pump, to allow slow drain of oil from the conduit means to the dispensing valves until a zeroing of oil pressure in the conduit means to the dispensing valves is attained, while keeping these conduit means full of oil in order to avoid the presence of air bubbles therein so as to make complete filling of the dispensing valves possible in the following cycle.

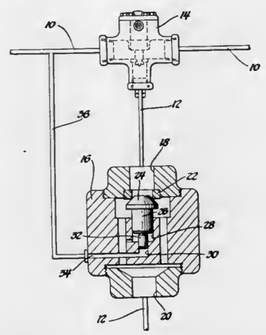
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**4,016,898**

## MEANS FOR SUPPRESSING CAVITATION IN A HIGH PRESSURE RELIEF VALVE

**E. Stephen Tokarchuk, Warren, and Gaylord O. Ellis, Rochester, both of Mich., assignors to Sperry Rand Corporation, Troy, Mich.**

**Filed May 27, 1975, Ser. No. 581,016**
**Int. Cl.² G05D** *11/00*
**U.S. Cl. 137—115** **2 Claims**



1. In a hydraulic power transmission system having a high pressure supply line, an intermediate pressure line and a low pressure exhaust line, the combination with a maximum pressure limiting relief valve connected between the supply line and the intermediate pressure line of at least one back pressure valve between the intermediate pressure line and the exhaust line, the back pressure valve having an inlet connected to the relief valve outlet through the intermediate pressure line, and having an outlet connected to the exhaust line, with the intermediate pressure acting over a first operating area to open the back pressure valve, and means comprising a piston of smaller operating area exposed to supply line pressure and acting to partially oppose the opening force of the intermediate pressure to thereby supress cavitation in the fluid leaving the relief valve.

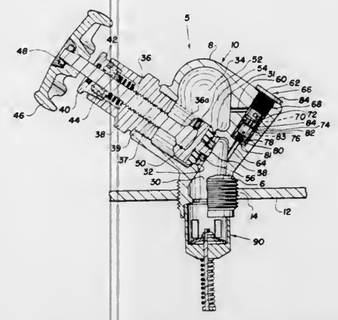


**4,016,899**

## RELIEF VALVE

**Willard J. Fletcher, Dallas, Tex., assignor to Fitting, Valve & Control Corporation, Dallas, Tex.**

**Filed Dec. 10, 1975, Ser. No. 639,285**
**Int. Cl.² F16K** *11/10*
**U.S. Cl. 137—115** **6 Claims**



1. In a tank shut-off valve; a body having an inlet passage and an outlet passage with a valve port formed therebetween, said body having a bore formed therein; a first passage in the body between the bore and the outlet passage; a second passage in the body between the bore and the inlet passage; a valve seat in said port; a valve member arranged to seat on said valve seat and moveable from a position opening said valve port to a position closing said valve port; a relief valve assembly detachably secured in said bore having a portion with a second port formed therethrough communicating with the first passage and the second passage; a resilient valve member arranged to be urged against said second port to close same; resilient means urging said valve member against said second port until a predetermined pressure from said outlet passage is exerted through said first passage and through said second port formed in said relief valve assembly against said valve member to overcome the resilient means to urge said valve member away from said second port to release the pressure within said outlet passage, allowing said pressure to pass through said second passage into said inlet passage.

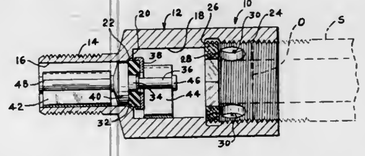
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**4,016,900**

## SPRINGLESS VALVE FOR PNEUMATIC TIRES AND THE LIKE

**John William Shipp, Centerville, and Paul Douglas Goodman, Dickson, both of Tenn., assignors to Scovill Manufacturing Company, Waterbury, Conn.**

**Filed Apr. 21, 1975, Ser. No. 569,777**
**Int. Cl.² F16K** *15/20*
**U.S. Cl. 137—223** **10 Claims**



1. A valved fitting for pneumatic tires and the like comprising:

a. a tubular housing having a reduced section, the inside of the housing having a smooth cylindrical surface of one diameter in the area of the reduced section, and a smooth cylindrical surface of a second larger diameter to one side of the reduced section, the inside presenting a seating shoulder intermediate the surfaces and coupling means on the opposite side of the second surface from the first surface;

b. a valve comprising a pin disposed on the axis of the housing, the pin mounting intermediate its ends an annular sealing washer adapted to seat on the seating shoulder, and support means supporting the valve in the tubular housing, the support means comprising a pair of clips engaging the pin on either side of the washer respectively and engaging the first and second surfaces respectively, the clips each being of sheet material disposed longitudinally of the housing and having portions engaging the pin from opposite sides and also longitudinally engaging the associated surface of the housing at a plurality of points, the clips being held from longitudinal movement with respect to the pin,

whereby the valve including clip means is movable bodily in the housing as the clips slide along their associated surfaces.

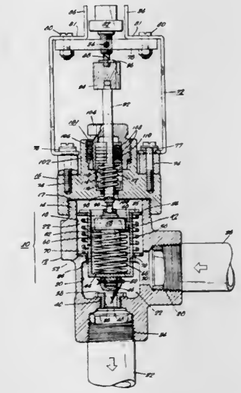
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**4,016,901**

## THERMOSTATIC VALVE

**Thomas M. Kenny, Paoli, Pa., assignor to Ogontz Controls Company, Willow Grove, Pa.**

**Filed June 23, 1975, Ser. No. 589,089**
**Int. Cl.² F16K** *49/00*
**U.S. Cl. 137—340** **8 Claims**



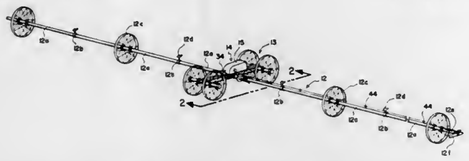
6. A system for automatically preventing the freezing of a process pipe, said system comprising a steam source, a tracer line adjacent said process pipe connected at one end of said steam source, an insulating layer surrounding said tracer line and pipe, and a steam trap with ambient sensing on-off control at the end of said tracer line remote from said steam source, said steam trap with ambient sensing on-off control comprising an internal thermostatic actuator for opening and closing said trap responsive to fluid temperature conditions within said trap, and an external ambient air temperature responsive actuator for closing said trap when the ambient air temperature exceeds a predetermined temperature level.

8. A steam trip with ambient sensing on/off control comprising a body, a closed chamber within said body, an inlet port in said body for connecting said chamber with a source of steam, an outlet port in said body for draining condensate from said chamber, a valve seat communicating with said outlet port, a valve closing element adapted for movement toward and away from said valve seat, a thermostatic actuator within said chamber connected with said valve closing element to provide movement thereof toward said valve seat upon an increase in temperature of the fluid within said chamber, said actuator comprising an expansible medium changing from the solid to

the liquid state upon increase in temperature of the fluid within said chamber, spring means biasing said valve closing element away from said valve seat, means for accommodating the over-expansion of said actuator upon engagement of said valve closing element with said valve seat, an ambient air response actuator disposed exteriorly of said body, and means connecting said ambient air responsive actuator with said thermostatic actuator within said chamber to cause a displacement of said latter actuator and said valve closing element in response to changes in ambient air temperature, said ambient air responsive actuator being adapted to engage said valve closing element with said valve seat upon the occurrence of a predetermined atmospheric air temperature.

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**4,016,902**
**END-CONTROL AGRICULTURAL SPRINKLER IRRIGATION SYSTEM**
**George Vollmer, Rte. No. 1, Americans Falls, Idaho 83211**
**Filed Nov. 11, 1975, Ser. No. 630,911**
**Int. Cl.² B05B** *15/10*
**U.S. Cl. 137—344** **20 Claims**

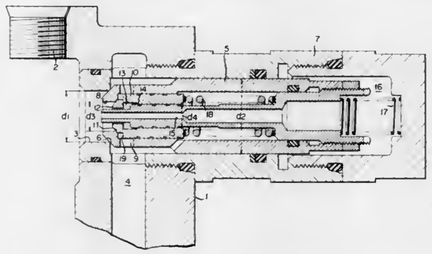


1. Control mechanism for use with an agricultural sprinkler, irrigation system, said system having wheel-mounted pipe sections and a mover unit coupled together end-to-end to form a sidewise movable pipeline having the mover unit interposed intermediate its length and including power drive means for rotating the pipeline about its longitudinal axis, said control mechanism being adapted to control the power drive means from an end of the pipeline and comprising movement-transmitting means adapted to be disposed between the pipeline and the mover unit and including a rotatable element adapted for mounting on the pipeline so it can be reciprocated back and forth therealong while rotating therewith, and a non-rotatable element adapted to be mounted on said mover unit so as to be moved rectilinearly by said rotatable element; a switch assembly mounted on the mover unit in association with and to control operation of said drive means; operating means associated with the movement-transmitting means; and a control line mounted on and extending along the pipeline substantially to one end thereof for operating said operating means to effect actuation of said switch assembly.

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**4,016,903**
**PILOT OPERATED PRESSURE AND VACUUM RELIEF VALVE**
**Mitsumasa Akashi, Kamakura, and Toshio Makio, Wako, both of Japan, assignors to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan**
**Filed Dec. 1, 1975, Ser. No. 636,595**
**Claims priority, application Japan, Nov. 29, 1974, 49-143399[U]**
**Int. Cl.² F16K** *17/26*
**U.S. Cl. 137—493.5** **2 Claims**

1. A pilot operated pressure and vacuum relief valve comprising
- a housing having a bore in it;
- a first vacuum responsive valve means slidably inserted in the bore of said housing;
- a system port having a diameter $d_1$ provided at the front end portion of said housing, said system port being connectable with a portion of a hydraulic system in which varying fluid pressures may be developed;
- a drain port opening from the front end portion of said housing and communicating with said system port through an annular rearwardly facing valve seat provided at the front portion of said housing;
- a first back pressure room having a diameter $d_2$ defined in said housing between a rear surface portion of said first valve means and a rear surface of the bore of said housing;
- a second pressure responsive valve means slidably inserted in said first valve means, a front end portion of said second valve means facing the annular valve seat of said housing;
- a regulating member inserted in said first and second valve means, extending from the front portion to rear portion of said first valve means and having a hole therethrough so as to communicate said first back pressure room with said system port, said regulating member being threaded at the rear portion thereof and being engaged with a threaded portion of said first valve means;
- a second back pressure room defined in said second valve means and communicating with said system port via a throttling portion formed between said second valve means and said regulating member;
- a first spring means disposed between the rear portion of said regulating member and the rear surface of the bore



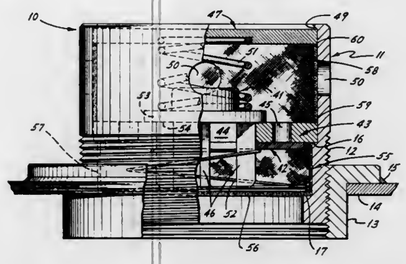
of said housing, said first spring means exerting a spring force against the rear portion of said regulating member so as to bias said first valve means against the annular valve seat of said housing;
- a second spring means disposed in said first valve means between said second valve means and said regulating member to bias said second valve means against an annular valve seat located on said first valve means;
- means for communicating said system port with said drain port through a path between the annular valve seat of said first valve means and the front portion of said second valve means when the pressure in said system port exceeds a predetermined level;
- means for communicating said system port with said drain port through a path between the annular valve face of said housing and the front end portion of said first valve means when a vacuum pressure is developed in said system port; and
- said first valve means has an inlet port located therein opening to said annular valve seat of said first valve means with a diameter $d_3$ at the front portion thereof and said second back pressure room having a diameter $d_4$, and wherein the relationship of said diameters is $d_2 > d_1 > d_3 > d_4$.

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**4,016,904**
**SAFETY VENT VALVE**
**Edmund A. Gordon, Philadelphia, Pa., assignor to Central Safety Equipment Co., Wyncote, Pa.**
**Filed Dec. 29, 1975, Ser. No. 644,659**
**Int. Cl.² F16K** *17/26*
**U.S. Cl. 137—493.9** **5 Claims**

1. In a safety valve of the kind including a pair of spring-loaded valve bodies, one displaceable to pressure-vent an associated container, to prevent explosion thereof, and the other displaceable to provide relief of vacuum within the container, to permit withdrawal of fluid therefrom, the improvements which comprise: a valve shell structure which consists of a tube capped toward one end thereof and apertured in the region of that end, said tube having in the region of an opposite end, a threaded portion for association with a container; a pair of shelf-like abutments spaced along the axis of the tube, extending inwardly of the tube, and peripherally of interior wall portions thereof; and a plurality of interior valve components all nested within said tube and supported by said abutment surfaces, said components including a pair of valve bodies, flame-retardant screen means, valve seat structure with respect to which the mentioned valve bodies are

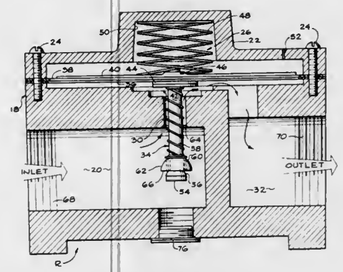




displaceable, and a pair of springs each of which urges an associated one of said valve bodies toward said seat structure, the improvements being further characterized in that said seat structure bears against one of said abutments; and said screen means includes two screens, one of which is seated upon the surface defined by the other of said abutments and extends across the open end of said tube, and the other of which screens extends across the apertured portion of said tube and has spaced, generally annular, portions one of which rests against the tube cap and the other of which bears against a surface portion of said seat structure, to maintain said other screen in position.

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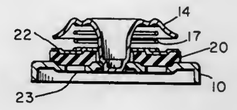
**4,016,905**
**REGULATOR FOR LIQUEFIED PETROLEUM GAS SYSTEMS**
**John W. Marlatt, Sr., 2511 Abonado Place, Rowland Heights, Calif. 91748**
**Filed Feb. 6, 1976, Ser. No. 656,044**
**Int. Cl.² F16K** *31/12*
**U.S. Cl. 137—505.41** **4 Claims**



1. A regulator, as for use in a fluid system, comprising:
- a valve body defining a high pressure chamber, a vented low pressure chamber and a passage between said chambers with a contiguous first valve seat;
- a spring-biased diaphragm means affixed to said valve body for closing said vented low pressure chamber;
- a valve stem means affixed to said diaphragm means and extending through said passage so as to be variously positioned therein under control of said diaphragm, said valve stem means including a stud affixed to extend coaxially from said diaphragm means,
- valve member means slidably disposed on said valve stem for cooperation with said first valve seat to regulate the flow of gas through said passage from said high pressure chamber to said low pressure chamber,
- said valve member means defining a second valve seat for cooperation with said valve stem means whereby a pair of concentric valves are provided in said regulator on said valve stem means, and
- a coil spring mounted on said stud between said valve member means and said diaphragm to spring bias said valve member.

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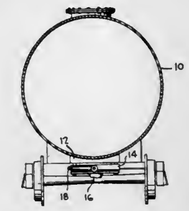
**4,016,906**
**ANTI-LEAK FUEL PUMPS FOR VEHICLES**
**Ralph E. Ulm, Fairfield, Ill., assignor to Airtex Products, Div. of United Industrial Syndicate, Inc., New York, N.Y.**
**Filed Mar. 9, 1976, Ser. No. 665,249**
**Int. Cl.² F16K** *15/08*
**U.S. Cl. 137—516.21** **7 Claims**



1. A unitary fuel pump check valve having a valve seat member provided with a circular array of apertures therethrough;
- a flexible valve disc overlaying said apertures to close flow therethrough and extending radially inwardly and outwardly thereof;
- a spring pressed backup water having a ridge;
- said ridge pressing into said flexible disc to deform it toward said apertures;
- said backup washer effecting radially spaced circular areas of compression of said disc on radially opposite sides of said apertures against said valve seat member.

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**4,016,907**
**TANK BOTTOM INTERNAL VALVE HOUSING**
**William W. Rawstron, Northboro, Mass., assignor to Jamesbury Corporation, Worcester, Mass.**
**Continuation of Ser. No. 476,074, June 3, 1974, abandoned.**
**This application Oct. 31, 1975, Ser. No. 627,692**
**Int. Cl.² F16L** *55/99;* **F16K** *1/22*
**U.S. Cl. 137—797** **3 Claims**



1. A tank bottom butterfly valve assembly adapted to be attached to a saddle which is integrally formed with said tank and which has a lower face horizontally disposed to define a first plane, comprising a flanged butterfly valve housing having an upper surface which is substantially planar and has a circular grooved recess adapted to mate with a corresponding protrusion in said saddle when said butterfly valve housing is attached to said saddle such that said upper surface is disposed parallel to said first plane, a lower surface which is substantially planar and which is parallel to said upper surface thereby defining a second plane which is parallel to and below said

first plane, a butterfly valve disc and cooperating seat ring which are both completely disposed within the space bounded by said first and second plane when said butterfly disc is in the closed position, a discharge nozzle having an upper surface which is substantially planar and which is mounted to said valve housing such that said nozzle upper surface is disposed substantially parallel to said second plane, first connection means comprising a plurality of bolt holes disposed about the perimeter of said valve housing and adapted to receive a first set of bolts in said bolt holes which attach said valve housing to said saddle with a connection having a first shear strength, second connection means comprising a plurality of bolt holes through said nozzle upper surface and corresponding bolt holes in said valve housing lower surface and adapted to receive a second set of bolts which attach said nozzle to said valve housing with a connection having a second shear strength, said first shear strength being greater than said second shear strength such that unexpected forces on said tank bottom valve assembly will cause said nozzle to separate from said valve housing along the plane between them rather than said valve housing separating from said tank, and thus prevent discharge of the tank contents.

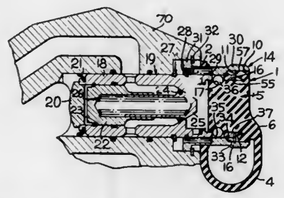
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**4,016,908**

## UNIVERSAL DUST COVER FOR A HYDRAULIC COUPLING SOCKET

**Edward B. Heckenkamp, Brookfield, Wis., assignor to Allis-Chalmers Corporation, Milwaukee, Wis.**

**Filed Aug. 4, 1975, Ser. No. 601,845**
**Int. Cl.² B65D** *59/06*; **F16L** *57/00*
**U.S. Cl. 138—96 R** **9 Claims**



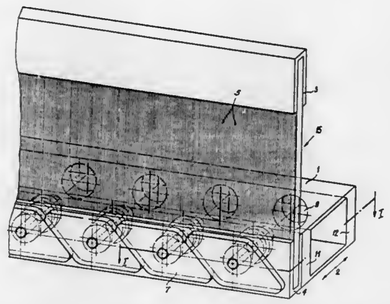
1. A resilient dust cover in combination with a socket section of a hydraulic coupling comprising, a hydraulic coupling including a socket section defining a socket said socket section including detent means on the inner periphery thereof, an expandable fastening loop extending peripherally around the socket section of the hydraulic coupling, a deformable plug portion, a flexible strap integrally connecting said fastening loop and said plug portion for carrying said plug portion of the dust cover when said dust cover is not in use, said plug portion including, a plug end said deformable plug portion received within the socket of the socket section of said hydraulic coupling and deforming when received in or removed from the socket, said plug portion defining a peripheral retaining groove adjacent said plug end for receiving said detent means on the inner periphery of the socket section of said hydraulic coupling for retaining the plug portion in the socket of said coupling, a disc portion integral with said plug portion extending radially from said plug portion and including a sealing flange extending axially from the peripheral of said disc portion resiliently biased radially and axially for sealing the periphery of said socket section of said hydraulic coupling, a raised portion on said disc portion joining said strap with said disc portion to allow said disc portion and said flange to be positioned either axially external of the socket of the socket section of the hydraulic coupling or to be received within the internal periphery of the socket, said axial sealing flange forming an annular recess intermediate said plug portion and said flange, said recess providing greater resilience to said flange to permit sealing engagement of said flange with said socket section.

**4,016,909**

## DEVICE FOR FASTENING THE REED TO THE SLAY OF A LOOM

**Allan William Henry Porter, Lustmuhle, Switzerland, assignor to Aktiengesellschaft Adolph Saurer, Arbon, Switzerland**

**Filed Jan. 16, 1976, Ser. No. 649,688**
**Claims priority, application Switzerland, Jan. 24, 1975, 00899/75**
**Int. Cl.² D03D** *49/60*, *49/62*
**U.S. Cl. 139—188 R** **10 Claims**



1. Device for fastering the reed of a loom onto the elongated slay beam of the loom, comprising: a slay beam having a longitudinal axis extending along the length of a row of reed blades; a reed comprising a plurality of reed blades arrayed in a row and an elongated rib on which one end of each said reed blade is supported; a hardenable compound placed along said rib and in which all said reed blade one ends are embedded to form an integral unit among said reed blades and said rib; said rib being positioned adjacent to said slay beam; a plurality of pressure flanges arrayed in a row along said rib on the side thereof away from said slay beam; said pressure flanges being shaped and located along said rib such that a said pressure flange is over every said reed blade; pressure flange fastening means securing said pressure flanges against said rib and said rib against said slay beam, thereby squeezing said rib against said slay beam.

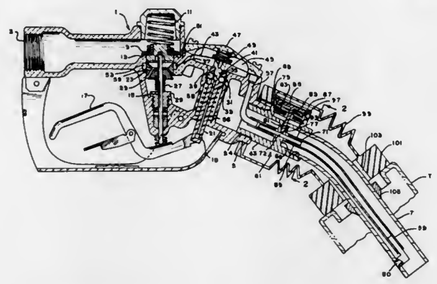
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**4,016,910**

## FUEL DISPENSING NOZZLE WITH AUTOMATIC SHUT-OFF RESPONSIVE TO VAPOR PRESSURE

**Janis Dumpis, St. Ann, and Grenville G. Sutcliffe, Villa Ridge, both of Mo., assignors to Husky Corporation, Pacific, Mo.**

**Filed Sept. 4, 1975, Ser. No. 610,460**
**Int. Cl.² B65B** *3/04*
**U.S. Cl. 141—226** **11 Claims**



1. In a liquid dispensing nozzle, a body having an inlet, an outlet and liquid passage means therebetween including a main valve controlling the flow of liquid from said inlet to said outlet, means resiliently biasing said main valve closed, a spout connected to said outlet and adapted for insertion in the inlet opening of a tank, manually actuated means for opening said main valve against said resilient means, Venturi means in said fuel passage means including a vacuum take-off, a vacuum chamber, means connecting said Venturi vacuum take-off to said vacuum chamber, means responsive to vacuum within said chamber caused by the flow of liquid through said Venturi means operatively connected to said manually actuated means for releasing the same and thereby permitting said resilient means to close said main valve, vent passage means communicating with said vacuum chamber to render said vacuum-responsive means inoperative when said vent passage is open and having a port insertible in the tank with said spout, said vent passage means including a normally open vent control valve, gas conduit means entirely separate from said vent passage means whereby gas pressure in said gas conduit means is unaffected by fluctuations in vacuum in said vent passage means resulting from variations in the rate of flow of liquid through said Venturi means and adapted for sealed communication with the tank inlet opening, a piston exposed directly to gas pressure conditions in said gas conduit means and arranged to close said vent control valve when gas pressure within the tank and said conduit means exceeds a predetermined value, whereby when said port is submerged or when such predetermined pressure conditions occur to close said vent control valve and thereby block said vent passage means, said vacuum-responsive means becomes operative to release said manually-operated means and thereby permit said resilient means to close said main valve.



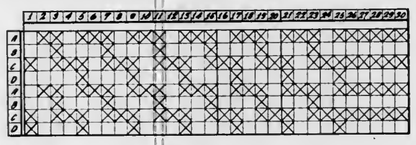
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**4,016,911**

## WOVEN ROPE

**Robert Looker, Carpinteria, Calif., assignor to Satron, Inc., El Segundo, Calif.**

**Filed Mar. 17, 1975, Ser. No. 558,911**
**Int. Cl.² D03D** *1/00*, *3/00*
**U.S. Cl. 139—383 R** **29 Claims**



1. Woven rope comprising a multiplicity of warp strands extending in a longitudinal orientation and at least one weft strand interwoven with said warp strands to form a generally circular woven rope;

said weft strand being inwardly of the outer surface of outer warp strands;

said weft strand extending continuously and progressively along the length of said warp strands; and

said weft strand being under tension to pull said warp strands radially inwardly into a generally circular orientation.

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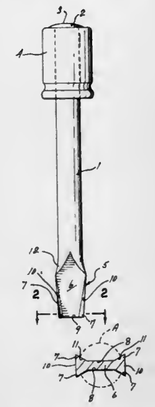
**4,016,912**

## SCREWDRIVER FOR SLOTTED HEAD SCREW

**Lionel St-Amour, 604 Francoise Loisel St., Boucherville, Quebec, Canada**

**Filed Dec. 15, 1975, Ser. No. 640,624**
**Int. Cl.² B25B** *15/00*
**U.S. Cl. 145—50 A** **6 Claims**

1. A screwdriver for a screw having a slot of predetermined length and predetermined width on the head thereof, said screwdriver comprising a shank, a handle and a screwdriving bit fixed at the opposite ends of said shank, said screwdriving bit having opposite faces converging toward each other lengthwise of said shank and toward a cooperatively formed straight outer edge extending lengthwise transversely of said shank, having an overall length exceeding the predetermined length of said slot, and having a central portion of even thickness not exceeding said predetermined width and of a length less than said predetermined length, said opposite faces having opposite lateral edges extending lengthwise longitudinally of said shank, protuberances on said opposite faces at said opposite lateral edges ending lengthwise of said shank outwardly coextensive with said straight outer edge, and said bit at said straight outer edge progressively increasing in thickness at both ends of the outer edge, from said central portion of even thickness to the corresponding ends respectively of the straight outer edge, thereby producing tight engagement of part of said ends of increased thickness in the opposite ends of said slot.



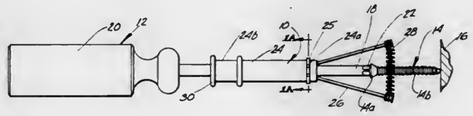
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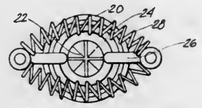
**4,016,913**

## HOLDING DEVICE FOR SCREW DRIVERS AND THE LIKE

**Raymond L. Anderson, 1419 Lexington St., Covington, Ky. 41016**

**Filed Apr. 12, 1976, Ser. No. 676,222**
**Int. Cl.² B25B** *15/00*, *23/08*
**U.S. Cl. 145—52** **15 Claims**





1. A driver having a fastener driving end, a shank portion and a fastener holding device mounted thereon, said fastener holding device comprising a sleeve adapted to fit over said shank portion, a pair of diverging arms at the forward most end of said sleeve, and a pair of coiled springs extending the length between said arms, each spring having two ends each connected to a respective one of said arms and adapted to receive the head and grip the shank of a fastener, said sleeve being shiftable longitudinally of said screw driver shank, whereby said pair of springs engages the shank of a fastener beneath its head to hold the fastener in place during both the installation and the removal thereof.

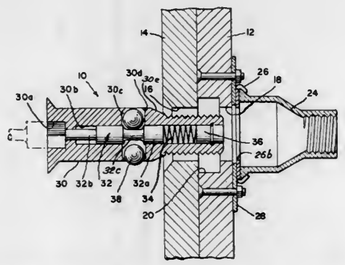
15. A holding device to be used with tools such as screw drivers, nut drivers, Allen wrenches and the like, and to hold or attach any type of fastener to the appropriate driver at any angle while placing or removing fasteners in parts or materials comprising a sleeve adapted to fit over a shank portion of the driver, a pair of diverging arms at the forwardmost end of said sleeve, and a pair of coiled springs extending the length between said arms, each spring having two ends each connected to a respective one of said arms and adapted to receive the head and grip the shank of a fastener, said sleeve being shiftable longitudinally of said driver shank, whereby said pair of springs engages the shank of a fastener beneath its head to hold the fastener in place during both the installation and the removal thereof.

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## 4,016,914
## SELF-LOCKING PANEL FASTENER

Mieczyslaw J. Zurko, 64 Dutch Drive, Holland, Pa. 18966

Filed June 26, 1975, Ser. No. 590,652
Int. Cl.² F16B 39/22
U.S. Cl. 151—41.76 4 Claims




1. A fastener assembly adapted to extend through substantially aligned corresponding openings of two panels for joining said panels comprising:

a stud having a greater diameter shank portion, a threaded shank portion of smaller major diameter, a sloping shank shoulder between said shank portions, a head of greater diameter than and located at the end of the stud nearest said greater diameter shank portion, a longitudinal bore, and a transverse bore within said greater diameter shank portion and intersecting said longitudinal bore;

a plurality of ball detents movable in said transverse bore between a retracted position within said stud and a protruding position;

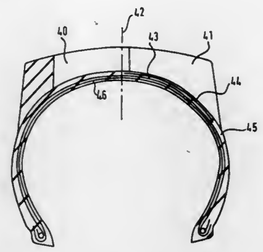
locking means movable in said longitudinal bore for movement between a first position wherein said ball detents are urged to said protruding position and a second position wherein said ball detents are free to assume said retracted position; and

a stud receptacle secured to one of said panels including a basket nut member movably secured to a nut cage, said basket nut member having a reduced diameter threaded portion threadingly engaging said smaller diameter threaded shank portion of said stud, said basket nut member further forming first and second juxtaposed holes wherein the diameter of said first hole engages said ball detents while in said protruding position, and wherein the diameter of said hole will admit said greater diameter shank portion of said stud while said ball detents are in said protruding position.

## 4,016,915
## PNEUMATIC TIRES

Edward Pryce Astley; Owen Morris Jones, both of Liverpool, and Kenneth William Law, Frodsham, all of England, assignors to Dunlop Limited, London, England

Filed May 12, 1975, Ser. No. 576,428
Claims priority, application United Kingdom, May 24, 1974, 23288/74
Int. Cl.² B60C 9/04, 9/20
U.S. Cl. 152—355 7 Claims



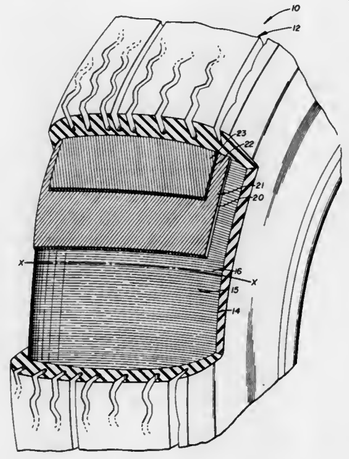

1. An off the road tire comprising a tread portion, sidewall portions and beads, the tread portion having a tread pattern comprising a plurality of bars arranged herringbone fashion about the midcircumferential plane of the tire, the tire being reinforced by a plurality of plies of cord fabric wherein at least one of said plies comprises cords of polyester fiber while the radially outermost ply of said plurality of plies underlying the tread of the tire comprises cords of a first polyamide fiber extending on both sides of the mid-circumferential plane, and a further strip of polyamide cord fabric of opposite bias angle to the cords of said first polyamide fiber ply superimposed thereon to lie under tread bars located substantially only to one side of the midcircumferential plane.

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## 4,016,916
## TIRE PLY STEER CONTROL

Frederick Joseph Ravagnani, Uniontown, Ohio, assignor to The Firestone Tire & Rubber Company, Akron, Ohio

Filed Apr. 7, 1975, Ser. No. 565,895
Int. Cl.² B60C 9/18
U.S. Cl. 152—361 R 2 Claims




1. A pneumatic tire comprising, tread means, body ply means, and at least two stabilizer plies interposed between said tread means and said body ply means, the innermost of said stabilizer plies having a crown angle of approximately 54°, whereby the ply steer force of the tire is substantially zero, and the outermost of said stabilizer plies having a crown angle of approximately 80° and being oppositely angularly biased with respect to the innermost of said stabilizer plies.

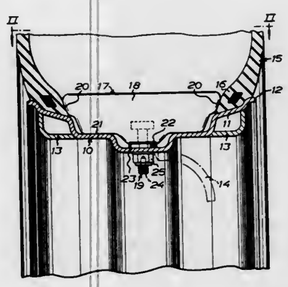


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## 4,016,917
## RIM AND BEAD-CLAMP CONSTRUCTION FOR PNEUMATIC TIRES

Carl-Gustav Börje Christer Victor, Hollviksnas, Sweden, assignor to Trelleborgs Gummifabriks Aktiebolag, Trelleborg, Sweden

Filed Mar. 10, 1975, Ser. No. 557,146
Claims priority, application Sweden, Mar. 11, 1974, 7403187
Int. Cl.² B60C 5/16, 15/02
U.S. Cl. 152—400 3 Claims

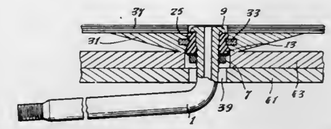



1. A rim and bead clamp construction comprising a rim with flanges and a rim bottom and several bead clamps spaced about the circumference of said rim, each of said bead clamps being formed as an elongated rigid body, jaw means on the distal ends of each of said bead clamps applying radially inward and axially outward forces against the beads of a pneumatic tire to be mounted on said rim to force the beads out against the flanges of said rim and to maintain an airtight seal between the bead and the rim even when the tire is in a partially deflated condition, a clamping bolt connected to and extending from each of bead clamps and arranged centrally between its ends, bottom wall portions of the rim bottom of said rim defining an aperture for said clamping bolt of each of said bead clamps, and resilient gasket means around said clamping bolt of each of said bead clamps, said bead clamps being rotatable in the interior of the tire from a tire-mounting position where their elongated directions coincide with the plane of rotation of the rim to an operative clamping position where their elongated directions extend in the axial direction of said rim, said bead clamps while in said clamping position having shoulders which are pressed against the bottom of said rim to stabilize the bead clamps and prevent them from tilting during run flat driving, said bead clamp having a central surface area spaced from the rim in the area surrounding said clamping bolt, said central surface area pressing said resilient gasket against the bottom of the rim to provide an air-tight seal around the clamping bolt when shoulders are pressed against the bottom of said rim, said rim having a recess which provides the spacing between the rim and the central surface area of the bead clamp.

## 4,016,918
## CLAMP IN VALVES

Stephen Ernest William Thacker, Lynn Stonnal, England, assignor to Scovill Manufacturing Company, Waterbury, Conn.

Filed May 14, 1975, Ser. No. 577,593
Claims priority, application United Kingdom, May 21, 1974, 22649/74; Aug. 28, 1974, 37688/74
Int. Cl.² B60C 29/00
U.S. Cl. 152—427 9 Claims



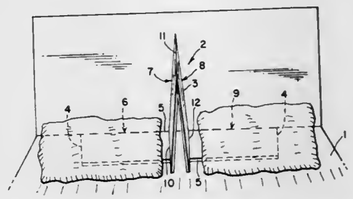

1. A clamp-in valve for sealing engagement with an aperture, the valve comprising a valve stem, a flange at one end of the valve stem extending circumferentially of the stem, a screw-threaded region on the stem remote from said end flange and a circumferentially extending rib on the stem at a region between said screw-threaded region and said flange and spaced from said flange, a lock washer on the stem for interference engagement with said stem rib, a grommet of elastomeric material round the stem and disposed between said lock washer and said stem flange, a flange on the grommet at its end remote from said stem flange, a screw-threaded member engaging said screw-threaded region of the stem for tightening down against such lock washer to urge it towards the stem flange, the diameter of the stem flange being less than that of the aperture into which the valve is to be clamped and the grommet being insertable into said aperture with the screw-threaded member and lock washer in a first position, said tightening-down of the screw-threaded member displacing the member and the lock washer from said first position towards the stem flange and forcing the lock washer into its interference engagement with said rib to bear on said grommet flange and compress the grommet to clamp the valve sealingly in the aperture.

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## 4,016,919
## BREATH DEFLECTOR

Emma Zmijewski, 268 17th St., Brooklyn, N.Y. 11215

Filed Nov. 7, 1974, Ser. No. 521,748
Int. Cl.² A47C 21/00
U.S. Cl. 160—130 5 Claims




1. A collapsible breath deflector for placing between two adjacent pillows on a bed comprising:

a rectangular surface sheet having end edges and side edges;

the end edges of a length substantially equivalent to the pillow width;

three folding lines connecting the side edges to form two end and two middle rectangular areas foldably connected to each other;

the two end areas are of equal size and shape;

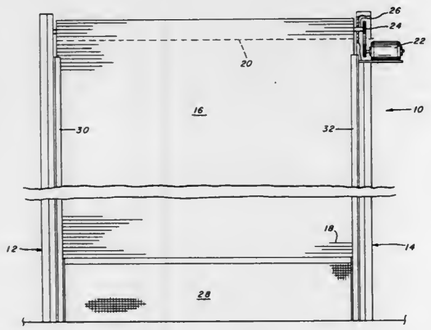
the two middle areas are of equal size and shape;

the end areas and middle areas of a size and shape such that when the two end areas are placed underneath the two

pillows adjacent to each other the two middle areas fold to a height above the bed and at an angle to the bed sufficient to deflect, but not reflect, a person's breath lying on one pillow from a person lying on the adjacent pillow; whereby the breath deflector can be folded and collapsed flat so that it can be easily stored.

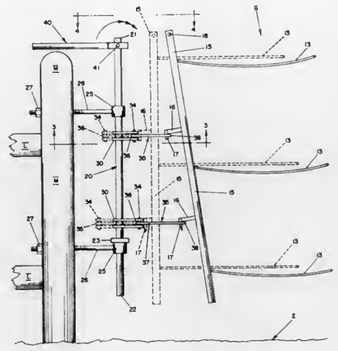
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**4,016,920**
**FLEXIBLE GUIDING TRACK AND RELEASE MECHANISM FOR AN OVERHEAD ROLLING DOOR ASSEMBLY**
**James N. Shepard, Concord, Calif., assignor to United States Steel Corporation, Pittsburgh, Pa.**
**Filed May 23, 1975, Ser. No. 580,387**
**Int. Cl.² E06B 9/14**
**U.S. Cl. 160—133** **5 Claims**




1. A sectional door assembly comprising:
means defining a support frame located proximate the periphery of an opening with which said door assembly is associated;
means defining a door composed of a plurality of sections attached to one another such that they are collectively movable between an open position, for permitting entrance and egress through such opening, in which said plurality of sections are conveniently stored out of the path of entrance and egress, and a closed position, for denying entrance and egress, in which said plurality of sections are oriented in stacked parallel abutting fashion to one another for defining a door; and
means for supporting and guiding said plurality of sections at their ends at and between said open and closed positions, said supporting and guiding means including a flexible generally U-shaped guide track located on both sides of such opening, said flexible guide track being supported on both sides of such opening substantially totally from the closed end thereof, said guide track having a greater flexibility than said sections, such that one or more of said sections retained within said guide track will be released from said flexible guide track, in either of the two directions which are orthogonal to the plane established by said sections in their closed positions, when a force is applied to said one or more of sections which is otherwise sufficient to flex said sections, said one or more sections being released from said generally U-shaped guide track before said sections are substantially flexed and possible damage results to said one or more sections or to said guide track.

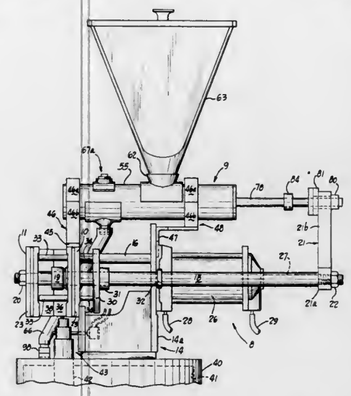
**4,016,921**
**LATCHING MECHANISM ADAPTABLE FOR USE WITH STRETCHABLE FARM GATES**
**Clarence H. Ericksen, R.R. No. 2, Neola, Iowa 51559**
**Filed Sept. 19, 1975, Ser. No. 614,881**
**Int. Cl.² E06B 3/80**
**U.S. Cl. 160—328** **9 Claims**



1. In combination with an upright farm gate closure for a longitudinally extending fence opening defined by a pair of separated upright stationary fence posts including a fore-post and a rear-post, said farm gate being structurally longitudinally horizontally stretchable between a pair of upright gate terminii including a rearward restrained-end that is pivotably associated with the fence rear-post and a gate forward free-end that is removably latchable to the fence fore-post, an improved latching assembly for maintaining the gate in a longitudinally horizontally stretched locking-station condition wherein the distance between the gate upright free-end and the fence fore-post is minimized, said latching mechanism assembly comprising:
A. An upright elongate lineal shaft having a top-end and a bottom-end, said upright shaft being offset from and rotatably secured to the fore-post and wherein said shaft is rotational about the shaft vertical-axis for an angular extent of about 170°–190° commencing at a latching-station and terminating at a locking-station;
B. A pair of vertically separated radial lugs attached rigidly to and extending radially outwardly from the upright shaft whereby the shaft and lugs are co-rotatable about the shaft vertical-axis;
C. A pair of C-shaped horizontal link members and each having its first-end pivotably attached to a lug at a location radially outwardly from the upright shaft;
D. A pair of vertically separated dogs attached to the gate free-end and forwardly offset therefrom whereby the dogs are removably associatable with said lugs when the gate free-end is at rearward latching-station;
E. Bifurcate handle means pivotably attached to the upper portion of said upright shaft to facilitate rotation thereof whereby the C-shaped members pivotably restrained first-ends are caused to move from rearward latching-station to the forward locking-station; and
F. Said bifurcate handle means being pivotal about a horizontal pivot-pin on the upright shaft and from there to surround both sides of the gate columnar free-end to provide an arresting means to arrest rotation of the upright shaft after the gate dogs have attained said forward locking-station.



**4,016,922**
**METHOD AND APPARATUS FOR FEEDING GRANULATED MATERIAL**
**John H. Simmons, Euclid, and Donald A. Daugherty, Lyndhurst, both of Ohio, assignors to Precision Metalsmiths, Inc., Cleveland, Ohio**
**Filed Mar. 31, 1976, Ser. No. 672,524**
**Int. Cl.² B29F 1/06**
**U.S. Cl. 164—45** **13 Claims**

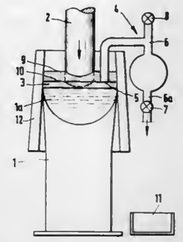


1. In an injection apparatus having a pair of relatively movable dies, means including a pressurized heated tank for supplying molten injection material to the dies, and means for causing relative movement of the dies between open and closed positions, the improvement of a feeder for periodically supplying charges of solid granules of injection material to said tank, said feeder comprising:
a. a housing having an inlet port and an outlet port communicating with said tank,
b. means containing a supply of granules communicating with said inlet port;
c. transfer means including a metering chamber movable in said housing between a first position in which said chamber receives a quantity of granules admitted through said inlet port and a second position in which said chamber discharges a charge of granules through said outlet port.
d. means for actuating said transfer means, and
e. means for pressurizing said metering chamber to fluidize the granules of injection material contained therein.

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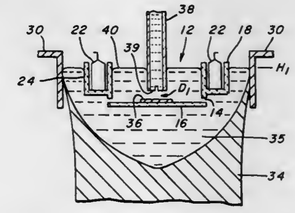
**4,016,923**
**PROCESS FOR HOT TOPPING BY ELECTRO-SLAG-REMELTING**
**Hermann Maas, Bochum, and Georg von Bormann, Kaarst, both of Germany, assignors to August Thyssen-Hutte AG, Duisburg-Hamborn, Germany**
**Filed Aug. 20, 1975, Ser. No. 607,123**
**Claims priority, application Germany, Aug. 23, 1974, 2440360**
**Int. Cl.² B22D 23/02**
**U.S. Cl. 164—52** **8 Claims**

1. In an electro-slag-remelting process wherein a mass of steel in the form of an electrode is remelted while inserted in slag to produce an ingot and at the end of said remelting carrying out a hot topping process wherein said electrode is supplied with a reduced power as compared to that achieved during said remelting while inserted in said slag, the improvement which comprises subsequent to said electro-slag-remelting and prior to said hot topping removing a portion of said slag.



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**4,016,924**
**METHOD OF CONTINUOUS CASTING WITH WEIGHTED FLOAT-DISTRIBUTOR**
**Ralph D. Maier, Monroeville, Pa., assignor to Aluminum Company of America, Pittsburgh, Pa.**
**Filed Sept. 17, 1975, Ser. No. 614,090**
**Int. Cl.² B22D 11/10**
**U.S. Cl. 164—82** **12 Claims**

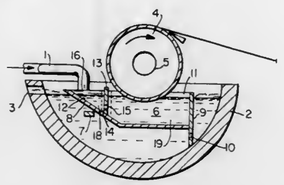


1. In a method of continuously casting ingot wherein molten metal is continuously supplied to the entrance of an open-ended substantially vertical mold and an ingot is withdrawn from the mold exit, and wherein heat is extracted from said ingot by direct chill application, and wherein the supply of molten metal to the mold is controlled at a rate substantially commensurate with that of ingot withdrawal by cooperation between a molten metal supply nozzle and a float-distributor means responsive to molten metal level within the mold, said float-distributor being maintained afloat in the surface portions of the molten metal, the improvement comprising the steps of:
a. downwardly urging said float-distributor means to cause said float-distributor means to float lower in the molten metal; thereby causing a relatively high molten metal level within the mold; and
b. thereafter decreasing the downward urging of the said float-distributor means to cause said float-distributor means to float higher in the molten metal thereby to cause a reduced height of molten metal within the mold, said decreasing of the downward urging of said float-distributor means causes a reduction in the rate of molten metal introduction into the mold to establish a instability condition with respect to molten metal feed and ingot withdrawal rate after which said float-distributor means settles downwardly as a result of decreasing molten metal level in said mold during said instability condition, stability between molten metal feed and ingot withdrawal rates being re-established at said reduced molten metal height, and continuing the casting operation while substantially maintaining said reduced height of molten metal in said mold.

## 4,016,925
## METHOD FOR CONTINUOUSLY MANUFACTURING ENDLESS LEAD SHEET

**Tokunobu Sumida, Takehara, Japan, assignor to Mitsui Mining & Smelting Co., Ltd., Tokyo, Japan**

**Filed Feb. 19, 1974, Ser. No. 443,636**
**Claims priority, application Japan, Feb. 23, 1973, 48-23478[U]**
**Int. Cl.² B22D** *11/06, 43/00*
**U.S. Cl. 164—87** **3 Claims**



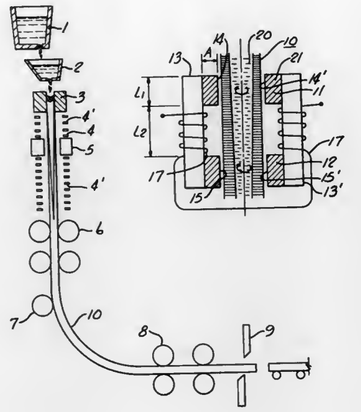
1. In a method for continuously manufacturing an endless lead sheet from which a cathode starting sheet to be used in electrolytic refining of lead is prepared, including the steps of casting molten lead on a rotating drum to form a sheet and stripping and winding up the cast sheet, an improvement characterized by introducing molten lead containing dross continuously into a first separation zone, causing the dross to come up to the surface, introducing the dross together with the molten lead in the vicinity of the interface between the dross and the molten lead into a second separation zone, causing the dross to come up to the surface and accumulating it, introducing the molten lead substantially free from the dross into a casting zone for casting.

## 4,016,926
## ELECTRO-MAGNETIC STRIRRER FOR CONTINUOUS CASTING MACHINE

**Naohei Yamada, Tokyo; Katsuhiko Yamada, and Teruo Fujita, both of Itami, all of Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan**

**Filed Mar. 21, 1975, Ser. No. 560,964**
**Claims priority, application Japan, Mar. 23, 1974, 49-32961**
**Int. Cl.² B22D** *11/10, 27/02*
**U.S. Cl. 164—147** **3 Claims**

1. A rotary magnetic field stirrer for a continuous casting machine for metals wherein a two-pole rotary magnetic field type stirrer is installed in the secondary cooling zone of the continuous casting machine and has poles symmetrically positioned with respect to the central axis of the cast strand, the improvement comprising at least two opposed pairs of electromagnetic coils each having at least two magnetic poles positioned at different longitudinal positions along the cast strand and respectively positioned facing each other with the cast strand disposed therebetween, electric power source means connected to said coils for flowing a single phase alternating current in one of said pairs of electromagnetic coils and a single phase alternating current of a prescribed phase difference in another of said pairs of electromagnetic coils to thereby impart opposite polarities to said respective magnetic pole pairs facing each other and generate a two-pole rotary

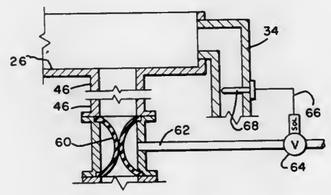


magnetic field at at least two locations in the longitudinal direction of the cast strand.

## 4,016,927
## CONDENSER CONTAMINATION REMOVAL ARRANGEMENT

**William Earl Palmer, Easton, Pa., assignor to Ingersoll-Rand Company, Woodcliff Lake, N.J.**

**Filed Mar. 12, 1976, Ser. No. 666,240**
**Int. Cl.² F28F** *11/00;* **F28B** *9/08*
**U.S. Cl. 165—70** **4 Claims**



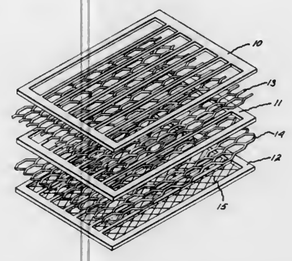
1. In a surface condenser having a gas inlet and a condensed gas outlet: a plurality of separate compartments, each containing a plurality of hollow tubes over which the gas is flowed; means for feeding cooling liquid through the tubes to condense the gas; condensed gas collectors located in the separate compartments for collecting condensed gas; a first liquid conduit extending from the condensed gas collectors in each separate compartment to remove the condensed gas from each compartment; a second liquid conduit having a normally closed valve also extending from said condensed gas collectors; a contamination sensor located in each first liquid conduit for sensing any contamination in the liquid flowing through said liquid conduit from the compartment to which the particular liquid conduit is connected; and means responsive to the sensing of contamination by any particular contamination sensor to open the normally closed valve in the particular second liquid conduit extending from the same compartment.



## 4,016,928
## HEAT EXCHANGER CORE HAVING EXPANDED METAL HEAT TRANSFER SURFACES

**Eugene L. Bartels, Kettering, Ohio, and Robert B. Fleming, Scotia, N.Y., assignors to General Electric Company, Schenectady, N.Y.**

**Filed Dec. 26, 1973, Ser. No. 428,075**
**Int. Cl.² F28D** *7/10*
**U.S. Cl. 165—141** **3 Claims**



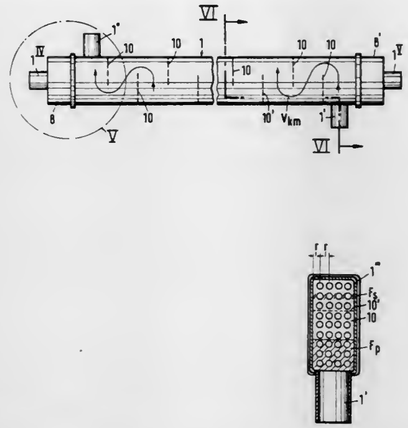
1. A heat exchanger core for transferring heat between at least two counterflowing fluid streams comprising a plurality of high conductivity expanded metal members, each such member with a mechanically continuous structure having a plurality of interstices and having approximately 70 percent open area, said interstices having major and minor axes, a plurality of low conductivity thermoplastic separators interleaved with said expanded metal members, each separator having a rectangular shape and a peripheral portion and transverse elements defining fluid flow channels, said separator members and said expanded metal members oriented with respect to each other such that the major axes of said interstices are perpendicular to said transverse portions, the material of the separator penetrating the interstices of the expanded metal members at the points of contact between the expanded metal members and peripheral portion and transverse elements of the separators, the separator material thereby bonding the separator to the expanded metal members, and the separators being aligned, thereby providing at least a pair of mutually isolated fluid flow channels through the heat exchanger core.

## 4,016,929
## HEAT-EXCHANGER

**Ulrich Pflüger, and Klemens Waterkotte, both of Herne, Germany, assignors to Pfluger Apparatebau GmbH & Co. KG, Herne, Germany**

**Filed June 5, 1975, Ser. No. 583,835**
**Claims priority, application Germany, June 8, 1974, 2427808**
**Int. Cl.² F28D** *7/00;* **F28F** *9/22*
**U.S. Cl. 165—159** **12 Claims**

1. A heat-exchange arrangement, comprising a housing of substantially rectangular cross-sectional configuration having an inner surface which defines a first flow path for a fluid to undergo heat-exchange; a plurality of spaced, substantially parallel conduits in said first flow path defining a series of second flow paths for a medium to undergo heat-exchange with a fluid flowing in said first flow path, said conduits being arranged such that the most closely adjacent ones thereof are spaced from one another by substantially the same predetermined distance and such that the spacing between said inner surface and the conduits most closely adjacent thereto substantially equals said predetermined distance; at least one wall in said housing, said one wall bounding said first flow path at a longitudinal end thereof; and a plurality of axially spaced baffles in said first flow path for regulating the flow pattern of a fluid flowing in said first flow path, adjacent ones of said baffles, as well as said wall and the baffle adjacent thereto, defining with one another flow regions for a fluid flowing in said first flow path, and each of said baffles having an edge which is spaced from said inner surface and together with the latter defines a space connstituting a boundary area between the respective neighboring regions, said baffles being arranged

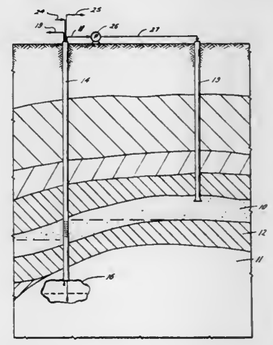


in such a manner that a first projected free flow cross-section of said first flow path as determined in any one of said regions approximately equals a second projected free flow cross-section of said first flow path as determined at a boundary area for said one region, and said first projected free flow cross-section being determined in a plane substantially parallel to said conduits whereas said second projected free flow cross-section is determined in a plane substantially normal to said conduits. component

## 4,016,930
## OIL WELL PRODUCING METHOD AND SYSTEM

**James F. Arnold, 241 Kilts Drive, Houston, Tex. 77024**

**Filed Oct. 23, 1975, Ser. No. 624,759**
**Int. Cl.² E21B** *43/25*
**U.S. Cl. 166—266** **13 Claims**



1. A method for producing oil from an oil producing formation comprising the steps of drilling and completing a well through such formation and establishing a separation zone at a depth deeper than, and in fluid communication with said formation; flowing water into said formation at an injection point offset from said well and causing such water to flow

laterally through said formation into said well; flowing water from a lower portion of said separation zone upwardly through said well to the earth's surface; flowing oil from an upper portion of said separation zone to the earth's surface, and adjusting the rate of flow of water and oil from the separation zone to be such that the level of oil is maintained below said formation.

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**4,016,931**

## METHOD OF FORMING A CONSOLIDATED GRAVEL PACK

**Herbert B. Cryar, Jr., Keithville, La., assignor to The Dow Chemical Company, Midland, Mich.**

**Filed Apr. 22, 1976, Ser. No. 679,263**
**Int. Cl.² E21B** *33/138, 43/04*
**U.S. Cl. 166—276** **17 Claims**

1. A method for providing a permeably consolidated particulate mass adjacent a subterranean formation surrounding a borehole penetrating the formation, wherein prior to treatment, the formation is characterized as being incompetent, permeable, and of insufficient pressure, to support a head of

a slurry of the consolidated-particulate-mass-forming type, containing a fluid carrier, particles of solid material, and a means for causing said particles to permeably but stably adhere to one another to form a consolidated particulate pack,

at least as high as the critical height, said critical height meaning the most shallow depth at which detritus from said formation can enter the borehole, for at least the minimum effective time sufficient to permit said particles in the slurry to permeably but stably adhere to one another, comprising:

a. emplacing in the formation via the borehole, a gel of the self-breaking type, said gel being effective to adequately temporarily plug the formation to permit a head of said slurry to be supported to at least the critical height for at least the minimum effective time;

b. filling said borehole with said slurry to a height at least as high as the critical height;

c. permitting said particles to permeably but stably adhere to one another to form a consolidated particulate pack; and

d. permitting said gel to break.

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**4,016,932**

## SURFACTANT OIL RECOVERY METHOD FOR USE IN HIGH TEMPERATURE FORMATIONS CONTAINING WATER HAVING HIGH SALINITY AND HARDNESS

**George Kalfoglou, Houston, Tex., assignor to Texaco Inc., New York, N.Y.**

**Filed Dec. 24, 1975, Ser. No. 643,965**
**Int. Cl.² E21B** *43/22, 43/24*
**U.S. Cl. 166—303** **19 Claims**

12. A method for recovering petroleum from a subterranean petroleum-containing permeable formation, said formation also containing water having a salinity from about 40,000 to about 120,000 parts per million total dissolved solids and from 3,000 to 12,000 parts per million divalent ions including calcium and magnesium, the formation temperature being from 100° to 150° F., comprising:

a. introducing into the formation a saline surfactant-containing aqueous fluid having about the same salinity as the formation water, and containing an organic sulfonate anionic surfactant and a polyethoxylated nonionic surfactant, the average number of ethoxy groups per nonionic surfactant molecule being sufficient to cause the cloud point of the polyethoxylated nonionic surfactant in an aqueous solution having about the same salinity and divalent ion concentration as the formation water to be from 1° to 20° F. greater than the temperature of the formation; and

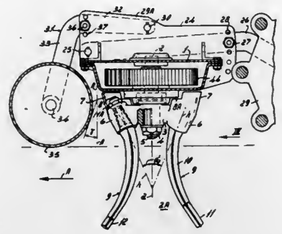
b. recovering oil displaced by the surfactant solution from the formation.

**4,016,933**

## ROTARY HARROWS

**Cornelis van der Lely, 7, Bruschenrain, Zug, Switzerland**

**Filed Feb. 27, 1975, Ser. No. 553,606**
**Claims priority, application Netherlands, Mar. 1, 1974, 7402787**
**Int. Cl.² A01B** *33/00*
**U.S. Cl. 172—59** **26 Claims**



1. A rotary harrow comprising a frame portion supporting a number of soil working members rotatably mounted in a transverse row on upwardly extending shaft means, each of said soil working members including a generally horizontal support of elongate configuration and a sleeve-like tine holder at each end thereof, a downwardly extending tine being held in an internal bore that extends through the top and bottom of said holder, said support being rotatable about an axis of rotation defined by said shaft means that is substantially centrally located between the holders on said support, the top of said holder being radially spaced further from said axis of rotation than the bottom thereof at the outer side of that holder, the outer surfaces of said holder being substantially inclined to said axis of rotation.

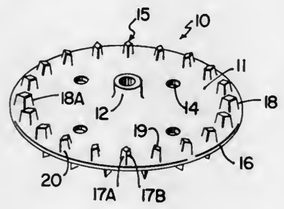
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**4,016,934**

## PACKER WHEEL CONSTRUCTION

**Fred J. Schneider, P.O. Box 940, Eston, Saskatchewan, Canada**

**Filed July 28, 1975, Ser. No. 599,646**
**Int. Cl.² A01B** *21/04*
**U.S. Cl. 172—555** **1 Claim**




1. A packer wheel for use with agricultural implements comprising a disc, a central hub formed on said disc and extending outwardly on each side thereof for supporting said wheel for rotation upon an associated supporting axle, and a plurality of packer lugs formed adjacent to but spaced inwardly from the periphery of said disc and extending outwardly upon each side of said disc, each of said lugs having four sides with each side inclined away from the center of said lug from the other end of said lug toward the inner end thereof thus giving additional strength of said lugs at the junction between said lugs and said disc, the outer ends of said lugs being flattened thus forming a frustum of a four sided pyramid, adjacent ones of said four sides of each of said lugs meeting to form relatively sharply defined edges, two of the opposing edges of each of said lugs lying on a radial line extending from the center of said hub to the periphery of said disc, the other two opposing edges of each of said lugs lying on a circular line parallel to and spaced inwardly from the outer periphery of said disc, said periphery of said disc being rounded when viewed in cross section, said hubs extending outwardly from said disc a distance slightly more than the distance that said lugs extend outwardly, said lugs on both sides of said disc being substantially the same distance from the axis of said disc, but the lugs on one side of said disc being staggered circumferentially relative to the lugs on the other side of said disc.



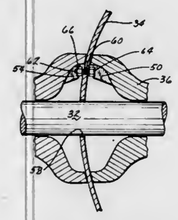
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**4,016,935**

## HARROW DISC GANG

**Maurice E. Miller, Stratton, Nebr. 69043**

**Filed Nov. 11, 1975, Ser. No. 631,145**
**Int. Cl.² A01B** *7/00, 15/16, 21/08, 23/06*
**U.S. Cl. 172—601** **5 Claims**




1. A disc section for a disc harrow including a frame means, comprising,

an elongated shaft rotatably secured to said frame means, said shaft having a circular cross section,

a plurality of spaced-apart disc blades mounted on said shaft for rotation therewith,

a plurality of spool members mounted on said shaft,

one of said spool members being mounted between adjacent pairs of disc blades,

and means on said disc blades and said spool members for preventing relative rotation therebetween as the disc harrow is moved through a field,

each of said spool members comprising a center section having end portions extending outwardly therefrom,

each of said spool members having a central opening formed therein which receives said shaft,

said means on said spool members and disc blades comprising a lug means on each of said end portions which extends toward the adjacent disc blade,

each of said disc blades having a central opening formed therein which receives said shaft,

each of said disc blades having a bolt opening formed therein outwardly of its central opening,

and a bolt positioned in each of said bolt openings having a head at one side of the disc blade and a nut at the other side of the disc blade, said bolt being secured only to said disc blade, said head and said nut abutting against the lugs on adjacent spool elements to prevent rotation therebetween as the disc harrow is moved through the field.

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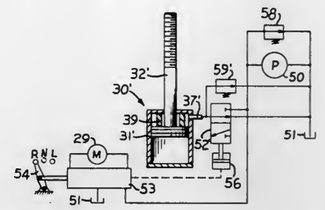
**4,016,936**

## MOTOR GRADER HAVING IMPROVED GUIDE SHOES FOR CIRCLE-MOUNTED IMPLEMENT

**Gene B. Easterling, Decatur, Ill., and Joseph L. Strabala, Orinda, Calif., assignors to Caterpillar Tractor Co., Peoria, Ill.**

**Filed Apr. 24, 1975, Ser. No. 571,118**
**Int. Cl.² E02F** *3/76*
**U.S. Cl. 172—796** **10 Claims**

1. A motor grader including a main frame mounted on wheels, a drawbar structure attached to said main frame, a circle member carrying a working implement and a plurality of guide shoes supporting said circle member under said drawbar structure; each of said guide shoes including generally vertically aligned surfaces in face to face mating engagement at all times with both upper and lower surfaces respectively of said circle member and each of said plurality of guide shoes including remotely controlled mechanical means for varying




the frictional forces exerted by said guide shoes on said circle member without substantial change in the relative physical locations of said circle member and guide shoe surfaces, said mechanical means selectively exerting sufficient force on said guide shoes such that said circle member may be selectively held substantially immovable with respect to said drawbar structure by said guide shoes.

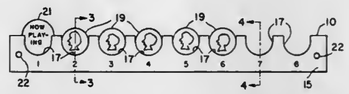
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**4,016,937**

## APPLIANCE FOR COIN-OPERATED DEVICES

**Norman J. Abraham, 12524 Lorain Ave., Cleveland, Ohio 44111**

**Filed Aug. 18, 1975, Ser. No. 605,512**
**Int. Cl.² A63F** *9/00*
**U.S. Cl. 273—1 R** **25 Claims**




1. An appliance for illustrating the order of prospective use by a plurality of sequential users of a coin-operated device having coin receiving means, comprising in combination:

support means having a plurality of coin retaining means with each of said coin retaining means being capable of retaining a coin which is insertable in the coin receiving means of the coin-operated device;

each of said coin retaining means having a coin inserting and withdrawing aperture which exceeds the diameter of the coin to permit insertion and withdrawal of a coin without physical interference between a coin and said coin retaining means;

display means for displaying the order in which a plurality of coins are placed in said plurality of coin retaining means by a plurality of users, respectively;

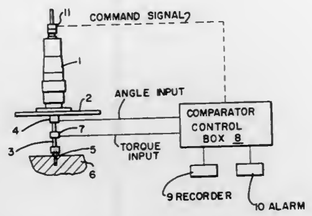
indicator means for indicating the one of said plurality of coin retaining means corresponding to the present user of the coin-operated device;

and means mounting said display means and said indicator means for enabling inspection thereof to indicate the order of prospective use of the coin-operated device by the plurality of users in accordance with said display means and said indicator means.

## 4,016,938
## METHOD FOR FASTENER TENSIONING

**Edwin Eugene Rice, Ann Arbor, Mich., assignor to Ingersoll-Rand Company, Woodcliff Lake, N.J.**

**Filed Dec. 2, 1975, Ser. No. 636,984**
**Int. Cl.² B23Q** *19/06*
**U.S. Cl. 173—1** **7 Claims**

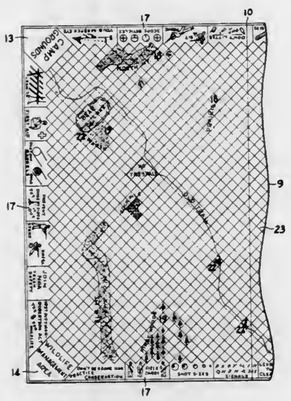



1. Apparatus for threaded fastener tensioning comprising:
a power wrench for rotating the fastener;
differentiating means for determining when the fastener has been rotated into its non-proportional range in tension and stopping the power wrench;
rotation means for untightening the fastener a predetermined rotary angle using the fastener thread as a means of fastener strain measurement; and
means for stopping the power wrench after said fastener is untightened said predetermined rotary angle.

## 4,016,939
## BOARD GAME APPARATUS

**Harry Marshall Thron, Rte. 2, Box 73, Glencoe, Md. 21152**

**Filed July 28, 1975, Ser. No. 599,888**
**Int. Cl.² A63F** *3/00*
**U.S. Cl. 273—134 AT** **9 Claims**

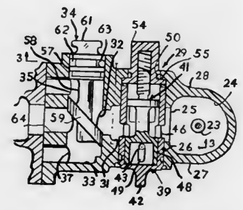


1. A game apparatus comprising:
a. a playing board depicting an area divided into a plurality of progress spaces and surrounded by a plurality of lesson spaces for instructional purposes;
b. means for selectively displaying a quarry dimensioned to, positionable upon, and movable about said progress spaces;
c. a plurality of pictorial representations of a plurality of specific items of equipment that each player may selectively employ in the play of the game;
d. means for indicating the position of the game players dimensioned to and positionable upon said progress spaces;
e. a deck of cards to provide a number of situations that when drawn by the player will alter the play of the game;
f. chance means to determine the number of progress spaces a player moves his player position indicating means and to determine the rapidity of selection of each player's pictorial representations of items of equipment.

## 4,016,940
## PNEUMATIC NUT RUNNER HAVING A DIRECTIONAL VALVE AND AN AIR REGULATOR

**Edward F. Spring, Sr., Mohawk, N.Y., assignor to Chicago Pneumatic Tool Company, New York, N.Y.**

**Filed Oct. 21, 1975, Ser. No. 624,483**
**Int. Cl.² B23B** *45/04;* **E03B**
**U.S. Cl. 173—169** **14 Claims**

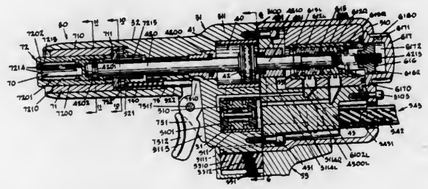


1. A pneumatically powered nut running tool comprising in a housing, a reversible rotary air motor for providing a forward or a reverse torque output accordingly as live air is applied to a forward or reverse side of the motor; a throttle valve for admitting live air into the housing; a directional valve selectively manipulative for controlling the directional application of the live air to the motor, and a manually operable flow regulating unit positioned between the directional valve and the throttle valve for regulating the volume flow of the live air from the throttle valve to the directional valve, the regulating unit comprising a manipulative cylindrical hollow by-pass valve closed at one end and open at the other and a separately manipulative regulating valve slidably disposed in the by-pass valve, the by-pass valve and the regulating valve each being selectively adjustable relative to the other for determining either a full or a restricted volume air flow to the directional valve.

## 4,016,941
## HAND-SIZE FLUID-POWERED TOOL RECIPROCATOR

**William H. Sanders, 3442 Kenwood Blvd., Toledo, Ohio 43606**

**Continuation-in-part of Ser. No. 339,122, March 8, 1973, abandoned. This application Aug. 11, 1975, Ser. No. 603,787**
**Int. Cl.² B24B** *23/00*
**U.S. Cl. 173—170** **18 Claims**



1. In a tool reciprocator for operation with a source of pressured fluid and a sump, the tool reciprocator having a housing; a fluid-operated reciprocatory motor having cylinder and piston elements on the housing; a pair of motor conduits in communication with spaced points in the motor cylinder element on opposite sides of the motor piston element and with the sump and source of pressured fluid; a pressured fluid responsive and operated movable shifter valve member common to the motor conduits and disposed therein between the motor cylinder element and source of pressured fluid and

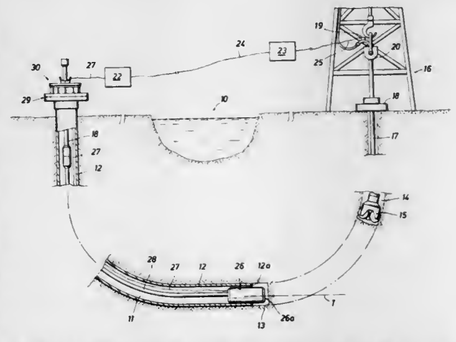


sump adapted, when moved to and occupying one position, to connect a motor conduit, communicating with the motor cylinder element on one side of the motor piston element, with the source of pressured fluid and the other motor conduit, communicating with the motor cylinder element on the other side of the motor piston element, with the sump and, when moved to and occupying another position, to connect the first mentioned motor conduit with the sump and the second mentioned motor conduit with the source of pressured fluid and thereby to reciprocate one of the motor elements; a tool engaging part operatively connected to the reciprocative of the motor elements and adapted to be reciprocated thereby; and means for moving the movable shifter valve member to and from the mentioned positions thereof comprising:
a pilot conduit individual to and operatively connected with one end of the mentioned movable shifter valve member and to the source of pressured fluid and to the sump for communicating pressured fluid and for venting spent pressured fluid to and from the mentioned movable shifter valve member end;
a second pilot conduit individual to and operatively connected with the other end of the movable shifter valve member, opposite to the first mentioned shifter valve member end, and to the source of pressured fluid and to the sump for communicating pressured fluid and for venting spent pressured fluid to and from the second mentioned movable valve shifter member end;
a pilot valve member individual to and disposed in the first mentioned pilot conduit between the source of pressured fluid and the sump and the first mentioned end of the movable shifter valve member and supported for movement to and from a first position in closed relation to the sump and open relation to the source of pressured fluid from and to a second position in open relation to the sump and closed relation to the source of pressured fluid and providing, when in the first mentioned position, communication between the source of pressured fluid and the first mentioned end of the movable shifter valve member and, when in the second mentioned position, communication between the sump and the first mentioned end of the movable shifter valve member;
a second pilot valve member individual to and disposed in the second mentioned pilot conduit between the source of pressured fluid and the sump and the second mentioned end of the movable shifter valve member and supported for movement to and from a first position in closed relation to the sump and open relation to the source of pressured fluid from and to a second position in open relation to the sump and closed relation to the source of pressured fluid and providing, when in the first mentioned position, communication between the source of pressured fluid and the second mentioned end of the movable shifter valve member and, when in the second mentioned position, communication between the sump and the second mentioned end of the movable shifter valve member;
means in engagement with the mentioned pilot valve members and operative to bias each of the same to normally occupy the pilot valve member first mentioned position, whereby pressured fluid is normally communicated to and exerts against both ends of the mentioned opposite ends of the movable shifter valve member at the same time; and means operatively connected to and actuated by the reciprocative of the motor elements to individually and selectively move one of the pilot valve members from its respective first mentioned position to the second mentioned position thereof, when the reciprocative of the motor elements approaches a certain stage in a stroke thereof,
whereby the movable shifter valve member responds to the pressured fluid being communicated and exerted on the end of the mentioned opposite ends of the movable shifter valve member through the pilot conduit in which the unmoved pilot valve member is located causing the movable shifter valve member to move from an occupied to an unoccupied position of the mentioned positions thereof with alacrity and substantially coincidentally with the arrival of the reciprocative of the motor elements at the mentioned stage in its stroke and thus to speedily reverse the direction of movement of the reciprocative of the motor elements.

## 4,016,942
## METHOD AND APPARATUS FOR INDICATING THE POSITION OF ONE WELL BORE WITH RESPECT TO A SECOND WELL BORE

**David E. Wallis, Jr., Glendale; Robert G. Polansky, La Canada, and Peter R. Rahm, Pasadena, all of Calif., assignors to Trunkline Gas Company, Houston, Tex.**

**Continuation-in-part of Ser. No. 261,415, June 10, 1972, abandoned. This application Dec. 28, 1973, Ser. No. 429,189**
**Int. Cl.² E21B** *47/12*
**U.S. Cl. 175—45** **9 Claims**



5. Apparatus for indicating the position of a drill bit relative to a target point comprising means for generating a signal of a preselected frequency, means for transmitting said signal of a preselected frequency from the drill bit into the ground, a microphone array including a plurality of microphones positioned at the target area and oriented in a known position relative to each other, means providing signals proportional to the phase angles of the signals reaching the microphones, and means responsive to the phase angle proportional signals to indicate the position of the drill bit relative to the target area.

## 4,016,943
## METHOD FOR CONNECTING ELECTRICAL CONDUCTORS FOR ELECTRIC EARTH BORING MEANS

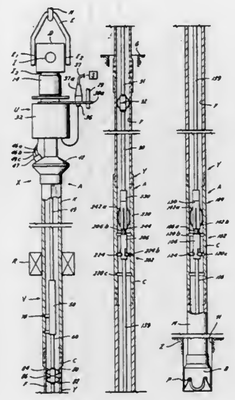
**Roy H. Cullen, and Jimmie R. Aker, both of Houston, Tex., assignors to Roy H. Cullen, Houston, Tex.**

**Division of Ser. No. 448,975, March 7, 1975, Pat. No. 3,926,269. This application Dec. 5, 1975, Ser. No. 638,078**
**Int. Cl.² E21B** *3/10*
**U.S. Cl. 175—65** **12 Claims**

1. A method of earth boring with a rotating drill bit driven by an electric motor power means and mounted with a drilling string of desired length formed by a plurality of connected tubular pipe joints having communicating bores which enables communication of the drill bit with a supply of drilling fluid, including the steps of:
assembling the drill bit with the electric motor power means to form a unit to effect earth formation penetrating rotation with the drill bit when the electric motor power means is operated;
mounting the drill bit and electric motor power means unit with the tubular drilling string having a bore extending therethrough;
installing electrical power conductor means having an electrical connector means in the bore of the drilling string to supply electrical power to the drill bit and electric motor power means unit;

installing actuating means in the bore for effecting connection of electrical connector means inside the bore of the drill string;

connecting the actuating means with a source of electrical power for supplying electrical power to the drill bit and electric motor power means unit to rotate the drill bit;



operating the actuating means to electrically contact electrical connector means for the actuating means with electrical connector means for the electrical power conductor means; and

supply electrical power to the drill bit and electrical motor power means unit when desired to rotate the drill bit to effect earth formation penetrating rotation of the drill bit wherein earth boring is effected.

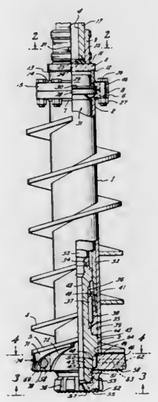
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**4,016,944**

## PNEUMATIC HAMMER-AUGER EARTH BORING APPARATUS

**William I. Wohlfeld, San Angelo, Tex., assignor to Reed Tool Company, Houston, Tex.**

**Filed Jan. 12, 1976, Ser. No. 648,559**
**Int. Cl.² E21B** *5/00*
**U.S. Cl. 175—92** **10 Claims**



1. a percussion and rotary auger earth boring apparatus comprising:

a rotatable earth boring auger having a hollow case,

said auger case having a driven end, including means adapted for connection to an external rotary driving means, and a cutting end,

a first helical flight secured on said auger case extending helically from said cutting end substantially to said driven end,

a second helical flight secured on said auger case and extending at least partially from said cutting end towards said driven end at substantially the same pitch as said first flight,

said flights terminating at said cutting end in edges substantially aligned on opposite sides of said auger case,

a pneumatic percussor positioned removably within said auger case,

said percussor having a case enclosing a reciprocally movable pneumatically actuated hammer operable to strike an anvil member positioned therein for longitudinal movement,

said anvil member having a stem portion extending outside the cutting end of said auger case,

a rigid rock cutting bit member secured on said stem portion and extending across the entire diameter of said flights and movable therewith and having an upper surface directing cuttings on to said flights, and

means secured at the cutting end edges of said flights and operatively engaging said bit member whereby rotation of said auger effects rotation of said bit member while said hammer effects percussive movement thereof.

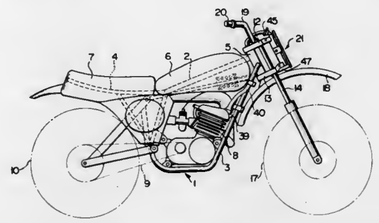
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**4,016,945**

## MOTORCYCLE WITH A WATER COOLED ENGINE

**Hirotaka Shibata, Hamamatsu, Japan, assignor to Yamaha, Hatsudoki Kabushiki Kaisha, Iwata, Japan**

**Filed Mar. 3, 1976, Ser. No. 663,441**
**Claims priority, application Japan, Mar. 6, 1975, 50-27296**
**Int. Cl.² B60K** *11/04;* **B62K** *11/00*
**U.S. Cl. 180—33 R** **6 Claims**



1. A motorcycle with a water cooled engine comprising a frame having a head pipe at one end, a water cooled engine fitted to said frame, a steering shaft rotatably inserted through said head pipe, a control handle and a front fork for supporting a front wheel of said motorcycle, fixed to said steering shaft, a radiator fitted to said front fork, a flow-in side liquid chamber and flow-out side liquid chamber defined by the inner periphery of said head pipe and the outer periphery of said steering shaft separately from each other, a flow-in side liquid passageway and flow-out side liquid passageway formed in said steering shaft separately from each other, a pair of communication bores formed in said steering shaft respectively communicating between said flow-in side liquid chamber and flow-in side liquid passageway and between said flow-out side liquid chamber and flow-out side liquid passageway, first and second tubes connecting said liquid chambers to said water cooled engine, respectively, and third and fourth tubes connecting both said liquid passageways to said radiator, respectively, whereby cooling water within said radiator circulates to pass through said fourth tube, flow-out liquid passageway, flow-out side liquid chamber, second tube, water-cooled engine, first tube, flow-in side liquid chamber, flow-in side liquid passageway and third tube to return to said radiator.



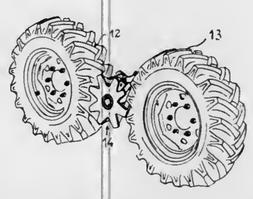
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**4,016,946**

## METHOD AND DEVICE FOR DRIVING THE DRIVING WHEELS OF A VEHICLE

**Jacques A. Demichelis, Paris, France, assignor to FORATRAC "Societe Civile", Paris, France**

**Filed Oct. 17, 1975, Ser. No. 623,222**
**Claims priority, application France, Oct. 17, 1974, 74.34957**
**Int. Cl. B60k** *23/00*
**U.S. Cl. 180—74** **6 Claims**



1. In an apparatus for driving the driving wheels of a vehicle through the intermediary of a tubular driving roller maintained between two driving wheels and meshing with the sculptures of the pneumatic tires of said wheels, the improvement comprising: at least one first bar-shaped member of said roller penetrating into one sculpture of a first tire and a second bar-shaped member penetrating into one sculpture of a second tire, at least one star-shaped flange coupled to one end of said roller, said bars being attached at least by one of their ends to the tips of the arms of said star-shaped flange and means disposed on said roller to couple the other ends of said bars to the roller at an angle oblique to the driving axis of said roller.

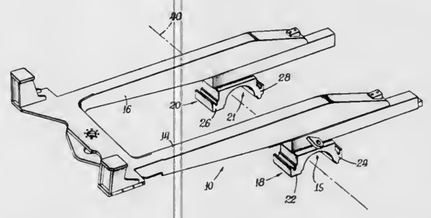
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**4,016,947**

## MEANS FOR SECURING AXLE TO FRAME

**Richard W. Chamberlain, Aurora, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.**

**Filed Dec. 1, 1975, Ser. No. 636,503**
**Int. Cl.² B60B** *35/00*
**U.S. Cl. 180—88** **9 Claims**



1. Apparatus for securing an axle housing relative to a frame, comprising:

a bracket fixed relative to the frame;

said axle housing defining first and second extended portions, positioned on either side thereof and engageable with first and second extensions of the bracket respectively;

clamp means for engaging and securing the first extension and first extended portion together; and

means for engaging and securing the second extension and second extended portion together.



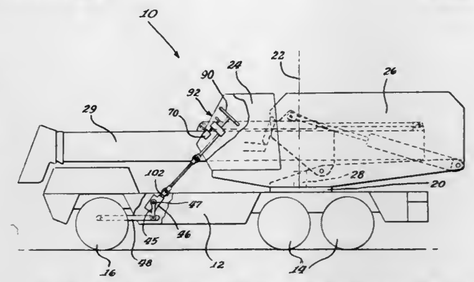
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**4,016,948**

## DUAL STEERING SYSTEM FOR VEHICLE

**Donald A. Kuester, Wausau, Wis., assignor to J. I. Case Company, Racine, Wis.**

**Filed Nov. 17, 1975, Ser. No. 632,515**
**Int. Cl.² B62D** *5/08*
**U.S. Cl. 180—132** **3 Claims**



1. A vehicle having a vehicle chassis supported by a pair of steerable front wheels and at least one pair of rear wheels with said front wheels supported for movement about vertical axes to steer said vehicle, a cab rotated about a vertical axis on said chassis, and a dual steering system for said vehicle, said dual steering system including a hydrostatic steering system, a mechanical actuated power steering system and a steering wheel in said cab common to both said systems; said hydrostatic steering system including a hydrostatic steering valve in said cab, a pressurized fluid source and a reservoir connected to said valve, a fluid ram having one element connected to said chassis and a second element connected to said front wheels, and conduit means connecting said valve to said fluid ram; said mechanical actuated power steering system including a steering gear secured to said chassis and having an input shaft and an output shaft, linkage means connecting said output shaft to said front wheels, a disconnectable linkage system extending from said input shaft to said cab adjacent said steering wheel; and a selector unit in said cab adjacent said steering wheel for selectively connecting said steering wheel to said steering valve or said linkage system so that said vehicle may be steered by either said hydrostatic steering system or said mechanical actuated power steering system.

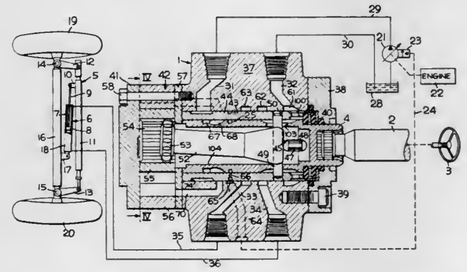
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**4,016,949**

## HYDROSTATIC LOAD SENSITIVE REGENERATIVE STEERING SYSTEM

**John R. Plate, and Charles P. Heisig, both of Milwaukee, Wis., assignors to Allis-Chalmers Corporation, Milwaukee, Wis.**

**Filed Nov. 24, 1975, Ser. No. 634,892**
**Int. Cl.² B62D** *5/06*
**U.S. Cl. 180—160** **10 Claims**



1. A regenerative hydraulic steering system for a motor vehicle comprising, a variable displacement pump having a pressure compensator for controlling the displacement of the pump responsive to a sensed load pressure, a control valve

including a housing defining inlet passage for connection to the pump, a return passage for connection to a reservoir, and actuator passages, a hydraulic actuator for connection to a steering linkage to steer a motor vehicle, said hydraulic actuator including a piston with a rod connected to said piston extending from said hydraulic actuator defining a rod end hydraulic chamber and a base end hydraulic chamber, an actuator conduit connecting the rod end chamber to an actuator passage in said control valve and an actuator passage connecting the base end chamber of said hydraulic actuator to a second actuator passage in the control valve, said control valve including an input shaft adapted for operation by a steering wheel, a commutator sleeve connected to said input shaft adapted for movement in a first direction when said steering wheel is rotated in one direction and for movement in a second direction when said steering wheel is rotated in the other direction, a valve sleeve received in said housing and receiving said commutator sleeve, a metering unit positioned in said valve housing for metering fluid flowing through said control valve, passage means connecting said control valve to and from said metering unit, said commutator sleeve and said valve sleeve defining a plurality of passageways selectively connecting said inlet passage through said metering unit to said actuator passages for regenerative operation and connecting said inlet passage to one of said actuator passages through the metering unit and connecting the other actuating passage to the return passage for non-regenerative operation, said input shaft causing displacement of said commutator sleeve relative to said valve sleeve when said input shaft is rotated in either of said two directions, said displacement between said sleeves selectively connecting said passageways in said commutator sleeve and valve sleeve in said control valve for selective connection of said valve through said metering unit to said hydraulic actuator to selectively extend and contract said hydraulic actuator for steering of the motor vehicle, said commutator sleeve and valve sleeve defining a sensing passage in communication with said passageways for sensing a pressure signal when said variable displacement pump is connected to said hydraulic actuator through said control valve, a pilot line connecting said sensing passage in said control valve to said compensator for selectively sensing load pressures in said control valve to vary the displacement of the pump in response to the sensed pressure.

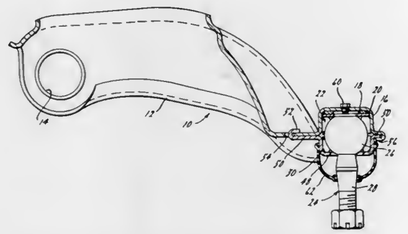
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**4,016,950**

## SUSPENSION ARM AND JOINT ASSEMBLY

**William D. Allison, Grosse Pointe Farms, Mich., assignor to Ford Motor Company, Dearborn, Mich.**

**Filed July 7, 1975, Ser. No. 593,809**
**Int. Cl.² B60G** *7/00*
**U.S. Cl. 280—674** **10 Claims**



1. A suspension arm and joint assembly comprising:
a stamped sheet metal suspension arm having pivot structure at its inner end constructed to be pivotally connected to a vehicle chassis;
said suspension arm having an integral first socket part spaced from said pivot structure;
a first bearing means positioned in said first socket part;
said first bearing means having a plurality of circumferentially spaced apart bearing elements;
a ball stud having a ball portion in slidable engagement with said circumferentially spaced apart bearing elements of said first bearing means and a shank portion extending in a direction away from said first socket part;
a second bearing means having a plurality of circumferentially spaced apart bearing elements in slidable engagement with said ball;
said first bearing means being disposed on one side of the equator of said ball portion and said second bearing means being disposed on the other side of the equator of said ball portion;
a second socket part engaging said second bearing means;
means securing said socket part to said suspension arm;
said first and second socket parts cooperating to provide an enclosure for said first and second bearing means and said ball portion of said ball stud.

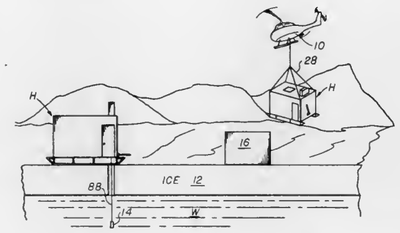
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**4,016,951**

## AIR TRANSPORTABLE SEISMIC EXPLORATION SYSTEM FOR USE ON ICE-COVERED WATERS

**Charles W. Dick, Houston; Otis A. Johnston, League City; John L. Paitson, Galveston, and Carl H. Savit, Houston, all of Tex., assignors to Western Geophysical Company of America, Houston, Tex.**

**Filed Mar. 8, 1976, Ser. No. 664,502**
**Int. Cl.² G01V** *1/02*
**U.S. Cl. 181—109** **18 Claims**




1. A seismic exploration apparatus for use on ice-covered water, comprising:
a housing, said housing being substantially enclosed, said housing having a floor with a hole therein;
means for generating acoustic signals; power means located within said housing for supplying power to said generating means, said power means also creating heat, whereby said heat warms the air within said housing, provides suitable working temperatures for personnel within said housing and prevents freezing of equipment within said housing; and
means within said housing for boring holes in said ice so that said signal generating means can be lowered into the water below said ice.

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**4,016,952**

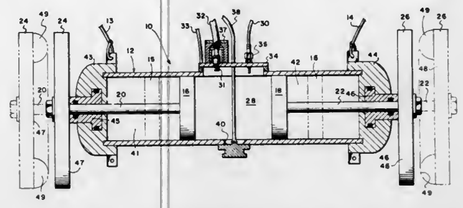
## MARINE GAS EXPLODER

**Dale H. Reed, Dallas, and Jack E. Hardison, Garland, both of Tex., assignors to Atlantic Richfield Company, Los Angeles, Calif.**

**Filed Oct. 6, 1975, Ser. No. 619,927**
**Int. Cl.² G01V** *1/38*; **H04B** *13/00*; **G01V** *1/02*
**U.S. Cl. 181—118** **8 Claims**

1. In a marine gas exploder utilizing an enclosed cylinder adapted to be supported in a submerged state, a piston movable therein, a piston rod extending from said piston through one end of said cylinder, and air spring means between said piston and said one end for biasing said piston away from said one end, the combination comprising:
a. an annular plate mounted at the external end of said rod substantially surrounded by water, one surface of said plate being in facing relation to said one end, and unopposed by any other adjacent or contiguous surface of similar contour and extent; and
b. means for explosively driving said piston in the direction of said one end to propel said annular plate through the water, the diameter of said plate being selected between limits such that the forward acceleration thereof is sufficient to induce substantial cavitation adjacent its trailing surface and the damped return thereof responsive to said air spring means is insufficient to produce substantial oscillation.





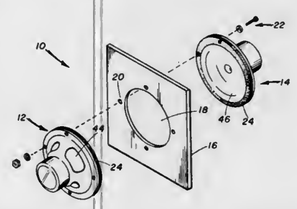
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**4,016,953**

## PUSH-PULL TRANSDUCER SYSTEM

**Robert J. Butler, 11605 Terry Town Drive, Reisterstown, Md. 21136**

**Filed May 23, 1975, Ser. No. 580,250**
**Int. Cl.² H05K** *5/00*; **H04R** *13/02*
**U.S. Cl. 181—144** **6 Claims**



1. A push-pull transducer system for reproduction of high fidelity sound, comprising:
two loudspeaker means each including a cone and a drive means, the loudspeaker means being coaxially disposed relative to each other with the base of each cone of each said means being disposed in facing relation to the base of the other of the cones to define a chamber therebetween;
sealing means between the two cones for sealing the aforesaid chamber to render said chamber impervious to transfer of fluid to or from the ambient environment of the system;
audio means; and,
means for connecting said loudspeaker drive means in series to the audio means, stimulation of the loudspeaker means by the audio means causing push-pull air currents to be produced.

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**4,016,954**

## FOLDABLE LADDER

**Ronald Price Hickman, Waltham Abbey, England, assignor to Inventec International Limited, Sark, Guernsey (Channel Is.)**

**Filed Mar. 13, 1975, Ser. No. 558,120**
**Claims priority, application United Kingdom, Mar. 14, 1974, 11457/74; Apr. 11, 1974, 16263/74**
**Int. Cl.² E06C** *1/383*
**U.S. Cl. 182—22** **42 Claims**

1. A foldable ladder having first and second sections, said first section comprising, in combination:
a first central elongate member and two first outer elongate members arranged one on each side of, and substantially parallel to, the central member; a series of first rungs each foldably connected to the central member and one of the outer members, each first rung being arranged to fold between an erected position, in which it extends generally at right angles to the longitudinal direction of each member to which it is connected, and a storage position in which the rung lies substantially parallel to the first central member with the first outer member to which it is connected extending parallel to and in close juxtaposition with the first central member; and first engaging means, disposed on said first central member adjacent its upper end;
said second section comprising a second central elongate member and second engaging means, disposed on said second central member,
wherein said first and said second engaging means are operative to engage each other with said second central member adjacent, and subsantially parallel to said first central member at an exended partially overlapping position.



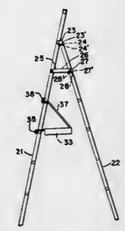
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**4,016,955**

## STEP LADDER WITH PAINT CARRIER APPARATUS

**Robert B. Gates, R.R. No. 2, Mohall, N. Dak. 58761**

**Filed Mar. 25, 1976, Ser. No. 670,131**
**Int. Cl.² E06C** *7/14*
**U.S. Cl. 182—122** **1 Claim**

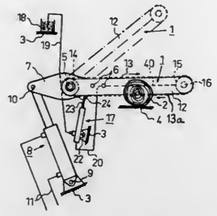


1. A ladder and paint carrier plate, said ladder comprising two ladder sections with one section pivotally mounted at its end to the other section and with the other section overlapping the first section so that the sections may be straightened out and used as a step ladder or folded into a step ladder, said ladder having locking means to lock the ladder sections when folded into a step ladder, said paint carrier plate having a center opening so that the paint carrier plate may be slipped over the top of the step ladder and slid downward to rest on the locking means, said paint carrier plate also comprising a pair of hooks pivotally mounted to the paint carrier plate and a pair of hooks fixed to the paint carrier plate, with the hooks being attachable to the rungs of the ladder to attach the paint carrier plate at different heights on the rungs of the ladder.

## 4,016,956
## APPARATUS FOR LUBRICATING SAW CHAINS IN GUIDE BARS

**Börje E. Karlsson, Rottne, Sweden (360 30)**

**Filed Oct. 10, 1975, Ser. No. 621,363**
**Int. Cl.² F16N 7/24**
**U.S. Cl. 184—15 R** **12 Claims**



1. Apparatus for lubricating a saw chain travelling on guide rail means carried by a guide bar, wherein said guide bar is mounted on a frame and is adapted to be rotated by power unit means in one direction to crosscut an object, afterwhich it is rotated back in the opposite direction, and wherein lubricant is conducted from a reservoir means to the saw chain through conduit means by the action of a lubricant pump, said apparatus comprising: a lubricant pump having a pump housing including a space therewithin into which lubricant is drawn from said reservoir means and from which it is transmitted to said saw chain, and a piston reciprocally mounted within said space, said lubricant pump being connected to said frame and said guide bar in such a way that the piston is moved upon rotation of the guide bar in said one direction to establish pressure within said space to force lubricant therefrom to said saw chain, and upon rotation of said guide bar in the opposite direction to establish suction in said space for drawing lubricant from said reservoir means; first conduit means connecting said pump housing space with said reservoir means; a suction valve connected in said first conduit means, arranged to be opened by suction in said space whereby to draw lubricant into said space from said reservoir means, and to be closed in the presence of pressure within said space; second conduit means connecting said pump housing space with said saw chain; and a pressure valve connected in said second conduit means, arranged to be closed by suction in said space, and to be opened in the presence of pressure within said space to transmit lubricant from said space to said saw chain, whereby rotation of said guide bar in said opposite direction will draw lubricant from said reservoir means through said suction valve and will force the pressure valve shut, and rotation of said guide bar in said one direction thereafter will close the suction valve and force the lubricant through said second conduit means to the saw chain.

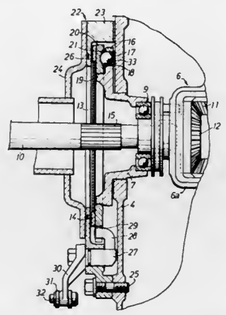
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## 4,016,957
## BALL-RAMP CAM ACTUATED DISK BRAKE

**Masahide Osujo; Seiiti Ikegami; Yoshinobu Murayama; Takaho Omura, and Tadashi Morimoto, all of Sakai, Japan, assignors to Kubota Tekko Co., Ltd., Osaka, Japan**

**Filed Sept. 30, 1975, Ser. No. 618,154**
**Claims priority, application Japan, Aug. 20, 1974, 49-95784; Oct. 24, 1974, 49-129730; Nov. 22, 1974, 49-134718**
**Int. Cl.² F16D 55/31**
**U.S. Cl. 188—72.7** **4 Claims**

1. A disk brake apparatus for use in a tractor or the like comprising a brake disk mounted on each of a pair of differential gear shafts extending through differential bearing cases fixed to the opposite side walls of a transmission case respectively to rotatably support a differential case, a brake housing mounted on each of the opposite side walls of the transmission case and having a friction surface outside the brake disk and in facing relation thereto, and thrust producing means disposed in the housing to press the brake disk against the friction surface, the thrust producing means comprising a cam plate formed with cam grooves facing a wall of said transmission casing arranged circumferentially thereof at a specified spacing, a ball received in each cam groove respectively, and



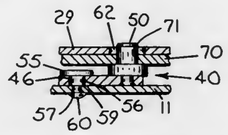
a ball retaining plate having bores for retaining each said ball therein respectively, the balls being held in the bores in point-to-point contact with the side wall of the transmission case or a seat member placed in each of the bores of the ball retaining plate, the cam plate being movable in its circumferential direction to produce a thrust in the direction to press the brake disk against the friction surface through the cooperation of the balls and the cam grooves.

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## 4,016,958
## MOTION TRANSMITTING MEMBER FOR A MECHANICAL BRAKE ASSEMBLY

**Gene A. Yoak, Ashtabula, and Glenn E. McKay, Kingsville, both of Ohio, assignors to Rockwell International Corporation, Pittsburgh, Pa.**

**Filed May 27, 1975, Ser. No. 581,339**
**Int. Cl.² F16D 51/12**
**U.S. Cl. 188—78** **1 Claim**



1. A brake assembly comprising a support, brake shoes carried by said support for outward displacement into frictional contact with a surrounding brake drum, an actuating lever disposed between said support and said brake shoes, and motion transmitting means mounted to said support, said motion transmitting means comprising a link mounted to said support intermediate said support and said actuating lever, an aperture adjacent each end of said link, means cooperating with one of said apertures to pivotally mount said link to said support, a pin non-rotatably mounted in the other said apertures, said pin including a radially extending flange intermediate oppositely disposed ends thereof with one surface of said flange abutting a major surface of said link, one end of said pin upset interiorly of said other aperture to secure said pin to said link, the other surface of said flange is a bearing surface substantially coplanar with the surface of said lever facing said support, said one surface of said flange extending radially outward a distance greater than one-half the diameter of said one end of said pin and the other end of said pin projecting



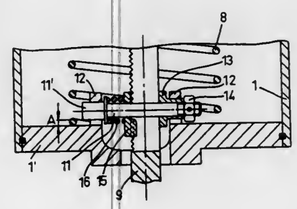
away from said support between said actuating lever and one of said brake shoes whereby said pin will move said brake shoe radially outward in response to movement of said actuating lever.

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## 4,016,959
## ACTUATOR FOR A RAIL WHEEL TREAD SCRUBBER BLOCK

**Pierre R. Menard, l'Isle Adam, and André Ledoux, Boulogne, both of France, assignors to Societe S A B, Saint-Cloud, France**

**Filed Feb. 13, 1976, Ser. No. 658,083**
**Claims priority, application Sweden, Feb. 17, 1975, 7501707**
**Int. Cl.² F16D 65/54**
**U.S. Cl. 188—196 B** **2 Claims**



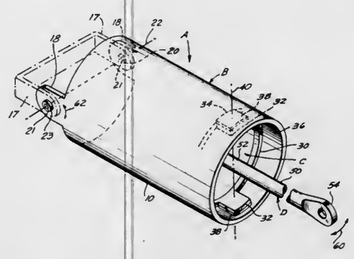
1. A fluid pressure controlled cylinder-piston unit for actuating a wheel contacting surface toward a rail wheel, comprising in combination, a cylinder, a piston movable forward in said cylinder under influence of fluid pressure and held in a return position by a spring, a piston rod movable with said piston having a toothed surface, and a locking element comprising a member spring biased against the piston rod teeth and movable with the piston rod positioned for locked engagement with the toothed surface to follow the piston rod during a forward stroke toward said wheel and to lock the piston rod relative to the cylinder on the return stroke after movement over a predetermined clearance distance between said wheel contacting surface and wheel wherein the piston rod defines a longitudinal slot and said locking element comprises a pin extending through said rod, whereby movement in said slot comprises said predetermined clearance distance.

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## 4,016,960
## DASHPOT WITH GUIDED PISTON

**Lance C. Wilcox, Wilton, Conn., assignor to Airpot Corporation, Norwalk, Conn.**

**Filed Jan. 2, 1976, Ser. No. 645,942**
**Int. Cl.² F16F 9/02**
**U.S. Cl. 188—282** **14 Claims**



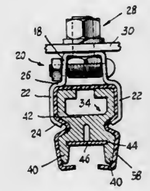
1. A dashpot comprising
A. a hollow cylinder substantially closed at one end thereof;
B. piston means comprising
i. a piston disposed in and slidable along said cylinder, said piston having an outer sidewall spaced inwardly from the inner sidewall of said cylinder;
ii. fluid blocking means secured to said piston for movement therewith and having a flexible portion thereof disposed intermediate opposed sidewall portions of said piston and said cylinder respectively and effective to block passage of fluid therebetween; said piston and said fluid blocking means as a unit by themselves being configured and dimensioned for appreciable pivotal movement within said cylinder about axes transverse to said cylinder axis; and
iii. at least one pair of guide means disposed on said piston for movement therewith, each guide means of said guide pair having an outer surface closely adjacent said cylinder inner sidewall, substantially circumferentially spaced from the outer surface of the other guide means of said guide pair, and configured and dimensioned to essentially preclude movement of a first magnitude of said piston means within said cylinder along a first axis substantially connecting said guide means of said guide pair while only limiting to a predetermined level movement of a second magnitude appreciably greater than said first magnitude of said piston means within said cylinder about a second axis parallel to said first axis; and
C. a piston rod having a first end portion operatively connected to said piston for moving said piston and a second end portion adapted for connection with a member undergoing reciprocating motion along a path substantially, but not necessarily exactly, aligned with the axis of said cylinder;
whereby said guide pair insures the effective blocking function of said blocking means by essentially precluding motion of said piston means within said cylinder along said first axis while limiting to an acceptable level motion of said piston means within said cylinder about said second axis in response to limited misalignment of the axis of said cylinder and the axis of said piston rod.

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## 4,016,961
## RAIL CONSTRUCTION FOR RAIL-TYPE ELECTRIFICATION SYSTEMS

**Alleyne C. Howell, Jr., 645 Mine Hill Road, Fairfield, Conn. 06430**

**Division of Ser. No. 603,149, Aug. 8, 1975, Pat. No. 3,998,306.**
**This application Aug. 2, 1976, Ser. No. 710,906**
**Int. Cl.² B60M 1/34**
**U.S. Cl. 191—23 A** **5 Claims**



1. A rail construction for rail-type electrification systems, comprising in combination:
a. an elongate malleable metal electrically conducting carrier rail member or relatively high expansion coefficient, formed of extruded stock, said member having a pair of spaced flange portions and a web portion connecting said flange portions,
b. said flange portions having undercuts in their inner surfaces adjacent the connecting web portion,
c. an elongate, substantially flat contact member of metal having a hard, glass-like surface, said contact member being coextensive with said rail member, said contact member having a relatively low expansion coefficient and

having the property of resisting pitting and having broad oppositely disposed plane surfaces and oppositely disposed parallel edge portions extending into said undercuts, said edge portions and plane surfaces thereof being permanently pinched by the walls of the undercuts as a consequence of the flange portions being inwardly forced beyond the elastic limit of the stock, toward one another from divergent positions with the contact member so positioned,

d. one broad surface of said contact member facing and being juxtaposed to said web portion,

e. said web portion having a cross-sectional enabling it to be permanently reshaped when the flange portions are forced inwardly, said web portion at all locations between the flange portions, and said flange portions being under continual tensile stress to effect the pinching of the contact member,

f. said pinching effecting a permanent and rigid mechanical connection between the conducting carrier rail member and the contact member so as to resist relative movement between the two parts at any given temperature,

g. said permanent reshaping of the web portion being maintained regardless of normal environmental temperature changes by virtue of the higher expansion coefficient of the carrier member as compared with the contact member,

h. the said different expansion coefficients preventing distortion and permanent deformation of the carrier member as the environmental temperature increases,

i. changes in temperature of the rail construction effecting a relative longitudinal displacement of portions of the carrier and contact members.

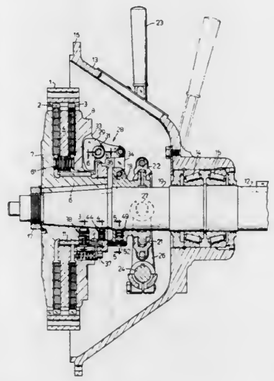
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**4,016,962**

## VIBRATION RESISTANT MECHANICAL CLUTCH

**James B. Black, Roscoe, Ill., assignor to Twin Disc, Incorporated, Racine, Wis.**

**Filed Nov. 3, 1975, Ser. No. 628,389**
**Int. Cl.² F16D** *13/56, 49/00;* **F16F** *13/02*
**U.S. Cl. 192—70.2** **6 Claims**



1. In a friction plate clutch the combination of a rotatable torque transmitting drum element, a torque transmitting shaft element extending axially of said drum element in rotatable relation thereto; a back plate non-rotatably secured to said shaft element in an axially fixed position and having an externally splined hub; a pressure plate loosely spline connected with said hub in axially slideable and radially loose relation thereto; a stack of interleaved driving and driven clutch plates operatively interposed between said drum and shaft elements; and articulated link mechanism pivotally connected to said pressure plate and operable to shift said pressure plate toward said back plate; and spring means biasing said pressure plate into a radially fixed relation to said hub, said spring means comprising a coil spring seated in a radial bore of said hub and bearing against said shaft element and also bearing radially outward upon said pressure plate.

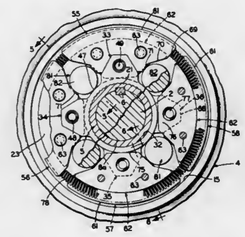
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**4,016,963**

## CENTRIFUGAL CLUTCH CONSTRUCTION

**Richard C. St. John, North Canton, Ohio, assignor to Aspro, Incorporated, Westport, Conn.**

**Filed Feb. 9, 1976, Ser. No. 656,378**
**Int. Cl.² F16D** *43/14*
**U.S. Cl. 192—105 BA** **13 Claims**



1. Centrifugal clutch construction including:

a. a driven clutch member having an axially extending coupling surface;

b. drive shaft means;

c. rotor means mounted on the drive shaft means for rotation with the shaft means, said rotor means being formed with a plurality of radially extending slots;

d. a plurality of shoe means mounted on the rotor means and movable radially between retracted and extended positions;

e. the shoe means each having an outer frictional coupling surface adapted to drivingly engage the axially extending coupling surface of the driven clutch member when the shoe means are in extended position;

f. detent plate means formed on each of the shoe means and extending radially inwardly toward the drive shaft means and located within a respective rotor means slot;

g. inwardly tapered conical surface means formed on each of the detent plate means, said surface means being located within the rotor means slots when the shoe means are in retracted positions;

h. a plurality of detent means mounted on the rotor means and movable axially into respective slots of the rotor means, said detent means being formed with generally conical-shaped outer ends complementary to the conical surface means of the detent plate means;

i. first spring means biasing the shoe means radially inwardly toward retract position;

j. second spring means biasing the detent means axially toward a respective conical surface means of the detent plate means, with the conical-shaped ends of the detent means engaging the complementary conical surface means of the detent plate means; and

k. the detent means and first spring means clampingly retaining the shoe means in retracted position until the drive shaft means reaches a predetermined speed, said shoe means and detent plate means moving radially outwardly under the influence of centrifugal force from retracted toward extended position disengaging the detent means conical-shaped ends from engagement with the detent plate conical surface means, whereupon the clutch shoe means snap outwardly from retracted to extended position and drivingly engage the driven clutch member.

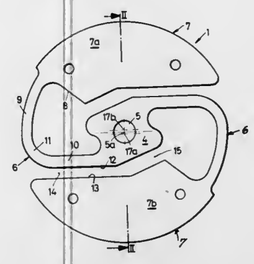


**4,016,964**

## ROTOR FOR CENTRIFUGAL CLUTCH

**Günter Dietzsch, Schmiden; Gerd Frers, Weinstadt; Klaus Henning, Stuttgart, and Helmut Lux, Waiblingen, all of Germany, assignors to Andreas Stihl Maschinenfabrik, Neustadt, Germany**

**Filed Mar. 3, 1976, Ser. No. 663,293**
**Claims priority, application Germany, Mar. 5, 1975, 7506785**[U]
**Int. Cl.² F16D** *43/06*
**U.S. Cl. 192—105 CD** **19 Claims**



1. A rotor for a centrifugal clutch, which includes a plurality of axially superimposed layers, and connecting means interconnecting said layers to form said rotor as a multi-layer packet, said rotor comprising a central supporting element, at least two arcuate segmental centrifugal weights, and elastic supporting members respectively connecting one end portion of said centrifugal weights with said central supporting element.

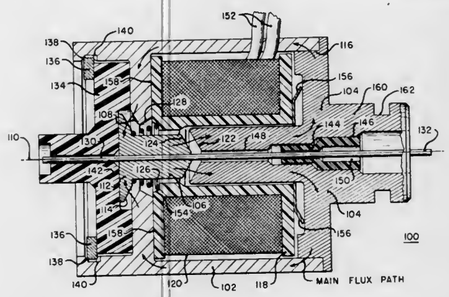
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**4,016,965**

## MATRIX PRINT HEAD AND SOLENOID DRIVER

**Robert L. Wirth, and David W. Bell, both of Ithaca, N.Y., assignors to NCR Corporation, Dayton, Ohio**

**Filed Aug. 19, 1975, Ser. No. 605,970**
**Int. Cl.² B41J** *3/04*
**U.S. Cl. 197—1 R** **24 Claims**




1. A magnetic circuit comprising:

a coil for providing magnetic flux when energized by an electrical current;

flux conductive means for providing a substantially continuous non-restricted path for said flux comprising a housing having a stationary core member enclosing one end thereof and an annular pole piece substantially closing the other end thereof and a plunger reciprocally movable in one direction with respect to said core member, said plunger having a flanged end including an inner conical surface aligned with a companion outer surface of said pole piece and an opposite end including a conical surface aligned with a companion conical surface of said core member; and

plunger return means yieldingly urging said plunger to a normal position defining a first and a second low reluctance air gap between said plunger conical surfaces and said companion pole piece and core member conical surfaces for generating upon energization of said coil a composite accelerating magnetic force on said plunger in part by each of said air gaps.

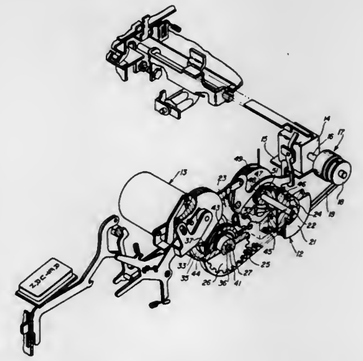
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**4,016,966**

## TYPEWRITER JAM RELEASE MECHANISM

**Theodore N. Madison, Windsor, Conn., assignor to Royal Business Machines, Inc., Hartford, Conn.**

**Continuation of Ser. No. 542,243, Jan. 20, 1975, abandoned, which is a division of Ser. No. 333,389, Feb. 16, 1973, Pat. No. 3,876,054. This application Mar. 24, 1976, Ser. No. 670,097**
**Int. Cl.² B41J** *23/02*
**U.S. Cl. 197—16** **1 Claim**



1. In an electric typewriter having a frame mounting a power roll, a power train for continuously rotating said power roll, and a motor having an output shaft for driving said power train which motor is subject to stalling incident to overload demands on said power roll, and a normally engaged wrap spring clutch between said motor shaft and a pulley in said power train,

manually operated means for momentarily disengaging said clutch to allow said motor to resume speed and deliver a power surge to said power roll on reengagement of said clutch,

said means including a friction band trained around both a frame-fixed part and a driven part of said clutch,

means resiliently connecting one end of said band to said frame,

a lever pivoted at one end on said frame,

means connecting the other end of said band to the other end of said lever,

operator controlled means for moving said lever about its pivot to tension said band on said clutch part to frictionally rotate said clutch part to unwind said wrap spring clutch to allow said motor to resume speed, said operator controlled means including

a pivotally mounted segment-shaped member,

a link connected to lever and eccentrically mounted on said segment-shaped member, and

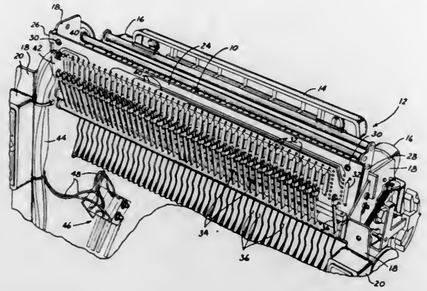
means for restoring said segment-shaped member after rotation and release thereof by an operator to allow said clutch to reengage.

**4,016,967**

## DECODING MEANS WITH ERROR INHIBITOR FOR USE WITH A TYPEWRITER

**William E. Webb, Hoffman Estates, Ill., assignor to Hamilton Communications, Inc., Schaumburg, Ill.**

**Filed Nov. 18, 1975, Ser. No. 632,924**
**Int. Cl.² B41J** *5/08*
**U.S. Cl. 197—19** **9 Claims**



1. Apparatus for attachment to a typewriter for selectively actuating a plurality of electrical switch means in response to depressing the keys of typewriter, comprising, in combination:

support means for attachment to the underside of the typewriter generally beneath the keyboard thereof, said support means being adapted to support a plurality of switch means adjacent one another;

a plurality of first electrical switching means that are connected in electrical circuits that are matrixed in rows and columns, and adapted to produce electrical signals identifying the key being depressed when switched, said switching means being positioned adjacent one another and extending along said support means generally across the width of the keyboard;

a plurality of pivotable actuating levers positioned adjacent said switching means, each of said levers being operably associated with a key of the typewriter and with one of said switching means so that pivotal movement of one of said actuating levers occurs in response to depression of its associated typewriter key, said actuating levers actuating its associated switching means;

means operably associated with the universal bar mechanism of the typewriter, said means being movable in response to the universal bar triggering the escapement mechanism of the typewriter;

second switching means being operated by said universal bar mechanism associated means;

circuit means associated with said second switching means and said first switching means adapted to inhibit the receipt of said electrical signals by said matrixed electrical circuits from said first switching means until said second switching means is actuated, said signals thereby being inhibited unless and until a character is typed.

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**4,016,968**

## METHOD AND APPARATUS FOR ORIENTING CAN ENDS

**Ronald B. Stelter, Country Club Hills, Ill., assignor to The Continental Group, Inc., New York, N.Y.**

**Filed Sept. 5, 1975, Ser. No. 610,900**
**Int. Cl.² B65G** *47/24*
**U.S. Cl. 198—394** **5 Claims**

1. In a mechanism for orienting a substantially planar article to a predetermined angular position said article having stop means formed thereon, comprising:

a sensor mateable with said stop means;

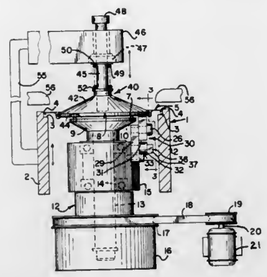
a rotating drive means;

means for depositing said article upon said drive means into contact with said sensor thereupon terminating rotation of said article, to hold the same in oriented position; and

said drive means including clutch means arranged to slip upon contact being made by the stop means and said sensor to prevent abrasion between the drive means and said article; and

said drive means including a vertically disposed mandrel rotatable on a generally vertical axis, a pad at the upper end of the mandrel for seating said article, and said sensor comprising a libratory element pivotally mounted on a substantially horizontal axis for vertical pivotal movement and having a stop projecting upwardly from said element and movable to the locus of said stop means into intercepting relation therewith; and

said libratory element having a lower edge and means en-



gageable with said lower edge for limiting pivotal movement of the element in a direction biasing said stop upwardly; and

clamp means vertically aligned with the mandrel and having means biasing the same downwardly into a position clamping the article between the same and the mandrel; and

said means for depositing said article upon the drive means comprising reciprocating conveying means, and link means operatively connecting said clamp means with the conveying means for holding the article upon the mandrel when the article is placed thereon and releasing the article from the clamp means upon said conveying means initiating movement of the article to a succeeding station.

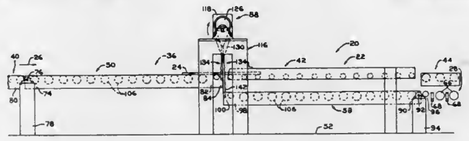
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**4,016,969**

## FLOW DIVIDING MECHANISM FOR A CONVEYOR SYSTEM

**Jay J. Brand, Pittsburgh, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.**

**Filed July 22, 1975, Ser. No. 598,090**
**Int. Cl.² B65G** *47/30*
**U.S. Cl. 198—435** **28 Claims**



1. An article flow dividing mechanism, comprising:

a first conveying section having a first end and a second end;

means for pivotally mounting the first end of said first conveying section to move the second end of said first conveying section through a first reciprocating arcuate path;

a second conveying section having a first end and a second end;

means for pivotally mounting the first end of said second conveying section in spaced relation to the first end of said first conveying section to move the second end of said second conveying section through a second reciprocating arcuate path to align the second end of said first



conveying section and second end of said second conveying section at a predetermined position along their respective arcuate paths; and

elevator means comprising:

motor means;

shaft means operatively connected to said motor means; and

means operatively connected to said shaft means and said first and second conveying sections for simultaneously moving the second end of said first conveying section and the second end of said second conveying section in opposed directions along their respective arcuate paths when said motor means is energized to align the second end of said first conveying section and the second end of said second conveying section and for applying the dynamic force of said first conveying section to said shaft means in an opposed direction to the dynamic force applied to said shaft means by said second conveying section.

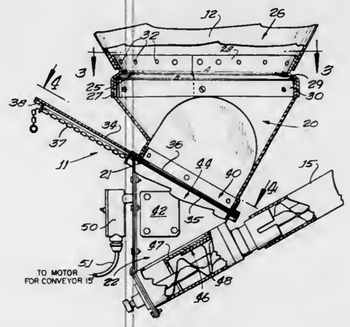
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**4,016,970**

## BULK BIN DISCHARGE CONTROL BOOT

**John M. Wert, South Bend, Ind., assignor to Chore-Time Equipment, Inc., Milford, Ind.**

**Continuation of Ser. No. 361,506, May 18, 1973, abandoned.**
**This application Nov. 26, 1975, Ser. No. 635,433**
**Int. Cl.² B65G** *65/46*
**U.S. Cl. 198—524** **11 Claims**



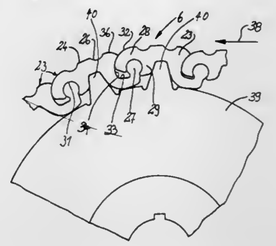

1. A device for receiving and controlling a flow of particulate feed and the like from a bin, comprising bin collar means having a relatively small neck of unbroken circular shape and a relatively large exhaust of unbroken circular shape for receiving the feed flow and reducing the internal pressure of the feed flow, upper boot means for receiving the feed flow from the bin collar means, regulator means inclined upwardly in a given direction and attached to the upper boot means for selectively restricting the cross-sectional area of feed flow through a range of area sizes, lower boot means attached to the regulator means for receiving the feed flow having a lower boot exhaust inclined upwardly at an angle and an orientation opposite to that of the regulator means for introducing the feed flow to a feed conveyor means and switch means having a sensor means extending into the lower boot means between the regulator means and the conveyor means for halting operation of the conveyor means in response to the absence of feed flow, and thereby preventing unnecessary wear of the feed conveyor.

**4,016,971**

## CONVEYOR FOR USE IN TOBACCO SHREDDING APPARATUS

**Werner Komossa, Bornsen; Werner Neustadt, and Gerhard Tolasch, both of Hamburg, all of Germany, assignors to Hauni-Werke Körber & Co., KG, Hamburg, Germany**

**Filed Feb. 27, 1975, Ser. No. 553,901**
**Claims priority, application Germany, Mar. 8, 1974, 2411117**
**Int. Cl.² B65G** *15/30*
**U.S. Cl. 198—850** **8 Claims**



1. (REPLACES THE CLAIMS 10 AND 11) In a conveyor for compacting tobacco and for advancing compacted tobacco into the range of a comminuting device, an endless flexible element arranged to travel in a predetermined direction and comprising a plurality of interengaging neighboring links, each of said links having a leading end and a trailing end, as considered in said direction, a tobacco-contacting outer side, an inner side, a substantially cylindrical male coupling portion provided in said outer side at one of said ends and a complementary socket provided in said inner side at the other of said ends, the socket of each link receiving the coupling portion of the neighboring link and each coupling portion substantially filling and being turnable in the corresponding socket, each link further comprising a first protuberance adjacent to said socket and having a cylindrical first surface and each link also having a complementary second surface adjacent to said coupling portion, said first surface being in permanent sliding engagement with the second surface of the neighboring link to shield the coupling portion in the corresponding socket against entry of foreign matter and said coupling portion and first protuberance of each link extending transversely of said direction, each of said links further comprising a second protuberance and said socket being disposed between said first and second protuberance of the respective link, said first and second protuberance being disposed at said inner side and said inner side further having a tooth space between said second protuberance and said coupling portion of the respective link.

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**4,016,972**

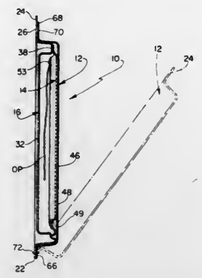
## DISPLAY CONTAINER FOR NECK CHAINS AND THE LIKE

**Edmund Szamborski, Scarsdale, N.Y., assignor to Edmund Szamborski, Scarsdale, N.Y.**

**Filed Oct. 20, 1975, Ser. No. 624,176**
**Int. Cl.² B65D** *75/32, 73/00*
**U.S. Cl. 206—45.34** **15 Claims**

1. A display container for chains such as necklaces comprising, an assembly consisting of separate base, platform and cover portions, said base comprising a bottom wall having a peripheral bottom edge with interconnected side and end walls extending upwardly therefrom and terminating in an upper peripheral edge, the inner surfaces of said side and end walls having an inwardly extending ledge upwardly spaced from said bottom wall and terminating short of said upper peripheral edge, said platform having an interior chain receiving channel disposed therein, an upstanding boss disposed

within said channel and a peripheral edge extending outwardly from said channel, said peripheral edge adapted to contact said base ledge to support said platform above and spaced from said bottom wall, said chain receiving channel having means for receiving a running length of chain, and wherein central cavity positioned beneath said platform and defined by



said bottom wall, said interconnected side and end walls and said platform is formed for receipt of excess chain when a loop thereof is placed in said chain receiving channel about said upstanding boss, said cover having a top and side walls downwardly extending therefrom and terminating in a lower peripheral edge, said cover adapted for receipt of said base when said container is in a closed position.

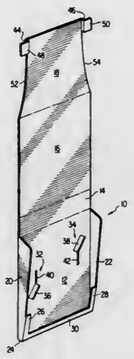
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**4,016,973**

## PLASTIC HOLDER FOR SAFETY MATCHES

**Richard E. Blake, 3110 Frederick Ave., Colonial Heights, Va. 23834**

**Filed Oct. 6, 1975, Ser. No. 619,839**
**Int. Cl.² A24F *27/04***
**U.S. Cl. 206—107** **8 Claims**



1. A plastic holder for receiving safety matches which comprises:
   a. a pouch to receive a pack of bookmatches, one portion of which constitutes a rear panel of said plastic holder,
   b. top, front and overlap panels of said plastic holder being foldable along fold lines between adjacent panels to a closed position in which said panels envelop said pack of bookmatches,
      1. said overlap panel overlapping at least a portion of said rear panel when said plastic holder is folded into its closed position,
      2. said overlap panel being provided with at least two spaced apart foldable locking tab means at one end thereof,
   c. and a spaced pair of locking tab-receiving means provided on said rear panel,
      1. said locking tab-receiving means including angularly positioned cut-out portions so spaced with respect to the spacing of said foldable locking tab means on said overlap panel that in order to insert said foldable locking tab means on said overlap panel into said locking tab-receiving means, said overlap panel must be squeezed and twisted; and in order to remove said locking tab means from said locking tab-receiving means, said overlap panel must be twisted and squeezed,
      2. each of said locking tab-receiving means in said rear panel constitutes first and second cut-out portions with said first cut-out portion thereof being wider than said second cut-out portion so as to readily receive and release a locking tab and with said second cut-out portion being narrower so as to lock said locking tabs in position.

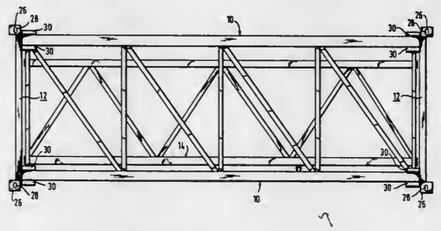
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**4,016,974**

## PACKAGE FOR TRANSPORTING UNITS OF A MODULAR CRANE

**Hans Tax, Potsdamer Str. 3, D-8 Munich 40, Germany**

**Filed Oct. 23, 1975, Ser. No. 625,307**
**Claims priority, application Germany, Nov. 8, 1974, 2453166**
**Int. Cl.² B65D *85/46*, *85/68***
**U.S. Cl. 206—321** **4 Claims**



1. A package comprising:
   a. an elongated unit of a modular crane having two longitudinal end portions;
   b. fastening means on said longitudinal end portions of said unit for fastening the unit to two other substantially identical units in longitudinal alignment;
   c. a rectangular frame releasably attached to each longitudinal end portion of said unit by said fastening means in a plane transverse to the direction of elongation of said unit; and
   d. coupling means on each of the four corners of each frame for coupling said frame to container handling apparatus.

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**4,016,975**

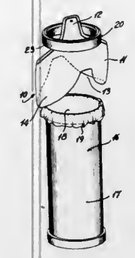
## NIPPLE CLOSURE FOR FLUID CONTAINER

**Ilse M. Hammer, 46 Place Kieffer, Dollard des Ormeaux, Quebec, Canada**

**Filed Jan. 5, 1976, Ser. No. 646,440**
**Int. Cl.² B65D *33/14*, *85/67***
**U.S. Cl. 206—390** **13 Claims**

1. A nipple closure of flexible material for open ended fluid containers, said closure comprising a continuous side wall defining a nipple body having a nipple end and an opposed open end, a peripheral skirt portion defined by said side wall adjacent said open end for engagement about a rigid margin of an open end of said open ended fluid containers, said closure being formed by a tubular body of flexible material collapsed to form opposed walls defining opposed parallel longitudinal





edges, and a nipple shaped seal line extending from between said longitudinal edges and defining said nipple end.

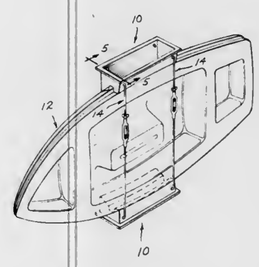
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**4,016,976**

## A SUPPORT FOR STORING AND SHIPPING SMALL BOATS

**Dale L. Cosper, 1603 Hoover Ave., South Bend, Ind. 46615**

**Filed June 10, 1976, Ser. No. 694,561**
**Int. Cl.² B65D *85/68***
**U.S. Cl. 206—335** **4 Claims**



1. A support for a boat comprising first and second cradle means for positioning generally abeam said boat with said first cradle means at the port side and said second cradle means at the starboard side of the boat, ach cradle means including a base means for contact with the floor or ground and trough means for contacting said boat adjacent the gunwales thereof, and connector means extending between said means at the starboard side of the boat, each cradle means towards one another into compressive engagement with said boat.

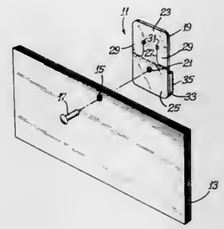
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**4,016,977**

## ASSEMBLAGE WITH DUAL SUPPORT

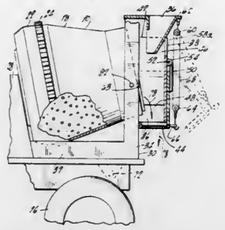
**Richard G. Krautsack, Arlington Heights, Ill., assignor to The Cooperative Marketing Co., Elk Grove Village, Ill.**

**Continuation-in-part of Ser. No. 559,167, March 17, 1975, Pat. No. 3,945,559. This application Dec. 15, 1975, Ser. No. 640,556**
**Int. Cl.² B65D *85/00*; G09F *1/00***
**U.S. Cl. 206—526** **4 Claims**



1. An assemblage of items for presentation for taking on a one-by-one basis, which assemblage comprises
   a plurality of generally sheetlike items,
   means for supporting said items either from a price channel having top and bottom flanges or against the vertical surface of a wall or the like,
   said support means including a flat support plate of flexible plastic material which includes a head section and a base section, said head section of said plate having a pair of ears formed therein, the lower edges of which ears are spaced from the upper edge of said head section a distance greater than the vertical distance between the top and bottom flanges of a price channel,
   said plate having pressure-sensitive adhesive means on the rear surface of said base section and having a release liner covering said adhesive, and
   pivot means linking said plurality of items and said plate, said pivot means being connected to a generally central location on said plate that is vertically aligned with the plate region lying between said ears, so that said plate can be pivoted 180° in the vertical plane of the flat plate from a first orientation, where said head section is uppermost and where after insertion of said upper edge of said head section into the top flange of a price channel said ears can be snapped into the bottom flange of the price channel to cause said ears to first take an outwardly arcuate configuration and after inward application of pressure to snap over-center to lock said ears within the channel and resist dislodgement to securely support said items in depending relation therebelow, to a second upsidedown orientation where said base section is uppermost and said adhesive can attach said plate to a vertical surface and can stably support said items in depending relation generally therebelow.

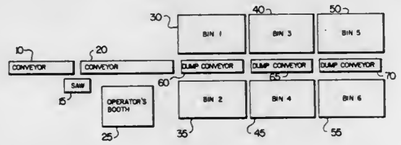
**4,016,978**
**CEMENT MIXER APPARATUS**
**Frank Danna, Jr., 1 Munson St., Croton-on-Hudson, N.Y. 10520**
**Filed Aug. 25, 1975, Ser. No. 601,875**
**Int. Cl.² B07B** *1/00*
**U.S. Cl. 209—2** **6 Claims**



1. A device enabling the separation and reclamation of gravel, stones, pebbles or the like from a concrete mix in combination with a mobile cement mixer having a drum, a delivery outlet, means for mixing and for feeding mix to said delivery outlet for discharging the contents of said drum, and means for introducing water into said drum; said device comprising screen means adapted to be positioned in alignment with said outlet, means mounting said screen means on said cement mixer, means for moving said screen means from a position aligned with said outlet to a position displaced from said outlet, and means for securing said screen in aligned position with said outlet.

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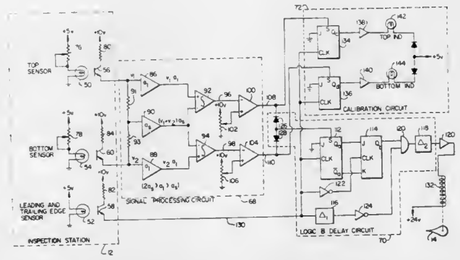
**4,016,979**
**LOG SORTING CONVEYOR**
**David R. Bibler, Russellville, Ark., assignor to Bibler Brother, Inc., Russellville, Ark.**
**Filed Sept. 18, 1975, Ser. No. 614,657**
**Int. Cl.² B65G** *21/00*
**U.S. Cl. 209—74 R** **10 Claims**




1. Apparatus for sorting logs to either side of a central transport path comprising:
- conveyor means for transporting logs along said path, said conveyor means including a conveyor frame, an endless conveyor supported by said conveyor frame, drive means for driving said endless conveyor mounted on and below said conveyor frame and side members extending upward and outward from said endless conveyor to define a through preventing lateral displacement of logs being transported;
- a support structure including means defining at least one central pivot point for connection to said conveyor frame, said pivot point being above the level of said drive means;
- connecting means for connecting said conveyor means to said support structure at said pivot point, said connecting means including first pin means providing a pivot axis for said conveyor means;
- pneumatic cylinder means connected between said conveyor means and said support structure effective when actuated for selectively causing said conveyor means to pivot about said axis; and
- control means operable to cause the elective actuation of said pneumatic cylinder means to cause said conveyor means to be pivoted sufficiently to cause a log carried by said conveyor means to roll out of said trough to a selected side, said drive means acting as a counterweight to then cause said conveyor means to be returned to an initial level orientation.

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**4,016,980**
**DEVICE FOR CHECKING ENVELOPES FOR ENCLOSED DOCUMENTS**
**John R. DeHart, Coral Gables, Fla., and Larry L. Nelson, Redwood City, Calif., assignors to Docutronix, Inc., Homestead, Fla.**
**Filed May 9, 1975, Ser. No. 576,104**
**Int. Cl.² B07C** *5/10*
**U.S. Cl. 209—111.7 T** **14 Claims**




1. A device for checking a plurality of generally rectangular envelopes for enclosed documents, said device comprising means for feeding said envelopes one at a time past an inspection station at a substantially constant velocity with each of said envelopes being oriented so that two of its edges are leading and trailing edges, respectively, both perpendicular to its direction of movement and its remaining two edges are parallel to said direction of movement, and a detection means at said inspection station, said detection means comprising two sensors spaced from one another along a line generally parallel to the plane of said envelopes and perpendicular to said direction of envelope movement, said two sensors being opacity sensors each producing an electrical output signal which varies with the opacity of an associated discrete sensed field, said two opacity sensors being arranged so that as said envelopes are moved past said inspection station the field sensed by one of said sensors is located inboard of one of said two remaining edges of each envelope and said field sensed by the other of said sensors is located inboard of the other of said remaining edges of each envelope, and means responsive to variations of the integral with respect to time of the difference in the values of the output signals of said two opacity sensors for producing a suspect signal indicating the suspected presence of a document in the envelope producing such suspect signal.

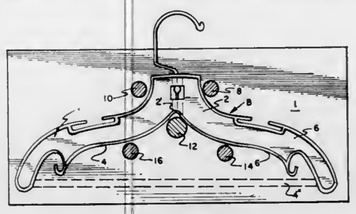
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**4,016,981**
**HANGER STACKER FIXTURE**
**Earl H. Hildt, 2303 Tarleton Lane, Baltimore, Md. 21234**
**Filed Dec. 31, 1975, Ser. No. 645,603**
**Int. Cl.² A47F** *7/00*
**U.S. Cl. 211—49 R** **1 Claim**

1. In combination, a unitary garment hanger of substantially flat form having a single extended neck portion and a pair of oppositely disposed shoulder portions extending outwardly and downwardly from each side of the neck portion forming a junction with the neck portion and with one another in substantially the same plane, the upper edges of the extended neck portion having a concave surface along each of the two side edges to receive the neck portion of the garment, a base of such dimension as to receive the hanger in a horizontal



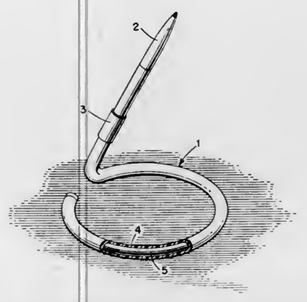
position, a pair of laterally spaced posts extending upwardly from the upper surface of the base and perpendicular thereto, said posts positioned one on each side of the neck portion of the hanger, a third post extending upwardly from the base parallel with the first two posts and off-set from the plane connecting the two posts in a horizontal central line perpendicular to the center of the plane connecting the first two posts and so positioned on the base as to slideably engage the under edge of the junction of the two shoulder portions, a second



pair of laterally spaced posts fixed to the base parallel with the said third post and spaced outwardly therefrom and on the opposite side of the third post from the first two posts, the second pair of posts located in a plane parallel with the plane of the first two posts, each of the second pair of posts being spaced laterally from the center line at a greater distance than the corresponding first post and positioned on the base to slideably engage the bottom edges of the two shoulder portions of the hanger.

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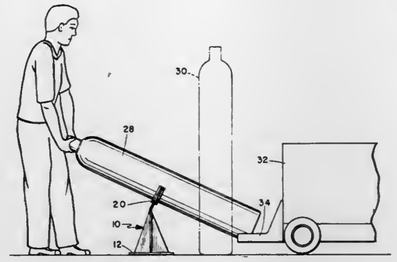
**4,016,982**
**HOLDER FOR A WRITING IMPLEMENT**
**Klaus-Günther Schreiber, Hamburg, Germany, assignor to Messrs. Berendsohn AG, Hamburg, Germany**
**Filed June 3, 1975, Ser. No. 583,243**
**Claims priority, application Germany, June 20, 1974, 7420963[U]**
**Int. Cl.² B43K** *23/04*
**U.S. Cl. 211—69.1** **3 Claims**



1. A holder in connection with a writing implement, the holder comprising an elongated part being non-detachably connected to the writing implement and being bendable into any shape and to remain in that shape when being bent, said elongated bendable part consisting of a core of material easily bendable by hand and a covering for said core of a material easily bendable by hand.

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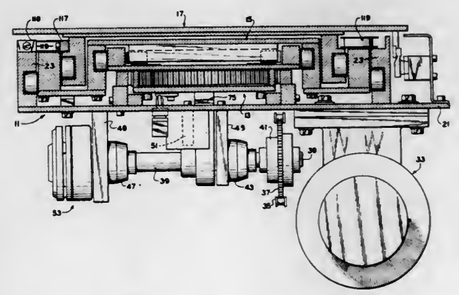
**4,016,983**
**COMPRESSED GAS BOTTLE HANDLER**
**Andrew J. Dadisman, 4191 Caledonia Drive, San Diego, Calif. 92111**
**Filed Oct. 16, 1975, Ser. No. 622,946**
**Int. Cl.² B25J** *3/00*
**U.S. Cl. 214—1 R** **5 Claims**



1. A compressed gas bottle handling device for supporting bottles for movement thereof comprising,
- an enlarged flat horizontally extending base plate for supporting said handling device for vertical and horizontal loads,
- a vertical plate secured normal to said base plate and extending upward therefrom,
- triangular shaped side plate brace means secured to said base plate and said vertical plate along lengths thereof extending from the intersection of said plates,
- an upper plate secured to the upper end of the vertical plate and at fixed acute angle therewith,
- the upper edge of the upper plate having a semicircular recess formed therein,
- a half ring bearing plate secured in said semicircular recess for receiving the cylindrical side surface of a tilted gas bottle for supporting same,
- the axial surface of said bearing plate being fixed at an acute angle to the ground surface,
- said vertical plate and upper plate having combined lengths that position the half ring bearing plate at a height less than one-half of a gas bottle to be received therein and
- a resilient cushion member positioned on the surface of the bearing plate.

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**4,016,984**
**SHUTTLE ASSEMBLY FOR A LOAD HANDLING APPARATUS**
**George R. Pipes, Salt Lake City, Utah, assignor to Eaton Corporation, Cleveland, Ohio**
**Filed Aug. 28, 1975, Ser. No. 608,412**
**Int. Cl.² B65G** *65/02*
**U.S. Cl. 214—1 BB** **10 Claims**



1. A shuttle assembly for use on a load handling apparatus,

and being operable to move longitudinally between a retracted position and an extended position in response to an input drive, said shuttle assembly comprising:

a. a base assembly including a drive means operable to be actuated by said input drive,

b. a drive assembly operatively associated with said drive means to move longitudinally in at least one direction relative to said base assembly in response to actuation of said drive means;

c. said drive assembly including second drive means operable in response to longitudinal movement of said drive assembly;

d. an intermediate assembly longitudinally movable relative to said drive assembly;

e. means interconnecting said second drive means and said intermediate assembly operable to impart harmonic motion to said intermediate assembly to cause said intermediate assembly to move relative to said drive assembly at a variable velocity in response to movement of said second drive means;

f. a load supporting assembly longitudinally movable in said one direction relative to said intermediate assembly; and

g. means connecting said intermediate assembly and said load supporting assembly and operable to transmit motion of said intermediate assembly, at a first average velocity, into motion of said load supporting assembly at a second average velocity, said second average velocity being at least equal to said first average velocity.

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**4,016,985**

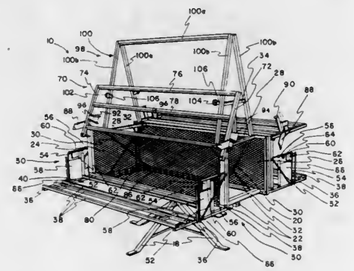
## COMBINATION BULK TOBACCO RACK LOADER AND UNLOADER AND METHOD OF UNLOADING A BULK TOBACCO RACK

**John Charles Green, Rte. 1, Box 114, Lillington, N.C. 27546, and Ronald Edward Wheeler, Rte. 2, Angier, N.C. 27501**

**Filed Feb. 14, 1975, Ser. No. 550,122**

**Int. Cl.² A24B *1/06***

**U.S. Cl. 214—5.5** **22 Claims**



**1.** A bulk tobacco rack unloader for receiving a filled tobacco rack and assisting in the removal of tobacco therefrom, wherein the bulk tobacco rack is of the type having first and second sections latched together by a latching mechanism and with tines extending from at least one section and penetrating through the bulk volume of tobacco peripherally contained by the bulk tobacco rack, said bulk tobacco rack unloader comprising:

a. frame structure means for receiving and supporting said bulk tobacco rack;

b. rack unlatching means disposed about said frame structure for engaging the latching mechanism of said bulk tobacco rack and unlatching said latching mechanism;

c. actuating means operatively connected to said unlatching means for selectively actuating said unlatching mechanism and causing said unlatching means to operatively engage said latching mechanism of said bulk tobacco rack and to unlatch the same whereby one section of said rack may be removed from the other section thereof; and

d. said actuating means having retaining means operatively associated therewith and operatively responsive to the operation of said actuating means, said retaining means moveably mounted on said frame structure for movement between an inoperative position and an operative retaining position where said retaining means engages and lies across the entire bulk volume of tobacco within said rack for effectively stripping the bulk volume of tobacco from said tines of said one rack section as said one rack section is removed from said rack unloader.

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**4,016,986**

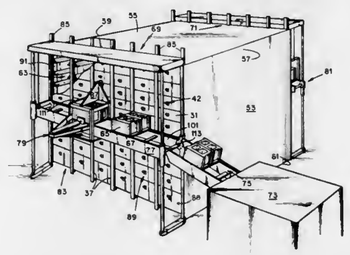
## CLOSURE SYSTEM

**Paul M. Thomas, Paradise Valley, Ariz., assignor to Builders Equipment Co., Phoenix, Ariz.**

**Filed Apr. 14, 1975, Ser. No. 567,531**

**Int. Cl.² F26B *3/18*; B65G *1/06***

**U.S. Cl. 214—16.4 A** **3 Claims**



**1.** In an apparatus for storing pallets of uncured concrete blocks during the curing thereof comprising a kiln having a front infeed and a rear discharge end, a plurality of guideways in said kiln each of which extends from the front end to the rear end of said kiln, each of said guideways being proportioned to receive a series of the pallets being stored, said guideways being arranged in a pattern wherein guideways are disposed in horizontally aligned layers and vertically aligned tiers whereby the ends of said guideways adjacent said infeed and discharge ends are arranged in a grid pattern, infeed means including means to feed pallets of blocks into any selected one of said guideways, discharge means adjacent the discharge end of said kiln, and said discharge means including means for receiving pallets of blocks from any selected one of said guideways, the improvement which comprises:

an end closure for each of the infeed and discharge ends of said kiln, each of said end closures comprising a plurality of vertically aligned panels, vertically disposed guide means for said panels, said guide means being supported adjacent the end of said kiln, said guide means slidably engaging the ends of said panels and supporting said panels in vertical alignment with the end of said kiln, a lifting means, connecting means on each of said panels adapted to provide a connection for said lifting means, means for positioning said lifting device adjacent a preselected panel, and means for actuating said lifting means to engage it with said connecting means on said panel and to raise said preselected panel and panels above said preselected panel whereby said blocks may be inserted into the infeed end of said guideways and said blocks may be withdrawn from the discharge end of said guideways.



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**4,016,987**

## STORAGE SYSTEM

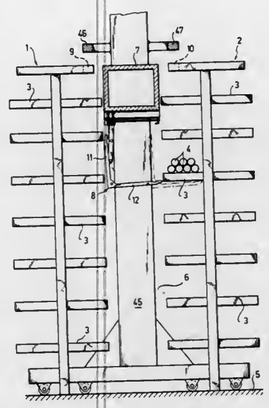
**Paul Stolzer, Achern, Germany, assignor to Stopa Stahlbau GmbH & Co., Achern (Gamshurst), Germany**

**Continuation-in-part of Ser. No. 475,242, May 31, 1974, Pat. No. 3,977,542. This application Apr. 14, 1976, Ser. No. 676,885**

**Claims priority, application Germany, Apr. 23, 1975, 2517900**

**Int. Cl.² B65G *1/06***

**U.S. Cl. 214—16.4 A** **18 Claims**



**1.** In a storage system including a plurality of storage frames positioned in a storage area; each frame having a length dimension extending parallel to the width of the storage area; the storage frames being aligned in the direction of depth of the storage area; a gantry movable parallel to the depth of the storage area; a horizontal cross beam vertically movably mounted on the gantry and having a length dimension oriented parallel to the width of the storage area for lowering the cross beam into the service area defined between two selected adjoining storage frames; the cross beam having a cross-sectional outline; a plurality of tines secured to the cross beam along the length thereof for depositing articles into and removing articles from selected storage frames; each tine being formed of a first and a second tine arm rigidly attached to one another at an approximately right angle; each tine being swingable in a vertical plane about a pivotal support situated in the zone of connection of the tine arms, into first and second operative positions offset about 90° with respect to one another; in the first operative position the first tine arm extending horizontally in one direction perpendicularly to the cross beam and the second tine arm extending vertically from the pivotal support; in the second operative position the second tine arm extending horizontally in the other, opposite direction perpendicularly to the cross beam and the first tine arm extending vertically from the pivotal support; the improvement comprising suspension means for securing each tine to said cross beam, said suspension means including

a. a carrier arm extending generally vertically downwardly from an underside of said cross beam; said carrier arm having upper and lower portions; said tine being secured, at least indirectly, to the lower portion of said carrier arm;

b. mounting means for displaceably securing said carrier arm at its said upper end beneath said cross beam adjacent said underside thereof, said mounting means defining, for said carrier arm, a horizontal path of travel extending transversely to the length dimension of said cross beam and having a length approximately corresponding to the width of said cross beam measured parallel to the depth of said storage area; said carrier arm having first and second opposite end positions at respective opposite ends of said path of travel; when said tine is in said first operative position and simultaneously, said carrier arm is in said first end position, said tine being in an advanced condition in which said first tine arm projects substantially beyond said cross-sectional outline of said cross beam; when said tine is in said first operative position and simultaneously, said carrier arm is in said second end position, said tine being in a withdrawn condition in which substantially the entire tine is disposed within said cross-sectional outline of said cross beam; when said tine is in said second operative position and simultaneously, said carrier arm is in said second end position, said tine being in an advanced condition in which said second tine arm projects substantially beyond said cross-sectional outline of said cross beam; when said tine is in said second operative position and simultaneously, said carrier arm is in said first end position, said tine being in a withdrawn condition in which substantially the entire tine is disposed within said cross-sectional outline of said cross beam; and

c. means for tilting said tine about its said pivotal support in the course of the displacement of said carrier arm and said tine from said advanced condition into said withdrawn condition for effecting a more inclined orientation of the horizontal tine arm downwards towards its said pivotal support in the withdrawn condition than in the advanced condition in the same operative position of the tine.

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**4,016,988**

## APPARATUS FOR INTRODUCING WASTE OR THE LIKE INTO A COLLECTING CONTAINER

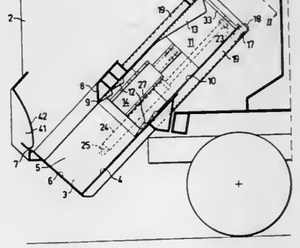
**Åke Bertil Ingemar Dahlin, Blomstermala, Sweden, assignor to Norba Aktiebolag, Blomstermala, Sweden**

**Filed Dec. 1, 1975, Ser. No. 636,378**

**Claims priority, application Sweden, Dec. 9, 1974, 7415348**

**Int. Cl.² B65G *65/30***

**U.S. Cl. 214—17 C** **9 Claims**



**1.** Apparatus for introducing refuse into a collecting container, comprising

a load hopper forming a shaft leading to said collecting container and having an inlet opening for receiving refuse;

a pair of gripping members, which are movable in said shaft;

means for moving said gripping members towards each other, when they are positioned in the inlet opening end of said shaft to hereby grip and compress a portion of refuse between themselves;

means for advancing said gripping members and said refuse portion held by them towards said collecting container;

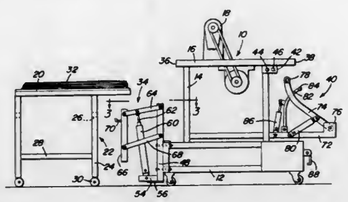
means for releasing the hold of said gripping members on said refuse portion and for separating said gripping members from each other, when they have reached the collecting container end of said shaft to hereby introduce said refuse portion into said collecting container; and

means for returning said gripping members to the inlet opening end of said shaft.

## 4,016,989
## WORK HANDLING APPARATUS

**Anthony Furnari, 107 Greenview Drive, Indiana, Pa. 15701**

**Filed May 20, 1975, Ser. No. 579,256**
**Int. Cl.² B65G** *67/02*
**U.S. Cl. 214 –38 R** **8 Claims**

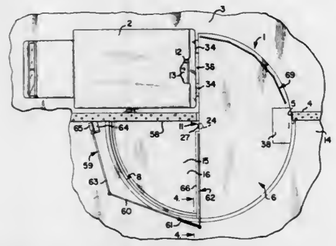


1. In combination with a machine having a base and a horizontal work surface adapted to support a workpiece thereon, apparatus for transferring the workpiece between said work surface and a first transport device, including a frame attached to said base, vertically movable lift means engageable with said first transport device for elevation thereof from a lower horizontal position spaced below the work surface, link means interconnecting the frame and the lift means for constraining movement of said first transport device between said lower position and an upper tilted position downwardly inclined relative to said work surface, and power operated means connected to the link means for displacement of said first transport device to said upper position to enhance transfer of the workpiece to the work surface, said link means comprising a pair of link elements pivotally interconnected between the frame and the lift means in non-parallel relation to each other.

## 4,016,990
## ROTATABLE DOCK

**Lester H. Hodkin, and James L. Hinson, both of c/o Mid-West Supply, 214 N. Summit, Arkansas City, Kans. 67005**

**Filed Nov. 17, 1975, Ser. No. 632,564**
**Int. Cl.² B61B** *1/00*
**U.S. Cl. 214—38 BB** **8 Claims**

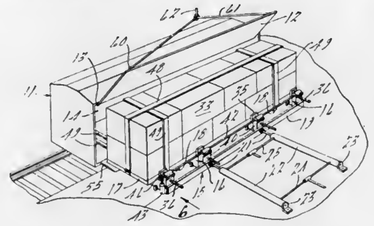


7. A loading structure comprising:
a. a building having a wall alongside of a drive for cargo carrying vehicles, said building having a floor approximately at normal dock heighth and a door opening in said wall;
b. a dock platform generally semicircular in shape and having a straight edge adjacent to and substantially parallel to said building wall and a periphery inside and adjacent one side of said door opening, said dock platform having a radial dimension less than the width of the door opening;
c. means mounting said dock platform in the building for rotation about an axis adjacent to the other side of said door opening with rotation of the dock platform moving a portion thereof outwardly through said door opening to a cantilevered position with a straight edge of the dock platform at an angle of as great as 90° to the building wall and for substantially engaging a rear portion of a cargo vehicle positioned in the drive for loading and unloading; and
d. power means operatively connected to said dock platform for selectively rotating same.

## 4,016,991
## RAILWAY LOADING AND UNLOADING SYSTEM

**William G. Oldford, 4944 Lakeshore, Lexington, Mich. 48450**

**Continuation of Ser. No. 459,478, April 10, 1974, abandoned. This application Nov. 18, 1975, Ser. No. 633,109**
**Int. Cl.² B65G** *67/02*
**U.S. Cl. 214—38 C** **5 Claims**

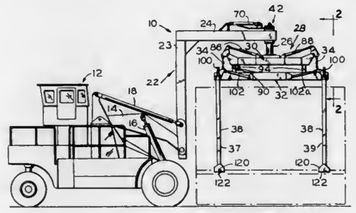


1. In a loading and unloading mechanism for a transporting unit, a platform on which a load is assembled, carriers for supporting said platform, said carriers having upper and lower portions, wheels on said carriers by which they are advanced and retracted, means for connecting said carriers so as to have them operate as a unit, spaced runners on the bottom of the platform on which the platform rests when the carriers therebetween are removed, ramp means between said portions for raising and lowering the height of the carriers upper portions for moving the platform from and onto the runners, means for advancing and retracting said carriers to and from the railway car; U-shaped securing means for latching fingers are provided at the bottom of the side opening of the transporting unit adjacent to the floor, and a bridging member having spaced projecting fingers on one edge for engaging said securing means with the other edge resting on the dock for bridging the space therebetween.

## 4,016,992
## LIFT TRUCK WITH ROTATABLE LOAD-HANDLING APPARATUS

**Richard L. Larsen, and James J. Robnett, both of Portland, Oreg., assignors to Raygo Wagner, Inc., Portland, Oreg.**

**Continuation of Ser. No. 474,618, May 30, 1974, abandoned. This application Jan. 26, 1976, Ser. No. 652,556**
**Int. Cl.² B66C** *23/00*
**U.S. Cl. 214—147 G** **4 Claims**



1. In a lift truck having a load-lifting mechanism at its forward end for handling heavy loads,
a boom means for attachment to said load-lifting mechanism including a generally horizontally disposed boom portion forwardly of said truck,
a load carriage means spaced vertically below said boom portion,



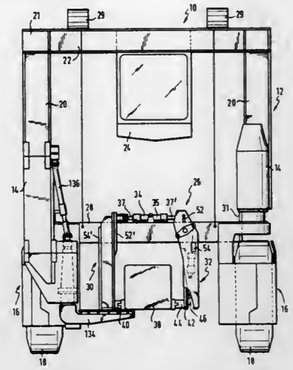
a vertical pivot shaft means rotatably supported by said boom portion and extending downwardly therefrom, a lower portion of said pivot shaft means being affixed to said carriage means to suspend and rotatably support said load carriage means below said boom portion,
and fluid cylinder operated rotation means carried by said boom portion and connected to said pivot shaft means for pivoting said shaft means in opposite directions about the vertical axis thereof through an arc of at least 180° and thereby pivoting said load carriage means and any load carried thereby to the same extent,
said fluid cylinder operated rotation means includes a first floating lever rotatably connected to said pivot shaft means, a first fluid cylinder connected at one end to said boom means, a first fluid cylinder connected at one end to said boom portion and at its other end to said floating lever for rotating said floating lever about said pivot shaft means through at least about 90° in opposite directions, a second fixed lever affixed to said pivot shaft means for rotation therewith, and a second fluid cylinder connected at one end to said floating lever and at its other end to said fixed lever for pivoting said fixed lever through at least about 90° in opposite directions, whereby extension of said first cylinder causes rotation of said floating and fixed levers and thus said pivot shaft means through at least about 90° in one direction about the vertical axis of said shaft means and extension of said second cylinder causes rotation of said fixed lever relative to said floating lever and thus said shaft means at least about an additional 90° in the same said one direction, wherein said load carriage means includes a first horizontally disposed rotatable carriage frame suspended directly from said pivot shaft means to rotate therewith and a second horizontally disposed load pickup carriage frame spaced below said rotatable carriage frame, flexible suspension means suspending said pickup carriage frame from said rotatable carriage frame, and load pickup means carried by said pickup carriage frame, whereby operation of said rotation means to rotate said pivot shaft means causes rotation of said pickup carriage frame and any load supported thereby; said flexible suspension means includes a plurality of flexible members each are connected to a corresponding fluid cylinder operated slope adjustment means on said rotatable carriage frame for adjusting the slope of said pickup carriage frame at least laterally and longitudinally relative to said rotatable carriage frame.

## 4,016,993
## LOAD CLAMPING APPARATUS

**Hans Tax, and Dieter Bauer, both of Munich, Germany, assignors to Hans Tax, Munich, Germany**

**Filed Mar. 18, 1976, Ser. No. 668,290**
**Claims priority, application Germany, Mar. 24, 1975, 2512927**
**Int. Cl.² B60P** *3/00;* **B66C** *3/16*
**U.S. Cl. 214—394** **6 Claims**

1. Clamping apparatus comprising:
a. an elongated carrier;
b. two clamping jaws spaced longitudinally of said carrier;
c. guide means on one of said jaws engaging said carrier for guiding longitudinal movement of said one jaw relative to said carrier and angular movement of said one jaw about an axis transverse to the direction of elongation of said carrier;
d. cooperating blocking means on said carrier and on said one jaw for blocking said longitudinal movement of said one jaw in response to said angular movement of said one jaw;
e. first load gripping means mounted on a portion of said one jaw spaced from said axis;
f. second load gripping means on the other jaw, said first and second load gripping means facing each other for gripping a load therebetween;
g. first drive means for actuating said longitudinal movement of said one jaw; and
h. second drive means for moving said first load gripping

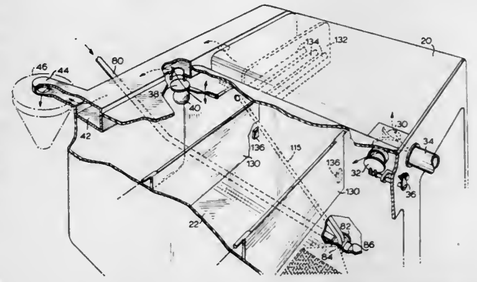


means on said one jaw toward said second load gripping means and for thereby angularly moving said one jaw about said axis in response to engagement of said first load gripping means with said load.

## 4,016,994
## MOBILE VACUUM AND PNEUMATIC UNIT

**Wilfred A. Wurster, 7085 Gainer Road, Niagara Falls, Ontario, Canada (L2E 6S5)**

**Filed Sept. 16, 1975, Ser. No. 613,818**
**Int. Cl.² B60P** *1/04, 1/60;* **B65G** *53/28*
**U.S. Cl. 214—508** **10 Claims**

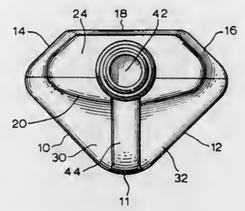


1. A mobile vacuum and pneumatic unit for collecting, storing and discharging air conveyable materials, comprising:
a mobile frame, having a power source;
at least one tank for collecting and storing said materials;
an inlet valve for said materials in each said tank, an inlet port, and means for communicating said inlet port to said at least one tank through the inlet valve for such tank;
a float operated outlet valve in each said tank, communicating to an exhaust header duct; said exhaust header duct communicating to air filtering and cleaning means and to a three-way valve having an inlet and direct and second outlets and means for communicating said inlet to either or both of said first and second outlets;
said first outlet of said three-way valve being connected to a first means for creating a vacuum;
said second outlet of said three-way valve being connected to a second means for creating a vacuum;
each of said first and second means for creating a vacuum being connected to said power source;
pressure valve means for communicating the outlet of said second means for creating a vacuum to means for connecting said pressure valve means to a pressure inlet valve of said at least one tank;
said three-way valve being operable to have one or the other

or both of said first and second means for creating a vacuum communicating to said at least one tank, whereby material may be drawn into or expelled from said at least one tank at will;
said first means for creating a vacuum being a vacuum pump, and second means for creating a vacuum being a blower;
said air filtering and cleaning means comprising a venturi scrubber and a demister, in series with and interposed between said exhaust header duct and said three-way valve.

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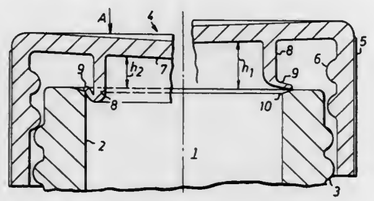
**4,016,995**
**LIQUID CONTAINER**
**John S. Frazer, Pequannock, N.J., assignor to Plastipak Packaging, Detroit, Mich.**
**Filed Dec. 8, 1975, Ser. No. 638,622**
**Int. Cl.² B69D** *21/00*
**U.S. Cl. 215—10** **27 Claims**




1. A liquid container, comprising:
a series of side panels with at least the lower portion of the container having five principal panels, two wide front panels which intersect and are generally perpendicular to each other, two relatively narrow intermediate panels each of which is connected and generally perpendicular to one of the front panels, and a wide rear panel connected to each of the intermediate panels at an angle of approximately 135°;
a top having a neck extending therefrom, the neck having an opening for the passage of the liquid; and
a bottom.

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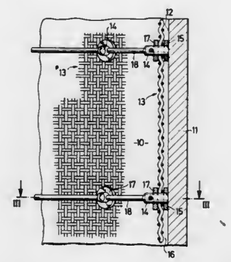
**4,016,996**
**CONTAINER WITH SCREW CAP AND SEAL**
**Dietmar Aichinger, Arlesheim, and Albert Obrist, Reinach, both of Switzerland, assignors to Albert Obrist AG, Reinach, Switzerland**
**Filed June 22, 1976, Ser. No. 698,597**
**Claims priority, application Germany, July 1, 1975, 2529340**
**Int. Cl.² B65D** *53/00*
**U.S. Cl. 215—344** **4 Claims**




1. In the combination of a pressurized container having an externally screw threaded neck and a synthetic plastics screw stopper comprising an internally threaded screw cap and a seal part protruding centrally from the cap top and having an outwardly protruding seal section which on introduction into the container neck is bent back outwards and abuts in sealing manner with its outer portion on the cylindrical inner wall of the container neck, the improvement that the external screw threading of the container neck, the internal threading of the screw cap, the seal part, and the seal section are so formed in relation to one another that at least in the first application of the screw stopper to the container the seal section engages with the container neck and is bent back at least partially by the latter before the external screw threading and the internal threading engage with one another.

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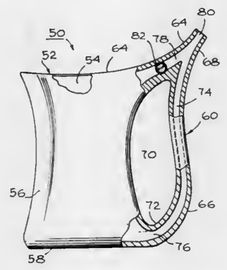
**4,016,997**
**VESSEL FOR CONVEYING A LIQUID/GAS MIXTURE**
**Josua Roffler, Winterthur, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland**
**Filed Mar. 7, 1975, Ser. No. 556,461**
**Claims priority, application Switzerland, Mar. 8, 1974, 3267/74**
**Int. Cl.² B65D** *7/22, 7/49*
**U.S. Cl. 220—10** **10 Claims**




1. In combination with a metallic vessel having an interior wall defining at least a portion of a flow path for conveying wet steam from an inlet toward an outlet of said vessel, at least one metallic wire mesh having disposed adjacent said wall to protect said wall from wet steam in said path, said lining being disposed at least in a region where said wall would be subject to cavitation-erosion by the wet steam flowing along the side of said lining opposite to that side of said lining facing said wall, said lining having apertures therein with the mean diameter of said apertures being smaller than the mean diameter of drops in the conveyed wet steam, said apertures being such as to permit formation of a layer of water on said lining during conveyance of the wet steam.

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**4,016,998**
**DRINKING VESSEL**
**Leonard Finch, 8765 Tyrone Ave., Van Nuys, Calif. 91402**
**Filed Apr. 1, 1976, Ser. No. 672,674**
**Int. Cl.² A47G** *19/22*
**U.S. Cl. 220—90.2** **3 Claims**

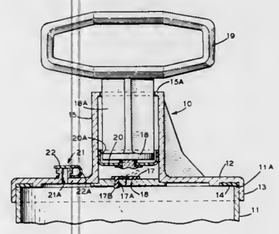



1. An improved drinking vessel comprising a container and an integrally associated drinking straw combination; said container having a flat bottom lying in a horizontal plane, a top extending on an arcuate plane, and a generally cylindrical mid-section having a reduced portion intermediate said top and bottom, a lip portion extending inwardly from and entirely around the top of said container and lying in the same plane as said top, a handle located at one side of said container and formed integrally therewith, said handle having an upper portion projecting upwardly and outwardly from the upper end of said side of the container, and a generally vertically extending portion integral at its upper end with said upper portion, said extending portion of said handle being laterally displaced from said side of the container during most of its length to form a finger receiving cavity, said extending portion of said handle having its lower end terminating at and integral with said bottom of the container, a straw comprising a first and second channel terminating into a common channel, said first channel being formed within the lower portion of the extending portion of the handle and serves to connect the bottom of the container's interior with said common channel, said second channel being formed within said upper portion of said handle and serves to connect the top of the container's interior with said common channel, said common channel being formed in the upper portion of the extending portion of said handle and terminating at the upper lateral tip thereof, whereby the contents of the container can be simultaneously drawn through both channels into said common channel.



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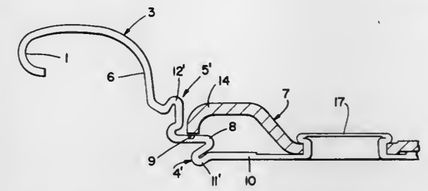
**4,016,999**
**AIR EVACUATING CLOSURE**
**Alan R. Denzer, Greenwich, Conn., assignor to Zamax Manufacturing Co., Inc., Belleville, N.J.**
**Filed June 15, 1976, Ser. No. 696,202**
**Int. Cl.² B65D** *51/16*
**U.S. Cl. 220—231** **1 Claim**




1. A device for evacuating a container comprising:
a closure adapted to seal the open end of a container,
said closure having a circumscribing sealing edge adapted to rest on the edge of a container,
a tubular extension projecting above said closure, said closure having an opening located within the area defined by said tubular extension, said opening being in direct communication with the interior of the container,
a flapper valve for normally sealing said opening closed
a piston slideably disposed within said tubular extension,
a piston rod connected to said piston,
said piston comprising a sealing cup having a connected circumscribing flexible sealing flange,
said sealing flange defining with the walls of said tubular extension a unidirectional exhaust valve,
a handle connected to said piston rod for actuating said piston,
and a vent means in said closure for venting the interior of the container to facilitate the removal of said closure when the interior of the container is under a negative pressure,
said vent means including a vent opening defined by a projecting boss formed on said closure,
said vent opening communicating directly with the interior of said container, and
a vent closure for sealing said vent opening,
said vent closure being frictionally secured to said boss for sealing said vent opening,
and a flexible hinge connecting said vent closure to said boss.

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**4,017,000**
**EASY OPEN CONTAINER END WITH PROTECTIVE EDGES FOR ITS SEVERED SCORE**
**Keith R. Woodley, San Francisco, Calif., assignor to Wescan, Inc., San Francisco, Calif.**
**Filed June 21, 1976, Ser. No. 698,093**
**Int. Cl.² B65D** *41/32*
**U.S. Cl. 220—270** **4 Claims**



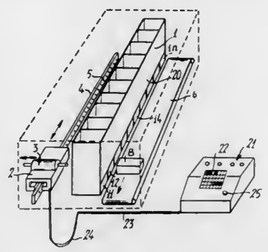

1. In an easy opening container end including
a generally annular curled edge for seaming upon a open end of a container side wall;
an end wall closing the open end of the container and having
a pair of generally annular double-reverse folds with a common band between them, and
a score line in said band defining a removable panel that carries the inner one of said double-reverse folds;
a chuck wall connecting the curled edge to the outer one of said double-reverse folds of said end wall; and
a pull tab secured to said removable panel adjacent to said score line and carrying at one end a fracturing nose for rupturing the end wall at said score line and having a lifting end for tearing the removable panel from the end wall, the improvement comprising
the smooth edge of an inwardly opening reverse fold of the inner one of said double-reverse folds placed underneath the score line to protect its severed edge on the removable panel;
the smooth edge of an outwardly opening reverse fold of the outer one of said double-reverse folds placed over the score line to protect its severed edge that remains integral with the chuck wall;
the pull tab placed with its fracturing nose spanning the score line to prevent its accidental rupture; and
the smooth edge of the outwardly opening reverse fold of the outer one of said double-reverse folds flattened outwardly and upwardly in the region of the pull tab fracturing nose to provide clearance and rupture protection for said nose.

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**4,017,001**
**ELECTROMAGNETIC SYSTEM FOR PROPULSION AND PROGRAMMED POSITIONING**
**Maurice Barthalon, Verrieres, and Andre Subtil, Venissieux, both of France, assignors to Maurice Barthalon, Verrieres, France**
**Filed Sept. 29, 1975, Ser. No. 617,728**
**Claims priority, application Luxembourg, Jan. 10, 1975, 71614**
**Int. Cl.² B65G** *1/10*
**U.S. Cl. 221—5** **54 Claims**

1. An electromagnetic system for propulsion and programmed positioning for carrying out the displacement of objects in accordance with requirements and the control of

said displacements, comprising a propulsion device formed by a magnetizing assembly and a magnetized assembly which are capable of moving with respect to each other, the magnetizing assembly being provided with at least one uniform row of N magnetic circuits fitted with inductance windings and having N poles or pairs of poles, a magnetized assembly provided with at least one uniform row of N′ magnetic cores separated by non-magnetic sections and having a pitch which is different from that of the magnetic circuits, said system being further provided with a device for supplying electric power to the windings in the form of a sequence of unidirectional electrical pulses fed successively to said windings, wherein the ratio of



pitch of circuits to pitch of cores is equal to $(Kn \pm 1)/(n)$, where $K$ and $n$ are whole numbers, wherein one of the two assemblies of the propulsion system is connected to a container which contains at least one object and the other assembly is connected to a device for withdrawing the object from the container, and wherein the system comprises an electronic device for the programmable control of said sequence, the program being such as to comprise a series of whole numbers of pulses such that each whole number corresponds to one stationary position of the propulsion and programmed-positioning device for placing the object-withdrawal device in oppositely-facing relation to the stored object to be withdrawn.

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**4,017,002**

## DISPENSING MOIST TREATED TOWELS OR TISSUES

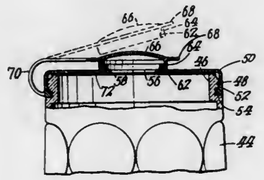
**Ross L. Doyle, Ramsey, N.J., and Thomas S. Harrison, New Canaan, Conn., assignors to Sterling Drug Inc., New York, N.Y.**

**Continuation-in-part of Ser. No. 856,096, Sept. 8, 1969, abandoned, and a continuation-in-part of Ser. No. 128,800, March 29, 1971, abandoned, and a continuation-in-part of Ser. No. 222,882, Feb. 2, 1972, abandoned. This application Jan. 11, 1974, Ser. No. 432,620**

**Claims priority, application United Kingdom, Apr. 1, 1970, 15535/70; Canada, Aug. 10, 1970, 92035**

**Int. Cl.² B65H** *1/00*

**U.S. Cl. 221—63** **6 Claims**



1. A dispenser containing a continuous web of wet absorbent material in compacted form having sheets connected in end-to-end relationship separated by a scored line, and from which the respective sheets can be readily dispensed, one at a time, comprising:

a self-sustaining container of impervious material, including a body containing a supply of said wet continuous web in a compacted form such as to create a minimum of friction within the body of the container as the web is withdrawn through a dispensing opening in the container,

a closure for said container,

means defining a dispensing opening for said container through which the web is withdrawn and sheets of said web can be automatically separated as each sheet is pulled through said opening, leaving a tip of the next sheet exposed above the dispensing opening,

said means including a slit opening and associated resilient flap edges normally sealing said slit in the absence of the web therebetween wherein said flap edges exert a frictional force on the web as it is pulled therethrough, which force is greater than that necessary to separate adjacent sheets of said web, but which force is insufficient to sever the web in the absence of the scored line,

said frictional force exerted by the flap edges on the web being the sole means for causing the web to sever at the scored line above the dispensing opening, thereby exposing the next leading end of the web which may be readily grasped for subsequent extraction of additional sheets,

said minium friction within the body of the container as the web is withdrawn through the dispensing opening in the container, being sufficiently low so as to permit the perforated scored line of said web to at least partially go through the dispensing opening and cause severance of the web above the dispensing opening to ensure that a sufficient amount of the next sheet of said web extends above the opening so that it can be grasped to dispense the next sheet.

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**4,017,003**

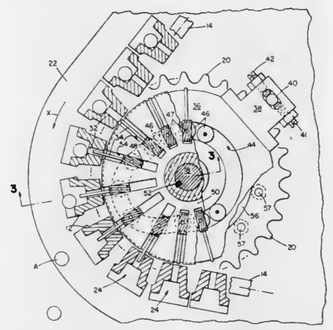
## ARTICLE DISPENSING MACHINE

**Richard N. Heino, Ashby, Mass., assignor to The Lakso Company, Incorporated, Fitchburg, Mass.**

**Filed Dec. 18, 1975, Ser. No. 642,158**

**Int. Cl.² B65G** *47/34*

**U.S. Cl. 221—81** **3 Claims**



1. In an article dispensing machine which has conveyor means including holder means providing a multiplicity of cavities having an open end for receiving therein the articles to be dispensed, feed means for feeding articles to be dispensed into said cavities, tilt means for tilting said holder means to a position in which articles in the cavities thereof may discharge by gravity, and means for moving said conveyor in an endless path between said feed means and said tilt means,

the improvement comprising the combination of,

cavity defining wall means in said holder means having an apertured portion providing access therethrough to the interior of each cavity at each article holding location therein, and



ejector means operative on said holder means while tilted, and having ejectors inserted through said apertured portion of said wall means at each said location in each said cavity into the positions occupied by the articles before discharge to engage and dislodge articles retained therein,

said holder means comprising a plurality of elongated slats connected for movement by said conveyor means in a direction transverse to their length and having said cavities formed therein, said tilt means including means for causing said slats to move partially about an axis, and said ejectors being arranged for eccentric travel about said axis.

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**4,017,004**

## PAPER MONEY DISPENSING APPARATUS

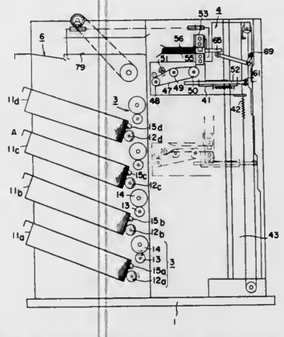
**Katsuhiko Onoe; Masahiro Abe, and Masashi Tamura, all of Himeji, Japan, assignors to Glory Kogyo Kabushiki Kaisha, Hyogo, Japan**

**Filed Feb. 19, 1975, Ser. No. 550,910**

**Claims priority, application Japan, Feb. 22, 1974, 49-20417; July 3, 1974, 49-76002**

**Int. Cl.² B65H** *3/44*

**U.S. Cl. 221—94** **2 Claims**



1. A sheet dispensing apparatus comprising a plurality of sheet storing spaced for containing respectively therein stacked sheets of different denominations, a sheet dispensing section having sheet dispensing means for dispensing sheets of a predetermined and designated denomination taken out of said sheet storing space, inlet means in each of said sheet storing spaces for charging sheets of the respective denominations thereinto and means for urging the sheets charged into said space further into said sheet storing space thereby to position the foremost sheet at a position for being easily removed from the space at the end thereof remote from the end having said inlet means, both said inlet means and said sheet dispensing section being provided at the same side of the apparatus, sheet removal means in each of said sheet storing spaces and comprising a sheet removal device provided at a position confronting the foremost sheet in the sheet storing space, movable sheet receiving means movable past the ends of said sheet storing spaces having said removal means therein and including means for moving said sheet receiving means selectively to a position confronting a sheet removal device corresponding to a designated denomination and for stopping said sheet receiving means of a time sufficient for receiving and temporarily storing thereon a plurality of sheets taken successively out of the sheet storing space by the sheet removal device, said sheet receiving means further having a transferring device for simultaneously transferring all said temporarily stored sheets to said sheet dispensing means when a designated number of sheets of each denomination have been stored, and said sheet dispensing means comprises a sheet conveying device which is in a watch-and wait attitude at the transferring end of said transferring device for receiving thereon the sheets transferred by said transferring device and conveying the thus received sheets to the sheet dispensing section.

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**4,017,005**

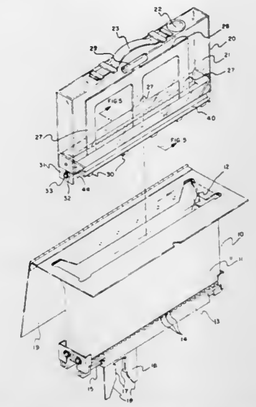
## CORRUGATED DISCHARGE CONTROL DEVICE FOR A DISPENSER

**Andrew P. Forbes, Jr., R.D. No. 2, Mount Holly, N.J. 08060**

**Filed Aug. 27, 1973, Ser. No. 388,587**

**Int. Cl.² B67D** *5/08*

**U.S. Cl. 222—47** **8 Claims**



1. An improved toner dispenser for a xerographic copying machine that is equipped with a toner dispensing apparatus comprising a toner well and an open grate located at the bottom of the well, said grate being subjected to reciprocal movement to dispense toner particulate to the internal copying apparatus, and wherein in the improved toner dispenser,

a. an enclosed container capable of holding toner particulate and fitting into the horizontal cross-section of the well,

b. a dispensing means in the container capable of dispensing toner particulate when provided with reciprocal motion force,

c. at least one anti-caking arm connected directly to the dispensing means responsive to the reciprocal motion force and extending vertically into the container, and

d. transmitting means to transmit the reciprocal force from the xerographic machine to the dispensing means and anti-caking arm comprising at least one foot to engage in one of the openings of the grate such that the foot is subjected to the reciprocal movement of the grate.

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**4,017,006**

## APPARATUS FOR HEATING AND DISPENSING BOILING LIQUIDS

**Harvey Wilder, 1725 Crest Drive, Hagerstown, Md. 21740**

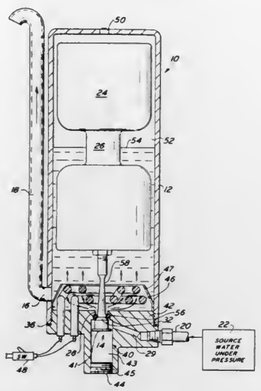
**Filed May 5, 1975, Ser. No. 574,473**

**Int. Cl.² B67D** *5/08*

**U.S. Cl. 222—67** **13 Claims**

1. Apparatus for dispensing liquid at its boiling temperature comprising a housing having an inlet means for connection to a source of liquid under pressure and an outlet for discharging a boiling liquid, a spigot connected to said outlet, said spigot extending to an elevation above the liquid-vapor interface and terminating at a discharge port above the elevation of said outlet, the upper end of said housing being closed so that it may confine a vapor of the liquid above liquid level, a float in said housing above the elevation of said outlet and responsive to the liquid-vapor interface, an inlet valve means for controlling flow through said inlet into said housing, said valve means including a metering valve member, said metering valve member being coupled to said float for movement therewith in response to the elevation of said float in said housing, an electrical heater means in said housing for rapidly heating liquid to its boiling temperature and for creating a vapor in the zone above liquid level so that said inlet valve means is con-

trolled in response to the elevation of the liquid-vapor interface in aid housing, whereby the rate of flow of said liquid through said inlet into said housing increases as said float



descends and decreases as said float ascends, and an on-off switch means for operating said heater means to initiate the discharge of boiling liquid through said outlet.

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**4,017,007**

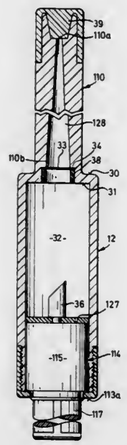
**SINGLE DOSE AIR PRESSURE OPERATED DISPENSER**

**Pasquale R. Riccio, Salem, N.H., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.**

**Continuation-in-part of Ser. No. 427,855, Dec. 26, 1973, abandoned. This application June 24, 1975, Ser. No. 589,838**

**Int. Cl.² B05B** *7/26;* **B65D** *83/06;* **A61M** *13/00*

**U.S. Cl. 222—80** **9 Claims**



1. An air pressure-operated dispenser for spraying a single dose of a fluent material or liquid or powder form, and comprising:

a. a single dose container having a compressed air inlet opening and a closable discharge orifice, the interior space and the inlet opening and the discharge orifice thereof being free from obstructions to the flow of compressed air thereinto and to flow of a mixture of a dose of fluent material present in the interior space from the discharge orifice thereof;

b. means for closing the discharge orifice in a non-dispensing position of the dispenser;

c. an air-compressing piston pump having a compressed air outlet from a compression space thereof; and

d. value means for releasing a flow of compressed air after build-up of a determined excess pressure, the inlet opening of the single dose container being joined to the compressed air outlet of the compression space and wherein the valve means comprise an obturator located at the junction of the inlet opening and the compressed air outlet, the obturator being a breakable diaphragm across the junction, and pin means mounted on the frontal face of the piston of the pump adapted to rupture the diaphragm when the piston reaches a position near the end of its compression stroke.

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**4,017,008**

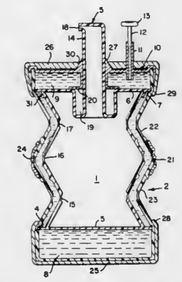
**SPRAY CONTAINER**

**Eli Raitport, 1807 Mower St., Philadelphia, Pa. 19152**

**Continuation-in-part of Ser. No. 102,330, Dec. 29, 1970, abandoned. This application Oct. 25, 1973, Ser. No. 409,385**

**Int. Cl.² B65D** *35/22*

**U.S. Cl. 222—94** **17 Claims**



1. A collapsible container for dispensing comprising two bellows type containers and at least one orifice, whereas one of said bellows being smaller, the other being larger, each of said bellows has at least one opening, the said smaller container placed within the said larger bellows - container forming a space therebetween, said space being filled with flowable substance, said smaller container provided for with an extension which protrudes through the said opening of said larger bellows, each of said bellows has at least one end plate, said end plates of said smaller bellows projects outwardly, said projection fits into grooves provided for on the inside of the walls of said larger bellows forming an interlocking means for both said bellows in such a way that when pressure is applied to said larger container both said bellows are biased to collapse simultaneously, whereas a separate compartment is formed at the end of the container between the ends of said smaller and said larger bellows, and said compartment is filled with a flowable substance.

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**4,017,009**

**CHILD SAFETY CLOSURE (METHOD III)**

**Robert F. Ewald, Rolling Meadows, Ill., and Norbert Normos, Courbevoie, France, assignors to Seaquist Valve Company, Div. of Pittway Corporation, Cary, Ill.**

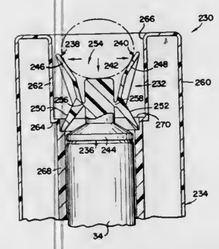
**Continuation-in-part of Ser. No. 352,440, April 19, 1973, Pat. No. 3,885,717. This application June 10, 1974, Ser. No. 477,969**

**Int. Cl.² B65D** *83/14*

**U.S. Cl. 222—402.11** **5 Claims**

1. A safety adaptor for a fluid dispenser comprising a valve actuator means, control means connected to said valve actuator means and configured to prevent actuation of the valve actuator means by a finger less than a predetermined dimension, said control means comprising a pair of finger guides disposed in predetermined spaced apart relation to one another, at least one of said finger guides movable relative to the other and including a locking element mounted thereon and movably connected to the valve actuator means, said locking element movable into and out of locking engagement with the fluid dispenser upon movement of said one movable finger guide relative to the other finger guide and said valve actuator means; said valve actuator means comprising a base disposable in engageable relation with a valve mechanism on said fluid dispenser, said one locking element being coupled to said base by resilient interconnecting means such that said locking element is movable between a locked and actuated position relative to said valve actuator means; each of said finger guides including an actuator element, said actuator elements disposed relative to one another to cooperatively form a finger passage therebetween, each of said actuator elements connected to one locking element; each of said actuator elements and said corresponding locking elements being coupled to each other to cooperatively form said finger guides, each of said locking elements movably connected to opposite sides of said base and disposable into and out of locking engagement with the fluid dispenser upon movement of said actuator elements; each of said resilient interconnecting means being attached to a predeterminded portion of one of said finger guides such that movement of said actuator elements relative to one another causes movement of said locking elements relative to one another into and out of locking engagement with the fluid dispenser; and an overcap, said overcap including a stepped inner skirt, said stepped inner skirt comprising an upper and lower wall section integrally connected to one another, the cross-sectional dimension of said overcap being such that said upper wall is greater than the cross-sectional dimension of said lower wall to cooperatively define a locking ledge therebetween.





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**4,017,010**

**CLOSURE ELEMENT FOR A SLIDE CLOSURE AND PROCESS FOR THE MANUFACTURE THEREOF**

**Ernst Meier, Kilchberg, Switzerland, assignor to Stopinc Aktiengesellschaft, Zug, Switzerland**

**Filed July 11, 1975, Ser. No. 595,307**

**Claims priority, application Switzerland, July 17, 1974, 9858/74**

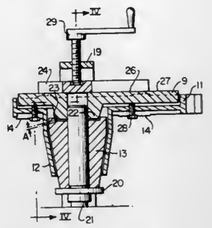
**Int. Cl.² B22D** *37/00*

**U.S. Cl. 222—590** **8 Claims**

7. A process for assembling a closure element of a slide closure for use in liquid melt containers, e.g. steel ladles, said closure element including a metallic support element having bearing surfaces located in a first plane and a refractory plate embedded within said support element by means of a plastic, solidifiable refractory mass and having a first surface embedded in said refractory mass and a second, sliding surface, such that said sliding surface of said plate extends in a second plane parallel to said first plane of said bearing surfaces of said support element, said method comprising:

inserting said plate within said support element; and

prior to solidification of plastic, solidifiable refractory mass material positioned therebetween, positioning and holding said plate in a desired final operational position within an auxiliary device by means of providing adjustable spacers adjustable perpendicularly to said first plane and



positioned between said support element and said first surface of said plate, and adjusting said spacers until said sliding surface of said plate is positioned within a second plane parallel to said first plane.

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**4,017,011**

**THREADING DEVICE**

**Rick P. Ressa, E. 505 Parkhill Drive, Spokane, Wash. 99208**

**Filed Feb. 17, 1976, Ser. No. 658,184**

**Int. Cl.² D05B** *85/00*

**U.S. Cl. 223—102** **2 Claims**



1. An elongated threading device, comprising:

an elongated flexible multi-strand thread;

an elongated wire cable needle;

an interlocking interconnection extending integrally between the thread and the needle;

said thread being constructed of one or more thread filaments that are folded back upon themselves to define multiple thread strands with at least two thread filament bends at an end of the thread;

said wire cable needle being constructed of one or more wire filaments that are folded back upon themselves to form a number of wire strands and wire filament bends corresponding to the number of thread filament bends;

said thread filament bends and wire filament bends being interthreaded and longitudinally offset along the threading device to form said interlocking interconnection between the thread and cable needle; and

wherein the thread strands and wire strands are twisted in opposite directions about a longitudinal axis to form the device.

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**4,017,012**

**SEVERING APPARATUS FOR PLASTIC MATERIAL**

**Reginald L. Brock, Rte. 44, Salisbury, Conn. 06068**

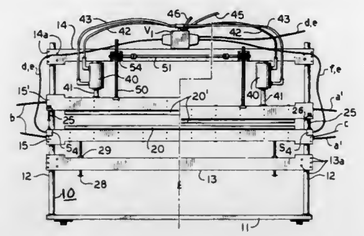
**Division of Ser. No. 366,734, June 4, 1973, Pat. No. 3,877,625. This application Nov. 25, 1974, Ser. No. 526,467**

**Int. Cl.² B26F** *3/00*

**U.S. Cl. 225—96.5** **20 Claims**

1. A resin severing apparatus for effecting an improved severance of successive individual pieces from a sheet-like body length of solidified thermosplastic resin material which comprises, a frame, a pair of opposed blades operatively carried by said frame and defining a pass for the body length, means for moving one blade of said pair into engagement with the material of the body length and flexing it into engagement with the other blade at the pass and for then simultaneously

applying said pair of blades in the same plane inwardly with aligned cutting-in blade pressure and melting heat along lines of blade engagement fully across opposite sides of the body length to form opposed aligned line recesses therein, means carried by said frame for positively limiting the relative forward movement of said blades to a slightly separated fully in-line relation to complete the application of cutting-in blade



pressure and retain a relatively thin transverse thickness portion between the line recesses, means for thereafter withdrawing the blades relative to each other to release the body length, and means for advancing and cooling the material along the line recesses and for thereafter severing a forward end portion of the body length along the full extent of the thin transverse thickness portion.

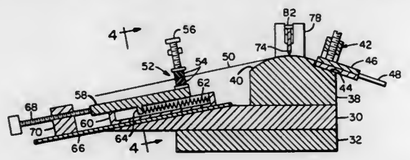
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**4,017,013**

## MULTIPLE FIBER END PREPARATION

**Robert M. Hawk, Bath, and Jerome G. Racki, Painted Post, both of N.Y., assignors to Corning Glass Works, Corning, N.Y.**

**Filed Dec. 16, 1975, Ser. No. 641,341**
**Int. Cl.² B26F** *3/00*
**U.S. Cl. 225—96.5** **10 Claims**



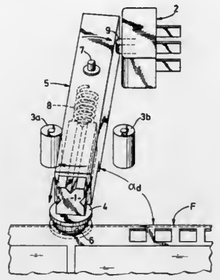
1. An apparatus for severing a plurality of glass fibers comprising:
- means defining an arcuate surface over which said fibers are adapted to be disposed,
- first clamp means at one end of said surface for fixedly clamping said fibers with a force that is sufficient to prevent said fibers from sliding therethrough,
- second clamp means disposed at that side of said surface opposite said fixed clamp means for loosely clamping said fibers with a frictional force that is less than that force applied by said first clamp means so that fibers clamped by said second clamp means can slide therethrough if a pulling force is applied thereto which is greater than said frictional force, said second clamp means being movable in a direction extending from said arcuate surface defining means,
- means for applying to said second clamp means a force tending to urge said second clamp means away from said arcuate surface defining means, said force decreasing as the distance between said first and second clamp means increases, and
- means disposed adjacent to said arcuate surface for scoring said fibers.

**4,017,014**

## APPARATUS FOR SENSING NOTCHES

**René Lüscher, Regensdorf, Switzerland, assignor to Gretag Aktiengesellschaft, Regensdorf, Switzerland**

**Filed Jan. 23, 1976, Ser. No. 651,619**
**Claims priority, application Switzerland, Jan. 30, 1975, 1126/75**
**Int. Cl.² B65H** *25/02*
**U.S. Cl. 226—45** **15 Claims**



1. In apparatus having a path along which a strip is longitudinally movable, a sensing device located at a point along said path for sensing recesses in an edge of the moving strip comprising:
- a lever mounted to a pivot which is to one side of said path and at right angles to the plane of the strip at said point;
- first resilient means urging said lever into a quiescent angular position about said pivot;
- means carried by said lever to engage recesses in one edge of the strip moving past said point;
- second resilient means acting in the longitudinal direction of said lever for urging said engagement means to bear against said one edge of the strip and to move the said engagement means into engagement with a recess when it arrives at said point whereby said lever couples for associated movement with the film and deflects about said pivot from said quiescent angular position upon continuing movement for the engaged recess;
- switching means actuable upon said lever reaching a first pre-selected deflection from said quiescent angular position to indicate the presence of a recess; and
- releasing means acting automatically upon said lever reaching a second pre-selected deflection for moving the said engagement out of engagement with the recess, the first pre-selected deflection being less than the second pre-selected deflection.

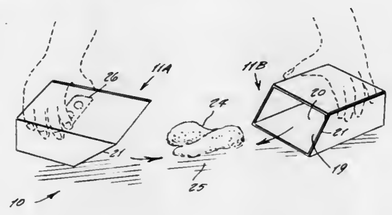
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**4,017,015**

## DISPOSABLE BIODEGRADABLE ENVIRONMENTAL ANIMAL FECES WASTE SCOOP AND CONTAINER

**Ray Jefferson, 494 Broome St., New York, N.Y. 10013**

**Filed Jan. 12, 1976, Ser. No. 648,646**
**Int. Cl.² B65D** *5/38*
**U.S. Cl. 229—19** **1 Claim**



1. In a disposable, environmental, animal feces waste scoop and container, the combination of a pair of interfitting boxes having scoop means for scooping up a feces therebetween and enclosing said feces within said boxes when interfitted; both said boxes being made of corrugated, biogradable cardboard, each box having six sides comprising a wall on each of five said sides while a sixth thereof comprises an opening, an edge of said opening being angularly inclined by one said wall projecting outwardly farthest by protruding farther than an opposite wall thereto so to define a scoop, one of said boxes additionally including a handle die-cut on said furthest projecting wall, said handle being outwardly bendable about a fold line, said handle having a pair of finger-receiving openings therethrough; each said box being formed from a flat, die-cut blank, and one of said five walls which is opposite said opening being comprised of a pair of interfitting and interlocking tabs each of which is formed adjacent an end of said opposite walls, and each said tab includes a minor portion separated from a major portion thereof by a fold line that aligns with a fold line between said walls that form four side walls of said box.



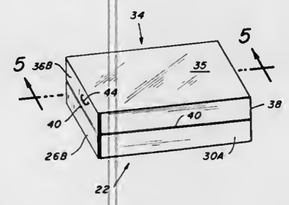
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**4,017,016**

## SHIPPING CONTAINER FOR PERISHABLES

**Orval D. Ivy, Fort Smith, Ark., assignor to IWN, Inc., Fredonia, Kans.**

**Filed Mar. 1, 1976, Ser. No. 662,804**
**Int. Cl.² B65D** *13/00, 5/56*
**U.S. Cl. 229—23 BT** **1 Claim**



1. An improved shipping container comprising:
- a body portion of corrugated paper board cut initially in the form of a long, narrow flat rectangle, the width of the rectangle defining the depth of the container, the flat rectangle being scored in four lines parallel the ends, one of the scored lines being adjacent one end defining a sealing tab, the body portion being folded along the scored lines forming an upright open bottom and open top rectangular container, the tab portion being glued to the inner end of the base portion opposite the tab end to retain the base portion in the rectangular configuration;
- foam insulation secured to the surface of the body portion to cover all of one side of the body portion except an area adjacent the end opposite the end having the tab portion such that when the body portion is formed as an upright open bottom and open top rectangular container all interior surfaces are covered by insulation;
- a top cover initially formed of a flat sheet of corrugated paper board including:
  - a. a rectangular center portion defining the length and width of the container;
  - b. an integral end flap portion at each end of the center portion of the same width of the center portion and of length equal to one-half of the depth of said body portion, each end flap being scored at the juncture with the center portion whereby the end flap portions may be folded perpendicular to the center portion; and
  - c. an integral side flap portion at each side of the center portion of the same length of the center portion and of width equal to one-half of the depth of said body portion, each side flap being scored at the juncture with the center portion whereby the side flap portions may be folded perpendicular to the center portion;
- a bottom cover identical to said top cover;
- foam plastic insulation secured to one surface of said top and said bottom cover center portions;
- the container being assembled such that the body portion is upright with the center portion of the top cover covering the upper open end of the body portion and the end flap and side flap portions secured by adhesive to the exterior of the body portion and in like manner, the center portion of the bottom cover covers the lower open end of the body portion and the end flap and die flap portions secured by adhesive to the exterior of the body portion, the edges of the end flaps and side flaps of the top cover contacting the edges of the end flaps and side flaps of the bottom cover, the assembled container thereby having all sides of double thickness of corrugated paper board secured by adhesive to each other, and wherein said body portion is formed in a manner such that in the assembled container the corrugations are vertical and wherein said top and bottom covers are such that the corrugations in said side flaps are vertical in the assembled container.

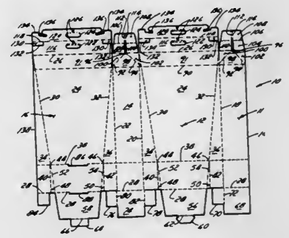
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**4,017,017**

## CORRUGATED LUGGAGE

**Hendrikus Vos, Winnipeg, Canada, assignor to Domtar Limited, Montreal, Canada**

**Filed June 28, 1976, Ser. No. 700,443**
**Int. Cl.² B65D** *5/10, 5/46, 25/28*
**U.S. Cl. 229—38** **4 Claims**



1. A carton blank and a carton formed therefrom comprising a first end wall panel and a first side wall panel, a second end wall panel and a second side wall panel interconnected by a set of substantially parallel fold lines, each of said side wall panels being divided by a parallity of fold lines arranged substantially in the same pattern in each of said side panels, each said plurality of fold lines defining in its respective said side wall panel, a central trapezonal panel having two sides substantially parallel and forming the top and bottom of said side wall panels and a pair of legs interconnecting adjacent ends of said two parallel sides and converging toward each other at the same angle from said top, each of said legs forming one side of a triangle defined by said bottom end and an adjacent fold line of said set of fold lines, closure means connected to said bottom of said side panels and to said end wall panels by a first bottom fold line means substantially perpendicular to said set of fold line, a second bottom fold line spaced above and substantially parallel to said first bottom fold line means, further fold lines substantially parallel to said set of fold lines and extending from the junction of each of said legs with said second bottom fold line to said bottom fold line means.

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**4,017,018**

## CARTON CLOSURE

**Ernest C. Pellation, Larkspur, Calif., assignor to Fibreboard Corporation, San Francisco, Calif.**

**Filed Mar. 29, 1976, Ser. No. 671,624**
**Int. Cl.² B65D** *5/10*
**U.S. Cl. 229—39 R** **3 Claims**

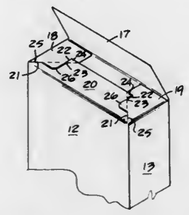
1. A closure for a carton, said carton comprising a front wall, a back wall, a pair of side walls, a bottom closure and a

top closure, said top closure formed so that the inner flaps thereof intermesh with each other to provide support during sealing operations and thus promote a tight seal,

said top closure comprising a pair of minor flaps hinged to the side walls, an inner major flap hinged to the front wall and an outer major flap hinged to the back wall,

said minor flaps and said inner major flap folded inwardly at 90° angles to the respective walls to which they are hinged and said outer major flap folded over into contact with and sealed to said minor flaps and said inner major flap to form said top closure,

first cutaway side edges on sides of said inner major flap adjacent said minor flaps, and second cutaway side edges on each minor flap on a side thereof adjacent said inner major flap, said cutaway edges on one of (a) said minor flaps and (b) said inner major flap, comprising first cuts extending from the side edges thereof adjacent hingelines connecting said flaps to the carton walls diagonally up-



wardly and inwardly to the free outer edge thereof, and protruding portions formed medially of said cutaway edges, and the cutaway edges on the other of said flaps comprising second cuts extending from the side edges thereof adjacent hingelines connecting said flaps to the carton walls diagonally inwardly and upwardly toward outer free edges thereof, third cuts extending from points on an outer free edge thereof generally perpendicularly downwardly to intersect said second cuts and form angles therewith having vertices at said intersections, the intersections of said third cuts and said outer free edges forming free corners,

said protruding portions and said free corners comprising means which intermesh when said flaps are in folded position so that portions of said minor flap overlie said inner major flap and portions of said inner major flap overlie said minor flaps, thereby providing support for said flaps during sealing of said outer major flap thereto.

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**4,017,019**

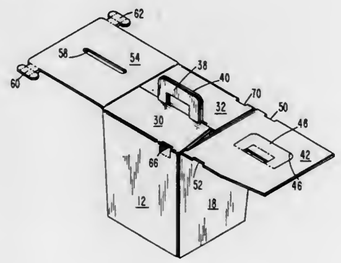
**PAPERBOARD CONTAINER**

**Vernard S. Booth, Albany, Ga., assignor to Olinkraft, Inc., West Monroe, La.**

**Filed Apr. 5, 1976, Ser. No. 673,850**

**Int. Cl.² B65D** *5/10, 5/46*

**U.S. Cl. 229—39 R** **1 Claim**



**1.** A paperboard container comprising four trapezoidal side wall panels, each joined to two adjacent side wall panels along its non-parallel sides,

a bottom formed from bottom panels extending from the short parallel sides of each of the side wall panels,

a handle panel flap extending from each of the top half-panels,

a first top panel having a handle die cut formed therein defining a handle panel flap, the first top panel foldable over the top half-panels so that the handle panel flaps from the top half-panels and the handle panel flap from the first top panel are adjacently aligned,

a second top panel having a handle slot formed therein, the second top panel foldable so that the three aligned handle panel flaps are received through the handle slot,

locking means including a pair of locking fingers extending from opposite sides of the second top panel, opposite sides of the container having top-lock recesses formed therein to receive the locking fingers to secure the second top panel in position,

said first top panel extending from a side of the container opposite the side from which the second top panel extends and said first top panel having top-lock cut-outs defined in opposite sides thereof to receive the locking fingers of the second top panel therein,

top half-panels extending from the sides of the container in which the top-lock recesses are defined, the top-lock recesses also extending into the top half-panels so that the locking fingers can be received therein,

one of said bottom panels defining a female bottom lock panel having a locking slot defined therein and a bridging portion separating the locking slot from the edge of the female bottom lock panel,

a pair of said bottom panels defining a pair of buffer panels each having a buffer tab formed thereon,

another of said bottom panels defining a male bottom lock panel having a locking tab extending therefrom,

the buffer panels being foldable onto the female bottom lock panel so that the buffer tabs lie adjacent the bridging portion and the male bottom lock panel being foldable such that the locking tab is received in the locking slot, the bridging portion thereby holding the buffer tabs against the male bottom lock panel to secure the bottom of the container, and

said locking tab being of a generally rectangular shape and being held in the locking slot by frictional forces.

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**4,017,020**

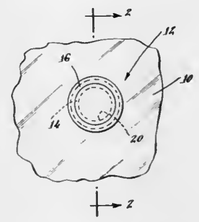
**NOZZLE OUTLET IN THE STRETCHABLE FLEXIBLE WALL FOR A CONTAINER**

**Carl A. Frank, 624 Stanley Place, River Vale, N.J. 07675**

**Filed Nov. 20, 1975, Ser. No. 633,618**

**Int. Cl.² B65D** *33/16*

**U.S. Cl. 229—62** **5 Claims**



**1.** In a flexible bag having its wall formed entirely from stretchable, flexible plastic film material having a thickness in the range from 4 mils to 15 mils, a permanent nozzle outlet for said flexible bag, said nozzle outlet being located in an area of said wall and comprising:

a rigid inner sleeve having an outlet passage therethrough, said inner sleeve having an exterior tapered surface which converges at a small angle of taper toward a smaller end of said inner sleeve,

said smaller end of said inner sleeve being projected out into said wall of the flexible bag and having a portion of the flexible film wall stretched therearound,

a rigid outer sleeve having an interior tapered surface which diverges at a small angle of taper toward a larger end of said outer sleeve,

said small angle of taper of said interior surface corresponding to said small angle of taper of said exterior surface for mating therewith,

said outer sleeve being mated around the portion of plastic film wall which is stretched around said inner sleeve with said larger end of said outer sleeve facing toward said wall of the bag, said respective exterior and interior surfaces being in wedging-locking relationship with the stretched portion of the film wall being sandwiched between said tapered surfaces,

whereby said mated sleeves are firmly held together by their wedging-interlocking relationship to form a permanent nozzle outlet in the flexible film wall of the flexible bag with said outlet passage in the inner sleeve serving as the passage through the nozzle, and

said stretched portion of the plastic film material temporarily closing said outlet passage and protecting said smaller end of the inner sleeve.



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**4,017,021**

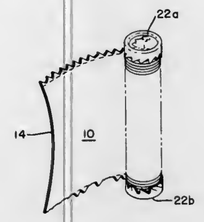
**COIN ROLL**

**Cleveland B. Crudgington, 2798 S. Highland Drive, Las Vegas, Nev. 89102**

**Filed Mar. 8, 1976, Ser. No. 664,545**

**Int. Cl.² B65D** *65/04*

**U.S. Cl. 229—87.2** **6 Claims**



**1.** A coin roll comprising a cylindrical jacket in the form of a tape surrounding a stack of superposed coins, crimps formed on the opposite ends of said jacket to retain the stack of coins in said jacket, and a circumferential series of oblique parallel slits in the areas of said jacket adjacent to said crimps, said slits extending into said crimps.

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**4,017,022**

**CENTRIFUGE ARRANGEMENT AND METHOD OF MAKING A CONICAL CONTAINER THEREFOR**

**Bernhard Fiedler, Grevenbroich, Germany, assignor to Maschinenfabrik Buckau R. Wolf Aktiengesellschaft, Grevenbroich, Germany**

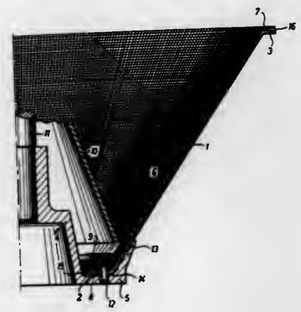
**Filed Oct. 17, 1975, Ser. No. 623,455**

**Claims priority, application Germany, Oct. 24, 1974, 2450552**

**Int. Cl.² B04B** *7/04*

**U.S. Cl. 233—1 R** **8 Claims**

**1.** In a centrifuge, a combination, comprising a hub mounted for rotation about an axis and having a central portion, a lip portion radially and outwardly spaced from said central portion having an inner conical face concentric with said axis and extending upwardly and outwardly, and a bottom portion connecting said central portion with said lip portion; a conically shaped container having a circumferential wall having a lower portion closely adjacent said conical surface and including a base portion integral with said circumferential wall; and adhesive means disposed intermediate said lower



portion of said container and said inner conical face of said lip portion for securing said container with said hub so that the former rotates exactly coaxial with the latter without causing an imbalance during fast rotation of said centrifuge.

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**4,017,023**

**SELF-CLEANING AIR-TIGHT CENTRIFUGAL SEPARATOR**

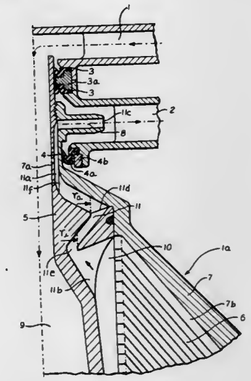
**Heinrich Hemfort, Oelde, Germany, assignor to Westphalia Separator Aktiengesellschaft, Oelde Westphalia, Germany**

**Filed Feb. 23, 1976, Ser. No. 660,541**

**Claims priority, application Germany, Feb. 27, 1975, 2508503**

**Int. Cl.² B04B** *11/02*

**U.S. Cl. 233—1 A** **4 Claims**



**1.** In a self-cleaning, air-tight centrifugal separator comprising:

a rotating drum providing a chamber for the separation, a passageway in the drum having an inlet end for receiving clarified liquid from the chamber and a discharge end for discharge of the clarified liquid from the rotating drum, a stationary discharge conduit connected to the drum for receiving the clarified liquid from the discharge end of said passageway, and a flange packing interposed between the discharge end of said passageway and the stationary conduit for providing an air-tight seal therebetween, the flange packing being of such construction that it is urged so as to provide said seal by the pressure of the clarified liquid,

the improvement which comprises:

said passagewaying having a siphon-like section between passageway inlet end and discharge end for formation of a liquid seal between the passageway discharge end and the drum chamber the siphon-like section being disposed so that the siphon bend is radially outward of the siphon inlet end and outlet end.

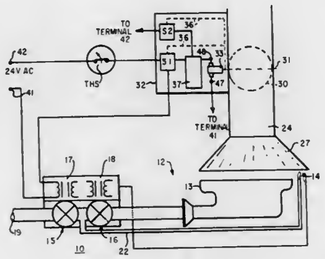
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**4,017,024**

## STACK DAMPER CONTROL ARRANGEMENT

**Martin Coiner Grostick, and Thomas Edward Hayes, both of Goshen, Ind., assignors to Johnson Controls, Inc.**

**Filed Dec. 3, 1975, Ser. No. 637,322**
**Int. Cl.² F24D *5/00***
**U.S. Cl. 236—16** **15 Claims**



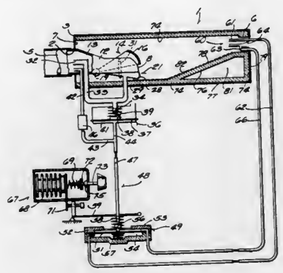

1. In a heating system including a furnace having a fuel-fired burner apparatus, fuel supply means operable when energized to supply fuel to said burner apparatus for combustion, a vent stack for conducting combustion products away from said burner apparatus, and a damper plate pivotally mounted within said vent stack, said damper plate being normally maintained at a first position to close said vent stack, and being rotatable to a second position to open said stack, a stack damper control arrangement comprising drive means operatively coupled to said damper plate, control circuit means including a first limit switch operable to provide a first energizing circuit for said drive means, activate means operable in response to a request for heat to connect power to said first energizing circuit for energizing said drive means to effect rotation of said damper plate from said first position to said second position, said first limit switch being operated when said damper plate reaches said second position to interrupt said first energizing circuit to thereby effect the deenergization of said drive means and to complete an energizing path for said fuel supply means, said control circuit means further including a second limit switch and normally disabled switching means, said second limit switch being operated as said damper plate is moved away from said first position to prepare a second energizing circuit for said drive means, said activate means effecting the deenergization of the fuel supply means and the enabling of said switching means when the heating demand has been met to complete said second energizing circuit for energizing said drive means to effect rotation of said damper plate from said second position to said first position, said second limit switch being operated when said damper plate reaches said first position to interrupt said second energizing circuit to thereby effect the deenergization of said drive means.

**4,017,025**

## VARIABLE VOLUME CONTROL BOX AND SYSTEM INCORPORATING SAME

**Konstantins Dravnieks, Madison, and Gordon C. Sylvester, Verona, both of Wis., assignors to Wehr Corporation, Milwaukee, Wis.**

**Filed Jan. 28, 1974, Ser. No. 436,963**
**Int. Cl.² F24F *11/04***
**U.S. Cl. 236—49** **17 Claims**



1. A control box for use in an air distribution system and comprising, in combination,
plenum means defining an inlet to the interior of said box,
means defining an outlet spaced from said inlet so that air flows through said box from said inlet to said outlet,
a damper positioned at said inlet,
means mounting said damper to assume a first position closed on said inlet and for movement away from said first position to open said inlet,
means biasing said damper in one direction of movement relative to said first position,
air operated actuator means connected to said damper for moving said damper against said bias and opposite to said one direction of movement,
means for exposing said actuator means to the flow of air into said plenum means so that said actuator means is operated by air flowing into said plenum means,
said damper being generally arcuate in transverse cross section and said plenum means further defining an arcuate surface corresponding to the arcuate shape of said damper with said arcuate surface defining said inlet,
said damper closing on said arcuate surface to close said inlet,
and said mounting means defining an axis about which said damper moves in moving toward and away from said first position, the centers about which said arcuate surfaces of said damper and arcuate surface are generated being offset from said axis.

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**4,017,026**

## AUTOMATIC DAMPER

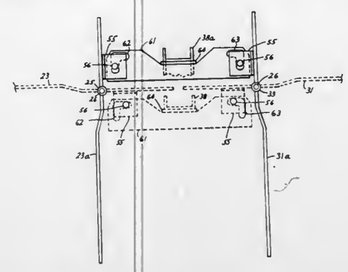
**John V. Felter, P.O. Box 7464, Houston, Tex. 77008**

**Filed May 15, 1975, Ser. No. 577,682**
**Int. Cl.² G05D *23/275***
**U.S. Cl. 236—93 R** **7 Claims**

1. Automatic damper apparatus, comprising a pair of mirror image vanes pivotal about axes intermediate the widths of the vanes between open and closed positions, means pivotally movable from one side of the inner edges of said vanes in closed position to between said inner edges of said vanes to open said vanes and pivotally movable in the opposite direction to close said vanes, means linking the free end of said pivotally movable means to said inner edges of said vanes comprising pin means on said inner edges of said vanes means and J-slot means on said pivotally movable means having said pin means engaged therein and cooperating to lock said vane means in said open position with said pin means engaged in a transverse J-slot position when said vane means have been



opened by said pivotally movable means, and drive means comprising gas filled diaphragm means for moving said pivot-



ally movable means in both directions in response to opposite changes in temperature.

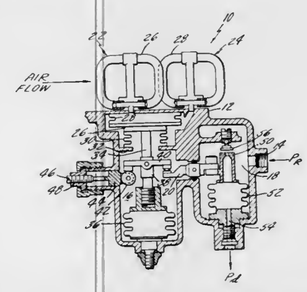
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**4,017,027**

## LEAD-LAG COMPENSATED TEMPERATURE SENSOR

**Lawrence Sidney Smith, Simsbury, Conn., assignor to United Technologies Corporation, Hartford, Conn.**

**Filed Dec. 3, 1975, Ser. No. 637,490**
**Int. Cl.² G05D *23/12***
**U.S. Cl. 236—99 E** **2 Claims**




1. A compensated temperature responsive transmitter for sensing air temperature of an airstream comprising:
a housing having a first and a second chamber;
a pressure responsive element disposed in said first chamber;
a first gas-filled temperature responsive bulb disposed in said airstream;
first bellows between said first bulb and a first area on one side of said element for putting said first bulb in closed fluid communication with said first area to urge it in one direction;
a second gas-filled temperature responsive bulb disposed adjacent said first bulb in said airstream;
second bellows between said second bulb and a second area on the opposite side of said element for putting said second bulb in closed fluid communication with said second area to urge said element in an opposite direction;
said first and second areas being of different magnitude;
said first and second bulbs responding to a temperature change in said airstream at different rates;
inlet means in said second chamber for communicating said second chamber with a supply of fluid under pressure;
valve means disposed in said second chamber for varying the pressure of said supply fluid; and
means responsive to said movement of said pressure responsive element connected to said valve means for controlling the pressure of said supply fluid.

2. A compensated temperature responsive transmitter for sensing air temperature of an airstream comprising:
a housing having a first and a second chamber;
pressure responsive means, including a plate, disposed in said first chamber;
a first temperature responsive bulb means disposed in said airstream and in closed fluid communication with a first surface on said plate to urge it in one direction, said first bulb means including a first bellows in said first chamber connected at one end to said housing and at the other end to said first surface on said plate;
a second temperature responsive bulb means disposed in said airstream and in closed fluid communication with a second surface on said plate to urge it in an opposite direction, said second bulb means including a second bellows in said first chamber connected at one end to said housing and at the other end to said second surface on said plate;
said first bulb being filled with a gas which expands in response to a temperature change in said airstream at a first rate;
said second bulb being filled with a gas which expands in response to said temperature change in said airstream at a second rate different from said first rate;
said pressure responsive means including a third bellows connected at one end to said housing and at the other end to said second surface, said third bellows having an effective cross-sectional area equal to the effective cross-sectional area of said second bellows;
inlet means in said second chamber communicating said second chamber with a supply of hydraulic fluid under pressure;
valve means disposed in said second chamber for varying the pressure of said supply fluid; and
means responsive to movement of said pressure responsive means extending between said first and second chambers for controlling the pressure of said supply fluid.

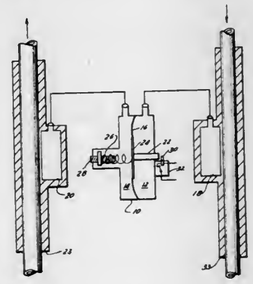
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**4,017,028**

## TEMPERATURE DIFFERENTIAL SENSING AND CONTROL DEVICE

**Giora Manor, 19 Kilmer Road, Larchmont, N.Y. 10538**

**Filed Feb. 28, 1975, Ser. No. 554,270**
**Int. Cl.² F24J *3/02*; F16H *3/08***
**U.S. Cl. 237—1 A** **6 Claims**



1. A heating system comprising a heat collector, a thermal reservoir, a first conduit leading from the reservoir to the collector, a second conduit leading from the collector to the reservoir, an electrically-operable pump connected to pump fluid from the reservoir, through the first conduit, the collector and the second conduit and back to the reservoir, and a differential thermostat which comprises a housing having mounted therewithin a flexible diaphragm which divides the interior of the housing into first and second chambers, first and second vessels having their interiors in communication with the first and second chambers respectively, the first vessel and the first chamber containing thermally expansible fluid sealed therewithin and the second vessel and the second chamber also containing thermally expansible fluid sealed therewithin, the first vessel being in thermally conductive

contact with the first conduit and the second vessel being in thermally conductive contact with the second conduit, and the thermostat further comprising an actuating member mounted so as to be displaced by the diaphragm in dependence upon difference in pressure between the first and second chambers, and a control device mounted to be acted upon by the actuating member in dependence upon displacement thereof and connected to control supply of operating current to the pump.

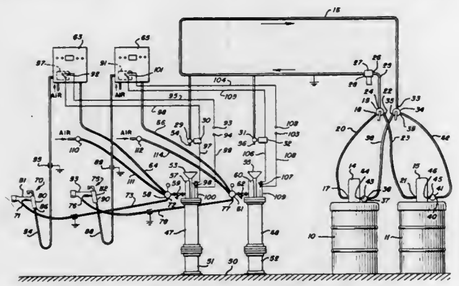
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**4,017,029**

## VOLTAGE BLOCK ELECTROSTATIC COATING SYSTEM

**Arvid C. Walberg, 708 S. Lombard Ave., Lombard, Ill. 60148**

**Filed Apr. 21, 1976, Ser. No. 679,025**
**Int. Cl.² B06B** *5/02*
**U.S. Cl. 239—15** **10 Claims**



1. In an electrostatic coating system having a spray gun for ejecting highly electrically conductive coating material and an electrode charge to high voltage adjacent the location of ejection of the coating material from the spray gun having a high voltage power supply, and having a coating material supply system supplying coating material to the gun, wherein the improvement comprises,

a first sub-system in said coating material supply system containing coating material electrically grounded,

a second sub-system in said coating material supply system containing coating material insulated from electrical ground and connected to said high voltage power supply,

means for ejecting a stream of coating material into the atmosphere forming a portion of said first sub-system,

means for receiving said stream of coating material as it is ejected across a predetermined air space forming a portion of said second sub-system, said air space having a sufficiently large predetermined dimension between said first and second means to prevent arcing in said air space when said second system is charged to a high voltage by said high voltage power supply, and

control means connected to said ejecting means to prevent ejection of said stream when said high voltage power supply is charging said second sub-system to a high voltage.

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**4,017,030**

## DEVICES FOR CONTROLLED RELEASE OF VAPORS

**Myron J. Coplan, Natick, and Thomas W. Brooks, Medway, both of Mass., assignors to Albany International Corporation, Dedham, Mass.**

**Continuation-in-part of Ser. No. 519,603, Oct. 31, 1974, abandoned. This application Sept. 26, 1975, Ser. No. 617,261**
**Int. Cl.² A61L** *9/04;* **A24F** *25/00*
**U.S. Cl. 239—44** **40 Claims**

1. A device for dissemination of a vaporizable material at a predetermined rate by vapor diffusion through a stagnant gas layer comprising a elongated capillary conduit of predetermined cross-sectional area and length having one closed end, and a vaporizable substance contained in said conduit, said



stangnant gas layer overlaying the vaporizable substance in the conduit.

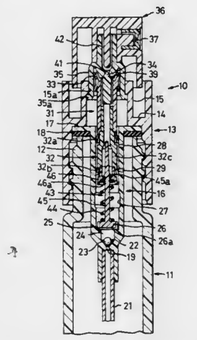
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**4,017,031**

## MINIATURE ATOMIZER OF MANUAL TYPE

**Takao Kishi, and Takamitsu Nozawa, both of Tokyo, Japan, assignors to Yoshino Kogyosho Co., Ltd., Tokyo, Japan**

**Filed Sept. 25, 1975, Ser. No. 616,884**
**Claims priority, application Japan, Sept. 26, 1974, 49-116183[U]**
**Int. Cl.² B05B** *9/043;* **G01F** *11/36*
**U.S. Cl. 239—333** **6 Claims**



1. A liquid spraying device comprising a container for liquid, including an axially perforated cap, spray means including a nozzle associated with said container and including reciprocable means extending through said cap, first pressure chamber means depending beneath said cap, second pressure chamber means in axial alignment with said first pressure chamber means and positioned above said cap, said reciprocable means including a first piston member in the first pressure chamber means and a second piston member in said second pressure chamber means and further including first valve means, said valve means being arranged to control liquid flow from said second pressure chamber to the nozzle of said spray means, spring means arranged to maintain said first valve means in a closed condition to prevent inadvertent emission of liquid therefrom, second valve means in said first pressure chamber means, liquid carrying means depending from said last-named means and extending into said container, further characterized by said first pressure chamber means including spaced upper and lower vent means, said first piston member including plural axially spaced upper and lower skirt means adapted to open and close said plural vent means upon reciprocation of said spray means.

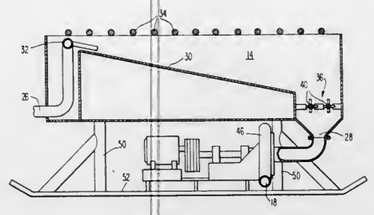


**4,017,032**

## FORMATION AND TRANSPORTATION OF SLURRIED UNCONSOLIDATED OVERBURDEN

**Keith E. Dyas, Bagdad, Ariz., assignor to Cyprus Mines Corporation, Los Angeles, Calif.**

**Filed Aug. 7, 1975, Ser. No. 602,575**
**Int. Cl.² B02C** *23/36*
**U.S. Cl. 241—15** **9 Claims**



9. The method of disintegrating and slurrying unconsolidated overburden for transport from a region of sub-surface exploitation to a depositing area, comprising the steps of:

a. providing a hopper having upstanding sidewalls, an inclined bottom surface, and an opening adjacent the lowermost portion of the bottom surface;

b. providing a first, coarse grillwork across the top of the hopper;

c. providing a plurality of rotatable toothed rollers in said opening;

d. providing a second, fine grillwork in said opening, said grillwork comprising a plurality of horizontal members extending between the paths of the teeth of the rollers;

e. discharging overburden through said first grillwork and onto said inclined bottom surface;

f. directing a stream of pressurized water directly upon the unslurried overburden to disintegrate the overburden and to urge the disintegrated overburden downwardly along the bottom surface to the second grillwork; and

g. rotating said toothed rollers between the horizontal members of the second grillwork to comminute the overburden urged thereupon.

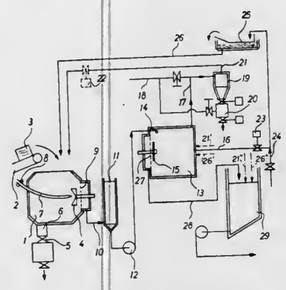
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**4,017,033**

## APPARATUS AND METHOD FOR RECLAIMING WASTE PAPERS

**Josef Trä, Heidenheim, Germany, assignor to J. M. Voith GmbH, Heidenheim (Brenz), Germany**

**Filed Mar. 25, 1976, Ser. No. 670,353**
**Claims priority, application Germany, Mar. 29, 1975, 2514162**
**Int. Cl.² B02C** *23/38*
**U.S. Cl. 241—28** **15 Claims**



1. Apparatus for processing contaminated waste paper into a cellulosic fibrous pulp, which comprises;

a slusher for slushing said waste paper;

a pressure-operated fiberizer for liberating fibers from slushed waste paper, said fiberizer being adapted to continuously separate liberated fiber, light waste paper contaminants mixed with fibrous cellulosic material and heavy waste paper contaminants mixed with fibrous cellulosic material;

means connected to said slusher, for delivering waste paper slush produced in said slusher to said fiberizer;

means for separating liberated fiber substantially free of contaminants, from said fiberizer;

means for receiving the separated, liberated fiber;

a centrifugal separator adapted to separate heavy waste paper contaminants from mixtures thereof with fibrous cellulosic materials;

means communicating between said fiberizer and said centrifugal separator for conveying the separated heavy waste paper contaminants mixed with fibrous cellulose material in pressurized condition directly from said fiberizer to said centrifugal separator;

means for recycling fibrous cellulosic materials separated in said centrifugal separator, to said means for receiving the separated, liberated fiber;

a separator adapted to separate light waste paper contaminants from mixtures thereof with fibrous cellulosic materials;

means communicating between said fiberizer and said separator adapted to separate light waste paper contaminants, for conveying said mixtures of light waste paper contaminants with fibrous cellulosic materials from said fiberizer to said separator adapted to separate light waste paper contaminants; and

means for recycling fibrous cellulosic materials separated in said separator adapted to separate light waste paper contaminants, to said means for receiving the separated, liberated fiber.

15. A method of continuously processing contaminated waste paper into a usable cellulosic fiber pulp, which comprises

A. slushing the contaminated waste paper with water;

B. continuously making a first separation of gross contaminants from the slushed waste paper;

c. continuously liberating cellulosic fibers from the slushed waste paper separated in said first separation, whereby a mixture is obtained which comprises light contaminants, heavy contaminants and liberated cellulosic fibers;

D. continuously separating said mixture at a first location into

1. A substantially contaminant free cellulosic fiber pulp;

2. a mixture of light contaminants with fibrous cellulosic material; and

3. a pressurized mixture of heavy contaminants with fibrous cellulosic material;

E. separating the light contaminants from the mixture (2) above;

F. conveying the pressurized mixture (3) above from said first location directly to a second location;

G. continuously separating the heavy contaminants from the mixture (3) above at said second location; and

H. continuously mixing the fibrous cellulosic material obtained in at least one of the steps (E) and (G) with the slushed waste paper.

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**4,017,034**

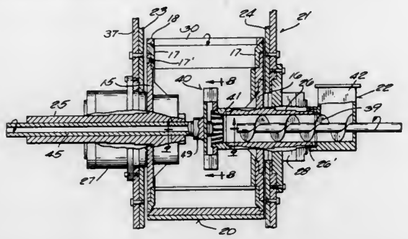
## ART OF DRY MILLING SORGHUM AND OTHER CEREAL GRAINS

**Edwin Griffith, Dodge City, Kans., and Edward S. Stickley, Milwaukee, Wis., assignors to Krause Milling Company, Milwaukee, Wis.**

**Filed Apr. 12, 1976, Ser. No. 676,017**
**Int. Cl.² B02C** *13/09*
**U.S. Cl. 241—74** **16 Claims**

1. In milling apparatus having an outer housing, having a cylindrical stator supported in said outer housing, said stator

having a perforated peripheral wall and there being an outer space between said outer housing and stator from which grain particles are adapted to be discharged, having a rotor and having means supporting said rotor for rotation on a horizontal axis within said stator, there being a milling space between said rotor and stator, and there being cooperating means on



the interior of the peripheral wall of the stator and the exterior of the rotor for performing concomitant decortication and degermination in said milling space, the improvement comprising having the rotor hollow and provided with openings in its periphery communicating with said milling space, and means for feeding grain into the interior of said hollow rotor to be discharged from said rotor openings into said milling space.

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**4,017,035**

## IMPACT CRUSHER WITH ADJUSTABLE IMPACT OR GRINDING MEANS

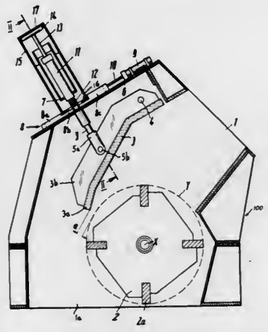
**Jürgen Stuttmann, Munster, Germany, assignor to Hazemag Dr. E. Andreas KG, Munster, Germany**

**Filed July 24, 1975, Ser. No. 598,881**

**Claims priority, application Germany, July 27, 1974, 2436337**

**Int. Cl.² B02C *13/06***

**U.S. Cl. 241—189 R** **11 Claims**



1. In an impact crusher, a combination comprising a housing having an inlet for material to be comminuted and an outlet for comminuted material; a rotor provided with beaters and mounted in said housing; an impact or grinding means mounted in said housing for movement toward and away from said rotor and defining therewith a gap through which the material to be comminuted passes on its way from said inlet toward said outlet and is comminuted by said rotor beaters and said impact or grinding means; and adjusting means for varying the width of said gap, having a lost motion to allow the impact or grinding means to yield in direction away from said rotor and including carrier means connected with said impact or grinding means and extending from said housing, holder means connected with said carrier means outside of said housing, motor means operable to move said holder means at least in a direction to increase the width of said gap, and at least one insert mounted at the other side of said housing and having portions of different thicknesses, said insert being movable between said holder means and said housing to thereby determine the minimum width of said gap depending on the thickness of that portion of said insert which is located between said housing and said holder means.

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**4,017,036**

## CONTROL OF THE LINEAR SPEED OF THE WEB

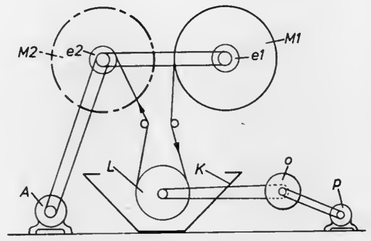
**Emile Bernard Bates, 11 Barrington Road, Stoneygate, Leicester, England**

**Filed July 8, 1975, Ser. No. 594,083**

**Claims priority, application United Kingdom, July 11, 1974, 30691/74**

**Int. Cl.² B65H *17/06***

**U.S. Cl. 242—75.5** **6 Claims**




1. Apparatus for controlling the linear speed of a web travelling from a supply to a take-up, comprising drive means for advancing the web from said supply to said take-up; sensing means for sensing the actual speed of the advancing web; comparing means for making a comparison of the sensed actual speed with a reference speed, including a first shaft which is adapted to rotate in dependence upon the actual speed of the web, a second shaft, a synchronous motor rotating said second shaft at said reference speed and in the same direction as said first shaft, and means for determining relative angular displacement of said shafts including a disk on each of said shafts and rotatable therewith, a first electrical contact on one and a pair of second electrical contacts on the other of said disks, said first contact being arranged to engage one of said second contacts in response to relative circumferential displacement of said disks; and adjusting means for adjusting the operation of said drive means in accordance with the engagement of said first contact with either of said second contacts.

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**4,017,037**

## TENSION BRUSH FOR WIRE SPOOL

**Joseph J. Kovaleski, c/o Wyrepak Industries Inc., 136 James St., Bridgeport, Conn. 06604**

**Filed Mar. 31, 1975, Ser. No. 563,787**

**Int. Cl.² B65H *49/00***

**U.S. Cl. 242—129.8** **9 Claims**

1. A tension brush assembly for use with a spool wound with wire, comprising in combination:

a. a support structure comprising a pair of circular disklike members constituted of sheet material adapted to be disposed broadside to each other in axial alignment,

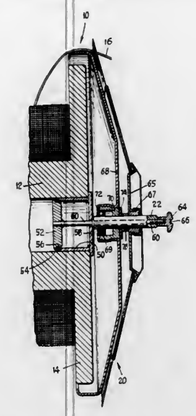
b. a multiplicity of flexible and resilient tines disposed between the members and extending radially thereof beyond the outer peripheral edge portions of the members, and

c. means disposed in a generally circular configuration and extending adjacent the outer peripheral edges of the members, for securing the same together to clamp inner end portions of the tines therebetween,

d. the outer ends of the tines being free and unattached, and said structure having means adapted to mount it at one end of a spool,



e. said tines being constituted of heat-softenable material, all portions of said tines being disposed radially, and the



adjoining inner end portions of the tines being integrally secured to each other solely by being heat-fused together.

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**4,017,038**

## TENSIONING DEVICE FOR TRAVELING YARNS AND THE LIKE

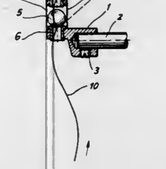
**Horst Paepke, Fasanenweg 30, 7470 Rottenburg, N., Germany**

**Filed Mar. 26, 1975, Ser. No. 562,242**

**Claims priority, application Germany, Mar. 14, 1975, 2511162**

**Int. Cl.² B65H *59/22***

**U.S. Cl. 242—152.1** **7 Claims**



1. A tensioning device for traveling yarns and the like, comprising first means forming a yarn passage having an inlet and an outlet; a spherical member straddling said outlet to control the tension of a yarn traveling through said passage; second means defining with said first means at said outlet thereof a chamber for said spherical member which has at least two opposite open sides; and third means spaced axially from said outlet by a distance so selected that said spherical member is prevented from moving out through said open sides.

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**4,017,039**

## VEHICLE TRANSPORT PIPELINE PUMPING SYSTEM

**Marion R. Carstens, Atlanta, Ga., assignor to Georgia Tech Research Institute, Atlanta, Ga.**

**Filed Jan. 30, 1975, Ser. No. 545,339**

**Int. Cl.² B65G *51/04*; B61B *13/00***

**U.S. Cl. 243—6** **31 Claims**

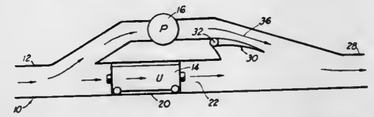
1. A transportation system comprising, in combination:

conduit means defining a path for vehicular movement therewithin and having a generally uniform cross-sectional shape of generally constant area;

a wheeled vehicle in said conduit means having a cross-sectional shape similar to but of smaller area than that of said conduit means, said vehicle presenting a high coefficient of drag with respect to air flowing through said conduit means past said vehicle;

pump means for creating a flow of air through said conduit means at a selected mass rate of flow sufficient to sweep said vehicle along said path;

said conduit means including a section having parallel branches, one of which branches defines a passage constituting a portion of said path along which the vehicle moves and the other of which branches defines an air



by-pass for said passage, said other branch being overhead with respect to said one branch and joining same at a small angle;

said pump means including a pump in said by-pass defined by said other branch and operating to divert the full flow of system air around said passage; and

control means at the confluence of said branches, said control means including a plate pivotally suspended about an axis within said other branch transverse to said passage and normally hanging downwardly to engage the top of said passage at said confluence whereby to block said passage and prevent reverse air flow through said passage.

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**4,017,040**

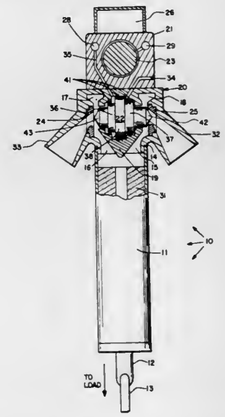
## STEERABLE EXTRACTION ROCKET

**Robert B. Dillinger, Ridgecrest, and W. James Stone, China Lake, both of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Jan. 12, 1976, Ser. No. 648,557**

**Int. Cl.² F41G *7/00***

**U.S. Cl. 244—3.22** **8 Claims**



1. A rocket motor for towing a load along a flight trajectory away from an aircraft, comprising:

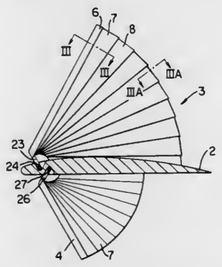
an elongated casing having first and second ends, a longitudinal axis, and having tow means fastened at said first end;

a propellant charge contained within said elongated casing for generating a high pressure gas;

a rocket nozzle housing rigidly attached to one end of said elongated casing, said rocket nozzle housing defining a plurality of apertures therethrough forming opposed rocket nozzle pairs for creating thrust by exhausting said high pressure gas from said elongated casing;
rocket nozzle closure means controlling each of said opposed rocket nozzle pairs of varying the rate of gas flow through each of said nozzles;
said rocket nozzle closure means having first and second opposed conical ends spaced from a stepped cylindrical center section, said center section defining first, second, and third diameters wherein said first diameter is larger than said second diameter and is located between said second and third diameters, and said second diameter is larger than said third diameter, each of said first, second, and third diameters being sealingly retained in sliding relationship with said rocket nozzle housing;
said first and second diameters defining a first annular face; said first and third diameters defining a second annular face; said second diameter and said first conical end being spaced apart to define a first cylindrical region having a diameter which is smaller than said third diameter, and a third annular face; said third diameter and said second conical end being spaced apart to define a second cylindrical region having a diameter equal to the diameter of said first cylindrical region, and a fourth annular face; said third and fourth annular faces, first and second cylindrical regions, and first and second conical ends all being exposed to said high pressure gas when said propellant charge is ignited;
said housing, first and second diameters, and first annular face defining a first volume; said housing, first and third diameters and second annular face defining a second volume; said first and second opposed conical ends being positioned to alternately open and close two of said rocket nozzles by reciprocative sliding motion of said rocket nozzle closure means therebetween;
sensing means for generating signals in response to the motion of said rocket motor; and
control means connected to said sensing means and operatively connected to said rocket nozzle closure means for selectively operating said closure means in response to signals from said sensing means;
said control means being operable to selectively supply said high pressure gas to said second volume, said first volume being maintained at ambient pressure.

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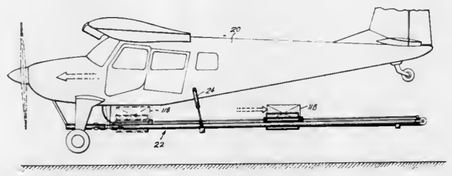
**4,017,041**
**AIRFOIL TIP VORTEX CONTROL**
**Wilbur C. Nelson, 1540 Cedar Bend Drive, Ann Arbor, Mich. 48103**
**Filed Jan. 12, 1976, Ser. No. 648,247**
**Int. Cl.² B64C *23/00***
**U.S. Cl. 244—40 R** **23 Claims**




**22.** For an airfoil of an aircraft having a longitudinal centerline, wherein the airfoil includes an upper surface, a bottom surface and an end, the improvement comprising:
a collapsible foil oriented substantially perpendicular to one said surface of said airfoil at least adjacent said end thereof and aligned at least approximately parallel to the longitudinal centerline of said aircraft; and
controllable power means for selectably extending said foil into an extended position and collapsing said foil to a fully collapsed position, said collapsible foil in said extended position projecting away from said one airfoil surface, said collapsible foil in its fully collapsed position presenting a covered profile but still protruding beyond said one airfoil surface, said collapsible foil in all its positions remaining substantially prependicular to said one airfoil surface and protruding beyond said one airfoil surface.

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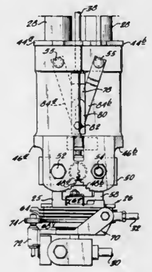
**4,017,042**
**AIRPLANE PARCEL EJECTOR**
**Darwin J. Jacobson, P. O. Box 962, Port Angeles, Wash. 98362**
**Filed Apr. 26, 1976, Ser. No. 680,064**
**Int. Cl.² B64D *1/02***
**U.S. Cl. 244—137 R** **15 Claims**




**1.** An airplane parcel ejector mechanism comprising frame means adapted to be secured to, carried by, and to extend longitudinally of the underside of an airplane; a parcel carriage mounted for travelaing movement longitudinally of said frame means; a plurality of longitudinally spaced sheave means; elastic line means having one end portion thereof connected with the airplane, being reeved about said sheave means, and having the other end portion thereof connected with said carriage; elastic line tensioning means providing tension in said elastic line means; releasable catch means for holding said elastic line tensioning means while under tension; and release means for said catch means providing for release thereof and permitting the elastic line means to impart a propelling force on said parcel carriage.

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**4,017,043**
**DEPLOYABLE ROTOR**
**Justin J. Barzda, Windsor, Conn., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**
**Filed Mar. 8, 1976, Ser. No. 664,714**
**Int. Cl.² B64D *19/02***
**U.S. Cl. 244—138 A** **7 Claims**



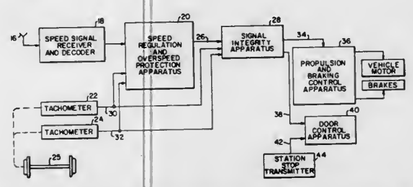
**1.** A preconing device for a deployable rotor having a pair of parallelly folded rotor blades mounted on a rotor hub for movement between stowed and flight positions, comprising, in combination:



drag means for producing a force opposite to the direction of flight;
a lanyard having a shank connected to said drag means for moving in the direction of said force, said lanyard forming a fork having a pair of parallelly spaced prongs connected together at respective one ends to form said shank and having a pair of concentric holes formed in each of the respective other ends;
a slide having a shank formed to be connected to the rotor hub for movement therewith, said slide forming a fork having a pair of parallelly spaced prongs formed to slidably register therebetween with said lanyard prongs, said slide prongs having a pair of identically aligned slots formed along the respective lengths thereof and connected together at respective one ends to form said shank;
guide means having an elongated member passing through the holes in said lanyard and simultaneously engaging the slots of said slide for limiting the motion of said lanyard within said slide to linear displacement along said slots and for slidably fixing said lanyard prongs within said slide prongs; and
spreading means including a pair of links releasably connected at respective one ends to corresponding ones of the rotor blades and rotatably connected at the respective other ends to said guide means elongated member intermediate said lanyard prongs for urging said one ends of said links along said slots upon application of said drag means force and for concomittantly spreading said other ends of said links to precone the folded rotor blades.

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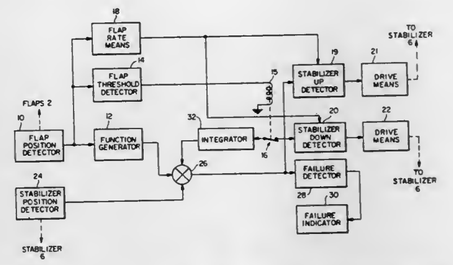
**4,017,044**
**TRAIN VEHICLE CONTROL APPARATUS**
**Larry W. Anderson, and Michael P. McDonald, both of Pittsburgh, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.**
**Filed Aug. 6, 1975, Ser. No. 602,491**
**Int. Cl.² B61L *3/24***
**U.S. Cl. 246—182 B** **8 Claims**




**1.** In control apparatus responsive to the movement of a train vehicle, the combination of:
means operative with said train vehicle for providing a first speed signal having a first polarity when said train vehicle is moving in a predetermined direction at a speed greater than a predetermined zero speed and having a second polarity when said train vehicle is not moving in said direction at greater than said predetermined zero speed,
means operative with said train vehicle for providing a second speed signal having said first polarity when said train vehicle is moving at a speed greater than said predetermined zero speed and having said second polarity when said train vehicle is not moving at greater than said predetermined zero speed, and
means for providing a vehicle control signal in response to each of said first speed signal and said second speed signal having said first polarity.

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**4,017,045**
**FLAP COMPENSATION SYSTEM FOR USE WHEN CONTROLLING THE PITCH ATTITUDE OF AN AIRCRAFT**
**Albert T. Kirchhein, Montvale, N.J., assignor to The Bendix Corporation, Teterboro, N.J.**
**Filed Dec. 24, 1975, Ser. No. 644,217**
**Int. Cl.² G05D *1/00***
**U.S. Cl. 244—194** **4 Claims**



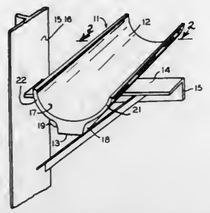

**1.** Apparatus for controlling the pitch attitude of an aircraft through aircraft flaps and a horizontal stabilizer of the aircraft, comprising:
means for providing a signal corresponding to the pilot effected rate of displacement of the flaps;
detector means connected to the flap displacement rate signal means and responsive to the signal therefrom for providing a signal when the flap displacement rate signal exceeds a predetermined threshold;
means connected to the detector means and coupled to the horizontal stabilizer and responsive to the signal from the detector means for displacing the stabilizer;
means for providing a signal corresponding to the displacement of the flaps;
means for providing a signal corresponding to the displacement of the horizontal stabilizer;
means for combining the flap displacement signal and the stabilizer displacement signal and for providing a stabilizer displacement error signal having a sense in accordance with the sense of the displacement of the flaps;
the detector means being connected to the combining means and responsive to the error signal therefrom for providing a signal when the flap displacement rate signal exceeds a predetermined threshold in a sense in accordance with the sense of the displacement of the flaps;
other detector means connected to the combining means and responsive to the error signal therefrom above a predetermined threshold for providing a failure signal;
means connected to the other detector means and responsive to the failure signal therefrom for indicating a failure; and
the other failure detector means includes time delay means whereby the error signal must remain above the predetermined threshold for a predetermined interval for the failure signal to be provided.

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**4,017,046**
**SUPPORTING, ALIGNING AND COUPLING DEVICE FOR PIPES**
**Chester F. Hicks, 203 N. Main St., Walbridge, Ohio 43465**
**Filed Apr. 25, 1975, Ser. No. 571,544**
**Int. Cl.² F16L *3/16***
**U.S. Cl. 248—55** **6 Claims**

**1.** A pipe saddle comprising a unitary structure formed of a continuous body of glass fiber reinforced resin including a cradle in the form of a segment of a right-circular cylinder of glass fiber reinforced resin; a wear block having a broad flat bottom surface extending parallel to the cylindrical axis of the cradle over a substantial portion of its length and integral with

said cradle; a core of material other than said resin conformed to the external shape of said wear block and contiguous cradle portion; wings of said cradle extending beyond said wear block as portions of said segment of a cylinder wherein said cradle segment includes a continuous layer of woven glass



fiber extending around the arc thereof and between the distal portions of said arc to reinforce said wings; and walls of said resin reinforced with glass fiber embracing said core to define said wear block, said walls cooperating with said core to form a resin and glass fiber thickness which is essentially uniform around said core and throughout said wings.

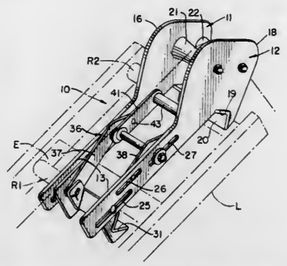
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**4,017,047**

## QUICK-RELEASE ROLLER ATTACHMENT FOR SUPPORTING A ROPE OR HOSE AND THE LIKE ON AN AERIAL LADDER

**Glenn F. Brogdon, Jr., Manassas, and Algar H. Cosby, Chantilly, both of Va., assignors to C. T. Inc., Manassas, Va.**

**Filed May 21, 1976, Ser. No. 688,580**
**Int. Cl.² H02G** *3/04*
**U.S. Cl. 248—55** **8 Claims**



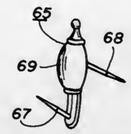
1. A quick-connect and quick-disconnect roller attachment for supporting a rope or hose and the like on an aerial ladder and the like, comprises: a pair of substantially identical, flat, parallel side plates; roller means connected at opposite ends thereof to the side plates and extending transversely therebetween for supporting a rope or hose and the like; first rung-engaging channel means carried by the side plates at one of their ends and extending transversely therebetween in a position to engage a rung of a ladder; second rung engaging channel means movably carried by the side plates at their other ends and extending transversely therebetween in opposed relation to said first rung-engaging channel means for engaging another rung of a ladder to secure the attachment to a ladder; and linkage means carried by the side plates and connected to the second rung-engaging channel means for selectively moving the second rung-engaging channel means into and out of operative engagement with a pair of spaced rungs of a ladder, said linkage means including an overcenter mechanism to latch the attachment in rung engaging position.

**4,017,048**

## METHOD OF FORMING A PUSH PIN ARTICLE AND ARTICLES PRODUCED BY THE METHOD

**Ruediger Einhorn, Katonah, N.Y., assignor to Coats & Clark Inc., Stamford, Conn.**

**Division of Ser. No. 489,051, July 16, 1974, Pat. No. 3,911,516. This application July 23, 1975, Ser. No. 598,372**
**Int. Cl.² A47G** *1/16*
**U.S. Cl. 248—216.1** **20 Claims**



1. A push pin hanger for supporting an object on a supporting surface comprising a rigid base having first and second opposite surfaces, said first surface conforming to said supporting surface, a first pin rigidly mounted in said base and extending from said first surface at an acute angle thereto in a plane normal to said first surface, and a second pin rigidly mounted in said base and extending from said second surface in said plane at an acute angle to said first surface, whereby the direction of extension of said second pin intersects said first surface at a point spaced from said first pin, the ends of said first and second pins away from said base being directed in opposite directions with respect to said base and being pointed for insertion in said supporting surface and said object respectively.

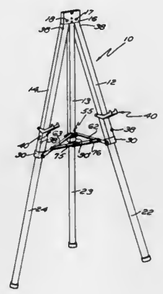
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**4,017,049**

## EASEL

**Percy Frederick Albee, Jr., Barrington, R.I., assignor to Q-Panel Company, Providence, R.I.**

**Filed May 22, 1972, Ser. No. 255,561**
**Int. Cl.² A47B** *97/04*
**U.S. Cl. 248—464** **5 Claims**



4. An easel comprising
a. at least three sleeves,
b. means pivotally securing said sleeves together at one of their ends to form the top of the easel,
c. a leg telescopically mounted in each of said sleeves,
d. pad holder means having at least two units, each unit being formed with an outwardly extending arm member, a pair of legs extending angularly upwardly from the sides of the arm member beyond said sleeve to form a channel between the legs in which said sleeve is located and means beyond said sleeve closing the open end of the channel whereby an opening is formed which slidably receives the sleeve upon which the pad holder units travel when their height is adjusted upwardly or downwardly.

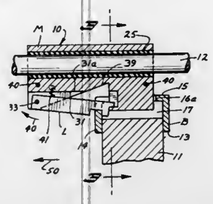


**4,017,050**

## FISHING ROD HOLDER APPARATUS

**Gordon G. Rosenau, 400-7th Ave. NW., Waseca, Minn. 56093**

**Filed Aug. 7, 1975, Ser. No. 602,584**
**Int. Cl.² A01K** *97/10*
**U.S. Cl. 248—534** **5 Claims**



1. Apparatus for releasably mounting a fishing rod on a wall portion of a boat comprising a mounting bracket mountable on the boat wall portion and a fishing rod mount having a rod mounting portion and a foot portion, said bracket having a foot portion slot and said foot portion having first means extendable into said slot for supporting the holder on the bracket, said bracket and foot portion having cooperating means for releasably locking the mount to the bracket when said first means is extended into said slot, the foot portion cooperating means including a fishing rod mount that is slidably extendable into said slot, a latch having a first end portion and a second end portion, said first end portion having means for latchingly engaging the bracket, means for mounting the latch on the fishing rod mount for pivotal movement between a latching position and a release position, and means for resiliently urging the latch to its latching position, the fishing rod mount having stop means abuttable against the latch for limiting the pivotal movement of the latch from its release position toward the latching position to the latching position, the bracket cooperating means including a bracket wall portion adjacent the slot and the first end portion means comprising latch edge portions defining a latch slot of a size for the last mentioned wall portion to extend into, one of said latch edge portions in the latch latching position being abuttable against said wall portion to lock the mount to the bracket.

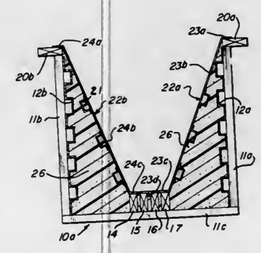
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**4,017,051**

## LIGHTWEIGHT CONCRETE BEAM FORM

**Samuel C. Scott, Rte. 1, Box 369, Franktown, Colo. 80116, and David R. Wells, 6862 Marshall St., Arvada, Colo. 80003**

**Filed Aug. 18, 1975, Ser. No. 605,321**
**Int. Cl.² E04G** *13/04*
**U.S. Cl. 249—50** **7 Claims**



1. A rigid, lightweight beam form for molding long concrete beams comprising:
a. a plurality of U-shaped members spaced apart;
b. a pair of opposed corrugated metal sheets secured to the insides of the legs of said U-shaped members in generally upright, parallel position;
c. a bottom support assembly secured to the cross members of said U-shaped members and extending the length of the form;
d. non-stick, flexible, but essentially rigid, plastic sheet means extending longitudinally of the form and extending laterally from the top of one of said corrugated metal sheets to the top of the opposite corrugated metal sheet and formed in a general U-shape having the profile of the desired beam; and
e. essentially rigid, foamed plastic filling the space between said non-stick plastic sheet means and said opposed corrugated metal sheets and adhered thereto.

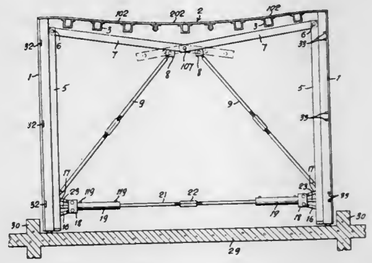
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**4,017,052**

## TUNNEL LIKE FORMWORK

**Giovanni Azzaroni, 8, Via Botticelli, Bologna, Italy**

**Filed Nov. 5, 1975, Ser. No. 628,959**
**Claims priority, application Italy, July 9, 1975, 12692/75**
**Int. Cl.² E04G** *11/02;* **B28B** *7/30*
**U.S. Cl. 249—183** **3 Claims**



1. Apparatus providing two laterally spaced, parallel, vertical mold form surfaces and one elevated horizontal mold form surface extending between the upper edges of the vertical mold form surfaces, for use in the casting of concrete, in situ, to form the walls and floors of a building, said apparatus comprising a tunnel-like formwork composed of:
two side shuttering panels each defining a respective one of the vertical mold form surfaces;
a flexible upper shuttering panel composed of two side sections, each fastened to the upper edge of a respective one of said side shuttering panels, and an intermediate, replaceable control section disposed between, and bolted to, said side sections, said two side sections and said intermediate section having upper surfaces defining the horizontal mold form surface; and
a plurality of supporting wheels pivotally mounted to the lower edges of said side shuttering panels and projecting below said side panels for permitting rolling of said apparatus to a work location, and a framework structure disposed inside of said formwork and composed of:
at least two pairs of upright members, with the members of each pair being disposed opposite one another and one member of each pair being fastened to a respective one of said side shuttering panels and being substantially coextensive in height with said side shuttering panels;
at least two pairs of arms, each pair of arms being associated with a respective pair of said upright members, one arm of each pair being pivotally connected at one end to the upper edge of a respective upright member of its associated pair and the two arms of each pair being pivotally connected together at their respective other ends;
a plurality of pairs of inclined struts, each pair being associated with a respective pair of said arms and each strut having an upper end pivotally connected to a respective arm of its associated pair at a point near said other end of its respective arm, each said strut having an adjustable length;
two pairs of parallel, vertical guide members, with each guide member of each pair being secured to a respective one of said side shuttering panels, and each guide member defining a vertical guide channel;

a pair of first shafts each disposed adjacent a respective one of said side shuttering panels and two pairs of first guide wheels, with the guide wheels of each pair being rotatably mounted on respective ends of a respective one of said first shafts and each first guide wheel being located in a guide channel of a respective one of said guide members which is secured to that side shuttering panel which is associated with the shaft on which said guide wheel is mounted, each said guide wheel being vertically movable in the guide channel in which it is located;

a plurality of pairs of sleeves, each pair being associated with a respective pair of said struts and each sleeve being secured to the lower end of a respective strut of its associated pair and being pivotally mounted on a respective shaft of said pair of first shafts;

a pair of second shafts each disposed adjacent a respective one of said side shuttering panels at a location below a respective one of said first shafts and two pairs of second guide wheels, with the wheels of each pair being rotatably mounted on respective ends of a respective one of said second shafts and each second guide wheel being located in a guide channel of a respective one of said guide members which is secured to that side shuttering panel which is associated with the second shaft on which said second guide wheel is mounted, each said second guide wheel being vertically movable in the guide channel in which it is located, below said first guide wheel located in the same guide channel;

two pairs of bearing feet, with one foot of each pair being connected to a respective one of said second shafts and extending downwardly for movement, with its respective shaft, in a vertical direction to an extended position in which said foot projects below said supporting wheels;

power actuated reciprocating means comprising two double acting, fluid driven cylinders extending between said side shuttering panels and each containing a piston and each disposed adjacent a respective associated one of said side shuttering panels, a pair of first piston rods each connected to a respective one of said pistons and extending through one end of its associated cylinder, said rods having their free ends extending toward one another, means connecting said free ends of said first piston rods together while permitting adjustment of the distance between said pistons, a pair of connecting plates each secured to a respective one of said cylinders at the end thereof directed toward its associated side shuttering panel, and a pair of second piston rods each connected to a respective one of said pistons and extending through the end of its associated cylinder to which the respective plate is secured, each said second rod extending through said respective plate;

a pair of first links each having one end pivotally connected to a respective one of said plates and its other end pivotally connected to that respective one of said first shafts associated with the same side shuttering panel;

a pair of second links each having one end pivotally connected to a respective one of said plates and its other end pivotally connected to that respective one of said second shafts associated with the same side shuttering panel; and

a pair of third link means each having one end pivotally connected to the free end of a respective one of said second piston rods and its other end pivotally connected to the associated one of said side shuttering panels;

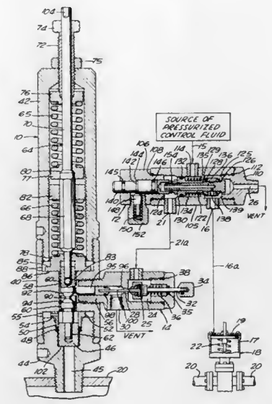
whereby movement of said cylinders away from one another causes simultaneous upward movement of all of said first guide wheels to move all of said struts in a direction to raise all of said arms into a common horizontal plane, downward movement of all of said second guide wheels to move all of said bearing feet into bearing engagement with the underlying surface, and outward movement of said side shuttering panels to stretch said upper shuttering panel in a horizontal plane.

**4,017,053**

## FLUID PRESSURE MONITORING SAFETY SYSTEM

**Richard E. Wells, Westminster; Victor E. Derval, Seal Beach, and John D. Muchow, Cerritos, all of Calif., assignors to Willis Oil Tool Co., Long Beach, Calif.**

**Filed Feb. 6, 1974, Ser. No. 440,165**
**Int. Cl.² F16K *31/143***
**U.S. Cl. 251—58** **7 Claims**




1. A monitor pilot to control an actuator pilot in a control system by venting the actuator pilot in response to pressure changes in a fluid line,

said monitor pilot having in combination:

a body;

a piston in the body exposed to the pressure in the fluid line, said piston having a normal position when the pressure in the fluid line is in a predetermined normal range;

spring means in the body effective to move the piston out of its normal position in response to departure from said normal range of the pressure in the fluid line;

a normally closed relief valve for connection to the actuator pilot to vent the actuator pilot;

a cam movable with the piston;

a longitudinally reciprocable follower cooperative with the cam,

said follower having a normal position at the normal position of the piston and being displaced from its normal position by displacement of the piston from its normal position to cause said follower to be displaced from its normal position,

said follower being operatively connected to said relief valve to open the relief valve by displacement of the follower from its normal position;

said spring means comprising a first spring and a second spring in end-to-end relation;

said first spring opposing the fluid pressure on the piston and being of a strength to move the piston in one direction out of its normal position in response to drop in the pressure on the fluid line below said normal range,

said second spring opposing the fluid pressure on the piston and being of a strength to yield and permit the fluid pressure to move the piston in the opposite direction out of its normal position in response to rise in pressure in the fluid line above said normal range;

said cam being shaped and dimensioned to displace the follower in response to the movement of the piston in either direction out of its normal position;

a rod extending axially from the piston;

said two springs surrounding the rod in axial alignment with each other;

a first seat for the first spring slidably and rotatably embracing the rod;



a bushing in screw threaded engagement with the body and in abutment with the first seat and being rotatable to shift the first seat axially to vary the pressure exerted by the first spring;

a second seat for the second spring slidably embracing a portion of the rod in screw threaded engagement with the body,

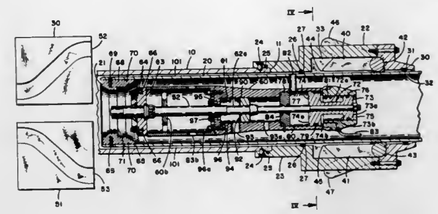
said second seat having a non-circular opening for said portion of the rod and said portion of the rod being of corresponding non-circular cross sectional configuration, whereby the rod may be rotated to shift the second valve seat axially to vary the pressure of the second spring.

**4,017,055**

## PNEUMATIC VALVE APPARATUS

**Calvin C. Daughetee, Arlington, and Sidney Z. Winski, Dallas, both of Tex., assignors to Vought Corporation, Dallas, Tex.**

**Division of Ser. No. 436,567, Jan. 25, 1974, Pat. No. 3,901,276. This application May 21, 1975, Ser. No. 579,743**
**Int. Cl.² F16K *31/363***
**U.S. Cl. 251—62** **4 Claims**



1. Apparatus for closing the end of a tube when the pressure in an area surrounding the open end of said tube is lower than the pressure within said tube comprising:

a. an annular valve seat within the open end of said tube having a central opening therein with an inwardly projecting shoulder,

b. a shaft mounted coaxially within said tube for reciprocal movement between first and second positions,

c. valve plate means mounted on said shaft and adapted to mate with said valve seat and close the end of said tube when said shaft is in said second position,

d. a double-ended piston mounted on said shaft, said double-ended piston comprising first and second flanges radially extending from said shaft and adapted for reciprocal movement within first and second cylinders, respectively, the diameter of said first cylinder being larger than the diameter of said second cylinder, said first flange and said first cylinder defining a control chamber having a maximum volume when said shaft is in said first position and a minimum volume when said shaft is in said second position, said first flange, said first cylinder, said second flange and said second cylinder defining a variable volume relief chamber having a mimimum volume when said shaft is in said first position and a maximum volume when said shaft is in said second position, and the face of said second flange being exposed to the pressure of the fluid within said tube,

e. relief vent means for maintaining atmospheric pressure within said relief chamber, and

f. control vent means providing fluid communication between said control chamber and said area surrounding the open end of said tube.

**4,017,054**

## CONDITION RESPONSIVE VALVE CONSTRUCTION

**Harley V. Bible, Maryville, and William T. Moon, Jr., Knoxville, both of Tenn., assignors to Robertshaw Controls Company, Richmond, Va.**

**Division of Ser. No. 516,429, Oct. 21, 1974, Pat. No. 3,937,244. This application Nov. 19, 1975, Ser. No. 633,364**
**Int. Cl.² F16K *31/126***
**U.S. Cl. 251—61.4** **9 Claims**



1. In a condition responsive valve construction having a valve member moved relative to a valve seat to control fluid flow through said valve construction in relation to a condition being sensed by condition responsive means of said valve construction, a plunger forming part of said condition responsive means and being engageable with said valve member to move the same upon movement of said plunger, a tubular member forming part of said condition-responsive means and telescopically receiving a portion of said plunger therein, said condition responsive means having a movable wall operatively associated with said tubular member to move said tubular member relative to said valve seat in relation to said condition being sensed, and means for normally maintaining a certain telescoped relation of said plunger and said tubular member during movement of said tubular member by said wall, the improvement wherein said means for normally maintaining said certain telescoped relation comprises shoulders respectively on said plunger and said tubular member and a spring acting between said tubular member and said plunger to tend to maintain said shoulders in contact with each other.

**4,017,056**

## SERVO CONTROL SYSTEM FOR ELECTRO-HYDRAULIC INLET VALVES

**Thomas H. Schwalenstocker, Indiana Township, Glenshaw, and William E. Zitelli, Middletown Township, Media both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed Feb. 23, 1976, Ser. No. 660,747**
**Int. Cl.² F16K *31/02***
**U.S. Cl. 251—131** **10 Claims**

10. A system for controlling the position of an electro-hydraulically operated valve, comprising

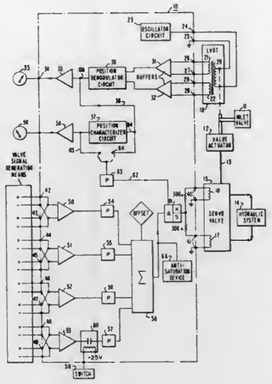
A. a valve;

B. means including a valve actuator operative to position the valve in accordance with the value of an electrical valve position signal;

C. means operative to generate an electrical feedback signal having a characteristic corresponding to the position of the valve;

D. a proportional plus integral controller operative to generate at its output the valve position signal in accordance with the value of the valve control signal and the feedback signal at its input;

E. means to apply an electrical valve control signal to the controller;



F. said means to apply the electrical valve control signal includes a plurality of input terminal pairs, each pair being connectable to said signal, an input buffer having its input connected across each pair of input terminals, and a summing device connected in common to each buffer output to average the signals at the buffer output.

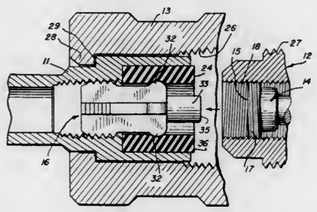
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**4,017,057**

## ADJUSTABLE VALVE CORE DEPRESSOR

**Richard V. Strybel, Elk Grove Village, Ill., assignor to Imperial-Eastman Corporation, Chicago, Ill.**

**Filed Apr. 28, 1976, Ser. No. 681,136**
**Int. Cl.² F16L** *37/28*
**U.S. Cl. 251—149.1** **14 Claims**



1. In a fluid coupling having a body defining an outer end portion, a through bore opening outwardly through said body outer end portion, a connector having a body defining an inner end portion, a bore opening inwardly through said connector inner end portion, a biased-closed valve in said bore at said connector inner end portion and having an operating element projecting inwardly for opening the valve as an incident of the outward depression of said operating element, and means for removably securing said connector to said coupling body, improved valve depressor means comprising:

means defining a stepped recess in the outer end of said body bore, said recess having an outer portion defining an inner radial shoulder, and a threaded inner portion extending inwardly from said shoulder;

a resilient tubular seal element coaxially in said recess abutting said shoulder; and

a valve operator having an inner threaded end threaded to said body in said threaded inner portion of said body bore, a retainer portion outwardly of said threaded end having a locking portion frictionally radially outwardly engaging said seal element for selectively retaining said depressor in adjusted disposition in said recess, and a depressor portion extending outwardly from said retainer portion in adjusted, fixed disposition for depressing said valve as an incident of connection of said connector to said coupling body in sealing engagement with said seal.

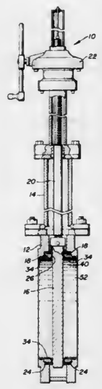
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**4,017,058**

## RETAINER FOR SEAT RING ON GATE VALVE

**Bert L. Morrison, Houston, Tex., assignor to ACF Industries, Incorporated, New York, N.Y.**

**Filed Nov. 5, 1975, Ser. No. 628,871**
**Int. Cl.² F16K** *3/02*
**U.S. Cl. 251—328** **14 Claims**



5. A gate valve, comprising:

a. a gate valve body having an annular seat pocket around a flow passageway and having a gate movably mounted in said gate valve body for movement between open and closed positions relative to said flow passageway,

b. a seat ring mounted in said annular seat pocket and having an annular sealing portion on one side thereof in contact with said gate, said seat ring having an inner periphery forming generally a continuation of the flow passageway,

c. a recess in said valve body opening into said flow passageway and spaced closely from the seat ring in a direction axially of the flow passageway, and

d. a seat ring retainer having one end portion secured to the inner periphery of said seat ring and extending longitudinally of the flow passageway to said recess, the opposite end portion of said retainer being free and extending outwardly within the recess to retain said seat ring in place in said gate valve body.

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**4,017,059**

## DEVICE FOR STRESSING WITH A LIMITED FORCE, IN PARTICULAR FOR A BELT TENSIONER

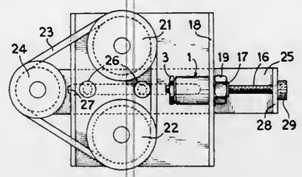
**Gabriel Laine, Andresy, France, assignor to Automobiles Peugeot, Paris, France**

**Filed Aug. 12, 1976, Ser. No. 713,976**
**Claims priority, application France, Sept. 11, 1975, 75.27854**
**Int. Cl.² B66F** *3/08*
**U.S. Cl. 254—54** **12 Claims**

1. A stressing device for acting on an element which is



movable or adjustable with respect to a fixed support, the device comprising means defining a body for fixing to the support, a screw, a nut and coaxial with and cooperative with the screw, elastically yieldable means adapted to determine the force applied on the element, two abutments integral with



the body the nut being interposed between the abutments, complementary means respectively provided on the nut and a first of said abutments for ensuring a releasable connection between the nut and the first abutment, the elastically yieldable means being disposed between the nut and a second of said abutments.

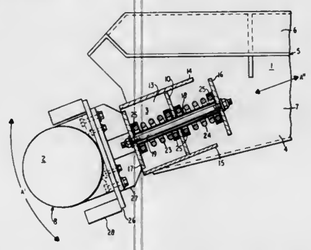
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**4,017,060**

## TUNED VIBRATORY FEEDERS

**James Edward Brander, and John David Davies, both of Strathfield, Australia, assignors to International Combustion Australia Limited, Australia**

**Continuation-in-part of Ser. No. 530,472, Dec. 6, 1974, abandoned, which is a continuation-in-part of Ser. No. 308,877, Nov. 22, 1972, abandoned. This application May 28, 1976, Ser. No. 690,741**
**Claims priority, application Australia, Dec. 9, 1971, 7314/71**
**Int. Cl.² F16H** *33/00;* **B65G** *27/18;* **B01F** *11/00*
**U.S. Cl. 259—1 R** **4 Claims**



1. A vibrator of the tuned two mass type comprising a working member, an imbalance generator of the type having eccentric weights secured to a rotating shaft, and a spring system coupling the imbalance generator to the working member, the spring system comprising a wall member secured to the working member, two vibrator plates held in fixed spaced parallel relationship with one vibrator plate on one side of the wall member and the other vibrator plate on the other side of the wall member, at least two pairs of helical coil springs held without clamping of the spring ends between the wall member and the vibrator plates, one spring of a pair being held between said one vibrator plate and the wall member, and the other spring of a pair being held between said other vibrator plate and the wall member, the springs of a pair being collinear, the imbalance generator being secured to said one vibrator plate outside of the spring system, the vibrator having a natural axial frequency which is close to but higher than the frequency of the oscillatory forces generated by the imbalance generator, the distance by which the imbalance generator is outside the spring system being sufficient to make the natural lateral frequency of the vibrator small compared to the frequency of the oscillatory forces generated by the imbalance generator.

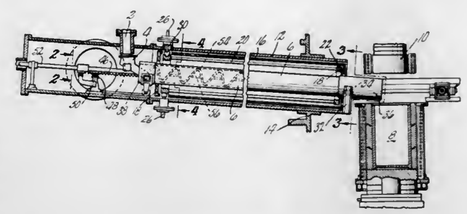
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**4,017,061**

## CONVEYOR TUBE FOR A PARTICULATE HEATING FURNACE

**Vernon F. Manz, North Palm Beach, and Robert A. Metcalfe, West Palm Beach, both of Fla., assignors to United Technologies Corporation, Hartford, Conn.**

**Filed Dec. 4, 1975, Ser. No. 637,626**
**Int. Cl.² C21B** *11/06*
**U.S. Cl. 266—173** **3 Claims**



1. A furnace for heating particulate material including:

a cylindrical housing,

a cylindrical insulator within and spaced from the housing and end caps with openings therein,

a heater in the form of a plurality of resistance heating rods parallel to the cylindrical insulator and within the insulator and supported from the surrounding cylindrical housing, said rods forming a cylinder located concentrically within the insulator,

a rotary tube concentrically within the heating cylinder for conveying particulate material through the heater, said tube having a helical rib internally for translating material axially through the tube and spaced axially extending ribs internally of the tube to cause tumbling of the material within the tube, said tube extending through the openings in the insulating end caps, and

the several cylinders being positioned at an acute angle to the horizontal to increase the axial rate of travel of the particulate material through a tube.

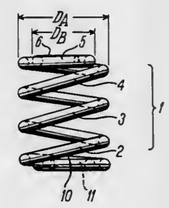
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**4,017,062**

## PRESSURE SPRING

**Eckhard Zwirner, Nufringen, Germany, assignor to Stumpp & Schule KG, Beuren, Germany**

**Filed Sept. 18, 1975, Ser. No. 614,665**
**Claims priority, application Germany, Sept. 18, 1974, 314151[U]; May 15, 1975, 2521646**
**Int. Cl.² F16F** *1/04*
**U.S. Cl. 267—166** **9 Claims**

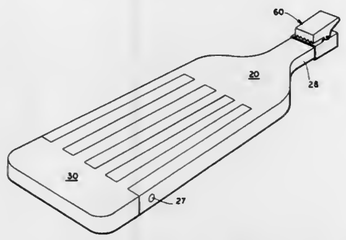


1. A helical valve spring with a plurality of first windings of a first diameter and at least one second winding with a second diameter, which is different from the first diameter, in which each second winding is provided adjacent to one of the first windings and connected to it by a transitional zone of changing diameter, which spring is in a first condition of operation, in which a valve operatively associated with the valve spring is closed, compressed to a first extent and, in a second condition of operation, in which the operatively associated valve is open,

still further compressed to a second extent, characterized in that each transitional zone, at least in the second condition of operation, is in frictional contact over a predetermined area with its respective adjacent winding.

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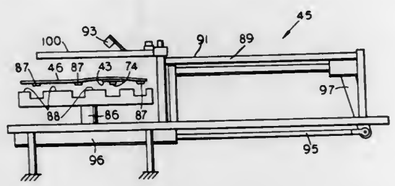
**4,017,063**
**FOOD PROCESSING BOARD**
**Joseph J. Brusich, 2702 N. Hudlow Court, Tucker, Ga. 30084**
**Filed Oct. 28, 1975, Ser. No. 626,614**
**Int. Cl.² A47J** *43/00*
**U.S. Cl. 269—302.1** **4 Claims**




1. An expandable food product processing board comprising a first section including a plurality of elongated parallel projections defining elongated spaces therebetween, a second section including a plurality of elongated parallel projections defining elongated spaces therebetween, with the lengths of the projections of each section being slidably received along the lengths of the spaces of the other section and with the opposite sides of the projections forming opposite flat coplanar surfaces of the processing board, the projections and spaces of each of said sections being of lengths so that the projections of each section substantially fill the spaces of the other section when the sections are moved together, whereby when the sections are expanded apart the projections of each section withdraw from the spaces of the other section and maintain flat working surfaces on opposite surfaces of the processing board, stop means for limiting the distance of the sections can withdraw from each other, and clamp means mounted on one of said sections for holding a food product on said board.

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**4,017,064**
**APPARATUS FOR MANUFACTURING AND STACKING HEMMED FABRIC PIECES**
**Douglas J. Crawford, Waterford; Roger LeMere, Petersburg, and Francis H. Hughes, North Troy, all of N.Y., assignors to Cluett, Peabody & Co., Inc., New York, N.Y.**
**Division of Ser. No. 344,227, March 23, 1973, Pat. No. 3,898,941. This application Apr. 23, 1975, Ser. No. 570,810**
**Int. Cl.² B65H** *39/06*
**U.S. Cl. 270—58** **3 Claims**

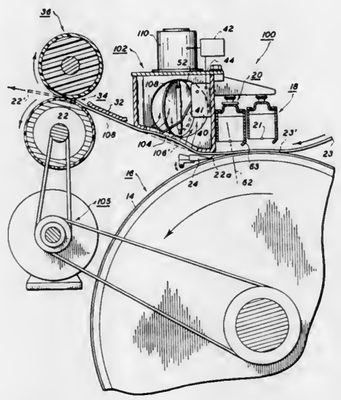



1. Apparatus for positioning sequentially on a continuously moving conveyor, two pieces of sheet material together in proper orientation with each other and in a path defined by said continuously moving conveyor, comprising

a. said continuously moving conveyor being a plurality of spaced parallel endless belts;
b. a horizontal first piece receiving shutter movable from a first position spaced vertically above said path to a second position to one side of said path;
c. first power means connected to said shutter for the movement thereof from one position to the other;
d. a staging platform in said path;
e. said staging platform having an upper surface defined by a plurality of alternating lands and grooves and portions of said endless belts being received in said grooves; the improvement characterized by
f. a positioning abutment on said shutter for engaging, sequentially, one side edge of pieces received thereon to hold a piece relative to said shutter to permit the shutter to be moved from beneath the piece;
g. sensing means on said abutment for sensing said received pieces and activating said first power means to cause said shutter to move from said first position to said second position;
h. a second piece receiving cavity in said spaced lands for receiving, sequentially, and holding a second piece to be positioned in relation to a first piece on said shutter;
i. said staging platform being movable vertically in said path from a position with said lands and said cavity above the upper surfaces of said belts to a position with said lands and said cavity below said belts;
j. second power means for moving said staging platform;
k. switch means actuated when said shutter moves to said second position for actuating said first and second power means for causing said shutter to move back to said first position and said platform to move below said conveyor;
l. whereby positioning a piece against said abutment activates said sensing means to cause said shutter to move from said first position to said second position thereby dropping said piece onto said staging platform, and movement of said shutter to said second position activates said switch means causing said shutter to move back to said first position and said platform to move below said conveyor to cause said positioned first piece and a second piece in said cavity to drop onto said conveyor in proper position to each other.

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**4,017,065**
**TRANSFER-FUSING SPEED COMPENSATION**
**Raymond E. Poehlein, Penfield, N.Y., assignor to Xerox Corporation, Stamford, Conn.**
**Filed Apr. 29, 1976, Ser. No. 681,309**
**Int. Cl.² B65H** *29/24, 29/54*
**U.S. Cl. 271—80** **11 Claims**




1. In a copying system in which an unfused image of imaging material is transferred from a moving initial image support surface means onto one side of a copy sheet while said copy sheet overlies the initial image support surface and moves therewith, and in which a lead area of the transferred unfused image-bearing copy sheet is then engaged by a moving sheet transport means spaced from the initial image support surface while a trail area of the same copy sheet is still moving with the initial image support surface, with the copy sheet extending therebetween, the improvement comprising:

speed control means for moving said initial image support surface and said sheet transport means at a pre-set speed differential for moving the lead area and the trail area of the same copy sheet at different speeds when said lead area of the copy sheet is engaged by said sheet transport means,

vacuum guide surface means for vacuum supporting the copy sheet against a vacuum guide surface from the side of the copy sheet opposite from the side bearing the transferred unfused image,

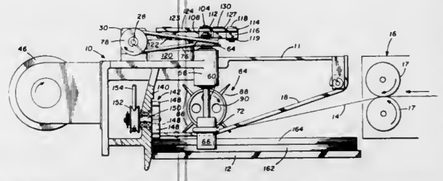
said vacuum guide surface means being positioned between said initial image support surface and said sheet transport means for guiding the copy sheet therebetween, and

vacuum control means cyclicly actuable for reducing the vacuum applied to said vacuum guide surface in coordination with the extension of the copy sheet between said initial image support surface and said sheet transport means for movement of the copy sheet away from said vacuum guide surface by said pre-set speed differential from said speed control means for speed variation compensation.



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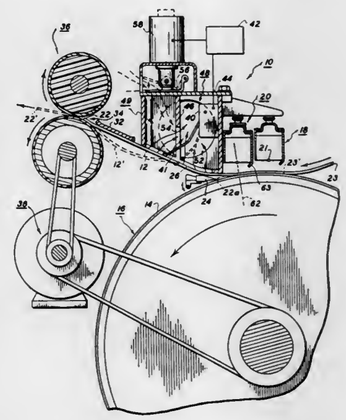
**4,017,066**
**SET SEPARATOR**
**David C. Lasher, Lewisville, Tex., and Kenneth F. Blanchard, Macedon, N.Y., assignors to Xerox Corporation, Stamford, Conn.**
**Filed June 4, 1976, Ser. No. 692,829**
**Int. Cl.² B65H** *29/22, 33/08*
**U.S. Cl. 271—80** **4 Claims**




1. A set separator for offsetting sets of sheets comprising: support means having stop means; means for moving a sheet toward said stop means; said sheet moving means including a first pair of paddle wheels rotatably carried by said support means, each of said paddle wheels comprising a main portion having a plurality of circumferentially spaced flexible members extending outwardly therefrom; said paddle wheels being rotatable about aligned axes of rotation; said paddle wheels being in the path of travel of the sheet and being spaced apart a distance less than the dimension of the leading edge of the sheet; means for simultaneously shifting said paddle wheels from a first position, wherein the force exerted thereby on a sheet is in the general direction of movement of the sheet and to one side, to a second position wherein the force exerted thereby is in the general direction of movement of the sheet and to the opposite side, and for simultaneously shifting said paddle wheels back to said first position; means for rotating said paddle wheels in the same direction to move the sheet toward said stop means; said sheet moving means further including a pair of vertical sideposts rotatably supported by said support means and spaced apart in a direction transverse to the direction of sheet travel; said spacing between said posts being greater than the dimension of the leading edge of the sheet; said paddle wheels in said first position urging the side edge of the sheet against one of said posts and when in said second position, directing the opposite side edge of the sheet against the other of said posts; and means for rotating said posts in opposite directions to each other for moving the sheet toward said stop means.

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**4,017,067**
**TRANSFER-FUSING SPEED COMPENSATION**
**Nicholas M. Soures, Penfield; James W. Patterson, Sodus, and Wayne C. Powley, Lyons, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.**
**Filed July 20, 1976, Ser. No. 706,996**
**Int. Cl.² B65H** *29/24, 29/54*
**U.S. Cl. 271—80** **6 Claims**




1. In a copying system in which an unfused image of imaging material is transferred from a moving initial image support surface means onto one side of a copy sheet while said copy sheet overlies the initial image support surface and moves therewith, and in which a lead area of the transferred unfused image-bearing copy sheet is then engaged by a moving sheet transport means spaced from the initial image support surface while a trail area of the same copy sheet is still moving with the initial image support surface, with the copy sheet extending therebetween, the improvement comprising:

speed control means for moving said initial image support surface and said sheet transport means at a pre-set speed differential for moving the lead area and the trail area of the same copy sheet at different speeds when said lead area of the copy sheet is engaged by said sheet transport means,

vacuum guide surface means for vacuum supporting the copy sheet against a stationary vacuum guide surface from the side of the copy sheet opposite from the side bearing the transferred unfused image,

said vacuum guide surface means being positioned between said initial image support surface and said sheet transport means for guiding the copy sheet therebetween, and

vacuum control means cyclically actuable for reducing the vacuum applied to said vacuum guide surface in coordination with the extension of the copy sheet between said initial image support surface and said sheet transport means for movement of the copy sheet away from said vacuum guide surface by said pre-set speed differential from said speed control means for speed variation compensation;

wherein said vacuum guide surface means comprises at least first and second pneumatically discrete vacuum chambers with respective apertured surfaces providing pneumatically discrete first and second areas of said vacuum guide surface, wherein both of said vacuum chambers are provided with penumatic vacuum from a pneumatic vacuum

generating means and said second vacuum chamber is controlled by said vacuum control means;

wherein said vacuum guide surface first area is adjacent said initial image support surface and vacuum support is maintained therethrough for the copy sheet without substantial reduction by said vacuum control means;

wherein said vacuum guide surface second area is further spaced from said image support surface than said first area and the copy sheet is vacuum retained thereagainst only when said vacuum control means is operative to maintain said vacuum support; and

wherein said vacuum control means comprises an automatically actuated pneumatic valve for rapidly pneumatically venting said one vacuum chamber to atmosphere to rapidly reduce the vacuum therein.

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**4,017,068**

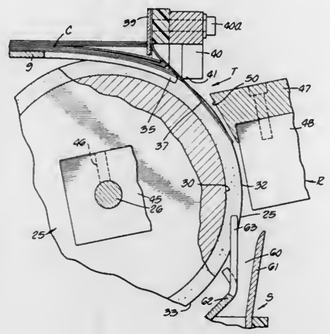
**CARD TRANSPORT APPARATUS**

**James W. McKee, Mission Viejo, Calif., assignor to True Data Corporation, Santa Ana, Calif.**

**Division of Ser. No. 198,722, Nov. 15, 1971, Pat. No. 3,847,382. This application Nov. 11, 1974, Ser. No. 522,736**

**Int. Cl.² B65H 5/06**

**U.S. Cl. 271—275** **9 Claims**



1. In apparatus for handling data cards: a read station, and transport means for moving said cards past said station, said transport means comprising a single card feed roll having a resilient friction surface for moving a card therewith in response to pressure contact of said card with said resilient surface, and pressure applying means for holding said card in pressure contact with said resilient surface, said feed roll having an annular peripheral groove in said resilient surface, and said pressure applying means being located within the extent of said groove axially of said roll, and being spaced from the bottom of the groove whereby said roll is continuously rotatable without contact with said pressure applying means and said pressure applying means is in position to effect transport of a card upon presentation of a card between said resilient surface and said pressure applying means.

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**4,017,069**

**DIVING PLATFORM**

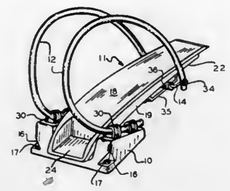
**Lewis J. Daly, Fayetteville, and Alan W. Brownlie, Skaneateles, both of N.Y., assignors to Robert C. Stevens, Pottsford and John M. Loftus, Scottsville, both of, N.Y.**

**Filed Oct. 28, 1975, Ser. No. 626,297**

**Int. Cl.² A63B 5/10**

**U.S. Cl. 272—66** **8 Claims**

1. A diving platform comprising a base member, a board member pivotally connected at one end to the base member, a pair of spring arms secured to the base member on opposite sides of the board member, the spring arms extending upwardly and outwardly from the base member and terminating adjacent a position on the board member that is spaced outwardly from its pivotal connection with the base member, and a cross bar connected to the outer, free ends of the spring



arms and passing beneath the board member to support the outer end of same.

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**4,017,070**

**TRAINING DEVICE FOR POLE VAULTERS**

**H. Ronald Hilton, 7 Morningside Drive, Pennington, N.J. 08534**

**Filed Sept. 29, 1975, Ser. No. 617,622**

**Int. Cl.² A63B 5/06**

**U.S. Cl. 272—104** **6 Claims**



1. The combination, with a vaulting pole, of a universal, quickly-adjustable device for training vaulters in sound vaulting techniques and in particular for properly locating the vaulter's hands upon said pole, said device comprising means extending longitudinally of the vaulting pole and formed to deter the vaulter from grasping the pole between the opposite extremities of said means, said means including a pair of collars slidably, removably mounted upon the pole, each collar including means for fixing the same to the pole against movement from a selected position to which the collar is slidably moved therealong, and adjustably extensible elements extending between the collars and carried thereby in positions to deter a user from grasping the pole in the area between the collars.

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**4,017,071**

**MACRAME SWING AND METHOD OF FORMING**

**Jim Wright, Rte. 3, Box 348, Rockingham, N.C. 28379**

**Filed Feb. 23, 1976, Ser. No. 660,106**

**Int. Cl.² A63G 9/00**

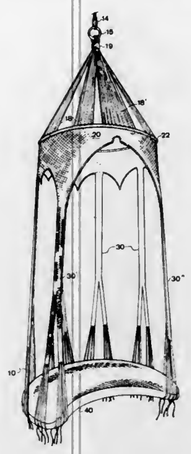
**U.S. Cl. 272—85** **5 Claims**

1. A swing apparatus of the type adapted to carry a human occupant suspended above the ground or floor from a stationary elevated support comprising:

a. an upper support ring and a generally planar, lower seat member spaced from said support ring and having front, rear, and side edges;



b. a plurality of spaced straps connecting spaced points on said ring with spaced points around the sides and rear edges of said seat member, each of said straps being formed of a plurality of cord lengths knotted together according to conventional macrame techniques;



c. the front edge of said seat being void of any straps extending between said front edge and said ring, said ring front edge having a length of at least 16 inches to accommodate a normal occupant; and

d. means connecting said support ring and stationary support for suspending said support ring from said stationary support.

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**4,017,072**

**ELECTRICALLY OPERATED GAME APPARATUS**

**Lynn C. Kurtz, 2104 Campo Alegro, Tempe, Ariz. 85281**

**Filed July 9, 1975, Ser. No. 594,509**

**Int. Cl.² A63F 9/00**

**U.S. Cl. 273—1 E** **7 Claims**

1. An electrically operated game played between a first player and a second player, said game comprising, in combination:

a. a play area formed by a plurality of contiguous elements arranged on a matrix having at least two axes, said elements including

i. a plurality of neutral elements; and

ii. a plurality of scoring elements associated with each player, said scoring elements being located among said neutral elements and dispersed across said play area;

b. means for designating one of said contiguous elements;

c. means for incrementally moving the location of said designated element to a contiguous element;

d. means operable by said first player for moving said designated element a single increment along a first axis of the matrix of said play area when said operable means is momentarily operated;

e. means operable by said second player for moving said designated element a single increment along a second axis of the matrix of said play area when said operable means is momentarily operated; and

f. means for indicating a score for one player whenever said designated element is also a scoring element associated with said one player.

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**4,017,073**

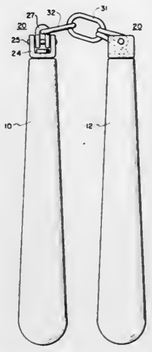
**HAND COMBAT WEAPON**

**Douglas B. Dolan, 620 Fairview Ave., Neptune, N.J. 07753**

**Filed Jan. 5, 1976, Ser. No. 646,662**

**Int. Cl.² F41B 15/02**

**U.S. Cl. 273—84** **7 Claims**



1. In combination with a "nunchaku" type weapon having at least two elongated members, means for coupling the adjacent ends of said elongated members together comprising swivel assemblies connecting each of the pairs of said adjacent ends; each of said swivel assemblies comprising a first elongated pivot bolt extending centrally within a first end of each of said pairs of adjacent ends; a second elongated pivot bolt extending centrally within a second end of each of said pairs of adjacent ends; each of said elongated pivot bolts having a rigid, enlarged, head portion; a first U-shaped swivel having a flat center portion, said center portion having a centrally-located hole, fitting loosely about said first pivot bolt beneath its enlarged head portion; a second U-shaped swivel having a flat center portion, said center portion having a centrally-located hole fitting loosely about said second pivot bolt beneath its enlarged head portion; a first clevis pin extending between the opposing sides of said first U-shaped swivel; a first clevis having a lower and an upper portion, said lower portion of said first clevis forming a first loop about said first clevis pin, said upper portion of said first clevis forming a second loop; a second clevis pin extending between the opposing sides of said second U-shaped swivel; a second clevis having a lower portion and an upper portion, said lower portion of said second clevis forming a first loop about said second clevis pin, said upper portion of said second clevis forming a second loop; and means for connecting said second loops of said first and second clevises of each of said pairs of adjacent ends to provide a freely-swivelling coupling between said members.

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**4,017,074**

**TABLE BASEBALL GAME**

**Goodwin N. Roberts, 17 W. 174 Deerpath Road, Bensenville, Ill. 60106**

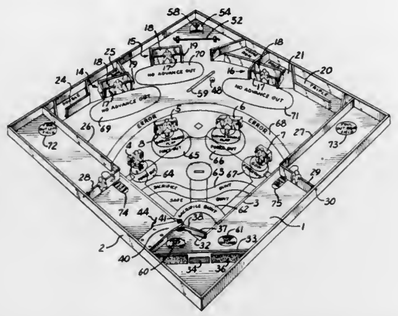
**Filed June 23, 1975, Ser. No. 589,331**

**Int. Cl.² A63F 7/06**

**U.S. Cl. 273—89** **8 Claims**

5. Baseball game apparatus comprising a board having a substantially flat upper playing surface with a simulated baseball diamond thereon, a bat mounted for turning on said apparatus adjacent home plate by a first player, a baseball in the form of a disc having a flat surface adapted to slide on the playing surface, a pitching unit in center field operated by a second player to drive said baseball on the playing surface toward said bat, fielder units distributed over the playing field to be struck by batted baseballs, designated areas at various locations on the playing field including locations immediately adjacent some of said fielder units denoting a play assumed to have occurred when said baseball after being batted comes to

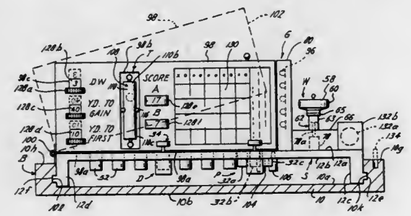
rest thereon, wherein, said baseball comprising a thick, weighted disc having a V-groove extending around the circumference of same in the edge thereof, said pitching unit including an elastic member anchored at its ends and adapted to be engaged between its ends in the groove of said baseball, a stop on the board behind said pitching unit, said stop limiting the distance to which the elastic member can be deflected from its normal straight idle position between its ends by said



ball in front of the elastic member when the elastic member is seated in the groove of said ball, said stop including a plate having a long concave ball-engaging edge nearest the elastic member, the edge being in the form of an arc of a circle whose center is on a line that is perpendicular to and that bisects the elastic member when the elastic member is in its idle, straight position, said plate being adjustable away from and toward the elastic member.

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**4,017,075**
**SIMULATED FOOTBALL GAME**
**Sheldon B. Wilson, P.O. Box 3005, Austin, Tex. 78764**
**Filed Aug. 11, 1975, Ser. No. 603,390**
**Int. Cl.² A63F** *7/06*
**U.S. Cl. 273—94 R** **18 Claims**



1. A game simulating the play of football to be played by at least two opposing players, comprising:
- a playing field board simulating a football field having two opposing end zones;
- an action sled mounted adjacent said playing field board and movable along the length of said board, said action sled having a first player end and a second player end, each of said first and second player ends respectively opposing one of said end zones;
- play selection means mounted adjacent said first and second player ends of said action sled for each opposing player to select their respective types of offensive and defensive simulated football plays;
- direction selection means mounted adjacent said first and second player ends of said action sled for each opposing player to select the direction of the simulated football play for the respective offensive and defensive maneuverings of each player; and,
- random selection means mounted with said action sled for randomly designating a penalty and a non-penalty situation for either of the opposing players during each simulated football play.

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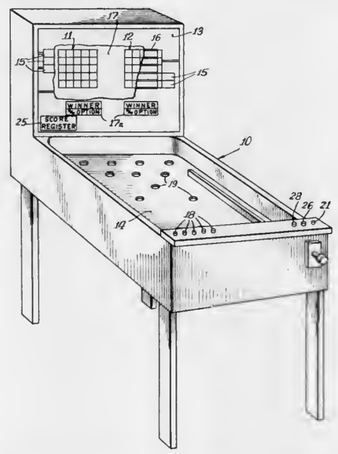
**4,017,076**
**TARGET GAME**
**Henry S. Bai, 421-14 Picadilly Place, San Bruno, Calif. 94066**
**Filed Aug. 25, 1976, Ser. No. 717,639**
**Int. Cl.² A63B** *63/00*
**U.S. Cl. 273—102 R** **3 Claims**



1. A target game including: a glove formed of a hemispherical dish-shaped rigid plastic member; a strap mounted on the rear side of the plastic member to enable the glove to be held on the palm of the hand of a player; a sheet of fabric material mounted on the glove and extending across the front face of the dish-shaped rigid plastic member to constitute a target for a missile thrown thereagainst, said sheet of fabric material being mounted on the plastic member in spaced relationship with the inner surface thereof so as to present a resilient surface which is deflectible inwardly when struck by the missile.

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**4,017,077**
**MATRIX TRANSFORMATION PIN BALL MACHINE WITH SCORE MULTIPLIER OPTION**
**Walter M. Burnside, Waukegan, Ill., assignor to Bally Manufacturing Corporation, Chicago, Ill.**
**Filed July 3, 1975, Ser. No. 592,925**
**Int. Cl.² A63F** *7/00*
**U.S. Cl. 273—121 A** **2 Claims**

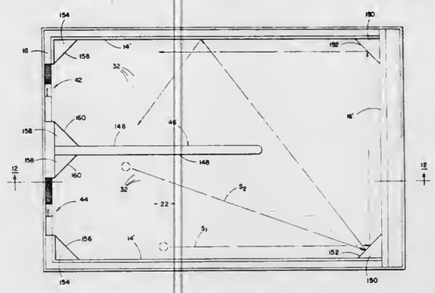


1. In a pin ball game apparatus having a bingo-type matrix, a plurality of game ball switches adapted to be closed by game balls as a result of operation of the game, combinations of said game ball switches adapted to determine a nominal score award value, search relay contacts connected with said game ball switches, contact wiper means for traversing said search relay contacts to detect active electrical circuit connections, a plurality of search relays each adapted to be actuated by said wiper means when contacting said active circuit connections, relay switches actuated by said search relays for establishing score award circuit corresponding to certain of said active electrical circuit connections, score register means associated with said relay switches for recording any said score award value, said score register means having score register operating means adapted to transmit to said score register means for recording therein a score award value, a score award altering means adapted to be operatively connected with said score register operating means whenever any said score award circuit is established, and said score award altering means adapted to select at random for transmission to said score register means between a score award value greater than said nominal score award value and no score award value.



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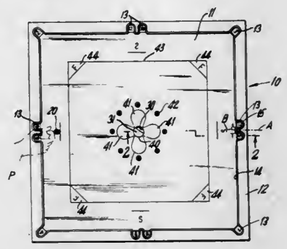
**4,017,078**
**AIR TABLE HANDBALL GAME APPARATUS**
**Adolph E. Goldfarb, 4614 Monarca Drive, Tarzana, Calif. 91356, and Erwin Benkoe, 17965 Medley Drive, Encino, Calif. 91316**
**Filed Dec. 15, 1975, Ser. No. 640,837**
**Int. Cl.² A63F** *3/00*
**U.S. Cl. 273—126 A** **10 Claims**



6. A game apparatus capable of generating an air cushion for supporting a movable playing piece thereon, and for affording fast and generally continuous play action movement of the playing piece, said apparatus comprising:
- a. a member having a generally flat upper surface defining a playing surface having a front rebound end and a rear player end, said surface being inclined downwardly from said rebound end toward said player end,
- b. means defining a plurality of apertures through said playing surface,
- c. means located beneath said member and secured thereto to form an air chamber in communication with said apertures,
- d. means operatively associated with and connected to said apparatus for providing air under pressure into said air chamber so that air is emitted through said apertures to provide an air cushion above said playing surface to support a play piece for movement across the playing surface,
- e. a pair of opposed side walls extending upwardly from said playing surface, each having a forward end adjacent said front rebound end, a rearward end adjacent said rear player end, and having inwardly presented side rebound surfaces,
- f. a front wall extending upwardly from said playing surface and having an inwardly presented front rebound surface,
- g. means including said inward side and front rebound surfaces extending around the periphery of said playing surface except for at least a portion of said rear player end,
- h. an elongated upstanding divider means disposed generally centrally of said playing surface and extending from said rear plays end toward said forward rebound end a portion of the distance between said front and rear ends of the playing surface so as to divide the player end of said playing surface into a pair of transversely spaced player goal areas, said divider means defining a pair of upstanding ouwardly presented side rebound surfaces each spaced opposite the inwardly presented side rebound surface of one of the side walls, and
- i. corner bumper means disposed in operative relation to said playing surface and providing a corner rebound surface at the forward end of each of said inward side rebound surfaces and at the rearward end of each of all four of the side rebound surfaces, said corner rebound surfaces extending at an obtuse angle to the side rebound surface adjacent thereto.

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**4,017,079**
**TABLE GAME**
**Norberto Apellaniz, 2360 First Ave., New York, N.Y. 10035**
**Filed Mar. 17, 1975, Ser. No. 558,903**
**Int. Cl.² A63F** *3/00*
**U.S. Cl. 273—126 R** **10 Claims**



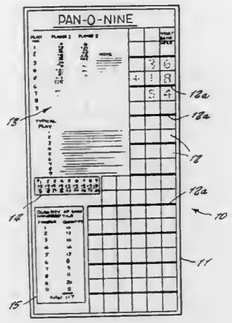
1. A game board comprising a board, side walls extending up from said board, at least one disc, at least one surface of the disc and the surface of the board being adapted to permit the disc to be propelled across the board by the flicking of a finger of a player, said board comprising a plurality of pockets for receiving the disc, and wherein at a side wall there are two pockets adjacent one another and separated by a distance approximately equal to the diameter of the disc in a plane parallel to the plane of the board, further comprising in a first mode of play said board being formed with a recess surface for receiving a propelled disc and in a second mode of play further comprising an insert adapted to fit said recess so as to provide a continuous flat board surface, and in a third mode of play, a second insert adapted to fit into said recess and being formed with a raised portion extending above the board surface and the peripheral surface of the raised portion being adapted to permit a propelled disc to carom from the peripheral surface.

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**4,017,080**
**ARITHMETIC BOARD GAME**
**Richard W. Severson, 2644 Boetcher Road, Waukesha, Wis. 53186**
**Filed Sept. 17, 1975, Ser. No. 614,067**
**Int. Cl.² A63F** *9/18*
**U.S. Cl. 273—135 R** **1 Claim**

1. In an arithmetic board game, the combination of a pair of playing boards, and a plurality of one hundred and seventeen tiles of numerical value for being placed upon said playing boards, and said game additionally including a plurality of multiplication, division, addition and subtraction symbol tiles for use together with said numerical digit tiles, each of said playing boards comprising a flat panel having a plurality of square spaces imprinted thereupon, said spaces each being of a same size as said tiles, and said spaces being arranged in

horizontal and vertical rows, a double line between each two said horizontal rows of said spaces, said playing board additionally including an example of playing the game for serving as a guide to players, said playing board additionally including a multiplication table imprinted thereupon and also a table indicating a quantity of each numbered tiles, said arithmetic symbol tiles comprising a plurality of yellow tiles having a plus




sign on one side and a multiplication sign upon its other side while a remainder of said arithmetic symbol tiles are pink and have a subtraction sign on one side and a division sign upon its other side, and said game additionally including a rack of transverse L-shaped configuration for each player and upon which said tiles can be stored in an upright position hidden behind an upright wall of said rack so an opponent player is prevented from seeing said tiles.

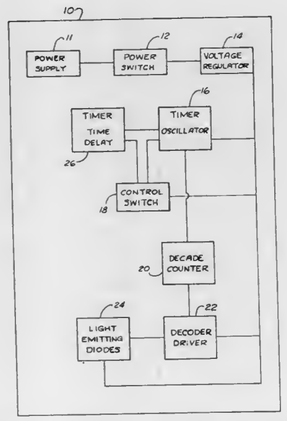
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**4,017,081**

**ELECTRONIC RANDOM SELECTION DEVICE AND AMUSEMENT APPLICATION THEREFOR**

**Anthony J. Windisch, 3882 Walsh St., St. Louis, Mo. 63116**

**Filed Dec. 29, 1975, Ser. No. 645,206**
**Int. Cl.² A63B** *71/06*; **A63F** *5/00*
**U.S. Cl. 273—138 A** **2 Claims**




1. An electronic random selection device comprising in combination:

a control switch having first and second selectable positions;

first integrated timer circuit means connected for generating a signal oscillating at a first constant rate when the control switch is in the first position;

resistance means connected for causing the first timer circuit means to generate a signal oscillating at a second constant rate, slower than the first rate, when the control switch is in the second position;

second integrated timer circuit means connected for generating a time delay signal to the first timer circuit means when the control switch is in the second position;

integrated decade counter circuit means connected to the first timer circuit means for receiving a signal therefrom and for generating a binary coded decimal count;

integrated decoder/driver circuit means connected to the decade counter circuit means for receiving a signal therefrom and for decoding the signal to a decimal equivalent signal thereof; and

a plurality of light emitting diode means connected to the decoder/driver circuit means for receiving the signal oscillating at the first rate for sequentially illuminating the diodes at a rate corresponding to the first rate when the switch is in the first position, for receiving the signal oscillating at the second rate for sequentially illuminating the diodes at a rate corresponding to the second rate when the switch is in the second position and for receiving the time delay signal for ultimately illuminating only one of the diodes when the switch is in the second position.

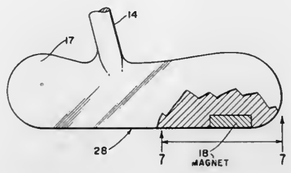
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**4,017,082**

**MEANS AND METHOD FOR PLACING A GOLF BALL POSITION MARKER ON A PUTTING GREEN AND FOR REMOVAL THEREOF**

**Charles E. Channing, Dover, and George H. Darrell, Dedham, both of Mass., assignors to Charles E. Channing, Dover, Mass.**

**Filed Apr. 29, 1975, Ser. No. 572,879**
**Int. Cl.² A63B** *57/00*
**U.S. Cl. 273—162 D** **19 Claims**




3. A method of placing a golf ball position marker in position on a putting green without bending by the user, which method comprises:

a. providing a golf club putter having a golf club putter head at the one end with a bottom surface, the golf club putter head containing a permanent magnet, the outer surface of the magnet being substantially flushed with the bottom surface of the golf club putter head;

b. providing a golf position marker which comprises a material which will adhere to the permanent magnet in the golf club putter head, the marker having a ground engaging projection extending from one surface thereof;

c. manually placing without bending the golf ball position marker into contact with the permanent magnet in the golf club putter head to retain the marker in position solely by magnetic attraction between the marker and the magnet;

d. manually lowering the golf club putter head with the marker to the surface of a putting green and to and above a position on the putting green which is to be marked;

e. pressing the ground engaging projection of the marker into the desired position on the putting green by manually exerting sufficient pressure downwardly on the other end of the golf club putter; and

f. sliding the golf club putter head in a lateral direction generally parallel to the surface of the putting green until said magnet has slid sufficiently out of contact with the



golf ball position marker, so that the golf club putter head may be removed and the marker left in the desired position on the putting green.

10. In combination a golf club putter and a golf ball position marker, which combination comprises:

a. a golf club putter comprising

i. an elongated rod having a one end and another end,

ii. a handle at the one end adapted to be gripped by the user,

iii. a golf club putter head at the other end, the putter head characterized by a bottom surface substantially transverse to the other end,

iv. a permanent magnet having a magnetic pole disposed transversely to the other end of the rod, and

v. the magnet secured within the golf club putter head, the outer surface of said magnet being substantially flushed with the bottom surface of the golf club putter; and

b. a golf ball position marker comprising

i. a material which will adhere magnetically to the permanent magnet in the golf club putter head, and

ii. the marker having ground engaging projection means extending from one side of the marker to retain the marker in position on a putting green, whereby the magnet in the golf club putter head is employed in use to place the golf ball position marker onto the putting green and to mark a golf ball position, and to remove the golf ball position marker from the green without the need for the user to bend and stoop for such placement and removal.

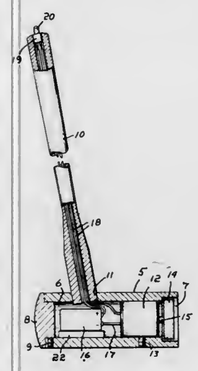
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**4,017,083**

**PUTTER**

**James A. Johnson, 59 Ocean House Road, Cape Elizabeth, Maine 04107**

**Filed Sept. 19, 1975, Ser. No. 615,095**
**Int. Cl.² A63B** *69/36*; **A63H** *1/32*
**U.S. Cl. 273—164** **9 Claims**




1. A putter comprising a shaft and a head including a ball engaging portion having a chamber, a fly wheel within said chamber adjacent the outer end of said head with its axis disposed lengthwise thereof, the length of said shaft and the angle between said shaft and said axis being such as to enable the ball to be engaged by the ball engaging portion of the head when the shaft is held by the user while standing in putting position, and a battery powered drive for said fly wheel within said putter and connected to said fly wheel, said drive operable to effect the rotation of said fly wheel at a rate such that a gyroscopic force is exerted on the outer end of the head adequate to stabilize the head against accidental turning during a putt from a position at right angles to the wanted path for the ball, said drive including a battery source, a low voltage, high speed motor, and a circuit between said motor and said source and including a switch.

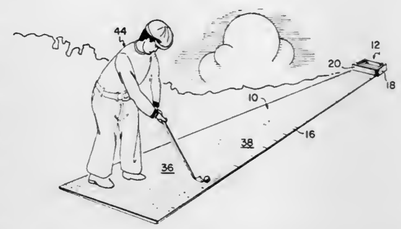
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**4,017,084**

**GOLF PUTTING AND CHIPPING DEVICE**

**Ernest Jeffery, 1 Liszt Gate No. 810, Willowdale, Ontario, Canada (M2H 1T6)**

**Filed June 30, 1975, Ser. No. 591,516**
**Int. Cl.² A63B** *69/36*, *67/02*
**U.S. Cl. 273—176 FB** **4 Claims**




1. In a golf practice and amusement device enabling a player to practice both chipping and putting the combination of a receptacle including side, front and upper walls defining an inner compartment, said upper wall being dished to present a central recessed cup-like portion occupying the major area thereof, a roll of carpet mounted rotatably within said inner compartment, a transversely extending aperture formed in the lower portion of said front wall dimensioned to permit the withdrawal of said carpet therethrough, said carpet having an upper surface, when withdrawn from said receptacle, comprising a first area adjacent the free end thereof formed of a material offering a predetermined resistance to the movement of a golf ball thereacross and substantially the entire remaining upper surface formed of a material offering a lesser resistance to the movement of a golf ball thereacross.

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**4,017,085**

**GOLF GAME**

**Charles Stephen Maxwell, 2995 Altamont Crescent, West Vancouver, British Columbia, Canada (V7V 3C2)**

**Filed Feb. 27, 1976, Ser. No. 662,194**
**Int. Cl.² A63B** *67/02*
**U.S. Cl. 273—176 FA** **15 Claims**

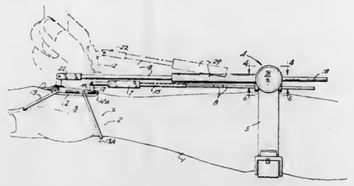



1. A golf game comprising a playing board, an upper surface of the playing board simulating part of a golf course and having a scoring hole therein promixate an end of the playing board and at least one non-scoring hole therein representing a hazard, a golf ball issuing device, switch means associated with each hole to detect capture therein of a golf ball, a scoreboard, logic circuit means including means causing operation of the golf ball issuing device to re-issue a golf ball on detection of a golf ball by one of the switch means and means to assign an initial score to the scoreboard, ball count means counting the balls issued, means assigning a number to the

scoring hole and incrementing the assigned number on detection of a ball in the scoring hole, and score means decrementing said initial score by predetermined values which vary inversely according to a number of issued balls counted for an assigned hole.

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**4,017,086**
**GOLFER'S TRAINING AID**
**Philip J. Washburn, P.O. Box 936, Roseburg, Oreg. 97470**
**Filed Nov. 7, 1975, Ser. No. 629,779**
**Int. Cl.² A63B** *69/36*
**U.S. Cl. 273—183 B** **9 Claims**

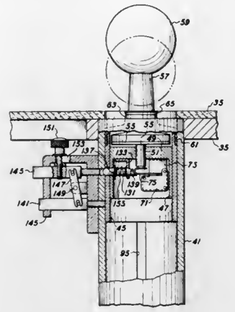


1. A device for attachment to a golfer's forearm for the purpose of conditioning arm muscles so as to properly control uncocking of the forearm hand and wrist during the club downswing, said device comprising,
   a ratchet assembly including an adjustably biased pawl,
   means attaching said assembly to the forearm,
   hand retention means in place on the back of said hand for movement therewith,
   flexible elongate retention means extending rearwardly from said hand retention means into operative engagement with said pawl of the ratchet assembly,
   an abutment member offset rearwardly from the hand retention means and coupled to said ratchet assembly, said abutment member contacted by said hand retention means when the forearm hand is cocked and thereafter during initial uncocking of the forearm hand to maintain the ratchet assembly in place on the forearm against forces exerted by said elongate retention means.
   said ratchet assembly pawl permitting rearward displacement of the elongate retention means during cocking of the forearm hand during the backswing and subsequently holding same against extraction, and
   said ratchet assembly additionally retaining said elongate and hand retention means in a retracted state until club imparted forces during the downswing overcome the biased pawl of the ratchet assembly resulting in release of the elongate retention means and uncocking of the hand at a desired point in the downswing.

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**4,017,087**
**AUTOMATIC GOLF BALL TEEING APPARATUS**
**Philip Bruno, 521 W. Hickory St., East Rochester, N.Y. 14445**
**Filed Nov. 6, 1975, Ser. No. 629,324**
**Int. Cl.² A63B** *57/00*
**U.S. Cl. 273—201** **8 Claims**

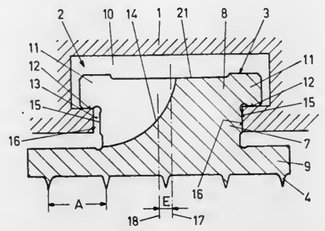
1. Golf ball positioning apparatus comprising an approximately vertical guideway, a carrier movable upwardly and downwardly along said guideway, a golf ball supporting member mounted on and movable upwardly and downwardly bodily with said carrier, means for moving said carrier between a lower loading position in which a ball may be placed on said supporting member and an intermediate hitting position in which a ball on said supporting means is substantially at a turf reference elevation and a high hitting position in which a ball on said supporting member is at a teed-up elevation higher than said turf reference elevation, an electric switch mounted on and movable bodily with said carrier, said switch having a switch operating member movable between an upper position and a lower position, said switch operating member being biased upwardly toward its upper position and being arranged to be depressed to its lower position by the combined weight of said ball supporting member and a ball carried thereon, the weight of said ball supporting member alone without a ball thereon being insufficient to depress said switch operating member from its upper position to its lower position, driving means controlled by said switch for moving said



carrier along said guideway while said switch operating member is in its upper position and for discontinuing movement thereof along said guideway while said switch operating member is in its lower position, and control means for holding said switch operating member in its upper position to cause operation of said driving means notwithstanding presence of a ball on said supporting member tending to depress said switch operating member to its lower position.

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**4,017,088**
**SHAFT SEAL FOR TURBOMACHINES**
**Georg Lerjen, Oberrohrdorf, Switzerland, assignor to BBC Brown Boveri & Company Limited, Baden, Switzerland**
**Filed Dec. 22, 1975, Ser. No. 643,329**
**Claims priority, application Switzerland, Mar. 5, 1975, 2755/75**
**Int. Cl.² F16J** *15/44*
**U.S. Cl. 277—53** **2 Claims**



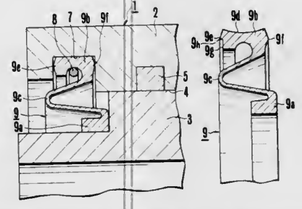
1. A shaft and seal structure therefor comprising a casing surrounding the shaft and having a circumferentially extending T-shaped slot opening in the direction of the shaft and which receives a pressurized gaseous medium, at least one row of circumferentially extending assymetrical seal segments located in said T-shaped slot, each said seal segment having a radially outer suspension part located in the radially outer broad part of said T-shaped slot and including end portions which overlie and bear upon correspondingly located shouldered portions of said T-shaped slot to form bearing surfaces therebetween, a radially inner serrated seal part engaging the periphery of said shaft forming a labyrinth type seal therebetween, and a middle part having lateral surfaces — one of which is located on the low-pressure side of the middle part and engages a correspondingly located internal surface at the



radially inner narrow part of said T-shaped slot to form sealing surfaces therebetween, said pressurized gaseous medium serving to apply a radially inward directed force against the periphery of said seal segments, and the median plane of said radially inner serrated seal part of the seal segments of at least the last row of the low pressure side of the seal being axially offset with respect to the median plane of the middle part thereof in the direction of the high-pressure side of the seal.

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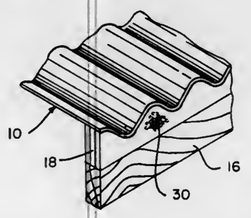
**4,017,089**
**SEALING DEVICE FOR HYDRAULICALLY OR PNEUMATICALLY OPERATED EQUIPMENT**
**Masayuki Kurata, and Yusiyo Watanabe, both of Iwatsuki, Japan, assignors to Akebono Brake Industry Co., Ltd., Tokyo, Japan**
**Filed July 29, 1975, Ser. No. 600,010**
**Int. Cl.² F10J** *15/24*
**U.S. Cl. 277—152** **6 Claims**



1. A sealing device for hydraulically or pneumatically operated equipment comprising:
   a cylinder body;
   a piston fitted into said cylinder body;
   a circumferential groove provided in said cylinder body, the groove being formed by a pair of confronting walls and a circumferential face forming a bottom for said groove;
   a boot which is composed of an internal portion tightly attached to the outer edge of said piston, an external portion having a recess which forms a continuous curvature in the direction of the width of the external portion, and a flexible portion which connects said external portion to said internal portion; and
   a resilient ring which presses said external portion of said boot into fitted engagement with said circumferential groove and against said bottom thereof.

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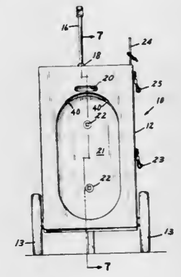
**4,017,090**
**CLOSURE STRIP**
**Irvin Cohen, Reading, Pa., assignor to Construction Fasteners, Inc., Wyomissing, Pa.**
**Filed July 16, 1973, Ser. No. 379,486**
**Int. Cl.² E04B** *1/68*
**U.S. Cl. 277—206 R** **12 Claims**



1. An elongated sealing element for interposition between a panel of corrugated configuration and a member extending transversely of said panel, said sealing element having an edge adapted to lie in contact with said panel, of a corrugated configuration corresponding to that of said panel, and said sealing element comprising a laminated structure with the laminations thereof extending longitudinally of the sealing element and with the opposite edges of said laminations adapted to underlie said panel and overlie said member respectively, said laminations having adjoining surface portions secured together and each of said laminations having a porous interior portion coextensive with said surface portions, the porous interior portion of at least one of said laminations having a density greater than the densities of the interior portions of other of said laminations.

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**4,017,091**
**GOLF CART**
**Russell J. Wallen, 1800 Hayes St. NE., Minneapolis, Minn. 55418**
**Filed June 30, 1975, Ser. No. 591,301**
**Int. Cl.² B62B** *1/04*
**U.S. Cl. 280—30** **5 Claims**



1. A convertible golf cart, comprising:
   a. a cart body formed of a durable plastic material having a plurality of integrated recesses formed therein being sized to accommodate the handle and shaft of a golf club;
   b. a pair of detachable wheels;
   c. means for engaging and disengaging said wheels and said cart in an operating position;
   d. means carried on an exterior surface of said cart body and on said wheels for engaging and disengaging said wheels and said cart in a storage position;
   e. means for supporting said cart in a substantially upright position; and
   f. a handle being movable from an operating position to a storage position in which said means for engaging and disengaging said wheels and said cart comprises a plurality of female members of a ball detent connection being positioned on either side of the bottom of said cart in an operating position and a plurality of female members being positioned within a wheel storge recess formed in an exterior surface of said body and including male members of a ball detent connection, engageable with each of said female members, being positioned on each of said wheels.

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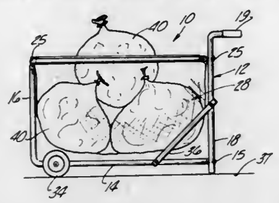
**4,017,092**
**TRASH BAG CADDY**
**Virginia M. Boomer, 50575 Fairchild Road, Mount Clemens, Mich. 48043**
**Filed Oct. 20, 1975, Ser. No. 623,981**
**Int. Cl.² B62B** *1/12*
**U.S. Cl. 280—47.26** **2 Claims**

1. A trash bag caddy of the type to store and transport loaded plastic trash bags comprising:
   a rigid frame having two parallel tubular legs forming a horizontal lower member carrying two vertical supports at opposite ends, one of said vertical supports having handlebar means, the other vertical support terminating in a horizontal support surface; an upper rectangular

member positioned in a vertically spaced relation above said lower member and comprising two releasably joined U-shaped portions which attach to said vertical supports to complete said rigid frame, one joined end of said upper rectangular member being supported by said horizontal surface;

first fastening means extending through said one joined end into said horizontal support surface for simultaneously securing said U-shaped portions to each other and to said horizontal surface;

second fastening means extending through said other joined

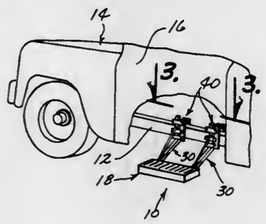


end into said one vertical support for simultaneously securing said U-shaped portions at said other joined end to each other and to said one vertical support; and

a multi-apertured bag made from a material sufficiently strong to withstand the attacks of canine creatures and small animals, yet sufficiently pliant to permit the deposit of a variable number of trash bags, said multi-apertured bag being of a generally rectangular shape and having two opposing longitudinal surfaces and two opposing transverse surfaces, said surfaces forming loops, said loops engaging said U-shaped portions of said upper rectangular member.

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**4,017,093**
**VEHICLE STEP**
**Alvin Stecker, Sr., Woden, Iowa 50485**
**Filed Sept. 12, 1975, Ser. No. 612,765**
**Int. Cl.² B60R** *3/02*
**U.S. Cl. 280—163** **7 Claims**



1. A vehicle step assembly for being attached to the frame of a vehicle comprising,

a step having width substantially equal to the width of a person's pair of feet,

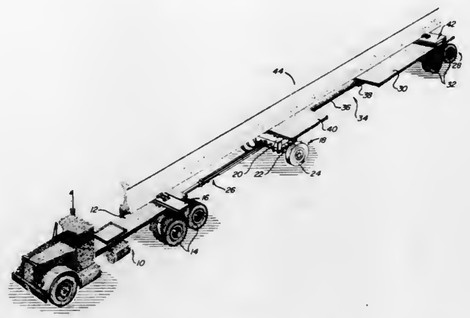
a pair of spaced apart support arms connected to said step and extending angularly upwardly relative to the top surface of said step and terminating in upstanding portions extending perpendicularly to a plane of said step top surface,

a pair of bracket assemblies for connecting said upstanding portions to the frame of a vehicle, each bracket assembly including a pair of clamping plates for engaging opposite sides of said vehicle frame, and means being provided for connecting one of said clamping plates to said upstanding portion, and

each ofsaid bracket assemblies, and said connecting means including a third clamping plate for engaging said upstanding portion on one side with said one plate of said pair of plates engaging said upstanding portion on the opposite side and said one of said pair of plates also adapted to engage one side of said vehicle frame.

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**4,017,094**
**STEERING CONVERTER APPARATUS**
**Robert Dwayne Pilcher, 1220 S. Utica, Denver, Colo. 80219**
**Filed Oct. 16, 1975, Ser. No. 622,849**
**Int. Cl.² B60P** *3/40*
**U.S. Cl. 280—404** **13 Claims**



1. Apparatus for transporting long loads comprising:

a tractor having a body, rear driving wheels, and forward steerable wheels, a first steering converter trailer truck provided with road wheels, and a second load-bearing trailer truck provided with road wheels;

a forward bolster mounted on the tractor body for rotation about a vertical axis and constructed and arranged to support and be secured to the forward portion of a long load;

the second truck being located well aft of the tractor and provided with an aft bolster mounted thereon for rotation about a vertical axis and constructed and arranged to support and be secured to the aft portion of a long load;

the tractor and the second truck serving to take the entire weight of the load with the latter serving as the draft hitch between the tractor and the second truck;

the first steering converter truck being located at an intermediate position between the tractor and the second truck independently of the load and of the aft bolster, and bearing no part of the weight thereof;

a pivot mount on the first truck;

an elongate follower coupler secured to the second truck in non-load-bearing position independently of the aft bolster and extending forward from the second truck with its forward end connected to the pivot mount for rotation;

a pivotal connector secured to a fixed part of the tractor body independent of the bolster and at a point spaced aft of the pivotal axis of the bolster;

and a steering converter coupler secured to the first truck and extending forward therefrom with its forward end pivotally connected to the connector on the tractor;

the first truck being free to swing laterally independently of the load and adapted to be directed by the lateral movement of the pivotal connector, in response to turning movement of the tractor, toward the outside of the curve to increase the turning radius of the first truck.

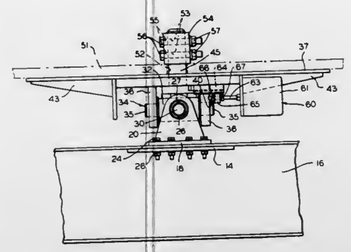
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**4,017,095**
**FIFTH WHEEL CONNECTION FOR A TRACTOR-TRAILER COMBINATION**
**William J. Best, Naperville, Ill., assignor to Clark Equipment Company, Buchanan, Mich.**
**Filed Nov. 19, 1975, Ser. No. 633,187**
**Int. Cl.² B62D** *53/10*
**U.S. Cl. 280—438 R** **11 Claims**

1. A connecting mechanism provided between a tractor-trailer combination, said connecting mechanism comprising a



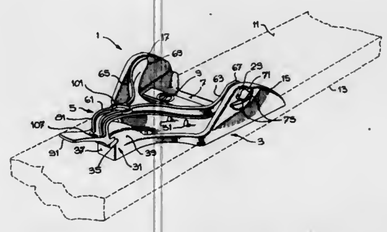
first mounting portion including a bracket assembly mountable on a rear bed portion of the tractor, a beam assembly transversely mounted on the bracket assembly for relative pivotal movement therebetween, a mounting table assembly mounted on the beam assembly for pivotal movement transverse to the pivotal movement of the beam assembly, a mounting post extending outwardly from an upper surface of a mounting table associated with the mounting table assembly, a second mounting portion provided on the trailer including a connecting plate suitable for engagement with the first mount-



ing portion of the connecting mechanism provided on the tractor, the connecting plate including a central hole receivable on the mounting post and a retaining mechanism mountable on the post after the connecting plate is mounted thereon and suitably engaging the mounting table, said mechanism comprising a sleeve receivable on the mounting post and means to lock the sleeve to the post, the mechanism retaining the mounting table and the connecting plate is connected cooperative relationship to provide relative pivotal movement therebetween.

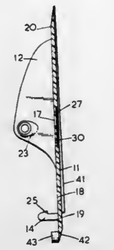
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**4,017,096**
**SKI HARNESS**
**Maurice Pinsonnault, 770, Boulevard Desaulniers, St-Lambert, Quebec, Canada**
**Filed Aug. 8, 1975, Ser. No. 603,181**
**Int. Cl.² A63C** *9/20*
**U.S. Cl. 280—615** **27 Claims**



1. A ski harness having a toe plate and a one-piece bail; the toe plate having a base plate; a pair of spaced-apart flanges extending up from the base plate; locking means on the base plate in front of the flanges the one-piece bail having means integral therewith for pivotably, detachably connecting it at one end thereof to the flanges; and projecting lug locking means on the other end of the one-piece bail and integral therewith, directly engageable with the locking means on the toe plate, to detachably lock the one-piece bail to the toe plate.

**4,017,097**
**SKI BINDINGS**
**Ole Jacob Kvam, Waldemar Thranes gate 84B, Oslo 1, Norway**
**Filed Feb. 17, 1976, Ser. No. 658,838**
**Int. Cl.² A63C** *9/20*
**U.S. Cl. 280—615** **9 Claims**



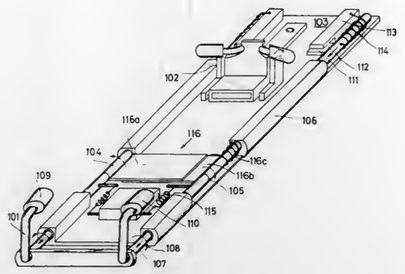
1. A ski binding which comprises a bottom member for mounting on a ski and for receiving a sole of a ski shoe, said member having ears adapted to project upwardly on either side of the toe of said shoe, a guard element having a continuous surface shaped essentially as a shoe toe and pivotably mounted on said ears to permit pivotal movement between upward inactive and downward active positions about an axis passing through said ears, said element having a lateral side and longitudinal sides converging forwardly from opposite ends of said lateral side, said lateral side facing said pivotal axis of said element and defining at its under edge clamp means designed in said upward position to permit insertion on said bottom member of said sole of said shoe at its toe and in said downward position to hold the edge of said shoe sole down against the bottom member with said longitudinal sides of said guard element reaching down adjacent said bottom member, means associated with at least one of said bottom member and said clamp means for retainingly engaging said sole, and said guard element when in said active position being adapted to cover the front edge of the sole of the shoe and a portion of said bottom element which is to lie in front of said front edge, said portion providing the location for an upstanding pin having a locking edge engageable with a retaining portion of said guard element adjacent thereto and said bottom member having a ramp-like shaped rib extending longitudinally of and projecting downwardly from its under side to a position adjacent said pin to space the bottom member from the ski beneath said pin.

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**4,017,098**
**SAFETY BINDINGS FOR SKIS**
**Bernhard Kirsch, Im Litzelholz 23, 55 Trier-Biewer, Germany**
**Filed Sept. 5, 1975, Ser. No. 610,743**
**Claims priority, application Germany, Sept. 7, 1974, 2442902; Mar. 6, 1975, 2509809**
**Int. Cl.² A63C** *9/08*
**U.S. Cl. 280—625** **7 Claims**

1. A safety binding for skis having a front binding including two arms each carrying a toe-clamp, such toe-clamps being spaced apart and normally engageable with the toe of a ski-boot, the improvement comprising spring means exerting a predetermined force on the arms in a direction substantially longitudinally and rearwardly of the ski for maintaining the toe-clamps in boot toe engaging position, moving means responsive to a forward force exceeding such predetermined rearward force for simultaneously moving such toe-clamps apart transversely of the ski a distance greater than the width of a ski-boot including pivot means having their axes extend-

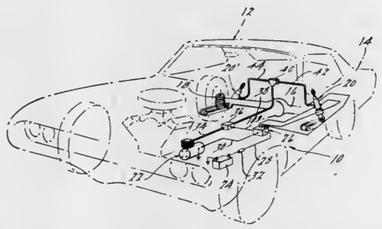
ing substantially longitudinally of the ski, the arms being swingable about the axis of said pivot means, biasing means



for urging simultaneous swinging of the arms about said pivot means, and means for latching the arms against swinging.

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**4,017,099**
**VEHICLE LEVELING SYSTEM**
**Robert W. Hegel; Burke A. West, both of Monroe, Mich., and Robert H. Verb, Ottawa, Ohio, assignors to Monroe Auto Equipment Company, Monroe, Mich.**
**Filed June 9, 1975, Ser. No. 585,322**
**Int. Cl.² B60G** *11/28*
**U.S. Cl. 280—707** **39 Claims**



**11.** A vehicle attitude control device comprising first and second telescopic sections in part defining a pressurizable chamber, first and second solid state signal means located within said chamber for controlling the pressure thereof, said solid state means being responsive to longitudinal displacement of said sections for selectively communicating a pressurized media to and from said chamber.

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**4,017,100**
**FLUID SUPPLY, FILTER PACK USED THEREIN AND METHOD OF ASSEMBLY**
**Robert G. Gehrig, Southfield, and George W. Goetz, Detroit, both of Mich., assignors to Eaton Corporation, Cleveland, Ohio**
**Filed Jan. 8, 1975, Ser. No. 539,220**
**Int. Cl.² B60R** *21/08*
**U.S. Cl. 280—736** **14 Claims**

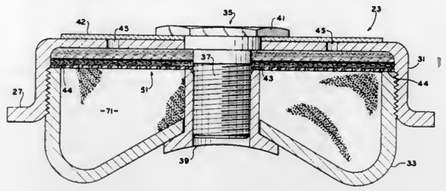
**1.** A fluid supply for inflating a vehicle occupant restraint system of the type activated in response to a vehicle collision signal; said fluid supply comprising;

a. housing means defining an enclosure having fluid discharge port means;

b. combustible gas generating means disposed within said enclosure said generating means being operable upon ignition to produce gas and combustion products;

c. means operable to activate said gas generating means in response to said collision signal; and

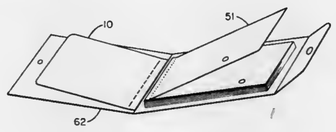
d. filter means disposed in said enclosure between said gas generating means and said fluid discharge port means, said filter means including a plurality of layers of fibrous filter material each of said layers being at least as porous as the next adjacent downstream filter layer, at least the filter layer furthest downstream being fibrous material comprising fibers having diameters less than about twenty microns, said filter means causing filtration of progressively finer of said combustion products as said gas and



said combustion products move downstream toward said fluid discharge port means, to minimize clogging of said filter means, said filter means including edge means sealing the margins of said layers with said enclosure to prevent by-pass of said gas and combustion products around said filter means to said discharge port means, said filter means further including porous support means intermediate selected ones of said fiber layers.

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**4,017,101**
**LETTER OF CREDIT DEVICE**
**John M. Case, 35 Lehigh Road, Wellesley, Mass. 02181**
**Filed May 20, 1976, Ser. No. 688,313**
**Int. Cl.² B42D** *15/00*
**U.S. Cl. 283—57** **5 Claims**



**1.** A letter of credit device to be used by an authorized holder comprising in combination:

a. a flat card having a plurality of numerical columns, each of which is headed by a characteristic numeral and a plurality of transaction sections extending across said numerical columns and containing a punch out element in each of said numerical columns, whereby the amount of each of said transactions may be indicated by selectively punching out punch out elements in said transaction section; and

b. an idividual account check drawn on an issuing financial institution;

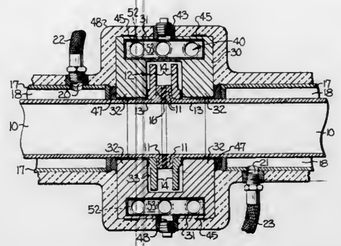
c. said card and check each having imprinted on it an identification of the issuing institution and the same account number of the holder,

d. said card bearing an identification of the holder, including his signature, and also bearing the terms and instructions upon which credit is to be issued to the holder by a negotiating party; and

e. said check having a punch out element, whereby, when punched out, it serves to identify to the issuing bank that said check was negotiated under said card.



**4,017,102**
**JACKET CONSTRUCTION FOR PIPE COUPLING**
**James R. Henderson, Charlotte, N.C., assignor to Controls Southeast, Inc., Charlotte, N.C.**
**Filed June 16, 1975, Ser. No. 587,123**
**The portion of the term of this patent subsequent to Aug. 26, 1992, has been disclaimed.**
**Int. Cl.² F16L** *53/00*
**U.S. Cl. 285—41** **12 Claims**



**1.** In a fluid conveying system including a pair of pipes having opposing end portions positioned in fluid communication and fastener means cooperating with the opposing end portions of the pipes to releasably secure the pipes together in fluid-tight relation, the opposing end portions of the pipes and the cooperating fastener means collectively defining an enlarged coupling having a predetermined external surface configuration substantially larger than adjoining portions of said pipes, the combination therewith of means cooperating with said enlarged coupling for directing a temperature controlling fluid into heat-transferring relation thereto, said means comprising a plurality of blocks of heat conductive material cooperating with one another to substantially surround and enclose the opposing end portions of said pipes and the fastener means associated therewith, inner surface portions of each block being concave and defining a cavity therein of predetermined shape, the respective cavities of the cooperating blocks collectively defining a hollow chamber substantially conforming to said predetermined external surface configuration of said enlarged coupling so as to receive the coupling in heat-transferring relation therein, and each block also having an enclosed fluid passageway therein extending alongside said cavity and having inlet and outlet ports communicating with the enclosed fluid passageway for circulation of a temperature controlling fluid therethrough, and means associated with said plurality of blocks for securing the blocks in cooperating substantially surrounding relation to said opposing end portions of said pipes and the fastener means associated therewith.

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**4,017,103**
**GARDEN HOSE COUPLER**
**Jonathan L. Lorkowski, Tallmadge, Ohio, assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest**
**Filed July 28, 1975, Ser. No. 599,702**
**Int. Cl.² F16L** *55/00, 41/00*
**U.S. Cl. 285—155** **5 Claims**

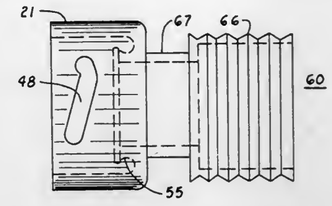
**1.** A coupler assembly for detachably joining together two lengths of flexible garden hose comprising

a male coupler and a female coupler shaped to matingly detachably engage each other,

each said coupler formed with a through axial hole extending from a first end to a second end and formed on its first end with means to fasten to a length of flexible hose,

said male coupler formed at its second end as a collar open to said second end and fitted with a continuous annular rib of generally rounded cross-section projecting from the inside wall of said collar about the rim of the opening of said collar

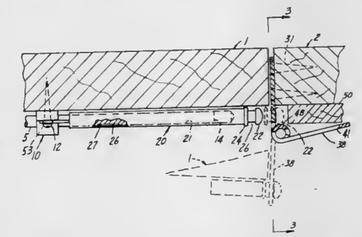
said female coupler formed at its second end as a collar open to said second end, with the internal opening of said collar of a size to fit over the collar of the male coupler, and a rim formed inside the collar of the female coupler



extending from the interior of the said collar and spaced radially inwardly therefrom, said rim being formed with a recessed annular shape of a size to matingly engage the rib of said male coupler collar when said male coupler collar is nested inside the female coupler collar.

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**4,017,104**
**DOOR LATCH**
**Brooks Walker, 1280 Columbus Ave., San Franci co, Calif. 94133**
**Filed May 24, 1976, Ser. No. 689,092**
**Int. Cl.² E05C** *17/04*
**U.S. Cl. 292—268** **9 Claims**



**1.** In a door structure that includes a frame, and a door having a hinge edge and an opposite latch edge, a safety latch comprising:

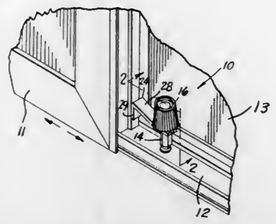
a bar slidably supported on said door for horizontal movement from a retracted position alongside said door and inwardly of said latch edge to a projected position with one end extending past said latch edge,

a plate swingably mounted on said frame for movement between a first position alongside said frame and substantially parallel to the plane of said door to a second position substantially at right angles to the plane of said door,

said plate being formed with an abutment adapted to be engaged by the outer end of said bar when the latter is in said projected position and said plate is in said first position with the door closed to prevent opening movement of said door,

said plate being further provided with an elongated slot closed at its inner end and into which the outer end of said bar may be received when the latter is in said projected position and said plate is in said second position to permit said door to be partially opened with the outer end of said bar against the inner end of said slot and to prevent further opening from said partially open position.

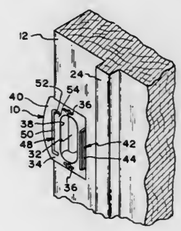
**4,017,105**
**LOCK FOR SLIDING WINDOWS AND DOORS**
**Lee C. Paxton, 5050 North Ave., Carmichael, Calif. 95608**
**Filed Dec. 19, 1975, Ser. No. 642,252**
**Int. Cl.² E05C** *19/18*
**U.S. Cl. 292—288** **6 Claims**



1. A lock for sliding windows or doors of a type including a frame comprising a shaft, means on said shaft for detachably securing said shaft to the frame, means on said shaft extending upwardly and laterally for engaging the sliding window or door, and hand actuated means on said shaft for twisting said shaft into and out of locked position with respect to said window or door.

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**4,017,106**
**STRIKE PLATE FOR SPRING BOLT DOOR LATCHES**
**Charles Salazar, 2740 E. Indianapolis, Fresno, Calif. 93726**
**Filed Oct. 7, 1974, Ser. No. 512,457**
**Int. Cl.² E05C** *19/00*
**U.S. Cl. 292—340** **8 Claims**



1. An improved strike plate for a spring bolt door latch for latching the lead edge of a door to the door jam of a door opening disposed between an inside area and an outside area, comprising:

a planar base plate with a back surface and a face surface, said base plate having a leading edge deflected out of alignment with said base plate plane in the direction of said back surface to provide a latch cam surface, and a trailing edge disposed on the opposite edge of said base plate from said leading edge, and said base plate having a latch bolt opening therein disposed between said leading edge and said trailing edge;

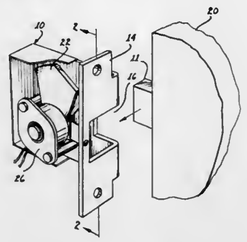
mounting means on said base plate for securing said base plate to said door jam with its back surface against said jam and said latch bolt opening aligned with a bolt recess in said jam;

a first guard flange interconnected with said base plate and positioned to project from said base plate outwardly from and substantially normal to said face surface thereof and disposed adjacent said latch bolt opening on the side thereof closest to the trailing edge of said base plate to prevent access to said spring bolt through the swing space between said door jam and the lead edge of said door when said base plate is mounted to said door jam by mounting means; and

an alternate guard flange interconnected with said base plate and disposed on the opposite side of said latch bolt opening from said first mentioned guard flange and between said base plate leading edge and said latch bolt opening, and positioned to be bent to project from said base plate outwardly from said face surface sufficient to prevent access to said spring bolt through said swing space between said door jam and the lead edge of said door when said base plate is mounted to said door by said mounting means, whereby said strike plate can be arranged to accommodate either an inside or outside opening door by utilization of either said first guard flange or said alternate guard flange, and said alternate guard flange is so positioned that said spring bolt engages and passes over the same upon closing of said door and engagement of said alternate guard flange by said spring bolt is avoided when said spring bolt is fully withdrawn into said spring bolt latch for opening said door.

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**4,017,107**
**ELECTRIC DOOR STRIKE**
**Leland Hanchett, 211 Ridge St., Winchester, Mass. 01890**
**Filed Nov. 11, 1974, Ser. No. 522,340**
**Int. Cl.² E05C** *3/02*
**U.S. Cl. 292—341.16** **3 Claims**



1. Electric strike apparatus comprising a strike frame having a front face plate and a jam face plate; means defining a notch in said strike frame for receiving a latch or dead bolt; a rotary solenoid positioned adjacent said strike frame and having a shaft extending therefrom, said shaft rotatable between a first and second position; a shutter positioned adjacent said front face plate and tied to said shaft for joint movement with said shaft between said first position exposing said notch and said second position covering a portion of said notch to prevent passage of said latch or dead bolt through said portion of said notch; spring biasing means urging said shutter to said second position; and said electric strike apparatus further including a spring latch positioned adjacent said notch and extending into the path of said latch or dead bolt as said latch or dead bolt is extended into said notch, said spring latch extending into the path of said shutter as said shutter moves from said first position to said second position, said spring latch being urged out of the path of said shutter by contact with said latch or dead bolt.

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**4,017,108**
**WINDOW STAY**
**Richard David Hamblin, Birmingham, England, assignor to Archibald Kenrick and Sons Limited, England**
**Filed Apr. 17, 1975, Ser. No. 568,912**
**Int. Cl.² E05C** *17/04*
**U.S. Cl. 292—262** **7 Claims**

1. A window stay comprising:

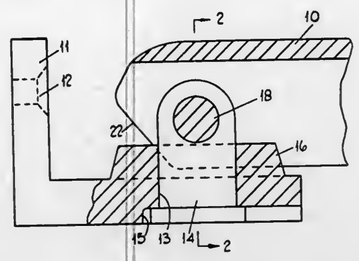
a. an attachment part for securement to a window,

b. a circular spigot extending from one side of said part, said spigot having outer side walls and a top wall,

c. said part and spigot having an opening extending therethrough, said opening being concentric with said spigot and forming a recess in said part,



d. a swivel member extending through said opening, said swivel member having a head end disposed within said recess and with the other end portion of said swivel member extending beyond said top wall,



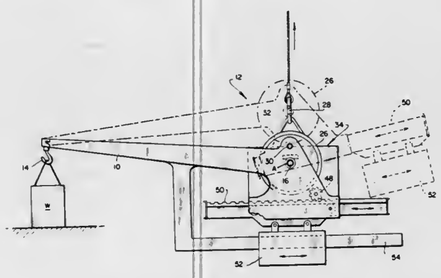
e. a transverse pin extending through an opening in said other end portion of said swivel member, said pin normally engaging said top wall of said spigot,

f. and an elongated stay bar pivotally connected to said pin,

g. the construction being such that said stay bar is pivotable about the axes of said swivel member and said pin.

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**4,017,109**
**HOISTING DEVICE FOR A CRANE**
**Sidney I. Belinsky, 40 Waterside Plaza, New York, N.Y. 10010**
**Filed Jan. 7, 1976, Ser. No. 647,197**
**Int. Cl.² B66C** *1/16*
**U.S. Cl. 294—67 AA** **2 Claims**

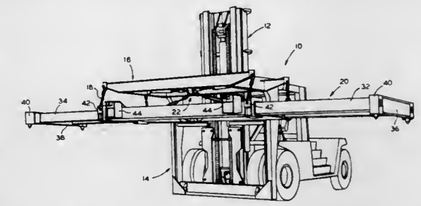


1. A hoisting device including a pivotal boom, a swing shaft attached to said boom off its axis of pivot, a sun gear mounted on said swing shaft, a planet gear having internal teeth engaging said sun gear, a member adapted to receive a hoisting hook mounted atop said planet gear, a main shaft journalled in said boom, a main gear engaging said sun gear and mounted on said main shaft, a slide secured to the underside of said boom, a counterweight supported on said slide being normally positioned under the journalled end of the main shaft when the boom is unloaded and means actuated by said main shaft for shifting the counterweight from its normal position when said boom is loaded and as the device is hoisted.

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**4,017,110**
**CYLINDER AND PISTON ASSEMBLY**
**Bobbylee Pease, Battle Creek, and Clark C. Simpson, Martin, both of Mich., assignors to Clark Equipment Company, Buchanan, Mich.**
**Filed May 19, 1975, Ser. No. 578,445**
**Int. Cl.² F01B** *15/02*; **B66C** *1/66*; **F15B** *13/06*
**U.S. Cl. 294—81 SF** **19 Claims**

1. In a spreader frame for handling cargo containers of a plurality of predetermined lengths by means of lift trucks, van carriers, and the like, having central fixed beam means, first and second oppositely extending telescopic beam means mounted on said central beam means and first and second transverse beam means secured to the outer end portions of said first and second telescopic beam means adapted to engage such cargo containers, a first compound cylinder and piston assembly operatively connected to the fixed beam means and to the first transverse beam means including a movable cylinder means having first and second coaxial cylinder portions separated by a wall means, an extensible first piston means in said first cylinder portion and a fixed second piston means in said second cylinder portion, a second compound cylinder and piston assembly extending in a direction opposite to the said first cylinder and piston assembly operatively connected to the fixed beam means and to the second transverse beam means including a movable cylinder means having first and second coaxial cylinder portions separated by a wall means, an extensible first piston means in said first cylinder portion and a fixed second piston means in said second cylinder portion, spacer means adapted at the time of assembly of said first and second piston and cylinder assemblies to be assembled in a selected one cylinder portion of each of said cylinder means for establishing a pre-selected intermediate position of each of said first and second cylinder and piston assemblies for engaging a selected one length container, and hydraulic control means for pressurizing said first and second cylinder portions of both said first and second cylinder and piston assemblies such that said first piston means of said first and second assemblies are extended in opposite directions from the respective first cylinder portions thereof and said cylinder means of said first and second assemblies are extended in opposite directions on the respective second piston means, said first and second transverse beam means being actuated by said first and second assemblies to selectively engage cargo containers of relatively short, long and intermediate lengths, the short container being engageable thereby when said first and second assemblies are retracted, the long container being engageable when said first and second assemblies are extended, and the intermediate container being engageable when said first and second assemblies are extended in intermediate position in which said spacer means is operative to fix said intermediate position.

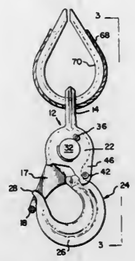


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**4,017,111**
**SAFETY HOOK**
**Edward S. Sandnes, New Cumberland, Pa., assignor to Presco International, Inc., New Cumberland, Pa.**
**Filed Apr. 5, 1976, Ser. No. 673,626**
**Int. Cl.² B66C** *1/34*
**U.S. Cl. 294—82 R** **5 Claims**

1. A safety hook of the type comprising a clevis with a bail, two arms extending from the end of the bail, bores extending through the arms adjacent the bail to receive a pin; a hook having a curved portion with a bill at one end, an eye at the other end thereof and a rounded crest facing one arm of the clevis; a pin extending through said bores and said eye to secure the hook to the clevis between the arms; the clevis extending to the bill to close the hook when the safety hook is in the closed or weight carrying position; and an annular spring on the pin between the hook and the other arm of the

clevis normally positioning the hook adjacent said one arm of the clevis; wherein the improvement comprises a threaded bore extending through said one arm of the clevis radially outwardly of the pin so that the threaded bore sweeps past the crest as the safety hook is moved between the open and closed positions; an insert threadably mounted within said threaded bore and normally extending from said bore towards the hook a distance beyond said crest, the insert having a smooth



rounded end facing the rounded crest and a tool engaging feature facing away from the hook to facilitate rotation of the insert with respect to the one arm to position the rounded end a desired distance from the hook whereby the rounded end of the insert lies in the path of movement of the crest as the hook is moved between the open and closed positions and either restricts or prevents rotation of the hook with respect to the bail depending upon such distance.

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**4,017,112**

**DEVICE FOR RELEASING A LOAD FROM ITS SUPPORT**

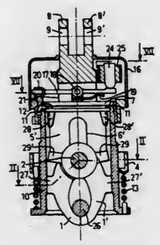
**René Delest, Meudon, France, assignor to Callisto, France**

**Filed Apr. 15, 1976, Ser. No. 677,329**

**Claims priority, application France, Apr. 21, 1975, 75.12364**

**Int. Cl.² B66C *1/38***

**U.S. Cl. 294—83 R** **10 Claims**



1. Device for releasing a load from its support comprising two clamping jaws for the load, mounted inside a sleeve formed with openings and movable in relation to said sleeve under the combined action of the load and of a spring whose action is applied in the opposite direction to the load, between two positions, a lower position where the jaws are compulsorily closed and a higher position where the jaws can open due to the shape of the jaws and the position of the openings with means inhibiting the relative movement of said jaws in relation to said sleeve and driving means arranged so that it stops the action of said inhibiting means.

**4,017,113**

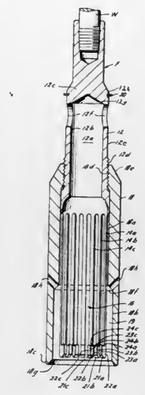
**ELECTRICAL CABLE OVERSHOT-GRAPPLING TOOL**

**Roy H. Cullen; Jimmie R. Aker, and Jim Witovek, Jr., all of Houston, Tex., assignors to General Electric Company**

**Filed Feb. 4, 1976, Ser. No. 654,992**

**Int. Cl.² E21B *31/12***

**U.S. Cl. 294—86.22** **9 Claims**



1. A fishing tool for retrieveing from a well sections of electrical cable having terminal connectors at the ends of each section, comprising:

a main body adapted to be supported in a well and having bore means for receiving a terminal connector of the electrical cable section in a well;

a plurality of flexible gripping fingers mounted with the body for gripping the electrical cable terminal connector with a portion of the terminal connector being received in the bore means;

releasable means for restraining the plurality of flexible gripping fingers under spring pressure for gripping said terminal connector and for releasing said spring pressure from said plurality of flexible gripping fingers for releasing the terminal connector from said fingers;

the releasable finger restraining means including an outer tubular body mounted about the main body for longitudinal movement relative thereto between a position about the flexible gripping fingers for retaining said flexible gripping fingers under spring pressure inwardly relative to each other for gripping the electrical cable terminal connector and a position above said flexible gripping fingers for releasing said fingers for movement outwardly relative to each other for releasing the terminal connector; and

the outer tubular body including an enlarged counterbore portion forming a space between the outer tubular body and a portion of the plurality of gripping fingers with the outer tubular body positioned about the gripping fingers for limited outward bending of the finger portions to permit the electrical cable terminal connector to pass therebetween upon engagement of the terminal connector with the gripping finger ends with the terminal connector being received between said gripping fingers.

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**4,017,114**

**MULTIDIRECTIONAL GRAPPLE**

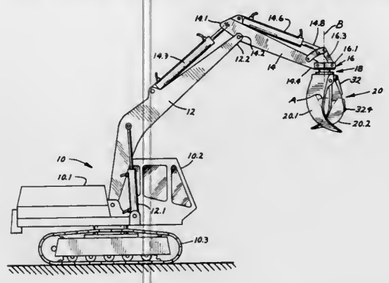
**Roy E. LaBounty, 1607 - 8th Ave., Two Harbors, Minn. 55616**

**Filed Nov. 13, 1975, Ser. No. 631,509**

**Int. Cl.² B66C *1/42***

**U.S. Cl. 294—88** **7 Claims**

1. A multidirectional grapple for a backhoe having a swinghouse, a vertically swingable boom extending outwardly from the swinghouse, and a forwardly extending, hydraulically powered elongate stick mounted to the boom, a tiltable base swingably mounted on the stick for tilting about a horizontal tilt axis extending transversely of the stick, the base having a hydraulic cylinder connected to the stick to control tilting of the base, the grapple including coacting back and forward jaws of which the back jaw has generally downwardly and outwardly extending arcuate, spaced tines; rotatable hydraulic means on the base and mounting the back jaw at its upper end to the base to rotate the back jaw about a rotation axis extending generally along the tines and transversely of the tilt axis, to facilitate turning the back jaw toward one side or the other



from a normal position in which the tines of the back jaw extend downwardly and forwardly in position to forwardly rake the ground, the back jaw being movable relative to the base only about said rotation axis; the forward jaw being pivotally mounted at its upper end to the back jaw and having arcuate tines curved oppositely to the tines of the back jaw, the forward jaw being hydraulically powered and positioned to close toward and interleave with the tines of the back jaw to crush debris therebetween; the forward jaw being openable widely from the back jaw, and the jaws being rotatable as a unit by the rotatable hydraulic means toward one side or the other to bite horizontally into a building, to rake debris from the ground, and the like.

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**4,017,115**

**LIFT SYSTEM FOR CONCRETE SLABS**

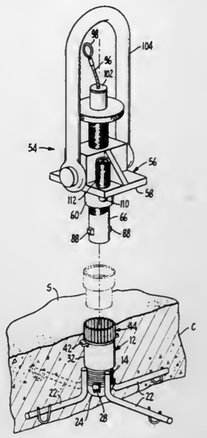
**Jack A. Holt, Belmont, and Philip A. Torbet, San Mateo, both of Calif., assignors to The Burke Company, San Mateo, Calif.**

**Filed Dec. 17, 1975, Ser. No. 641,529**

**Int. Cl.² B66C *1/66***

**U.S. Cl. 294—89** **18 Claims**

1. A remotely releasable hoisting coupling for selective engagement with a concrete slab having a surface, a cylindric passage formed in the slab in generally perpendicular relationship to the surface and opening therethrough, and an annular abutment within the passage below the surface, said coupling comprising: a cylindric body sized for entry into said passage; at least one lug engagable with said abutment and supported in said body for movement relative thereto between a position protruding laterally from said body at which the lug engages the abutment and a position retracted into said body at which the lug is disengaged from the abutment, said body defining a central bore; an actuator rod axially movable in said bore and having an inner end operatively connected to said lug and an outer end accessible from the surface of the slab; means operatively connecting said lug to said actuator rod so that in response to axial movement of the actuator rod in one direction relative said body said lug is moved to the retracted position and, in response to axial movement of the actuator rod in an opposite direction relative to said body, said lug is moved to the protruding position; means within said body for resiliently biasing said actuator rod in said opposite direction so as to correspondingly bias said lug to the protruding position; means secured to the externally accessible end of said actuator rod for selectively moving the rod axially in said one direction to move the lug to the retracted position; and, means



secured to said body exterior of the slab for affording attachment of a hoisting line thereto.

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**4,017,116**

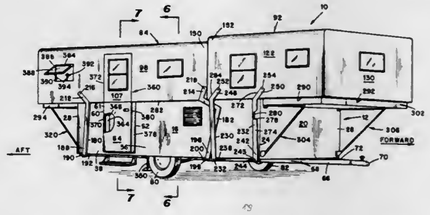
**RECREATION VEHICLE**

**William J. Hulsey, 114 Columbia, Oak Ridge, Tenn. 37830**

**Filed Aug. 11, 1975, Ser. No. 603,514**

**Int. Cl.² B62D *33/08***

**U.S. Cl. 296—26** **9 Claims**



1. A recreational vehicle convertible in size comprising:

a body portion including a floor, end walls and side walls joined to and extending upwardly from said floor and joined together along their adjacent upright side edges to define a rigid open-top box-type structure, said body portion having a relatively low profile,

a first cover section including roof means, and end wall and side walls joined to and depending from said roof means and joined together along their adjacent upright side edges to define a rigid open-bottom box-type structure having one open end, said first cover section being of a geometry and size that permits nesting of one end of said body portion therein,

means mounting said first cover section for substantially arcuate movement of said first cover section between substantialy nesting and substantially non-nesting positions thereof relative to one end of said body section,

a further cover section including roof means, and end wall and side walls joined to and depending from said roof means and joined together along their adjacent upright side edges to define a rigid open-bottom box-type structure having one open end, said further cover section being of a geometry and size that permits nesting of said body section and the open end of said first cover section therein,

means mounted said further cover section for substantially arcuate movement of said further cover section between substantially nesting and substantially non-nesting positions thereof relative to said opposite end of said body sections, said open end of said further cover section overlapping said open end of said first cover section when said cover sections are in their substantially non-nesting position relative to said body section,

a portion of each of said cover sections extending in cantilevered fashion from its respective end of said body section and having a portion of its open bottom exposed when said cover section is in its substantially non-nesting position relative to said body section,

means movably disposed in closing relationship with each of said exposed open body portions of said cover sections,

seal means interposed between said overlapping open ends of said cover sections, and

means mounting said floor for movement over a supporting surface.

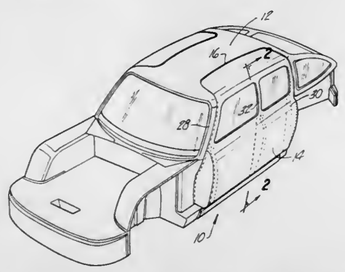
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**4,017,117**

## ROOF HINGED DOOR IN AN AUTOMOBILE

**Walter S. Eggert, Jr., Huntingdon Valley, Pa., assignor to The Budd Company, Troy, Mich.**

**Filed Oct. 8, 1975, Ser. No. 620,902**
**Int. Cl.² B60J** *5/00*
**U.S. Cl. 296—146** **4 Claims**



1. A car body having a roof section, a door hinged to said roof disposed to be opened upwardly towards said roof and to be closed when moved downwardly against a side sill, said door including bottom and inside side portions, said side sill having first and second perpendicularly disposed ledge sections to receive the bottom and inside side portion of said door therebetween when said door is closed, said first ledge section of said side sill being offset outwardly from the vertical plane of the body of said car body, said second ledge portion of said side sill being offset downwardly below the horizontal plane of said car body whereby an inward impact of said door causes the bottom and inside portion of said door to crush and lock into said first ledge section preventing said door from riding over said side sill upon impact.

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**4,017,118**

## PATIENT SUPPORTING DEVICE

**Reginald E. Cawley, 12826 Chapman Ave., Apt. B, Garden Grove, Calif. 92640**

**Filed Apr. 19, 1976, Ser. No. 678,296**
**Int. Cl.² A47C** *3/00*
**U.S. Cl. 297—284** **26 Claims**

22. A device for supporting a patient comprising

seat means,

backrest means extending from one end of said seat means and having an outer edge remote from said seat means,

toeboard means extending from the opposite end of said seat means,

a headrest on said backrest means beyond said outer edge thereof, said headrest including

a support,

a central pad,

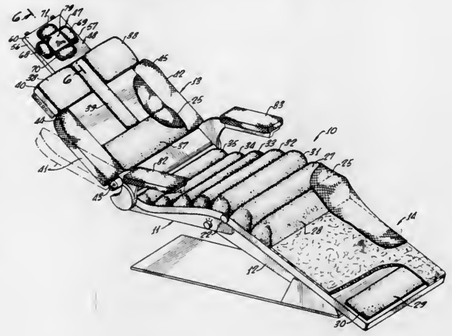
four additional pads,

and means connecting said four additional pads to said support adjacent and around the periphery of said central pad so as to provide a top, a bottom, and two side pads for said headrest with the corners of said additional pads in adjacency,

and inflatable means for varying the surface contour of said device, said inflatable means including

a first transverse bladder on said backrest means adjacent said seat means,

a second transverse bladder on said backrest means spaced from said first transverse bladder and adjacent said outer edge of said backrest means,



a central bladder on said backrest means extending from adjacent said outer edge thereof to adjacent said first bladder,

a bladder beneath each of said additional pads of said headrest for moving each of said additional pads outwardly upon inflation thereof,

at least one transverse bladder on said toeboard means adjacent said seat means for providing the effect of a continuation of said seat means upon inflation thereof,

a plurality of transverse bladders on said seat means extending inwardly from said end adjacent said toeboard means, and means for selectively inflating said bladders.

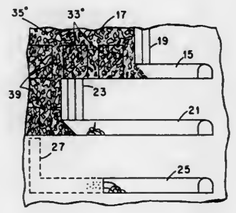
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**4,017,119**

## METHOD FOR RUBBLIZING AN OIL SHALE DEPOSIT FOR IN SITU RETORTING

**Arthur E. Lewis, Los Altos, Calif., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.**

**Filed Mar. 25, 1976, Ser. No. 670,478**
**Int. Cl.² E21B** *43/26;* **E21C** *41/10*
**U.S. Cl. 299—2** **10 Claims**



1. A method for preparing a block of an oil shale deposit for in situ retorting, the block being comprised of alternate layers of rich and lean shale, including the steps of:

developing a vertical access tunnel in the deposit;



driving a horizontal tunnel from the the access tunnel into the deposit;

performing sublevel caving of both rich and lean oil shale layers overlying the distal end of the tunnel to rubblize at least the two immediately overlying layers;

removing a sufficient amount of accessible rubblized shale in the tunnel to permit the rubblized layer adjacent the immediately overlying rubblized layer to drop to the floor level of the tunnel to thereby form a column of shale of different compressability than the horizontally adjacent shale;

performing additional sublevel caving towards the proximate end of the tunnel; and

periodically removing accessible rubble of the immediately overlying layer to create additional columns of shale from the rubblized layer adjacent the immediately overlying layer to thereby form alternate zones of rich and lean shale to maximize the permeability of the oil shale block to hot fluids during retorting.

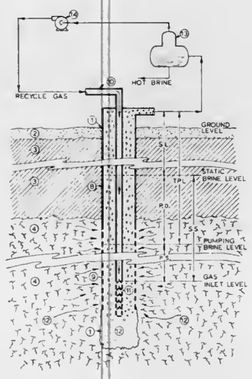
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**4,017,120**

## PRODUCTION OF HOT BRINES FROM LIQUID-DOMINATED GEOTHERMAL WELLS BY GAS-LIFTING

**Elwood L. Carlson, Clayton; Albert A. Gunkler, Walnut Creek; Conrad O. M. Miller, Concord, and H. Hunter Paalman, Walnut Creek, all of Calif., assignors to The Dow Chemical Company, Midland, Mich.**

**Filed Nov. 28, 1975, Ser. No. 636,192**
**Int. Cl.² E21B** *43/00, 43/28*
**U.S. Cl. 299—5** **5 Claims**




1. The method of producing from a subterranean formation a hot brine containing a dissolved gas and from which mineral precipitation will tend to occur if the composition of said gas in the brine is substantially altered, comprising

gas-lifting said brine to the surface of the earth, through a well bore communicating with said formation, using a gas of essentially the same composition as said dissolved gas, including steam, and

discharging the resulting gas/brine mixture from said well against a back pressure which is maintained at a level not substantially lower than the vapor pressure exerted by the brine at the temperature prevailing at the point of introduction of the lift gas in said well, thereby preventing substantial subsurface flashing or stripping of the brine.

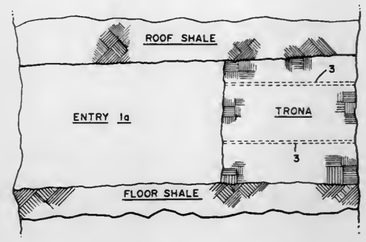
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**4,017,121**

## LONGWALL MINING OF TRONA WITH PREFRACTURING TO PREVENT SLABBING

**Robert Harold Trent, Longmont, Colo., assignor to Allied Chemical Corporation, Morris Township, N.J.**

**Continuation-in-part of Ser. No. 526,771, Nov. 25, 1974, abandoned. This application Apr. 28, 1975, Ser. No. 572,250**
**Int. Cl.² E21C** *27/10, 37/12*
**U.S. Cl. 299—11** **8 Claims**




1. In the longwall method of mining a sub-surface, substantially horizontal bed of trona by driving substantially parallel entries into the trona bed, connecting the entries by at least one primary passage to define a main trona pillar to be mined, and mining the exposed face of the trona pillar along the primary passage, the improvement which comprises prefracturing the trona in situ to substantially reduce slabbing of the trona at the longwall face by

a. driving one or more holes into the trona pillar to be mined;

b. introducing fracturing agent into the hole or holes, and

c. causing the fracturing agent to fracture the trona in situ without substantial displacement of the trona so that the prefractured trona will continue to support the overburden and

d. mining the exposed, prefractured face of the trona pillar along the primary passage.

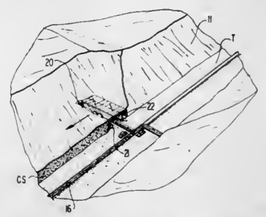
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**4,017,122**

## LONGWALL TRENCH MINING SYSTEM

**Peter Joseph Simpson, Niagara Falls, Canada, assignor to Acres Consulting Services Limited, Toronto, Canada**

**Filed June 23, 1976, Ser. No. 698,878**
**Int. Cl.² E21C** *41/00*
**U.S. Cl. 299—11** **21 Claims**



1. A method of mining minerals from a bed located below ground comprising:

forming an elongated trench of predetermined width to the depth of the mineral bed,

mining the minerals from the mineral bed within the lateral confines of the trench,

providing a mining tunnel through the mineral bed to one side of and substantially perpendicular to the trench for a distance at least several times the width of the trench at its base to form a long wall surface,

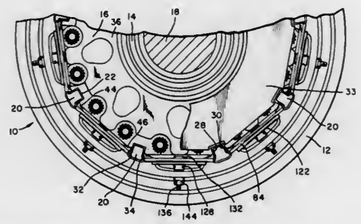
providing longwall mining equipment in the mining tunnel,

mining minerals from the longwall surface by utilizing the longwall mining equipment,

advancing the longwall mining equipment in a direction generally parallel to the trench to mine the minerals of the mineral bed, and
removing the mined minerals.

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**4,017,123**
**DUAL LAYER HEAT SHIELD FOR WHEELS**
**Richard F. Horner, and Jaring Vander Veen, both of South Bend, Ind., assignors to The Bendix Corporation, South Bend, Ind.**
**Filed Apr. 2, 1976, Ser. No. 673,232**
**Int. Cl.² B60B** *19/00*
**U.S. Cl. 301—6 WB** **10 Claims**

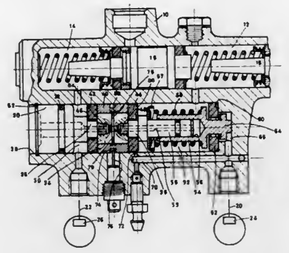


1. A wheel and heat shield therefor comprising in combination:
a tire supporting wheel rim defining a brake cavity adapted to receive a brake assembly having rotatable and non-rotatable frictionally engageable members;
a plurality of elongated drive key means fixedly secured to said wheel rim in circumferentially spaced apart formation and extending radially inwardly therefrom into engagement with said rotatable member;
a plurality of heat shields removably secured in position between said plurality of drive key means to define a substantially continuous annular wall having a radially spaced relationship to said wheel rim;
each of said heat shields including first and second spaced apart plate members fixedly secured together to define a rigid double wall structure having an air space therebetween and opposite side portions engaged with adjacent drive key means for supporting the heat shield in spaced apart relationship with said wheel rim; and
fastening means including a spacing member operatively connected to said heat shield and said wheel rim for reinforcing said radially spaced relationship therebetween and fixedly securing said heat shield in position between said adjacent drive key means.

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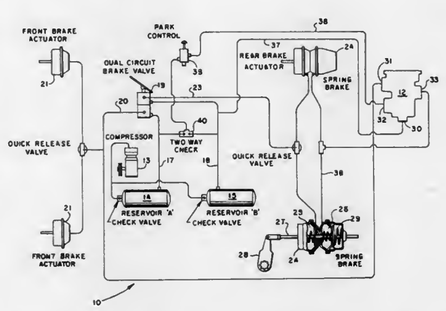
**4,017,124**
**PRESSURE FAILURE WARNING DEVICE**
**Leonardo Cadeddu, Crema, Italy, assignor to Benditalia S.p.A., Crema, Italy**
**Filed Jan. 7, 1976, Ser. No. 647,303**
**Claims priority, application Italy, Jan. 9, 1975, 19115/75**
**Int. Cl.² B60T** *8/26*
**U.S. Cl. 303—6 C** **9 Claims**

3. A failure detector for detecting pressure failure in a system having two independent hydraulic circuits comprising a housing with a bore slidably receiving a movable piston-forming assembly so as to define in the bore on opposite sides of the said movable piston-forming assembly two pressure chambers connectible to the two independent hydraulic circuits, switch means being provided to make electrical contact when the movable piston-forming assembly moves in either direction from a central idle position due to a pressure difference denoting failure of one of the two independent circuits, said movable piston-forming assembly comprising a sleeve cooperating with the switch means and two resilient elastomeric discs, said movable piston-forming assembly being mounted on supporting means remotely fixed to the housing, said supporting means including a cylindrical rigid core coaxial with the bore and two axial projections extending from opposite sides of the core and being smaller in diameter than the core, said sleeve being slidable along both the bore and the core whereas said discs are axially secured in fluid-tight manner on said axial projections and are sealingly slidable on said bore at their periphery, said sleeve having the same axial length as the core, one face of each resilient disc being partly in contact with one of the sleeve and partly in contact with one side of the core when the movable assembly is in said central idle position such that the core is entirely contained within the sleeve.



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**4,017,125**
**INVERSION BRAKE VALVE AND SYSTEM THEREFOR**
**Harold Durling, Elsie, Mich., assignor to Midland-Ross Corporation, Cleveland, Ohio**
**Filed Sept. 9, 1975, Ser. No. 611,648**
**Int. Cl.² B60T** *13/44*
**U.S. Cl. 303—7** **7 Claims**

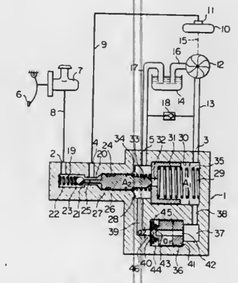



5. A tractor-trailer brake system comprising a first brake circuit associated with said tractor, a second brake circuit associated with said trailer, a plurality of brake actuators in each circuit, means for generating in each circuit fluid at supply and service pressures, tractor protection valve means on said tractor providing fluid communication between said tractor and said trailer when fluid at supply pressure is ported thereto and interrupting fluid communication between said tractor and said trailer in an off position when fluid at supply pressure drops below a predetermined pressure, trailer valve means on said trailer operable to actuate said trailer brake actuators when said tractor protection valve means is in an off position, first valve means on said tractor biased by a source of fluid at signal pressure to provide fluid communication between the higher source at supply pressure in each circuit with said tractor protection valve means and effective to modulate said higher source of supply pressure in accordance with the pressure developed by said signal source of fluid; and inversion valve means providing said source of signal fluid and normally operable to generate said signal source of fluid at supply pressure and operable in a brake failure mode to decrease the pressure of said signal source of fluid at a rate proportional to said source of fluid at service pressure when a decrease in said source of fluid at supply pressure in said second circuit occurs.



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**4,017,126**
**VEHICLE ANTI-SKID BRAKING DEVICE**
**Yoshimoto Ohta, Kawasaki, Japan, assignor to Tokico Ltd., Japan**
**Filed Oct. 28, 1975, Ser. No. 626,445**
**Int. Cl.² B60T** *8/00*
**U.S. Cl. 303—115** **5 Claims**

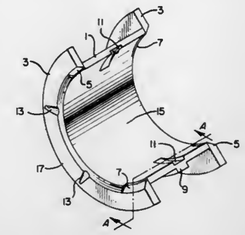


1. A vehicle antiskid braking device for use in a hydraulic braking system for applying hydraulic pressure to a brake cylinder of a wheel of a vehicle and having a main valve means for controlling flow of hydraulic fluid to the brake cylinder, said device comprising a hydraulic pump driven by the rotational force of the wheel, a reservoir connected to said pump for supplying hydraulic fluid to the pump, a valve means comprising a bore having an inlet end connected to the pump and an outlet end connected to the reservoir, a valve member slidably disposed in the bore, one end of the valve member cooperating with the outlet end of the bore to cut off fluid communication therethrough, a spring in said bore urging the valve member toward the inlet end, said valve member having a leak passage formed therein to afford a restricted fluid flow through the valve member when said one end of the valve member is spaced from the outlet end, the valve means opening at a predetermined pressure and closing at a pressure lower than said predetermined pressure, and pressure responsive means coupled to said inlet end of said valve member and acting on said valve means for closing said main valve means when the pressure at said inlet to said valve means drops below a predetermined value.

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**4,017,127**
**SLEEVE TYPE FLANGED BEARING**
**John R. Smith, St. Clair Shores, and Ronald J. Thompson, Brighton, both of Mich., assignors to Federal-Mogul Corporation, Detroit, Mich.**
**Filed June 2, 1975, Ser. No. 583,008**
**Int. Cl.² F16C** *33/14*
**U.S. Cl. 308—23** **11 Claims**

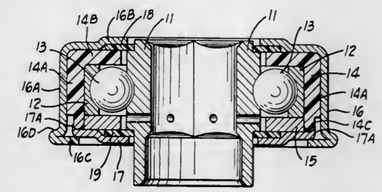
1. A flanged engine bearing assembly comprising at least one first bearing member comprising a substantially semicylindrical engine bearing shell, at least one second bearing member comprising a loosely fitted, co-terminus substantially semicylindrical flange located on at least one axial end of said shell and extending radially outward therefrom, said shell and said flange including interengaging support means for supporting said flange on said shell in a manner permitting unlimited axial displacement of said bearing members relative to one another and preventing unlimited relative circumferential rotation, said locking means including a plurality of relatively spaced notches along the co-terminus portion of one of said bearing members and a plurality of projecting lugs along the correspondingly co-terminus portion of said other bearing member,



and each said lug being in loosely and separable interfitting engagement with a respective one of each of said notches such that the bearing members may be axially separated from one another even as installed on a crankshaft within an engine.

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**4,017,128**
**BALL BEARING ASSEMBLY**
**William O. Setele, Independence, Ohio, and Donald A. Miller, Sterling, Ill., assignors to Kendale Industries, Inc., Valley View, Ohio**
**Filed Feb. 17, 1976, Ser. No. 658,520**
**Int. Cl.² F16C** *19/04*
**U.S. Cl. 308—174** **15 Claims**



1. A ball bearing assembly comprising an inner race member and outer race member, said race members defining opposed annular bearing surfaces for accommodating a plurality of ball bearings located therebetween, a plurality of ball bearings arranged in a circle between said opposed annular bearing surfaces, a rigid cup-shaped shell having an annular outer portion concentric with said race members and spaced radially outward of said outer race member, said shell having an end wall portion extending radially inward from said annular outer portion at a first end of the assembly beyond said outer race member toward said inner race member to guard said ball bearings at said first end of the assembly, said shell having a shoulder portion extending radially inward from said annular outer portion at an opposite end of the assembly, a resilient member of elastomeric material having an outer portion concentric with said race members and positioned between the outer portion of said rigid cup-shaped shell and said outer race member to resist and resiliently absorb radially directed thrust between said outer race member and said outer portion of the said rigid cup-shaped shell, said resilient member having an end wall portion extending radially inward at said first end of the assembly from said outer portion of the resilient member toward said inner race member and positioned between the end wall portion of the rigid cup-shaped shell and the said outer race member to resist and resiliently absorb axial thrust between said outer race member and said end wall portion of the said rigid cup-shaped shell, a rigid washer having a central opening therein for accommodating said inner race member and disposed concentrically of said assembly, said washer abutting said outer race member at said opposite end of the

assembly to hold the outer race member firmly between said washer and said end wall portion of the resilient member, and an annular retainer member having a central opening therein for accommodating said inner race member, said retainer member abutting said rigid washer to hold the same against said outer race member, the outer peripheral edge portion of said annular retainer member being positioned intermediate said shoulder portion of the rigid cup-shaped shell and the resilient member at said opposite end of the assembly and abutting said resilient member to hold the resilient member firmly against said end wall portion of the rigid cup-shaped shell, said shoulder portion of the said rigid cup-shaped shell overlapping the said outer peripheral edge portion of the annular retainer.

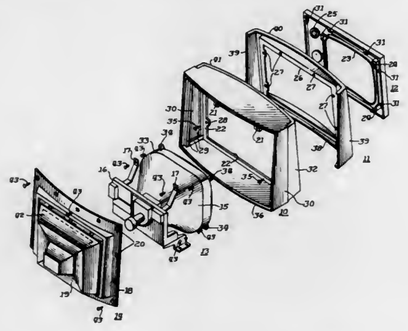
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**4,017,129**

## TELEVISION RECEIVER CABINET WITH FORMED DECORATIVE FRONT

**Melvin H. Boldt, Glenview; David P. Chuboff, North Barrington, and Robert W. Becker, Naperville, all of Ill., assignors to Zenith Radio Corporation, Glenview, Ill.**

**Filed Nov. 14, 1975, Ser. No. 632,350**
**Int. Cl.² H05K *5/00*; A47B *81/06***
**U.S. Cl. 312—7 TV** **7 Claims**



1. A television receiver comprising: a chassis; a picture tube; a cabinet for housing said chassis and picture tube, said cabinet having a top, a bottom, a back, sides and a front frame defining a first substantially rectangular picture tube escutcheon opening; a removable rigid picture tube escutcheon, said cabinet having an unfinished front edge adjacent said rectangular opening, a formed decorative member having a configuration similar to said unfinished front edge of said cabinet and defining a second substantially rectangular picture tube escutcheon opening; means mounting said escutcheon to said front frame of said cabinet in said first opening; means for supporting said picture tube, within said cabinet, from said escutcheon; means supporting said decorative member on said front frame around said second opening; and means fastening the free ends of said formed member to said cabinet to thereby conceal said unfinished front edge.

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**4,017,130**

## DISPLAY CASE

**Jerry D. Hanson, Spring Lake, Mich., assignor to Structural Concepts Corporation, Spring Lake, Mich.**

**Filed Nov. 6, 1975, Ser. No. 629,292**
**Int. Cl.² A47F *3/06***
**U.S. Cl. 312—128** **9 Claims**

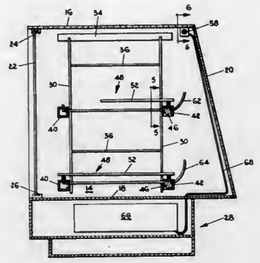
1. A display case for display of bakery goods and the like, said display case comprising:

a cabinet having sidewalls, a top wall, a bottom wall and a front glass wall;

thin elongated support brackets having a plurality of vertically spaced support means thereon;

means removably mounting said support brackets on the sidewalls and spaced above the bottom wall so that the brackets can be quickly and easily removed without the use of tools, said mounting means consisting of receiving means at an upper portion of the sidewalls and means at an upper portion of the support brackets for slidably engaging the receiving means;

at least two crossbars extending between the support brackets on opposite sidewalls, the crossbars having means for removably engaging the support means so that the cross-



bars are supported by the elongated support brackets and the crossbars further including means for pressing the support brackets against the sidewalls so that the brackets are at least partially held by frictional contact with the sidewalls;

shelves supported by the crossbars; and

means releasably fastening the shelves to the crossbars;

whereby the shelves of the display case can be quickly and easily removed and replaced for complete cleaning of the case interior.

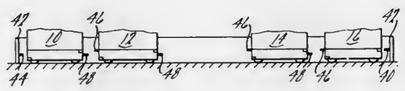
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**4,017,131**

## MAXIMUM DENSITY MOBILE STORAGE SYSTEM

**Johann L. Camenisch, Dubendorf, Switzerland, assignor to J. Gestle, AG, Chur, Switzerland**

**Filed Sept. 22, 1970, Ser. No. 74,287**
**Int. Cl.² A47B *53/00***
**U.S. Cl. 312—198** **4 Claims**



1. A mobile load carrying system comprising an elongated supporting structure having end stops, a plurality of load carrying devices mounted on said supporting structure in side-by-side relation for movement along a controlled path between said end stops, the length of said path exceeding by a predetermined amount the sum of the widths of the devices whereby to provide at least one loading or unloading gap between selected ones of the devices, a plurality of motive means, each motive means being carried by an individual device, all of said motive means being separate from said supporting structure, sensing means carried by each device on opposite sides thereof for sensing the presence or absence of a gap between either side of said device and an adjacent device or one of said end stops, each sensing means comprising a switch shiftable between a first position when a gap is present and a second position when a gap is absent, means for controlling the motive means of and thereby starting a selected device having both switches in said second position towards a gap and simultaneously energizing the individual motive means of and thereby starting all other devices between said selected device and said gap until the gap is closed, the movement of said devices being in unison, said energizing means including a circuit between a power source and a



switch on one of said devices which is in said first position, and means responsive to a change in the current in said circuit simultaneously to activate the motive means of said selected device as well as said other devices while the switches of said selected device are both still in their second position.

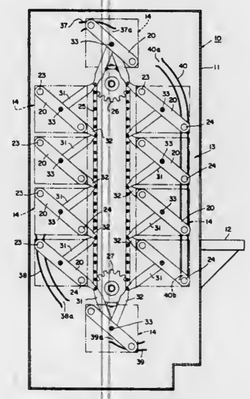
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**4,017,132**

## MECHANIZED FILE CARRIER STABILIZATION SYSTEM

**Algis Raymond Banys, Rohnert Park, Calif., assignor to Sperry Rand Corporation, New York, N.Y.**

**Filed Sept. 19, 1975, Ser. No. 615,008**
**Int. Cl.² A47B *49/00*, *77/16***
**U.S. Cl. 312—268** **6 Claims**



1. Mechanized filing apparatus of the type in which a plurality of article storage carriers are controllably conveyed along a closed loop path for selectively positioning the carriers at a work station adjacent the apparatus, comprising:

a plurality of carriers each having a lateral shelf member and a pair of side members spaced along and extending transversely of the shelf member for holding and storing articles,

a conveyor assembly for conveying the carriers along the closed loop path, including first and second pairs of vertically spaced wheels laterally separated from one another, a first flexible member extending around and riding on the first pair of wheels, a second flexible member extending around and riding on the second pair of wheels, and means for pivotally suspending each carrier from the flexible members including a pair of suspension arms connected from spaced points along the first flexible member to a rod extending laterally from one side member of the carrier and another pair of suspension arms connected from spaced points along the second flexible member to a rod extending laterally from the other side member of the carrier,

each carrier having a first pair of rollers mounted in diagonally disposed relation to one another on the one side member of said carrier and having a second pair of rollers mounted in diagonally disposed relation to one another on the other side member of said carrier, the diagonal disposition of said second pair of rollers being transverse to the diagonal disposition of said first pair of rollers, and

track means positioned adjacent the carrier side members for guiding the rollers to limit the tilt of the carriers while moving around the closed loop path,

said track means including upper first and second track sections and lower first and second track sections disposed in discontinuous nonoverlapping relation to one another in a vertically oriented plane adjacent the one side member of the carriers, adjacent ends of the upper first and second track sections being spaced along one-half of an upper curved portion of the closed loop path about the upper wheels, adjacent ends of the lower first and second track sections being spaced along one-half of a lower curved portion of the closed loop path about the lower wheels and diagonally opposite the adjacent ends of the upper first and second track sections, said upper and lower first and second track sections being arranged such that as each carrier moves along upper and lower curved portions of the closed loop path one roller of said one side member is guided by the first track sections and the diagonally disposed roller of said one side member is guided by the second track sections,

said track means further including upper third and fourth track sections and lower third and fourth track sections disposed in discontinuous nonoverlapping relation to one another in a vertically oriented plane adjacent the other side member of the carriers, adjacent ends of the upper third and fourth track sections being spaced along the other half of the upper curved portion of the closed loop path along which the upper first and second track sections are spaced and adjacent ends of the lower third and fourth track sections being spaced along the other half of the lower curved portion of the closed loop path along which the lower first and second track sections are spaced, said upper and lower third and fourth track sections being arranged such that as each carrier moves along the upper and lower curved portions of the closed loop path one roller of said other side member is guided by the third track sections and the diagonally disposed roller of said other side member is guided by the fourth track sections.

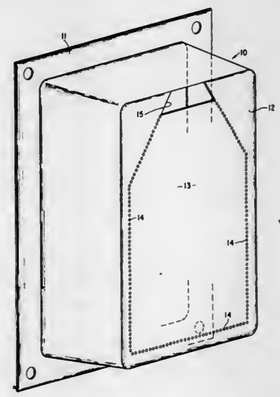
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**4,017,133**

## FIRE EXTINGUISHER ENCLOSURE

**Eugene B. Sigler, 1920 Burnside, Sioux Falls, S. Dak. 57104**

**Filed Feb. 23, 1976, Ser. No. 660,341**
**Int. Cl.² B65D *25/54*; A47B *77/18***
**U.S. Cl. 312—293** **5 Claims**



1. An enclosure for a fire extinguisher or the like comprising a box-like structure having one open side, flanges on said structure adjacent said open side whereby said structure may be mounted on a wall, and a front panel readily removable from the front side of said box-like structure opposite the open side.

**4,017,134**

## RACK-MOUNTING FOR ELECTRONIC EQUIPMENTS

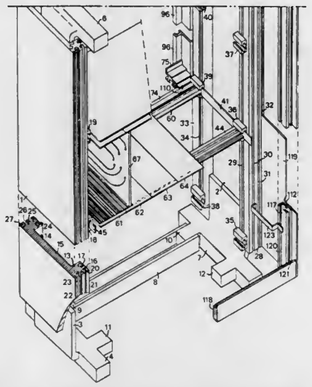
**Thierry Lenglin, Trebeurden; Albert Lissillour, Tregastel; Jean-Louis Desaunay, Perros-Guirec; Robert Le Corvec, Vanves; Robert Simonneau, Perros-Guirec, and Richard Rouquaud, Grigny, all of France, assignors to L'Etat Francais, represente par le Ministre des Postes et Telecommunications and Socotel Societe Mixte pour le Developpement de la Technique de la Commutation dans le Domaine des Telecommunications, both of Issy-les-Moulineaux, France**

**Filed July 8, 1975, Ser. No. 593,967**

**Claims priority, application France, July 8, 1974, 74.24253**

**Int. Cl.² H02B** *1/04;* **H05K** *7/16*

**U.S. Cl. 312—351** **4 Claims**



1. A chassis for electronic equipment comprising a frame structure including two similar spaced uprights connected respectively at their tops and at their bottoms by two similar rigid frames, each frame comprising two lateral plate means fixed respectively to the uprights and connected by crosspiece means, and wherein each upright is constituted by a symmetrical, profiled section defining two spaced, parallel posts connected by a rigid web, each of said posts having vertical grooves defining a T-shape cross section for receiving brackets, a plurality of brackets, each comprising an elongated part adapted to be located in the groove and then rotated through a small angle to a locked position, said elongated part having a cylindrical portion on one side, said elongated part further comprising a small plate of generally rectangular shape, and a nipple projecting from a side of the plate opposite the cylindrical portion, said plate having diagonally opposite corners with a thickness which diminishes progressively towards the edge of the corner, the length of the small plate being substantially equal to the overall length of the arms of the T-shaped groove, so that when the small plate is introduced into the groove and is turned by 90°, the bracket is retained therein, and the bottom of the groove having holes defined therein, each hole being shaped and proportioned to receive said nipple.

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**4,017,135**

## ELECTRICAL CONTACT ELEMENT

**Hiroshi Taguchi, Tokyo, Japan, assignor to AMP Incorporated, Harrisburg, Pa.**

**Filed Sept. 5, 1975, Ser. No. 610,792**

**Claims priority, application Japan, Sept. 19, 1974, 49-107095**

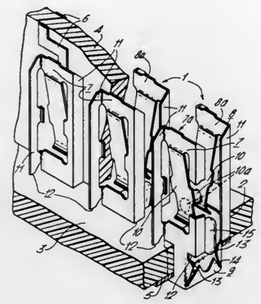
**Int. Cl.² H05K** *1/08*

**U.S. Cl. 339—17 LM** **15 Claims**

1. A single element contact of electrically conducting material for mounting and making an electrical connection between a mother and a daughter circuit board comprising:

a base having a generally rectangularly shaped cross-section locatable within a hole in the mother board to support the contact upon the mother board and make electrical connection therewith;

a pair of parallel upstanding members having a generally Z-shaped cross-sectional configuration carried upon said base to extend upwardly from the mother board for receiving the daughter board therebetween; and



the ends of said Z-shaped upstanding members being terminated to form shoulders which rest upon the surface of said mother board when said contact is inserted therein;

a pair of tangs, each formed of a portion of a respective one of said members bent in the direction of the other of said members, whereby each of said tangs engages the daughter board when it is inserted between said members to support it and to make electrical connection to it.

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**4,017,136**

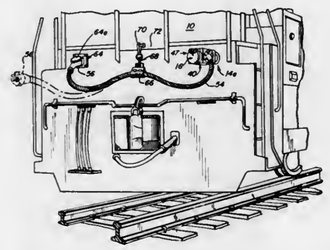
## PERMANENT TRI-HEADED JUMPER CABLE FOR LOCOMOTIVES

**Peter J. Sasgen, Forest Park, Ill., assignor to Power Parts Company, Chicago, Ill.**

**Filed Aug. 25, 1975, Ser. No. 607,559**

**Int. Cl.² H01R** *33/00*

**U.S. Cl. 339—28** **3 Claims**



1. An improved jumper system for use in the electrical interconnection of a pair of locomotive units of a consist for hauling trains, where the end of each locomotive unit adjacent the other locomotive unit is originally provided adjacent one side thereof with a receptacle substantially enclosing a multiple-pronged terminal connector;

said improved jumper system comprising, in combination:

an elongated hollow junction box having opposite ends and side walls means, transverse to the ends, that enclose and surround a space between said opposite ends of the box, and an aperture in said side wall means,

a first mounting stud extending from one end of the junction housing and defining therein a plurality of female-socketed elements constructed and arranged for electrical connection to the original multiple-pronged terminal connector on the locomotive,

a receptacle at the other end of the junction housing enclosing a second multiple-pronged terminal connector that is a duplicate of the original multiple-pronged terminal connector on the locomotive, the second multiple-pronged terminal connector being electrically connected to said female-socketed elements,

an elongated permanently mounted jumper cable originating at one end thereof from the aperture in the side wall means of the junction box and providing at its other end a free head that includes a second mounting stud with electrical connections that are a duplicate of the electrical connections of the first mounting stud at the one end of the junction box,

electrical connection means, located within the space enclosed by the junction box and extending through the permanently mounted jumper cable for electrically connecting the female socketed elements of the two mounting studs and the multiple-pronged terminal connector carried on the other end of the junction box,

means operatively associated with the junction box for rigidly mounting the junction box on the locomotive with the female socketed elements of the first mounting stud electrically coupled to the multiple prongs of the original terminal connector on the locomotive unit, and

a dummy receptacle physically and electrically separated from said first receptacle and mounted on said locomotive unit adjacent the other side thereof, to provide a storage receptacle where the free head of the elongated cable may be selectively entered therein to be held when the jumper cable is not in use.



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**4,017,137**

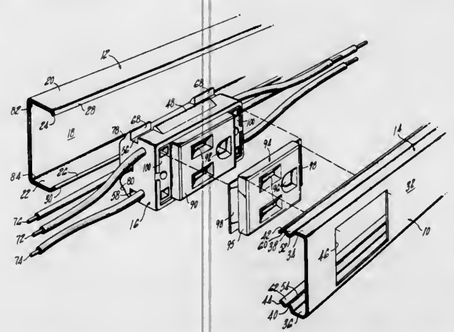
## ELECTRICAL RACEWAY AND RECEPTACLE ASSEMBLIES

**William E. Parks, Plantsville, Conn., assignor to The Wiremold Company, West Hartford, Conn.**

**Filed Jan. 16, 1976, Ser. No. 649,787**

**Int. Cl.² H01R** *13/60*

**U.S. Cl. 339—21 R** **20 Claims**



13. An electrical receptacle assembly comprising a receptacle having a plug prong-receiving face, a receptacle face cap dimensioned and configured to be mounted in fixed overlying relation to the receptacle face, and a receptacle cover plate having an opening registrable with the receptacle face and, alternatively, both the receptacle face and its overlying face cap, the face cap having retaining means projecting therefrom which when assembled is in interposed trapped relation between the cover plate and the receptacle and serves to secure the face cap against movement in fixed overlying relation to the face of the receptacle.

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**4,017,138**

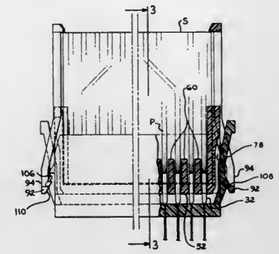
## SUBSTRATE CONNECTOR

**Robert Franklin Evans, New Cumberland, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed June 16, 1975, Ser. No. 587,228**

**Int. Cl.² H05K** *1/07;* **H01R** *13/54*

**U.S. Cl. 339—75 MP** **7 Claims**



1. An electrical connector for receiving a substrate having a plurality of conductive pads along a surface adjacent an edge thereof comprising:

a first housing including a base having a pair of upstanding walls forming a channel, a releasable latch arm mounted on each end of the base of said housing, each latch arm including a latching surface extending from a side away from the channel and a latch release member on the free end of each arm, and a latch surface on each end of each wall spaced a distance away from said base and said latch surface on each said latch arm,

a plurality of cantilever contacts mounted in said base of said housing extending into said channel, and

a member for receiving the substrate operatively mounted in said channel, said member including a base having an aperture receiving each contact and a surface on the base of said member for receiving an edge of the substrate having conductive pads on adjacent surfaces including a latch arm medially mounted on each end of the base of said member, each said arm on said member having a first free end including a first latch surface operatively engageable with said latch surface on one end of each wall of said housing in a loading position in which said member and said housing are engaged for receiving the substrate with zero contact insertion force against the conductive pads, and a second latch surface operatively engageable with said latch surface on one of said releasable latch arms on said housing in a loaded position in which the substrate, said member and said housing are engaged with a graduated force, wiped electrical connection between each contact and each conductive pad.

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**4,017,139**

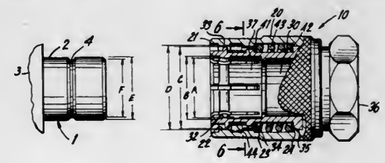
## POSITIVE LOCKING ELECTRICAL CONNECTOR

**Wilfred Nelson, Laguna Hills, Calif., assignor to Sealectro Corporation, Mamaroneck, N.Y.**

**Filed June 4, 1976, Ser. No. 692,891**

**Int. Cl.² F16L** *37/08;* **H01R** *13/54, 13/56*

**U.S. Cl. 339—91 R** **7 Claims**



1. A female plug connector for use in combination with a standard male jack, said male jack including a tubular body

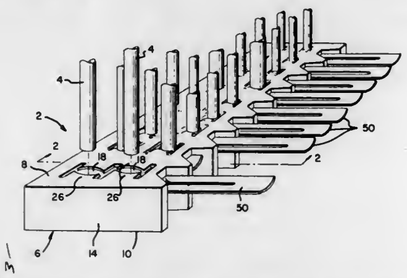
having an annular groove disposed intermediate its length, said female plug connector comprising:

a. a tubular outer sleeve including:
   i. an annular edge at one end;
   ii. an interior locking surface of reduced diameter; and
   iii. first and second interior containing surfaces;
b. a tubular insert slidably received in the outer sleeve, said tubular insert including:
   i. at one end of said insert, longitudinally extending slits forming slotted members to allow radial expansion;
   ii. interior reduced diameter protrusions corresponding in configuration to the annular groove of the jack.
   iii. outer annular projections which bear against the locking surface of the outer sleeve when the female plug connector is in the locked position; and
   iv. first and second outer containing surfaces;
c. a first retaining means bearing against the first interior containing surface of the outer sleeve and the first outer annular containing surface of the tubular insert;
d. a second retaining means bearing against the second interior containing surface of the sleeve and the second outer annular containing surface of the tubular insert;
e. biasing means disposed between the first and second retaining means for locating the outer sleeve in its normal position relative to the tubular insert; and
f. a retaining ring disposed around the slotted members of the tubular insert, between the outer annular projections of the tubular insert and the first retaining means.

## 4,017,140
## WIRE-IN-SLOT ELECTRICAL CONNECTIONS

**Robert Philmore Reavis, Jr., Statesville, and Melvin Andrew Soderstrom, Advance, both of N.C., assignors to AMP Incorporated, Harrisburg, Pa.**

**Filed Oct. 28, 1975, Ser. No. 625,810**
**Int. Cl.² H01R 9/08**
**U.S. Cl. 339—98** **7 Claims**

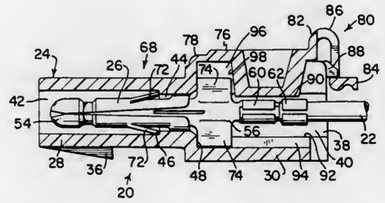


1. Connecting means for forming an electrical and mechanical connection with a wire comprising:
an insulating housing,
a wire receiving cavity extending into said housing from one side thereof,
a connecting device cavity extending into said housing from a side which is adjacent to said one side, said connecting device cavity having a flat surface and an arcuate surface, said arcuate surface being opposed to said flat surface so that said connecting device cavity has a substantially geometrically segmental cross section, said flat surface being proximate to said one side of said housing and said arcuate surface being remote from said one side, said cavities intersecting each other,
an electrical connecting device comprising a plate-like member having a wire receiving end, said connecting device having an arcuate cross section and having a wire-receiving slot extending inwardly from said wire-receiving end towards its other end, the curvature of the cross-section of said connecting device conforming to the curvature of said arcuate surface of said connecting device cavity whereby, upon inserting said wire into said wire-receiving cavity and inserting said connecting device into said connecting device cavity, wire receiving end first, said wire will move relatively into said slot.

## 4,017,141
## CONNECTORS WITH PRIMARY AND SECONDARY LOCK STRUCTURE

**Allen J. Bury, 400 Etowah, Prospect Heights, Ill. 60070, and William D. Gruhn, Jr., 408 Hillcrest Lane, Lombard, Ill. 60148**

**Filed May 23, 1973, Ser. No. 363,310**
**Int. Cl.² H01R 9/08**
**U.S. Cl. 339—217 S** **4 Claims**



1. An electrical connector comprising in combination:
a housing formed of insulating material and including a main body portion and a hinged door portion movable to closed and open positions;
at least one terminal-receiving cavity extending through said main body portion, said cavity including an entrance region;
a conductive terminal insertable into said cavity from said entrance region to a home position;
said terminal comprising a generally cylindrical body having a pair of projections extending radially from said terminal and lying approximately in a plane including the center of said body;
primary lock means on said terminal and main body portion effective upon movement of said terminal to the home position for retaining the terminal in place;
guide groove means in said main body portion along the entrance region of said cavity for receiving said projections and guiding said terminal to said home position with said projections in a predetermined position; and
said door including a segment received in said entrance region upon closing of said door and engagable with one said projection in said predetermined position, said door segment and said projections including camming means for advancing said terminal from a position closely adjacent the home position to the home position upon closing of said door.

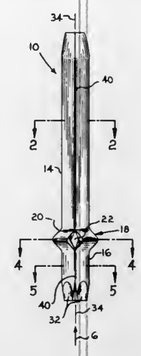
## 4,017,142
## SELF-STAKING CIRCUIT BOARD PIN CONTACT

**Stephen Larry Clark, Rossville, and William Charles Thoms, East Berlin, both of Pa., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Continuation-in-part of Ser. No. 558,421, March 14, 1975, abandoned. This application Jan. 12, 1976, Ser. No. 648,514**
**Int. Cl.² H01R 9/08**
**U.S. Cl. 339—220 T** **25 Claims**

10. A contact formed from flat metal stock and having a longitudinal axis, said contact comprising an outer hollow body at one end of the contact, a tubular mounting portion at the other end of the contact, a collapsible portion between said body and mounting portion, means at the free end of the mounting portion engagable with a support, and an inner elongate body surrounded by said outer hollow body, said inner elongate body extending past the collapsible portion and into the interior of the mounting portion to move the means into engagement with a support upon collapse of said collapsible portion, and a longitudinal seam extending along said outer hollow body, said inner elongate body joining said outer body through a reverse bend portion at the seam.

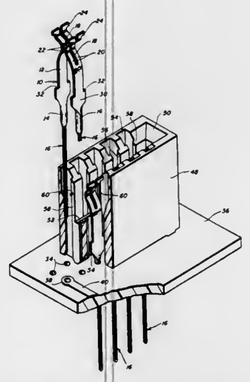




## 4,017,143
## SOLDERLESS ELECTRICAL CONTACT

**Robert Gordon Knowles, Litchfield, Conn., assignor to Litton Systems, Inc., Beverly Hills, Calif.**

**Filed Dec. 16, 1975, Ser. No. 641,386**
**Int. Cl.² H05K 1/12**
**U.S. Cl. 339—221 R** **9 Claims**



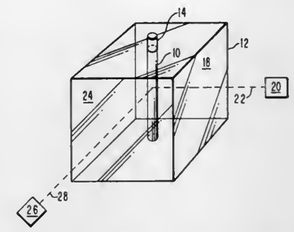
1. An electrical contact for insertion into a mounting plane aperture wherein said contact comprises:
an aperture engaging section having a C-shaped cross section formed from opposing arms; and
said opposing arms engaging said aperture along their outer surface to the ends thereof and tapering over a circumferential arc greater than 90° to a reduced cross-sectional thickness at the ends thereof for reducing internal stress within said C-shaped section as said section is inserted into said aperture.

## 4,017,144
## RECORDING ASSEMBLY FOR VOLUME HOLOGRAPHY

**David Lloyd Staebler, Lawrenceville, N.J., assignor to RCA Corporation, New York, N.Y.**

**Filed Feb. 11, 1976, Ser. No. 657,032**
**Int. Cl.² G03H 1/02**
**U.S. Cl. 350—3.5** **5 Claims**

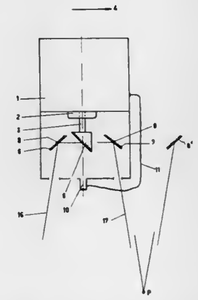
1. A holographic recording assembly, comprising:
a transparent block having a cavity therein, a side of said block being planar; and
a holographic recording medium having the shape of a solid of revolution and an index of refraction substantially equal to the index of refraction of said block, said medium being axially rotatable within said cavity, the shapes of said cavity and said medium being substantially complementary.



## 4,017,145
## DEVICE MOUNTABLE IN A CRAFT FOR THE RECORDING OF DATA FROM A REMOTE OBJECT

**Hans Georg Jerie, Enschede, Netherlands, assignor to Stichting Internationaal Instituut voor Luchtkaartering en Aarkunde (ITC), Enschede, Netherlands**

**Filed Apr. 29, 1975, Ser. No. 572,901**
**Claims priority, application Netherlands, May 9, 1974, 7406227**
**Int. Cl.² G02B 27/17**
**U.S. Cl. 350—7** **3 Claims**



1. In a device arranged to record data from a remote object constituted by a surface while being moved in a given direction relative to such surface, the device including a primary element mounted for continuous rotation about a main axis and presenting a radiation reflecting surface oriented at a fixed angle of 45 degrees to the main axis and the main axis being substantially perpendicular to the surface, the improvement wherein said device further comprises a first plane mirror permanently disposed on one side of said main axis a second plane mirror permanently disposed on the opposite side of said main axis, at least one of said mirrors being oriented so that its reflecting surface extends at an angle unequal to 45° to the main axis, and two pivotally mounted mirror support shafts each carrying a respective one of said plane mirrors and each lying in a plane which is perpendicular to the main axis.

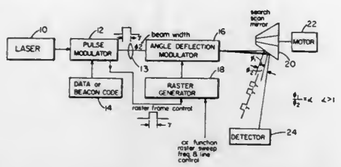
## 4,017,146
## TRANSMITTER FOR USE IN A LASER COMMUNICATION AND RANGING SYSTEM

**Samuel W. Lichtman, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Mar. 4, 1976, Ser. No. 663,884**
**Int. Cl.² G02B 27/17**
**U.S. Cl. 350—7** **5 Claims**

1. For use in a laser communication and ranging system a transmitter for extending the operational range capability comprising:

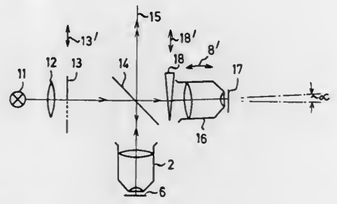
a. a laser beam source;
b. pulsed modulator means for receiving said laser beams and providing a modulated beam output containing encoded data;
c. optical focusing means for receiving said modulated beam for focusing said beam to a predetermined narrow beam width,




d. angle deflection modulator means for receiving said beam and deflecting said beam in a predetermined raster scan of an operational area equivalent to a broad beam scan, said angle deflection means including a ramp generator coupled to said pulse modulator and being triggered by the onset and for the duration of each beam pulse;
e. search scan mirror means for reflecting said beam to an area of interest.

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**4,017,147**
**COMPARISON MICROSCOPE**
**Klaus Weber, Konigsbronn, and Lothar Trapp, Heidenheim (Brenz), both of Germany, assignors to Carl Zeiss-Stiftung, Wuerttemberg, Germany**
**Filed Feb. 10, 1975, Ser. No. 548,672**
**Claims priority, application Germany, Feb. 15, 1974, 2407270**
**Int. Cl.² G02B** *21/18*
**U.S. Cl. 350—30** **7 Claims**




1. In a comparison microscope for the simultaneous observation of two objects, optical-element means including a first microscope objective on an observation-light path to a first object, a partially transmitting mirror arranged in and inclined with respect to the observation-light path, illuminating means offset to one side of said mirror, including a light source and a diaphragm having a straight edge defining the border between a light-transmitting area and a light-blocking area, said diaphragm being positioned with its light-transmitting area asymmetrical to the axis of light from said light source to said mirror, said mirror being positioned to reflect light from said source on the observation-light path through said microscope objective, whereby an image of the first object is viewable on the observation-light path as light transmitted via said first objective and through said mirror, part of the light from said source passing through said mirror and generally transverse to said observation-light path, a second microscope objective having its axis so positioned in the path of light-source light transmitted through said mirror as to illuminate a second object and to cause light reflected by the second object to place an image of the second object as a reflection from said mirror on the observation-light path, the axis of said second microscope objective being so tilted with respect to the axis of light from said source to said mirror that the image of the second object is viewable directly adjacent the image of the first object within that part of the field of view which is not illuminated by the light coming through said diaphragm.

**4,017,148**
**TRI-POWER PERISCOPE HEAD ASSEMBLY**
**William H. Taylor, South Deerfield, Mass., assignor to Kollmorgen Corporation, Hartford, Conn.**
**Filed July 16, 1975, Ser. No. 596,515**
**Int. Cl.² G02B** *7/04*
**U.S. Cl. 350—37** **4 Claims**



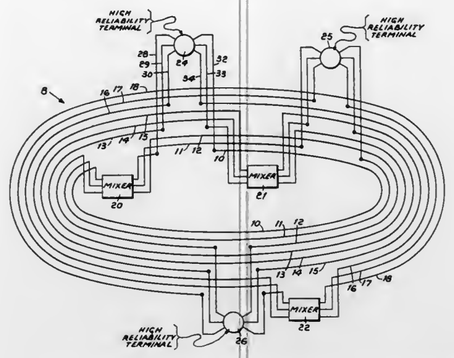

1. An optical system for a periscope head assembly, said optical system having an optical axis and comprising:
a. a first telescopic lens assembly aligned with said optical axis for altering the magnification of said optical system, said first lens assembly having two positions, both of which transmit light, the alteration of the magnification of said optical system by said first lens assembly being effected by rotating said first lens assembly approximately 180° in a plane substantially parallel to said optical axis;
b. a second telescopic lens assembly aligned with said optical axis for altering the magnification of said optical system, said second lens assembly having two positions, both of which transmit light, said second lens assembly being in series with said first lens assembly, said first and second lens assemblies forming a part of the optical path regardless of the magnification selected, the alteration of the magnification of said optical system by said second lens assembly being effected by rotating said second lens assembly by approximately 180° in a plane substantially parallel to said optical axis, said first and second lens assemblies providing, in combination, three different optical magnifications; and
c. an objective lens assembly aligned with said optical axis for receiving optical information transmitted serially by said first and second lens assemblies.

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**4,017,149**
**MULTIPLE ACCESS FIBER OPTICAL BUS COMMUNICATION SYSTEM**
**Charles K. Kao, Southwest Roanoke, Va., assignor to International Telephone and Telegraph Corporation, Nutley, N.J.**
**Filed Nov. 17, 1975, Ser. No. 632,614**
**Int. Cl.² G02B** *5/16;* **H04B** *9/00*
**U.S. Cl. 350—96 C** **18 Claims**

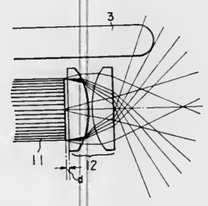
1. A low loss fiber optical bus communication system comprising:
a plurality of optical transmission lines, each of which is formed into a closed loop;
a finite number of transmission line optical mixers operatively interconnected to a discrete number of said optical transmission lines, each of said mixers being independent of each other and forming a finite number of independent mixer transmission line loops; and
one or more optical access terminals connected to said transmission lines by being interconnected to at least one transmission line associated with at least one of said mixers said optical access terminals exceeding said finite number of transmission line optical mixers.






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**4,017,150**
**WIDE-ANGLE ILLUMINATING OPTICAL SYSTEM WITH LIGHT GUIDE**
**Toshihiro Imai, Hachioujl, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan**
**Filed Oct. 7, 1975, Ser. No. 620,503**
**Claims priority, application Japan, Oct. 8, 1974, 49-115872; Nov. 6, 1974, 49-127833**
**Int. Cl.² G02B** *5/16*
**U.S. Cl. 350—96 BC** **4 Claims**



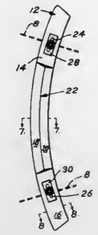

1. A wide-angle illuminating optical system with light guide comprising:
a light guide for transmitting the illuminating light and a positive lens system arranged near the end of said light guide,
said wide-angle illuminating optical system with light guide being arranged to illuminate a wide area of the portion to be observed by converging the illuminating light from said light guide at the back focal point of said positive lens system and, then, diverging said light,
said illuminating optical system satisfying the following conditions:

$$f/l < 0.866 \quad (1)$$

$$d < \tfrac{1}{2} f \quad (2)$$

wherein
reference symbol *l* represents the diameter of said light guide,
reference symbol *d* represents the airspace between the end face of said light guide and the first lens surface of said positive lens system, and
reference symbol *f* represents the focal length of said positive lens system.

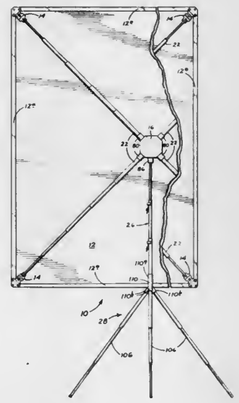
**4,017,151**
**BICYCLE SIDE REFLECTOR**
**Jo Kagayama, Osaka, Japan, assignor to Tsuyama Mfg. Co., Ltd., Osaka, Japan**
**Filed Nov. 3, 1975, Ser. No. 628,556**
**Int. Cl.² G02B** *5/12*
**U.S. Cl. 350—99** **8 Claims**



1. A side reflector assembly for mounting on spokes of a wheel comprising two slim and elongated reflector bodies having a longitudinal axis adapted to be oriented generally parallel to a rim of a wheel upon which the reflector assembly is to be mounted, each reflector body made from molded material and each having a front reflective surface and a rear face faceted with prismatic reflector elements, said bodies being seamed together to form said assembly, said front reflective surface being comprised of at least a first planar surface and a second roof surface having two inclined planar sections symmetrical to the longitudinal axis of the assembly, and means for clamping said assembly to a wheel spoke.

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**4,017,152**
**PORTABLE PROJECTION SCREEN**
**William P. Allen, P.O. Box 702, Portland, Oreg. 97207**
**Filed May 14, 1975, Ser. No. 577,230**
**Int. Cl.² G03B** *21/56*
**U.S. Cl. 350—117** **18 Claims**



1. A portable projection screen comprising
a sheet of flexible material, and
sheet support means including a central hub member, at least three elongate rods having inner and outer ends, means on said hub member of detachably connecting the inner set of ends of said rods to said hub member with said members radiating outwardly therefrom at substantial angles relative to each other and with the outer set of

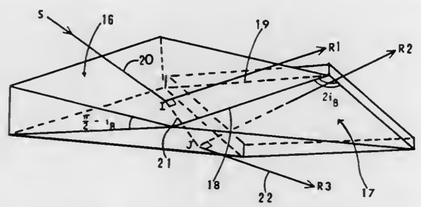
ends of said rods occupying a substantially common plane, spaced-apart connector means on said sheet adjacent marginal edges thereof for releasably connecting outer end portions of said rods to said sheet, said connector means being so positioned on the sheet that when said rod ends are connected thereto in operative positions the sheet is tensed, and said sheet being collapsible upon release of said rods from said connector means.

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## 4,017,153
## POLARIZATION ANALYZERS AND DUPLEXERS

**René Sardos, Bordeaux, France, assignor to Agence Nationale de Valorisation de la Recherche (ANVAR), Neuilly sur Seine, France**

**Continuation-in-part of Ser. No. 469,766, May 14, 1974, abandoned. This application June 26, 1975, Ser. No. 590,841**
**Claims priority, application France, May 18, 1973, 73.19248**
**Int. Cl.² G02B** *5/30, 27/28, 5/04*
**U.S. Cl. 350—152** **6 Claims**




1. A polarization analyzer comprising a first substantially non-absorbent dielectric prismatic layer defining, at one side, a first interface, and at the other side a second interface, said second interface determining with said first interface a summit angle of $\pi/2 - iB$, $iB$ being the Brewsterian angle value for a reflection against a diopter whose first medium is the medium surrounding said layer and second medium is the dielectric of the layer, a second substantially non-absorbent dielectric prismatic layer defining, at one side, a first interface and at the other side, a second and a third side disposed symmetrically to opposite sides of a plane perpendicular to said first interface so as to determine with said first interface two opposite angles equal to $\pi/2 - i'B$ and a summit angle of $2i'B$, $i'B$ being the Brewsterian angle value for a reflection against a diopter whose first medium is the dielectric of the layer and second medium is that surrounding said layer, said layers having the same refractive index, and means for directing an incident wave at the angle $iB$ against the first interface of the first layer, said layers being so joined that the second interface of the first layer is applied directly to the third interface of the second layer, the edge of the summit angle of said second layer being orthogonal with the edge of the summit angle of said first layer.

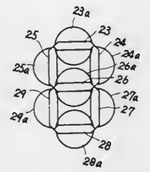
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## 4,017,154
## DISPLAY DEVICE

**Masanori Kobayashi, Yachiyo, Japan, assignor to Kabushiki Kaisha Seikosha, Japan**

**Filed Dec. 23, 1974, Ser. No. 535,208**
**Claims priority, application Japan, Dec. 25, 1973, 49-3930; July 8, 1974, 49-80430[U]; July 24, 1974, 49-84755; Sept. 13, 1974, 49-105782; Sept. 9, 1974, 49-103598; Sept. 13, 1974, 49-105783**
**Int. Cl.² G04B** *19/06*
**U.S. Cl. 350—159** **2 Claims**

1. A display device comprising, a plurality of segment light polarizers mounted for receiving incident light thereon and for rotation independently and positioned to jointly define different numerals sequentially in dependence upon their relative angular orientation, a common light polarizer mounted forwardly of said plurality of segment light polarizers and common thereto for polarizing light from said segment light polarizers and for viewing of said different numerals thereon in dependence upon the relative angular orientation of the segment light polarizers and their relative angular orientation to said common light polarizer, driving means to drive the segment light polarizers rotationally independently in timed relationship to develop said different numerals sequentially in dependence upon relative angular positions thereof during rotation, two transparent plates between which said common light polarizer is sandwiched, a mask between said two transparent plates having openings therethrough positioned for



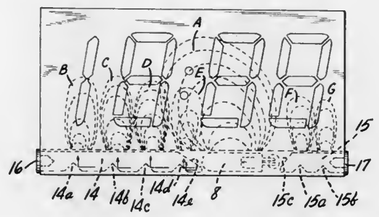

viewing of the corresponding individual segments of said numerals on said common light polarizer, said openings being shaped to correspond in configuration with corresponding segment light polarizers, and said driving means positioning said corresponding segment light polarizers in registry with corresponding openings, whereby said numerals are sharply defined, said mask having other openings arranged circularly, angularly spaced, a disc spaced from said mask in said device and having an opening therethrough rotated into registry with said other openings, a light source for transmitting light through the opening in said disc, and means in said driving means for driving the last-mentioned disc in timed relationship with said segment light polarizers.

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## 4,017,155
## LIQUID CRYSTAL DISPLAY DEVICE

**Kenjiro Yagi, Tokyo; Yuji Koike, Matsudo, and Hirotomo Hirai, Tokyo, all of Japan, assignors to Kabushiki Kaisha Daini Seikosha, Japan**

**Filed Sept. 6, 1974, Ser. No. 503,610**
**Claims priority, application Japan, Sept. 7, 1973, 48-100898; Sept. 21, 1973, 48-110675[U]; Sept. 21, 1973, 48-110676[U]**
**Int. Cl.² G02F** *1/13*
**U.S. Cl. 350—160 LC** **7 Claims**




1. A liquid crystal display device suitably thin and compact for use in wrist watches and the like comprising: a display panel comprised of upper and lower transparent plates having liquid crystal material sandwiched therebetween; a reflecting plate disposed beneath said lower transparent plate and having a roughened upper surface facing said lower transparent plate; an energizeable light source disposed laterally adjacent one side edge of said reflecting plate and positioned to direct light when said light source is energized through said reflecting plate; and light-distributing means substantially encasing



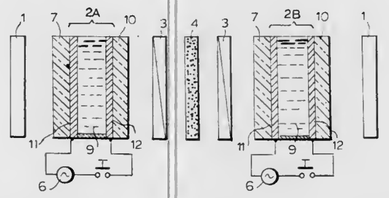
said display panel, reflecting plate and light source except for said upper transparent plate and forming therewith a thin and compact liquid crystal display device for effectively distributing the light emitted by said light source into said reflecting plate and throughout said display panel, said light-distributing means including means located alongside said light source and extending along said one side edge of said reflecting plate for reflecting light at discrete points therealong into said reflecting plate.

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## 4,017,156
## ELECTRO-OPTICAL DISPLAY DEVICE

**Akio Moriyama, Katano; Masakazu Fukai, Nishinomiya, and Katsuji Hattori, Uji, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan**

**Filed Feb. 24, 1975, Ser. No. 552,151**
**Claims priority, application Japan, Feb. 28, 1974, 49-24010; Mar. 6, 1974, 49-26503**
**Int. Cl.² G02F** *1/13*
**U.S. Cl. 350—160 LC** **1 Claim**

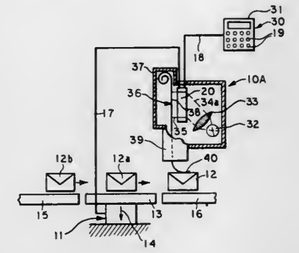


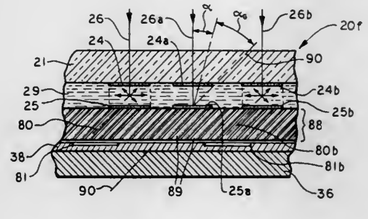

1. An electro-optical display device of the transmissive type which comprises:
a linear polarizer for providing substantially linearly polarized light;
a twisted nematic electro-optical cell positioned in the path of the light from said linear polarizer and capable of changing the state of polarization of said light, said twisted nematic electro-optical cell being composed of a pair of spaced transparent plates with a nematic liquid crystal filling the space therebetween and said plates having transparent electrodes provided on the opposed surfaces thereof;
a ¼-spectrum plate on the opposite side of said twisted nematic electro-optical cell from said linear polarizer for exhibiting one-quarter wave length retardation and producing circularly polarized light as its output;
a cholesteric liquid crystal film on the opposite side of said ¼-spectrum plate from said cell for selectively reflecting light of a specific wave length and exhibiting circular dichromism;
means coupled to said cell for supplying an electric field to the nematic liquid crystal and including switch means for connecting and disconnecting said means from said nematic liquid crystal;
a second ¼-spectrum plate on the opposite side of said cholesteric liquid crystal film from said first mentioned ¼-spectrum plate for receiving the light which is passed through said cholesteric liquid crystal film and for producing circularly polarized light as its output;
a second twisted nematic electro-optical cell on the opposite side of said second ¼-spectrum plate from said cholesteric liquid crystal film for changing the state of polarization of light from said second ¼-spectrum plate; and
a second linear polarizer on the other side of said second twisted nematic electro-optical cell from said second ¼-spectrum plate for receiving the light from said second twisted nematic electro-optical cell and providing substantially linearly polarized light.

## 4,017,157
## APPARATUS FOR THE DIGITAL DISPLAY OR RECORDING OF DATA

**Aloysius Johannes van Riet, Rijswijk, Netherlands, assignor to Maatschappij Van Berkel's Patent N.V., Rotterdam, Netherlands**

**Filed Mar. 26, 1975, Ser. No. 562,238**
**Claims priority, application Germany, Mar. 26, 1974, 2414368; Dec. 23, 1974, 2461253; Dec. 23, 1974, 2461239**
**Int. Cl.² G02F** *1/13*
**U.S. Cl. 350—160 LC** **18 Claims**




1. An apparatus for producing data for display and/or recording purposes, said apparatus comprising: a liquid crystal cell having a pair of light transparent parallel spaced walls, said cell having an input side on one side of the cell at one of said walls and an output or display side on the opposite side thereof at the other of said walls, light transparent electrodes on the facing sides of the walls profiled to produce alpha-numerical data and/or machine-readable code marks, a source of light producing parallel light rays on the input side of the cell, means for addressing the electrodes in accordance with given information, a liquid crystal material between the walls, and a fiber-optic plate on the output side of the cell having a plurality of parallel arranged optical fibers embedded in a light-absorbing material, wherein the angle of inclination between the light rays produced by said source and the axes of the optical fibers exceeds the limit angle for which total reflection of light rays occurs in the fibers passing undisturbed through the liquid crystal material whereby such light rays do not pass through the fibers.

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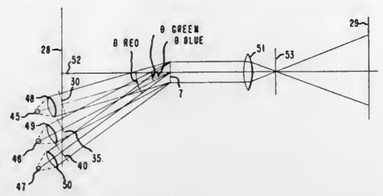
## 4,017,158
## SPATIAL FREQUENCY CARRIER AND PROCESS OF PREPARING SAME

**Bruce Lee Booth, Hockessin, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Mar. 17, 1975, Ser. No. 559,168**
**Int. Cl.² G02B** *27/38;* **G03H** *1/02*
**U.S. Cl. 350—162 SF** **2 Claims**

1. An optical viewer having a plurality of light sources which are independently variable as to color and intensity, mounted in said optical viewer, a film-like transparency from about 50 to about 200 microns in thickness having a plurality of mutually exclusive areas, each individual area containing

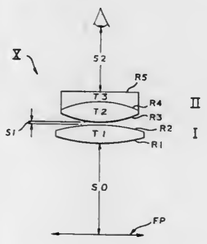
differently oriented spatial frequency carriers formed of a photopolymerized organic resin, said spatial frequency carriers having a spacing of from 200 to 2,000 lines per millimeter,




and each of said light sources being positioned so as to cooperate with an individual area of said transparency whereby light from said light source is diffracted onto a display.

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**4,017,159**
**TWO-ELEMENT EYEPIECE**
**Milton H. Sussman, Amherst, N.Y., assignor to American Optical Corporation, Southbridge, Mass.**
**Filed Feb. 9, 1976, Ser. No. 656,764**
**Int. Cl.² G02B *9/06***
**U.S. Cl. 350—175 E** **2 Claims**




1. A two-element eyepiece having a magnification of substantially 10X, a field of view of approximately 40° and eye relief of approximately 80 percent of the effective focal length which comprises a biconvex positive singlet as the first element and a convex-plano positive doublet as the second element, said lens elements having the following values:

| Lens | Radius | Thickness | Space | Refraction | Abbe Number |
|---|---|---|---|---|---|
| | | | $S_0$= 1.0331x | | |
| | $R_1$ 1.5796x | | | | |
| I | | $T_1$= 0.2057x | 1.52<N-$D_1$<1.53 | $\nu_1 \cong 58$ | |
| | $R_2$= | | $S_1$=0.021-74x | | |
| | −1.5796x | | | | |
| | $R_3$= 1.0626x | | | | |
| | | $T_2$= 0.2341x | 1.52<N-$D_2$<1.53 | $\nu_2 \cong 58$ | |
| II | $R_4$= −1.0626x | | | | |
| | | $T_3$= 0.1087x | 1.78<N-$D_3$<1.79 | $\nu_3 \cong 25$ | |
| | $R_5$=∞ | | | | |
| | | | $S_2$= | | |

-continued

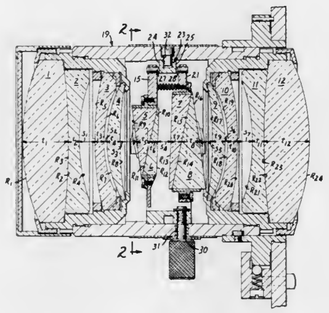
| Lens | Radius | Thickness | Space | Refraction | Abbe Number |
|---|---|---|---|---|---|
| | | | 0.8609x | | |

where x=20 to 26mm

wherein the minimum amount of surface curvatures and lens elements provide good correction for field curvature, distortion and lateral color aberrations.

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**4,017,160**
**CONTINUOUSLY VARIABLE ANAMORPHIC LENS**
**Ellis I. Betensky, Toronto, Canada, assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**
**Filed Sept. 19, 1975, Ser. No. 614,900**
**Int. Cl.² G02B *13/10***
**U.S. Cl. 350—182** **3 Claims**



1. A continuously variable anamorphic lens comprising:
a four element front lens group for collimating light,
a four element rear lens group for decollimating light,
a pair of achromatized prisms between said front and rear groups, said prisms being pivotable about parallel axes perpendicular to the axis of the lens, and
means for pivoting said prisms in a predetermined relationship,
said front and rear lens groups cooperating with said prisms to provide a primary magnification of from 0.8 to 1.2 and a continuously variable anamorphic magnification of from 0.9 to 1.0.

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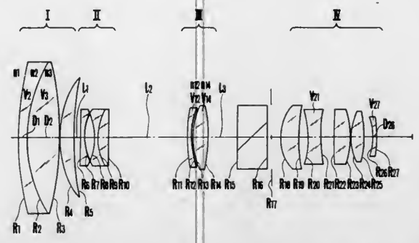
**4,017,161**
**COMPACT ZOOM LENS**
**Sadahiko Tsuji, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan**
**Filed Feb. 3, 1976, Ser. No. 654,905**
**Claims priority, application Japan, Feb. 26, 1975, 50-24316**
**Int. Cl.² G02B *15/18***
**U.S. Cl. 350—184** **7 Claims**

1. A compact zoom lens comprising : four lens groups optically aligned on a common axis, a first group (counting from the front) axially movable to effect focusing which remains stationary during zooming, said first group having a positive refractive power and being composed of a positive compound component and a positive simple component rearwardly spaced therefrom, said positive compound component being constituted by negative and positive lens elements in this order from the front, a second group having a negative refractive power axially movable behind said first group to effect variation of the equivalent focal length of the entire lens system, a third group having a positive refractive power axially movable behind said second group to effect compensation of the image



plane, said third group being composed of a negative component and a positive component spaced from each other in this order from the front, and a fourth group having a positive refractive power which serves as an image-forming lens, said zoom lens being characterized by the following relationships:

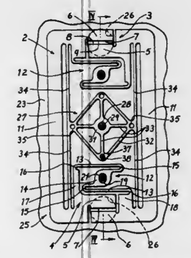
1. $Fw < |F_{II}| < 1.4Fw$ ; $F_{II} < 0$
2. $0.75F_I < R_2 < 0.95F_I$
3. $0.6F_I < R_4 < 0.8F_I$
4. $-10F_{II} < R_6 < \infty$
5. $0.3F_{III} < R_{12} < 0.5F_{III}$
6. $R_{12} < R_{13} < 1.2R_{12}$
7. $n_{14} < n_{12}$
8. $V_{12} < V_{14}$




wherein Fw is the minimum equivalent focal length of the entire lens system; $F_I$, $F_{II}$ and $F_{III}$ are the equivalent focal lengths of the first, second and third lens groups respectively; $R_2$ is the radius of curvature of the internal contacting surface in the first group; $R_4$ is the radius of curvature of the front surface of the rear component of the first group; $R_6$ is the radius of curvature of the front surface of the second group; $R_{12}$ is the radius of curvature of the rear surface of the negative component of the third group; $R_{13}$ is the radius of curvature of the front surface of the positive component of the third group; $n_{12}$ and $V_{12}$ are respectively the refractive index and Abbe number of the material from which the negative component of the third group is made, and $n_{14}$ and $V_{14}$ are respectively the refractive index and Abbe number of the material from which the positive component of the third group is made.

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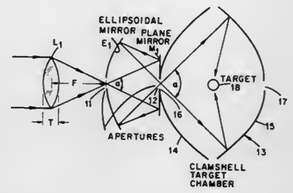
**4,017,162**
**ADJUSTABLE SLIT MECHANISM**
**James Philip George Mills, Doncaster, Australia, assignor to Varian Techtron Pty. Ltd., Mulgrave, Australia**
**Continuation of Ser. No. 496,439, Aug. 9, 1974, abandoned.**
**This application Jan. 26, 1976, Ser. No. 652,451**
**Claims priority, application Australia, Aug. 13, 1973, 4456/73**
**Int. Cl.² G01J *3/04*; G05D *25/00***
**U.S. Cl. 350—271** **38 Claims**



1. An optical system slit mechanism including a plate defining two opposed and spaced jaw sections, and hinge means integral with and interconnecting said jaw sections; two substantially flat and parallel mounting surfaces arranged in opposed spaced relationship, at least part of each said jaw section being slidably located between said mounting surfaces and being confined thereby so as to maintain said jaw sections substantially coplanar with said plate during relative movement of said jaw sections; and actuator means connected to said plate and operable to cause relative movement of said jaw sections, and said hinge means being arranged to flex during said relative movement.

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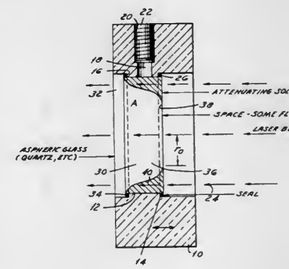
**4,017,163**
**ANGLE AMPLIFYING OPTICS USING PLANE AND ELLIPSOIDAL REFLECTORS**
**Alexander J. Glass, Pleasanton, Calif., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.**
**Filed Apr. 16, 1976, Ser. No. 677,646**
**Int. Cl.² G02B *5/10*, *17/00***
**U.S. Cl. 350—294** **5 Claims**




1. An optical system for providing wide angle input beams into ellipsoidal target illumination systems comprising: a pair of ellipsoidal reflectors positioned to define a clamshell configured target chamber, each of said reflectors having apertures therein, a pair of lens assemblies positioned on opposite sides of said target chamber and aligned with said apertures of said reflectors, at least one pair of plane mirrors having apertures therein positioned on opposite sides of said target chamber intermediate said reflectors and said lens assemblies with said apertures being aligned with said apertures of said reflectors, and at least one pair of ellipsoidal mirrors having apertures therein positioned on opposite sides of said target chamber intermediate said reflectors and said lens assemblies with said apertures being aligned with said apertures of said reflectors, each of said ellipsoidal mirrors being positioned with respect to one of said plane mirrors such that said one plane mirror is adjacent a concave surface of said ellipsoidal mirror.

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**4,017,164**
**HIGH POWER LASER APODIZER**
**Robert L. Nolen, Jr., and Larry D. Siebert, both of Ann Arbor, Mich., assignors to KMS Fusion, Inc., Ann Arbor, Mich.**
**Filed Oct. 9, 1974, Ser. No. 513,340**
**Int. Cl.² G02B *5/24***
**U.S. Cl. 350—312** **2 Claims**

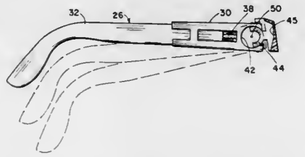



1. A dye cell for apodizing laser beams which comprises:

a. a supporting ring having an opening,
b. a pair of windows in said ring shaped to provide an annular chamber therebetween at the periphery of the opening in said ring,
c. means to seal said chamber to retain liquid, and
d. a solution in said chamber comprising copper nitrate in dimethyl sulfoxide and water mixed in such proportions that said solution has the same index of refraction as said windows at the operating temperature of said dye cell.

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**4,017,165**
**EYEGLASS FRAMES**
**James F. Davis, Muskogee, Okla., assignor to Frank S. Griffin, Vian, Okla., a part interest**
**Filed Sept. 22, 1975, Ser. No. 615,554**
**Int. Cl.² G02B** *5/30*
**U.S. Cl. 351—153** **8 Claims**

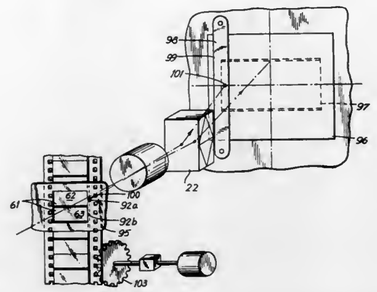


1. An eyeglass frame comprising a bow portion, earpiece members pivotally secured to each end of the bow portion and movable to alternate extended and contracted positions, and hinge means comprising substantially ball and socket shaped elements interposed between the bow portion and earpiece members providing said pivotal movement and securing the earpiece members to the bow portion for rotation about an axis substantially parallel with the longitudinal dimension of the bow portion, said substantially socket shaped element having elongated slot means provided therein, and outwardly extending pin means provided on said substantially ball shaped element for extending through said slot means for providing both the rotation of said bow portion and the movement of said earpiece members.

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**4,017,166**
**MOTION PICTURE FILM FOR THREE DIMENSIONAL PROJECTION**
**Arthur P. Kent, Forest Hills, and Mortimer Marks, Beechhurst, both of N.Y., assignors to Marks Polarized Corporation, Whitestone, N.Y.**
**Continuation-in-part of Ser. No. 329,733, Feb. 5, 1973, Pat. No. 3,851,955. This application Nov. 18, 1974, Ser. No. 524,798**
**Int. Cl.² G03B** *35/00*
**U.S. Cl. 352—57** **2 Claims**

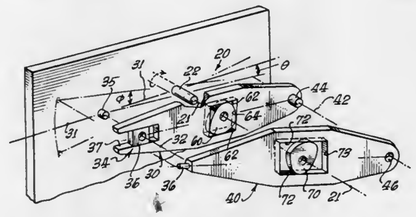
1. In a motion picture projection system for the projection of 3-dimensional pictures, a motion picture projector adapted therefor, a gate in said motion picture projector, a single strip motion picture film positioned in said projector, said motion picture film comprising a succession of frames, a right stereo image and a left stereo image positioned within each said frame, a dark bar strip between said right and said left images positioned at the center of said frame, and an indicium mark on said film to predetermine the location of the said right and left images in said gate, a projected image including an image of said indicium at an edge thereof, a reflecting mask at an edge of the projected image, the said mask blocking and displaying said indicium only, the reflected image of said



indicium on said mask being an indicator that the projected image is in true stereo.

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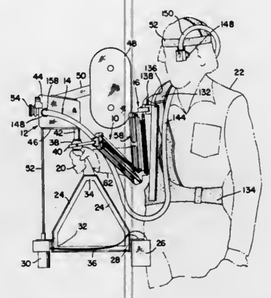
**4,017,167**
**INTERMITTENT MOVEMENT WITH TANDEM CAMS**
**George A. Mitchell, 687 Prospect Crescent, Pasadena, Calif. 91103**
**Filed Mar. 5, 1976, Ser. No. 664,155**
**Int. Cl.² G03B** *1/22*
**U.S. Cl. 352—194** **3 Claims**



1. In a film intermittent movement the combination of
a frame providing a film guideway,
a driven shaft journaled in the frame rearwardly of the guideway
first and second cams each of constant diameter mounted on the shaft in approximately opposite phase relation,
a carrier arm,
means for mounting the carrier arm at its forward end for oscillatory swinging movement with respect to a first pivot axis and for longitudinal translational movement with respect to the frame,
cam follower means on the carrier arm intermediate its length and engaging one of said cams for driving the carrier arm in its said swinging and translational movements,
a claw arm having claw means at its forward end for engaging a film in the guideway,
means pivoting the claw arm at its rearward end on the carrier arm on a second pivot axis which is fixed with respect to the claw arm and the carrier arm,
cam follower means on the claw arm intermediate its length and engaging the other of said cams for driving the claw arm in oscillatory swinging movement about said second pivot axis while permitting free longitudinal translational movement of the claw arm due to said movement of the carrier arm,
said translational movement of the carrier arm causing said claw means to engage the film substantially throughout the swings of said arms opposite to the direction of drive of the shaft.



**4,017,168**
**EQUIPMENT FOR USE WITH HAND HELD MOTION PICTURE CAMERAS**
**Garrett W. Brown, 1845 Walnut St., Philadelphia, Pa. 19103**
**Filed Sept. 16, 1974, Ser. No. 506,326**
**Int. Cl.² G03B** *17/00*
**U.S. Cl. 352—243** **69 Claims**

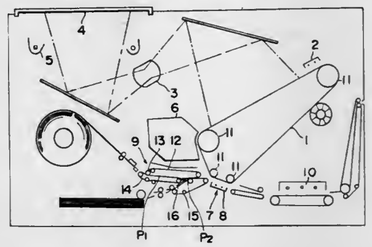


1. A portable camera equipment system especially adapted for operation by a cameraman in motion and capable of being hand-guided, the system being of improved stability against angular deviations in pan, tilt and roll, and substantially free-floating in a manner to isolate the equipment also from unwanted lateral and vertical movement caused by the motion of the cameraman using the equipment which comprises;
camera equipment components positioned in an expanded balanced arrangement at points remote from each other and about a handle means for guiding the camera equipment which means is positioned at or approximately at the center of gravity and at or approximately at the center of the moment of inertia of the mass of the components comprising the expanded camera equipment;
camera equipment support means adapted to support at least part of the weight of the camera equipment which means is adapted to be pivotally and rotatably connected to the cameraman and is connected to the camera equipment, said means substantially freeing the cameraman's hands from the weight of the camera equipment, isolating and free-floating the camera equipment at a distance from the cameraman substantially independently of any of his unwanted lateral and vertical motions and capable of being guided to a position in space in a range of positions selected by the cameraman;
pivotable and rotatable means interconnecting the camera equipment with the support means to permit rotatable and pivotal movement of the camera equipment relative to the support means and which thereby virtually does not transmit deviations in the pan, tilt and roll axes from the cameraman to the camera equipment; and
view finding means adapted to indicate the field of view of the camera to the cameraman without the need for his eye to be in direct contact with the camera.

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**4,017,169**
**COPY PAPER TRANSPORTING UNIT FOR USE IN ELECTRO-PHOTOGRAPHIC COPYING APPARATUS**
**Masaru Komura, and Kenichi Arai, both of Toyokawa, Japan, assignors to Minolta Camera Kabushiki Kaisha, Azuchi, Japan**
**Filed May 20, 1975, Ser. No. 579,288**
**Claims priority, application Japan, May 31, 1974, 49-63737[U]**
**Int. Cl.² G03G** *15/00*
**U.S. Cl. 355—3 R** **10 Claims**

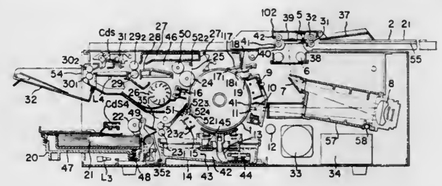
1. In an electrophotographic copying apparatus having a housing, a photosensitive member on which a latent charge image is formed corresponding to an original image to be copied, a transfer station located adjacent the photosensitive member, and a copy paper supply system including a transporting unit for presenting copy paper intermediate the imaged photosensitive member and the transfer station for transferring the image from the photosensitive member to the copy paper, the improvement comprising
a support member within the housing adapted to be withdrawn therefrom, including locking means to prevent withdrawl of the support member from the housing,
a transfer device movably mounted on said support member in a normal position of rest adjacent said photosensitive



member, said normal rest position defining said transfer station,
means mounting the transporting unit on the support member, the transporting unit comprising a pair of rotary elements cooperating to define a copy paper transport path having an entrance and an exit, said exit being adjacent the transfer station, manual means to move the transfer device to a retracted position well-spaced from the photosensitive member, and
means operable to unlock said support member in response to moving the transfer device to the retracted position, thereby permitting withdrawl of the support member only when the transfer device is retracted,

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**4,017,170**
**ELECTROPHOTOGRAPHIC DEVICE**
**Shigehiro Komori; Hisashi Sakamaki, both of Yokohama; Hiroyuki Hattori, Mitaka; Toshihide Iida; Koichi Miyamoto, both of Tokyo, and Kazumi Umezawa, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**
**Continuation of Ser. No. 348,092, April 5, 1973, abandoned. This application July 31, 1975, Ser. No. 600,860**
**Claims priority, application Japan, Apr. 13, 1972, 47-37288; Apr. 15, 1972, 47-38149; June 20, 1972, 47-72961[U]**
**Int. Cl.² G03G** *15/00*
**U.S. Cl. 355—3 R** **4 Claims**



1. An electrophotographic copying device comprising a photosensitive member, charging means and exposing means for forming an electrostatic latent image on said photosensitive member, developing means for visualizing said electrostatic latent image, means for fixing said visible image, means for transporting copying paper, means for transferring said

visible image onto said copying paper, and means for making the surface potential of the photosensitive member substantially uniform after the termination of a copying cycle and before the complete cessation of operation of the device.

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**4,017,171**

## APPARATUS FOR MAKING COPIES OF MULTI-COLORED ORIGINALS

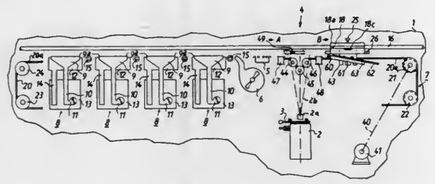
**Richard Wick, Munich; Friedrich Bestenreiner, Grunwald; Dieter Giglberger, Unterhaching; Günter Wetzel, Haar; Walter Schott, Zorndeding, all of Germany; Jozef Leonard V. Engeland, St. Katelijne-Waver, and Willy Gommaire Verlinden, Edegem, both of Belgium, assignors to AGFA-Gevaert, A.G., Leverkusen, Germany**

**Filed July 17, 1975, Ser. No. 596,737**

**Claims priority, application Germany, July 25, 1974, 2435851**

**Int. Cl.² G03B** *27/58*; **G03G** *15/01*

**U.S. Cl. 355—4** **7 Claims**



1. In a color copying apparatus wherein the image of an original is repeatedly exposed onto a sheet-like copy carrier at an exposure station and the copy carrier is moved to a different one of several developing units subsequent to each exposure, a combination comprising a carriage having means for supporting a copy carrier thereon; guide means defining for said carriage an elongated path extending along said exposure station and said developing units; drive means for said carriage, including an endless flexible element and means for moving said flexible element along a fixed path; coupling means normally connecting said carriage to said drive means and comprising a first coupling member in form of a pin on said flexible element and a complementary second coupling member on said carriage and having two spaced-apart parallel open slots normal to said elongated path; a roller adjacent to the path of movement of said second coupling member with said carrier for guiding a portion of said flexible element in parallelism with said slot, said roller having a diameter at least substantially equal to the distance between said slots; means for automatically disengaging said coupling means when the carriage reaches said exposure station, comprising a device which defines for said first coupling member at least one further path which is normal to said elongated path so that said carriage is at a standstill while said first coupling member is located in said further path; and means for centering said carriage in a predetermined position at said exposure station upon disengagement of said coupling means.

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**4,017,172**

## DOCUMENT FEEDING APPARATUS

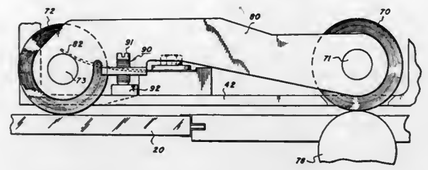
**Thomas Lynch, Fairport, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

**Filed Apr. 24, 1975, Ser. No. 571,113**

**Int. Cl.² G03G** *15/30*

**U.S. Cl. 355—8** **11 Claims**

1. A moving document exposure apparatus comprising:
a viewing platen;
a photosensitive surface arranged for movement;
means for viewing a document at said platen and for projecting an image thereof onto said photosensitive surface;
means for feeding said document over said platen and past said viewing means in synchronism with the movement of said photosensitive surface, said feeding means including at least one feed member urged against said platen to form a nip therebetween for passage of said document,



said feed member being formed of a multi-component material comprising a solid polymeric component impregnated with a non-volatile liquid component, said material being selected to reduce the difference between the feed member-to-platen coefficient of friction and the document-to-platen coefficient of friction.

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**4,017,173**

## COPYING APPARATUS FOR COPYING A PLURALITY OF ORIGINAL SURFACES WITH A SINGLE SCAN

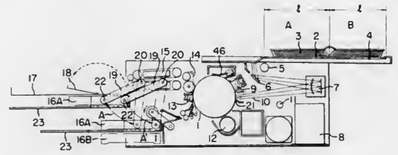
**Shigehiro Komori; Hisashi Sakamaki, both of Yokohama; Masao Ariga, Chofu; Hiroshi Nitanda, and Seigi Nagasawa, both of Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Dec. 31, 1974, Ser. No. 537,641**

**Claims priority, application Japan, Jan. 11, 1974, 49-6459; June 7, 1974, 49-65253**

**Int. Cl.² G03G** *15/28*

**U.S. Cl. 355—8** **13 Claims**



1. A copying apparatus comprising:
an original carrier having a surface defining first and second contiguous areas for retaining thereon an original corresponding dimensionally to the combined area of two surfaces of a desired copy size;
a photosensitive member;
optical scanning means for scanning the entire area of the original by sequentially scanning the portions of the original retained respectively on said first and second contiguous carrier areas as said scanning means transverses first and second portions of an elongated scanning path, wherein each of said portions extends across one of said contiguous areas;
means for forming an electrostatic image of the original on said photosensitive member;
means for developing the electrostatic image;
means for transfering the portions of developed image defined by the first and second portions of the scanning path onto separate copy material surfaces; and
means for feeding copy material to said transferring means.



**4,017,174**

## DEVELOPER ASSEMBLY SUPPORT

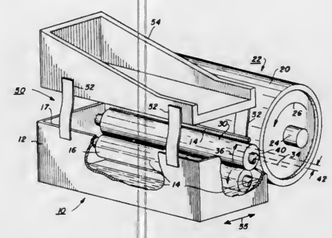
**Robert Andrew Cheeseman, Hitchin, England, assignor to Xerox Corporation, Stamford, Conn.**

**Filed Oct. 14, 1975, Ser. No. 622,191**

**Claims priority, application United Kingdom, Nov. 20, 1974, 50316/74**

**Int. Cl.² G03G** *15/10*; **B05C** *1/08*

**U.S. Cl. 355—10** **11 Claims**



1. An electrostatographic apparatus comprising a liquid development assembly having support means therefor, said liquid development assembly having an applicator roll movable into and out of contact with the surface of an imaging member, said support means including a plurality of arms holding said liquid development assembly for movement in a plane substantially perpendicular to said imaging member surface at the area of contact with said applicator roll when they are in contact to compensate for variances therebetween and provide a uniform width of engagement along the length of contact.

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**4,017,175**

## APPARATUS FOR PREVENTING SUCCESSIVE JAMMING OF COPY SHEETS IN COPYING APPARATUS

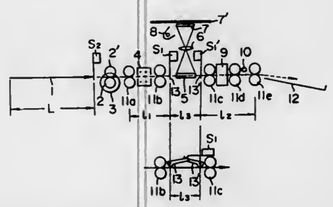
**Takaji Washio, Toyonaka, and Tatsuo Aizawa, Osaka, both of Japan, assignors to Mita Industrial Company, Ltd., Osaka, Japan**

**Continuation of Ser. No. 164,779, July 21, 1971, abandoned. This application Apr. 17, 1973, Ser. No. 351,977**

**Claims priority, application Japan, July 21, 1970, 45-63211**

**Int. Cl. G03g** *15/22*

**U.S. Cl. 355—14** **7 Claims**



1. In an electrophotographic copying apparatus for producing images on copy sheets capable of being used in the apparatus, having a treatment zone including a charging means for charging a copy sheet, a light-exposing means having an optical system for projecting an image of an original to be copied on a charged copy sheet to form an electrostatic image on the copy sheet, a developing means for developing the exposed copy sheet thereby converting the electrostatic image to a visible image, a drying or fixing means for drying or fixing the image formed on the copy sheet, a forwarding mechanism for moving a copy sheet along a running path through the treatment zone from an initial nip to a discharge end, a copy sheet feeding mechanism for delivering single copy sheets to the initial nip of the forwarding mechanism, an original support for reciprocating the original laterally from a central position in synchronism with movement of the copy sheet and returning the original to the central position and a source of electricity, said copying apparatus comprising:
an activating means for controlling the copy sheet feeding mechanism;
first switch means having both a normally closed contact connecting said actuating means with a source of electricity and a normally open contact;
detecting means for detecting a copy sheet in the running path at least at one detecting point and controlling said first switch means to open said normally closed contact and close said normally open contact when a copy sheet is detected at said detecting point, said detecting point being positioned in the running path according to the following conditions:

$l_1 < L$

$l_2 < L$

where L is the minimum length of the copy sheets capable of being used in the apparatus, $l_1$ is the distance between the initial nip of the forwarding mechanism and said detecting point forwarding mechanism, and $l_2$ is the distance between said detecting point forwarding mechanism and the discharge end of the forwarding mechanism;
a second switch means closed only when the original support is stationary at the central position; and
alarm means connected with the source of electricity through said second switch means and said normally open contact of said first switch means, said alarm means being energized to signal occurrence of jamming of the copy sheet if the copy sheet is jammed in the running path and detected at said detecting point and closes said normally open contact of said first switch means when the original support returns to the central position and closes said second switch means.

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**4,017,176**

## MACHINE FOR COLOR REPROGRAPHY, INTENDED FOR PRODUCING COLOR SEPARATIONS OF AN ORIGINAL

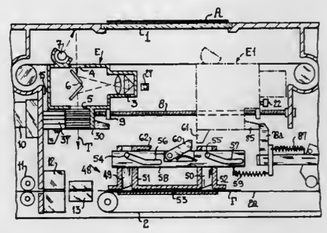
**René Béguin, Geneva, and Roland Monti, Cologny, both of Switzerland, assignors to Sublistatic Holding S.A., Glaris, Switzerland**

**Filed May 21, 1975, Ser. No. 579,725**

**Claims priority, application Switzerland, May 28, 1974, 7238/74**

**Int. Cl.² G03B** *27/32*, *27/52*

**U.S. Cl. 355—32** **11 Claims**

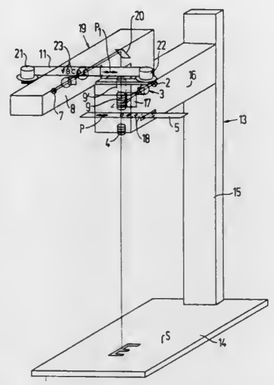


1. A color reprography machine for producing color separations of an original to be copied onto a photosensitive film, said machine comprising:
exposure means, mounted for movement from a storage position along a path positioned between an original and a photosensitive film, for exposing said original and reflecting an image therefrom to said film;
a filter magazine attached to said exposure means and containing a plurality of superposed parallelly mounted opti-

cal filters, said filters being individually movable between an operative position interposed in the path of said image and an inoperative position out of said path of said image;
stop means on said exposure means for moving all of said filters, upon movement of said exposure means to said storage position, to said respective inoperative positions;
means operable by movement of said exposure means for moving a selected one of said filters to the operative position thereof;
retention means on said magazine for retaining all said filters but said selected one filter in the respective inoperative positions;
a plurality, equal in number to the number of filters, of developing dispensers for developing on said film an image corresponding to a respective one of said filters;
means operable by said retention means for moving the respective said developing dispenser corresponding to said selected filter to a dispensing position; and
perforating means, operable by movement of said exposure means, for punching at least one register cut-out in said film.

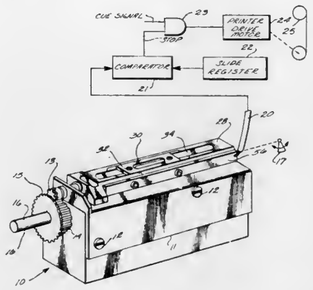
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**4,017,177**
**PHOTOSETTER**
**Siegfried Kühnle, Stuttgart, Germany, assignor to H. Berthold A.G., Germany**
**Filed June 2, 1975, Ser. No. 582,636**
**Int. Cl.² G03B** *27/52, 27/70*
**U.S. Cl. 355—43** **7 Claims**



1. In a photosetter having a type carrier located in an object plane and a projection system with a projection objective by means of which type of said type carrier is projectable onto a setting plane spaced from said object plane; an auxiliary projection system having a film therein and located at a distance from said object plane by means of which an intermediate image of type on said film can be created at said object plane for projection onto said setting plane by said projection objective, said auxiliary projection system comprising an adjustably movable field lens for changing the size of said intermediate image at said object plane to correspond to the size of the type of said type carrier.

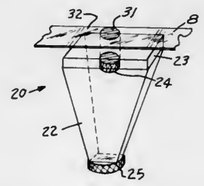
**4,017,178**
**APPARATUS FOR DETECTING A MALFUNCTION IN A COLOR CONNECTING LIGHT VALVE OF A FILM PRINTER**
**Hans Chr. Wohlrab, North Hollywood, Calif., assignor to PSC Technology, Inc., Glendale, Calif.**
**Filed Mar. 14, 1975, Ser. No. 558,537**
**Int. Cl.² G03B** *27/78*
**U.S. Cl. 355—38** **15 Claims**



1. In a light valve for a color correcting film printer having light vane means set by the expansion of a plurality of slides parallel to a first axis, the slides being individually actuatable parallel to a second axis transverse to the first axis in a path between a first position and a second position so the slides expand parallel to the first axis an amount depending upon the combination of slides actuated into the second position and being movable as a unit parallel to the first axis responsive to trim adjusting means, apparatus for detecting a malfunction comprising:
a carriage movable parallel to the first axis;
sensing means on the carriage intersecting the path of each slide to indicate whether the slide is in the first position or the second position; and
means for coupling the carriage to the trim adjusting means to move the carriage parallel to the first axis as the slides are moved parallel to the first axis as a unit to maintain the slides between the sensing means.

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**4,017,179**
**AUTOMATIC DENSITY CONTROL**
**John Poné, Jr.; Kenneth B. Schrupp; Patrick J. Gilligan; Ronald B. Harvey, all of Minneapolis, and Gerald A. Jensen, Wayzata, all of Minn., assignors to Pako Corporation, Minneapolis, Minn.**
**Filed Sept. 4, 1975, Ser. No. 610,188**
**Int. Cl.² G03B** *27/74, 27/78*
**U.S. Cl. 355—68** **9 Claims**

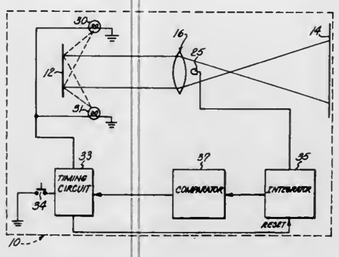


1. An improvement for use with a photographic printer of the type which includes, a negative strip feed and positioning mechanism, a print paper feed and positioning mechanism disposed in spaced relation to the negative strip feed and positioning mechanism, a printing station including a print radiation source positioned to direct radiation through said negatives and onto said print paper, a preview station located ahead of the printing station including negative positioning means and a preview radiation source positioned to direct radiation through a negative positioned at said preview station;
said improvement comprising:
a radiation directing member made from a material for conducting and directing radiation from one end to the other and being larger at one end than at the other with the enlarged end disposed in proximate spaced relation to said preview radiation source and the diminished end disposed remotely from said source, said member receiving and directing radiation transmitted through the negative positioned at the preview station,
subject sensing means mounted at the central portion of the enlarged end of said member to receive radiation transmitted through the central subject area of said negative from said preview radiation source,
background sensing means mounted at the diminished remote end of said member to receive radiation transmitted through the outer marginal area of said negative end directed through said member,
first electronic circuitry receiving the signals from said subject and background sensing means including means connected to said sensing means for producing a first and second signal responsive to the intensity of radiation respectively received by said subject and background sensing means and means for producing a ratio signal whose voltage is proportional to the ratio between the voltage of said first and second signals, and
second electronic circuitry receiving said ratio signal for producing a density output signal which may be used to control the exposure time of the negative in the photographic printer.



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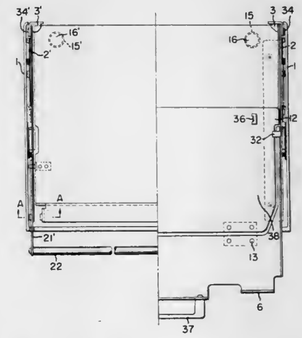
**4,017,180**
**EXPOSURE CONTROL FOR COPYING MACHINE**
**Nai-Chyuan Yen, Waterford, Conn., and George Marinoff, Arlington Heights, Ill., assignors to Adddressograph Multigraph Corporation, Cleveland, Ohio**
**Filed Aug. 7, 1975, Ser. No. 602,581**
**Int. Cl.² G03B** *27/74, 27/78*
**U.S. Cl. 355—68** **4 Claims**



1. Apparatus comprising means for projecting an image from an illuminated object plane to an image plane comprising illumination means for illuminating the object plane, a lens for receiving illumination reflected from said object plane and for transmitting said reflected illumination therethrough and onto said image plane, the path of said reflected illumination from said object plane to said image plane forming a light path, the portion of the light path between the lens and the object plane defining the object side of the lens and the portion of the light path between the lens and the image plane defining the image side of the lens, transducer means in said light path and on the image side of said lens for sensing the intensity of light traversing said light path and for producing an output signal whose intensity varies in accordance therewith, said transducer means being spaced from said lens a distance which is no more than 10% of the distance from the lens to the image plane and means coupled to said transducer means for controlling the illumination of said object plane by said illumination means in accordance with the intensity of said output signal.

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**4,017,181**
**COPY MEDIUM CARRIER**
**Shiro Komaba, and Yoshitomo Goshima, both of Kawasaki, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**
**Continuation of Ser. No. 465,603, April 30, 1974, abandoned.**
**This application Dec. 22, 1975, Ser. No. 643,194**
**Claims priority, application Japan, May 8, 1973, 48-51470**
**Int. Cl.² G03B** *27/58;* **B65H** *1/12, 1/28*
**U.S. Cl. 355—72** **8 Claims**



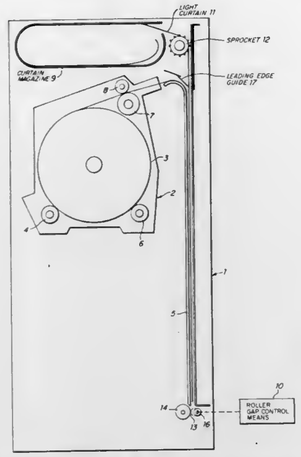
1. A copy medium carrier comprising:
first copy medium containing means having a front end pivotable about a portion thereof adjacent a rear end thereof;
second copy medium containing means having a front end pivotable substantially vertically;
means for separating the copy medium contained in said first and second copy medium containing means to feed the copy medium one by one;
means for normally urging said first copy medium containing means towards said separating means;
said separating means being vertically movable to be on a leading edge of the copy medium by the dead-weight thereof when copy medium feeding means acts on the copy medium, and said leading edge of the copy medium being urged towards the separating means by said urging means, when the copy medium feeding means does not act on the copy medium,
said second copy medium containing means being movable in the direction of the feeding of the copy medium between a first position wherein the topmost of the copy medium contained in said first copy medium containing means is engaged with said separating means by said urging means, and a second position wherein the topmost of the copy medium contained in said second copy medium containing means is engaged with said separating means by said urging means through said first copy medium containing means,
the copy medium within said first copy medium containing means and the copy medium within said second copy medium containing means being capable of being fed from the same position and through the same separating means.

**4,017,182**

## PHOTOSENSITIVE MATERIAL POSITIONING SYSTEM

**Daniel H. Robbins, Rochester, N.Y., assignor to Itek Corporation, Lexington, Mass.**

**Filed July 2, 1975, Ser. No. 592,491**
**Int. Cl.² G03B** *27/58*
**U.S. Cl. 355—74** **1 Claim**




1. A photosensitive material positioning system for transporting photosensitive material from a cartridge to an exposure platen comprising:

a. means for lowering a light curtain over said exposure platen;

b. means for driving said material from said cartridge while directing the leading edge of said material at an acute angle relative to the plane of said light curtain so that said material becomes straightened out by said light curtain and travels along said curtain in contact therewith while being driven by said drive means, thereby to eliminate photosensitive material guide means which would be otherwise positioned adjacent said exposure platen in front of said platen;

c. means for raising said light curtain after final positioning of said material upon said platen to enable exposure thereof to a light image;

d. a pair of exit drive rollers for driving said material off of said exposure platen; and

e. exit drive roller control means for selectively opening and closing the nip between said roller pair.

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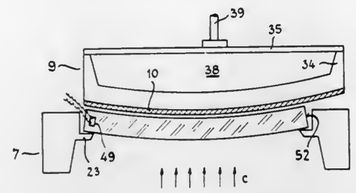
**4,017,183**

## APPARATUS FOR THE PRODUCTION OF EXPOSED PRINTING PLATES

**Werner Lenz; Josef Woellhaf, both of Ludwigshafen; Klaus Spreng, Weisenheim; Manfred Zuerger, Mannheim; Paul Hecke, Ludwigshafen; Gerhard Hoffmann, Speyer, and Milan Obradovic, Bruehl, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany**

**Filed Feb. 19, 1975, Ser. No. 550,913**
**Claims priority, application Germany, Feb. 23, 1974, 2408748**
**Int. Cl.² G03B** *27/04*
**U.S. Cl. 355—85** **14 Claims**

1. An apparatus for the production of exposed printing plates comprising a mold having a first wall formed by the support of the printing plate to be produced and a second wall formed by a glass plate covered with an image-bearing transparency; means for introducing a predetermined amount of a fluid photopolymerizable material under pressure into the mold, said predetermined amount substantially corresponding to the volume of the resin layer of the exposed printing plate to be produced; first and second members which are movable relative to one another, said first member carrying the glass plate and said second member carrying the support, movement of the said two members toward each other serving to close said mold; at least one source of actinic radiation located in such a way that the layer of fluid photopolymerizable material can be exposed through the glass plate; and means provided on the said second member for so adjusting the support that the latter's surface is equidistant from the surface of the




glass plate, and maintaining the distance between the said two surfaces during exposure of the layer of fluid photopolymerizable material, said introducing means introducing the fluid photopolymerizable material into the mold under pressure, which causes the glass plate to bend or dome outwardly of the mold, and said support-adjusting means consists for so bending or doming the support that its bent or domed surface is equidistant from the bent or domed surface of the glass plate, and for maintaining the distance between the said two surfaces during exposure of the fluid photopolymerizable material through the glass plate using said source of actinic radiation.

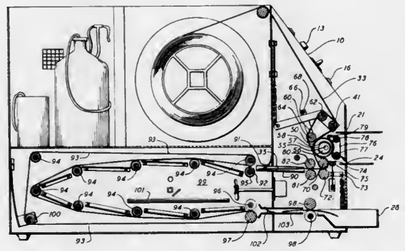
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**4,017,184**

## APPARATUS FOR COPYING TRANSLUCENT DOCUMENTS

**Walter F. Allport, R.D. No. 3, Norwich, N.Y. 13815**

**Filed May 5, 1975, Ser. No. 574,441**
**Int. Cl.² G01B** *9/02*
**U.S. Cl. 355—109** **1 Claim**



1. An apparatus for automatically copying the image of a translucent master sheet material onto a continuous web of sensitized copying material comprising:

a. a rotationally mounted transparent printing cylinder, adapted to continuously transport a translucent master sheet and a continuous web of sensitized copy material without intermittent stopping and starting; said transparent printing cylinder having a circumference approximately equal to one dimension of the translucent master sheet, and

b. means for feeding a translucent master sheet onto the transparent printing cylinder and automatically guiding the translucent master sheet away, after the desired number of multiple copies have been made, and

c. means for continuously exposing the image of the translucent master sheet, on the transparent cylinder without intermittent stopping and starting between repetitive exposure upon a continuous web of sensitized copy material, until the desired number of multiple copies have been exposed, and

d. means for automatically advancing the exposed web of sensitized copy material at a constant speed and cutting it in synchronization with the locations of the exposed images of the translucent master sheet.



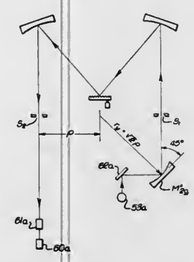
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**4,017,185**

## OPTICAL ARRANGEMENTS FOR COUPLING MONOCHROMATORS WITH EXTERNAL SYSTEMS

**Vernon L. Chupp, Los Altos, Calif., assignor to Varian Associates, Palo Alto, Calif.**

**Division of Ser. No. 453,826, March 22, 1974, Pat. No. 3,936,191. This application May 12, 1975, Ser. No. 576,273**
**Int. Cl.² G01J** *3/02*
**U.S. Cl. 356—96** **8 Claims**




1. In combination with a monochromator comprising

a. means forming an entrance slits $S_1$ to receive a light beam from a source, and an exit slit $S_2$, said slits having curvature defining an Ebert circle,

b. dispersing means in the beam path between the slits $S_1$ and $S_2$, and

c. mirror means to reflect the beam for passage between slits $S_1$ and $S_2$ via the dispersing means,

d. the improvement comprising coupling optical means including a spherical mirror located in the beam path between the source and slit $S_1$ for imaging $S_1$ onto the source, the center of said mirror located at the center of said circle,

e. said spherical mirror having a radius of equal to $2\rho$, where $\rho$ equals the radius of said circle.

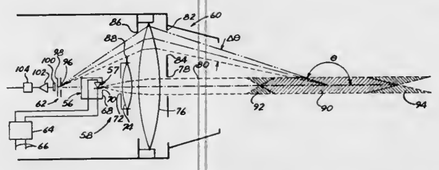
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**4,017,186**

## ELECTRO-OPTICAL METHOD AND SYSTEM FOR IN SITU MEASUREMENTS OF PARTICULATE MASS DENSITY

**Frederick M. Shofner, and Gerhard Kreikebaum, both of Knoxville, Tenn., assignors to Environmental Systems Corporation, Knoxville, Tenn.**

**Filed Mar. 5, 1975, Ser. No. 555,355**
**Int. Cl.² G01N** *21/00*
**U.S. Cl. 356—103** **21 Claims**



1. A system for measuring in situ the mass per unit volume of particles suspended in a fluid medium, said system comprising a source of substantially monochromatic electromagnetic radiation having a wavelength of the order of magnitude of the mean diameter of each of a majority of the particles of interest, means for directing a beam of radiation from said source through a portion of said medium, photodetector means having a photosensitive medium for producing electronic detection signals systematically related to the intensity of electromagnetic radiation falling on said photosensitive medium, said photosensitive medium being located out of the path of said beam, optical means for directing upon said photosensitive medium electromagnetic radiation backscattered from a distally and proximally optically limited region of the portion of said fluid medium traversed by said beam, which limited region contains many of said particles, and indicator means responsive to said electronic detection signals for indicating the mass of said particles per unit volume of the fluid medium substantially independently of the size of particles of mean diameters of the order of magnitude of the wavelength of the radiation from said source.

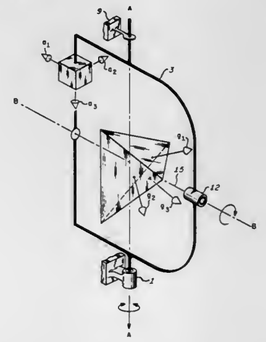
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**4,017,187**

## DOUBLE ROTATION INERTIAL MEASUREMENT APPARATUS

**Bernard Schwartz, Melville, N.Y., assignor to Sperry Rand Corporation, New York, N.Y.**

**Filed June 23, 1975, Ser. No. 589,319**
**Int. Cl.² G01B** *9/02*
**U.S. Cl. 356—106 LR** **12 Claims**



1. Inertial measurement apparatus comprising:

a plurality of equi-spaced ring laser means similarly disposed upon an inner spin member about a spin axis, thereof,

all of said ring laser means being disposed in individual planes at equal predetermined angles with respect to said spin axis,

spin motor means for rotating said inner spin member about said inner spin axis in a predetermined direction for eliminating mode-lock operation of each of said ring laser means within a predetermined operating range and whereby first components of bias and scale factor errors of the ring laser means outputs are cancelled,

drive frame means including first trunnion means for supporting said inner spin member therein,

reversible motor means for reversibly rotating said drive frame means about a second axis substantially perpendicular to said inner spin axis whereby second components of bias and scale factor errors of said ring laser means output are cancelled, and

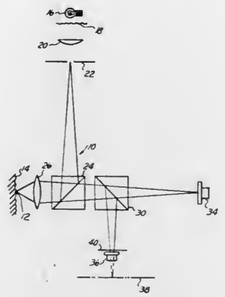
fixed frame means including second trunnion means for supporting said drive frame means for reversible rotation about said second axis,

said reversible motor means serving to drive said drive frame means with respect to said fixed frame means through successive integral numbers of revolutions after respective successive reversals thereof.

## 4,017,188
## SURFACE PROFILE MEASURING DEVICE AND METHOD

**Takeo Sawatari, Southfield, Mich., assignor to The Bendix Corporation, Southfield, Mich.**

**Filed Feb. 26, 1975, Ser. No. 553,332**
**Int. Cl.² G01B** *11/30*
**U.S. Cl. 356—120** **4 Claims**

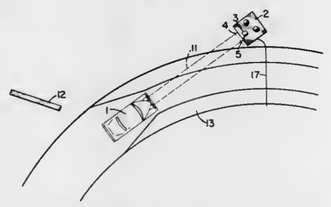


1. An optical surface profiling device for generating signals corresponding to variations in a surface comprising:
means for illuminating a spot scanned across said surface;
objective lens means for projecting an image of said illuminated spot;
large area detector means located to receive said projected image and generating a signal corresponding to the total illumination produced by the spot image projected thereon;
slit detector means located forwardly of said focal plane and including a light detector and further including a slit interposed between said objective lens means and said light detector, said means generating signals corresponding to the illumination produced by an image of said spot passing through said slit;
means for generating signals from said large area detector means signals and said slit detector means signals corresponding to the ratio of said signals,
display means displaying said signals as a function of the scan position of said illuminated spot;
whereby signals corresponding to the distance to said surface from a fixed reference are generated.

## 4,017,189
## TESTING OF AUTOMOBILE HEADLIGHTS

**Robert F. Bischoff, Jr., 30 Fairmount Ave., Morristown, N.J. 07960**

**Filed May 20, 1975, Ser. No. 579,237**
**Int. Cl.² G01S** *9/02;* **G01J** *1/00*
**U.S. Cl. 356—121** **1 Claim**

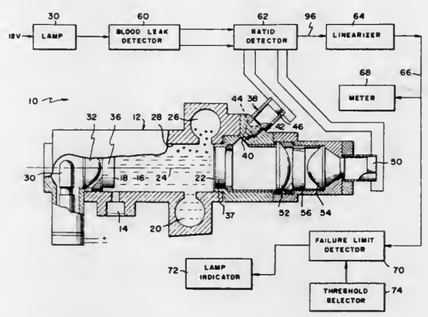


1. A surveying apparatus for the observation of headlights, where there is proper placement of the said apparatus for proper alignment of the apparatus to the headlights of moving vehicles and where the said apparatus is a receiving instrument which gives indications to the focuser of the headlights that the focusing of said headlights is either proper or improper, and where the said apparatus is so developed that a radar and a photocell activate the said apparatus, and where such activity shows through indicators whether the focusing of the headlights is regular or irregular, said apparatus comprising and functioning as follows:
1. an apparatus which possesses adjustable legs, an aiming device, and a leveling device so that said machine is able to be positioned for proper observation;
2. said apparatus is placed in an applicable location so that the apparatus is well able to observe the focusing of headlights;
3. a posting of notice signs prior to the reaching of the site of the apparatus, said posting is a notification that there is to be an inspection of vehicle headlights;
4. said apparatus containing a radar system and indicating means, which said radar system is able to transmit and receive so that the apparatus, through said indicating means, is able to show that a vehicle is present;
5. said apparatus further contains a photocell system which receives irregular headlight rays from a particular vehicle, and activates further indicating means which upon reception of irregular rays, indicates that the alignment of the light rays are irregular;
6. said apparatus incorporates a switch, which said switch deactivates the apparatus when the vehicle being observed runs over the switch.

## 4,017,190
## BLOOD LEAK DETECTOR COMPARING INTENSITIES OF HIGH ABSORPTION BAND AND LOW ABSORPTION BAND OF A SINGLE BEAM OF LIGHT PASSING THROUGH A SAMPLE

**Halbert Fischel, 5301 Newcastle, No. 16, Encino, Calif. 91316**

**Filed July 18, 1975, Ser. No. 597,243**
**Int. Cl.² G01J** *3/46;* **356**
*39;40;41;51;181;184;189;206;246;178*
**U.S. Cl. 356—178** **17 Claims**




1. A system for detecting the presence of hemoglobin in a solution comprising:
a radiant energy transmissivity cell including a sample chamber extending along an inclined optical axis between an upper end and an opposite lower end, the sample chamber having a fluid inlet at one end of the chamber for receiving a continuous flow of said solution, a fluid outlet at an end opposite said one end for continuously expelling said solution and a gas outlet positioned at an uppermost portion of the chamber at the upper end to continuously expel gas that accumulates at the gas outlet;
first and second light transmissive windows positioned at opposite ends of the sample chamber;
a light source positioned proximate an end of the sample chamber to emit radiant energy along the optical axis through the first and second windows and through the sample chamber;

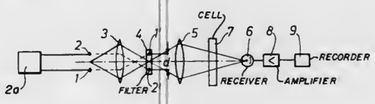


first and second radiant energy detectors each positioned proximate an end of the sample chamber opposite the light source to receive radiant energy emitted by the light source after the energy has passed through the first and second windows and the sample chamber, and to generate an indication of the radiant energy incident thereon;
a bandpass optical filter disposed along a light path between a window at an end of the sample chamber proximate the first and second detectors and one of the detectors, the filter having a pass band centered at a wavelength at which hemoglobin constituents of blood are highly light absorbent; and
ratio detecting means responsive to the first and second radiant energy detectors for indicating the ratio of the indications of said detectors.

## 4,017,191
## TWO-BEAM PHOTOMETER WITH ROTATABLE GRADED INTERFERENCE FILTER

**Konrad Bunge, Cologne, Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Germany**

**Filed June 20, 1975, Ser. No. 588,750**
**Claims priority, application Germany, June 22, 1974, 2430011**
**Int. Cl.² G01J** *3/50;* **G01N** *21/24*
**U.S. Cl. 356—188** **6 Claims**



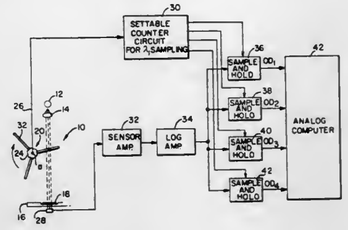

1. A two beam photometer comprising:
a. means for providing two light beams to provide a measuring beam and a comparison beam,
b. a first lens for receiving said beams and directing them in the direction of the optical axis of the lens,
c. a graded interference filter perpendicular to the optical axis and rotatable about the optical axis, disposed on the optical axis for receiving the beams from the first lens, for selecting a range of wavelengths for the measuring beam and another range of wavelengths for the comparison beam, the paths of the beams in the zone of the filter being narrowly limited and situated symmetrically on either side of the optical axis,
d. the path of the measuring beam and the comparison beam coinciding in space but following each other periodically in time,
e. a second lens for receiving the beams from the filter and directing them further along the optical axis,
f. a cell for holding a specimen to be investigated disposed in the path of beams from the second lens for at least partial transmission of the beams through the specimen,
g. a photoelectric means for receiving the beams passing through the specimen, and
h. means operatively connected to the photoelectric means for recording the output of the photoelectric means.

## 4,017,192
## OPTICAL ANALYSIS OF BIOMEDICAL SPECIMENS

**Robert D. Rosenthal, Gaithersburg, Md., assignor to Neotec Corporation, Silver Spring, Md.**

**Filed Feb. 6, 1975, Ser. No. 547,658**
**Int. Cl.² G01N** *21/22*
**U.S. Cl. 356—201** **13 Claims**

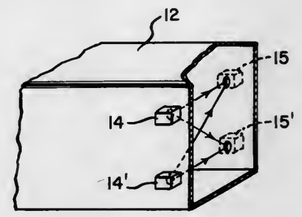
2. A method of detecting the presence of a pathological abnormality in a multicellular bulk biomedical specimen, comprising the steps of illuminating the multicellular bulk specimen sequentially with a plurality of difference light wavelengths, recording selected light absorption dependent values within the sample's light output spectrum, computing the value of a mathematical function of said selected absorption-dependent values, said mathematical function being selected to produce a computed value which correlates with the presence or absence of said pathological abnormality, and comparing the level of the computed value to a predetermined screening level.




## 4,017,193
## APPARATUS FOR MEASURING THE TRANSMITTANCE OR OPACITY OF A GASEOUS MEDIUM CARRYING PARTICULATE MATTER THROUGH A CONDUIT

**Leo Loiterman, c/o American Electric Power Service Corp., 2 Broadway, New York, N.Y. 10004**

**Filed Mar. 2, 1976, Ser. No. 663,090**
**Int. Cl.² G01N** *21/26*
**U.S. Cl. 356—206** **19 Claims**

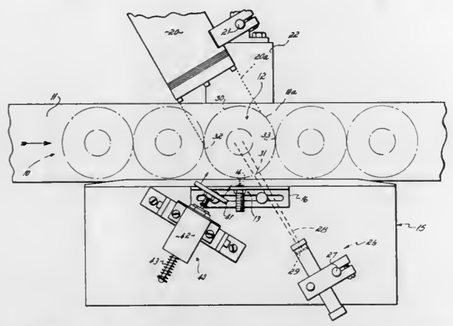


1. Apparatus for measuring the transmittance or opacity of a gaseous medium carrying particulate matter through a conduit which comprises
a. spaced first and second light sources and spaced first and second light sensors positioned on opposite walls of said conduit with equal shorter path lengths between first source and first sensor and between second source and second sensor and equal longer path lengths between first source and second sensor and between second source and first sensor,
b. means at each light source for producing and directing narrow collimated beams toward each light sensor,
c. means at each light sensor for producing a narrow reception beam angle,
d. means for exposing each sensor to collimated beams from said sources alternately during measuring periods and directing the collimated beams to the sensor at said reception beam angle thereof,
e. and computing means for utilizing the outputs of said sensors to produce the quotient of the products of the outputs corresponding to light transmitted over said longer paths and over said shorter paths and producing from the quotient an output corresponding to the transmittance or opacity over a predetermined distance of said gaseous medium carrying particulate matter.

## 4,017,194
## APPARATUS AND METHOD FOR DIFFERENTIATING BETWEEN POLYMER COATED GLASS CONTAINERS AND UNCOATED CONTAINERS

**Gary D. Conroy, Lancaster, and John D. Scott, Sugar Grove, both of Ohio, assignors to Anchor Hocking Corporation, Lancaster, Ohio**

**Filed Sept. 22, 1975, Ser. No. 615,235**
**Int. Cl.² G01N** *21/16, 21/32*
**U.S. Cl. 356—240** **13 Claims**



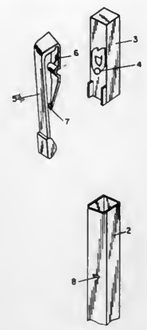
1. Apparatus for inspecting glass containers to determine the presence of a polymer coating thereon, comprising,
means for moving the containers in single file along a path,
a stoboscopic light source triggerable to emit a pulse of light which will impinge on a container moving along said path,
position sensing means for sensing the moment when a container is in a read position while moving along said path,
said position sensing means being operatively connected to trigger said source to emit a single pulse of light which is synchronized to impinge on the respective container whose position was sensed at the read position,
light-sensitive receptor means for receiving light from said source which has passed through the respective container,
said receptor means receiving only light from said source which has passed substantially diametrically through the center of said respective container,
means blocking said receptor means from receiving light from said source tangentailly through the side wall of the respective container,
and continuously receptive circuit means responsive to the intensity of the single pulse of light received by said receptor means to produce an output signal indicative of whether the respective container has a polymer coating on it.

## 4,017,195
## WRITING IMPLEMENT AND METHOD OF MANUFACTURING THE SAME

**Rudi Jahraus, Keltern Ellmendingen, Germany, assignor to Moriz Hausch GmbH, Pforzheim, Germany**

**Filed Jan. 5, 1976, Ser. No. 646,875**
**Claims priority, application Germany, Jan. 25, 1975, 7502204[U]**
**Int. Cl.² B43K** *24/08*
**U.S. Cl. 401—104** **1 Claim**

1. A writing implement which comprises
a barrel formed with a slot,
a retaining clip carried by said barrel and disposed on the outside thereof,
a clip extension which is integral with said clip and extends in said barrel and has a laterally bent lower end portion extending into said slot, said extension being formed with a recessed ball seat, and
a pressure-operable mechanism which comprises a slider slidably mounted in said barrel and formed with a heart-

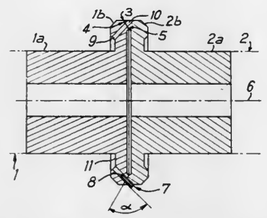


shaped groove, and a ball seated in said ball seat and protruding into said groove.

## 4,017,196
## UNION FOR COUPLING MEMBERS

**Pierre Jean-Louis Peàn; Josette Andrée Mauroux, both of 26600 Tain L'Hermitage, Beaumont-Monteux, and Bernard Rey, 26800 Portes-les-Valence, Etoile-sur-Rhone, all of France**

**Filed Feb. 3, 1976, Ser. No. 654,968**
**Claims priority, application France, Feb. 6, 1975, 75.04402**
**Int. Cl.² F16B** *7/00*
**U.S. Cl. 403—2** **9 Claims**



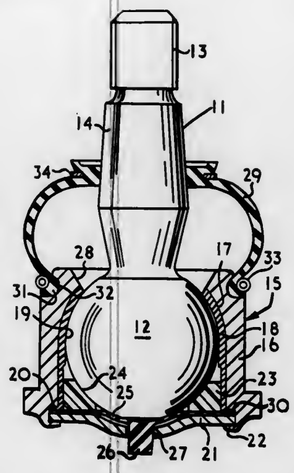
1. A union for coupling first and second cylindrical members comprising:
a. a first radially directed annular flange on said first member;
b. a second radially directed annular flange on said second member;
c. said second flange having substantially the same diameter as said first flange;
d. a first truncated conical mating surface on said first flange;
e. a second truncated conical mating surface on said second flange;
f. at least three assembling holes in each of said first and second flanges;
g. said assembling holes passing through said first and second truncated conical mating surfaces;
h. the axes of said assembling holes making angles of at least 5° from the normals to said mating surfaces; and
i. means for connecting said first and second flanges together.



## 4,017,197
## BALL JOINT WITH WEAR INDICATOR MEANS

**David John Rowland Farrant, Leamington Spa, England, assignor to Automotive Products Company Limited, England**

**Filed Dec. 16, 1975, Ser. No. 641,158**
**Claims priority, application United Kingdom, Dec. 23, 1974, 55459/74**
**Int. Cl.² F16C** *11/06*
**U.S. Cl. 403—27** **6 Claims**

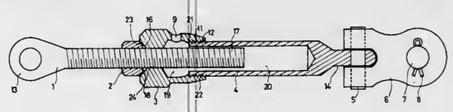


1. A pivot joint comprising a pin having a head thereon; a socket comprising a housing receiving said head and defining a first aperture through which said pin projects; mating bearing surfaces on said head and said socket such that the pin is movable angularly with respect to the socket; a second aperture in said socket; a wear indicator received in said second aperture and having an inner end engageable with said head; and a flexible diaphragm extending between the indicator and the socket and fixedly secured around its periphery to a portion of said socket to seal the bearing surfaces against ingress of foreign matter through the second aperture.

## 4,017,198
## PIVOTAL CONNECTION

**Henry Stanford Mason, Castlecrag, Australia, assignor to H. S. Mason Pty. Limited, Australia**

**Filed June 3, 1975, Ser. No. 583,482**
**Claims priority, application Australia, June 27, 1974, 7992/74**
**Int. Cl.² F16B** *7/06*
**U.S. Cl. 403—43** **5 Claims**

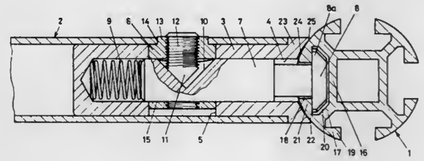


1. A turnbuckle including a first member adapted to be attached to eye means, a second member, means including a rod having disparate connecting means on one end thereof with its other end threaded into said second member, and means connecting said members for relative rotation about a common axis and for containing said members against relative axial movement wherein said connection means comprises a cylindrical portion on one member disposed within a bore on the other member, a plurality of discrete annular grooves in said cylindrical portion, a plurality of discrete annular grooves formed in the inner wall of said bore, said grooves in each member being disposed in closely spaced axial relationship along the respective members to provide an annular radially projecting ridge between each pair of grooves, the separate ridges on each member providing a plurality of annular substantially frustoconical axial load bearing surfaces engaging complementary annular axial load bearing surfaces of the other member.

## 4,017,199
## ELASTICALLY-DEFORMED ADJUSTABLE T-JOINT

**Marcel Strassle, Kirchberg, Switzerland, assignor to Syma Intercontinental S.A., Kirchberg, Switzerland**

**Filed Dec. 3, 1975, Ser. No. 637,210**
**Claims priority, application Switzerland, Dec. 9, 1974, 16319/74**
**Int. Cl.² B25G** *3/00;* **F16B** *7/04;* **F16L** *41/00*
**U.S. Cl. 403—264** **7 Claims**

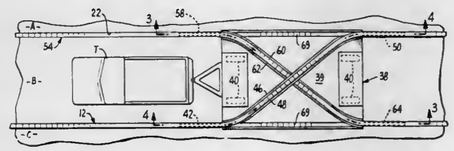


1. A frame comprising: at least two sectional elements which are detachably interconnected and adapted to be pressed against each other, a first sectional element being of a double-walled construction and having webs, said webs connecting an inner section part of said first sectional element to an outer section part of said first sectional element, and said first sectional element further having longitudinal channels, longitudinal slots and vanes, said vanes being separated from each other by said longitudinal channels; and a bolt, which is anchored in one of the longitudinal slots, rotatably and longitudinally displaceably mounted in a second sectional element, said bolt presses said vanes against an end face of said second sectional element; said end face of said second sectional element and an outer surface of said first sectional element are differently shaped in such a manner that when said sectional elements are clamped together by said bolt, the end face bears against the outer surface of said first sectional element along lines of contact and rotation of the sectional elements relative to each other is prevented, further clamping causes said vanes to bear against said end face of said second sectional element by becoming elastically deformed.

## 4,017,200
## HIGHWAY LANE DIVIDER BARRIER AND APPARATUS FOR SHIFTING THE SAME

**Frank W. Woods, Jr., P.O. Box 16434, San Francisco, Calif. 94116**

**Filed Apr. 28, 1976, Ser. No. 681,054**
**Int. Cl.² E01F** *13/00*
**U.S. Cl. 404—6** **6 Claims**



1. Apparatus for forming a removable barrier between two adjacent road lanes on a pavement surface comprising a plurality of substantially identical elongate generally U-shaped

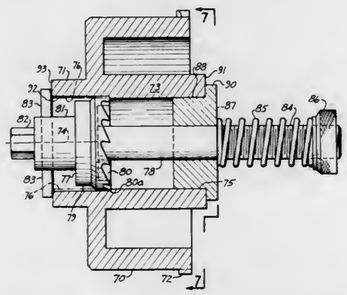
rigid members each having a central web and a pair of flanges integral with the web and extending normal to the web from opposite ends of the web, said U-shaped members being arranged in first and second sets, the first set being positioned with the webs in coplanar relationship and the respective flanges of adjacent members in surface-to-surface juxtaposition, said second set being identically arranged and having the flanges thereof extending intermediate the flanges of the first set so that the flanges bear against the reverse side of the U-shaped members in the other set and so that said planar surfaces of respective said sets are spaced from one another by an amount substantially equal to the sum of the thickness of the two webs plus the length of the flanges, said pavement defining a slot intermediate said road lanes, said slot being formed by two vertical surfaces below the pavement surface that are spaced from another by a distance corresponding to the thickness of said barrier so as to slidably receive the U-shaped members forming said barrier in said slot, and means at opposite longitudinal ends of said barrier for compressively supporting the ends of said barrier, said member being vertically slidable relative one another.

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**4,017,201**
**MEANS FOR RENOVATING WORN CYLINDRICAL BEARING SURFACES**

**Claude L. Adams, Lakewood, and Sergio Flores, Redondo Beach, both of Calif., assignors to Flowers Tool Inc., South Gate, Calif.**

**Filed Sept. 15, 1975, Ser. No. 613,335**
**Int. Cl.² B23B** *41/12, 47/18*
**U.S. Cl. 408—82** **1 Claim**



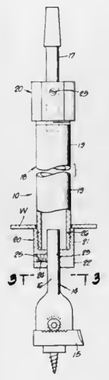
1. Tooling for removing worn areas from an original cylindrical bearing surface of a bearing mounted on a hollow bearing shaft having a central longitudinal axis, and permitting a sleeve having a cylindrical bearing surface of the same diameter as said original bearing surface to be fitted to said bearing, comprising:
a cutting head shaft;
means for supporting the cutting head shaft in a position concentric with said axis, said means comprising a portion of the cutting head shaft adapted to rotate and slide axially within the hollow of the bearing shaft;
a rotatable cutting head mounted on the cutting head shaft, having cutting edge means which describes a circle when the head is rotated, said circle having a diameter sufficiently different from the diameter of said bearing surface as to make a circular cut into the bearing to a depth which lies beneath the worn areas;
drive means by which the cutting head may be rotated;
advance means urging said head to move longitudinally relative to the bearing, so that rotation during said urging machines a cylindrical surface on said bearing of a diameter which is that of said circle; and
limit means attached to the cutting head to prevent further longitudinal movement of the head after a desired longitudinal length of said last-mentioned cylindrical surface has been achieved, said advance means comprising a compression spring positioned between a member attached to the cutting head shaft and a member to which the bearing is attached;
whereby the sleeve having a cylindrical bearing surface of the same diameter as the original bearing surface may be fitted to cover the machined surface of the bearing.

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**4,017,202**
**BORING TOOL WITH VARIABLE EXTENSION**

**Robert E. Townsend, 9442 E. Pentland St., Temple City, Calif. 91780**

**Filed Oct. 20, 1975, Ser. No. 624,224**
**Int. Cl.² B23B** *51/00*
**U.S. Cl. 408—226** **4 Claims**



1. A boring tool, comprising, in combination:
a. a rotatable cutter having an axially extending shank portion;
b. a coupling member having an axial bore at one end for the endwise reception of said shank portion;
c. means for releasably securing the received shank portion against rotation is said bore; and
d. an opposite end on said coupling member which is internally stepped and threaded for selective threaded connection with pipes of different diameter.

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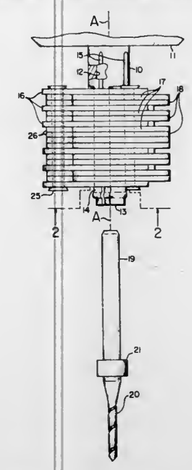
**4,017,203**
**HIGH SPEED DRILL SYSTEM**

**William F. Marantette, and Ruth B. Marantette, both of 20624 Earl St., Torrance, Calif. 90503**

**Filed Apr. 14, 1976, Ser. No. 677,035**
**Int. Cl.² B23B** *31/10, 5/22*
**U.S. Cl. 408—240** **5 Claims**

1. A high speed drill system including, in combination:
a. a drill holding spindle having an interior axial bore opening at one end and a plurality of exterior flats at equal circumferential spaced points on its exterior wall, said spindle including a similar plurality of exterior slots extending from equal circumferentially spaced points between said flats radially inwardly to intercept said bore and longitudinally along the spindle from said one end to points beyond the ends of said flats such that said flats can be biased radially inwardly to effectively decrease the cross sectional area of said bore adjacent to said one end; and
b. a plurality of eccentric weight means surrounding said spindle with their centers of mass at equally spaced radial distances from the axis of the spindle and at equal circumferential spacing about said spindle, each weight means having straight internal segment means in opposed engaging relationship with at least one flat on the opposite side of the axis of said spindle from its center of mass, whereby high speed rotation of said spindle rotates said eccentric





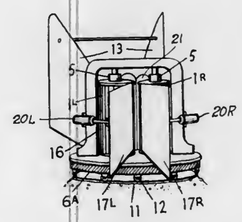
weight means to generate centrifugal forces and urge said segment means against said flats to move the flats radially inwardly so that when a drill shank is received in said one end of said bore, it is gripped by the inward movement of said flats to lock the drill shank against rotational and longitudinal movement relative to said spindle.

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**4,017,204**
**WIND MOTORS**

**Donald L. Sellman, 407 S. 3rd St., Lincoln, Kans. 67455**

**Division of Ser. No. 484,148, June 28, 1974. This application Dec. 1, 1975, Ser. No. 636,667**
**Int. Cl.² F03B** *3/18*
**U.S. Cl. 415—2** **9 Claims**



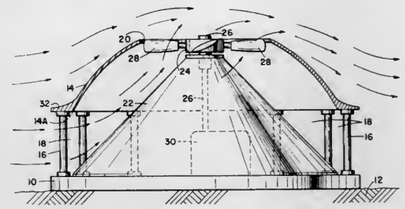
1. A wind motor that is propelled by the impact of wind against an impeller rotor that travels in the same direction as the on-coming wind comprising:
a. a unit comprising a pair of impeller rotors which have vanes at the perimeter and which are mounted on a vertical axis, the pair of impeller rotors are substantially in series abreast, the vertical axis of each impeller rotor is journaled by a bearing at the top and bottom sides, the bottom bearings are supported directly by the base platform structure and the top bearings are supported by structure extending up on two sides from the base platform;
b. at right angle to the face of the rotary impellers are two vertical wind channel directing members, one vertical wind directing member on the left side and the other on the right side, preferably they are spaced widely apart at the outer edge and gradually slope upwardly toward each other at the inner side which is substantially in front of the vanes of these impeller rotors and almost close enough to touch these impeller rotor vanes;
c. and the angle of slope of these two wind directing channel members can be adjusted by mechanical means to control the speed of the impeller rotors and also to guard against violent destructive winds.

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**4,017,205**
**VERTICAL AXIS WINDMILL**

**Victor W. Bolie, 7504 American Heritage NE., Albuquerque, N. Mex. 87109**

**Filed Nov. 19, 1975, Ser. No. 633,387**
**Int. Cl.² F03D** *7/00*
**U.S. Cl. 415—2** **8 Claims**



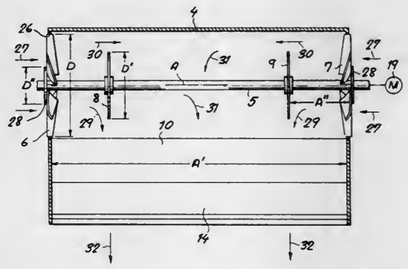
1. A windmill comprising:
a horizontal base;
a dome having a horizontal bottom spaced above said base and having a central circular orifice in a horizontal plane;
means to support said dome above said base providing an annular air inlet between the base and the dome bottom;
a conical baffle supported on said base below said dome, the conical axis thereof being coincidental with the vertical axis of said dome circular orifice;
a vertical shaft supported coaxially in said conical baffle; and
an impeller affixed to said shaft and rotatably positioned in said plane of said dome circular orifice.

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**4,017,206**
**WINNOWING BLOWER FOR COMBINE HARVESTER-THRESHER**

**Klaus Döge, Dresden; Gerd Manig, Nassebohla; Wolfgang Hentsch, Grosspostwitz, and Johannes Mucke, Singwitz, all of Germany, assignors to VEB Kombinat Fortschritt Landmaschinen, Neustadt in Sachsen, Germany**

**Filed Sept. 3, 1975, Ser. No. 610,083**
**Int. Cl.² F01D** *3/02;* **A01F** *7/00*
**U.S. Cl. 415—102** **5 Claims**

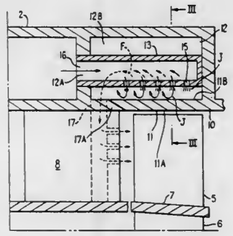


1. A winnowing blower for discharging a stream of air over the sieve of a combine harvester-thresher, said blower comprising:
an axially elongated housing having axial ends each formed

with an inlet and a side formed with an outlet extending the full axial length of said housing;
a plenum passage extending radially from said housing at said outlet and directed at said sieve;
an axial-flow fan at each of said inlets;
means for rotating said fans and drawing air into said housing through said inlets; and
at least one transversely extending inperforate deflection plate in said housing between said fans, said plate being a disk mounted along the axis of said fans and having an axial spacing from one of said fans which is about one fifth to one-third of the axial distance between them, said disk having a diameter of about one-third to two-thirds the diameter of said one of said fans.

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**4,017,207**
**GAS TURBINE ENGINE**
**John Kenneth Alexander Bell, and John Rodney Dyson Fuller, both of Bristol, England, assignors to Rolls-Royce (1971) Limited, London, England**
**Filed Oct. 28, 1975, Ser. No. 626,238**
**Claims priority, application United Kingdom, Nov. 11, 1974, 48662/74**
**Int. Cl.² F01D** *5/00*
**U.S. Cl. 415—115** **4 Claims**

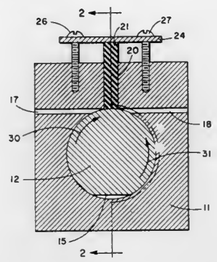


1. A gas turbine engine comprising an annular duct for combustion products, means defining an annular cooling air chamber surrounding the duct, a wall common to the chamber and the duct, a source of pressurized cooling air, an annular array of nozzles arranged in the chamber and connected to be supplied by said cooling air source, the nozzles being direced for axial spaced jets of air emanating therefrom to impinge on to and return from said wall, the nozzles being arranged in rows parallel to the axis of said chamber, an outlet at one axial end of the means defining the chamber for the returned air, and said axial rows of nozzles being circumferentially spaced apart to define, between next adjacent ones of said rows, axially extending spaces accomodating the flow of returning air to said outlet.

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**4,017,208**
**TWO-WAY FLUID METER PUMP**
**Bernard Vonnegut, Guilderland, N.Y., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**
**Filed June 13, 1975, Ser. No. 586,684**
**Int. Cl.² F04D** *11/00*
**U.S. Cl. 415—90** **2 Claims**

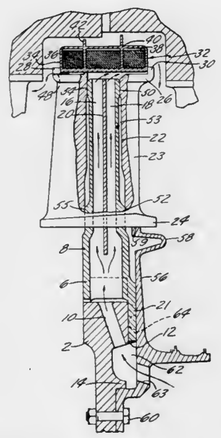
1. A reversible pump wherein flow of liquid in a pipeline or other conduit may be reversed by reversing the direction of rotation of a single cylindrical member comprising:
a bearing in block form and an enlarged shaft portion disposed for rotation therein in close tolerance therewith;
at least two passages in said bearing traversing opposite sides thereof,
said passages in line and terminating at the apex of the interior surface of said bearing;
a liquid supply and/or discharge line connected to the outer ends of said passages;
at least one recess in the surface of said shaft positioned so as to be symmetrically disposed during rotation thereof with the interior ends of said passages,
said recess elliptical in shape and having a depth on the order of the diameter of said passages;
an opening in said bearing in register with and encompassing said shaft recess;
a resilient member in said opening and means for maintaining said resilient member in compression against said shaft portion,



said resilient member terminating at and spanning the space between the interior ends of said passages,
said member extending exterior to said bearing and said means for maintaining compression disposed outside of and adjustably secured to said bearing; and
means for rotating said shaft portion,
whereby rotation of said shaft portion in one direction pumps liquid in one direction through said passages and reverse rotation causes flow of liquid in the opposite direction through said passages via transport in said recess terminated by said resilient member.

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**4,017,209**
**TURBINE ROTOR CONSTRUCTION**
**Robert R. Bodman, Riviera Beach, Fla., assignor to United Technologies Corporation, Hartford, Conn.**
**Filed Dec. 15, 1975, Ser. No. 640,808**
**Int. Cl.² F01D** *5/18*
**U.S. Cl. 416—97 R** **12 Claims**



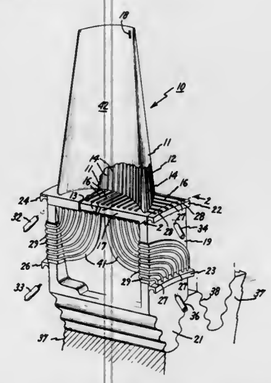
1. A turbine rotor construction including:
a disk having blade slots in the periphery;
blade positioning tubes having roots fitting in said slots and extending radially outward therefrom;



ceramic blades positioned on said tubes and radially slidable thereon, the outer end of the blade extending radially beyond the tube;
a filament wound ring surrounding said blades and engageable with the outer ends thereof, the ring being out of contact with the ends of the tubes; and
a spring ring mounted on the disk and engaging the inner ends of the blades to hold the blades against the ring.

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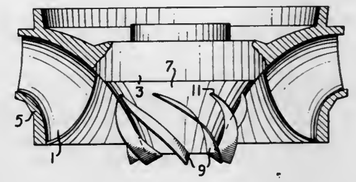
**4,017,210**
**LIQUID-COOLED TURBINE BUCKET WITH INTEGRAL DISTRIBUTION AND METERING SYSTEM**
**Kenneth A. Darrow, Sprakers, N.Y., assignor to General Electric Company, Schenectady, N.Y.**
**Filed Feb. 19, 1976, Ser. No. 659,576**
**Int. Cl.² F01D** *5/18*
**U.S. Cl. 416—97 R** **12 Claims**



1. Turbine bucket construction having a leading edge and a trailing edge comprising in combination:
integrally formed airfoil-shaped core, platform, shank and root portions;
a plurality of first coolant passages extending along the pressure and suction faces of said core portion;
a plurality of second coolant passages in said platform portion, each of said second coolant passages being connected at one end thereof to a separate one of said first coolant passages as a set;
skin material disposed over the upper surface of said platform portion and over said core portion;
a first pair of arcuate gutters as an integral part of said bucket construction with one of said gutters in said first pair projecting from the leading edge of said bucket and the other of said gutters in said first pair projecting from the trailing edge of said bucket, both of said gutters in said first pair being located radially inward of said core portion;
a second pair of arcuate gutters integral with said shank portion with one of said gutters in said second pair being disposed at each end of said shank portion, the centers of the radii of curvature of all gutters lying on a common axis; and
each of said gutters having at least one hole extending therethrough in the generally radial direction, each of said holes being in flow communication with a separate one of said sets of coolant passages
whereby each of said holes will meter the flow of liquid coolant to the set of coolant passages with which it is in flow communication and each of said gutters can be made to supply a different amount of liquid coolant to the holes extending therethrough.

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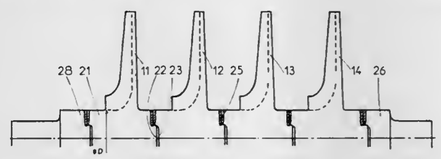
**4,017,211**
**RUNNER FOR HYDRODYNAMIC MACHINES**
**Ludvig Rune Ingvar Alestig, and Göte Ivar Gustavsson, both of Kristinehamn, Sweden, assignors to Aktiebolaget Karlstads Mekaniska Werkstad, Karlstad, Sweden**
**Filed Sept. 17, 1975, Ser. No. 614,345**
**Int. Cl.² F01D** *1/10*
**U.S. Cl. 416—183** **4 Claims**



1. In a runner for a hydrodynamic machine having a crown, a skirt ring located coaxially with and spaced outwardly from the crown to define with the crown a generally radially oriented first portion of an annular flow channel, a crown tip joined to the crown, extending coaxially within the skirt ring, forming a continuation of the crown and defining with the skirt ring a generally axially-oriented second portion of the annular flow channel, and a multiplicity of circumferentially spaced-apart, fixed runner vanes mounted in the channel and extending between the crown and the skirt ring, the improvement comprising a multiplicity of fins attached to and extending generally radially from the crown tip and adapted to modify the direction of flow leaving the runner vanes to provide substantially axial flow from the runner, the fins being spaced apert circumferentially, and each fin being substantially triangular in shape, as viewed in plan and having dimensions radially of the annular flow channel at all locations thereon that are substantially less than the radial dimensions of the flow channel at such locations such that flow through the flow channel is not substantially obstructed, the apex portion of each fin being in proximity to the runner vanes and the base portion of each fin being remote from the vanes and substantially spaced radially from the axis of rotation of the runner, the apex end of the apex portion of each fin being aligned with the direction of flow through the channel as it leaves the vanes and each fin being curved to deflect the flow of water progressively to turn the flow of water leaving the vanes substantially to eliminate circumferential flow.

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**4,017,212**
**BLADED ROTOR**
**Jean Gordienne, and Georges Dousse, both of Le Creusot, France, assignors to Creusot-Loire, Paris, France**
**Filed Mar. 5, 1975, Ser. No. 555,613**
**Claims priority, application France, Mar. 14, 1974, 74.08719**
**Int. Cl.² F01D** *5/06*
**U.S. Cl. 416—198 A** **2 Claims**



1. A bladed rotor for a centrifugal compressor comprising a plurality of coaxial wheels each comprising a hub and a blade having a foot formed integrally with the hub, said wheels being welded together at said hubs along weld planes perpendicular to the axis of the wheels by welds extending radially to the

level of the feet of said blades, the blades of adjacent hubs being spaced from one another, each hub having an axial length equal to the spacing between adjacent blades, and journals welded to the hubs of the axially outermost ones of said wheels, one end face of the hub of each of said wheels having an axial projection cooperating with a recess provided in the other end face of an adjacent wheel receiving said projection, one journal at the end of said assembly of wheels having a projection cooperating with the recess of the adjacent wheel end face, the other journal at the other end of said wheel assembly having a recess into which the end face of the adjacent wheel is received, said wheels bearing against one another over annular opposed faces being welded together, said blades being centrifugal blades all of the same diameter, each including a radial disc portion integral with said hub for radial flow and an axial flow portion extending axially from said disc portion and including a base integral with said hub, said blades having a radial length substantialy greater than the diameter of said hub.

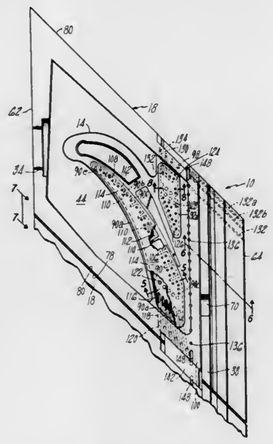
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**4,017,213**

## TURBOMACHINERY VANE OR BLADE WITH COOLED PLATFORMS

**Hans Rainer Przirembel, Hebron, Conn., assignor to United Technologies Corporation, Hartford, Conn.**

**Filed Oct. 14, 1975, Ser. No. 622,320**
**Int. Cl.² F01D** *5/18*
**U.S. Cl. 416—97 A** **19 Claims**



1. A turbomachinery vane or blade including:

A. an airfoil section having a leading edge, a trailing edge, a pressure side and a suction side and adapted to extend across a hot gas passage,

B. a platform attached to the airfoil section at one end thereof and extending substantially laterally with respect thereto and including:

1. a leading edge portion forward of the airfoil section leading edge,
2. a trailing edge portion aft of the airfoil section trailing edge,
3. an inner surface defining the boundary of the hot gas passage, and
4. an outer surface,

c. first means to cool the platform adjacent the airfoil section pressure side using a combination of impingement, convection and film cooling,

D. second means to cool the platform adjacent the airfoil section suction side using a combination of impingement and film cooling, and

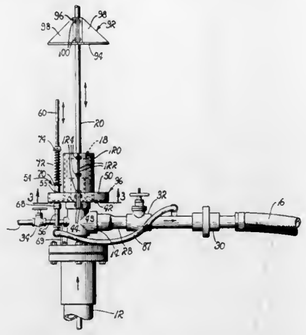
E. third means to cool the platform trailing edge portion utilizing convection cooling.

**4,017,214**

## PACKING GLAND LEAK RETRIEVER DEVICE

**Leonard G. Smith, 2325 Elton Ave., Bakersfield, Calif. 93306**

**Filed Nov. 25, 1974, Ser. No. 526,723**
**Int. Cl.² F04B** *49/10*
**U.S. Cl. 417—9** **9 Claims**



4. In a packing gland for providing a seal between a reciprocally movable member and a stationary member, a leak retriever comprising;

means defining a reservoir operatively associated with a first of said packing gland members and disposed to collect fluid breaking from said packing gland;

a retriever pump with an inlet channel interconnected in fluid communication with said reservoir means and an outlet channel;

drive means for driving said retriever pump to pump fluid from said inlet channel to said outlet channel, said drive means including a first drive member mechanically interconnected with said reciprocating member for reciproal movement therewith, a second drive member interconnected with said retriever pump and disposed to operate said pump when reciprocated, and operating means including said first drive member disposed to engage and reciprocate said second drive member.

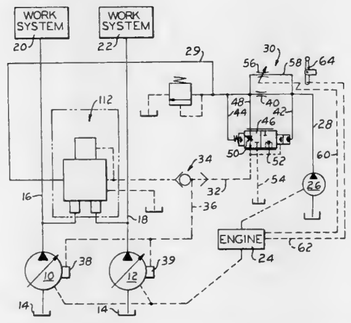
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**4,017,215**

## INFINITELY VARIABLE ORIFICE FOR PART THROTTLE CONTROL

**Ralph G. Butler, Chicago, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.**

**Filed Mar. 15, 1976, Ser. No. 666,722**
**Int. Cl.² F04B** *49/00*; **F16D** *31/02*
**U.S. Cl. 417—216** **4 Claims**




1. A hydraulic system including the combination of a plurality of variable displacement pumps driven by a single prime mover, and a horsepower-controlling system for controlling the horsepower output of the variable displacement pumps, said system comprising:

a source of pilot pressure including a fixed displacement pump driven by said prime mover for controlling displacement of said pumps in relation to the speed output of said prime mover;

throttle control means for controllably selecting the speed of said prime mover;

underspeed control valve means responsive to a deviation from selected operating speeds of said prime mover for normally controlling the communication of said pilot control pressure with said pump displacement means to thereby vary the displacement of said pumps in proportion to load thereon; and,

infinitely variable means movable with said throttle control means for adjusting the response of said underspeed valve to respond to a deviation from said operating speed.



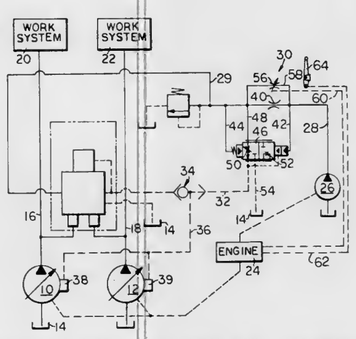
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**4,017,216**

## VARIABLE UNDERSPEED SYSTEM LINKAGE

**Huber A. Moore, Geneva, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.**

**Filed Mar. 15, 1976, Ser. No. 666,723**
**Int. Cl.² F04B** *49/00*; **F16D** *31/02*
**U.S. Cl. 417—216** **3 Claims**




1. A hydraulic system comprising the combination of a plurality of variable displacement pumps driven by a single prime mover, and a horsepower-controlling system for controlling the horsepower output of the variable displacement pumps, including a source of pilot pressure including a fixed displacement pump driven by a prime mover for controlling displacement of said pumps in relation to the speed output of said prime mover, throttle control means for controllably selecting the speed of said prime mover, underspeed control valve means responsive to a deviation from selected operating speeds of said prime mover for normally controlling the communication of said pilot control pressure with said pump displacement means to thereby vary the displacement of said pumps in proportion to loads thereon, and infinitely variable means movable with said throttle control means for adjusting the response of said underspeed valve to respond to a deviation from said operating speed, the improvement comprising:

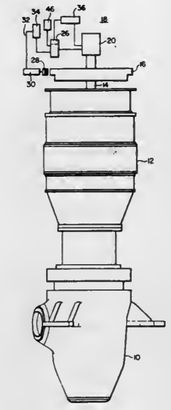
lost motion linkage means connecting said infinitely variable means to said throttle control means for movement of said infinitely variable means with said throttle control means only after said throttle control means has advanced a predetermined amount.

**4,017,217**

## OVERSPEED PROTECTION SYSTEM

**Robert P. Lamers, Franklin Township, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed Feb. 26, 1976, Ser. No. 661,591**
**Int. Cl.² F04B** *49/00*; **F16D** *31/02*; **B60T** *7/12*
**U.S. Cl. 417—214** **9 Claims**



1. A protection system to prevent the failure of a flywheel of a fluid pump caused by an overspeed condition of said fluid pump, said flywheel being coupled to, and rotating with, a drive shaft of said fluid pump, said protection system comprising:

a positive displacement pump coupled to, and driven by, said fluid pump drive shaft, said positive displacement pump circulating a protection system fluid;

a discharge manifold serially connected to said positive displacement pump, said discharge manifold receiving said protection system fluid from said positive displacement pump, said discharge manifold having an orifice through which said protection system fluid exits from said discharge manifold, said discharge manifold having a fluid pressure therein dependent upon the speed of said positive displacement pump;

first conduit means for transporting protection system fluid from said positive displacement pump to said discharge manifold and from said discharge manifold orifice to said positive displacement pump;

braking means movably positioned adjacent to said flywheel, said braking means being capable of being in two positions with respect to said flywheel, one of said positions being in contact with said flywheel, the other of said positions being in spaced apart relationship with said flywheel, said braking means when in said position in contact with said flywheel providing braking of said flywheel;

a hydraulic cylinder fixedly coupled to said braking means and positioning said braking means in one of said two positions with respect to said flywheel, said hydraulic cylinder being in fluid communication with said discharge manifold;

second conduit means for transporting protection system fluid from said discharge manifold to said hydraulic cylinder; and

pressure-responsive flow control means positioned in said second conduit means, said flow control means being responsive to said discharge manifold pressure such that, when said discharge manifold pressure is above a first predetermined pressure, said flow control means permits flow of said protection system fluid from said dishcarge manifold to said hydraulic cylinder, and when said discharge manifold pressure is below said first predetermined pressure, said flow control means prevents flow of

said pressure system fluid from said discharge manifold to said hydraulic cylinder,

said hydraulic cylinder positioning said braking means in response to said flow of said pressure system fluid to said hydraulic cylinder, said hydraulic cylinder positioning said braking means in contact with said flywheel when said pressure system fluid is flowing to said hydraulic cylinder, said hydraulic cylinder positioning said braking means in spaced apart relationship with said flywheel when said pressure system fluid is prevented from flowing to said hydraulic cylinder.

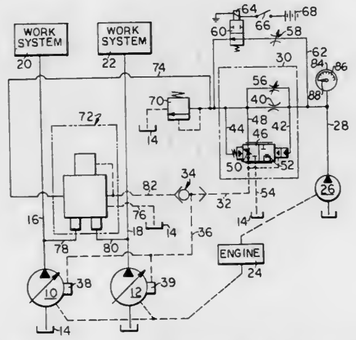
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**4,017,218**

## DUAL-SPEED SETTING UNDERSPEED SYSTEM

**Duane L. Burk, East Peoria, and Huber A. Moore, Geneva, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.**

**Filed Mar. 15, 1976, Ser. No. 666,724**
**Int. Cl.² F04B *49/00*; F16D *31/02***
**U.S. Cl. 417—216** **5 Claims**




1. A hydraulic system comprising the combination of a horsepower-controlling system for controlling the horsepower output of a plurality of variable displacement pumps driven by a single prime mover, a source of pilot pressure including a fixed displacement pump driven by said prime mover for controlling displacement of said pumps in relation to the speed output of said prime mover, underspeed control valve means responsive to a deviation from either one of a predetermined normal operating speed of said prime mover and a second predetermined operating speed less than said normal speed controlling the communication of said pilot control pressure with said pump displacement means to thereby vary the displacement of said pumps in proportion to load thereon, and adjustable means for selectively adjusting said pilot control pressure so that the response of said underspeed valve is to a deviation from a selected one of said normal operating speed and said second operating speed, the improvement comprising pilot pressure-responsive indicator means for indicating said predetermined normal operating speed and said second predetermined operating speed.

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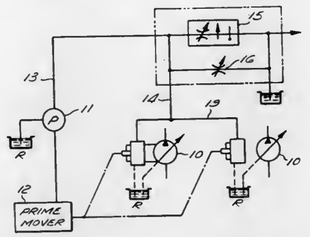
**4,017,219**

## CONTROL SYSTEM FOR VARIABLE DISPLACEMENT PUMPS

**Ellis H. Born, Columbus, and David L. Thurston, Ashley, both of Ohio, assignors to Abex Corporation, New York, N.Y.**

**Filed Dec. 22, 1975, Ser. No. 642,886**
**Int. Cl.² F04B *49/00*; F16D *31/02***
**U.S. Cl. 417—216** **6 Claims**

1. In a control system which includes a prime mover, a plurality of independently adjustable variable displacement pumps driven thereby and an independent control for selectively varying the displacement of each pump, the improvement comprising a load sensing means connected to the prime mover, the load sensing means having an output signal proportional to the load on the prime mover, means connecting the output signal to each independent control, each independent control including input means for selectively setting the displacement of the pump, the input means includes means responsive to said output signal for proportionally changing the displacement of each pump when said output signal reaches a predetermined value which indicates the prime mover is overloaded, the input means further includes a servo valve which operates a fluid motor to set the displacement of the pump and manually operable means for setting the position of the servo




valve to thereby set the displacement of the pump, the servo valve further includes a movable valve member and movement of the valve member operates the servo valve between a first position of maximum pump displacement and a second position of minimum pump displacement, and the manually operable means includes movable setting means which operates the valve member and a ratio changing device which changes the ratio between the amount of movement of the setting means and the amount of corresponding movement of the valve member.

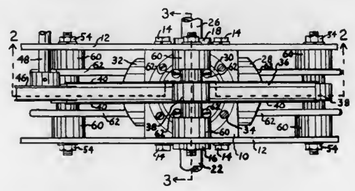
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**4,017,220**

## REVERSIBLE PUMP WITH POSITIVE VALVING

**William Hotine, Box 216, Albion, Calif. 95410**

**Filed Oct. 30, 1975, Ser. No. 627,381**
**Int. Cl.² F04B *1/04*; F01B *13/06***
**U.S. Cl. 417—273** **6 Claims**



1. A fluid pumping device comprising:

a plurality of mounting plates;

a ducting and support member substantially centrally secured within said mounting plates and containing an inlet duct, an outlet duct and a plurality of internal ducts;

a plurality of flat face portions formed on said member defining a plurality of cylinder heads, each of said cylinder heads having an inlet port and an outlet port, said inlet and outlet ports of each of said cylinder heads interconnecting with said internal ducts to permit the flow of fluid through said inlet and outlet ports of each of said cylinder heads in sequence from said inlet duct to said outlet duct;

a cylinder affixed to each of said cylinder heads, each of said cylinders enclosing said inlet and outlet ports of an associated cylinder head;

a reciprocating piston slidably positioned in each of said cylinders, each of said pistons having a top surface and a bottom surface;

a resilient sealing pad affixed to the bottom surface of each of said pistons;



a plurality of alignment guide rods secured to the top surface of each of said pistons, said alignment guide rods for each of said pistons holding cam follower means;

a plurality of rotatable bearings mounted within said mounting plates near the outer perimeters thereof;

a cam wheel surrounding said ducting and support member and operably positioned within said mounting plates for rotation about an axis, said cam wheel engaging said bearings and said cam follower means to sequentially cam actuate each of said pistons in equal time periods to sequentially receive fluid into each of said cylinders through said inlet port of each of said cylinder heads, to sequentially expel fluid from each of said cylinders through said outlet port of each of said cylinder heads, and to sequentially dwell closed to act as a valve to prevent passage of fluid through said inlet and outlet ports of each of said cylinder heads by compressing said resilient piston pad over said inlet and outlet ports; and

drive means connected to rotate said cam wheel about said axis, whereby fluid is pumped from said inlet duct to said outlet duct upon rotation of said cam wheel.

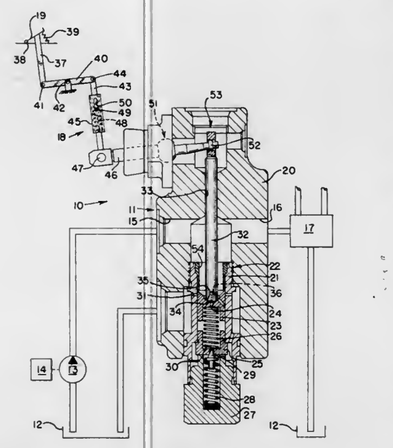
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**4,017,221**

## COMBINED UNLOADING AND RELIEF VALVE FOR PUMP UNLOADING CIRCUIT

**Joseph E. Dezelan, Indian Head Park, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.**

**Filed Feb. 27, 1976, Ser. No. 661,881**
**Int. Cl.² F04B *49/02*; F16K *31/14***
**U.S. Cl. 417—305** **12 Claims**



1. A hydraulic fluid circuit comprising

a pressurized fluid source including a pump and a reservoir,

unloading valve means having an inlet communicating with said source for receiving pressurized fluid therefrom and for opening to reduce the pressure of said fluid below a first predetermined level,

actuating means for selectively opening said unloading valve means, and

override means operatively connected to said actuating means for preventing said actuating means from opening said unloading valve means when the fluid pressure therein exceeds a second predetermined level which is higher than said first predetermined level.

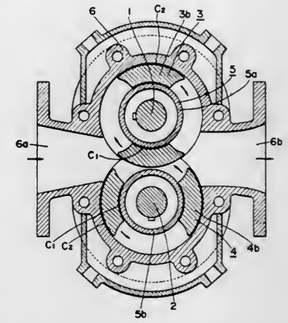
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**4,017,222**

## PUMP FOR USE IN A PAINT APPLICATION APPARATUS

**Yoshiaki Ueno; Yoshio Nishiumi, both of Tokyo, and Yukio Nagasaka, Kawagoe, all of Japan, assignors to Atom Chemical Paint Co., Ltd., Tokyo, Japan**

**Filed Sept. 24, 1975, Ser. No. 616,291**
**Claims priority, application Japan, Nov. 26, 1974, 49-135177**
**Int. Cl.² F04C *15/00*, *1/14***
**U.S. Cl. 418—46** **2 Claims**



1. A pump for use in a paint application apparatus comprising a casing, a pair of shafts mounted to the casing and adapted to rotate in opposite directions to each other at a predetermined speed, a pair of rotors each of which has a boss portion and one or more protruded portions formed integrally with the rotor, said rotors being connected at their respective boss portions to end portions of the respective shafts, and a pair of grand boxes each having a cylinder section which is positioned between one of said shafts and the protruded portions through a heat resistive mechanical seal, wherein the casing, rotors and grand boxes are so disposed as to form clearances therebetween which are substantially equal to the diameter of the largest particles included in the paint.

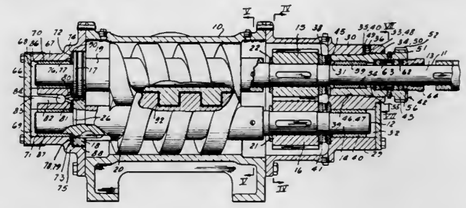
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**4,017,223**

## AXIAL THRUST ADJUSTMENT FOR DUAL SCREW-TYPE PUMP

**Elliott H. Blackwell, Warren, Mass., assignor to Houdaille Industries, Inc., Buffalo, N.Y.**

**Filed Mar. 24, 1975, Ser. No. 561,619**
**Int. Cl.² F01C *1/16*, *21/00*; F04C *1/10***
**U.S. Cl. 418—107** **9 Claims**



1. In a pump having a front head assembly, a rear head assembly, and dual screw pumping parts comprising,

a drive screw having a shaft,

a driven screw having a shaft,

means mounting said dual screw pumping parts for floating intermeshed rotation and providing an inlet and an outlet for pressurizing a pumping medium,

cylinder means at one end of the dual screw pumping parts,

piston means received in said cylinder means for axial movement relative to said screws and having pistons

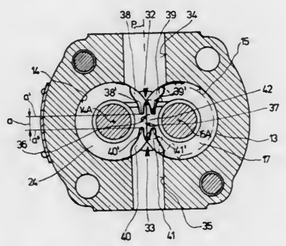
engageable with corresponding said screws to adjust the relative longitudinal position of said screws,
pressure loading means for axially loading said pistons as a function of a pressure differential acting on said screws,
a timing cartridge at an opposite axial end of said screws, said timing cartridge being rotatably adjustable and having a movable element shiftable in an axial direction relative to said screw pumping parts,
means interfacng one of said screw pumping parts and said movable element to selectively adjust the position of said one screw pumping part to obtain a balance of the resultant axial thrust on the screw pumping parts,
said drive and driven screw further comprising,
said rear end of each said shaft prepared for disposition in a sleeve bearing in said rear head assembly,
said front end of said shaft prepared for disposition in a sleeve bearing in said front head assembly,
each said piston having an outer circular surface and a front and rear vertical surface, said outer circular surface having at least one circumferent sealing groove, said outer surface prepared for disposition into a piston portion in the rear head assembly with a by-pass fit,
said timing cartridge prepared for engagement with a timing gear on said drive screw.

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## 4,017,224
## GEAR MACHINE WITH CUTOUTS IN THE SHAFT JOURNALS

**Claus Jöns, Munchingen, Germany, assignor to Robert Bosch G.m.b.H., Stuttgart, Germany**

**Filed Feb. 25, 1976, Ser. No. 661,162**
**Claims priority, application Germany, Mar. 11, 1975, 2510496**
**Int. Cl.² F01C *19/08*; F03C *3/00*; F04C *27/00***
**U.S. Cl. 418—131** **7 Claims**

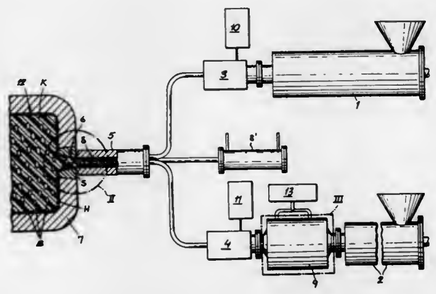


1. In a hydraulic machine wherein two meshing gears have parallel axis-defining shafts received in respective journals having end faces turned axially toward the respective gears and formed with cutouts opening in opposite directions in line with input and output passages formed in a housing carrying said journals and enclosing said gears, the improvement wherein said journals abut flatly at said cutouts along surfaces extending axially to immediately adjacent said gears and chordally to cylindrical continuations of the outer surfaces of said journals, each of said journals on each axial side of each gear being formed with a recess opening toward said inlet passage and a recess opening toward said outlet passage, each recess with the adjacent recess opening in the same direction constituting a one of said cutouts.

## 4,017,225
## APPARATUS FOR THE PRODUCTION OF SYNTHETIC-RESIN BODIES HAVING CORE AND SKIN OF DIFFERENT DENSITY

**Robert Hanning, Campione d'Italia, Italy, assignor to Societa Internazionale per lo Sfruttamento di Brevetti S.A., Panaman, Panama**

**Division of Ser. No. 507,465, Sept. 19, 1974. This application Apr. 29, 1975, Ser. No. 572,713**
**Claims priority, application Switzerland, Sept. 19, 1973, 13479/73; Feb. 20, 1974, 2334/74; Apr. 29, 1974, 5812/74**
**Int. Cl.² B29D *27/00***
**U.S. Cl. 425—4 R** **3 Claims**



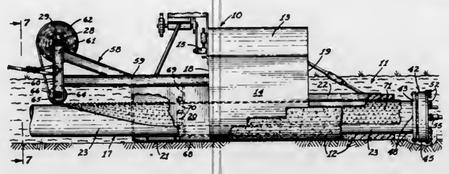
1. An apparatus for producing a synthetic resin body consisting of a homogeneous skin material and a pore-containing core material, said apparatus comprising:
a first plasticating extruder for producing a first flowable synthetic resin adapted to form said skin material;
means forming a mold cavity having an injection orifice;
a first injection-molding device connected to said first plasticating extruder for injecting said skin material along the walls of said cavity through said orifice;
a second plasticating extruder adjacent said first plasticating extruder for producing a second flowable synthetic resin forming said core material;
a second injection-molding device connected to said second plasticating extruder for injecting said core material into said cavity through said orifice in a stream simultaneously with said first synthetic resin material and surrounded thereby to form the core of the body in said cavity;
a common injection nozzle communicating with both said extruders and traversed by said streams, said nozzle being formed with means maintaining a separation of said streams substantially until they reach said orifice;
at least one perforated plate in the path of said second stream and formed with a multiplicity of porous-wall passages traversed by said second stream;
pressure means operatively associated with said passages for forcing a macroblowing agent through the porous walls of said passages to distribute said macroblowing agent in the synthetic resin of said second stream whereby said macroblowing agent expands within said mold cavity to produce gas bubbles therein;
first and second control means connected respectively to said first and second injection-molding devices for controlling the rates of flow and pressures of the respective streams of synthetic resin traversing said orifice; and
further control means connected to said pressure means for regulating the flow of said macroblowing agent into said second stream independently of said first and second control means.



## 4,017,226
## APPARATUS FOR LINING A CONTINUOUS CONCRETE PIPE

**Joe E. Long, 2535 S. Main St., Santa Ana, Calif. 92707**

**Division of Ser. No. 164,395, July 20, 1971, Pat. No. 3,773,874. This application May 29, 1973, Ser. No. 365,034**
**Int. Cl.² B28B *21/12***
**U.S. Cl. 425—59** **5 Claims**



1. A cylindrical concrete pipe laying machine using a fluid pressure inflatable core comprising:
a frame having a semi-cylindrical bottom and vertically disposed sides slidably engaging a bottom of a pre-dug trench to receive a pipe,
a pair of laterally disposed vertical baffles one fixed to the front end and one fixed to the rear end of said frame,
an elongated horizontally disposed arcuate core support member fixed in spaced position from the inside surface of the bottom and sides of said frame and extending through an opening in said front baffle and rearwardly of said front baffle toward said rear baffle so as to define a space between the bottom of said trench and the underside of said core support member for troweling the lower half of the bore of the pipe to be formed,
a hopper fixed to said frame above said core support member, said hopper adapted to receive plastic cementitious material,
a top troweling member fixed to said rear baffle and extending rearwardly of said hopper,
said hopper being in communication with the space below said core support member and with the top half of a core carried on said core support member,
means secured to said frame and extending in the direction of movement of said machine for supporting a rotatable roll of flexible impervious material,
a roll of flexible impervious material rotatably supported on said frame, and
means for guiding and wrapping said material around at least a part of the core carried on said core support member as said machine moves forward during a pipe forming operation,
said material adhering to the bore of the formed pipe upon setting of said plastic cementitious material.

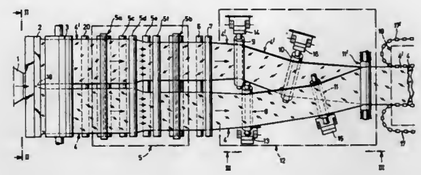
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## 4,017,227
## APPARATUS FOR INCREASING THE PRODUCTION OUTPUT OF STRETCHED FLAT FILM WEBS COMPOSED OF THERMOPLASTIC MATERIAL

**Willi Johann Schmidt, Taunusstein, Germany, assignor to Hoechst Aktiengesellschaft, Germany**

**Division of Ser. No. 590,501, June 26, 1975. This application Dec. 5, 1975, Ser. No. 637,928**
**Claims priority, application Germany, June 29, 1974, 2431385**
**Int. Cl.² B29D *7/24***
**U.S. Cl. 425—66** **6 Claims**

1. In an apparatus for increasing the production of stretched flat film webs of thermoplastic material including an extruder, a flat slot die connected to said extruder, a cooling roller, and a transverse stretching frame,
the improvement comprising a slot die wider than the die normally employed for the production of a preliminary film which usually corresponds to the width of the transverse stretching frame,
an extruder having an output corresponding to the width of said wider die,
dividing means at said slot die for dividing a melt issuing therefrom into at least two longitudinal webs,



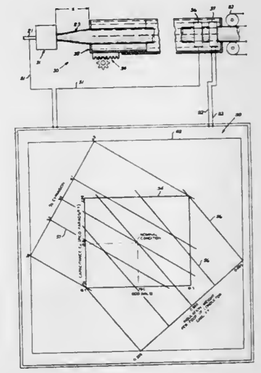
means for superposing said webs in register prior to entry into said transverse stretching frame,
and means for separating the superposed films in non-laminated condition after transverse stretching.

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## 4,017,228
## APPARATUS FOR MONITORING CELLULAR DIELECTRIC MATERIAL

**Manuel Ramon Cereijo, Atlanta, and Timothy Stephen Dougherty, Norcross, both of Ga., assignors to Western Electric Company, Inc., New York, N.Y.**

**Division of Ser. No. 321,082, Jan. 4, 1973, Pat. No. 3,914,357. This application June 2, 1975, Ser. No. 583,002**
**Int. Cl.² B29F *3/10***
**U.S. Cl. 425—71** **11 Claims**



1. An apparatus for monitoring the application of a cellular dielectric material to an elongated material, which includes:
means for advancing an elongated material;
means upstream of the advancing means for covering the elongated material with at least a layer of a cellular dielectric material;
means effective subsequent to the covering means covering the elongated material for measuring the capacitance and the associated thickness of the dielectric material; and
means responsive to the measuring means measuring the capacitance and associated thickness of the dielectric material for generating electical signals related to the measured capacitance and associated thickness of the dielectric material; and
means responsive to the generation of the electrical signals for displaying the signals while relating the displayed signals to the weight of dielectric material per unit length of the elongated material and the percent of voids in the cellular dielectric material to control the weight of dielectric material per unit length of the elongated material and

the percent of voids in the cellular dielectric material to maintain the capacitance and associated thickness within a specified range of values.

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**4,017,229**

## APPARATUS FOR UNITING CONCENTRICALLY EXTRUDED TUBULAR FILMS OF THERMOPLASTIC SYNTHETIC RESIN

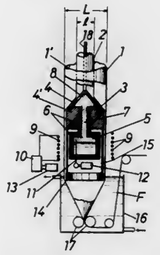
**Michio Sudo, c/o Nikko Resin Co. Ltd., Fujikoshi Bldg. No. 23-7, 5 chome, Higashi Gotanda, Shinagawa, Tokyo, Japan**

**Continuation-in-part of Ser. No. 558,716, March 14, 1975, abandoned, which is a continuation-in-part of Ser. No. 330,043, Feb. 6, 1973, Pat. No. 3,894,907. This application May 27, 1976, Ser. No. 690,571**

**Claims priority, application Japan, June 26, 1972, 47-63273**

**Int. Cl.² B29C** *17/07, 27/12*

**U.S. Cl. 425—71** **7 Claims**



1. In an apparatus for uniting at least two concentrically extruded tubular films of thermoplastic synthetic resins to each other, a combination comprising mandrel means located within the innermost of the concentrically extruded films and constructed to expand said innermost film in a direction transverse to its elongation so that the surfaces of the concentrically extruded films will engage each other; heating means for heating said mandrel means, said heating means comprising a high-frequency coil surrounding the outermost of said concentrically extruded films in the region of the mandrel means and a high-frequency transmitter connected to said coil for causing the engaging surfaces of the at least two concentrically extruded films to unite.

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**4,017,230**

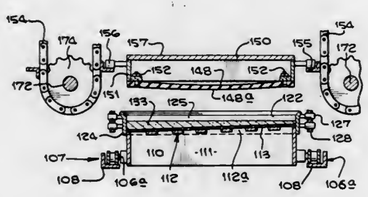
## MEANS FOR FORMING TAPERED SLABS

**Gus R. Jakel, Glendale, Calif., assignor to California Cement Shake Co., Inc., Irwindale, Calif.**

**Continuation-in-part of Ser. No. 443,137, Feb. 14, 1974, abandoned, which is a division of Ser. No. 303,225, Nov. 2, 1972, Pat. No. 3,870,777. This application July 25, 1975, Ser. No. 598,765**

**Int. Cl.² B28B** *1/08, 3/12*

**U.S. Cl. 425—84** **9 Claims**



1. Apparatus for making a cementitious product slab useful in construction, that comprises,

a. a continuous conveyor having a stretch movable in a longitudinal direction, there being fixed support structure supporting said conveyor,

b. support means carried by the conveyor stretch and having an upper surface which extends laterally at a shallow angle taper $\alpha$ form horizontal,

c. a frame carried on the conveyor stretch and bounding a zone directly above said support means, said zone adapted to receive a flowable aqueous cementitious slurry, said zone being upwardly open to accommodate downward application of pressure transmitted to said slurry, and

d. vibration means for locally transmitting vibration to said stretch to laterally vibrate the stretch, support means and frame for aiding distribution of the slurry throughout said zone and primarily in a lateral direction so that the top surface of the slurry becomes horizontal and the bottom surface of the slurry extends at the taper angle $\alpha$ from the slurry top surface, the support structure including longitudinal guide means for the stretch, and said vibration means operatively connected with said guide means to locally vibrate same laterally, thereby to vibrate the conveyor stretch and support means laterally, as aforesaid.

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**4,017,231**

## DEVICE ON APPARATUS FOR PRESSING POWDER OR GRANULES INTO CANDLES

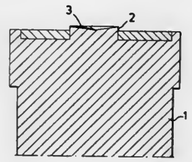
**Hugo Karlsson, Kopmansgatan 17, S-820 60 Delsbo, Sweden**

**Filed Mar. 7, 1975, Ser. No. 556,342**

**Claims priority, application Sweden, Mar. 8, 1974, 7403091**

**Int. Cl.² B29D** *31/00;* **B29C** *3/00*

**U.S. Cl. 425—110** **3 Claims**



1. In an apparatus for pressing paraffin granules or paraffin powder into candles wherein a candle wick tube containing a candle wick is concentrically disposed within a candle-making tubular chamber, said tubular chamber also housing a piston which is slidably disposed therein and adapted to compress the paraffin granules or paraffin powder into a candle, the improvement which comprises providing a recess in the end face of the piston for receiving and centering the end of the wick tube in said tubular chamber to ensure that the wick is centered in the tubular chamber and subsequently in the candle from one end to the other end thereof.

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**4,017,232**

## APPARATUS FOR PRODUCING A CONTINUOUS FLEXIBLE REINFORCED TUBULAR CONDUIT

**Homer N. Holden, Sylva; James P. Hunt, Clyde; Vernon D. Browning, Waynesville; Edward L. Hoglen, Candler, all of N.C., and Donald L. Kleykamp, Springboro, Ohio, assignors to Dayco Corporation, Dayton, Ohio**

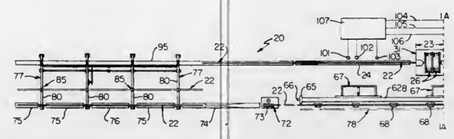
**Division of Ser. No. 555,493, March 5, 1975, Pat. No. 3,929,957. This application Sept. 29, 1975, Ser. No. 617,780**

**Int. Cl.² B29F** *3/10*

**U.S. Cl. 425—112** **15 Claims**

1. Apparatus for producing a continuous flexible reinforced tubular conduit comprising, a plurality of elongated rigid mandrels operatively associated in aligned end-to-end relation, means moving said mandrels continuously through a fabrication area in a substantially rectilinear path, wire forming means in said area for forming a wire into a continuous non-rotating helical coil about said mandrels, an extruder head in said are downstream of said wire forming means operable to receive a plastic material in a flowable condition, said moving means being the sole means moving said mandrels and moving said mandrels with said helical coil therearound through said extruder head at a speed correlated with the





speed of forming said helical coil, means within said head for forming a tube of said plastic material around said coil and mandrels to define said conduit, and means operatively associated with said conduit and said mandrels for separating said conduit from said mandrels.

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**4,017,233**

## DEVICE FOR PRODUCING CHIP BOARDS AND THE LIKE

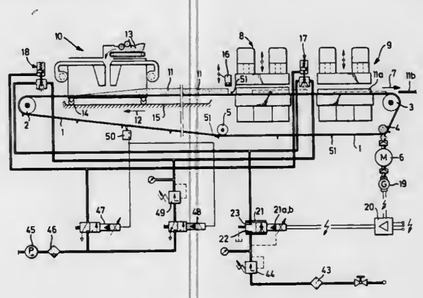
**Heinz-Everhard Keusgen, Kaiserseech; Günter Seeger, and Reinhard Beyer, both of Springe, all of Germany, assignors to Bison-werke Bähre & Greten GmbH & Co. KG, Germany**

**Filed May 1, 1975, Ser. No. 573,530**

**Claims priority, application Germany, May 2, 1974, 2421284**

**Int. Cl.² B29C** *3/06, 15/00*

**U.S. Cl. 425—145** **9 Claims**



1. In a device for the treatment of the upper surface of a moving fleece used for the production of chip plates and the like, and/or of the upper surface of a conveyor belt provided for moving the fleece, with a fluid mist atomized with air, said treatment being accomplished before final hot pressing of the fleece, said apparatus including a motor for step-wise actuating said fleece conveyor belt and a timing relay for controlling the duration of operation of said motor, the improvement comprising a moving coil regulating device in the supply pipe supplying said fluid, a tacho-generator connected to said motor and an amplifier for amplifying the output voltage of said tacho-generator and controlling said moving coil regulating device.

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**4,017,234**

## MULTIPLE ROTARY CASTING MACHINE

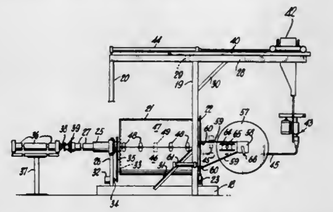
**Theodore E. Andrews, Kutztown; John J. Weller, Emmaus, and Rudolph T. Benson, Jr., Walnutport, all of Pa., assignors to Armstrong Cork Company, Lancaster, Pa.**

**Continuation-in-part of Ser. No. 554,549, March 3, 1975, abandoned, which is a continuation of Ser. No. 383,072, July 27, 1973, abandoned. This application June 18, 1976, Ser. No. 697,685**

**Int. Cl.² B29D** *27/04*

**U.S. Cl. 425—145** **10 Claims**

1. A multiple rotary casting machine for casting foamed-plastic tubular articles, comprising a frame, a plurality of rotary casting units in spaced relation to each other and each having coaxially spaced inner and outer mold members supported for rotation with respect to said frame, thereby establishing an annular mold space between said members of each casting unit, each casting unit further including end-closure wall members closing the respective longitudinal ends of said mold spaces, corresponding ends of corresponding end-closure members having a filler opening in registry with the mold space served thereby and therefore offset from the rotary axis, foamable mold-material supply means having a single elongate tubular discharge element sized for accommodation at a selected one of said filler openings, two-component frame-based movable support means mounting said supply means for selective positioning of said tubular discharge element for axial insertion via the selected filler opening and into the annular mold space, and rotary drive means for the respective casting units; whereby, after discharhge of foamable material into the



mold space of a first casting unit and while foamed expansion and curing of such material are in process at said first casting unit, said supply means may be selectively repositioned within the mold space of a second casting unit and for service of the second casting unit to effect interlaced and concurrent casting procedures at both casting units; and actuating means operative during discharge-element insertion through a selected filler opening and controlling the volume of foamable material injected in each filler opening, said last-defined means including programmed means governing a selected program of operation of said supply means, said programmed means including first shot-size program means appropriate for the mold-space size of a first casting unit and second shot-size program means appropriate for the mold-space size of a second casting unit, and program-selection means responsive to position of said support means along said one axis and connected for selection of that one of said shot-size program means which is appropriate for the mold-space size to be served at the instantaneous position of said movable support means.

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**4,017,235**

## APPARATUS FOR AVOIDING AN EXCESS OF PRESSURE IN A CONTINUOUS PRESS

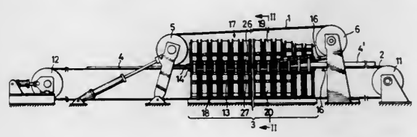
**Karl-Heinz Ahrweiler, Krefeld, Germany, assignor to Edward Kusters, Krefeld-Forstwald, Germany**

**Filed Oct. 10, 1975, Ser. No. 621,381**

**Claims priority, application Germany, Oct. 30, 1974, 2451661**

**Int. Cl.² B29C** *3/06*

**U.S. Cl. 425—149** **5 Claims**



1. In a press having two press platens, each of which is supported on an external support construction wherein the force from one press platen is transmitted to its corresponding support construction through a pressure fluid within pressure

elements positioned between the platen and its corresponding support construction, means for maintaining proper positioning of the press platens during normal operation and for relieving excess pressures in the press comprising:

a. means rigidly coupling the support constructions associated with each of said two press platens;

b. means coupled to the support construction associated with said pressure element and to one press platen for sensing deviations of said press platen from a pre-determined position and for regulating the pressure element so as to maintain said one press platen at said pre-determined position during a pressing operation; and

c. means for limiting the pressure of the pressure fluid at a pre-determined pressure while preventing an increase of spacing of the pressure platens over that necessary to prevent said pre-determined pressure from being exceeded.

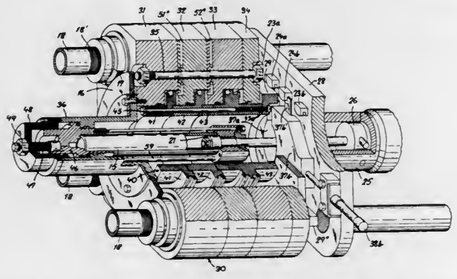
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**4,017,236**

**MOLD-CLAMPING MECHANISM FOR INJECTION-MOLDING MACHINE**

**Dave Penkman, Oakville, and Herbert Rees, Willowdale, both of Canada, assignors to Husky Injection Molding Systems Inc., Bolton, Canada**

**Filed Nov. 26, 1975, Ser. No. 635,638**
**Int. Cl.² B29C *1/16*; B29F *1/00***
**U.S. Cl. 425—150** **11 Claims**



1. In an injection-molding machine provided with a fixed platen, a movable platen and fluid-operated drive means for reciprocating said movable platen along an axis with reference to said fixed platen between a mold-open and a mold-closed position, the combination therewith of:

a stationary housing forming a plurality of cylinder chambers bounded by end walls generally transverse to said axis;

a like plurality of pistons respectively received in said chambers;

a thrust member rigid with said movable platen advancing past said pistons in a mold-closing stroke;

force-transmitting means mounted on said housing for engagement with said member in said mold-closed position;

actuating means carried on said housing for moving said force-transmitting means into and out of engagement with said member; and

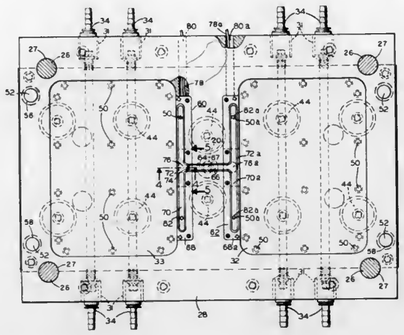
clamping means connected with said housing for admitting high-pressure fluid simultaneously to said chambers upon engagement of said force-transmitting means with said member in said mold-closed position, said pistons being operationally linked with said force-transmitting means and being normally separated from said end walls by clearances increasing progressively in the direction of mold-closing motion, the smallest of said clearances being sufficient to allow an axial displacement of said member with exertion of pressure upon a mold between said platens whereby said pistons successively come to rest against said end walls with separation from one another under the pressure of said fluid in the event of accidental overtravel.

**4,017,237**

**INJECTION MOLD WITH ULTRA SONIC GATING MEANS**

**Geoffrey R. Webster, Coopersburg, Pa., assignor to Bethlehem Steel Corporation, Bethlehem, Pa.**

**Filed Mar. 5, 1975, Ser. No. 555,649**
**Int. Cl.² B29F *1/00***
**U.S. Cl. 425—174.2** **3 Claims**



1. An apparatus for injection molding plastic material, comprising:

a. a mold comprising:

i. at least two cavities;

ii. a runner connecting each of said cavities to a common entry point;

iii. a gate, comprising a constriction orifice, disposed in at least all but one of said runners;

b. means operatively connected to said mold for injecting plastic material into said common entry point of said mold; and

c. means connected to each of said gates for sequentially supplying sufficient ultrasonic energy to each of said gates to permit said plastic material to flow therethrough and into the respective gate cavity.

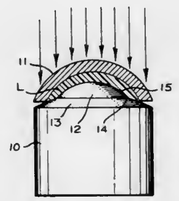
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**4,017,238**

**MOLD FOR CASTING CONTACT LENSES UTILIZING AND ELECTRON BEAM TO POLYMERIZE THE RESIN LENS**

**Charles C. Robinson, Sturbridge, Mass., assignor to American Optical Corporation, Southbridge, Mass.**

**Filed Apr. 21, 1975, Ser. No. 570,042**
**The portion of the term of this patent subsequent to Oct. 28, 1992, has been disclaimed.**
**Int. Cl.² B29D *11/00*; B29C *3/00***
**U.S. Cl. 425—174.6** **3 Claims**



1. A mold including a thin-walled cap member and a base member for casting contact lenses and the like by forming the lens within the mold from unpolymerized resin and subsequently polymerizing the resin while it is within the mold by the action of an electron beam directed against the thin-walled mold member and passing therethrough to act upon the resin, wherein said base member comprises:



a stainless steel member having a surface shaped to conform with one surface of the lens being cast within the mold and being susceptible to pitting when acted on by an electron beam in the presence of a resin; and a layer of inert metal covering said surface to protect the surface from the pitting resulting from the action of the electron beam.

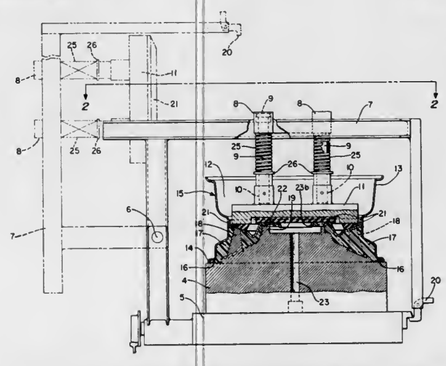
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**4,017,239**

**MOLDING APPARATUS**

**Ronald B. O'Connell, Waterville, and Albert H. Prueter, Jr., Perrysburg, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio**

**Filed June 7, 1976, Ser. No. 693,658**
**Int. Cl.² B29C *1/00*, *27/30***
**U.S. Cl. 425—175** **3 Claims**



1. An improved molding apparatus which includes a lower mold part containing a seat to permit a wheel to be locked thereon to form a mold cavity between the upper surface of the lower mold part and under surface of the wheel, said wheel having openings therein including at least openings for mounting the wheel on an axle and for charging the cavity with molding material, a sealing means for sealing the openings in the wheel, said sealing means being pivotable about the lower mold part by a pivot frame to bring the sealing means into a locked sealing relationship through an elastomeric gasket, said gasket in the locked sealing relationship being under uniform compression, said uniform compression being achieved by action of at least three springs located around the seal means and between the pivot frame.

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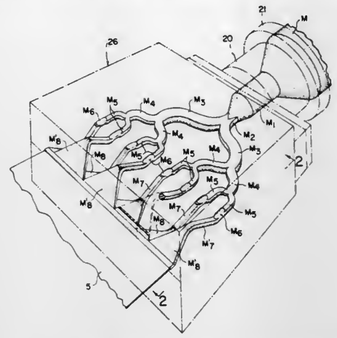
**4,017,240**

**DIE FOR EXTRUDING SHEET MATERIAL**

**Robert F. Nelson, Canton, Ohio, assignor to Rubbermaid Incorporated, Wooster, Ohio**

**Filed Nov. 19, 1975, Ser. No. 633,435**
**Int. Cl.² B29F *3/06***
**U.S. Cl. 425—192 R** **8 Claims**

1. A die for extruding a sheet of elastomeric material having an entrance passageway for receiving a strand of extruded material, a symmetrical runner system in said die connected to said passgeway and comprising a plurality of laterally adjacent divided and sub-divided passageways substantially equal in length and cross section, two overlapping sets of laterally adjoining flattened passageways connected to alternate laterally adjacent passageways, said sets overlapping each other in staggered relation, said flattened passageways each gradually increasing progressively in lateral dimension and decreasing in vertical dimension while maintaining substantially the same cross-sectional area, and a laterally extending continuous



extrusion slot merging the exit ends of all of said flattened passageways together.

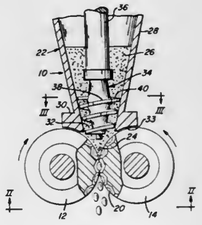
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**4,017,241**

**NOTCHED-FLIGHT FEEDER SCREWS FOR BRIQUETTING OPERATION**

**Michael J. Papinchak, Plum Boro, and Dino Ravasio, McKeesport, both of Pa., assignors to United States Steel Corporation, Pittsburgh, Pa.**

**Filed Nov. 7, 1975, Ser. No. 629,958**
**Int. Cl.² B29C *3/00*, *15/00*; B30B *3/00***
**U.S. Cl. 425—237** **9 Claims**



1. In a briquetting press including a hopper containing particulate material to be briquetted, a pair of cooperating press rolls mounted for opposite rotation adjacent the discharge end of said hopper for pressing particulate material fed thereto into briquettes, and a screw feeder having helical flights rotatably mounted in said hopper for feeding said particulate material to said press rolls wherein the improvement comprises:

a. that screw flight adjacent said press rolls being substantially impervious to the retrograde movement of particulate material; and

b. all the remaining screw flights having through-openings defining a passage for the retrograde movement of particulate material, which passage extends between said aforementioned screw flight and the interior of said hopper.

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**4,017,242**

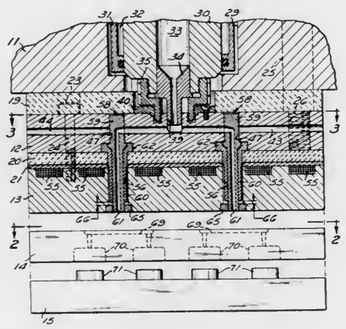
**INJECTION MOLDING APPARATUS**

**James R. Mercer, Akron, Ohio, assignor to The McDowell-Wellman Engineering Company, Cleveland, Ohio**

**Filed Oct. 28, 1975, Ser. No. 626,303**
**Int. Cl.² B29F *1/00***
**U.S. Cl. 425—243** **23 Claims**

1. In combination, a multiple nozzle thermosetting injection molding machine and a mold; said thermosetting injection

molding machine comprising an injector chamber, a distribution platen, a heating platen, and a plurality of distribution nozzles; said injector chamber and distribution platen and heating platen and mold being disposed along a longitudinal axis, said distribution platen being disposed between said injector chamber and said heating platen, and said heating platen being disposed between said distribution platen and said mold; said injector chamber being adapted to be filled with a thermosetting material having a predetermined curing temperature, said injector chamber having a piston for pressurizing thermosetting material in said injector chamber; said mold having a plurality of mold clusters, said mold clusters being spaced from one another, each of said mold clusters including a plurality of separate mold cavities and a runner extending between said mold cavities; said distribution platen being a generally flat plate having a first side facing said injector chamber and a second side facing said heating platen, a supply chamber extending from said first side of said distribution platen into said distribution platen, said supply chamber being adjacent said injector chamber and being constructed and arranged to receive thermosetting material from said injector chamber; said distribution platen further including a distribution chamber extending along a line through said distribution platen and intersecting said supply chamber to



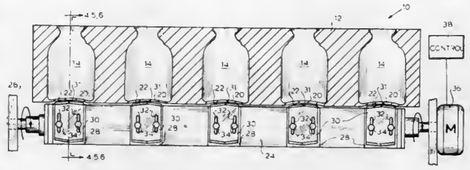
receive thermosetting material from said supply chamber, a nozzle bore on each side of said supply chamber, said nozzle bores each extending from said second side of said distribution platen through said distribution chamber, one of said distribution nozzles being in each of said nozzle bores for receiving thermosetting material from said distribution chamber, said distribution nozzles each extending from said distribution chamber toward said mold for carrying said thermosetting material from said distribution chamber to said mold; each of said distribution nozzles having a nozzle chamber constructed and arranged to carry thermosetting material from said distribution chamber to a single one of said mold clusters of said mold; said heating platen being a generally flat plate having heating means providing a source of heat; said nozzle chambers each extending through said heating platen from said distribution platen toward said mold; first temperature control means for maintaining the temperature of said distribution chamber below said predetermined curing temperature; second temperature control means for maintaining the temperature of at least a major portion of each of said nozzle chambers within said heating platen below said predetermined curing temperature; third temperature control means including said heating means for maintaining the temperature of said mold cavities at a temperature of at least said predetermined curing temperature.

**4,017,243**

## ADJUSTABLE FLASH REMOVAL ASSEMBLY FOR MOLDED CONTAINERS

**Michael L. Lindsay, Mount Dora, Fla., assignor to Doric Foods Corporation, Mount Dora, Fla.**

**Filed Sept. 22, 1975, Ser. No. 615,603**
**Int. Cl.² B28B** *11/12*
**U.S. Cl. 425—292** **8 Claims**



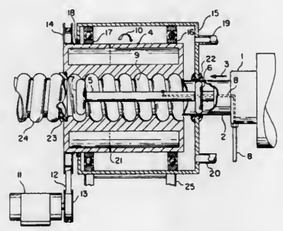
1. Molding apparatus comprising:
two mold halves each having a plurality of corresponding cavities such that an article may be molded between said mold halves in each cavity when said mold halves are brought together, said cavities being aligned in a row;
means for removing flash from said articles when in said molds, said removing means comprising:
a shaft rotatably carried by a support and juxtaposed with said mold halves, said shaft extending substantially parallel with said row of cavities;
a plurality of flat surfaces spaced along said shaft, each adjacent one of said cavities;
a plurality of cutting blades each abutting one flat surface of said shaft and each positioned opposite one of said cavities and carried by said shaft;
means for changing the dimension between each said blade and the corresponding one of said cavities, said dimension changing means including means for fastening each blade to one of said flat surfaces of said shaft and operative to allow each blade to move on said flat surface radially and independently with respect to the axis of said shaft and toward and away from the corresponding one of said cavities; and means for rotating said shaft whereby said blades remove any undesirable flash from all of said articles while positioned between said mold halves.

**4,017,244**

## DEVICE FOR THE MOLDING OF CORRUGATED PIPE FROM EXTRUDED THERMOPLASTIC MATERIALS

**Andrea Giuliano Vellani, 3 Hanson Way, Coram, N.Y. 11727**

**Filed Apr. 15, 1975, Ser. No. 568,241**
**Int. Cl.² B29D** *23/04*
**U.S. Cl. 425—326 R** **4 Claims**



1. A device for the molding of corrugated pipe from extruded thermoplastic materials comprising: a stationary frame having a first end mounted adjacent to the exit of an extruding machine and a second end downstream from said first end; a rotatable mold in said stationary frame having a first end adjacent to and aligned with said first end of said stationary frame, and a second end downstream of said first end through which a corrugated pipe exits; means mounting said mold for



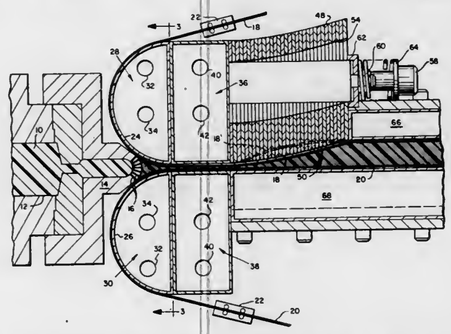
rotatable movement in said stationary frame; means for rotatably driving said mold about its longitudinal axis, said mold comprising a central passage forming an inner wall of said mold, said inner wall having a spiral groove formed along the length thereof, said stationary frame having means for cooling said mold and the extrudate, and means for supplying air pressure to the interior of the extrudate when passing through said central passage, said means for supplying air pressure comprising a source of pressurized air, and passage means connecting said source of pressurized air to the interior of said central passage, wherein said means for supplying pressurized air further comprises a mandrel mounted in said central passage having a first plug mounted at one end thereof, and a second plug mounted at the other end thereof, said first plug positioned within said first end of said stationary frame, and said second plug spaced downstream from said first plug and positioned within said central passage, said mandrel having a passageway in the center thereof forming part of said passage means of said means for supplying air pressure, whereby when pressurized air is directed to the interior of said central passage the extrudate is forced outwardly into contact with said spiral groove of said inner wall, wherein each of said first end and said second end of said stationary frame has an opening formed therein for the passage of extrudate therethrough each opening having a seal therearound for preventing the flow of air therethrough.

**4,017,245**

## APPARATUS FOR EXTRUDING EXPANDABLE THERMOPLASTIC MATERIAL

**Theo Lang, Leominster, Mass., assignor to Foster Grant Co. Inc., Leominster, Mass.**

**Filed July 26, 1974, Ser. No. 492,129**
**Int. Cl.² B29D** *27/04*
**U.S. Cl. 425—327** **3 Claims**



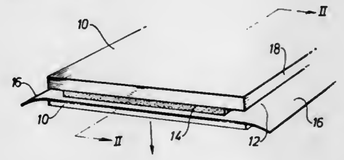
1. Apparatus for the continuous production of thermoplastic foam material having formed thereon a molecularly integral substantially non-cellular high density skin and a cellular internal body portion comprising:
an extruder including a chamber from which material including a mixture of molten thermoplastic polymer and a foaming agent is discharged;
an extrusion die located at the downstream end of said extruder through which said material is continuously discharged into a receiving area;
a pair of continuously traveling temperature controlled substantially thin metal belts following a path, a portion of which is positioned immediately adjacent said extrusion die so that said belt may immediately contact opposing upper and lower surfaces of said material as it is discharged in a foaming condition in which it expands to fill the receiving area, said belts serving as means to continuously withdraw said material from said extrusion die and to form a substantially non-cellular smooth molecularly integral skin on said extruded material;
temperature controlling means downstream of said extruder which maintain the surface temperature of said belts within a predetermined temperature range;
stationary constrainment type belt backing means for said traveling belts located in the vicinity of said extrusion die and having a configuration which causes said belts to follow a path which place initial forces of constrainment on said mixture while being withdrawn from said die;
a pair of pressure members located on either side of the extruded material which constrain the material in a lateral direction as it is moved downstream between the pair of continuous traveling belts; and
a plurality of selectively adjustable stationary belt backing members spaced downstream a predetermined distance from said die and said constrainment type belt backing means and over which at least one of said belts travels which selectively relieve the constraining forces placed on the material by said belts and said pressure members during the time period coincident with the length of travel of said belts over said adjustable members resulting in a predetermined cellular internal structure of said extruded material, each of said selectively adjustable stationary belt backing members including a substantially thin edge surface over which said belt travels and a body portion including at least one slot by which said member may be slideably positioned and clamped in a selected belt backing position.

**4,017,246**

## CONVEYOR PLATE FOR WET SHEETS OR DRY SHEETS

**William Falkinger, Farsta, and Per Anders Åsberg, Täby, both of Sweden, assignors to Defibrator Aktiebolag, Stockholm, Sweden**

**Filed Oct. 17, 1975, Ser. No. 623,533**
**Claims priority, application Sweden, Oct. 23, 1974, 7413343**
**Int. Cl.² B29C** *3/00*
**U.S. Cl. 425—338** **1 Claim**



1. A pressure plate assembly for hardboard presses comprising a pair of opposite horizontally disposed rectangular pressure plates defined by longitudinal and transverse edges, a thin metal sheet for supporting the mat forming material to be compressed into hardboard inserted between said pressure plates, said thin metal sheet having longitudinal edges and transverse edges conforming to the longitudinal edges and the transverse edges of said pressure plates, said longitudinal edges and said transverse edges of said sheet extending beyond the lateral limits thereof, the portion of said metal sheet extending beyond the longitudinal edge of said pressure plates being bent downward to impart substantial rigidity to said portion and to provide a drainage surface for the material to be compressed while the portion of said sheet between the lateral edges of said pressure plates is maintained in planar condition by said pressure plates, the portion of said metal sheet extending beyond the transverse plates forming horizontally extending projections, said projections having edge members of increased thickness relative to said metal sheet and extending at least coextensively with the transverse edges of said pressure plates.

## 4,017,247
## DEVICE FOR THE FORMING OF A PACKING MATERIAL WEB IN A PACKAGING MACHINE

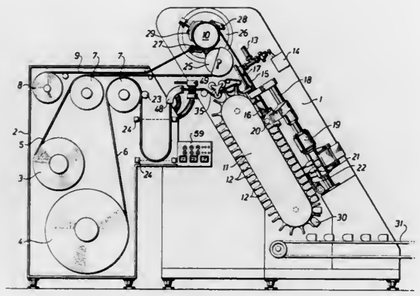
**Franz Soukup, Malmo; Tore Ingvar Larsson, Loddekopinge, and Veine Bernt Borg, Kalmar, all of Sweden, assignors to Tetra Pak Developpement SA, Lausanne, Sweden**

**Filed Apr. 28, 1975, Ser. No. 572,091**

**Claims priority, application Sweden, June 28, 1974, 7408565**

**Int. Cl.² B65B** *47/02*

**U.S. Cl. 425—360** **8 Claims**



1. In apparatus for forming a web of packaging material into a series of interconnected packages in which a plurality of U-shaped mould cavities are interconnected to form an endless chain having transverse walls separating each mould cavity and means adjacent said endless chain for feeding the web to the endless chain of mould cavities and means operatively associated with said endless chain for moving the endless chain in a closed continuous path about parallel axes, the improvement comprising a device for pressing the web into each successive mould cavity as it passes a package shaping station, said device comprising at least two rotatable shaping elements, each shaping element comprising a pair of spaced coaxial roller elements, means mounting each pair of coaxial roller elements for free rotation about an axis parallel to the parallel axes of said endless chain, and angularly equidistant from each other pair, means operatively associated with said shaping elements for rotating said shaping elements synchronously with the movement of the endless chain about a common fixed axis equidistant from the axes of each pair of coaxial roller elements and adjacent said endless chain so that each of said at least two shaping elements successively enter into and are withdrawn from successive mould cavities during movement of said endless chain and during synchronous rotation of said shaping elements about the common axis to press the web into successive mould cavities and a pressure device comprising an endless belt disposed between the spaced coaxial roller elements of each pair, one portion of said belt being located adjacent the transverse walls of the U-shaped mould cavities passing the package shaping station whereby the endless belt engages and presses the web of packaging material against the top of the transverse walls while passing the shaping station to prevent longitudinal slippage of the web after having been pressed into a preceeding mould cavity by one of said shaping elements.

## 4,017,248
## CONTINUOUSLY OPERATING PANEL PRESS

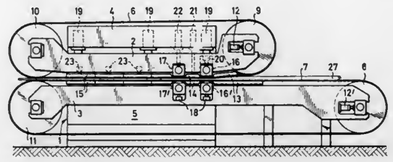
**Gerhard Dieffenbacher, and Heinrich Pfeiffer, both of Eppingen, Germany, assignors to Maschinenfabrik J. Dieffenbacher & Co., Eppingen, Germany**

**Filed Jan. 31, 1975, Ser. No. 546,014**

**Claims priority, application Germany, Jan. 31, 1974, 2404523**

**Int. Cl.² B29C** *3/06*

**U.S. Cl. 425—371** **8 Claims**



1. In a continuously operating panel press for the fabrication of pressed panels, such as chipboard panels, fiber panels, plywood panels, and the like, where a press frame carries an upper, vertically adjustable elongated press spar on an upper support, and a lower fixed elongated spar or press table on a lower support; and where each press spar is equipped with a horizontal conveyor comprising an endless conveyor band running from a reversing drum on the front end of the spar to a drive drum on the rear end of the spar so as to define a work gap between the two bands; and further where the continuously advancing conveyor bands on opposite sides of the work gap carry between them the press work which is to become a finished pressed panel, as pressure and heat are applied to the press work, via the moving bands, by heater pads that are arranged behind the bands and supported by the upper and lower press spars, respectively; in such a press, the improved combination comprising:

a heater pad arrangement on the upper press spar which features a plurality of longitudinally adjacent sectional heater pads which are independently supported on the press spar so as to be vertically adjustable in relation thereto;

hydraulic cylinder means connected to the vertically adjustable sectional heater pads individually for varying their relative position and pressure against the press work between the advancing conveyor bands;

at least one pair of cooperating pressure rollers arranged near the front end of the work gap and mounted on said upper and lower press spars, respectively, in a location in which the rollers are longitudinally adjacent to heater pads, the rollers bearing against the advancing bands in the sense of applying pressure against the press work, the pressure transmitting peripheries of the rollers being spaced a small amount closer than the adjacent heater pads which likewise bear against said bands, and at least the upper one of said rollers being vertically adjustable; and

hydraulic cylinder means for vertically adjusting said roller, thereby varying the pressure exerted by the roller pair against the press work between the advancing conveyor bands, and wherein

the hydraulic cylinder means associated with said adjustable heater pads and the hydraulic cylinder means associated with said roller pair are independently operable, so as to allow for a continuous variation of the ratio between the sliding friction which is created between the heater pads and the conveyor bands and the rolling friction which is created between the pressure rollers and the conveyor bands.



## 4,017,249
## MELT SPINNING APPARATUS

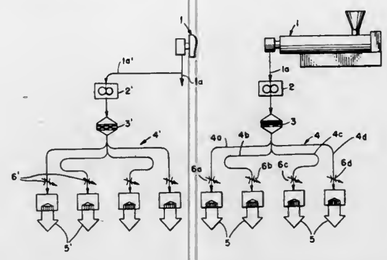
**Erich Lenk, Remscheid, Germany, assignor to Barmag Barmer Maschinenfabrik Aktiengesellschaft, Wuppertal, Germany**

**Continuation of Ser. No. 401,535, Sept. 27, 1973, abandoned. This application June 13, 1975, Ser. No. 586,539**

**Claims priority, application Germany, Oct. 5, 1972, 2248757**

**Int. Cl.² B29C** *23/00*

**U.S. Cl. 425—382.2** **4 Claims**



1. In a melt spinning apparatus for the production of polymer filaments, the combination of:

a. a plurality of spinning nozzle units connected in parallel;

b. a central extruder with a capacity sufficient to feed a polymer melt to said plurality of spinning nozzle units;

c. a central metering pump for receiving melt through a feed conduit from said central extruder and directing the metered melt through a branched conduit system to each of said spinning nozzle units;

d. a single central filter in said feed conduit line after said metering pump and before branching of said feed line into said branched conduit system for the removal of fine particles which still remain in the initially extruded and metered melt; and

e. pressure regulating means located in each branched conduit preceding a spinning nozzle unit in the direction of melt flow, including means adjusting the pressure drops at these points in each branched conduit to a value proportionately substantially larger than the pressure losses in the spinning nozzle units or the pressure differences in the individual spinning nozzles.

## 4,017,250
## APPARATUS FOR BLOW MOLDING

**Long Fei Chang, and Robert F. Kontz, both of Toledo, Ohio, assignors to Owens-Illinois, Inc., Toledo, Ohio**

**Filed June 16, 1975, Ser. No. 587,023**

**Int. Cl.² B28B** *7/20*

**U.S. Cl. 425—387 B** **6 Claims**

1. In a mold for blow molding a container having a side wall surmounted by a dispensing opening and having a generally concave bottom wall,

means defining a mold cavity conforming to the shape of the container with the exception of an opening aligned with the location of said bottom wall,

a plurality of nested sleeves surrounding a central rod axially aligned with said opening, said sleeves and said rod each having a free axial extremity insertable through said opening and each being telescopically movable,

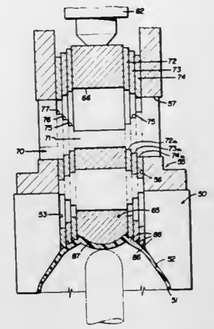
means for inflating a parison internally of said cavity, a portion of said inflated parison contacting the free axial extremities of said sleeves and said rod,

means for axially displacing said rod,

a radial actuating key fixed to said rod and displaceable with said rod into contact with each of said sleeves to displace the sleeves in timed sequence and to differing axial extents as the rod is displaced, the profile of the key determining the sequence and extent of displacement of each sleeve,

the rod being initially retracted at the time of parison inflation to position to the free extremities of the sleeves in an overall concave arcuate pattern, so that the parison is inflated against the extremities of the rod and the sleeves into a concave configuration, and

the rod being subsequently displaced towards the mold cavity to advance in sequence (1) the extremity of the rod and (2) the extremities of the sleeves against the inflated



concave parison portion, so that the ends of the rod and sleeves assume a convex pattern and the inflated parison portion is deflected to the desired, final, generally concave configuration, and

a stop key fixed relative to said rod and sleeves and of a profile complementary to that of said actuating key for limiting the extent of movement of said sleeves and said rod.

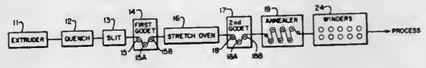
## 4,017,251
## APPARATUS FOR PHYSICALLY CONDITIONING PLASTIC TAPE

**Theodore Robert Coburn, Coventry, and James Edward Kilcoyne, East Providence, both of R.I., assignors to Marshall and Williams Company, Providence, R.I.**

**Division of Ser. No. 530,878, Dec. 9, 1974. This application June 4, 1976, Ser. No. 692,960**

**Int. Cl.² B29C** *25/00, 17/00;* **B29D** *7/02, 7/24*

**U.S. Cl. 425—404** **2 Claims**




1. An apparatus for physically conditioning plastic tape, comprising means for producing a moving web of thermoplastic material, in-line means for cutting said web into a plurality of parallel tapes, in-line means for tensioning said web, said means for tensioning having a set of rollers, a second in-line means for tensioning said web, said second means for tensioning having a set rollers rotating faster than said first set of rollers to provide increased linear speed, said first set of roller and said second set of rollers having a gap therebetween, a stretch oven located in said gap whereby said web is heat softened and stretched in said stretch oven, the improvement comprising an annealer in line following said second set of rollers and having a set of conductive steel heat transfer rollers and a set of conductive steel chill transfer rollers, the heat transfer rollers and the chill transfer rollers all being provided with means for rotating progressively slower than the preceding adjacent roller, to reduce the linear speed between rollers, said set of conductive steel heat transfer rollers reheating said tapes, and relaxing said tapes between the progressively slower rotating adjacent rollers thereby to control the shrinkage of the tapes due to said preheating and to stabilize the tapes against shrinkage.

## 4,017,252

## METHOD FOR THE STORAGE OF A LIQUEFIED GAS IN THE PRESENCE OF AN ADSORBANT SUPPORT HAVING OPEN CELLS

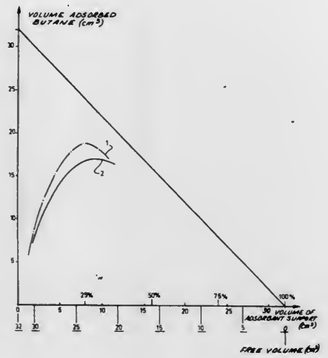
Georges Tallonneau, Avon, France, assignor to S.T. Dupont, Paris, France

Filed Oct. 15, 1974, Ser. No. 515,036

Claims priority, application France, Oct. 12, 1973, 73.36495

Int. Cl.² F17C 7/02

U.S. Cl. 431—12 3 Claims




1. A process of storing a liquefied gas for distribution exclusively in gaseous form into an atmosphere whose pressure is less than that of the storage chamber, the liquefied gas being combustible and being stored in the storage chamber constituted by a feed reservoir of a device having a burner directly connected to an evacuation orifice of the reservoir without interposition of auxiliary gas evaporation apparatus and without auxiliary expansion apparatus, said process comprising disposing in the storage chamber conjointly with the stored liquefied gas, quantity of a capillary adsorbant support having open cells, the minimum value of the actual volume of the support, constituted by the volume remaining after deduction of all interstitial spaces, going from (*a*) 2% of the volume of the storage chamber for a capillary support having open cells the mean volume of each, once in place, being equal to that of a sphere of a diameter of 40 microns with a mean thickness of the intercellular wall of about 4 microns to (*b*) 12% of the volume of the storage chamber for a capillary support having open cells in which the mean volume of each cell, once in place, being equal to that of a sphere of a diameter of 200 microns with a mean thickness of the intercellular wall of 30 microns, the amount of liquefied gas disposed in the chamber corresponding to the volume of the support such that all the liquefied gas is adsorbed by the support and only gaseous form of the liquefied gas is discharged upon opening of the evacuation orifice, the said minimum value of the actual volume of the support being of such magnitude to be sufficient to insure the distribution of the liquefied gas exclusively in gaseous form to the burner without auxiliary gas evaporation apparatus and auxiliary expansion apparatus.

## 4,017,253

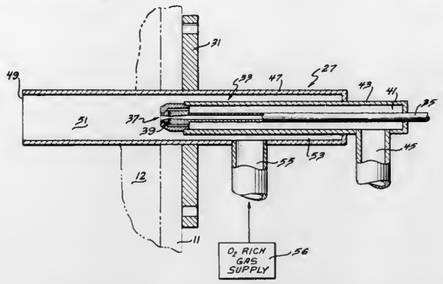
## FLUIDIZED-BED CALCINER WITH COMBUSTION NOZZLE AND SHROUD

Joseph A. Wielang, Idaho Falls; William B. Palmer, Shelley, and William B. Kerr, Idaho Falls, all of Idaho, assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Sept. 16, 1975, Ser. No. 613,779

Int. Cl.² F27B 15/14; F23M 3/04

U.S. Cl. 432—58 4 Claims




1. In a fluidized-bed calciner for the processing of liquids containing solidifiable material to form dry solid particles, wherein said calciner comprises a vessel having walls defining an internal chamber, fluidizable solid particles within said chamber, means for passing an upward gas flow through said vessel to fluidize said solid particles, and nozzle means for injecting a fuel mixture for combustion into said internal chamber of said vessel, said nozzle means includes a first conduit for passing liquid fuel terminating with a venturi section towards said internal chamber of said vessel, said venturi section having a generally central constricted portion, a second conduit generally coaxially disposed about said first conduit to define an annulus for passing an oxygen-containing gas, said second conduit terminating around said venturi section and said venturi section including radial passageways at the constricted portion thereof whereby oxygen-containing gas from said second conduit is caused to flow into and atomize said liquid fuel, the improvement comprising an elongated, tubular shroud with one open end, disposed generally coaxially about said nozzle means, said nozzle means terminating at a location about flush with said vessel walls and said tubular shroud extending beyond the end of said nozzle means at said open end into said internal chamber to provide an antechamber within said shroud end portion between said open end and said nozzle means for the combustion of said fuel, said antechamber having a length-to-diameter ratio of about 2:1 to 5:1 extending into said internal chamber and supply means communicating with said shroud for supplying an oxygen-rich gas with a higher oxygen concentration than air to said antechamber.

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## 4,017,254

## RECIRCULATING FURNACE-DRYER COMBINATION

Allen Jacob Jones, Grants Pass, Oreg., assignor to S. J. Agnew, Tenino, Wash.

Filed Dec. 15, 1975, Ser. No. 640,963

Int. Cl.² F23J 15/00

U.S. Cl. 432—72 16 Claims

1. A recirculating furnace-dryer combination comprising a combustion chamber in which a greater than atmospheric pressure may be maintained,

fuel feed means for feeding fuel to said combustion chamber,

housing means surrounding said combustion chamber in which a greater than atmospheric pressure may be maintained,

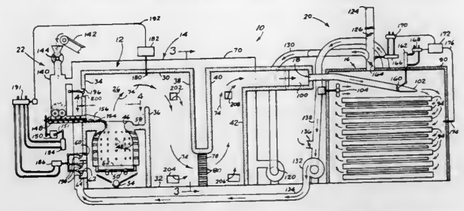
dryer means for receiving materials to be dried, said dryer constructed to maintain a greater than atmospheric pressure therein,

feed conduit means through which combustion gases may flow from said combustion chamber to said dryer,

return conduit means connecting said dryer to said housing for returning gases from said dryer to said housing,

means for admitting controlled quantities of returning gases to said combustion chamber from said housing, and

pressurizing means for producing a greater than atmospheric pressure throughout said combustion chamber,



housing, dryer, and feed conduit means and in said return conduit means during operation.

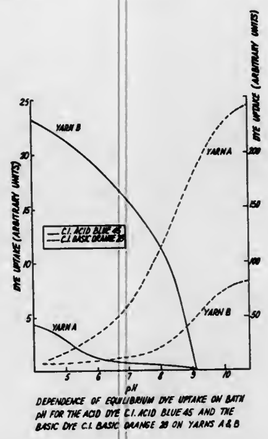
## 4,017,255
## DYED TEXTILE MATERIALS

**Malcolm Carnie Cobb, Ponthir, England, assignor to Imperial Chemical Industries, London, England**

**Continuation of Ser. No. 876,218, Dec. 1, 1969, abandoned, which is a continuation of Ser. No. 519,336, Jan. 7, 1966, abandoned. This application May 20, 1974, Ser. No. 471,742**

**Int. Cl.² D06P** *3/854*

**U.S. Cl. 8—21 B** **5 Claims**




DEPENDENCE OF EQUILIBRIUM DYE UPTAKE ON BATH pH FOR THE ACID DYE C.I. ACID BLUE 45 AND THE BASIC DYE C.I. BASIC ORANGE 28 ON YARNS A & B

1. A process for the manufacture of fiber materials containing at least two groups of differently dyed nylon filaments which comprises forming a fiber structure of filaments of which at least some are composed of nylon, said nylon filaments being of two distinct types in which a first type is composed of a nylon having a substantially homogeneous equal content of about 90 to 110 microequivalents per gram of carboxyl end groups and an amine end group content of about 20 to 30 microequivalents per gram, a second type of fiber composed of nylon having a substantially homogeneous equal content of about 20 to 30 microequivalents per gram of carboxyl end groups and about 90 to 110 microequivalents of amine end groups, said difference is carboxyl end group content between said two nylons being at least about 60 microequivalents per gram of polymer, and dyeing the fiber structure with a dye liquor containing a cationic dyestuff, under such conditions, including a pH in the dye liquor of at least 6, that said cationic dyestuff dyes said first and second types of filaments to different extents.

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## 4,017,256
## PROCESS FOR THE PRINTING AND PAD-DYEING OF MIXED FABRIC

**Gerhard Kogel, Reinach; Roberto Degen, and Walter Mundwiler, both of Basel, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

**Filed Mar. 24, 1975, Ser. No. 561,514**

**Claims priority, application Switzerland, Mar. 28, 1974, 4359/74**

**Int. Cl.² D06P** *3/82*

**U.S. Cl. 8—21 C** **8 Claims**

1. Process for the printing and pad-dyeing of mixed fabric made from fibre mixtures consisting of materials dyeable with disperse dyestuffs and materials dyeable with reactive dyestuffs by the use of printing pastes or padding liquors containing at least one disperse dyestuff of the azo series and at least one reactive dyestuff, wherein there is used a printing paste or padding liquor in which the disperse dyestuff is formed in the printing paste or padding liquor by the mixing of a coupling component, in the presence of alkalies, with a pasting agent, the subsequent dissolving of the mixture in water, the coupling of the coupling component with a diazo component to form a disperse dyestuff of the azo series, and the subsequent addition of a thickening agent and at least one reactive dyestuff.

3. Process for the preparation of a printing paste or padding liquor containing at least one disperse dyestuff of the azo series and at least one reactive dyestuff, wherein the disperse dyestuff is formed in the printing paste or padding liquor by the mixing of a coupling component, in the presence of alkalies, with a pasting agent, the dissolving of this mixture in water, the coupling of the coupling component with a diazo component to form a disperse dyestuff of the azo series, and subsequently the addition of a thickening agent and at least one reactive dyestuff.

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## 4,017,257
## TEXTILES FIRE-RETARDANT TREATED WITH COPOLYCONDENSED VINYLPHOSPHONATES AND PROCESS

**Edward D. Weil, Hastings-on-Hudson, N.Y., assignor to Stauffer Chemical Company, Westport, Conn.**

**Continuation-in-part of Ser. No. 505,123, Sept. 11, 1974, abandoned, which is a division of Ser. No. 187,575, Oct. 7, 1971, Pat. No. 3,855,359, which is a continuation-in-part of Ser. No. 153,075, June 14, 1971, Pat. No. 3,822,327. This application Jan. 31, 1975, Ser. No. 545,862**

**Int. Cl.² D06M** *13/22, 15/62*

**U.S. Cl. 8—115.5** **32 Claims**

1. A process for flame retarding textiles, said process comprising applying to a textile an effective concentration of at least one copolycondensed vinylphosphonate and thereafter curing said copolycondensed vinylphosphonate so as to form an insoluble, fire retardant resin in and/or on the fibers of said textile; at least one of said copolycondensed vinylphosphonates consisting essentially of the product resulting from the reaction, in stoichiometric ratio of from about 1:10 to 10:1, between a bis (2-haloalkyl) vinylphosphonate and at least one pentavalent phosphorus ester of the structure ROP(=O)XY where R is selected from the class consisting of $C_1$–$C_{20}$ alkyl and $C_1$–$C_{20}$ chloro- or bromoalkyl groups and X and Y are groups selected from the class consisting of RO—, $C_1$–$C_{20}$ alkyl, $C_2$–$C_{20}$ alkenyl, phenyl, phenxoy, amino, $C_1$–$C_{20}$ alkyl substituted amino, phenyl substituted amino, $C_2$–$C_{20}$ alkylene bonded to the same or to another ROP(=O) moiety and $C_2$–$C_{20}$ alkyleneoxy and $C_2$–$C_{20}$ alkylenedioxy bonded to the same or to another ROP(=O) moiety, wherein said reaction is carried out at an elevated temperature for a period of time which is sufficient to evolve R-halide as a by-product and to form a P(O)-O-alkylene-O-P(O) linkage, with the proviso that said product is not the homopolycondensed product of said phenoxy, (2-haloalkyl) vinylphosphonate.

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## 4,017,258
## METHOD OF FORMING A PRESSURE SEAL EMPLOYING AN AIR-BALANCE IN A HIGH PRESSURE STEAMER

**Yoshikazu Sando; Hiroshi Ishidoshiro, and Matsuo Minakata, all of Wakayama, Japan, assignors to Sando Iron Works Co., Ltd., Japan**

**Filed June 4, 1975, Ser. No. 583,836**

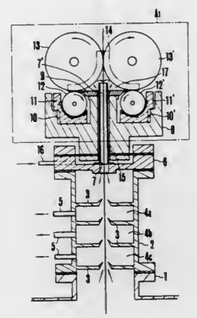
**Claims priority, application Japan, June 10, 1974, 49-65819; June 10, 1974, 49-65820**

**Int. Cl.² D06B** *23/18*

**U.S. Cl. 8—149.3** **2 Claims**

1. A method of providing a pressure seal for the fiber feed-in and the take-out openings in a high pressure steamer vessel body in which the fiber is treated, comprising steps of providing a roll seal mechanism at the feed-in and take-out openings, forming a tubular chamber for each of the roll seal mechanisms with the tubular chamber open at one end to the roll seal mechanism and at the other end to the interior of the steamer vessel body wherein the fiber is treated, dividing the interior of the tubular chamber into at least three serially arranged intercommunicating sub-chambers with a first sub-

chamber being closest to the roll seal mechanism, a second-sub-chamber being closest to the interior of the steam vessel body and a third sub-chamber being positioned between the other two, supplying a pressurized sealing gas at a pressure corresponding to the pressure within the steam vessel body



into the first sub-chamber, admitting steam from the interior of the steamer vessel body into the second sub-chamber, and intermixing the sealing gas and the steam in the third sub-chamber for forming a sealing gas zone in the first sub-chamber, a steam zone in the second sub-chamber and a mixed gas zone in the third sub-chamber.

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**4,017,259**

## CELLULOSE REAGENTS INCORPORATING T-AMINO GROUPS

**Clinton P. Wade, Jefferson, and Stanley P. Rowland, New Orleans, both of La., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.**

**Filed Oct. 24, 1975, Ser. No. 625,722**
**Int. Cl.² D06M *13/34***
**U.S. Cl. 8—183** **4 Claims**

1. A process for imparting to cellulosic fabric durable press properties, recurability, resistance to hydrolysis, scorch resistance, and sorption of acid dyes and fluorescent brighteners comprising reacting a cellulosic fabric with an aqueous tertiary-amino-N-methylol reagent selected from the group consisting of 2(diethylamino)ethyl N,N-di(hydroxymethyl)carbamate and dimethyloldiethylaminopropyltriazone in the presence or absence of metal salt or acid catalysts.

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**4,017,260**

## METHOD OF MEASURING SULPHUR DIOXIDE

**Joachim Stauff, Darmstadt; Wolfgang Jaeschke, Kronberg, and Gunter Schlögl, Frankfurt, all of Germany, assignors to Joachim Stauff, Darmstadt, Germany**

**Filed July 3, 1974, Ser. No. 485,324**
**Claims priority, application Germany, July 7, 1973, 2334574**
**Int. Cl.² G01N *33/00*; G01T *1/20***
**U.S. Cl. 23—232 E** **17 Claims**

1. A method for quantitatively detecting $SO_2$ comprising the steps of:
providing a water solution of the $SO_2$ to be detected;
exposing the water solution of $SO_2$ to a liquid containing a liquid or a solid oxidizer which oxidizes $SO_2$ to provide chemi-luminescence; and
photoelectrically detecting the chemi-luminescence and its intensity to obtain a representation of the $SO_2$ concentration in the said water solution.

**4,017,261**

## BIOLOGICAL DIAGNOSTIC TEST STRIP AND METHOD OF PRODUCING SAME

**Vlastimil Svoboda, and Olga Celchovska, both of Brno, Czechoslovakia, assignors to Lachema, narodni podnik, Brno, Czechoslovakia**

**Filed Oct. 16, 1975, Ser. No. 622,833**
**Claims priority, application Czechoslovakia, Oct. 16, 1974, 7070/74**
**Int. Cl.² G01N *21/06, 31/22, 33/16***
**U.S. Cl. 23—253 TP** **7 Claims**

1. Diagnostic test strip for the detection and semi-quantitative estimation of blood and hemoglobin in biological materials comprising a bibulous carrier impregnated with a composition of matter comprising (a) an acid buffer having a pH within the range of 2.5–5.0, (b) a chromogen, (c) an agent capable of enhancing the peroxidase activity of hemoglobin, (d) a wetting agent, (e) a solid, polymeric film-forming substance, and (f) an amine salt of an organic hydroperoxide.

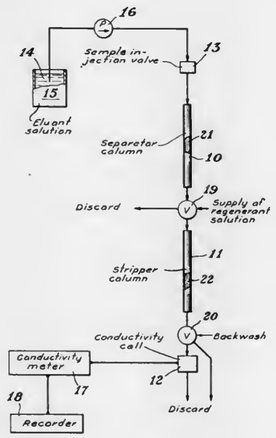
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**4,017,262**

## CHROMATOGRAPHIC APPARATUS FOR ANALYSIS OF IONIC SPECIES

**Hamish Small, and Timothy S. Stevens, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.**

**Division of Ser. No. 386,261, Aug. 6, 1973, Pat. No. 3,925,019. This application Sept. 8, 1975, Ser. No. 611,107**
**Int. Cl.² G01N *27/08, 31/04, 31/08***
**U.S. Cl. 23—253 R** **4 Claims**




1. Apparatus for chromatographic quantitative analysis of a plurality of species of cations in aqueous sample solution, which comprises:
a first chromatographic column for separating the cationic species, said first column being charged with a cation exchange resin;
means for adding sample solution and solution of developing reagent to the first chromatographic column;
a second chromatographic column for precipitating metal ions contained in said developing reagent, said second column being charged with an anion exchange resin in a form selected from the chloride form and the sulfate form, the anion exchange resin having a total exchange capacity at least 50 times that of the cation exchange resin;
liquid conduit means for conveying effluent from the first column to the second column;
a common detector means for quantitatively detecting each separated cation species of interest exiting from said second column;



and liquid conduit means for conveying effluent from said second column to said common detector means.

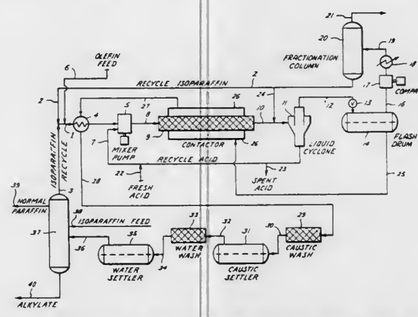
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**4,017,263**

## APPARATUS FOR SULFURIC ACID CATALYZED ALKYLATION PROCESS

**Jeffrey W. Holmes, Sedro-Woolley, Wash.; Bruce K. Purcell, Baton Rouge, La.; William F. Franz, Cardiner, and Edward L. Cole, Fishkill, both of N.Y., assignors to Texaco Inc., New York, N.Y.**

**Filed Oct. 18, 1974, Ser. No. 515,942**
**Int. Cl.² B01J *8/08*; C07C *3/54***
**U.S. Cl. 23—288 E** **3 Claims**




1. Apparatus for alkylating isoparaffin hydrocarbon with olefin hydrocarbon, in the liquid phase, in the presence of sulfuric acid alkylation catalyst, which apparatus comprises:
a. mixing means for forming an emulsion of isoparaffin and olefin reactants and sulfuric acid catalyst;
b. a non-backmixed tubular reactor, having an inlet end, an outlet end and a tubular wall, the inlet of which is in communication with said mixing means, for maintaining the emulsion effluent from said mixing means at alkylation reaction conditions, including a selected temperature of from about −20° F to be about 100° F, an olefin space velocity of from about 0.05 to about 1.0 volumes olefin per hour per volume of acid catalyst and a Reynolds number for said flowing emulsion of at least about 5000 $N_{RE}$;
c. liquid cyclone centrifugal separation means having an inlet in communication with the outlet of said tubular reactor and having a hydrocarbon outlet and an acid catalyst outlet, for rapidly separating reaction emulsion effluent into a liquid hydrocarbon phase comprising unreacted isoparaffin hydrocarbon and alkylate hydrocarbon product, and an acid catalyst phase comprising about 70–100 volume percent acid catalyst and about 30–0 volume percent entrained hydrocarbon;
d. a cooling jacket having inlet and outlet means, surrounding said tubular reactor, defining a confined path for the flow of a refrigerant fluid;
e. a flash drum having an inlet, a top vapor outlet and a bottom liquid outlet, for adiabatically flashing a portion of said separated liquid hydrocarbon phase;
f. first conduit means for conveying separated liquid hydrocarbon phase from said centrifugal separation means to the inlet of said flash drum;
g. a gas compressor, in communication with the top vapor outlet of said flash drum for withdrawing hydrocarbon vapor from said flash drum at a subatmospheric pressure;
h. condensing means in communication with compressor discharge for condensing hydrocarbon vapor from said gas compressor;
i. first fractionation means, in communication with said condensing means, for fractionating condensed hydrocarbon vapor into a first isoparaffin fraction and a fraction lighter than the first isoparaffin fraction;
j. second conduit means for conveying said first isoparaffin fraction from said first fractionation means to said mixing means;
k. third conduit means for conveying cooled, unvaporized hydrocarbon from said flash drum to said cooling jacket inlet;
l. second fractionation means for fractionating separated liquid hydrocarbon phase into a second isoparaffin fraction, a normal paraffin fraction, and an alkylated hydrocarbon fraction;
m. fourth conduit means for conveying liquid hydrocarbon phase from said cooling jacket outlet to said second fractionation means;
n. means for recycling the second isoparaffin hydrocarbon fraction from said second fractionation means into said second conduit means before the inlet of said mixing means for contact with additional reactant hydrocarbons; and
o. means for recycling acid catalyst phase from said centrifugal separation means to the inlet of said mixing means.

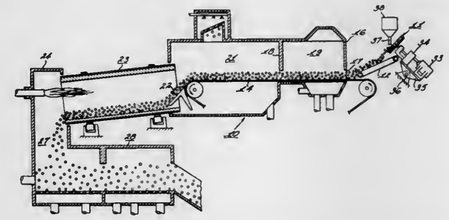
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**4,017,264**

## PAN AGGLOMERATION WITH MECHANICAL PELLET CLASSIFICATION

**Glenn A. Heian, Franklin, Wis., assignor to Allis-Chalmers Corporation, Milwaukee, Wis.**

**Filed Feb. 21, 1975, Ser. No. 551,724**
**Int. Cl.² B01J *2/14***
**U.S. Cl. 23—313 R** **2 Claims**



1. A method of agglomerating material into pellets exhibiting characteristics of improved strength, abrasion resistivity and size conformity comprising:
a. introducing raw material into a rotating pelletizer pan;
b. moisturizing the raw material as it is introduced into the pan;
c. allowing the moisturized material to travel with the pan to a maximum height whereat the material free-falls in a cascading return flow over the bottom of the pan to the lowest portion of the rotating pan to effect pellet growth;
d. mechanically classifying the material moving with the pan to physically strip at least one layer of predetermined sized moving pellets from the material moving with the pan at a position prior to the material moving with the pan reaching a maximum height at which it free falls and at a position near the outer edge of the pan in the deepest part of the material bed to effect a rapid change in the direction of movement of the predetermined sized moving pellets while allowing smaller pellets and fines to continue to move with the rotating pan to a maximum height for free-fall to the lowest portion of the rotating pan.

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**4,017,265**

## FERROMAGNETIC MEMORY LAYER, METHODS OF MAKING AND ADHERING IT TO SUBSTRATES, MAGNETIC TAPES, AND OTHER PRODUCTS

**David W. Taylor, P.O. Box 67, Providence Road, Edgemont, Pa. 19028**

**Filed Feb. 15, 1972, Ser. No. 226,512**
**Int. Cl.² C25D *5/56, 5/00, 5/10, 5/24***
**U.S. Cl. 428—675** **40 Claims**

1. A magnetic memory member comprising;

a. a substrate;
b. a flexible synthetic polymer layer superimposed on a surface thereof, said layer having cyano groups, having a solvent-dispersed phase of catalytic nuclei of platinum, palladium, copper, silver or gold on its surface and concurrently therewith dispersed in the body of the resin;
c. a conductive layer of copper or nickel adhering to said nuclei; and
d. a magnetic layer integrally secured to said conductive layer;

said magnetic layer consisting essentially of substantially pure closely packed hexagonal cobalt which is thin, uniform, continuous and substantially pit-free, having a thickness of about 0.05 to 0.5 microns and a smooth surface approximating optical reflectivity; a nominal coercivity of about 200 to about 500 Oersteds; an inductance of about 6,000 to 16,000 Gauss and a ratio of remnant to saturation induction greater than 0.8 and approaching unity at the extreme, the magnetic memory member having improved information density, frequency response and data rate capability without reduction of output amplitude.

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**4,017,266**

**PROCESS FOR MAKING A BRAZED LEAD ELECTRODE, AND PRODUCT THEREOF**

**Monroe B. Goldberg, Huntington Station, and William B. Voorhis, Hicksville, both of N.Y., assignors to General Instrument Corporation, Clifton, N.J.**

**Continuation-in-part of Ser. No. 463,678, April 24, 1974, Pat. No. 3,930,306. This application Dec. 19, 1975, Ser. No. 642,588**

**Int. Cl.² B32B *15/20***

**U.S. Cl. 428—600** **7 Claims**

1. A brazed lead electrode workpiece for use in a semiconductor device comprising:
a. an axially extending contact member formed substantially of Molylidenum and terminating at one end in a joining surface;
b. a lead member formed substantially of a thermally and electrically conductive metal and terminating at one end in a joining surface; and
c. a silver/copper-based brazing alloy having a wetting point of at least 450° C brazed with and securing together said joining surfaces of said members, thereby to join said members into a unitary structure.

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**4,017,267**

**METHOD OF DIE CONSTRUCTION USING JOINT STRUCTURE**

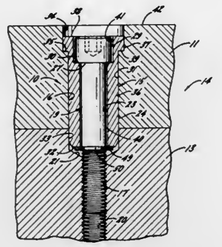
**Lee E. Hawley, Janesville, Wis., assignor to Ronald Hawley, Freeport, Ill.; Melvin Enkkeli, Watertown, Wis.; Daniel M. Clark, Rockton, Ill.; William Bryden; Arthur Adams, both of, Beloit, Wis.; Dennis Hillison, Janesville, Wis.; Mrs. Dennis Hillison, Janesville, Wis.; Irving Hillison, Janesville, Wis. and Mrs. Irving Hillison, Janesville, Wis., part interest to each**

**Filed Mar. 22, 1976, Ser. No. 669,169**

**Int. Cl.² B23Q *17/18***

**U.S. Cl. 29—407** **7 Claims**

1. A method for precisely locating and securing a die part on a die shoe, said method comprising the steps of, forming two bores through said die part, locating said die part in an approximately accurate position on said die shoe, spotting through said bores to locate points on the die shoe for forming threaded holes in the die shoe, forming threaded holes in the die shoe at said points, securing the die part temporarily to the die shoe by means of screws inserted into said bores and threaded into said holes, said screws having a diameter substantially less than the diameter of said bores, checking the accuracy of the approximate position of the die part on the die shoe, shifting the die part on the die shoe as necessary to position the die part precisely on the die shoe, clamping the die part on the shoe adjacent each of the bores, removing the screws from the die part and shoe, forming bores in the shoe in axial alignment with the first bores and to the same diameters as the first bores, inserting sleeves through the bores in said die part and into the bores in said die shoe to hold the die part in its precisely located position on the shoe, said sleeves having outside diameters corresponding closely to diameters of said bores, and telescoping screws into said sleeves and threading such screws in said holes to secure the die part on the die shoe regardless of whether the axes of the screws coincide with the axes of the sleeves.



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**4,017,268**

**HYDROCARBON FUEL CONTAINING DISPERSED HYDROGEN AND METHOD OF USE THEREOF**

**E. Gene Gilley, 1506 Mulberry Road, Martinsville, Va. 24112**

**Filed Feb. 12, 1975, Ser. No. 549,144**

**Int. Cl.² C10L *1/10***

**U.S. Cl. 44—52** **7 Claims**

3. A liquid hydrocarbon fuel comprising a mixture of a liquid hydrocarbon fuel having a specific gravity below 0.75 with a liquid hydrocarbon having a specific gravity above 0.75 and having bubbles of gaseous hydrogen dispersed therein, the resulting mixed fuel having a specific gravity of at least about 0.75.

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**4,017,269**

**METHOD AND ARRANGEMENT FOR GASIFYING FINELY DIVIDED FLUIDIZED SOLID COMBUSTIBLE MATERIAL**

**Karl-Heinz Dutz, Herten, and Adolf Linke, Essen, both of Germany, assignors to Krupp-Koppers GmbH, Essen, Germany**

**Continuation of Ser. No. 345,204, March 26, 1973, abandoned. This application May 22, 1975, Ser. No. 579,816**

**Claims priority, application Germany, Mar. 25, 1972, 2214737**

**Int. Cl.² C10J *3/50***

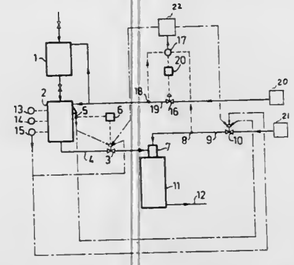
**U.S. Cl. 48—86 R** **20 Claims**

1. An arrangement for converting finely divided solid combustible material into gaseous form, comprising, in combination, a first container containing finely divided solid combustible material to be fluidized; a second container containing an inert fluidizing gas incapable of supporting combustion; an inert gas supply conduit having one end connected to said second container for receipt of said gas and having an other end for discharge of said gas and an adjustable regulating valve in said conduit intermediate said ends; fluidizing means having a first inlet connected to said first container for receipt of said material and having a second inlet connected to said other end of said inert gas supply conduit for receipt of said gas, and having an outlet for discharge of the fluidized material; combustion gas supply means operative for supplying a



combustion-supporting gas; gasifying means having a first inlet connected to said combustion gas supply means for receipt of said combustion-supporting gas and having a second inlet connected to said outlet of said fluidizing means for receipt of said fluidized material; negative feedback stabilizing means automatically operative for maintaining the pressure of the fluidized combustible material entering said gasifying means higher than the pressure of gas in said gasifying means, to prevent backflow of combustion-supporting gas in said gasifying means through said second inlet of said gasifying means, by automatically adjusting said regulating valve, and thereby varying the flow of inert gas through said inert gas supply conduit, in dependence upon the difference between the pressure of the inert gas in said inert gas supply conduit and the pressure of gas in said gasifying means.

11. An method of gasifying a finely divided solid combustible material, comprising the steps of passsing into a fluidizer a



finely divided solid combustible material and also through an inert gas supply conduit an inert fluidizing gas incapable of supporting combustion and causing said finely divided solid combustible material to be fluidized in said fluidizer; passing the fluidized solid combustible material into a gasifier; passing a combustion-supporting gas into said gasifier; reacting said fluidized material and said combustion-supporting gas in said gasifier to said produce gaseous combustible material and discharging the produced gaseous combustible material from said gasifier; and maintaining the pressure of the fluidized combustible material entering said gasifier higher than the pressure of gas in said gasifier, to prevent backflow of combustion-supporting gas in said gasifier, by adjusting a regulating valve in said inert gas supply conduit to vary the flow of inert gas into said fluidizer in dependence upon the difference between the pressure of the inert gas entering said fluidizer and the pressure of the gas in said gasifier.

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**4,017,270**

**COAL GASIFICATION PROCESS WITH IMPROVED PROCEDURES FOR CONTINUOUSLY FEEDING LUMP COAL UNDER PRESSURE**

**Erwin D. Funk, and Michael I. Sherman, both of Glens Falls, N.Y., assignors to Kamyr, Inc., Glens Falls, N.Y.**

**Continuation-in-part of Ser. No. 438,273, Jan. 31, 1974, abandoned. This application Jan. 20, 1975, Ser. No. 542,407**

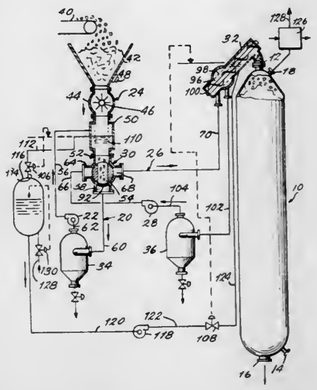
**Claims priority, application South Africa, July 29, 1974, 74/4815**

**Int. Cl.² C10J *3/06, 3/30***

**U.S. Cl. 48—197 R** **12 Claims**

1. A process of producing gas from gas producing material, such as coal, having a predetermined particle size range, such as approximately ¼ inch nominal diameter to approximately 2 inches nominal diameter, by continuously feeding a supply of such particles into inlet means of gasifier means under a predetermined elevated inlet pressure where the particles are continuously heated under pressure to produce gas by procedures which are detrimentally affected by the presence of substantial amounts of fine particles of a size less than said predetermined size range, the improvement wherein said continuous feeding comprises the steps of:

confining a liquid within a first path including a first volume defining a first free surface exposed to pressure conditions which are low with respect to the elevated inlet pressure of said gasifier means,
introducing a supply of particles of said size range into the liquid within said first confined path downwardly through the free surface thereof,
confining liquid within a second path which is circuitous and includes a second volume defining a second free surface communicating with the elevated pressure of the inlet means of said gasifier means,
continuously circulating the liquid within said second circuitous path by pumping the same at a pumping position spaced from said second volume,
removing successive incremental volumes of liquid and entrained particles within said first path and communicating said successive removed volumes of liquid and entrained particles with the liquid flowing in said second path at a position between said pumping position and said second volume,
collecting the particles of said size range within said second volume, and
moving the collected particles upwardly through said second free surface and into the inlet means of said gasifier means.



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**4,017,271**

**PROCESS FOR PRODUCTION OF SYNTHESIS GAS**

**Kenneth M. Barclay, Woodland Hills; James R. Birk, San Jose, and William E. Parkins, Woodland Hills, all of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.**

**Filed June 19, 1975, Ser. No. 588,563**

**Int. Cl.² C10K *1/00*; C10J *3/00***

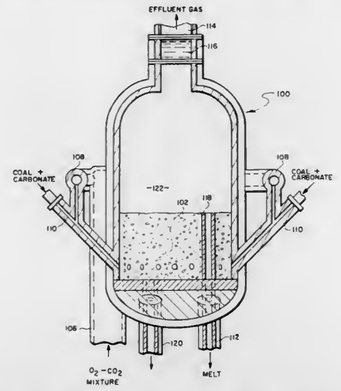
**U.S. Cl. 48—197 R** **12 Claims**

1. A process for producing a synthesis gas capable of being upgraded to a pipeline gas, which process comprises:
providing a reaction zone containing a molten salt consisting essentially of a major portion of sodium carbonate and a minor portion of at least 1 wt.% of sodium sulfide, said molten salt containing carbon in an amount of about 1 to 10% by weight of the molten salt and having a total solids concentration of less than about 25 wt.%,
maintaining said molten salt at a temperature between about 1400° and 2000° F,
introducing a sulfur-containing carbonaceous material, substanially pure oxygen, and recycled carbon dioxide from the process into said molten salt reaction zone, said substantially pure oxygen and carbon dioxide being introduced in an amount sufficient to provide about 0.6 to about 1.2 mole of carbon dioxide per mole of oxygen,
controlling the foregoing conditions without the introduc-

tion of steam to promote CO production and decompose said carbonaceous material, whereby the sulfur component of the carbonaceous material is retained in the molten salt, the reaction being carried out at a pressure between 1 and 100 atmospheres,

obtaining from said reaction zone an initial gaseous effluent containing carbon monoxide, hydrogen, hydrocarbons and carbon dioxide, and being essentially free of sulfur-containing pollutants,

subjecting said gaseous effluent to a water gas shift reaction,




recovering a resultant gaseous mixture of carbon dioxide, carbon monoxide and hydrogen from said shift reaction,

removing the carbon dioxide from said resultant gaseous mixture,

recycling a portion of said carbon dioxide for introduction thereof into said molten salt reaction zone, and

separately recovering from the carbon dioxide removal process a substantially carbon-doxide-free synthesis gas capable of being upgraded to a pipeline gas.

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**4,017,272**

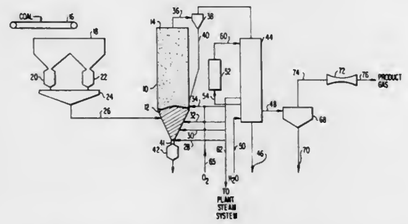
## PROCESS FOR GASIFYING SOLID CARBONACEOUS FUEL

**Jamil Anwer, Cologne, Germany; Ira Norman Banchik, Lakeland, Fla.; Gerhard Wilhelm Bode, Lechenich, Germany; Werner Lemberg, Cologne-Weidenpesch, Germany, and Kuldip Kumar Sud, Cologne, Germany, assignors to Bamag Verfahrenstechnik GmbH, Germany**

**Continuation-in-part of Ser. No. 584,130, June 5, 1975, abandoned. This application May 27, 1976, Ser. No. 690,549**

**Int. Cl.² C10J *3/16*; C10K *1/20***

**U.S. Cl. 48—197 R** **28 Claims**




**1.** An efficient and economical process for continuously gasifying particulate carbonaceous material under selective conditions to produce, in an environmentally-acceptable manner, a gaseous product rich in carbon monoxide and hydrogen using pressurized gasifier means having a lower, dense-phase, fluidized bed of the material and contiguous to the upper phase boundary of the bed, an upper dilute-phase, particulate-entrained, gas zone which comprises

introducing, in the gasifier, particulate carbonaceous material at a pressure slightly in excess of the pressure in the gasifier, at a temperature from about ambient to 1,000° F., and with amounts of the material at a rate sufficient to maintain the upper phase boundary of the fluidized bed at a given level of about 4 to 20 feet above the lower phase boundary of the fluidized bed wherein the ratio of the height of the diute phase, gas zone to the height of the fluidized bed is from about 3:1 to 10:1;

introducing oxygen-containing gas with up to about 50 percent (vol.) of steam at average bulk temperatures up to about 1000° F., at a pressure slightly in excess of that in the gasifier, at spatially-separate points, substantially uniformly distributed circumferentially, at different levels in the gasifier and in amounts sufficient to substantially uniformly contact and gasify the constituents of the fluidized bed under controlled selective reaction conditions;

introducing at least about 50 percent (wt.) of the steam being introduced into the fluidized bed, at the lower phase boundary of the fluidized bed, at spatially-separate points, substantially uniformly distributed circumferentially, at a temperature up to about 1200° F., at a pressure slightly in excess of that in the gasifier, and at a rate sufficient to fluidize the lower portion of the bed;

gasifying the material in the fluidized bed to provide a maximum temperature in the gasifier in the range of about 1500° to 2400° F. and at a bulk temperature in the dense phase below the softening temperature of any ash contained in the material to produce a gaseous reaction product including carbon monoxide, hydrogen, carbon dioxide, methane and diluents, which product evolves into the dilute phase, and in conjunction with such production partially spent char solids are produced;

introducing additional increments of oxygen-containing gas with up to about 10 percent (vol.) of steam at or just above the phase boundary between the fluidized bed and dilute phase at spatially-separate points, substantially uniformly distributed circumferentially, in amounts sufficient to react with carbon values leaving the fluidized bed, thus increasing the temperature in the dilute-phase, and to enhance the carbon-conversion efficiency of the process to provide a raw product gas containing at least about 50 percent of the oxidized carbon in the form of carbon monoxide;

passing the gaseous reaction product through the dilute phase at a superficial velocity well above the point of incipient fluidization and up to about 20 feet per second, and for a residence time in the dilute-phase of about 2 to 5 seconds to undergo further gasification and produce a raw product gas, maintaining the dilute-phase at a maximum temperature possible commensurate with the properties of any contained ash;

removing the raw product gas from said upper dilute-phase zone;

removing up to about 60 percent (wt.) of partially spent char from the bottom of the bed and containing the char with steam being introduced into the bed at the lower phase boundary to recover sensible heat from the char and preheat the steam;

providing a cooled product gas from said raw product gas, said cooled product gas having less than about 4 grains of solid per standard cubic foot of gas at approximate gasifier pressures and at temperatures better suited for further processing, wherein substantial amounts of partially spent char are removed from the raw product gas for discharge from the process or for recycle or for reprocessing under different conditions, and wherein the cooling of the raw product gas to temperatures of about 200° F. to 500° F. is conducted in a heat recovery zone to recover heat values;

employing recovered heat values from said heat recovery zone to produce steam, a portion of which is utilized in the process;



conducting the cooled product gas, cooled in a heat recovery zone at the heat recovery zone pressures, which are less than the pressures in the gasifier, through a high efficiency, high pressure-drop type, scrubber to remove fine partially spent char particles and provide a gas product containing less than about 0.1 grains of solids per standard cubic foot of gas, a carbon monoxide content of at least about 10 percent (vol.), a hydrogen content of at least about 10 percent (vol.), and a BTU content of at least about 90 BTU per standard cubic foot; and

maintaining the pressure in the gasifier at super-atmospheric pressures including pressures above about 1.5 atmospheres absolute by means of back-pressure control applied to the gas system at a point downstream of the gasifier.

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**4,017,273**

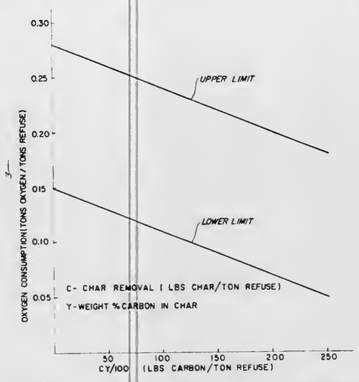
## PYROLYSIS PROCESS FOR CONVERTING REFUSE TO FUEL GAS

**John Erling Anderson, Katonah, N.Y., assignor to Union Carbide Corporation, New York, N.Y.**

**Filed May 26, 1976, Ser. No. 690,187**

**Int. Cl.² C10J *3/00***

**U.S. Cl. 48—209** **2 Claims**




**1.** In a process for disposing of refuse while simultaneously producing a useful gaseous product and an inert solid residue, comprising the steps of (a) feeding refuse into the top portion of a vertical shaft furnace, (b) feeding an oxygen containing gas into the base of said furnace, (c) pyrolyzing the organic portion of the refuse, (d) fluidizing the inorganic portion of the refuse, (e) discharging the gaseous products from the top of said furnace, and (f) tapping the fluidized inorganic material from the base of said furnace, the improvement comprising:

removing char from the furnace in an amount such that oxygen consumption in said process is reduced, while retaining a sufficient amount of combustible materials in the furnace so that on oxidation thereof the energy requirements of the process are satisfied, the amount of char removed (lbs. char/ton refuse) being less than the value of 50X/Y,

where:

X = lbs. carbon contained in a ton of refuse

Y = weight percent (%) carbon in the char and wherein the range of oxygen consumption for a given amount of char removed will be within the values determined by the equation:

$R = B - (4 \times 10^{-6})(CY)$

where:

R = oxygen consumption (tons oxygen/ton refuse)

C = char removal (lbs. char/ton refuse)

Y is the same as above, and B can vary between 0.15 and 0.28.

**4,017,274**

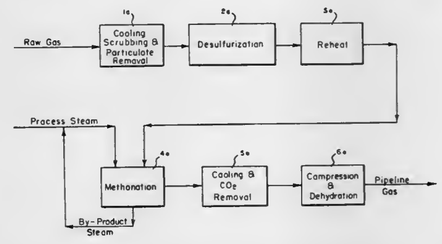
## PROCESS FOR THE METHANATION OF GASES CONTAINING HIGH CONCENTRATION OF CARBON MONOXIDE

**Lionel S. Galstaun, New York, N.Y., assignor to Bechtel Associates Professional Corporation, New York, N.Y.**

**Continuation-in-part of Ser. No. 493,082, July 30, 1974, abandoned, which is a continuation of Ser. No. 272,418, July 17, 1972, abandoned. This application Feb. 26, 1976, Ser. No. 661,565**

**Int. Cl.² C10K *3/04*; C10G *13/30***

**U.S. Cl. 48—214 A** **14 Claims**




**1.** A process for the methanation of scrubbed raw gases containing a concentration of carbon monoxide in excess of 3 mole percent and a methane concentration of less than 25 mole percent which comprises reacting a part of the carbon monoxide contained in the raw gases in the presence of an effective amount of at least one steam reforming catalyst contained in a fixed bed, substantially adiabatic reactor with steam, water, or a steam and water mixture provided directly to the reaction zone to effect the shift conversion of a part of the carbon monoxide according to the equation

$$CO + H_2O = CO_2 + H_2$$

and simultaneously to effect methanation of the remaining carbon monoxide with hydrogen up to the equilibrium point of the equation

$$CO + 3H_2 = CH_4 + H_2O$$

the amount of steam, water, or steam and water mixture being sufficient to maintain the temperature of the reactants below that at which cracking of the methane product in the methanation reaction can take place.

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**4,017,275**

## CENTRIFUGAL SEPARATOR

**Robert A. Hodgson, and Charles K. Gravis, both of Tulsa, Okla., assignors to Maloney-Crawford Tank Corporation, Tulsa, Okla.**

**Filed Mar. 8, 1973, Ser. No. 339,311**

**Int. Cl.² B01D *45/12***

**U.S. Cl. 55—1** **11 Claims**

**1.** A centrifugal separator for separating liquid from gas, comprising:

a. a vertically oriented cylindrical shell having a top, bottom, and cylindrical wall;

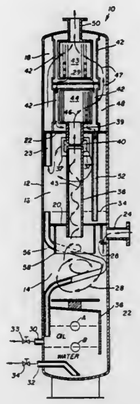
b. said shell divided into three chambers, a first bottom chamber separated from a second central chamber by a first transverse dividing wall, and a third top chamber separated from said second chamber by a second transverse dividing wall;

c. an inlet pipe entering said first chamber near said first dividing wall, through which a mixture of liquid gas is introduced into said first chamber, and means to impart a tangential flow of said mixture in said first chamber;

d. means to withdraw separated liquid from the bottom of said first chamber;

e. an axial tube sealed through said first and second dividing walls, said tube formed of two parts, spaced slightly apart to form a narrow gap in the wall of said tube, said gap positioned in said second chamber;

f. means utilizing the flow of the liquid-gas mixture in said separator to create a zone of low pressure in said second chamber;



g. conduit means within said cylindrical shell to communicate said zone of low pressure with said third chamber; and

h. means to remove gas from said third chamber through a mist extractor.

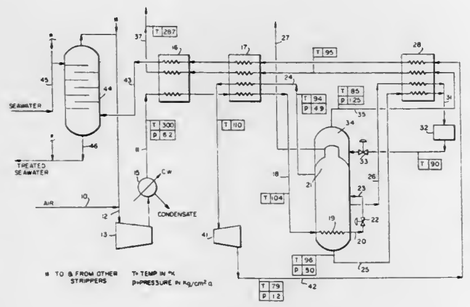
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**4,017,276**

## DEOXYGENATION OF WATER

**Bert Bloem, Waddinxveen, Netherlands, assignor to The Lummus Company, Bloomfield, N.J.**

**Filed June 22, 1976, Ser. No. 698,317**
**Int. Cl.² B01D** *19/00*
**U.S. Cl. 55—51** **8 Claims**



1. A process for deoxygenating water, comprising:

stripping oxygen from the water, said stripping being effected with a nitrogen stripping gas;

recovering oxygen containing nitrogen stripping gas from said stripping;

fractionating the oxygen containing nitrogen stripping gas to recover nitrogen; and

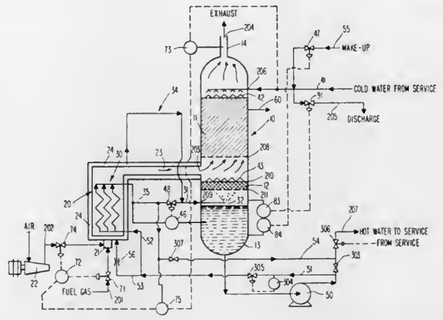
employing recovered nitrogen as stripping gas for said stripping.

**4,017,277**

## DIRECT CONTACT WATER HEATING SYSTEM AND PROCESS

**Bingham H. Van Dyke, Sr., 19 Olde Benchmark Village, and Bingham H. Van Dyke, Jr., 127 Roboda Blvd., both of Royersford, Pa. 19468**

**Filed Feb. 6, 1975, Ser. No. 547,698**
**Int. Cl.² B01D** *19/00*
**U.S. Cl. 55—54** **20 Claims**



1. An unpressurized process for heating water, comprising the steps of:

burning fuel in air in a combustion chamber, thus generating hot flue gases;

passing without flow-reversal the hot flue gases unquenched and unwashed through a contactor chamber and then exhausting the flue gases to ambient atmosphere;

passing water-to-be-heated through the contactor chamber simultaneously with, and counter-current to, the hot flue gases, such that there is heat and mass transfer relationship between the hot flue gases and the water-to-be-heated;

passing the water which has passed through the contactor chamber through a stripper chamber; and

passing steam through the stripper chamber simultaneously with, and counter-current to, the water which has passed through the stripper chamber, such that there is heat and mass transfer relationship between the water and the steam, thereby stripping out dissolved gases such as $CO_2$ and $O_2$ from the heated water, and thereby also increasing the temperature of the water.

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**4,017,278**

## METHOD AND APPARATUS FOR REMOVING FINELY DIVIDED SOLIDS FROM GAS

**Richard G. Reese, Woodside, Calif., assignor to Combustion Power Company, Inc., Menlo Park, Calif.**

**Filed Sept. 30, 1974, Ser. No. 510,291**
**Int. Cl.² B01D** *46/04*
**U.S. Cl. 55—96** **8 Claims**

1. A process for removing finely divided solids from gas which comprises:

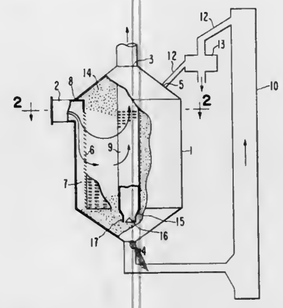
a. providing an elongated annular mass of particulate contact material confined between two generally concentric cylindrical walls, the outer wall being perforated to form a louvered surface having vanes extending outwardly and inclined to the vertical at an angle of about 15° to 80° and louver openings sufficiently large to permit passage of most of the particles constituting the contact mass to pass through the openings and the inner wall having perforations which permit passage of the gas through the wall,

b. passing a feed gas containing finely divided solids through the outer wall and through the annular mass of contact material into the space enclosed by the inner cylindrical wall,



c. withdrawing gas having a substantially reduced content of finely divided solids from the space enclosed by the inner wall,

d. moving the mass of particulate contact material downwardly by gravity flow through the annular space between the two walls at a rate between about one-half foot per hour and forty feet per hour whereby a minor proportion of the contact material passes through the louvers of the outer wall,



e. removing contact material from the lower end of the annular space between the two walls at a rate such as to maintain the rate of downward movement of the mass of contact material in the range about ¼ foot per hour to 40 feet per hour,

f. separating entrained finely divided solids from the removed contact material and then returning the contact material to the upper end of the annular space between the two walls.

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**4,017,279**

## DEFOAMER APPARATUS

**Wallace W. Bowley, Stafford Springs, Conn., assignor to Intech, Inc., Manchester, Conn.**

**Division of Ser. No. 295,724, Oct. 6, 1972, Pat. No. 3,898,045.**
**This application May 29, 1975, Ser. No. 581,971**
**The portion of the term of this patent subsequent to Aug. 5, 1992, has been disclaimed.**
**Int. Cl.² B01D** *19/02*
**U.S. Cl. 55—178** **14 Claims**

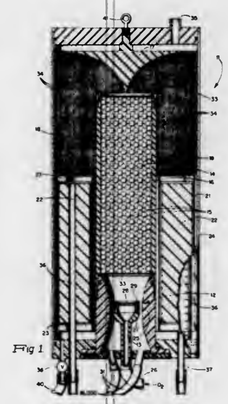


Fig 1

1. Apparatus for defoaming a liquid material, said apparatus being adapted and configured to fit within a container having an inlet for the liquid material, an outlet for removing the liquid of the material being defoamed and an outlet for removing the gas of the material being defoamed, said apparatus comprising:

multiple layers of fabric arranged in confronting, closely adjacent, surface contacting relationship, said fabric comprising:

a first material having non-wetting characteristics; and

a second material having a lesser degree of nonwetting characteristics than said first material, said second material being arranged in closely adjacent relationship with said first non-wetting material;

wherein the liquid of the material being defoamed is repelled from said first non-wetting material and attracted by said second material to thereby separate the gas of the liquid material from the liquid.

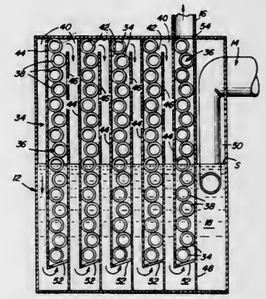
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**4,017,280**

## ANTI-POLLUTION DEVICE FOR INCINERATORS AND THE LIKE

**Charles F. Cleman, 4401 Pacific Highway East, Tacoma, Wash. 98424, and David E. Gilligan, 1010 Grand Ave., Centralia, Wash. 98531**

**Filed Mar. 14, 1975, Ser. No. 558,829**
**Int. Cl.² B01D** *47/02*
**U.S. Cl. 55—255** **6 Claims**



1. An anti-pollution device for polluted gaseous medium from incinerators and the like, comprising, in combination: a tank having an inlet for the gaseous medium and an outlet for cleaned gases, and holding a bath of a washing solution; single blower means having an input and output connected to said tank but mounted outside thereof for creating a flow of a gaseous medium being cleaned between the inlet and the outlet of the tank and having another input, a line having one end connected to the tank and in communication with the bath and having the other end connected to said another input, said blower means inducting the washing solution through said line for cooling the blower means, and baffle means for creating a large surface across the flow of gaseous medium and facilitating separation of particulate matter from the medium being cleaned arranged in the tank, and partially immersed in the bath, between the output of said blower means and the tank outlet.

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**4,017,281**

## INDUSTRIAL VACUUM LOADER WITH DUST REMOVAL MEANS FOR BAG HOUSE FILTRATION SYSTEM

**Duncan Johnstone, P.O. Box 574, Lannon, Wis. 53046**

**Filed Oct. 2, 1975, Ser. No. 618,945**
**Int. Cl.² B01D** *50/00*
**U.S. Cl. 55—334** **6 Claims**

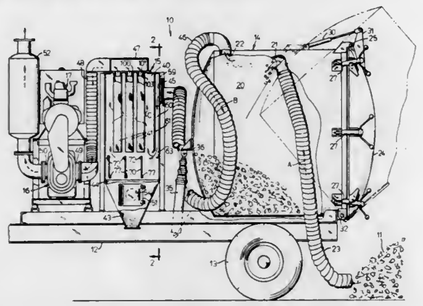
1. An industrial vacuum loader for handling dust-laden particulate material comprising;

a hopper having a material inlet port and an air outlet port;

a housing having an air inlet port connected to said air

outlet port of said hopper and comprising a first chamber containing filtering means and a dust collecting chamber below said filtering means, said dust collecting chamber being communicable with said first chamber;

a blower connected to said housing to maintain system air pressure below atmospheric pressure in said hopper and in said housing whereby material can be drawn into said hopper and whereby dust-laden air from said hopper is drawn through said filtering means;



means for isolating said dust collecting chamber from said first chamber so that air pressure in said dust collecting chamber increases above said system air pressure in said hopper;

and conduit means for connecting said dust collecting chamber to said hopper while said dust collecting chamber is isolated from said first chamber so that dust is drawn from said dust collecting chamber into said hopper.

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**4,017,282**

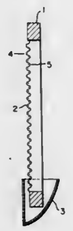
## RAIN RETARDANT SCREEN

**Joseph G. Zahka, 16A Deerwood Drive, Amherst, N.H. 03031, and Ruthven H. Daniels, Old Amherst Road, Mount Vernon, N.H. 03057**

**Continuation-in-part of Ser. No. 371,297, June 18, 1973, abandoned. This application May 22, 1975, Ser. No. 579,909**

**Int. Cl.² B01D** *39/10*

**U.S. Cl. 55—428** **18 Claims**



1. A water retardant screen which retards the passage of water drops therethrough from an outer surface exposed to a water-containing atmosphere to an inner surface thereof and allows the passage of light rays and air therethrough comprising:

a screen mesh having fine pore diameter and moderate percent open area, said mesh having said inner and said outer surface;

said outer surface having a contact angle with water greater than 90°; and

said inner surface having a contact angle with water less than 90°.

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**4,017,283**

## METHOD AND PLANT FOR MAKING UP NITROGEN VAPORIZATION LOSSES IN NITROGEN-CONTAINING LIQUIFIED NATURAL GAS CARRYING TANKERS

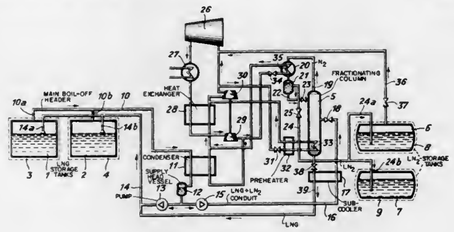
**Karel Witt, Volketswil, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland**

**Continuation of Ser. No. 304,900, Nov. 9, 1972, abandoned. This application Oct. 17, 1974, Ser. No. 515,539**

**Claims priority, application Switzerland, Nov. 17, 1971, 16685/71**

**Int. Cl.² F25J** *1/02*

**U.S. Cl. 62—40** **5 Claims**



1. In combination with the hold of a tanker, a plant for obtaining liquified nitrogen for use aboard said tanker from a liquified natural gas body being transported in said hold of said tanker; said plant comprising primarily a fractional distillation column; and a closed looped nitrogen refrigerant cycle;

said column further comprising a condenser coil, a reboiler coil, and an overhead liquid nitrogen receiver having at least one outlet for feeding liquified nitrogen not required for column reflux to at least one storage vessel,

said cycle further comprising at least a primary compressor, a brake compressor and an expansion turbine,

conduit means for feeding nitrogen refrigerant from the discharge of said primary compressor to the inlet of said turbine,

conduit means for feeding at least a portion of said refrigerant from the discharge of said turbine through an expansion valve to the inlet of said condenser coil of said column,

conduit means for feeding said portion from the outlet of said condenser coil to the inlet of said brake compressor,

conduit means for feeding at least a first portion of the refrigerant from the outlet of said brake compressor through an expansion valve to the inlet of said reboiler coil of said column,

conduit means to feed said first portion from the outlet of said reboiler coil to the inlet of said brake compressor,

conduit means for feeding at least a second portion of the refrigerant from the discharge of said brake compressor to the inlet of said primary compressor

conduit means for feeding nitrogen for refrigerant makeup from said storage vessel to said cycle, and

mechanical linkage means for transmitting mechanical energy from said expansion turbine to said brake compressor.

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**4,017,284**

## AIR DISTILLATION APPARATUS COMPRISING REGENERATOR MEANS FOR PRODUCING OXYGEN

**William E. Gifford, Syracuse, N.Y., assignor to Cryox Corporation, Eden, N.Y.**

**Continuation of Ser. No. 360,397, May 14, 1973, abandoned. This application Dec. 6, 1974, Ser. No. 530,231**

**Int. Cl.² F25J** *3/04*

**U.S. Cl. 62—40** **10 Claims**

1. A system for liquefying air, separating the oxygen and nitrogen components of the liquiefied air and delivering oxygen gas of high purity comprising:



a. a distillation column having a rectification region, a source of refrigeration above said region and heat exchanger means below said region, said heat exchanger means being in a bath of liquid oxygen during operation of said system;

b. input conduit means connected to said heat exchanger means for providing input air to be liquefied;

c. means connecting said heat exchanger means to said recitification region of said distillation column for transmitting liquefied air to said region for separation into the oxygen and nitrogen components thereof;

d. output conduit means connected to said distillation column for removing oxygen gas of high purity from said column;

e. means comprising regenerator means operatively connected to said input and output conduits for exchanging heat between said oxygen gas and said air to be liquefied whereby said air is precooled prior to entering said heat exchanger means in said distillation column, said regenerator means having a first region connected to said input conduit means and a second region surrounding said first region in heat exchange relationship therewith and connected to said output conduit means;

f. an insulated housing for said system tending to keep said system at a substantially constant temperature; and

g. a plurality of perforated plates of heat conducting material in said first region and in heat exchange relationship with said second region for transferring heat between said regions.

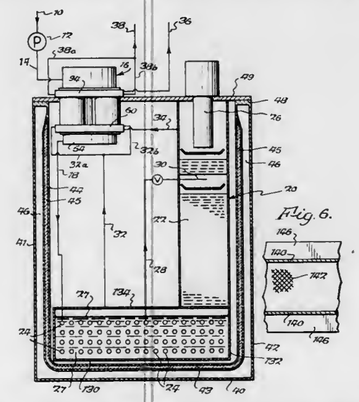


Fig. 6.

10. A system for liquefying air, separating the oxygen and nitrogen components of the liquiefied air and delivering oxygen gas of high purity comprising:

a. a distillation column having a rectification region, a source of refrigeration above said region and heat exchanger means below said region, said heat exchanger means being in a bath of liquid oxygen during operation of said system;

b. input conduit means connected to said heat exchanger means for providing input air to be liquefied;

c. means connecting said heat exchanger means to said rectification region of said distillation column for transmitting liquefied air to said region for separation into the oxygen and nitrogen components thereof;

d. output conduit means connected to said distillation column for removing oxygen gas of high purity from said column;

e. means comprising regenerator means operatively connected to said input and output conduits for exchanging heat between said oxygen gas and said air to be liquefied whereby said to air is precooled prior to entering said heat exchanger means in said distillation column, said regenerator means having a first region connected to said input conduit means and a second region surrounding said first region in heat exchange relationship therewith and connected to said output conduit means;

f. an insulated housing for said system tending to keep said system at a substantially constant temperature; and

g. packing material in said first region of said regenerator means for removing particulate material from the air and a plurality of thread members in said region.

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**4,017,285**

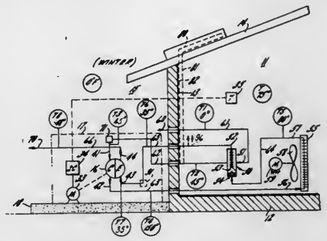
## HEAT PUMP-REFRIGERATION SYSTEM WITH WATER INJECTION AND REGENERATIVE HEAT EXCHANGER

**Thomas C. Edwards, Oviedo, Fla., assignor to The Rovac Corporation, Rockledge, Fla.**

**Filed Oct. 30, 1975, Ser. No. 627,114**

**Int. Cl.² F25B** *13/00*

**U.S. Cl. 62—2** **8 Claims**



1. A heat pump-refrigeration system comprising, in combination, a cool space, a relatively warm space separated therefrom by an insulating oarrier, a unitary compressor and expander having rotor means driven by a common shaft, the rotor means having vanes defining enclosed compartments which cyclically become smaller and larger as the shaft rotates, the compressor and expander each having an inlet port and an outlet port so that air is positively compressed and elevated in temperature in the compressor and positively expanded and lowered in temperature in the expander, a regenerative heat exchanger having first and second thermally coupled air passages, a primary heat exchanger in the warm space having an air passage thermally coupled to the air in the warm space, an initial air inlet for conducting air from the cool space into the first passage of the regenerative heat exchanger, means for conducting the air from said first passage to the compressor inlet port, means for conducting the air from the compressor outlet port to the primary heat exchanger, means for conducting the air from the primary heat exchanger to the second air passage of the regenerative heat exchanger, means for conducting the air from the said second air passage to the inlet port of the expander, and a final air outlet for conducting air from the outlet port of the expander to the cool space so that heat is effectively pumped from the cool space to the warm space to increase the temperature differential between them, and means for injecting water in finely divided form into the air stream which enters the compressor.

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**4,017,286**

## HEAT PUMP SUCTION LINE VENT

**William A. English, Franklin, Pa., and Charles J. Robinson, Norman, Okla., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed Dec. 22, 1975, Ser. No. 642,808**

**Int. Cl.² F25B** *13/00, 41/00*

**U.S. Cl. 62—160** **3 Claims**

1. A heat pump system including:

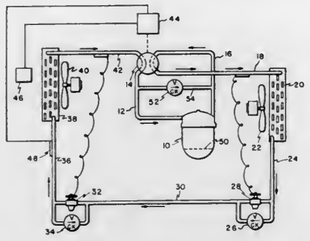
refrigerant compressor means;

a first refrigerant coil selectively operable as a condenser and as an evaporator;

a second refrigerant coil selectively operable as an evaporator and as a condenser in reverse relation to said first coil;

a reversing valve;

a refrigerant discharge line, and a refrigerant suction line, connecting said compressor means to said reversing valve;
refrigerant lines connecting each of said coils to said reversing valve, and a refrigerant line connecting said coils;
control means to effect a rapid reversal of said reversing valve while said compressor is running to initiate a defrost



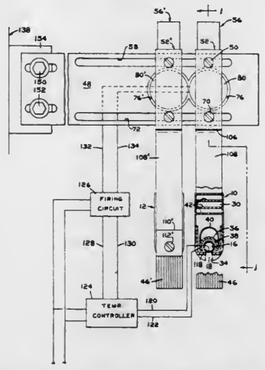
cycle and subsequently to effect another reversal of said reversing value to its original position to terminate the defrost cycle; and
line means including a one way check valve connecting said suction line to said discharge line to vent said suction line to said discharge line upon said reversal of said reversing valve.

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## 4,017,287
## CONTROL APPARATUS AND SYSTEM FOR CLOSELY SPACED HEATING ELEMENTS FOR FORMING GLASS FIBERS AND METHOD OF USING SAME

**Thomas H. Jensen, Murrysville, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.**

**Continuation of Ser. No. 563,930, March 31, 1975, Pat. No. 3,969,098, which is a continuation-in-part of Ser. No. 531,942, Dec. 12, 1974, abandoned, which is a continuation-in-part of Ser. No. 320,381, Jan. 2, 1973, abandoned. This application Jan. 20, 1976, Ser. No. 650,818**
**Int. Cl.² C03B** *37/02*
**U.S. Cl. 65—2** **3 Claims**

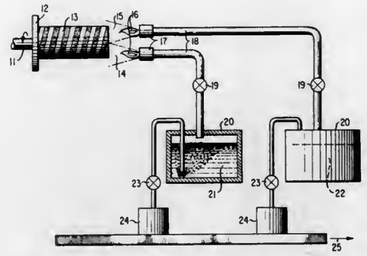


1. In a glass fiber forming system in which glass fibers are formed from an elongated tubular bushing operating under positive pressure other than glass head pressure and in which the elongated tubular bushing is electrically controlled, the improvement comprising providing along incremented lengths of the bushing gaseous cooling fluid means which are adjustable, and adjusting one or more of said means in response to a need for more or less gaseous cooling fluid to corresponding incremented lengths during the operation of the bushing.

## 4,017,288
## METHOD FOR MAKING OPTICAL FIBERS WITH HELICAL GRADATIONS IN COMPOSITION

**William George French, Plainfield, and John Burnette MacChesney, Stirling, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed Dec. 15, 1975, Ser. No. 640,577**
**Int. Cl.² C03B** *37/02*; **C03C** *25/02*
**U.S. Cl. 65—2** **4 Claims**



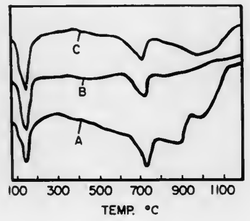
1. In a method of producing optical fibers with longitudinal gradations in index of refraction comprising:
rotating a substantially flat starting member about an axis perpendicular to the flat face of the said member;
forming thermochemically at least two different materials capable of being consolidated into a glass of optical loss less than 50 db/km and having two different indices of refraction;
depositing axially the material on the starting member;
consolidating the structure so formed into a unitary glass body; and
drawing the consolidated structure into an optical fiber the improvement comprising
forming the said materials into at least two different streams of different composition; and
depositing the material by directing each of the material streams onto the starting member to positions differing from each other in azimuth.

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## 4,017,289
## OPAL GLASSES PREPARED THROUGH CLAY VITRIFICATION

**Syed N. Hoda, Horseheads, N.Y., assignor to Corning Glass Works, Corning, N.Y.**

**Continuation-in-part of Ser. No. 679,983, April 26, 1976, abandoned. This application Aug. 9, 1976, Ser. No. 712,480**
**Int. Cl.² C03B** *23/20*; **C04B** *33/13, 7/00*
**U.S. Cl. 65—18** **9 Claims**




1. A method for making an opal glass comprising the steps of:
A. a bentonite clay exhibiting a DTA curve free from a sharp rise in slope at about 900° C., having a cation exchange capacity of about 100–200 milliequivalents/100 grams, and consisting essentially, in weight percent on the oxide basis, of about 57–78.5% $SiO_2$, 13.8–23% $Al_2O_3$, 0–4% MgO, 0–5% $Fe_2O_3$, 0–2.5% CaO, 0–5.4% $Na_2O$, and 0–0.5% $K_2O$, is treated with an aqueous solution of a sodium and/or potassium salt to exchange sodium and/or potassium ions with other cations present in said clay to obtain a mono-cationic derivative having a composition within the $Na_2O/K_2O$-$Al_2O_3$-$SiO_2$ system;
B. the ion exchanged clay is washed with water;
C. the washed clay is dried;
D. the dried clay is shaped into a desired form; and
E. the clay shape is fired to vitrification in accordance with the schedule:
a. the clay shape is dried;
b. the clay shape is dehydroxylized and carbonaceous material is burned out by heating to about 700°–900° C.; and then
c. the clay shape is vitrified by heating to about 950°–1200° C.

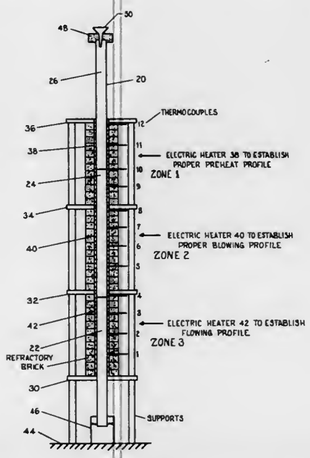


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## 4,017,290
## METHOD AND APPARATUS FOR MAKING UNIFORM PELLETS FOR FUSION REACTORS

**Ronald G. Budrick, Ann Arbor, Mich.; Frank T. King, Hillsboro, Oreg.; Alfred J. Martin; Robert L. Nolen, Jr., both of Ann Arbor, Mich., and David E. Solomon, Ann Arbor, Mich., assignors to KMS Fusion, Inc., Ann Arbor, Mich.**

**Filed Apr. 15, 1974, Ser. No. 463,860**
**Int. Cl.² C03B** *19/10, 19/08*
**U.S. Cl. 65—21** **4 Claims**




1. A method of forming sized microspheres which comprises:
a. separating glass frit into a plurality of quantities of predetermined selected sizes in the range of 50 to 90 micrometers,
b. heating a vertical drop tube from outside the tube to temperature ranges between 800° and 1300° C,
c. closing the top of the tube with a closure and the bottom of said tube with a quantity of receiving liquid to prevent down or updraft,
d. feeding a quantity of a selected size of frit into the top of said heated tube and recovering said frit as microspheres in said liquid, and
e. repeating said feeding step with a different selected size in each instance to provide a plurality of microspheres of differing sizes.

## 4,017,291
## PROCESS FOR THE TREATMENT OF GLASS BY METAL MIGRATION

**Georg Gliemeroth, Finthen, and Lothar Meckel, Ostrich, both of Germany, assignors to Jenaer Glaswerk Schott & Gen., Mainz, Germany**

**Filed June 10, 1976, Ser. No. 694,595**
**Claims priority, application Germany, June 16, 1975, 2526804**
**Int. Cl.² C03C** *21/00*
**U.S. Cl. 65—30 R** **16 Claims**

1. A process for the treatment of glass for the purpose of varying properties of the glass, comprising the steps of applying a vapor-coating of at least one metal onto the surface of said glass and thereafter heating said metal coating and said glass substrate, in the absence of oxygen, to a temperature sufficient to cause said metal to migrate from the surface of said glass into said glass without any residue remaining on the surface of said glass.

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## 4,017,292
## PROCESS FOR MAKING MULTIFOCAL PHOTOCHROMIC OPHTHALMIC LENS

**George H. Mann, Corning, N.Y., assignor to Corning Glass Works, Corning, N.Y.**

**Continuation-in-part of Ser. No. 636,126, Nov. 28, 1975, abandoned, which is a continuation-in-part of Ser. No. 491,786, July 25, 1974, abandoned. This application Jan. 15, 1976, Ser. No. 649,474**
**Int. Cl.² C03B** *32/00, 11/08*; **C03C** *3/04*
**U.S. Cl. 65—33** **5 Claims**

5. A process for manufacturing a photochromic multifocal ophthalmic lens comprising a major lens portion composed of a photochromic glass and at least one lens segment fused to the major lens portion composed of a glass having a higher index of refraction than the major lens portion, comprising the steps of:
a. providing a major lens portion composed of a silver halide-containing glass which is potentially photochromic, said glass consisting essentially, in weight percent on the oxide basis, of about 48–57% $SiO_2$, 6–10% $Al_2O_3$, 15–22% $B_2O_3$, 0.8–2% $Na_2O$, 2.4–3.1% $Li_2O$, 0–4% $K_2O$, 3.2–7.2% $Na_2O + Ki_2O + K_2O$, 4.5–5.3% PbO, 3–9% BaO, 0–7.2% $ZrO_2$, 0.10–0.6% Ag, 0.01–0.10% CuO, 0.15–1.2% Cl, 0–1.0% Br, 0–0.1% I and 0–1.2% F;
b. subjecting the potentially photochromic major lens portion to a nucleating heat treatment above the annealing point of the glass for a time sufficient to initiate the growth of silver halide crystals therein, but insufficient to render the glass photochromic, to provide a nucleated major lens portion;
c. combining the nucleated major lens portion with at least one lens segment composed of a glass having a higher index of refraction than the major lens portion;
d. subjecting the nucleated major lens portion and lens segment to a fusion heat treatment at a temperature near the softening point of at least one of the glasses for a time sufficient to develop photochromic properties in the nucleated major lens portion and fuse the lens segment thereto; and
e. cooling the fused major lens portion and lens segment.

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## 4,017,293
## HEAT TREATING AND SAGGING LENS BLANKS

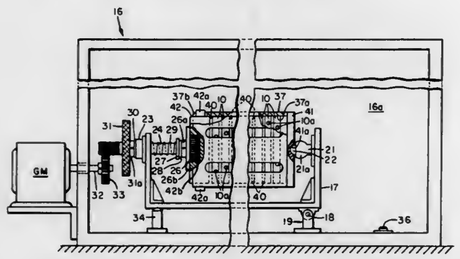
**Edwin J. Illig, Corning, N.Y., assignor to Corning Glass Works, Corning, N.Y.**

**Filed May 27, 1976, Ser. No. 690,623**
**Int. Cl.² C03B** *23/02, 32/00*
**U.S. Cl. 65—107** **6 Claims**

1. A method of heat treating a plurality of flat geometrically congruent glass lens blanks made from a phototropic glass composition which requires, or it is expedient to subject to, for

development of the phototropic properties thereof, a heat treatment at a temperature above the softening point temperature of such glass for a predetermined period of time, such method comprising the steps of:

A. forming a stack by alternately positioning similar areas of the flat surfaces of each of said lens blanks, adjacent the perimeters thereof, between the flat surfaces of two flat spacer members having hollows extending from one flat surface through the other flat surface thereof, such hollows having perimetric configurations corresponding to perimetric configurations desired for eyeglass lenses to be subsequently made from said lens blanks;



B. disposing said stack in a tube whose hollow has a cross-sectional shape complemental to the outer peripheries of said lens blanks and supplying force to the ends of said stack to clamp the lens blanks;

C. rotating said tube and said lens blanks about the longitudinal axis of such tube while horizontally oriented and while evenly heating such lens blanks to said development temperature for said period of time; and

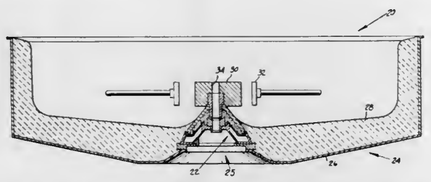
D. terminating said heating and permitting the glass of said lens blanks to become set up.

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**4,017,294**
**FURNACE OUTLET**

**Steve Douglas Sanford, Richmond, Ind.; Vaughn Charles Chenoweth, Hollanburg, Ohio, and Duane Harold Faulkner, Cambridge City, Ind., assignors to Johns-Manville Corporation, Denver, Colo.**

**Continuation of Ser. No. 491,885, July 25, 1974, Pat. No. 3,912,488. This application Sept. 4, 1975, Ser. No. 610,211**
**The portion of the term of this patent subsequent to Oct. 14, 1992, has been disclaimed.**
**Int. Cl.² C03B 5/26**
**U.S. Cl. 65—326** **15 Claims**



1. In an electric furnace for melting glass and other high melting point materials at temperatures exceeding 2500° F. said furnace including a vessel, means for electrically heating and melting the materials with the vessel, and an outlet means extending through a wall of said vessel from the interior of said furnace to the exterior of said furnace for withdrawing molten material from said vessel, the improvement comprising:

said outlet means including a first outlet orifice having one end in the interior of said vessel and through which molten material passes upon withdrawal from said vessel, said first outlet orifice comprising a corrosion resistant metal having a melting point in excess of 2500° F, but which must be protected from an oxidizing atmosphere at the temperature of the molten material, and means for shielding said first outlet orifice from an oxidizing atmosphere without the need for the use of a neutral or reducing gas surrounding the outlet, said shielding means consisting essentially of a second outlet orifice below said first outlet orifice, said second outlet orifice being made from a material having a higher resistance to oxidation from air than the metal in said first outlet orifice, said second outlet orifice being located in a recess in the bottom of said vessel and fluid cooling means at least partially surrounding said second outlet orifice for maintaining said second outlet orifice at a temperature below its critical or melting temperature.

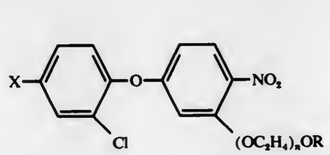
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**4,017,295**
**HERBICIDAL COMPOSITION**

**Ryohei Takahashi; Isao Yokomichi, both of Kusatsu; Kazuyuki Maeda, Hikone, and Takahiro Haga, Kusatsu, all of Japan, assignors to Ishihara Sangyo Kaisha Ltd., Osaka, Japan**

**Filed July 21, 1975, Ser. No. 597,677**
**Claims priority, application Japan, July 24, 1974, 49-84249**
**Int. Cl.² A01N 9/20**
**U.S. Cl. 71—66** **3 Claims**

1. A method of controlling aquatic and hygrophytic weed-growth which comprises applying to paddy fields or dry fields a herbicidally effective amount of a herbicidal composition which comprises an active ingredient of a diphenylether having the formula



wherein X represents a chlorine atom or a trifluoromethyl group; R represents a methyl or ethyl group and *n* represents an integer of 2 or 3; and an agriculturally acceptable adjuvant.

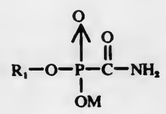
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**4,017,296**
**PHOSPHONATES FOR CONTROL OF BINDWEED**

**Turney John Hernandez, Centerville, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Aug. 29, 1975, Ser. No. 608,908**
**Int. Cl.² A01N 9/36**
**U.S. Cl. 71—86** **4 Claims**

1. A method for the retardation of bindweed on cropland which comprises applying to the foliage of the bindweed an effective amount of a compound selected from the compounds having the formula



wherein

$R_1$ is alkyl of 1 to 3 carbon atoms or allyl; and

M is hydrogen, ammonium, sodium, lithium, or potassium, and then proceeding immediately to plant crops on said cropland whereby there is substantially no injury to said crops.

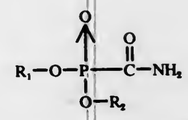


**4,017,297**
**PHOSPHONATES FOR THE CONTROL OF BINDWEED**

**Turney John Hernandez, Centerville, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Aug. 29, 1975, Ser. No. 608,907**
**Int. Cl.² A01N 9/36**
**U.S. Cl. 71—86** **4 Claims**

1. A method for the retardation of bindweed on cropland which comprises applying to the foliage of the bindweed a herbicidally-effective amount of a compound selected from compounds having the formula



wherein $R_1$ and $R_2$ independently can be alkyl of 1 to 3 carbon atoms or allyl, and then proceeding immediately to plant crops on said cropland whereby there is substantially no injury to said crops.

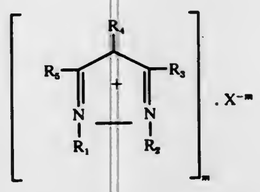
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**4,017,298**
**1,2,4-TRIALKYL-3,5-DIPHENYLPYRAZOLIUM SALTS AS HERBICIDES**

**Barrington Cross, Rocky Hill, and Bryant Leonidas Walworth, Pennington, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.**

**Filed May 2, 1975, Ser. No. 574,068**
**The portion of the term of this patent subsequent to Dec. 30, 1992, has been disclaimed.**
**Int. Cl.² A01N 9/22**
**U.S. Cl. 71—92** **14 Claims**

1. A method for the herbicidal control of undesirable plant species comprising: applying to the foliage of said undesirable plant species, or to the soil containing the seeds of said plant species, a herbicidally effective amount of a compound having the formula:



wherein $R_1$ and $R_2$ each represent $C_1$–$C_4$ alkyl, $R_3$ represents a member selected from the group consisting of $C_2$–$C_4$ alkyl, $C_3$–$C_7$ cycloalkyl, phenyl and benzyl; $R_4$ represents a member selected from the group consisting of $C_1$–$C_5$ alkyl, allyl, propargyl, carbethoxymethyl and benzyl; $R_5$ represents a member selected from the group consisting of $C_2$–$C_4$ alkyl, $C_3$–$C_7$ cycloalkyl and phenyl; X represents an anion having the charge of 1, 2 or 3, and *m* is an integer from 1 to 3.

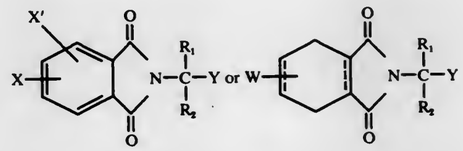
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**4,017,299**
**PHTHALIMIDE DERIVATIVES AS PLANT GROWTH REGULANTS**

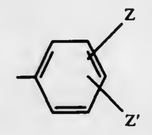
**Robert Eugene Diehl, Trenton, and Bryant Leonidas Walworth, Pennington, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.**

**Division of Ser. No. 382,418, July 25, 1973, Pat. No. 3,940,419, which is a continuation-in-part of Ser. No. 348,355, April 5, 1973, abandoned, which is a continuation-in-part of Ser. No. 282,537, Aug. 21, 1972, abandoned. This application July 23, 1975, Ser. No. 598,458**
**Int. Cl.² A01N 9/22**
**U.S. Cl. 71—96** **10 Claims**

1. A method for regulating the growth of plants comprising: applying to the foliage, roots, stems, seeds, seed pieces or to soil in which the plants are grown, an effective plant growth regulating amount of a compound having the formula:



wherein W is hydrogen or lower alkyl $C_1$–$C_4$; X and X′ each represent hydrogen, alkyl $C_1$–$C_4$, $CF_3$, alkoxy $C_1$–$C_4$, benzyloxy, di($C_1$–$C_4$) alkylamino, $C_1$–$C_4$ alkylthio, hydroxy, $C_1$–$C_4$ alkylsulfonyl, halogen, alkanoylamino $C_1$–$C_4$ or nitro; Y is $-CONHR_8$, $-COOR_3$, $-CONR_3R_4$, $-CONHN(R_5)_2$, $-CONHN^+(R_6)_3$.halide$^-$, or $-CN$; $R_1$ and $R_2$ each represent alkyl $C_1$–$C_4$ or when taken together with the carbon to which they are attached form cycloalkyl $C_4$–$C_{11}$ optionally substituted with methyl; $R_3$ and $R_4$ each represent hydrogen or alkyl $C_1$–$C_4$; $R_5$ and $R_6$ each represent alkyl $C_1$–$C_2$, $R_8$ is $-CH_3$ or



where Z and Z′ are hydrogen, alkyl $C_1$–$C_2$, halogen, $-CF_3$ or $-OCH_3$ and ---- is a single or double bond with the proviso that there be only 0 or 1 double bond in the ring; or mixtures thereof.

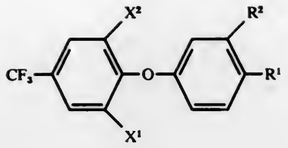
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**4,017,300**
**HALOGENATED 4-TRIFLUOROMETHYL-DIPHENYL-ETHER HERBICIDAL COMPOSITIONS**

**Lothar Rohe, Wuppertal; Jürgen Schramm, Dormagen; Erich Klauke, Odenthal-Hahnenberg; Ludwig Eue, and Robert Rudolf Schmidt, both of Cologne, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany**

**Division of Ser. No. 483,331, June 26, 1974, Pat. No. 3,957,865. This application Feb. 27, 1976, Ser. No. 662,065**
**Claims priority, application Germany, July 3, 1973, 2333848**
**Int. Cl.² A01N 9/12**
**U.S. Cl. 71—98** **12 Claims**

1. Herbicidal compositions comprising a herbicidally acceptable carrier and, in effective amounts, a halogenated 4-trifluoromethyl-diphenyl-ether compound of the formula



(I)

wherein
$R^1$ is aminothiocarbonyl;
$R^2$ is hydrogen or methyl;
$X^1$ is halogen; and
$X^2$ is hydrogen or halogen.

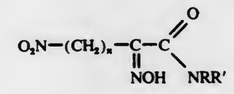
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## 4,017,301
## PLANT GROWTH REGULANTS

**John B. O'Brien, Watertown, Conn.; John Pisanchyn, Morristown, N.J., and S. Robert Colby, Durham, N.H., assignors to Allied Chemical Corporation, Morris Township, N.J.**

**Division of Ser. No. 387,054, Aug. 9, 1973, Pat. No. 3,873,301. This application Jan. 14, 1975, Ser. No. 540,937**
**Int. Cl.² A01N** *9/20*
**U.S. Cl. 71—118** **8 Claims**

1. A method for increasing the yield of plants which comprises applying to the plants an effective amount of a nitrooximino alkanoic derivative having the general formula:



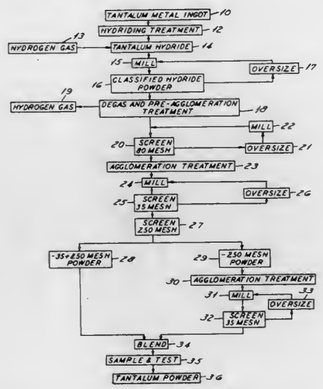
wherein *n* is an integer from 1 to 12 and R and R′ are independently selected from the group consisting of hydrogen, alkyl of 1–12 carbon atoms, cycloalkyl of 3–12 carbon atoms, hydrocarbyl aralkyl of 7–19 carbon atoms, hydrocarbyl alkaryl of 7–19 carbon atoms, hydrocarbyl aryl, alkenyl of 3–12 carbon atoms and alkynyl of 3–12 carbon atoms.

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## 4,017,302
## TANTALUM METAL POWDER

**Victor T. Bates, Kenosha, Wis.; Stanley S. Fry, North Chicago, and James B. Hakko, Waukegan, both of Ill., assignors to Fansteel Inc., North Chicago, Ill.**

**Filed Feb. 4, 1976, Ser. No. 655,159**
**Int. Cl.² B22F** *1/04*
**U.S. Cl. 75—.5 BB** **18 Claims**




1. A method of manufacturing an improved, high-purity agglomerated tantalum powder having high green strength in the absence of a binder which comprises:

a. milling hydrided high-purity tantalum metal ingots to a predetermined particle size powder,
b. subjecting the milled powder to a two-step heat treatment at predetermined temperatures under chemically non-reactive conditions to degas at a first temperature and then to pre-agglomerate the powder at a second and higher temperature,
c. milling and screening the pre-agglomerated powder to separate portions larger than a first intermediate mesh size and milling, such portions and blending with the pre-agglomerated powder to achieve intermediate mesh size powders,
d. heating the blended powder under chemically non-reactive conditions to a temperature higher than the original predetermined agglomeration temperature to agglomerate it,
e. milling the agglomerated powder and screening to a second pass through an intermediate mesh size screen larger than said first intermediate mesh size and a relatively fine no-go mesh size,
f. separating the fines from said screening,
g. heating said fines under chemically non-reactive conditions to an agglomeration temperature,
h. remilling said agglomerated fines to pass the second intermediate screen, and
i. blending all said agglomerated powder to provide a tantalum powder ready for pressing into shapes and sintering to form low density anodes.

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## 4,017,303
## MANUFACTURE OF ACICULAR FERROMAGNETIC METAL PIGMENTS CONTAINING IRON

**Eberhard Koester, Frankenthal; Gerd Wunsch, Speyer; Paul Deigner, Weisenheim; Werner Stumpfi, Ludwigshafen, and Hans Henning Schneehage, Mutterstadt, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany**

**Filed July 14, 1975, Ser. No. 595,563**
**Claims priority, application Germany, July 16, 1974, 2434058**
**Int. Cl.² B22F** *9/00*
**U.S. Cl. 75—.5 AA** **9 Claims**

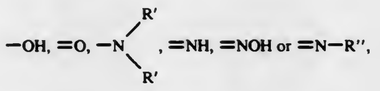
1. A process for the manufacture of acicular ferromagnetic metal pigments, predominantly containing iron, comprising the steps of:

a. dispersing acicular iron oxide in a solution of (i) an alkaline earth metal compound wherein the alkaline earth metal cation of said alkaline earth metal compound is selected from the group consisting of Ca, Ba, and Sr cation, and (ii) an organic compound which contains at least one group which can form chelates of the formula I



(I)

in which X and Y are



wherein R′ is a terminal short-chain carboxylic acid linked to nitrogen by means of an amino bond, R″ is alkyl or aryl and R is a two-membered or three-membered carbon chain or a part of an aromatic ring, whereby said organic compound forms a chelate with said alkaline earth metal cation in the solvent used to form said solution,

b. removing the solvent by evaporation wherein said chelate is applied to said acicular iron oxide, and
c. reducing the so-treated acicular iron oxide with hydrogen at temperatures of up to 400° C to form metal pigments which retain their acicular shape.

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## 4,017,304
## PROCESS FOR SELECTIVELY CHLORINATING THE TITANIUM CONTENT OF TITANIFEROUS MATERIALS

**Hans Hellmut Glaeser, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Continuation-in-part of Ser. No. 299,470, Oct. 20, 1972, abandoned. This application Sept. 18, 1973, Ser. No. 398,470**
**Int. Cl.² C22B** *5/10*; **C01G** *23/02*; **C01B** *31/18*; **C21B** *15/00*
**U.S. Cl. 75—33** **13 Claims**

1. Process for chlorinating the titanium constituent of a titaniferous material without an appreciable net yield of iron chloride from the iron constituent of said material, whereby said iron constituent is recoverable in the metallic state, by intimately contacting said material with a chlorinating agent at an elevated temperature of 950° to 1400° C. and in the presence of a carbonaceous reductant, said chlorinating agent consisting essentially of $FeCl_2$ and $Cl_2$, all or part of said chlorinating agent may be in the form of $FeCl_3$, when the chlorinating agent consists essentially of $FeCl_2$ and other chlorine-containing members the ratio in the chlorinating agent of the atoms of chlorine provided by the total of said other chlorine-containing members to $FeCl_2$ being no more than about 4, and the atomic ratio of carbon in said carbonaceous reductant to oxygen in said material being at least about 1, whereby said ratio is at least stoichiometric to produce carbon monoxide.

6. Process according to claim 1 wherein the reaction is carried out to convert at least 85% by weight of the iron in the titaniferous material to metallic iron.

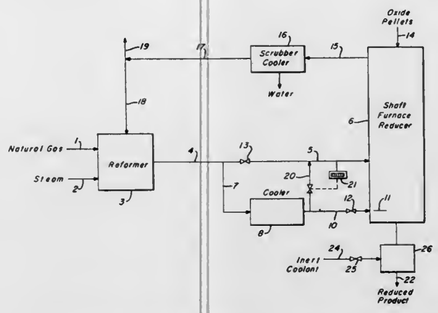
13. Process according to claim 1 wherein the chlorinating agent is a mixture of $FeCl_2$ and $FeCl_3$ and the reaction is carried out to produce an amount of metallic iron in excess of that in the titaniferous material.

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## 4,017,305
## PROCESS FOR HEAT HARDENING

**Stephen Waslo, Penn Hills Township, Allegheny County, Pa., assignor to United States Steel Corporation, Pittsburgh, Pa.**

**Continuation-in-part of Ser. No. 568,332, April 15, 1975. This application Dec. 24, 1975, Ser. No. 644,249**
**Int. Cl.² C21B** *13/02*
**U.S. Cl. 75—34** **13 Claims**




1. In the production of metallized pellets by the gaseous reduction of iron oxide particles in a shaft furnace the method of thermally densifying said particles to increase the ignition temperature and strength of the product comprising the steps of:

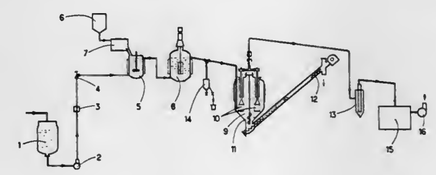
a. establishing a gravitational flow of said particles by feeding the same to the upper part of said furnace and removing the reduced product from the bottom thereof;
b. passing a reducing gas in counterflow relation to the flow of said particles through said furnace as follows:
i. introducing a first portion of said reducing gas at a temperature sufficient to heat said particles to the level necessary to chemically reduce at least 95 percent of said iron oxide at an upstream location in the particle-flow sense of said furnace; and
ii. introducing a second portion of said reducing gas at a lower temperature at a location downstream of said upstream location, said second portion being in an amount sufficient to maintain the temperature of said particles at a level to thermally densify the reduced particles to raise their ignition temperature to at least 400° F.

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## 4,017,306
## PROCESS FOR CONTINUOUS PRODUCTION OF PURE SODIUM

**Bernard Batoux, Saint-Marcel; Albert Laurent-Atthalin, Annecy, and Michel Salmon, Saint-Marcel, all of France, assignors to Metaux Speciaux S.A., Paris, France**

**Filed Dec. 30, 1974, Ser. No. 537,442**
**Claims priority, application France, Nov. 16, 1973, 73.40816**
**Int. Cl.² C22B** *27/00*
**U.S. Cl. 75—66** **4 Claims**



1. A purification process for continuously producing extremely pure, nuclear-grade sodium from commercial-grade sodium containing calcium and barium impurities consisting essentially of the following stages, carried out in the absence of air and moisture:

a. continuously introducing sodium peroxide in a finely divided form into a stream of liquid commercial-grade sodium flowing at a substantially constant rate and at a temperature of between 110° and 120° C, the introduction of the sodium peroxide being continuously metered in a quantity by weight adjusted to between 2 to 8 times the quantity by weight of calcium in the commercial-grade sodium;
b. continuously mixing the sodium peroxide and commercial-grade sodium in a mixing zone at a temperature of between 110° and 130° C by vigorous stirring which enables the particles of sodium peroxide to be wetted by the commercial-grade sodium and to thus suspend and uniformly disperse the particles in the commercial-grade sodium;
c. continuously passing the mixture thus formed to a reaction zone at a temperature in the range from 210° to 230° C, the mixture being subjected to stirring of sufficient intensity to avoid the formation of any appreciable deposits in the mixing and reaction zones, the reaction being accompanied by the formation of calcium and barium oxides which remain substantially suspended in the agitated stream of commercial-grade sodium;
d. continuously flowing the aforesaid reaction mixture to a decantation zone kept at a cooling temperature of between 105° and 115° C;
e. separating the greater part of the suspended particles by decantation;
f. retaining the fine particles remaining in the suspension by filtration at about 105° to 115° C; and

g. recovering from the filtration step a purified sodium containing less than 10 ppm of calcium and less than 5 ppm of barium.

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**4,017,307**

## THERMAL METHOD FOR THE RECOVERY OF METALS AND/OR METAL COMBINATIONS WITH THE AID OF A MELTING CYCLONE

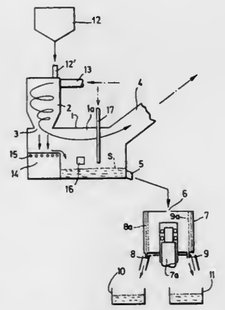
**Helmut Winterhager, Aachen; Roland Kammel, Berlin, and Horst Weigel, Cologne-Bruck, all of Germany, assignors to Klockner-Humboldt-Deutz Aktiengesellschaft, Germany**

**Continuation-in-part of Ser. No. 507,785, Sept. 20, 1974, abandoned. This application Apr. 20, 1976, Ser. No. 678,496**

**Claims priority, application Germany, Sept. 25, 1973, 2348105**

**Int. Cl.² C22B** *15/00*

**U.S. Cl. 75—72** **11 Claims**



1. A thermal method of continuously recovering metals and/or metal combination from ores, concentrates, or metal-containing intermediary products as starting materials, comprising:

continuously charging starting materials into a cyclone reactor and therein continuously melting the starting materials;

continuously discharging molten materials and gases from the reactor into one end of a generally horizontal flow-through buffer hearth chamber within an enclosure;

continuously withdrawing gases from the upper portion of the opposite end of the chamber;

continuously receiving the molten materials discharged from the reactor at said one end of the chamber and flowing the molten materials continuously toward said opposite end of the chamber along a relatively short molten materials flow area along the bottom of said chamber;

continuously discharging the molten materials at a substantially uniform flow rate from said flow area through a discharge opening leading downwardly from said flow area at said opposite end of the chamber;

maintaining the molten materials along the length of said relatively short bottom flow area in the chamber at a temperature substantially as received from the reactor and in a thoroughly fluid state and continuously flowing toward said opposite end of the chamber without additional heating;

buffering the flow volume of said molten materials along said relatively short flow area and assuring a continuous supply of molten materials to said discharge opening even though the discharge output from the reactor may fluctuate;

continuously receiving molten materials downwardly from said discharge opening through an upper end entrance into an upright axis centrifugal separator;

continuously centrifugally separating the molten materials in said separator and about the axis of the separator into a substantially cylindrical metallic phase and a concentric substantially cylindrical slag phase;

and continuously discharging the metallic phase of the molten materials and the slag phase of the molten materials from the lower end of the separator through separate respective exits offset from the axis of the separator and radially spaced from each other.

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**4,017,308**

## SMELTING AND REDUCTION OF OXIDIC AND SULPHATED LEAD MATERIAL

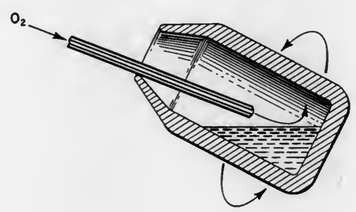
**Stig Arvid Peterson, and Sven Anders Lundquist, both of Skelleftehamn, Sweden, assignors to Boliden Aktiebolag, Stockholm, Sweden**

**Filed Dec. 12, 1974, Ser. No. 532,233**

**Claims priority, application Sweden, Dec. 20, 1973, 7317217; Dec. 20, 1973, 73172181**

**Int. Cl.² C22B** *13/00*

**U.S. Cl. 75—77** **12 Claims**




1. The method of recovering crude lead from materials containing lead substantially in the form of oxides and/or sulfates comprising

charging said materials into a top blown rotary converter with an inclined rotational axis,

smelting said materials with the aid of a flame formed by burning fuel with oxygen over the surface of the bath of smelted material,

rotating the top blown rotary converter at 10–60 r p m and at a speed of 0.5 – 7 m/s measured at the inner periphery of the cylindrical part of the converter and with said rotational axis inclined to the horizontal plane so that the smelted material by means of the friction force induced by the rotational speed is lifted up along said inner periphery of the converter to a level at which smelt falls as finely-divided drops of liquid,

reducing oxides and/or sulfates of lead present in said smelted material during said rotation by introducing a reducing agent, and thereafter

tapping any slag formed and crude lead smelt from the converter.

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**4,017,309**

## THIN LAYER LEACHING METHOD

**Paul H. Johnson, Anaheim, Calif., assignor to Holmes & Narver, Inc., Anaheim, Calif.**

**Filed Mar. 28, 1975, Ser. No. 562,962**

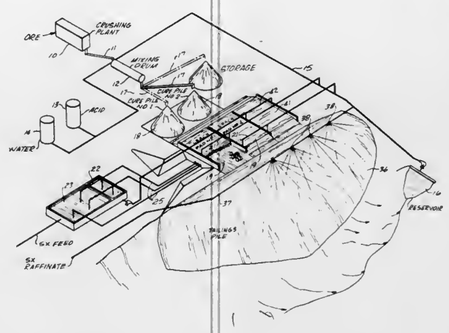
**Int. Cl.² C22B** *1/00*

**U.S. Cl. 75—101 R** **64 Claims**

1. A method for leaching material values from particles comprising the steps of:

forming a thin layer of particles having more than about 25% by weight particles larger than about 4 mesh, the thickness of the layer being less than about one and ½






meters; and

percolating a leach liquid downwardly through the layer.

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**4,017,310**

## METHOD FOR MAKING STRONTIUM ADDITIONS TO FERROSILICON

**James Herbert Downing, Clarence, and James Enoch Wells, III, Kenmore, both of N.Y., assignors to Union Carbide Corporation, New York, N.Y.**

**Filed Dec. 31, 1975, Ser. No. 645,716**

**Int. Cl.² C22C** *33/00*

**U.S. Cl. 75—129** **6 Claims**

1. A method for adding strontium to silicon or ferrosilicon which comprises adding to molten silicon or ferrosilicon at a temperature in the range of 1400° to 1700° C a mixture consisting essentially of carbon and at least one material selected from the group consisting of strontium oxide, strontium carbonate and strontium sulfate, the carbon in said mixture being in substantially the amount required to reduce the selected material and form strontium carbide.

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**4,017,311**

## PHOTOELECTROPHORETIC IMAGING SUSPENSION

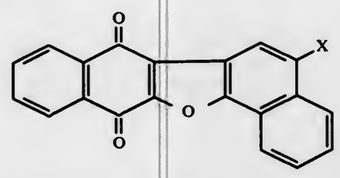
**Robert J. Gruber, Pittsford, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

**Division of Ser. No. 492,555, July 29, 1974, Pat. No. 3,957,829. This application Nov. 10, 1975, Ser. No. 630,479**

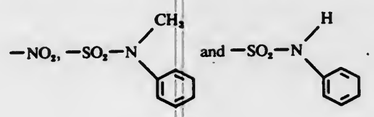
**Int. Cl.² G03G** *5/06, 9/04*

**U.S. Cl. 96—1.5** **4 Claims**

1. A suspension comprising electrically photosensitive pigment particles in an electrically insulating carrier liquid, said pigment particle comprising a compound represented by the general formula




wherein X is a member selected from the group consisting of




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**4,017,312**

## METHOD OF MANUFACTURING AN ARTICLE CARRYING A RELIEF IMAGE RECEPTOR MATERIAL COMPRISING EXPOSURE AND HEATING STEPS

**William Erskine, Grand-Lancy; Raymond Gerber, Moillesulaz, and Francis Mentienne, Carouge, all of Switzerland, assignors to Mitsubishi Plastics Industries, Limited, Tokyo, Japan and Battelle Memorial Institute, Geneva, Switzerland**

**Filed Dec. 19, 1975, Ser. No. 642,552**

**Claims priority, application Switzerland, Dec. 23, 1974, 17218/74**

**Int. Cl.² G03C** *5/00, 5/24*

**U.S. Cl. 96—35** **9 Claims**

1. A method of manufacturing an article carrying a relief image suitable for use as a printing plate which comprises:

i. image-wise exposing to appropriate actinic radiation the surface of a photosensitive receptor material having at least a portion of its thickness from the surface comprising a homogeneous mixture of:

a. a solid material whose softening point is altered upon exposure to said actinic radiation such that the exposed and non-exposed portions of said receptor material have different softening points; and

b. at least one substance which releases a gas when heated to a temperature between the softening points of said exposed portions and non-exposed portions of said receptor material;

ii. then heating the exposed receptor material to a temperature between the softening points of said exposed portions and said non-exposed portions of said receptor material, said temperature being at least equal to the temperature at which said substance releases said gas;

thereby causing the swelling of said exposed portions and said non-exposed portions to different heights to form a relief image.

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**4,017,313**

## PHOTOSENSITIVE COMPOSITION CONTAINING A LEUCO DYE, A PHOTOSENSITIZER, AN AROMATIC ALDEHYDE AND A SECONDARY OR TERTIARY AMINE AND THE USE THEREOF IN A DIRECT-PRINT PROCESS

**Harris Dale Hartzler, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Continuation-in-part of Ser. No. 511,029, Sept. 30, 1974, abandoned. This application July 24, 1975, Ser. No. 599,013**

**Int. Cl.² G03C** *5/24, 1/52*

**U.S. Cl. 96—48 QP** **21 Claims**

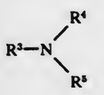
1. A radiation sensitive leuco dye composition which comprises

1. a photosensitive leuco dye which is exidizable to a colored form by exposure to radiation,

2. 0.01 to 50 parts by weight, per part of leuco dye, of photosensitizer for the dye selected from the group consisting of ketones, hexaarylbiimidazoles, and perylene,

3. 0.5 to 100 parts by weight, per part of leuco dye, of an aromatic aldehyde,

4. 0.1 to 10 parts by weight, per part of aromatic aldehyde, of a secondary or tertiary amine is of the formula




in which

$R^3$ is H; benzyl; or $C_1$–$C_8$ alkyl, unsubstituted or substituted, and

$R^4$ and $R^5$, alike or different, are $C_1$–$C_8$ alkyl, unsubstituted or substituted; cyclohexyl; benzyl; or together form a carbocyclic or hetero-O-cyclic portion of an alicyclic 6-membered ring.

4,017,314

## USE OF CROWN COMPOUNDS (CYCLIC POLYETHERS) IN LITHO DEVELOPERS TO IMPROVE HALFTONE DOT QUALITY AND GRADATION

**Ralph Kingsley Blake, deceased, late of Union County, N.J. (by June Arlene Blake, executrix), assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Jan. 7, 1976, Ser. No. 647,642**
**Int. Cl.² G03C** *5/30*
**U.S. Cl. 96—66 R** **10 Claims**

3. A process for the production of developed photographic material which comprises subjecting photographic lith material containing a latent silver image in a silver halide emulsion layer to development by means of a formaldehyde/bisulphite/-hydroquinone lithographic developer, the process being characterized in that the development takes place in the presence of a crown compound having 5–16 oxygen atoms in a cyclic ring having a total of 14–60 atoms.

4,017,315

## MOLYBDATE-PHOSPHATE CORROSION INHIBITING PIGMENT

**Mark S. Vukasovich, Ann Arbor, and Francis J. Sullivan, Allen Park, both of Mich., assignors to Amax Inc., New York, N.Y.**

**Filed June 27, 1975, Ser. No. 590,798**
**Int. Cl.² C09D** *5/08*
**U.S. Cl. 106—14** **11 Claims**

1. A corrosion inhibiting pigment comprising discrete particles of an average particle size up to about 25 mircons comprising a mixture of a metal molybdate compound selected from the group consisting of zinc molybdate, calcium molybdate, strontium molybdate, barium molybdate and mixtures thereof and a metal phosphate compound selected from the group consisting of zinc phosphate, calcium phosphate, magnesium phosphate and mixtures thereof, said metal molybdate compound being present on a pigment volume concentration basis of from about 2 parts up to about 3 parts per part of said metal phosphate compound.

11. In a corrosion inhibiting protective coating formulation comprising a vehicle and a solid corrosion inhibiting pigment dispersed substantially uniformly therethrough, said pigment comprising discrete particles of an average particle size up to about 25 microns; the improvement comprising, as said pigment, a mixture consisting of a metal molybdate compound selected from the group consisting of zinc molybdate, calcium molybdate, strontium molybdate, barium molybdate and mixtures thereof and a metal phosphate compound selected from the group consisting of zinc phosphate, calcium phosphate, magnesium phosphate and mixtures thereof, said metal molybdate compound being present on a pigment volume concentration basis of from about 2 parts up to about 3 parts per part of said metal phosphate compound, said corrosion inhibiting pigment being present in said vehicle in an amount sufficient to impart corrosion inhibiting properties thereto.

4,017,316

## FIREPROOF STAMPING MASS FOR TAP SPOUTS AND FLUES IN BLAST FURNACES

**Albert Lajos Renkey, Dusseldorf-Wittlaer, and Hans-Peter Engelhardt, Krefeld, both of Germany, assignors to Magnesital-Feuerfest GmbH, Oberhausen, Germany**

**Filed Mar. 26, 1975, Ser. No. 605,246**
**Claims priority, application Germany, Mar. 28, 1974, 2414965**
**Int. Cl.² C09D** *5/18*
**U.S. Cl. 106—15 FP** **8 Claims**

1. An aqueous stamping mass for tap spouts and flues in blast furnaces consisting essentially of

1. 20–60% by weight pyrophyllite ($Al_2O_3.4\ SiO_2.H_2O$) having a particle size of up to 8 mm,
2. 5–30% by weight silicon carbide,
3. 5–20% by weight plastic clay ($Al_2O_3.SiO_2.\times H_2O$),
4. 5–25% by weight quartzite,
5. 5–15% by weight carbonaceous bonding agent having a fusion point of 110°–200° C (without the components becoming gaseous at operating temperature), and
6. a suitable quantity of water for attaining optimal thickness.

4,017,317

## GLASS-CERAMICS AND PROCESS FOR MAKING SAME

**James R. Rapp, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio**

**Division of Ser. No. 169,217, Aug. 5, 1971, Pat. No. 3,984,251. This application May 10, 1976, Ser. No. 684,615**
**Int. Cl.² C03C** *3/04, 3/22*
**U.S. Cl. 106—39.6** **11 Claims**

1. A transparent glass-ceramic formed by in situ crystallization of a crystallizable base glass consisting essentially of about 37–55 mole percent $SiO_2$, 23–35 mole percent $Ta_2O_5$ and 20–33 mole percent $Na_2O$, said transparent glass-ceramic containing $NaTaO_3$ as the predominant crystalline phase.

4,017,318

## PHOTOSENSITIVE COLORED GLASSES

**Joseph E. Pierson, and Stanley D. Stookey, both of Painted Post, N.Y., assignors to Corning Glass Works, Corning, N.Y.**

**Filed Jan. 2, 1976, Ser. No. 646,259**
**Int. Cl.² C03C** *3/04, 3/26*
**U.S. Cl. 106—52** **17 Claims**

1. A glass article wherein at least a portion thereof is integrally colored by silver, said portion containing microcrystals of alkali fluoride in a concentration of at least 0.005% by volume and having:

a. discrete colloidal particles of metallic silver less than about 200A in the smallest dimension; and/or
b. metallic silver contained within said alkali fluoride microcrystals, said silver-containing part of the microcrystals being less than about 200A in the smallest dimension; and/or
c. a coating of metallic silver on at least a portion of the surface of said alkali fluoride microcrystals, the portion of the microcrystal coated with silver being less than about 200A in the smallest dimension.

4,017,319

## $SI_3N_4$ FORMED BY NITRIDATION OF SINTERED SILICON COMPACT CONTAINING BORON

**Charles D. Greskovich, Schenectady, and Svante Prochazka, Ballston Lake, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.**

**Filed Jan. 6, 1976, Ser. No. 646,967**
**Int. Cl.² C04B** *35/70, 35/58;* **F27B** *9/10*
**U.S. Cl. 106—55** **9 Claims**

1. A process for producing a polycrystalline silicon nitride body by nitridation of a polycrystalline sintered body of silicon which comprises forming a particulate mixture of silicon powder and boron, said silicon powder and said boron having an average particle size less than 3 microns, said boron being present in an amount ranging from 0.1% by weight to 5% by weight of said silicon powder, shaping said mixture into a green body having a density of at least 30% of the theoretical density of silicon, an sintering the green body at a temperature ranging from 1250° C to a temperature below the melting point of silicon in an atmosphere which has no significant deteriorating effect on the green body or the resulting sintered body to produce a sintered body having a density ranging from 60% to 75% of the theoretical density of silicon, said sintering densifying said green body in an amount of at least 2%, and nitriding said sintered body by reacting it in a gaseous nitrogen atmosphere ranging from subatmospheric pressure to superatmospheric pressure at a temperature ranging from 1100° C to below the melting point of silicon to form a polycrystalline silicon nitride body having a density ranging from 79% to 92% of the theoretical density of silicon nitride and comprised of polycrystalline silicon nitride containing a boron nitride phase in an amount of 0.1% to 8% by volume of the solid phase of said silicon nitride body, and containing unreacted boron-doped silicon in an amount ranging from zero % to 10% by volume of the solid phase of said silicon nitride body.



4,017,320

## CERAMIC DIELECTRIC COMPOSITION

**Shinobu Fujiwara, and Hitoshi Tanaka, both of Akita, Japan, assignors to TDK Electronics Company, Limited, Tokyo, Japan**

**Continuation of Ser. No. 449,640, March 11, 1974, abandoned. This application Nov. 19, 1975, Ser. No. 633,237**
**Int. Cl.² C04B** *35/00, 35/46*
**U.S. Cl. 106—73.3** **6 Claims**

1. A ceramic dielectric composition comprised of 30 to 94% by mol of $SrTiO_3$, 1 to 22% by mol of $Bi_2O_3$ and 5 to 69% by mol of $TiO_2$, and 0.1 to 20% by weight of MgO based on the total weight of the above-mentioned three compounds $SrTiO_3$, $Bi_2O_3$ and $TiO_2$, the amount of MgO being selected to provide a ceramic dielectric composition exhibiting reduced dielectric loss factor and reduced variation of the electrostatic capacity with respect to applied temperatures or voltages, as compared to a ceramic dielectric composition containing no MgO; and further including an amount ranging from 0.01 to 10% by weight of at least one of the oxides of the rare earth elements, said amount being selected to provide a ceramic dielectric compositon with reduced dielectric loss factor as compared to a ceramic dielectric composition which is otherwise the same but contains no oxide of the rare earth elements.

4,017,321

## VOID FREE ELECTRICAL CEMENT-CONCRETE

**David H. Reighter, Roslyn, Pa., assignor to I-T-E Imperial Corporation, Spring House, Pa.**

**Filed July 11, 1975, Ser. No. 595,179**
**Int. Cl.² C04B** *7/02*
**U.S. Cl. 106—98** **9 Claims**

1. A method of producing electrical insulation grade concrete which comprises mixing aggregate, cement and an amount of an aqueous liquid in excess of the amount necessary to cause hardening of the concrete and sufficient to substantially reduce the viscosity of the mixture, applying a vacuum to the resulting mixture sufficient to remove entrained air therefrom, and thereafter removing the excess amount of aqueous liquid under vacuum.

4,017,322

## METHOD FOR REINFORCING AQUEOUS HYDRAULIC CEMENT

**Motochika Kawai, Fujisawa, and Izuru Shimozawa, Odawara, both of Japan, assignors to Japan Inorganic Material Co., Ltd., Kanagawa, Japan**

**Continuation of Ser. No. 459,218, April 8, 1974, abandoned. This application June 9, 1975, Ser. No. 584,830**
**Claims priority, application Japan, Nov. 20, 1973, 48-130545; Nov. 20, 1973, 48-130546; Nov. 20, 1973, 48-130547; Nov. 20, 1973, 48-130548; Nov. 20, 1973, 48-130549; Dec. 21, 1973, 48-143117; Dec. 21, 1973, 48-143118; Dec. 27, 1973, 49-1919; Dec. 29, 1973, 49-4088; Mar. 18, 1974, 49-30823**
**Int. Cl.² C04B** *31/44, 31/06;* **B05D** *1/18*
**U.S. Cl. 106—99** **9 Claims**

1. In a method for reinforcing aqueous hydraulic cement wherein glass fibers are incorporated into the cement, the improvement which comprises said fibers containing zirconia and immersing the fibers in an aqueous solution of a compound selected from the group consisting of phosphoric acids, zirconium salts, titanium salts, and hafnium salts at a temperature from 80° to 95° C prior to incorporating the fibers in the cement for a time sufficient to improve the alkali resistance thereof.

4,017,323

## PITCH-ALUMINUM PIGMENT COMPOSITION

**Charles R. Gannon, Ashland, Ky., assignor to Ashland Oil, Inc., Ashland, Ky.**

**Continuation of Ser. No. 373,628, June 26, 1973, which is a division of Ser. No. 277,290, Aug. 2, 1972, which is a continuation-in-part of Ser. No. 224,216, Feb. 7, 1972, abandoned. This application Sept. 23, 1974, Ser. No. 508,388**
**Int. Cl.² C08L** *95/00*
**U.S. Cl. 106—281 R** **4 Claims**

1. A composition for impregnating fibrous tubular bodies in the mamnufacture of pitch impregnated fiber pipe consisting essentially of:

a. molten unoxidized thermal petroleum pitch, and
b. aluminum pigment suspended in said pitch in a concentration of between about 0.1 to about 1.4 percent by weight of pitch-aluminum mixture wherein at least 85% of the aluminum particles in said pigment is in the range of 0.5 to 44 microns.

4,017,324

## CLAY SLURRIES

**Warren J. Eggers, Aurora, Ill., assignor to IMC Chemical Group, Inc., Terre Haute, Ind.**

**Filed Feb. 19, 1974, Ser. No. 443,560**
**Int. Cl.² C09D** *1/02;* **C04B** *33/04*
**U.S. Cl. 106—288 B** **3 Claims**

1. An aqueous slurry of kaolin clay, water, a suspending agent and a dispersant and exhibiting minimum settling, the clay portion consisting essentially of calcined kaolin clay and hydrated kaolin clay in a ratio of about 2.75 parts of said calcined clay to one of said hydrated clay at a total clay content of about 75%.

4,017,325

## PIGMENT COMPOSITION

**Robert K. Remer, Evanston, Ill., assignor to Hull-Smith Chemicals, Inc., Des Plaines, Ill.**

**Division of Ser. No. 392,671, Aug. 29, 1973, Pat. No. 3,880,666, which is a continuation of Ser. No. 129,603, March 30, 1971, abandoned. This application Jan. 9, 1975, Ser. No. 539,824**
**Int. Cl.² C09C** *1/48*
**U.S. Cl. 106—288 Q** **2 Claims**

1. A pigment composition comprising a substrate and a colorant, which substrate is an insoluble multi-valent metal salt of dithiocarbamate formed in an aqueous alkaline medium by the reaction of polyvalent metal ions, amine or amide compounds, carbon disulfide, and water-dispersible inorganic reactive polymeric material.

4,017,326

## ENHANCEMENT OF IRIDESCENT COLORS TO PROVIDE VIVID RECORDING COLORS

**Chester Davis, 1685 Atson Lane, Cincinnati, Ohio 45205**

**Division of Ser. No. 549,707, Feb. 13, 1975, and a continuation of Ser. No. 549,706, Feb. 13, 1975. This application Jan. 16, 1976, Ser. No. 649,689**
**Int. Cl.² C09C** *1/28*
**U.S. Cl. 106—291** **4 Claims**

1. A composition of matter which comprises
an iridescent pigment of the type comprising an essentially transparent micaceous substrate having thereon at least one overcoating of an essentially transparent material having a refractive index greater than about 2.0,
and discrete finely divided particles of a diluent which is a water-insoluble, essentially transparent solid having a refractive index less than about 1.8,
the particles of said diluent comprising up to about 75% of the weight of said composition,
the diluent particles being admixed among the pigment.

4,017,327

## PROCESS FOR PRODUCING MESOPHASE PITCH

Irwin Charles Lewis, Lakewood; Edgar Ronald McHenry, and Leonard Sidney Singer, both of Berea, all of Ohio, assignors to Union Carbide Corporation, New York, N.Y.

Division of Ser. No. 423,718, Dec. 11, 1973, Pat. No. 3,976,729. This application Oct. 31, 1974, Ser. No. 519,761
Int. Cl.² C08L 95/00
U.S. Cl. 106—273 R 6 Claims

1. A process for producing a mesophase pitch having a mesophase content of from 50 percent by weight to 65 percent by weight wherein the mesophase and non-mesophase portions of the pitch are present as a homogeneous emulsion which comprises heating a carbonaceous pitch in an inert atmosphere at a temperature of from 380° C. to 440° C. for a time sufficient to produce a mesophase content of from 50 percent by weight to 65 percent by weight while agitating the pitch during formation of the mesophase so as to produce a homogeneous emulsion of the immiscible mesophase and non-mesophase portions of the pitch.

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4,017,328

## LEAD CHROMATE PIGMENT WITH IMPROVED THERMAL STABILITY

James Francis Higgins, Livingston, N.J., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Mar. 24, 1975, Ser. No. 561,436
Int. Cl.² C09C 1/20, 1/20
U.S. Cl. 106—298 11 Claims

1. In a process for preparing lead chromate pigment in aqueous medium by contacting an aqueous solution containing a soluble salt of chromate and, optionally, at least one soluble salt selected from the group consisting of sulfate and molybdate with aqueous lead salt whereby an aqueous slurry of said pigment is formed and applying at least one hydrous metal oxide to the pigment of the aqueous slurry pigment,

wherein the improvement comprises adding from 0.2 to 1% by weight of a soluble silicate compound, calculated as $SiO_2$ and based on the weight of the final base pigment, to said aqueous solution prior to precipitation of said pigment.

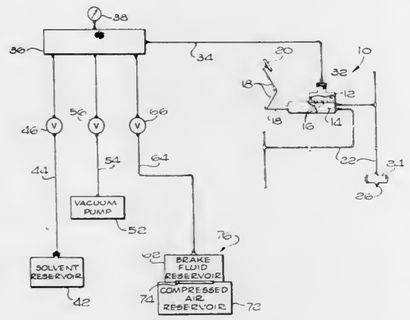
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4,017,329

## METHOD OF RESTORING HYDRAULIC SYSTEMS

Philip C. Larson, 23908 Canerwell, Newhall, Calif. 91321

Filed Jan. 7, 1976, Ser. No. 647,287
Int. Cl.² B08B 7/04, 9/06
U.S. Cl. 134—21 4 Claims




1. A method of cleaning and replenishing a hydraulic system having first and second ends, comprising the sequential steps of:

opening the ends of the system to allow hydraulic fluid in the system to drain from the system;

injecting an organic solvent into the system through one end of the system and out the other end of the system, said solvent being miscible with oil and water and vaporizable at low temperatures and at atmospheric pressure;

terminating the flow of solvent and closing the first end of the system;

applying a vacuum to the second end of the system to vaporize the solvent and remove the solvent vapor and air;

injecting hydraulic fluid into the second end of the evacuated system to fill the system with hydraulic fluid while the vacuum is maintained on the system; and,

closing the second end of the system.

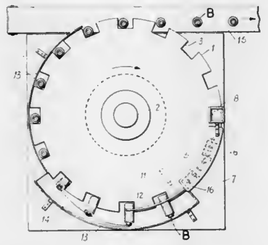
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4,017,330

## METHOD AND APPARATUS FOR INTERNAL SPRAY CLEANING OF CONTAINERS

Samuel S. Aidlin, 214 Beaumont St., Brooklyn, N.Y. 11235, and Stephen H. Aidlin, 934 Glenwood Road, West Hempstead, N.Y. 11581

Filed Feb. 27, 1976, Ser. No. 662,028
Int. Cl.² B08B 5/04
U.S. Cl. 134—21 13 Claims



1. An apparatus for purging containers from impurities prior to filling as said containers are being continuously conveyed in an opening down orientation by directing separate streams of fluid under pressure through said opening to dislodge and evacuate said impurities from interior surfaces of said containers, said apparatus including: arcuately shaped slotted orifice means disposed in the path of travel of said containers for drawing a negative pressure across said container opening; a plurality of spaced apart orifice means disposed in parallelism to and on either side of said slotted orifice means providing individual pressurized jet streams for action upon said container interior through said container opening; conveyor means for conveying said containers along a predefined path for aligning the central axis of said container openings with the longitudinal axis of said slotted orifice means; overhead restraining means for restraining the movement of said containers while under the influence of said respective streams; and means to position said containers after purging, for advancement on to additional conveyor means for filling.

13. A method of purging interior surfaces of containers having openings therein, while continuously advancing in a forward direction on a rotatable conveyor provided with a series of recesses for receiving said containers, advancing each of said containers in the opening down position past a cleaning station for the removal of contaminents and thereafter reorienting each of said containers in the opening up position for further handling, said steps including: advancing said opening down containers in proximity to a plurality of pressurized jet streams disposed about and in axial alignment with an arcuate slotted orifice for drawing a vacuum thereacross, each of said containers being positioned in said conveyor means for advancement along an arcuate centerline of said slotted orifice; introducing said jet streams through each of said container opening at a first pressure level, while simultaneously evacuating said each of said container interior through said openings by a vacuum front at a second pressure level; conveying said containers beyond said vacuum front; impinging a single jet stream upon the lower most portion of each of said containers for urging said containers to assume a horizontal position; advancing said containers in a forward direction as contact occurs with a curved guide means for gradually urging said containers to assume an opening up position; and conveying said containers in an opening up position to a next work station.



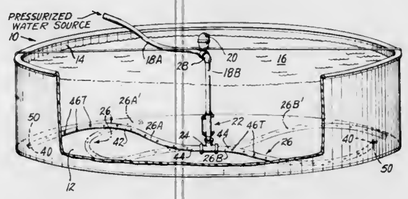
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4,017,331

## SWIMMING POOL CLEANING APPARATUS

Walter P. Thoelen, Sr., 15 Kamm St., Pequannock, N.J. 07440

Filed Feb. 12, 1976, Ser. No. 657,569
Int. Cl.² B08B 3/02
U.S. Cl. 134—167 R 10 Claims




1. A liquid agitation device particularly useful for maintaining swimming pool debris in suspension in a liquid for removal by the pool filtration system, which device comprises, in combination:

a. a flexible feed conduit for receiving a flow of pressurized liquid for discharge into the liquid;

b. at least one flexible agitation hose in fluid communication with the feed conduit, which agitation hose includes:

i. a bifurcated nozzle, formed by securing two opposed wall portions of the agitation hose together in abutting relationship, located at its distal end whereby the agitation hose is propelled within the liquid in a manner to preclude stalling of the agitation hose; and

ii. a plurality of apertures disposed along the length of the agitation hose for discharging the pressurized fluid for agitating the debris; and

c. means for positioning the feed conduit and agitation hose in the liquid.

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4,017,332

## SOLAR CELLS EMPLOYING STACKED OPPOSITE CONDUCTIVITY LAYERS

Lawrence W. James, Palo Alto, Calif., assignor to Varian Associates, Palo Alto, Calif.

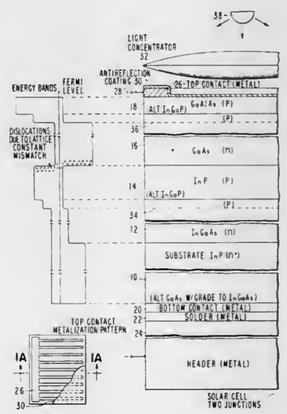
Continuation of Ser. No. 553,850, Feb. 27, 1975, abandoned. This application Mar. 29, 1976, Ser. No. 671,891
Int. Cl.² H01L 31/06
U.S. Cl. 136—89 PC 10 Claims

1. A photovoltaic cell comprising:

a. a first epitaxial layer of semiconductive material comprising a first given compound selected from the group consisting of IIB-VIA, IB-IIIA-VIA, and IIIA-VA compounds, said compound capable of being either *p* or *n* conductivity type, a portion of said layer, starting from the bottom surface thereof, being of a given conductivity type, the remaining portion of said layer, comprising the portion of said layer adjacent the upper surface thereof, being of a conductivity type opposite to said given type and such that a rectifying junction is formed in said layer parallel to the upper and lower surfaces thereof, said layer having a given bandgap and a given lattice constant,

b. a second epitaxial layer of semiconductive material joined to the upper surface of said first epitaxial layer and comprising a second given compound selected from the group consisting of IIB-VIA, IB-IIIA-VIA and IIIA-VA compounds, said compound capable of being either *p* or *n* conductivity type, said layer being of said opposite conductivity type, said layer having a given bandgap at least as high as that of said first epitaxial layer, said layer having substantially the same lattice constant as that of said first epitaxial layer, said second epitaxial layer being joined to the upper surface of said first epitaxial layer so as to form a first heterojunction of like conductivity with the upper portion of said first epitaxial layer,

c. a third epitaxial layer of semiconductive material comprising a third given compound selected from the group consisting of those IIB-VIA, IB-IIIA-VIA and IIIA-VA compounds, said compound capable of being either *p* or *n* type, a bottom portion of said layer, starting from the bottom surface thereof, being of said given conductivity type, the remaining portion of said layer, comprising the portion adjacent the upper surface thereof, being of said opposite conductivity type such that a rectifying junction is formed in said layer parallel to the upper and lower surfaces thereof, said layer having a given bandgap higher than the bandgap of said first epitaxial layer, said third epitaxial layer being joined to the upper surface of said




second epitaxial layer so as to form a second heterojunction of opposite conductivity with said second epitaxial layer, said second and third epitaxial layers comprising means providing a substantial short circuit between said second and third epitaxial layers in a direction opposite to what would be the direction of easy current flow across a rectifying heterojunction formed by said second and third epitaxial layers in absence of said means providing said substantial short circuit.

2. The photovoltaic cell of claim 1 further including a fourth epitaxial layer of semiconductive material joined to the upper surface of said third epitaxial layer and comprising a fourth given compound selected from the group consisting of IIB-VIA, IB-IIIA-VIA and IIIA-VA compounds, said layer being of said conductivity type opposite to said given conductivity type, said layer having a given bandgap at least as high as that of said third epitaxial layer, said layer having substantially the same lattice constant as that of said third epitaxial layer, said fourth epitaxial layer being joined to the upper surface of said third epitaxial so as to form a third heterojunction of like conductivity with the upper portion of said third epitaxial layer.

## 4,017,333
## FINE GRAIN BERYLLIUM BODIES

**Donald Webster, Saratoga, and Donald D. Crooks, San Jose, both of Calif., assignors to Lockheed Missiles & Space Company, Inc., Sunnyvale, Calif.**

**Filed Aug. 25, 1975, Ser. No. 607,675**
**Int. Cl.² C22F *1/16***
**U.S. Cl. 148—2** **5 Claims**

1. A method for reducing cast beryllium and beryllium alloy grain size comprising the steps of
   adding to molten beryllium from about 0.01 percent by weight to about 1.0 percent by weight of at least one element selected from the group of elements having atomic numbers 22 through 24, 28, 40 through 42, and 72 through 74, said metal forming a soluble metal beryllide phase in said molten beryllium,
   casting and solidifying said melt, said soluble metal beryllide phase precipitating in particulate form 0.5 um or less in diameter in the solid beryllium,
   mechanically deforming said casting at least 20 percent below its recrystallization temperature to form an unstable grain structure, and
   converting said unstable grain structure into a fine grain structure by annealing said mechanically deformed casting above its recrystallization temperature.

## 4,017,334
## PROCESS FOR TREATING ALUMINUM CANS

**Yasunobu Matsushima, Kawasaki; Hideo Oka, Yokohama; Katsuyoshi Noji, Ichikawa, and Hiroyoshi Nakagawa, Yokohama, all of Japan, assignors to Oxy Metal Industries Corporation, Warren, Mich.**

**Continuation-in-part of Ser. No. 511,404, Oct. 2, 1974, abandoned. This application Dec. 15, 1975, Ser. No. 641,050**
**Claims priority, application Japan, Oct. 4, 1973, 48-110778**
**Int. Cl.² C23F *7/14***
**U.S. Cl. 148—6.15 R** **13 Claims**

1. In a process for treating aluminum to impart corrosion resistance and paint adhesion to the surface thereof, the improvement comprising treating the surface with an aqueous solution having an acidic pH and containing in dissolved form:
   a vegetable tannin: 0.0l – 10 g/l
   a titanium compound: 0.01 – 10 g/l as Ti
   a fluoride compound: 0.01 – 10 g/l as F
   a phosphate compound: 0.01 – 50 g/l as $PO_4$

## 4,017,335
## LIQUID PHOSPHATIZING COMPOSITION AND USE THEREOF

**James E. Maloney, Eagan, Minn., assignor to Economics Laboratory, Inc., St. Paul, Minn.**

**Filed Oct. 30, 1975, Ser. No. 627,082**
**Int. Cl.² C23F *7/10***
**U.S. Cl. 148—6.15 R** **13 Claims**

1. A method of treating a ferrous metal surface with a phosphatizing composition comprising the steps of:
   a. contacting said ferrous metal surface, in a phosphatizing zone, with an organic ammonium phosphate salt solution formed by diluting a liquid concentrate with water in the salt:water ratio of at least 1:5 but less than about 1:250, said concentrate comprising said organic ammonium salt dissolved in water, said concentrate containing less than 1% by weight of any alkali metal containing compound and containing a buffering amount, up to 10% by weight, of an organic ammonium salt buffering compound for stabilizing the pH of said concentrate within the range of about 3.0 to 5.5, said phosphate salt solution having a substantially stabilized pH within the range of about 3.0 to about 5.5, said phosphate salt solution comprising 0.15–15% by weight of said phosphate salt, the organic amine of said organic ammonium salt having a $pK_b$ within the range of about 3 to about 10; said contacting being continued until an iron phosphate coating weight of at least about 10 mg/sq.ft. is obtained on said ferrous metal surface; and
   b. rinsing the resulting coated ferrous metal surface with an aqueous rinse composition.

## 4,017,336
## SURFACE TREATMENT OF METALS

**Z. Andrew Foroulis, Mendham, N.J., assignor to Exxon Reseaarch and Engineeering Company, Linden, N.J.**

**Continuation of Ser. No. 241,289, April 5, 1972, abandoned. This application Jan. 7, 1976, Ser. No. 647,063**
**Int. Cl.² C23F *7/04***
**U.S. Cl. 148—6.35** **6 Claims**

1. In a process for the refining of petroleum hydrocarbons in an environment wherein (a) free sulphur, (b) sulphur-containing compounds, or (c) mixtures of (a) and (b) are present and the refining process is operated under conditions such that the presence of (a), (b), or (c) would result in corrosive attack of steel equipment used for carrying out said refining, the improvement which comprises carrying out said refining with steel equipment which has been pretreated according to the following: selecting said steel from the group consisting of steel, chromium-containing steels, and chromium-nickel-containing steels, heating said steel in the presence of an oxidizing environment at temperatures above the expected surface temperature of said steel during said refining; forming a submicroscopic thin barrier on said steel, which barrier is resistant to (a), (b), or (c); and selecting said temperature so as to produce optimum resistance to corrosive attack by (a), (b), or (c).

## 4,017,337
## METHOD FOR PREPARING AN ALUMINUM CLIP

**Joseph Winter, New Haven; Richard Lanam, Hamden, both of Conn., and Douglas L. Graham, Ballwin, Mo., assignors to Swiss Aluminium Ltd., Chippis, Switzerland**

**Filed Apr. 9, 1975, Ser. No. 566,467**
**Int. Cl.² C22F *1/04***
**U.S. Cl. 148—11.5 A** **8 Claims**



1. A method for the preparation of an aluminum paper clip possessing improved corrosion resistance and reduced weight which comprises:
   A. providing an aluminum base alloy in rod form, said aluminum base alloy consisting essentially of from about 0.05–6.0% silicon, from about 0.10–0.8% iron, from about 0.02–0.3% copper, from about 0.05–0.20% chromium, from about 0.05–0.20% manganese and from about 4.5–5.6% magnesium, balance aluminum;
   B. drawing said rod into wire of a diameter ranging from about 0.035–0.055 inches by a continual drawing operation which is conducted at a speed ranging from about 2,000 to about 4,000 feet per minute without an interannealing treatment; and
   C. bending a finite length of said wire into the shape of a paper clip.

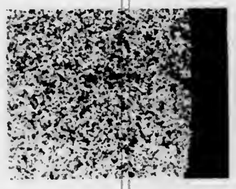
4. The method of claim 1 further including annealing said wire after the completion of said drawing.



## 4,017,338
## STEEL MEMBER FOR REINFORCING RUBBER COMPOSITES AND METHOD OF MAKING SAME

**Milan F. Kozak, Raleigh; Mark W. Taylor, Cary, both of N.C., and Ronald C. Elder, Dayton, Ohio, assignors to Monsanto Company, St. Louis, Mo.**

**Filed Nov. 24, 1975, Ser. No. 634,965**
**Int. Cl.² C21D *9/52***
**U.S. Cl. 148—12 B** **3 Claims**



1. A method for making steel articles for reinforcing rubber composites which comprises:
   a. providing steel stock with a round cross-section having a carbon content of at least 0.35 percent and an essentially pearlitic microstructure;
   b.. forming an essentially rectangular member from said stock wherein said member has an aspect ratio of at least 2; and
   c. heat treating said member to provide a microstructure of tempered martensite, bainite or mixtures thereof.

## 4,017,339
## FLUX FOR USE IN SUBMERGED ARC WELDING OF STEEL

**Naoki Okuda, Fujisawa, and Kazuo Tanaka, Yokosuga, both of Japan, assignors to Kobe Steel Ltd., Kobe, Japan**

**Filed Nov. 29, 1974, Ser. No. 528,554**
**Claims priority, application Japan, Nov. 29, 1973, 48-135041**
**Int. Cl.² B23K *35/34***
**U.S. Cl. 148—24** **3 Claims**

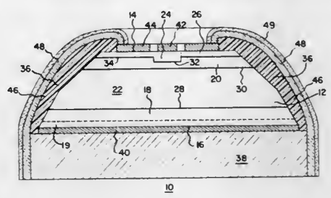
1. A flux composition which is useful in submerged arc welding of steel, which comprises:
   10 – 70% iron powder, 10 – 50% MgO, 3 – 25% CaO, 2 – 25% $CO_2$ as derived from a carbonate compound, 0.03 – 1.5% $B_2O_3$ as derived from $B_2O_3$ itself, a boron compound from which $B_2O_3$ can be derived or mixtures thereof, less than 15% $TiO_2$, and at least one deoxidizing metallic agent selected from the group consisting of Si, Mn, Al, Ti and alloys thereof.

## 4,017,340
## SEMICONDUCTOR ELEMENT HAVING A POLYMERIC PROTECTIVE COATING AND GLASS COATING OVERLAY

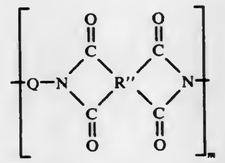
**Alexander J. Yerman, Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.**

**Filed Aug. 4, 1975, Ser. No. 601,839**
**Int. Cl.² H01L *23/30***
**U.S. Cl. 148—33.3** **24 Claims**

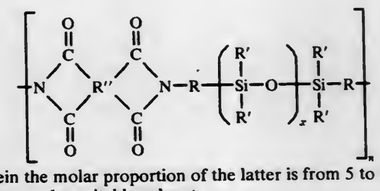
1. A semiconductor element comprising
   a body of semiconductor material having at least two regions of opposite type conductivity and a P-N junction disposed between, and formed by the abutting surfaces of, each pair of regions of opposite type conductivity;
   an end portion of at least one P-N junction exposed at a surface of the body;
   a layer of a protective coating material disposed on the exposed end portion of the at least one P-N junction,
   the protective coating material is a copolymer which is, when cured, one selected from the group consisting of the reaction product of a silicon-free organic diamine, an organic tetracarboxylic dianhydride and a polysiloxane



diamine and a blend of polyimide compound of recurring structural units of the formula:



with a polyimide composed of recurring structural units of the formula:



wherein the molar proportion of the latter is from 5 to 50 mol percent, and a suitable solvent
wherein
R is a divalent hydrocarbon radical,
R′ is a monovalent hydrocarbon radical,
R″ is a tetravalent organic radical,
Q is a divalent silicon-free organic radical
which is the residue of an organic diamine,
*x* is a whole number equal to at least 1,
*m* is greater than 1, and
*n* is greater than 1, and
at least one layer of a chemical vapor deposited glass material disposed on the layer of protective coating material.

## 4,017,341
## METHOD OF MANUFACTURING SEMICONDUCTOR INTEGRATED CIRCUIT WITH PREVENTION OF SUBSTRATE WARPAGE

**Takaya Suzuki; Akio Mimura; Seturo Yagyu, all of Hitachi, and Shinji Okuhara, Fujisawa, all of Japan, assignors to Hitachi, Ltd., Japan**

**Filed Aug. 15, 1975, Ser. No. 604,947**
**Claims priority, application Japan, Aug. 19, 1974, 49-94183**
**Int. Cl.² H01L *21/20, 21/76***
**U.S. Cl. 148—174** **8 Claims**

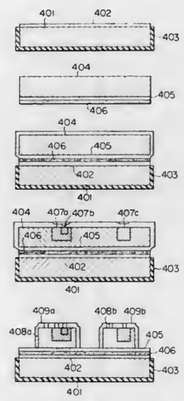
1. In a method of manufacturing a semiconductor integrated circuit wherein a plurality of monocrystalline semiconductor regions are formed in a polychrstalline semiconductor support substrate and wherein insulating material is formed between said island regions and said substrate to isolate said regions from each other and from said support substrate, and wherein circuit elements are formed in said island regions in an oxygen atmosphere at such high temperatures which would ordinarily subject said support substrate to warping resulting

from the oxidation and the introduction of oxygen into said substrate,

the improvement comprising the step of

a. preventing the warping of said support substrate resulting from the oxidation and the introduction of oxygen into said substrate during the formation of said circuit elements by

a1. initially forming a passivation film on those surfaces of said support substrate which would otherwise be exposed to said oxygen atmosphere and said such high temperatures prior to the carrying out of steps in which




said oxygen atmosphere and said such high temperatures are employed for the formation of said circuit elements, and

a2. retaining said initially formed passivation film on said surfaces of said support substrate during the performance of those steps in which said oxygen atmosphere and said such high temperatures are employed for the formation of said circuit elements, to thereby prevent the unwanted warping of said support substrate due to the oxidation and introduction of oxygen into said support during the formation of said circuit elements.

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**4,017,342**

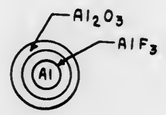
## METHOD FOR IMPROVING METAL COMBUSTION IN SOLID ROCKET PROPELLANTS

**Robert L. Geisler, Tehachapi, Calif.; Arnold M. Crelier, Colorado Springs, Colo., and Francisco Q. Roberto, Lancaster, Calif., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**

**Filed Apr. 5, 1976, Ser. No. 674,020**

**Int. Cl.² C06B** *45/30*

**U.S. Cl. 149—5** **3 Claims**




1. A method for improving the combustibility of aluminum metal powders for use in solid rocket propellant formulations which comprises the step of exposing aluminum oxide coated aluminum metal powder, having a particle size smaller than about 100 microns to hydrogen fluoride gas for a period of time sufficient to effect a reaction therebetween.

**4,017,343**

## METHOD OF AND APPARATUS FOR ETCHING

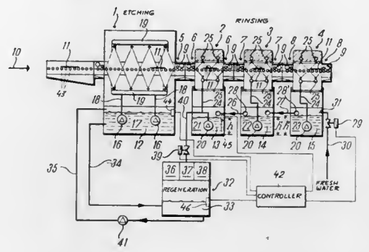
**Rainer Haas, Herrenberg, Germany, assignor to Firma Hans Hollmuller, Maschinenbau, Gultstein near Herrenberg, Germany**

**Filed July 15, 1975, Ser. No. 596,001**

**Claims priority, application Germany, July 17, 1974, 2434305**

**Int. Cl.² C23F** *1/00*

**U.S. Cl. 156—642** **8 Claims**




1. A method of etching a workpiece comprising the steps of:

circulating an etchant liquid in a closed etchant path over said workpiece and through an etchant sump,

thereafter circulating a rinse liquid in a closed rinse path over said workpiece and through a rinse sump,

withdrawing from said rinse sump a portion of said rinse liquid and introducing said portion into said etchant path along with a regenerator to replace lost etchant liquid and restore the strength thereof,

introducing into said rinse path a quantity of fresh water of volume substantially equal to that of said portion of rinse water withdrawn, said rinse water by circulating through a pair of such rinse paths each having a respective sump and spaced apart in a transport direction, said fresh water being added to the downstream rinse path and said portion being withdrawn from the upstream rinse path;

successively passing said workpiece in said direction through said etchant path, then through said upstream rinse path, and then through said downstream rinse path; and

automatically withdrawing from the downstream sump and introducing into the upstream sump a quantity of rinse liquid of volume substantially equal to that of said portion on withdrawal thereof from said upstream sump.

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**4,017,344**

## MAGNETICALLY ENHANCED COAXIAL CABLE WITH IMPROVED TIME DELAY CHARACTERISTICS

**Harold Lorber, 3225 Burn Brae Drive, Dresher, Pa. 19025, and Irving Duboff, 1513 Woodland Road, West Chester, Pa. 18015**

**Division of Ser. No. 338,335, March 5, 1973, Pat. No. 3,886,506. This application May 23, 1975, Ser. No. 580,231**

**Int. Cl.² H01B** *13/06, 13/22*

**U.S. Cl. 156—52** **9 Claims**

1. The method of making flexible low time delay coaxial transmission cable comprising the steps of:

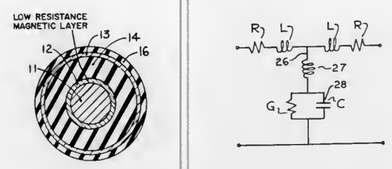
forming a magnetically loaded flexible center conductor having a layer of magnetic material having high conductivity, high permeability and high anisotropy,

forming said layer of magnetic material to provide a circumferentially oriented easy axis of magnetization and a strong effective internal circumferential magnetic field,

said step of forming said layer of magnetic material comprising the steps of heating said layer of magnetic material to near its recrystallization temperature and cooling said layer of magnetic material from near its recrystallization temperature while applying a conduction current through said center conductor,



forming a flexible dielectric spacer layer around said magnetically loaded center conductor, and




forming a flexible conductive shield completely around said dielectric spacer to provide flexible magnetically enhanced transmission cable with a permanent easy axis of magnetization oriented in a circumferentially direction.

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**4,017,345**

## PROCESS FOR PRODUCING PILE FABRICS AND AN APPARATUS FOR CARRYING OUT THE PROCESS

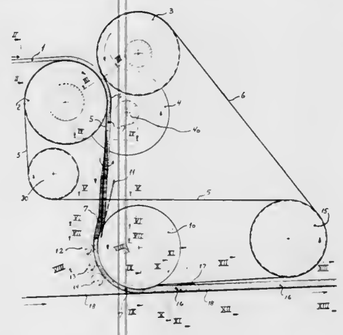
**Esben Bruhn, Horning, and Finn Hansen Jensen, Skanderborg, both of Denmark, assignors to A/S Weston Toeppefabrik, Horning, Denmark**

**Filed Oct. 31, 1975, Ser. No. 627,862**

**Claims priority, application Denmark, June 4, 1975, 2497/75**

**Int. Cl.² B32B** *31/18, 31/22*

**U.S. Cl. 156—72** **17 Claims**



1. A process for producing and depositing a fibrous pile comprising the steps of providing a batt having substantially parallel edges defining a longitudinal direction of the batt and consisting of a fibrous material oriented substantially transversely of said longitudinal direction, forwarding said batt in its longitudinal direction, subdividing said batt into strips by cuts longitudinal of the batt and substantially perpendicular to the orientation of the fibres, forwarding each strip in a free path between a pair of conveying wires having line contact only with the strips, so that the fibres of the strips extend freely in both directions from the lines of contact with the conveying wires and running from a position in which they are located in positions opposite one another on either side of the subdivided batt to a position in which they are located side by side in a longitudinal plane of the subdivided batt, thereby turning each strip through an angle of 90° about its longitudinal axis, displacing the strips out of the spaces between said pairs of conveying wires by means acting on the portions of the fibres extending freely in one direction from the lines of contact with the conveying wires, and applying the portions of the fibres extending freely in the other direction from said lines of contact to a moving pile receiving surface.

**4,017,346**

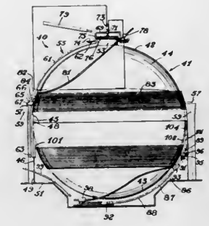
## INSULATION OF VESSELS HAVING CURVED SURFACES

**Hubert Stacy Smith, Bay City, Mich., assignor to The Dow Chemical Company, Midland, Mich.**

**Division of Ser. No. 242,061, April 7, 1972, abandoned, which is a continuation-in-part of Ser. No. 158,272, June 30, 1971. This application May 28, 1974, Ser. No. 473,985**

**Int. Cl.² B65H** *81/00*

**U.S. Cl. 156—185** **24 Claims**



1. A method for the insulation of a vessel having at least one curved wall, the steps of the method comprising

depositing a plastic foam strip and a vapor barrier material in the form of a strip about the periphery of the vessel in a plurality of loops, with the further limitation that the vapor barrier material is disposed remote from the vessel wall and the foam strip adjacent the vessel wall,

joining together adjacent loops of foam strip at a location remote from the vessel to thereby envelop at least a portion of the vessel within an insulating enclosure, the adjacent loops of foam strip being generally unconnected adjacent the vessel, and

joining adjacent edges of the strip of vapor barrier material together.

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**4,017,347**

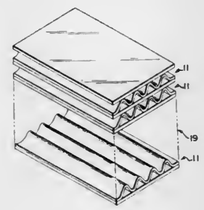
## METHOD FOR PRODUCING CERAMIC CELLULAR STRUCTURE HAVING HIGH CELL DENSITY

**Joseph J. Cleveland, Wysox, Pa., assignor to GTE Sylvania Incorporated, Stamford, Conn.**

**Division of Ser. No. 455,193, March 27, 1974, Pat. No. 3,943,994, which is a continuation-in-part of Ser. No. 313,101, Dec. 7, 1972, abandoned. This application Oct. 31, 1975, Ser. No. 627,515**

**Int. Cl.² F28D** *17/00;* **B32B** *3/28*

**U.S. Cl. 156—89** **5 Claims**



1. A process for producing a ceramic cellular structure comprising:

a. corrugating a green ceramic tape having a cell density of from 500 to 1600 cells per square inch of cross-sectional area and wall thicknesses from 2 to 30 mils to produce a corrugated first tape member, said tape consisting essen-

tially of finely divided sinterable solid particles of ceramic raw materials substantially uniformly distributed throughout a fugitive plastic support matrix, the weight ratio of said supporting matrix to said raw materials being from about 1 to 3 to about 1 to 6, said supporting matrix consisting essentially of from about 28.5 to 74.5 weight percent of a two part resin, the resin consisting essentially of polyvinyl butyral in the amount of from 50 to 95 weight percent, remainder an amine thermosetting resin, selected from the group consisting of melamine formaldehyde and urea formaldehyde, and from about 25 to 70 weight percent of a plasticizer selected from the group consisting of alkyl phthalate and dialkyl phthalate plasticizers and from about 0.5 to about 1.5 percent by weight of a deflocculating agent,

b. adhering a substantially flat second tape mbember containing substantially the same ceramic raw material and supporting matrix to the nodes of the first corrugated tape member to form a bilayered tape member, and

c. adhering said bilayered tape member and a predetermined number of subsequent bilayered tape members to each other to form a cellular structure having alternate corrugated and flat members.

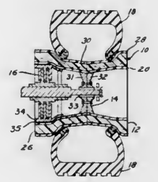
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**4,017,348**

**METHOD OF MAKING A COMPOSITE VEHICLE WHEEL**

**Gerald C. Shumaker, 2685 Cevennes Terrace, Xenia, Ohio 45385**

**Filed Mar. 10, 1975, Ser. No. 557,000**
**Int. Cl.² B60B** *5/02*
**U.S. Cl. 156—189** **2 Claims**



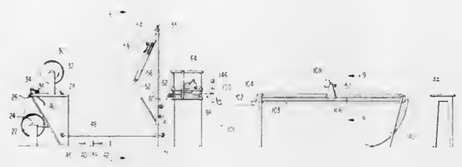
1. The method for constructing heavy duty wheels for vehicles, comprising: forming a barrel member by winding an inner layer of predetermined thickness of filament reinforced epoxy resin tape on a mandrel having a symmetrical out of round outer surface; subjecting the inner layer to a precure compaction stage; positioning a plurality of partially cured preformed segments of chopped fiber reinforced epoxy resin, having their inner surface conforming to the out of round configuration of the inner tape layer and their outer surface conforming to the desired tire receiving configuration of the wheel, around the periphery of the tape layer; winding an outer layer of a predetermined thickness of filament reinforced epoxy resin tape around the outer surface of said segments; subjecting the outer layer to precure compaction stages after each predetermined number of thicknesses of tape; curing the barrel member within a form in an autoclave at a predetermined temperature and pressure; removing the barrel member from the autoclave; allowing the barrel member to cool; securing a two part hub member within the barrel member with an epoxy adhesive.

**4,017,349**

**APPARATUS FOR MANUFACTURING LARGE DISPOSABLE SPECIALTY DRAPES**

**Donald R. DePriest, and Bobby C. Brandon, both of Columbus, Miss., assignors to Humboldt Products Corporation, Columbus, Miss.**

**Continuation of Ser. No. 329,144, Feb. 2, 1973, abandoned.**
**This application Mar. 28, 1975, Ser. No. 563,180**
**Int. Cl.² B65C** *11/00;* **B65H** *25/00*
**U.S. Cl. 156—361** **11 Claims**



1. Apparatus for forming large, disposable specialty drapes having a predetermined length from a first end thereof to a substantially parallel second end thereof and having a fenestration a predetermined distance from the first end thereof, said apparatus comprising:

a. holding means for holding a plurality of rolls of stock material positioned to overlap as the stock material is withdrawn therefrom;

b. adhesive supply means for applying adhesive to the area of overlap of stock material taken from at least one roll thereof;

c. means for applying pressure to the area of overlap of stock material taken from said plurality of rolls after adhesive has been applied to at least one roll thereof;

d. means defining a first work station;

e. alignment means for aligning a reinforcement patch on stock material passing the first work station from the holding means;

f. punch means for cutting a fenestration through reinforced stock material passing the punch means from the first work station;

g. support means for supporting said holding means, said first work station defining means, said alignment means, and said punch means and including guide means defining a path from said holding means, beneath said first work station defining means, and over said alignment means, permitting an operator positioned at the first work station access to said alignment means, said guide means being adjustable to permit adjustment of the length of the path to accommodate large disposable specialty drapes having various predetermined lengths and predetermined distances;

h. knife means for cutting large, disposable specialty drapes from fenestrated stock material, said knife means separated from said punch means by a distance along the path equal to the predetermined distance plus an integral multiple of the predetermined length;

i. drive means for moving stock material along the path from a supply thereof at said holding means; and

j. control means for intermittently deactivating said drive means and said adhesive supply means and activating said punch means and said knife means, said control means including linear measuring means for measuring the length of stock material moving on the path and a control unit responsive to measurement by said linear measuring means of the present length of stock material for deactivating said drive means and activating said punch means and said knife means.

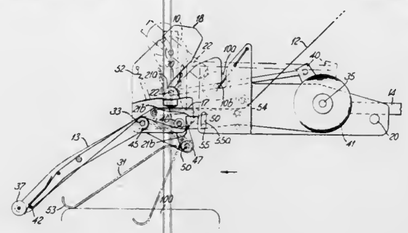


**4,017,350**

**LABELLING MACHINE**

**James Ernest Thomas, Dagenham, England, assignor to Pricemaster Ltd., Degenham, England**

**Filed Mar. 5, 1975, Ser. No. 555,905**
**Claims priority, application United Kingdom, June 14, 1974, 26499/74, Oct. 30, 1974, 9908/74**
**Int. Cl.² B65C** *9/18, 9/42*
**U.S. Cl. 156—384** **14 Claims**



1. A labelling machine for repetitive cycle operation having a strip to which is affixed pressure-sensitive adhesive labels spaced apart at a constant pitch therealong for applying a label to successive articles moving past the machine, comprising:

a mounting;

a supply reel supporting the label strip and a wind up reel for collecting the spent strip, said reels being supported for rotation on parallel axes on said mounting;

drive means for said wind up reel;

a label applicator carried on said mounting and disposed in the path of the moving articles and receiving the label strip from said supply reel, dispensing a label from the strip on to one article of said successive articles in each cycle of the machine, and passing spent strip on to the wind up reel;

first means for causing initial advance of the label strip past said applicator during each cycle of the machine so as to cause said applicator to dispense a leading portion of a label for adhesion to said one article while a residual portion of the label which is complementary to said leading portion is still adhering to the label strip;

second means for limiting operation of said first means and said advance thereby, further advance of the strip, namely to the extent of said residual portion of the label adhering to the strip, being effected by adhesion of said leading portion of the label to said one article and by consequential pulling of the strip past said applicator by said adhesion of said label to the strip until said label is fully detached from the strip;

said label applicator being coupled with said drive means and being motivated by and deriving movement from said one article thereby causing said drive means to drive said wind up reel and bring a label on said strip adjacent to said applicator without advancing said leading portion of the label past said applicator; and,

a drawing off arm carried on said mounting motivated by and deriving movement from said one article and causing said first means to cause said initial advance of the label strip and dispensing of said leading portion of the label while the wind up reel is stationary.

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**4,017,351**

**SYSTEM AND DEVICE FOR INFLATING AND SEALING AIR INFLATED CUSHIONING MATERIAL**

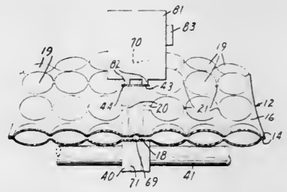
**Curtis L. Larson, Hudson, Wis., and John R. Ward, St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

**Filed Dec. 24, 1975, Ser. No. 644,047**
**Int. Cl.² B32B** *31/00*
**U.S. Cl. 156—494** **14 Claims**

1. A device adapted for inflating and sealing a strip material comprising two thin elongate flexible films, each film comprising a heat sealable thermoplastic material forming at least one surface of the film, said films being positioned with their thermoplastic surfaces adjacent and with adjacent portions of their thermoplastic surfaces in face-to-face contact and being fused together in discrete areas to define a plurality of unsealed adjacent surface areas in a pattern providing two rows of inflatable chambers and a passageway between the rows extending the length of the strip, with each of said chambers having an inlet opening communicating with the passageway, wherein said device comprises:

means adapted to defining a strip path for a said strip material through said device extending from a inlet to an outlet end;

means along said strip path adapted for defining an inflation station for the uninflated chambers of a said strip material comprising an elongate nozzle having a terminal end portion directed toward the inlet end of said path and positioned to afford movement of the portion of the strip material along said strip path over said nozzle with said nozzle in its passageway;



means spaced from the terminal end of said nozzle toward the outlet end of said strip path adapted for opening one of the films of a said strip material along its passageway to afford movement of the strip material along said strip path;

means along the strip path subsequent to the inflation station adapted for applying heat to seal the inlet openings of a said strip material along predetermined sealing paths longitudinally of the strip material;

tensioning means adapted for tensioning a said strip material along the strip path through said means for applying heat, said tensioning means being adapted to remove wrinkles across the inlet openings;

means along said strip path adapted for pressing together the films of a said strip material along the sealing paths and in areas on the sides of the sealing paths adjacent the rows of chambers from a first position in advance of said means for applying heat to a second position between said means for applying heat and the outlet end of said strip path; and

means adapted for affording cooling of sealed inlet openings on a said strip material between said means for applying heat and said second position.

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**4,017,352**

**APPARATUS USED IN THE APPLICATION OF WHITE SIDEWALL TO A TIRE**

**Frederick F. Vannan, Jr., Akron, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio**

**Filed May 26, 1976, Ser. No. 690,114**
**Int. Cl.² B29C** *27/00;* **B29H** *7/00*
**U.S. Cl. 156—502** **9 Claims**

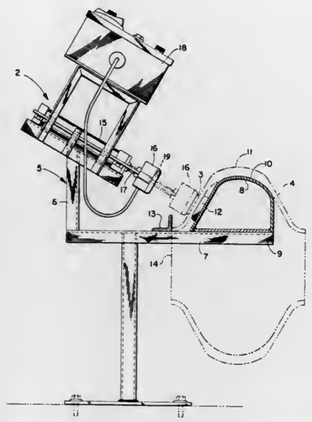
1. An apparatus for treating abutted, spliced ends of a component of an unvulcanized tire, comprising:

a. means for supporting spliced ends of an unvulcanized component in spliced, abutting engagement;

b. a movable pad disposed in spaced relation from the support means, said pad including a number of rigid, movable segments composed of heat conductive material

and means for allowing the segments to conform to the contour of the spliced ends;

c. means for reciprocating the pad to and from the support means, whereby the spliced ends of the component are compressed between the support means and pad; and



d. means for heating the pad to correspondingly heat the spliced ends of the components sufficiently to bond the spliced ends together.

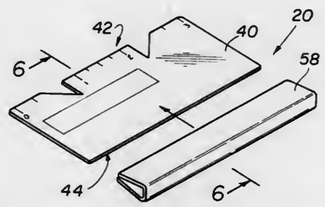
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**4,017,353**

## ACCESSORY TOOL FOR BURGLAR ALARM FOIL

**Morton Cohen, 41-27 Westmorland St., Little Neck, N.Y. 11363**

**Filed Feb. 9, 1976, Ser. No. 656,291**
**Int. Cl.² B44C 7/00; A47L 13/02**
**U.S. Cl. 156—574** **6 Claims**



1. A tool for facilitating the adhesive attachment on a window or like support surface of self-adhesive burglar alarm foil in a crossover contemplating a 90° change of direction, said tool comprising a generally rectangular body having opposite foil-positioning and distal sides, a triangular cutout in said foil-positioning side presenting an aligning edge which is perpendicular to the foil-positioning side has been inserted, and an angularly oriented changing-direction edge both of which bound said triangular cutout, the angle between the aligning edge and the changing-direction edge is 45° said tool having an operative position established by the alignment of said tool aligning edge with an edge of said foil adhesively attached in a first direction along said window in which said tool is then in a superposed position over said foil in folded back relation on itself exposing said foil adhesive surface, said foil being adapted to be folded again upon itself but along said changing-direction edge of said tool both to orient said foil in a second transverse direction and to reestablish the facing relation of said foil adhesive surface to said window, and a grip along said distal edge for removing said tool from beneath said foil adhesive surface, whereby there may be continued adhesive attachment of said foil to said window in said changed transverse direction.

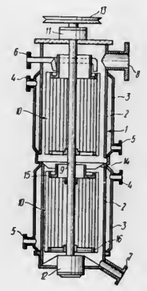
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**4,017,354**

## ROTARY FILM EVAPORATING APPARATUS

**Alexandr Nikolaevich Marchenko, Kolodezny pereulok, 47, kv. 2, and Anatoly Borisovich Tjutjunnikov, ulitsa Frunze, 17, kv. 34, both of Kharkov, U.S.S.R.**

**Filed May 4, 1976, Ser. No. 683,228**
**Int. Cl.² B01D 1/22**
**U.S. Cl. 159—6 R** **1 Claim**



1. A rotary film evaporating apparatus comprising: a vertical cylindrical housing subdivided vertically into a plurality of intercommunicating sections; a heating jacket on the side wall of said housing at each said section; a central shaft mounted for rotation within said housing; hollow spraying drums concentrically mounted on said shaft in each one of said sections; longitudinal bars defining the side wall of each said spraying drum, said bars being generally S-shaped in cross-section and arranged so that the longitudinal outer edges of said bars extend into the indented portions of the adjacent ones of said bars, defining therewith labyrinth-like passsages for a vapor; the portions of said bars which are the most remote from said shaft having apertures made therethrough for passage of a liquid; means for supplying a liquid product to be evaporated into the topmost portion of said housing; means for withdrawing a concentrate from the bottom part of said housing; means for withdrawing the vapor from the internal space of said housing; means for collecting the evaporating liquid flowing down the wall of said housing within an upper one of said sections and for directing it into said spraying drum of the underlying one of said sections, said last-mentioned means being located intermediate the adjacent pairs of said sections.

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**4,017,355**

## PROCESS FOR TREATING LATICES

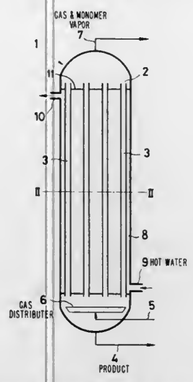
**Takashi Kiyota; Yoshihiko Araki, both of Yokohama, and Hideo Hayashi, Kawasaki, all of Japan, assignors to Nippon Oil Company Ltd., Tokyo, Japan**

**Continuation-in-part of Ser. No. 513,522, Oct. 10, 1974, abandoned, which is a continuation of Ser. No. 207,799, Dec. 14, 1971, abandoned. This application May 3, 1976, Ser. No. 682,853**

**Claims priority, application Japan, Dec. 18, 1970, 45-113029**

**Int. Cl.² B01D 1/22**
**U.S. Cl. 159—49** **7 Claims**

1. A process for removing unreacted monomers or solvents from a latex selected from the group consisting of synthetic rubber latex and synthetic resin latex which comprises bringing said latex into contact with an inert gas fluid, without imposition of any substantial mechanical shear stress, at a temperature ranging from 20° to 100° C by feeding said latex into the upper part of an wetted-wall tower (falling film evaporator), said wetted-wall tower being provided with one or a plurality of circular tubes opened at the both ends and standing vertically, the latex being supplied at the upper end of the tube so as to contact with tube walls, the feed rate of latex being the range of from 5 to 100 gm/min/cm perimeter, the




latex fed being caused to flow down spontaneously by gravity along tube walls in the state of film, the average thickness of said film being in the range of from 0.2 to 1.2 mm and an inert gas being introduced into said tubes at the lower or upper part of said tubes.

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**4,017,356**

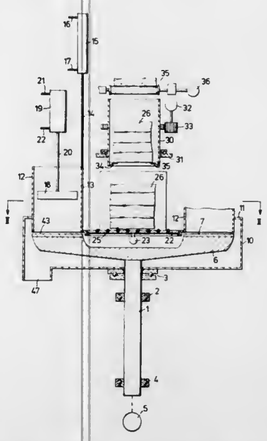
## APPARATUS AND METHOD FOR MANUFACTURING WOOD PULP BY GRINDING WOOD BLOCK MATERIAL

**Hjalmar Sten Ingemar Bystedt, Danderyd, Sweden, assignor to Defibrator AB, Stockholm, Sweden**

**Continuation-in-part of Ser. No. 470,782, May 17, 1974, abandoned. This application Mar. 22, 1976, Ser. No. 669,308**

**Claims priority, application Sweden, May 22, 1973, 072100/73**

**Int. Cl.² B02C 23/18, 7/12; D21B 1/16, 1/26**
**U.S. Cl. 162—26** **7 Claims**



6. A method for manufacturing ground wood pulp from ligno-cellulose containing block material by separating the fibers therein by grinding the block material against a rotating grinding disc end surface comprising providing projecting means in the shape of elevations on the disc end surface to define grooves directed toward the end surface periphery, pressing each piece of block material along a longitudinal side against the disc end surface with its fibers directed outwardly from the center of the grinding disc toward the disc periphery while the fibers are separated to orient the fibers in the same direction as the edges of the elevations and carrying the fibers radially outward so that the elevation edges engage the block fibers under a movement component transverse to the longitudinal direction of the fibers.

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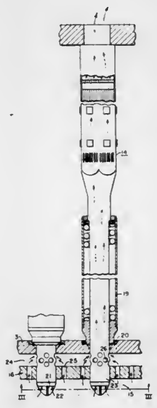
**4,017,357**

## NUCLEAR CORE INLET FLOW ARRANGEMENT

**John F. Patterson, Jr., Murrysville, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Continuation of Ser. No. 262,434, June 13, 1972, now Defensive Publication No. T909,019. This application July 31, 1974, Ser. No. 493,372**

**Int. Cl.² G21C 15/24**
**U.S. Cl. 176—61** **2 Claims**



1. A nuclear core inlet flow arrangement for a nuclear reactor, said nuclear core comprising, in combination, a plurality of fuel assemblies including fissile material for generating heat by nuclear fission, inlet flow means for admitting reactor coolant into said nuclear core, said reactor coolant serving to remove said generated heat from said nuclear core, said inlet flow means comprising a plurality of seperate plenum flow regions, plurality of inlet flow nozzles respectively communicating with a corresponding one of said plurality of fuel assemblies for admitting and directing said reactor coolant into and through said corresponding fuel assemblies, each of said inlet flow nozzles having a plurality of parallel inlet flow path means with the respective corresponding flow path means of said plurality of nozzles in fluid communication with a corresponding one of a plurality of separate plenum flow regions from which said reactor coolant is drawn into said nuclear core for assuring the existence of an inlet flow path for said reactor coolant into said nuclear core, said plurality of parallel inlet flow path means associated with each of said nozzles being connected by a common flow channel comprising the interior of said corresponding inlet flow nozzle and an outlet means for exiting said reactor coolant from said nuclear core.

**4,017,358**

## BORON THERMAL REGENERATION SYSTEM

**Martinus R. Van der Schoot, Dilbeek, Belgium, assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Continuation of Ser. No. 359,054, May 10, 1973, abandoned, which is a continuation-in-part of Ser. No. 189,321, Oct. 14, 1971, abandoned. This application June 26, 1975, Ser. No. 591,781**

**Int. Cl.² G21C** *15/08*

**U.S. Cl. 176—65** **3 Claims**



1. A process for reversibly changing the boric acid concentration in coolant circulated through a nuclear reactor coolant system comprising the steps of:

removing coolant having a first concentration of boron therein from the reactor coolant system;

reducing the temperature of the removed coolant to a first lower level;

conveying the reduced temperature coolant in a forward direction through a tank charged with ion exchange resins to remove boron from the resins and thereby increase the concentration of boron in said removed coolant;

returning said removed coolant having increased boron concentration to the reactor coolant system; and thereafter;

again removing and reducing the temperature of coolant from the reactor coolant system to a second level lower than said first level;

conveying the second temperature level coolant in a reverse flow direction through said tank to deposit boron on said resins and thereby decrease the concentration of boron in the second temperature level coolant; and

returning said second temperature level coolant having a decreased concentration of boron therein to the reactor coolant system;

continuing the circulation of said reduced temperature coolant and the second temperature level coolant respectively through the tank until an equilibrium is established between the concentration of boron and the temperature of said coolants.

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**4,017,359**

## PRODUCTION OF NON-ANTIGENIC ATTENUATED VIRUSES

**Otto-Christian Straub, Tuebingen, Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Germany**

**Division of Ser. No. 313,245, Dec. 8, 1972, abandoned. This application June 24, 1974, Ser. No. 482,619**

**Claims priority, application Germany, Dec. 10, 1971, 2161344**

**Int. Cl.² C12K** *9/00;* **A61K** *45/02*

**U.S. Cl. 195—1.3** **4 Claims**

1. A method of producing an attenuated virus capable of stimulating the natural defense mechanism of a host organism with a detectable non-specific induction of interferon without antigenic effect which comprises passing a virus through a plurality of at least 300 tissue cultures to achieve a degree of attenuation such that antigenic effect cannot be detected in the presence of a detectable non-specific induction of interferon in said organism, wherein said virus is AUJESZKY/pseudo-rabies virus, Influenza virus A1, Influenza virus A1—strain FM1, AUJESZKY/pseudo-rabies virus—strain S/T, or IPV virus.

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**4,017,360**

## METHOD FOR PURIFYING HEPATITIS B ANTIGEN

**Alexander U. Bertland; Alfred A. Tytell, both of Lansdale; George P. Lampson, Hatfield, and Eugene Buynak, North Wales, all of Pa., assignors to Merck & Co., Inc., Rahway, N.J.**

**Filed May 14, 1975, Ser. No. 577,483**

**Int. Cl.² A61K** *39/12;* **C12K** *5/00, 7/00*

**U.S. Cl. 195—1.4** **7 Claims**

1. A method for purifying hepatitis B antigen from a partially purified concentrate obtained from clarified plasma containing hepatitis B antigen comprising treating the concentrate with a quantity of pepsin effective to digest proteinaceous matter at a pH within the range wherein pepsin is enzymatically active, treating the concentrate with a quantity of urea effective to dissociate proteinaceous matter, and removing pepsin, pepsin degradation products and urea, and optionally adding formaldehyde in a concentration effective to inactivate viruses.

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**4,017,361**

## PROCESS FOR OBTAINING CONTINUOUS LINES OF TUMORAL CELLS IN VITRO

**Henri Lucien Febvre, Paris, France, assignor to Choay S.A., Paris, France**

**Filed Mar. 20, 1975, Ser. No. 560,241**

**Claims priority, application France, Mar. 27, 1974, 74.10458**

**Int. Cl.² C12B** *3/00;* **C12K** *9/00*

**U.S. Cl. 195—1.8** **9 Claims**

1. Process for obtaining continuous lines of human tumoral cells in vitro, originating from surgical samples of malignant tumors in which there is an inherent cytotoxicity of the lymphocytes, comprising:

culturing said human malignant tumoral cells in vitro in the presence of

an immunosuppressive anti-human lymphocyte serum devoid of anti-erythrocyte and anti-thrombocyte action, obtained from the supernatant of cultures of lymphocytes established in long-term lines initiated from human lymphocytes,

said serum neutralizing the cytocidic and macrophagic activities of the lymphoblastoid and of the active monocyte cells present in the cellular system, with respect to said human malignant cells, thus permitting the establishment of continuous lines of said human malignant tumoral cells in vitro.

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**4,017,362**

## MICROBIOLOGICAL PROCESS FOR PREPARING L-TARTARIC ACID IN PRESENCE OF SURFACTANTS

**Yuichi Miura, Tokuyama; Kiyohiko Yutani, Kudamatsu; Hitoshi Takesue, Yamaguchi, and Kenji Fujii, Tokuyama, all of Japan, assignors to Tokuyama Soda Kabushiki Kaisha, Japan**

**Filed Feb. 5, 1976, Ser. No. 655,411**

**Int. Cl.² C12D** *1/02*

**U.S. Cl. 195—30** **15 Claims**

1. A method for preparing L-tartaric acid which comprises reacting cells of a microorganism belonging to the genus Nocardia having the ability to produce an enzyme which hydrolyzes the epoxy ring of cis-epoxysuccinic acid or crude cisepoxysuccinate hydrolase derived from said microorganism with cisepoxysuccinate acid or a derivative thereof having the cis-epoxysuccinate acid structure in an aqueous medium containing at least one surfactant, and thereafter recovering L-tartaric acid from said aqueous medium.



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**4,017,363**

## PRODUCTION OF HIGH PURITY GLUCOSE SYRUPS

**William H. McMullen, Norwalk, Conn., and Rosemary Andino, Brooklyn, N.Y., assignors to Novo Industri A/S, Bagsvaerd, Denmark**

**Filed Dec. 19, 1975, Ser. No. 642,474**

**Int. Cl.² C12D** *13/02*

**U.S. Cl. 195—31 R** **4 Claims**

1. A process for converting starch into a glucose syrup containing at least 98% glucose on a dry solids basis comprising:

a. enzymatically liquefying a starch slurry to produce thereby a dextrin solution;

b. saccharifying the resulting dextrin solution at a 10–20% w/w dsb solids content enzymatically for from about 15–75 hours with amyloglucosidase at an enzyme dosage of 0.30–1.0 AG units per gram of starch solids;

c. halting the saccharification when the glucose content exceeds 98% on a dry solids basis.

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**4,017,364**

## PROCESS FOR PRODUCING AN ENZYME PRODUCT HAVING VARIABLE SOLUBILITY

**Ekkehard van Leemputten, Clarens, Switzerland, assignor to Societe d'Assistance Technique pour Produits Nestle S.A., Lausanne, Switzerland**

**Filed June 19, 1975, Ser. No. 588,182**

**Int. Cl.² C07G** *7/02*

**U.S. Cl. 195—68** **11 Claims**

1. A process for the preparation of an enzymatically active product having a variable solubility in an aqueous medium dependent on pH, comprising reacting an enzyme with a polymer carrying both free aldehyde groups and free acid groups, said free acid groups being present in a sufficient number to ensure the variable solubility of the product.

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**4,017,365**

## METHOD FOR DETERMINING ENZYME ACTIVITY

**Toshimasa Nakayama, Kawasaki, and Motoshi Kitamura, Tokyo, both of Japan, assignors to Chugai Seiyaku Kabushiki Kaisha, Tokyo, Japan**

**Filed Oct. 7, 1974, Ser. No. 512,620**

**Claims priority, application Japan, Oct. 9, 1973, 48-112846**

**Int. Cl.² G01N** *31/14*

**U.S. Cl. 195—103.5 R** **4 Claims**

1. In the Karmen method, comprising coupling GOT or GPT with dehydrogenase which reacts with substrates of GOT or GPT are determining GOT or GPT activity by determining the reduction in absorbance in ultraviolet wave length of $NADH_2$ which is coenzyme of the dehydrogenase,

the improvement comprising using a GOT or GPT-containing serum sample of about 0.04 to 0.01 ml and adding a nonion surfactant to the reaction system, said surfactant being one which does not inhibit the intended enzyme activity and does not absorb ultraviolet.

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**4,017,366**

## THERMOGRAPHIC PRINTING METHOD

**Paul Y. Hsieh, Ridgewood, N.J., and Eugene W. Rogall, Huntington Station, N.Y., assignors to Ing. C. Olivetti & C., S.p.A., Ivrea (Turin), Italy**

**Continuation of Ser. No. 454,653, March 25, 1974, which is a continuation of Ser. No. 323,583, Jan. 15, 1973, abandoned, which is a continuation of Ser. No. 64,395, Aug. 17, 1970, abandoned. This application Feb. 6, 1976, Ser. No. 655,795**

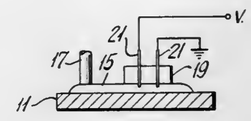
**Int. Cl.² G01D** *15/06, 15/10*

**U.S. Cl. 204—2** **2 Claims**

1. A method of producing visible printing on an electrically insulating receiving medium comprising the steps of:

applying to a selected portion of said receiving medium a non-conductive heat sensitive material in the liquid state and of the type that changes its color when heated over a threshold temperature in mixture with a liquid electrolyte chemically non-reactable with said heat sensitive material;

contacting said selected portion of said applied mixture with a pair of closely spaced electrodes made of material electrolytically non-corrodable by said liquid electrolyte, and




applying an electrical potential difference across said electrodes for causing a current to flow therebetween and through said applied mixture to heat a selected portion of said applied mixture to a temperature higher than said threshold temperature to effect the associated heat sensitive material to change color.

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**4,017,367**

## IRONING CONTAINER STOCK MANUFACTURING METHOD

**William T. Saunders, Weirton, W. Va., assignor to National Steel Corporation, Pittsburgh, Pa.**

**Division of Ser. No. 561,832, March 25, 1975, Pat. No. 3,956,915. This application Apr. 1, 1976, Ser. No. 672,711**

**Int. Cl.² B21B** *27/02*

**U.S. Cl. 204—28** **1 Claim**

1. In the production of flat rolled steel for use in manufacture of a drawn and ironed cup-shaped container body having a bottom wall and a unitary sidewall,

a continuous-strip method for improving lubricant adhesion to one surface of such strip material and decreasing surface contact on the remaining surface during subsequent drawing and ironing operations, comprising the steps of

providing flat rolled steel in continuousstrip form,

processing such continuous-strip to selected gage by cold rolling in continuous-strip mill means including performing final cold reducing operations to impart a selected surface texture, such final cold reducing operations including the steps of

providing roll stand means with surface contact rolls of preselected embossed finishes,

passing the continuous-strip through such roll stand means to impart a pattern of surface indentations on such continuous-strip surfaces,

such surface indentations including linearly extended impressions providing a textured surface for holding lubricant on that surface of the continuous-strip to be exposed to ironing rings working on an exterior surface of a cup drawn from such continuous-strip,

with the remaining surface of the continuous-strip flat rolled steel being treated simultaneously during passage through such roll stand means to imprint surface indentations including linearly extended impressions for decreasing intimate surface contact between an ironing mandrel and such remaining surface during ironing operation on such cup,

and, then

electroplating such flat rolled steel with a protective metal coating applied subsequent to such final cold reduction operations,

such electroplating being applied uniformly and not reflowed in order to maintain such surface indentations.

**4,017,368**

## PROCESS FOR ELECTROPLATING ZIRCONIUM ALLOYS

**Daniel E. Wax, and Robert L. Cowan, II, both of Livermore, Calif., assignors to General Electric Company, San Jose, Calif.**

**Filed Nov. 11, 1974, Ser. No. 522,767**
**Int. Cl.² C25D** *5/34*
**U.S. Cl. 204—32 R** **8 Claims**

1. An aqueous electrolytic activating solution comprised of
   a. from about 10 to about 20 grams per liter of ammonium bifluoride, and
   b. from about 0.75 to about 2 grams per liter of sulfuric acid, said solution having been aged by immersion of zirconium therein.

4. A method for protecting zirconium and zirconium base alloys by electrolytic deposition of a metal film thereon, comprising
   a. activating the zirconium and zirconium alloys in an aqueous electrolytic activating solution of from about 10 to about 20 grams per liter of ammonium bi-fluoride and from about 0.75 to about 2 grams per liter of sulfuric acid, said solution being aged by immersion of pickled zirconium in said solution for about 10 minutes, and
   b. electroplating the zirconium material in a plating bath of the metal to be plated on the zirconium material.

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**4,017,369**

## METHOD FOR THE ELECTROLYTIC RECOVERY OF SB, AS, HG AND/OR SN

**Nils Folke Rune Lindström, Skelleftehamn, Sweden, assignor to Boliden Aktiebolag, Stockholm, Sweden**

**Filed May 3, 1976, Ser. No. 682,337**
**Claims priority, application Sweden, May 7, 1975, 7505336**
**Int. Cl.² C25C** *1/14, 1/16, 1/22*
**U.S. Cl. 204—121** **5 Claims**

1. A method for selectively leaching at least one element from the group comprising antimony, mercury, arsenic and tin from sulphidic and oxidic materials with alkali sulphide solutions with subsequent electrolytic recovery of the leached elements, comprising maintaining in the electrolyte a concentration of sulphide ions and hydroxyl ions, so that the sum of the sulphide ion concentration in mol/l multiplied by two and the hydroxyl ion concentration in mol/l is at least 8, the electrolyte containing hydroxyl ions at least in a quantity equimolar to the sulphide ions, and effecting the electrolysis at an anode current density of more than 1500 A/m².

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**4,017,370**

## METHOD FOR PREVENTION OF FOULING BY MARINE GROWTH AND CORROSION UTILIZING TECHNETIUM-99

**Carl B. Wootten, Rte. 1, Box 249A, Kaswick, Va. 22947**

**Filed May 28, 1974, Ser. No. 473,691**
**Int. Cl.² C23F** *13/00;* **C25D** *3/54;* **B63B** *59/00*
**U.S. Cl. 204—147** **6 Claims**

1. A method for the prevention of fouling and corrosion on the surfaces of underwater instrumentation and buoys which are exposed to marine environments which comprises treating said surfaces with technetium-99, prior to exposure of said surfaces to a marine environment, in an amount effective to prevent the growth of marine organisms on said surfaces and simultaneously effective to inhibit corrosion of said surfaces and exposing said treated surfaces to a marine environment.

**4,017,371**

## SOLID RADIATION CURABLE POLYENE COMPOSITIONS CONTAINING LIQUID POLYTHIOLS AND SOLID STYRENE-ALLYL COPOLYMER BASED POLYENES

**Charles R. Morgan, Silver Spring, Md., assignor to W. R. Grace & Co., New York, N.Y.**

**Division of Ser. No. 330,818, Feb. 8, 1973, Pat. No. 3,925,320, which is a continuation-in-part of Ser. No. 250,554, May 5, 1972, abandoned. This application Nov. 24, 1975, Ser. No. 634,721**
**Int. Cl.² C08F** *8/18, 8/34*
**U.S. Cl. 204—159.18** **10 Claims**

1. A solid curable composition useful for obtaining a solid crosslinked polythioether consisting essentially of:
   1. a solid polyene which is the reaction product of a styrene-allyl alcohol copolymer and a member selected from the group consisting of at least one reactive unsaturated monoisocyanate and at least one reactive unsaturated monocarboxylic acid, said polyene containing at least 2 reactive carbon to carbon bonds per molecule;
   2. a liquid polythiol containing at least 2 thiol groups per molecule, the total combined functionality of (a) the reactive unsaturated carbon to carbon bonds per molecule in the polyene and (b) the thiol groups per molecule in the polythiol being greater than 4; and
   3. a photocuring rate accelerator.

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**4,017,372**

## PROCESS FOR ELECTRODEPOSITION OF CROSS-LINKED POLYMER COATINGS

**Earl H. Wagener, Concord, Calif.; Ritchie A. Wessling, and Dale S. Gibbs, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.**

**Filed Apr. 21, 1975, Ser. No. 569,722**
**Int. Cl.² C25D** *13/06*
**U.S. Cl. 204—181** **10 Claims**

1. A method for applying a cross-linked coating to an object having an electroconductive surface comprising the steps of
   1. immersing the object in a coating bath comprising a latex of cationic structured particles of a film-forming polymer consisting of a nonionic, organic polymer core encapsulated by a thin layer of a water-insoluble, organic polymer having pH independent cationic groups chemically bound to the organic polymer at or near the particle surface;
   2. passing an electric current through said coating bath sufficient to deposit and to cross-link a coating of said structured particles of polymer on the object by providing a difference of electrical potential between the object and an electrode that is
      a. spaced apart from said object
      b. in electrical contact with said coating bath; and
      c. electrically positive in relation to said object;

said coating bath having a conductivity of from about 300 micromhos to about 3500 micromhos per centimeter measured at 25° C.

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**4,017,373**

## ELECTROCHEMICAL SENSING CELL

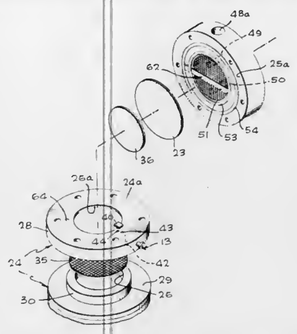
**Manuel Shaw, Bel Air, and Imbrie Thatcher, Chatsworth, both of Calif., assignors to Interscan Corporation, Chatsworth, Calif.**

**Filed Apr. 5, 1976, Ser. No. 673,963**
**Int. Cl.² G01N** *27/46*
**U.S. Cl. 204—195 R** **12 Claims**

1. An electrochemical sensing cell of the type having a counterelectrode, a sensing electrode and an electrolyte, and used for detecting a gas species in a fluid sample, said cell comprising:
   a rigid manifold cap having a lower surface, a shallow recess in said lower surface, and spaced inlet and outlet ports communicating to said recess for flowing said fluid sample through said recess,
   said sensing electrode being substantially planar,
   a container housing said counterelectrode and said electrolyte; and



a cover for said container, said cover having an upper surface on which said planar sensing electrode is situated, said cover having an opening through which electrolyte from said container can contact said sensing electrode, said manifold cap being secured to said cover so that said




sensing electrode is clamped between said cap and said cover, so that said fluid sample flowing through said recess is in contact with one side of said sensing electrode over the entire area of said recess, and so that said electrolyte is in contact with the other side of said sensing electrode over the entire area of said opening.

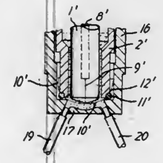
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**4,017,374**

## ELECTROCHEMICAL MEASURING ELECTRODE

**Flemming Aas, Soborg, and Ole Dollerup Jensen, Herlev, both of Denmark, assignors to Radiometer A/S, Copenhagen, Denmark**

**Filed Sept. 23, 1974, Ser. No. 508,623**
**Int. Cl.² G01N** *27/30, 27/46*
**U.S. Cl. 204—195 P** **1 Claim**



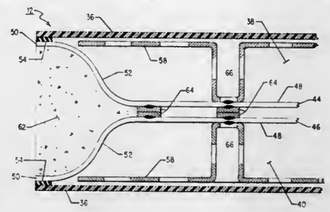

1. An arrangement for carrying out electrochemical measurements on samples, comprising
   a measuring chamber having walls surrounding a measuring cavity, inlet and outlet means for introducing the samples into and expelling them from the measuring cavity, and a hole in the walls leading to the measuring cavity, in combination with
   an electrochemical measuring electrode including a substantially cylindrical portion, a thin foil-shaped membrane arranged over an end face of the cylindrical portion and folded along the adjacent cylindrical outer wall of the cylindrical portion, a resilient O-ring inserted over the folded-over part of the membrane and a circumferential groove in the cylindrical portion at the transition from the cylindrical outer wall to the end face thereof, the groove being of such dimension in relation to the O-ring and so positioned that the O-ring, when seated in the groove, will be maintained therein by its elastic force and extends beyond the end face of the cylindrical portion, whereby, when the electrode is placed so in relation to the measuring chamber that the membrane covers the hole in the walls of the measuring chamber, the O-ring will in addition to maintaining the membrane in position on the cylindrical portion, provide a sealing of the membrane against the walls of the measuring chamber.

**4,017,375**

## BIPOLAR ELECTRODE FOR AN ELECTROLYTIC CELL

**Gerald R. Pohto, Mentor, Ohio, assignor to Diamond Shamrock Corporation, Cleveland, Ohio**

**Filed Dec. 15, 1975, Ser. No. 640,647**
**Int. Cl.² C25B** *9/00*
**U.S. Cl. 204—255** **11 Claims**




1. A bipolar electrode comprising: two pans of identical configurations; an electrode plate connected to each of said pans such that said pans separate said electrode plates; means for connecting said pans in back-to-back spaced relation to provide electrical and mechanical contact therebetween; said pans presenting a peripheral channel when connected; and at least one access port for adding materials or removing products from the bipolar electrode.

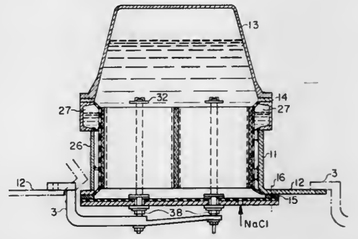
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**4,017,376**

## ELECTROLYTIC CELL

**Luciano Mosé, Dortmund-Hoechsten; Wolfgang Kramer, Herdecke; Wolfgang Strewe, Dortmund, and Bernd Strasser, Hamm, all of Germany, assignors to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.**

**Filed Jan. 20, 1975, Ser. No. 542,537**
**Claims priority, application Germany, Oct. 2, 1974, 2448187**
**Int. Cl.² C25B** *1/24, 9/02, 9/04*
**U.S. Cl. 204—258** **29 Claims**




1. An electrolytic cell of the vertical electrode type including a top and bottom, which cell comprises at least one anode and at least one cathode, a rectangular cathode walled enclosure, a cathode busbar structure, cathode elements having a box-like structure, anode busbars and an anode base structure including a bottom, wherein:
   said cathode wall enclosure comprises four walls with the aspect ratio of the sidewalls to the end walls being at least 2:1, one sidewall of the walled enclosure being fabricated from a conductive metal, the conductive metal sidewall having at least one cathode lead-out busbar, said cathode walled enclosure containing a plurality of cathode elements and a peripheral chamber for conducting gases on the upper part of the cathode walled enclosure;
   said cathode busbar structure comprises said conductive metal sidewall and said cathode lead-out busbar;
   said cathode elements comprise metal means for composite functions of structural supporting and for electrical conducting, said box-like structure comprising two parallel foraminous plates with their upper ends and lower ends bent, thereby forming a box which is open on both sides after assembly;

said metal means comprise spacer pieces attached to the foraminous plates to provide a uniform nominal distance between the foraminous plates, thereby providing gas compartment space inside the cathode box structure allowing for vertical flow of fluids within said cathode box, the metal means being in electrical contact with the interior of said conductive metal sidewall and being adapted to carry current at a substantially uniform current density through the cathode elements, said cathode walled enclosure containing a plurality of cathode elements which extend substantially across the interior length of the cathode walled enclosure, said conductive metal sidewall comprising a component of the cathode busbar structure;

said anode base structure comprises a support base having holes disposed therethrough for the receipt of anode posts, a corrosion resistant and electrically non-conductive layer being located so as to cover the support base and having holes disposed therethrough corresponding to the holes in the support base, said anode posts being in electrical communication with said anode busbars by means of electrical contacts.

## 4,017,377

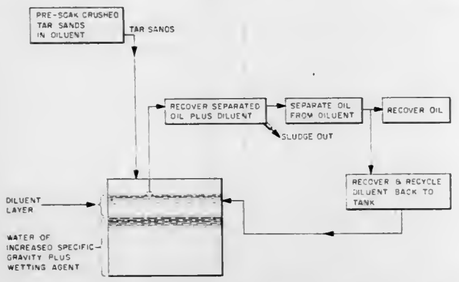
## PROCESS AND FLUID MEDIA FOR TREATMENT OF TAR SANDS TO RECOVER OIL

**John B. Fairbanks, Jr., 3927 S. 3030 East, Salt Lake City, Utah 84106, and Gary C. Brimhall, 2915 Branch Drive, Salt Lake City, Utah 84117**

**Continuation-in-part of Ser. No. 462,206, April 19, 1974, abandoned. This application Sept. 18, 1975, Ser. No. 614,612**

**Int. Cl.² C10G** *1/04*

**U.S. Cl. 208—11 LE** **8 Claims**




1. A process for recovering oil from tar sands including the steps of: providing tar sands; subjecting initially said tar sands to a non-aqueous, hydrocarbon, tar-oil viscosity-reducing diluent environment; providing a separating tank having an aqueous bath of ambient temperature condition not exceeding 100° F. and with a specific gravity greater than one but not exceeding 1.01, said aqueous bath including a wetting agent; directly introducing, for settling, said tar sands, containing diluent from said environment, into said aqueous bath immediately after said subjecting step, whereby to release oil from said tar sands to float upwardly in said bath in a quiescent area thereof; and recovering said oil.

## 4,017,378

## BINDERS FOR ELECTRODES

**Christian Pierre Maurice Fauveau, Lavera; Albert Julus Lucien Bonzom, Sausset les Pins, and Anne Marie Eugenie Moutard nee Andre, Paris, all of France, assignors to The British Petroleum Company Limited, London, England**

**Filed Nov. 11, 1974, Ser. No. 522,911**

**Claims priority, application France, Nov. 12, 1973, 73.40152**

**Int. Cl.² C10G** *37/06*

**U.S. Cl. 208—41** **5 Claims**

1. A process for the manufacture of binders suitable for use in electrodes, consisting of distilling at atmospheric pressure at a residue temperature of from 150° to 450° C. a residue boiling predominantly above 200° C. obtained from a high temperature cracking of a naphtha petroleum fraction, to give a pitch having a KS softening point of from 55° to 90° C. and thermally ageing the pitch at a temperature of from 350° to 450° C. and at atmospheric pressure for from 1 to 20 hours to increase the KS softening point to between 80° and 100 C., said ageing being carried out by recycling the pitch at the base of the distillation column.

## 4,017,379

## CONVERSION PROCESS OF HYDROCARBONS

**Tetsuya Iida; Hideo Saori, both of Yokohama; Masao Inoguchi, Tsukui, and Hiroo Tominaga, Matsudo, all of Japan, assignors to Showa Oil Company, Ltd., Tokyo, Japan**

**Filed May 7, 1975, Ser. No. 575,386**

**Claims priority, application Japan, Nov. 7, 1974, 49-127479**

**Int. Cl.² C10G** *13/06, 23/02, 37/04*

**U.S. Cl. 208—68** **8 Claims**

1. A process for converting hydrocarbon wherein the process comprises (a) a step of thermal cracking of a tar-sand bitumen and vacuum residues having a boiling point of more than 530° C from various petroleum origins at a temperture of 400°14 800° C, a hydrogen pressure of 1–200 Kg/cm² and a contact time of 10–500 seconds to increase the amount of asphaltenes contained in the thermal cracked oil to 1.2 – 3.0 times of the amount of asphaltenes originally contained in the starting material and (b) a step of hydrocracking of the entire product oil obtained by the process of the step (a) at a temperature of 350°–500° C, a hydrogen pressure of 50–300 Kg/cm² and a liquid hourly space velocity of 0.1 – 5, in the presence of a catalyst supporting a metal or metals selected from the 6th and 8th groups of the periodic table on a carrier.

## 4,017,380

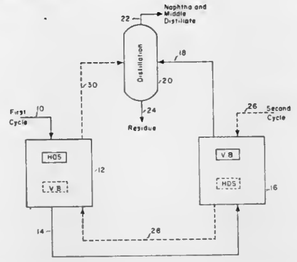
## SEQUENTIAL RESIDUE HYDRODESULFURIZATION AND THERMAL CRACKING OPERATIONS IN A COMMON REACTOR

**William H. Byler, Allison Park, and Angelo A. Montagna, Monroeville, both of Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.**

**Filed July 18, 1975, Ser. No. 597,400**

**Int. Cl.² C10G** *23/00, 34/00*

**U.S. Cl. 208—89** **10 Claims**




1. A process comprising passing a first stream of residual oil containing metals and sulfur together with hydrogen downflow through a zone containing a packed bed of hydrodesulfurization catalyst comprising supported Group VI and Group VIII metals under hydrodesulfurization conditions including a space velocity between about 0.1 and 10 volumes of oil per volume of catalyst per hour, a hydrogen rate between about 500 and 10,000 SCF per barrel of oil and at a hydrogen pressure between about 50 to 5,000 psi, incrementally increasing the temperature in said zone within the range of about 690 to about 790° F. to compensate for loss of catalyst activity with age until said catalyst is deactivated for hydrodesulfurization, subsequently passing a second stream of residual oil and hydrogen upwardly through said zone containing said deactivated hydrodesulfurization catalyst under cracking conditions including a temperature above said hydrodesulfurization temperature up to 1,000° F. in the presence of hydrogen at a flow rate between about 500 to 10,000 SCF per barrel of oil, a hydrogen pressure between about 100 and 5,000 psi and an oil residence time between about 0.0014 and 5 hours to produce middle distillates.



## 4,017,381

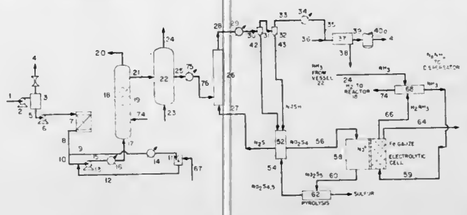
## PROCESS FOR DESULFURIZATION OF RESIDUA WITH SODAMIDE-HYDROGEN AND REGENERATION OF SODAMIDE

**William Chalmers Baird, Jr., Roby Bearden, Jr., and Ralph Louis Bollinger, Jr., all of Baton Rouge, La., assignors to Exxon Research and Engineering Company, Linden, N.J.**

**Filed Apr. 28, 1975, Ser. No. 571,955**

**Int. Cl.² C10G** *23/00*

**U.S. Cl. 208—143** **18 Claims**




1. A process for the desulfurization and hydroconversion of a sulfur-containing petroleum oil feedstock, which comprises

contacting a sulfur-containing petroleum oil feedstock, in a desulfurization-hydroconversion zone, with sodamide in the presence of added hydrogen, said feedstock being maintained substantially in the liquid phase, thereby forming an oil-salt mixture comprising a sulfur-reduced oil phase and a salt phase, said salt phase comprising a sodium sulfur salt;

treating said mixture with hydrogen sulfide to form a dispersion of sodium hydrosulfide in the sulfur-reduced oil;

separating said oil from said sodium hydrosulfide and recovering said sulfur-reduced oil;

converting said sodium hydrosulfide to a sulfur-depleted sodium polysulfide;

converting said sodium polysulfide to sodamide; and

returning at least a portion of the so-regenerated sodamide to said desulfurization-hydroconversion zone.

## 4,017,382

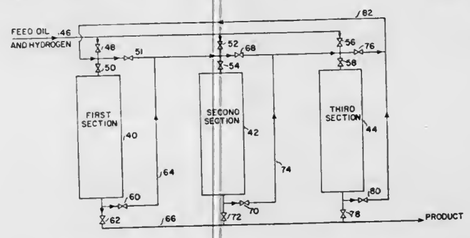
## HYDRODESULFURIZATION PROCESS WITH UPSTAGED REACTOR ZONES

**William S. Bonnell, Mt. Lebanon; Robert D. Christman, Pittsburgh; Jordan S. Lasher, Pittsburgh; John A. Paraskos, Pittsburgh, and Stephen J. Yanik, Valencia, all of Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.**

**Filed Nov. 17, 1975, Ser. No. 632,374**

**Int. Cl.² C10G** *23/02*

**U.S. Cl. 208—210** **5 Claims**




1. A process for the hydrodesulfurization of a metal- and sulfur-containing asphaltenic feed oil comprising (a) passing said oil and hydrogen downwardly through at least three fixed bed catalytic hydrodesulfurization zones connected in series so the reaction effluent from each of said zones is passed downwardly through the next zone in said series; (b) the hydrodesulfurization reaction in said zones being conducted at a temperature of 600° to 900° F., a hydrogen pressure of 500 to 5,000 psi, and with a catalyst in each of said zones comprising supported Group VI-B and Group VIII metals; (c) said feed oil being charged directly to one of said series zones, the zone receiving said feed oil constituting the upstream zone in the series, the reaction effluent from said upstream zone being passed downwardly through the first succeeding downstream zone and the reaction effluent from said first succeeding downstream zone being passed downwardly through the second succeeding downstream zone; (d) removing the upstream zone from service upon catalyst deactivation therein and charging said feed oil directly to said first succeeding downstream zone, (e) removing deactivated catalyst from and charging fresh catalyst to said removed upstream zone, (f) subsequently removing said first succeeding catalyst zone from service upon catalyst deactivation therein, returning said upstream zone containing fresh catalyst to said series as the final zone receiving said reaction effluent in said series, and charging said feed oil directly to said second succeeding downstream zone, (g) removing deactivated catalyst from and charging fresh catalyst to said removed first succeeding zone so that said first succeeding catalyst zone is being subsequently returned to said series as the final zone receiving said reaction effluent in said series, and (h) continuing said sequence so that each downstream zone becomes in succession an upstream zone and upon catalyst deactivation is removed from said series for catalyst replacement and subsequent return to said series as the final zone receiving said reaction effluent in the series.

## 4,017,383

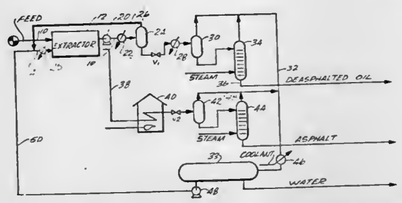
## SOLVENT DEASPHALTING PROCESS BY SOLVENT RECOVERY AT STAGED PRESSURES

**David K. Beavon, Pasadena, Calif., assignor to Ralph M. Parsons Company, Pasadena, Calif.**

**Filed May 15, 1975, Ser. No. 577,694**

**Int. Cl.² C10G** *21/14*

**U.S. Cl. 208—309** **7 Claims**




1. In a process for the deasphalting of a hydrocarbon feed wherein the feed is contacted with a liquefied low molecular weight solvent at an elevated temperature and pressure in an extraction zone, the quantity of solvent employed being sufficient to form a liquid deasphalted hydrocarbon oil-solvent mixture and a fluid heavy hydrocarbon-solvent mixture followed by recovery of solvent from each mixture for recycle to the extraction zone, the improved method of solvent recovery and recycle which comprises:

a. pressurizing and heating at least a portion of the elevated temperature, deasphalted hydrocarbon oil-solvent mixture from the extraction zone to a pressure and temperature above the temperature and pressure of the extraction zone;

b. evaporating a portion of the solvent from the pressurized, heated mixture in an evaporation zone maintained at a pressure and temperature above the pressure and temperature in the extraction zone;

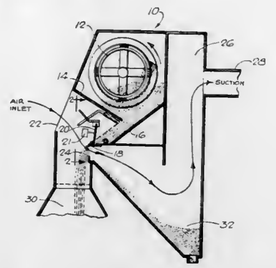
c. condensing and combining the elevated pressure, evaporated solvent with residual, recycled cooled solvent recovered from the hydrocarbon oil-solvent and heavy hydrocarbon-solvent mixtures to form a liquid solvent mixture at a pressure sufficient for introduction to the extraction zone, the quantity of solvent evaporated in the evaporation zone being sufficient on condensation to furnish at least about 50% of the heat required to heat the recycled, cooled solvent to the temperature required for introduction to the extraction zone, and

d. returning the liquid solvent mixture to the extraction zone at a temperature and pressure sufficient for deasphalting the hydrocarbon feed.

## 4,017,384
## PNEUMATIC BYPASS SYSTEM FOR AIR WASH SEPARATORS

**Ardee H. Freeman, and Bruce H. Berger, Jr., both of Granger, Ind., assignors to Wheelabrator-Frye, Inc., Mishawaka, Ind.**

**Filed Nov. 3, 1975, Ser. No. 628,540**
**Int. Cl.² B07B** *11/06*
**U.S. Cl. 209—149** **6 Claims**




**1.** In an air wash separator for separating a mixture of lighter particles from denser particles including means for passing air through the separator and means for feeding said mixture to the air passing through the separator, the means for feeding including a separator lip over which said mixture passes a swinging baffle controlling passage of particles over said lip, a counter balance for adjusting the operation of said baffle, the improvement comprising:

a surge bypass system including:

a. pneumatic means for sensing lighter particle overflow in said feed means,

b. trip means attached to said swinging baffle for opening said baffle when actuated;

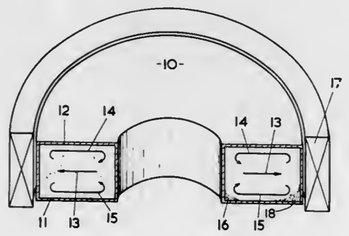
c. a two-way pneumatic cylinder having an extensible piston, said piston actuating said trip means when extended; and

d. valve means responsive to said pneumatic means for controlling operation of said cylinder to extend and retract said piston.

## 4,017,385
## MAGNETIC SEPARATOR SYSTEMS

**Peter Harlow Morton, 12 Danford Lane, Solihull, Warwickshire; Enrico Cohen, 66 Wolsey Road, Moor Park, Northwood, Middlesex HA6 2EH, and Jeremy Andrew Good, 72 Lexham Gardens, London W8, all of England**

**Filed Sept. 6, 1974, Ser. No. 504,669**
**Claims priority, application United Kingdom, Sept. 11, 1973, 42566/73; July 17, 1973, 31657/73**
**Int. Cl.² B03C** *1/00*
**U.S. Cl. 209—214** **12 Claims**

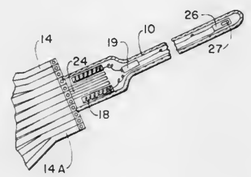



**10.** A method of separating magnetically susceptible particles from a mixture of magnetically susceptible particles and non-magnetic or less magnetically susceptible particles comprising the steps of introducing a stream containing the mixture in a fluidized condition under pressure or under gravity into one end of an arcuate separation channel having an inlet end and an outlet end and arcuate inner and outer walls and at least one connecting wall which constrain the stream to flow in a single undirectional arcuate path along the channel in frictional contact with the inner and outer walls and with the connecting wall, the velocity of the stream and the frictional resistance to flow being such that the stream is subject to sufficient centrifugal force as it flows around the channel that there is produced in the channel a secondary circulation radially outwardly within the body of the stream and then radially inwardly, subjecting the stream during its passage around the channel to a radial magnetic field gradient from a fixed magnet so that the magnetic force and the secondary circulation cooperate to cause the magnetically susceptible particles to gravitate toward the magnet while moving through the channel, removing the magnetically susceptible particles from that radial side of the arcuate channel which is adjacent the magnet and removing the non-magnetic or less magnetically susceptible particles from that radial side which is remote from the magnet.

## 4,017,386
## MAGNETIC SWEEPER

**Samuel M. Barry, Chicago, Ill., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest**

**Filed Oct. 28, 1975, Ser. No. 626,171**
**Int. Cl.² B03C** *1/30*
**U.S. Cl. 209—215** **6 Claims**



**1.** A rake, the tines of which are magnetizable for the attraction and retention of magnetically attractable debris, comprising

a handle section mounted at one end to a hollow housing, with

a plurality of rake tines joined together by one or more spreader bars, said rake tines and spreader bar each being formed of a magnetizable material, said tines comprising

a first set of said rake tines extending into said housing, and

a second set of rake tines which do not extend into the housing,

magnetic means mounted in said housing to magnetize the sections of the first set of tines extending into said housing,

said spreader bars serving to conduct the magnetic field from said first set of tines to the said second set of tines.

## 4,017,387
## SCREENING APPARATUS

**Derald R. Hatton, and Donald F. Lehman, both of Middletown, Ohio, assignors to The Black Clawson Company, Middletown, Ohio**

**Filed Aug. 11, 1975, Ser. No. 603,304**
**Int. Cl.² B07B** *1/04*
**U.S. Cl. 209—240** **5 Claims**

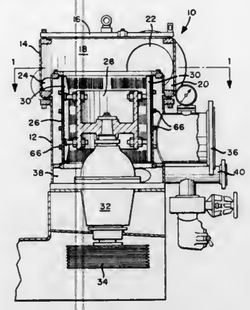
**1.** In a screening machine including a main casing, a perforated screen cylinder disposed within said main casing, said cylinder having inner and outer faces, an inlet into said casing for directing material to be screened to said inner face of said cylinder, an outlet from said casing for removing from said casing screened material which has passed through said cylinder from said inner face to said outer face thereof, means fixing said cylinder to said casing to prevent rotation of said cylinder, and cleaning foils mounted for rotation within said cylinder adjacent said inner face of said cylinder to maintain said perforations unobstructed, the improvement comprising:

a plurality of uninterrupted, discrete slots extending completely through said cylinder from said inner to said outer face thereof,

said slots being arranged in a plurality of circumferentially arranged bands extending about said cylinder,

each of said bands being spaced from each other longitudinally of said cylinder,

said bands being interrupted at spaced intervals by unperforated cantilevered sections extending longitudinally of said cylinder, and



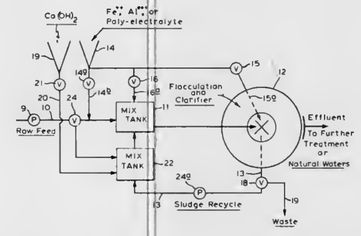
said cantilevered sections and said foils are of such number and arranged with respect to each other such that said foils and said cantilevered sections cannot be aligned with each other.



## 4,017,388
## SPLIT TREATMENT PHOSPHORUS REMOVAL FROM WASTE

**Orris E. Albertson, Norwalk, Conn., assignor to Dorr-Oliver Incorporated, Stamford, Conn.**

**Continuation-in-part of Ser. No. 145,579, May 20, 1971, abandoned, which is a continuation-in-part of Ser. No. 852,280, Aug. 22, 1969, abandoned. This application Jan. 26, 1973, Ser. No. 326,795**
**Int. Cl.² C02B** *1/02*
**U.S. Cl. 210—5** **1 Claim**



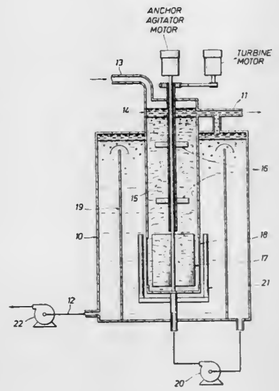

**1.** A method for precipitating algae producing phosphorous from sewage, wherein the incoming sewage flow is treated with lime to effect precipitation of phosphate, and the thus treated sewage is then subjected to a flocculation and clarification operation producing an overflow of clarified sewage and phosphate sludge as underflow,

characterized thereby that an amount of underflow sludge equal to about 50% of the incoming raw feed flow, containing about 180 mg. of lime per liter at a pH of about 9.0 to 9.5, is recycled to a first mixing stage, that about 360 mg. of lime is added per liter of recycle sludge in said first mixing stage, equal to about 180 mg. of lime per liter of incoming feed, thereby raising the pH to about 11 with concurrent water softening effect, and that the thus treated recycled material is mixed with the incoming raw feed in a second mixing stage, thereby lowering the pH of the total flow to 9.0 to 9.5 with a resultant net phosphate precipitate contained in said underflow sludge derived from said flocculation and clarification operation.

## 4,017,389
## METHOD AND APPARATUS FOR CONTINUOUSLY SEPARATING EMULSIONS

**James E. Heath, and Webster M. Sawyer, both of Houston, Tex., assignors to Shell Oil Company, Houston, Tex.**

**Filed June 6, 1975, Ser. No. 584,450**
**Int. Cl.2 B01D** *17/04*
**U.S. Cl. 210—23 R** **3 Claims**




**1.** A method for continuous two-stage separation of the phases of a liquid-liquid emulsion having a disperse phase of 30 ppm to 5,000 ppm and a continuous phase comprising:

providing a liquid suspension of 500 ppm to 20,000 ppm of continuous phase wet, disperse phase trapping fibers within a chamber located concentrically within a vessel;

admitting liquid-liquid emulsion into the chamber;

agitating the fibers and emulsion to break at least part of the emulsion in the chamber into a first disperse phase and a first continuous phase;

allowing the first disperse phase to float to the top of the chamber and withdrawing the first disperse phase therefrom;

discharging the first continuous phase and remaining emulsion from the chamber through a fiber filter on a fiber impermeable screen and into the vessel, thereby breaking the remaining emulsion into a second disperse phase and a second continuous phase;

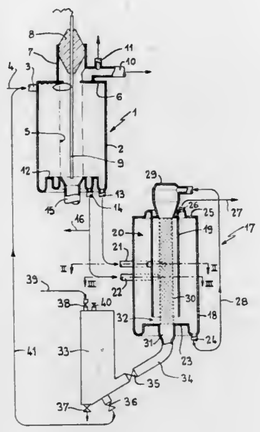
flowing the second disperse phase and second continuous phase to the top of the vessel, withdrawing the second disperse therefrom, flowing the second continuous phase over and down around an annular baffle, and withdrawing the second continuous phase from the vessel; and

combining and discharging the first and second continuous phases from the vessel.

## 4,017,390
## METHOD FOR SEPARATING SOLID POLLUTANTS FROM FLUIDS

**Jean-Francois Vicard, Lyon, France, assignor to Societe Lab, Saint Dider Au Mont D'or, France**

**Filed May 28, 1975, Ser. No. 581,519**
**Claims priority, application France, June 7, 1974, 74.20622**
**Int. Cl.² C02B** *1/82*
**U.S. Cl. 210—42 R** **4 Claims**



1. The method of separating solid particles from a liquid in which they are suspended to recover at separate outlets the particles and a clarified liquid effluent, the method being performed at a preparatory stage in a first vertically oriented cylindrical body having an axially disposed electrode to which a high voltage is applied to create an electrical field with respect to the body, and being performed at a concentrator stage in a second vertically oriented cylindrical body having an axially disposed hollow filter passing therethrough, and the second cylindrical body having a first inlet entering tangentially through its outer periphery and coupled to take liquid from the outer periphery of the first body, and the second body having a second inlet entering therethrough and opening tangentially thereinto at a location near the filter and coupled to take liquid from the first body near said electrode, including the steps of:

centrifuging a liquid mass containing the particles by introducing it tangentially under high pressure into said first cylindrical body to form a first vortex of the liquid around the electrode and out of electrical contact therewith, whereby the electrical field of the electrode agglomerates particles and the centrifugal force concentrates them toward the outer periphery of the first body while leaving a more clarified liquid near the electrode;

withdrawing from the first body above the first vortex the lighter particle, foam, and gases which become separated from the rotating liquid;

transferring liquid and particles from the preparatory stage to the first and second inlets of the concentrator stage;

centrifuging the liquid and particles in said concentrator stage by whirling them inside the second body to form a second vortex of liquid around said filter and spaced therefrom, whereby the centrifugal force concentrates particles outwardly of the centrifuging liquid to leave clarified liquid near said second vortex of the centrifuging liquid;

withdrawing liquid containing concentrated particles near the outer periphery of the second body and introducing it into one end of the hollow filter;

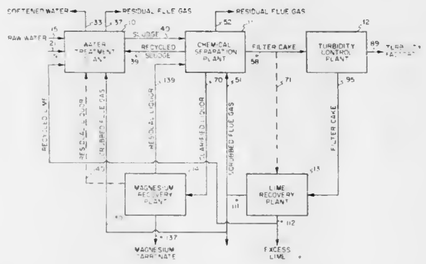
withdrawing a sludge of the particles from the other end of the hollow filter; and

withdrawing clarified liquid from the second body near the second vortex of the liquid.

## 4,017,391
## WATER TREATMENT SYSTEM

**Alvin P. Black, 1717 NW. 23rd Ave, Unit 3"b", Gainesville, Fla. 32601**

**Continuation of Ser. No. 418,896, Nov. 26, 1973, abandoned, which is a continuation of Ser. No. 258,369, May 31, 1972, abandoned, which is a continuation-in-part of Ser. No. 136,094, April 21, 1971, abandoned. This application July 6, 1976, Ser. No. 702,954**
**Int. Cl.² C02B** *1/22*
**U.S. Cl. 210—44** **39 Claims**



1. The method of recovering calcium values from an aqueous sludge product of the lime treatment of raw water and which is separated from the treated water and contains an aqueous component and an intimate mixture of precipitated calcium carbonate and precipitated magnesium hydroxide, said method comprising the steps of:

A. carbonating the separated aqueous sludge product to solubilize the precipitated magnesium hydroxide of the separated sludge product in the aqueous component of the separated sludge product, thereby to provide a carbonated sludge product which has a liquid phase component that contains the solubilized magnesium hydroxide and which has residual solids that include the precipitated calcium carbonate,

B. separating the residual solids from the liquid phase component of the carbonated sludge product, and

C. calcining the precipitated calcium carbonate of the separated residual solids obtained from the separating step (B) and recovering the calcium values of the separated aqueous sludge product as a calcined lime product;

said carbonating step comprising steps of:

A-1. maintaining a flow path of the separated aqueous sludge product through a plurality of serially connected sludge treatment zones by continuously introducing progressively diminishing portions of the separated aqueous sludge product to successive treatment zones along the path of the maintained flow,

A-2. continuously introducing scrubbed flue gases at the bottoms of each of the respective zones,

A-3. continuously and intimately mixing the flue gases introduced in the respective treatment zones with the flowing aqueous sludge therein,

A-4. continuously withdrawing the introduced gases remaining from the intimate mixture thereof with the flowing aqueous sludge from the tops of each of the respective zones, and

A-5. continuously withdrawing the carbonated sludge product from the last of the treatment zones along the maintained flow path;

said separated aqueous sludge product being maintained between **15°** C. and **21°** C. during its flow through the sludge treatment zones, said carbonated sludge product being maintained between **15°** C. and **21°** C. during the separation step (B),

said flowing aqueous sludge being maintained under substantially atmospheric pressure conditions during its flow through the treatment zones, and

said portions of the separated aqueous sludge product introduced to the treatment zones having a magnesium content less than **6.5** grams per liter (as MgO).



## 4,017,392
## ORGANIC PEROXIDES AS SLIME SETTLING AGENTS

**Martin Hamer, Skokie, and Othmer F. Batzer, Libertyville, both of Ill., assignors to International Minerals & Chemical Corporation, Libertyville, Ill.**

**Filed Dec. 22, 1975, Ser. No. 643,447**
**Int. Cl.² C02B** *1/20*
**U.S. Cl. 210—54** **13 Claims**

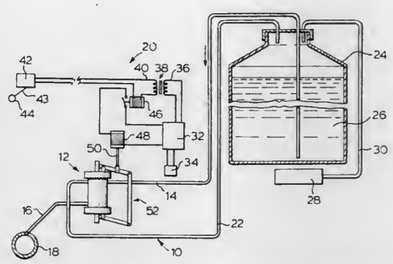
1. A process for settling finely-divided mineralogical waste slime solids from a phosphate ore processing operation including colloidal argillaceous material from an aqueous suspension thereof which comprises adding to said suspension, in an amount effective to enhance the settling of said solids, at least one organic peroxide having a molecular weight not in excess of about 225 in an amount of at least about 10 lb per ton of suspended solids said organic peroxide being selected from the group consisting of urea hydrogen peroxide, peracetic acid, di-t-butyl peroxide, cumene hydroperoxide, t-butyl hydroperoxide, t-butyl per-2-ethyl hexoate, and t-butyl perbenzoate.

## 4,017,393
## APPARATUS FOR DISPENSING A LIQUID

**H. Rodney Foggett, Toronto, Canada, assignor to Her Majesty the Queen in right of Ontario as represented by the Minister of the Environment, Toronto, Canada**

**Filed Feb. 23, 1976, Ser. No. 660,247**
**Int. Cl.² C02B** *1/23*
**U.S. Cl. 210—101** **12 Claims**

1. An apparatus for dosing a treatment solution into a waste liquid comprising a device for measuring and dispensing a predetermined volume of treatment solution, means for delivering treatment solution from a reservoir to said device and means for delivering a measured volume of treatment solution from said device to a waste liquid to be dosed, and control means adapted to determine when waste liquid is present to be dosed and activate said device to dispense a measured volume of treatment solution into a waste liquid, said device having a container which defines a chamber of predetermined volume with an inlet in communication with said means for delivering treatment solution to said device and an outlet in communication with said means for delivering treatment solution to waste liquid, an inlet valve and an outlet valve provided respectively at said inlet and said outlet, air vent means for venting said chamber during the filling and dispensing of treatment solution, said air vent means being adapted to prevent overflow of treatment solution from said vent means to the surroundings, reversible actuation means for simultaneously opening said inlet valve and closing said outlet valve to permit filling of said chamber with a treatment solution and for simultaneously closing said inlet valve and opening said outlet valve to permit

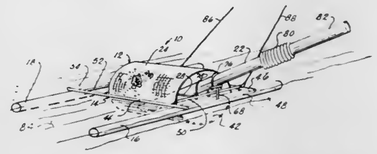


dispensing a measured volume of treatment solution, said reversible actuation means being operated by said control means when waste liquid is to be dosed to thereby open said outlet valve and close said inlet valve so that waste liquid is dosed with a measured volume of treatment solution, said control means being adapted to close said outlet valve and open said inlet valve for refilling said chamber with treatment solution in the absence of waste liquid to be dosed.

## 4,017,394
## WATER SCREEN

**Roy A. Hensley, Ford, Kans. 67842**

**Filed May 12, 1975, Ser. No. 576,682**
**Int. Cl.² B01D** *33/06*
**U.S. Cl. 210—157** **6 Claims**



1. A stream powered, self-cleaning rotary strainer for use in drawing water from a running body of water, the strainer comprising:

a strainer frame;

a drum having a perforate sidewall, an open end, and a closed end, said drum rotatably mounted on said strainer frame about its longitudinal axis;

a plurality of paddles rigidly mounted on the closed end of said drum and extending outwardly therefrom in a spaced relationship around the circumference of the closed end of said drum, said paddles parallel to the longitudinal axis of said drum, said paddles co-acting with the flow of the body of water to rotate said drum on said strainer frame;

a float assembly rigidly mounted on said strainer frame, said strainer frame and said float assembly constructed and adapted to position said drum in a partially submerged condition in the body of water with the longitudinal axis of said drum disposed transverse to the direction of flow of the body of water; and

a water withdrawing conduit mounted on said strainer frame and having the inlet inside a lower portion of the perforate sidewall of said drum;

the rotary strainer being constructed and adapted to, in use, float in a moving body of water wherein said drum is rotated by said paddles passing debris around the sidewall of said

drum, the outlet of said conduit being connected in fluid communication with a pump, or the like, for removing water from within said drum.

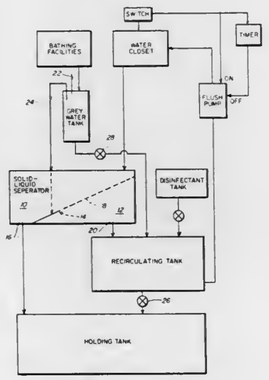
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**4,017,395**

## RECIRCULATING SEWERAGE SYSTEM

**Robert B. Davis, New Britain, Conn., assignor to Koehler-Dayton, Inc., New Britain, Conn.**

**Filed June 27, 1974, Ser. No. 483,636**
**Int. Cl.² B01D** *29/04*
**U.S. Cl. 210—167** **4 Claims**



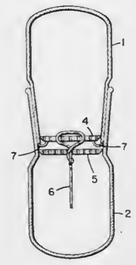

1. A recirculating sewerage system comprising
water closet means,
a selectively inclined effluent receiving member including filtering media at least at the upper portion thereof,
means for directing the effluent flushed from said water closet means onto the top surface of said effluent receiving member proximate the uppermost portion thereof, whereby the liquid portion of the flushed effluent will pass through said filtering media and the solid portion of the flushed effluent will slide down said effluent receiving member,
means for collecting the portion of the flushed effluent which filters through said filtering media,
means for selectively draining said filtrate collecting means,
means for collecting the portion of the flushed effluent which slides off of said effluent receiving member,
means for priming said filtrate collecting means with a predetermined volume of grey water including
a reservoir for receiving grey water discharged from a bathing facility, the volume of said reservoir being selected so that said predetermined volume of grey water can be contained therein, and
means for selectively draining said reservoir into said filtrate collecting means,
means for selectively directing the collected filtrate to said water closet means to flush same, and
means for directing grey water received by said reservoir to the bottom portion of said effluent receiving member when the level of the grey water contained in said reservoir exceeds a predetermined maximum level substantially corresponding to the level of said predetermined volume of grey water contained therein whereby any solids which remain on said effluent receiving member will be washed therefrom into said solids collecting means.

**4,017,396**

## CENTRIFUGAL FILTRATION TUBE FOR REMOVAL OF THE MOTHER LIQUOR FROM THE CRYSTALS IN THE PURIFICATION OF A CHEMICAL COMPOUND BY RECRYSTALLIZATION

**Evald L. Skau, New Orleans, La., assignor to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.**

**Continuation-in-part of Ser. No. 445,742, Feb. 25, 1974, abandoned. This application Sept. 19, 1975, Ser. No. 615,039**
**Int. Cl.² B01D ; C02B ; C02C**
**U.S. Cl. 210—232** **3 Claims**




1. An apparatus for purifying chemical compounds by recrystallization comprising in combination:
a. a male glass segment comprising an enclosed rounded end extending into flat sides and then extending into tapered sides with an open end, said tapered sides tapered inwardly and ground on the outside surface thus forming substantially a ground tapered joint;
b. a female glass segment comprising an enclosed rounded end extending into tapered sides and an open end, said tapered sides tapered outwardly and ground on the inside surface thus forming substantially a ground tapered joint;
c. said male segment assembled to the female segment with said outer ground glass surface of said male segment directly in contact with the said inner ground glass surface of the said female segment thus substantially forming a leak-tight sealing surface, and
d. a porcelain disk strainer or filter segment having a beveled edge constructed with a top circular circumference equivalent to the inside circumference of the tapered male segment except for two parallel flat sides which are spaced a few tenths of a millimeter closer together than the inside diameter of the small end of the male joint so that the strainer can be inserted sideways into the male segment and said strainer or filter segment positioned athwart the inner diameter of the tapered male segment said strainer's circumferential edge forming a tight fit seal with said inner ground glass surface of said male segment and said strainer or filter affixed to the male segment by means of hooks;
e. a thin round porcelain disk with a beveled edge thus substantially forming a splash shield said splash positioned just below the strainer or filter disk athwart the female segment of the assembled apparatus with the outer circumference of the splash shield in direct contact with the inner surface of the female tapered segment thereby imparting structural rigidity to the splash shield, said splash shield having a hole through the center thereof;
f. a wire handle located through the hole in the center of the splash shield and affixed to the said porcelain strainer.

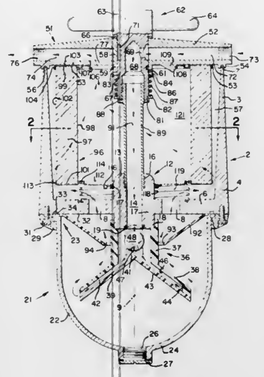


**4,017,397**

## FILTER DEVICE FOR DIESEL ENGINES

**Shannon B. Copeland, 3104 Scenic Drive, Modesto, Calif. 95355**

**Filed Dec. 2, 1974, Ser. No. 528,679**
**Int. Cl.² B01D** *27/08*
**U.S. Cl. 210—238** **7 Claims**



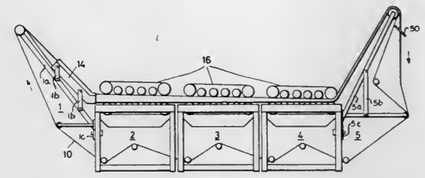
1. A fuel filter device for diesel fuel comprising:
a main body portion open at one end and having an apertured end wall at the other end, said main body portion constituting a filter chamber;
a fuel expansion chamber attached to the apertured end wall of the main body, said fuel expansion chamber constituting a depressurization zone;
a baffle system enclosed within said fuel expansion chamber to control the flow of fuel therethrough, said baffle system including an upper skirt portion having a central aperture, lower conical portion spaced therebelow, and a plurality of radiate rib structures which project between said upper skirt portion and said lower conical portion to provide passageways between successive radiating ribs through which fuel flows into said expansion chamber is substantially laminar flow so as to separate entrained air, water and solids from said fuel by gravity separation;
a cover plate sealingly engaging the open end of the filter chamber and including inlet and outlet passageways therein at substantially the same level in relation to the filter chamber;
a handle assembly rotatably journaled on the cover plate and including an elongated conduit connecting said inlet passageway with the central aperture in said baffle system within said expansion chamber whereby fuel is caused to flow through said baffle system and into said fuel expansion chamber for depressurization and separation prior to flowing through said filter chamber; and
a fuel filter element disposed within said filter chamber and disposed concentrically about said elongated conduit, said fuel filter being arranged in relation to said filter chamber so that fuel flows from said baffle system upwardly through said apertured end wall of said main body portion, surrounds the exterior of the filter element, and flows radially inwardly through the filter element and thence upwardly through the interior thereof to be discharged directly into said outlet passage, said outlet passage communicating directly with the interior of the filter chamber and the filter element being closed at its end remote from said apertured end wall, whereby the fuel must pass through said filter before reaching the outlet passageway.

**4,017,398**

## DEVICE FOR THE CONTINUOUS SEPARATION OF MIXTURES OF SOLIDS AND FLUIDS

**Otto Hartmann, Stuttgart; Hans Brunner, Steinmaur, and Thomas Hartmann, Berlin, all of Germany, assignors to Firma Hamako Hartmann, Berlin, Germany**

**Filed Aug. 11, 1975, Ser. No. 603,567**
**Claims priority, application Germany, Aug. 13, 1974, 2439176**
**Int. Cl.² B01D** *33/32*
**U.S. Cl. 210—350** **15 Claims**



1. Apparatus for continuous separation of solid-fluid mixtures comprising:
a. an endless band of filter cloth folded to form an endless tube which is longitudinally openable and closable and routing means to permit cyclically introducing a mixture into the tube for filtering, filtering and removal of solids following filtering;
b. inlet means for introducing the the mixture into the tube;
c. a filter unit providing a channel for passage of the tube filled with the mixture and folded as aforesaid, for filtration of fluid from the mixture, the cross sectional flow area of the channel being adjustable;
d. means for opening the filter tube following the filter unit for discharge of solids from the tube;
e. the inlet means and the filter unit being mounted on a first frame and the opening means being mounted on a second frame, said frames being separable to provide a modular construction.

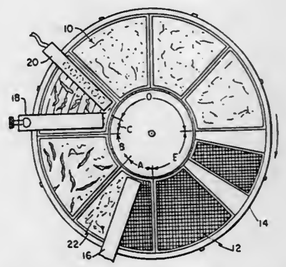
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**4,017,399**

## METHOD AND APPARATUS FOR FILTRATION OF SLURRIES

**Edwin B. Lopker, Fort Lauderdale, Fla., assignor to Pullman Incorporated, Chicago, Ill.**

**Division of Ser. No. 806,087, March 11, 1969, Pat. No. 3,608,721. This application Feb. 26, 1971, Ser. No. 119,416**
**Int. Cl.² B01D** *23/24*
**U.S. Cl. 210—408** **1 Claim**

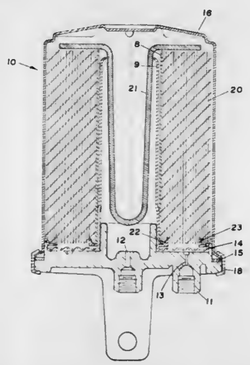


1. In a filter wherein a filter cake is formed on a filter medium, the combination therewith of means for loosening particles from the surface of the filter cake, said means comprising at least one adjustable wire rake, said rake comprising a plurality of substantially hairpin shaped wires connected to said rake at the open end of the hairpin, the closed end of the hairpin extending downwardly whereby the closed end of the hairpin will sweep the surface of the filter cake and loosen

particles therefrom, said rake being positioned so that particles loosened from said filter cake are not removed therefrom but are retained on the surface thereof, support means to adjustably support said rake so that adjustable abrading action may be applied to the surface of the filter cake, and means for applying a wash fluid to the portion of the cake having said loosed particles thereon.

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**4,017,400**
**OIL FILTER**
**Harvey R. Schade, P.O. Box 83, Edgerton, Wis. 53534**
**Continuation-in-part of Ser. No. 433,992, Jan. 17, 1974, abandoned. This application May 19, 1975, Ser. No. 579,032**
**Int. Cl.² B01D** *27/00*
**U.S. Cl. 210—439** **4 Claims**

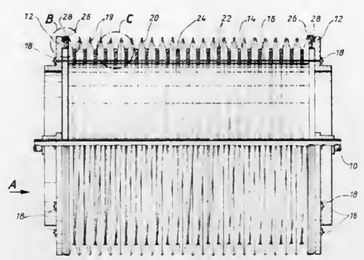


1. In axial flow filtering apparatus for fluids which interstitially pass between leaves of an assemblage of tissue within a confining vessel, an improvement comprising means sealably partitioning said vessel isolating one transverse face of said assemblage of tissue from a second transverse face of said assemblage of tissue against communicating by-pass flow of fluid past said assemblage of tissue wherein said means is of a configuration comprising at least one relatively uniform, thin annular substantially cyclindrically uniform outer diameter lip projecting baffle-like interstitially in overlapped interposition with said leaves at said one face, interlocking with said leaves without substantial distortion of said assemblage of tissue to prevent fluid leakage past said assemblage of tissue.

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**4,017,401**
**STRAINER DRUM AND METHOD OF MAKING THE SAME**
**Emil Holz, Eningen, Germany, assignor to Firma Hermann Finckh Metalltuch-und Maschinenfabrik, Baden-Wurttemberg, Germany**
**Continuation of Ser. No. 428,897, Dec. 27, 1973, abandoned. This application Oct. 14, 1975, Ser. No. 622,438**
**Claims priority, application Germany, Jan. 8, 1973, 2300553**
**Int. Cl.² B01D** *33/06*
**U.S. Cl. 210—493** **6 Claims**

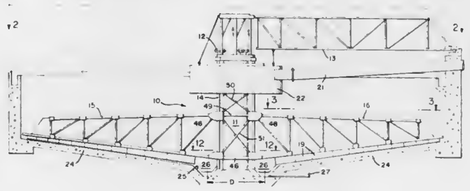
1. A strainer drum having an axis and a circumference, comprising
a. filter fabric supporting means including a series of apertured, axially juxtapositioned carrier discs defining axially spaced, alternating, circumferentially extending crests and roots;
b. a one-piece prefolded filter fabric positioned substantially 360° about said discs to be supported thereby, said filter fabric having circumferential folds, said filter fabric conforming to said crests and roots and being made of warps and wefts of non stretchable filaments extending obliquely with respect to the strainer to define a filter



fabric drum axis, conforming to the shape of discs and overlying the apertures thereof and
c. securing means for clamping said filter fabric to said discs.

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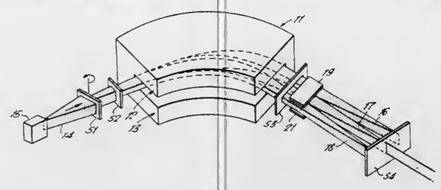
**4,017,402**
**SEDIMENTATION TANK HAVING A ROTARY RAKE STRUCTURE**
**Elliot Bryant Fitch, Weston, Conn., assignor to Dorr-Oliver Incorporated, Stamford, Conn.**
**Continuation of Ser. No. 496,386, Aug. 12, 1974, abandoned. This application July 7, 1975, Ser. No. 594,373**
**Int. Cl.² B01D** *23/18*
**U.S. Cl. 210—528** **16 Claims**



1.
A continuously operating settling tank which comprises in combination slurry feeding means for the tank, overflow means for supernatant liquid, a tank bottom having a central sludge collecting zone provided with sludge discharge means,
a rotary sludge raking structure and means for supporting said structure for rotation about a vertical axis, said raking structure comprising radial rake arms, a sequence of sludge raking blades fixed to the underside of at least one of said arms and spaced from one another along said arms, said blades being set at an angle to the direction of their path of movement so that sludge is conveyed by said blades to said collecting zone incident to rotation of the rake structure,
said spaced blades on each arm comprising a group of inner blades operating in an inner zone adjacent to and surrounding said central sludge collecting zone, each of said inner blades having a substantially vertical upper body portion, a forwardly extending lower end portion shaped so as to present a rigid forwardly directed slicing edge, adapted to provide a forward lifting effect upon the sludge mass being engaged and moved by said blade, thereby inducing at the back side of said blade a downflow of liquid from a zone having a fluidity greater than that of the sludge mass being moved by the blade, into the space below said forwardly directed lower end portion, said downflow thus adapted to reach the interface between the sludge solids being moved by the blade and a bottom layer of residual material, whereby the frictional resistance of the sludge to the movement by the blades relative to said bottom layer is diminished;
and means for rotating the rake structure.



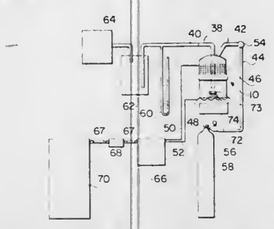
**4,017,403**
**ION BEAM SEPARATORS**
**James Harry Freeman, Abingdon, England, assignor to United Kingdom Atomic Energy Authority, England**
**Filed July 7, 1975, Ser. No. 593,188**
**Claims priority, application United Kingdom, July 31, 1974, 33863/74; July 31, 1974, 33864/74; July 31, 1974, 33865/74**
**Int. Cl.² H05K** *3/06*
**U.S. Cl. 250—492 A** **26 Claims**



1. An ion beam separator comprising a curved ion beam passageway, a deflecting magnet for deflecting an ion beam injected into the passageway, and a beam width defining slit traversed by the ion beam prior to entry into the deflecting field of the said magnet, which slit is rotatable about an axis parallel with the beam height for adjusting the width of beam permitted to pass through the slit.

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**4,017,404**
**APPARATUS FOR LOW TEMPERATURE ASHING USING RADIO FREQUENCY EXCITED GAS PLASMA**
**Larry E. Habeger, Big Lake, Minn., assignor to The United States of America as represented by the Secretary of the Department of Health, Education and Welfare, Washington, D.C.**
**Filed Mar. 11, 1976, Ser. No. 665,878**
**Int. Cl.² B01K** *1/00;* **G01N** *27/00*
**U.S. Cl. 250—531** **5 Claims**



1. A low temperature ashing device comprising:
side and end walls defining a gas tight reaction chamber for containing a specimen to be ashed;
means communicating with said chamber for reducing the pressure therein;
means communicating with said chamber for supplying a stream of reaction gas thereto; and
RF means for coupling a radio frequency output to said gas and generating a plasma to produce low temperature ashing of a specimen therein, said RF means including a driven and receiving antenna pair having an annular antenna encompassing the side walls with a spaced substantially planer antenna associated with an end wall of said chamber.

**4,017,405**
**SOLUBLE OIL COMPOSITION**
**LeRoy W. Holm, Fullerton, Calif., assignor to Union Oil Company of California, Brea, Calif.**
**Continuation-in-part of Ser. No. 345,184, March 26, 1973, Pat. No. 3,920,073. This application July 18, 1975, Ser. No. 597,085**
**Int. Cl.² E21B** *43/16;* **C09K** *3/00*
**U.S. Cl. 252—8.55 D** **19 Claims**

13. A soluble oil additive concentrate consisting essentially of an admixture of preferentially oil-soluble surface active alkyl aryl sulfonates, 0.1 to 1.5 parts by weight of a sulfated surfactant consisting essentially of an admixture of alkali metal or ammonium lauryl polyethoxy sulfate having 2 to 6 ethoxy groups and an amide builder, and a stabilizing agent selected from the group consisting of monohydric aliphatic alcohols having 3 to 5 carbon atoms, aliphatic ketones having 4 to 6 carbon atoms, glycol ethers having 4 to 12 carbon atoms, and dialkylene glycols having 4 to 6 carbon atoms, in the proportion of 1 to 12 parts by volume of said sulfonates per part of stabilizing agent.

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**4,017,406**
**CARBOXYLATE HALF ESTERS OF 1-AZA-3,7-DIOXABICYCLO[3.3.0] OCT-5-YL METHYL ALCOHOLS, THEIR PREPARATION AND USE AS ADDITIVES FOR OLEAGINOUS COMPOSITIONS**
**Stanley J. Brois, Wantage, England; Jack Ryer, East Brunswick, and Esther Winans, Colonia, both of N.J., assignors to Exxon Research and Engineering Company, Linden, N.J.**
**Filed May 1, 1975, Ser. No. 573,545**
**Int. Cl.² C10M** *1/32*
**U.S. Cl. 252—51.5 A** **12 Claims**

1. A lubricating oil composition comprising a major amount of lubricating oil and in the range of about 0.01 to 20 wt. % of an oil soluble ester which is the half ester reaction product of: (a) about 1 molar proportion of a hydrocarbyl substituted $C_4$ to $C_{10}$ dicarboxylic acid or anhydride having about 6 to about 300 carbon atoms per hydrocarbyl group partly esterified with the reaction product of (b) either about 1 or 2 molar proportions of an aldehyde, or one molar proportion of ketone and one molar proportion of aldehyde, reacted with about 1 molar proportion of tris-(hydroxymethyl) aminomethane; said half ester reaction product having a 1-aza-3,7-dioxabicyclo[3,3,0] octyl ring.

12. A composition according to claim 1, wherein the amount of said half ester reaction product is about 0.01 to 5 wt. %, and said half ester is the half ester reaction product of octadecenyl succinic anhydride and the reaction product of two molar proportions of formaldehyde with one molar proportion of tris-(hydroxymethyl) aminomethane.

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**4,017,407**
**METHODS FOR PREPARING SOLID IODINE CARRIER MIXTURES AND SOLID FORMULATIONS OF IODINE WITH IODINE CARRIERS**
**Abraham Cantor, Elkins Park, Pa., and Murray W. Winicov, Flushing, N.Y., assignors to West Laboratories, Inc., Long Island City, N.Y.**
**Continuation-in-part of Ser. No. 360,338, May 14, 1973, Pat. No. 3,898,326. This application Jan. 27, 1975, Ser. No. 544,412**
**Int. Cl.² C11D** *1/72, 3/48*
**U.S. Cl. 252—106** **14 Claims**

1. The solid PVP-iodide product obtained by first preparing an aqueous solution of poly (N-vinyl-2-pyrrolidone), a water soluble iodide selected from the group consisting of sodium, potassium, lithium, magenesium, hydrogen, calcium, ammonium, amine and a quaternary ammonium iodides, and a compatible additive selected from the group consisting of nonionic detergents and mixtures thereof in proportions to provide a (PVP plus nonionic detergent): $I^-$ ratio in the range

of about 1:1 to 20:1, the amount of nonionic detergent not exceeding the amount of PVP, and drying said aqueous solution and particalizing the resulting solid to obtain a product in which individual particles contain the PVP, iodide and additive in homogeneous mixture.

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**4,017,408**

## WATER SOLUBLE LIQUID IODINE CONCENTRATE, AQUEOUS IODINE BACTERIOCIDAL SOLUTION AND METHODS OF MAKING THE SAME

**Elmer H. Fults, 219 Woodward Drive, Tulare, Calif. 93274**

**Filed July 14, 1975, Ser. No. 595,560**
**Int. Cl.² C11D** *3/34, 3/48*
**U.S. Cl. 252—106** **3 Claims**

1. A method of producing a water soluble iodine concentrate consisting essentially of dissolving 100 parts by weight of iodine in at least about 37 parts by weight of dimethyl sulfoxide, and dissolving the resultant system in a water solution surfactant selected from the group consisting of anionic and nonionic surfactants in an amount sufficient effectively to enhance the solubility of said system in water.

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**4,017,409**

## LIQUID HOUSEHOLD CLEANER

**Emiel Mathilde Anna Alfons Demessemaekers, Cincinnati, Ohio; Guido Bognolo, Brussels, Belgium, and Gianfranco Luigi Spadini, Newcastle upon Tyne, England, assignors to The Procter & Gamble Company, Cincinnati, Ohio**

**Filed Jan. 20, 1976, Ser. No. 650,815**
**Int. Cl.² C11D** *1/14, 1/37, 3/06*
**U.S. Cl. 252—109** **8 Claims**

1. A liquid, homogenous, stable, household cleaner composition, in particular for cleaning hard surfaces, containing anionic detersive surfactants, builder salts, and other usual cleaner additives, consisting essentially of:

A. from about 2% to about 15% by weight of a mixture of
   a. an anionic, organic, synthetic sulfonate, having the formula $R_1SO_3M$ wherein $R_1$ is selected from the group consisting of alkyl groups containing from 10 to 20 carbon atoms, and wherein M represents a cation selected from the group consisting of sodium, potassium, ammonium and ethanol ammonium; and
   b. an anionic, organic synthetic sulfate having the formula $R_2SO_4M$ wherein $R_2$ is selected from the group consisting of saturated or unsaturated, straight or branched aliphatic hydrocarbon groups containing from 8 to 18 carbon atoms, and M has the meaning given above;

whereby the weight ratio of (a) to (b) is between 3/2 and 10/1;

B. from about 3% to about 7.5% by weight of a water-soluble, organic or inorganic builder salt; and mixtures thereof;

C. from about 0.3% to about 3% by weight of a suds depressing system comprising a fatty ester of the general formula $R_3COOR_4$, wherein $R_3$ is an alkyl radical containing from 11 to 17 carbon atoms and $R_4$ is an alkyl radical containing from 2 to 4 carbon atoms; and sodium, potassium or ammonium soap of a fatty acid containing from 12 to 18 carbon atoms; whereby the ester/soap weight ratio is between 1/1 and 1/20; and

D. water;

wherein the weight ratio of (A) to (B) is between 5/1 and 1/2.

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**4,017,410**

## METHOD OF WASHING GLASSWARE AND INHIBITED CLEANING SOLUTION AND ADDITIVE COMPOSITION USEFUL THEREIN

**Malachi E. Sorgenfrei, Grosse Ile, and Otto T. Aepli, Southgate, both of Mich., assignors to BASF Wyandotte Corporation, Wyandotte, Mich.**

**Division of Ser. No. 520,546, Nov. 4, 1974. This application Nov. 5, 1975, Ser. No. 628,979**
**Int. Cl.² C11D** *7/06*
**U.S. Cl. 252—156** **14 Claims**

1. A liquid additive composition for aqueous caustic soda cleaning solutions used in washing coated glass containers having a thin coating thereon including a coating of an organic hot end coating material applied to the glass containers while hot, the resultant hot end coating initially being substantially free of objectionable color and imparting abrasion resistance to the glass containers and being altered by repeated washings therein whereby the glass containers exhibit loss of abrasion resistance or an objectionable discoloration appears, the additive composition consisting essentially of on a weight basis from about 15 to 20% of caustic soda, from about 2 to 5% of at least one soluble zinc containing compound when calculated as zinc oxide, from about 0.5 to 1% of at least one synthetic organic phosphate ester anionic surfactant, from about 0.2 to 0.6% of at least one low foaming synthetic alkoxylated nonionic surfactant, from about 2 to 5% of at least one hard water conditioning sequesterant which sequesters calcium ion or magnesium ion from hard water contaning the same and the remainder water, the said caustic soda, zinc containing compound, anionic surfactant, nonionic surfactant and sequesterant being dissolved in the liquid additive composition to form a homogeneous aqueous solution thereof which is compatible with aqueous caustic soda cleaning solutions, and the said liquid additive composition being effective to prolong the useful life of the said hot end coating including the coating of the organic hot end coating material when added to said aqueous caustic soda cleaning solutions in an amount to provide the zinc containing compound therein in a concentration of from about 0.01 to 0.3% by weight when calculated as zinc oxide.

8. An aqueous caustic soda cleaning solution for use in washing coated glass containers having a thin coating thereon including a coating of an organic hot end coating material applied to the glass containers while hot, the resultant hot end coating initially being substantially free of objectionable color and imparting abrasion resistance to the glass containers and being altered by repeated washings therein whereby the glass containers exhibit loss of abrasion resistance or an objectionable discoloration appears, the aqueous caustic soda cleaning solution consisting essentially of on a weight basis from 0.3 to 6% of caustic soda, from 0.01 to 0.3% of at least one soluble zinc containing compound when calculated as zinc oxide, from 0.002 to 0.05% of at least one synthetic organic phosphate ester anionic surfactant, from 0.001 to 0.03% of at least one low foaming synthetic alkoxylated nonionic surfactant, from 0.008 to 0.2% of at least one hard water conditioning sequesterant which sequesters calcium ion or magnesium ion from hard water containing the same, and the remainer water, the said aqueous caustic soda cleaning solution being effective to prolong the useful life of the said hot end coating including the coating of the organic hot end coating material.

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**4,017,411**

## BLEACHING ARTICLES

**Francis Louvaine Diehl, Wyoming; Mario Stephen Marsan, and James Byrd Edwards, both of Cincinnati, all of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio**

**Filed Mar. 27, 1975, Ser. No. 562,527**
**Int. Cl.² D06L** *3/02;* **C11D** *3/395*
**U.S. Cl. 252—186** **6 Claims**

1. An article especially adapted for bleaching fabrics in an automatic dryer, comprising:



a. a non-starch thickened peroxygen bleaching composition characterized by a viscosity of from 200 cps to 100,000 cps; and
b. a water-insoluble dispensing means characterized by being in the form of a pouch having perforations of a diameter from about 0.05 mm to about 3 mm or embossed in such a manner that upon rupture perforations are formed having a diameter of from about 0.05 mm to about 3 mm,

wherein said bleaching composition is in releasable combination with the dispensing means.

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**4,017,412**

## BLEACHING COMPOSITION

**William Jack Bradley, Cincinnati, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio**

**Filed Mar. 27, 1975, Ser. No. 562,531**
**Int. Cl.² D06L** *3/02;* **C11D** *3/395*
**U.S. Cl. 252—186** **11 Claims**

1. A fabric bleaching composition having a viscosity of from about 200 cps to about 100,000 cps, comprising:
   a. from about 5% to about 35% by weight of a solid, substantially water-insoluble peroxygen compound selected from the group consisting of diperazelaic acid, diperbrassylic acid, dipersebacic acid, and diperisophthalic acid;
   b. an effective amount of a starch thickening agent; and
   c. the balance a liquid carrier.

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**4,017,413**

## PROCESS FOR THE PRODUCTION OF SOLUTIONS OR SUSPENSIONS OF CYANURIC CHLORIDE IN AQUEOUS ORGANIC SOLVENTS

**Friedrich Bittner, Bad Soden, Germany; Heinz Haschke, Weissenstein ob der Drau, Austria; Helmut Suchsland, Rodenbach, Germany; Gerd Schreyer, Hanau, Germany, and Werner Schwarze, Frankfurt, Germany, assignors to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler, Frankfurt, Germany**

**Filed Nov. 18, 1975, Ser. No. 632,952**
**Claims priority, application Germany, Nov. 20, 1974, 2454910**
**Int. Cl.² B01F** *3/08;* **C07D** *251/28*
**U.S. Cl. 252—187 R** **14 Claims**

1. A process for the production of a solution or suspension of cyanuric chloride in a water containing organic solvent comprising mixing liquid cyanuric chloride and the organic-aqueous solvent while they are agitated, said process including leading the liquid 200°chloride at a temperature between its melting point and 200° C. into the flowing organic-aqueous solvent, the cyanuric chloride having a velocity

Vcy in kg/hr where

$$Vcy = \frac{P - P_{LM}}{100 - P} \times V_{LM}$$

where

P is the desired concentration of cyanuric chloride in said solution or suspension,

$P_{LM}$ is the concentration of cyanuric chloride in the solvent, $V_{LM}$

$V_{LM}$ is the velocity of the added solvent in kg/h, and

$P_{LM}$, $V_{LM}$, the temperature of the added solvent are so selected that the equation

$$T_x = \frac{T_{LM} + \frac{Vcy}{V_{LM}} \times \frac{C_p(Cy)}{C_p(LM)} \times T_{Cy}}{1 + \frac{Vcy}{V_{LM}} \times \frac{C_p(Cy)}{C_p(LM)}}$$

does not exceed the boiling point in ° C. of the solvent and wherein $C_P(LM)$ and $C_P(Cy)$ indicate the specific heat capacities in cal. $\times g^{-1} \times$ degree $C^{-1}$ of the solvent and cyanuric chloride respectively.

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**4,017,414**

## POWDERED METAL SOURCE FOR PRODUCTION OF HEAT AND HYDROGEN GAS

**Stanley A. Black, Port Hueneme, and James F. Jenkins, Camarillo, both of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Division of Ser. No. 507,652, Oct. 19, 1974, Pat. No. 3,942,511. This application Dec. 8, 1975, Ser. No. 635,009**
**Int. Cl.² C09K** *3/00*
**U.S. Cl. 252—188** **14 Claims**

1. An electrochemical source for the rapid generation of heat and hydrogen gas upon activation by electrolyte, comprising:
   a. an intimate mixture of powdered active magnesium metal particles and passive metallic iron particles such that the electrical contact resistance between said active and passive powdered metal particles is very low;
   b. passive metallic iron particles being embedded in the surface of at least a substantial portion of said active magnesium metal particles; each said active magnesium metal particle having at least one passive metal particle embedded thereon comprises a powdered form of a shorted micro electrochemical cell; said intimate mixture of powdered active and passive metal particles operable to produce heat and hydrogen by exothermic reaction in a suitable electrolyte;
   c. an electrolyte in which the exothermic reaction occurs when in solution, the electrolyte solution being kept separate from the metal containing particles until the reaction is desired;
   d. controls for the amount of heat and hydrogen produced and the operational life of said intimate mixture in the electrolyte being the variation of powder sizes and the ratio of active to passive metal surface area exposed.

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**4,017,415**

## PROCESS FOR THE RESTORATION OF THE CHEMICAL LIGHTING POTENTIAL OF A CHEMILUMINESCENT LIGHTING FORMULATION

**Arthur Albert Doering, Middlesex, N.J., assignor to American Cyanamid Company, Stamford, Conn.**

**Filed May 29, 1975, Ser. No. 582,037**
**Int. Cl.² C09K** *3/00;* **A61L** *13/00;* **C09K** *11/06*
**U.S. Cl. 252—188.3 CL** **5 Claims**

1. An improved method of treatment for oxalate component solution useful in a chemical light system, said oxalate component solution comprising an oxalate diester in liquid solution, and said component prior to treatment having a characteristic failure to produce initial high intensity luminosity on mixture with liquid activator component comprising peroxide and basic catalyst in liquid solvent, said improved method comprising the steps of contacting the defined liquid oxalate component with solid aluminum oxide for a period of time sufficient to correct the defined characteristic failure and then separating the treated liquid from the solid.

## 4,017,416
## P-CYANOPHENYL 4-ALKYL-4'-BIPHENYLCARBOXYLATE, METHOD FOR PREPARING SAME AND LIQUID CRYSTAL COMPOSITIONS USING SAME

**Takashi Inukai; Hideo Sato; Shigeru Sugimori, and Tetsuya Ishibe, all of Yokohamashi, Japan, assignors to Chisso Corporation, Osaka, Japan**

**Filed Oct. 3, 1975, Ser. No. 619,539**

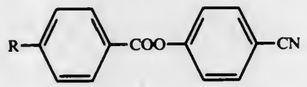
**Claims priority, application Japan, Oct. 11, 1974, 49-116928; Apr. 12, 1975, 50-44496**

**Int. Cl.² C09K** *3/34;* **G02F** *1/13*

**U.S. Cl. 252—299** **2 Claims**

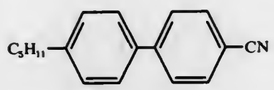
1. A liquid crystal composition comprising the following 4 groups of (A)–(D) in the proportions specified:

A. 35–50% by mol, based upon the total amount of the composition, of two or three compounds selected from the group consisting of 4-alkylbenzoic acid-4'-cyanophenyl esters expressed by the general formula

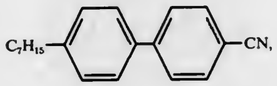


(wherein R is a straight chain alkyl group having 4–8 carbon atoms or a straight chain alkoxy group having 5–8 carbon atoms), said two or at least two of said three compounds each having R as a straight chain alkyl group,

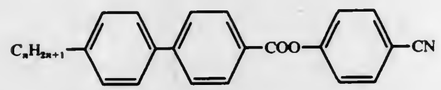
B. 20–30% by mol, based upon the total amount of the composition, of



or a mixture thereof with

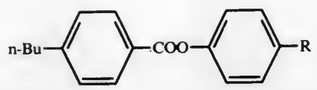


C. 8–13% by mol, based upon the total amount of the composition, of one or two or more of compounds selected from the group consisting of 4-alkylbiphenylcarboxylic acid-4'-cyanobiphenyls expressed by the general formula

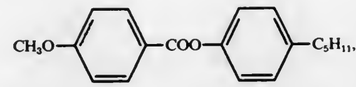


-(wherein $C_nH_{2n+1}$ is a straight chain alkyl group having 4–8 carbon atoms or a methyl branched alkyl group having 5–7 carbon atoms, and

D. 15–30% by mol, based upon the total amount of the composition, of one or more compounds selected from the group consisting of 4-n-butylbenzoic acid-4'-alkyl esters (wherein R is n-heptyl group, n-hexyloxy group or n-heptyloxy group) expressed by the general formula



and 4-anisic acid-4'-n-pentylphenyl ester having a formula of



alone or in admixture with said one or more compounds selected from the group consisting of the above 4-n-butylbenzoic acid-4'-alkyl esters.

## 4,017,417
## IMMOBILIZATION OF IODINE IN CONCRETE

**Walter E. Clark, and Clarence T. Thompson, both of Oak Ridge, Tenn., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.**

**Filed July 30, 1976, Ser. No. 710,087**

**Int. Cl.² G21F** *9/16*

**U.S. Cl. 252—301.1 W** **10 Claims**

1. A method for immobilizing fission product radioactive iodine recovered from irradiated nuclear reactor fuel, said method comprising forming a fluid mixture comprising water, Portland cement, and about 3–20 wt. % iodine as $Ba(IO_3)_2$and allowing the fluid mixture to harden, said radioactive iodine being present in the form of $Ba(IO_3)_2$.

## 4,017,418
## PROCESS FOR MAKING COLLOIDAL SOLS OF ANTIMONY PENTOXIDE IN POLAR ORGANIC SOLVENTS

**Charles Edward Crompton, Arlington Heights, Ill., and Abdulla M. Z. Kazi, Euclid, Ohio, assignors to Chemetron Corporation, Chicago, Ill.**

**Filed Aug. 18, 1975, Ser. No. 605,606**

**Int. Cl.² B01J** *13/00*

**U.S. Cl. 252—309** **6 Claims**

1. A process for making a colloidal dispersion of hydrous antimony pentoxide particles comprising introducing particles of antimony trioxide into a polar organic solvent selected from the group consisting of formamide, methylformamide, dimethyl formamide, acetamide, methylacetamide, dimethylacetamide, dimethyl sulfoxide, formic acid, tetramethyl urea, methanol and ethanol and contacting said particles with aqueous hydrogen peroxide in the presence of an aliphatic alpha-hydroxy carboxylic acid, and a halogen acid selected from the group consisting of hydrogen chloride and hydrogen bromide, at a temperature of from about 0° C to about the decomposition temperature of the reaction mixture for a length of time sufficient to convert at least a portion of the antimony particles to colloidal particles of hydrous antimony pentoxide.

## 4,017,419
## CATIONIC BITUMINOUS EMULSIONS

**Charles H. Ludwig, Bellingham, and Larry B. Fiske, Everson, both of Wash., assignors to Georgia-Pacific Corporation, Portland, Oreg.**

**Filed Jan. 2, 1976, Ser. No. 646,372**

**Int. Cl.² B01J** *13/00*

**U.S. Cl. 252—311.5** **16 Claims**

1. In a cationic bitumen emulsion wherein from 30 to about 75% by weight of bitumen is dispersed in an aqueous continuous phase using a cationic, water-soluble aliphatic amine salt or quaternary ammonium salt emulsifier, the improvement which comprises a lignin-polyamine reaction product being present in a sufficient amount to stabilize the set time of the emulsion in presence of negatively charged aggregate, said lignin-polyamine reaction product being a lignin heated under alkaline conditions at a pH of at least 10, with from 8 to 35 percent by weight of a water-soluble, aliphatic polyamine at a temperature of at least 100° C until sufficient amount of amine has reacted with the lignin for the reaction product to form aqueous solutions with the emulsifier under acid conditions, said lignin being soluble in an aqueous alkaline medium said polyamine containing at least one primary or secondary amine group and said polyamine having a molecular weight of from about 60 to 300 and containing from 20 to 47 percent organically bound amino-type nitrogen with only one amino-type nitrogen atom being attached to a particular carbon atom and said amino-type nitrogen being the only functional substituent on said carbon atom.



## 4,017,420
## STABLE OXIDASE REAGENT SOLUTIONS

**Betty Anne Bowie, Havertown, and Joseph F. Pagano, Paoli, both of Pa., assignors to SmithKline Corporation, Philadelphia, Pa.**

**Filed Dec. 22, 1975, Ser. No. 643,465**

**Int. Cl.² C09K** *3/00*

**U.S. Cl. 252—408** **4 Claims**

1. A stable oxidase reagent solution for detection of microbial colonies comprising from about 0.1% to about 1.0% by weight of N,N,N',N'-tetramethyl-p-phenylenediamine or N,N-dimethyl-p-phenylenediamine in dimethyl sulfoxide or acid addition salts thereof.

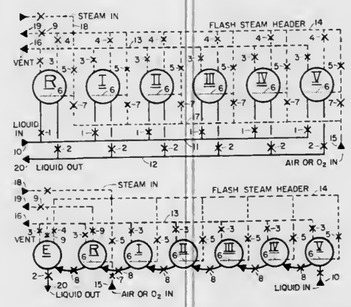
## 4,017,421
## WET COMBUSTION PROCESS

**Donald F. Othmer, 333 Jay St., Brooklyn, N.Y. 11201**

**Filed Dec. 16, 1975, Ser. No. 641,335**

**Int. Cl.² B01D** *15/06, 1/14*

**U.S. Cl. 252—416** **40 Claims**




1. In a process of heating, reacting with an added material, flash evaporating, and condensing vapors so formed of individual batches of an original aqueous liquid wherein there is no mechanical pumping of said liquid during the processing cycle, the steps comprising:

a. arranging in the order of decreasing temperature a series of batches of said original aqueous liquor, each batch being preheated in one of a series of heat transfer vessels;

b. supplying heat to heat further at least a major part of the batch of said liquid of the heat transfer vessel which has been preheated to highest temperature, so that this batch is raised to an even higher temperature, the maximum temperature in the process, and said batch becomes the hottest batch of liquid in the process;

c. contacting said hottest batch with an added material which at said maximum temperature changes the concentration of at least some of the components of the liquid in said hottest batch;

d. subjecting said hottest batch of liquid, with the concentration of at least some of its components changed, successively to a series of as many individual and separate flash evaporations as there are heat transfer vessels exclusive of the vessel containing said hottest liquid, the first of which individual flash evaporations generates an amount of steam at the highest temperature of any of said flash evaporations; and each successive flash evaporation generates an amount of steam of a successively lower temperature;

e. condensing said amount of steam of highest temperature which is generated by said flash evaporation in the condensing zone of the heat transfer vessel of the next highest temperature below said maximum temperature so as to preheat the batch of liquid therein, and condensing said steam generated in each successive flash evaporation at each successively lower temperature in the condensing zone of the heat transfer vessel taken serially in the order of successively lower temperatures, until the steam generated at the lowest temperature condenses to preheat the batch of raw original liquid which is at the lowest temperature of the process;

f. cooling by each of said individual flash evaporation said liquid of what had been the hottest batch, so that after each of said flash evaporations, its temperature approaches the temperature of the liquid of the batch in the heat transfer vessel wherein was condensed the steam of this particular flash evaporation; and

g. continuing said cooling of said liquid of what had been the hottest batch until its temperature approaches that of the batch of lowest temperature which was the one last charged with the original liquid.

11. In a process according to claim 1 wherein said original liquid contains particulate solids which when activated adsorb organic material and said contacting comprises adding oxygen to said activated particulate solids while carried in said original liquid, said particulate solids containing oxidizable organic material adsorbed thereon; so as to produce a controlled wet combustion of the adsorbed oxidizable organic material but not of said particulate solids, thereby reactivating said particulate solids so that they will again adsorb organic material.

## 4,017,422
## METHOD AND APPARATUS FOR REGENERATING ABSORPTION PARTICLES

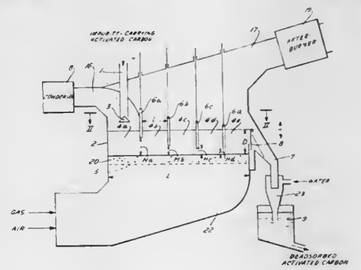
**Günther Gappa, Gelsenkirchen-Buer; Harald Jüntgen, and Jurgen Klein, both of Essen, all of Germany, assignors to Bergwerksverband GmbH, Essen, Germany**

**Filed Feb. 12, 1976, Ser. No. 657,406**

**Claims priority, application Germany, Feb. 15, 1975, 2506394; May 2, 1975, 2519669**

**Int. Cl.² B01D** *53/34, 15/06*

**U.S. Cl. 252—417** **8 Claims**



1. An apparatus for regenerating an adsorption agent, said apparatus comprising: an upper elongated reaction chamber

having an upper foraminous floor and adapted to hold an upper bed of said agent; a vertically displaceable upper baffle in said upper chamber extending down into said upper bed and subdividing same longitudinally into an upstream bed and a downstream bed communicating therewith; a lower elongated reaction chamber under said upper chamber having a lower foraminous floor and adapted to hold a lower bed of said agent, each of said chambers having a length at least twice as great as the respective width; a plurality of vertically displaceable lower baffles in said lower chamber extending down into said lower bed and subdividing same longitudinally into a succession of communicating downstream beds; means including an overflow weir in said downstream bed of said upper chamber for conducting particles from said downstream bed of said upper chamber into the downstream bed at one end of said chamber, said lower baffles having respective lower edges spaced from said lower floor by distances decreasing from said one end; means for feeding particles into said upstream bed to create a flow therefrom into the downstream bed of said upper chamber and thence down and sequentially through the downstream beds of said lower chamber; means for withdrawing particles from the downstream bed at the other end of said lower chamber; means for passing a hot gas up throughsaid lower bed to fluidize same and thence through said upper bed to fluidize same; means connected to said upper chamber for collecting and condensing gases rising from said upstream bed; and means connected to both said chambers for collecting and afterburning gases rising from said downstream beds.

7. A method of regenerating adsorption particles, said method comprising the steps of:

introducing said particles into an upstream compartment to form an upstream bed therein;

passing said particles from said upstream bed through an upstream restriction into the first of a succession of downstream compartments to form a downstream bed therein;

subdividing said downstream compartments from each other with a plurality of downstream restrictions of size decreasing from said first downstream compartment and passing said particles from said first downstream compartment through said restrictions to the last downstream compartment;

withdrawing particles from said last downstream compartment at substantially the same rate said particles pass through said upstream restriction into said first downstream compartment;

flowing a hot gas up through said particles in all of said compartments to fluidize said beds;

collecting and condensing the gas rising from said upstream bed; and

collecting and afterburning all the gas rising from said downstream bed, whereby impurities adsorbing into said particles are carried off by the gases rising from said beds.

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**4,017,423**

**PROCESS FOR THE PREPARATION OF UNSATURATED ACIDS FROM UNSATURATED ALDEHYDES**

**James F. White, Akron, and James R. Rege, Lakewood, both of Ohio, assignors to The Standard Oil Company (Ohio), Cleveland, Ohio**

**Filed Aug. 18, 1975, Ser. No. 605,362**
**Int. Cl.² B01J** *27/14*
**U.S. Cl. 252—437** **8 Claims**

1. The catalyst composition described by the formula

$$A_aRb_bMo_3P_cO_x$$

wherein A is at least one element selected from the group consisting of arsenic, cadmium, indium, tin, thallium, potassium, calcium, vanadium, uranium, cerium, tungsten, nickel, zirconium, barium, iron, rhodium, manganese, rhenium, ruthenium, cobalt, and copper.

and wherein

*a* is a positive number less than about 20;

*b* is about 0.01 to about 3;

*c* is a positive number less than about 2;

*x* is the number of oxygens required by the valence states of the other elements present

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**4,017,424**

**HYDROCARBON STEAM REFORMING AND METHANATION CATALYSTS**

**Marvin M. Johnson, and Gerhard P. Nowack, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.**

**Filed Oct. 1, 1975, Ser. No. 618,722**
**Int. Cl.² B01J** *27/14, 23/64*
**U.S. Cl. 252—437** **11 Claims**

1. A catalyst composition consisting essentially of nickel, a metal selected from the group consisting of barium and uranium, combined oxygen and a calcium phosphate support having a Ca:P atomic ratio in the range of 1.4:1 to 2.3:1, wherein the compounds are present in approximate amounts, as follows:

| | |
|---|---|
| Calcium | 5 to 35, |
| Phosphorus | 2 to 20, |
| Nickel | 10 to 50, and either |
| Barium | 1 to 20, or |
| Uranium | 2 to 40, |

all said amounts expressed in terms of weight percent, based upon the weight of the total catalyst.

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**4,017,425**

**METHOD OF ACTIVATION OF RED MUD**

**Shing-Jen Shiao, 48-18, 2-chome, Eifuku, Suginami, Tokyo, Japan**

**Filed Nov. 10, 1972, Ser. No. 305,433**
**Int. Cl.² B01J** *37/02, 29/06*
**U.S. Cl. 252—453** **10 Claims**

1. Activated red mud for allowing its use as adsorbent, catalyst, clarifying substance and ion-exchanging substance is made from red mud of Bayer process by method comprising digesting red mud and dispersing the metal oxide compound particales in the compound of metal hydroxides and silica gel which comprises;

a. digesting the red mud with acid,

b. adjusting the pH of the acid digested mixture comprising the sludge product to above 4,

c. separating and washing the gelation product, and,

d. heat treating the resulting active compound under 800° C.

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**4,017,426**

**HIGHLY POROUS CONDUCTIVE CERAMICS AND A METHOD FOR THE PREPARATION OF SAME**

**Henri Carbonnel, Antony, and Ludovic Hamon, Paris, both of France, assignors to Groupement Atomique Alsacienne Atlantique, Le Plessis Robinson, France**

**Continuation of Ser. No. 317,562, Dec. 22, 1972, abandoned. This application Dec. 2, 1974, Ser. No. 529,420**
**Claims priority, application France, Dec. 22, 1971, 71.46212**
**Int. Cl.² H01B** *1/06*
**U.S. Cl. 252—520** **2 Claims**

1. A porous electrically conductive molded ceramic product comprising more than 20% but no more than 80% by weight of grains Of a few millimeters in diameter comprising a diboride of one of, and of 0-25% of a disilicide of one of, the group of metals consisting of titanium, zirconium, hafnium, and tungsten, uniformly dispersed within less than 80% but no less than 20% by weight of a homogeneous sintered powder, said powder particles having a diameter of a few microns and comprising a mixture of a diboride of one of, and a disilicide of one of, the group of metals consisting of titanium, zirconium, hafnium and tungsten, said porous electrically conductive ceramic having a porosity greater than 30%.



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**4,017,427**

**FAST COOLING STYRENE POLYMER FOAMS**

**Jose E. Granda, Aliquippa, Pa.; John J. Quinlan, Atco, N.J., and James J. Garland, Aliquippa, Pa., assignors to ARCO Polymers, Inc., Philadelphia, Pa.**

**Filed May 30, 1975, Ser. No. 582,332**
**Int. Cl.² C08F** *112/08, 212/08;* **C08J** *9/04, 9/06*
**U.S. Cl. 260—2.5 B** **12 Claims**

1. Method of making foamable styrene polymer particles which yield a fast cooling foamed molding comprising the steps of:

a. suspending styrene polymer particles in water with the aid of a suspending agent system;

b. adding 3 to 20 weight percent of a blowing agent and 0.05 to 0.4 weight percent of a silicone surfactant selected from the siloxane-oxyalkylene copolymers having (1) at least one polysiloxane block which contains mers of the general formula $R_2SiO$ where R is selected from the group consisting of alkyl having 1 to 4 carbon atoms and halogenated alkyl having 1 to 4 carbon atoms, and (2) at least one polyoxyalkylene block attached to said polysiloxane block, and terminated by hydroxyl groups, and containing mers of general formula $C_nH_{2n}O$, where *n* is 2, 3 or 4;

c. heating the suspension at a temperature of from 80° to 150° C. to impregnate the polymer particles;

and

d. separating the impregnated particles from the aqueous system.

7. A composition consisting essentially of particles of a styrene polymer containing dispersed throughout 3 to 20 weight percent of a blowing agent and 0.05 to 0.4 **weight percent of a silicone surfactant, said surfactant being dispersed by impregnation into the polymer with the blowing agent, and said surfactant being a siloxane-oxyalkylene copolymer having** (1) at least one polysiloxane block which contains mers of the general formula $R_2SiO$ where R is selected from the group consisting of alkyl having 1 to 4 carbon atoms and halogenated alkyl having 1 to 4 carbon atoms, and (2) at least one polyoxyalkylene block attached to said polysiloxane block, and terminated by hydroxyl groups and containing mers of general formula $C_nH_{2n}O$, where *n* is 2,3, or 4; said particles being fast cooling during molding in thick-section billets that are greater than one foot in the smallest dimension.

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**4,017,428**

**ABRASION RESISTANT, NON-DISCOLORING POLYURETHANE FOAMS AND METHOD OF MAKING**

**Gerald A. Capocci, Port Chester, N.Y., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed June 10, 1975, Ser. No. 585,536**
**Int. Cl.² C08J** *9/00*
**U.S. Cl. 260—2.5 AM** **10 Claims**

1. A process for producing a predominantly open celled, polyurethane foam having a density of from about 30 to about 50 pounds per cubic foot and a high abrasion index by reacting and foaming at a reaction temperature maintained below about 140° F. a reaction mixture comprising:

a. a polyether diol having a molecular weight of about 2000;

b. a polyurethane-forming agent selected from the group consisting of a cycloaliphatic diisocyanate, a prepolymer of a polyether diol having a molecular weight of about 2000 and a cycloaliphatic diisocyanate, and mixtures of the foregoing polyurethane-forming agents;

c. a curing agent selected from the group consisting of 1,4 butanediol and trimethylol propane;

d. from about 0.15 to about 0.24 percent by weight of water;

e. a surfactant; and

f. a catalyst for the polyurethane-forming reaction;

said polyether diol and said polyurethane-forming agent, taken together, being present in the reaction mixture in a major amount and in relative amounts required to produce said polyurethane foam.

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**4,017,429**

**PREPARATION OF 2-HYDROXYALKYL ESTERS**

**Roger B. Steele, Fair Oaks, and Arthur Katzakian, Jr., Sacramento, both of Calif., assignors to Aerojet-General Corporation, El Monte, Calif.**

**Division of Ser. No. 389,079, Aug. 17, 1973, abandoned, which is a continuation-in-part of Ser. No. 4,056, Jan. 19, 1970, Pat. No. 3,968,135. This application Jan. 14, 1975, Ser. No. 540,776**
**Int. Cl.² C08F** *2/00*
**U.S. Cl. 260—2 EP** **15 Claims**

1. A method of forming as ester linkage which comprises reacting an organic carboxylic acid with an organic oxirane compound in the presence of an effective catalytic amount of soluble chromium III carboxylate of the formula:

$$Cr(OOCR^a)_3$$

where $OOCR^a$ is a carboxylate group containing at least 4 carbon atoms, said catalyst being the reaction product of a hydrated Cr III tricarboxylate heated in an excess of organic acid to a temperature above 140° C and said reaction product having the following characteristics:

1. emerald green in color;
2. slightly soluble in hexane but fully soluble in acetone;
3. melts slightly above room temperature;
4. does not exhibit a water absorption peak at 2750 mμ in the near infrared
5. at least 90% of the carboxylate carbonyl absorption is at 1615 $cm^{-1}$ and not at 1540 $cm^{-1}$.

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**4,017,430**

**COATING COMPOSITION**

**William Scott Briggs, Bellingham, Wash., assignor to Georgia-Pacific Corporation, Portland, Oreg.**

**Filed June 23, 1975, Ser. No. 589,456**
**Int. Cl.² C08H** *5/02;* **C08L** *97/00*
**U.S. Cl. 260—17.5** **18 Claims**

1. A coating composition comprising a reaction product of a polyunsaturated carboxylic acid having from 5 to 22 carbon atoms and a phenolated-lignosulfonate, said carboxylic acid being reacted with the phenolated-lignosulfonate until a substantial proportion of the carboxyl groups of the acid has reacted with the phenolic hydroxyl groups of the phenolated-lignosulfonate, said phenolated-lignosulfonate being obtained by reacting a phenol with the lignosulfonate in an amount of at least 15 weight percent, based upon lignosulfonate solids.

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**4,017,431**

**AQUEOUS DISPERSIONS OF WAX BLENDS AND A WATER-SOLUBLE CATIONIC RESIN AND PAPER SIZED THEREWITH**

**Paul Harwood Aldrich, Greenville, Del., assignor to Hercules Incorporated, Wilmington, Del.**

**Continuation-in-part of Ser. No. 420,191, Nov. 28, 1973, abandoned. This application June 17, 1976, Ser. No. 697,008**
**Int. Cl.² C08L** *91/06*
**U.S. Cl. 260—18 N** **20 Claims**

1. An aqueous dispersion of finely divided solid particles consisting essentially of, by weight

A. from about 5% to about 50% of finely divided solid particles, said solid particles being selected from the group consisting of

1. a blend consisting essentially of, by weight, from about 99% to about 93% of a wax selected from the group consisting of petroleum waxes, synthetic hydrocarbon

waxes, and mixtures thereof and from about 1% to about 7% of a $C_{18}$ to $C_{24}$ saturated fatty acid,

2. a blend consisting essentially, by weight, from about 99.5% to about 75% of a wax selected from the group consisting of petroleum waxes, synthetic hydrocarbon waxes, and mixtures thereof and from about 0.5% to about 25% of at least one alkyl ketene dimer having the formula $[RCH{=}C{=}O]_2$ where R is an alkyl radical having 10 to about 20 carbon atoms, and

3. mixtures of (1) and (2),

B. from about 0.5% to about 20% of water-soluble cationic resin dispersing agent selected from the group consisting of

i. a water-soluble polyaminopolyamide—epichlorohydrin resin,

ii. a water-soluble alkylenepolyamine—epichlorohydrin resin,

iii. a water-soluble poly(diallylamine)—epichlorohydrin resin, and

iv. mixtures of any two or more of (i), (ii), and (iii), and

C. water to 100%.

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**4,017,432**

## POLYEPOXIDE COMPOSITIONS EXHIBITING IMPROVED PHYSICAL PROPERTIES

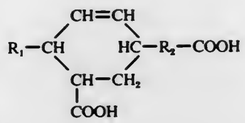
**James E. Carey, Mullica Hill, N.J., assignor to Shell Oil Company, Houston, Tex.**

**Continuation-in-part of Ser. No. 623,521, Oct. 17, 1975, abandoned. This application Sept. 13, 1976, Ser. No. 722,848**

**Int. Cl.² C08G** *59/14*

**U.S. Cl. 260—18 EP** **15 Claims**

1. A compatilizable, curable composition comprising (1) a polyepoxide having at least one vicinal epoxy group and (2) a curing amount of a blend of (a) a polymerized fatty acid derived from unsaturated fatty acids having at least 12 carbon atoms in the molecule and (b) a liquid organic polycarboxylic acid of the general formula:



wherein $R_1$ is an alkyl radical and $R_2$ is an alkylene radical, the weight ratio of (a) to (b) being from about 1:10 to about 10;1.

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**4,017,433**

## PITCH WATER SOLUBLE RESIN AND ALKYD RESIN AS BINDER COMPOSITION FOR REFRACTORY PARTICLES

**Grant M. Farrington, Marlton, N.J.; J. Donald Harris, Beamsville, Canada, and Alfred H. Foessel, Baltimore, Md., assignors to General Refractories Company, Bala Cynwyd, Pa.**

**Division of Ser. No. 413,250, Nov. 6, 1973, Pat. No. 3,903,025. This application May 28, 1975, Ser. No. 581,656**

**Int. Cl.² C08L** *61/24, 67/08, 95/00, 75/00*

**U.S. Cl. 260—17.5** **11 Claims**

1. A binder composition for binding refractory particles comprising:

a. 10% to 40% by weight pitch;

b. 25% to 80% by weight of an aqueous solution containing from 40% to 60% by weight of a water soluble ammonium or metal lignosulfonate or urea formaldehyde resin; and

c. 10% to 35% by weight of an organic solvent solution containing from 60% to 100% by weight of an alkyd resin.

**4,017,434**

## DIALLYL PHTHALATE RESIN-CONTAINING AQUEOUS EMULSIONS

**Akio Suzui, Amagasaki; Shinji Nose, Kobe; Takashi Kodama, Matsuyama; Kenji Yokoyama, Amagasaki; Kazuya Matsumoto, Kobe, and Yoshiharu Fujio, Amagasaki, all of Japan, assignors to Osaka Soda Co., Ltd., Osaka, Japan**

**Division of Ser. No. 488,926, July 16, 1974, Pat. No. 3,963,661. This application Dec. 1, 1975, Ser. No. 636,561**

**Claims priority, application Japan, May 31, 1974, 49-62406**

**Int. Cl.² C08L** *31/08*

**U.S. Cl. 260—21** **6 Claims**

1. A diallyl phthalate resin-containing aqueous emulsion product containing:

A. an aqueous emulsion of a diallyl phthalate resin having a degree of conversion of monomer to polymer of from 30 to 75 weight percent, said diallyl phthalate resin consisting of

1. diallyl phthalate present in from 50 to 100 weight percent, and

2. an alkyl acrylate present in from 50 to 0 weight percent; and

B. an aqueous emulsion of a thermosetting vinyl resin consisting of a copolymer of

1. a vinyl compound present in from 10 to 1 weight percent and containing a thermosetting functional moiety selected from the group consisting of glycidyl, N-methylol, N-alkoxy-methyl, carboxyl, hydroxyl, amino, and amide, and

2. a vinyl compound present in from 90 to 99 weight percent and not containing a thermosetting functional moiety and selected from the group consisting of $C_{1-8}$ alkyl esters of $\alpha,\beta$-unsaturated carboxylic acid, vinyl esters, aromatic vinyl compounds, and $\alpha,\beta$-unsaturated nitriles,

said product containing from 10 to 70 weight percent of the resin of A) and from 90 to 30 weight percent of the resin of B), based on the total resin content of A) and B), and further containing a cross-linking agent for the resin of B) present in from about 10 to about 100 parts by weight per 100 parts by weight of B).

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**4,017,435**

## POWDER COATING COMPOSITION FOR ELECTRODEPOSITION

**Taizo Kondo; Komaharu Matsui, and Kunio Yamamoto, all of Hiratsuka, Japan, assignors to Kansai Paint Company, Ltd., Japan**

**Division of Ser. No. 465,078, April 29, 1974, Pat. No. 3,960,791, which is a division of Ser. No. 211,660, Dec. 23, 1971, abandoned. This application Dec. 22, 1975, Ser. No. 643,161**

**Claims priority, application Japan, Dec. 26, 1970, 45-118724**

**Int. Cl.² C08L** *33/06;* **C25D** *13/06, 13/10*

**U.S. Cl. 260—22 A** **9 Claims**

1. A powder coating composition for electrodeposition which comprises powdery particles of a polyester resin powder coating composition having 0.1–50 microns particle size wet with an organic liquid which does not dissolve the powdery particles and is nearly insoluble in an aqueous medium and which has a boiling point of 50°–250° C. in the range of 5–100 parts by weight per 100 parts by weight of the powdery particles, said wet powdery particles dispersed in an aqueous medium containing 0.05–5 parts by weight per 100 parts by weight of the powdery particles of a surface active agent.



**4,017,436**

## THERMOPLASTIC RESIN COMPOSITION

**Minoru Tabana, Suita; Tatsuyuki Mitsuno, Toyonaka, and Hiroshi Maki, Takatsuki, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan**

**Filed Sept. 2, 1975, Ser. No. 609,894**

**Claims priority, application Japan, Sept. 5, 1974, 49-102804**

**Int. Cl.² C08K** *5/01;* **C08L** *93/04*

**U.S. Cl. 260—27 BB** **8 Claims**

1. A resin composition consisting essentially of

a. a styrene-butadiene block copolymer resin represented by the formula,

$$A_1 - B_1 - C - B_2 - A_2$$

wherein $A_1$ and $A_2$ are non-elastomeric blocks comprising a styrene polymer chain; $B_1$ and $B_2$ are elastomeric blocks comprising a random copolymer chain in which styrene and butadiene have uniformly been distributed; C is an elastomeric block comprising a butadiene homopolymer chain or a styrene-butadiene copolymer chain; the proportion of the sum of $A_1$ and $A_2$ in the block copolymer is 40 to 80 weight %; the proportion of the sum of $B_1$ and $B_2$ in the block copolymer is 10 to 60 weight %; the proportion of C in the block copolymer is 0 to 25 weight % and is always smaller than the proportion of the sum of $B_1$ and $B_2$; the weight ratio of $A_1$ to $A_2$ is in the range from 2:8 to 8:2; the weight ratio of $B_1$ to $B_2$ is in the range from 0:10 to 10:0; the weight ratio of styrene to butadiene in $B_1$ and $B_2$ is in the range from 10:90 to 75:25; and the weight ratio of styrene to butadiene in C is in the range from 0:100 to 10:90,

b. a resin selected from the group consisting of a liquid polybutadiene, a liquid butadiene-styrene copolymer, a maleic anhydride-modified liquid polybutadiene and an epoxidation-modified liquid polybutadiene, and

c. a tackifier, wherein the contents of (a) the styrene-butadiene block copolymer, (b) the resin, and (c) the tackifier are 70 to 94 weight %, 3 to 15 weight % and 3 to 15 weight %, respectively.

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**4,017,437**

## EMULSIFIED PHENOL-FORMALDEHYDE RESINS

**Ramesh C. Vasishth, Delta, and Pitchaiya Chandramouli, Richmond, both of Canada, assignors to Cor Tech Research Limited, Richmond, Canada**

**Filed Apr. 14, 1975, Ser. No. 567,881**

**Int. Cl.² C08L** *61/06;* **C09J** *1/00*

**U.S. Cl. 260—29.3** **4 Claims**

1. A stable resin-in-water emulsion of a room temperature-stable and mobile thermosetting phenol-formaldehyde resin capable of rapid cure at elevated temperature, formed by reaction of formaldehyde with phenol at a mole ratio of formaldehyde to phenol greater than about 1.7:1 in an aqueous reaction medium in the presence of a metal carboxylate catalyst therefor and acid addition to the resin so formed prior to emulsification, and having a viscosity of about 1,000 to 40,000cps at about 24° C.

**4,017,438**

## KETIMINE-BLOCKED PRIMARY AMINE GROUP-CONTAINING CATIONIC ELECTRODEPOSITABLE RESINS

**Robert D. Jerabek, Glenshaw; Joseph R. Marchetti, Greensburg, and Robert R. Zwack, New Kensington, all of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.**

**Continuation-in-part of Ser. No. 533,418, Dec. 16, 1974, abandoned, which is a continuation of Ser. No. 400,304, Sept. 24, 1973, abandoned, which is a division of Ser. No. 203,875, Dec. 1, 1971, abandoned. This application Apr. 2, 1976, Ser. No. 672,902**

**Int. Cl.² C08G** *51/24, 30/08*

**U.S. Cl. 260—29.2 EP** **6 Claims**

1. An aqueous electrodepositable composition comprising an uncrosslinked acid-neutralized, amine group-containing, synthetic organic resin, wherein said organic resin contains hydroxyl groups curable through urethane group crosslinking, wherein at least a portion of said amine groups are primary amine groups and wherein said organic resin is formed from reacting:

A. a polyepoxide containing 1,2-epoxy functionality,

B. a polyamine derivative having at least one primary amine group which is blocked by a ketimine group and having a secondary amine group.

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**4,017,439**

## VULCANIZATION OF NEOPRENE

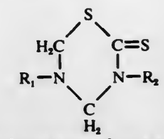
**Howard C. Beadle, and Lester A. Brooks, both of Norwalk, Conn., assignors to R. T. Vanderbilt Company, Inc., Norwalk, Conn.**

**Filed July 31, 1975, Ser. No. 600,680**

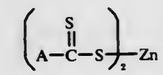
**Int. Cl.² C08F** *28/00*

**U.S. Cl. 260—79.5 B** **11 Claims**

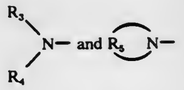
1. A vulcanizable composition comprising a nonsulfur modified neoprene rubber; a metal oxide selected from zinc oxide, magnesium oxide and mixtures thereof; and about 0.25 to 3 phr of an accelerator system comprising a thiadiazine accelerator having the structural formula:



wherein $R_1$ and $R_2$ taken separately are each selected from the group consisting of straight chain and branched chain alkyl groups having one to four carbon atoms and a dithiocarbamate secondary accelerator having the structural formula:



wherein A represents the structural units



wherein $R_3$ is selected from straight chain and branched chain alkyl groups having one to four carbon atoms, phenyl, and benzyl groups, $R_4$ is selected from benzyl and, straight chain and branched chain alkyl groups having one to four carbon atoms, and $R_5$ is selected from pentamethylene, hexamethylene and 4-oxapentamethylene radicals and the ratio of the thiadiazine to dithiocarbamate is about 0.8 to 0.5 parts by weight to about 0.2 to 0.5 parts by weight.

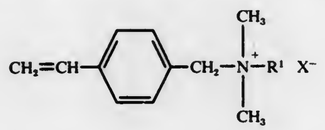
**4,017,440**

## POLYMERS STABILIZED WITH POLYMERIZABLE VINYLBENZYLTRIALKYL AMMONIUM SALT SURFACTANT

**H. Scott Killam, Holland, Pa., assignor to Rohm and Haas Company, Philadelphia, Pa.**

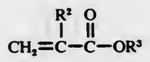
**Filed Oct. 10, 1973, Ser. No. 405,221**
**Int. Cl.² C08F** *212/08, 226/00*
**U.S. Cl. 260—29.6 HN** **6 Claims**

**1.** An aqueous polymer latex which comprises 0.25 to 5.0% of the total polymer composition of a vinylbenzyltrialkylammonium salt monomer having the formula



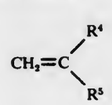
wherein $R^1$ is alkyl of from 8 to 22 carbon atoms and $X^-$ is an anion, copolymerized with one or more of monomers selected from the following:

a. a monomer of the formula



wherein $R^2$ is hydrogen or alkyl and $R^3$ is a straight chain, branched chain or cyclic alkyl, alkoxyalkyl, alkylthioalkyl, ureido, hydroxy lower alkyl, 2,3-epoxypropyl, amino lower alkyl, mono- or di- lower alkylamino, lower alkyl or hydroxyalkyl lower alkylamino lower alkyl or

b. a monomer of the formula



wherein $R^4$ is hydrogen, methyl or halo and $R^5$ is hydrogen, halo, lower alkanoyloxy, formyl, phenyl, N-hydroxyethyl, tolyl, methoxyethyl, 2,4-diamino-s-triazinyl, lower alkyl, or epoxy, said vinylbenzyltrialkylammonium salt being the sole surfactant in the latex.

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**4,017,441**

## SOAP SOLUTION OF MALEIC ANHYDRIDE-MODIFIED RESIN BACKBONE

**James J. Tazuma, Stow, and Mario D. Zadra, Barberton, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio**

**Division of Ser. No. 510,332, Sept. 30, 1974, Pat. No. 3,929,737. This application Dec. 18, 1975, Ser. No. 642,088**
**Int. Cl.² C08F** *2/24, 255/08, 285/00*
**U.S. Cl. 260—29.6 PM** **8 Claims**

**1.** A soap solution suitable for use in an aqueous emulsion free radical polymerization system prepared from 100 parts by weight of soap, which itself comprises about 50 to about 100 parts by weight of a maleic anhydride-modified resin backbone and correspondingly about 50 to about 0 parts by weight of rosin acid, or its sodium or potassium salt, about 0 to about 50 parts by weight of a fatty acid, about 350 to about 450 parts by weight water and mixing therewith a sufficient parts by weight sodium hydroxide or potassium hydroxide in about 200 to about 300 parts by weight water to achieve a final pH of about 8 to about 11, where said modified resin backbone is characterized by having a softening point in the range of about 45° C. to about 100° C., having a basin resin backbone of piperylene and methyl branched monoolefins which comprises about 50 to about 60 mole percent units derived from piperylene and about 20 to about 30 mole percent units derived from monoolefins selected from at least one methyl branched chain $\alpha$ or $\beta$ monoolefin containing 4 to 6 carbon atoms, where the mole ratio of piperylene to said branched monoolefin is about 0.8/1 to about 2/1, in combination with about 10 to about 30 mole percent units derived from maleic anhydride, based on the total resin composition.

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**4,017,442**

## STRUCTURED-PARTICLE LATEXES

**Dale S. Gibbs, Midland, Mich.; Earl H. Wagener, Concord, Calif., and Ritchie A. Wessling, Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.**

**Filed Apr. 21, 1975, Ser. No. 569,724**
**Int. Cl.² C08L** *33/08*
**U.S. Cl. 260—29.6 RB** **17 Claims**

**1.** An aqueous colloidal dispersion of structured particles having activated halogens at or near their surface, said particles consisting of a nonionic, organic polymer core having adhered thereto a thin layer of water-insoluble copolymer of an ethylenically unsaturated, nonionic monomer which is devoid of an activated-halogen and a nonionic emulsion polymerizable, oil-soluble, ethylenically unsaturated, activated-halogen monomer which does not inhibit free-radical polymerization, can diffuse through an aqueous medium and does not hydrolyze readily in such aqueous medium; said thin layer having a thickness of from a monomolecular layer to about 100 Angstroms; the amount of said activated-halogen monomer copolymerized in the thin layer ranging from about 0.01 milliequivalent to about 1.4 milliequivalent per gram of particles in the dispersion and not more than 3.0 milliequivalents for each gram of copolymer in the thin layer; said dispersion being stabilized by a small, stabilizing amount up to about 0.25 milliequivalent per gram of structured particles of a cationic surfactant or blend of cationic and nonionic surfactants.

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**4,017,443**

## COATING COMPOSITIONS CONTAINING AS BINDER AQUEOUS POLYMER DISPERSIONS

**Ulrich Türck, and Heinz Tetzner, both of Marl, Germany, assignors to Chemische Werke Huls Aktiengesellschaft, Marl, Germany**

**Filed Aug. 7, 1975, Ser. No. 602,803**
**Claims priority, application Germany, Aug. 8, 1974, 2438151**
**Int. Cl.² C08L** *9/08*
**U.S. Cl. 260—29.6 T** **10 Claims**

**1.** An aqueous coating composition whose binder consists essentially of an aqueous dispersion of a polymer produced from a mixture of monomers consisting of, by weight,

a. 35–70% of styrene, a substituted styrene or mixture thereof;

b. 30–65% of a fumaric acid diester of 3–6 carbon atoms, in the alcohol component;

c. 0–15% of butadiene, a substituted butadiene or mixture thereof;

d. 0–3% of an $\alpha,\beta$-unsaturated carboxylic acid; and

e. 0.2–2% of an amide of an $\alpha,\beta$-unsaturated carboxylic acid.

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**4,017,444**

## PROCESS FOR STABILIZING THE VISCOSITY OF POLYVINYL ACETALS USING A BUFFER

**George E. Mont, Springfield, and James A. Snelgrove, Monson, both of Mass., assignors to Monsanto Company, St. Louis, Mo.**

**Filed Aug. 13, 1975, Ser. No. 604,271**
**Int. Cl.² C08L** *29/14*
**U.S. Cl. 260—29.6 H** **16 Claims**

**1.** A process for stabilizing the viscosity of polyvinyl acetal resins which process comprises incorporating into the polyvinyl acetal resin an effective amount of a buffer, which when prepared as an aqueous solution has a pH in the range of from 3 to 7, wherein the buffer is incorporated into the resin prior to fabricating the resin into a shaped article in order to minimize changes in the viscosity of the polyvinyl acetal resin, wherein at least one component of the buffer is at least a bidentate ligand with the ability to interact with a metal to form a chelated ring structure and wherein the buffer is substantially free from hydrochloric, nitric and sulfuric acid components.



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**4,017,445**

## PROCESS FOR THE REMOVAL OF VINYL CHLORIDE FROM POLYVINYL CHLORIDE DISPERSIONS

**Hans Grosse-Wortmann; Bernhard Hentschel, both of Marl; Peter Rauth, Bochum; Karl-Heinz Schoenberg, Marl; Bernd Terwiesch, Marl, and Hermann Winter, Marl, all of Germany, assignors to Chemische Werke Huls Aktiengesellschaft, Marl, Germany**

**Filed Aug. 28, 1975, Ser. No. 608,791**
**Claims priority, application Germany, Aug. 29, 1974, 2441303; Sept. 7, 1974, 2442931**
**Int. Cl.² C08L** *27/06*
**U.S. Cl. 260—29.6 R** **9 Claims**

**1.** In a process for the removal with steam of unreacted vinyl chloride, from aqueous polyvinyl chloride dispersions obtained by suspension or emulsion polymerizations of vinyl chloride, to residual monomer contents of less than 50 p.p.m., the improvement which comprises withdrawing steam and vinyl chloride contained in a boiling aqueous polyvinyl chloride dispersion maintained at a temperature of 80°–100° C., at a vaporization rate per minute of 0.006–0.2 kg steam per kg of polyvinyl chloride, for a period of time from 3–60 minutes until a vinyl chloride content of less than 50 p.p.m. is achieved.

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**4,017,446**

## FRICTIONALLY STABLE EMULSIONS

**Pat F. Rion, Borger, Tex., assignor to Phillips Petroleum Company, Bartlesville, Okla.**

**Continuation-in-part of Ser. No. 276,372, July 31, 1972, abandoned, which is a continuation-in-part of Ser. No. 113,617, Feb. 8, 1971, abandoned. This application Feb. 10, 1975, Ser. No. 548,581**
**Int. Cl.² C08L** *9/00*
**U.S. Cl. 260—29.7 GP** **16 Claims**

**1.** A frictionally stable oil-in-water emulsion having a water phase and an oil phase wherein said oil phase consists of an aromatic oil having an aromatic content of at least 50 percent and a viscosity below 50 SUS at 210° F and an elastomer dissolved therein.

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**4,017,447**

## FLOW CONTROL AGENT FOR ULTRA THIN EPOXY RESIN POWDER COATINGS

**Donald Wayne Larsen, Marriottsville, and Jerrold Bain Billmyer, Sykesville, both of Md., assignors to W. R. Grace & Co., New York, N.Y.**

**Filed Sept. 8, 1975, Ser. No. 611,019**
**Int. Cl.² C08K** *5/10*
**U.S. Cl. 260—31.2 R** **2 Claims**

**1.** A particulate thermosetting resin composition consisting essentially of a solid epoxy resin comprising a polyether derivative of a polyhydric organic compound containing epoxy groups and having a molecular weight in the range 1,000–4,000, 1–15% by weight of the epoxy resin of a curing agent therefor and 0.5–3.0% by weight of the composition of a flow control agent consisting essentially of liquid poly(ethylacrylate) having a number average molecular weight in the range 5,000–15,000, the particles of said composition having an average size diameter of 2–20 microns and said molecular weights herein being measured by gel permeation chromotography.

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**4,017,448**

## TRANSPARENT PIGMENT DISPERSION PROCESS

**Sol Panush, Farmington Hills, Mich., assignor to Celanese Coatings & Specialties Company, Louisville, Ky.**

**Filed June 16, 1975, Ser. No. 587,192**
**Int. Cl.² C08K** *5/02, 5/05, 5/07, 5/10*
**U.S. Cl. 260—31.4 R** **9 Claims**

**1.** A process for preparing a transparent pigment dispersion which comprises

A. in a first stage, dispersing a pigment selected from at least one member of the group consisting of iron oxide, phthalocyanine green, phthalocyanine blue, anthrapyrimidine yellow, flavanthrone yellow, imidazole orange, quinacridone red, carbozole blue, dioxazine blue, indanthrene blue, azo browns, isoindolinones and high molecular weight azo pigments in an acrylic resin solution, wherein the acrylic resin is a film-forming acrylic copolymer made by polymerizing acrylic monomers with a free radical producing catalyst, in a pigment to resin ratio of about 2.5:1 to about 3.5:1 and at a solids content of about 55 to about 65 weight percent using as solvents aromatic hydrocarbons and oxygenated solvents having boiling points above 240° F., under high speed, high shear, high impact conditions so that the temperature rises from room temperature to 200° to 240° F. over a period of at least 3 hours, the shear stress increases from about 300 to 600 gm./cm.sec.² to about 5,000 to 6,000 gm./cm.sec.², the flow of the dispersion changes from turbulent to laminar flow as measured by a Reynolds Number change of about 25,000 to about 30,000 down to about 1,500 to about 2,500; and

B. in a second stage at a pigment to resin ratio of about 0.5 to about 1 at a solids content of about 50 to about 65 weight percent, completing the dispersion of pigment to a fineness of 8 as measured on a Hegman scale under conditions of maximized shear and minimized impact for a period of about 12 to about 25 hours at a temperature of about 90° to about 140° F.

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**4,017,449**

## MIXTURE FOR THE MANUFACTURE OF ANTISTATIC FLOOR COVERINGS AND COATINGS

**Thaddeus Audykowski, and Kurt Amsler, both of Basel, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

**Continuation of Ser. No. 473,548, May 28, 1974, abandoned. This application Feb. 9, 1976, Ser. No. 656,686**
**Claims priority, application Switzerland, June 15, 1973, 8724/73**
**Int. Cl.² C08K** *5/01;* **C08L** *63/00;* **H01B** *1/02*
**U.S. Cl. 260—33.6 EP** **10 Claims**

**1.** A mixture for the manufacture of antistatic floor coverings or coatings which comprises, based on the total mixture, 30 to 45% by weight of a cold-curing liquid epoxy resin combination; 45 to 70% by weight of aluminum grit the particles of which have a length of 0.35 to 1.2 mm; 0 to 30% by weight of a pigment; and 0.3 to 1.1% by weight of a thixotropic agent.

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**4,017,450**

## INHIBITION OF POLY(ARYLENE SULFIDE) RESIN INDUCED METAL CORROSION

**Fay W. Bailey, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.**

**Filed Mar. 29, 1976, Ser. No. 671,191**
**Int. Cl.² C08L** *81/04*
**U.S. Cl. 260—37 R** **17 Claims**

**1.** A method for improving a poly(arylene sulfide) resin composition so that it will be less likely to cause metal to corrode as a result of having been in contact with molten poly(arylene sulfide) resin in said composition, said method comprising forming an intimate mixture of said poly(arylene sulfide) resin and an amount of at least one hydroxide or carbonate of an alkali metal sufficient to reduce the corrosive

nature of said poly(arylene sulfide) resin prior to placing said metal in contact with a molten state of said poly(arylene sulfide) resin.

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**4,017,451**

## PENCIL LEAD AND MANUFACTURING METHOD OF THE SAME

**Nobuhiro Ishida, Yokohama, and Kazuyuki Saito, Kofu, both of Japan, assignors to Mitsubishi Chemical Industries Ltd., Tokyo and Oriental Sangyo Co., Ltd., Yamanashi, both of, Japan**

**Filed June 16, 1975, Ser. No. 587,327**
**Claims priority, application Japan, June 17, 1974, 49-68085**
**Int. Cl.² C08K** *3/04*
**U.S. Cl. 260—38** **7 Claims**

1. A pencil lead comprising an extrudate of a kneaded blend of a coloring material and a novolak resin or a novolak epoxy resin.

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**4,017,452**

## POLYMER MODIFIED HYDROPHILIC INORGANIC FILLERS FOR THERMOPLASTIC POLYMERIC MATERIALS

**Eckhard C. A. Schwarz, Neenah, Wis., assignor to Presto Products, Incorporated, Appleton, Wis.**

**Filed Apr. 30, 1975, Ser. No. 573,217**
**Int. Cl.² B05D** *7/00;* **B32B** *5/16, 27/02*
**U.S. Cl. 260—42.14** **15 Claims**

1. A method for preparing an inorganic filler which is dispersible in a thermoplastic polymeric resin comprising the steps of

admixing particles of an inorganic filler having a hydrophilic surface with an aqueous wetting angle of less than 50° with a block copolymer having an A-B-A structure with the A units being a homopolymer of ethylene oxide, the B unit being a homopolymer of propylene oxide, and a mole ratio of ethylene oxide to propylene oxide within the range of 40:60 to 90:10 and having an average molecular weight of at least 3,000, the amount of said filler being within the range of about 5 to about 95 weight %, based on the total weight of said admixture;

compounding said admixture under shear at a temperature of at least 80° C for a time period sufficient to coat said filler particles with said copolymer;

cooling the resulting compound until solidified; and

comminuting said solidified compound.

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**4,017,453**

## HOMOGENEOUS POLYEPOXIDE-POLYANHYDRIDE COMPOSITIONS

**William J. Heilman, Allison Park, Pa.; Frank C. Peterson, Orange, Tex.; Mical C. Renz, and Leslie P. Theard, both of Houston, Tex., assignors to Gulf Oil Corporation, Pittsburgh, Pa.**

**Continuation-in-part of Ser. No. 501,634, Aug. 29, 1974, abandoned. This application June 26, 1975, Ser. No. 590,460**
**Int. Cl.² C08K** *7/14;* **C08L** *63/00, 63/02*
**U.S. Cl. 260—42.18** **16 Claims**

1. A method of forming a handleable, thermosettable composition which comprises

forming a homogeneous liquid resin mixture substantially free of active hydrogen comprising

a. about five to about 80 weight percent based on the total resin components of an olefinically unsaturated monomer selected from styrene, ring substituted chloro-, bromo or lower alkylstyrenes, lower alkylacrylates, lower alkylmethacrylates, vinyl acetate, acrylonitrile, vinyl chloride, vinyl bromide and vinylidene chloride;

b. an anhydride component consisting of

1. an olefinically unsaturated monoanhydride selected from maleic anhydride, chloromaleic anhydride, methylmaleic anhydride, ethylmaleic anhydride, dichloromaleic anhydride, dimethylmaleic anhydride, n-butylmaleic anhydride, phenylmaleic anhydride, diphenylmaleic anhydride, chloromethylmaleic anhydride, bromophenylmaleic anhydride and itaconic anhydride, the molar ratio of the olefinically unsaturated monomer (a) to the olefinically unsaturated monoanhydride being from about 0.5:1 to about 8:1;

2. a saturated polyanhydride comprising the copolymer having between two and about 500 repeating units and prepared from one to 10 mols of said unsaturated monoanhydride (1) per mol of said olefinically unsaturated monomer (a) or prepared from equimolar amounts of said unsaturated monoanhydride (1) and one or more two to 20 carbon 1-alkenes or halogen-substituted 1-alkenes; and

3. a saturated monoanhydride selected from phthalic anhydride, hexahydrophthalic anhydride, methyltetrahydrophthalic anhydride, dodecenylsuccinic anhydride, chlorendic anhydride, and a mixture of methyl bicyclo (2.2.1)-heptane-2,3-dicarboxylic anhydride isomers;

4. the ratio of the anhydride equivalents of said olefinically unsaturated monoanhydride (1) to the sum of the total anhydride equivalents in the resin solution being from about 0.2:1 to about 1:1 and the ratio of anhydride equivalents in said saturated polyanhydride (2) to the anhydride equivalents in said saturated monoanhydride (3) being at least about 1:1;

c. an epoxy component substantially free of active hydrogen consisting of

1. an epoxy resin having a 1,2-epoxy equivalent value greater than one which is soluble in the resin solution or is capable of forming a homogeneous dispersion in the resin solution and

2. a monoepoxy compound,

3. the ratio of epoxy equivalents in the epoxy resin to the epoxy equivalents in the monoepoxy compound being at least 1:1 and an A/E ratio of total anhydride equivalents to total epoxy equivalents in the resin solution of about 0.1:1 to about 2.5:1; and

d. from about 0.01 to about 10 weight percent of an anhydride accelerator which is substantially inactive during the copolymerization reaction of said olefinically unsaturated monomer (a) and said anhydride component (b); and copolymerizing said olefinically unsaturated monomer (a) and said anhydride component (b) by free radical means at a temperature up to about 150° C. without substantial reaction of the anhydride groups with the epoxide groups present in the resin mixture whereby a handleable, thermosettable composition comprising a homogeneous mixture of polyanhydride molecules, polyepoxide molecules and anhydride accelerator is obtained.

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**4,017,454**

## GLASS CERAMIC AS FILLER IN POLYMERIZABLE DENTAL FILLING COMPOSITIONS

**Gerd Müller, Mainz-Weisenau, Germany, assignor to Jenaer Glaswerk Schott & Gen., Mainz, Germany**

**Division of Ser. No. 505,146, Sept. 11, 1974, Pat. No. 3,973,972. This application Feb. 6, 1976, Ser. No. 655,963**
**Claims priority, application Germany, Sept. 21, 1973, 2347591**
**Int. Cl.² C08K** *3/34*
**U.S. Cl. 260—42.52** **15 Claims**

1. In a dental filling composition consisting essentially of organic compound polymerizable into a synthetic resin and particles of a glass ceramic, the improvement comprising employing as said glass ceramic particulate colorless, transparent glass ceramic having a particle size of 5–100 microns, having about 30–70% crystallinity by weight, a thermal expansion of less than $20 \cdot 10^{-7}$ degree$^{-1}$ (0° – 50° C.) and exhibiting absorption for X-rays, said glass ceramic consisting essentially of, in percent by weight based on oxides:

| | |
|---|---|
| $SiO_2$ | 40 – 55 |
| $Al_2O_3$ | 15 – 25 |
| $P_2O_5$ | 3 – 10 |
| $Li_2O$ | 3 – 5 |
| MgO | 0 – 3 |
| ZnO | 0 – 5 |
| $ZrO_2$ | 2 – 7 |
| $Ta_2O_5$ | 0 – 7 |
| $La_2O_3$ | 10 – 20. |



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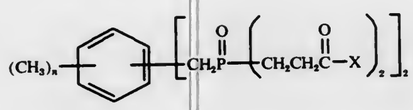
**4,017,455**

## POLYOLEFINS AND POLYESTERS FLAME-PROOFED WITH CARBOXYALKYL AND CARBAMOYLALKYL SUBSTITUTED POLY(PHOSPHINE OXIDES)

**Joseph Adrian Hoffman, Somerville, N.J., assignor to American Cyanamid Company, Stamford, Conn.**

**Filed Aug. 11, 1975, Ser. No. 603,464**
**Int. Cl.² C08K** *1/00*
**U.S. Cl. 260—45.7 P** **13 Claims**

1. A flame-retarded composition comprising (1) a polyolefin selected from the group consisting of polyethylene and polypropylene or a linear, aromatic polyester selected from the group consisting of polyethylene terephthalate, polybutylene terephthalate and poly (1,4-cyclohexanedimethylene) terephthalate and (2) a flame-retarding amount of a compound having the formula



wherein X is OH or $NH_2$ and *n* is a whole, positive integer of 1–4, inclusive.

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**4,017,456**

## COATING COMPOSITIONS COMPRISING STABILIZED REACTION PRODUCT OF HYDROXYL-TERMINATED URETHANE AND MELAMINE RESIN

**Robert Jerome Tucker, Hackettstown, and Ruth Greenwood, Somerville, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.**

**Filed Mar. 20, 1975, Ser. No. 560,417**
**Int. Cl.² C08K** *5/13, 5/34;* **C08L** *61/28*
**U.S. Cl. 260—45.8 R** **6 Claims**

1. A coating composition consisting essentially of a mixture of (1), (2), (3) and (4), in which

1. is a saturated urethane prepolymer having terminal hydroxy groups which is the reaction product of materials consisting essentially of a mixture of (a) and (b), at a molar ratio of 1:2, respectively, in which

a. is an isocyanate-terminated urethane which is the reaction product of a mixture of (I) and (II), at a molar ratio of 1:2, respectively, in which

I. is a saturated diol having a molecular weight of from about 200 to about 3000 and

II. is a saturated organic diisocyanate and

b. is a monomeric, sterically bulky, polyhydric alcohol containing 2-6 hydroxyl groups and being free of oxyalkylene units,

2. is a polyalkyl ether of a polymethylol melamine,

3. is an acid catalyst and

4. is an ultraviolet light absorber comprising 2-[(2-hydroxy-5-t-octylphenol)] benzotriazole or 2,2′-dihydroxy-4-methoxybenzophenone.

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**4,017,457**

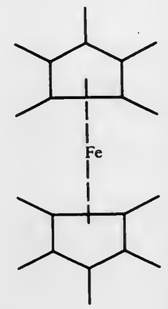
## FLAME RETARDANT POLYCARBONATE COMPOSITIONS

**Arthur L. Baron, and Parameswar Sivaramakrishnan, both of New Martinsville, W. Va., assignors to Mobay Chemical Corporation, Pittsburgh, Pa.**

**Filed Oct. 6, 1975, Ser. No. 620,488**
**Int. Cl.² C08K** *5/56*
**U.S. Cl. 260—45.75 P** **9 Claims**

1. A polycarbonate having improved flame retardant characteristics comprising:

a polycarbonate resin and an amount effective to provide flame retardant characteristics of a member selected from the group consisting of ferrocene and ferrocene derivatives, said polycarbonate resin produced by reacting compounds selected from the group consisting of di-(monohydroxyaryl)-alkanes, dihydroxybenzenes and substituted dihydroxybenzenes with compounds selected from the group consisting of carbonic acid diesters, phosgene, bis-chlorocarbonic acid esters of di-(monohydroxyaryl)-alkanes, bis-chlorocarbonic acid esters of dihydroxybenzenes and bis-chlorocarbonic acid esters of substituted dihydroxybenzenes and said ferrocene derivatives characterized in that they do not degrade the polycarbonate resin and in that they contain a structure represented by the formula:



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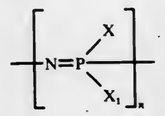
**4,017,458**

## STABILIZATION OF POLY(PHOSPHAZENES)

**Delmar Frederick Lohr, Jr., Akron, Ohio, assignor to The Firestone Tire & Rubber Company, Akron, Ohio**

**Filed Feb. 26, 1976, Ser. No. 661,688**
**Int. Cl.² C08K** *5/47*
**U.S. Cl. 260—45.75 W** **8 Claims**

1. A poly(phosphazene) composition stabilized against thermal aging comprising a poly(phosphazene) represented by the general formula:



wherein *n* represents an integer from 3 up to about 50,000 and X and $X_1$ each represent a monovalent substituent selected from the groups consisting of alkoxy, substituted alkoxy, aryloxy, substituted aryloxy, hydroxy and amino, and X and $X_1$ are randomly distributed along the —P=N— backbone and the poly(phosphazene) includes one or two or more randomly distributed groups

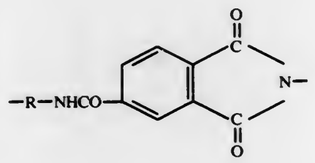
and an organometallic compound compatible with said poly(phosphazene) and present in an amount sufficient to stabilize said poly(phosphazene) against thermal degra-

dation, said organometallic compound being zinc 2-mercaptobenzothiazole.

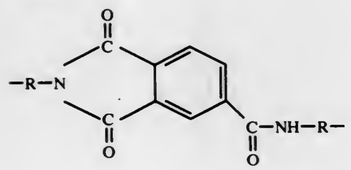
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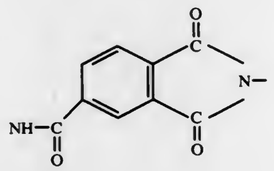
**4,017,459**
**POLYAMIDE-IMIDES**
**Besir K. Onder, North Haven, Conn., assignor to The Upjohn Company, Kalamazoo, Mich.**
**Filed Sept. 19, 1975, Ser. No. 614,838**
**Int. Cl.² C08G** *73/14*
**U.S. Cl. 260—47 CP** **5 Claims**

1. A polyamide-imide characterized by the presence in random arrangement of at least two recurring units having the formulae:

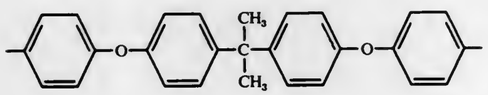


and





wherein R in each case represents



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**4,017,460**
**NOVEL STARCH ETHERS**
**Martin M. Tessler, Edison, N.J., assignor to National Starch and Chemical Corporation, Bridgewater, N.J.**
**Filed Dec. 10, 1975, Ser. No. 639,490**
**Int. Cl.² C08B** *31/08*
**U.S. Cl. 536—50** **6 Claims**

1. A method for the preparation of modified starch products comprising the steps of:

a. reacting starch base with 1 to 100% by weight of the starch base of modifying agent in an aqueous medium at a pH of 9.5 to 12.5 and a temperature of 10° to 90° C. for a period of 0.2 to 24 hours, said modifying agent comprising the reaction product of a 2,3-dihalopropionic acid or a $C_1$–$C_8$ alkyl ester thereof with a secondary amine of the formula:



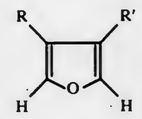
where R′ and R″ are, independently, alkyl, alkenyl or hydroxy or ether substituted alkyl or alkenyl wherein the total number of carbon atoms in R′ and R″ combined in a maximum of 8; and

b. isolating the resulting starch product.

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**4,017,461**
**METHOD FOR MANUFACTURING LIQUID RESINOUS FURAN-FORMALDEHYDE CONDENSATION PRODUCTS**
**Andrew P. Dunlop, Riverside, and Rudy F. Macander, Cary, both of Ill., assignors to The Quaker Oats Company, Chicago, Ill.**
**Filed Jan. 2, 1976, Ser. No. 646,193**
**Int. Cl.² C08G** *16/00, 2/08*
**U.S. Cl. 260—67 R** **31 Claims**

1. A method for producing a liquid resin comprising: contacting formaldehyde and a furan of the formula:



where R, and R′ are hydrogen, halogen, alkyl, phenyl, halogen-substituted phenyl, alkyl-substituted phenyl, carboxy, hydroxy-alkyl, or carboxyalkyl, and in which the alkyl substituents have from 1 to 10 carbons, said contacting takes place in the presence of a catalytically effective amount of acid catalyst for a period of time sufficient to produce a liquid resinous material, said furan being present during said contacting in a quantity sufficient to provide more than 1.1 mole of said furan per mole of formaldehyde.

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**4,017,462**
**TREATMENT OF ORGANIC TEXTILES WITH ADDUCT POLYMERS AND PHENOLS**
**Donald J. Daigle, New Orleans; Armand B. Pepperman, Jr., Metairie, and Sidney L. Vail, River Ridge, all of La., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.**
**Division of Ser. No. 499,806, Aug. 22, 1974, Pat. No. 3,961,110. This application Mar. 4, 1976, Ser. No. 663,886**
**Int. Cl.² C08G** *12/04;* **C09D** *5/18;* **C09K** *3/28*
**U.S. Cl. 260—72 R** **2 Claims**

1. A process for preparing a water soluble adduct polymer comprising:

a. reacting a hydroxymethylphosphorus compound selected from the group consisting of trihydroxymethylphosphene, tetrakis(hydroxymethyl)phosphonium hydroxide and tetrakis(hydroxymethyl)phosphonium chloride with a nitrogenous compound selected from the group consisting of ammonia, hexamethylenetetraamine and ethylenediamine to form an insoluble polymeric precipitate, and

b. dissolving the precipitate from (a) in the presence of formaldehyde and a hydroxymethylphosphonium compound selected from the group consisting of tetrakis(hydroxymethyl)phosphonium acetate, tetrakis(hydroxymethyl)phosphonium oxalate, and tetrakis(hydroxymethyl)-phosphonium chloride with a mole ratio of 1:4 to 4:1 of formaldehyde to phosphorus contained in the precipitate and a 1:10 to 2:1 ratio of phosphonium compound to phosphorus contained in the precipitate.



**4,017,463**
**HIGH MELTING N,N-TEREPHTHALOYL BIS-PHTHALIMIDE AND ITS USE AS AN ESTER INTERLINKING AGENT FOR POLYESTERS**
**Yuzi Okuzumi, Cuyahoga Falls, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio**
**Continuation of Ser. No. 465,215, April 29, 1974. This application July 21, 1975, Ser. No. 597,795**
**Int. Cl.² C08G** *63/46, 63/68*
**U.S. Cl. 260—75 T** **6 Claims**

1. In a process for preparing high molecular weight linear polyesters of an aromatic dicarboxylic acid selected from the group consisting of terephthalic acid, isophthalic acid, 2,6-naphthoic acid, 2,7-naphthlic acid and p,p′-diphenyl dicarboxylic acid and copolyesters of at least one of said acids and a second acid by melt polymerizing the reaction product of the esterification or transesterification of the dicarboxylic acid or lower alkyl ester thereof with a glycol of the series $HO(CH_2)_nOH$ where *n* is an integer ranging from 2 to 10 the improvement which comprises adding to the polymerizing product, when the intrinsic viscosity of said polymerizing product is at least 0.2, from 1.0 to 20.0 parts by weight of N,N′-terephthaloyl bis-phthalimide, having a melting point of at least 330° C., per 100 parts by weight of the dicarboxylic acid or lower alkyl ester thereof and reacting it with said polymerizing product to form a high molecular weight product.

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**4,017,464**
**POLYTETRAMETHYLENE ETHER URETHANE CURED WITH 2,2′-DIAMINODIPHENYL DISULPHIDE**
**Michael E. Kimball, Norton, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio**
**Filed Feb. 5, 1976, Ser. No. 655,325**
**Int. Cl.² C08G** *18/10*
**U.S. Cl. 260—77.5 AM** **2 Claims**

1. A polytetramethylene ether polyol urethane prepared by reacting a mol of a polytetramethylene ether polyol having 2 to 3 hydroxyls and an average molecular weight of 1000 to 4000 with 1.6 to 4 mols of toluene diisocyanate containing at least 50 percent by weight of the 2,4 isomer at a temperature from ambient to 40° C. to form a prepolymer and curing said prepolymer at a temperature no higher than 150° C. with 0.8 to 0.95 mol percent of 2,2′-dithiodianiline.

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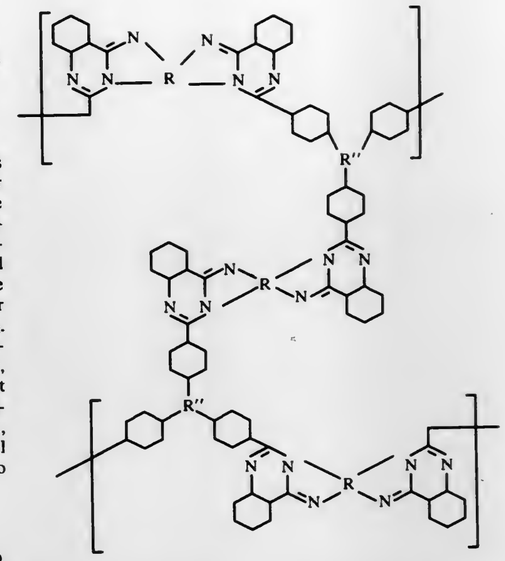
**4,017,465**
**PROCESS FOR POLYMERIZATION OF 2-PYRROLIDONE**
**Robert Bacskai, Kensington, Calif., assignor to Chevron Research Company, San Francisco, Calif.**
**Filed Jan. 23, 1975, Ser. No. 543,384**
**Int. Cl.² C08G** *69/24, 69/20*
**U.S. Cl. 260—78 P** **9 Claims**

1. The process for polymerizing 2-pyrrolidone comprising agitating 2-pyrrolidone, alkaline polymerization catalyst, polymerization initiator, an inert nonsolvent in weight ratio to 2-pyrrolidone of about 0.5–20:1, and an insoluble salt, which is alkali metal halide in weight ratio to 2-pyrrolidone of about 1–10:1 at a temperature of from 25° to about 70° C for 4 to about 100 hours to form a particulate poly-2-pyrrolidone product.

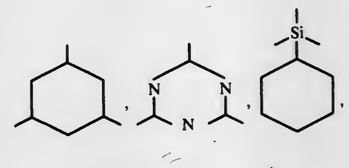
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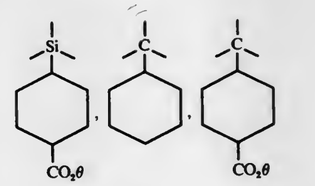
**4,017,466**
**POLYBENZIMIDAZOQUINAZOLINES AND PREPOLYMERS FOR MAKING SAME**
**Robert J. Milligan, San Diego, Calif.; Walter P. Fitzgerald, Jr., deceased, late of San Diego, Calif., and by Mary E. Fitzgerald, surviving spouse, assignors to Whittaker Corporation, Los Angeles, Calif.**
**Filed Feb. 7, 1975, Ser. No. 547,890**
**Int. Cl.² C08G** *73/00, 73/18*
**U.S. Cl. 260—78 TF** **30 Claims**

1. A highly cross-linked polybenzimidazoquinazoline for laminating and molding use consisting of the following recurring unit:



wherein R is a tetravalent aromatic residue to which the nitrogen atoms are attached in pairs with the members of each pair being located in the ortho position with respect to each other and which contains at least one 6-carbon aromatic ring, and wherein R″ is a trivalent radical selected from the group consisting of





and



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**4,017,467**
**SULFUR-CURABLE COMPOSITIONS**
**Richard C. Doss, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.**
**Filed Apr. 21, 1975, Ser. No. 569,908**
**Int. Cl.² C08F** *28/00*
**U.S. Cl. 260—79** **10 Claims**

1. A polythiol composition which is curable at ambient temperatures comprising, in weight ratio:

a. 100 parts by weight of a poly(oxyalkylene)-polyester-poly(monosulfide)-polythiol having on average more than two pendent thiol groups per molecule,

b. from about 0.01 to 5 weight parts of sulfur as the curing agent, and

c. from about 0.01 to about 5 weight parts of at least one of magnesium oxide and calcium oxide curing agent accelerator, the amounts of (b) and (c) present being sufficient to effect cure of said polythiol at ambient temperatures and at 3 days.

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**4,017,468**

## N-CHLOROTHIOCARBOXYLIC ACID AMIDE/IMIDE-MODIFIED TERPOLYMERS

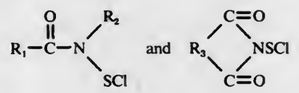
**Roger J. Hopper, Akron, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio**

**Filed June 30, 1975, Ser. No. 591,372**

**Int. Cl.² C08K** *5/44*

**U.S. Cl. 260—79.5 B** **12 Claims**

1. A chemically modified rubbery terpolymer which comprises the admixture product of a rubbery terpolymer of ethylene, α-olefin containing 3 to 6 carbon atoms and a non-conjugated diene containing 6 to 12 carbon atoms with at least one compound selected from N-chlorothio-carboxylic acid amides and imides of the formulae:



where $R_1$ and $R_2$ are radicals which can be individually selected from alkyl, cycloalkyl, benzyl, and phenyl radicals, where $R_1$ can additionally be selected from hydrogen, where the aromatic rings of said phenyl and benzyl radicals may be substituted with one or two radicals selected from alkyl and chloro radicals, where $R_1$ and $R_2$ may be taken together to represent an alkylene radical of 3 to 5 carbon atoms and where $R_3$ may be an alkylene radical of 2–4 carbon atoms, a 1,2-cycloalkylene radical of 6–8 carbon atoms, or an orthophenylene radical of 6 to 8 carbon atoms.

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**4,017,469**

## PHOTODEGRADABLE POLYOLEFIN COMPOSITIONS

**Geneviéve Nicoud espouse Le Brasseur, Bully-les-Mines, France, assignor to Ethylene Plastique, Courbevoie, France**

**Filed July 2, 1974, Ser. No. 485,103**

**Claims priority, application United Kingdom, July 9, 1973, 32589/73**

**Int. Cl.² C08J** *3/20*

**U.S. Cl. 526—19** **9 Claims**

1. A photodegradable polyolefin composition which is degraded on exposure to solar radiation so as to counteract environmental pollution, which comprises, in addition to the polyolefin,

i. from about 5 to about 500 ppm of iron in the form of at least one alkali metal trioxalatoferrate, and

ii. from about $5 \times 10^{-5}$ to about $5 \times 10^{-3}$ mol, per 100 g of the polyolefin, of at least one photosensitizing organic compound having a triplet energy of at least about 30 Kcal/mol.

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**4,017,470**

## METHOD FOR PREPARING A HEAT-STABLE PLASMA PROTEIN SOLUTION FROM PASTE IV-1

**Ken-ichi Izaka, Hirakata, and Kazuo Takechi, Sakai, both of Japan, assignors to The Green Cross Corporation, Osaka, Japan**

**Filed June 12, 1974, Ser. No. 478,884**

**Claims priority, application Japan, Feb. 18, 1974, 49-19247**

**Int. Cl.² C07G** *7/00*

**U.S. Cl. 260—112 B** **6 Claims**

1. A method for preparing a heat-stable plasma protein solution showing no blood pressure-depressing action which comprises adding distilled water to a paste IV-1, a fraction obtained from the Cohn's cold ethanol plasma fractionation method, to extract water-soluble proteins in the paste and removing solids contained in the mixture by centrifuging to obtain an extract containing water-soluble proteins, heat treating the resulting extract at pH 4.5 to 5.5 at 50° to 65° C. with an organic acid having 4 to 8 carbon atoms to a final concentration of the organic acid of 2 to 6 W/V%, removing as precipitates by filtration or centrifugation lipo- and glycoproteins contained in the extract, adding 2-ethoxy-6,9-diaminoacridine lactate in an amount of 0.2 to 3.0 g. per liter of the supernatant to the resulting supernatant, allowing the mixture to stand at room temperature or below and removing by precipitation residual lipo-proteins giving turbidity to the supernatant, and then removing blood pressure-depressing substances present in the resulting supernatant by adsorption with an inorganic adsorbent or cation exchanger.

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**4,017,471**

## IMMUNOLOGICAL COMPOUNDS

**David Allen Lewis Davies, High Wycombe, England, assignor to G. D. Searle & Co., High Wycombe, England**

**Filed Sept. 15, 1975, Ser. No. 613,446**

**Int. Cl.² A23J** *1/06*

**U.S. Cl. 260—112 B** **4 Claims**

1. An antitumor agent comprising p-di(2-chloroethyl-)amino-L-phenylalanine or N,N-bis(2-chloroethyl)p-phenylenediamine hydrochloride as a cytotoxic agent bound to a tumor specific antibody by peptide bonds.

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**4,017,472**

## PROCESS FOR ISOLATION OF ASPARTYL DIPEPTIDE ESTERS

**Walter G. Farkas, Ruvigliana, Tl, Switzerland; Willard M. Hoehn, Cupertino, Calif., and Joseph F. Zawadzki, Skokie, Ill., assignors to G. D. Searle & Co., Chicago, Ill.**

**Continuation-in-part of Ser. No. 337,927, March 5, 1973, abandoned. This application July 5, 1974, Ser. No. 485,972**

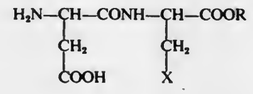
**Claims priority, application Canada, Feb. 25, 1974, 193344**

*Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976*

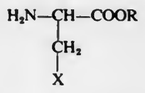
**Int. Cl.² C07C** *103/52;* **A23L** *1/22*

**U.S. Cl. 260—112.5 R** **9 Claims**

1. In a process for preparing a dipeptide ester of the general formula



wherein X is a phenyl or p-hydroxyphenyl radical, R is an alkyl radical containing 1 to 7 carbon atoms and the stereochemical configuration is L-L; by the reaction of an L-aspartic acid anhydride salt with a compound of the formula



wherein R and X are defined as above, the step of isolating said dipeptide ester from the crude reaction mixture containing said ester which comprises partitioning said crude mixture between water and a suitable alkanol containing up to 5 carbon atoms and isolating the dipeptide ester from the alkanol layer.



**4,017,473**

## HARDENING OF PROTEINACEOUS MATERIALS

**Arthur Henri De Cat, Mortsel; Valere Frans Danckaert, Boechout; Francis Jeanne Sels, Kontich, and Robert Joseph Pollet, Vremde, all of Belgium, assignors to AGFA-GEVAERT N.V., Mortsel, Belgium**

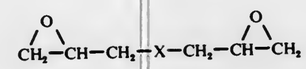
**Filed May 20, 1975, Ser. No. 579,251**

**Claims priority, application United Kingdom, May 24, 1974, 23409/74**

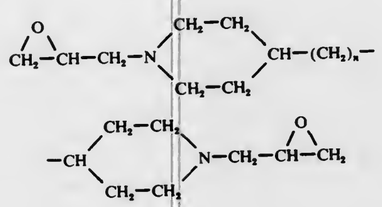
**Int. Cl.² C09H** *11/00*

**U.S. Cl. 260—117** **3 Claims**

1. A process for hardening a thin layer of proteinaceous material, which comprises incorporating in the proteinaceous material at least one bis-epoxy compound corresponding to one of the formulae:



and



wherein:

X represents a 1,4-piperazinylene group or a monomethyl- or dimethyl-substituted 1,4-piperazinylene group, or represents a 1,2-pyrazolidinylene group,

and $n$ is 0 or an integer from 1 to 4.

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**4,017,474**

## POLYURETHANE INTERMEDIATES AND PRODUCTS AND METHODS OF PRODUCING SAME FROM LIGNIN

**Wolfgang Gerhard Glasser, and Oscar Hsien-Hsiang Hsu, both of Blacksburg, Va., assignors to Research Corporation, New York, N.Y.**

**Filed Aug. 15, 1975, Ser. No. 605,200**

**Int. Cl.² C07G** *1/00*

**U.S. Cl. 260—124 A** **10 Claims**

1. A method for the preparation of a polycarboxyoxyalkylene polyester-ether polyol from lignin comprised of the following steps:

a. reacting lignin with maleic anhydride, substituted maleic anhydrides, or mixtures thereof to form a lignin-maleic anhydride copolymer; and

b. reacting said copolymer with an oxyalkylating medium to form the desired polycarboxy-oxyalkylene polyester-ether polyol.

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**4,017,475**

## LIGNIN COMPOSITION AND A PROCESS FOR ITS PREPARATION

**Charles H. Ludwig, Bellingham, Wash., assignor to Georgia-Pacific Corporation, Portland, Oreg.**

**Continuation-in-part of Ser. No. 542,562, Jan. 20, 1975, abandoned. This application Sept. 22, 1975, Ser. No. 615,345**

**Int. Cl.² C07G** *1/00*

**U.S. Cl. 260—124 A** **22 Claims**

1. A process for the preparation of aminoalkylated hydroxyphenylated lignosulfonate which comprises reacting a lignosulfonate with a phenol until the phenolic hydroxyl content of the hydroxyphenylated lignosulfonate is at least 2½ weight percent, the reacting the hydroxyphenylated lignosulfonate with an aldehyde and a nitrogen compound selected from a group consisting essentially of ammonia, primary amines, secondary amines, and mixtures thereof, until the aminoalkylated hydroxyphenylated lignosulfonate contains at least 3 percent organic nitrogen, said aldehyde having no alpha hydrogen, and said amines having from 1 to 22 carbon atoms with substituents selected from the group consisting of alkyl, cycloalkyl, and substituted alkyl radicals of from 1 to 18 carbon atoms.

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**4,017,476**

## PREPARATION OF FINELY DIVIDED STYRENE-DIVINYLBENZENE ORGANIC PIGMENTS

**James G. Murray, East Brunswick, and Frederick C. Schwab, Metuchen, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.**

**Filed Mar. 15, 1974, Ser. No. 451,405**

**Int. Cl.² C09B** *31/30, 43/00, 1/16, 11/06*

**U.S. Cl. 260—144** **14 Claims**

1. A process for producing an organic pigment that comprises slurry polymerizing a reaction mixture comprising styrene, 0.5 to 15.0 weight percent divinylbenzene based upon styrene, and an anionic polymerization initiator dispersed in a liquid aliphatic hydrocarbon slurrying medium in presence of from about 0.1 to about 10 weight percent, based upon styrene, of a block polymer dispersing agent to produce a finely divided solid cross-linked polymer, at a temperature between about 20° C. and about 120° C., said anionic polymerization initiator comprising an alkali metal-bearing compound capable of initiating polymerization of styrene, and terminating the slurry polymerization, with an organic dye, an organic dye precursor selected from the group consisting of 4,4′(bis-dimethylamino)benzophenone and 4,4′(bis-diethylamino)benzophenone, or a coupling agent and a dye.

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**4,017,477**

## 3-HALOGENO-6-HYDROXY-PYRIDONE-(2) AZO DYESTUFFS

**Gert Hegar, Schoenenbuch, and Henri Riat, Arlesheim, both of Switzerland, assignors to Ciba-Geigy AG, Basel, Switzerland**

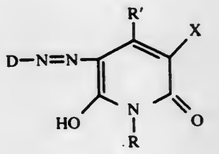
**Continuation of Ser. No. 421,370, Dec. 3, 1973, abandoned, which is a continuation of Ser. No. 172,913, Aug. 18, 1971, abandoned. This application July 14, 1975, Ser. No. 595,816**

**Claims priority, application Switzerland, Aug. 19, 1970, 12370/70; July 28, 1971, 11173/71**

**Int. Cl.² C09B** *62/08, 62/24, 62/50, 45/04*

**U.S. Cl. 260—153** **11 Claims**

1. An azo compound of the formula:



in which

X represents chloro, bromo or fluoro,

R and R′ independently represent hydrogen, phenyl, methoxyphenyl, cyclohexyl, alkyl contains 1 to 4 carbon atoms, or alkyl containing 1 to 4 carbon atoms substituted by halo, hydroxyl, $NH_2$-, dimethylamino, phenyl, methoxy, acetylamino, cyano, nitro, or a fiber reactive group capable of reacting with the hydroxyl groups of cellulose or with the amino groups of polyamides

and

D represents benzene, naphthalene, phenylazobenzene, naphthylazobenzene, diphenyl, diphenylurea or stilbene which is unsubstituted or substituted by sulfo, carboxy, chloro, bromo, trifluoromethyl, cyano, carbomethoxy, carboethoxy, methylsulfonyl, β-hydroxyethylsulfonyl,

methyl, nitro, β-chloroethylsulfonyl, cyclohexyloxycarbonyl, aminosulfonyl, N-methylaminosulfonyl, N,N-dimethylaminosulfonyl, N,N-dimethylaminosulfonyl, N,γ-isopropoxypropylaminosulfonyl, benzoylamino, N-isopropylaminosulfonyl, aminosulfonyloxy, methoxy, N,N-bis-(β-hydroxyethyl)aminosulfonyl, vinylsulfo, β-sulfatoethylsulfo, β-thiosulfatoethylsulfo, β-thiosulfatopropionylamido, ethylsulfonyl, β-thiosulfatoethylsulfonylamido, β-hydroxyethylsulfonylpropionylaminoethyl, chloroacetylaminomethyl, dimethylaminosulfonoxy, di-n-butylaminosulfonoxy, n-propylaminosulfonoxy, N-morpholinosulfonoxy, N-piperidinosulfonoxy, cyclohexylaminosulfonoxy, N-methylanilinosulfonoxy, diethylaminosulfonoxy, ethyleneiminosulfonoxy, n-propoxysulfonyl, β-chloroethoxysulfonyl, benzyloxysulfonyl, ethoxysulfonyl, acetylamino, hydroxy, acetyl, carbamyl, $NH_2$—, or amino substituted by a fiber reactive group capable of reacting with the hydroxyl groups of cellulose or with the amino groups of polyamides or a quaternary ammonium group selected from the group p-(N-chloro, N,N,N,-trimethylaminoacetyl) phenoxy, 2-(N-chloropyridinium(1)) ethoxy, N-chloro, N,N-dimethyl hydrazinium(N)-acetyl, N-bromo, N,N,N-triethylaminoacetyl, 3-(N-chloropyridinium(1))-2-hydroxypropylaminosulfonyl, and N-chloro, N-methylpyridinium (3)carbonamido; or 1:1 or 1:2 complexes thereof with iron, manganese, nickel, copper cobalt or chromium.

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**4,017,478**

## WATER-SOLUBLE AZO DYES HAVING A 2-ACETOACETAMIDOFLUORENYL COUPLING COMPONENT RADICAL

**Jacky Dore, Basel, Switzerland, assignor to Sandoz Ltd., Basel, Switzerland**

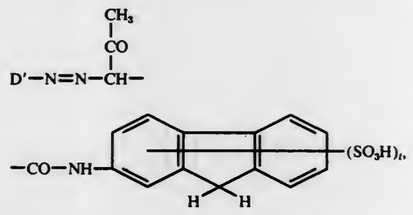
**Division of Ser. No. 40,355, May 25, 1970, abandoned. This application Sept. 6, 1974, Ser. No. 503,967**

**Claims priority, application Switzerland, June 2, 1969, 8335/69; June 20, 1969, 9463/69**

**Int. Cl.² C09B** *29/32, 31/10, 35/20, 45/28*

**U.S. Cl. 260—158** **13 Claims**

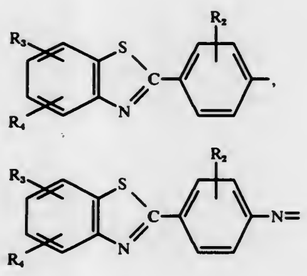
1. A compound of the formula



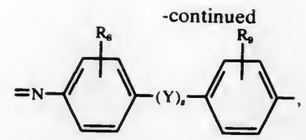
or a mixture thereof,

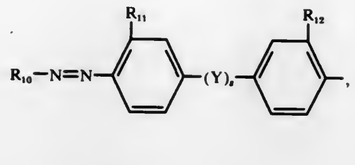
wherein

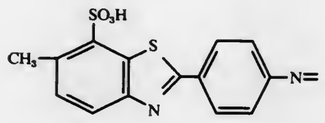
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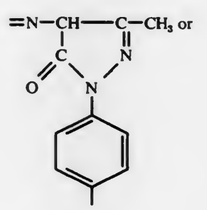


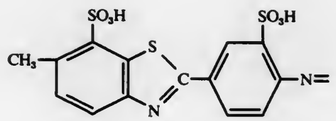
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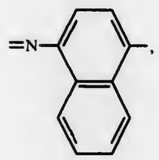












wherein

$R_2$ is hydrogen or sulfo,

$R_3$ is hydrogen, lower alkyl or sulfo,

$R_4$ is hydrogen, lower alkyl or sulfo,

$R_8$ is hydrogen, lower alkyl, lower alkoxy, carboxy or sulfo,

$R_9$ is hydrogen, lower alkyl, lower alkoxy, carboxy or sulfo, with the proviso that when $R_8$ and $R_9$ are sulfo or carboxy they are in the 2,2′- or 3,3′-positions,

$R_{10}$ is 1-phenyl-3-methylpyrazol-5-one-4-yl or 1-(3′-sulfophenyl)-3-methylpyrazol-5-one-4-yl,

$R_{11}$ is hydroxy, carboxy or lower alkoxy,

$R_{12}$ is hydroxy, carboxy or lower alkoxy,

Y is —CH=CH—, —NH—CO—, —CO—NH— or —NH—CO—NH—,

$s$ is 0 or 1, and

$t$ is 0, 1 or 2, with the proviso that the molecule contains 1 to 5 sulfo groups.



**4,017,479**

## CATIONIC INDAZOLE-AZO-5-AMINO PYRAZOLE DYESTUFFS

**Günther Kaupp, Binningen, and Jacques Voltz, Riehen, both of Switzerland, assignors to Ciba-Geigy AG, Switzerland**

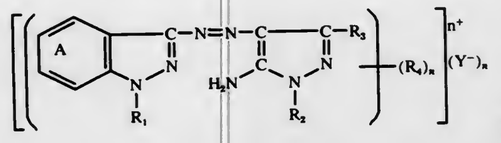
**Continuation of Ser. No. 78,287, Oct. 5, 1970, abandoned, which is a continuation-in-part of Ser. No. 747,385, July 26, 1968, abandoned. This application Mar. 14, 1973, Ser. No. 341,098**

**Claims priority, application Switzerland, Aug. 11, 1967, 11355/67**

**Int. Cl.² C09B** *29/38, 45/12;* **D06P** *3/70*

**U.S. Cl. 260—158** **13 Claims**

1. A dye salt of the formula



wherein $R_1$ represents methyl or ethyl, $R_2$ represents phenyl or phenyl substituted by chlorine or lower alkyl, $R_3$ represents methyl, $R_4$ represents methyl or ethyl and is bound to one of the two ring nitrogen atoms which are free from $R_1$ and $R_2$, Y represents an anion and $n$ represents 1 or 2 and the benzene ring A is unsubstituted or substituted by chlorine or nitro.

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**4,017,480**

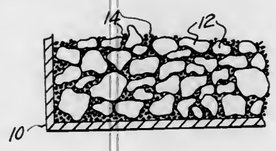
## HIGH DENSITY COMPOSITE STRUCTURE OF HARD METALLIC MATERIAL IN A MATRIX

**Charles S. Baum, St. Clair Shores, Mich., assignor to Permanence Corporation, Detroit, Mich.**

**Filed Aug. 20, 1974, Ser. No. 498,994**

**Int. Cl.² C22C** *29/00*

**U.S. Cl. 428—601** **4 Claims**




1. A wear resistant plate comprising: a substantially uniform dispersion of a plurality of irregularly shaped particles of a relatively large average size produced by crushing sintered tungsten carbide and a plurality of irregularly shaped particles of sintered tungsten carbide of a substantially smaller average size disposed within and substantially filling the interstices of the larger particles, said particles being bonded within a matrix of a metal having a lower melting point than said particles.

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**4,017,481**

## RIFAMYCIN COMPOUNDS

**Leonardo Marsili, Segrate, (Milan); Vittorio Rossetti, Melzo, (Milan), and Carmine Pasqualucci, Milan, all of Italy, assignors to Archifar Industrie Chimiche del Trentino S.p.A., Rovereto, Italy**

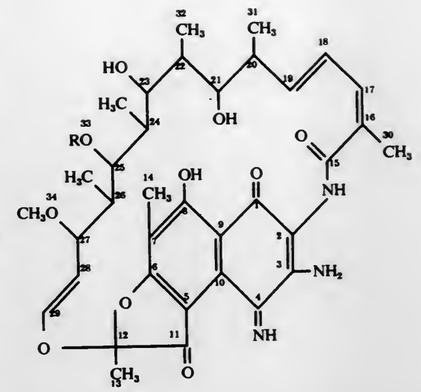
**Filed Apr. 27, 1976, Ser. No. 680,771**

**Claims priority, application Italy, May 15, 1975, 5155/75**

**Int. Cl.² C07D** *498/08*

**U.S. Cl. 260—239.3 P** **5 Claims**

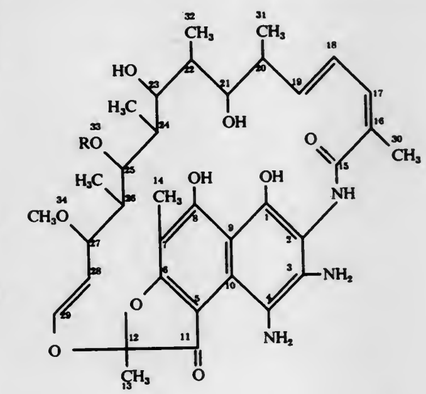
1. A Rifamycin compound selected from the group consisting of a compound having the following formula:



(I)

in which R is —H or —$COCH_3$, its 16, 17, 18, 19 tetrahydroderivatives, 16, 17, 18, 19, 28, 29 hexahydroderivatives and corresponding reduced products having the formula:

(III)



wherein R is —H or —$COCH_3$, its 16, 17, 18, 19 tetrahydroderivatives, 16, 17, 18, 19, 28, 29 hexahydroderivatives.

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**4,017,482**

## METHOD OF PURIFYING CAPROLACTAM

**Rudolph Hans Gath, Mannheim, and Hugo Fuchs, Ludwigshafen, both of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany**

**Filed Aug. 11, 1975, Ser. No. 603,444**

**Claims priority, application Germany, Sept. 11, 1974, 2443341**

**Int. Cl.² C07D** *201/16*

**U.S. Cl. 260—239.3 A** **5 Claims**

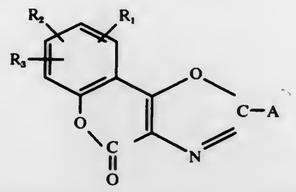
1. A method for purifying crude caprolactam obtained in the Beckmann rearrangement of cyclohexanone oxime in oleum together with impure caprolactam obtained from the gas-phase rearrangement of cyclohexanone oxime in the presence of a catalyst, which process comprises adding the impure lactam obtained from the catalytic gas-phase rearrangement of cyclohexanone oxime to an acid rearrangement mixture derived from the Beckmann rearrangement of cyclohexanone oxime in oleum in an amount of said impure lactam up to 50% of the lactam in said acid rearrangement mixture, maintaining the resultant mixture of said lactams at a temperature of 100° to 200° C with thorough stirring of said mixture, then neutralizing said mixture, and recovering substantially pure caprolactam from the neutralized mixture.

## 4,017,483
## COUMARINO-3,4-OXAZOLES

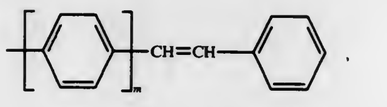
**Hans Rudolf Meyer, Binningen, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.**

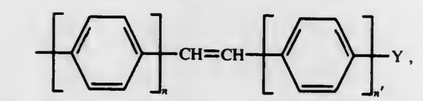
**Filed Oct. 1, 1974, Ser. No. 510,979**
**Claims priority, application Switzerland, Nov. 1, 1973, 15405/73**
**Int. Cl.² C07D** *263/00*
**U.S. Cl. 260—240 D** **17 Claims**

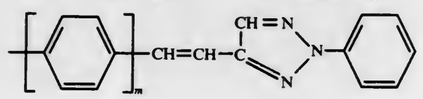
1. Coumarino-3,4-oxazoles of the formula

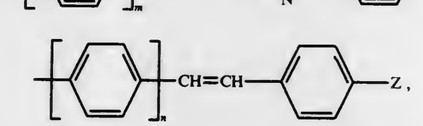


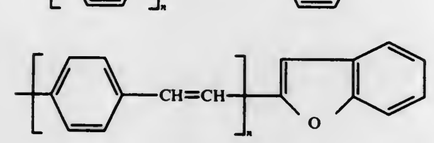
wherein $R_1$, $R_2$ and $R_3$ independently of one another represent hydrogen or a non-chromophoric substituent or $R_1$ and $R_2$ in the o-position relative to one another together represent an unsubstituted or non-chromophorically substituted fused-on benzene radical and A represents an unsubstituted or non-chromophorically substituted radical of the formulae

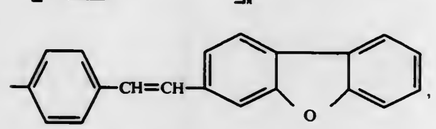


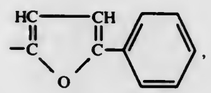


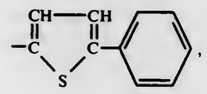




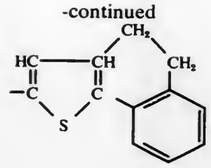




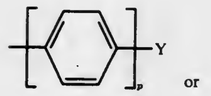




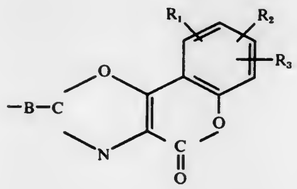
-continued



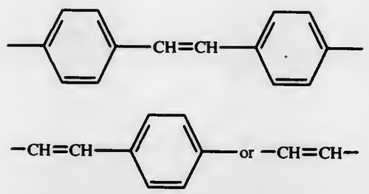




or



wherein Y represents an optionally non-chromophorically substituted benzoxazol-2-yl, naphthoxazol-2-yl, phenanthreno-9′,19′:4,5-oxazol-2-yl, benzotriazol-2-yl, naphthotriazol-2-yl or phenanthrotriazolyl-2 radical. Z represents a radical having the meaning of Y or an unsubstituted non-chromophorically substituted phenyl, 2-triazolyl, 5-phenyloxdiazol-2-yl, pyrazol-1-yl or 4,6-diphenyl-1,3,5-triazin-2-yl radical, B represents a radical of the formula



or a 1,4-phenylene, 4,4′-diphenylene, 1,4-naphthylene, 2,6-naphthylene, 2,5-furylene or 2,5-thienylene radical, or a dibenzofurane, dibenzothiophene-dioxide or 9,10-dihydrophenanthrylene-2,7 radical bonded in the 3,7-position to the oxazole radical, *m* represents the numbers 0, 1 or 2, *n* and *n′* represent the number 0 or 1 and *p* represents the number 1 or 2 and the sum of *n*+*n′* must be 1 or 2.

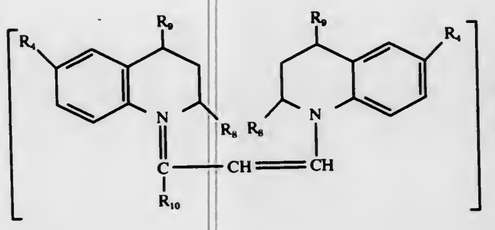


## 4,017,484
## CATIONIC DYESTUFFS

**Alfred Brack, and Hubertus Psaar, both of Leverkusen, Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany**

**Continuation of Ser. No. 469,521, May 13, 1974, abandoned, which is a continuation of Ser. No. 271,723, July 14, 1972, abandoned. This application Oct. 23, 1975, Ser. No. 625,181**
**Claims priority, application Germany, July 14, 1971, 2135156**
**Int. Cl.² C07D** *401/06*
**U.S. Cl. 260—240 R** **6 Claims**

1. Cationic dyestuff having the formula



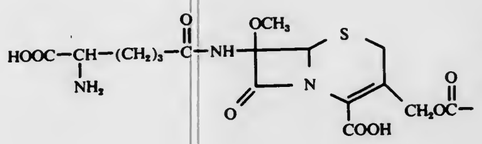
wherein
$R_4$ denotes an alkoxy group with 1 to 4 C atoms;
$R_8$ denotes hydrogen or a methyl group;
$R_9$ denotes hydrogen or a methyl group;
$R_{10}$ denotes hydrogen, a phenyl radical or a phenyl radical substituted by chloro, methyl, methoxy nitro or ethoxycarbonylamino; and
$An^-$ denotes an anion.

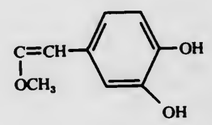
## 4,017,485
## 7-METHOXYCEPHALOSPORIN DERIVATIVES

**Tōru Hasegawa, Kawanishi; Kazunori Hatano; Hiroshi Fukase, both of Osaka, and Hidesuke Iwasaki, Itami, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan**

**Filed Sept. 11, 1974, Ser. No. 505,089**
**Claims priority, application Japan, Sept. 18, 1973, 48-105287**
**Int. Cl.² C07D** *501/20*
**U.S. Cl. 260—240 J** **1 Claim**

1. A compound selected from the group consisting of a compound of the formula:





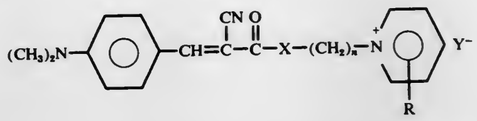
and pharmaceutically acceptable salts thereon.

## 4,017,486
## CATIONIC ALPHA-CYANO-P-DIMETHYLAMINOCINNAMOYL DYES AND PAPER DYED THEREWITH

**Bennett George Buell, and Frank Fred Loffelman, both of Bridgewater, N.J., assignors to American Cyanamid Company, Stamford, Conn.**

**Filed May 18, 1976, Ser. No. 687,492**
**Int. Cl.² C09B** *57/00;* **C07D** *211/00*
**U.S. Cl. 260—240.9** **5 Claims**

1. A cationic dye having the formula:



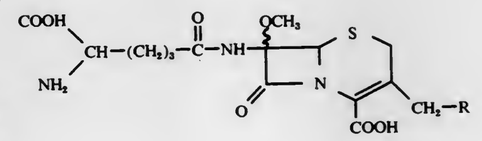
wherein R is selected from hydrogen and methyl, X is selected from O and NH, *n* is 2 or 3 and $Y^-$ is an anion selected from halide and methosulfate.

## 4,017,487
## 7β-(D-5-AMINO-5-CARBOXYVALERAMIDO)-7-METHOXY-3-SUBSTITUTED-3-CEPHEM-4-CARBOXYLIC ACID ANTIBIOTICS

**Edward O. Stapley, Metuchen, N.J., and Justo M. Mata, Madrid, Spain, assignors to Merck & Co., Inc., Rahway, N.J.**

**Division of Ser. No. 203,896, Dec. 1, 1973, abandoned, and a continuation-in-part of Ser. No. 19,496, March 13, 1970, abandoned, Ser. No. 51,319, June 30, 1970, abandoned, Ser. No. 96,594, Dec. 9, 1970, and Ser. No. 115,779, Feb. 16, 1971.**
**This application Oct. 4, 1974, Ser. No. 512,837**
**Int. Cl.² C07D** *501/60*
**U.S. Cl. 260—243 C** **2 Claims**

1. A compound according to the formula:



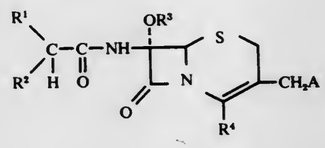
wherein R is hydroxy.

## 4,017,488
## PROCESS FOR PREPARING 7β-ACYLAMINO-7α-ALKOXYCEPHALOSPORINS

**Tetsuo Hiraoka, and Yukio Sugimura, both of Tokyo, Japan, assignors to Sankyo Company Limited, Tokyo, Japan**

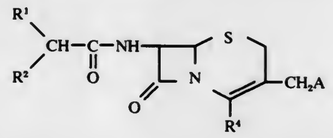
**Filed July 29, 1975, Ser. No. 600,083**
**Claims priority, application Japan, Aug. 22, 1974, 49-96495**
**Int. Cl.² C07D** *501/02*
**U.S. Cl. 260—243 C** **7 Claims**

1. A process for preparing a cephalosporin derivative having the formula

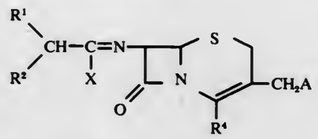


Wherein $R^1$ represents hydrogen, alkyl having 1 – 4 carbon atoms, phenyl or naphthyl; $R^2$ is hydrogen, alkyl having 1 – 4

carbon atoms, phenyl or napthyl, alkylthio having 1 – 4 carbon atoms, alkynylthio having 2 – 4 carbon atoms, phenylthio, azidoalkylthio having 1 – 4 carbon atoms, cyanoalkylthio having 1 – 4 carbon atoms in the alkyl moiety, alkylsulfonyl having 1 – 4 carbon atoms, 5- or 6-membered heterocyclic optionally substituted with a lower alkyl having from 1 to 3 carbons and selected from the group consisting of thienyl, imidazolyl, thiadiazolyl, isoxazolyl, tetrazolyl, pyrimidinyl and pyridyl, 5- or 6-membered heterocyclic thio optionally substituted with a lower alkyl having from 1 to 3 carbons and selected from the group consisting of imidazolylthio, thiadiazolylthio, triazolythio, thienylthio, isoxazolylthio, tetrazolythio, pyrimidinylthio and pyridylthio, or 5-or 6-membered heterocyclic oxy optionally substituted with a lower alkyl having from 1 to 3 carbon atoms and selected from the group consisting of isoxazolyloxy, imidazolyloxy, thiadiazolyloxy, triazolyloxy, thienyloxy, tetrazolyloxy, pyrimidinyloxy and pyridyloxy; $R^3$ is alkyl having 1 –4 carbon atoms; $R^4$ is carboxyl, alkoxycarbonyl having 1 – 4 carbon atoms in the alkyl moiety, chloroalkoxycarbonyl having 1 – 4 carbon atoms in the alkyl moiety, benzyloxycarbonyl optionally substituted with methoxy or nitro, diphenylmethyloxycarbonyl, trialkylsilyloxycarbonyl having 1 – 4 carbon atoms in each alkyl moiety, dialkylhalogenosilyloxycarbonyl having 1 – 4 carbon atoms in each alkyl moiety wherein halogen is chloro or bromo, phenacyloxycarbonyl optionally substituted with halogen or methoxy, acetoxycarbonyl, benzoyloxycarbonyl, chloroacetoxycarbonyl, bromoacetoxycarbonyl, dichlorophosphinooxycarbonyl, dibromophosphinooxycarbonyl, dimethylphosphinooxycarbonyl or an aminocarbonyl; A is hydrogen, azido or the formula —B—E wherein B is oxygen or sulfur and E is acetyl, propionyl or benzoyl, alkyl having 1 – 4 carbon atoms or optionally substituted - carbamoyl, - thiocarbamoyl or - heterocyclic group which comprises contacting a 7$\beta$-acylaminocephalosporin having the formula:

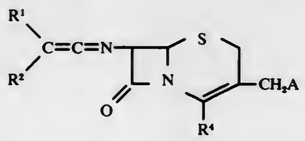


wherein $R^1$, $R^2$, $R^4$ and A have the same meansings as above with a halogenating agent selected from the group consisting of a phosphorus halide and a halogenated sulfur compound to form an iminohalide having the formula:

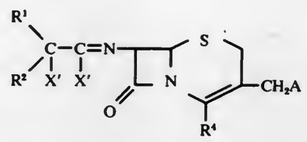


wherein X represents a halogen atom and $R^1$, $R^2$, $R^4$ and A have the same meanings as above,

contacting the said iminohalide with a base selected from the group consisting of an alkali metal carbonate, alkali metal hydroxide, an organic tertiary amine, diazabicyclooctane and diazabicyclononene, to form a keteneimine having the formula:



Wherein $R^1$, $R^2$, $R^4$ and A have the same meanings as above, contacting the said keteneimine with a halogen selected from the group consisting of chlorine, bromine and iodine, to form a halogeno-iminohalide having the formula:



wherein $R^1$, $R^2$, $R^4$ and A have the same meanings as above and X′ represents a halogen atom,

contacting the said halogeno-iminohalide with an alkali metal alkoxide having the formula:

$R^3OM$

wherein M represents an alkali metal and $R^3$ has the same meaning as above, and consecutively either subjecting the resulting compound to hydrolysis in the presence of water or an acid selected from the group consisting of hydrochloric acid, sulfuric acid, trifluoroacetic acid and trichloroacetic acid, or contacting the resulting compound with said acid or a chlorosilyl compound, followed by contacting the resulting compound with water.

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**4,017,489**

## PROCESS OF PREPARING UNSYMMETRICAL DISULFIDES

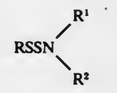
**John P. Lawrence, Stow, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio**

**Filed July 10, 1975, Ser. No. 594,831**

**Int. Cl.² C07C** *154/02, 155/10, 161/00;* **C07D** *277/72*

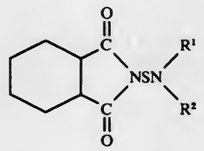
**U.S. Cl. 260—243 B** **2 Claims**

1. A process of preparing a compound having the structure

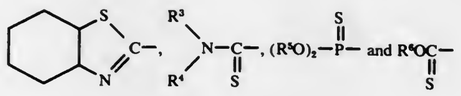


comprising reacting a thiol compound having the structure RSA

with an N-(aminothio)-imide having the structure



wherein A is selected from the group consisting of hydrogen, sodium and potassium, wherein R is selected from the group consisting of alkyl radicals having 1 to 20 carbon atoms, cycloalkyl radicals having 6 to 12 carbon atoms, aralkyl radicals having 7 to 11 carbon atoms, aryl radicals having 6 to 10 carbon atoms and the radicals





wherein $R^1$, $R^2$, $R^3$, $R^4$, $R^5$ and $R^6$ are selected from the group consisting of the alkyl, cycloalkyl and aralkyl radicals described for R and wherein $R^5$ can also be an aryl radical having 6 to 10 carbon atoms and wherein $R^1$ and $R^2$ and/or $R^3$ and $R^4$ can also be joined to form, with the attached nitrogen, a heterocyclic ring containing 5 to 7 carbon atoms which can contain, but need not contain, one other hetero atom selected from the group consisting of —O—, —S— and —N—.

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**4,017,490**

## PYRIDO (3,4-d)PYRIDAZINES

**Shojiro Yurugi, Kyoto, and Shintaro Kikuchi, Takarazuka, both of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan**

**Filed Aug. 21, 1975, Ser. No. 606,607**

**Claims priority, application Japan, Sept. 17, 1974, 49-107279**

**The portion of the term of this patent subsequent to Apr. 6, 1993, has been disclaimed.**

**Int. Cl.² C07D** *413/14*

**U.S. Cl. 260—246 B** **1 Claim**

1. 8-methoxy-1,4-dimorpholino-7-phenylpyrido[3,4-d]-pyridazine or a pharmaceutically acceptable salt thereof.

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**4,017,491**

## 1,1-DIARYL-1H-TETRAZOLE AMINES

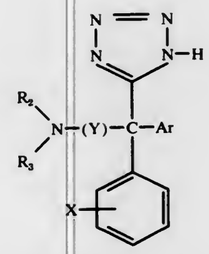
**Gilbert W. Adelstein, Evanston, Ill., assignor to G. D. Searle & Co., Chicago, Ill.**

**Continuation-in-part of Ser. No. 456,755, April 1, 1974, Pat. No. 3,917,615, and Ser. No. 568,694, April 16, 1975. This application July 28, 1975, Ser. No. 599,413**

**Int. Cl.² C07D** *401/06, 403/08*

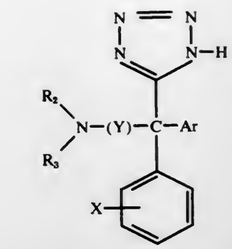
**U.S. Cl. 260—247.5 E** **16 Claims**

1. A compound of the formula



wherein Y is straight or branched chain alkylene having 1–4 carbon atoms; X is hydrogen, halo or lower alkyl containing 1–7 carbon atoms; Ar is pyridyl, phenyl, mono-substituted phenyl wherein the substituent is halo or lower alkyl having 1–7 carbon atoms; and $R_2$ and $R_3$ together with N is an azamonocyclic ring selected from the group comprising 1-pyrrolidinyl, piperidino, 4-phenyl-4-hydroxypiperidino, 4-phenyl-4-acetoxypiperidino, 4-phenyl-4-carboxypiperidino, 4-phenyl-4-carboloweralkoxypiperidino, or 4-phenyl-4-hydroxymethyl-piperidino and morpholino.

2. A compound of the formula



wherein Y is straight or branched chain alkylene containing 1–4 carbon atoms; X is hydrogen, halo, or lower alkyl having 1–7 carbon atoms; Ar is pyridyl, phenyl, monosubstituted phenyl wherein the substituent is halo or lower alkyl having 1–7 carbon atoms; and $R_2$ and $R_3$ together with N is an azabicycloalkanyl containing 6 to 9 carbon atoms and having at least 5 atoms in each ring of the azabicycloalkanyl.

16. A compound according to claim 1 which is 5-[1-phenyl-1-(3-pyridyl)-3-(morpholino]propyl-1H-tetrazole.

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**4,017,492**

## AS-TRIAZINOBENZODIAZEPIN-1-ONES

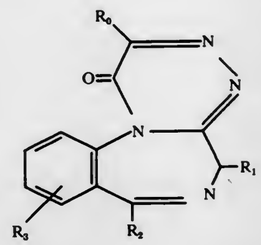
**Robert B. Moffett, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.**

**Filed Apr. 2, 1976, Ser. No. 672,995**

**Int. Cl.² C07D** *253/08*

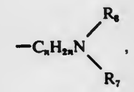
**U.S. Cl. 260—248 AS** **12 Claims**

1. An as-triazinobenzodiazepin-1-one of the formula IV

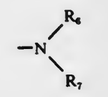


IV

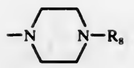
where in $R_o$ is hydrogen, alkyl of 1 to 3 carbon atoms, inclusive, $—C_nH_{2n}OR$, in which *n* is an integer of 1 to 3, inclusive, and R is hydrogen or methyl,



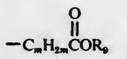
in which *n* is defined as before and $R_6$ and $R_7$ are hydrogen or alkyl as defined above, or together



is pyrrolidino, piperidino, morpholino, or



in which $R_8$ is methyl, ethyl, or 2-hydroxyethyl,



in which $m$ is an integer of 0 to 3 inclusive, and $R_9$ is hydrogen, lower alkyl of from 1 to 4 carbon atoms, inclusive; wherein $R_1$ is hydrogen or methyl; wherein $R_2$ is phenyl, o-chlorophenyl, o-fluorophenyl, 2,6-difluorophenyl or 2-pyridyl; and wherein $R_3$ is hydrogen, chloro, fluoro, bromo, trifluoromethyl, or nitro, or the pharmacologically acceptable acid addition salts thereof.

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**4,017,493**

## TEXTURED POLYURETHANE SURFACE

**George R. Ferment, Randolph, N.J., and David B. Skinner, Allentown, Pa., assignors to GAF Corporation, New York, N.Y.**

**Filed June 11, 1975, Ser. No. 585,796**
**Int. Cl.² B05D** *3/02, 5/02, 7/04*
**U.S. Cl. 427—257** **9 Claims**

**1.** A process for creating a textured surface with a polyurethane coating on a polyvinyl chloride substrate which comprises;

a. forming a smooth, uncured, polyurethane coating on a polyvinyl chloride substrate;

b. heating the polyurethane coated polyvinyl chloride substrate to a temperature between about 100° and 160° C for a time of between about 1 and about 10 minutes; and

c. then heating said coated substrate to a temperature between about 170° and about 210° C for a time of between about 0.5 and about 10 minutes to thereby produce a cured, textured, polyurethane surface on said polyvinyl chloride substrate.

**6.** A process for creating a textured polyurethane surface on a polyvinyl chloride substrate previously coated with a cured, polyurethane coating which comprises;

a. aging the coated polyvinyl chloride substrate at least about one week following curing of the polyurethane coating; and

b. then heating the coated substrate to a temperature between about 140° and about 210° C for a time of between about 0.1 and about 10 minutes to thereby texture the surface of said polyurethane coated substrate.

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**4,017,494**

## CATALYST FOR THE MANUFACTURE OF TRIETHYLENEDIAMINE

**Horst Guenter Bosche, Speyer; Karl Baer, Weinheim, and Kurt Schneider, Bad Durkheim, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany**

**Filed Sept. 3, 1975, Ser. No. 609,953**
**Claims priority, application Germany, Sept. 7, 1974, 2442929**
**Int. Cl.² C07D** *295/02*
**U.S. Cl. 260—268 T** **5 Claims**

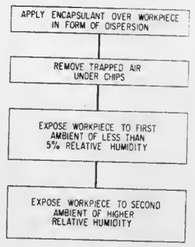
**1.** A process for the manufacture of triethylenediamine which comprises the elimination of glycol from N,N′-dihydroxyethylpiperazine, with cyclization, in the gas phase at a temperature of from 200° to 500° C and a pressure of from 0.001 to 10 bars, over a solid catalyst selected from the group consisting of $\alpha$-$Al_2O_3$, $\beta$-$Al_2O_3$, $\gamma$-$Al_2O_3$, and $\epsilon$-$Al_2O_3$.

**4,017,495**

## ENCAPSULATION OF INTEGRATED CIRCUITS

**Donald Jaffe, Emmaus, and Nicholas Alec Soos, Macungie, both of Pa., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed Oct. 23, 1975, Ser. No. 625,315**
**Int. Cl.² B29C** *6/00*
**U.S. Cl. 264—272** **11 Claims**




**1.** A method of encapsulating a circuit element formed on an insulating substrate wherein a gap exists between the element and the substrate and whereby the area under the element is filled with encapsulant comprising the steps of:

applying over and under said element an encapsulant comprising a dispersion of a material which cures by reaction with moisture;

evaporating the solvent of said dispersion by exposure to a first dry ambient with a relative humidity of less than 5%, which suppresses crosslinking and

curing the material by exposure to a second ambient with a relative humidity of at least 20%.

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**4,017,496**

## PROCESS FOR PREPARING PIGMENTARY QUINACRIDONE IN PREDETERMINED CRYSTAL FORM

**Albert Robert Hanke, Scotch Plains, N.J., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Nov. 21, 1975, Ser. No. 634,170**
**Int. Cl.² C09B** *48/00*
**U.S. Cl. 260—279 QA** **3 Claims**

**1.** Process for preparing pigmentary quinacridone in the $\alpha$-form by the steps of

i. vacuum evaporating crude quinacridone at an elevated temperature from 400° C. to 500° C. in a high vacuum of from $10^{-3}$ mmHg to $10^{-5}$ mmHg,

ii. rapidly condensing the evaporated crude quinacridone on a substrate at a temperature of less than 40° C. to form an amorphous condensate, and

iii. contacting the condensate with o-dichlorobenzene at room temperature to form pigmentary quinacridone in the $\alpha$-form.

**2.** Process for preparing pigmentary quinacridone in the $\beta$-form by the steps of

i. vacuum evaporating crude quinacridone at an elevated temperature from 400° C. to 500° C. in a high vacuum of from $10^{-3}$ mmHg to $10^{-5}$ mmHg,

ii. rapidly condensing the evaporated crude quinacridone on a substrate at a temperature of less than 40° C. to form an amorphous condensate, and

iii. contacting the condensate with boiling o-dichlorobenzene to form pigmentary quinacridone in the $\beta$-form.

**3.** Process for preparing pigmentary quinacridone in the $\gamma$-form by the steps of

i. vacuum evaporating crude quinacridone at an elevated temperature from 400° C. to 500° C. in a high vacuum of from $10^{-3}$ mmHg to $10^{-5}$ mmHg,

ii. rapidly condensing the evaporated crude quinacridone on a substrate at a temperature of less than 40° C. to form an amorphous condensate, and



iii. contacting the condensate with dimethylformamide at room temperature to form pigmentary quinacridone in the $\gamma$-form.

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**4,017,497**

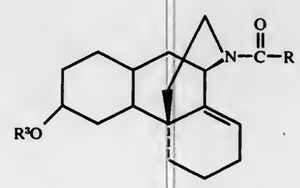
## PROCESS FOR THE PREPARATION OF 14-HYDROXYMORPHINAN DERIVATIVES

**Gary Lim, Candiac, and John W. Hooper, Pierrefonds, both of Canada, assignors to Bristol-Myers Company, New York, N.Y.**

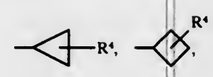
**Filed Nov. 18, 1975, Ser. No. 632,947**
**Int. Cl.² C07D** *221/28*
**U.S. Cl. 260—285** **10 Claims**

**1.** The process for the preparation of the compound having the formula

X



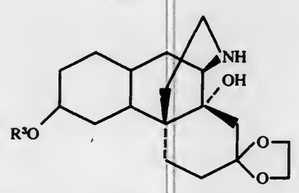
in which $R^3$ is (lower)alkyl and R is selected from the group consisting of



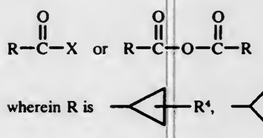
$-CF_3$ and $OR^1$ in which $R^1$ is (lower)alkyl and $R^4$ is H or $CH_3$; which process comprises the consecutive steps of

A. treating the compound having the formula

VI



in which $R^3$ is (lower)alkyl with an acylating agent having the formula

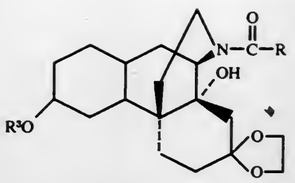


wherein R is



$CF_3$, or $-OR^1$ in which $R^1$ is (lower)alkyl, $R^4$ is H or $CH_3$, and X is chloro, bromo, iodo or a mixed anhydride moiety, in a molar ratio of about 1 to 2.0 moles of acylating agent per mole of Compound VI, in the presence of a tertiary amine to produce the compound having the formula

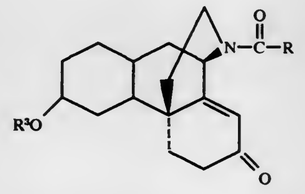
VII



in which $R^3$ and R are as defined above;

B. heating Compound VII with sulfuric acid in a (lower)alkanol to produce the compound having the formula

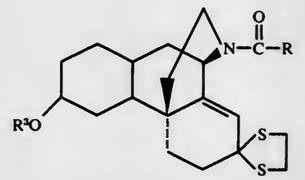
VIII



in which $R^3$ and R are as above;

C. treating Compound VIII with excess ethanedithiol and boron trifluoride etherate in acetic acid to produce the compound having the formula

IX

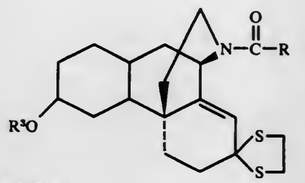


in which $R^3$ and R are as above; and

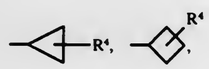
D. heating Compound IX with Raney nickel in a (lower)alkanol to produce Compound X.

**4.** A compound having the formula

IX

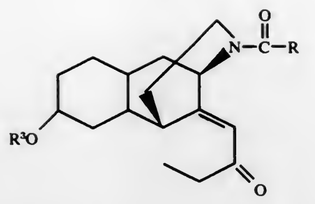


in which R is

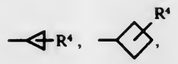


$CF_3$ or $-OR^1$ in which $R^1$ and $R^3$ are (lower)alkyl and $R^4$ is H or $CH_3$.

**7.** A compound having the formula



wherein $R^3$ is (lower)alkyl and R is



$CF_3$ or —O—$R^1$ in which $R^1$ and $R^3$ are (lower)alkyl and $R^4$ is H or $CH_3$.

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**4,017,498**

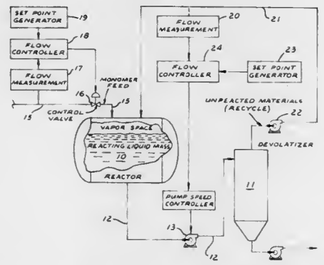
**RECYCLE CONTROL SYSTEM FOR CONTINUOUS POLYMERIZATION**

**Byrd Hopkins, Longmeadow, Mass., assignor to Monsanto Company, St. Louis, Mo.**

**Division of Ser. No. 452,303, March 18, 1974, abandoned. This application Apr. 18, 1975, Ser. No. 569,349**

**Int. Cl.² C08F *1/98***

**U.S. Cl. 23—285** **3 Claims**




1. Apparatus for controlling the material balance and the weight fraction of polymer in a reactor, said apparatus comprising in combination:

A. a variable fillage reactor means for the continuous polymerization of monomer to produce a fluid product comprising a mixture of unreacted material and polymer,

B. a separator means for continuous physical separation of unreacted material from said mixture,

C. a valve means for controlling monomer feed flow rate at a predetermined constant value into said reactor means,

D. flow rate regulating means, including a first pump means and conduit means, functionally interconnecting said reactor means with said separator means to regulate the quantity of said mixture fed to said separator means from said reactor means in response to a signal fed thereto,

E. flow rate measuring means functionally interconnected with said separator means to measure the quantity of unreacted material so separated from said mixture in said separator means and to generate a flow rate signal representative thereof, said unreacted material being taken from said separator and fed to said flow rate measuring means by a second pump means,

F. signal generating means to generate a prechosen set signal,

G. flow rate control means to compare said flow rate signal with said prechosen set signal and to generate an output signal representative of any difference between said flow rate signal and said prechosen set signal, and

H. signal interconnecting means functionally joining said signal generating means with said flow rate control means, said flow rate measuring means with said flow rate control means, and said flow rate control means with said flow rate regulating means, whereby the quantity of said mixture so fed to said separator means from said reactor means contains a predetermined quantity of unreacted material.

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**4,017,499**

**6H(1)-BENZOPYRANO(3,2-c)QUINOLINES**

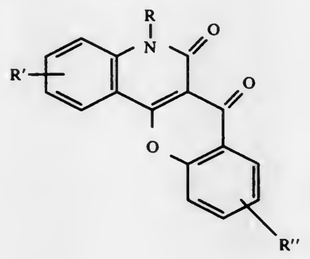
**Goetz E. Hardtmann, Morristown, and Gary M. Coppola, Parsippany, both of N.J., assignors to Sandoz, Inc., E. Hanover, N.J.**

**Filed Apr. 5, 1976, Ser. No. 673,743**

**Int. Cl.² C01D *215/16***

**U.S. Cl. 260—289 C** **14 Claims**

1. A compound of the formula:



wherein

R is alkyl of 1 to 5 carbon atoms, alkenyl of 3 to 5 carbon atoms, alkynyl of 3 to 5 carbons, benzyl optionally mono- or disubstituted independently by fluoro, chloro or alkyl of 1 to 4 carbon atoms or cycloalkylalkyl in which the cycloalkyl is of 3 to 6 carbon atoms and the alkyl is of 1 to 3 carbon atoms, provided that the unsaturation on any alkenyl or alkynyl is other than on the alpha carbon atom,

R′ is hydrogen, alkyl of 1 to 4 carbon atoms, fluoro, chloro, bromo or alkoxy of 1 to 4 carbon atoms, and

R″ is hydrogen or alkyl of 1 to 4 carbon atoms.

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**4,017,500**

**CERTAIN 8-AMINO-1,7-NAPHTHYRIDINES**

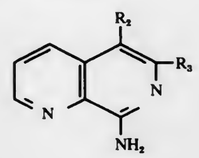
**Joseph Mayer, New York, N.Y., and Margaret H. Sherlock, Bloomfield, N.J., assignors to Schering Corporation, Kenilworth, N.J.**

**Division of Ser. No. 379,525, July 16, 1973, Pat. No. 3,928,367, which is a continuation-in-part of Ser. No. 119,377, Feb. 26, 1971, abandoned, which is a continuation-in-part of Ser. No. 816,075, April 14, 1969, abandoned. This application Nov. 12, 1975, Ser. No. 631,010**

**Int. Cl.² C07D *213/74***

**U.S. Cl. 260—294.8 C** **13 Claims**

1. a compound of the formula:



wherein $R_2$ is selected from the group consisting of hydrogen, lower alkyl, phenyl, benzyl, phenthyl and pyridyl and $R_3$ is selected from the group consisting of furyl and thienyl.



**4,017,501**

**PROCESS FOR PREPARING PYRIDINIUM CHLORIDE SALTS OF ALKYL ESTERS OF 2-CHLORO-N-2-HYDROXYETHYLACETAMIDE**

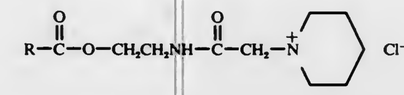
**John Edson Gordon, Martinsville, and Robert A. Ralston, Lebanon, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.**

**Filed Oct. 24, 1975, Ser. No. 625,407**

**Int. Cl.² C07D *213/20***

**U.S. Cl. 260—295 Q** **9 Claims**

1. A method for producing a pyridinium salt represented by the formula:



wherein R is an alkyl group containing from 11 to 17 carbon atoms, comprising combining approximately equimolar quantities of an aliphatic acid halide containing 12 to 18 carbon atoms and 2-chloro-N-2-hydroxyethylacetamide and slightly more than 2 moles of pyridine for each mole of 2-chloro-N-2-hydroxyethylacetamide present, in a non-hydroxylic organic solvent, stirring the mixture for a period of about 1 to 4 hours at a temperature of about 10° to 65° C., warming the mixture to a temperature of about 65° to 95° C. and stirring for about 1 to 8 hours, and isolating said pyridium salt.

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**4,017,502**

**PROCESS FOR PURIFYING THE MIXED ESTER, ETHYLENE GLYCOL 1-(2-p-CHLOROPHENOXY)-2-METHYLPROPIONATE NICOTINATE**

**Carlos Sunkel Letelier, and Fernando CilleroGrafulla, both of Madrid, Spain, assignors to Alter, S.A., Madrid, Spain**

**Filed Aug. 4, 1975, Ser. No. 601,866**

**Claims priority, application Spain, June 4, 1975, 438246**

**Int. Cl.² C07D *213/55***

**U.S. Cl. 260—295.5 R** **1 Claim**

1. A process for purifying the mixed ester, ethylene glycol 1-[2-(p-chlorophenoxy)-2-methylpropionate]-2-nicotinate, which process comprises passing said ethylene glycol 1-[2-(p-chlorophenoxy)-2-methylpropionate]-2-nicotinate prepared in oily form with the temperature maintained at 60° C. through a layer of Super-Cel and charcoal, to prepare the same compound in solid form, which is then recrystallized from benzene/petroleum ether.

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**4,017,503**

**ANTIFUNGAL 1-SUBSTITUTED BENZIMIDAZOLES**

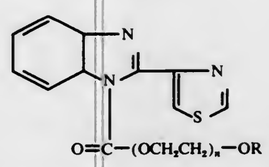
**Wallace T. Ashton, Clark, and Edward F. Rogers, Middletown, both of N.J., assignors to Merck & Co., Inc., Rahway, N.J.**

**Filed June 12, 1975, Ser. No. 586,438**

**Int. Cl.² C07D *417/00***

**U.S. Cl. 260—302 H** **7 Claims**

1. A compound having the formula:



wherein *n* is a number of from 1 to 4; and R is loweralkyl or phenylloweralkyl.

**4,017,504**

**ANTIFUNGAL 1-SUBSTITUTED BENZIMIDAZOLES**

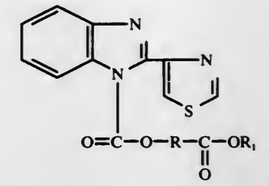
**Wallace T. Ashton, Clark, and Edward F. Rogers, Middletown, both of N.J., assignors to Merck & Co., Inc., Rahway, N.J.**

**Filed June 12, 1975, Ser. No. 586,439**

**Int. Cl.² C07D *417/00***

**U.S. Cl. 260—302 H** **7 Claims**

1. A compound having the formula:



wherein R is a straight or branched alkylene of from 3 to 10 carbon atoms, and $R_1$ is hydrogen, phenacyl, halophenacyl, an alkali metal cation, guanidinium or N-dodecyl guanidinium.

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**4,017,505**

**1-(N-OCTYLTHIOCARBONYL)-2-(4-THIAZOLYL)BENZIMIDAZOLE**

**Edward F. Rogers, Middletown; Wallace T. Ashton, Clark, and Richard A. Dybas, Edison, all of N.J., assignors to Merck & Co., Inc., Rahway, N.J.**

**Continuation of Ser. No. 467,190, May 6, 1974, abandoned. This application Oct. 23, 1975, Ser. No. 625,335**

**Int. Cl.² C07D *417/00***

**U.S. Cl. 260—302 H** **1 Claim**

1. A compound which is 1-(n-octylthiocarbonyl)-2-(4-thiazolyl)-benzimidazole.

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**4,017,506**

**PROCESS FOR THE PREPARATION OF 2-BENZO THIAZOLE SULPHINAMIDES**

**Georges Raymond Henry Mingasson, Paris; Michel Louis Jules Montu, Enghien les Bains, and Michel Jean Camille Alicot, Soisy sous Montmorency, all of France, assignors to Ugine Kuhlmann, Paris, France**

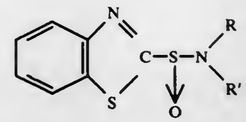
**Continuation-in-part of Ser. No. 862,920, Oct. 1, 1969, abandoned. This application Jan. 27, 1975, Ser. No. 544,540**

**Claims priority, application France, Oct. 2, 1968, 68.168410; Apr. 30, 1969, 69.13809**

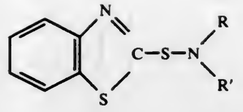
**Int. Cl.² C07D *277/80***

**U.S. Cl. 260—306.6 R** **6 Claims**

1. A process for the preparation of 2-benzothiazolesulphinamides of the formula:


(I)

in which R and R′ represent alkyl groups containing from 1 to 6 carbon atoms, cyanoethyl or cycloalkyl groups containing from 5 to 7 carbon atoms or —NRR′ is piperidino, hexamethyleneimino, morpholino, or 2,6-dimethylmorpholino which comprises oxidizing with an alkali metal hypochlorite, at a temperature between −5° C and below 30° C. an aqueous suspension of a sulphenamide of the formula:



(II)

in which R and R′ have the same significance as in formula (I) in the presence of a sufficient amount of an alkaline agent selected from sodium carbonate, sodium bicarbonate, potassium carbonate, potassium bicarbonate and mixtures thereof so as to maintain the pH at 9 to 10.

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**4,017,507**

## 2,3-DIHYDRO-7-CHLOROTHIAZOLO[3,2-A]BENZIMIDAZOLE AND SALT

**Kalman Hideg; Olga Hankovszky, both of Pecs; Eva Palosi, Budapest; Gyorgy Hajos, Budapest, and Laszlo Szporny, Budapest, all of Hungary, assignors to Richter Gedeon Vegyeszeti Gyar Rt., Budapest, Hungary**

**Division of Ser. No. 473,184, May 24, 1974, Pat. No. 3,932,395. This application Dec. 5, 1975, Ser. No. 637,978**
**Claims priority, application Hungary, June 20, 1973, RI 509**
**Int. Cl.² C07D** *513/04*
**U.S. Cl. 260—306.7 T** **1 Claim**

1. 2,3-dihydro-7-chloro-(1,3)-thiazolo [3,2-a] benzimidazole or the hydrochloric acid addition salt thereof.

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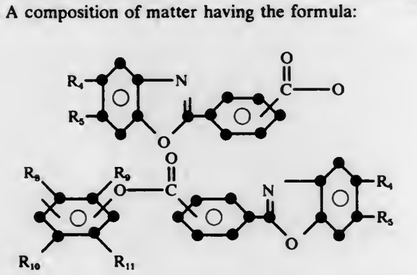
**4,017,508**

## BENZOXAZOLE ULTRAVIOLET STABILIZERS AND THEIR USE IN ORGANIC COMPOSITIONS

**David Martin Pond, Kingsport, Tenn., assignor to Eastman Kodak Company, Rochester, N.Y.**

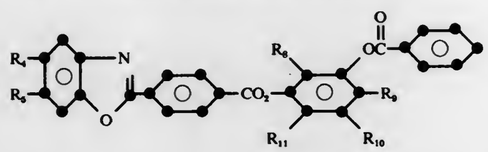
**Filed July 1, 1974, Ser. No. 484,849**
**Int. Cl.² C07D** *263/56*
**U.S. Cl. 260—307 D** **15 Claims**

1. A composition of matter having the formula:



wherein $R_4$ is hydrogen, lower alkyl, or nitrile; $R_5$ is hydrogen or lower alkyl; and at least one $R_8$, $R_9$, $R_{10}$ and $R_{11}$ is hydrogen, and the remainder are hydrogen, lower alkyl, alkoxy containing 1 to 20 carbon atoms, halogen, or nitrile or carboalkoxy containing 1 to 20 carbon atoms.

4. A composition of matter having the formula:



wherein $R_4$ is hydrogen, lower alkyl, or nitrile; $R_5$ is hydrogen or lower alkyl; and at least $R_8$, $R_9$, and $R_{11}$ is hydrogen and the remaining $R_8$, $R_9$, $R_{10}$ and $R_{11}$ are hydrogen, lower alkyl, alkoxy containing 1 to 20 carbon atoms, halogen or nitrile or carboxy.

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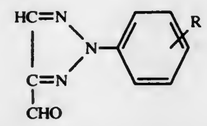
**4,017,509**

## PROCESS FOR PRODUCING SUBSTITUTED OR UNSUBSTITUTED 2-PHENYL-1.2.3.-TRIAZOLE-4-CARBOXALDEHYDE

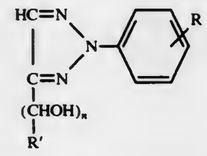
**Michihiro Tsujimoto, Tachikawa; Ryoichi Tsukahara, Yokohama; Masaaki Torisu, Tokyo, and Ichiro Okubo, Hachioji, all of Japan, assignors to Mitsui Toatsu Chemicals, Incorporated, Tokyo, Japan**

**Filed Aug. 12, 1975, Ser. No. 604,031**
**Claims priority, application Japan, Sept. 2, 1974, 49-99874**
**Int. Cl.² C07D** *249/06*
**U.S. Cl. 260—308 A** **10 Claims**

1. A process for producing substituted or unsubstituted 2-phenyl-1.2.3-triazole-4-carboxaldehyde having the formula:



wherein R is hydrogen, halogen, methyl, carboxyl, sulfonic acid group or alkali metal salt thereof, which comprises oxidizing 2-phenylglycosotriazole having the formula:



wherein R has the same meaning as that defined above, *n* is 2 or 3, and R′ is hydroxymethyl when *n* is 2, and is methyl or hydroxymethyl when *n* is 3, in dilute sulfuric acid with an oxide of manganese selected from the group consisting of manganese dioxide and manganese oxide.

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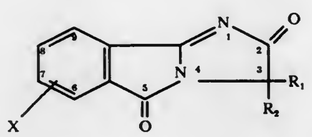
**4,017,510**

## IMIDAZOISOINDOLEDIONES AND THE USE THEREOF AS HERBICIDAL AGENTS

**Marinus Los, Pennington, N.J., assignor to American Cyanamid Company, Stamford, Conn.**

**Filed Nov. 12, 1975, Ser. No. 631,357**
**Int. Cl.² C07D** *235/00*
**U.S. Cl. 260—309.6** **10 Claims**

1. A compound having the structure:



I

wherein X is H, $CH_3$, $NO_2$, Cl, $OCH_3$ or $SCH_3$; $R_1$ is alkyl $C_1$–$C_4$; $R_2$ is alkyl $C_1$–$C_6$, cycloalkyl $C_3$–$C_6$, alkenyl $C_2$–$C_4$, phenyl, halophenyl or benzyl; and when $R_1$ and $R_2$ are taken together with the carbon to which they are attached they may form cycloalkyl $C_3$–$C_6$ optionally substituted with methyl; and the optical isomers thereof.



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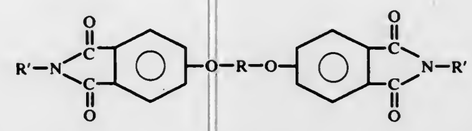
**4,017,511**

## PREPARATION OF AROMATIC BISIMIDES

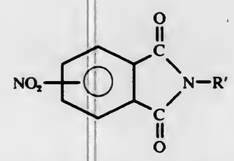
**Frank J. Williams, III, Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.**

**Filed Mar. 24, 1976, Ser. No. 670,047**
**Int. Cl.² C07D** *209/34*
**U.S. Cl. 260—326 N** **12 Claims**

1. The process for making aromatic imides of the general formula



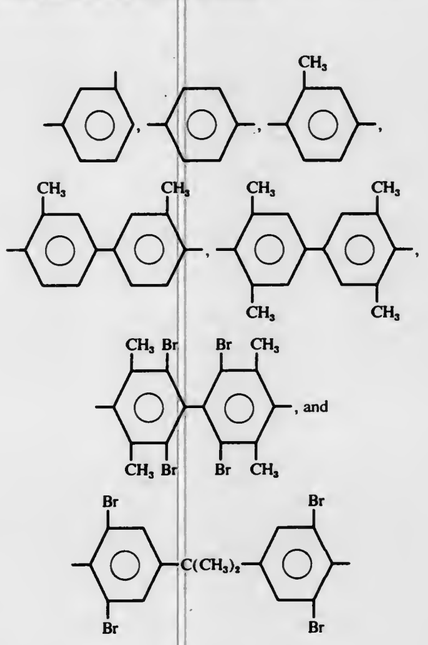
which comprises (1) effecting reaction under substantially anhydrous conditions between a nitrophthalimide of the general formula



with a dihydroxy compound of the general formula

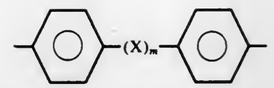
HO—R—OH

where r is a member selected from the class consisting of a. divalent radicals of the formula

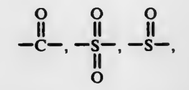


and

b. divalent organic radicals of the general formula



where X is a member selected from the class consisting of divalent radicals of the formulas $-C_yH_{2y}-$,



—O— and —S—, where *m* is 0 or 1, *y* is a whole number from 1 to 5, and R′ is a phenyl radical or an alkyl radical of from 1 to 2 carbon atoms, the said reaction being conducted in a solvent selected from the class consisting of dimethyl formamide, dimethyl acetamide, N-methylpyrrolidone, and mixtures of such solvents and in the presence of a substantially water free solid alkali-metal hydroxide, and (2) isolating the formed aromatic bisimide.

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**4,017,512**

## PROCESS FOR PRODUCING N-ALKYLHYDROXYLAMINES

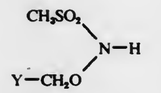
**Yoshikazu Isowa, Funabashi, and Hideaki Kurita, Sagamihara, both of Japan, assignors to Sagami Chemical Research Center, Tokyo, Japan**

**Filed July 1, 1975, Ser. No. 592,310**
**Claims priority, application Japan, July 2, 1974, 49-74983; July 2, 1974, 49-74984**
**Int. Cl.² C07C** *83/00, 83/02, 83/08;* **C07D** *209/34*
**U.S. Cl. 260—326 N** **6 Claims**

1. A process for producing an N-alkylhydroxylamine of the formula (I)

RNH-OH (I)

wherein R represents a straight or branched chain alkyl group having 1 to 4 carbon atoms which may be substituted with one or more substituents selected from the group consisting of a halogen atom, a phenyl group, a phthalimido group, a carboxyl group or an alkoxycarbonyl group having 1 to 4 carbon atoms in the alkoxy moiety thereof and an amino group, which comprises reacting an N-mesyl-O-(p-alkoxybenzyl)hydroxylamine or an N-mesyl-O-(2,4,6-trialkylbenzyl)hydroxylamine of the formula (IV)

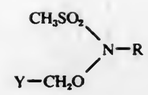


(IV)

wherein Y represents a p-alkoxyphenyl group or a 2,4,6-trialkylphenyl group, each having 1 to 4 carbon atoms in each of the alkyl moieties, with an alkyl halide of the formula (III)

R-X (III)

wherein R is as defined above and X represents a halogen atom, in the presence of a base selected from the group consisting of an alkali metal alkoxide, an alkali metal hydroxide, an alkali metal hydride and a mixture thereof and in an inert solvent to produce the corresponding N-alkyl-N-mesyl-O-(p-alkoxybenzyl)hydroxylamine or N-alkyl-N-mesyl-O-(2,4,6-trialkylbenzyl)hydroxylamine of the formula (II)



(II)

wherein Y and R are as defined above, and treating the resulting compound of the formula (II) above with a solution of hydrogen bromide in an aliphatic acid in the presence of a phenol compound.

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**4,017,513**

## METHOD FOR MAKING AMINOACID AMIDES

**Robert Roteman, Waukegan, Ill., assignor to Abbott Laboratories, North Chicago, Ill.**

**Filed Mar. 17, 1975, Ser. No. 558,581**
**Int. Cl.² C07D** *207/16*
**U.S. Cl. 260—326.2** **5 Claims**

1. The process of making the optically pure amide of an aminoacid consisting essentially in adsorbing an optically pure loweralkyl ester of an aminoacid dissolved in an inert solvent to a cationic exchange resin in the hydrogen cycle having a $pK_a$ of $1.7 \times 10^{-5} - 4.0 \times 10^{-1}$ and wherein said complex contains at least one equivalent of resin per equivalent of said aminoacid spearating the desired amide from said resin by bringing said resin in contact with an excess of an amine of the formula $RNH_2$ wherein R is hydrogen or loweralkyl, separating the insoluble residue from the reaction mixture, and isolating said amide from the liquid phase.

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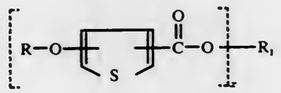
**4,017,514**

## HYPOLIPIDEMIC AGENTS

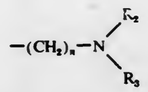
**Roger Alan Parker, Cincinnati, Ohio, assignor to Richardson-Merrell Inc., Wilton, Conn.**

**Filed June 16, 1975, Ser. No. 587,044**
**Int. Cl.² C07D** *333/24*
**U.S. Cl. 260—332.2 G** **10 Claims**

1. A compound selected from the formula:



wherein R is selected from a straight or branched saturated hydrocarbon chain containing from 10 to 20 carbon atoms and a straight or branched unsaturated hydrocarbon chain containing from 10 to 20 carbon atoms and from 1 to 4 double bonds; $R_1$ is selected from hydrogen, a straight or branched lower alkyl chain of from 1 to 6 carbon atoms, benzyl, phenethyl, alkane-poly-yl containing from 3 to 6 carbon atoms and from 2 to 6 univalent bonds, 1,2,3,4,5,6-cyclohexanehexayl, and Z; Z is the group



wherein *n* is the integer 2 or 3; $R_2$ is selected from a straight or branched lower alkyl chain of from 1 to 4 carbon atoms and alkylcarbonyl wherein the alkyl moiety contains from 1 to 4 carbon atoms and may be straight or branched; $R_3$ is selected from hydrogen and a straight or branched lower alkyl chain of from 1 to 4 carbon atoms with the proviso that when $R_3$ is hydrogen, $R_2$ is alkylcarbonyl; X is an integer of from 1 to 6 with the proviso that when $R_1$ is alkane-poly-yl or 1,2,3,4,5,6-cyclohexanehexayl, X is equal to from 2 to 6, and when $R_1$ is other than alkane-poly-yl or 1,2,3,4,5,6-cyclohexanehexayl, X is equal to 1; and pharmaceutically acceptable salts thereof.

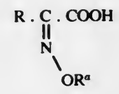
**4,017,515**

## α-(ETHERIFIED OXIMINO) CARBOXYLIC ACIDS AND ACID CHLORIDES

**Martin C. Cook, Liverpool; Gordon I. Gregory, Chalfont St. Peter, and Janice Bradshaw, Harow, all of England, assignors to Glaxo Laboratories Limited, Greenford, England**

**Division of Ser. No. 304,524, Nov. 7, 1972, Pat. No. 3,971,728, which is a continuation-in-part of Ser. No. 252,666, May 12, 1972, abandoned. This application Sept. 30, 1975, Ser. No. 618,167**
**Claims priority, application United Kingdom, May 14, 1971, 15082/71; Oct. 1, 1971, 45884/71; May 12, 1972, 15082/72; Oct. 25, 1972, 49255/72**
**Int. Cl.² C07D** *333/16*
**U.S. Cl. 260—332.3 R** **15 Claims**

1. A compound selected from the group consisting of an acid of the formula



wherein R is thienyl; furyl; benzothienyl; benzofuryl; or thienyl, furyl, benzothienyl or benzofuryl substituted by fluoro, chloro, bromo, iodo, hydroxy, lower alkyl, nitro, amino, lower alkylamino, di(lower alkyl)amino, lower alkanoyl, lower alkanoylamido, lower alkoxy, lower alkylthio or carbamoyl; and $R^a$ is lower alkyl; lower cycloalkyl; phenyl; naphthyl; benzyl; phenylethyl; diphenylmethyl; triphenylmethyl; thienylmethyl; furylmethyl; pyridylmethyl; pyrrolylmethyl; or any of these groups substituted by hydroxy, carboxy, lower alkxoycarbonyl, benzyloxycarbonyl, acetamido, benzamido, cyano, lower alkanoyl, amino, lower alkoxycarbonylamino, benzyloxycarbonylamino, fluoro, chloro, bromo, iodo or lower alkoxy, the said acid being in the form of a syn isomer free of the corresponding anti isomer to the extent of at least 75% based on the total weight of said acid; and the acid chloride thereof.

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**4,017,516**

## NOVEL MONOESTERS OF ROSAMICIN

**Hans Reimann, Wayne, N.J., assignor to Schering Corporation, Kenilworth, N.J.**

**Continuation-in-part of Ser. No. 303,903, Nov. 15, 1972, abandoned. This application Oct. 30, 1975, Ser. No. 627,322**
**Int. Cl.² C07D** *315/00*
**U.S. Cl. 260—343** **12 Claims**

1. A process for preparing a 3-monoester of rosamicin which comprises solvolyzing a 3,2'-diester of rosamicin in a medium comprising a water miscible organic solvent containing from about 5% to about 50% water by volume, at from about 0° C to about 100° C, continuing said solvolysis for from about ¼ to about 72 hours and isolating the 3-monoester from said medium.

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**4,017,517**

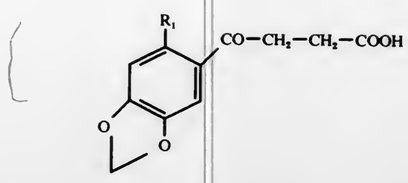
## 2-(TRISUBSTITUTED BENZOYL)-PROPIONIC ACID AND A METHOD FOR THE PRODUCTION THEREOF

**Tadakazu Murata, Osaka; Akira Nohara, Kyoto; Hirosada Sugihara, and Yasushi Sanno, both of Osaka, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan**

**Division of Ser. No. 288,348, Sept. 12, 1972, Pat. No. 3,943,169. This application Nov. 26, 1975, Ser. No. 635,446**
**Claims priority, application Japan, Sept. 13, 1971, 46-71087; Sept. 13, 1971, 46-71088; Dec. 29, 1971, 47-3167; Jan. 11, 1972, 47-5401**
**Int. Cl.² C07D** *317/44*
**U.S. Cl. 260—340.5** **7 Claims**

1. A compound of the formula





wherein $R_1$ is alkyl of 1 to 4 carbons, alkoxy of 1 to 4 carbons or hydroxyl or pharmaceutically acceptable salts thereof.

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**4,017,518**

## METHOD OF PREPARING 4,4-DIMETHYLDIOXANE-1,3

**Boris Nikolaevich Gorbunov, prospekt Lenina 6, kv. 41; Galina Dmitrievna Efremova, ulitsa Sovetskaya 26, kv. 65, both of Volgograd; Evgeny Maximovich Kukartsev, ulitsa Kommunisticheskaya 38, kv. 18; Lidia Vladimirovna Erokhina, ulitsa Druzhby 12, kv. 49, both of Volzhsky Volgogradskoi; Anatoly Ivanovich Lukashov, ulitsa Palekhskaya 9, korpus 1, kv. 65, Moscow; Vitaly Vasilievich Orlyansky, ulitsa Sovetskaya 5, kv. 21, Volzhsky Volgogradskoi oblasti; Alexandr Pavlovich Khardin, ulitsa Krasnopiterskaya 2, kv. 32, Volgograd; Ideya Antonovna Churikova, prospekt Lenina 101, kv. 65, and Daniil Iosifovich Valdman, ulitsa Sovetskaya 37, kv. 35, both of Volzhsky Volgogradskoi oblasti, all of U.S.S.R.**

**Continuation of Ser. No. 484,788, July 1, 1974, abandoned. This application Apr. 18, 1975, Ser. No. 569,388**
**Int. Cl.² C07D** *319/04*
**U.S. Cl. 260—340.7** **3 Claims**

1. A method of preparing 4,4-dimethyldioxane-1,3 comprising reacting isobutylene with formaldehyde in an aqueous medium at 90°–115° C in the presence of a catalyst comprising inorganic salts of mineral acids, whose aqueous solutions have a pH value of from 2.2 to 4.5 and whose acidity of said aqueous solutions does not increase with an increase in the salt concentration said inorganic salts being selected from the group consisting of chromium sulfate, chromic potassium sulfate, ferriamonium sulfate, potassium bifluoride, aluminum nitrate, and chromium trichloride, to form organic and aqueous phases containing the end product; separating said phases; washing the organic phase with water; and isolating the end product.

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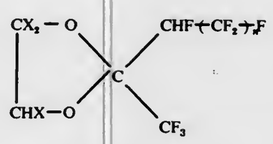
**4,017,519**

## FLUORO DIOXOLANE ANESTHETIC COMPOUNDS

**George L. Moore, South Plainfield, and Ross C. Terrell, Plainfield, both of N.J., assignors to Airco, Inc., Montvale, N.J.**

**Division of Ser. No. 348,407, April 5, 1973, Pat. No. 3,930,013, which is a division of Ser. No. 168,401, Aug. 2, 1971, Pat. No. 3,749,793. This application Sept. 24, 1975, Ser. No. 616,351**
**Int. Cl.² C07D** *317/10*
**U.S. Cl. 260—340.9** **3 Claims**

1. A cyclic ether compound of the formula



wherein *n* is zero or one, and each X is F when *n* is zero and is H when *n* is one.

**4,017,520**

## PRODUCTION OF MALEIC ANHYDRIDE BY AZEOTROPIC DEHYDRATION OF MALEIC ACID SOLUTIONS DERIVED FROM BENZENE OXIDATION PROCESSES

**Herbert Haferkorn, Bottrop, Germany, assignor to Veba-Chemie AG, Gelsenkirchen-Buer, Germany**

**Filed Mar. 7, 1975, Ser. No. 556,240**
**Claims priority, application Germany, Mar. 8, 1974, 2411101**
**Int. Cl.² C07D** *307/60*
**U.S. Cl. 260—346.8 M** **2 Claims**

1. In a process for the preparation of maleic acid anhydride by the dehydration of maleic acid which maleic acid is in an aqueous solution resulting from a catalytic benzene oxidation process and which thus contains benzoquinone, and in which said aqueous maleic acid solution is fed to a distillation zone in which maleic anhydride and an organic solvent are being refluxed and in which the water of dehydration is removed by azeotropic distillation, the improvement for lessening the formation of precipitation products in said distillation zone which comprises adding to the maleic acid aqueous solution, prior to dehydration, 0.1–2.0 wt.% of phthalic acid or its anhydride, based upon the weight of maleic acid.

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**4,017,521**

## PROCESS FOR THE MANUFACTURE OF MALEIC ANHYDRIDE USING HIGH SURFACE AREA CATALYST

**Ronald A. Schneider, Berkeley, Calif., assignor to Chevron Research Company, San Francisco, Calif.**

**Continuation-in-part of Ser. No. 263,883, June 19, 1972, abandoned. This application May 11, 1973, Ser. No. 359,294**
**Int. Cl.² C07D** *307/60*
**U.S. Cl. 260—346.8 A** **7 Claims**

1. A process for producing maleic anhydride, which comprises partially oxidizing a hydrocarbon feed selected from the group consisting of aromatic and saturated or mono- or diolefinic acyclic or cyclic hydrocarbons having a carbon atom content in the range 4 to 10 and a linear chain of at least 4 carbon atoms, at a temperature in the range from about 300° to 500° C. by contacting a mixture of said feed and air or of said feed and a molecular oxygen-containing gas with a crystalline phosphorus-vanadium mixed oxide catalyst composition containing phosphorus, vanadium and oxygen, wherein the catalyst is effective for catalyzing the oxidation of the feed to maleic anhydride and wherein the catalyst is characterized by vanadium having an average valence in the range from about plus 3.9 to 4.6, a phosphorus to vanadium atomic ratio in the range from about 0.9–1.8 to 1, and an intrinsic surface area in the range from about 10 to 50 square meters per gram.

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**4,017,522**

## N-(FUROYLOXYETHYL) FATTY ACID AMIDES

**August V. Bailey; Gordon J. Boudreaux; Gene Sumrell, all of New Orleans, and Arthur F. Novak, Baton Rouge, all of La., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.**

**Filed Mar. 15, 1976, Ser. No. 667,063**
**Int. Cl.² C07D** *307/68*
**U.S. Cl. 260—347.5** **6 Claims**

1. N,N-bis(2-furoyloxyethyl)lauramide.

## 4,017,523
## PROCESS FOR THE CONTINUOUS PREPARATION OF POLYGLYCIDYL ETHERS OF POLYHYDROXY PHENOLS

**Silvio Vargiu, Sesto S. Giovanni (Milan); Giancarlo Crespolini, Bergamo, and Giulio Grazzini, Cinisello Balsamo (Milan), all of Italy, assignors to Societa' Italiana Resine S.I.R. S.p.A., Milan, Italy**

**Filed May 30, 1975, Ser. No. 582,518**
**Claims priority, application Italy, May 30, 1974, 23314/74**
**Int. Cl.² C07D** *301/28*
**U.S. Cl. 260—348.6** **8 Claims**

**1.** A method for the continuous preparation of liquid epoxy resins comprising diglycidyl ethers of dihydroxy phenols by reacting a dihydroxy phenol with an epihalohydrin in the presence of an alkali metal hydroxide, which comprises:

contacting in a first stage of reaction a dihydroxy phenol with an excess of epihalohydrin in a quantity of from 8 to 15 moles of said epihalohydrin for each mole of said dihydroxy phenol and an aqueous solution of alkali metal hydroxide in a molar ratio of said hydroxide to said dihydroxy phenol not exceeding 2:1, at a pressure of from 1 to 4 atmospheres above atmospheric pressure, at a temperature of from 80° to 140° C and with a residence time of from 20 to 140 minutes;

subjecting the reaction products of said first stage to decantation and washing with water, at a pressure of from 1 to 4 atmospheres above atmospheric pressure and at a temperature of from 40° to 140° C and recovering the resulting organic phase;

removing the unreacted epihalohydrin from said organic phase by distillation at subatmospheric pressure and recovering as a residue a liquid epoxy resin having a content of hydrolyzable chlorine of from 1 to 6% by weight;

dissolving said recovered epoxy resin in an aromatic hydrocarbon or a cycloaliphatic hydrocarbon and contacting in a second stage of reaction the resulting solution with an aqueous solution of alkali metal hydroxide while maintaining an atomic ratio of alkali metal to the hydrolyzable chlorine contained in the resin of from 1:1 to 1.17:1, at a pressure of from 1 to 4 atmospheres above atmospheric pressure, at a temperature of from 80° to 140° C and with a contact time of from 10 to 80 minutes;

subjecting the reaction products of said second stage to decantation and washing with water, at a pressure of from 1 to 4 atmospheres above atmospheric pressure and at a temperature of from ambient temperature to 140° C and recovering the resulting separated organic phase; and

removing by distillation at subatmospheric pressure the hydrocarbon solvent from said organic phase and recovering a liquid epoxy resin with a content of hydrolyzable chlorine less than 0.02% by weight.

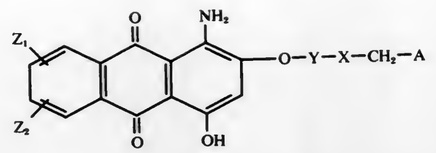
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## 4,017,524
## ANTHRAQUINONE DYESTUFFS

**Friedrich Wilhelm Kröck, Opladen, and Rutger Neeff, Leverkusen, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany**

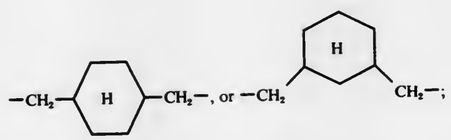
**Division of Ser. No. 433,693, Jan. 16, 1974, Pat. No. 3,929,401. This application June 27, 1975, Ser. No. 590,853**
**Claims priority, application Germany, Jan. 16, 1973, 2301892**
**Int. Cl.² C07C** *97/126;* **C09B** *5/62*
**U.S. Cl. 260—380** **9 Claims**

**1.** Anthraquinone dyestuff of the formula



wherein

Y denotes a straight-chain or branched $C_3$ to $C_{10}$-alkylene, $-CH_2-CH_2-O-CH_2-$, $-CH_2-CH_2-O-CH_2-CH_2-$, $-CH_2-CH_2-O-(CH_2)_4-$, $-(CH_2)_3-O-CH_2-CH_2-$, $-(CH_2)_4-O-CH_2-CH_2-$, $-(CH_2)_3-O-(CH_2)_3-$, $-(CH_2)_4-O-(CH_2)_4-$, $-(CH_2)_5-O-(CH_2)_5-$, $-CH_2-CH_2-O-CH_2-CH_2-O-CH_2-CH_2-$, $-CH_2-CH_2-(O-CH_2-CH_2)_2-O-CH_2-CH_2-$,



X denotes oxygen or sulphur;

A denotes naphthyl, tetrahydronaphthyl, or phenyl substituted by 1 to 3 substituents selected from the group consisting of $C_1$—$C_4$-alkyl, trifluoromethyl, difluoromethyl, fluorine, chlorine, bromine, $C_1$—$C_4$-alkoxy, benzyl, phenyl or phenoxy radical; and

$Z_1$ and $Z_2$ denote hydrogen or halogen.

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## 4,017,525
## TETRA(NEOPHYL) ZIRCONIUM

**Robert Alton Setterquist, Wilmington, Del., assignor to E. I. DuPont de Nemours and Company, Wilmington, Del.**

**Division of Ser. No. 471,813, May 20, 1975, Pat. No. 3,932,307. This application July 30, 1975, Ser. No. 600,296**
**Int. Cl.² C07F** *7/00*
**U.S. Cl. 260—429.3** **1 Claim**

**1.** Tetra(neophyl)zirconium.

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## 4,017,526
## METAL COMPLEXES

**Günther Wilke, and Ernst Willi Müller, both of Mulheim (Ruhr), Germany, assignors to Studiengesellschaft Kohle m.b.H., Mulheim (Ruhr), Germany**

**Division of Ser. No. 532,900, March 9, 1966, which is a division of Ser. No. 104,221, April 20, 1961, abandoned, and a continuation-in-part of Ser. No. 76,520, Dec. 19, 1960, abandoned, and Ser. No. 203,753, June 20, 1962, abandoned. This application Apr. 30, 1975, Ser. No. 573,198**
**Claims priority, application Germany, Dec. 22, 1959, 1593012; Apr. 28, 1960, 16427**
**Int. Cl.² C07F** *15/04, 15/06*
**U.S. Cl. 260—439 CY** **6 Claims**

**1.** As a novel complex compound, dicyclooctadiene-nickel of the formula $(C_8H_{12})_2Ni$ in the form of yellow crystals.

**2.** As a novel complex compound, cyclooctatetraene-nickel of the formula $C_8H_8Ni$ in the form of black-colored needles having metallic lustre.

**3.** As a novel complex compound, all-trans-cycle-dodeca-(1,5,9)-triene-centro-nickel in the form of pure red crystals.

**4.** As a novel complex compound, cyclooctadiene-nickel-acetylacetone of the formula $C_{13}H_{20}O_2Ni$ in the form of orange-colored crystals.

**5.** As a novel complex compound, tris(stilbene) nickel of the formula $Ni(C_{14}H_{12})_3$ in the form of brown crystals.



## 4,017,527
## METALLIC-ORGANO-PEROXIDE AND ORGANO-METALLIC-PEROXIDE

**George G. Merkl, 46 Sunset Court, Haworth, N.J. 07641**

**Division of Ser. No. 319,293, Dec. 29, 1972, Pat. No. 3,969,387. This application Oct. 15, 1974, Ser. No. 514,681**
**Int. Cl. C07F** *5/06*
**U.S. Cl. 260—448 AD** **21 Claims**

**1.** A method of forming a peroxy compound which comprises contacting and reacting:

a. reactive aluminum comprising highly pure aluminum permeated with a metal having an atomic volume close to hydrogen; with

b. a liquid mixture of

i. hydrogen peroxide; and

ii. a member selected from alcohols, ketones, and aldehydes; and

separating the peroxy compound from unreacted reactive aluminum.

**19.** A method of forming a peroxy compound which comprises contacting and reacting:

a. a reactive aluminum comprising highly pure aluminum permeated with a liquid metal selected from mercury, gallium and indium/gallium alloys; with

b. a liquid mixture of

i. hydrogen peroxide; and

ii. a member selected from methyl acrylate, ethyl oxalate, ethyl alcohol, isopropyl alcohol, butyl alcohol, acetone, methyl ethyl ketone and acetaldehyde; and

separating the peroxy compound from unreacted reactive aluminum.

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## 4,017,528
## PREPARATION OF ORGANICALLY MODIFIED SILICON DIOXIDES

**Klaus Unger, Darmstadt, and Jürgen Schick-Kalb, Eichenzell near Fulda, both of Germany, assignors to Merck Patent Gesellschaft mit beschrankter Haftung, Darmstadt, Germany**

**Filed Nov. 11, 1974, Ser. No. 522,982**
**Claims priority, application Germany, Nov. 16, 1973, 2357184**
**Int. Cl.² C07F** *7/04*
**U.S. Cl. 260—448.8 R** **10 Claims**

**1.** In a process for the production of a porous silicon dioxide bearing organosilyl groups on the surface thereof by the hydrolytic polycondensation of a tetraalkoxysilane or a polyalkoxysiloxane in the heterogeneous phase, the improvement which comprises conducting the hydrolytic polycondensation in the presence of a monomeric organoalkoxysilane, the organogroup of which is not hydrolyzable under conditions of said hydrolytic polycondensation, thereby producing a porous silicon dioxide bearing organic groups which are part both of the skeleton structure and the surface of the porous silicon dioxide.

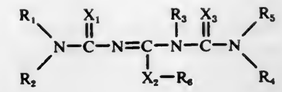
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## 4,017,529
## HERBICIDAL ALLOPHANIMIDATES

**Julius Jakob Fuchs, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Division of Ser. No. 268,768, July 3, 1972, Pat. No. 3,879,190, which is a continuation-in-part of Ser. No. 256,254, May 24, 1972, abandoned, which is a continuation-in-part of Ser. No. 181,203, Sept. 16, 1971, abandoned. This application Feb. 27, 1975, Ser. No. 553,628**
**Int. Cl.² C07C** *119/18, 119/20*
**U.S. Cl. 260—453 R** **12 Claims**

**1.** Compounds of the formula:



wherein:

$R_1$, $R_2$, $R_4$ and $R_5$ are each independently selected from the group consisting of hydrogen; alkyl of 1 through 8 carbon atoms; alkenyl of 3 through 4 carbon atoms; cycloalkyl of 3 through 8 carbon atoms; cycloalkenyl of 5 through 8 carbon atoms; cycloalkylalkyl of 4 through 10 carbon atoms; bicycloalkyl of 7 through 10 carbon atoms; hydrocarbyl arylalkyl of 5 through 9 carbon atoms; alkynyl of 3 through 4 carbon atoms; methoxy; phenyl; the above alkyl and alkenyl groups substituted with 1 through 3 chlorines, bromine, iodine, 1 through 7 fluorines, methoxy, ethoxy, methylthio, ethylthio, cyano, or acetyl; the above cycloalkyl and bicycloalkyl groups substituted with 1 through 3 chlorines, bromine, 1 or 2 methyls, or alkyl of 2 through 4 carbon atoms; phenyl substituted with 1 or 2 chlorines, 1 or 2 bromines, fluorine, nitro, cyano, alkyl of 1 through 4 carbon atoms, methoxy, or trifluoromethyl; and the above hydrocarbyl arylalkyl groups substituted with 1 chlorine or 1 methyl;

$R_3$ is hydrogen; alkyl of 1 through 4 carbon atoms; alkynyl of 3 through 4 carbon atoms; or alkenyl of 3 through 4 carbon atoms;

$R_6$ is alkyl of 1 through 8 carbon atoms; cycloalkyl of 5 through 8 carbon atoms; alkenyl of 3 through 8 carbon atoms; phenyl; or benzyl; and

$X_1$, $X_2$, and $X_3$ are each independently selected from oxygen and sulfur;

provided that:

a. at least one of $R_1$, $R_2$, $R_4$ and $R_5$ is other than hydrogen;

b. no more than one of $R_1$, $R_2$, $R_4$ and $R_5$ is phenyl, substituted phenyl; hydrocarbyl arylalkyl or substituted hydrocarbyl arylalkyl;

c. the total number of carbon atoms in $R_1$ and $R_2$ does not exceed 10;

d. the total number of carbon atoms in $R_4$ and $R_5$ does not exceed 10;

e. $R_1$ and $R_2$ are not both methoxy;

f. $R_4$ and $R_5$ are not both methoxy;

g. when $R_6$ is normal alkyl of 3 through 8 carbon atoms, cycloalkyl of 6 through 8 carbon atoms and benzyl, and $R_3$ is hydrogen, and one of $R_1$, $R_2$, $R_4$ and $R_5$ is phenyl, then only one of the other $R_1$, $R_2$, $R_4$ and $R_5$ can be other than hydrogen; and

h. when one of $R_1$, $R_2$, $R_4$ and $R_5$ is 2,5-dichlorophenyl and $R_3$ is hydrogen, then only one of the other $R_1$, $R_2$, $R_4$ and $R_5$ can be other than hydrogen;

and the alkali metal, alkaline earth and ammonium salts of the above compounds in which $R_3$ is hydrogen.

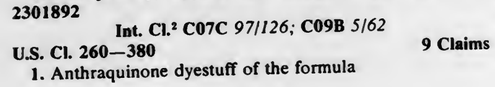
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## 4,017,530
## PHENOXY SUBSTITUTED THIOLCARBOXYLIC ACID AMINO ACID SUBSTITUTED ESTERS

**Jean Blum, 20 Ter rue de Bezons, Appt. 2275, 92 400 Courbevoie, France**

**Continuation-in-part of Ser. No. 465,306, April 29, 1974, abandoned. This application Apr. 3, 1975, Ser. No. 564,633**
**Claims priority, application France, May 4, 1973, 73.16162**
**Int. Cl.² C07C** *153/07*
**U.S. Cl. 260—455 R** **3 Claims**

**1.** A compound N-acetylhomocysteine-S-parachlorophenoxy-2-isobutyrate of the formula



$ClC_6H_4OC(CH_3)_2COSCH_2CH_2CH(COOH)NHCOCH_3$

and esters thereof.

**4,017,531**

## INTERMEDIATES FOR THE PRODUCTION OF TRICYCLIC BENZODIAZEPINES

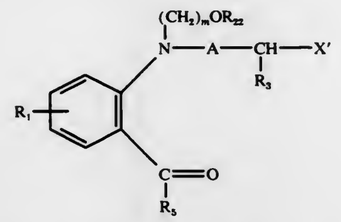
**Michael Edward Derieg, Caldwell; James Valentine Earley, Cedar Grove; Rodney Ian Fryer, North Caldwell, and Leo Henryk Sternbach, Upper Montclair, all of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.**

**Division of Ser. No. 557,438, March 11, 1975, Pat. No. 3,965,151, which is a division of Ser. No. 45,928, June 12, 1970, abandoned, which is a continuation-in-part of Ser. No. 26,068, April 6, 1970, Pat. No. 3,905,956, which is a continuation-in-part of Ser. No. 863,377, Oct. 2, 1969, abandoned, which is a continuation-in-part of Ser. No. 768,909, Oct. 18, 1968, abandoned. This application Apr. 12, 1976, Ser. No. 676,077**

**Int. Cl.² C07C** *69/96*

**U.S. Cl. 260—463** **1 Claim**

1. Compounds of the formula



wherein $R_1$ is hydrogen, nitro, trifluoromethyl, halogen, lower alkyl, lower alkyl mercapto or lower alkoxy; $R_3$ is hydrogen; $R_5$ is phenyl and phenyl substituted with a member selected from the grop consisting of halogen, nitro, trifluoromethyl and lower alkyl; $R_{22}$ is carbobenzoxy; m is an integer from 1–7; A is selected from the group consisting of $-CH_2-$ and



and X′ is chlorine, bromine or iodine.

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**4,017,532**

## INTERMEDIATES FOR THE PRODUCTION OF TRICYCLIC BENZODIAZEPINES

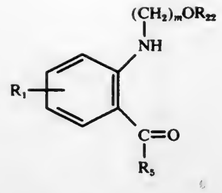
**Michael Edward Derieg, Caldwell; James Valentine Earley, Cedar Grove; Rodney Ian Fryer, North Caldwell, and Leo Henryk Sternbach, Upper Montclair, all of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.**

**Division of Ser. No. 557,438, March 11, 1975, Pat. No. 3,965,151, which is a division of Ser. No. 45,928, June 12, 1970, abandoned, which is a continuation-in-part of Ser. No. 26,068, April 6, 1970, Pat. No. 3,905,956, which is a continuation-in-part of Ser. No. 863,377, Oct. 2, 1969, abandoned, which is a continuation-in-part of Ser. No. 768,909, Oct. 18, 1968, abandoned. This application Apr. 12, 1976, Ser. No. 676,092**

**Int. Cl.² C07C** *69/96*

**U.S. Cl. 260—463** **1 Claim**

1. Compounds of the formula



wherein $R_1$ hydrogen, nitro, trifluoromethyl, halogen, lower alkyl, lower alkyl mercapto or lower alkoxy; $R_5$ is phenyl and phenyl substituted with a member selected from the group consisting of halogen, nitro, trifluoromethyl and lower alkyl; $R_{22}$ is carbobenzoxy; and m is an integer from 1–7.

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**4,017,533**

## DIAMINOMALEONITRILE DERIVATIVES AND PROCESSES FOR PREPARING THE SAME

**Yozo Ohtsuka, Sagamihara, Japan, assignor to Sagami Chemical Research Center, Tokyo, Japan**

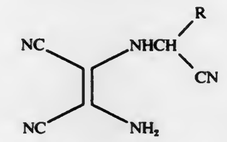
**Filed Dec. 29, 1975, Ser. No. 645,179**

**Claims priority, application Japan, Dec. 27, 1974, 49-148714; Dec. 27, 1974, 49-148715**

**Int. Cl.² C07C** *120/00, 121/45, 121/78, 121/84*

**U.S. Cl. 260—465 E** **5 Claims**

1. N-α-Cyanoalkyl compounds of diaminomaleonitrile represented by the formula (I)



(I)

wherein R represents a straight or branched chain alkyl group having 1 to 4 carbon atoms or a phenyl group.

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**4,017,534**

## 16-FLUORO-11-DEOXY-13-DIHYDRO-PROSTAGLANDIN

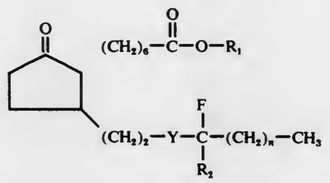
**Robert Eugene Schaub, Upper Saddle River, N.J.; Middleton Brawner Floyd, Jr., Suffern, N.Y., and Martin Joseph Weiss, Oradell, N.J., assignors to American Cyanamid Company, Stamford, Conn.**

**Division of Ser. No. 475,479, June 3, 1974, Pat. No. 3,932,463, which is a continuation-in-part of Ser. No. 263,036, June 15, 1972, abandoned, which is a continuation-in-part of Ser. No. 95,911, Dec. 7, 1970, abandoned. This application Oct. 14, 1975, Ser. No. 621,919**

**Int. Cl.² C07C** *177/00*

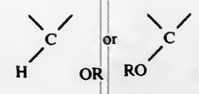
**U.S. Cl. 260—468 D** **13 Claims**

1. A compound selected from the group consisting of an optically active compound of the formula:



and a racemic compound of that formula and the mirror image thereof wherein Y is a divalent moiety of the formulae:





wherein R is hydrogen or lower alkanoyl; *n* is an integer from 2 to 5, inclusive; $R_1$ is hydrogen or alkyl having from one to 12 carbon atoms; $R_2$ is hydrogen or fluorine; and the pharmacologically acceptable cationic salts thereof when $R_1$ is hydrogen.

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**4,017,535**

## SUBSTITUTED TOLYL ESTERS OF 16-SUBSTITUTED-PGE$_2$-TYPE COMPOUNDS

**Walter Morozowich, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.**

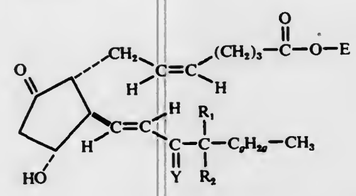
**Division of Ser. No. 523,568, Nov. 14, 1974. This application Nov. 21, 1975, Ser. No. 634,118**

**The portion of the term of this patent subsequent to July 8, 1992, has been disclaimed.**

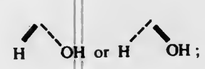
**Int. Cl.² C07C** *177/00*

**U.S. Cl. 260—468 D** **7 Claims**

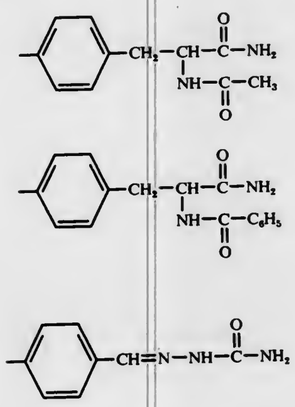
1. An optically active compound of the formula



or a racemic mixture of that compound and the enantiomer thereof, wherein $C_9H_{20}$ is alkylene of one to 9 carbon atoms, inclusive, in the chain between $-CR_1R_2-$ and terminal methyl; $R_1$ and $R_2$ are hydrogen, methyl, ethyl, or fluoro, being the same or different, with the proviso that at least one of $R_1$ and $R_2$ is other than hydrogen, and with the further proviso that $R_2$ is fluoro only when $R_1$ is hydrogen or fluoro; Y is



and E is



or



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**4,017,536**

## ETHER AND THIOETHER CONTAINING THIOLESTERS

**Friedrich Karrer, Basel, and Saleem Farooq, Aesch, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

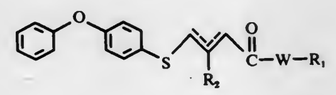
**Division of Ser. No. 521,314, Nov. 6, 1974, Pat. No. 3,900,507. This application May 27, 1975, Ser. No. 581,070**

**Claims priority, application Switzerland, Nov. 9, 1973, 15812/73; Nov. 9, 1973, 15813/73; Oct. 9, 1974, 13565/74**

**Int. Cl.² C07C** *149/40*

**U.S. Cl. 260—470** **3 Claims**

1. Compounds of the formula



wherein

$R_1$ represents $C_1$–$C_4$-alkyl,

$R_2$ represents methyl or ethyl, and W represents oxygen.

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**4,017,537**

## NONCATALYZED ALDOL REACTION

**Anthony W. McCollum, and Hugh J. Hagemeyer, Jr., both of Longview, Tex., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Aug. 25, 1975, Ser. No. 607,160**

**Int. Cl.² C07C** *67/08, 67/44*

**U.S. Cl. 260—494** **5 Claims**

1. The process for preparing beta-acyloxyaldehydes comprising reacting at a temperature from about 150° C. to about 280° C., formaldehyde, an aldehyde having the formula



wherein $R^1$ and $R^2$ are each selected from hydrogen, alkyl of 1–12 carbons, and phenyl, and, in the absence of any other acid, an acid having the formula RCOOH wherein R is alkyl of 1–12 carbons or phenyl.

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**4,017,538**

## ALKYL THIO SULFINYL AND SULFONYL OXAMIC COMPOUNDS, COMPOSITIONS AND METHODS OF USE

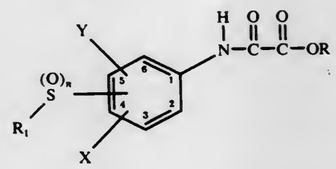
**Charles M. Hall, and John B. Wright, both of Kalamazoo, Mich., assignors to The Upjohn Company, Kalamazoo, Mich.**

**Filed Oct. 1, 1975, Ser. No. 618,509**

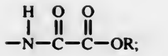
**Int. Cl.² C07C** *101/78;* **A61K** *31/24*

**U.S. Cl. 260—518 R** **12 Claims**

1. A compound of the formula



wherein X is at the 3 or 4 position and is hydrogen or



Y is selected from the group consisting of hydrogen, alkyl of one to four carbon atoms, inclusive, halo, hydroxy, cyano, nitro, trifluoromethyl,



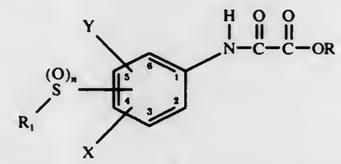
wherein D is selected from the group consisting of hydrogen, and a physiologically acceptable metal or amine cation,

R is selected from the group consisting of hydrogen, and a physiologically acceptable metal or amine cation;

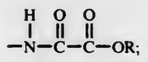
$R_1$ is selected from the group consisting of hydrogen, alkyl of one to six carbon atoms, inclusive, and cycloalkyl of five or six carbon atoms, inclusive;

and *n* is 0, 1 or 2.

**10.** A pharmaceutical composition which comprises an anti-allergy effective amount of a compound of the formula



wherein X is at the 3 or 4 position and is hydrogen or

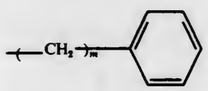


Y is selected from the group consisting of hydrogen, alkyl of one to four carbon atoms, inclusive, halo, hydroxy, cyano, nitro, trifluoromethyl,



wherein D is selected from the group consisting of hydrogen, and a physiologically acceptable metal or amine cation,

R is selected from the group consisting of hydrogen,



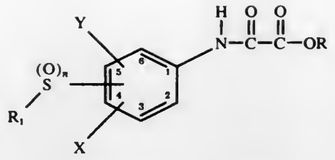
wherein *m* is 0, 1 or 2, and a physiologically acceptable metal or amine cation;

$R_1$ is selected from the group consisting of hydrogen, alkyl of one to six carbon atoms, inclusive, and cycloalkyl of five or six carbon atoms, inclusive;

and *n* is 0, 1 or 2,

in association with a pharmaceutical carrier.

**11.** A method of prophylactically treating allergy of a reagin or non-reagin mediated nature in a mammal which comprises the administration of an anti-allergy effective amount of a compound of the formula



wherein X is at the 3 or 4 position and is hydrogen or



Y is selected from the group consisting of hydrogen, alkyl of one to four carbon atoms, inclusive, halo, hydroxy, cyano, nitro, trifluoromethyl,



wherein D is selected from the group consisting of hydrogen, and a physiologically acceptable metal or amine cation,

R is selected from the group consisting of hydrogen, and a physiologically acceptable metal or amine cation;

$R_1$ is selected from the group consisting of hydrogen, alkyl of one to six carbon atoms, inclusive, and cycloalkyl of five or six carbon atoms, inclusive;

and *n* is 0, 1 or 2.

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**4,017,539**

## BIGUANIDE COMPOUNDS AND ANTI-DIABETIC COMPOSITIONS

**Elmar Bosies, Heppenheim; Kurt Stach, Mannheim-Waldhof; Felix Helmut Schmidt, Mannheim-Seckenheim; Ruth Heerdt, Mannheim-Feudenheim, and Helmut Weber, Frankfurt am Main-Schwanheim, all of Germany, assignors to Boehringer Mannheim G.m.b.H., Mannheim-Waldhof, Germany**

**Filed May 7, 1975, Ser. No. 575,098**

**Claims priority, application Germany, June 1, 1974, 2426683**

**Int. Cl.² C07C** *123/00*

**U.S. Cl. 260—564 B** **1 Claim**

**1.** 1-(cyclobutylmethyl)-biguanide-hydrochloride.

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**4,017,540**

## METHOD OF USE, COMPOSITION, AND COMPOUNDS

**Girts Kaugars, Cooper Township, Kalamazoo, and Edwin G. Gemrich, II, Richland Township, Kalamazoo, both of Mich., assignors to The Upjohn Company, Kalamazoo, Mich.**

**Continuation-in-part of Ser. No. 779,251, Nov. 26, 1968, Pat. No. 3,879,543, which is a continuation-in-part of Ser. No. 709,943, March 4, 1968, abandoned. This application Feb. 22, 1972, Ser. No. 228,359**

**Int. Cl.² C07C** *109/16*

**U.S. Cl. 260—566 B** **6 Claims**

**1.** p-toluoyl chloride phenylhydrazone.



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**4,017,541**

## ORGANIC BUILDER

**Christopher Edward Stubbs, Wirral, England; Jacobus Roelof Nooi, Vlaardingen, and Hermanus Christoffel Kemper, Brielle, both of Netherlands, assignors to Lever Brothers Company, New York, N.Y.**

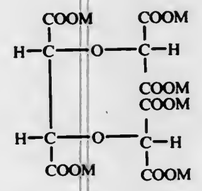
**Continuation of Ser. No. 422,039, Dec. 5, 1973, abandoned. This application Sept. 15, 1975, Ser. No. 613,677**

**Claims priority, application United Kingdom, Dec. 7, 1972, 56514/72**

**Int. Cl.² C07C** *59/14*

**U.S. Cl. 260—535 P** **1 Claim**

**1.** Novel tartaric acid dimalonyl ethers, useful as builders in detergent compositions, of the following formula:



in which M = H, $-CH_3$, $-C_2H_5$, Na or K.

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**4,017,542**

## 9-(2-HYDROXY-3-AMINO-PROPYL)-9,10-DIHYDRO-9,10-ETHANO-ANTHRACENES AND SALTS THEREOF

**Max Wilhelm, Watchung, N.J.; Raymond Bernasconi, Oberwil, Switzerland; Angelo Storni, Rheinfelden, Switzerland; Dieter Beck, Basel, Switzerland, and Karl Schenker, Binningen, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

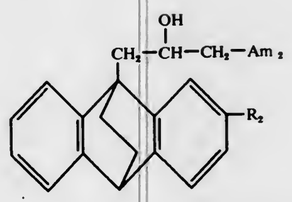
**Continuation-in-part of Ser. No. 226,329, Feb. 14, 1972, abandoned. This application Apr. 2, 1975, Ser. No. 564,580**

**Claims priority, application Switzerland, Feb. 23, 1971, 2578/71; Feb. 17, 1972, 669/72**

**Int. Cl.² C07C** *91/22*

**U.S. Cl. 260—570.6** **5 Claims**

**1.** A compound selected from the group consisting of a compound of the formula



(III)

wherein $R_2$ represents a member selected from the group consisting of trifluoromethyl, chloro and hydrogen, and $Am_2$ denotes a member selected from the group consisting of diethylamino, monoethylamino, dimethylamino and monomethylamino, and a pharmaceutically acceptable acid addition salt thereof.

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**4,017,543**

## α,α-DIALKYL-4-PHENETHYL-BENZYLAMINES AND THE SALTS THEREOF

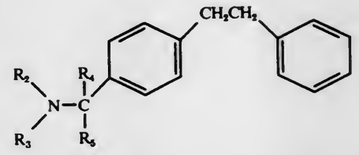
**Marcia Elizabeth Christy, Perkasie, Pa., assignor to Merck & Co., Inc., Rahway, N.J.**

**Continuation of Ser. No. 426,170, Dec. 19, 1973, abandoned, which is a continuation-in-part of Ser. No. 205,708, Dec. 7, 1971, abandoned, which is a continuation-in-part of Ser. No. 106,389, Jan. 15, 1971, abandoned. This application Oct. 23, 1975, Ser. No. 625,279**

**Int. Cl.² C07C** *87/28*

**U.S. Cl. 260—570.8 R** **9 Claims**

**1.** A compound of the formula



wherein

$R_2$ and $R_3$ are each members of the group consisting of hydrogen and loweralkyl and

$R_4$ and $R_5$ are loweralkyl substituents of from 1–3 carbon atoms;

or a derivative of said compound in which one of the hydrogens of the benzene ring is replaced by halogen, loweralkyl, loweralkoxy, perfluoroloweralkyl, loweralkylmercapto or loweralkysulfonyl.

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**4,017,544**

## N-(NITROALKYL)-N'-PHENYL-p-PHENYLENEDIAMINES

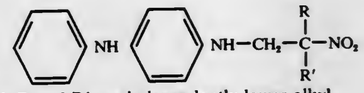
**Darrell Dexter Mullins, Norton, Ohio, assignor to Monsanto Company, St. Louis, Mo.**

**Division of Ser. No. 435,676, Jan. 23, 1974, Pat. No. 3,896,162. This application Apr. 17, 1975, Ser. No. 569,119**

**Int. Cl.² C07C** *87/64, 93/14, 69/54*

**U.S. Cl. 260—576** **2 Claims**

**1.** A compound of the formula



in which R and R' are independently lower alkyl.

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**4,017,545**

## PROCESS FOR THE PREPARATION OF BICYCLOALKANE DERIVATIVES

**Gerhard Sauer; Hans Peter Lorenz; Ulrich Eder; Gregor Haffer; Jurgen Ruppert, and Rudolf Wiechert, all of Berlin, Germany, assignors to Schering Aktiengesellschaft, Berlin & Bergkamen, Germany**

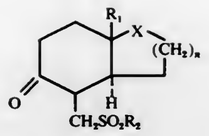
**Filed June 20, 1974, Ser. No. 481,241**

**Claims priority, application Germany, June 21, 1973, 2331997**

**Int. Cl.² C07C** *49/76*

**U.S. Cl. 260—590 FA** **13 Claims**

**1.** A bicycloalkane of the formula

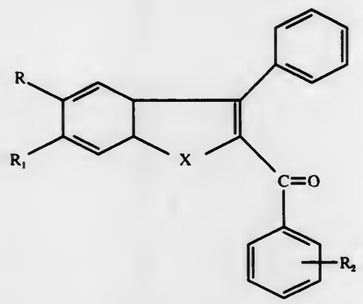


wherein $n$ is the integer 1 or 2; $R_1$ is alkyl of 1–4 carbon atoms inclusive; $R_2$ is alkyl, mono- or dicyclic carbocyclic aryl or aralkyl, each of up to 12 carbon atoms, X is $\beta$-hydroxymethylene, 1-$\beta$-alkoxymethylene wherein alkoxy is of 1–4 carbon atoms or 1-$\beta$-hydrocarboncarbonyloxymethylene of 1–10 carbon atoms in the hydrocarbon group.

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**4,017,546**
**NOVEL ANTIFERTILITY AGENTS**
**Tulio Suarez, and C. David Jones, both of Indianapolis, Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.**
**Filed Oct. 28, 1975, Ser. No. 625,992**
**Int. Cl.² C07C** *49/76*
**U.S. Cl. 260—591** **13 Claims**

**1.** A compound of the formula



in which X is $-CH_2-$, $-CH_2-CH_2-$ or $-CH=CH-$; R and $R_1$ independently are hydrogen, hydroxyl, $C_1-$ to $C_5-$alkoxy, or $C_5-$ to $C_6-$cycloalkoxy; subject to the limitation that at least one of R and $R_1$ is hydrogen; and $R_2$ is hydrogen, chloro, bromo, hydroxyl, $C_1-$ to $C_5-$alkoxy, or $C_5-$ to $C_6-$cycloalkoxy; subject to the limitation that at least one of R, $R_1$, or $R_2$ is other than hydrogen.

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**4,017,547**
**OXIDATION OF p-XYLENE TO TEREPHTHALALDEHYDE**
**Kenneth E. Simmons, and James E. Williams, both of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.**
**Filed Sept. 8, 1975, Ser. No. 611,381**
**Int. Cl.² C07C** *45/02*
**U.S. Cl. 260—599** **7 Claims**

**1.** In a process for preparing terephthalaldehyde by the vapor phase oxidation of p-xylene in the presence of a supported catalyst mixture of molybdenum in the form of an oxide and tungsten in the form of an oxide or silicotungstic acid, the improvement which comprises employing an oxide of bismuth on the supported catalyst.

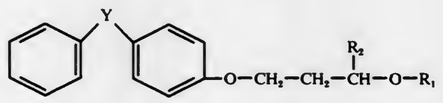
**4,017,548**
**BORONTRIFLUORIDE RECOVERY FROM ALKYL PHENOL MIXTURE**
**Dennis G. Petrille, Batavia, Ill., assignor to Standard Oil Company (Indiana), Chicago, Ill.**
**Filed Oct. 6, 1975, Ser. No. 619,789**
**Int. Cl.² C07F** *5/02*
**U.S. Cl. 260—606.5 B** **7 Claims**

**1.** A process for continuous removal of $BF_3$ from the viscous fluid alkylation reacton mixture obtained by the reaction at a temperature in the range of 45°–60° C of phenol with a 500–3000 $M_n$ viscous liquid polymer of propylene or butylene in the presence of $BF_3$-phenolate catalyst and mineral oil of the crankcase lubricating viscosities, wherein for each mole of said polymer there is used 1–6 moles of phenol and 0.05 to 0.5 mole of said catalyst and mineral oil in an amount of 30–70 weight percent of said polymer; which $BF_3$ removal process comprises continously dissolving 6 to 25 weight percent of 80°–125° C boiling alkane hydrocarbon in the viscous liquid alkylation reaction mixture and continuously heating incremental portions of the resulting composition to a temperature in the range of from 100° to 130° C for simultaneous catalyst dissociation and vaporization of the alkane to strip $BF_3$ gas from the heated fluid with vapors of the alkane.

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**4,017,549**
**DIPHENYLMETHANE ETHER DERIVATIVES**
**Friedrich Karrer, Basel, and Saleem Farooq, Aesch, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**
**Filed Oct. 20, 1975, Ser. No. 623,876**
**Claims priority, application Switzerland, Oct. 24, 1974, 14246/74; Sept. 23, 1975, 12337/75**
**The portion of the term of this patent subsequent to May 18, 1993, has been disclaimed.**
**Int. Cl.² C07C** *43/20*
**U.S. Cl. 260—613 R** **5 Claims**

**1.** A compound of the formula I



(I)

wherein

$R_1$ represents a $C_3$–$C_5$-alkenyl, $C_3$–$C_5$-chloroalkenyl or $C_3$–$C_5$-alkynyl radical,

$R_2$ represents a hydrogen atom or a methyl radical, and

Y represents a methylene group.

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**4,017,550**
**MANUFACTURE OF 1,4-BUTANEDIOL**
**Rudolf Kummer, Frankenthal, Germany, assignor to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany**
**Filed Dec. 30, 1974, Ser. No. 537,118**
**Claims priority, application Germany, Jan. 14, 1974, 2401553**
**Int. Cl.² C07C** *29/00, 29/16*
**U.S. Cl. 260—635 E** **18 Claims**

**1.** A process for the manufacture of 1,4-butanediol, wherein cyclic acetals of acrolein are reacted with carbon monoxide and hydrogen in the presence of cobalt carbonyl complexes or rhodium carbonyl complexes which are modified with tertiary organic phosphines, at temperatures of from 80° to 200° C under superatmospheric pressure, and the resulting 3-formylpropionaldehyde-acetals and the 4-hydroxybutyraldehyde-acetals produced are hydrogenated in the presence of water at 70°–150° C and under superatmospheric pressure in the presence of a hydrogenation catalyst containing a metal of group 8 of the Periodic Table or copper as a catalytically active metal.



**4,017,551**
**LIQUID PHASE CHLORINATION OF AROMATIC HYDROCARBONS USING MANGANESE CHLORIDE CATALYST**
**Joseph E. Milam, New Martinsville, W. Va., and Gordon A. Carlson, Wadsworth, Ohio, assignors to PPG Industries, Inc., Pittsburgh, Pa.**
**Filed Jan. 27, 1975, Ser. No. 544,244**
**Int. Cl.² C07C** *25/08*
**U.S. Cl. 260—650 R** **14 Claims**

**1.** A process for preparing a dichlorobenzene product having a mole ratio of paradichlorobenzene to orthodichlorobenzene below 1.35, which comprises reacting benzene or monochlorobenzene and elemental chlorine in the liquid phase, in the presence of a catalytically effective amount of a manganese chloride catalyst composition, at a temperature between about 27° C. to about 74° C., the reaction media having an iron concentration not above about 3 parts per million.

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**4,017,552**
**BICYCLO-[3'3'0]-OCTA-2-ENE FORMED BY ISOMERIZING 1,5-CYCLOOCTADIENE**
**Henry R. Menapace, Stow, and Neil A. Maly, Tallmadge, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio**
**Continuation of Ser. No. 219,527, Jan. 20, 1972, abandoned. This application Mar. 7, 1973, Ser. No. 338,771**
**Int. Cl.² C07E** *13/00*
**U.S. Cl. 260—666 PY** **2 Claims**

**1.** A process which comprises isomerizing 1,5-cyclooctadiene to bicyclo-[3.3.0]-octa-2-ene by contacting 1,5-cyclooctadiene with a catalyst of (1) a soluble nickle compound selected from at least one of the group consisting of nickel salts of carboxylic acids and (2) a co-catalyst selected from at least one of the group consisting of alkylaluminum dichloride, alkylaluminum sesquichloride and aluminum trichloride.

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**4,017,553**
**PROCESS FOR THE PREPARATION OF LINEAR ALPHA-OLEFIN OLIGOMERS, SUBSEQUENT HYDROGENATION THEREOF AND SATURATED PRODUCTS THUS OBTAINED**
**Sebastiano Cesca; Aldo Priola, and Giuseppe Ferraris, all of San Donato Milanese (Milan), Italy, assignors to Snam Progetti, S.p.A., San Donato Milanese, Italy**
**Filed Aug. 1, 1975, Ser. No. 601,186**
**Claims priority, application Italy, Aug. 2, 1974, 25939/74**
**Int. Cl.² C07C** *3/10*
**U.S. Cl. 260—683.15 D** **16 Claims**

**1.** Process for the preparation of oligomers from linear alpha-olefins having a carbon atom number of from 3 to 12 characterized in that the reaction is carried out in the presence of a catalyst system constituted by:

a. an aluminum metallorganic halide compound having the following general formula

$R_mAlX_{3-m}$

in which X is a halogen atom, R is hydrogen, an alkyl, aryl, cycloalkyl, arylalkyl, alkylaryl, alkoxy, ester radical having 1 to 12 carbon atoms and $m$ is a number comprised between 1 and 3;

b. A compound able to react with the halide of (a) to give the catalytic species which is the starter of the polymerization such compound being selected from the group consisting of:

I. halogens or interhalogenic compounds having the general formula X'Y in which X' and Y, the same or different, are selected among chlorine, bromine, iodine and fluorine,

II. metal halides having the general formula

$MeX''_nY'_m$

in which X'' is a halogen atom or anion chosen among $ClO_4^-$, $HSO_4^-$, $NO_2^-$, $NO_3^-$, $ClO_3^-$, Y' is oxygen or sulphur, or a functional group chosen among the alcoxi, ester, amide, alkyl, cycloalkyl, aromatic, either simple or substituted, groups, Me is a metal element chosen among Si, B, Be, Sb, As, Bi and Mg; $m_1$ is a whole number, even if equal to zero, $n$ too is a whole number and the sum thereof is equal to the Me valence, apart from Y' is oxygen or sulphur, where the valence is expressed by $2m_1 + n$.

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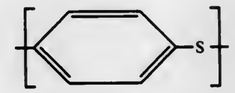
**4,017,554**
**EPOXIDE MODIFIED POLYSULFIDE POLYMERS AS ADHESIVE ADDITIVES FOR LIQUID POLYSULFIDE POLYMER BASED ADHESIVE COMPOSITIONS**
**Jose L. Villa, Heightstown, N.J., assignor to Thiokol Corporation, Newtown, Pa.**
**Continuation of Ser. No. 377,161, July 6, 1973, abandoned, which is a division of Ser. No. 252,646, May 12, 1972, Pat. No. 3,813,368. This application Oct. 14, 1975, Ser. No. 622,339**
**Int. Cl.² C08L** *63/00*
**U.S. Cl. 260—830 S** **6 Claims**

**1.** A curable liquid polysulfide polymer based sealant composition containing, as an adhesive additive, 0.5 to 5.0 parts by weight of epoxy terminated polysulfide resin per 100 parts by weight of curable liquid polysulfide polymer.

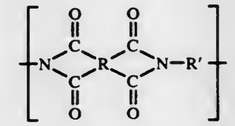
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**4,017,555**
**POLYALLOY OF POLYPHENYLENE SULFIDE AND POLYIMIDE**
**Robert T. Alvarez, 13382 Flint Drive, Santa Ana, Calif. 92705**
**Filed June 21, 1976, Ser. No. 698,441**
**Int. Cl.² C08L** *77/00*
**U.S. Cl. 260—857 PA** **2 Claims**

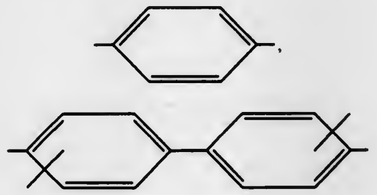
**1.** A polymeric alloy of polyphenylene sulfide having recurring units of the formula:



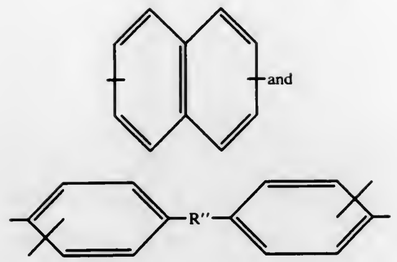
wherein $n$ is a positive integer selected to result in a polymer which is thermally stable at at least about 200° C. and a polyimide having recurring units of the formula



wherein R is a tetravalent aromatic radical containing at least one ring of six carbon atoms, said ring characterized by benzenoid unsaturation, the four carbonyl groups being attached directly to separate carbon atoms in a benzene ring of the R radical and each pair of carbonyl groups being attached to adjacent carbon atoms in a benzene ring of the R radical; and wherein R' is a divalent benzenoid radical selected from the group consisting of

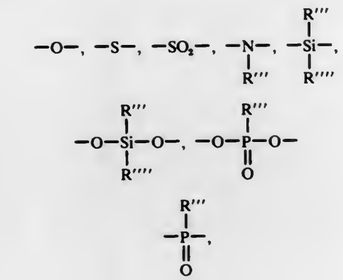


-continued



wherein R'' is selected from the group con-alkylene chain having 1–3 carbon atoms,

and



wherein R''' and R'''' are selected from the group consisting of alkyl and aryl, and *n* is a positive integer high enough to result in a polymer which is heat stable to at least about 200° C., said alloy being characterized by possessing melt flow properties at temperatures about about 300° C.

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**4,017,556**

## POLYMERIC SUBSTRATES COATED WITH REACTION PRODUCT OF HYDROXY-TERMINATED URETHANE AND MELAMINE RESIN

**Samuel S. Wang, Cheshire, Conn., assignor to American Cyanamid Company, Stamford, Conn.**

**Filed Mar. 20, 1975, Ser. No. 560,416**

**Int. Cl.² C08L** *61/28*

**U.S. Cl. 260—856** **10 Claims**

**1.** An article of manufacture comprising a polymeric substrate having a mar-resistant coating thereon, said coating consisting essentially of the acid catalyzed reaction product of a mixture of (1) and (2), in an amount ranging from about 5:1 to about 1:1, respectively, in which

1. is a saturated urethane prepolymer having terminal hydroxy groups which is the reaction product of materials consisting essentially of a mixture of (a) and (b), at a molar ratio of 1:2, respectively, in which
   a. is an isocyanate-terminated urethane which is the reaction product of a mixture consisting essentially of (I) and (II), at a molar ratio of 1:2, respectively, in which
      i. is a saturated diol having a molecular weight of from about 200 to about 3000, and
      ii. is a saturated organic iso- cyanate, and
   b. is a monomeric, sterically bulky, polyhydric alcohol containing 2–6 hydroxyl groups and being free of oxyalkylene units and
2. is a polyalkyl ether of a polymethylol melamine.

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**4,017,557**

## NOVEL ELASTOMERIC GRAFT COPOLYMERS

**Clarence Frederick Hammer, Wilmington, Del., and Harold King Sinclair, Louisville, Ky., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Nov. 13, 1974, Ser. No. 523,465**

**The portion of the term of this patent subsequent to Aug. 3, 1993, has been disclaimed.**

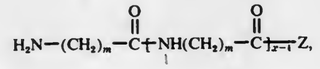
**Int. Cl.² C08L** *77/00*

**U.S. Cl. 260—857 G** **15 Claims**

**1.** An elastomeric, thermoplastic graft copolymer consisting essentially of

A. an elastomeric trunk copolymer derived from at least two monomers, at least one of said monomers providing amine-reactive sites selected from the class consisting of an anhydride group, a vicinal pair of carboxylic groups, and a carboxylic group adjacent to an alkoxy-, phenoxy-, napthoxy-, substituted phenoxy-, or substituted naphthoxycarbonyl group, where the alkyl of the alkoxycarbonyl group has 1-10 carbon atoms, and the substituents of substituted phenoxycarbonyl and naphthoxycarbonyl groups can be a $C_1$-$C_{10}$ alkyl, halogen, or a $C_1$-$C_{10}$ alkoxy group; at least one of said monomers containing no amine-reactive sites and none of said monomers containing hydroxyl or amino groups; and

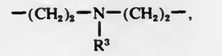
B. a side chain polymer derived from a short chain polyamide represented by the formula



where Z is



$R^1$ and $R^2$ being independently selected from hydrogen, a $C_1$–$C_{18}$ alkyl, benzyl, and $C_5$-$C_6$ cycloalkyl; or taken together, being $-(CH_2)_4-$, $-(CH_2)_5-$, $-(CH_2)_2-O-(CH_2)_2-$, or



where $R^3$ is a $C_1$-$C_6$ alkyl; with the proviso that only one of $R^1$ and $R^2$ can be hydrogen;

*m* is 5 and 11; and

*x* is a positive number having an average value of 5–60;

said side chain polymer being attached to said trunk copolymer through amide or imide linkages resulting from a reaction of the terminal primary amino group of said short chain polyamide with the amine-reactive sites of said trunk copolymer;

the proportion of said elastomeric trunk copolymer in the graft copolymer being about 45–85 weight percent.



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**4,017,558**

## THERMOPLASTIC MOLDING COMPOSITIONS OF HIGH IMPACT RESISTANCE

**Franz Schmidt, Mannheim; Gerhard Fahrbach, Plankstadt; Wolfgang Schenk, Schwetzingen, and Erhard Seiler, Freiburg, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany**

**Filed Feb. 13, 1975, Ser. No. 549,678**

**Claims priority, application Germany, Feb. 22, 1974, 2408487**

**Int. Cl.² C08L** *53/00*

**U.S. Cl. 260—876 B** **2 Claims**

**1.** Impact-resistant thermoplastic molding compositions comprising a blend of from 70 to 98 percent by weight of a polyoxymethylene and from 30 to 2 percent by weight of a block copolymer of the formula A—B—A, wherein A is a polyethylene oxide block and B is a diene polymer block, said diene polymer block being a homopolymer of butadiene, a copolymer of butadiene and isoprene, a copolymer of butadiene and styrene showing random distribution of the monomers, or a copolymer of butadiene and styrene showing a block structure, said diene polymer B containing at least 30 percent by weight of diene hydrocarbon, said block B having a molecular weight of from 20,000 to 1,000,000.

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**4,017,559**

## POLYBLEND CONTAINING TWO GRAFTED RUBBER COMPONENTS

**Gary L. Deets, and Robert L. Kruse, both of Springfield, Mass., assignors to Monsanto Company, St. Louis, Mo.**

**Continuation-in-part of Ser. No. 291,949, Sept. 25, 1972, which is a continuation-in-part of Ser. No. 220,428, Jan. 24, 1972, abandoned. This application July 1, 1975, Ser. No. 592,282**

**Int. Cl.² C08L** *55/02, 57/08*

**U.S. Cl. 260—876 R** **8 Claims**

**1.** A polyblend composition comprising:

A. a polymer of a monovinylidene aromatic monomer and an ethylenically unsaturated nitrile monomer wherein the weight ratio of monovinylidene aromatic monomer to nitrile monomer is in the range of 80/20 to 20/80;

B. from 16.5 to 80% by weight based on the total weight of the polyblend, of a grafted, crosslinked polychloroprene rubber having a Mooney viscosity of at least 200 (MS 2-½ min. 212° F.), said rubber being grafted with:
   1. at least one monovinylidene aromatic monomer, and
   2. an ethylenically unsaturated nitrile monomer; wherein the weight ratio of monovinylidene aromatic monomer to nitrile monomer in the grafted rubber is in the range of 80/20 to 20/80;

wherein the amount of polychloroprene rubber in the polyblend, calculated as ungrafted rubber, is in the range of from 15 to 40% by weight, based on the total weight of the polyblend and wherein the particle size of the polychloroprene rubber prior to grafting is in the range of from 0.05 to 0.20 micron;

C. from 0.5 to 5% by weight, based on the total weight of the polyblend, of a butadiene rubber having a particle size in the range of from 0.07 to 4.0 microns, said butadiene rubber having been grafted with:
   1. at least one monovinylidene aromatic monomer, and
   2. an ethylenically unsaturated nitrile monomer; wherein the weight ratio of monovinylidene aromatic monomer to nitrile monomer in the grafted rubber is in the range of 80/20 to 20/80; and

D. from 6 to 12% by weight, based on the total weight of the polyblend of $Sb_2O_3$.

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**4,017,560**

## AQUEOUS EMULSION LATEX DERIVED RUBBERY COPOLYMER

**James J. Tazuma, Stow, and Mario D. Zadra, Barberton, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio**

**Division of Ser. No. 510,332, Sept. 30, 1974, Pat. No. 3,929,737. This application Dec. 18, 1975, Ser. No. 641,848**

**Int. Cl.² C08F** *2/24, 255/08, 285/00*

**U.S. Cl. 260—888** **9 Claims**

**1.** An aqueous emulsion latex-derived rubbery copolymer prepared by the method which comprises free radical polymerizing 100 parts by weight of a mixture comprising about 60 to about 95 weight percent of a diene selected from 1,3-butadiene and isoprene and, correspondingly, about 40 to about 5 weight percent of a comonomer selected from styrene and acrylonitrile, in the presence of about 2 to about 6 weight percent of a soap which comprises about 50 to about 100 weight percent of the sodium or potassium salt of an anhydride-modified resin backbone and, correspondingly, about 50 to about 0 weight percent of a sodium or potassium salt of a rosin acid where said modified resin backbone is characterized by having a softening point in the range of about 45° to about 100° C. having a basic resin backbone of piperylene and methyl branched monoolefins which comprises about 50 to about 60 mole percent units derived from piperylene and about 20 to about 30 mole percent units derived from monoolefins selected from at least one methyl branched chain $\alpha$ or $\beta$ monoolefin containing 4 to 6 carbon atoms, where the mole ratio of piperylene to said branched monoolefin is about 0.8/1 to about 2/1, in combination with about 10 to about 30 mole percent units derived from maleic anhydride, based on the total resin composition.

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**4,017,561**

## WET SPUN MODACRYLIC FILAMENTS WITH IMPROVED COLORISTIC PROPERTIES

**Ralf Miessen, Dormagen; Günter Blankenstein, Stommeln; Siegfried Korte, Leverkusen, and Carlhans Süling, Odenthal-Hahnenberg, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany**

**Filed Nov. 11, 1975, Ser. No. 630,776**

**Claims priority, application Germany, Nov. 15, 1974, 2454323**

**Int. Cl.² C08L** *33/20*

**U.S. Cl. 260—898** **5 Claims**

**1.** A wet-spun modacrylic filament with improved coloristic properties and adequate dimension stability under dyeing conditions based on a polymer mixture, which comprises at least one acrylonitrile-vinyl chloride copolymer and a chlorine-containing copolymer containing sulphonic acid groups or sulphuric acid ester groups.

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**4,017,562**

## PHOSPHONITRILATE POLYMERS AND METHOD OF PREPARATION

**Charles R. Bergeron, Baton Rouge, La., assignor to Ethyl Corporation, Richmond, Va.**

**Continuation-in-part of Ser. No. 285,007, Aug. 30, 1972, Pat. No. 3,795,526. This application Dec. 14, 1973, Ser. No. 424,897**

**The portion of the term of this patent subsequent to Mar. 5, 1991, has been disclaimed.**

**Int. Cl.² C07F** *9/24*

**U.S. Cl. 260—927 N** **6 Claims**

**1.** A process for preparing a phosphonitrilate polymer having an average molecular weight of from about 800 to about 2000 comprising adding an alcohol and water to a slurry of an alkali metal in an inert solvent to form a mixture of an alkali metal alcoholate and an alkali metal hydroxide in said solvent and reacting said mixture at a temperature of from about 55° to about 110° C for a period of from about 0.5 to about 10

hours in a hot inert solvent with a cyclic oligomeric chlorophosphazene having the general formula



wherein *a* is at least 3, said mixture having from about 5 to about 15 weight percent excess of the theoretical amount of said alkali metal alcoholate and from about 0.1 to about 10 percent by weight of said alkali metal hydroxide based on said alcoholate.

6. A phosphonitrilate polymer produced by the process of claim 1.

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## 4,017,563
## O-ETHYL-S-N-BUTYL-O-(2- OR 3-NITROPHENYL) PHOSPHOROTHIOLATES

**Alexis A. Oswald, Mountainside, and Paul L. Valint, Woodbridge, both of N.J., assignors to Ciba-Geigy AG, Basel, Switzerland**

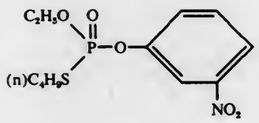
**Filed Dec. 15, 1972, Ser. No. 315,389**

**Claims priority, application Switzerland, Dec. 16, 1971, 18439/71; Oct. 27, 1972, 15728/72**

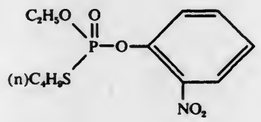
**Int. Cl.² C07F 9/18**

**U.S. Cl. 260—954** **2 Claims**

1. The compound of the formula



2. The compound of the formula



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## 4,017,564
## PROCESS FOR THE PRODUCTION OF (METH)ALLYL PHOSPHONIC ACID DIALKYL ESTERS

**Günter Arend; Heinz Schaffner, and Jürgen Schramm, all of Dormagen, Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany**

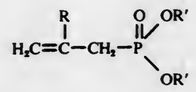
**Filed Aug. 26, 1975, Ser. No. 607,946**

**Claims priority, application Germany, Sept. 5, 1974, 2442428**

**Int. Cl.² C07F 9/40**

**U.S. Cl. 260—969** **8 Claims**

1. A process for the production methallyl phosphonic acid dialkyl esters of the formula



wherein

R represents hydrogen or methyl, and

R′ represents a straight-chain or branched, unsubstituted or halogen-substituted alkyl radical having up to 4 carbon atoms, which comprises reacting allyl chloride or methallyl chloride with a phosphorous acid trialkyl ester (trialkyl phosphites) of the formula:

$P(OR')_3$

in which R′ is as defined above, under atmospheric pressure at a temperature in the range of from 80° to 160° in the presence of from 0.5 to 7 mole % based on the phosphite of a catalyst selected from the group consisting of elemental nickel, Raney nickel, nickel tetracarbonyl, nickel triphenyl phosphine tricarbonyl, nickel-bis-(triphenyl phosphine)-dicarbonyl, π-allyl nickel chloride, π-allyl nickel bromide, π-allyl nickel iodide, π-cyclopentadienyl nickel nitrosyl, nickel diacrylonitrile, Raney cobalt, dicobalt octacarbonyl, cobalt-II-chloride and cobalt-II-bromide.

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## 4,017,565
## DEVICE FOR ADMIXING A GASEOUS AND A LIQUID PHASE

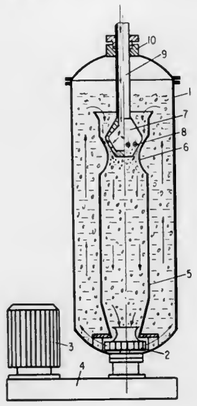
**Hans Müller, Im Almendli, Erlenbach, Zurich, Switzerland**

**Continuation of Ser. No. 487,808, July 11, 1974, abandoned. This application Feb. 24, 1976, Ser. No. 661,026**

**Claims priority, application Switzerland, July 13, 1973, 10300/73**

**Int. Cl.² B01F 3/04; C12B 1/16**

**U.S. Cl. 261—36 R** **7 Claims**



1. In a device for admixing a liquid and a gaseous medium, particularly in a reaction vessel or a fermentor, a combination comprising an upright vessel for the liquid medium; a substantially cylindrical tubular baffle extending in said vessel upwardly from a lower region thereof, said cylindrical tubular baffle having a lower open end and an upper end portion provided with a constricted region which bounds a throat; admitting means for admitting the gaseous medium into said cylindrical tubular baffle in the region of said throat, said admitting means including a substantially barrel-shaped elongated hollow gas-admitting body located in said upper end portion of said cylindrical tubular baffle coaxially with said throat, and defining a substantially Venturi-shaped annular gap in said throat with said constricted region, said hollow gas-admitting body having an interior containing a replenishable volume of the gaseous medium and a plurality of small-sized gas outlet openings penetrating said hollow gas-admitting body in a common plane which extends normal to the longitudinal axis of said hollow gas-admitting body, said openings being directed outwardly of said hollow gas-admitting body so as to communicate said interior of the latter with said Venturi-shaped annular gap to thereby supply the gaseous medium into said Venturi-shaped annular gap in direction toward said constricted region of said cylindrical tubular baffle; and impeller means located in the region of said lower open end of said cylindrical tubular baffle and operative for drawing the liquid medium downwardly through said cylindrical tubular baffle and through said annular gap so that underpressure caused by Venturi effect develops in the liquid medium flowing through said Venturi-shaped annular gap and draws the gaseous medium in form of a fine dispersion through said plurality of small-sized gas outlet openings into said Venturi-shaped annular gap.



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## 4,017,566
## VAPORIZER FOR ANAESTHETICS

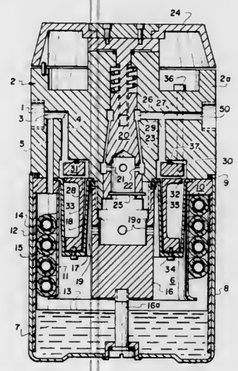
**Peter Seidel, Lubeck, Germany, assignor to Dragerwerk Aktiengesellschaft, Germany**

**Filed Feb. 11, 1976, Ser. No. 657,219**

**Claims priority, application Germany, Feb. 20, 1975, 2507281**

**Int. Cl.² A61M 15/00**

**U.S. Cl. 261—56** **7 Claims**



1. A vaporizer for anaesthetics or narcotics comprising a housing having an interior liquid narcotic reservoir and an evaporation chamber above said reservoir, an inlet into said housing, an outlet passage in said housing spaced from said inlet, a first conduit for evaporation gases extending from said inlet to said evaporation chamber and from said evaporation chamber to said outlet passage, a second bypass conduit extending from said inlet to said outlet passage and having an annular portion, flow control means in said second bypass passage comprising an annular trough-shape member having a bottom wall closing one end of said annular portion, a hollow cylindrical member positioned in said trough-shape member and having a top planar wall, a ring-shape member having a bottom planar wall opposed to said top planar wall of said hollow cylindrical member, and sealing means including an anchor for suspending said annular ring member in said housing and being of a different thermal coefficient of expansion than said housing to permit relative movement of said ring member to vary the gap between said flat bottom surface of said ring member and said planar surface of said hollow cylinder member.

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## 4,017,567
## PROCESS FOR THE PRODUCTION OF BLOCK FUEL ELEMENTS FOR GAS COOLED HIGH TEMPERATURE POWER REACTOR

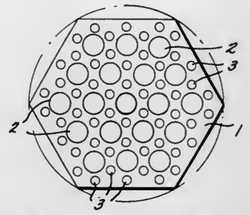
**Milan Hrovat, Rodenbach; Willi Wolff, Kahl, and Karl-Gerhard Hackstein, Hanau, all of Germany, assignors to Nukem G.m.b.H., Hanau, Germany**

**Continuation of Ser. No. 218,244, Jan. 17, 1972, abandoned. This application May 13, 1975, Ser. No. 577,054**

**Claims priority, application Germany, Jan. 30, 1971, 2104431**

**Int. Cl.² G21C 21/00**

**U.S. Cl. 264—.5** **11 Claims**



1. In a process for the production of molded block fuel elements having an isotropic structure and useful in gas cooled high temperature power reactors, said fuel elements comprising fuel-containing and fuel-free zones and a graphite matrix in both the fuel-containing and fuel-free zones including the steps of making a fuel-free block-shaped graphite matrix zone by first molding a graphite and binder containing molding composition, making fuel channels and cooling channels in the graphite matrix, encasing coated fuel particles with a binder containing graphite powder and making prepressed fuel rods by molding said encased coated fuel particles, placing said fuel rods into said fuel channels finally, molding the composite body thus formed and carbonizing said composite body the improvement comprising first producing isotropic graphite granulates of density 1.5 to 1.9 g/cm³ with a porosity of 7.5 to 25 percent by volume and wherein said granulates have an average particle diameter of about 1 mm and each granulate particle contains several hundred thousand isotropically arranged graphite particles by molding in a first molding step from a molding powder having an average grain diameter of about 20 microns and then preliminarily hot molding these isotropic granulates to form said block-shaped fuel-free matrix zone, and afterwards in the final molding step hot molding the composite bodies each consisting of a fuel-free matrix zone with inserted fuel rods at a pressure lower than that applied in said first molding step to form said isotropic fuel elements, the molding powder consisting essentially of a mixture of (A) a binder resin with (B) a member of the group consisting of (1) natural graphite grains, and (2) synthetic graphite grains, and (3) a mixture of both natural and synthetic graphite grains.

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## 4,017,568
## TECHNIQUE FOR COMPRESSION SEALING ELECTRICAL CONDUCTORS IN A RIGHT CIRCULAR CYLINDER RESIN CASTING

**James F. Quirk, Pittsburgh, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed May 20, 1974, Ser. No. 471,738**

**Int. Cl.² B29D 3/00; B29G 7/00; H01B 17/26**

**U.S. Cl. 264—27** **2 Claims**

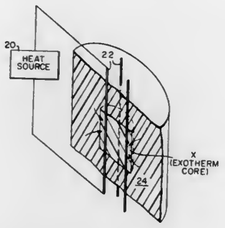
1. A method for consistently producing a gas-tight compression seal between the resin composition of a right circular cylinder resin casting and one or more electrical conductors extending through the end walls of the right circular cylinder resin casting without the use of bonding agents, comprising the steps of,

positioning one or more electrical conductors within a mold designed to form a right circular cylinder resin casting

having a surface-to-volume ratio in a range between approximately 0.9 inches$^{-1}$ and 2.0 inches$^{-1}$,

locating the said one or more electrical conductors within a volume of said mold corresponding to the exotherm core of a resin composition to be introduced into said mold,

casting a resin composition of a type to develop an exotherm core of approximately 150° C in said mold and produce a right circular cylinder resin casting having a surface-to-volume ratio in a range of between approximately 0.9 inches$^{-1}$ and 2.0 inches$^{-1}$,




curing said resin composition, and

heating said one or more electrical conductors, as required, to a temperature approximating the temperature of said exotherm core of said resin composition to assure the collapse of the resin composition of said exotherm core about said one or more electrical conductors during curing to produce a compression seal between said resin composition and said one or more electrical conductors.

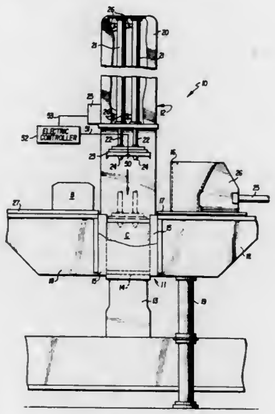
## 4,017,569
## ANODE VIBRATOR AND PRESS

**Wynn M. Hass, Owensboro, Ky., assignor to Southwire Company, Carrollton, Ga. and National Steel Corporation, Pittsburgh, Pa.**

**Division of Ser. No. 419,862, Nov. 28, 1973, Pat. No. 3,883,278, which is a continuation-in-part of Ser. No. 163,766, July 19, 1971, abandoned. This application May 12, 1975, Ser. No. 576,857**

**Int. Cl.² G05D** *15/00, 15/01*

**U.S. Cl. 264—40.2** **8 Claims**



1. In a method of forming a carbon anode block, having indentations in the upper surface thereof, comprising the steps of:

a. discharging carbon aggregate into a vertically movable mold;

b. vibrating the aggregate in the mold to expel substantially all air therefrom and cause compaction thereof, the upper surface of the aggregate thereby moving downwardly; and

c. compressing the aggregate by lowering a press ram thereagainst to further compact its particles and to form indentations in the lower face of the press ram; the improvement comprising;

d. synchronizing the lowering of the press ram during vibration of the aggregate with the lowering of the upper surface of the aggregate which occurs as a result of the vibration so that the aggregate will form around the protrusions on the lower face of the press ram, and maintaining only enough pressure by the press ram to contain the aggregate within the movable mold until substantially all air has been expelled from the aggregate,

wherein said synchronizing step is accomplished by sensing changes in the relative positions of the upper surfaces of the aggregate and the press ram, which changes occur as a result of the vibration, generating a control signal in response to the sensing, and positively controlling the lowering of the press ram in response to said signal so that it moves at a rate corresponding substantially to the compaction rate of the aggregate applying little or no pressure thereagainst, and

wherein said sensing step is performed by passing an electrical current through the aggregate.

5. In a method of forming a carbon anode block, having indentations in the upper surface thereof, comprising the steps of:

a. discharging carbon aggregate into a vertically movable mold;

b. vibrating the aggregate in the mold to expel substantially all air therefrom and cause compaction thereof, the upper surface of the aggregate thereby moving downwardly; and

c. compressing the aggregate by lowering a press ram thereagainst to further compact its particles and to form indentations in the aggregate conforming to protrusions on the lower face of the press ram; the improvement comprising:

d. synchronizing the lowering of the press ram during vibration of the aggregate with the lowering of the upper surface of the aggregate which occurs as a result of the vibration so that the aggregate will form around the protrusions on the lower face of the press ram, and maintaining only enough pressure by the press ram to contain the aggregate within the movable mold until substantially all air has been expelled from the aggregate,

wherein said synchronizing step is accomplished by sensing changes in the relative positions of the upper surfaces of the aggregate and the press ram, which changes occur as a result of the vibration, generating a control signal in response to the sensing, and positively controlling the lowering of the press ram in response to said signal so that it moves at a rate corresponding substantially to the compaction rate of the aggregate applying little or no pressure thereagainst, and

wherein said sensing step is performed by providing a reference threshold pressure, monitoring the pressure applied by the press ram against the aggregate, and generating said control signal only upon the appearance of an applied pressure which exceeds the threshold pressure.

## 4,017,570
## METHOD OF PRODUCING THREE DIMENSIONAL SKELETAL STRUCTURES

**Warren A. Rice, Dexter; Clarence S. Vinton, Ann Arbor, and Hugh Richard Norris, Fowlerville, all of Mich., assignors to Chemotronics International, Inc., Ann Arbor, Mich.**

**Continuation of Ser. No. 131,224, April 5, 1971, abandoned. This application Apr. 2, 1973, Ser. No. 346,998**

**Int. Cl.² B29D** *27/00;* **B22F** *3/02, 3/10*

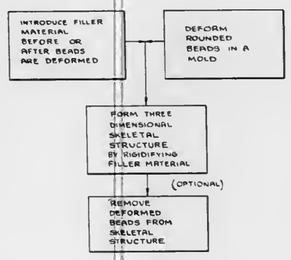
**U.S. Cl. 264—42** **10 Claims**

1. In the method of producing a three dimensional skeletal structure by introducing and rigidifying a powdered filler material which is to form the skeletal structure in a matrix formed by a removable mold of packed beads which can be removed by melting, decomposition or volatilization or by a solvent or reactant which is a non-solvent or non-reactant with the filler material, the improvement which comprises:

a. partially deforming packed deformable beads having comparable dimensions and an average diameter of at least about one one-hundredth of an inch which are in contact with each other to form a mold with interconnected void spaces between the partially deformed beads;

b. introducing particles of a powdered filler material which is loosely bondable upon compression into the interconnected void spaces between the packed, partially deformed beads while maintaining the beads in contact with each other;






c. compressing the powdered filler material and the partially deformed beads to form a heterogeneous solid mass of fully deformed beads with the particles of the filler material bonded together to form the continuous and interconnected skeletal structure without being bonded to the beads sufficiently to prevent removal and wherein the fully deformed beads occupy between about 80 and 98 percent of the total volume; and

d. removing the deformed beads from the heterogeneous mass without removing the filler material forming the skeletal structure.

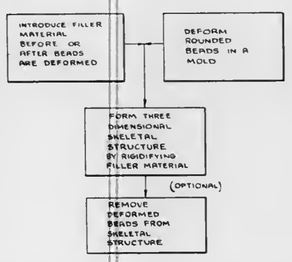
## 4,017,571
## METHOD OF PRODUCING THREE DIMENSIONAL SKELETAL STRUCTURES

**Warren A. Rice, Dexter; Clarence S. Vinton, Ann Arbor, and Hugh Richard Norris, Fowlerville, all of Mich., assignors to Chemotronics International, Inc., Ann Arbor, Mich.**

**Continuation of Ser. No. 131,224, April 5, 1971, abandoned. This application Apr. 2, 1973, Ser. No. 346,999**

**Int. Cl.² B29D** *27/00;* **B22F** *3/02, 3/10*

**U.S. Cl. 264—42** **12 Claims**




1. In the method of producing a three dimensional skeletal structure by introducing and rigidifying a liquid hardenable filler material which is to form the skeletal structure in a matrix formed by a mold of packed beads which can be removed from the filler material by melting, decomposition or volatization or by a solvent or reactant which is a non-solvent or non-reactant with the filler material, the improvement which comprises:

a. deforming packed beads having comparable dimensions and an average diameter of at least about 1/100th inch which are in contact with each other and which are rounded such that a mold is formed with a matrix of interconnected spaces between the deformed beads defining a three dimensional skeletal structure of continuous interconnected strands which contains the liquid filler material completely filling the matrix of interconnected spaces between the deformed beads;

b. rigidifying the liquid hardenable filler material to form a continuous and interconnected skeletal structure having openings between the strands and wherein the deformed beads define between about 80 and 98 percent of the total volume; and

c. removing the deformed beads without removing the filler material forming the skeletal structure.

## 4,017,572
## METHOD OF MOLDING ARTICLES OF POLYMERIC FOAM SUBSTANTIALLY FREE FROM FLASHING

**Raymond L. Magone, Redondo Beach, Calif., and Samir N. Saaty, Orange, Conn., assignors to The Upjohn Company, Kalamazoo, Mich.**

**Division of Ser. No. 439,573, Feb. 4, 1974, abandoned. This application Apr. 15, 1975, Ser. No. 568,256**

**Int. Cl.² B29D** *27/04*

**U.S. Cl. 264—51** **6 Claims**




1. A process for molding an article of polymer foam substantially free from flashing using a polymer foam forming mix comprising ingredients which undergo chemical interaction with simultaneous blowing in situ, said process being characterized by the steps of:

providing a two piece mold, one of said mold pieces being substantially rigid and the other of said mold pieces being relatively flexible;

providing a jig comprising two facing jig members held in permanent, spaced apart, relationship one of said jig members having disposed thereon an inflatable hollow flexible bag;

providing an opening in said jig to permit insertion of said assembled two piece mold between said facing jig members without disassembly, in whole or in part, of said jig;

charging polymer foam forming mix to the cavity of said two piece mold;

inserting said charged mold, after assembly thereof, between the said two facing jig members via said opening in said jig;

inflating said hollow flexible bag to a pressure such that the two mold pieces are held in sealing engagement one with the other and said mold is held in clamped engagement with said jig solely by means of said inflated bag;

permitting said foam mix to expand and set in said mold so disposed in said jig;

thereafter deflating said flexible bag and removing said mold and contents from said jig via said opening without disassembly of said jig in whole or in part, and

demolding said article of polymer foam.

**4,017,573**

## PROCESS FOR MAKING VARIEGATED SOAP

**Hargovind Himatlal Joshi, Piscataway, N.J., assignor to Colgate-Palmolive Company, New York, N.Y.**

**Filed June 4, 1975, Ser. No. 583,802**
**Int. Cl.² B29F** *3/12*; **C11D** *13/08, 13/18*
**U.S. Cl. 264—75** **6 Claims**

1. A method for producing multicolored soap bars comprising the steps of supplying to the vacuum chamber of a double barrel plodder which comprises upper and lower barrels separated by a vacuum chamber, a colored material including a liquid oil vehicle selected from oils of animal, vegetable and mineral origin and a water soluble dye, supplying a base soap material to said plodder, combining said colored material with said base soap material in the lower barrel of said double barrel plodder to form a multicolored soap mass, extruding said multicolored soap mass to form a multicolored billet, subdividing said billet into bars and pressing said bars to a desired shape.

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**4,017,574**

## PROCESS FOR MAKING VARIEGATED SOAP

**Hargovind Himatlal Joshi, Piscataway, N.J., assignor to Colgate-Palmolive Company, New York, N.Y.**

**Filed June 4, 1975, Ser. No. 583,801**
**Int. Cl.² B29F** *3/12*; **C11D** *13/08, 13/18*
**U.S. Cl. 264—75** **7 Claims**

1. A method for producing multicolored soap bars comprising the steps of, supplying to the vacuum chamber of a double barrel plodder which comprises upper and lower barrels separated by a vacuum chamber, a liquid colored material including a meltable solid vehicle in a melted state selected from wax and wax-like materials having a melting point above about 100° F and a water soluble dye, supplying a base soap material to said plodder, combining said colored material with said base soap material such that said colored material solidifies when in contact with said base soap material, in the lower barrel of said double barrel plodder to form a multicolored soap mass, extruding said multicolored soap mass to form a multicolored billet, subdividing said billet into bars and pressing said bars to a desired shape.

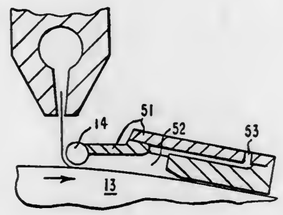
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**4,017,575**

## PRODUCTION OF A FLAT THERMOPLASTIC FILM BY PASSING THE FILM OVER A BEARING HAVING A LUBRICATING FLUID ON THE SURFACE THEREOF

**David E. Heyer, Circleville, Ohio, assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Continuation of Ser. No. 232,764, March 8, 1972, abandoned, which is a continuation-in-part of Ser. No. 23,390, March 27, 1970, abandoned. This application Aug. 16, 1973, Ser. No. 388,835**
**Int. Cl.² B29D** *7/02*
**U.S. Cl. 264—89** **1 Claim**




1. In the process for the preparation of flat thermoplastic film in which a molten web is cast in a catenary path from an extrusion die onto a moving quenching surface, the improvement which comprises:

passing the freshly extruded molten web as it moves in a free melt span over a bearing positioned between the orifice of the extrusion die and the normal touchdown point of the web onto the quenching surface;

providing a layer of fluid on the surface of the bearing;

displacing the molten web from its catenary path to an earlier tangential approach path from the extrusion die to the quenching surface by means of the layer of fluid on the surface of the bearing;

maintaining the fluid at a distributed pressure equal to the pressure exerted toward the bearing surface as a result of the tension of the web and sufficient to maintain the freshly extruded web out of contact with the surface of the bearing; and

applying a uniform field of air pressure onto the surface of the web after its touchdown onto the quenching surface sufficient to facilitate more intimate contact of the web and quenching surface while preparing a film free of recurring haze patterns known as "venetian blind haze."

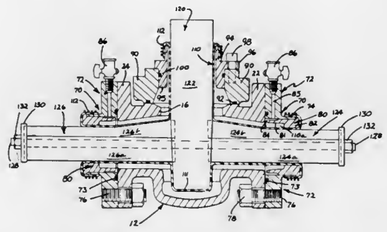
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**4,017,576**

## METHOD OF LINING A PLUG VALVE

**Jacob B. Freed, Battle Creek, Mich., and Victor G. Reiling, Dayton, Ohio, assignors to Union Pump Company, Battle Creek, Mich.**

**Continuation of Ser. No. 273,193, July 19, 1972, abandoned, which is a division of Ser. No. 35,016, May 6, 1970, Pat. No. 3,698,422. This application May 28, 1974, Ser. No. 473,379**
**Int. Cl.² B29D** *23/01*; **B27J** *5/00*
**U.S. Cl. 264—91** **16 Claims**



4. A method of lining a fluid flow-controlling member with a layer of corrosion-resistant material fully covering the interior thereof, comprising the steps: providing a generally hollow resilient forming element having an external shape generally corresponding to the shape of the desired lined passage within said member and inserting said element inside such member; resiliently expanding said forming element while inside of said member outwardly toward the interior surfaces of said member; inserting into said expanded forming element a mandrel having outwardly projecting component leg portions which are disposed at relative angles with respect to one another; resiliently contracting said forming element about said mandrel to provide a clearance space between the contacted forming element there upon and the internal walls of said member; loading a quantity of said corrosion-resistant lining material into said clearance space; resiliently expanding said forming member away from said mandrel to at least slightly compress said material, removing the mandrel from said forming element, and removing said forming element from said member.

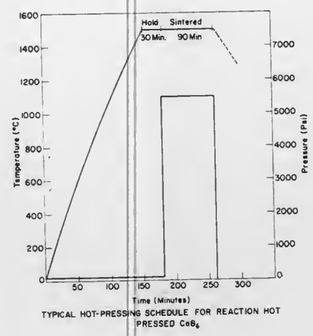


**4,017,577**

## HOT PRESSING OF REACTION SINTERED $CaB_6$

**Sunil K. Dutta, West Newton, Mass., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Feb. 15, 1974, Ser. No. 443,069**
**Int. Cl.² C04B** *35/58*
**U.S. Cl. 264—102** **1 Claim**




TYPICAL HOT-PRESSING SCHEDULE FOR REACTION HOT PRESSED $CaB_6$

1. A method for the production of high density compact of calcium hexaboride comprising the steps of:

after preliminary evacuation, gradually heating stoichiometric quantities of calcium oxide having an average particle size of 2.2 microns and boron powder having a particle size of less than 1 micron at a rate of approximately 8°–10° C per minute to a temperature of approximately 1,500° C.

maintaining the calcium oxide and boron powder at the above temperature for approximately 30 minutes to cause their reaction to produce calcium hexaboride;

applying a pressure of approximately 5,500 pounds per square inch to the produced calcium hexaboride;

maintaining the produced calcium hexaboride at 1,500° C and 5,500 psi for approximately 90 minutes to produce a sintered compact and

returning the pressure to atmospheric conditions while allowing the sintered compact to gradually cool to ambient temperatures.

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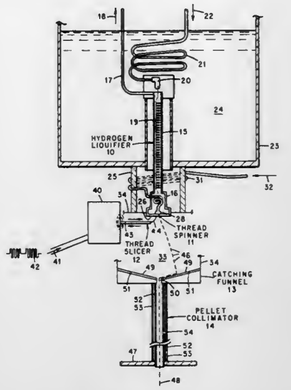
**4,017,578**

## METHOD FOR PRODUCING LASER TARGETS

**Thomas R. Jarboe, Oakland, and William R. Baker, Orinda, both of Calif., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.**

**Division of Ser. No. 446,066, Feb. 26, 1974, Pat. No. 3,907,477. This application June 12, 1975, Ser. No. 586,459**
**Int. Cl.² B02C** *18/02*; **G21B** *1/02*
**U.S. Cl. 264—143** **1 Claim**

1. A method for producing laser targets of deuterium having a diameter in the range of 25$\mu$ to 75$\mu$ comprising the steps of precooling a quantity of liquid deuterium, by cooling the liquid deuterium to a temperature in the range of 19° K to 22° K at a pressure in the range of 400 to 1200 Torr, forming a continuous thread of the thus cooled deuterium, by directing the thus cooled deuterium through a tapered orifice at a rate of about 50 micron-liters per second into a vacuum chamber maintained at less than $10^{-4}$ torr slicing the thus formed thread into desired length pellets, by use of a wire held at about 21° K collecting the thus sliced pellets, in a funnel bearing a roughened surface with a slope of about 20° and held at a temperature of about 77° K and collimating the collected pellets for passage thereof through the focal point of a laser system by passing the thus collected pellets through a capillary tube held at liquid nitrogen temperature and bearing a clean, smooth interior wall wherein the pressure within said tube continuously decreases from said funnel to said focal point of said system and is sufficiently low so as to prevent the pellets from becoming unduly warmed.



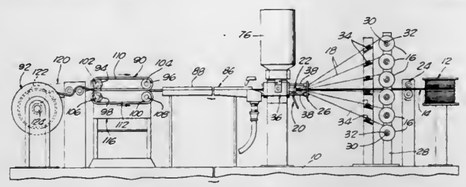

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**4,017,579**

## METHOD FOR FORMING A SHEATHED ELECTRICAL CABLE

**Norman P. Roe, and Gordon W. Brown, both of Idyllwild, Calif., assignors to Consolidated Products Corporation, Idyllwild, Calif.**

**Filed Nov. 18, 1974, Ser. No. 524,643**
**Int. Cl.² B29F** *3/10*; **H01B** *7/18*
**U.S. Cl. 264—174** **7 Claims**



1. A method of manufacturing a sheathed electromechanical cable for submarine use which includes the steps of:

feeding along a predetermined path an electrically conducting cable core covered by a hardened plastic insulating material and having a circular cross-section,

feeding a plurality of annularly disposed discrete flexible strain members along a converging course directed toward said predetermined path of said core,

drawing said strain members into close contact with said cable core with the individual members extending parallel to one another and to the longitudinal axis of said cable core and disposed about the core with a circumferential spacing,

simultaneously advancing said cable core and strain members along said predetermined path, and

continuously lengthwise extruding a molten thermoplastic material about the cable core and strain members as they simultaneously advance along said predetermined path to thereby provide a tubular sheath whose inner surface is brought into close contact with the outer surfaces of the strain members but is not forced to fill the circumferential spaces between the strain members, thereby providing a cable in which the strain members are free to physically reorient themselves helically about the axis of the cable when the latter is twisted.

**4,017,580**

## PROCESS AND APPARATUS FOR MANUFACTURING NON-WOVEN WEBS OF CONTINUOUS THERMOPLASTIC FILAMENTS

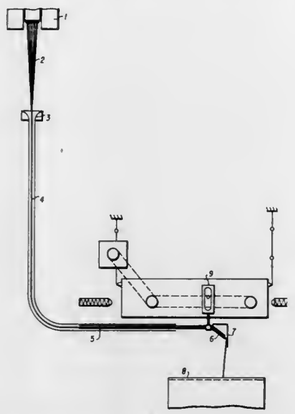
**Jacques Barbey, Miribel, France, assignor to Rhone-Poulenc-Textile, Paris, France**

**Filed June 2, 1975, Ser. No. 582,755**

**Claims priority, application France, June 10, 1974, 74.20254**

**Int. Cl.² D01D** *5/12, 7/00*

**U.S. Cl. 264—210 F** **10 Claims**



1. In a process for manufacturing non-woven webs from continuous filaments by steps including extruding, stretching, deflecting and depositing a bundle of filaments on a receiving table, the improvement comprising,

passing the stretched continuous filaments through a tube for guiding continuous filamentary material, said tube comprising a first immovable part which is fixed to a stretching nozzle for receiving said stretched continuous filaments and a movable second part substantially coaxial with and having one end thereof slidably mounted with respect to said first part so that said second part extends over and substantially parallel to the receiving surface of a moving receiving table,

deflecting said filaments emerging from said tube down toward the receiving surface of said table by contacting said filaments with a filament deflector attached to the other end of the second part of said guiding tube,

and distributing said deflected filaments in a non-woven web on the receiving surface of said moving receiving table by reciprocally moving said second part of the guiding tube in a plane which is transverse to the direction in which the receiving surface of said receiving table is simultaneously moving.

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**4,017,581**

## PROCESS FOR PREPARING RELIEF PRINTING MASTERS AND MOLDS

**Alan B. Amidon, Penfield, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

**Filed Mar. 25, 1975, Ser. No. 561,824**

**Int. Cl.² B29C** *1/02;* **B32B** *31/18*

**U.S. Cl. 264—220** **10 Claims**

5. A method for preparing a printing master comprising:

a. providing a suitable first substrate,
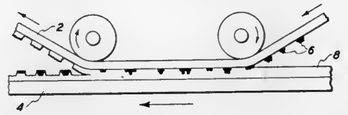
b. depositing a particulate material in image configuration on said first substrate,

c. providing a second substrate,

d. coating said second substrate with a tacky adhesive silicone gum curable to an adhesive elastomeric condition,

e. contacting said coated substrates such that the adhesive is in contact with the image bearing substrate in the nonimaged areas and is in contact with the particulate material in the imaged areas,

f. separating said substrates whereby the silicone splits in the nonimaged areas and is prevented from splitting by the transfer of the particulate image material in the imaged areas, and whereby the image material is transferred from the first substrate to the second substrate,



g. curing the silicone gum remaining on the first substrate to an elastomeric condition to provide a mold for relief printing masters,

h. filling the resultant submerged portions of said mold with a liquid but hardenable material suitable for forming a master image,

i. affixing a suitable master substrate to said liquid material,

j. hardening the liquid material and removing the resultant replica from the mold.

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**4,017,582**

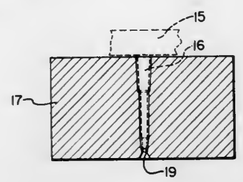
## PROCESS FOR MAKING A PROBE SHEET

**John R. Naumann, 347 N. 5th East, Brigham City, Utah 84302**

**Division of Ser. No. 322,966, Jan. 12, 1973, Pat. No. 3,880,282. This application Mar. 12, 1975, Ser. No. 557,785**

**Int. Cl.² B29D** *23/02*

**U.S. Cl. 264—291** **1 Claim**



1. A method of manufacturing a disposable sheath for a temperature sensing probe comprising the steps of

producing a tapered mandrel having the interior shape of the sheath to be produced;

positioning said mandrel to be in a cavity shaped to conform to the outer shape of the sheath to be produced such that said mandrel is spaced a distance from the cavity wall corresponding to the desired wall thickness of the sheath, the distance between the tapered mandrel and the cavity wall adjacent to the small end of the mandrel is not larger than about 0.012 inch, the distance at the large end of the mandrel is at least about 0.039 inch and the distance at the small tip end of the mandrel is less than about 0.002 inch;

injecting a suitable plastic selected from the group consisting of styrene, polypropylene and polyethylene into the space between the cavity and the mandrel at the tip end of the sheath through an orifice having a diameter of from 0.007 inch to 0.021 inch;

cutting off flow through the orifice; and

withdrawing the mandrel from the orifice while the plastic is in a moldable condition whereby the wall thickness adjacent a closed tip of the sheath is drawn down and the tip is fully enclosed said wall thickness at the top being such that rapid heat transfer will be obtained therethrough.



**4,017,583**

## VOLITILIZATION PROCESS FOR SEPARATION OF MOLYBDENUM-99 FROM IRRADIATED URANIUM

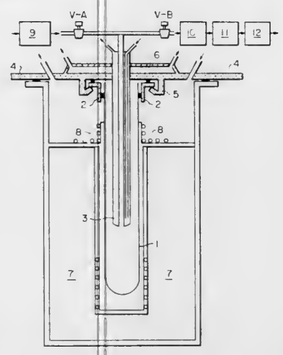
**Kenji Motojima, Mito; Matae Iwasaki, Ibaragi; Kazuya Suzuki, Ibaragi; Yoshihide Komaki, Ibaragi, and Katsuaki Ichiyanagi, Tokyo, all of Japan, assignors to Japan Atomic Energy Research Institute, Tokyo, Japan**

**Filed Jan. 31, 1975, Ser. No. 546,120**

**Claims priority, application Japan, Feb. 7, 1974, 49-14930**

**Int. Cl.² C01G** *39/00*

**U.S. Cl. 423—2** **7 Claims**



1. A process for separating and collecting molybdenum-99 in the form of molybdenum trioxide from neutron-irradiated, uranium, comprising:

heating the neutron-irradiated uranium in an atmosphere of oxygen under sub-atmospheric pressure to a temperature sufficient to oxidize the uranium to powdered triuranium octoxide,

heating the formed triuranium octoxide in vacuo to a temperature sufficient to sublimate molybdenum-99 in the form of molybdenum trioxide, and

condensing the sublimated molybdenum-99 in the form of molybdenum trioxide on a collector.

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**4,017,584**

## PROCESS FOR THE RECOVERY OF ALUMINUM TRICHLORIDE

**Giuseppe Messina, Alghero (Sassari), Italy; George Andrew Olah, Shaker Heights, Ohio, and Riccardo Moraglia, Sassari, Italy, assignors to Societa Italiana Resine S.I.R., S.p.A., Milan, Italy**

**Filed May 6, 1975, Ser. No. 574,953**

**Int. Cl.² C01F** *7/56;* **C01B** *1/02, 1/16*

**U.S. Cl. 423—122** **8 Claims**

1. A method for separating and recovering aluminum trichloride from a complex of aluminum trichloride, hydrocarbons and hydrogen chloride, said complex containing at least 20% by weight aluminum trichloride, which comprises contacting said complex with particulate metallic aluminum surface activated by contact with hydrogen chloride at a temperature of from ambient temperature to 100° C, for at least 0.5 hours and, optionally employing agitation, thus causing the formation of a precipitate of aluminum trichloride and by-products including gaseous hydrogen and liquid hydrocarbon, and recovering the precipitated aluminum trichloride.

**4,017,585**

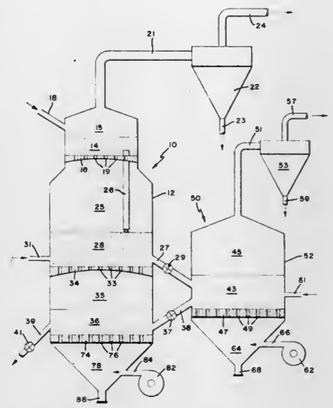
## FLUID BED CALCINATION PROCESS

**Peter A. Angevine, Ridgefield, and David W. Leyshon, Westport, both of Conn., assignors to Dorr-Oliver Incorporated, Stamford, Conn.**

**Filed Oct. 29, 1974, Ser. No. 518,800**

**Int. Cl.² C01B** *25/16*

**U.S. Cl. 423—167** **2 Claims**



1. A process for calcining phosphate rock containing contaminating quantities of the heavy metal cadmium comprising, preheating the phosphate rock in a primary chamber wherein the rock is fluidized by a first gas stream at a temperature of from about 700° C to about 800° C, the exhaust gas from said primary chamber being conducted to the stack, transferring the rock to a secondary chamber countercurrent to said first gas stream wherein fuel is injected into said chamber for combustion and the rock is fluidized by said first gas stream at a temperature of from about 450° C to about 500° C, transferring the rock for calcining to a tertiary chamber wherein fuel is injected for combustion to attain a temperature in the range from about 1000° C to about 1150° C to volatilize the cadmium and the rock is fluidized by a second gas stream flowing in parallel with said first gas stream, the exhaust gas and volatilized cadmium from said tertiary chamber being handled separately from the exhaust gas from said primary chamber so that the cadmium may be condensed therefrom for separate disposal, transferring the calcined rock to a cooling chamber for fluidization in said first gas stream, said calcined rock being cooled to a temperature of from about 450° C to about 500° C and the fluidizing gas being heated by said rock to this temperature range, discharging the cooled calcined rock from said cooling chamber and conducting the heated fluidizing gas to the secondary chamber as the fluidizing gas therefor.

2. A process for calcining cadmium-contaminated phosphate rock which is to be employed in the manufacture of phosphoric acid, the phosphate rock also containing significant quantities of the impurities carbon and sulfur, the calcination process to be connected in such a way as to avoid increasing the corrosive nature of the product phosphoric acid and removing the undesirable cadmium from the phosphate rock product, comprising, calcining the phosphate rock in a fluidized bed reactor at a temperature of from about 1000° C to about 1150° C while employing a detention time in the calcining fluidized bed of from 30 to 200 minutes to volatize the cadmium and so remove it from the phosphate rock as a vapor for disposal, maintaining oxidizing conditions in said reactor by controlling the exhaust gas from said reactor to contain at least about 0.5%, by volume, of oxygen so that the carbon and sulfur impurities are essentially completely oxidized and the formation of corrosive sulfide constituents is thereby prevented.

**4,017,586**

## STACK GAS TREATMENT

**Adam A. Reeves, P.O. Box 781, Rifle, Colo. 81650**

**Filed Aug. 6, 1975, Ser. No. 602,291**

**Int. Cl.² C01B** *17/00, 17/72*

**U.S. Cl. 423—242** **2 Claims**

1. A process for the reduction of sulfur dioxide in stack gas and for heating a stream of air in a vertically mounted two compartment reactor providing two vertically positioned zones comprising:

a. forming a gravity flow, continuously moving vertical bed of pebbles through said vertically aligned separate zones joined together with a minimum cross-section communication passage therebetween;

b. feeding pebbles into the top of the upper zone at a temperature of about 150°–250° F. and withdrawing the same from the bottom of the lower zone at a temperature of 150°–200° F. to maintain both zones full of pebbles and in solids communication with each other;

c. passing a heated stack containing sulfur dioxide at about 600° F into the lower end of the upper zone through said pebbles and withdrawing a clean stack gas at about 200°–250° F from the upper end thereof, said fluid stream being heated substantially above the maximum temperature of said pebbles;

d. passing ambient air into the lower end of the lower zone, through the pebbles, and withdrawing heated air from the upper end of the lower zone;

e. introducing an iron sulfate-manganese sulfate catalytic agent in solution into the upper zone along with said pebbles to wet the pebbles and to react oxygen of the air with sulfur compositions in the heated fluid stream;

f. regulating the pebble withdrawal rate from said lower zone in accordance with the temperature of the withdrawn stack gas so as to maintain the pebbles moist in the upper portion of the upper chamber so as to permit oxidation of the sulfur dioxide in the stack gas; and

g. subjecting withdrawn spent fluid to a collector for resultant sulfuric acid to produce a cooled relatively sulfur-free gaseous fluid system.

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**4,017,587**

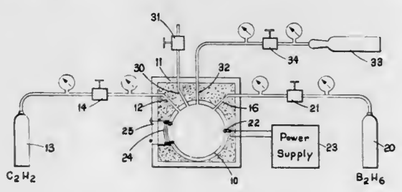
## BORON CARBIDE

**Jerome F. Ditter, Covina; Francis J. Gerhart, Temple City, and Robert E. Williams, La Canada, all of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Continuation of Ser. No. 864,957, Oct. 3, 1969, abandoned, which is a continuation of Ser. No. 695,315, Dec. 27, 1967, abandoned. This application Apr. 26, 1971, Ser. No. 137,626**

**Int. Cl.² C01B** *31/36*

**U.S. Cl. 423—291** **5 Claims**




1. A process of producing a boron carbide powder comprising the steps of:

providing a gaseous mixture of diborane and acetylene at a temperature less than 80° C to inhibit undesired side reactions and decomposition of the gases;

igniting the relatively low temperature gaseous mixture for producing a flame front;

promoting a relative movement between said flame front and said gaseous mixture for consuming the mixture in a flame reaction whereby said boron carbide powder is produced; and

recovering a reaction product of boron carbide powder.

5. A boron carbide powder of a porous nature with a surface area in excess of 100 m² per gram and with a mean pore size of about 30 Angstrom units and a mean particle diameter of less than one micron,

said powder being produced by a gaseous phase reaction of a boron hydride and acetylene and being amorphous to the extent that it has no apparent crystalline properties under X-ray spectroscopy and electron microscopy at magnifications up to 10,000 diameters.

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**4,017,588**

## MANUFACTURE OF SOLID AMMONIUM PHOSPHATE

**Eric Davidson, Edinburgh, Scotland, assignor to Scottish Agricultural Industries Limited, Edinburgh, Scotland**

**Filed Sept. 2, 1975, Ser. No. 609,808**

**Claims priority, application United Kingdom, Sept. 13, 1974, 40002/74**

**Int. Cl.² C01B** *15/16, 25/28*

**U.S. Cl. 423—313** **9 Claims**

1. A process for the production of a particulate solid product comprising ammonium phosphate of N:P atomic ratio 0.95 to 1.05 wherein a primary phosphoric acid-containing feed and ammonia are added to an aqueous slurry of ammonium phosphate of flowable consistency at the temperature of working and having an N:P atomic ratio of between 1.3 and 1.5 to form more slurry of substantially the same composition and concentration and flowable consistency, removing an amount of said slurry substantially equivalent to that produced by the addition of the phosphoric acid and ammonia and thereafter mixing the removed slurry with a secondary acid feed to reduce the N:P ratio to 0.95 to 1.05, wherein between 20% and 80% by volume of the removed slurry is mixed with the secondary acid feed, followed by the addition to the mixture of the remainder of the slurry, so that the ammonium phosphate of the resulting product has an N:P atomic ratio in the range 0.95 to 1.05, the water contents of the removed aqueous slurry and the secondary acid feed being such that the resulting product starts to solidify in a moisture disengagement unit where it is treated for a sufficient period of time for said product to be solid at ambient temperature whereby extra milling of the product is avoided.

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**4,017,589**

## PRODUCTION OF AMMONIUM POLYPHOSPHATES FROM MELAMINE PHOSPHATES

**John F. McCullough, Florence, and Richard C. Sheridan, Sheffield, both of Ala., assignors to Tennessee Valley Authority, Muscle Shoals, Ala.**

**Continuation of Ser. No. 619,710, Oct. 6, 1975, now Defensive Publication T952,008. This application Mar. 17, 1976, Ser. No. 667,553**

**Int. Cl.² C01B** *15/16, 25/26*

**U.S. Cl. 423—315** **6 Claims**

1. A process for manufacturing short-chain ammonium polyphosphates, which process comprises the steps of:

1. heating melamine orthosphosphate in an atmosphere of ammonia to a temperature between 150° and 210° C for a predetermined time sufficient to convert said melamine phosphate to crystalline melamine and ammonium polyphosphates;

2. separating said crystals of melamine formed by the reaction of said ammonia with said melamine orthophosphate in step 1, supra, and recovering said ammonium polyphosphates as product.



**4,017,590**

## PREPARATION OF SYNTHETIC FERRIERITE

**William E. Cormier, Worcester, and Leonard B. Sand, Holden, both of Mass., assignors to Zeochem Corporation, Worcester, Mass.**

**Continuation of Ser. No. 469,660, May 14, 1974, abandoned. This application Apr. 15, 1976, Ser. No. 677,263**

**Int. Cl.² C01B** *33/28*

**U.S. Cl. 423—329** **1 Claim**

1. A method of synthesizing a zeolite having the structure of ferrierite, comprising the steps of:

a. preparing a mixture including a source of silicon, a source of aluminum, a source of water, a source of sodium, and a source of potassium; and

b. allowing the mixture to react in the presence of carbon dioxide in the pressure vessel, wherein the mixture contains a carbonate-bicarbonate buffer pair, wherein the composition of the mixture as expressed in mole oxide ratios is

$$\frac{Na_2O + K_2O}{Al_2O_3} = \text{approximately } 3.26$$

$$\frac{CO_3 + HCO_3}{Al_2O_3} = \text{approximately } 5.7$$

$$\frac{SiO_2}{Al_2O_3} = \text{approximately } 13.5$$

$$\frac{H_2O}{Al_2O_3} = \text{approximately } 130.4$$

wherein the mixture before reaction contained no ferrierite, and wherein the mixture is held at 230° C to 310° C for 3 to 101½ hours.

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**4,017,591**

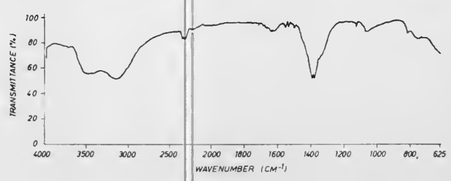
## PROCESS UTILIZING ACTIVATED ALUMINUM AND PRODUCTS PRODUCED THEREBY

**George G. Merkl, 46 Sunset Court, Haworth, N.J. 07641**

**Continuation-in-part of Ser. No. 389,797, Aug. 20, 1973, abandoned, and a continuation-in-part of Ser. No. 389,998, Aug. 20, 1973, abandoned. This application Mar. 8, 1976, Ser. No. 664,999**

**Int. Cl.² C01B** *21/20*

**U.S. Cl. 423—387** **26 Claims**




1. A process for producing an aluminum containing reaction product which comprises:

reactively contacting in an aqueous medium

a. activated aluminum comprising aluminum metal, at least 99.9% by weight pure, which has been permeated with from about 0.1% to about 5.0% by weight of mercury; and

b. a source of $NO_x$;

said process being carried out according to the following sequence:

i. adding said activated aluminum to said aqueous reaction medium;

iii. adding said source of $NO_x$ to said aqueous reaction medium in an amount to establish a pH in said aqueous reaction medium of at least about 1.5 and at a rate to maintain the temperature of said aqueous reaction medium below about 105° F during addition of said source of $NO_x$, the reaction of said source of $NO_x$ with the aluminum in said aqueous reaction medium being accompanied by an increase in the pH of said aqueous reaction medium;

iii. continuing the reaction while maintaining the temperature below the boiling point of the aqueous reaction medium until the specific gravity of the aqueous reaction medium is within the range of about 1.1 to 1.5; and

iv. terminating the reaction by withdrawal of any unreacted activated aluminum from the aqueous reaction medium before the specific gravity of said aqueous reaction medium exceeds about 1.5 and before the pH of the aqueous reaction medium exceeds about pH 4.5.

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**4,017,592**

## PROCESS FOR PRODUCTION OF AQUEOUS HYPOCHLOROUS ACID SOLUTION

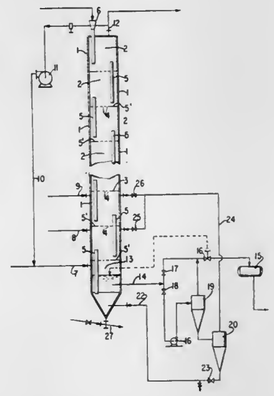
**Herbert F. L. Pénard, Bussum, and Johannis I. Risseeuw, Maarssen, both of Netherlands, assignors to Comprimo N.V., Amsterdam, Netherlands**

**Filed May 11, 1972, Ser. No. 252,453**

**Claims priority, application Netherlands, May 12, 1971, 7106494**

**Int. Cl.² C01B** *11/04*

**U.S. Cl. 423—473** **5 Claims**



1. A method of reacting a gas with at least one of the phases of a mixture of solids and liquid, which comprises feeding a fluid suspension of the solids in the liquid continuously into the highest reaction zone of a series of reaction zones disposed vertically one above another, in each of said zones maintaining a layer of suspension at a predetermined depth and as the volume of suspension therein exceeds said depth overflowing the excess suspension in a stream thereof conducted into the layer of suspension in the next lower reaction zone and, in the case of the lowest of said zones, conducted into a collecting space below it, the respective overflow streams from successive reaction zones being spaced horizontally away from each other, flowing gas continuously upwardly through the respective layers of suspension in said zones in succession and subdividing the gas flow entering each of said layers into a multiplicity of gas streams having a velocity sufficient for turbulently agitating the suspension in the layer, the gas upflow through at least a plurality of said layers containing the reactant gas, and continuously taking off residual gas from said highest reaction zone, each of said overflow streams being conducted from the surface of the layer of suspension in one

reaction zone into a bottom region of the layer of suspension in the next lower reaction zone at a location in the latter layer spaced horizontally away from the locations of entry of said gas streams thereinto, said suspension being an aqueous suspension of finely divided limestone and said gas consisting predominantly of chlorine, whereby a reacted suspension containing hypochlorous acid in aqueous solution is obtained in said collecting space.

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**4,017,593**

## MANUFACTURE OF SODIUM DITHIONITE

**Erfried Voelkl, Frankenthal; Siegfried Schreiner, Ludwigshafen; Gerd Wunsch, Speyer; Volker Kiener; Rudi Waibel, both of Ludwigshafen, and Hartwig Koester, Frankenthal, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany**

**Filed Aug. 12, 1975, Ser. No. 603,856**

**Claims priority, application Germany, Sept. 5, 1974, 2442418**

**Int. Cl.² C01B** *17/66*

**U.S. Cl. 423—515** **7 Claims**

1. A process for the manufacture of anhydrous sodium dithionite by the reaction of sodium formate, sulfur dioxide and caustic soda which comprises adding to an initial volume of a liquid mixture of an organic solvent and water having dissolved therein all of the caustic soda required for the reaction and not more than 70% of all of the formate required, adding together the remainder of the sodium formate and the sulfur dioxide at temperatures in the range of 67° to 80° C., reacting the formate, sulfur dioxide and caustic soda at 67° to 85°C., and separating the anhydrous sodium dithionite formed from the liquid phase.

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**4,017,594**

## REDUCING THE CONSUMPTION OF ANTHRAQUINONE DISULFONATE IN STRETFORD SOLUTIONS USING THIOCYANATE ION PRECURSORS

**Donald M. Fenton, Anaheim, and Raoul P. Vaell, Los Angeles, both of Calif., assignors to Union Oil Company of California, Brea, Calif.**

**Filed Aug. 12, 1975, Ser. No. 604,006**

**Int. Cl.² C01B** *17/04*

**U.S. Cl. 423—573 R** **11 Claims**

1. In the process for treating a hydrogen sulfide-containing gas to convert the hydrogen sulfide to elemental sulfur in which said gas is contacted with an aqueous alkaline washing solution comprising a water-soluble metal vanadate and a water-soluble anthraquinone disulfonate to yield an effluent gas of reduced sulfur content, the solution is thereafter regenerated by contact with an oxide-containing gas, elemental sulfur is recovered from said solution and said regenerated solution is recycled to said gas-contacting step, and in which said hydrogen sulfide-containing gas is deficient in thiocyanate ion precursors and the concentration of thiocyanate ion in said solution is insufficient to prevent chemical consumption of said anthraquinone disulfonate, the improvement which comprises the step of adding a thiocyanate ion precursor to said washing solution to increase the concentration of thiocyanate ion in said washing solution, said thiocyanate ion precursor being selected from the group consisting of the alkali metal and ammonium thiocyanates and the alkali metal and ammonium cyanides, whereby the concentration of said thiocyanate ion in said washing solution is increased and the consumption of said anthraquinone disulfonate is reduced.

**4,017,595**

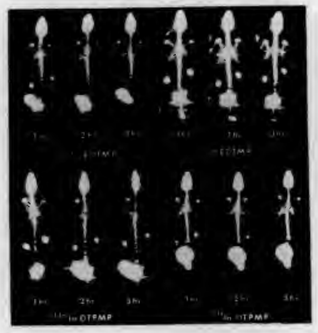
## BONE-SEEKING INDIUM-113M OR INDIUM-111 ORGANIC PHOSPHONATE COMPLEXES

**Gopal Subramanian, Manlius, and John Gilmour McAfee, Fayetteville, both of N.Y., assignors to Research Corporation, New York, N.Y.**

**Filed Aug. 28, 1975, Ser. No. 608,695**

**Int. Cl.² A61K** *29/00, 43/00*

**U.S. Cl. 424—1** **14 Claims**



1. A bone-seeking skeletal imaging agent comprising a complex of Indium-113m or Indium-111 with ethylene diamine tetra (methylene phosphonic) acid, diethylene triamine penta(methylene phosphonic) acid, or a salt thereof with a pharmaceutically acceptable cation.

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**4,017,596**

## RADIOPHARMACEUTICAL CHELATES AND METHOD OF EXTERNAL IMAGING

**Michael Dewey Loberg, Baltimore; Patrick Stephen Callery, Timonium, and Malcolm Cooper, Reisterstown, all of Md., assignors to Research Corporation, New York, N.Y.**

**Continuation-in-part of Ser. No. 555,037, March 3, 1975, abandoned. This application Sept. 2, 1975, Ser. No. 609,545**

**Int. Cl.² A61K** *43/00, 29/00;* **C07C** *101/02;* **G01T** *1/16*

**U.S. Cl. 424—1** **13 Claims**

1. A chelate of technetium-99m, cobalt-57, gallium-67, gallium-68, indium-111 or indium-113m and a substituted iminodiacetic acid.

2. A chelate of technetium-99m cobalt-57, gallium-67, gallium-68, indium-111 or indium-113m and an 8-hyroxyquinoline.

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**4,017,597**

## UNITIZED SOLID PHASE IMMUNOASSAY KIT AND METHOD

**John H. Reynolds, Baltimore, Md., assignor to Monsanto Company, St. Louis, Mo.**

**Filed Oct. 30, 1974, Ser. No. 519,317**

**Int. Cl.² A61k** *43/00;* **G01N** *33/00;* **A61B** *10/00;* **C12K** *1/04*

**U.S. Cl. 424—1.5** **33 Claims**

1. A means for use in the immunoassay of a component of the antigen-antibody reaction comprising a surface within a receptacle to at least a part of which one of the components in solid form is bound and in proximity to which the other component is present in labelled and in solid form but not bound, said components being present within said receptacle under conditions substantially impervious to the ambient atmosphere.



**4,017,598**

## PREPARATION OF READILY DISINTEGRABLE TABLETS

**Shigeru Ohno, Kamakura; Noboru Hoshi, Higashikurume, and Fujio Sekigawa, Yono, all of Japan, assignors to Shin-Etsu Chemical Company Limited, Tokyo, Japan**

**Filed Apr. 22, 1975, Ser. No. 570,959**

**Claims priority, application Japan, Apr. 27, 1974, 49-47875**

**Int. Cl.² A61J** *3/10;* **A61K** *47/00*

**U.S. Cl. 424—35** **9 Claims**

1. A method for the preparation of readily disintegrable tablets which comprises the steps of (a) granulating powdery methylcellulose wetted with a mixed solvent of water and and an alcohol selected from the group consisting of methanol, ethanol and propanol in a ratio of from 9:1 to 1:9 by weight into granules, (b) admixing a disintegrator selected from the group consisting of a microcrystalline cellulose, calcium salt of carboxymethylcellulose, methylcellulose with the degree of substitution in the range of from 0.1 to 1.2, hydroxypropylcellulose with the molar substitution in the range of from 0.1 to 1.2 and hydroxypropylmethylcellulose with the degree of molar substitution for the methoxy groups and hydroxypropoxy groups in the range of from 0.1 to 1.2 with said granules in an amount of from 3% to 200% by weight based on said granules to form a blend, and (c) shaping said blend into tablets.

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**4,017,599**

## ALUMINUM-ZIRCONIUM ANTI-PERSPIRANT SYSTEMS WITH SALTS OF AMINO ACIDS

**Andrew M. Rubino, New Providence, N.J., assignor to Armour Pharmaceutical Company, Phoenix, Ariz.**

**Filed Nov. 23, 1973, Ser. No. 418,712**

**Int. Cl.² A61K** *7/34*

**U.S. Cl. 424—47** **20 Claims**

1. An astringent, water soluble complex formed by reacting in an aqueous solution:

a. a basic aluminum compound selected from the group having the general empirical formula:

$$Al_2(OH)_{6-nx}A_x$$

wherein $x$ may vary from greater than 0 to less than 6, $6-nx$ is greater than or equal to 0, $n$ is the valence of $A$, and $A$ is selected from the group consisting of halides, nitrate, sulfamate, sulfate and mixtures thereof;

b. a zirconium compound selected from the group having the general empirical formula:

$$ZrO(OH)_{2-nz}B_z$$

wherein $z$ may vary from 0.9 to 2, $n$ is the valence of B, $2-nz$ is greater than or equal to 0, and $B$ is selected from the group consisting of halides, nitrate, sulfamate, sulfate and mixtures thereof; and

c. an amino compound selected from alkaline salts of amino acids, said alkaline salts of amino acids being derived from amino acids in which the number of a amino groups is equal to the number of carboxyl groups in the molecule; said zirconium and basic aluminum compounds being present in such amounts as to yield an Al/Zr mole ratio of about 10:1 to 1:10, and said amino compound being present in such an amount that the pH of a 5 to 15 weight percent (based on the oxides of Al and Zr) aqueous solution of the complex is at least about 3.

11. An astringent complex according to claim 1 wherein said complex is in the form of a powder.

14. A powder-in-oil antiperspirant composition comprising an aerosol propellant and the complex according to claim 11 wherein said complex is present in an amount such that the total aluminum plus zirconium present in the antiperspirant composition, calculated as the oxides, is about 1–6 weight percent.

**4,017,600**

## REACTIVATION OF INTERFERON

**William Edgar Stewart, Herent, and Pierre Marie Hendrik Frans de Somer, Leuven, both of Belgium, assignor to Stichting REGA V.Z.W.**

**Filed Apr. 3, 1975, Ser. No. 564,726**

**Claims priority, application Netherlands, Apr. 3, 1974, 7404590**

**Int. Cl.² A61K** *45/02*

**U.S. Cl. 424—85** **11 Claims**

1. A method of reactivating interferon, comprising the following steps:

a. providing an aqueous interferon solution which has lost at least part of its initial activity; and

b. treating said interferon solution with a combination of:

i. urea or guanidine-hydrochloride as an agent for disrupting non-covalent bonds,

ii. mercaptoethanol or ethanethiol as an agent for reducing disulfide bridges, and

iii. a surface-active agent selected from the group consisting of sodium dodecylsulfate, sodium decylsulfate, sodium dodecylsulfonate, dodecylamine and decylamine, so as to obtain an aqueous interferon solution which has been reactivated substantially to its initial activity.

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**4,017,601**

## HEPATITIS A ANTIGEN

**Maurice R. Hilleman, Lafayette Hill; William J. Miller, North Wales, and Philip J. Provost, Harleysville, all of Pa., assignors to Merck & Co., Inc., Rahway, N.J.**

**Filed Oct. 16, 1975, Ser. No. 623,184**

**Int. Cl.² A61K** *39/12*

**U.S. Cl. 424—89** **8 Claims**

1. A method of obtaining hepatitis A antigen comprising collecting a stool of a hepatitis A patient within the period of from about 7 days before to about 7 days after clinical onset of hepatitis A, forming a physiological saline homogenous extract of the stool, centrifuging the mixture, assaying the supernatant liquid for hepatitis A antigen and selecting extracts having a hepatitis A antigen titer of at least 1:4.

3. A method of preparing an immunizing antigen which comprises collecting a stool of a hepatitis A patient within the period of from about 7 days before to about 7 days after clinical onset of hepatitis A, forming a physiological saline homogeneous extract of the stool, centrifuging the mixture, assaying the supernatant liquid for hepatitis A antigen and selecting extracts having a hepatitis A antigen titer of at least 1:4, treating the selected extracts with ultrasound, centrifuging the sonicated extract to form a pellet, resuspending the pellet with ultrasound, filtering the suspension, centrifuging the filtrate in a cesium chloride density gradient, collecting fractions having densities of from about 1.32 to about 1.36 g/cm³, dialyzing the fractions against distilled water, extracting the fractions with ether, acidifying the aqueous phase to from about pH 2 to about pH 4, holding at ambient temperature for from about 1 to about 5 hours, adjusting the pH to about 7.0, heating to from about 50 to about 65° C. for from about 0.5 to about 2 hours, clarifying by centrifugation and treating the supernate with formaldehyde.

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**4,017,602**

## PROCESS FOR PREPARING PRODUCTS FOR USE IN AEROSOL FORM

**Jean Cazorla, and Yves Tillon, both of Bernay, France, assignors to Roger & Gallet, Paris, France**

**Filed Aug. 15, 1975, Ser. No. 605,089**

**Claims priority, application France, Aug. 28, 1974, 74.29386**

**Int. Cl.² A61L** *9/04*

**U.S. Cl. 424—44** **13 Claims**

1. A process for the preparation of products for use in aerosol form comprising the preparation of a base composi-

tion, the introduction of this composition into an aerosol container and the use of a propellant, wherein the composition is previously inoculated by organisms able to bring about fermentation with the giving off within the container of carbondioxide gas which serves as the propellant.

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**4,017,603**

## WATER-SOLUBLE PHARMACEUTICAL COMPLEXES OF PARTRICIN OR AN ALKYL ESTER THEREOF WITH SODIUM DESOXYCHOLATE OR SODIUM DEHYDROCHOLATE

**Rodolfo Ferrari, and Ernani Dell'Acqua, both of Milan, Italy, assignors to SPA-Societa Prodotti Antibiotici S.p.A., Milan, Italy**

**Filed Aug. 29, 1975, Ser. No. 609,143**

**Claims priority, application United Kingdom, Sept. 3, 1974, 38412/74**

**Int. Cl.² A61K** *35/00*

**U.S. Cl. 424—122** **4 Claims**

1. A water-soluble pharmaceutical complex, comprising an antibiotic selected from the group consisting of partricin, partricin methyl ester and partricin ethyl ester and a complex-forming compound selected from the group consisting of sodium desoxycholate and sodium dehydrocholate, wherein the weight ratio of the antibiotic to the complex-forming compound is about 1:1, said partricin having an Rf value of about 0.50 on silica gel using butanol-ethanol-acetone-25% ammonium hydroxide in a ratio of 2:5:1:3 as eluent, ultraviolet absorption maxima at 410, 379, 359 and 341 mμ in ethanol at a concentration of about 0.01 mg/ml, infrared absorption maxima at 3355, 1704, 1596, 1175, 1070, 995 and 850 $cm^{-1}$ in nujol, and an elemental analysis of C = 62.8%, H = 7.9%, N= 3.2% and O =25.2%

said complex having an ultraviolet absorption spectrum and Rf value equal to the ultraviolet absorption spectrum and Rf value of the antibiotic alone.

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**4,017,604**

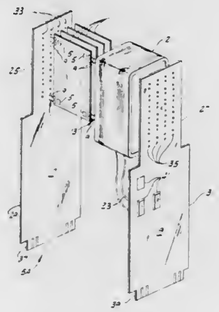
## MAGNETIC BUBBLE CHIP PACKAGING ASSEMBLY

**Rex Alan Naden, and Terry Wayne Noe, both of Richardson, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.**

**Filed Mar. 3, 1975, Ser. No. 554,955**

**Int. Cl.² G11C** *11/14*

**U.S. Cl. 340—174 TF** **11 Claims**



1. A packaging assembly for magnetic bubble chips comprising:

a plurality of parallel module assembly boards having a surface to which is secured in a substantially planar array a plurality of magnetic bubble chips for the storing and processing of information;

first and second sets of terminals located on opposed lateral edges of each of said module assembly boards for the routing therethrough of electrical signals to and from said chips;

first and second mounting boards positioned in spaced parallel registering relationship with each other, each board having respective sets of receptacle means for soldering thereto of a corresponding set of said terminals of each of said module assembly boards, said module assembly boards extending between said mounting boards in transverse relationship thereto and being secured to said mounting boards by soldered connections between the sets of terminals and receptacle means;

coil means surrounding said plurality of module assembly boards and wound about an axis parallel to the planes of said chips on said module assembly boards for producing a magnetic field parallel thereto;

bias field means positioned exterior to said coil means for producing a substantially constant magnetic field perpendicular to the planes of said chips on said module assembly boards;

means for exciting said coil means to produce a rotating magnetic field parallel to the planes of said chips on said module assembly boards to control the movement of magnetic bubbles therein; and

means for controlling the storage and processing of information in said chips whereby convenient access to the chips may be gained by sequential disassembly of said bias field means, said coil means, and reheating of the solder connections between the terminals and receptacle means for each respective module assembly board.

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**4,017,605**

## ACYLATED ORGOTEIN

**Wolfgang Huber, Atherton; Mark G. Saifer, Berkeley, and Lewis D. Williams, Menlo Park, all of Calif., assignors to Diagnostic Data, Inc., Mountain View, Calif.**

**Filed Sept. 20, 1974, Ser. No. 507,685**

**Int. Cl.² C07G** *7/04*

**U.S. Cl. 424—177** **12 Claims**

1. N-acyl orgotein wherein the acyl group is present on at least one lysine ϵ-amino group and is the acyl radical of a mono- or di-basic hydrocarbon carboxylic acid of up to 8 carbon atoms.

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**4,017,606**

## ORGANIC COMPOUNDS AND PROCESS

**Arthur R. Hanze, Kalamazoo, and Gerald W. Camiener, Portage, both of Mich., assignors to The Upjohn Company, Kalamazoo, Mich.**

**Continuation of Ser. No. 403,676, Oct. 4, 1973, abandoned, which is a continuation of Ser. No. 169,535, Aug. 5, 1971, abandoned, which is a continuation of Ser. No. 870,155, June 27, 1969, abandoned, which is a division of Ser. No. 665,244, Sept. 5, 1967, Pat. No. 3,462,416, which is a continuation-in-part of Ser. No. 636,608, May 18, 1967, abandoned, which is a continuation-in-part of Ser. No. 612,331, Jan. 30, 1967, abandoned. This application Mar. 28, 1975, Ser. No. 563,043**

**Int. Cl.² A61K** *31/70*

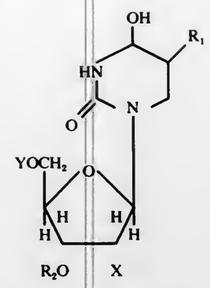
**U.S. Cl. 424—180** **5 Claims**

1. A pharmaceutical preparation comprising:

a. 1-β-D-arabinofuranosylcytosine or a pharmaceutically acceptable acid addition salt thereof, and

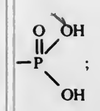
b. A compound of the formula:



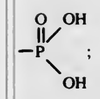


II

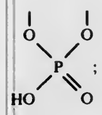
wherein $R_1$ is selected from the group consisting of hydrogen, methyl, hydroxymethyl, chlorine, fluorine and $-CF_3$; wherein $R_2$ is selected from the group consisting of hydrogen, Ac in which Ac is the acyl group of a hydrocarbon carboxylic acid containing from 2 to 12 carbon atoms, inclusive, and



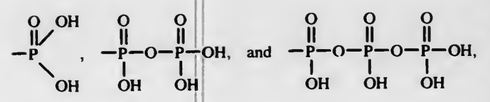
wherein X is selected from the group consisting of hydrogen, hydroxy, OAc in which Ac is defined as above, and



and wherein X and $OR_2$ together can be



wherein Y is selected from the group consisting of hydrogen, Ac defined as above,



wherein the ratio of 1-β-D-arabinofuranosylcytosine to the compound selected from (b) above is between 1,000:1 and 1:10.

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**4,017,607**

## 9,3'',4''-TRIACYL ESTER OF THE ANTIBIOTIC SF-837 $M_1$ SUBSTANCE AND THE PRODUCTION THEREOF

**Shigeharo Inouye, Yokohama; Shoji Omoto, Tokyo; Katsuyoshi Iwamatsu, Ayase; Takashi Tsuruoka, Kawasaki; Taro Niida, Yokohama, and Toyoaki Kawasaki, Tokyo, all of Japan, assignors to Meiji Seika Kaisha, Ltd., Tokyo, Japan**

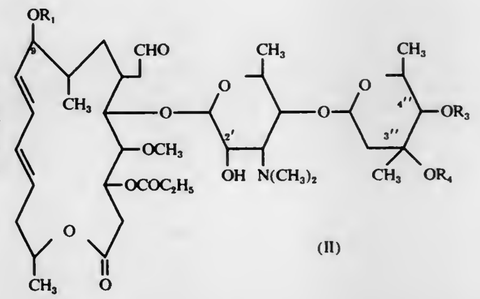
**Continuation-in-part of Ser. No. 475,311, May 31, 1974, abandoned. This application July 18, 1975, Ser. No. 597,188**

**Claims priority, application Japan, Aug. 27, 1974, 49-97485**

**Int. Cl.² C07H** *17/08*

**U.S. Cl. 424—180** **8 Claims**

1. A 9,3'',4''-tri-alkanoyl SF-837 $M_1$ substance of the formula (II):



(II)

wherein $R_1$ and $R_4$ are each acetyl or propionyl and $R_3$ is acetyl, propionyl, n-butyryl, isobutyryl or isovaleryl.

7. A pharmaceutical composition suitable for use in treating bacterial infections in a living animal, comprising a therapeutically effective amount of a compound selected from the group consisting of 9,3'',4''-tri-alkanoyl SF-837 $M_1$ substance of the formula (II) as claimed in claim 1 (and/or), a pharmaceutically acceptable salt thereof and a mixture of said substance and said salt of the 9,3'',4''-tri-alkanoyl SF-837 $M_1$ substance, in combination with a pharmaceutically acceptable carrier.

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**4,017,608**

## THERAPEUTIC COMPOSITION AND METHOD OF THERAPEUTICALLY TREATING WARM BLOODED ANIMALS THEREWITH

**Paul Gordon, Chicago, Ill., assignor to Strategic Medical Research Corporation, Murray, Utah**

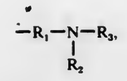
**Division of Ser. No. 424,786, Dec. 14, 1973, Pat. No. 3,939,146, which is a continuation-in-part of Ser. No. 337,134, March 1, 1973, Pat. No. 3,939,145. This application Sept. 2, 1975, Ser. No. 609,724**

**Int. Cl.² A61K** *31/70*

**U.S. Cl. 424—180** **52 Claims**

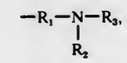
1. A novel therapeutic composition comprising a pharmaceutically acceptable carrier containing a therapeutically effective amount of at least one substance selected from the group consisting of an etheral monosubstitution of a monosaccharide derivative having the formula S—O—Y, and therapeutically effective and pharmaceutically acceptable organic acid and inorganic acid salts thereof, wherein S is the residue of a monosaccharide selected from the group consisting of pentoses, hexoses and heptoses which has been derivatized with at least one substance selected from the group consisting of (a) at least one aliphatic alcohol containing 1–18 carbon atoms to produce an acetal group at the site of at least one available hydroxyl group, (b) at least one aldehyde containing 1–18 carbon atoms to produce at least one acetal group at the site of at least one available hydroxyl group, (c) at least one ketone containing 1–18 carbon atoms to produce at least one ketal group at the site of at least one available hydroxyl group, and (d) at least one organic acid residue containing 1–18 carbon atoms to produce an ester group at the site of at least

one available hydroxyl group, and Y is selected from the group consisting of cyclic monovalent nitrogen containing organic radicals and monovalent organic radicals having the formula



wherein $R_1$ is a divalent organic radical having a linear crbon chain length of about 1–7 carbon atoms and $R_2$ and $R_3$ are selected from the group consisting of —H,—OH, —SH, halogen and monovalent organic radicals having a linear carbon chain length of about 1–7 carbon atoms.

**20.** A method of therapeutically treating a warm blooded animal comprising therapeutically administering thereto a therapeutically effective amount of at least one substance selected from the group consisting of an ethereal monosubstitution of a monosaccharide derivative having the formula S—O—Y, and therapeutically effective and pharmaceutically acceptable organic acid and inorganic acid salts thereof, wherein S is the residue of a monosaccharide selected from the group consisting of pentoses, hexoses and heptoses which has been derivatized with at least one substance selected from the group consisting of (a) at least one aliphatic alcohol containing 1–18 carbon atoms to produce an acetal group at the site of at least one available hydroxyl group, (b) at least one aldehyde containing 1–18 carbon atoms to produce at least one acetal group at the site of at least one available hydroxyl group, (c) at least one ketone containing 1–18 carbon atoms to produce at least one ketal group at the site of at least one available hydroxyl group, and (d) at least one organic acid residue containing 1–18 carbon atoms to produce an ester group at the site of at least one available hydroxyl group, and Y is selected from the group consisting of cyclic monovalent nitrogen containing organic radicals and monovalent organic radicals having the formula



wherein $R_1$ is a divalent organic radical having a linear carbon chain length of about 1–7 carbon atoms and $R_2$ and $R_3$ are selected from the group consisting of —H,—OH, —SH, halogen and monovalent organic radicals having a linear carbon chain length of about 1–7 carbon atoms.

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**4,017,609**

**O-ALKYL-O-[7-NITROBENZISOXAZOL(3)YL]-THIONOPHOSPHORIC (PHOSPHONIC) ACID ESTERS**

**Walter Lorenz, Wuppertal; Ingeborg Hammann, Cologne, and Wilhelm Stendel, Wuppertal, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany**

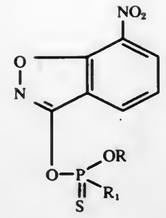
**Filed Dec. 8, 1975, Ser. No. 638,876**

**Claims priority, application Germany, Dec. 11, 1974, 2458626**

**Int. Cl.² C07D** *261/20*

**U.S. Cl. 424—200** **8 Claims**

1. An O-alkyl-O-[7-nitrobenzisoxazol (3)yl]-thionophosphoric(phosphonic) acid ester of the formula



in which

R is alkyl with 1 to 6 carbon atoms, and

$R_1$ is alkyl or alkoxy with 1 to 6 carbon atoms, or phenyl.

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**4,017,610**

**INHIBITING GROWTH OF BACTERIA, FUNGI AND ALGAE WITH A LOWER ALKYL TRI-N-OCTYL PHOSPHONIUM DIPHENYL PHOSPHATE**

**Don R. Baker, Orinda, Calif., assignor to Stauffer Chemical Company, Westport, Conn.**

**Filed Oct. 31, 1975, Ser. No. 627,564**

**Int. Cl.² A01N** *9/36; A61L 1/00, 13/00*

**U.S. Cl. 424—204** **3 Claims**

1. A method of inhibiting the growth of sulfate-reducing bacteria which comprises applying thereto an effective amount of a lower alkyl tri-n-octyl phosphonium diphenyl phosphate.

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**4,017,611**

**CONTROL OF INSECTS WITH 3-HYDROXYMETHACRYLIC ACID METHYL ESTER DIMETHYLTHIONOPHOSPHATE**

**Ernst Beriger, Neuallschwil, and Ladislaus Pinter, Basel, both of Switzerland, assignors to Ciba-Geigy AG, Basel, Switzerland**

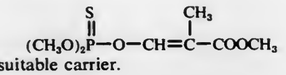
**Division of Ser. No. 348,426, April 5, 1973, Pat. No. 3,923,932, which is a continuation of Ser. No. 136,193, April 21, 1971, abandoned. This application Oct. 10, 1975, Ser. No. 621,454**

**Claims priority, application Switzerland, Apr. 21, 1970, 6028/70**

**Int. Cl.² A01N** *9/36*

**U.S. Cl. 424—212** **2 Claims**

1. An insecticidal composition which comprises (1) as an active component an insecticidally effective amount of the compound of the formula



and (2) a suitable carrier.

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**4,017,612**

**COMBATTING INSECTS AND ACARIDS WITH CERTAIN O-METHYL/ETHYL-S-PROPYL/BUTYL-O-PHENYL-THIOPHOSPHATES AND -DITHIOPHOSPHATES**

**Ernst Beriger, Allschwil, Switzerland; Manfred Böger, Haltingen, Germany; Jozef Drabek, Allschwil, and Odd Kristiansen, Reinach, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

**Division of Ser. No. 408,874, Oct. 23, 1973, Pat. No. 3,898,305. This application May 19, 1975, Ser. No. 578,960**

**Claims priority, application Switzerland, Nov. 3, 1972, 16043/72; Sept. 21, 1973, 13638/73**

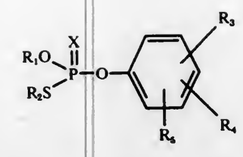
**Int. Cl.² A01N** *9/36*

**U.S. Cl. 424—219** **4 Claims**

1. An insecticidal and acaricidal composition comprising (1) an insecticidally or acaricidally effective amount of a compound of formula







wherein $R_1$ is methyl or ethyl; $R_2$ is n-propyl, isobutyl or sec. butyl; each of $R_3$ and $R_4$ is hydrogen, chlorine, bromine, methyl or ethyl; $R_5$ is 2-chloroallyl or 3-chloroallyl, and X is oxygen or sulphur; and (2) a carrier.

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**4,017,613**

**2,4,4-TRICHLOROBUTADIENYL-1-PHOSPHATES AND PHOSPHONATES AND PESTICIDES MADE THEREFROM**

**Wolfgang Deinhammer, Munich; Marco Vulic, Freising; Manfred Wick, Munich, and Helmut Prigge, Wolfratshausen-Farchet, all of Germany, assignors to Consortium fur Elektrochemische Industrie GmbH, Munich, Germany**

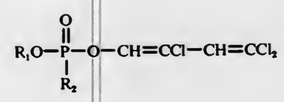
**Filed Oct. 20, 1975, Ser. No. 623,850**

**Claims priority, application Germany, Oct. 31, 1974, 2451943**

**Int. Cl.² A01N** *9/36;* **C07F** *9/09*

**U.S. Cl. 424—219** **21 Claims**

1. A compound of the formula:



wherein $R_1$ is selected from the group consisting of alkyl having 1 to 4 carbon atoms and alkenyl having 2 to 4 carbon atoms; $R_2$ is selected from the group consisting of straight-chain alkyl having 1 to 4 carbon atoms, alkoxy having 1 to 4 carbon atoms, alkenyloxy having 2 to 4 carbon atoms, and phenyl.

2. A method of combating pests in a crop area which comprises applying to the crop area a compound as recited in claim 1 in an amount of from 0.1 to 10 kg/ha.

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**4,017,614**

**COMPOSITIONS FOR THE RELIEF OF MIGRAINE**

**Henry Wild, 8 Winster Place, Mereside, Blackpool, Lancashire, England**

**Continuation of Ser. No. 504,781, Sept. 10, 1974, abandoned, which is a continuation of Ser. No. 301,906, Oct. 31, 1972, abandoned, which is a continuation of Ser. No. 95,361, Dec. 4, 1970, abandoned. This application Dec. 5, 1975, Ser. No. 638,006**

**Claims priority, application United Kingdom, Dec. 5, 1969, 59643/69**

**Int. Cl.² A61K** *31/625*

**U.S. Cl. 424—232** **16 Claims**

1. A method for preventing or diminishing the severity of a migraine attack of a migraneous individual comprising prophylactically administering to said individual after onset of an aura or premonition of a migraine attack by said individual or during an episodic pattern of migraine attacks, a composition comprising:

a. 1-p-chlorobenzhydryl 4-p-(tertiary butyl)-benzyl piperazine or a pharmaceutically acceptable addition salt of said piperazine and (b) a compound selected from the group consisting of N-acetyl-p-aminophenol, p-ethoxy-acetanilide, salicylamide and acetylsalicylic acid, the piperazine (a) and the compound (b) being respectively present in a weight ratio of 1:20 to 1:200, the dosage unit of said piperazine (a) ranging from 2.5 to 24 mg.

**12.** A method for preventing or diminishing the severity of a migraine attack of a migraneous individual comprising prophylactically administering to said individual after onset of an aura or premonition of a migraine attack by said individual or during an episodic pattern of migraine attacks, a composition comprising

component (a) 1-p-chlorobenzhydryl 4-p-(tertiary butyl)-benzyl piperazine or a pharmaceutically acceptable addition salt of said piperazine, component (b) at least wo compounds selected from the group consisting of N-acetyl-p-aminophenol, p-ethoxyacetanilide, salicylamide and acetylsalicylic acid and as component (c) codeine, the dosage unit of said piperazine (a) ranging from 2.5 to 24 mg., the piperazine (a) and said component (b) being respectively present in a weight ratio of 1:20 to 1:200, the amound of codeine being from 7.5 to 22.5 mg. per 1 gram of said component (b).

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**4,017,615**

**PROPYLENE CARBONATE OINTMENT VEHICLE**

**Subramaniam Shastri, Cupertino, and Zafaruzzaman I. Shaikh, Palo Alto, both of Calif., assignors to Syntex Corporation, Panama, Panama**

**Division of Ser. No. 85,246, Oct. 29, 1970, abandoned. This application Dec. 11, 1975, Ser. No. 639,740**

**Int. Cl.² A61K** *31/58*

**U.S. Cl. 424—241** **7 Claims**

1. An ointment comprising an ointment base consisting essentially of

a. from 0.5 to 30 weight percent propylene carbonate;

b. from 30 to 99.5 weight percent petrolatum, polysiloxane having a viscosity of from 0.5 to $10^6$ centistokes, or mixtures thereof;

c. compatible co-solvent, the concentration of which in combination with the propylene carbonate is from 0.5 to 70 weight percent;

d. from 0 to 45 weight percent pharmaceutically acceptable surfactant;

e. from 0 to 20 weight percent thickener; and

f. from 0 to 25 weight percent penetrant

in combination with a therapeutically effective amount of a propylene carbonate soluble medicament.

**4,017,616**

## PARENTERAL BENZODIAZEPINE COMPOSITIONS

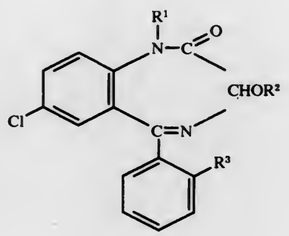
**Eloy A. Gomez, West Chester, and Howard J. Levin, Norristown, both of Pa., assignors to American Home Products Corporation, New York, N.Y.**

**Continuation-in-part of Ser. No. 219,867, Jan. 21, 1972, abandoned. This application Apr. 13, 1973, Ser. No. 351,114**

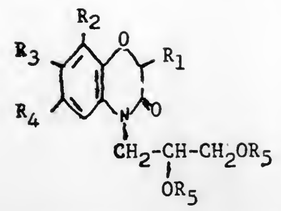
**Int. Cl.² A61K** *31/33*

**U.S. Cl. 424—244** **6 Claims**

**1.** A parenterally acceptable composition comprising from about 10% to about 65% polyethylene glycol, from about 35% to about 90% propylene glycol, from 0% to about 10% benzyl alcohol, and, per ml. of the above solution, from about 1 mg. to about 15 mg. of a benzodiazepine compound of the formula:



wherein $R^1$ and $R^2$ are independently hydrogen or methyl, and $R^3$ is hydrogen or chlorine, said composition being substantially free of water.



in which $R_1$ is selected from the group consisting of hydrogen and lower alkyl; $R_2$, $R_3$ and $R_4$, which are identical or different, are selected from the group consisting of hydrogen, halogen, nitro, lower alkyl, and lower alkoxy, and $R_4$ may also be allyl; and $R_5$ is selected from the group consisting of hydrogen and acetyl, and a physiologically acceptable vehicle.

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**4,017,617**

**Patent Not Issued For This Number**

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**4,017,618**

## DERIVATIVES OF 3-OXO-2,3-DIHYDRO-1,4-BENZOXAZINE FOR USE AS ANALGESICS AND ANTIOEDEMATOUS AGENTS

**Germaine Thuillier, Paris, and Jacqueline Laforest, Vincennes, both of France, assignors to CERPHA, Arcueil, France**

**Division of Ser. No. 384,924, Aug. 2, 1973, now U.S. Patent No. 3,935,203. This application May, 20, 1975, Ser. No. 579,213**

**Claims priority, application France, Aug. 3, 1972, 72.28095**

**Int. Cl.² A01N** *9/00; 9/22*

**U.S. Cl. 424—248.54** **7 claims**

**1.** A therapeutic composition, possessing analgesic and anti-oedematous properties, comprising a therapeutically effective amount of a compound of the formula:

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**4,017,619**

## ANESTHETIC AND SEDATIVE COMPOSITION

**Raymond W. Burnap, 1528 Canada Blvd., Glendale, Calif. 91208**

**Continuation of Ser. No. 409,893, Oct. 26, 1973, abandoned. This application Sept. 29, 1975, Ser. No. 617,971**

**Int. Cl.² A61K** *31/33*

**U.S. Cl. 424—244** **1 Claim**

**1.** A method for inducing anesthesia in a human patient comprising intraveneously administering to saidpatient an anesthetizing amount of an aqueous solution of 5% dextrose, 0.11% sodium chloride, 0.1% 2(-o-chlorophenyl)-2-(methylamino) cyclohexanone hydrochloride and 0.01% 7-chloro-1,3-dihydro-1-methyl-5-phenyl-2-H-1,4-benzodiazepin-2-one.

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**4,017,620**

## THIENODIAZEPINE DERIVATIVES

**Yutaka Kuwada, Ashiya; Kanji Meguro, Takarazuka; Hiroyuki Tawada; Takashi Sohda, both of Takatsuki; Hideaki Natsugari, Nishinomiya, and Yoshiaki Sato, Kobe, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan**

**Filed May 8, 1975, Ser. No. 575,727**

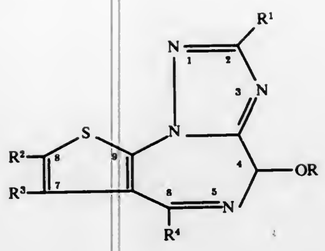
**Claims priority, application Japan, May 13, 1974, 49-53747**

**Int. Cl.² C07D** *495/14*

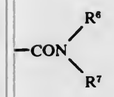
**U.S. Cl. 424—248.51** **31 Claims**

**1.** A compound of the general formula (I):

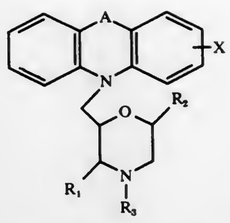




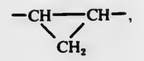
wherein $R^1$ represents a carboxyl group $—COOR^5$ in which $R^5$ is lower alkyl of 1 to 4 carbon atoms or



in which $R^6$ and $R^7$ represent hydrogen, straight, branched or cyclic alkyl of 1 to 6 carbon atoms; straight, branched or cyclic alkyl of 1 to 6 carbon atoms substituted by lower alkoxy of 1 to 4 carbon atoms or $R^6$ and $R^7$ taken together with the nitrogen atom to which they are attached form members selected from the group consisting of pyrrolidine, piperidine, morpholine, N-methyl piperazine, N-ethyl piperazine, N-propyl piperazine and N-(2-methoxyethyl)-piperazine each of $R^2$ and $R^3$ represent a hydrogen atom or a lower alkyl group or $R^2$ and $R^3$ taken together forming trimethylene or tetramethylene; $R^4$ is phenyl or phenyl substituted by halogen, lower alkyl, lower alkoxy, trifluoromethy, or trichloromethyl and R represents hydrogen, $—COR^8$ in which $R^8$ is alkyl of 1 to 4 carbon atoms, phenyl, tolyl, benzyl or phenethyl, or alkyl of 1 to 4 carbon atoms or its pharmaceutically acceptable acid addition salts.



wherein A is $—CH_2—CH_2—$, $—CH=CH—$ or



X is hydrogen, halogen, nitro, trifluoromethyl, $C_1—C_3$ alkyl or $C_1—C_3$ alkoxy, $R_1$ and $R_2$ are each hydrogen or $C_1—C_4$ alkyl and $R_3$ is hydrogen, $C_1—C_4$ alkyl, $C_3—C_5$ alkenyl, $C_3—C_5$ alkynyl, $C_3—C_6$ cycloalkyl ($C_2—C_3$) alkyl, ar($C_1—C_3$) alkyl, polyhalo($C_1—C_2$)alkyl, $C_1—C_4$ alkoxy($C_1—C_3$) alkyl or hydroxy($C_1—C_3$)alkyl, or a non-toxic pharmaceutically acceptable salt thereof.

**9.** A method for treatment of mental depression which comprises administering to a person an antidepressant effective amount of at least one compound according to claim **1**.

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**4,017,621**

## 2-MORPHOLINYL TRICYCLIC DIBENZAZEPINE COMPOUNDS

**Yoshinori Takashima, Nishinomiya; Isamu Maruyama, Minoo, and Junki Katsube, Toyonaka, all of Japan, assignors to Sumitomo Chemical Company, Limited, Japan**

**Filed Nov. 26, 1975, Ser. No. 635,355**

**Claims priority, application Japan, Dec. 9, 1974, 49-141691; Dec. 27, 1974, 50-2911; Apr. 23, 1975, 50-49891**

**Int. Cl.² C07D** *413/06*

**U.S. Cl. 424—248.4** **9 Claims**

**1.** A compound of the formula:

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**4,017,622**

## PIPERAZINE DERIVATIVES

**Shinsaku Minami, Yamatokouriyama; Jun-Ichi Matsumoto, Takatsuki; Minoru Sugita, Kyoto; Masanao Shimizu, Kobe; Yoshiyuki Takase, Amagasaki, and Shinichi Nakamura, Takatsuki, all of Japan, assignors to Dainippon Pharmaceutical Co., Ltd., Osaka, Japan**

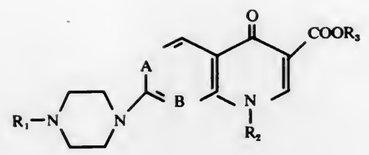
**Continuation-in-part of Ser. No. 424,697, Dec. 14, 1973, abandoned. This application Jan. 30, 1975, Ser. No. 545,549**

**Claims priority, application Japan, Dec. 18, 1972, 47-126968; Dec. 18, 1972, 47-126969; Dec. 21, 1972, 47-128441; Apr. 17, 1973, 48-43388; Oct. 26, 1973, 48-121057; Oct. 26, 1973, 48-121058; Oct. 27, 1973, 48-121006; Nov. 6, 1973, 48-124633**

**Int. Cl.² C07D** *295/10*

**U.S. Cl. 424—250** **16 Claims**

**1.** A compound of the formula



wherein:

A and B are carbon or nitrogen, provided that A and B are not both nitrogen;

$R_1$ is hydrogen, alkyl having 1 to 4 carbon atoms, benzyl, or acetyl;

$R_2$ is hydrogen, alkyl having 1to 4 carbon atoms, benzyl, or vinyl and

$R_3$ is hydrogen or alkyl having 1 to 6 carbon atoms;

or the pharmaceutically acceptable acid addition or alkali metal salts thereof.

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## 4,017,623

## ESTERS OF 2-[(4-QUINOLYL)AMINO]-BENZOIC ACIDS IN ANALGESIC AND ANTI-INFLAMMATORY COMPOSITIONS

Don Pierre René Lucien Giudicelli, Fontenay-sous-Bois; Henry Najer, Paris; Philippe Michel Jacques Manoury, L'Hay-les-Roses, and André Pierre Fernand Dumas, Bagneux, all of France, assignors to Synthelabo, Paris, France

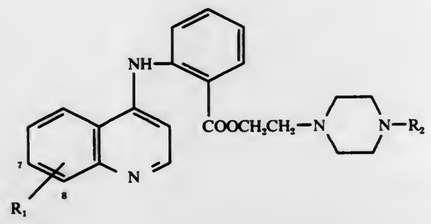
Division of Ser. No. 457,174, April 2, 1974, Pat. No. 3,935,279. This application Nov. 13, 1975, Ser. No. 631,673

Claims priority, application France, Apr. 6, 1973, 73.12505; May 9, 1973, 73.16635; Dec. 17, 1973, 73.44963

Int. Cl.² A61K *31/495*

U.S. Cl. 424—250 3 Claims

1. An analgesic and anit-inflammatory composition comprising an analgesic or anti-inflammatory effective amount of a compound of the formula:



wherein

$R_1$ is chlorine, trifluoromethyl or trifluoromethylthio; and

$R_2$ is phenyl, chlorophenyl, methylphenyl, trifluoromethylphenyl, trifluoromethoxyphenyl, trifluoromethylthiophenyl, dimethylphenyl, chloromethylphenyl or ditrifluoromethylphenyl, $R_2$ being a substituted phenyl when $R_1$ is chlorine,

or of a pharmaceutically acceptable acid addition salt thereof in combination with a pharmaceutically acceptable diluent.

## 4,017,624

## N-(ω-AMINO)ALKYLANILINE DERIVATIVES

Isamu Maruyama, Minoo; Masaru Nakao, Osaka; Kikuo Sasajima, Toyonaka; Shigeho Inaba, Takarazuka, and Hisao Yamamoto, Nishinomiya, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

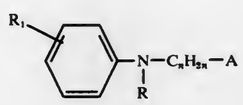
Division of Ser. No. 439,827, Feb. 5, 1974, Pat. No. 3,917,598. This application Aug. 8, 1975, Ser. No. 603,240

Claims priority, application Japan, Feb. 5, 1973, 48-15025

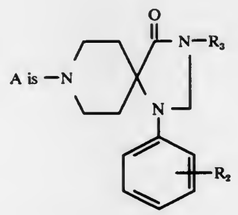
Int. Cl.² C07D *401/04*

U.S. Cl. 424—250 10 Claims

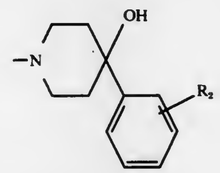
1. An N-(ω-amino)alkylaniline derivative of the formula:



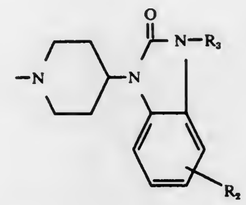
wherein R is hydrogen, $C_1$–$C_7$ alkyl, $C_1$–$C_7$ alkanoyl, benzoyl, halobenzoyl or nicotinoyl, $R_1$ is hydrogen, halogen, $C_1$–$C_7$ alkyl or $C_1$–$C_7$ alkoxy,



wherein $R_2$ is hydrogen, halogen, $C_1$–$C_7$ alkyl, $C_1$–$C_7$ alkoxy or trifluoromethyl and $R_3$ is hydrogen, $C_1$–$C_7$ alkyl or $C_1$–$C_7$ alkanoyl,



wherein $R_2$ is as defined above or



wherein $R_2$ and $R_3$ are each as defined above, and $n$ is 2, 3 or 4, and non-toxic pharmaceutically acceptable salts thereof.



## 4,017,625

## ANTI-ALLERGIC N-(5-TETRAZOLYL)-1-OXO-1H-6-ALKOXYPYRIMIDO-[1,2-a]QUINOLINE-2-CARBOXAMIDES AND INTERMEDIATES THEREFOR

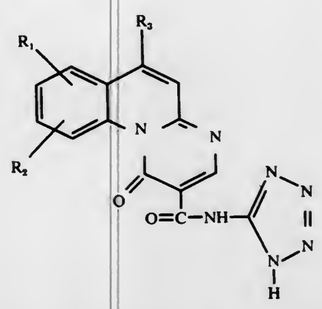
Saul B. Kadin, New London, Conn., assignor to Pfizer Inc., New York, N.Y.

Continuation-in-part of Ser. No. 601,039, Aug. 1, 1975, abandoned. This application May 24, 1976, Ser. No. 689,579

Int. Cl.² C07D *401/14*

U.S. Cl. 424—251 25 Claims

1. A compound of the formula



wherein each of $R_1$ and $R_2$ is hydrogen, from the group consisting of hydrogen, lower alkyl, lower alkoxy, chloro, and fluoro;

$R_1$ and $R_2$ when taken together are alkylenedioxy and are selected from the group consisting of methylenedioxy and ethylenedioxy;

$R_3$ is selected from the group consisting of chloro, bromo and lower alkoxy;

and the pharmaceutically-acceptable cationic salts thereof.

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## 4,017,626

## FUNGICIDALLY ACTIVE URACIL DERIVATIVES

Kailash Kumar Gauri, Lentfohrden, Germany, assignor to Robugen GmbH, Pharmazeutische Fabrik, Esslingen, Germany

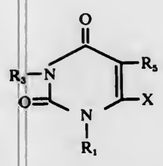
Filed Jan. 14, 1975, Ser. No. 541,047

Claims priority, application Germany, Jan. 14, 1974, 2401619

Int. Cl.² A01N *9/22*

U.S. Cl. 424—251 4 Claims

1. A fungicidal composition for inhibiting the growth of dermatophytes comprising an amount effective to inhibit the growth of dermatophytes of a uracil derivative having the formula:



wherein $R_1$ and $R_3$ are each an alkyl group of 2 to 10 carbon atoms, $R_5$ is an alkyl group having 2 to 5 carbon atoms and X is a chlorine atom, and an inert carrier.

## 4,017,627

## 7,8-DISUBSTITUTED-5-ACETYLQUINOLINES AND ANTIMICROBIAL COMPOSITIONS CONTAINING THEM

Elmar Sturm, Aesch, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

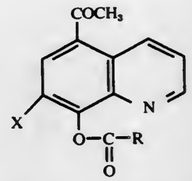
Filed May 19, 1975, Ser. No. 578,584

Claims priority, application Switzerland, May 29, 1974, 7321/74

Int. Cl.² C07D *215/32*, *215/34*; A61K *31/47*

U.S. Cl. 424—258 17 Claims

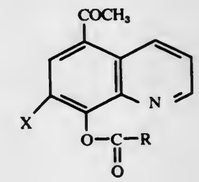
1. A 7,8-disubstituted-5-acetylquinoline of the formula



I

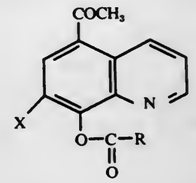
wherein X denotes chlorine, bromine, iodine or nitro, R denotes unsubstituted or halogen-substituted $C_1$–$C_{16}$ alkyl or $C_2$–$C_{10}$ alkenyl; $C_1$–$C_4$ alkoxy, $C_2$–$C_4$ alkenyloxy, $C_1$–$C_4$ alkylthio, unsubstituted or methyl-substituted $C_3$–$C_6$ cyclohexyl; cyclohexenyl or unsubstituted or nitro, halogen or $C_1$–$C_3$ alkyl substituted phenyl.

9. A process for combatting phytopathogenic fungi and bacteria which comprises applying to said fungi and bacteria, an inhibitory amount of a compound of the formula



wherein X denotes chlorine, bromine, iodine or nitro, R denotes unsubstituted or halogen-substituted $C_1$–$C_{16}$ alkyl or $C_2$–$C_{10}$ alkenyl; $C_1$–$C_4$ alkoxy, $C_2$–$C_4$ alkenyloxy, $C_1$–$C_4$ alkylthio, unsubstituted or methyl-substituted $C_3$–$C_6$ cyclohexyl; cyclohexenyl or unsubstituted or nitro, halogen or $C_1$–$C_3$ alkyl substituted phenyl.

12. An antimicrobial composition for combatting phytopathogenic fungi and bacteria which comprises an inert carrier and an inhibitory amount of a compound of the formula



wherein X denotes chlorine, bromine, iodine or nitro, R denotes unsubstituted or halogen-substituted $C_1$–$C_{16}$ alkyl or $C_2$–$C_{10}$ alkenyl; $C_1$–$C_4$ alkoxy, $C_2$–$C_4$ alkenyloxy, $C_1$–$C_4$ alkylthio, unsubstituted or methyl-substituted $C_3$–$C_6$ cyclohexyl cyclohexenyl or unsubstituted or nitro, halogen or $C_1$–$C_3$ alkyl substituted phenyl.

**4,017,628**

## TREATMENT OF MANGE

**Ovart Nitidandhaprabhas, 23/1 Tanpuying Pahol Lane, Ngam Vong Varn Road, Bangkhen, Bangkok, Thailand**

**Filed Dec. 22, 1975, Ser. No. 643,056**

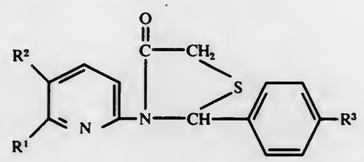
**Claims priority, application United Kingdom, Dec. 31, 1974, 56173/74**

**Int. Cl.² A61K** *31/44*

**U.S. Cl. 424—263** **9 Claims**

**1.** A method of treating mange in mammals which comprises applying to the infected area a composition comprising:

a. a compound having the formula:



wherein $R^1$, $R^2$, and $R^3$ independently represent substituents selected from the group consisting of hydrogen, halogen, alkyl groups containing 1 to 6 carbon atoms, alkoxy groups containing 1 to 6 carbon atoms, and phenyl; and

b. a physiologically acceptable carrier.

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**4,017,629**

## CERTAIN 1,4-DIHYDRO-3-SULFINYL OR SULFONYL-PYRIDINES

**Ernst Habicht, Oberwil, and Hans Kühnis, Basel, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

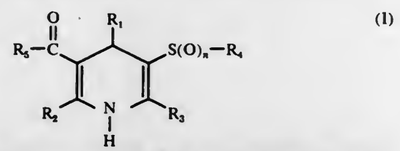
**Filed May 28, 1975, Ser. No. 581,523**

**Claims priority, application Switzerland, June 4, 1974, 7638/74**

**Int. Cl.² A61K** *31/455*; **C07D** *211/86*

**U.S. Cl. 424—266** **15 Claims**

**1.** A 1,4-dihydropyridine compound of the formula I



(I)

and their tautomers, wherein $R_1$ is unsubstituted phenyl or phenyl substituted by 1 or 2 identical or different substituents selected from the group consisting of nitro, trifluoromethyl, cyano, azido, lower alkanoyl, sulphamoyl, N-($C_{1-4}$) alkylsulphamoyl, N,N-di($C_{1-4}$)-alkylsulphamoyl, $R_2$ and $R_3$ independently of one another represent hydrogen, phenyl, phenyl-($C_{1-4}$)-alkyl or ($C_{1-7}$)-alkyl, $R_4$ represents ($C_{1-7}$)-alkyl or unsubstituted phenyl or phenyl substituted by ($C_{1-4}$)-alkyl, ($C_{1-4}$)-alkoxy, halogen or trifluoromethyl, $R_5$ represents (C1-4)-lower alkoxy, amino, mono- or di-($C_{1-4}$)-alkylamino, and *n* is 1 or 2.

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**4,017,630**

## CERTAIN DIPHENYLALKANOAMIDES USED AS BIRD AND MURINE REPELLENTS

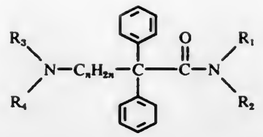
**Alan J. Lemin, Plainwell, and Paul W. O'Connell, Kalamazoo, both of Mich., assignors to The Upjohn Company, Kalamazoo, Mich.**

**Continuation of Ser. No. 64,575, Aug. 17, 1970, abandoned. This application Nov. 29, 1974, Ser. No. 528,216**

**Int. Cl.² A01N** *9/22*

**U.S. Cl. 424—267** **21 Claims**

**1.** A method of repelling birds and murine pests from prospective available foods which comprises coating the food or mixing with the food an effective amount of a compound of the formula



wherein $R_1$ and $R_2$ are independently selected from the group consisting of hydrogen and alkyl of one to four carbon atoms, inclusive, *n* is 2 or 3, $R_3$ and $R_4$ are independently selected from the group consisting of alkyl of one to four carbon atoms, inclusive, alkenyl of three or four carbon atoms; and $R_3$ and $R_4$, when taken together with the nitrogen atom to which they are attached, form a saturated alicyclic ring containing four to six carbon atoms, said alicyclic ring carbons being unsubstituted or substituted with one or more alkyl groups, the total number of carbon atoms in the ring and alkyl substituents being not more than ten, an acid addition salt thereof, a quaternary ammonium salt thereof, an N-oxide thereof or an N-oxide acid addition salt thereof.

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**4,017,631**

## IMIDAZOLIUM SALTS

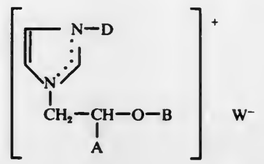
**Paul Adriaan Jan Janssen, Vosselaar; Jan Heeres, Turnhout, and Hubert Karel Frans Hermans, Gierle, all of Belgium, assignors to Janssen Pharmaceutica N.V., Beerse, Belgium**

**Division of Ser. No. 525,142, Nov. 19, 1974, which is a continuation-in-part of Ser. No. 438,810, Jan. 31, 1974, abandoned. This application Mar. 1, 1976, Ser. No. 662,998**

**Int. Cl.² C07D** *233/60*

**U.S. Cl. 424—273** **3 Claims**

**1.** A quaternary imidazolium salt represented by the structure



and hydrates thereof, wherein

A is a member selected from the group consisting of phenyl, mono- di- and trihalophenyl, lower alkyl phenyl, lower alkoxy phenyl, thienyl and halothienyl;

B is a member selected from the group consisting of benzyl, mono- di- and trihalobenzyl, mono- and di-lower alkylbenzyl, lower alkoxybenzyl, cyanobenzyl, phenethyl, mono-, di- and trihalophenethyl, mono- and di-lower alkylphenethyl, lower alkoxyphenethyl, cyanophenethyl, mono- and di-nitrophenyl, mono- and di-aminophenyl, lower alkyl, lower alkenyl and lower alkynyl;

D is an aralkenyl radical represented by the formula

$$-CH_2-CH=CH-Ar^3$$

wherein $Ar^3$ is selected from the group consisting of phenyl, halophenyl and dihalophenyl; and

W is a pharmaceutically acceptable anion selected from the group consisting of chloride, bromide, iodide, methanesulfonate, p-toluenesulfonate, nitrate, sulfate, phosphate, acetate, propionate, glycolate, lactate, pyruvate, malonate, succinate, maleate, fumarate, malate, tartrate, citrate, benzoate, cinnamate, mandelate, ethanesulfonate, benzenesulfonate, cyclohexanesulfamate, salicylate and p-aminosalicylate.



**4,017,632**

## PHENOXYACETIC ACID DERIVATIVES

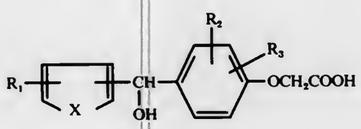
**Germaine Thuillier born Nachmias, Paris; Jacqueline Suzanne Laforest born Boutillier du Retail, Vincennes; Bernard Jean Marie Carlou, Combleux; Pierre Alfred Rene Bessin, Chilly Mazarin; Jacqueline Suzanne Bonnet born Roux, and Jean Eugene Thuillier, both of Paris, all of France, assignors to Centre European de Recherches Pharmacologiques C.E.R.P.H.A., Arcueil, France**

**Filed Oct. 22, 1975, Ser. No. 624,648**

**Int. Cl.² A61K** *31/38*, *31/34*

**U.S. Cl. 424—275** **7 Claims**

**1.** A phenoxyacetic acid derivative selected from the group consisting of a phenoxyacetic acid of the general formula



wherein X is oxygen or sulfur and $R_1$, $R_2$ and $R_3$ which may be identical or different, each represents a hydrogen atom, a halogen atom or a $C_{1-4}$ alkyl group, an alkali metal salt thereof and an additional salt thereof with a pharmaceutically acceptable base.

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**4,017,633**

## SUBSTITUTED 3-(1-AMINOETHYLIDENE)-5-CINNAMOYL-2H-PYRAN-2,6(3H)-DIONES

**Chester Rhodes Willis, Kingston, Jamaica, assignor to Smith-Kline Corporation, Philadelphia, Pa.**

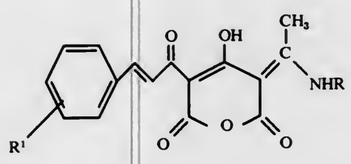
**Continuation-in-part of Ser. No. 511,152, Oct. 2, 1974, abandoned. This application Feb. 18, 1976, Ser. No. 658,983**

**Claims priority, application United Kingdom, Sept. 11, 1975, 37417/75**

**Int. Cl.² C07D** *309/10*

**U.S. Cl. 424—283** **12 Claims**

**1.** A chemical compound of the formula:



wherein:

R is lower alkyl, straight or branched chain, of from 3 to 6 carbon atoms, phenyl, halophenyl, hydroxyphenyl, methoxyphenyl, p-mercaptophenyl or aminophenyl; and

$R_1$ is hydrogen, hydroxy, methoxy or dimethoxy.

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**4,017,634**

## INSECT GROWTH REGULATORS

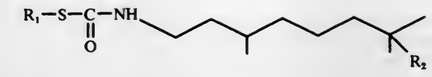
**Hsiao-Ling Lam, El Cerrito, and Ferenc M. Pallos, Walnut Creek, both of Calif., assignors to Stauffer Chemical Company, Westport, Conn.**

**Filed Jan. 12, 1976, Ser. No. 648,061**

**Int. Cl.² A01N** *9/20*; **C07C** *155/02*, *155/03*

**U.S. Cl. 424—300** **37 Claims**

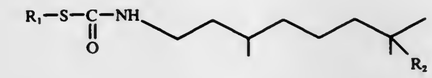
**1.** A compound having the formula



in which $R_1$ is lower alkyl, cycloalkyl, or cycloalkyl-alkyl and $R_2$ is hydrogen or lower alkoxy.

**24.** An insecticidal composition of matter comprising:

a. an insecticidal amount of a compound having a formula



in which $R_1$ is lower alkyl, cycloalkyl, or cycloalkyl-alkyl and $R_2$ is hydrogen or lower alkoxy an inert carrier.

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**4,017,635**

## MITICIDAL COMPOSITIONS COMPRISING 2-(P-TERT.-BUTYLPHENOXY)CYCLOHEXYL 2-PROPYNYL SULFITE AND DIBENZYL DISULFIDE

**Takeo Ishiguro, Kusatsu, Japan, assignor to Shionogi & Co., Ltd., Osaka, Japan**

**Filed Mar. 21, 1975, Ser. No. 560,866**

**Claims priority, application Japan, Mar. 22, 1974, 49-32943**

**Int. Cl.² A01N** *9/02*, *9/12*, *9/14*

**U.S. Cl. 424—303** **2 Claims**

**1.** A miticidal composition comprising a miticidally effective amount of a mixture of 2-(p-tert.-butylphenoxy)cyclohexyl 2-propynyl sulfite and dibenzyl disulfide in a weight ratio for the sulfite to the disulfide of from 18.8 : 75 to 75 : 18.8.

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**4,017,636**

## ESTERS OF γ-GLUTAMYL AMIDE OF DOPAMINE

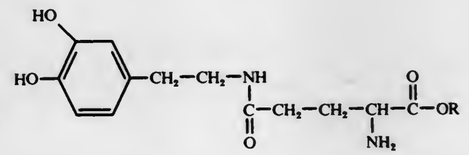
**Peter Hadley Jones, Lake Forest; Jaroslav Kyncl, Lake Bluff; Carroll Wayne Ours, Zion, and Pitambar Somani, Libertyville, all of Ill., assignors to Abbott Laboratories, North Chicago, Ill.**

**Division of Ser. No. 408,901, Oct. 23, 1973, Pat. No. 3,910,988. This application Sept. 24, 1975, Ser. No. 616,346**

**Int. Cl.² A01N** *9/20*

**U.S. Cl. 424—309** **4 Claims**

**1.** A method of increasing renal blood flow of warm-blooded mammals which comprises administering to said mammals at least an effective amount of a renal vasodilator compound of the formula



where R is a straight or branched chain alkyl containing 1 to 18 carbon atoms and a pharmaceutically acceptable acid addition salt thereof.

## 4,017,637
## BENZYLAMINE ANALGESICS

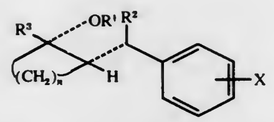
John P. Yardley, King of Prussia, and Peter B. Russell, Villanova, both of Pa., assignors to American Home Products Corporation, New York, N.Y.

Division of Ser. No. 345,037, March 26, 1973, Pat. No. 3,928,626, which is a continuation-in-part of Ser. No. 241,613, April 6, 1972, abandoned. This application Aug. 25, 1975, Ser. No. 607,088

Int. Cl.² A61K *31/135, 31/22, 31/215*

U.S. Cl. 424—311 9 Claims

1. The process for producing analgesia in warm-blooded animals which comprises administering to a warm-blooded animal in need thereof an amount sufficient to produce analgesia in said warm-blooded animal of a compound of the formula:



wherein $R^2$ is lower alkylamino, N-lower alkyl-N-methylamino, N-phenloweralkyl-N-methylamino, N-lower alkenyl-N-methylamino, N-cycloalkylmethyl-N-methylamino, or N-oxo-N-lower alkyl-N-methylamino; $R^3$ is hydrogen or methyl; and $R^1$ is hydrogen, lower alkyl, or lower alkylcarbonyl, and X is loweralkylcarbonyloxy; or $R^1$ is lower alkylcarbonyl and X is hydrogen, hydroxy, lower alkoxy, lower alkoxymethoxy, or halo; and *n* is an integer of from 3 to 6; and a pharmacologically acceptable acid addition salt thereof.

## 4,017,639
## 2-HYDROXY-3-NITRO-1,4-NAPHTHOQUINONES FOR THE PROPHYLAXIS OF CERTAIN ALLERGIES

Barry Christian Charles Cantello, Horsham; Derek Richard Buckle, Redhill, and Harry Smith, Maplehurst, near Horsham, all of England, assignors to Beecham Group Limited, Great Britain

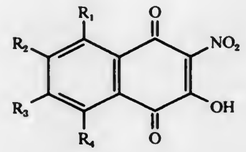
Division of Ser. No. 571,253, April 24, 1975. This application Mar. 12, 1976, Ser. No. 666,260

Claims priority, application United Kingdom, May 28, 1974, 23563/74

Int. Cl.² A61K *31/12*

U.S. Cl. 424—331 34 Claims

1. A pharmaceutical composition in a form suitable for oral, parenteral or insufflation administration to humans which comprises an amount of



(I)

or a pharmaceutically acceptable, nontoxic salt thereof, wherein $R_1$, $R_2$, $R_3$ and $R_4$ are each hydrogen, lower alkyl, lower alkoxy, phenyl, hydroxy or halogen, or any adjacent two of $R_1$, $R_2$, $R_3$ and $R_4$ taken together with the carbon atoms to which they are joined form a 5- or 6-membered carbocyclic ring, provided that $R_1$, $R_2$, $R_3$ and $R_4$ are not all hydrogen, sufficient to be effective for the prophylaxis of asthma, hayfever or rhinitis, in combination with a pharmaceutically acceptable nontoxic carrier suitable for said administration form.

## 4,017,638
## ISO-(THIO)-UREA DERIVATIVES

Volker Dittrich, Zeiningen; Werner Töpfl, Dornach, and Odd Kristiansen, Möhlin, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

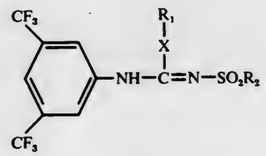
Filed Mar. 3, 1976, Ser. No. 663,413

Claims priority, application Switzerland, Mar. 5, 1975, 2761/75; Feb. 4, 1976, 1359/76

Int. Cl.² C07C *123/00*

U.S. Cl. 424—326 6 Claims

1. An iso-(thio)-urea derivative of the formula



(I)

wherein

$R_1$ and $R_2$ each represent $C_1$–$C_5$-alkyl or phenyl or benzyl mono-, di- or trisubstituted by halogen, trifluoromethyl, nitro methyl, and

X represents oxygen or sulphur.

## 4,017,640
## 1-p-ALKYLPHENYL-1-p-(ALKOXYPHENYL)-2-NITROALKANES

Beat Böhner, Binningen; Dag Dawes, Muttenz, and Willy Meyer, Riehen, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

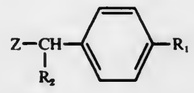
Filed Jan. 17, 1975, Ser. No. 541,982

Claims priority, application Switzerland, Jan. 21, 1974, 786/74; Dec. 21, 1974, 15951/74

Int. Cl.² C07C *43/20*

U.S. Cl. 424—340 9 Claims

1. A compound of the formula

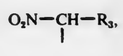


wherein

$R_1$ represents $C_1$–$C_3$-alkyl,

$R_2$ represents p-($C_1$ or $C_2$)-alkoxyphenyl,

Z represents



and

$R_3$ represents $C_3$–$C_5$-alkyl.



## 4,017,641
## SKIN MOISTURIZING COMPOSITIONS CONTAINING 2-PYRROLIDINONE

David Neil DiGiulio, Springfield Township, Hamilton County, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Filed Jan. 31, 1975, Ser. No. 545,938

Int. Cl.² A61K *7/48*

U.S. Cl. 424—365 6 Claims

1. A skin conditioning composition in the form of an oil-in-water emulsion comprising:

A from about 1% to about 25% by weight of an oil component which is physiologically acceptable for placement on the skin, and in which 2-pyrrolidinone is freely miscible when said oil component is in the liquid state; said oil component being selected from the group consisting of lanolin fatty acids, isopropyl esters of lanolin fatty acids, hydroxylated lanolin, straight chain fatty acids containing from about 10 to about 20 carbon atoms, straight chain fatty alcohols containing about 10 to 20 carbon atoms and mixtures thereof;

B. from about 1% to about 20% by weight 2-pyrrolidinone;

C. from about 50% to about 95% by weight water; and

D. an amount of oil-miscible emulsifier sufficient to achieve an emulsion between components A, B and C; said composition being prepared by a process comprising the steps of

1. liquifying the oil component by bringing it to a temperature at which it is liquid;

2. mixing the emulsifier and from about 10% to about 95% by weight of the total amount of 2-pyrrolidinone to be used in said composition into said oil component;

3. dissolving the balance of the 2-pyrrolidinone into the water; and

4. mixing the water solution of step (3) into the mixture of step (2) to form an emulsion.

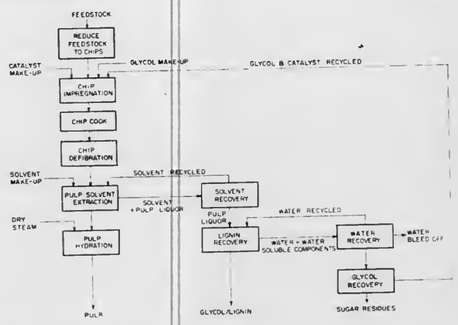
## 4,017,642
## PROCESS OF MAKING FOOD FOR RUMINANT ANIMALS FROM WOOD AND/OR WOODY PRODUCTS

George O. Orth, Jr., and Richard D. Orth, both of Seattle, Wash., assignors to George O. Orth, Seattle, Wash.

Filed July 28, 1975, Ser. No. 599,634

Int. Cl.² A23K *1/12*

U.S. Cl. 426—69 16 Claims




1. A method of making a food for ruminant animals which is substantially free from substances which are inimical to the microflora contained in the rumen of ruminant animals, comprising:

comminuting wood and/or woody material

impregnating the comminuted material with a solvent mixture consisting essentially of an acid catalyst and a glycol or glycol-ether solvent having from 2 to 6 carbon atoms,

heating the material impregnated with the solvent mixture to a temperature of at least 145° C. for a time sufficient to delignify the wood at least 70% and solubilize the lignin and wood sugars contained in the material,

subjecting the treated material to defibration to form a defibrated cellulose pulp,

extracting the solvent mixture from the defibrated pulp with an extraction solvent containing a water-soluble, lower aliphatic alcohol having from 1 to 4 carbon atoms,

recovering the solvent extracted pulp substantially in the anhydrous state, and

rehydrating the substantially anhydrous pulp for feeding to ruminant animals.

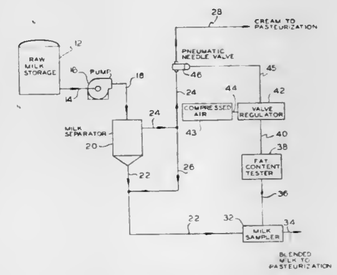
## 4,017,643
## PROCESS FOR STANDARDIZING MILK BY MONITORING THE FAT CONTENT OF THE BLENDED MILK PRODUCT

Joseph H. Lester, Gresham, Oreg., assignor to Western Food Equipment Company, Portland, Oreg.

Filed Apr. 17, 1975, Ser. No. 568,865

Int. Cl.² A23C *7/00*

U.S. Cl. 426—231 4 Claims




1. A process for producing a blended milk product having a predetermined fat content from raw milk, which comprises the steps of:

a. continuously introducing a stream of said raw milk into a milk separation zone and separating said raw milk stream to provide a skimmed milk fraction and a cream fraction;

b. continuously and separately withdrawing said skimmed milk fraction and said cream fraction from said separation zone;

c. continuously splitting said cream fraction into a first portion and a second portion and removing said first portion from the process;

d. continuously admixing said second portion with said skimmed milk fraction to provide a blended milk stream;

e. continuously testing said blended milk stream to determine the fat content thereof;

f. continuously comparing the fat content of said blended milk stream with said predetermined fat content; and

g. continuously controlling the amount of said second portion of cream to provide said blended milk product.

## 4,017,644
## HIGH CALORIE FOOD BAR

Louis Jokay, Niles, Ill., assignor to G. D. Searle & Co., Chicago, Ill.

Filed Aug. 25, 1975, Ser. No. 607,435

Int. Cl.² A23L *1/10*

U.S. Cl. 426—540 4 Claims

1. A high calorie food bar of dough baked to a crisp crust and essentially devoid of sodium, potassium, and protein, consisting essentially of the following ingredients:

a. 150–250 parts by weight of pregelatinized starch which has a viscosity in water of 250–500 Brabender units,

b. 300–500 parts by weight of edible vegetable oil which is semiplastic at 50°–70° F and liquid above 80° F,

c. 200–400 parts by weight sugar, and

d. consumable coloring and flavoring.

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**4,017,645**

## FAST CONCHED CANDY COATING AND METHOD

**Salvatore F. Ziccarelli, Downers Groove, Ill., assignor to Beatrice Foods Co., Chicago, Ill.**

**Continuation-in-part of Ser. No. 628,559, Nov. 3, 1975, Pat. No. 3,976,806. This application Aug. 23, 1976, Ser. No. 716,794**

**Int. Cl.² A23G** *1/16, 1/00*

**U.S. Cl. 426—613** **15 Claims**

1. A process for producing a candy coating comprising:
1. providing a mixture in a paste form having the following ingredients:
   a. 30 to 65 parts fat,
   b. 40 to 70 parts sugar,
   c. 0 to 8 parts milk and/or whey solids,
   d. 0 to 2 parts emulsifier,
   e. 0 to 12 parts cocoa, and
   f. 0 to 2 parts flavors; and
2. conching the paste mixture by high speed shearing and mixing, wherein the mixture is subjected to shearing forces having an average shear component of 75° or greater to produce an essentially mechanically generated conching temperature in the mixture of about 150° to 250° F in a conching time of less than 20 seconds and to reduce the moisture content of the conched mixture to 5 % or less.

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**4,017,646**

## PROCESS FOR PRODUCING PH MODIFIED PROTEIN FILAMENTS

**Ralph A. Hoer, Ballwin, Mo., and Michael H. Stewart, Belleville, Ill., assignors to Ralston Purina Company, St. Louis, Mo.**

**Filed Dec. 11, 1975, Ser. No. 639,721**

**Int. Cl.² A23J** *3/00*

**U.S. Cl. 426—656** **17 Claims**

1. In a method of continuously forming discrete, elongated protein filaments from proteinaceous material wherein an aqueous slurry of the proteinaceous material is formed having a pH below about 6.0 and a proteinaceous solids content of between about 0.5 and 35% by weight, the discrete, elongated filaments being formed by continuously conducting the slurry under pressure through a heat exchange zone and in said zone heating the slurry to a temperature which is above 240° F. but which is less than that which will degrade the protein, whereby the protein is subjected to such temperature for a sufficient period of time so that elongated, tender filaments are thereafter separated from the remaining constituents of the slurry and the heated slurry is continuously removed from said zone through a back pressure creating orifice whereby the discharge of said filaments from the heat exchange zone to a collecting zone is controlled by confining the stream of said filaments being discharged from said orifice into collecting zone to within a total angle of between about 4° and 90°, said angle being measured from an axis through the center of said orifice, followed by separation of said discrete filaments in the collecting zone from the remaining constituents of the slurry, the improvement comprising; injecting a pH elevating material into the stream of filaments during confinement in order to modify the pH of the filaments to above about 6.0.

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**4,017,647**

## METHOD FOR PROVIDING ENTERIC COATINGS ON SOLID DOSAGE FORMS

**Shigeru Ohno, Kamakura; Noboru Hoshi, Higashikurune, and Fujio Sekigawa, Yono, all of Japan, assignors to Shin-Etsu Chemical Company Limited, Tokyo, Japan**

**Filed June 9, 1975, Ser. No. 584,914**

**Claims priority, application Japan, June 11, 1974, 49-66271**

**Int. Cl.² A61K** *9/00, 15/00, 21/00*

**U.S. Cl. 427—3** **13 Claims**

1. A method for providing an enteric coating on a solid pharmaceutical dosage form which comprises coating said dosage form with an aqueous solution of a polymeric substance having carboxyl groups in the form of a water-soluble salt selected from the group consisting of alkali metal, ammonium and amine salts of said polymeric substance said coating being carried out in the absence of an organic solvent and bringing the coated dosage form into contact with a strong inorganic acid so that said polymeric substance is converted into a water-insoluble acid form, the amount of said acid being equal to or greater than the equivalent amount of said salt.

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**4,017,648**

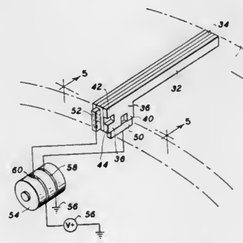
## TONER AGITATION THROUGH MICROFIELD DONOR

**Ernest A. H. Weiler, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

**Division of Ser. No. 546,589, Feb. 3, 1975. This application May 24, 1976, Ser. No. 689,281**

**Int. Cl.² B05D** *1/06*

**U.S. Cl. 427—14** **4 Claims**




4. A Method of transporting triboelectrically charged toner particles on a conductive support member to a latent electrostatic image on the surface of a xerographic photoconductor for development of said image, said conductive support member including a plurality of electrically conductive elements with adjacent ones of said electrically conductive elements being separated by a dielectric material located between each of said elements, adjacent ones of said electrically conductive elements being connected to a source of different electrical potential so as to establish an electrical potential difference between said adjacent conductive elements attracting toner particles to said conductive elements, comprising the step of:
   continuously reversing the connection of adjacent ones of said conductive elements to said sources of different electrical potential while moving said electrically conductive elements toward the xerographic photoconductor.

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**4,017,649**

## RADIATION-SENSITIVE COMPOUNDS AND METHODS OF USING SAME

**Robert DeMajistre, Pittsburgh, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.**

**Division of Ser. No. 329,914, Feb. 5, 1973, which is a continuation-in-part of Ser. No. 171,321, Aug. 12, 1971, abandoned. This application Dec. 11, 1975, Ser. No. 639,722**

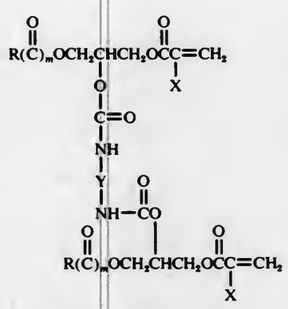
**Int. Cl.² B05D** *3/06;* **C07C** *125/06*

**U.S. Cl. 427—44** **21 Claims**

1. A mixture comprising



a. at least one compound containing urethane linkages and represented by the general formula:

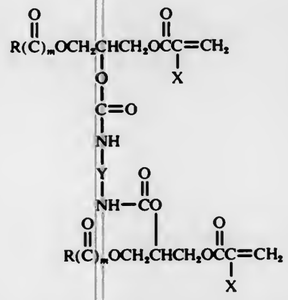



wherein
1. R is selected from the group consisting of n-octyl, isooctyl, 2-ethylhexyl, decyl, dodecyl, tetradecyl eicosyl and tertiary alkyl of the formula



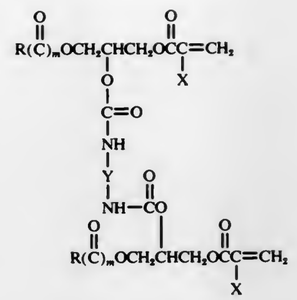

wherein $R_1$, $R_2$ and $R_3$ are alkyl groups containing 1 to 5 carbon atoms;
2. Y is a divalent hydrocarbon radical containing from 6 to 16 carbon atoms;
3. X is hydrogen or methyl; and
4. *m* is 0 or 1; and
b. at least one other radiation sensitive monomer.

**8.** A method of obtaining a hard, stain-resistant material comprising subjecting to ionizing irradiation a compound containing urethane linkages and represented by the general formula




wherein R is a saturated alkyl radical, Y is a divalent hydrocarbon having from 6 to 16 carbon atoms, X is hydro or methyl and *m* is 0 or 1.

**16.** A method of coating a substrate comprising
a. applying to a substrate a coating of a compound containing urethane linkages and represented by the general formula:




wherein R is a saturated alkyl radical, Y is a divalent hydrocarbon having from 6 to 16 carbon atoms, X is hydro or methyl and *m* is 0 or 1; and
b. subjecting said coating to ionizing irradiation to form a hard, mar-resistant and stain-resistant film.

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**4,017,650**

## METHOD OF COATING USING ACTIVE RADIATION CURABLE POLYENE-POLYTHIOL COMPOSITIONS

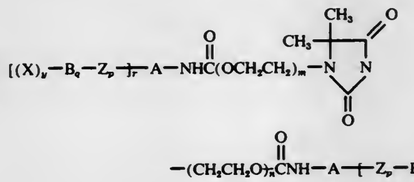
**Charles R. Morgan, Brookeville, Md., assignor to W. R. Grace & Co., New York, N.Y.**

**Division of Ser. No. 614,580, Sept. 18, 1975, Pat. No. 3,984,297, which is a division of Ser. No. 461,207, April 15, 1974, Pat. No. 3,945,982. This application May 21, 1976, Ser. No. 688,643**

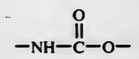
**Int. Cl.² B05D** *3/06*

**U.S. Cl. 427—53** **3 Claims**

1. A process which comprises:
A. applying to the surface of a substrate a layer of a composition consisting essentially of:
1 A polyene of the formula:



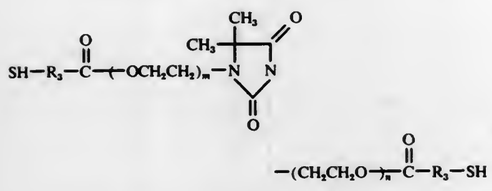

wherein A and B are polyvalent organic radical members free of reactive carbon to carbon unsaturation and are independtly selected from the group consisting of aryl, substituted aryl, aralkyl, substituted aralkyl, cycloalkyl, substituted cycloaklyl, alkyl and substituted alkyl containing 1 to 36 carbon atoms and mixtures thereof, said group members can be connected by a chemically compatible linkage selected from the group consisting of —0—, —S—, carboxylate, carbonate, carbonyl, urethane and substituted urethane, urea and substituted urea, amide and substituted amide, amine and substituted amine and hydrocarbon; Z is a divalent chemically compatible linkage selected from the group consisting of




—O— and —S—; X is a member selected from the group consisting of (a) $-(CH_2)_d-CR'=CHR$, (b) $-O-(CH_2)_d-CR'=CHR$, (c) $-S-(CH_2)_{CR'=CHR}$. (d) $-(CH_2)_d-C\equiv CR$, (e) —O—($CH_2$·

)$_d$—C ≡ CR, (f) —S—(CH$_2$)$_d$—C ≡ CR; and mixtures thereof; where R and R'each are independently selected radical; the group consisting of hydrogen and methyl radicals *d*, *p* and *q* are each integers from 0 0 to 1; *m* and *n* are each integers of at least 1; with *m* + *n* from 2 to 22 and *r* at least 1, and *y* from 1 to 10; and

2. A polythiol of the formula:



wherein *m* and *n* are each at least 1 and *m* + *n* is 2 to 22 and R$_3$ is a polyvalent organic radical member free of reactive carbon-to-carbon unsaturation and is selected from the group consisting of aryl; substituted aryl, aralkyl, substituted aralkyl, cylcoalkyl, substituted cycloalkyl, alkyl and substituted alkyl groups containing 1 to 16 carbon atoms and mixtures thereof, the total combined functionality of (a) the reactive carbon to carbon bonds per molecule in the polyene and (b) the thiol groups per molecule in the polythiol being greater than 4 and

3. a photocuring rate accelerator and, thereafter, exposing the layer to actinic radiation thereby curing said composition.

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**4,017,651**

**PRE-TREATMENT OF NON-WOVENS**

**Gustav Sinn, Opladen, and Martin Matner, Odenthal, both of Germany, assignors to Bayer Aktiengesellschaft, Germany**

**Filed Mar. 25, 1975, Ser. No. 561,936**

**Claims priority, application Germany, Mar. 30, 1974, 2415602**

**Int. Cl.² B05D** *3/02*; **D06B** *1/00*

**U.S. Cl. 427—55** **12 Claims**

1. In the wet process of forming a non-woven textile fiber fleece wherein most of the water from an aqueous suspension of textile fibers is mechanically removed to thereby obtain a wet textile fiber fleece, the improvement which comprises applying in finely divided form to the surface of said wet textile fiber fleece a heat-sensitive latex mixture whose coagulation point does not change substantially on dilution and then heating the fleece to a temperature at which the latex mixture coagulates to form a gel-like film.

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**4,017,652**

**PHOTOCATALYST SYSTEM AND ULTRAVIOLET LIGHT CURABLE COATING COMPOSITIONS CONTAINING THE SAME**

**Gerald W. Gruber, Sewickley, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.**

**Filed Oct. 23, 1974, Ser. No. 517,572**

**Int. Cl.² B05D** *3/06*

**U.S. Cl. 427—54** **20 Claims**

13. A method comprising:

a. coating a substrate with an ultraviolet light curable coating composition comprising

1. at least one aromatic ketone or aromatic aldehyde photosensitizer which

a. has a triplet energy in the range of from about 54 kilocalories per mole to about 72 kilocalories per mole, and

b. promotes polymerization through bimolecular photochemical reactions of the energy donor type,

2. at least one aromatic ketone photoinitiator which generates a radical pair by way of unimolecular homolysis resulting from photoexcitation, at least one member of said radical pair being capable of initiating addition polymerization of acrylic groups, said aromatic ketone photoinitiator being selected from the group consisting of ethyl benzoin ether, isopropyl benzoin ether, butyl benzoin ether, isobutyl benzoin ether, α, α-diethoxyacetophenone, α, α-diethoxy-α-phenylacetophone, α, α-dimethoxy-α-phenylacetophenone, 4,4'-dicarboethoxybenzoin ethyl ether, benzoin phenyl ether, α-methylbenzoin ethyl ether, α-methylbenzoin methyl ether, α, α, α-trichloroacetophenone, mixtures of butyl isomers of butyl benzoin ether, and mixtures thereof,

and

3. a resin having acrylic unsaturation and capable of being free radically addition polymerized by interaction with said photosensitizer and said photoinitiator upon exposure to ultraviolet light;

and

b. exposing said coated substrate to ultraviolet light to cure said coating into a hard mar and abrasion resistant film.

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**4,017,653**

**ABSORBENT ARTICLES AND METHODS FOR THEIR PREPARATION**

**James R. Gross, Lake Jackson, Tex., assignor to The Dow Chemical Company, Midland, Mich.**

**Division of Ser. No. 468,794, May 9, 1974, Pat. No. 3,980,663, which is a continuation-in-part of Ser. No. 371,909, June 20, 1973, abandoned. This application May 1, 1975, Ser. No. 573,661**

**Int. Cl.² B05D** *3/02*; **C08L** *31/02, 33/02*

**U.S. Cl. 427—385 A** **15 Claims**

1. A method of preparing an absorbent article coated with a substantially dry water swellable polyelectrolyte which comprises

a. applying a coating on a relatively thin article wherein the coating comprises

1. a solution of a carboxylic synthetic polyelectrolyte wherein the solution consists of water, lower alcohols, or mixtures thereof and about 5 to about 60% by weight of a carboxylic polyelectrolyte, and

2. at least about 0.1% by weight based on the polyelectrolyte of a crosslinking agent reactive with carboxylate groups,

B. heating said coated article to a temperature greater than about 30° C. to crosslink said polyelectrolyte.

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**4,017,654**

**CURED RUBBER ARTICLE AND METHOD OF PREPARATION**

**Theodore A. Evans, and William A. Watts, both of Uniontown, Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio**

**Filed Feb. 6, 1976, Ser. No. 655,818**

**Int. Cl.² B32B** *31/00*

**U.S. Cl. 428—40** **11 Claims**

1. A composite of a compounded, productive, tacky, shaped, unvulcanized rubber stock containing a curative therefor having a protective film overlay loosely adhered thereto, where said film overlay is an unvulcanized composite compatible with said compounded rubber stock having a thickness in the range of about 0.5 to about 10 mils comprised of an unvulcanized thermoelastic block copolymer selected from the group consisting of ABA and ABC block copolymers in which A represents a non-elastomeric monovinyl aromatic hydrocarbon polymer block selected from at least one of styrene, alpha methyl styrene and vinyl toluene having an average molecular weight in the range of about 7,000 to about 25,000 and a glass transition temperature above about 25° C., the total block A content being about 20 to about 70 weight percent of the ABA copolymer, B is an elastomeric conjugated diene polymer block selected from at least one of 1,3-butadiene, isoprene and piperylene having an average molecular weight of about 30,000 to about 100,000 and a glass transition temperature below about 10° C., and C is a polar polymer block derived from vinyl pyridine, vinyl quinoline, acrylic, vinyl nitrile, vinyl furan and vinyl carbazole monomers, where the total A plus C block content is about 20 to about 70 weight percent of the total ABC copolymer.



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**4,017,655**

**SELECTIVELY SEPARABLE STRIP ASSEMBLY**

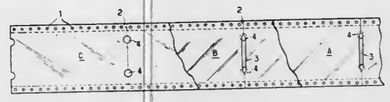
**Ulrich F. Mutschler, Marly-le-Roi, France, assignor to I E R Impression Enregistrement des Resultats, France**

**Filed Feb. 11, 1976, Ser. No. 657,206**

**Claims priority, application France, Mar. 26, 1975, 75.09535**

**Int. Cl.² B65D** *65/28*; **G09F** *3/00*

**U.S. Cl. 428—43** **5 Claims**



1. A strip assembly for imprinting of data and for subsequent selective separating comprising

an elongated support strip; and

a second strip superimposed on said support strip, said second strip being substantially coextensive with said support strip and having

means defining a plurality of transverse slits extending partially across said second strip at substantially equal longitudinal intervals,

said assembly being severable along transverse lines aligned with and transversely offset from said slits to completely separate said second strip into individual sheets while leaving corresponding portions of said support strip interconnected at the regions adjacent said slits.

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**4,017,656**

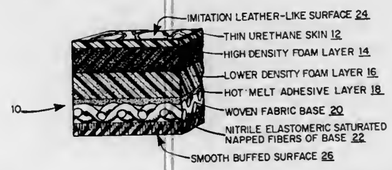
**IMITATION LEATHER MATERIAL AND METHOD OF PREPARING SUCH MATERIAL**

**Henry R. Lasman, Andover, Mass.; Robert J. Lebenson, Nashua, N.H., and Reuben Wisotzky, Lexington, Mass., assignors to Pandel-Bradford, Inc., Lowell, Mass.**

**Filed Sept. 18, 1975, Ser. No. 614,362**

**Int. Cl.² B32B** *27/40*

**U.S. Cl. 428—86** **33 Claims**




1. An imitation leather material which comprises in combination:

a. a woven fabric base sheet material, one surface of which is a napped surface and the other surface of which is not napped;

b. the napped surface of the base sheet impregnated with a cross-linked polymeric material;

c. the napped impregnated surface of the base sheet characterized by a buffed, flesh-like surface;

d. an open-cell flexible polymeric foam layer bonded to the other unnapped surface of the base sheet material;

e. a thin polymeric skin layer bonded to the surface of the foam layer; and

f. the thin polymeric skin layer characterized by an imitation leather-like surface.

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**4,017,657**

**PVC FOAMS**

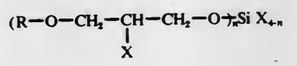
**Kevin M. Foley, Toledo; Frank P. McCombs, Granville, and Francesco M. Vigo, Heath, all of Ohio, assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio**

**Continuation-in-part of Ser. No. 523,596, Nov. 14, 1974, abandoned. This application Oct. 20, 1975, Ser. No. 624,145**

**Int. Cl.² B32B** *3/02, 3/26*

**U.S. Cl. 428—95** **6 Claims**

1. A polyvinyl chloride foam produced by curing and blowing a polyvinyl chloride plastisol which comprises a long chain silane represented by the formula



wherein R is an alkyl radical having from 5 to 50 carbon atoms, *n* has a value within the range from 1 to 4 and X represents chlorine, bromine, fluorine or iodine.

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**4,017,658**

**COMPOSITE TEXTURED PRODUCTS AND THEIR MANUFACTURE**

**René F. Bomboire, Wiltz, Luxembourg, assignor to Eurofloor S.A., Luxembourg**

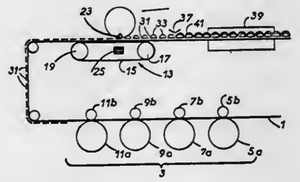
**Filed Mar. 5, 1974, Ser. No. 448,451**

**Claims priority, application Luxembourg, Nov. 21, 1973, 68838**

**The portion of the term of this patent subsequent to Sept. 16, 1992, has been disclaimed.**

**Int. Cl.² B32B** *3/14*; **B05D** *1/36*; **B32B** *31/26*

**U.S. Cl. 428—172** **20 Claims**



1. A process for the manufacture of sheet material having a relief effect on at least a first surface comprising the steps of:

printing a decoration on a surface of a support member;

applying at least one discontinuous layer of a transparent plastisol over and in registration with at least part of the printed decoration, the plastisol being applied in a thickness of at least ten mils and imparting a desired relief appearance to the printed decoration, the decoration being viewed through the discontinuous layer of plastisol; and

passing the printed plastisol bearing support through a gelation oven.

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**4,017,659**

**TEAM LATTICE FIBERS**

**George C. Brumlik, Montclair, N.J., assignor to Ingrip Fasteners Inc., Montclair, N.J.**

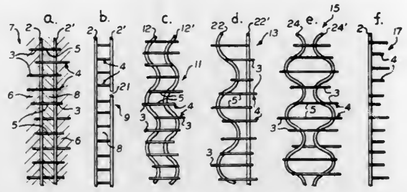
**Filed Oct. 17, 1974, Ser. No. 515,792**

**Int. Cl.² B32B** *9/00*; **D02G** *3/00*

**U.S. Cl. 428—397** **3 Claims**

1. A composite textile filament comprising at least two synthetic or natural textile filaments selected from the group consisting of polyesters, polyamides, polyimides, rayon, ace-

tate, rayon triacetate, cellulose, acrylics, polyolefins, polyvinyl derivatives, protein-based polymers, glass, cotton, flax, ramie, wool and animal hair extending side by side in the axial direction, said filaments being joined by a series of individual trans-




verse textile fibers selected from the group consisting of textile fines, cotton linters and silk rod which join said filaments extending side by side in the axial direction into said composite filament.

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## 4,017,660
## DIELECTRIC MATERIAL HAVING MONOMOLECULAR LAYERS AND CAPACITORS IN WHICH SAID MATERIAL IS EMPLOYED

**Andre' Barraud, Bures sur Yvette, and Jean Messier, Gif sur Yvette, both of France, assignors to Commissariat a l'Energie Atomique, Paris, France**

**Filed Sept. 29, 1975, Ser. No. 617,724**
**Claims priority, application France, Oct. 8, 1974, 74.33850**
**Int. Cl.² B32B** *9/04*
**U.S. Cl. 428—411** **9 Claims**

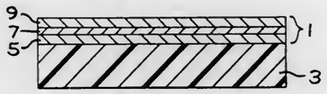
1. A dielectric material of the type having monomolecular layers of an organic substance consisting of: molecules formed of a long aliphatic chain of formula $CH_3—(CH_2)_n$ wherein $n$ is within the range of 18 to 30, and terminating in a hydrophilic group; and means for cohering said molecules including a plurality of lateral groups each grafted onto each of said aliphatic molecules, whereby pairs of said lateral groups cooperate together for bonding of adjacent molecules.

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## 4,017,661
## ELECTRICALLY CONDUCTIVE TRANSPARENT LAMINATED WINDOW

**Frank H. Gillery, Allison Park, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.**

**Division of Ser. No. 495,974, Aug. 9, 1974, Pat. No. 3,962,488. This application Jan. 19, 1976, Ser. No. 650,400**
**Int. Cl.² B32B** *27/36*
**U.S. Cl. 428—412** **11 Claims**



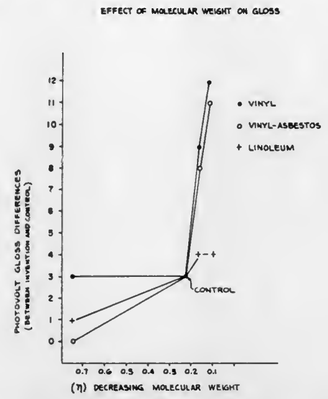

1. A transparent, colorless article comprising in combination:
a. a transparent substrate,
b. a first transparent layer having a thickness of from 200 to 500 Angstroms affixed to said substrate deposited as $TiO_x$, where $x$ is a value greater than 1.3 but less than 1.7,
c. a second transparent layer of metal selected from the class consisting of silver and gold having a thickness of from 60 to 250 Angstroms overlying and affixed to said first transparent layer, and having a sheet resistance of less than 10 ohms per square,
d. a third transparent layer having a thickness of from 200 to 500 Angstroms overlying and affixed to said second transparent layer deposited as $TiO_x$, where $x$ is a value greater than 1.3 but less than 1.7; said coated article having a luminous transmittance of at least 80 percent.

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## 4,017,662
## POLISHING METHOD

**David R. Gehman, Harleysville, Pa., and Irwin S. Fiarman, Willingboro, N.J., assignors to Rohm and Haas Company, Philadelphia, Pa.**

**Continuation-in-part of Ser. No. 686,709, Nov. 29, 1967, abandoned, and Ser. No. 771,703, Oct. 30, 1968, abandoned. This application Jan. 24, 1972, Ser. No. 220,394**
**Int. Cl.² B05D** *3/02*; **B32B** *19/04*, *9/04*, *27/08*
**U.S. Cl. 428—443** **16 Claims**




1. A method of polishing wood, linoleum, asphalt, vinyl, and vinyl asbestos flooring, with a high gloss coating having a Knoop hardness number of at least 0.5. comprising the steps of applying thereto a layer of a polymeric composition having an essentially water-clear appearance and containing alkaline or buffering agents, a salt of a water-insoluble addition polymer having carboxyl groups, a surface active agent, water, and optional ingredients, in which said addition polymer consists essentially of an addition polymer of monomers consisting essentially of from 12% of about 25% by weight of an $\alpha,\beta$-unsaturated carboxylic acid interpolymerized with an ester of acrylic acid or methacrylic acid, which polymer contains no more than about 10% of an additional copolymerizable hydrophilic property-conferring mononer having hydroxyl, amide, or amine groups, said polymer having an intrinsic viscosity, at 30° C. in tetrahydrofuran, of between 0.05 and 0.15, and in which a water miscible coalescing agent or plasticizer is present in an amount between about 3% and 75%, based on the combined weights of the acrylic polymer, and any wax, wax-soluble polymer, or alkali-soluble polymer present, there being 30 to 100 parts by weight addition polymer and 0 to 70 parts by weight of wax, wax-soluble resin, or alkali-soluble resin, the total of addition polymer and the wax, wax-soluble, or alkali-soluble resin being 100 parts, and drying the coating, the coating being removable with aqueous ammonia, there being no more than about 50% of other monoethylenically unsaturated monomers in the polymer, the total solids content being from about 8% to 45% by weight.

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## 4,017,663
## ELECTRODES FOR ELECTROCHEMICAL CELLS

**Richard D. Breault, Coventry, Conn., assignor to United Technologies Corporation, Hartford, Conn.**

**Continuation-in-part of Ser. No. 443,057, Feb. 15, 1974, abandoned, which is a continuation of Ser. No. 268,258, July 3, 1972, abandoned, which is a continuation-in-part of Ser. No. 98,934, Dec. 16, 1970, abandoned. This application Apr. 4, 1975, Ser. No. 565,177**
**Int. Cl.² H01M** *8/00*
**U.S. Cl. 429—12** **9 Claims**

1. In a fuel cell comprising an anode electrode, a cathode electrode, spaced apart and forming an electrolyte compartment therebetween, and means constructed and arranged to define a reactant gas passage on the nonelectrolyte side of each electrode, an improvement to said cell wherein at least one of said electrodes includes a carbon paper substrate comprising carbon fibers each coated with pyrolytic carbon, said pyrolytic carbon forming electrically conductive bonds between said fibers, said substrate including a hydrophobic polymer dispersed therein for wet-proofing the substrate, and a layer disposed on said wet-proofed substrate consisting of a catalyst and a hydrophobic polymer.

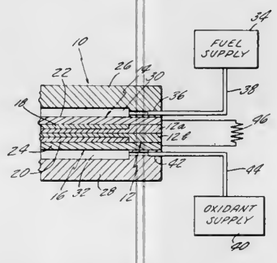


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## 4,017,664
## SILICON CARBIDE ELECTROLYTE RETAINING MATRIX FOR FUEL CELLS

**Richard D. Breault, Coventry, Conn., assignor to United Technologies Corporation, Hartford, Conn.**

**Filed Sept. 2, 1975, Ser. No. 609,867**
**Int. Cl.² H01M** *8/02*
**U.S. Cl. 429—44** **24 Claims**




1. A fuel cell comprising:
a pair of spaced apart gas diffusion electrodes;
a porous electrolyte retaining matrix confined in the space between said electrodes and extending therebetween, and comprising at least 90% silicon carbide; and
phosphoric acid electrolyte disposed within said matrix.

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## 4,017,665
## COMPOSITION FOR A ZINC ELECTRODE

**Josef Sandera; Milan Calabek; Oldrich Kouril; Miroslav Cenek, all of Brno; Josef Vanacek, Slapanice; Jiri Malik, and Vojtech Koudelka, both of Mlada Boleslav, all of Czechoslovakia, assignors to Prazska akumulatorka, narodni podnik, Mlada Boleslav, Czechoslovakia**

**Filed May 21, 1975, Ser. No. 579,701**
**Claims priority, application CanalZone, May 21, 1974, 3620/74**
**Int. Cl.² H01M** *35/02*
**U.S. Cl. 429—229** **5 Claims**

1. An improved composition for a zinc electrode, consisting of (a) a powdered material selected from the group consisting of zinc and zinc compounds, (b) a binding agent, (c) a porosity-increasing agent, and (d) a substance selected from the group consisting of sodium fluoride, potassium fluoride, and their mixtures, the substance being present in the composition in the range of 5–55% by weight.

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## 4,017,666
## PHOTODEGRADABLE POLYOLEFINS CONTAINING AN HALOALKYL DISULFIDE

**Bernard Freedman, Berkeley, and Martin J. Diamond, Oakland, both of Calif., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.**

**Division of Ser. No. 603,080, Aug. 8, 1975, Pat. No. 3,968,096, which is a division of Ser. No. 543,706, Jan. 23, 1975, Pat. No. 3,929,723. This application Apr. 21, 1976, Ser. No. 678,830**
**Int. Cl.² C08J** *3/20*
**U.S. Cl. 526—3** **2 Claims**

1. A photodegradable composition comprising a polyolefin and about from 0.1 to 10%, based on the weight of polyolefin, of an additive of the structure

$$R—(CH_bX_a)_c—S—S—(CH_bX_a)_c—R$$

wherein:
each X is chlorine, bromine, or iodine
R is hydrogen, chlorine, bromine, iodine, or an alkyl radical containing 1 to 6 carbon atoms
$a$ is 1 or 2
$b$ is 2-$a$
$c$ is 1 or 2.

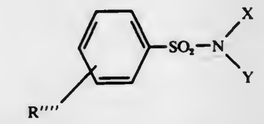
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## 4,017,667
## PHOTODEGRADABLE POLYOLEFIN COMPOSITION CONTAINING AN N-HALO BENZENESULPHONAMIDE

**Bernard Freedman, Berkeley, and Martin J. Diamond, Oakland, both of Calif., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.**

**Division of Ser. No. 582,507, May 30, 1975, Pat. No. 3,968,095, which is a division of Ser. No. 453,911, March 22, 1974, Pat. No. 3,932,352. This application Apr. 2, 1976, Ser. No. 672,907**
**Int. Cl.² C08J** *3/20*
**U.S. Cl. 526—3** **2 Claims**

1. A photodegradable composition comprising a polyolefin and about from 0.1 to 10%, based on the weight of polyolefin, of an additive of the structure —




wherein X is chlorine, bromine, or iodine, Y is hydrogen, chlorine, bromine, or iodine, and R'''' is hydrogen, a lower alkyl radical, chlorine, bromine, or iodine.

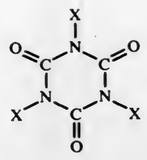
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## 4,017,668
## PHOTODEGRADABLE POLYOLEFIN COMPOSITION CONTAINING AN HALOGENATED ISOCYANURIC ACID

**Bernard Freedman, Berkeley, and Martin J. Diamond, Oakland, both of Calif., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.**

**Division of Ser. No. 582,507, May 30, 1975, Pat. No. 3,968,095, which is a division of Ser. No. 453,911, March 22, 1974, Pat. No. 3,932,352. This application Apr. 2, 1976, Ser. No. 672,904**
**Int. Cl.² C08J** *3/20*
**U.S. Cl. 526—6** **2 Claims**

1. A photodegradable composition comprising a polyolefin, and about from 0.1 to 10%, based on the weight of polyolefin, of an additive of the structure -



wherein X is chlorine, bromine, or iodine.

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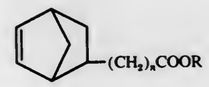
4,017,669

## FUNCTIONALLY SUBSTITUTED TERPOLYMERS AND TETRAPOLYMERS OF ALPHA-OLEFINS AND PROCESS FOR MANUFACTURING FUNCTIONAL SUBSTITUTED COPOLYMERS

John Wilfred Collette; Rolland Shin-Yuan Ro, and Fred Max Sonnenberg, all of Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 829,758, June 2, 1969, Pat. No. 3,748,316.
This application Apr. 27, 1973, Ser. No. 355,083
Int. Cl.² C08F *4/20, 32/04*
U.S. Cl. 526—169 16 Claims

1. A process for preparing copolymers of ethylene; of ethylene and an α-olefin having 3–18 carbon atoms; or of ethylene, an α-olefin having 3–18 carbon atoms, and a nonconjugated diene having one polymerizable double bond, with norbornene derivatives, in contact with a catalytic system formed by the association of an organoaluminum compound with a vanadium compoumd; characterized by the fact that contact is established in the presence of said catalyst between ethylene, or between ethylene and an αolefin having 3–18 carbon atoms, or between ethylene, an α-olefin having 3–18 carbon atoms, and a non-conjugated diene, and at least one norbornene derivative of the formula



where *n* is an integer within the range of 0–20 , and R can be an alkyl, aryl, or cycloalkyl containing 1–18 carbon atoms, the aforesaid copolymers being solid at ordinary temperatures.

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4,017,670

## SUSPENSION POLYMERIZATION PROCESS

John P. Spicuzza, Jr., Pittsburgh, and Frank J. E. Mills, Beaver, both of Pa., assignors to ARCO Polymers, Inc., Philadelphia, Pa.

Filed May 24, 1976, Ser. No. 689,025
Int. Cl.² C08F *12/04, 12/08*
U.S. Cl. 526—233 4 Claims

1. In a process for producing polymer beads by adding vinyl aromatic monomer containing from 0.15 to 0.55 percent by weight based on monomer of a monomer-soluble free-radical producing catalyst to an aqueous dispersion of from 0.20 to 1.0 percent by weight based on monomer of a finely divided, difficultly water-soluble phosphate with or without an extender for said phosphate and subjecting the resulting suspension to an elevated temperature to cause said monomer to polymerize, the improvement consisting of treating the aqueous dispersion of phosphate, prior to the addition of monomer, with 40,000 to 60,000 cycles per second ultrasonic waves for at least 10 minutes, whereby the polymer bead size resulting from the polymerization is less than the bead size produced by the same lot of phosphate in the absence of ultrasound.

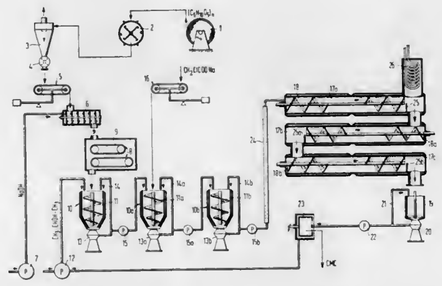
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4,017,671

## PROCESS FOR THE CONTINUOUS MANUFACTURE OF CELLULOSE GLYCOLATE

Wolfgang Schminke; Klaus Stölting; Hans Macholdt, and Hans Künkler, all of Wiesbaden-Biebrich, Germany, assignors to Hoechst Aktiengesellschaft, Germany

Filed Jan. 6, 1975, Ser. No. 539,035
Claims priority, application Germany, Jan. 9, 1974, 2400879
Int. Cl.² C08B *11/00*
U.S. Cl. 536—98 5 Claims



1. In the process for the continuous manufacture of cellulose glycolate, in which an etherification mixture, initially containing alkali cellulose formed from finely comminuted cellulose and sodium hydroxide solution, sodium chloroacetate and water is conveyed through a reaction zone having a constant temperature of at least 60° C and when said zone has more than one section, a constant temperature in each section, in a manner such that the residence time of the etherification mixture in the reaction zone is sufficient to cause the sodium chloroacetate initially contained in the mixture to react, and in which the etherification mixture is also thoroughly mixed by the application of shearing forces;

the improvement comprising that the etherification mixture initially comprises

1 part by weight of cellulose
0.2 to 0.6 part by weight of sodium hydroxide
0.5 to 1.75 part by weight of sodium monochloroacetate
7 to 22 parts by weight of isopropyl alcohol (100%)

and water corresponding to between 20% and 50% by weight of the isopropyl alcohol,

maintaining the constant temperature of the etherification mixture in the reaction zone in the range of 60° to 90° C,

exerting the shearing forces on the etherification mixture before it enters the reaction zone and at a temperature below 30° C, by homogenizing by means of a homogenizer, the residence time of the etherification mixture in the homogenizing zone being less than 1/10 of its residence time in the reaction zone,

and, after etherification has terminated, separating the fluid components from the solid components of the etherification mixture by mechanical means.

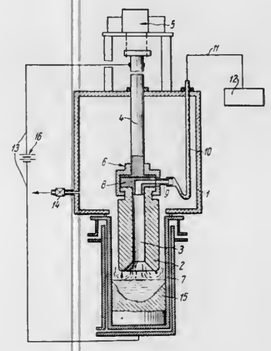


4,017,672

## PLASMA-ARC FURNACE FOR REMELTING METALS AND ALLOYS

Boris Evgenievich Paton, ulitsa Kotsjubinskgo 11/13, kv. 21; Viktor Iosifovich Lakomsky, ulitsa Anri Barbjusa, 22–26, kv. 119; Gennady Fedorovich Torkhov, Prazhskaya ulitsa 3, kv. 456; Vladimir Kirillovich Trigub, ulitsa Vernadskogo 63, kv. 61; Ivan Vasilievich Sheiko, ulitsa Schuseva, 36, kv. 32, all of, Kiev; Emil Vasilievich Verkhovtsev, ulitsa Ordzhonikidze, 28, kv. 9, Izhevsk; Sergei Panteleevich Bakumenko, ulitsa Sovetskaya, 21, kv. 17, Izhevsk; Nikolai Alexeevich Ponomarev, ulitsa Truda, 34, kv. 18, Izhevsk, and Anatoly Alexandrovich Kuzmin, ulitsa Sovetskaua, 21, kv. 2, Izhevsk, all of U.S.S.R.

Filed Mar. 11, 1976, Ser. No. 665,934
Int. Cl.² H05H *1/26*
U.S. Cl. 13—2 P 2 Claims



1. A plasma-arc furnace for remelting metals and alloys comprising:

a chamber with openings;

a plasmatron in the form of a consumable electrode of the metal or alloy to be remelted accommodated within said chamber,

said plasmatron having an axial through-going internal space;

a mechanism for moving said plasmatron in a substantially vertical direction;

a water-cooled rod of said plasmatron-moving mechanism extending into said chamber through one of the openings thereof and being operatively connected with said plasmatron;

a water-cooled crystallizer adapted to accumulate therein a liquid metal communicating with said chamber, there being settable a plasma-arc discharge in said crystallizer capable of melting away said plasmatron;

a system for supplying a plasma-yielding gas to said chamber;

a flexible conduit accommodated within said chamber and having one end thereof projecting outwardly of said chamber through one of the openings thereof and communicating with said plasma-yielding gas supply system, the other end of said flexible conduit being connected to said axial through-going internal space of said plasmatron;

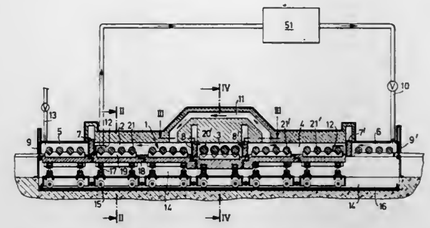
and a power supply source to which said water-cooled rod and said crystallizer are connectable.

4,017,673

## METHOD AND APPARATUS FOR GRAPHITIZATION OF CARBON MATERIALS

Martin Michels, Kuhlenthal, and Wilhelm Settele, Biberbach, both of Germany, assignors to Sigri Elektrographit GmbH, Meitingen near Augsburg, Germany

Filed Oct. 20, 1975, Ser. No. 624,273
Claims priority, application Germany, Dec. 17, 1974, 2459576
Int. Cl.² F27D *11/04;* F27B *9/00*
U.S. Cl. 13—7 12 Claims



1. Method for graphitization of carbon bodies in a continuous-type furnace which comprises transporting a charge of carbon containing at least one carbon body to be graphitized into a preheating zone of said furnace wherein said charge of carbon is retained by a holding device in said preheating zone and passing a hot inert gas in contact with said carbon charge, transporting said preheated carbon to a graphitization zone in said furnace wherein said preheated carbon is retained in said graphitization zone by a holding device in said zone and heating said preheated carbon by electrical heating means up to a temperature above 2200° C in said graphitization zone to effect graphitization of preheated carbon, transporting said graphitized carbon to a cooling zone in said furnace wherein said graphitized carbon is retained in said cooling zone by a holding device in said zone and cooled in said cooling zone to a temperature below about 500° C, said preheating, graphitization and cooling of said carbon body constituting a cycle of operation, simultaneously subjecting in furnace a carbon charge to preheating, another previously preheated carbon body to graphitization, and a third previously preheated and graphitized carbon body to cooling, and after each cycle removing the cooled graphite body from the holding device in the cooling zone and transporting it out of the cooling zone, removing the graphitized body from the holding device in the graphitizing zone and transporting it to the cooling zone, removing the preheated carbon from the holding device in the preheating zone and transporting it to the graphitizing zone, transporting a new charge of carbon into the preheating zone, and continuing the simultaneous preheating, graphitization and cooling of three different carbon charges and between cycles moving the carbon bodies from the holding devices and transporting the graphite carbon out of the cooling zone, transporting the graphitized carbon to the cooling zone, transporting the preheated carbon to the graphitization zone, and transporting a new charge to the preheating zone.

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4,017,674

## METHOD FOR STARTING OPERATION OF A RESISTANCE MELTER

Christopher Charles Chapman, Richland, Wash., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

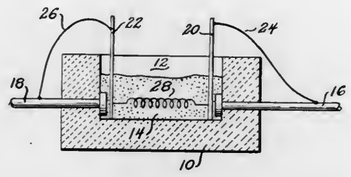
Filed Jan. 16, 1976, Ser. No. 649,770
Int. Cl.² C03B *5/02;* F27D *11/04;* H05B *3/60*
U.S. Cl. 13—23 6 Claims

1. A method for starting the operation of a resistance furnace for melting a charge, wherein the furnace contains two

opposed primary electrodes, heat is produced by the resistance of the charge to current flowing therethrough between the electrodes, and the charge is a material which is essentially electrically nonconductive when in a solid physical state, but which becomes more electrically conductive in a molten physical state comprising:

a. placing first and second start-up electrodes in the charge adjacent the first and second primary electrodes respectively;

b. electrically connecting the primary electrodes to the respective start-up electrode;




c. connecting electrical resistance heating wire electrically between the start-up electrodes, said wire being in contact with the material of the charge along a path between the two electrodes; and

d. passing a current between the primary electrodes through the start-up electrodes and the heating wire, said current being sufficient to heat the wire to a temperature high enough to melt the charge material in contact with the wire to form a path of molten charge material between the primary electrodes so that the current can pass directly between the electrodes through the melted charge material whereby operation of the resistance furnace is started.

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**4,017,675**

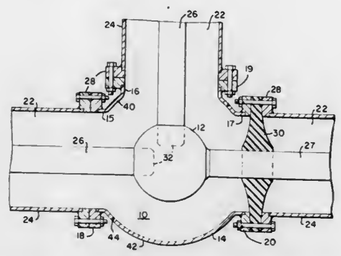
## JUNCTION BOX FOR HIGH VOLTAGE GAS INSULATED CONDUCTORS

**Melvyn D. Hopkins, Pittsburgh, and Charles B. Wolf, Irwin, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed June 6, 1975, Ser. No. 584,430**

**Int. Cl.² H01B 9/04**

**U.S. Cl. 174—21 C** **7 Claims**




1. A junction box for a high voltage gas insulated system comprising:

a first hemispherically shaped member having an opening formed therein;

a second hemispherically shaped member having an opening formed therein joined to said first hemispherically shaped member to define a spherically shaped cavity;

a first elongated conductor insulated from said first hemispherically shaped member and said second hemispherically shaped member having one end projecting through the opening in said second hemispherically shaped member;

a circular insulating support rigidly joined to said first elongated conductor to rigidly support and position said first elongated conductor;

an electrically conducting inner sphere permanently and rigidly joined to the end of said first elongated conductor within the spherical cavity defined by said first hemispherically shaped member and said second hemispherically shaped member and having a sliding contact opening formed therein, said inner sphere being in electrical contact with said first elongated conductor; and

a second elongated conductor projecting through the opening in said first hemispherically shaped member and engaging the slidable contact opening formed in said inner sphere, said second elongated conductor being in electrical contact with said inner sphere to make electrical contact with said first elongated conductor.

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**4,017,676**

## CIRCUIT ARRANGEMENT FOR SEPARATING VIDEO AND AUDIO SIGNALS

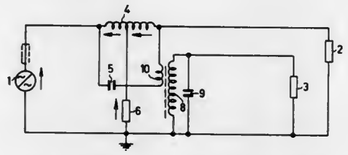
**Thorwald Rabeler, and Wolfgang Weltersbach, both of Hamburg, Germany, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed Oct. 24, 1975, Ser. No. 625,642**

**Claims priority, application Germany, Aug. 16, 1975, 2536496**

**Int. Cl.² H04N 5/44, 5/62**

**U.S. Cl. 358—196** **10 Claims**




1. A circuit arrangement for decoupling the video signal from an intercarrier sound signal in a television receiver, said circuit comprising an intermediate frequency source of video and sound signals, a sound trap coupled to said source and tuned to the intermediate frequency of the sound signal, a first output impedance from which the video signal can be obtained coupled to the a sound trap, a second output impedance from which the intercarrier sound signal can be obtained, means for coupling the second output impedance to the sound trap and for supplying the intercarrier sound signal from the sound trap to the second impedance, whereby losses are introduced into said sound trap thereby reducing the attenuation of said sound signal at said first output impedance, and means coupled to the sound trap for compensating for the losses, whereby a maximum attenuation for the intercarrier sound signal is produced at the first output impedance.

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**4,017,677**

## SQUELCH CIRCUIT FOR A VIDEO RECORD PLAYER

**Alfred Lynn Baker, Indianapolis, Ind., assignor to RCA Corporation, New York, N.Y.**

**Filed June 26, 1975, Ser. No. 590,484**

**Claims priority, application United Kingdom, Nov. 18, 1974, 49924/74**

**Int. Cl.² H04N 5/76**

**U.S. Cl. 358—127** **14 Claims**

1. In a record player, including pickup apparatus for recovering from a record, when said pickup apparatus is in a playback position, carrier waves subject to frequency modulation in accordance with a composite video signal occupying a given frequency band; the combination comprising:

frequency demodulation apparatus responsive to a carrier wave output of said pickup apparatus for developing a demodulated signal output substantially confined to said given frequency band;

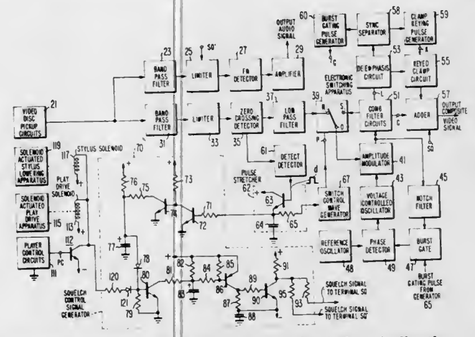


signal processing means, normally responsive to said demodulated signal output of said frequency demodulation apparatus, for developing an ouput composite video signal;

delay means, normally responsive to said demodulated signal output of said frequency demodulation apparatus, for providing a delayed composite video signal;

means coupled to said frequency demodulation apparatus for identifying departures of the instantaneous frequency of the input to said demodulation apparatus from a given frequency deviation range;

means for developing defect indication pulses in response to the output of said departure identifying means;




means responsive to the output of said defect indication pulse developing means for rendering said output composite video signal developing means responsive to said delayed composite video signal, instead of said demodulated signal output of said frequency demodulation apparatus, during the occurrence of a defect indication pulse;

means responsive to the output of said defect indication pulse developing means for initiating development of a squelch signal when the duration of a defect indication pulse exceeds a given length of time; and

means for utilizing said squelch signal to inhibit development of said output composite video signal by said signal processing means.

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**4,017,678**

## END-OF-PLAY CONTROL SYSTEM

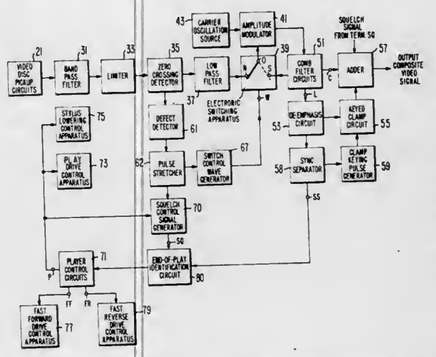
**Alfred Lynn Baker, Indianapolis, Ind., assignor to RCA Corporation, New York, N.Y.**

**Filed June 26, 1975, Ser. No. 590,483**

**Claims priority, application United Kingdom, Nov. 18, 1974, 49922/74**

**Int. Cl.² H04N 5/76**

**U.S. Cl. 358—128** **13 Claims**




1. In playback apparatus for a disc record having a spiral groove containing: (1) recorded picture information, comprising carrier waves modulated in frequency over a given frequency deviation range in accordance with composite video signals, inclusive of deflection synchronizing components and picture signal components, said recorded picture information occupying a first plurality of the groove convolutions; and (2) end-of-recording information, comprising undeviated carrier waves at a frequency within said given deviation range, occupying a second plurality of the groove convolution adjacent to said first plurality; the combination comprising:

pickup apparatus for developing, during disc record playback, a carrier wave output in response to traversal of successive disc record groove convolutions:

means responsive to said carrier wave output for recovering said deflection synchronizing components, when present;

means coupled to said pickup apparatus for identifying departures of the instantaneous frequency of the output of said pickup apparatus from said given frequency deviation range;

means, coupled to said identifying means and responsive to a sustained departure from said given deviation range in the output of said pickup apparatus, for developing a squelch signal; and

means, responsive to the continuance for a given time period of a simultaneous absence of (1) deflection synchronizing components from the output of said recovering means and (2) squelch signal development by said developing means, for automatically terminating said disc record playback.

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**4,017,679**

## TELEVISION PICK-UP AND DISPLAY SYSTEM SUITABLE FOR CONTINUOUS AND SHORT-DURATION INFORMATION PICK-UP AND FOR CONTINUOUS DISPLAY

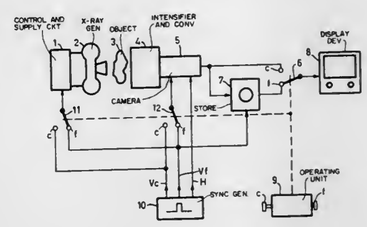
**Rudolf Kemner, and Joost Egbert Marquerinck, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed Feb. 27, 1975, Ser. No. 553,541**

**Claims priority, application Netherlands, Mar. 4, 1974, 7402868**

**Int. Cl.² H04N 7/18**

**U.S. Cl. 358—111** **4 Claims**




1. Television pick-up and display system suitable for continuous and for short-duration information pick-up and for continuous display, which system comprises a television pick-up device means for information signal generation during each field period using a line scanning raster, a repeatedly readable signal store coupled to the output of the pickup device, a display device means for displaying a television picture according to a standard having two interlaced line scanning rasters, a control circuit means coupled to said pick up device and said store for selecting either the continuous or the short-duration pick-up operation, said control circuit comprising a switchable synchronizing pulse generator means coupled to said pick-up device for applying during short-duration operation in a single field period a single line-scanning raster to the pick-up device for information signal generation, which raster has an integral number of lines and for applying to said pick-up device a standard line-scanning raster having a fractional

number of lines during continuous operation, and a switching device means coupled to said control circuit for coupling during short-duration operation the pick-up device to the signal store for storing the information signal generated in the single field period in which the line scanning raster having the integral number of lines is used, and for coupling the display device to the repeatedly readable signal store containing the information of the single line scanning raster having the integral number of lines after said single field period.

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**4,017,680**

## METHODS AND APPARATUS INVOLVING LIGHT PEN INTERACTION WITH A REAL TIME DISPLAY

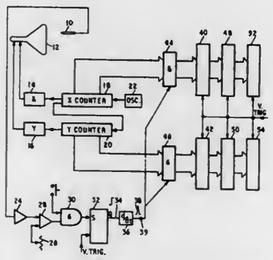
**Robert William Anderson, Fenstanton; William Ralph Knowles, Royston, and John Edward Culley, Arrington, all of England, assignors to Image Analysing Computers Limited, England**

**Filed July 8, 1975, Ser. No. 594,016**

**Claims priority, application United Kingdom, July 26, 1974, 33260/74; Sept. 20, 1974, 41186/74**

**Int. Cl.² H04N** *7/18*

**U.S. Cl. 358—242** **30 Claims**




1. A method of image analysis in which a video signal of an image of a field to be analyzed is displayed on a television monitor screen and a light pen is moved relative to the display to generate therefrom and in synchronism therewith an editing signal for editing signals relating to the field image as part of the analysis, the editing signal being such that if displayed on the television monitor it will appear in the display as a line which indicates the path followed by the pen, and in which the editing signal is stored in a memory so as to be available during subsequent frame scans, further comprising the steps of:

during one frame scan storing a position signal describing the position of one point only in the raster seen by the light pen during that frame scan,

storing during a second frame scan a position signal describing the position of another single point seen by the light pen during that scan,

generating by interpolation during a third frame scan short duration electrical pulses to occur during the scanning of any raster lines intermediate the lines containing the point seen during the said one frame scan and the point seen during the said second frame scan, said generated pulses being positioned along their respective lines so as together to define when displayed a straight line trace in the television display between the two said points; and

storing said interpolated short duration pulses in the memory with pulses occuring at the two said points during the scanning to form a least a part of said stored editing signal.

**4,017,681**

## TELEVISION RECEIVER INCLUDING A BEAM CURRENT LIMITING CIRCUIT

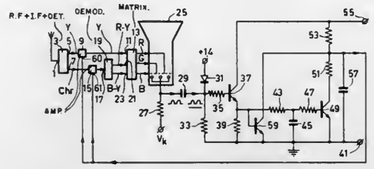
**Wouter Smeulers, and Willem Hendrik Amsen, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed Aug. 27, 1975, Ser. No. 608,393**

**Claims priority, application Netherlands, Sept. 9, 1974, 7411912**

**Int. Cl.² H04N** *5/68*

**U.S. Cl. 358—171** **7 Claims**




1. A beam current limiting circuit for a cathode ray display tube having at least one cathode, said circuit comprising an isolation circuit having a high impedance input means for coupling to said cathode and an output, and time constant circuit means for generating a beam current limiting signal in accordance with the cathode beam current having an input coupled to said isolation circuit output and an output means for providing said beam current limiting signal.

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**4,017,682**

## RADIO FREQUENCY CONVERTER

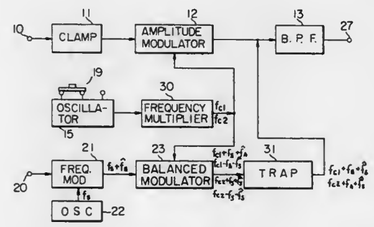
**Takayuki Tojo, Yokohama, Japan, assignor to Victor Company of Japan, Limited, Japan**

**Filed Aug. 6, 1974, Ser. No. 495,298**

**Claims priority, application Japan, Aug. 9, 1973, 48-93107; Oct. 15, 1973, 48-118699; Oct. 15, 1973, 48-118700**

**Int. Cl.² H04N** *5/38, 7/06*

**U.S. Cl. 358—167** **6 Claims**




1. A radio frequency converter for converting an applied video signal and audio signal to sideband frequencies of a selected one of a plurality of frequencies defining separate frequency channels, comprising:

an oscillator having a controllably variable frequency output signal;

frequency multiplying means comprised of a single wideband frequency multiplier receptive of said oscillator output signal for developing an output signal having frequency components equal to multiples of the frequency of said oscillator output signal, the output signal frequency components defining a plurality of frequency channels selectible by controlling said oscillator output signal frequency;

a modulator receptive of a video signal and said frequency multiplying means output signal for modulating the frequency multiplying means output signal to develop video signal sidebands;

a balanced modulator receptive of a modulted audio signal and said frequency multiplying means output signal of mixing the two signals to develop audio signal sidebands; and

filtering means receptive of the modulated output signals from said modulator and said balanced modulator for filtering unwanted sidebands from the modulated signals.



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**4,017,683**

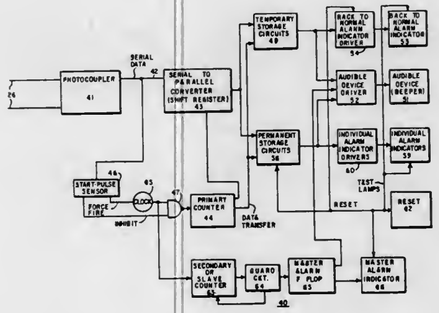
## DIGITAL MULTIPLEXING SYSTEM EMPLOYING REMOTE SCANNING OF A PLURALITY OF MONITORING POINTS

**Carl N. Pederson, Westmont, and Peter G. Angelopoulos, Elmhurst, both of Ill., assignors to Johnson Service Company, Milwaukee, Wis.**

**Division of Ser. No. 419,714, Nov. 28, 1973, Pat. No. 3,938,144. This application June 25, 1975, Ser. No. 590,311**

**Int. Cl.² H04L** *7/04*

**U.S. Cl. 178—69.1** **12 Claims**




1. In a multiplexed data transmission system for transmitting data over a transmission line from a first location to a second location, first sender means at said first location including means for generating a serial pulse train including a start pulse and a plurality of data pulses during each of a plurality of time frames, inhibit means for inhibiting the transmission of pulse trains during alternate time frames, and means for transmitting the pulse train provided during at least certain ones of said time frames to said second location over said transmission line, first receiver means at said second location including means for receiving said pulse train, data storage means, sequencing means including clock pulse generating means responsive to the start pulse to provide a plurality of clock pulses for enabling said data pulses to be gated into said data storage means, and second sender means at said second location having means enabled by said sequencing means during a portion of each time frame in which the transmission of data by said first sender means is inhibited to generate a further serial pulse train, including a start pulse and a plurality of data pulses, for transmission over said transmission line to said first location.

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**4,017,684**

## SYSTEM FOR DETERMINING BURST SENDING TIMING IN TDMA COMMUNICATION

**Hiroshi Kurihara, Tokyo; Akira Ogawa, Machida, and Yasuo Hirata, Tokyo, all of Japan, assignors to Kokusai Denshin Denwa Kabushiki Kaisha, Japan**

**Filed July 3, 1975, Ser. No. 592,717**

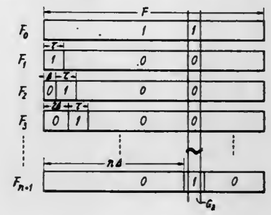
**Claims priority, application Japan, July 5, 1974, 49-76499**

**Int. Cl.² H04S** *3/06*

**U.S. Cl. 178—69.1** **4 Claims**

1. In a system for determining burst sending timing in a time division multiple access communication system of the type including a communication satellite, in which burst signals transmitted from a plurality of stations are received by the communication satellite which includes means for arranging the received time signals within one time frame at predetermined intervals, and means for transmitting the arranged burst signals, the improvement comprising:

a transmitting side in one of said stations for transmitting burst signals to the communication satellite and comprising first transmitting means for transmitting a first signal having a first signal state over one entire frame length, and second transmitting means connected to and coactive with said first transmitting means for transmitting after said first signal a sequence of successive signals each having a duration of one frame and each having the first signal state and a second signal state different from said first signal state, wherein the position or duration of said




first signal state within the respective frames over which said successive signals are defined is altered by a certain amount between each successive signal; and

a receiving side for receiving burst signal transmitted from the communication satellite and comprising counting means for counting the number of frames of the burst signals transmitted during a duration from the detection of said first signal to the detection of the next first or second state at a predetermined time slot in a frame of the burst signals, and means for determining the sending timing of the same station in accordance with said counted number of frames and said certain amount that the position or duration of said first signal state is altered between the respective frames of said successive signals.

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**4,017,685**

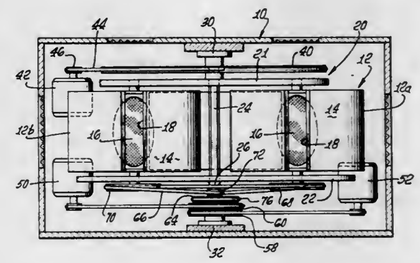
## PLANETARY ACOUSTIC PHASE SHIFT MECHANISM

**Donald J. Leslie, 1561 Gaywood Drive, Altadena, Calif. 91001**

**Filed July 28, 1975, Ser. No. 599,404**

**Int. Cl.² H04R** *1/28*

**U.S. Cl. 179—1.5** **10 Claims**



1. In apparatus for superimposing a frequency or phase modulation upon an acoustic phase shift device:

a. a speaker having a cone;

b. a rotor for the speaker and forming with the speaker cone, a sound channel having a sound emitting opening;

c. a support for the speaker rotor;

d. means mounting the speaker rotor on the support for rotation about an axis spaced from said sound emitting opening to impart orbital movement to the sound emitting opening and rotation to the sound radiation pattern produced thereby;

e. means mounting the support for rotation about an axis substantially parallel to, but spaced from, the axis of movement of said rotor axis so that a substantially epicycloidal movement is imparted to said sound emitting opening upon rotation of said support and said rotor; and
f. means rotating both said support and said rotor.

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**4,017,686**

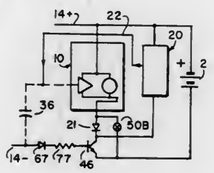
## TELEPHONE LINE VOLTAGE ACTUATED SWITCHES

**Leonard M. Todd, 424 W. 119th St., New York, N.Y. 10027**

**Continuation-in-part of Ser. No. 250,068, May 3, 1972, Pat. No. 3,794,767. This application Sept. 26, 1973, Ser. No. 401,062**

**Int. Cl.² H04M** *1/00, 11/00*

**U.S. Cl. 179—2 R** **3 Claims**




1. A voltage actuated switch for a telephone line having first and second conductors and a high resting and a low talking voltage comprising a semiconductor having a control element and two current conducting terminals, a load impedance and a power source having two terminals, said semiconductor ceasing to conduct when a voltage impressed on said control element with respect to one of said current conducting terminals is lower than a cut-off voltage, said semiconductor conducting when a voltage impressed on said control element with respect to said one of said current conducting terminals is higher than said cut-off voltage; said current conducting terminals, said load impedance and said power source connected in a first series circuit; a second series circuit comprising (a) said first conductor connected to said control element, (b) one of said current conducting terminals connected to one terminal of said power source, (c) the other of said terminals of said power source connected to said second conductor; said power source connected in voltage opposition to said telephone line voltage, said telephone line voltage and said power source voltage combining vectorially to a resultant voltage applied to said control element with respect to said one of said current conducting terminals, said high resting voltage subtracted from said power source voltage yielding a first resultant voltage lower than said cut-off voltage, said semiconductor ceasing to conduct, said low talking voltage subtracted from said power source voltage yielding a second resultant voltage, higher than said cut-off voltage, said semiconductor going into conduction, causing current flow in said first series circuit from said power source through said current conducting terminals and said load impedance, said current being employed to actuate associated apparatus.

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**4,017,687**

## DEVICE FOR MINIMIZING INTERCHANNEL CROSSTALK IN HIGH RATE COMMUTATOR MULTIPLEXERS

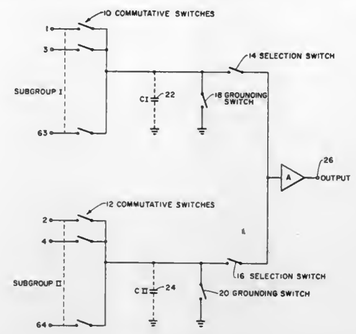
**Franklin R. Hartzler, Camarillo, and Michael V. Wechsler, Ventura, both of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Nov. 28, 1975, Ser. No. 635,821**

**Int. Cl.² H04J** *3/10*

**U.S. Cl. 179—15 A** **7 Claims**

5. A device for reducing crosstalk between channels of a rapid commutator multiplexer commutator comprising:
a. means for alternatively switching two subgroups of commutative switches to a single output;
b. means for grounding said commutative switches when-




ever said commutative switches are not connected to said output to provide a means for discharging inherent capacitance in said commutative switches and thereby reduce crosstalk between channels.

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**4,017,688**

## METHOD AND DEVICES FOR INSERTING ADDITIONAL PATTERN IN, OR REMOVING SAME FROM, A MESSAGE

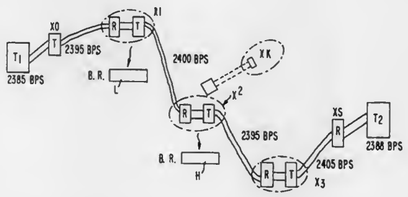
**Paul Raymond Callens, Cagnes sur Mer; Jean Louis Picard, La Colle sur Loup, and Alain Jean Poulet, Nice, all of France, assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Apr. 10, 1975, Ser. No. 567,021**

**Claims priority, application France, Apr. 12, 1974, 74.14306**

**Int. Cl.² H04J** *3/06*

**U.S. Cl. 179—15 AF** **10 Claims**




1. The method of inserting a plurality of additional patterns of elements into a message comprising a plurality of said elements, said message being transmitted from a sending device through a plurality of communication links to a receiving device, so that any node may insert said additional patterns into said message at any time and at any place within said message and so that said additional patterns may be selectively deleted from said message by any node, as necessary to make the number of elements available for transmission over each of said links correspond to an element transmission rate of said each of said links, said method comprising the steps of:
1. modifying said message at said sending device so that a sequence of said elements of said message does not contain a pattern of K*i* elements identical to any one of a plurality of patterns of K*i* additional elements which may be inserted at one of said nodes prior to transmission over one of said links, where K*i* is an integer greater than zero but not greater than K, where K and P are integers, and where $K = P^n$ defines a family of order *n* comprised of K possible combinations of *n* of said elements, each of said elements being capable of assuming P values;



2. storing said elements comprising said message in a buffer as said elements become available from said sending device;
3. transmitting said elements, one at a time, from said buffer over said one of said links;
4. detecting when the number of said elements available for transmission from said buffer is less than a predetermined number;
5. generating one of said patterns of K*i* additional elements to be transmitted following *n* of said elements from said buffer, the last *n* of said elements of said one of said patterns of K*i* additional elements being identical to said *n* of said elements from said buffer, and wherein one of said K possible combinations of *n* elements is formed by each element *i* of said one of said patterns of K*i* additional elements with *n*—1 of said elements which precede said element *i*, and where *i* is an integer greater than zero and not greater than K*i*; and
6. transmitting said pattern of K*i* additional elements following said *n* of said elements from said buffer.

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**4,017,689**

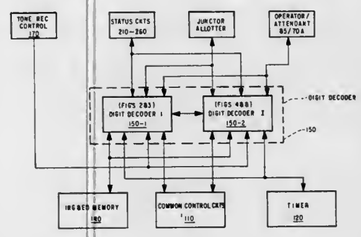
## DIGIT ANALYSIS SYSTEM FOR PRIVATE AUTOMATIC BRANCH EXCHANGE TELEPHONE SYSTEM

**Glenn L. Richards, Caledonia, and Uwe A. Pommerening, Webster, both of N.Y., assignors to Stromberg-Carlson Corporation, Rochester, N.Y.**

**Filed Mar. 25, 1975, Ser. No. 561,796**

**Int. Cl.² H04M** *3/22*

**U.S. Cl. 179—18 EB** **7 Claims**




1. In a common control type private automatic branch exchange telephone system having a memory containing a plurality of storage positions for storing the respective digits identifying a called number in response to dialed number information and a digit decoder for analyzing the contents of said memory and for supplying to the common control circuits of said system signals representative of further action which is necessary for processing the call, the improvement wherein said digit decoder comprises

first means, responsive to the reception of a first complete digit in the called number, for storing a prescribed digital code, the value of which is not exclusively established to correspond to the value of said first complete digit, in a first selected one of said plurality of storage positions within said memory;

second means, responsive to the reception of respective subsequent complete digits in the called number, for storing respective digital codes, corresponding to the values of said subsequent complete digits in respective selected ones of said plurality of storage positions within said memory; and

third means, responsive to the reception of the last complete digit necessary for identifying the course of action to be taken by the system, for supplying a signal representative thereof to said common control circuits, and wherein

the number of said plurality of storage positions within said memory corresponds to the number of digits identifying the line circuits within said system and wherein said decoder includes fourth means for storing each respective consecutively received digit in the same selected storage position as it is received for analysis by the decoder and for subsequently clearing said same selected storage position upon the completion of the processing of each received digit which is followed by a subsequent digit necessary for complete analysis of the called number.

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**4,017,690**

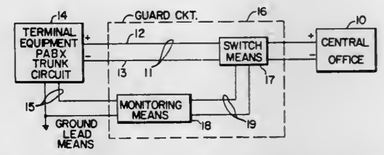
## GUARD CIRCUIT FOR GROUND START TELEPHONE EQUIPMENT

**George Leonard Rosing, Sylmar, Calif., assignor to General Telephone Company of California, Santa Monica, Calif.**

**Filed July 2, 1976, Ser. No. 702,007**

**Int. Cl.² H04M** *7/10*

**U.S. Cl. 179—18 AH** **5 Claims**




1. A guard circuit for ground start telephone equipment made up of a central office connected through a two wire trunk comprising positive and negative lines to customer terminal equipment with ground lead means, said guard circuit including in combination:
a. switch means connected to said positive and negative lines and responsive to removal of positive potential from the positive line and application of negative potential to the negative line when a call on said two wire trunk is released at said central office, to disconnect said two wire trunk between said central office and said terminal equipment; and,
b. monitoring means connected between said ground lead means at said terminal equipment and said switch means and responsive to removal of positive potential from said ground lead means upon completion of release and reconditioning of said terminal equipment to receive a subsequent call, to reset said switch means and thereby reconnect said two wire trunk between said central office and terminal equipment, the period of time that the terminal equipment is subject to glare being reduced by the time interval that said central office is disconnected from said terminal equipment by said guard circuit so that the terminal equipment is subject to glare only during a reduced time period of from one tenth to one fifth the time period such equipment would be subject to glare in the absence of said guard circuit.

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**4,017,691**

## NUMBER TRANSLATOR

**Otto Altenburger, Rochester, N.Y., assignor to Stromberg-Carlson Corporation, Rochester, N.Y.**

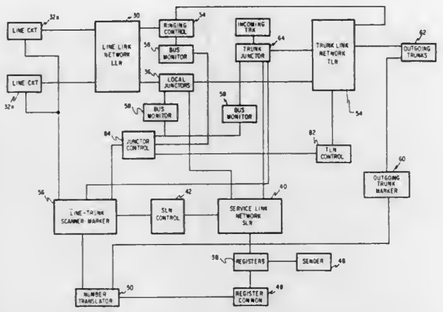
**Filed Dec. 10, 1975, Ser. No. 639,308**

**Int. Cl.² H04Q** *3/47*

**U.S. Cl. 179—18 ET** **12 Claims**

1. In a telephone system including a plurality of subscriber stations identified by an equipment number and a directory number, a plurality of groups of outgoing trunk circuits, and common control means including a plurality of registers for connecting subscriber stations together or to a trunk circuit in response to a signal designating the directory number of a called station received from a calling station, a number translator comprising a memory system including memory means for storing in respective memory locations the equipment and directory numbers and other data relating to each of said plurality of subscriber stations and comparator means for

comparing a directory number or equipment number with the data stored in said memory means so as to address a specific memory location; register digit storage means including a plurality of storage locations for storing equipment and directory number data, type of call data, and a translator memory request received from a register; means for sequentially scanning the storage locations of said register digit storage means

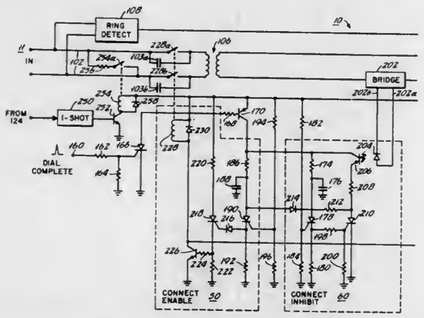



to read out data stored therein; translator control means responsive to said memory request stored in said register digit storage means read out by said scanning means for transferring said number data therein to said comparator means; and register sender control means responsive to said translator control means for transferring data from a specific memory location addressed by said comparator means to a register.

## 4,017,692
## TELEPHONE CALL-DIVERTER SYSTEM

**Mario Garcia, Bridgeport, and Robert C. Bell, Manchester, both of Conn., assignors to Dictaphone Corporation, Rye, N.Y.**

**Filed Aug. 22, 1975, Ser. No. 608,692**
**Int. Cl.² H04M 3/54**
**U.S. Cl. 179—81 R** **12 Claims**




1. In a telephone call-diverter system for interconnecting an incoming telephone line to an outgoing telephone line so that an incoming telephone call can be transferred to a predetermined remote telephone station, apparatus for connecting said incoming and outgoing telephone lines to permit voice frequency communication therebetween, comprising:

first switch means responsive to a detected ringing signal for completing a circuit from said call-diverter system to said outgoing line, said first switch means further enabling an energizing voltage to be supplied to a power supply terminal;

dial control means for transmitting predetermined dialing signals to said outgoing line from said call-diverter system;

second switch means responsive to the completion of the transmission of dialing signals to supply said energizing voltage to first and second time delay means to thereby energize said first and second time delay means, said first and second time delay means having different time delay characteristics such that said first time delay means generates a first actuating signal prior in time to a second actuating signal generated by said second time delay means;

third switch means actuated in response to said first actuating signal for de-energizing said second time delay means to prevent said second actuating signal from being generated;

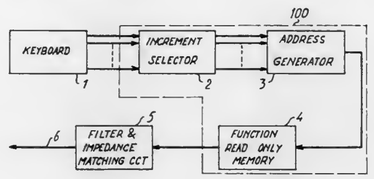
answer signal detecting means for detecting an answer signal returned automatically to said call-diverter system over said outgoing line when said predetermined remote telephone station responds to said dialing signals transmitted thereto to thereby deactuate said third switch means and enable said second time delay means to generate said second actuating signal; and

fourth switch means responsive to said second actuating signal for completing a circuit from said incoming line to said call-diverter system to thereby provide a communication channel between said incoming and outgoing lines.

## 4,017,693
## SYNTHESIZER OF MULTIFREQUENCY CODE SIGNALS

**Bernard G. Roche, Pavillon 18, Residence de Bourgogne; Jacques Majos, Boulevard d'Armor Batiment AC2, and Jean-Louis A. Lardy, Les Fontaines Batiment 22, all of Lannion, France (22300)**

**Filed Sept. 29, 1975, Ser. No. 617,488**
**Claims priority, application France, Sept. 30, 1974, 74-32908**
**Int. Cl.² H04Q 9/12**
**U.S. Cl. 179—84 VF** **6 Claims**




1. A digital generator of groups of sinusoidal signals of predetermined frequencies, each predetermined frequency being equal to the product of a common fundamental frequency by an increment specific to such predetermined frequency, said generator comprising:

a selector of the increments corresponding to the group of frequencies to be generated;

said selector having accumulation means for obtaining digital values of the selected increments and of consecutive multiples of said increments;

a read only memory for said increments and said multiples which are adapted to be read in said read only memory which constitutes a first subset of addresses of a first subset of words representing samples of a sinusoidal function in a range of equally distributed angular argument values from 0 to $\pi/2$ radians;

means for delivering to the ouputs of said selector said first subset of addresses in interlaced form at a fixed timing;

an address converter the inputs of which are connected to the outputs of said selector and having means for periodically transmitting by said delivery means of the outputs of said converter the said first subset of addresses and also a second subset of addresses obtained as the complements to said argument values corresponding to a range from $\pi/2$ to $\pi$radiams; and

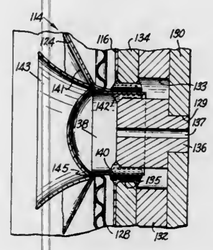


said read only memory containing at said first subset of addresses and at said subset of words a second subset of addresses and a second subset of words respectively which are representative of samples of said function in the range from $\pi/2$ to $\pi$radians.

## 4,017,694
## METHOD FOR MAKING LOUDSPEAKER WITH MAGNETIC FLUID ENVELOPING THE VOICE COIL

**John A. King, Mentor, Ohio, assignor to Essex Group, Inc., Fort Wayne, Ind.**

**Filed Feb. 18, 1976, Ser. No. 659,047**
**Int. Cl.² H04R 9/02**
**U.S. Cl. 179—115.5 VC** **10 Claims**




1. A method for increasing the damping of a moving coil loudspeaker having a magnet, an air gap between the coil and a mounting plate and of increasing electrical power dissipation without introducing hiss or spurious noise comprising:

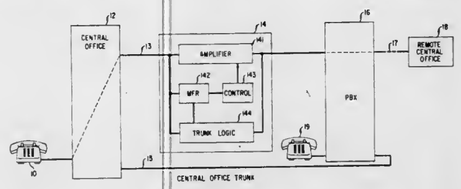
introducing into said air gap an amount of non volatile ferromagnetic liquid having a viscosity of 600 to 10,000 centipoises containing from about 4 to about 20% of colloidal magnetic particles to fill said air gap and be confined by magnetic action therein;

and venting said speaker to permit escape of entrapped air and prevent hiss.

## 4,017,695
## CUSTOMER OPERATED GAIN CONTROL CIRCUIT

**George Richard Jaconetty, and Steven Robert Palmquist, both of Boulder, Colo., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed Sept. 30, 1974, Ser. No. 510,430**
**Int. Cl.² H04B 3/36**
**U.S. Cl. 179—170 R** **13 Claims**




1. Apparatus for controlling the gain in a switching path between any pair of a plurality of subscriber station sets each of said sets having call signaling means, said apparatus comprising, in combination,

an amplifier connected in said path,

means for detecting signals from said call signaling means subsequent to the establishment of said path,

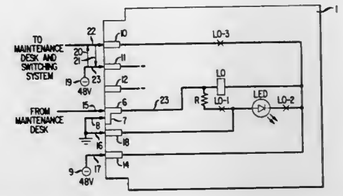
means including an up/down counter responsive to said detecting means for generating control signals, and

means responsive to the generation of said control signals for adjusting the gain of said amplifier.

## 4,017,696
## INITIALIZING CIRCUIT

**Robert James Falk, Columbus, Ohio, assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed Dec. 31, 1975, Ser. No. 645,655**
**Int. Cl.² H04M 3/22**
**U.S. Cl. 179—175** **10 Claims**



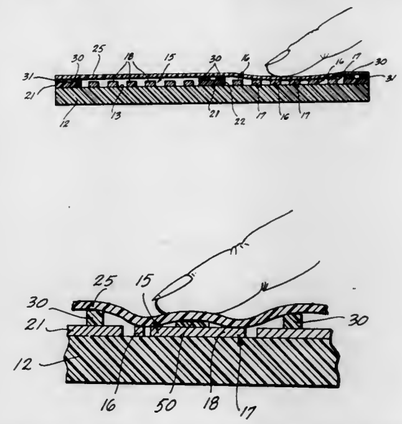

1. An initialization circuit for circuitry mounted on a printed circuit board having a sheet of insulating material and a plurality of conductive strips mounted flat on each side thereof, said strips being oriented perpendicular to one edge of said sheet, said one edge being adapted for insertion into a connector having a plurality of contact fingers for contacting said strips to establish electrical connection thereto, said circuit comprising,

a conductive contact comprising a generally L-shaped conductive strip mounted flat on one side of said sheet and having one leg of said L-shaped strip parallel to said one edge, said contact slidably engaging one of said plurality of fingers when said board is partially inserted into said connector and said contact sliding past said one finger and breaking contact with said finger when said board is fully inserted into said connector whereby a momentary connection between said one finger and said contact is established to initialize said circuitry when said board is inserted into said connector.

## 4,017,697
## KEYBOARD MEMBRANE SWITCH HAVING THRESHOLD FORCE STRUCTURE

**Willis August Larson, Mequon, Wis., assignor to Globe-Union Inc., Milwaukee, Wis.**

**Filed Sept. 15, 1975, Ser. No. 613,254**
**Int. Cl.² H01H 13/52, 1/50**
**U.S. Cl. 200—5 A** **17 Claims**




1. Membrane switch apparatus for accepting input signals from the touch of a user and for providing output signals for use with an electrical circuit comprising:

a nonconductive substrate having a generally planar top surface;

at least one first electrode means supported on the top surface of the substrate;

at least one second electrode means supported by the top surface of the substrate and spaced from and electrically isolated from the first electrode means;

flexible membrane means supported adjacent the first and second electrode means for selectively being deflected to bridge and electrically couple the first and second electrode means;

spacer means disposed between the membrane means and the substrate top surface for supporting the membrane means in a normally spaced relationship relative to at least one of the first and second electrode means, the spacer means comprising a viscous nonconductive material applied while in a liquid state and permitted to solidify;

nonconductive threshold means disposed between the path of movement of the membrane means and the first or second electrode means for requiring a threshold pressure to be applied to the membrane before bridging occurs, said threshold means comprising a nonconductive paint or resin material applied while in a liquid state and permitted to solidify, said material partially masking the contact area between the membrane means and the first or second electrode means; and

means for electrically connecting the first and second electrode means to the electrical circuit.

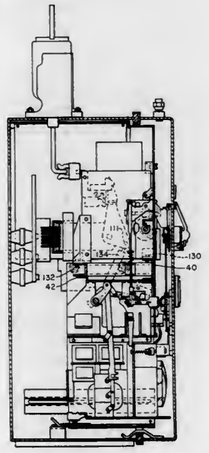
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**4,017,698**

**DRAW-OUT TYPE CIRCUIT INTERRUPTER WITH MODULAR CONSTRUCTION**

**Edmund W. Kuhn; Jesse L. Uber, and Joseph D. Findley, Jr., all of Pittsburgh, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed Apr. 2, 1975, Ser. No. 564,573**
**Int. Cl.² H01H** *9/22*
**U.S. Cl. 200—50 AA** **5 Claims**



1. A drawout type circuit interrupter, comprising:

a housing;

load and line terminals mounted upon said housing; and

a drawout unit mounted in said housing and comprising:

a main support structure;

an interrupter module comprising separable contacts operable between open and closed positions, load and line connectors cooperating with said load and line terminals, and an interrupter module sub-frame removably mounted upon said main support structure and supporting said contacts and said connectors;

a mechanism module comprising an operating mechanism for operating said separable contacts between open and closed positions and a mechanism module sub-frame removably mounted upon said main support structure and supporting said operating mechanism;

a control module for electrically activating said operating mechanism to operate said contacts between open and closed positions, said control module comprisng electrical control components and a control module sub-frame removably mounted upon said main support structure and supporting said control components;

trip means coupled to said mechanism module and operable upon actuation to cause said mechanism module to operate said contacts to an open position; and

an interlock lever associated with said trip means and extending into proximity to said control module, said lever being movable between a first position and a second position, movement of said lever to said second position actuating said trip means, said control module maintaining said lever in said first position and preventing movement of said lever to said second position if and only if said control module is fully inserted into said main support structure;

said drawout unit being movable between a connected position wherein said load and line connectors engage said load and line terminals to bridge said contacts across said load and line terminals, and a disconnected position wherein said connectors are separated from said terminals and said drawout unit is electrically isolated from said terminals.

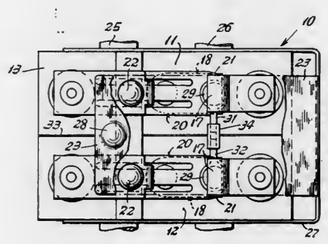
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**4,017,699**

**DUAL ACTING SNAP SWITCH**

**Robert R. Hellman, Bridgeport, Conn., assignor to Westport Development & Mfg. Co., Inc., Milford, Conn.**

**Filed May 12, 1975, Ser. No. 576,705**
**Int. Cl.² H01H** *13/36*
**U.S. Cl. 200—67 D** **4 Claims**



1. A dual switch for providing two electrically independent but almost always identical signals comprising a first switch having a snap-acting blade and means for receiving a movement to the blade to cause it to be actuated to shift from one of its states to its other state, a second switch identical to the first having a snap-acting blade and means for receiving a movement to the blade to cause it to be actuated to shift from one of the states to its other state, each of said switches including a base with its blade being mounted thereon at one end to have its other end free with the free ends of the blades being adjacent and moving in the same direction to produce the same signal, means securing the switches together with both blades being actuated by no more than a small difference in movement therebetween, means for applying an identical movement to the means for receiving of each blade to urge their actuation and means for causing the blade that is initially actuated to apply a force to the other blade to urge it to be actuated to the same state as the initially actuated blade, said means including a mechanical connection that is electrically non-conducting between the two free ends of the blade whereby the force from the initially actuated blade is obtained from the free end of the blade and is applied at the free end of the other blade.

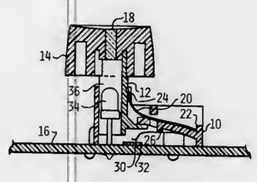


**4,017,700**

**MODULAR PRINTED CIRCUIT BOARD MOUNTABLE PUSH-BUTTON SWITCH WITH TACTILE FEEDBACK**

**William J. West, Los Altos, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.**

**Filed July 3, 1975, Ser. No. 593,078**
**Int. Cl.² H01H** *3/12*
**U.S. Cl. 200—314** **9 Claims**



1. A push-button switch mechanism comprising:

a body having a passage and a support member therein;

a cantilevered contact member mounted in the body;

a plunger slidably mounted in the body passage and having a tab for engaging and deflecting the contact member when the plunger is moved from an extended to a depressed position;

a button attached to the plunger for moving the plunger from the extended to the depressed position when force is applied to the button; and

a leaf spring retained in the body and supported along a portion of its length by the support member having a first end abutting an abutment in the body and a second end abutting an abutment on the plunger for holding the plunger in the extended position when no force is being applied to the button, the plunger forcing the first end of the leaf spring toward the second end of the leaf spring along a longitudinal axis thereof and causing the leaf spring to buckle when the plunger is moved from the extended to the depressed position in response to force being applied to the button to provide tactile feedback indicating that the plunger has been depressed, and the leaf spring forcing the plunger back to the extended position when force is removed from the button.

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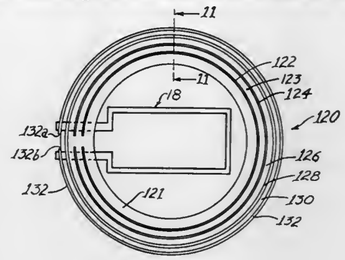
**4,017,701**

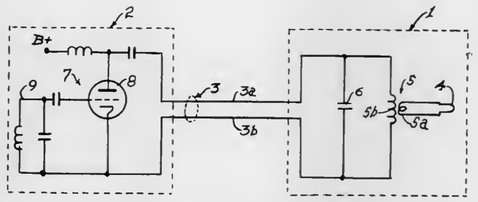
**INDUCTION HEATING UNIT WITH COMBINED TANK CIRCUIT AND HEATING COIL**

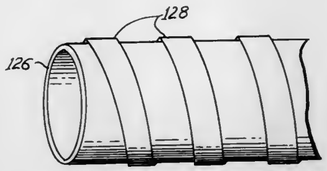
**Eugene Mittelmann, Chicago, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.**

**Division of Ser. No. 364,221, May 25, 1973, abandoned, which is a continuation of Ser. No. 230,234, Feb. 29, 1972, abandoned. This application Feb. 7, 1975, Ser. No. 548,039**
**Int. Cl.² H05B** *5/08;* **H01F** *15/14*
**U.S. Cl. 219—10.49** **8 Claims**

1. In an induction heating unit the structural interrelation of a tank circuit of a power supply and a current transformer formed about a generally cylindrical tubular support providing a compact unit, the unit including a first, multiturn coil means wrapped about the support and forming both the inductance element of the tuned tank circuit and the primary winding of a current transformer, laminated tubular capacitance means formed about the support and providing the capacitance of the tuned tank circuit, second coil means formed about the support and providing the secondary coil of the current transformer, inductive heating means connected to the second coil means for developing induction heating currents in an article to be heated, wherein the coil means and capacitance means are all cooperatively laminated over the support structure, the capacitance means being formed about the support structure with a pair of conductive sheet material layers having a layer of dielectric material formed therebetween, a layer of electrical insulating material formed over the layers of conductive sheet material, a ribbon-like first coil means deposited over the layer of electrical insulating material, a further layer of electrical insulating material formed over the first coil and a







single turn of metal sheet material forming a second coil means formed over said further layer of insulating material.

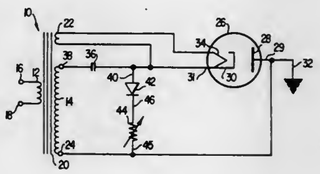
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**4,017,702**

**MICROWAVE OVEN INCLUDING APPARATUS FOR VARYING POWER LEVEL**

**Larry R. Harmon, Jeffersontown, and Donald J. Simon, Louisville, both of Ky., assignors to General Electric Company, Louisville, Ky.**

**Filed July 30, 1975, Ser. No. 600,313**
**Int. Cl.² H05B** *9/06*
**U.S. Cl. 219—10.55 B** **10 Claims**



1. In a microwave oven, variable power level apparatus comprising:

a. a magnetron for producing microwave energy, said magnetron having anode and cathode terminals;

b. a capacitor;

c. a power transformer including a primary winding having terminals for connection to an AC power source and a high voltage secondary winding having two terminals, one of said high voltage secondary winding terminals being

connected through said capacitor to one of said magnetron terminals and the other of said high voltage secondary winding terminals being connected to the other of said magnetron terminals; and

d. a series circuit comprising a rectifier and a variable resistance means, said series circuit being connected across said magnetron terminals, said rectifier being polarized with the rectifier anode connected to said magnetron cathode terminal and the rectifier cathode connected to said magnetron anode terminal.

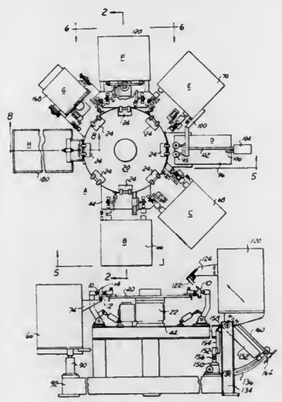
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**4,017,703**

## MULTIPLE STATION INDUCTION HEATING MACHINE

**Paul N. Lavins, Jr., Grosse Pointe Farms, Mich., and Willard J. Vanek, Walton Hills, Ohio, assignors to American Induction Heating Corporation, Detroit, Mich.**

**Filed Dec. 17, 1975, Ser. No. 641,448**
**Int. Cl.² H05B 5/06**
**U.S. Cl. 219—10.69** **18 Claims**



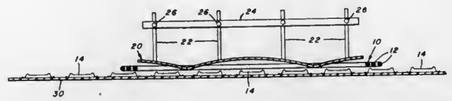
**1.** Apparatus for performing heat treatment on both ends of an elongate metallic workpiece having oppositely extending ends in an automatic manner comprising: a plurality of spaced work stations; transfer apparatus movable between each of the stations; a plurality of workpiece support devices attached to the transfer apparatus, the workpiece support devices being operative to retain the elongate workpieces at their center sections so that both ends of the workpieces project clear of the support devices and induction heating coils associated with at least two of the work stations, at least one of the induction heating coils being so positioned with respect to the transfer apparatus that it heats a first end of workpieces retained on support devices as they are moved by the transfer mechanism into operative position with respect to the station with which that coil is associated, and at least one other coil being so positioned relative to the transfer apparatus that it heats the opposite end of workpieces retained on support devices as they are moved by the transfer mechanism into operative position with respect to the station with which that coil is associated.

**4,017,704**

## INDUCTION HEATING APPARATUS AND METHOD FOR USING THE SAME

**John W. Collins, III, Allegheny Township, Westmoreland County, and E. Scott Douds, Pittsburgh, both of Pa., assignors to Aluminum Company of America, Pittsburgh, Pa.**

**Continuation-in-part of Ser. No. 455,559, March 28, 1974, abandoned. This application Apr. 22, 1975, Ser. No. 570,486**
**Int. Cl.² H05B 9/02**
**U.S. Cl. 219—10.79** **11 Claims**



**1.** Induction heating apparatus comprising a substantially flat high frequency induction heating coil having an elongate configuration with major and minor axes and a generally open center and terminals for electrical connection to a high frequency alternating current generator, and an associated elongate core of substantially non-magnetic, conductive metal disposed generally within the open center of the coil with the major axis of the core substantially aligned at and along the major axis of the coil and insulated from the coil.

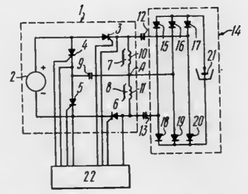
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**4,017,705**

## IMPULSE CURRENT GENERATOR FOR ELECTROEROSION MACHINING OF METALS

**Sergei Nikolaevich Bazhenov, ulitsa Pushkinskaya, 32, kv. 4, and Efim Mordukhovich Belyavsky, ulitsa Tonkopia, 8b, kv. 115, both of Kharkov,, U.S.S.R.**

**Filed May 14, 1975, Ser. No. 577,546**
**Int. Cl.² B23P 1/02**
**U.S. Cl. 219—69 C** **2 Claims**



**1.** An impulse current generator for electroerosion machining of metals comprising: a series inverter; at least one power supply source of said series inverter; controlled rectifiers of said series inverter; a control circuit for said rectifiers connected to said rectifiers; a first choke of said series inverter; a second choke of said series inverter; a winding of said first choke having a first end and a second end; a winding of said second choke having a first end and a second end, the first end being connected to the first end of said winding of said first choke; a storage capacitor of said series inverter connected to said first ends of said windings of said first and second chokes; each said choke winding, said respective controlled rectifiers and said respective one power supply source forming an independent recharge circuit of said storage capacitor; a rectifier circuit electrically coupled to the input of said series inverter and having three input terminals and two output terminals; a first differentiating capacitor providing said electric coupling of the output of said series inverter to said rectifier circuit, said first differentiating capacitor being connected between the second end of said winding of said first choke and said first input terminal of said rectifier circuit so as to form, together with said winding of said first choke, a circuit for shaping pulses of the output current of the generator; and a second differentiating capacitor providing said electric coupling of the output of said series inverter to said rectifier circuit, said second differentiating capacitor being connected between the second end of said winding of said second choke and said second input terminal of said rectifier circuit so as to form, together with said winding of said second choke, a circuit for shaping the pulses of the output current of the generator, said third input terminal of said rectifier circuit being connected to said first ends of said windings of said first and second chokes, said two output terminals of said rectifier circuit being adapted to be connected to a load, whereby a series of short pulses suitable for electroerosion machining of metals are produced and are all directed in the same direction or have the same polarity.



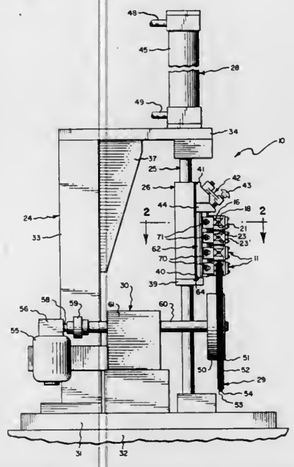
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**4,017,706**

## METHOD OF PROVIDING A TORQUE MOTOR WITH AIR GAPS OF EQUAL LENGTH

**Richard A. Aubrecht, East Aurora, and Richard N. Hart, Crittenden, both of N.Y., assignors to Moog Inc., East Aurora, N.Y.**

**Filed Jan. 12, 1976, Ser. No. 648,284**
**Int. Cl.² B23P 1/08**
**U.S. Cl. 219—69 M** **5 Claims**



**1.** The method of providing a torque motor with air gaps of equal length between an armature interposed between two spaced polepieces, comprising the following steps:

assembling said torque motor so that said armature is positioned between said polepieces, the space between said armature and each of said polepieces defining one of a cooperative pair of starting air gaps;

positioning an electrode having two spaced portions of equal dimension such that said electrode portions are arranged proximate said starting air gaps;

providing a plurality of repetitious pulses of electrical energy to discharge between said electrode and torque motor;

moving said electrode and torque motor relative to one another; and

removing proximate material of said armature and polepieces which is positioned closest to said electrode portions by such electrical discharge;

thereby to provide said torque motor with final air gaps of equal length between said armature and said polepieces.

**5.** The method of providing a torque motor with final air gaps of equal length between an armature interposed between two spaced polepieces, comprising the following steps:

assembling said torque motor so that said armature is positioned between said polepieces, the space between said armature and each of said polepieces defining one of a cooperative pair of starting air gaps;

positioning such assembled torque motor spaced from a means for removing material from said torque motor without physical contact with said torque motor;

energizing said means to remove material from said armature and polepieces;

thereby to remove material from said armature and polepieces to provide said final air gaps of equal length without physical contact with said torque motor.

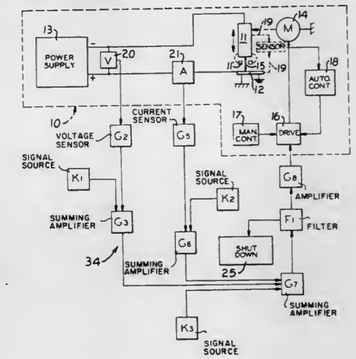
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**4,017,707**

## METHOD OF AND MEANS FOR SPACING CONTROL OF PLASMA ARC TORCH

**Ronald D. Brown, Morton, and Billy L. Stolin, Mundelein, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.**

**Filed Dec. 4, 1974, Ser. No. 529,324**
**Int. Cl.² B23K 9/10**
**U.S. Cl. 219—121 P** **8 Claims**




**1.** The method of automatically maintaining a selected spacing of a plasma arc torch from the work surface of a workpiece comprising the steps of:

a. establishing a plasma arc between said surface and said plasma arc torch at said selected spacing by means of a plasma arc torch power supply;

b. electrically sensing the voltage present between said workpiece and said plasma arch torch and generating a first electrical signal representative thereof with respect to a given ground;

c. electrically sensing the current flow between said workpiece and said plasma arc torch and generating a second electrical signal representative thereof with respect to said given ground;

d. electrically inverting one of said first and second electrical signals with respect to said given ground and electrically summing said inverted signal with a first selected reference signal to produce a first composite signal of given magnitude and sign with respect to said given ground;

e. electrically summing the other of said first and second electrical signals with a second selected reference signal to produce a second composite signal comparable in magnitude and opposite in sign to said first composite signal with respect to said given ground;

f. electrically generating a third selected reference signal equal in magnitude and opposite in sign to the difference between said first and second signals with respect to said given given ground at said selected spacing and summing said third electrical signal with said first and second composite signals to produce an electrical control signal representative of both the sense and the amount of any change in said second signal with respect to said first signal; and

g. applying said electrical control signal to electromechanical means coupled to said plasma arc torch for moving said plasma arc torch toward said selected spacing from said work surface in response to said control signal.

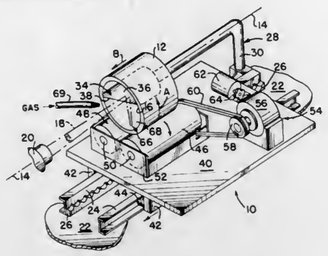
## 4,017,708
## METHOD AND APPARATUS FOR HEAT TREATING AN INTERNAL BORE IN A WORKPIECE

**Simon L. Engel, Mountain View, Calif.; Preston L. Gale, East Peoria, and Glenn H. Lenzen, Jr., Peoria, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.**

**Continuation of Ser. No. 487,913, July 12, 1974, abandoned. This application Feb. 27, 1976, Ser. No. 662,078**

**Int. Cl.² B23K** *26/00*

**U.S. Cl. 219—121 LM** **7 Claims**




1. A method of heat treating a bore in a workpiece to increase its surface hardness comprising;

shaping an annular laser beam emanating from a source into an elongated focal pattern to provide a more evenly distributed energy level in cross section;

directing said elongated focal pattern generally axially inwardly toward such bore;

reflecting said elongated focal pattern from mirror means substantially transversely upon a surface of said bore to provide an instantaneously more uniformly hot heating zone thereat; and

effecting relative motion between the workpiece and said mirror means so that said bore is progressively scannably heat treated to minimize heating of the entire workpiece.

## 4,017,709
## ARC WELDING MACHINE

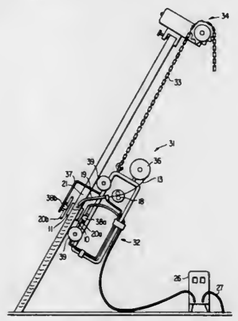
**Toshihiko Watanabe, Kamakura, and Tokuji Maruyama, Fujisawa, both of Japan, assignors to Kobe Steel Ltd., Kobe, Japan**

**Filed Feb. 13, 1975, Ser. No. 549,474**

**Claims priority, application Japan, Mar. 1, 1974, 49-25024[U]; Mar. 1, 1974, 49-25025[U]; June 26, 1974, 49-75927[U]; Feb. 13, 1974, 49-18004; Feb. 19, 1974, 49-19683; Mar. 3, 1974, 49-25575; Feb. 13, 1974, 49-18005**

**Int. Cl.² B23K** *9/08*

**U.S. Cl. 219—126** **9 Claims**




1. An arc welding machine for welding together two members defining a welding groove therebetween, comprising:

strap means adapted to be disposed adjacent said two members and said welding groove;

an electric conductor movably disposed adjacent to said strap and upon the side of said strap means opposite that wherein said welding groove is disposed, said electric conductor being electrically insulated from said strap means;

means for generating an arc within the vicinity of said welding groove;

means for applying an electric current to said electric conductor so as to generate a magnetic field for affecting the direction of said arc; and

means for cooling said electric conductor characterized in that a cooling water passage is disposed centrally of said conductor whereby a high electric current can pass through said electric conductor without enlarging the sectional area thereof so as to facilitate the approach of said electric conductor toward said welding arc so as to affect the same.

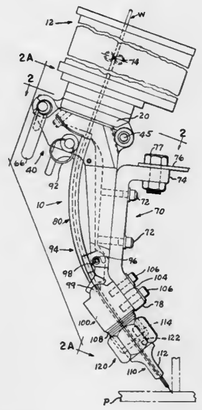
## 4,017,710
## WELDING ASSEMBLY

**Elbert D. Watt, East Alton, Ill., assignor to ACF Industries, Incorporated, New York, N.Y.**

**Filed Dec. 6, 1974, Ser. No. 530,368**

**Int. Cl.² B23K** *9/12*

**U.S. Cl. 219—130** **27 Claims**




1. A welding assembly comprising:

a weld head having means associated therewith for directing at least one weld wire generally in the direction of a work piece to be welded;

a nozzle body including a wire guide pivotally mounted about said weld head;

said nozzle body having means in association therewith for pivoting said nozzle body about said weld head;

latch means removably mounting said wire guide upon said nozzle body;

said wire guide having means thereon for further directing said weld wire toward said work piece;

said nozzle body having means thereon adapted to engage electrical current carrying equipment;

a welding tip mounted in operative relation with said wire guide to further direct movement of the weld wire toward said work piece;

and means for maintaining said weld tip in engagement with said welding assembly;

whereby said nozzle body, wire guide and welding tip may be simultaneously pivoted about said weld head to move said welding tip relative to said work piece, and whereby said wire guide can be readily removed from said welding assembly for cleaning and/or replacement thereof.



## 4,017,711
## WELDING MATERIAL FOR LOW TEMPERATURE STEELS

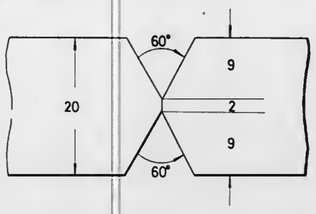
**Hiroyuki Honma, Sagamihara; Hirofumi Yoshimura, Kitakyushu; Takeshi Nishi, Machida, and Rokuro Fujimoto, Yokohama, all of Japan, assignors to Nippon Steel Corporation, Tokyo, Japan**

**Continuation-in-part of Ser. No. 532,228, Dec. 12, 1974, abandoned, which is a continuation of Ser. No. 400,673, Sept. 25, 1973, abandoned. This application Sept. 23, 1975, Ser. No. 616,074**

**Claims priority, application Japan, Sept. 25, 1972, 47-95895**

**Int. Cl.² C22C** *38/38, 38/58*

**U.S. Cl. 219—146** **4 Claims**




1. A welding material for low temperature steels comprising a core wire consisting essentially of 0.05 to 0.5% carbon, 0.15 to 0.75% silicon, 20 to 50% manganese, 4 to 17% chromium, 0.005 to 0.5% nitrogen, and more than 0.5 to 10% molybdenum, with the balance being iron and unavoidable impurities, all weights being based on the total weight of the welding material.

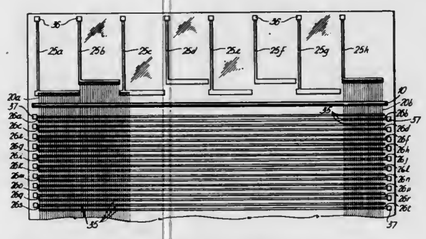
## 4,017,712
## THERMAL PRINTING DEVICE

**David Robbin Baraff, Robert James Boynton, and William Dickson Westwood, all of Ottawa, Canada, assignors to Northern Electric Company, Limited, Montreal, Canada**

**Filed Dec. 8, 1975, Ser. No. 638,611**

**Int. Cl.² H05B** *1/00*

**U.S. Cl. 219—216** **12 Claims**




1. A thermal printing device comprising:

a substrate of electrically insulating material;

a continuous bar of electrically resistive material on a surface of said substrate;

a first pattern of electrical conductors on said surface of said substrate and extending along one side of said bar and first electrical connectors extending from said first pattern to said bar, said first electrical connectors connected to said bar at said one side in a closely spaced predetermined arrangement extending along the bar, said first pattern of electrical conductors comprising a plurality of columns, each column electrically separate from other columns, and a plurality of said first electrical connectors extending side by side from each of said columns to said bar of electrically resistive material;

a second pattern of electrical conductors on said surface of said substrate and extending along the other side of said bar, and second electrical connectors from said second pattern to said bar, said second electrical connectors connected to said bar at said other side in a closely spaced predetermined arrangement extending along the bar and opposed to said first electrical connectors, said second pattern of electrical conductors comprising a plurality of rows, each row electrically separate from other rows, and a plurality of said second electrical connectors extending from each of said rows to said bar, each electrical connector from a row connected to said bar opposite a first electrical connector connected to a single different one of said columns, each row connected by said second electrical connectors to said bar at positions different from each other row;

means for connecting an electrical power supply to said patterns of electrical conductors to apply electric current to preselected opposed electrical connectors to produce heated areas in said bar.

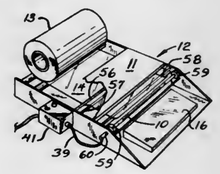
## 4,017,713
## HEATER FOR SEVERING PLASTIC FILM

**Frank Lodi, Niles, Ill., assignor to Fast Heat Element Manufacturing Co., Inc., Elmhurst, Ill.**

**Continuation-in-part of Ser. No. 500,565, Aug. 26, 1974, Pat. No. 3,947,656. This application Mar. 25, 1976, Ser. No. 670,449**

**Int. Cl.² H05B** *1/00*

**U.S. Cl. 219—243** **10 Claims**

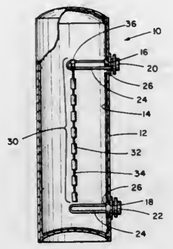



1. An assembly for severing a longitudinally extending web of plastic film meltable at a given temperature and extending relative to a wrapping surface, said assembly consisting of tensioning means for holding said web extended to resist movement of said web responsive to light pressure pull exerted on one end of said web against said tensioning means, a heater assembly adapted to heat sever said web from edge to edge, heater securing means lying outside the severing plane extending from edge to edge of said web for holding said heater in longitudinal alignment with and transverse to the longitudinal axis of said web, said heater assembly comprising an elongated sheath carried by said securing means and adapted to contact said web from edge to edge, dielectric core means substantially coextensive and within said sheath means, a passageway in said dielectric core means, an electric heating element extending through said passageway and secured therein by said core means, a thermal resistance element within said sheath and arranged in surface contact with said sheath and between said sheath and said core means, a circuit connecting said electric heating element and said thermal resistance element with a source of current, and means in said circuit for controlling the flow of current through said circuit to said heating element responsive to said thermal resistance element to maintain said sheath at said given temperature for severing said film at its melting point when said web is brought into contact with said sheath.

## 4,017,714
## SEGMENTED SACRIFICIAL ANODE ATTACHMENT TO WATER HEATING ELEMENT

C. Fred Kreiser, Boca Raton, Fla., assignor to Electro-Therm, Inc., Laurel, Md.

Filed Aug. 4, 1975, Ser. No. 601,900
Int. Cl.² F24H 1/00
U.S. Cl. 219—322 18 Claims



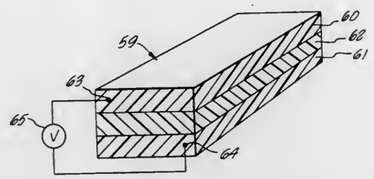

1. A segmented sacrificial anode attachment comprising a chain of discrete metal segments interconnected by a flexible metal conductor and adapted to be inserted through an opening provided in a metal shell of a tank for mounting an electric immersion heater in the tank, said segments being made of a metal which is anodic to the metal shell of the tank, and means for electrically and mechanically connecting one end of said chain of segments to a sheathed leg of an electric immersion heater grounded to the metal shell of the tank.

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## 4,017,715
## TEMPERATURE OVERSHOOT HEATER

Wells Whitney, Menlo Park, and David August Horsma, Palo Alto, both of Calif., assignors to Raychem Corporation, Menlo Park, Calif.

Filed Aug. 4, 1975, Ser. No. 601,427
Int. Cl.² H05B 3/10
U.S. Cl. 219—553 40 Claims




1. A self-regulating heating article when connected to a source of electrical current having a layered structure comprising:

a. a layer of electrically conductive material having a positive temperature coefficient of resistance (PTC layer) and an associated switching temperature $T_s$;

b. an electrical heating layer of constant wattage material (CW layer) having a higher resistance below $T_s$ than does said PTC layer to which it is connected in series;

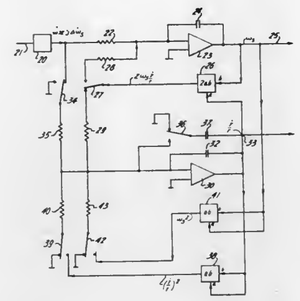
c. electrical terminal connection for said heating article; and

d. means for impeding the temperature increase in said PTC layer relative to said constant wattage layer when electrical connection is made to said source of current so that the PTC layer remains electrically conductive through a least a section of its thickness until the temperature of the CW layer rises above $T_s$.

## 4,017,716
## METHOD AND APPARATUS FOR DIRECTING AN OBSERVATION MEMBER

Carl Torbern Teiling, Lidingo, Sweden, assignor to AGA Aktiebolag, Lidingo, Sweden

Filed Jan. 27, 1976, Ser. No. 652,885
Int. Cl.² G06G 7/80
U.S. Cl. 235—061.5 S 10 Claims



6. In apparatus for tracking an object moving relative thereto, wherein a member is pointed towards said object during a first time interval and a driven member is controlled at the end of said first interval, the improvement comprising means for generating a drive signal for application to said driven member to assist in keeping said driven member pointed towards said object including:

means for generating an orientation signal which is a time function of the orientation of said member;

means operating on said orientation signal for deriving a further signal indicative of the movement of said object; and

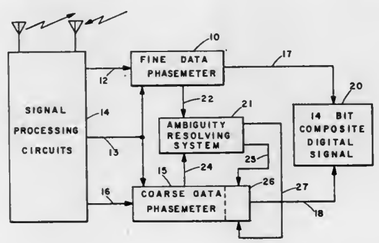
means for combining said orientation signal and said further signal at the end of said first time interval to provide said drive signal.

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## 4,017,717
## RESOLUTION OF AMBIGUITIES IN COUNTS CONTAINED IN OVERLAPPING BIT POSITIONS OF FINE AND COARSE DATA MEASUREMENT DIGITAL SIGNALS

Richard Edwin Watt, San Diego, Calif., assignor to Cubic Corporation, San Diego, Calif.

Filed June 25, 1976, Ser. No. 699,673
Int. Cl.² G06M 3/10
U.S. Cl. 235—92 CA 4 Claims




1. In a measuring system wherein a "fine" data signal consisting of a first digital signal providing fine measurement data is combined with an overlapping "coarse" data signal consisting of a second digital signal having more significant bit positions providing coarse measurement data to form a composite digital signal representative of a measured quantity, a system for resolving an ambiguity in the counts contained in overlapping bit positions of the fine data and coarse data signals, comprising



means for comparing the counts in the overlapping bit positions of the fine data and coarse data signals, and

means for adjusting the count in the non-overlapping more significant bit positions of the coarse data signal in accordance with said comparison,

wherein the improvement comprises:

the comparing means comprising

means for comparing the counts in the most significant overlapping bit position of the fine data and coarse data signals, and

means for comparing the counts in the next lesser significant overlapping bit positions of the fine data and coarse data signals; and

the adjusting means comprising

means for reducing the count in the non-overlapping more significant bit positions of the coarse data signal by one bit when the count in the most significant overlapping bit position of the fine data signal is greater than the count in the most significant overlapping bit position of the coarse data signal and the count in the next lesser significant bit positions of the fine data signal is greater than the count in the next lesser significant bit positions of the coarse data signal, and

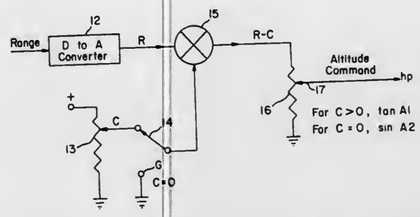
means for increasing the count in the non-overlapping more significant bit positions of the coarse data signal by one bit when the count in the most significant overlapping bit position of the fine data signal is less than the count in the most significant overlapping bit position of the coarse data signal and the count in the next lesser significant bit positions of the fine data signal is less than the count in the next lesser significant bit positions of the coarse data signal.

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## 4,017,718
## ALTITUDE CONTROL SYSTEM FOR DRONES

Robert John Gerrity, Canoga Park; Clarence Dwight Wandrey, Thousand Oaks, both of Calif., and Benjamin Howard Dolbin, deceased, late of Newbury Park, Calif. (by Arlene M. Dolbin Rossi, executor), assignors to Lear Siegler, Inc., Santa Monica, Calif.

Filed Feb. 9, 1976, Ser. No. 656,703
Int. Cl.² G06G 7/22, 7/78
U.S. Cl. 235—150.2 2 Claims




1. A method of providing a vertical profile command signal for a drone at a given slant range R from a target wherein the drone is to decrease in altitude and then make a low altitude horizontal approach when the target range reaches a value C, comprising the steps of:

a. generating a varying analog signal directly proportional to R;

b. generating a constant analog signal directly proportional to C;

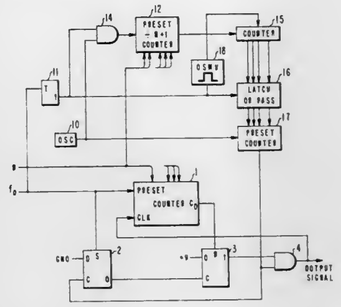
c. subtracting C from R to provide a difference signal; and,

d. multiplying said difference signal by a given constant equal to the tangent of the angle of approach of said drone to the point where R=C and by a given constant equal to the sine of the angle of approach of said slant range of said drone to the target when C=O.

## 4,017,719
## BINARY RATE MULTIPLIER WITH MEANS FOR SPACING OUTPUT SIGNALS

Gerald Stanley Kaplan, Lawrenceville, and Andrew David Ritzie, Delran, both of N.J., assignors to RCA Corporation, New York, N.Y.

Filed Dec. 18, 1975, Ser. No. 642,111
Int. Cl.² G06F 7/39; H03K 5/00
U.S. Cl. 235—150.3 6 Claims




1. In a binary rate multiplier for producing N times $f_0$ output signals, of the type having first input means for receiving signals representing the value of N, second input means for receiving signals at a rate $f_0$, programmable divide-by-N means preset to said value of N from said first input means by said second input signal means and responsive to said output signals for producing a carry signal after N output signals have been counted, clocking means for producing clocking signals at a rate $f_c$ not less than $N_{MAX}$ times $f_0$, where $N_{MAX}$ is the maximum value of N, and gating means responsive to said carry signal for passing N clocking signals for each signal from said second input means, the improvement comprising:

clock adjustment means responsive to the N value and to the rate $f_0$ for adjusting the clock signal rate to approximately (N+1) times $f_0$.

## 4,017,720
## FOUR QUADRANT ANALOG BY DIGITAL MULTIPLIER

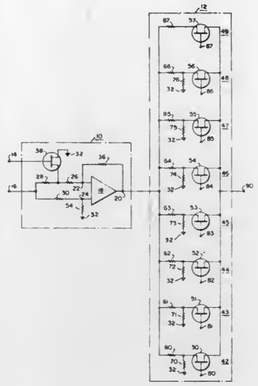
John Mattern, Catonsville, Md., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Dec. 4, 1975, Ser. No. 637,549
Int. Cl.² G06J 1/00
U.S. Cl. 235—150.52 16 Claims

1. Apparatus for the four quadrant multiplication of an analog value by a digital value having a sign plus magnitude binary format comprised of a sign bit and at least one magnitude bit, said apparatus comprising:

an amplifier gain network which provides an output substantially equivalent to the product of said analog value and the sign of said digital value; and

a resistance network responsive to said amplifier network for providing an output substantially equivalent to the



product of the output of said amplifier gain network and the magnitude of said digital value.

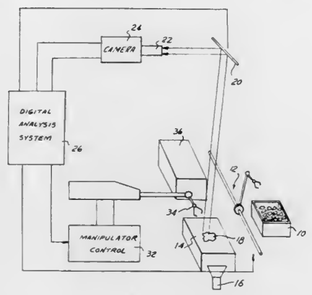
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**4,017,721**

**METHOD AND APPARATUS FOR DETERMINING THE POSITION OF A BODY**

**Jimmie A. Michaud, Bellbrook, Ohio, assignor to The Bendix Corporation, Southfield, Mich.**

**Filed May 16, 1974, Ser. No. 470,345**
**Int. Cl.² G06F** *15/46;* **B25J** *9/00*
**U.S. Cl. 235—151.3** **18 Claims**



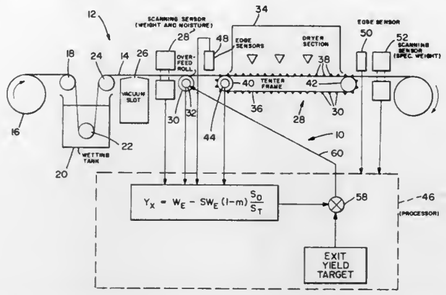
1. A system for generating electrical signals representative of the position of a three-dimensional body relative to a supporting surface, comprising: means for creating an optical image of the silhouette of said body in a first direction; means for receiving the optical image and for generating electrical signals representative of the outline of the body; means for receiving said electrical signals representative of the outline of the body and for generating electrical signals representative of the location of the centroid of the area of the object as viewed from said direction relative to the supporting surface; and means for receiving said electrical signals representative of the outline of the body as viewed from said direction and for generating a signature signal said signature signal being representative of the positions relative to one another of a plurality of positions on the outline of the body, all of said positions having equal displacement from the controid of the body.

**4,017,722**

**CONTROL SYSTEM FOR TEXTILE TENTER FRAME**

**S. Keith Swanson, Saratoga, Calif., assignor to Measurex Corporation, Cupertino, Calif.**

**Filed Apr. 11, 1975, Ser. No. 567,108**
**Int. Cl.² D06C** *3/00*
**U.S. Cl. 235—151.1** **7 Claims**




1. In combination with a textile tenter frame including a pair of spaced apart belts driven by a drive means and an overfeed roll at the entry end of said frame, and a sheet of fabric entering said frame from a source apparatus for controlling the yield of said fabric at the exit end of said frame comprising:

moisture and weight sensor means at the entrance of said frame measuring the moisture content and source weight of the fabric before entering the tenter frame for producing output signals proportional to the measured moisture content and measured source weight of the fabric before entering the tenter frame;

edge sensor means at opposite edges of said fabric sheet at the entrance of said frame for producing output signals proportional to the width of the fabric before entering the tenter frame;

speed sensor means connected to said belts and to said overfeed roll for producing output signals proportional to the speed of said tenter frame belts and said overfeed roll;

electronic computer control means connected to each of said sensor means and including means for receiving each of said output signals from each of said sensor means, means for repetitively computing a predicted exit yield signal from said output signals, means for generating a predetermined target yield signal, means for comparing said predicted exit yield signal to said target yield source to provide a control output signal corresponding to the difference between said target yield signal and said predicted exit yield signal; and

said control output signal being supplied to said overfeed roll to vary the speed thereof in accordance with said control output signal in order to control the actual yield of said fabric at the exit end of said frame.

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**4,017,723**

**APPARATUS FOR CONTROLLING REPETITIVE CUTTING CYCLES ON A WORK PIECE BEING CUT BY A CUTTING TOOL OF A LATHE**

**Ellwood Donald Fickes, Waynesboro, Va., assignor to General Electric Company, New York, N.Y.**

**Filed July 25, 1975, Ser. No. 599,229**
**Int. Cl.² G06F** *15/46;* **G05B** *19/18*
**U.S. Cl. 235—151.11** **8 Claims**

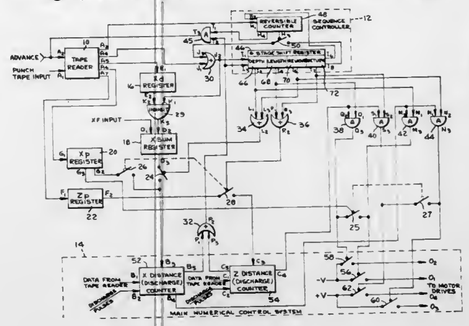
1. Apparatus for controlling repetitive cutting cycles on a work piece being cut by a cutting tool of a lathe, comprising:

a. means for storing a plurality of coded signals to control a depth to cut, a length of cut, a removal and a return path for a cutting cycle, and a desired number of identical cutting cycles;

b. means for enabling successive and sequential movement of the cutting tool over a complete cutting cycle of the work piece; and



c. means coupled and responsive to said enabling means for controlling continuation of the cutting of the work piece over additional identical cutting cycles, the number of cutting cycles being predetermined by a coded signal



received by said controlling means from said storing means, and the depth of the cut for each cycle being predetermined by a coded signal received by said enabling means from said storing means.

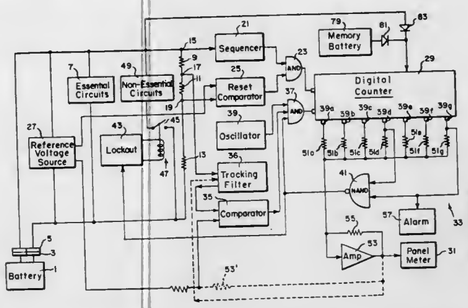
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**4,017,724**

**APPARATUS FOR MEASURING BATTERY DEPLETION BY MONITORING REDUCTIONS IN VOLTAGE**

**Eugene P. Finger, Brewster, N.Y., assignor to Curtis Instruments, Inc., Mount Kisco, N.Y.**

**Filed June 27, 1975, Ser. No. 591,055**
**Int. Cl.² G01R** *13/02*
**U.S. Cl. 235—151.31** **9 Claims**




1. Apparatus for monitoring the condition of a battery comprising:

means for monitoring the output terminal voltage of the battery and producing an output signal when the magnitude of the terminal voltage is less than a threshold value;

a stepping motor for integrating said output signal; and

indicator means driven by said stepping motor for indicating the integral stored in said stepping motor.

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**4,017,725**

**SOLAR POWERED PORTABLE CALCULATOR**

**Stephen A. Roen, New York, N.Y., assignor to Litton Business Systems, Inc., Morris Plains, N.J.**

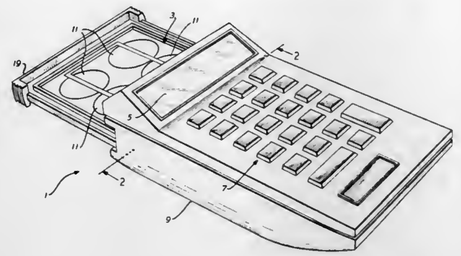
**Filed Jan. 3, 1975, Ser. No. 538,308**
**Int. Cl.² G06F** *15/30;* **H01V** *1/30*
**U.S. Cl. 235—152** **7 Claims**

1. A portable calculator comprising:

a housing having a keyboard and indicator means thereon;

solar panel means; and

means for allowing movement of said solar panel means, coupled to said housing, from a first position within said housing to a second position exposing said solar panel



means, comprising a rail-channel guide means for slidably moving said solar panel means.

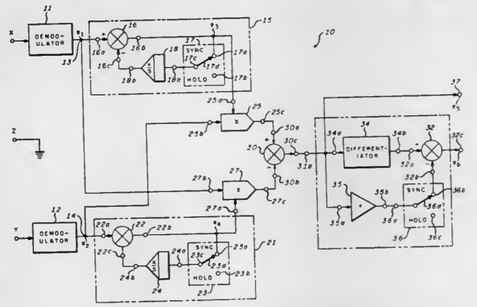
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**4,017,726**

**FOUR QUADRANT RATE TAKER AND SYNCHRONIZER**

**Edmund R. Skutecki, and Carl D. Griffith, both of Phoenix, Ariz., assignors to Sperry Rand Corporation, New York, N.Y.**

**Filed Nov. 5, 1975, Ser. No. 629,473**
**Int. Cl.² G06G** *7/22*
**U.S. Cl. 235—186** **4 Claims**




1. An apparatus for extracting signals representative of an angular variable, $\omega t$, and the time rate of change, $\omega$, thereof from three phase synchro generated signals which are modulated by data signals defining said angular variable and said time rate of change comprising:

three terminal input means coupled to receive said three phase synchro generated signals for developing first and second signals modulated by data signals with modulation of the form sin $(\omega t + \theta)$ and sin $(\omega t - \theta)$;

first and second demodulator means coupled to receive said first and second data modulated signals respectively, for providing demodulated signals proportional to sin $(\omega t + \theta)$ and sin $(\omega t - \theta)$ ,

first and second signal modifying means responsive to said demodulated signals from said first and second demodulator means respectively for providing an output signal which is representative of the derivative with respect to time of said demodulator signal including:

an integrator having an input means and an output means providing a signal at said output means that is representative of the integration with respect to time of a signal at said input means,

combining means coupled to said demodulated signal of said demodulator as a first input signal and said output signal of said integrator as a second input signal for providing an output signal proportional to the difference between said first and second input signals, said output signal coupled to said input terminal of said integrator and providing said output signal of said signal modifying means;

first multiplier means coupled to receive said demodulated signal from said second demodulator as a first input signal and said output signal of said first signal modifying means as a second input signal for combining said first and second input signals and providing an output signal that is proportional to the product thereof;

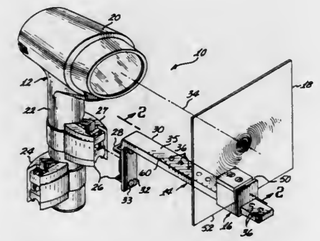
second multiplier means coupled to receive said demodulator signal of said first demodulator as a first input signal and said output signal of said second signal modifying means as a second input signal for combining said first and second input signals and providing an output signal that is proportional to the product thereof;

summation means coupled to receive said output signal of said first multiplier as a first input signal and said output signal of said second multiplier as a second input signal for providing an output signal that is representative of the difference between said first and second input signals; and

operational means responsive to said output signal of said summation means for performing mathematical operations on said output signal from said summation means whereby a signal proportional to the time rate of change of said variable is provided.

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**4,017,727**
**LIGHT PROJECTING APPARATUS**
**David J. Yamamoto, 4420 W. Vogel, Glendale, Ariz. 85301**
**Filed Nov. 12, 1975, Ser. No. 631,106**
**Int. Cl.² G03B** *15/02*
**U.S. Cl. 240—1.3** **7 Claims**



1. A light projecting apparatus comprising:

a. a photo flash unit having a light emitting structure from which an elongated body perpendicularly depends;

b. an elongated bar one end of which is demountably attached to the elongated body of said photo flash unit, said elongated bar positioned below and extending substantially parallel with the light beam path producable by said photo flash unit;

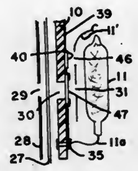
c. a clamping head carried on said elongated bar; and

d. a fresnel lens demountably attached to said clamping head and extending therefrom into the light beam path producable by said photo flash unit to substantially coincide with the light beam axis.

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**4,017,728**
**MULTILAMP PHOTOFLASH UNIT HAVING RADIANT-ENERGY-ACTIVATED QUICK-DISCONNECT SWITCH**
**Emery G. Audesse; William T. Colville; John W. Shaffer, and David W. Mecone, all of Williamsport, Pa., assignors to GTE Sylvania Incorporated, Montoursville, Pa.**
**Filed Sept. 17, 1975, Ser. No. 614,108**
**Int. Cl.² G03B** *15/02;* **F21K** *5/02*
**U.S. Cl. 240—1.3** **24 Claims**

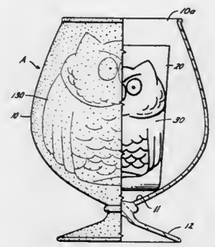
1. In a multilamp photoflash unit containing a plurality of flashlamps and circuit means for sequentially igniting said flashlamps, at least one radiant-energy-activated quick-disconnect switch included in said circuit means, said disconnect switch being electrically connected in series with one of said flashlamps for interrupting the ignition circuit means for said flashlamp after said flashlamp is ignited, said disconnect switch comprising a length of electrically conductive, heat shrinkable material positioned so as to be in operative relationship with the radiant output from said ignited flashlamp,



said heat shrinkable material being attached to said circuit means at both ends of said length thereof, with the mid portion of said length of heat shrinkable material being spatially suspended to avoid substantial thermal contact with heat absorbing surfaces and thereby maximize the speed with which the shrinking and separation of said mid portion occurs upon its being heated by the radiant output of said ignited flashlamp.

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**4,017,729**
**DECORATIVE LAMP**
**Preston J. Frazier, Jr., Houston, Tex., assignor to Faroy, Inc.**
**Continuation-in-part of Ser. No. 327,070, Jan. 26, 1973, abandoned. This application May 11, 1973, Ser. No. 359,494**
**Int. Cl.² F21V** *35/00*
**U.S. Cl. 240—13** **7 Claims**



1. A decorative lamp, comprising:

an outer shell having a substantially cylindrical surface, a bottom, and an open upper end;

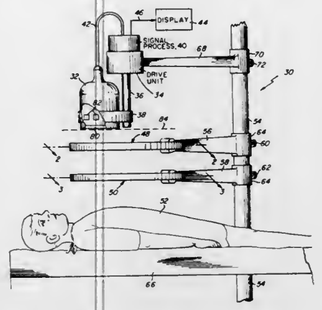
an inner non-rotating candleholder disposed in a selected seated position in said outer shell for holding a candle;

the external surface of said candleholder having a design through which light may pass from a candle in said candleholder; and

said external surface of said candleholder being spaced from said substantially cylindrical surface for the projection of an image of said design onto said outer shell from a candle in said candleholder so that it is visible from externally of said outer shell and so that the image thereof flickers to give the effect of movement of the design by reason of candlelight from a candle in the candleholder flickers.



**4,017,730**
**RADIOGRAPHIC IMAGING SYSTEM FOR HIGH ENERGY RADIATION**
**Harrison H. Barrett, Lexington, Mass., assignor to Raytheon Company, Lexington, Mass.**
**Division of Ser. No. 465,940, May 1, 1974, Pat. No. 3,936,639. This application Jan. 16, 1976, Ser. No. 649,878**
**Int. Cl.² G01T** *1/166*
**U.S. Cl. 250—363 S** **6 Claims**



1. A radiographic scanning system comprising:

a camera responsive to incident radiation propagating thereto from a subject;

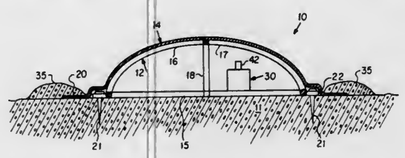
a mask interposed between said subject and said camera said mask having an elongated region transparent to said radiation and having a predetermined shape;

means coupled to said camera for displaying an image of said subject; and

means for moving said camera along said elongated region.

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**4,017,731**
**METHOD AND APPARATUS FOR PROSPECTING FOR BURIED MINERAL DEPOSITS**
**Eddie P. Howell, and Orland J. Gant, Jr., both of Plano, Tex., assignors to Atlantic Richfield Company, Los Angeles, Calif.**
**Continuation of Ser. No. 542,309, Jan. 20, 1975, abandoned. This application Apr. 12, 1976, Ser. No. 675,872**
**Int. Cl.² G01V** *5/00*
**U.S. Cl. 250—253** **9 Claims**



1. The method of detection of the presence of soil gases which migrate upwardly through the earth's structure comprising the steps of:

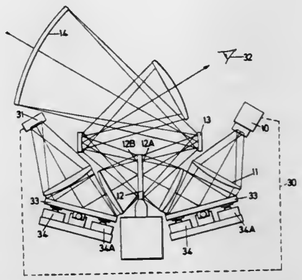
a. enclosing respective air spaces above each of a plurality of predetermined spaced apart areas at the surface of the earth in a location of interest so that said soil gases exiting into the atmosphere over said surface areas are confined within said respective air spaces and so that external atmospheric contaminants are excluded from entry therewithin;

b. employing a like plurality of shelters for enclosing said respective air spaces, each such shelter comprising a material which is highly permeable to infrared radiation, so that said surface areas are exposed to said radiation with sufficient intensity to raise significantly the temperature of the subsoil therebeneath and thus in turn to increase the rate of escape of said soil gases from the earth; and

c. measuring the level of concentration of said soil gases within said air spaces.

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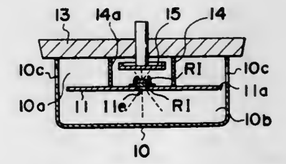
**4,017,732**
**RADIATION SCANNING SYSTEM**
**Herbert Morrison Runciman, Glasgow, Scotland, assignor to Barr and Stroud Limited, Glasgow, Scotland**
**Filed Jan. 7, 1976, Ser. No. 647,116**
**Claims priority, application United Kingdom, Feb. 5, 1975, 4843/75**
**Int. Cl.² H01J** *31/49*
**U.S. Cl. 250—334** **7 Claims**



1. A radiation scanning system comprising a radiation detector and an optical assembly which is arranged to scan radiation from a field of view across said detector, said optical assembly including radiation-imaging means forming an image of radiation from said field of view, a curved reflector arranged to reflect image-forming radiation from said imaging means, a plane mirror mounted for oscillatory motion about a fixed axis to thereby scan radiation reflected from said curved reflector, and a relay lens means interposed between the plane mirror and the detector to relay said scanned radiation image on to said detector and, in the plane normal to said axis the radius of curvature of said curved reflector approximates to twice the radius of curvature of said scanned radiation image.

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**4,017,733**
**IONIZATION TYPE SMOKE SENSOR**
**Kanji Ishii, and Haruyoshi Sato, both of Tokyo, Japan, assignors to Hochiki Corporation, Tokyo, Japan**
**Filed Apr. 17, 1975, Ser. No. 568,969**
**Claims priority, application Japan, Apr. 18, 1974, 49-44089**[U]; Dec. 12, 1974, 49-141990
**Int. Cl.² G01T** *1/18;* **H01J** *39/28*
**U.S. Cl. 250—381** **7 Claims**

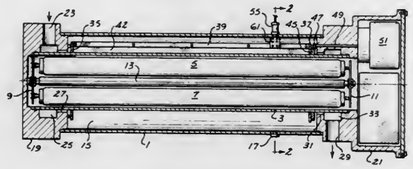


1. A smoke sensor of the ionization type comprising a first metal electrode member having a cup-shaped configuration and provided with air inlet means for permitting an air current to flow into the inner space of said first electrode member, a second metal electrode arranged within said first cup-shaped, electrode member and defining within the latter an upper section and a lower section thereof, said air current flowing into said upper section through said air inlet means and circulating in said upper section before flowing into said lower section, a flow regulating means provided within said upper

section and serving at least to change the direction of the air current in said upper section, a radioactive ray source carried by said second electrode member so as to radiate in said lower section, said second electrode member having opening means therethrough to permit the inflowing air current to flow from said upper section into said lower section, whereby the formation of dew is preferentially caused within said upper section and the heat retained by the inflowing air current is transferred to said second electrode member carrying said radioactive ray source such that the temperature of the second electrode member approaches that of said inflowing air current.

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**4,017,734**
**WATER PURIFICATION SYSTEM UTILIZING ULTRAVIOLET RADIATION**
**Henry M. Ross, The Lawn, Nokesville, Va. 22123**
**Continuation-in-part of Ser. No. 509,871, Sept. 27, 1974, abandoned. This application Mar. 24, 1976, Ser. No. 669,767**
**Int. Cl. G01n** *21/24*
**U.S. Cl. 250—431** **7 Claims**

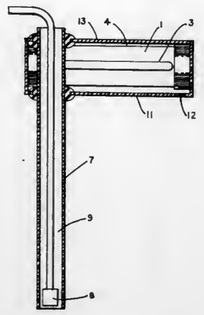


1. A water purification system utilizing ultraviolet radiation comprising
   an elongated outer enclosure having an inlet and an outlet for the passage of water,
   a transparent cylindrical enclosure mounted coextensively within said outer enclosure to define a passageway for water therebetween,
   ultraviolet radiation means mounted within said transparent cylindrical enclosure,
   first and second annular members mounted for rotation at opposite ends of said transparent cylindrical enclosure,
   a plurality of metallic wiper blades extending parallel to the longitudinal axes of said cylindrical enclosures and connected between said first and second annular members within said passageway in position to have an edge portion in wiping contact with the outer surface of said transparent cylindrical enclosure, and
   means to operate said wiper blades around said transparent enclosure to continually remove sediment and impurities deposited on the surface by the water passing through said passageway, said means to operate said wiper blades comprising a drive motor coupled to one of said annular members,
   whereby the efficiency of optical transmission of the ultraviolet radiation through said transparent enclosure will be maintained at an optimum value.

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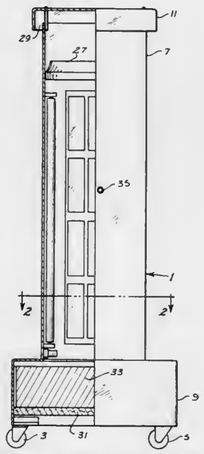
**4,017,735**
**ULTRAVIOLET LIQUID STERILIZER**
**Arthur D. Siegel, 24 Goldenrod Court, Cheshire, Conn. 06410**
**Filed Oct. 24, 1975, Ser. No. 625,557**
**Int. Cl.² E04H** *3/16, 3/20;* **G01N** *21/24, 23/12*
**U.S. Cl. 250—430** **4 Claims**

1. a liquid sterilizer which comprises:
   a. an enclosure;
   b. an ultraviolet germicidal lamp suspended in the upper portion of said enclosure;
   c. A lower wall of said enclosure exposed to the radiation from the lamp said lower wall having at least one drain hole (and) the upper rim of said drain hole flush with the upper surface of the lower wall; and
   d. a means to deliver turbulent, aerated liquid to said lower wall causing the liquid to pass over the lower wall and to drain from the drain holes.



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**4,017,736**
**AIR PURIFICATION SYSTEM UTILIZING ULTRAVIOLET RADIATION**
**Henry M. Ross, The Lawn, Nokesville, Va. 22123**
**Continuation-in-part of Ser. No. 509,885, Sept. 27, 1974, abandoned. This application Mar. 24, 1976, Ser. No. 669,766**
**Int. Cl. G01n** *21/24*
**U.S. Cl. 250—435** **1 Claim**

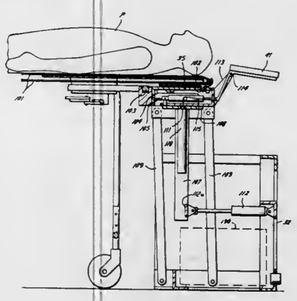


1. A portable air purification system utilizing ultraviolet radiation comprising
   an upstanding elongated metallic enclosure having a lower inlet and an upper outlet for the passage of air.
   fan means mounted within said enclosure between the inlet and outlet to cause the movement of air therebetween,
   a metallic cap member mounted over said outlet,
   said cap member having downturned edges spaced from said elongated enclosure to form an air passageway directing the flow of air downwardly,
   a base member comprising a hollow metallic enclosure mounted on casters, said base member being joined to said upstanding enclosure at the inlet end thereof,
   filter means positioned within said base member to remove particles of impurities contained in the air passing therethrough,
   said filter means comprising a metallic mesh pre-filter and a sub-micron laminar flow cell,
   said sub-micron laminar flow cell being constructed of fiberglass and paper with a porosity sufficiently small to cause particles with diameters larger than 0.3 microns to be trapped by said flow cell,
   a plurality of high intensity ultraviolet tubes vertically mounted within said enclosure in position to expose all air passing therethrough to ultraviolet radiation,
   a peep-hole provided with optical filter means positioned in said elongated enclosure to enable inspection of said ultraviolet tubes while in operation,
   whereby straight-line air flow is maintained with particulate materials being removed from the air by the filter means and microorganisms being killed by ultraviolet radiation to produce a clean air environment with complete suppression of ultraviolet radiation.



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**4,017,737**
**CONVEYER APPARATUS FOR MEDICAL PATIENTS**
**Donald C. Hudson, 502 Fenwick Drive, San Antonio, Tex. 78329; Charles R. Morris, 3119 War Arrow Drive, San Antonio, Tex. 78238; Horst G. Fleck, and Karl A. Senghaas, both of 818 E. Myrtle St., San Antonio, Tex. 78212**
**Division of Ser. No. 429,482, Jan. 2, 1974, Pat. No. 3,908,126. This application Apr. 24, 1975, Ser. No. 571,266**
**Int. Cl.² G21K** *5/08*
**U.S. Cl. 250—453** **3 Claims**



1. A conveyor cart for aiding in the placement of a subject to be x-rayed or treated in position in a radiographic apparatus, comprising, in combination:
   an elongated frame;
   a conveyor belt mounted on said frame and along the length thereof to move a subject placed on said belt along the length on said cart from a first position where said subject can be placed on said cart to a second position on said cart where he can be positioned in said radiographic apparatus; and
   coupling means mounted on said frame and connected to said belt and adapted to be actuated by a movable element in said radiograhic apparatus for moving said belt, and means connected between said coupling means and said conveyor belt for amplifying the motion of such a movable element to cause a greater movement of said belt in response thereto.

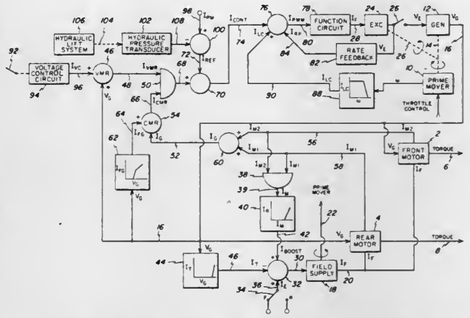
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**4,017,738**
**SCINTILLATOR**
**Mark Hyman, Jr., 62 Woodbine Road, Belmont, Mass. 02178**
**Division of Ser. No. 483,317, June 26, 1974, Pat. No. 3,951,847. This application June 17, 1975, Ser. No. 587,542**
**Int. Cl.² G01J** *1/58*
**U.S. Cl. 250—483** **5 Claims**

1. A method of detecting and measuring emission of high energy particles comprising exposing to high energy particles a measured solution containing 2,5-di-m-tolyl-1,3,4 oxadiazole and measuring the emission of radiation from the 2,5-di-m-tolyl-1,3,4 oxadiazole.

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**4,017,739**
**LIFTING FORCE RESPONSIVE LOAD CONTROL FOR ELECTRICALLY PROPELLED EARTHMOVING VEHICLES**
**Martin Jay Hapeman, Edinboro, and Barry Jay Turley, Erie, both of Pa., assignors to General Electric Company, Erie, Pa.**
**Filed Feb. 27, 1975, Ser. No. 553,864**
**Int. Cl.² B60L** *3/06*
**U.S. Cl. 290—14** **6 Claims**



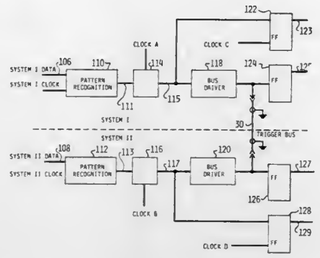
1. For use in an electrically propelled earthmoving traction vehicle of the type having integral earthmoving means for penetrating, lifting, transporting, and discharging earth matter and wherein prime mover means drives electric generating means supplying electrical energy to traction motor means, said prime mover means also being adapted to supply power to means for operating said earthmoving means, a propulsion control system for limiting the electrical output of said generating means responsive to the available output of said prime mover, said propulsion control system comprising:
   a. a source of feedback signals varying as functions of the electrical output of said generating means;
   b. a source of reference signals representative of the available power output level of said prime mover;
   c. comparison means responsive to said feedback and reference signals and having an output adapted to provide a control signal for limiting the output of said generating means;
   d. means for deriving a lifting force signal representative of a lifting force applied to said earthmoving means; and
   e. means responsive to said lifting force signal for modifying said control signal to reduce the output limit of said generating means and thereby to reduce maximum available tractive effort.

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**4,017,740**
**SYNCHRONIZATION OF DIGITAL CIRCUITS BY BUS TRIGGERING**
**William A. Farnbach, and Charles T. Small, both of Colorado Springs, Colo., assignors to Hewlett-Packard Company, Palo Alto, Calif.**
**Filed Apr. 30, 1975, Ser. No. 573,298**
**Int. Cl.² H03K** *19/08, 5/13*
**U.S. Cl. 307—208** **6 Claims**

1. A method for synchronizing the simultaneous interrogation of a plurality of digital circuits, said method comprising the steps of:
   detecting a first logical state within a first digital circuit; said first digital circuit being responsive to first clock signals;
   detecting a second logical state within a second digital circuit; said second digital circuit operating asynchronously with respect to said first digital circuit and not being responsive to said first clock signals nor to phase or harmonically related components derived therefrom;
   providing a first logic level to an electrical signal line in response to the detection of said first logic state;
   providing a first logic level to said electrical signal line in response to the detection of said second logic state;
   inhibiting the production of said first logic level and provid-

ing a second logic level to said electrical signal line if said first and second logic states are not detected simultaneously; and




generating one or more enable signals in response to said first logic level.

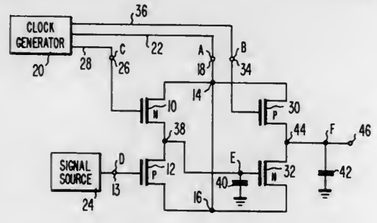
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**4,017,741**

## DYNAMIC SHIFT REGISTER CELL

**George Roland Briggs, Princeton, N.J., assignor to RCA Corporation, New York, N.Y.**

**Filed Nov. 13, 1975, Ser. No. 631,458**
**Int. Cl.³ G11C** *19/28, 19/18;* **H03K** *23/26, 17/60*
**U.S. Cl. 307—221 C** **12 Claims**




1. An integrated circuit dynamic shift register stage having an input and output terminal comprising, in combination:

first, second and third terminals to which respective control voltages may be applied;

first and second charge storage means coupled between a first node and a point at a reference potential and a second node and said point at said reference potential, respectively, said second node comprising said output terminal;

a first metal-oxide-semiconductor (MOS) transistor of a first conductivity type having a conduction path and a control electrode, said conduction path connected between said first node and said first terminal and said control electrode comprising said input terminal;

a second MOS transistor of a second conductivity type having a conduction path and a control electrode, said second transistor conduction path connected in parallel connection with said first transistor conduction path and said second transistor control electrode connected to said second terminal;

a third MOS transistor of said second conductivity type having a conduction path and a control electrode, said third transistor conduction path connected between said second node and said first terminal and said third transistor control electrode connected to said first node; and

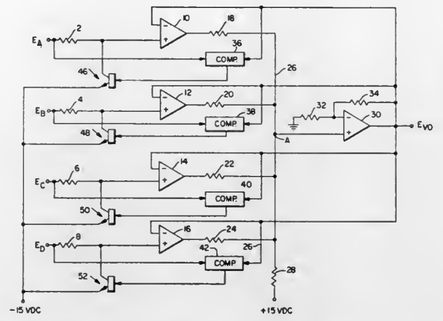
a fourth MOS transistor of said first conductivity type having a conduction path and a control electrode, said fourth transistor conduction path connected in parallel connection with said third transistor conduction path and said fourth transistor control electrode connected to said third terminal.

**4,017,742**

## MULTIPLE INPUT, MULTIPLE FAILURE OPERATIONAL VOTER CIRCUIT

**Robert L. James, Bloomfield, N.J., assignor to The Bendix Corporation, Teterboro, N.J.**

**Filed Mar. 28, 1975, Ser. No. 563,260**
**Int. Cl.² H03K** *5/20*
**U.S. Cl. 307—357** **9 Claims**




1. Apparatus for providing a voted output signal at any instant in time, and which signal corresponds to a selected signal of a plurality of input signals, comprising:

a plurality of amplifiers, each of which receives one of the plurality of input signals and receives the voted output signal as feedback, and provides an output signal in accordance with the received signals;

a plurality of comparators, each of which compares the voted output signal wit a corresponding one of the plurality of input signals and provides a signal when the difference between the compared signals exceeds a predetermined threshold, said signal being indicative of an unwanted input signal; and

a plurality of switching means, each of which receives a corresponding one of the plurality of input signals and is connected to a corresponding comparator and to a maximum fixed signal level means, and is responsive to the comparator signal indicative of an unwanted signal for switching the unwanted input signal to the maximum fixed signal level.

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**4,017,743**

## ELIMINATION OF CROSSTALK IN TWO SEQUENTIALLY OPERATED DARLINGTON AMPLIFIER CHANNELS

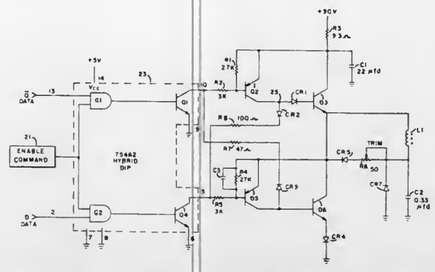
**Clyde E. Hartman, Huntsville, Ala., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Sept. 26, 1975, Ser. No. 617,213**
**Int. Cl.² H03K** *17/16, 17/56*
**U.S. Cl. 307—237** **4 Claims**

1. In a system having first and second sequentially operated amplifier channels each having a channel input and a channel output, the improvement comprising first clamping means connected between the first channel and said second channel so that when said first channel is in an on condition said second channel is clamped to an off condition; second clamping means connected between said second channel and said first channel such that when said second channel is in an on condition said first channel is clamped to an off condition; said first and second amplifier channels consists of a plurality of cascaded connected amplifiers each having a signal input terminal and a current output path; the input terminal of one amplifier of each channel being connected to said channel input; a current path of another amplifier of each channel being connected to said channel output; said first clamping means being



a first diode connected between a signal input terminal of an amplifier in said second channel and a current path of an amplifier in said first channel; and said second clamping




means being a second diode connected between a signal input terminal of an amplifier in said first channel and a current path of an amplifier in said second channel.

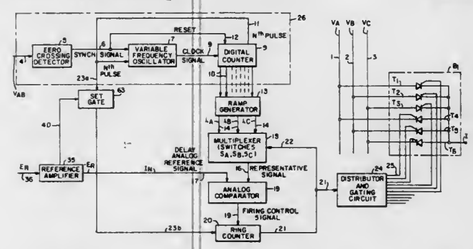
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**4,017,744**

## DIGITAL FIRING PULSE GENERATOR FOR THYRISTOR POWER CONVERTERS

**Frederick O. Johnson, Monroeville, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed Dec. 22, 1975, Ser. No. 642,814**
**Int. Cl.² H03K** *17/72;* **H02M** *7/155, 5/257*
**U.S. Cl. 307—252 Q** **3 Claims**




1. Digital firing pulse generator for generating and applying firing pulses to a plurality of controlled rectifiers connected as a polyphase arrangement in an alternating current power supply comprising:

first counter means synchronized with the power supply for generating a plurality of timing waveforms related to respective phases of said power supply;

comparator means for comparing one of said timing waveforms with a reference signal for generating a control signal defining a firing angle for the next controlled rectifier to be fired;

ring counter means responsive to said control signal for providing a logic representation of said next controlled rectifier;

gating means responsive to said ring counter means for selecting said next controlled rectifier and for firing the same; and

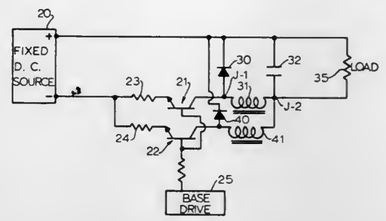
multiplexer means interposed between said first counter means and said comparator means for selecting said one timing waveform, said ring counter means controlling said multiplexer means to select as said one timing waveform a timing waveform corresponding to the phase associated with said next controlled rectifier.

**4,017,745**

## SWITCHING REGULATOR POWER SUPPLY

**William Henry McMahon, Salt Lake City, Utah, assignor to American Laser Corporation, Salt Lake City, Utah**

**Filed Feb. 11, 1976, Ser. No. 657,157**
**Int. Cl.² H03K** *17/60*
**U.S. Cl. 307—254** **9 Claims**




1. In an electrical system requiring DC power at a regulated voltage, in combination:

a. a fixed DC power source;

b. an electrical load arranged to receive the regulated voltage;

c. a pair of power switching transistors having collector, base and emitter connections and connected in parallel between said source and said load;

d. base drive means connected to the respective base connections of said transistor;

e. a pair of inductive type filters each being connected on one side to a common junction which in turn is connected to a first side of said electrical load with the other respective side of each said filter being connected to a respective selected one of said emitter and collector connections such that each said transistor provides current to said load through a separate said filter; and

f. a pair of flyback diodes, said diodes being connected on one side to a common line which in turn is connected to a second side of said load and said diodes on their respective opposite sides having a respective connection to the selected one of said emitter and collector connections of a respective transistor to which a respective filter is connected and in a manner enabling the respective currents carried by each of said transistors to be equalized during the rise and fall times of the switching cycle of said regulator circuit and each respective flyback diode to conduct the current generated by the respective filter with which it is associated during the time when the respective associated transistor is not conducting.

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**4,017,746**

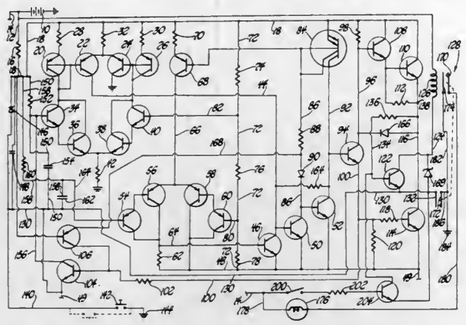
## TIMING CIRCUIT MEANS

**Gerald K. Miller, Hersey, Mich., assignor to Nartron Corporation, Reed City, Mich.**

**Filed July 18, 1975, Ser. No. 597,161**
**Int. Cl.² H03K** *5/13;* **G01R** *29/02;* **H01H** *47/32*
**U.S. Cl. 307—293** **9 Claims**

1. A timing circuit, comprising first switch means operable into first and second operating modes, circuit means including second switch means responsive to said first switch means being in its second operating mode to concurrently energize associated electrical relay switch means and electrical load means, said curcuit means further comprising means for conditioning said second switch means to de-energize said electrical load a predetermined time period subsequent to and independently of operation of said first switch means in said second operating mode, and third switch means having at least

two modes of operation, said third switch means when in one of its said two modes being effective to de-energize said elec-



trical relay switch means and said electrical load means within a time span less than said predetermined time period.

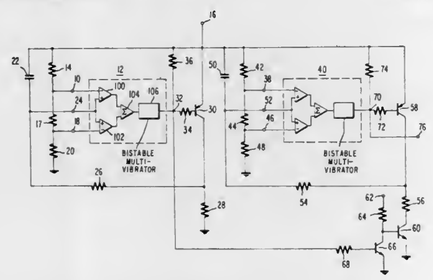
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**4,017,747**

**FIRST TIMING CIRCUIT CONTROLLED BY A SECOND TIMING CIRCUIT FOR GENERATING LONG TIMING INTERVALS**

**Abel Ching Nam Sheng, Westport, Conn., assignor to RCA Corporation, New York, N.Y.**

**Filed Nov. 17, 1975, Ser. No. 632,814**
**Int. Cl.² H03K** *5/13, 17/26*
**U.S. Cl. 307—293** **9 Claims**




1. A timing circuit comprising, in combination:
first and second charge store means:
first and second comparators, each of the type having two reference voltage input levels, one relatively high and the other relatively low, and a signal voltage input terminal, and each for producing an output signal at a first level when the input signal present at said input terminal is higher than said high reference level, for producing an output signal at a second level when said input signal is lower than said low reference level, and for producing an output signal which remains at its previous value, either first or second, when said input signal is between said high and low levels, said first comparator connected at its signal input terminal to one terminal of said first charge storage means for sensing the voltage present there and said second comparator connected at its signal input terminal to one terminal of said second charge storage means for sensing the voltage present there;
means responsive to the output signal of said first comparator for charging said first charge storage means when said output signal is at one level and discharging the same when said output signal is at its other level; and
means for charging the second charge storage means, during the time said first charge storage means is discharging, when the output of said second comparator is at one level, and responsive to the output signal of said second comparator when at its other level, for discharging said second charge storage means.
9. In combination:
means for producing a train of pulses of relatively short duration compared to the pulse period;
capacitance means;
means responsive to each pulse for charging said capacitance means during the pulse interval;
a comparator connected across said capacitance means for sensing the voltage across the same, said comparator being of the type which produces an output voltage at a first level when the voltage across the capacitance means is lower than a given first value, which produces an output voltage at a second level when the voltage across the capacitance means is greater than a given second value higher than the first, and which produces an output voltage at its previous level when the voltage across said capacitance means is between said first and second levels; and
means responsive to the output of said comparator for discharging said capacitance means when the output of said comparator is at its second level.

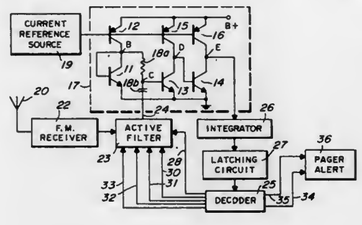
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**4,017,748**

**MONOLITHIC AC LEVEL DETECTOR**

**Walter Lee Davis, Plantation, Fla., assignor to Motorola, Inc., Schaumburg, Ill.**

**Filed Dec. 29, 1975, Ser. No. 644,995**
**Int. Cl.² H03K** *1/12*; **H03F** *3/04*
**U.S. Cl. 307—296 R** **8 Claims**




1. An improved AC level detector arrangement in integrated circuit form comprising in combination;
first transistor means connected as a diode and having a first semiconductor junction area to establish a first current reference level;
additional transistor means forming first amplifier means and coupled to said transistor diode, said additional transistor means having a second semiconductor junction area, smaller than said first semiconductor junction area, to establish a second current reference level related to said first current reference level by the ratio of the respective junction area thereof;
second amplifier means coupled to the first amplifier means and having its conductivity controlled by a portion of said second reference current; and
means coupled to the first amplifier means for applying an input signal to vary the current of said first amplifier means around the second reference level, whereby a predetermined level of input signal will effect cutoff of said second amplifier means and produce a voltage output pulse from said second amplifier means.

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**4,017,749**

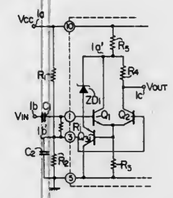
**TRANSISTOR CIRCUIT INCLUDING SOURCE VOLTAGE RIPPLE REMOVAL**

**Kunio Seki; Yukio Suzuki, both of Tokyo, and Yoshio Sakamoto, Kokubunji, all of Japan, assignors to Hitachi, Ltd., Japan**

**Filed Mar. 23, 1976, Ser. No. 669,699**
**Claims priority, application Japan, Oct. 6, 1975, 50-119764**
**Int. Cl.² H03K** *17/00*
**U.S. Cl. 307—296 R** **16 Claims**

1. A transistor circuit comprising a source voltage supply terminal, a first conductivity type transistor, collector load means, emitter impedance means for said first conductivity type transistor, first voltage dividing biasing means, second voltage dividing biasing means, a source voltage ripple removing impedance, and a source voltage ripple removing second conductivity type transistor, said first conductivity type transistor having an emitter connected to a reference potential through said emitter impedance means, a collector connected to one end of said collector load means, the other end of said collector load means connected to one end of said source voltage ripple removing impedance, the other end of said source voltage ripple removing impedance connected to said





source voltage supply terminal, said first and second voltage dividing biasing means connected in series to each other between said source voltage supply terminal and the reference potential, the biasing voltage for the base-emitter junction of said first conductivity type transistor set by the voltage generated at an interconnection point between said first and second voltage dividing biasing means, and said source voltage removing second conductivity type transistor having an emitter connected to the interconnection point of said collector load means and said source voltage ripple removing impedance, a base to the emitter of said first conductivity type transistor, and a collector to the reference potential.

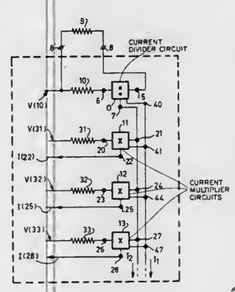
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**4,017,750**

**CIRCUIT ARRANGEMENT FOR EFFECTIVELY MAKING INTEGRATED IMPEDANCES ACCURATE**

**Johannes Otto Voorman, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.**

**Continuation of Ser. No. 507,367, Sept. 18, 1974, abandoned.**
**This application Apr. 8, 1976, Ser. No. 675,176**
**Int. Cl.² H03K** *3/26, 23/08, 1/00*
**U.S. Cl. 307—303** **6 Claims**




1. A circuit arrangement, comprising:
a first impedance;
a plurality of second impedances, said first and plurality of second impedances having accurately predetermined impedance ratios with respect to each other but inaccurately determined absolute impedance values;
means for electrically connecting one end of said first impedance to a source of constant potential;
a precision impedance electrically connected at one end thereof to said one end of said first impedance;
a current divider circuit electrically connected between the other end of said first impedance and the other end of said precision impedance for producing first and second output currents having the same ratio as the impedance ratio between said first impedance and said precision impedance;
a separate current multiplier circuit corresponding to and electrically connected to each one of said plurality of second impedances, each of said current multiplier circuits being responsive to current flowing through the corresponding electrically connected second impedance and being responsive to said first and second output currents of said current divider circuit for producing a current multiplier output current proportional to the product of said current flowing through the corresponding electrically connected second impedance and the ratio between said first and second output currents of said current divider circuit,
whereby the values of said current multiplier output currents are accurately determined by said accurately predetermined impedance ratios and the impedance value of said precision impedance and are not substantially affected by the absolute impedance values of said first and plurality of second impedances.

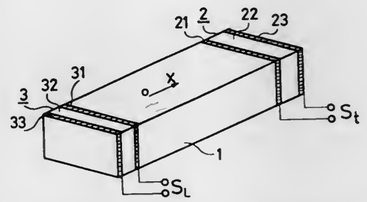
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**4,017,751**

**ELASTIC VOLUME WAVE CONVOLUTION DEVICE**

**Bernard Desormiere, and Edouard Bridoux, both of Paris, France, assignors to Thomson-CSF, Paris, France**

**Filed Dec. 15, 1975, Ser. No. 640,563**
**Claims priority, application France, Dec. 17, 1974, 74.4141521**
**Int. Cl.² H01L** *41/04*
**U.S. Cl. 310—8.1** **4 Claims**

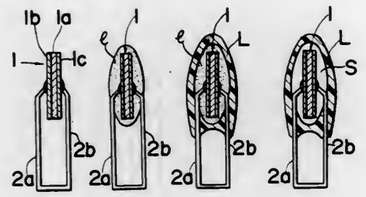


1. An elastic volume wave device for the convolution of a first and a second electric signal comprising a non piezoelectric substrate having two ends, first and second electromechanical transducer means located on said substrate adapted for respectively receiving a first carrier-wave modulated by said first electric signal and a second carrier wave modulated by said second electric signal and for producing in said substrate respectively transverse and longitudinal volume elastic waves propagating along a same axis for creating in said substrate a transverse resultant elastic wave travelling back to said first electromechanical transducer means adapted for transforming said resultant elastic-wave into a carrier wave modulated by an electric signal which represents, with time compression, the convolution product of said first and second electric signals.

4,017,752
**PIEZOELECTRIC CERAMIC RESONATOR MOUNTING MEANS**

**Sasuga Kakehi, Kyoto; Jiro Miyazaki, Jyoyo, and Jiro Inoue, Nagaokakyo, all of Japan, assignors to Murata Manufacturing Co., Ltd., Japan**

**Filed Dec. 12, 1974, Ser. No. 532,180**
**Claims priority, application Japan, Dec. 14, 1973, 48-140935**
**Int. Cl.² H01L 41/04**
**U.S. Cl. 310—9.4** **8 Claims**




1. A piezoelectric ceramic resonator which comprises a piezoelectric ceramic wafer including a piezoelectric ceramic plate and electrodes formed thereon, at least two outer terminal plates each having at one end portion thereof an engaging portion, means for holding said engaging portion of each terminal plate to said electrodes at a position corresponding to a node or a point close to said node of each of said electrodes, such that said ceramic wafer is held between said engaging portions of said outer terminals to provide a resonator structure, and a porous outer layer of thermosetting resinous material surrounding said ceramic resonator with a space provided therebetween, said space completely surrounding said resonator structure, wherein a portion of each of said outer terminal plates is secured to said porous outer layer for effecting free vibration of said resonator structure in operation thereof, wherein said engaging portion of said outer terminal plate includes an approximately square portion having a larger dimension than that of said ceramic wafer, said square portion being formed with a notch in each side edge of said square portion, and a projection which extends toward said node or said point close to said node of each of said electrodes, said projection being formed in a central portion of said square portion, and wherein said side edge of said square portion of said terminal plate is secured in said porous outer layer except for said notch, and said projection on said square portion is pressed against said node or said point close to said node of each of said electrodes for positively holding said ceramic wafer between said projections on said square portions, so that said resonator structure is completely surrounded by said space between said resonator structure and said porous outer layer for stable vibration.

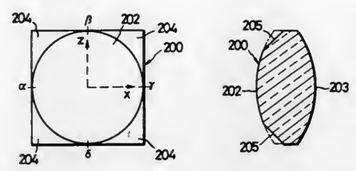
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4,017,753
**SHAPED QUARTZ CRYSTAL RESONATOR**

**Junichi Ishiwata; Hideo Suzuki, and Masakichi Sekiguchi, all of Tokyo, Japan, assignors to Kabushiki Kaisha Meidensha, Tokyo, Japan**

**Filed Jan. 29, 1976, Ser. No. 653,635**
**Claims priority, application Japan, Feb. 5, 1975, 50-16779[U]; Feb. 6, 1975, 50-17321[U]**
**Int. Cl.² H01L 41/04**
**U.S. Cl. 310—9.6** **3 Claims**

1. A quartz crystal resonator operating in the thickness-shear mode and having a rectangular quartz crystal with the ratio of the thickness to contour length exceeding 0.05, both opposite surfaces of said crystal having each only at the respective corner zones slant cut-away portions, each portion relatively steeply declining to terminate at the corner point of said crystal, of the thickness and contour length being uniform along the lines connecting the central points of respective opposite sides of said crystal, the cut-away portions each



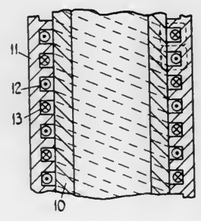

corresponding to the zone of minimum piezo-electrical activity.

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4,017,754
**ACTUATING DEVICES**

**Boaz Antony Jarrett, Sevenoaks, and Alec Harry Seilly, North Wembley, both of England, assignors to Simms Group Research & Development Limited, Birmingham, England**

**Filed Dec. 17, 1975, Ser. No. 641,369**
**Claims priority, application United Kingdom, Dec. 21, 1974, 55337/74**
**Int. Cl.² H01L 41/12**
**U.S. Cl. 310—26** **13 Claims**




1. An actuating device of the kind comprising an elongated member of annular form formed from a material having the property of magneto-striction, a winding which can be energised to cause a flow of magnetic flux in the member thereby to cause a change in a physical dimension of the member, said member being divided into a plurality of magnetic circuits disposed along the length of the member, portions of adjacent magnetic circuits being adjacent each other, the directions of flux flow in adjacent magnetic circuits being such that in said portions of two adjacent magnetic circuits, the flux flows are in the same direction, and a further member having a peripheral side surface in close proximity to a peripheral side surface of said first mentioned member, said further annular member having a two or a multiple of two, start helical thread like form in said peripheral side surface, said winding being accommodated in the grooves defined by the thread like form, said winding being arranged so that the direction of current flow in the two grooves or the adjacent grooves is in the opposite direction.

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4,017,755
**FLUID-COOLED ROTATING MEMBER WITH IMPROVED COOLANT EXHAUST STRUCTURE SUITABLE FOR SUPERCONDUCTING DYNAMOELECTRIC MACHINERY**

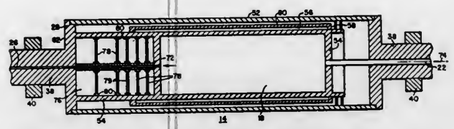
**Donald C. Litz, Monroeville, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Continuation of Ser. No. 263,039, June 15, 1972. This application Oct. 31, 1974, Ser. No. 519,725**
**Int. Cl.² H02K 9/00**
**U.S. Cl. 310—40 R** **5 Claims**

1. In apparatus in which a fluid is used as coolant for a member rotating about an axis of rotation:



means for exhausting coolant from the rotating member intended to be cooled, said means confining the coolant to a path along the axis of rotation for a distance in which radial coolant flow paths and radially displaced coolant flow paths are excluded to eliminate convection currents, said cooled member being supported within a substantially cylindrical supporting sleeve and said means for



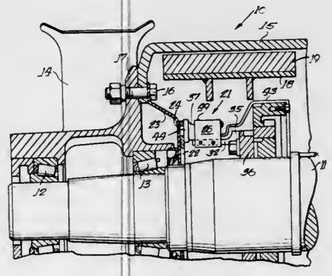
exhausting coolant being axially adjacent said cooled member and within said sleeve, said means for exhausting coolant comprising a tube along the axis for carrying the coolant therein said tube being spaced from said supporting sleeve by an evacuated volume, and a plurality of thermally conductive members extending between said tube and said sleeve through said evacuated volume at axially spaced intervals.

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4,017,756
**AUTOMATIC SENSOR POSITIONER**

**Hugh McDermand Davidson, Warren, Mich., assignor to Borg-Warner Corporation, Chicago, Ill.**

**Filed Aug. 18, 1975, Ser. No. 605,701**
**Int. Cl.² H02K 17/42**
**U.S. Cl. 310—168** **11 Claims**



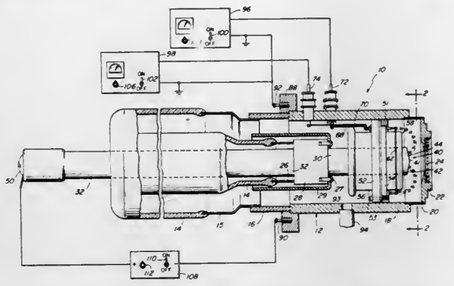
1. A wheel speed sensor assembly for utilization with a vehicle wheel rotatably mounted on an axle, comprising a rotor operatively connected to said wheel for rotation therewith, a magnetic sensing assembly including a housing, a sensor unit operatively positioned in said housing and having magnetic poles exposed at the forward end of the sensor unit facing the rotor, means on the sensor unit adapted to provide a predetermined spacing between the rotor and sensor unit, said housing and sensor unit having frictionally engageable surfaces, a generally U-shaped spring having one arm engaging the housing and the other arm engaging the sensor unit to bias the friction surfaces together, the top surface of the sensor unit is cut away to provide a shoulder adjacent the forward end of the sensor unit, said cutaway portion providing space for said spring, and mounting means operatively securing the magnetic sensing assembly on said axle.

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4,017,757
**MULTI-TARGET X-RAY TUBE**

**Donald F. DeCou, Jr., West Redding, Conn., assignor to The Machlett Laboratories, Incorporated, Stamford, Conn.**

**Filed Jan. 2, 1976, Ser. No. 646,091**
**Int. Cl.² H01J 35/00**
**U.S. Cl. 313—56** **7 Claims**



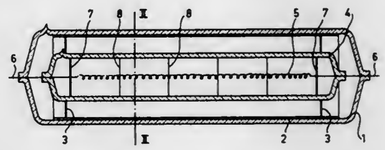
1. A stationary anode X-ray tube comprising:
a tubular envelope having an electrically conductive end portion, said end portion being closed by an X-ray transparent window made of electrically conductive material;
anode means supported within the envelope and including a plurality of stationary targets disposed in axial alignment with the window;
electron emitting means including a plurality of filaments supported within the envelope in radially spaced relationship with the anode means and electrically connected to the window for directing respective electron beams onto the targets, either simultaneously or alternatively; and
electrical means connected to the electron emitting means and to anode means for heating the filaments to electron emitting temperatures and for focusing the electron beams onto the respective targets.

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4,017,758
**INCANDESCENT LAMP WITH INFRARED FILTER**

**Friedrich Hermann Raymund Almer, Eindhoven, Netherlands, and Heiner Kostlin, Aachen-Schleckheim, Germany, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed Mar. 28, 1975, Ser. No. 563,062**
**Claims priority, application Netherlands, Apr. 16, 1974, 7405071**
**Int. Cl.² H01J 61/40**
**U.S. Cl. 313—112** **14 Claims**

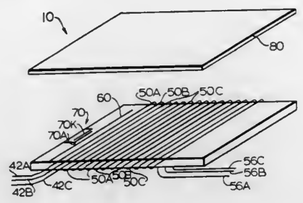


1. An electric incandescent lamp which comprises a filament body, a lamp envelope, a gas filling and a filter which is transparent to visible light and which reflects infrared radiation, said filter, being transparent to visible light and reflecting infrared radiation, comprise an interference filter and a heavily doped metal oxide filter with a plasma wavelength smaller than 1.4μum, which is disposed at the side of said interference filter which is remote from the filament body.

## 4,017,759
## DISPLAY PANEL FOR DISPLAYING A BAR OF LIGHT

**Donald E. Miller, Asbury, N.J., assignor to Burroughs Corporation, Detroit, Mich.**

**Filed July 31, 1975, Ser. No. 600,838**
**Int. Cl.² H01J *17/04*; H05B *37/00***
**U.S. Cl. 313—217** **2 Claims**




1. A display panel comprising

a gas-filled envelope including a base plate and a face plate hermetically sealed together with a gas-filled space between them,

said base plate having a top surface inside said envelope an anode electrode,

a first continuous wire wound about said base plate with portions thereof positioned adjacent to the top surface of said base plate and comprising first cathode elements spaced apart from each other in a series,

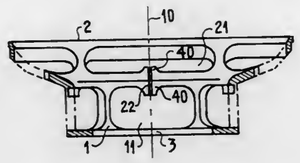
a second wire wound about said base plate, insulated from said first wire, with portions thereof positioned adjacent to the top surface of said base plate and comprising second cathode elements spaced apart from each other in a series, each second cathode element being positioned closely adjacent to a first cathode element, and

a third wire wound about said base plate, with portions thereof positioned adjacent to the top surface of said base plate and comprising third cathode elements spaced apart from each other in a series, each third cathode element being insulated from, and positioned closely adjacent to, a second cathode element.

## 4,017,760
## PARASITIC OSCILLATION SUPPRESSOR FOR ELECTRONIC TUBES

**Michel Benoit, and Pierre Gerlach, both of Paris, France, assignors to Thomson-CSF, Paris, France**

**Filed Jan. 9, 1976, Ser. No. 647,768**
**Claims priority, application France, Jan. 14, 1975, 75.00991**
**Int. Cl.² H01J *7/46*, *19/80***
**U.S. Cl. 315—39** **16 Claims**

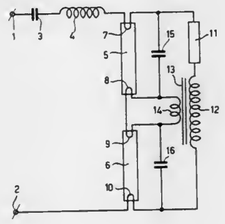



1. A device for suppressing parasitic oscillations in an electronic tube having a coaxial structure, comprising a component made of a material which is electrically conductive in the frequency range of said parasitic oscillations and substantially in the form of a cylinder with a flange, said component carrying a plurality of resonance circuits each of RLC type and incorporating at least one inductance constituted by an opening in said component coupled to at least one capacitor constituted by a slot in said component, said resonant circuits being tuned to the frequency range of said parasitic oscillations, the surface of said flange and the angle said flange makes with the surface of said cylinder being such that the impedance variation produced in the tube by said component is minimised.

## 4,017,761
## ELECTRIC DEVICE FOR STARTING AND SUPPLYING A GAS-AND/OR VAPOR DISCHARGE LAMP

**Leonard Woldring, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Nov. 25, 1975, Ser. No. 635,054**
**Claims priority, application Netherlands, Dec. 5, 1974, 7415839**
**Int. Cl.² H05B *41/23***
**U.S. Cl. 315—99** **13 Claims**




1. An electric device for starting and operating at least one electric discharge lamp comprising, two input terminals adapted for connection to an a.c voltage source, means connecting a series circuit incuding at least two coils and a capacitor across said input terminals so that in the operating condition of the device the capacitor and one of the coils are connected in series with the lamp and the second coil is in parallel with the lamp, the second coil being chosen so that with the AC voltage applied to the device but with the lamp not yet started said second coil becomes saturated, a resonant condition occuring at said saturation so that the voltage across the non-started lamp exceeds the voltage of the a.c. voltage source and ignites the lamp, the second coil on starting of the lamp being brought out of saturation and consequently assuming an impedance value which exceeds the resistance of the started lamp, characterized in that the second coil has a B-H magnetisation curve such that for an increasing H the ratio B/H drops to its 50% value at an instantaneous current $i$ through the second coil which satisfies the expression:

$$0.5 \cdot \frac{Eb}{2fL} < i < \frac{Eb}{2fL}$$

where:

H is the magnetic field strength within the second coil;

B is the magnetic induction within the second coil;

$i$ is the instantaneous electric current through the second coil (in Amperes);

E$b$ is the r.m.s. voltage across the started lamp (in Volts);

$f$ is the frequency of the a.c. supply voltage (in Herz); and

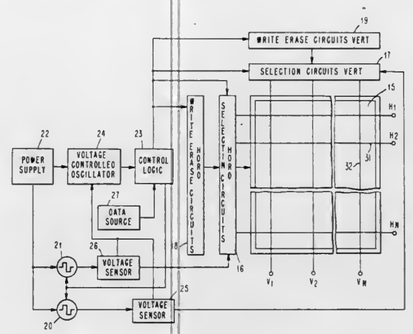
$L$ is the average self-induction of the second coil in its unsaturated condition.



## 4,017,762
## VOLTAGE CONTROLLED SUSTAIN FREQUENCY IN A GAS DISPLAY PANEL

**Tony Nick Criscimagna, Woodstock, and Michael J. Steinmetz, Hurley, both of N.Y., assignors to IBM Corporation, Armonk, N.Y.**

**Continuation of Ser. No. 529,309, Dec. 4, 1974, abandoned.**
**This application Mar. 30, 1976, Ser. No. 671,765**
**Int. Cl.² H05B *43/00*, *41/00*, *41/30***
**U.S. Cl. 315—169 TV** **3 Claims**




1. In a gas display panel comprising a plurality of light emitting cells formed at crossover points of two orthogonal sets of conductors and means comprising a sustain voltage generator for each of said two sets of conductors for applying an alternating polarity sustain voltage of predetermined amplitude and frequency between said two sets of conductors to sustain an ionized condition in said cells, said sustain voltage having operable values of amplitude between a minimum amplitude to sustain a previously ionized cell and a maximum amplitude to not ionize a previously erased cell, said minimum and maximum values having a predetermined approximately linear, positive, relationship to frequency of the sustain voltage, wherein the improvement comprises,

a voltage controlled oscillator and means connecting said oscillator to said means for applying said sustain voltage to establish the frequency of said sustain voltage,

means for deriving a voltage representative of said sustain voltage amplitude, and

means for changing the controlling voltage of said voltage controlled oscillator in response to said voltage that is representative of said sustain voltage amplitude to change the frequency of the sustain voltage according to said relationship of said minimum and maximum sustain amplitude values to sustain voltage frequency in the event that the amplitude of said sustain voltage drifts.

## 4,017,763
## DEVICE FOR TRIGGERING THE DISCHARGE OF FLASH TUBES

**Andre Schermesser, Kremlin Bicetre, France, assignor to Compagnie Generale d'Electricite, Paris Cedex, France**

**Filed Nov. 25, 1975, Ser. No. 635,014**
**Claims priority, application France, Nov. 29, 1974, 74.39197**
**Int. Cl.² H05B *41/32***
**U.S. Cl. 315—240** **1 Claim**

1. Device for triggering the discharge of flash tubes and comprising:

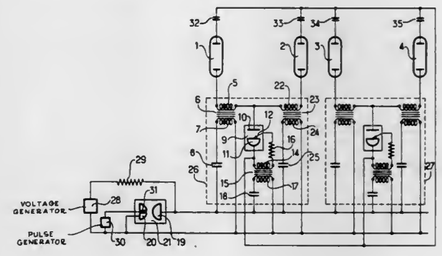
at least a switch comprising two main electrodes and an auxiliary electrode for controlling its electrical conduction;

a control transformer for controlling the switch, one end of the primary winding of the control transformer being connected to a plate of a control capacitor, the ends of the secondary winding of the control transformer being connected respectively to one main electrode and to said auxiliary electrode, means for charging said control capacitor and for discharging it in the primary winding of the control transformer so that the current induced in its secondary winding by the discharge is sufficient to make said switch conductive;

at least one starting transformer, one end of the primary winding of the starting transformer being connected to a plate of a starting capacitor, one end of the secondary winding of the starting transformer being connected to an electrode of one of said flash tubes, said switch being connected by its main electrodes in series with the secondary winding of the starting transformer;

a storage capacitor whose plates are connected respectively to the ends of the branch circuit in which are arranged in series said flash tube, the secondary winding of said starting transformer and said switch;

means for electrically charging said storage capacitor at a first predetermined voltage;




means for charging said starting capacitor and for discharging it into the primary winding of said starting transformer so that the voltage induced in its secondary winding by the discharge is sufficient for starting the discharge of said storage capacitor into said tube, said switch being conductive; and

wherein the means for electrically charging and discharging respectively said control and starting capacitors comprise:

a spark gap provided with two electrodes, means for setting up a second predetermined voltage between the two electrodes, the other end of the primary winding of said starting transformer and the other plate of said starting capacitor being connected respectively to the two electrodes of the spark-gap, the other end of the primary winding of said control transformer and the other plate of said control capacitor being connected respectively to the two electrodes of the spark-gap; and

means for causing an electric discharge between the two electrodes of said spark-gap, the electrodes being charged to said second predetermined voltage.

## 4,017,764
## ELECTRODELESS FLUORESCENT LAMP HAVING A RADIO FREQUENCY GAS DISCHARGE EXCITED BY A CLOSED LOOP MAGNETIC CORE

**John M. Anderson, Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.**

**Continuation-in-part of Ser. No. 542,374, Jan. 20, 1975, abandoned. This application Dec. 18, 1975, Ser. No. 642,142**
**Int. Cl.² H05B *41/24***
**U.S. Cl. 315—248** **51 Claims**

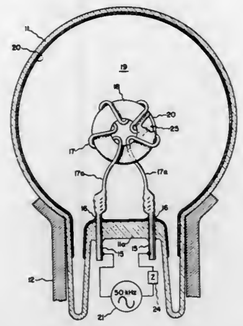
1. An improved fluorescent lamp comprising:

an evacuable, light-transmissive envelope having a substantially globular upper shell;

a closed loop magnetic core contained within said envelope;

means for energizing said core with a radio frequency magnetic field;

a gaseous medium within said envelope adapted to sustain an electric discharge due to an electric field induced therein by said magnetic core and to emit radiation at a first wavelength when sustaining said discharge; and



a luminescent phosphor at least on the interior of said envelope adapted to emit visible light when excited by said first wavelength radiation.

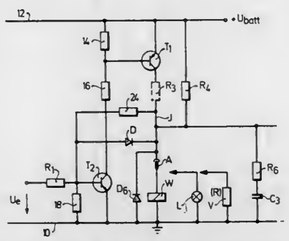
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**4,017,765**

## SHORT CIRCUIT PROTECTED ELECTRONIC CONTROL SYSTEM

**Wolfgang Maisch, Ville d'Avray, France, assignor to Robert Bosch G.m.b.H., Stuttgart, Germany**

**Filed Jan. 28, 1976, Ser. No. 653,280**
**Claims priority, application Germany, Apr. 15, 1975, 2516347**
**Int. Cl.² H02H** *3/24*
**U.S. Cl. 361—88** **16 Claims**



**1.** Short circuit protected electronic control system to protect a power transistor ($T_1$) against short circuit in a load (W, L, V) connected in series with the emitter-collector path of the power transistor, in which the series circuit formed by the emitter-collector path of the power transistor ($T_1$) and the load (W, L, V) is essentially directly connected across a power source (**10, 12; P,** $U_{batt}$) to permit application of essentially full source voltage to the load upon conduction of the transistor,

said system having a driver transistor ($T_2$), the emitter-collector path of which is connected to the base of the power transistor ($T_1$) to control conduction thereof, said system further comprising

a resistor ($R_4$) connected in shunt with the emitter-collector path of the power transistor ($T_1$) and having one terminal thereof connected to the junction (J) of the emitter-collector path of the power transistor ($T_1$) and the load (W, L, V);

and a diode (D) connected between said junction (J) and the base of the driver transistor and poled to block the voltage of the junction (J) from the base of the driver transistor ($T_2$), the voltage at said junction, under normal operating conditions, being determined by the relative internal resistance of the power transistor ($T_1$) and the resistance of the load and being blocked by said diode so that, under normal conditions, the operation of the circuit is unaffected by the presence of the diode (D) while, under short circuit conditions of the load (W, L, V), the diode becomes conductive and effectively short-circuits the base of the driver transistor ($T_2$) to cause the driver transistor to block and control the power transistor, likewise, to block and thus prevent damage to the power transistor ($T_1$) upon short circuit arising in the load.

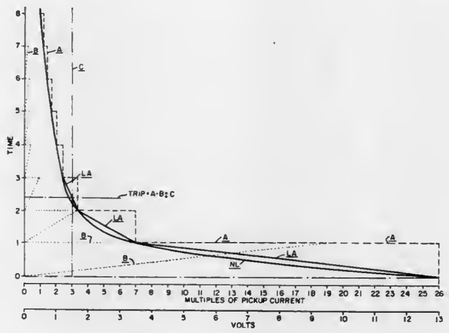
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**4,017,766**

## INVERSE TIME-OVERCURRENT RELAY USING SUCCESSIVE LINEAR APPROXIMATIONS

**Leonard C. Vercellotti, Verona, and Shan C. Sun, Pittsburgh, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed Aug. 4, 1975, Ser. No. 601,898**
**Int. Cl.² H01H** *47/18*
**U.S. Cl. 361—83** **15 Claims**




**1.** An inverse time-overcurrent relay for controlling an electric circuit, said relay comprising: input means adapted to be energized from said circuit for providing a first output quantity having a magnitude which is a function of the magnitude of the current in the electric circuit, a quantity magnitude comparing network having first and second inputs and an output, first circuit means operatively connecting said first input to said input means whereby said first input of said comparing network is energized by said first output quantity, a quantity magnitude generating means effective to alter the magnitude of a second output quantity in accordance with a predetermined pattern, said pattern comprising slope controlling means effective to change the magnitude of said second quantity at a different time rate, sequencing means connected to said generating means and effective to cause said generating means to progressively generate said rates in a sequence in which the magnitude of said second quantity progresses from a first to a second magnitude, second circuit means connecting said second input of said comparing network to said generating means for energizations by said second output quantity, said comparing network being effected to alter the conditions of its said output when the relative magnitudes of said quantities supplied to its said inputs reaches a desired relationship, and control means energized from said input means and effective when the magnitude of the current in said electric circuit reaches a predetermined minimum magnitude to render said generating means effective.

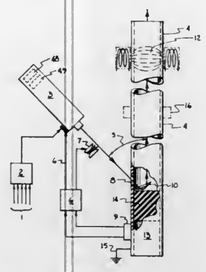


**4,017,767**

## LASER LIGHTNING ROD SYSTEM

**Leonard M. Ball, Rte. 4, Box 319-U, Eugene, Oreg. 97405**

**Filed Dec. 10, 1973, Ser. No. 423,239**
**Int. Cl.² H02H** *3/22*
**U.S. Cl. 361—117** **9 Claims**



**1.** A method of establishing an ionized conductive path of substantial length through air and thereby predetermining the course of a stepped leader and resultant lightning channel, such method comprising:

a. mode locking a laser;

b. determining the probable presence of a stepped leader and activating said mode-locked laser to produce a laser beam composed of clusters of photons before said lightning channel is established;

c. passing the beam produced from said mode-locked laser through said air and establishing by multi-photon ionization an ionization path of sufficient concentration and length to guide said stepped leader toward a predetermined location; and

d. electrically coupling said ionization path to ground.

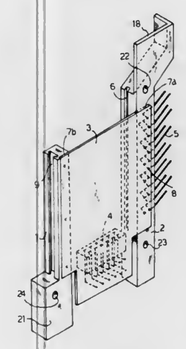
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**4,017,768**

## CONNECTING DEVICE FOR TELECOMMUNICATION CIRCUITS, PARTICULARLY FOR THE SECTIONING THEREOF

**Cesare Valfre, Via Borgosesia 46 bis, Turin, Italy**

**Filed Nov. 7, 1975, Ser. No. 627,031**
**Claims priority, application Italy, Dec. 23, 1974, 70731/74**
**Int. Cl.² H05K** *7/14*
**U.S. Cl. 361—399** **4 Claims**



**1.** A connecting device for telecommunication circuits, more particularly for the sectioning thereof, characterized in that it comprises two parts which may be coupled with each other, of which the first consists of two parallel rods, of different lengths, connected by a substantially rectangular printed circuit provided with a connector, the longer rod having on its outer face input terminals and on the opposed face a groove extending over the greatest part of its length; a face of said rods, parallel with the printed circuit, having a hollow able to house one of two opposed edges of the printed circuit and, on the longer rod, the inner ends of the input terminals; the outer face of the shorter rod having a longitudinal groove with double edge; the second part of the device being formed by a single side rod, externally provided with output terminals and having a hollow able to house an edge of a second, cantilevered printed circuit and the inner ends of the output terminals, one end of the second printed circuit being connected to a connector to which a third printed circuit is joined, said third circuit being kept parallel with the second one and being provided at the opposed end with the contacts able to engage the connector of the said first part, whereas the second and third printed circuits bear the components apt to carry out on the incoming signals the desired processings and treatments.

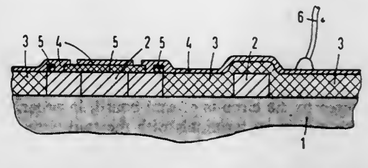
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**4,017,769**

## INTEGRATED CIRCUITS AND METHOD OF PRODUCING THE SAME

**Charlotte Raetzel, Munich, and Jenoë Tihanyi, Neuried, both of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany**

**Filed Feb. 16, 1973, Ser. No. 333,334**
**Claims priority, application Germany, Feb. 17, 1972, 2207510**
**Int. Cl.² H05K** *5/00*
**U.S. Cl. 361—419** **15 Claims**



**1.** An integrated circuit comprising an electrically insulating substrate formed of sapphire or spinel, a plurality of individual areas of a semiconductor layer supported on said substrate, a metallic conductor path supported on said substrate for connecting an external electrode with at least a portion of said semiconductor layer, and an electrically insulating intermediate layer interposed between said substrate and said conductive path and underlying all of the junction between said external electrode and said conductive path, said intermediate layer being disposed immediately on said substrate under said junction and immediately under said conductive path, and formed of $SiO_2$ or $Si_3N_4$.

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**4,017,770**

## CONNECTING DEVICE FOR TELECOMMUNICATION CIRCUITS

**Cesare Valfre, Turin, Italy, assignor to Applicazione Elettrotelefoniche SpA, Turin, Italy**

**Filed Nov. 22, 1974, Ser. No. 526,317**
**Int. Cl.² H02B** *1/02*
**U.S. Cl. 361—399** **6 Claims**

**1.** A connecting device for telecommunication circuits, to allow the transfer of signals from input terminals receiving the signals to be processed to output terminals carrying the processed signals, the said transfer being through circuits suitable to carry out said processing, said connecting device comprising:

a three-sided frame made of insulating material and shaped as a rectangle open in correspondence of one of the minor sides thereof;

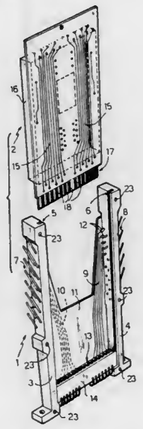
input and respectively output terminals on one outwardly directed face of two opposite sides of said three-sided frame, said terminals having an end portion thereof embedded in the material of said sides and ending on the inner face thereof;

guiding grooves on the said inner face of the opposite sides of said three-sided frame;

a movable board, having edges engaging said grooves and having shape and size such as to be coincident with the shape and size of the frame concavity;

printed circuits on the faces of said board, for connecting electrical components for processing said input signals;

input and output connectors connected to said input and output terminals respectively;



conjugate connectors carried by said board and cooperating with said input and output connectors and electrically connected to the circuits of said board, in order to connect the said input terminals with the said output terminals through the said processing circuits;

said two opposite sides of said frame are connected by a fixed board provided with a connector and with printed leads which have one end connected to contacts in the connector and the other end connected to the input or respectively output terminals, the said fixed board being parallel to the said movable board.

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**4,017,771**

**SAFEGUARDED SWITCHING DEVICE**

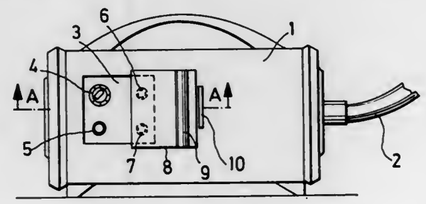
**Ludwig G. Baumann, Im Reckholder, 9527 Niederhelfenschwil, Switzerland**

**Filed July 21, 1975, Ser. No. 597,351**

**Claims priority, application Germany, Oct. 19, 1974, 2449745**

**Int. Cl.² H01H** *3/20*

**U.S. Cl. 361—357** **5 Claims**



**2.** A safeguarded switching device, as claimed in claim **1**, in which said motor master switch is a normally open switch.

**4,017,772**

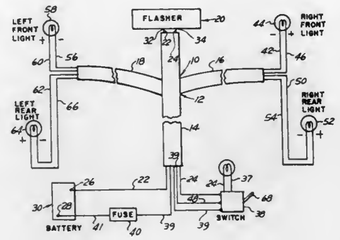
**TURN SIGNAL WIRING REPLACEMENT HARNESS**

**Ernest Burnside, 3843 Rohns, Detroit, Mich. 48214**

**Filed May 22, 1975, Ser. No. 580,012**

**Int. Cl.² H02B** *1/20*; **B60Q** *1/46*

**U.S. Cl. 361—428** **1 Claim**




**1.** A motor vehicle turn signal wiring replacement harness adapted to be owner-installed between the right and left front and rear turn signal lights and the two terminals of the vehicle storage battery and the conventional turn signal operating switch already present in the vehicle, said harness comprising

an approximately cruciform electrical wiring conduit of flexible material having a main conduit portion and right and left branch conduit portions stemming from said main conduit portion near one end thereof.

a flasher disposed at one end of said main conduit portion and having terminals,

a first main conduit wire disposed in said main conduit portion and connected at one end to one terminal of said flasher and adapted to be connected at its other end to one terminal of the vehicle storage battery,

a second main conduit wire disposed in said main conduit portion and connected at one end to the other terminal of said flasher and at its other end to one side of said signal operating switch,

a third main conduit wire disposed in said main conduit and connected at one end to said one side of said operating switch,

a pair of right front turn signal light energizing wires and a pair of right rear turn signal light energizing wires adapted to be connected respectively to the right front turn signal light and right rear turn signal light of the vehicle,

a pair of left front turn signal light energizing wires and a pair of left rear turn signal light energizing wires adapted to be connected respectively to the left front and left rear turn signal lights of the vehicle,

one of said turn signal light energizing wires of each of said pairs being connected at one of the ends thereof to said second main conduit wire and the other of said turn signal light energizing wires of each of said pairs being connected at one of the ends thereof to the other end of said third main conduit wire,

and a fourth main conduit wire disposed in said main conduit and connected at one end to the other side of said operating switch and adapted to be connected at its other end to the other terminal of the vehicle storage battery,

said pairs of said energization wires for said right front and rear turn signal lights being disposed within said right branch conduit portion, and said pairs of said energization wires for said left front and rear turn signal lights being disposed within said left branch conduit portion.



**4,017,773**

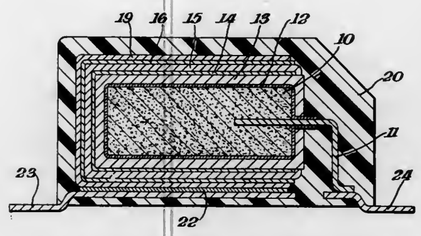
**SOLID VALVE-METAL CAPACITOR WITH BURIED GRAPHITE IN THE PARTICLES IN THE ELECTROLYTE**

**David M. Cheseldine, Bennington, Vt., assignor to Sprague Electric Company, North Adams, Mass.**

**Filed May 27, 1975, Ser. No. 581,192**

**Int. Cl.² H01G** *9/00, 9/16*; **B01J** *17/00*

**U.S. Cl. 361—433** **8 Claims**



**1.** In a solid electrolytic capacitor including a porous valve-metal body, an oxide film of said valve-metal covering the surfaces of said body, a solid electrolyte coating of manganese dioxide overlying said oxide film, an outer layer of graphite lying over the outer surface of said manganese dioxide coating, and a conductive counterelectrode overlying said outer layer of graphite, the improvement comprising at least one buried layer of graphite that is buried within said manganese dioxide coating, defined at least one sandwiched layer portion of said manganese dioxide coating between adjacent of said graphite layers, said sandwiched portion containing particles of graphite that provide a low electrical impedance between said adjacent graphite layers.

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**4,017,774**

**BOTTLE LABELING SYSTEM**

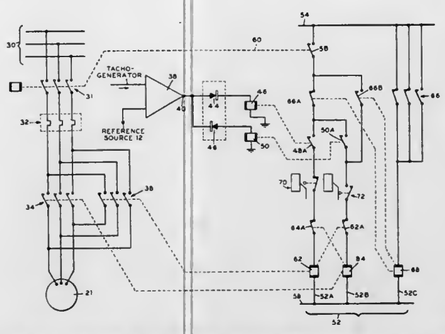
**Rainer Buchholz, Dusseldorf-Gerresheim, Germany, assignor to Jagenberg Werke AG, Dusseldorf, Germany**

**Continuation-in-part of Ser. No. 347,955, April 1, 1973, abandoned. This application May 30, 1975, Ser. No. 582,535**

**Claims priority, application Germany, Apr. 29, 1972, 2221199**

**Int. Cl.² H02P** *5/46*

**U.S. Cl. 318—39** **3 Claims**




**1.** An apparatus for labelling containers comprising a first transport for driving said containers to and from a labelling station, and a second transport placing labels on said containers, each of said first and second transports independently motor controlled, a first motor for controlling said first transport and a second motor for controlling said second transport, a third motor for adjusting the speed of said first motor and a fourth motor for adjusting the speed of said second motor, means for deriving a signal having a magnitude representing the speed of said first transport, means for deriving a signal having a magnitude representing the speed of said second transport, a reference source, means for comparing said reference source against each of said signal levels to determine deviation of each said transport speed from said reference source, a line for controlling the speed of said third motor in response to a deviation between the magnitude of the signal representative of the speed of said first transport and said reference signal, and a line for controlling the speed of said fourth motor in response to a deviation between the magnitude of the signal representative of the speed of said second transport and said reference signal, each of said control lines for the third and fourth motor speeds including switching means responsive to said deviation for energizing a contact for applying power to said third and fourth motors in respectively opposite directions.

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**4,017,775**

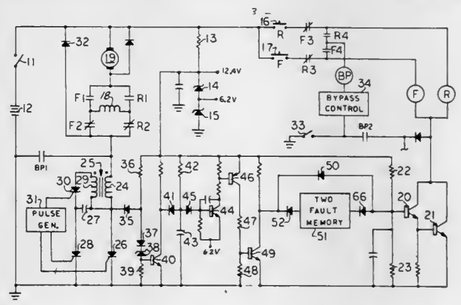
**FAULT DETECTOR CIRCUIT WITH TWO-FAULT MEMORY**

**Robert W. Artrip, Northfield, Ohio, assignor to Cleveland Machine Controls, Inc., Cleveland, Ohio**

**Filed Oct. 28, 1975, Ser. No. 626,502**

**Int. Cl.² H02P** *3/08*

**U.S. Cl. 318—139** **4 Claims**




**1.** Means for disabling an electrical drive system including an electric motor and power switching means for coupling said motor across a source of electrical energy, comprising:

a. sensing means coupled to the power switching means for producing a fault signal in response to each persistence of conductivity of said power switching means beyond a predetermined period of time;

b. first disable means for producing a disable signal in response to and only during the presence of each fault signal;

c. second disable means independent of said first disable means and including a counter operable by said fault signals for producing a continuous disable signal in response to and after the presence of a predetermined number of fault signals greater than one;

d. means independently responsive to said first and second disable means and for interrupting the flow of power to said motor from said source in response to and during the presence of either of said disable signals from said first and second disable means.

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**4,017,776**

**REVERSIBLE SHADED POLE MOTOR AND CONTROL ARRANGEMENT THEREFOR**

**Josef Fiegel, Landshut, Germany, assignor to International Standard Electric Corporation, New York, N.Y.**

**Filed Dec. 11, 1975, Ser. No. 639,914**

**Int. Cl.² H02P** *1/40*

**U.S. Cl. 318—208** **7 Claims**

**1.** A reversible, salient-pole, AC motor of the shaded-pole type, having a squirrel-cage rotor and comprising:

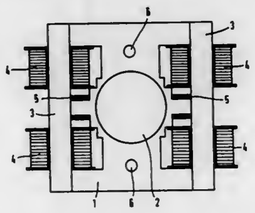
a magnetic circuit symmetrical about two mutually orthogo-

nal axes in a plane normal to the shaft of said rotor, said magnetic circuit including a lamination stack of geometrically regular outer perimeter with four equal and like-shaped windows, one of said windows being in each quadrant of said plane, said lamination stack having a centrally located opening through which said rotor is rotationally installed;

a pair of salient main magnetic poles formed by said lamination stack, said main poles of said main pair being diametrically opposite abutting said central opening;

a pair of salient auxiliary magnetic poles formed by said lamination stack, said auxiliary poles of said auxiliary pair being diametrically opposed abutting said central opening, said auxiliary poles being orthogonally oriented in said plane with respect to said main poles;

shading rings placed about at least one of said salient auxiliary poles adjacent said central opening;



an arrangement of a plurality of electromagnet coils separately magnetically coupling to four discrete portions of said magnetic circuit, said discrete portions being between said outer perimeter of said stack and said windows;

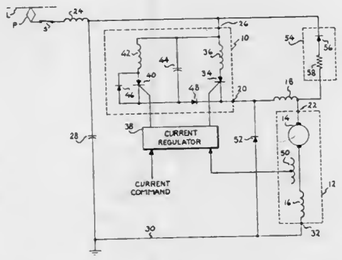
and a control circuit for energizing a first fraction of said electromagnet coils in a first predetermined relationship with respect to said magnetic circuit directly from the power mains and for energizing a second fraction of said electromagnet coils from said power mains through at least one series resistance, for causing rotation of said rotor in a first direction, said control circuit being controllable to alternatively energize said second fraction of said electromagnet coils directly from said power mains and said first fraction of said electromagnet coils from said mains through said series resistance to produce rotation of said rotor in the reverse direction.

**4,017,777**

## LOAD VOLTAGE CLAMPING CIRCUIT FOR VOLTAGE TURN-OFF CHOPPER

**Ronald Barry Bailey, Erie, Pa., assignor to General Electric Company, Erie, Pa.**

**Filed Dec. 22, 1975, Ser. No. 643,268**
**Int. Cl.² H02P** *9/10*
**U.S. Cl. 318—342** **4 Claims**




1. An electric motor power control system comprising:

a. first and second source terminals adapted for connection to a source of direct current power;

b. a direct current electric traction motor having first and second motor terminals and including an armature winding and a field winding serially connected between said motor terminals;

c. a voltage turn-off chopper circuit including a main thyristor and a commutation circuit and having first and second power terminals and first and second gating terminals, said chopper circuit being responsive to a gating signal applied to said first gating terminal to provide a current path between said first and second power terminals and being responsive to a gating signal applied to said second gating terminal for actuating said commutation circuit to extinguish said current path;

d. a motor current smoothing reactor;

e. a voltage clamping circuit;

f. means connecting said first motor terminal to said first source terminal;

g. means connecting said first power terminal of said chopper circuit to said second source terminal;

h. means serially connecting said smoothing reactor between said second power terminal of said chopper circuit and said second motor terminal; and

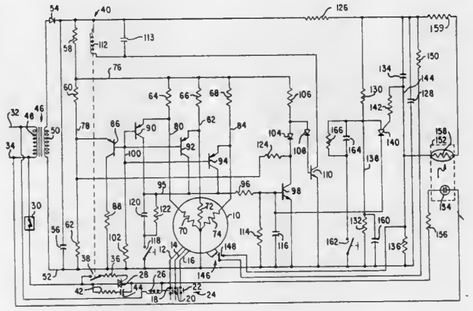
i. means serially connecting said clamping circuit between said second motor terminal and said second source terminal whereby commutation voltages produced by said chopper circuit and exceeding the magnitude of voltage at said second source terminal are dropped across said smoothing reactor.

**4,017,778**

## MOTOR PROTECTION CIRCUIT

**Erich O. Koch, King of Prussia, Pa., assignor to Robertshaw Controls Company, Richmond, Va.**

**Filed Sept. 6, 1974, Ser. No. 503,813**
**Int. Cl.² H02H** *5/04*
**U.S. Cl. 318—473** **15 Claims**



1. A motor protection circuit comprising

motor power switch means,

motor heat sensing means for terminating operation of the motor power switch means in response to an overheated condition,

unipolarity voltage means,

a first capacitance,

a first resistance,

said first capacitance and said first resistance connected in a series timing circuit across the unipolarity voltage means,

means including a voltage responsive semiconductor device responsive to a predetermined charge on the first capacitance for terminating operation of the motor power switch means,

lubricating fluid pressure responsive switch means connected to the timing circuit for preventing the charging of the first capacitance,

a series reset circuit including a second capacitance and a normally open reset switch means connected to the voltage responsive semiconductor device, and



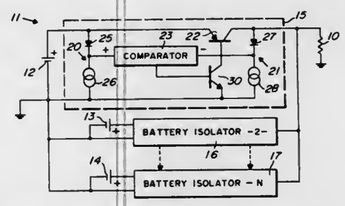
means including a second resistance connected across the second capacitance to bias the second capacitance to a predetermined condition sufficient to temporarily disable the means for terminating the operation of the motor power switch means when the reset switch means is closed but insufficient to maintain the disablement of the means for terminating operation of the motor power switch means when the reset switch means is held closed.

**4,017,779**

## BATTERY ISOLATOR

**James Anthony McDonald, Buffalo Grove, and Ralph Arthur Schatz, Chicago, both of Ill., assignors to Motorola, Inc., Schaumburg, Ill.**

**Filed Mar. 22, 1976, Ser. No. 668,756**
**Int. Cl.² H02J** *7/00, 3/32*
**U.S. Cl. 320—15** **10 Claims**




1. A battery isolator adapted to connect the terminals of a battery to a load and isolate the battery from other power sources connected to the load in parallel with the battery and providing a voltage across the load, said isolator comprising:

a. a semiconductor device having first, second and control electrodes with the first and second electrodes adapted to be connected in series with the battery and the load, and providing an offset voltage between the first and second electrodes dependent upon the amount of drive current supplied to the control electrode;

b. electronic circuit means connected to the control electrode of said semiconductor device and adapted to be coupled to the load and the terminals of the battery for sensing the amplitude of the voltage across the load and the amplitude of the voltage across the battery and for supplying drive current to said semiconductor device to tend to maintain said semiconductor device operating with a predetermined offset voltage thereacross as long as the battery supplies a voltage above the voltage across the load plus the predetermined offset voltage and for causing said semiconductor device to cease conducting when the voltage of the battery drops below the voltage across the load plus the predetermined offset voltage.

10. A method of isolating a battery from a load and other batteries each connected in parallel therein and supplying a voltage to the load, comprising the steps of:

a. connecting a series pass transistor in series with the battery to be isolated and the load;

b. comprising the voltage of the battery to be isolated with the voltage across the load plus a predetermined offset voltage across the series pass transistor; and

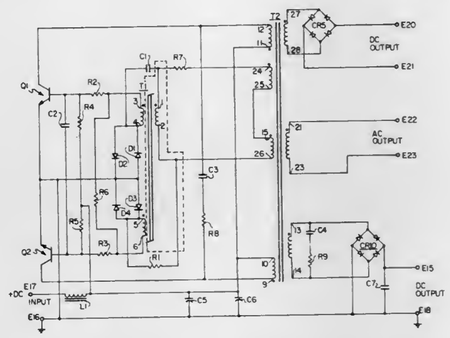
c. stopping conduction of the series pass transistor when the voltage of the battery is less than the voltage across the load plus the predetermined offset voltage.

**4,017,780**

## DYNAMIC TEMPERATURE COMPENSATING CIRCUIT FOR POWER TRANSISTOR CONVERTERS

**Philip M. Cowett, Jr., Olney, Md., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Dec. 16, 1975, Ser. No. 641,312**
**Int. Cl.² H02M** *3/335*
**U.S. Cl. 321—2** **13 Claims**




1. A dynamic temperature compensating circuit for biasing the bases of first and second transistors connected in common emitter configuration, having collector-emitter paths of the two transistors connected together in a current loop, comprising:

a transformer having a primary coil connected to an input alternating current source, a first secondary coil having a first side connected to the base of a first one of said transistors, and a second secondary coil having a first side connected to the base of a second one of said transistors, with said primary and first and second secondary coils being poled in the same direction;

a first and a second resistor having a common first node connected to a first D.C. potential, said first resistor being connected between said first node and either side of said first secondary coil and said second resistor being connected between said first node and either side of said second secondary coil;

a first and second diodes connected in parallel and oppositely poled between the second side of said first secondary coil and a second node connected to the common emitters of said transistors;

a third and fourth diodes connected in parallel and oppositely poled between the second side of said second secondary coil and said second node;

a capacitor connected between said second side of said first secondary coil and a first side of said primary coil;

a resistance connected between said second side of said second secondary coil and the second side of said primary coil;

said second diode poled in the same direction as the base-to-emitter junction of said first transistor, forward biasing said first transistor by the diode forward bias potential, when said transformer saturates and said first transistor has been in its off-state, so as to promote instantaneous conduction by said first transistor thereby avoiding cross-over distortion;

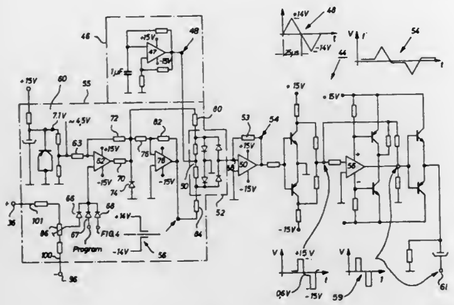
said diode forward bias potential of said second diode maintaining equality with the base-to-emitter forward bias potential of said first transistor over a range of temperatures;

whereby the output characteristics of said current loop are compensated for temperature fluctuations.

## 4,017,781
## D.C. VOLTAGE CONVERTER

**Peter Müller, Moosinning, Germany, assignor to Garching Instrumente Gesellschaft zur industriellen Nutzung von Forschungsergebnissen m.b.H., Garching, Germany**

**Filed July 30, 1975, Ser. No. 600,520**
**Int. Cl.² H02P** *13/22*
**U.S. Cl. 321—2** **7 Claims**

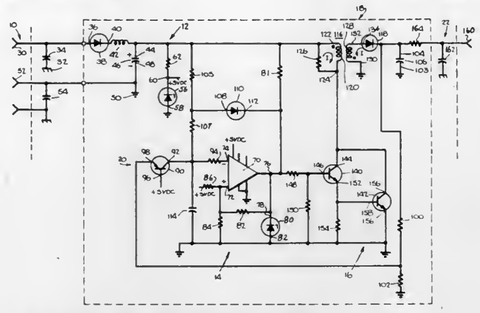


1. A D.C. to D.C. voltage converter for producing a regulated, adjustable D.C. output voltage from an unregulated D.C. input voltage, which comprises:
- an inverter means for producing alternating rectangular output pulses from the unregulated D.C. input voltage wherein the timing and duration of said inverter output pulses are determined by alternating rectangular control pulses;
- rectifier means for producing said regulated D.C. output voltage from said inverter output pulses; and
- control pulse generating means for producing said control pulses wherein the duration of said control pulses is determined by said regulated D.C. output voltage to stabilize same,
- characterized in that said control pulse generating means includes:
  - means for generating a D.C. reference voltage;
  - first operational amplifier means, having an inverting input, a non-inverting input, and an output, for comparing at least a portion of said regulated D.C. output voltage with said reference voltage to produce an error voltage.
  - means for producing a positive and a negative threshold voltage, each proportional to said error voltage;
- oscillator means for generating an alternating, triangular wave voltage;
  - a first threshold circuit means for combining said triangular wave voltage with said positive threshold voltage to produce positive signal pulses corresponding to positive portions of said triangular wave exceeding said positive threshold voltage;
  - a second threshold circuit means for combining said triangular wave voltage with said negative threshold voltage to produce negative signal pulses corresponding to negative portions of said triangular wave exceeding said negative threshold voltage;
  - means for combining said positive and negative signal pulses to produce alternating triangular signal pulses; and
  - pulse forming means for converting said alternating triangular signal pulses into said alternating rectangular control pulses.

## 4,017,782
## DC-DC CONVERTER

**Bruce C. Wheeler, Colchester, Vt., assignor to General Electric Company, Burlington, Vt.**

**Filed Nov. 7, 1975, Ser. No. 630,551**
**Int. Cl.² H02M** *3/335*
**U.S. Cl. 321—2** **6 Claims**



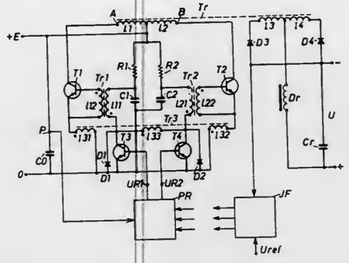
1. A DC to DC converter comprising:
- a relatively low voltage, direct current source;
- first inductor means and second inductor means, mutually magnetically coupled;
- rectifier means;
- energy storage means;
- switching means having a conductive state and a nonconductive state;
- oscillator means having an output on-state and an output off-state, the duration of said off-state being substantially constant, the duration of said on-state being inversely responsive to a control voltage, and said oscillator means being coupled to said current source to receive such a control voltage therefrom so that the duration of said output on state is an inverse function of the voltage level of said current source;
- oscillator control means;
- said current source, said first inductor means and said switching means being coupled in an input current series loop;
- said second inductor means, said rectifier means and said energy storage means being coupled in an output current series loop;
- said oscillator means being coupled to said switching means, and when in said output on-state causing said switching means to be in its conductive state, and when in its output off-state causing said switching means to be in its nonconductive state.
- said oscillator control means being coupled to and between said energy storage means and said oscillator means to provide a signal to said oscillator means to progressively reduce said duration of said output on-state to substantially zero in response to the voltage level of said storage means progressively reaching a preset value;
- said rectifier means and said second inductor means being of such polarity and winding orientation respectively with respect to the winding orientation of said first inductor means, that when said switching means is in its on-state, said rectifier means is not conducting and said second inductor means is open circuited and, therefore, said first inductor means stores energy in its magnetic field, and when said switching means is in its off-state, said first inductor means is open circuited, said rectifier means is conducting and said second inductor means extracts energy from said magnetic field,



## 4,017,783
## POWER TRANSISTOR DRIVE APPARATUS IN A DC-CONVERTER

**Bengt Holger Assow, and Kjell Ove Rolleberg, both of Norsborg, Sweden, assignors to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden**

**Filed May 5, 1976, Ser. No. 683,681**
**Claims priority, application Sweden, May 22, 1975, 7505828**
**Int. Cl.² H02M** *3/335*
**U.S. Cl. 321—2** **4 Claims**



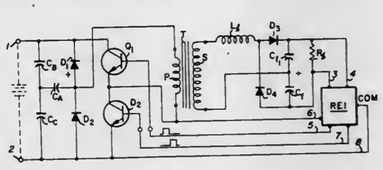
1. Power transistor drive apparatus in a DC-converter, said converter having first and second terminals for respective connection to the terminals of a DC supply voltage, a main transformer means, rectifying means and filtering means, said power transistors being alternately conducting and each having a main current circuit connected to said main transformer means and a control current circuit, comprising
- a first and a second drive transistor,
- a first and a second drive transformer each consisting of a primary winding connected to one of said terminals via one of said drive transistors and at least one secondary winding connected to the control current circuit of said power transistors,
- a further transformer consisting of a first and a second winding connected to said main current circuit of each of the power transistors, an a third winding connected to one of the primary windings of said first and second drive transformers for transferring, via said first winding and one of said drive transformers, a current proportional to the current through the main current circuit of one of said power transistors to the control circuit of the same transistor and, at the same time, for creating a voltage drop across
- said secondary winding which counteracts conducting of the non-conducting power transistor, and
- a first and a second capacitor connected to the primary winding of said first and second drive transformer and to one of said terminals, said capacitors each being charged via the third winding of said further transformer when the associated power transistor is conducting and being discharged when the same transistor is non-conducting, whereby the capacitor voltage provides further blocking of the transistor.

## 4,017,784
## DC TO DC CONVERTER

**David Harry Simmons, Palo Alto, and Paul Calvin Launderville, Redwood City, both of Calif., assignors to Litton Systems, Inc., San Carlos, Calif.**

**Filed May 17, 1976, Ser. No. 686,797**
**Int. Cl.² H02M** *3/335*
**U.S. Cl. 321—2** **5 Claims**

1. In a DC to DC converter the combination including:
- a transformer means, said transformer means including: a primary winding, and a secondary winding, said secondary winding being loosely coupled to said primary to provide a predetermined effective leakage inductance with respect to said primary winding;
- rectifier means connected to said secondary winding for supplying a rectified output;
- filter capacitor means coupled to the output of said rectifier means for smoothing said rectified voltage;
- means for connecting an electrical load across said filter capacitor means;
- second capacitor means, said second capacitor means connected in series circuit with said primary winding;
- input means for receiving a DC voltage for conversion to a different DC voltage;
- electronic switching means for periodically and alternately charging said second capacitor means in a first direction over a first interval of time T followed by charging said second capacitor means in a second opposite direction over a second interval of time T in a current path including said primary winding, said charging current derived

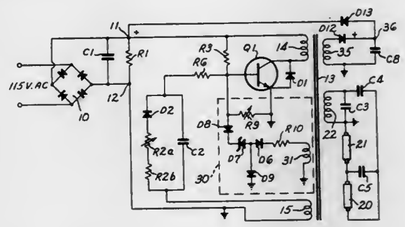


from a DC voltage at said input means, said second capacitor means being sized relative to said leakage inductance of said transformer and to the impedance characteristics of said electrical load and said filter capacitor means for causing said current in said current path to have the waveform essentially of half sinusoids over a portion of each time interval;
- clamping diode means coupled to said second capacitor means for limiting the level of voltage across said second capacitor means to below the level applied across said input means;
- and regulating means coupled to said switching means for regulating said interval of time, T, or said periodicity as a function of voltage level monitored across said filter capacitor means for maintaining said voltage across said filter capacitor means at a constant level irrespective of the voltage variation at said input means.

## 4,017,785
## POWER SOURCE FOR FLUORESCENT LAMPS AND THE LIKE

**Lloyd J. Perper, Tucson, Ariz., assignor to Iota Engineering Inc., Tucson, Ariz.**

**Filed Sept. 10, 1975, Ser. No. 611,897**
**Int. Cl.² H02M** *5/458*
**U.S. Cl. 321—4** **6 Claims**



1. In a high frequency power source for a load such as gas discharge lamps, and having an inverter with power supply, oscillator circuit and transformer, said power supply having a first rectifier and filter circuit with ac input terminals and dc output terminals and providing a first dc voltage at said dc terminals, said transformer having primary, secondary and feedback windings, said oscillator circuit including a transistor

having emitter and collector electrodes connected in series with said primary winding across said dc terminals and having the base and one of said electrodes connected across said feedback winding, the improvement comprising:

an output winding on said transformer;

a second rectifier and filter circuit connected across said output winding for developing a second dc voltage from the oscillator output; and

first means for connecting said second dc voltage in circuit with said first dc voltage in aiding relation to supplement the fluctuating first dc voltage thereby reducing the ac line current peaks and the power factor at the ac input terminals.

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**4,017,786**

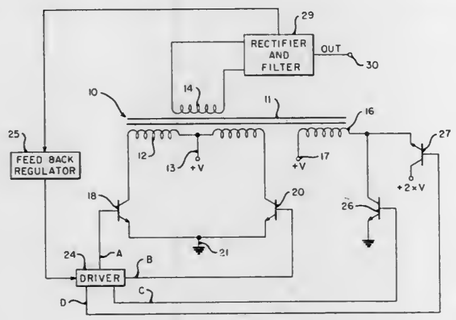
**TRANSFORMER SATURATION CONTROL CIRCUIT FOR A HIGH FREQUENCY SWITCHING POWER SUPPLY**

**Joseph C. Jensen, San Diego, Calif., assignor to NCR Corporation, Dayton, Ohio**

**Filed July 26, 1976, Ser. No. 708,525**

**Int. Cl.² H02M** *7/537*

**U.S. Cl. 321—45 R** **7 Claims**




1. A power supply circuit comprising:

a saturable core transformer, said transformer including a primary winding, a secondary winding for feeding a load and a tertiary winding;

first and second power switching elements for operatively connecting a power source in circuit with the primary winding of said transformer;

drive means for alternately rendering said power switching elements conductive with periods of overlapping non-conductivity therebetween, wherein each of said power switching elements tends to cause saturation in said saturable core transformer in opposite directions;

biasing means operatively connected to said tertiary winding for completing the saturation of said saturable core transformer, in the direction started by a power switching element, during said periods of overlapping non-conductivity.

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**4,017,787**

**SWITCHING REGULATOR HAVING A LOAD RESPONSIVE ALTERNATE BIASING CIRCUIT**

**Hirohito Hara, Fujisawa, and Hironori Shimamura, Yokohama, both of Japan, assignors to Nippon Electronics Memory Industry Co. Ltd., Tokyo, Japan**

**Filed July 9, 1975, Ser. No. 594,603**

**Claims priority, application Japan, Dec. 5, 1974, 49-140153**

**Int. Cl.² H02M** *7/00*

**U.S. Cl. 321—45S** **4 Claims**

1. A switching regulator for driving a load characterized by comprising

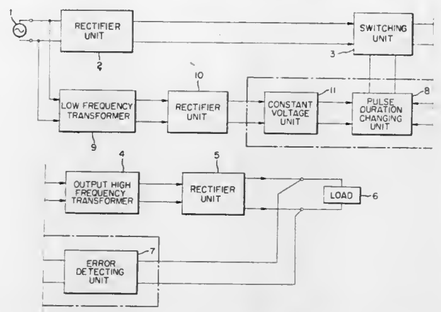
a. a power supply;

b. a pulse converter for converting the input from said power supply into the high frequency pulses;

c. an output unit for stepping up or down the voltage of the output pulses from said pulse converter and rectifying them;

d. an error detecting unit for detecting the variation in output voltage from said output unit;

e. a pulse duration changing unit for changing the pulse duration of the output pulses from said pulse converter in response to the output from said error detecting unit;




f. first biasing means for biasing, during the driving of said load, said pulse duration changing unit with the output from said output unit; and

g. a second biasing means for initially biasing said pulse duration changing unit with the power supplied from said power supply, and means responsive to the driving of said load for blocking the flow of current from said second biasing means to said pulse duration changing unit.

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**4,017,788**

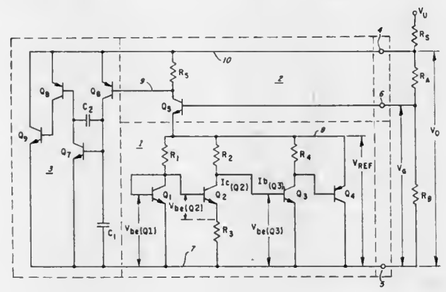
**PROGRAMMABLE SHUNT VOLTAGE REGULATOR CIRCUIT**

**Elvin Duane Stepp, Cincinnati, Ohio, and James Reggie Talley, Dallas, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.**

**Filed Nov. 19, 1975, Ser. No. 633,527**

**Int. Cl.² G05F** *1/58*

**U.S. Cl. 323—8** **9 Claims**



1. A shunt regulator circuit having an output terminal, a sample voltage terminal and a common terminal and comprising:

a. a reference voltage generator means having a pair of transistors driving a third transistor, each with load resistors, said load resistors being so proportioned in resistance value with respect to each other that the combined temperature coefficients of said pair of transistors is equal and opposite the temperature coefficient of said third transistor;

b. an error voltage amplifier means receiving the output of said reference voltage generator means and a voltage



from said sample voltage terminal and producing in response thereto an output indicative of any deviation of the voltage between said output terminal and said common terminal from a predetermined desired value; and

c. an active power amplifier means responsive to the output of said error voltage amplifier means to produce a change in the current through said power amplifier means whereby the voltage between said output terminal and said common terminal remains constant at said predetermined desired value.

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**4,017,789**

**CURRENT OVERLOAD PROTECTION CIRCUIT**

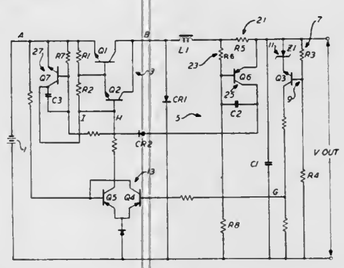
**David Morris, Brooklyn, N.Y., assignor to Litton Business Systems, Inc., Morris Plains, N.J.**

**Continuation of Ser. No. 347,185, April 2, 1973, abandoned.**

**This application Apr. 16, 1975, Ser. No. 568,486**

**Int. Cl.² G05F** *1/56*

**U.S. Cl. 323—17** **8 Claims**



1. A switching regulator for supplying energy to an output load comprising;

first coupling means for coupling a direct current input voltage source;

a series switching means, coupled to said first coupling means, having a first control terminal;

second coupling means for coupling said output load to said series switching means;

first control means, coupled to said second coupling means, for providing a first control signal which is a function of the output voltage;

first transmission means, coupled to said first control means, for separately coupling said first control signal to said first control terminal of said series switching means;

a current foldback control means for limiting the maximum output load current to a preset value and significantly decreasing the load current from said preset value as the load resistance is decreased, coupled between said series switching means and said first control means, for providing a second control signal which is a function of the output load current; and

second transmission means, coupled to said said first coupling means and coupled to said current foldback means for separately coupling said second control signal to said first control terminal.

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**4,017,790**

**ALTERNATING CURRENT POWER TRANSMISSION SYSTEMS**

**Erich Siegfried Friedlander, Sutton Coldfield, England, assignor to Associated Electrical Industries Limited, London, England**

**Filed Oct. 14, 1975, Ser. No. 621,822**

**Claims priority, application United Kingdom, Oct. 15, 1974, 44603/74**

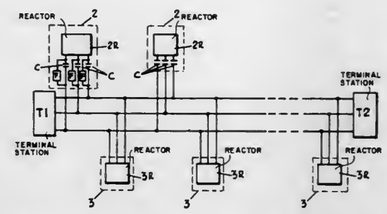
**Int. Cl.² H02J** *3/12*

**U.S. Cl. 323—110** **11 Claims**

1. An alternating current power transmission system including:

a. a transmission line connected between a pair of mutually distant terminal stations;

b. a plurality of intermediate stations located at spaced positions along the length of the transmission line between the terminal stations;




c. a stabilising arrangement comprising a plurality of alternating current saturated reactors connected to the line at the intermediate stations;

d. at least some of said reactors having slope correction capacitors connected in series therewith; and

e. others of said reactors having slope reactances which are not compensated by series slope correction capacitors.

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**4,017,791**

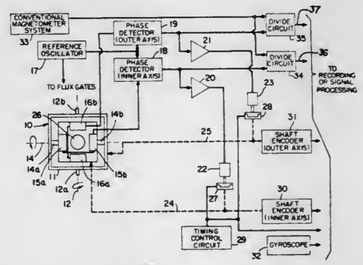
**METHOD AND APPARATUS FOR MEASURING VARIATIONS IN MAGNETIC FIELD ORIENTATIONS**

**Robert M. Black, Ocean City, N.J., assignor to Airmag Surveys, Inc., Philadelphia, Pa.**

**Filed July 11, 1974, Ser. No. 487,609**

**Int. Cl.² G01R** *33/04*

**U.S. Cl. 324—43 R** **22 Claims**




1. A system for measuring variations in magnetic field orientations comprising:

means for intermittently establishing a reference value for said variations, including

means for sensing field orientation, and

means for establishing the orientation of said sensing means in a predetermined angular relation to said field; and

means for measuring, during a period following each said establishment, departures from said reference value corresponding to variations in said field during the period, said measuring means including

a gimbaled platform bearing flux gates defining a plane,

means for detecting variations in the outputs of said flux gates,

intermittently operable means for utilizing said detected variations to orient said platform so as to null said variations, said intermittently operable means comprising gimbal drives for said platform controlled by said detecting means, and means for decoupling said drive means for said platform,

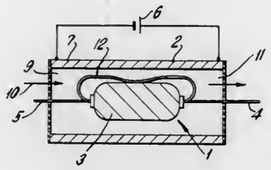
means for preserving said platform so oriented between said intermittent operations, said preserving means including a gyroscope mounted on said platform, and

means for deriving indications of said flux gate outputs between said intermittent operations.

## 4,017,792
## DEVICE FOR DETERMINING AND/OR MEASURING ALCOHOL CONTENT IN A GAS AND METHOD OF MANUFACTURING A SEMI-CONDUCTOR BODY FOR USE IN ALCOHOL DETECTION

**Gerhard Heiland, and Claus Dieter Kohl, both of Aachen, Germany, assignors to Dragerwerk Aktiengesellschaft, Germany**

**Filed Sept. 2, 1975, Ser. No. 609,551**
**Claims priority, application Germany, Sept. 5, 1974, 2442593**
**Int. Cl.² G01N *57/00*; H01C *7/00*; G01N *37/00***
**U.S. Cl. 324—71 SN** **9 Claims**

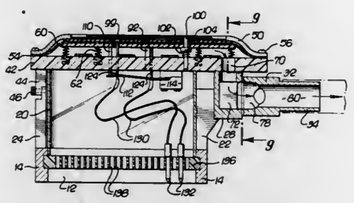


1. An alcohol presence sensor, comprising a conduit for the passage of breathing air therethrough, a heater carried by said conduit for heating the space within said conduit, a metallic oxide semiconductor body disposed within said conduit and spaced inwardly from the interior thereof so that breathing air passing through the conduit may pass thereover, said metallic oxide semiconductor body being made of zinc oxide and having a density approximating the density of a monocrystal, first and second electrodes of respective opposite polarity engaging respective opposite ends of said body, clamping means engaged with each electrode and applying a high clamping bias against each electrode to said body to establish said biased connection to said body, and indicating circuit means connected to said electrodes responsive to variations in the resistance of said body and to the variations of breathing air produced by the presence and absence of alcohol to indicate such variations.

## 4,017,793
## PRINTED CIRCUIT BOARD CIRCUIT TESTER

**Fred E. Haines, 2444 Cabrillo Ave., Torrance, Calif. 90501**

**Continuation-in-part of Ser. No. 603,332, Aug. 11, 1975, abandoned. This application July 6, 1976, Ser. No. 702,881**
**Int. Cl.² G01R *31/02*, *15/12***
**U.S. Cl. 324—73 PC** **20 Claims**

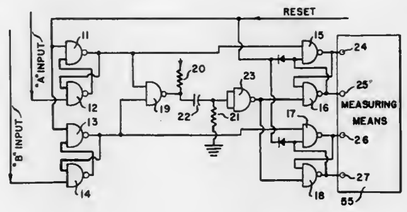


1. A printed circuit board circuit tester comprising: a vacuum chamber, a vacuum source connection to said chamber, a chamber base, vacuum operable means defining a part of said chamber, supporting means in said chamber associated with said vacuum operable means, internal flexible means in said chamber supporting said supporting means and said vacuum operable means away from said base, external flexible means outwardly of said chamber associated with said vacuum operable means, spacing flexible means on said external flexible means having an opening therethrough, said spacing flexible means being adapted to support a printed circuit board to be tested, said opening in said spacing flexible means being adapted to permit the circuits to be tested to be in communication with said external flexible means, electrical contacts secured to and extending through both sides of said base, and openings through said supporting means, through said vacuum operable means, and through said external flexible means being in respective alignment, one end of each electrical contact being adapted to extend into said vacuum chamber, into a respective said opening through said supporting means, into a respective said opening through said vacuum operable means and into a respective said opening through said external flexible means, whereby when a vacuum is applied to said chamber, a printed circuit board, supported on said spacing flexible means and in communication with said external flexible means, is moved toward said base with said external flexible means, said vacuum operable means, and said supporting means, so that the circuits on said board make predetermined contact with said electrical contacts.

## 4,017,794
## CIRCUIT FOR MEASURING TIME DIFFERENCES AMONG EVENTS

**Delwin M. Romrell, Richland, Wash., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.**

**Filed Sept. 18, 1975, Ser. No. 614,404**
**Int. Cl.² G01R *23/02***
**U.S. Cl. 324—78 D** **3 Claims**



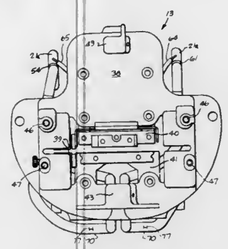

1. A circuit for measuring time differences between randomly arriving signals comprising:
a. a first latch having a first stable state and a second stable state;
b. a second latch having a first stable state and a second stable state;
c. reset means connected to said first and second latches for resetting said first latch to said first stable state and said second latch to said first stable state;
d. operating means connected to said first and second latches and responsive to an input to one of said first and second latches after said first and second latches are reset to cause said one of said first and second latches to maintain said first stable state and to cause the other of said first and second latches to change to said second stable state;
e. return means connected to said first and second latches and responsive to a later input to the other of said first and second latches to cause the other of said latches to return to said first stable state;
f. measuring means connected to said first and second latches and responsive to said changes from said first stable states to said second stable states to determine which of said first and second latches first changed states, which next changed states, and the time between said changes of state, which determination provides a measure of which latch first received a signal and the time between receipt of a signal at a first latch and at a second latch.



## 4,017,795
## HEAT SENSITIVE FAULT DETECTING AND INDICATING SYSTEM FOR WATTHOUR METER

**James W. Milligan, West Lafayette, Ind., assignor to Duncan Electric Company, Inc., Lafayette, Ind.**

**Filed June 9, 1975, Ser. No. 585,110**
**Int. Cl.² G01R *1/36***
**U.S. Cl. 324—110** **10 Claims**

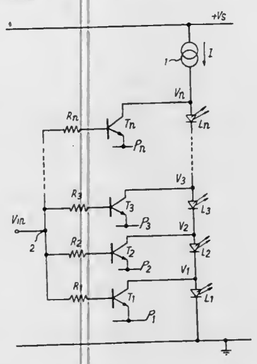


1. In a watthour meter having an element that becomes heated in response to current surges received by said meter, a heat sensitive fault detector and indicator comprising:
a first member contiguous to said heat responsive element in said meter, said first member having at least a predetermined portion that changes from a solid state to a liquid state in direct response to a current surge received by said meter sufficient to heat said heat responsive element therein to at least a preselected temperature; and
a covering member covering said first member, said cover member having at least predetermined portions thereof through which at least a part of said predetermined portions of said first member protrude to visually indicate a possible fault at said covering member when said first member is caused to change from solid state to liquid state.

## 4,017,796
## ELECTRICAL CIRCUIT MEANS FOR USE IN ANALOGUE DISPLAY AND/OR CONTROL SYSTEMS

**Martin B. Tobias, 43, Shakespeare Road, St. Ives, Huntingdon PE17 4TT, England**

**Filed Jan. 27, 1975, Ser. No. 544,366**
**Claims priority, application United Kingdom, Jan. 29, 1974, 4013/74**
**Int. Cl.² G01R *19/00*, *19/16***
**U.S. Cl. 324—122** **14 Claims**

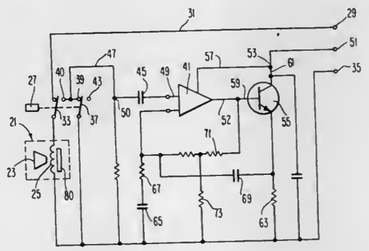


1. Electrical circuit means comprising a plurality of radiation emitting diodes connected in electrical relationship for the passage of electrical current successively therethrough, means for connecting the radiation emitting diodes in series with a source of direct constant current, current diverting paths respectively connected with the radiation emitting diodes, a semiconductor device disposed in each current diverting path, means for applying a control voltage in the form of an analogue input voltage to the semiconductor devices, and means independent of the radiation emitting diodes for biasing each semiconductor device to effect conduction of the current diverting path associated therewith at a predetermined level of the analogue input voltage, the said predetermined level being unique to each path and increasing successively from one to the next path.

## 4,017,797
## HEADSET FOR RECEIVING AND TRANSMITTING SIGNALS

**John D. Laessig, Newtown Square, Pa., assignor to Columbia Research Laboratories, Inc., Woodlyn, Pa.**

**Filed Feb. 5, 1975, Ser. No. 547,184**
**Int. Cl.² H04B *1/44*; H04M *1/05***
**U.S. Cl. 325—16** **6 Claims**

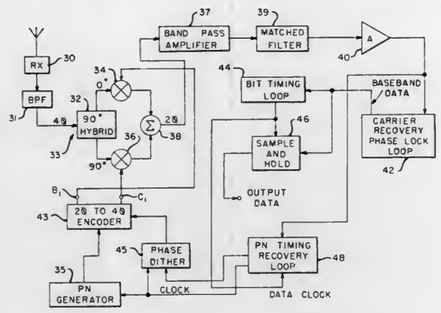


1. A device for attenuating ambient sounds attempting to enter the auditory canals of the ears of a user and for transmitting and receiving audio signals to and from at least one ear of the user which audio signals provide a basis of communication with a remote site comprising in combination: first and second sound attenuating members, said sound attenuating members each formed to surround a different one of the ears of said user and further formed to attenuate ambient sounds attempting to enter the auditory canal of its associated ear; securing means coupled to said first and second attenuating members and formed to secure said sound attenuating members over the ears of said user; a unitary, sound signal transducer means disposed in said first sound attenuating member so as to avoid coming in direct contact with the user's head and formed and disposed in said first sound attenuating member to receive sound signals generated by the larynx of said user and emanating from the auditory canal of the ear, of said user, surrounded by said first sound attenuating member in order to generate first electrical signals in response to said received sound signals, said unitary, sound signal transducer further formed and disposed to receive second electrical signals from a remote location and generate audio signals in response to said second electrical signals to be transmitted to the eardrums of said user; switching means located less than 1.5 inches from and connected to said unitary sound signal transducer means, said switching means formed to provide a first signal path or said first electrical signals generated by said unitary, sound signal transducer means and to provide a second signal path for said second electrical signals; high gain amplification circuitry means disposed in said first sound attenuating member less than 1.5 inches from said switching means and 1.5 inches or less from said unitary sound signal transducer means and connected to said first signal path whereby the circuit, from said unitary, sound signal transducer means, including said first signal path and said amplification circuitry is characterized by being a high gain-low noise circuit; and circuitry means connected to said high gain amplification means and adapted to transmit amplified electrical signals therefrom to a remote location.

## 4,017,798
## SPREAD SPECTRUM DEMODULATOR

**Robert S. Gordy, Largo; Alfred T. Anderson, and David E. Sanders, both of St. Petersburg, all of Fla., assignors to NCR Corporation, Dayton, Ohio**

**Filed Sept. 8, 1975, Ser. No. 611,367**
**Int. Cl.² H04B** *1/62*
**U.S. Cl. 325—42** **14 Claims**




**7.** A spread spectrum demodulator comprising:

means for receiving a four-phase encoded spread spectrum signal;

means for converting the received four-phase encoded spread spectrum signal into a two-phase encoded non-spread spectrum signal;

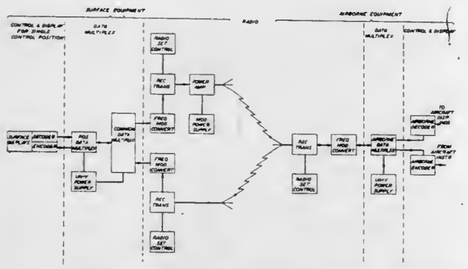
matched filter means operatively connected to said means for converting, for filtering said two-phase encoded non-spread spectrum signal so as to filter all but desired signal components from said signal; and

carrier recovery means responsive to the filtered signal from said matched filter for demodulating said signal to provide a decoded baseband signal.

## 4,017,799
## HIGH SPEED MULTIPLEX DATA TRANSMISSION SYSTEM

**David F. Burdett, Glen Ridge, and Doren Mitchell, Martinsville, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed Apr. 12, 1960, Ser. No. 21,836**
**Int. Cl.² H04J** *6/00*
**U.S. Cl. 325—55** **7 Claims**

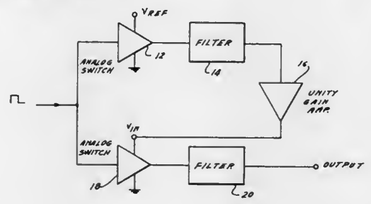


**5.** A high-speed data transmission system comprising a central station, a plurality of control positions connected to said central station, a transmitter connected to said central station, an individual mobile station for each of said positions, means at said central station for polling all of said control positions to find any of said positions which is ready to transmit to its individual mobile station, means at said central station, responsive to the finding of a control position which is ready to transmit, for connecting it to said transmitter, means in a control position connected to a transmitter for selectively directing intelligence to its individual mobile station, timng means at said central station for directing a reply from a selectively addressed mobile station to its individual control position after a measured interval and means at said central station, responsive to the elapse of said interval and the non-reception of a reply by any control position from its individual mobile station, for connecting that control position to said transmitter preferentially.

## 4,017,800
## DELINEARIZATION CIRCUIT

**Ronald E. Champagne, Westfield, Mass., assignor to General Instrument Corporation, Clifton, N.J.**

**Filed Apr. 29, 1975, Ser. No. 572,763**
**Int. Cl.² H03J** *3/06*; **G06G** *7/18*
**U.S. Cl. 325—464** **13 Claims**



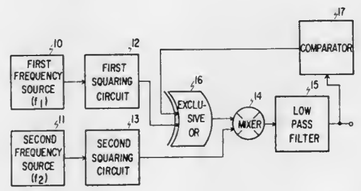

**1.** A delinearization circuit comprising first switch means switchable, in accordance with an input signal, between a given voltage and a reference voltage to form a first signal, means for forming from said first signal an intermediate signal which is a function of said first signal, and second switch means switchable, in accordance with said input signal, between said intermediate signal and a reference signal, to form an output signal.

**7.** An electronic tuning apparatus for use in a tuner or the like of the type having a tuning signal controlled tuning element, said apparatus comprising input signal generating means, a memory having a plurality of data storage locations, control means operatively connected to said input signal generating means for addressing a location in said memory in accordance with the generation of an input signal and for controlling data flow from said addressed location, means operatively connected to said memory for generating a signal variable in accordance with the data at said addressed location, means for delinearizing said variable signal to form a delinearized signal and means for forming the tuning signal from said delinearized signal.

## 4,017,801
## LOW FREQUENCY TRIANGULAR WAVEFORM GENERATOR

**Ronald J. Riedel, Loveland, Colo., assignor to Hewlett-Packard Company, Palo Alto, Calif.**

**Filed Mar. 22, 1976, Ser. No. 669,375**
**Int. Cl.² H03K** *5/08*, *4/10*
**U.S. Cl. 328—35** **5 Claims**




**1.** A circuit for generating sawtooth waveforms, the circuit comprising:



first squarewave generating means for providing a first squarewave of frequency $f_1$;

second squarewave generating means for providing a second squarewave of frequency $f_2$, said second squarewave having a linearly changing phase difference with respect to said first squarewave;

linear phase detector means responsive to said first and second squarewave generating means for linearly transforming the linearly changing phase difference between said first and second squarewaves into an output waveform;

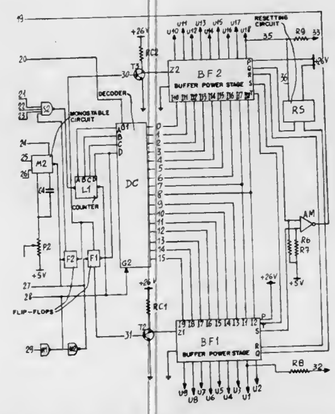
comparator means for comparing said output waveform of said linear phase detector to a desired peak value for the output waveform and for detecting when said output waveform equals said desired peak value; and

phase reversing means for changing the phase of said output waveform by 180° when said comparator means detects the value of said output waveform to be equal to the desired peak value.

## 4,017,802
## STORED ELECTRONIC DEVICE FOR PRODUCING PULSES HAVING PREDETERMINED RATE AND SEQUENCE

**Francesco Ferrarin, Milan, Italy, assignor to Societa' Italiana Materiali Pressati Resinati e Simili - S.I.M.P.R.E.S. - S.r.l., Milan, Italy**

**Filed July 17, 1975, Ser. No. 596,624**
**Claims priority, application Italy, July 24, 1974, 25518/74**
**Int. Cl.² H03K** *17/02*, *13/247*
**U.S. Cl. 328—130** **9 Claims**

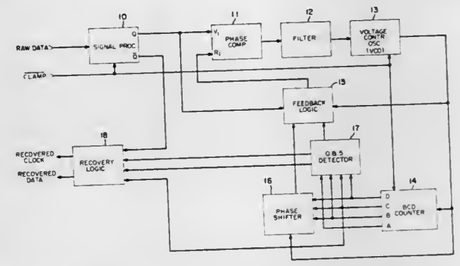



**1.** A stored electronic device for producing pulses having a predetermined rate and sequence on a number of output channels comprising, in combination, a single input connected to an associated power supply for starting the device, a selector for preselecting a number of pulses that for each operation of the device are sequentially made available on the respective output channel or channels, a decoder having a plurality of channels, two logical gates activated upon operation of the device which act upon one of the inputs of said decoder for blocking said decoder, a first counter for supplying scanning sequences to said decoder, a fast oscillator acting upon said first counter, a slow oscillator, at least one buffer power stage having a memory independent of any interruption in said power supply, said memory having inputs which are connected to said decoder, and outputs which form the output channels of the device, said memory in said buffer stage being arranged to block said fast oscillator and release said slow oscillator for determining the pulse rate, a plurality of logical gates, a second counter for supplying respective signals to said logical gates each for selecting a number of pulses to activate a gate which is preselected by said selector, an inverter switch for receiving a signal from said activated logical gate to provide a pulse blocking said slow oscillator a resetting circuit arranged to be actuated when the last output channel is activated to bring said memory back to an initial state and means for connecting said memory to said slow oscillator and to said second counter.

## 4,017,803
## DATA RECOVERY SYSTEM RESISTANT TO FREQUENCY DEVIATIONS

**Kenneth L. Baker, Norristown, Pa., assignor to Sperry Rand Corporation, New York, N.Y.**

**Filed Jan. 29, 1976, Ser. No. 653,410**
**Int. Cl.² H03D** *3/18*
**U.S. Cl. 329—104** **25 Claims**



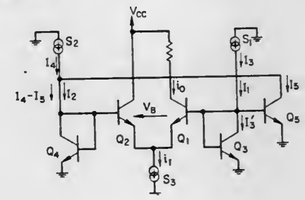

**1.** In a system for recovering encoded binary information which is represented in a data stream at time positions recurring at a frequency that is nominally predetermined but subject to uncontrollable deviations, the system including means for generating signals having alternating high and low portions for use as recovery windows, recovery logic supplied with said windows, and a phase locked oscillator loop controlled by a phase comparator and determining the times of occurrence of the windows, the phase comparator having supplied to it two comparison signals, one being the feedback signal within the loop and the other being a signal derived from the data stream, the improvement which comprises

means for supplying to the recovery logic a signal also derived from the data stream and having information representative time-varying characteristics which occur substantially concurrently with corresponding time-varying characteristics of the said signal derived from the data stream which is supplied to the phase comparator, and which do so occur substantially independently of said frequency deviations.

## 4,017,804
## BROAD BAND VARIABLE GAIN AMPLIFIER

**Dan M. Hunsinger, San Jose, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.**

**Filed Dec. 5, 1975, Ser. No. 637,910**
**Int. Cl.² H03G** *3/30*; **H03F** *3/45*
**U.S. Cl. 330—29** **8 Claims**




**1.** A broad band variable gain amplifier comprising:

a first and a second transistor, each having an emitter, a collector and a base, said first and second transistors are connected differentially with the emitters of each of the transistors connected together with the amplifier output signal being selected as the collector current of the second transistor;

input current means coupled to the emitters of the first and second transistors for applying an input current thereto;

control voltage application means connected to the bases of the first and second transistors for applying a control voltage between the bases of these transistors to control the gain of the first and second transistors;

means for receiving a first and a second D.C. current, each current being coupled to the control voltage application means, for biasing and controlling the gain of the first and second transistors; and

current subtracting means coupled to the means for receiving said first D.C. current and to said control voltage application means for subtracting a current that is equivalent to a fractional part of said second D.C. current from said first D.C. current to form a resultant bias current;

said control voltage being the voltage differential between the two bases of the first and second transistors, with the voltage on the base of the second transistor being responsive to said second D.C. current and the voltage on the base of the first transistor being responsive to the resultant bias current.

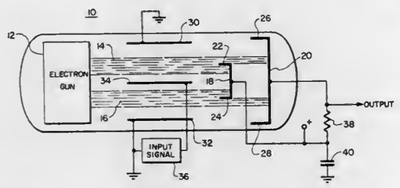
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**4,017,805**

## COMPENSATED ELECTRON BEAM DEFLECTION DEVICE

**Herbert M. Wagner, Belmar, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Jan. 8, 1976, Ser. No. 647,684**
**Int. Cl.² H03F** *3/10, 3/54*
**U.S. Cl. 330—33** **15 Claims**




1. An electron beam deflection amplifier comprising:

means for generating a pair of like spaced parallel longitudinal electron beams, said beams being normally positioned symmetrically about a longitudinal axis;

a pair of longitudinally spaced collector electrodes, each of said electrodes being disposed symmetrically about said longitudinal axis and across the path of both beams to intercept respective portions of each of said beams;

output means responsive to the outputs of said collector electrodes to produce an output current;

electrode means extending axially intermediate said beams and symmetrical with respect to said normal position of said beams and being responsive to applied input signals for transversely deflecting said beams in opposite directions about said longitudinal axis;

said longitudinally spaced collector electrodes being so positioned relative to said beams such that when said beams are transversely deflected in opposite directions the beam current of one beam on one electrode increases and decreases in correspondence with the beam current of the other beam on said one electrode so that the respective collector electrode beam currents due to both beams are additive at each of said electrodes; and

when said beams move transversely in the same direction the beam current of one beam on one electrode changes oppositely from the beam current of the other beam on said one electrode so that the respective collector beam currents due to both beams are negated at each of said electrodes.

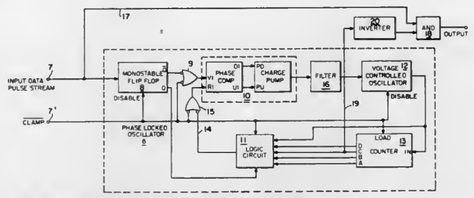
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**4,017,806**

## PHASE LOCKED OSCILLATOR

**Bruce J. Rogers, Collegeville, Pa., assignor to Sperry Rand Corporation, New York, N.Y.**

**Filed Jan. 26, 1976, Ser. No. 652,369**
**Int. Cl.² H03B** *3/04*
**U.S. Cl. 331—1 A** **10 Claims**




1. A phase locked oscillator comprising:

means for supplying in response to an input pulse stream a series of input pulses each of predetermined duration,

controllable oscillator means for providing a series of oscillator pulses,

means for providing an asymetric cyclic pulse signal including a counter responsive to the oscillator pulses for repetitively counting to a predetermined count,

means responsive to a first count in the predetermined count for generating a reference pulse in response to an input pulse,

means responsive to a second count in the predetermined count for terminating the reference pulse, and

comparator means for producing a signal representative of the time displacement between the termination of each input pulse and its related reference pulse to control said oscillator means so that the frequency of the oscillator pulses is an integral multiple of the frequencies corresponding to the spacings of the input pulses and the period of the asymmetric cyclic pulse signal is equal to the fundamental period of the input pulse stream.

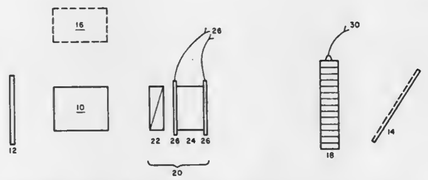
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**4,017,807**

## ELECTRONICALLY CONTROLLED DIGITAL LASER

**Lynn D. Hutcheson, Tucson, Ariz., and Richard Swart Hughes, China Lake, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Feb. 23, 1976, Ser. No. 660,586**
**Int. Cl.² H01S** *3/10*
**U.S. Cl. 331—94.5 C** **4 Claims**




1. An electronically controlled digital laser comprising:

a resonant laser cavity having a lasing cell, and bounded at one end by a laser output mirror;

a reflective grating positioned angularly for retroreflecting those wavelengths that are incident thereon at the retroreflective angle unique to each wavelength, said reflective grating being located at the end of said cavity opposite to said output mirror;



means for deflecting an intracavity laser beam in response to an electrical signal, said deflecting means located in said cavity adjacent said retroreflecting means;

an electronically tunable bandpass filter located in said cavity adjacent said lasing cell and in optical alignment therewith; and

means for tuning the passband of said filter.

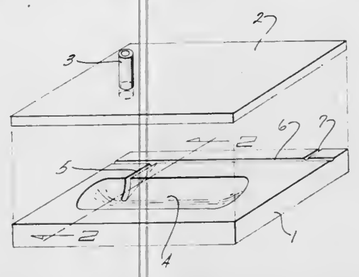
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**4,017,808**

## GAS LASER WITH SPUTTER-RESISTANT CATHODE

**Michael E. Fein, Toledo, and Charles W. Salisbury, Rising Sun, both of Ohio, assignors to Owens-Illinois, Inc., Toledo, Ohio**

**Filed Feb. 10, 1975, Ser. No. 548,307**
**Int. Cl.² H01S** *3/03*
**U.S. Cl. 331—94.5 T** **5 Claims**




1. In a gaseous laser device comprising an envelope, a cathode volume, an anode volume, a cathode electrode within said cathode volume and formed as a thin adherent conductive metal film on the walls of said envelope bounding said cathode volume, a lasing gaseous volume, a cathode channel connecting said cathode volume to said lasing gaseous volume, an anode within said anode volume, and means for igniting a gaseous discharge between the anode and cathode and wherein the cathode has a relatively large area and at least one edge adjacent to said cathode connecting channel which is subject to gas discharge deterioration, the improvement wherein said at least one edge of said relatively large area cathode adjacent said cathode connecting channel has an insulating coating applied only on the said edge thereof and from about 0.1 micron to about 50 microns in thickness to protect the cathode from edge deterioration due to gas discharge without diminishing the effective surface area of said cathode and without increasing the average current density over said effective surface area.

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**4,017,809**

## MULTI-FREQUENCY OSCILLATOR CIRCUIT

**Lionel P. Melancon, Oxnard, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Division of Ser. No. 528,595, Dec. 2, 1974, Pat. No. 3,924,262.**
**This application July 25, 1975, Ser. No. 599,253**
**Int. Cl.² H03B** *5/24*
**U.S. Cl. 331—179** **2 Claims**

1. An oscillator circuit capable of generating a first or second a-c signal in response to a first and second switch comprising:

a. a first inverting amplifier having an input and an output, said first inverting amplifier input being connected to said first switch;

b. a first resistance network being connected between said first inverting amplifier input and said first inverting amplifier output;

c. a second inverting amplifier having an input and an output, said second inverting amplifier input being connected to said first inverting amplifier output, said first or second a-c signal appearing on said second inverting amplifier output;

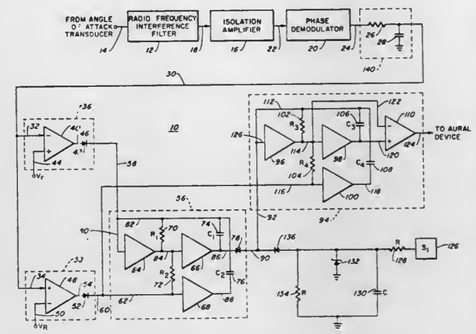
d. a first capacitance circuit being connected between said first inverting amplifier input and said second inverting amplifier output;

e. a third inverting amplifier having an input and an output;

f. a second capacitance circuit being connected between said first inverting amplifier input and said third inverting amplifier output, said first and second capacitance circuit and said first resistance network determining the time constant for the frequency of oscillation of said first a-c signal, said first a-c signal appearing on said second inverting amplifier output when said first switch is "off" and said second switch is "off";

g. a second resistance network being connected between said first inverting amplifier output and said third inverting amplifier input; and

h. means connected to said third inverting amplifier for electrically removing said second capacitance circuit from said oscillator circuit when said first switch is "off" and said second switch is "on", thereby causing said second a-c signal to appear on said second inverting amplifier output.



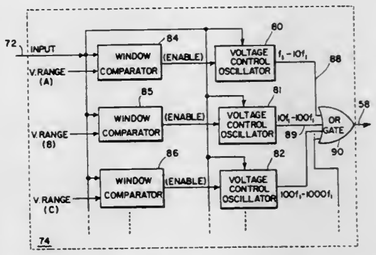

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**4,017,810**

## VOLTAGE CONTROLLED OSCILLATOR

**Sotirios John Vahaviolos, East Windsor Township, Mercer County, N.J., assignor to Western Electric Company, Inc., New York, N.Y.**

**Division of Ser. No. 592,437, July 2, 1975, Pat. No. 3,965,726.**
**This application Apr. 1, 1976, Ser. No. 672,825**
**Int. Cl.² G01R** *19/26;* **H03K** *7/06*
**U.S. Cl. 332—14** **4 Claims**




1. A voltage controlled oscillator circuit for receiving an analog input signal and generating an output frequency which is linearly proportional to the analog input signal, comprising:

a plurality of window comparators for simultaneously receiving the analog input signal, each comparator being responsive to a predetermined different range of the maximum analog input signal amplitude to generate an enable signal; and

a plurality of voltage control oscillators, for simultaneously receiving the analog input signal, each oscillator being

responsive to the enable signal from a different one of the window comparators to generate a frequency-modulated output signal which is linearly proportional to the analog input signal within the predetermined range.

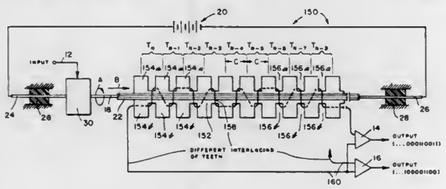
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**4,017,811**

## INVERSE WIEDEMANN EFFECT TORSIONAL DELAY LINE MATCHED FILTER DEVICE

**George F. Lindsay, Arcadia, and Harper John Whitehouse, Hacienda Heights, both of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Feb. 28, 1968, Ser. No. 710,705**
**Int. Cl.² H03H** *7/30*
**U.S. Cl. 333—30 M** **5 Claims**



1. In a torsional delay line signal processing device of the type having a matched filter response characteristic corresponding to a first predetermined sequence of N binary digits, where N is a numerical value in excess of 100, the combination comprising;

a. an elongated tooth-edged strip element of non-magnetic, conductive metal, said element having laterally aligned, uniformly spaced, teeth formed along each edge thereof, said element having N + 1 pairs of laterally aligned teeth along its length forming a linear sequence of N pairs of laterally aligned slots between the teeth,

b. a torsional mode acoustic delay line of magneto-elastic metal disposed over one face of the strip element in the longitudinal direction thereof over the median portion thereof between the teeth,

c. means operatively associated with said delay line for producing a field of circular magnetic lines of force about the length of the delay line,

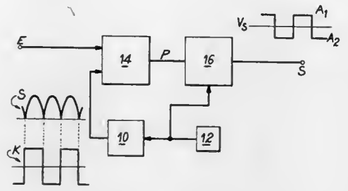
d. a first code wire which is interlaced through individual successive pairs of laterally aligned slots to pass circumferentially over the delay line at each pair of aligned slots in one or the other of opposite angular directions about the delay line axis in accordance with whether the digit in the corresponding bit position of said first sequence of N binary bits is a 0 or a 1, where the wire is to pass over the delay line at the next slot in the same angular direction said wire being interlaced from one to the next of the successive laterally aligned slots by being helically passed around the median portion of the other face of the tooth-edged strip element, where the wire is to be passed over the delay line at the next slot in the opposite angular direction said wire being passed over a tooth at the other face of the tooth-edged strip in a direction parallel to the strip element.

**4,017,812**

## METHOD OF PROCESSING A SIGNAL, AND CORRESPONDING DEVICES

**Jean-Paul Bonnefoy-Claudet, St-Martin d'Heres; Michel Martin, Eybens, and Edmond Tournier, Grenoble, all of France, assignors to Commissariat a l'Energie Atomique, Paris, France**

**Filed July 31, 1975, Ser. No. 600,273**
**Claims priority, application France, Aug. 2, 1974, 74.26992**
**Int. Cl.² H03H** *7/28;* **H03D** *3/18;* **H03H** *7/15, 7/50*
**U.S. Cl. 333—70 A** **14 Claims**



1. A method of processing an alternating electric signal of an assigned frequency Fo, comprising the steps of:

producing first and second symmetrical reference electrical waves having the frequency Fo and the period 1/Fo and mutually coherent in phase, said first reference wave being a non-rectangular wave and said second reference wave being a rectangular wave;

producing an auxiliary signal having the period ½ Fo by rectifying said first reference wave;

multiplying the signal to be processed by said auxiliary signal in an electronic multiplier; and

isosynchronously processing the output of said multiplier at the frequency Fo in a synchronous chopper-integrator circuit switched by said second reference wave and arranged for separately and successively integrating alternate sequences of ½ Fo periods of said multiplier output.

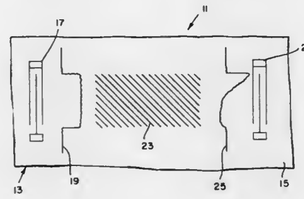
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**4,017,813**

## SURFACE ACOUSTIC WAVE NOTCH FILTER

**Oberdan W. Otto, Los Angeles, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.**

**Filed Apr. 5, 1976, Ser. No. 673,322**
**Int. Cl.² H03H** *9/26, 9/30;* **H01L** *41/04*
**U.S. Cl. 333—72** **1 Claim**



1. A surface acoustic wave notch filter, comprising:

a surface acoustic wave delay line including a substrate of material capable of supporting propagating surface acoustic wave energy and including spaced input and output transducers disposed on said substrate, said input transducer converting electromagnetic energy to a beam of surface acoustic wave energy having a surface displacement beam profile and propagating in said substrate along a predetermined path toward said output transducer; and

synchronous reflection means including a periodic angled reflective array having a synchronous reflection frequency and disposed on said substrate in said predetermined path for distorting said beam profile of said beam and causing selective portions thereof adjacent said synchronous reflection frequency to be out of phase with the remainder of said beam profile, said beam profile being amplitude averaged at said output transducer to provide thereat an output signal having a relatively deep notch in amplitude at said synchronous reflection frequency.



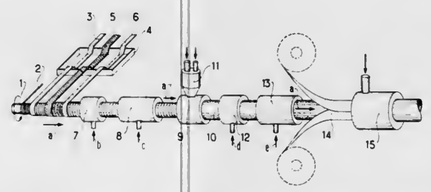
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**4,017,814**

## WAVE GUIDE AND METHOD FOR THE MANUFACTURING THEREOF

**Marcel Aupoix, Paris, and Jean-Pierre Trezeguet, Venissieux, both of France, assignors to Les Cables de Lyon, Lyon Cedex, France**

**Division of Ser. No. 569,428, April 18, 1975, Pat. No. 3,952,407. This application Dec. 19, 1975, Ser. No. 642,630**
**Claims priority, application France, Apr. 25, 1974, 74.14461**
**The portion of the term of this patent subsequent to Apr. 27, 1993, has been disclaimed.**
**Int. Cl.² H01P** *11/00, 3/12*
**U.S. Cl. 333—95 R** **4 Claims**



1. In a wave guide comprising a hollow conductor and a casing covering said conductor, the improvement wherein said casing comprises layers of porous dielectric and conductive materials in a resinous compound connecting said layers together and to said hollow conductor, said casing being manufactured by, in sequence, impregnating said layers of porous dielectric and conductive materials with an unhardened resinous compound and hardening said resinous compound at ambient temperature and in a few seconds by contacting said resinous compound with a catalyst diluted and borne by a gas, such that the hollow conductor is free of deformation due to hardening of the resin.

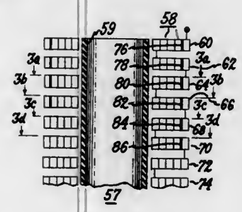
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**4,017,815**

## IMPULSE VOLTAGE DISTRIBUTION IMPROVING PARTIAL-TURN ELECTROSTATIC SHIELDS FOR DISC WINDINGS

**George E. Sauer, Stockbridge, Mass., assignor to General Electric Company**

**Filed Sept. 27, 1976, Ser. No. 727,299**
**Int. Cl.² H01F** *15/04*
**U.S. Cl. 336—70** **6 Claims**



1. Improved electrostatic shielding for inductive apparatus of the type having,

a winding, including a plurality of generally coaxially disposed annular disc coil sections, each of said coil sections having a plurality of insulated conductor turns, each of said conductor turns having at least one strand;

spirally wound, in the same direction, alternately radially inward and radially outward,

a finish-end of a disc coil section being connected to a start-end of an immediately adjacent disc coil section for form a winding connected in an electrical series circuit relation,

electrostatic shield conductors in less than all of said disc coil sections forming a winding having a portion with, and a portion without electrostatic shield conductors,

a shield conductor in one disc coil section being electrically connected to a correspondingly positioned shield conductor in an immediatley adjacent disc coil section to form a shield conductor pair,

wherein the improvement comprises:

partial-turn electrostatic shield conductors in at least a disc coil section pair between those disc coil sections of said winding having, and those disc coil sections of said winding not having electrostatic shield conductors,

said partial-turn electrostatic shields being connected together to form shield conductor pairs.

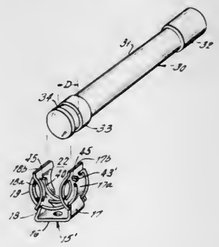
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**4,017,816**

## FERRULE FUSE TERMINAL CLIP WITH PIVOTED REJECTOR

**William R. Latimer, Jr., Bellefontaine, Ohio, assignor to I-T-E Imperial Corporation, Spring House, Pa.**

**Filed Dec. 29, 1975, Ser. No. 644,577**
**Int. Cl.² H01H** *85/14*
**U.S. Cl. 337—227** **4 Claims**



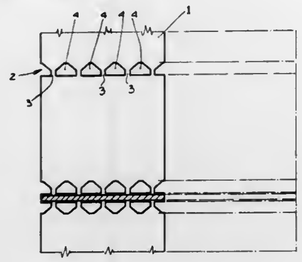
1. A fuse terminal clip forming an electrical connection to fuse means including a cylindrical ferrule end terminal having an annular groove recessed therein, said fuse terminal clip comprising:

space means including a pair of spaced contact legs for electrically contacting opposed portions of said terminal, said spaced contacting means adapted to resiliently capture said terminal between said contact legs;

a generally U-shaped rejection member supported on and extending between said spaced contact legs, and cooperating with said groove for rejecting a ferrule end terminal lacking said groove and for facilitating insertion and capture between said spaced means only of a fuse means having a ferrule end terminal provided with said groove means; said rejection member comprising a single stamping from sheet material and including arms spaced by a distance greater than the diameter of said annular groove and less than the diameter of said cylindrical ferrule end terminal; said rejection member also including a pair of aligned pivot arms extending in opposite directions from said arms through aligned apertures in said contact legs whereby said contact legs support said pivot arms for tilting of said rejection member; and

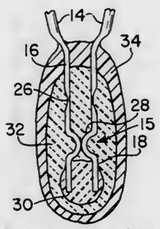
said pivot arms having their ends outboard of said contact legs peened over to provide the sole means for preventing the removal of said rejection member from said spaced contacting means.

**4,017,817**
**FUSE STRIPS**
**Pierluigi Ranzanigo, Brescia, Italy, assignor to Bassani Ticino S.p.A., Milan, Italy**
**Filed July 9, 1975, Ser. No. 594,284**
**Claims priority, application Italy, July 16, 1974, 25194/74**
**Int. Cl.² H01H** *85/04*
**U.S. Cl. 337—290** **11 Claims**



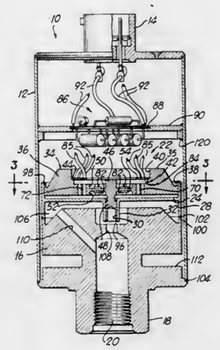
1. A fuse strip, particularly of the type used in protecting electrical circuits from overloads, comprising an elongated strip-shaped body; two spaced apart substantially parallel rows extending transversely of the elongation of said body, each row being composed of a plurality of apertures successive ones of which respectively delimiting with each other current-carrying portions; and a strip of fuse metal secured on said body in the space intermediate said rows, and overlying said body in direction transversely of the elongation of the latter so that each of said current-carrying portions is provided with substantially identical current-carrying capability.

**4,017,818**
**THERMAL SWITCH DEVICE AND METHOD OF MAKING**
**Charles Calvin Rayburn, Mount Prospect, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.**
**Filed Dec. 22, 1975, Ser. No. 642,650**
**Int. Cl.² H01H** *37/76*
**U.S. Cl. 337—403** **16 Claims**



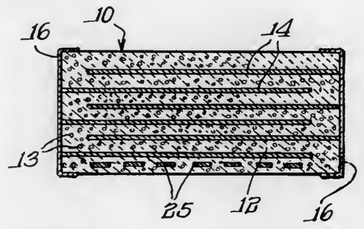
1. A thermal switch device comprising a pair of electrical conductor wire members in side by side relationship to each other and having free ends extending generally in the same direction forming switch sections and lead wire sections, the switch section including a localized contact region providing an electrically conductive path between the wire members, at least one of said conductor wire members in the switch section including a spring means biasing the contact regions and adjacent portions of the pair of conductor wire members away from each other, the free extremities, contact region and at least a portion of the spring means being encapsulated with a nonconductive heat fusible material with the conductor wires being held, against the spring bias, into electrical contact with each other, by the encapsulating material, the nonconductive heat fusible material and portions of the conductor wire adjacent the spring means which extend out of the encapsulated material being conformally coated with a rigid insulating material to totally encapsulate the heat fusible material and space and electrically insulate the extending lead wire sections from each other, wherein the conductor wires of the encased switch section are adapted to spring away from and out of contact from each other at the contact region when the heat fusible material is subjected to a predetermined temperature level causing it to flow and release the energy stored in the spring means.

**4,017,819**
**PRESSURE TRANSDUCER**
**Hsia-Si Pien, New Fairfield, Conn., assignor to Consolidated Controls Corporation, Bethel, Conn.**
**Filed Jan. 13, 1975, Ser. No. 540,510**
**Int. Cl.² G01L** *1/22*
**U.S. Cl. 338—4** **8 Claims**



1. A unitary force measuring beam assembly comprising,
a fixed beam support member,
a deflectable beam,
means for applying a force to be measured to the center of said beam,
and means for symmetrically and floatingly mounting said beam to said beam support member, said last named means comprising a pair of torsionally flexible mounting elements connected between the opposite ends of said beam and said beam support member and extending in planes perpendicular to the plane of said beam.

**4,017,820**
**HUMIDITY SENSOR WITH MULTIPLE ELECTRODE LAYERS SEPARATED BY A POROUS MONOLITHIC CERAMIC DIELECTRIC STRUCTURE**
**Bernd Ross, San Diego, Calif., assignor to Illinois Tool Works Inc., Chicago, Ill.**
**Continuation-in-part of Ser. No. 599,196, July 25, 1975, abandoned. This application May 13, 1976, Ser. No. 685,837**
**Int. Cl.² H01L** *7/00*
**U.S. Cl. 338—35** **2 Claims**

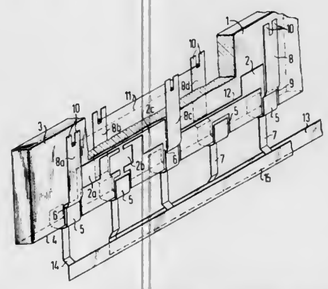


1. A multi-layered device for sensing humidity comprising a homogeneous porous monolithic dielectric structure, a plurality of electric field-producing electrode layers stacked in planes one above each other which extend substantially entirely across two dimensions of said device and which are buried into said dielectric structure with alternating ones of said electrode layers being connected to separate conductive terminals and with said electrodes being separated by said dielectric structure, which structure is formed with at least a ten percent open cell construction wherein the dielectric is comprised of:

| | |
|---|---|
| Magnesium titanate ($MgTiO_3$) | 65%–75% by weight |
| Zinc oxide (ZnO) | 10%–20% by weight |
| Calcium titanate ($CaTiO_3$) | 4%–7% by weight |
| Titanium dioxide ($TiO_2$) | 6%–9% by weight. |



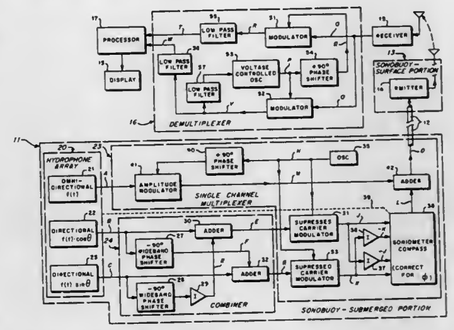
**4,017,821**
**CIRCUIT ASSEMBLY AS FOR A T-ELEMENT**
**Gerhard Schmidt, Emmering, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany**
**Filed Dec. 1, 1975, Ser. No. 636,428**
**Claims priority, application Germany, Dec. 6, 1974, 2457868**
**Int. Cl.² H01C** *10/06*
**U.S. Cl. 338—95** **6 Claims**



1. A circuit assembly comprising a substantially rectangular substrate having circuit elements which are applied by the film circuit technique to at least one of its large surfaces, and a plurality of longitudinally spaced-apart, clamp-like contact elements each having clamping flanks which embrace an edge of said substrate, said contact elements forming electric connections to the circuit elements and affording mechanical connections of the substrate to a carrier plate, wherein:
at least one of the flanks of each contact element is extended to form a contact arm which extends in spaced, parallel relation to the substrate to a free end; and
fork means provided on the free ends of the contact arms receive in electrical contact at least one wire bridge extending between two of said contact arms.

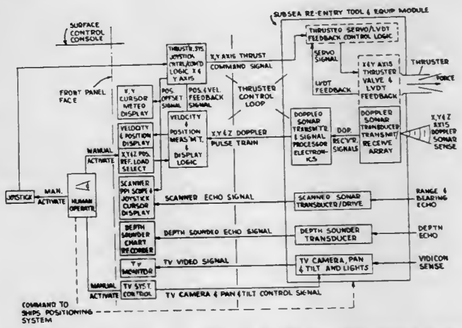
**4,017,822**
**BEARING DETERMINING APPARATUS INCLUDING SINGLE CHANNEL MULTIPLEXING**
**William T. Rusch, Hollis, N.H., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**
**Filed Nov. 24, 1969, Ser. No. 886,602**
**Int. Cl.² G01S** *3/80*
**U.S. Cl. 340—2** **10 Claims**

1. In a system for determining the bearing of a remotely located acoustic signal source, apparatus comprising:
a surface sonobuoy portion;
a submergible sonobuoy portion including a hydrophone array having fixed together an omnidirectional hydrophone and a pair of directional hydrophones having orthogonally arranged patterns of sensitivity fixed relative to an array heading, each said hydrophone providing a hydrophone output signal;
said submergible portion further including a combiner means connected to receive said directional hydrophone output signals for providing at least one combiner output signal which is displaced in phase from said omnidirectional hydrophone output signal by an amount indicative of the angular displacement of said array heading from the direction of the signal source;



said submergible sonobuoy portion further including multiplexer means for impressing said omnidirectional signal and said combiner output signal on respective quadrature components of a carrier to provide a multiplexer output signal carrying bearing information which is suitable for transmission along a single frequency channel; and
signal cable means connected between said multiplexer means and said surface sonobuoy portion for carrying said multiplexer output signal in one frequency channel to said sonobuoy surface portion.

**4,017,823**
**POSITION CONTROL SYSTEM FOR A SUBSEA VEHICLE**
**David A. Cooke, Saratoga, Calif., and David M. Edison, Murrysville, Pa., assignors to Subsea Equipment Associates Limited, Hamilton, Bermuda**
**Filed July 21, 1975, Ser. No. 597,577**
**Int. Cl.² G01S** *9/66*
**U.S. Cl. 340—3 D** **5 Claims**

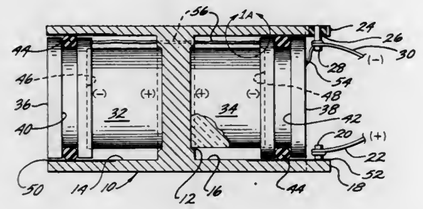


1. A position control system, for use in positioning relative to a subsea well a subsea vehicle or re-entry tool having thrusters, comprising, in combination:
a Doppler sonar system connected to said vehicle and operable for generating a Doppler pulse train signal having a pulse rate substantially proportional to the Doppler frequency produced by a change in the spatial position of said vehicle along a predetermined linear coordinate, whereby the occurrence of each pulse signal in said Doppler pulse train signal corresponds substantially to a predetermined linear distance;

velocity measurement means connected to said Doppler pulse train signal and operable for converting it into an equivalent velocity amplitude;
a pulse generator operable for producing a predetermined number of pulse signals equivalent to a certain linear distance along said coordinate;
up/down counter means operable for counting up from one input signal and down from another input signal;
connection means operable for connecting said up/down counter means to said Doppler pulse train signal and said pulse generator for opposite counting therein;
drive means connected to said up/down counter means and operable for supplying the count therein as an error signal for controlling one of said thrusters; and
coupling means operable to couple said drive means to said one thruster.

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**4,017,824**
**ACCELERATION-INSENSITIVE HYDROPHONE**
**Merrill E. Fife, Canyon Country, and James W. Pell, Jr., Northridge, both of Calif., assignors to The Bendix Corporation, North Hollywood, Calif.**
**Filed June 6, 1975, Ser. No. 584,329**
**Int. Cl.² H04B** *13/00*
**U.S. Cl. 340—10** **10 Claims**

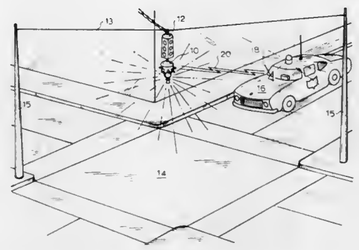


**1.** A hydrophone for providing electrical output signals in response to sensed acoustic signals comprising a hollow housing having substantial strength and a central bulkhead dividing said housing into two chambers,
a piezoelectric element of solid ceramic material abutting against and connected to each side of said bulkhead and spaced from the walls of said chambers,
electrically conducting end cap members mechanically sealed to the outer ends of said piezoelectric elements,
means electrically insulating said end caps from the walls of said chambers,
sealing means providing a liquid-tight seal between said chamber walls and said end caps,
first electrical connections providing output potentials of a first polarity connected to said housing, said bulkhead and adjacent end surfaces of said piezoelectric elements; and
second electrical connections providing output potentials of a second polarity connected to at least one of said end caps and the opposite end surfaces of said piezoelectric elements.

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**4,017,825**
**INTERSECTION EMERGENCY WARNING SYSTEM**
**Paul J. Pichey, 5317 Curry Ford Road, Orlando, Fla. 32806**
**Filed Sept. 8, 1975, Ser. No. 611,436**
**Int. Cl.² G08G** *1/00*
**U.S. Cl. 340—32** **13 Claims**

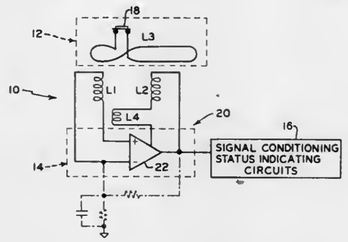
**1.** An intersection emergency warning system which is independent of other intersection traffic control devices, and remotely controlled from an emergency vehicle, comprising in combination:
radio frequency transmitting means for mounting on an emergency vehicle for transmitting activation signals;
radio frequency receiving means for receiving said activation signals;
visual warning means for generating a visual emergency warning signal, said visual warning means being coupled to said radio frequency receiving means and activated responsive to said activation signals from said radio frequency receiving means and independent of other intersection traffic control devices, with said visual warning means comprising an illuminated rotating beacon for emitting said visual emergency warning signal in an arc sweeping the intersection as said illuminated beacon is rotated;
audible warning means for generating an audible emergency



warning signal, said audible warning means being coupled to said radio frequency receiving means and activated responsive to said activation signals from said radio frequency receiving means;
a housing for carrying said radio frequency receiving means, said visual warning means and said audible warning means; and
means for supporting said housing adjacent to said intersection at a position spaced from other intersection traffic control devices, whereby persons in proximity to said intersection may be warned by said visual and audible emergency warning signals as to the approach of said emergency vehicle independent of and not interacting with other intersection traffic control devices.

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**4,017,826**
**METHOD AND APPARATUS FOR EXTENDING THE OPERATING RANGE OF A CONDITION MONITORING SYSTEM**
**Robert S. Enabnit, Akron, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio**
**Filed Sept. 24, 1975, Ser. No. 616,120**
**Int. Cl.² B60C** *23/02*
**U.S. Cl. 340—58** **12 Claims**

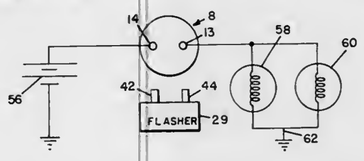



**1.** A monitoring system for sensing and indicating the occurrence of a change in condition of a first member moving relative to a second member comprising:
A. circuit means on the second member responsive to a modulation pulse signal at its input to provide an indication of the normal and/or abnormal condition of the first member as determined by the presence or absence of a modulation signal;
B. a monitoring circuit on the second member comprising an amplifier having input and output inductances, the amplifier configured to operate at a threshold of two operational states, the first state being such that the operational parameters of the circuit influence regenerative feedback over degenerative feedback and the amplifier oscillates while the second state is such that the circuit parameters influence degenerative feedback over regenerative feedback and the amplifier does not oscillate, said monitoring circuit coupled to the above mentioned circuit means to provide a modulation signal that will influence the status of the circuit means for indicating the change in condition; and
C. an inductive sensor circuit on the first member, movable therewith and responsive to the occurrence of a change in the condition being monitored, said sensor circuit configured to provide intercoupling of the amplifier input and output inductances when close-circuited and in proximate position thereto such that a signal is generated in the monitoring circuit regardless of its current oscillatory or nonoscillatory operational state.



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**4,017,827**
**LIGHT FLASHER SYSTEM FOR TRAVEL TRAILERS**
**Klaus J. Brodesser, 154 Sawyer Ave., West Babylon, N.Y. 11704**
**Filed Oct. 23, 1975, Ser. No. 625,108**
**Int. Cl.² B60Q** *1/00, 1/46*
**U.S. Cl. 340—81 R** **2 Claims**

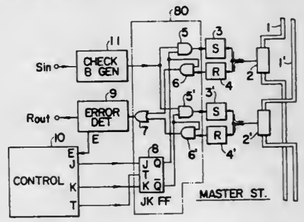



**1.** In a trailer having lights normally energized from the battery of a towing vehicle and also having a light flashing system to be energized from a battery in the trailer, the flashing system comprising:
a cable connected at a first end to the preselected trailer lights and a trailer battery, separately;
a trailer connector connected at the second end of the cable, the connector being removably attachable to a mating connector from a towing vehicle for deriving power from the vehicle battery fo the trailer lights when the vehicle is attached to the trailer; and
flasher means mounted to the trailer, the flasher means having contacts thereon for mating with the trailer connector when it is disconnected from the mating vehicle connector, thereby selectably connecting the trailer battery to the trailer lights through the flasher means, which is series connected with the lights, causing the trailer lights to flash independently of the vehicle battery, which enables the trailer lights to flash, even when the trailer is unhitched from the towing vehicle.

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**4,017,828**
**REDUNDANCY SYSTEM FOR DATA COMMUNICATION**
**Kazutaka Watanabe; Misao Shimizu; Toshio Ogawa; Akihiro Sugawara, and Kiyoharu Inou, all of Musashino, Japan, assignors to Yokogawa Electric Works, Ltd., Tokyo, Japan**
**Filed July 10, 1975, Ser. No. 594,799**
**Claims priority, application Japan, July 19, 1974, 49-82903**
**Int. Cl.² G08C** *25/00*; **G06F** *11/00*
**U.S. Cl. 340—146.1 BE** **5 Claims**

**1.** In a redundancy system for data communications between a master station and a slave station over two duplicate communication channels each capable of transmission and reception of signals to and from each of the master and slave stations, the slave station being arranged to transmit a responding signal to the master station upon receipt of each data transmission from the master station, the improvement which comprises:
switching means in the master station for selecting either one of said two communication channels to transmit data;
a first error detecting means in the master station for detecting an error in the signal transmitted by the slave station over the selected channel including an error corresponding to the absence of a responding transmission to the master station;
control means in the master station for said switching means, said control means causing said switching means to change channels following each data transmission when both channels are in normal operation, and, in response to an error detected by the error detection



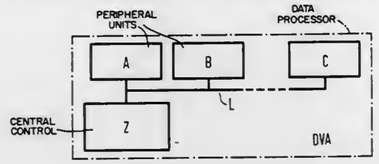

means, causing one of said two channels to be selected exclusively to transmit data when the other channel fails; and
a second error detecting means in the slave station for detecting errors in transmitted signals from the master station over the selected communication channel and for generating a signal for inhibiting utilization by the slave station of said erroneously transmitted signals and for preventing a responding transmission by the slave station to the master station, whereby the first error detector means in the master station detects the presence of a transmission error noted by a slave station and causes the switching means to select one of the two channels exclusively to transmit data;
whereby the two channels are regularly tested during alternating data transmissions for errors, and a single error detection means in the master station can serve both channels and detect transmission errors in communications both to and from the master station over either channel.

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**4,017,829**
**METHOD AND CIRCUIT ARRANGEMENT FOR TESTING DATA PROCESSORS**
**Hugo Sternat, Munich, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany**
**Filed May 14, 1975, Ser. No. 577,447**
**Claims priority, application Germany, May 14, 1974, 2423260**
**Int. Cl.² G08C** *25/00*
**U.S. Cl. 340—146.1 C** **8 Claims**

**1.** A method for testing data processing systems having a plurality of peripheral units connected to a central control by means of a bus line and wherein check instructions are sent over the bus line so as to obtain predetermined answerbacks to check these answerbacks, comprising the steps of:
sending from said central control a first check instruction and an address of a given peripheral unit for checking the correctness of address decoding in said peripheral units,
communicating, responsive to said first check instruction, the address of the addressed peripheral unit to said central control as a first message,

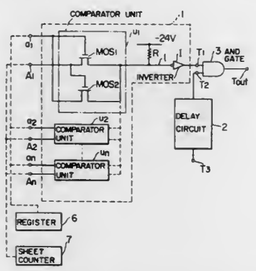
comparing said first message received in said central control with said sent address,
sending, thereafter, a second check instruction and said sent address from said central control,
communicating, responsive to said second check instruction, said sent address of the addressed peripheral unit in inverted form to said central control as a second message,
comparing said second message received in said central control with said sent address in inverted form,
indicating a fault if said comparing steps produce the result of inequality between said first message and said sent




address and/or inequality between said second message and said second address in inverted form,
upon indicaion of a fault, correlating, bit-by-bit, said first and second messages with said sent address and said sent address in inverted form,
determining a faulty component in one of said messages on the basis of the equality or inequality of a bit position in said correlated messages and addresses and
comparing said faulty component with addresses of others of said peripheral units for determining the address where erroneous address decoding is occurring thereby causing faulty messages.

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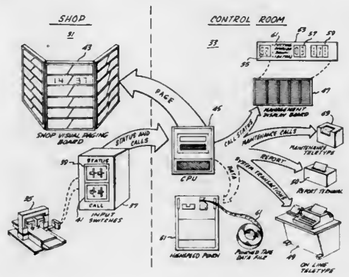
**4,017,830**
**SHEET COMPARING SYSTEM AND COMPARATOR ADAPTED FOR SAID SYSTEM**
**Hideto Shigemori, and Motoaki Fukunaga, both of Himeji, Japan, assignors to Glory Kogyo Kabushiki Kaisha, Japan**
**Continuation of Ser. No. 287,570, Sept. 8, 1972, abandoned. This application Feb. 13, 1975, Ser. No. 549,736**
**Claims priority, application Japan, Sept. 9, 1971, 46-69956; Sept. 9, 1971, 46-69957**
**Int. Cl.² B07B** *13/04*
**U.S. Cl. 340—146.2** **2 Claims**




1. A sheet counter comparison system for automatically comparing a counted number of sheets with a predetermined number of sheets to be counted, which system comprises:
register means for storing information representative of said predetermined number of sheets to be counted;
counter means for counting a sequence of counting pulse signals representative of the sheets being counted by the counter, said counter means being driven step-by-step at the leading edge of each of said counting pulse signals;
comparator means connected to receive the outputs of said register means and said counter means for producing at the output thereof a comparison coincidence signal when the number represented by the output from said counter means equals said predetermined number of sheets to be counted; and
gate control circuit means for producing an output coincidence signal in response to said comparison coincidence signal and to the trailing edge of said counting pulse signals, whereby said output coincidence signal is produced a predetermined time after the counting operation of said counter means.

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**4,017,831**
**N/C MACHINE PAGING, STATUS AND REPORT SYSTEM**
**Jansey D. Tieden, Puyallup, and Forester E. Woodruff, Jr., Renton, both of Wash., assignors to The Boeing Company, Seattle, Wash.**
**Filed Mar. 15, 1976, Ser. No. 666,641**
**Int. Cl.² H04Q** *9/00*
**U.S. Cl. 340—147 P** **18 Claims**

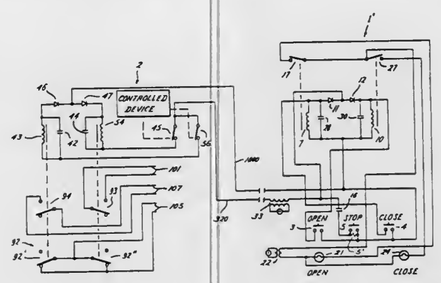



1. Apparatus for use in increasing the productivity of a plurality of N/C machines located in a common shop area, said apparatus comprising:
A. a plurality of operator modules, one associated with each of said N/C machines, each of said operator modules:
1. being individually addressable by a predetermined digital interrogation code; and,
2. including manually adjustable encoding means for producing:
a. a digital call code related to the support assistance needs of the operator of the machine; and,
b. a digital status code related to the status of the machine;
B. a CPU, connected to said plurality of operator modules, for:
1. producing predetermined digital interrogation codes suitable for addressing said plurality of operator modules;
2. interrogating said plurality of operator modules by sequentially applying said digital interrogation codes to said plurality of operator modules;
3. receiving the digital call and status codes produced by each of said N/C machines;
4. producing digital paging codes related to said digital call codes, said digital paging codes being suitable for controlling at least one visual paging board such that said visual paging board displays alphanumeric characters related to said digital call codes; and,
5. producing digital status board codes related to said digital status codes, said digital status board codes suitable for controlling a status board display adapted to display alphanumeric characters related to said digital status codes;
C. at least one visual paging board connected to said CPU and suitable for location in said common shop area for receiving said digital paging codes and creating alphanumeric character displays in accordance therewith; and,
D. a status board connected to said CPU for receiving said digital status board codes and creating a plurality of alphanumeric character displays in accordance therewith, one display of each of said plurality of alphanumeric character displays being related to a particular N/C machine of said plurality of N/C machines. appropriate messages



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**4,017,832**
**TWO WIRE COMMAND AND MONITORING SYSTEM**
**Donald Edmond Gilbert, Houston, Tex., assignor to Powell Electrical Manufacturing Company, Houston, Tex.**
**Continuation-in-part of Ser. No. 596,386, July 16, 1975, Pat. No. 3,993,977. This application May 27, 1976, Ser. No. 690,411**
**Int. Cl.² H04Q** *9/06*; **H01H** *47/00*
**U.S. Cl. 340—147 LP** **3 Claims**

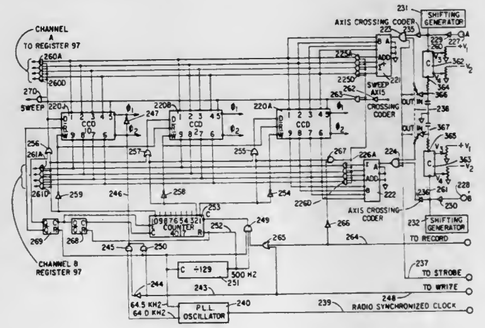



1. A transmitting and monitoring system for transmitting commands over a pair of wires to a controlled device having two end states and for monitoring the states of the controlled device, comprising:
transmission and indication means for monitoring such states of such controlled device and including command means for transmitting three commands over such pair of wires including a command to stop such controlled device, said command means including actuation means for actuating said command means to transmit said commands;
control implementation means for receiving such commands from such pair of wires and transmitting such commands to such controlled device; and
said transmission means including inhibiting means for preventing such stop command from being transmitted when such controlled device is in one of such two end states, said inhibiting means including a first portion connected in series with said actuation means for said stop command and a second portion connected in parallel with said actuation means.

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**4,017,833**
**SUMMER FOR GROUP RECORDER**
**Robert A. Broding, Tulsa, Okla., assignor to Standard Oil Company (Indiana), Chicago, Ill.**
**Filed Dec. 29, 1975, Ser. No. 644,795**
**Int. Cl.² G01V** *1/22*
**U.S. Cl. 340—15.5 TS** **4 Claims**

1. In a portable recorder containing means to receive and amplify an electric signal, means to sample the amplified signal periodically at a base frequency $f_1$, and means for recording reproducibly on a medium a quantity directly proportional to the sampled amplitude of said amplified signal, the improvement comprising
1. a plurality of charge-coupled shift registers connected in cascade, each such register being capable of storing in an identical plurality of channels of N successive adjoining memory cells charges equivalent to a logical one or a logical zero, and of replenishing automatically such charge values as said values move through said cells, said registers further being capable of moving said charge values through said plurality of memory cells on application of a multiphase electric voltage of a frequency lying within a predetermined range, said registers further being capable of discharging said charge value in the last of said memory cells into said means for recording reproducibly, the write terminals of each of said shift registers being connected to the read terminals of the next preceding of said shift registers,
2. a bank of AND gates for synchronously inserting new data to a plurality of conductors as well as to a second bank of AND gates for synchronously transferring output data from said plurality of conductor lines to said means for recording,
3. said plurality of conductors, insulated from each other, forming bi-directional data transfer lines, each of said plurality of conductors connecting in parallel only data lines of said charged coupled shift registers, an adder, and said AND gates used with each conductor,
4. said adder circuit containing two sets of input terminals and a set of output terminals electrically equal to the digital sum of the electrical input signals on both said sets of inputs, one only of said sets of inputs being connected to the conductors forming said transfer bus, and the other of said sets being connected to the output of said sampling means of said portable recorder,
5. stable oscillator means for producing an actuating signal




at a predetermined base frequency $f_1$, connected to and actuating said sampling means,
6. a synchronized second oscillator connected to said stable oscillator means for generating two output signals, one at a base frequency $f_2$ where $f_2$ is $f_1$ times N, and the other at a base frequency $f_3$ where $f_3$ is $f_1$ times (N+1),
7. means alternatively connected to said two output signals of frequency $f_2$ and $f_3$ for producing a multiphase signal connected in parallel to the appropriate terminals of all said shift registers for moving charge values through said memory cells thereof,
8. a frequency divider synchronized by connection on the input to the signal of frequency $f_3$ for producing an output of base frequency $f_1$ by division by (N+1),
9. a program counter containing a number of separate, equally serially spaced outputs corresponding in number to the number of said shift registers, each of said outputs in turn being connected to send an operative pulse to the write terminal of the corresponding one of said shift registers in accordance with its position in the cascade connection, the reset input of said counter being connected to the output of said frequency divider,
10. a plurality of OR gates equal in number to the number of said shift registers, each containing two inputs and one output, one each of said inputs being connected in turn to one of the separate outputs of said program counter, the second of each of said inputs being connected to the next succeeding of the separate outputs of said program counter, and said output being connected to the data

terminal of the corresponding one of said shift registers, and

11. an actuating circuit including separate means for producing a write and a record actuating electric signal, said means being connected to the two inputs of an OR gate, the output of which forms one input to a 3-input AND gate, the other two inputs being connected respectively to the output of said frequency divider and to the frequency $f_3$ output of said second oscillator, the output of said AND gate being connected to the clock terminal of said counter, said means of producing said write actuating signal being connected to one input of another OR gate, the other input to which is connected to the actuator of frequency $f_1$ of said sampling means, the output of said another OR gate being connected to alternative switching means interposed between the $f_2$ and $f_3$ outputs of said second oscillator and said means (6) for producing a multiphase signal whereby said last-mentioned means operates either at base frequency $f_2$ or $f_3$.

whereby said shift registers precess at frequency $f_2$ until a write pulse is generated which causes said shift registers to sum any stored input synchronously with input from said adder circuit at frequency $f_3$, and whereby, on generation of a record pulse, the contents of said cascaded shift registers are serially dumped into said means for reproducibly recording to form a reproducible record of said sums.

## 4,017,834

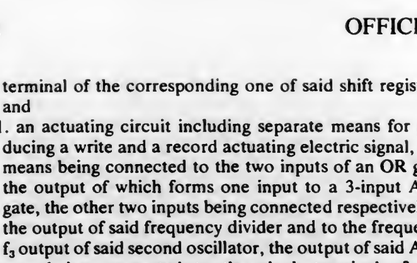
## CREDIT CARD CONSTRUCTION FOR AUTOMATIC VENDING EQUIPMENT AND CREDIT PURCHASE SYSTEMS

**William E. Cuttill, 907 Newport Drive, Fenton, Mich. 48430, and Vilma M. Wagner, 1081 W. Yale, Flint, Mich. 48503**

**Continuation-in-part of Ser. No. 357,509, May 4, 1973, Pat. No. 3,872,438. This application Jan. 8, 1975, Ser. No. 539,330**

**Int. Cl.² G06K** *7/08;* **G06F** *7/00*

**U.S. Cl. 340—149 A** **15 Claims**




1. A card of the self-identifying type, comprising:

a core of vinyl material having a plurality of openings formed therein in a predetermined pattern;

an upper and a lower polyester layer positionable above and below said core;

an upper and a lower metallic contact positionable in each of said openings and extending through opposed openings preformed in each respective upper and lower layer; and

a plurality of high and low dielectric constant inserts positionable between preselected pairs of said contacts in accordance with the code selected.

## 4,017,835

## SYSTEM FOR VERIFYING CREDIT STATUS

**Richard D. Randolph, 3212 Colfax, Pueblo, Colo. 81008**

**Filed Feb. 11, 1974, Ser. No. 441,649**

**Int. Cl.² G06F** *3/14;* **H04M** *11/06;* **H04Q** *9/00*

**U.S. Cl. 340—152 R** **3 Claims**

1. In a credit status verification system, the combination comprising:

an on-line real-time computer programmed with data concerning the credit of a bearer of a customer account decimal number including the number of short checks in a particular time period generating high-speed, synchronous output messages in a binary coded digital signal form, said computer generating response-type output messages relating to the credit status of a bearer, line control characters and address characters and poll-type output messages;

converter means for the computer having

a step-down portion to change the output messages from the computer to a slow-speed smaller bit code, asynchronous format, said step down portion including:

a decode logic circuit to receive the output messages from the computer,

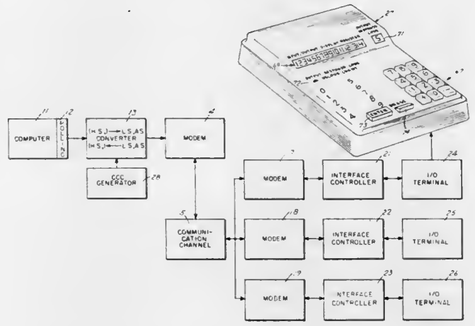
a flip-flop to receive a set signal from the decode logic circuit and receive a reset signal from the decode logic circuit actuated by an end-of-message character in the output message,

a high speed clock to provide high speed timing to output the messages from the computer,

a low speed clock to provide low speed timing for the output messages from the computer,

a logic network including a first AND gate controlled by said flip-flop and high speed clock, a second AND gate controlled by said flip-flop and low speed clock and an OR gate controlled by said first and second AND gates,

an output shift register controlled by said output messages and the output of said OR gate,




a character strip control to control the output shift register to remove selected characters from the output message and from the output shift register,

and a universal asynchronous receiver-transmitter coupled to the output of said output shift register to convert the output messages from the output shift register to a form that may be transmitted by a modem;

a step-up portion to change the input messages from the terminals to a high-speed larger bit code asynchronous format, said step-up portion including:

a universal asynchronous receiver-transmitter to convert the input messages received from a modem to a form that may be applied to logic circuits,

a decode logic circuit to receive the input messages from the universal asynchronous receiver-transmitter,

a flip-flop to receive a set signal from the decode logic circuit and a reset signal from the decode logic circuit actuated by an end-of-message character in the input message,

a high speed clock to provide high speed timing for input messages,

a low speed clock to provide low speed timing for input messages,

a logic network including a first AND gate controlled by the flip-flop and high speed clock, a second AND gate controlled by the flip-flop and low speed clock and an OR gate controlled by said first and second AND gates,

an input shift register controlled by the output messages from the universal asynchronous receiver-transmitter and the OR gate,

a character add control to control the output of the input shift register to add line control characters for the high speed input messages and

a character generator coupled to an input shift register to add a character that checks for error;

a telephone line to transmit output messages and transmit input messages;

a first modem coupled between the telephone line and the converter means and a second modem coupled between the telephone line and each of a plurality of interface controllers, each said modem converting digital signals to analog signals and converting analog signals back to digital signals;

each said interface controller for each of said second modems including:

a universal asynchronous receiver-transmitter receiving output messages from one of said second modems,

an address recognition shift register receiving output messages from the universal asynchronous receiver-transmitter,

an address strap controlling the shift register to recognize an address for one of said terminal units,

a poll or response block for distinguishing between a poll-type and a response-type output message,

an address decoder having a plurality of outputs with one output to each terminal unit to couple a particular response-type message to a particular of said terminal units,

an any inputs ready block responsive to a poll-type output message,

a go-ahead generator responsive to a no signal from the any inputs ready block for generating a go-ahead character indicating no response-type messages were sent,

an input control receiving data-type input messages from each terminal unit controlled by a yes signal from the any inputs ready block allowing only one input message per poll,

an input inquiry assembly register responsive to the output of said input control,

an OR gate responsive to the go-ahead generator and the output of the input inquiry assembly register and

a universal asynchronous receiver-transmitter responsive to an output from the OR gate and a control for controlling the input inquiry assembly shift register and universal asynchronous receiver-transmitter;

a plurality of input-output terminal units associated with each interface controller for each of said second modems for generating input messages in a binary coded signal form, said input messages including line control character, address character, polling character and data-type messages, each said terminal unit including:

a keyboard with a plurality of depressible keys to enter a selected decimal number,

a display register to display the decimal number produced by depressing the keys,

an output response register to display a response-type output message received from the computer, and

a calculator large scale integrated circuit responsive to a selected decimal number input on said keyboard transmitting said entered decimal number to said display register for storing said entered decimal number in a binary coded form until a certain response-type message is received from said computer, at which time said stored decimal number is automatically transmitted as an input message in a binary coded digital form to said computer.



## 4,017,836

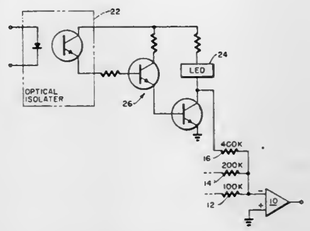
## EVENT STACKER AND DISPLAY DEVICE

**Wesley R. Paulson, Ventura, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Apr. 5, 1976, Ser. No. 673,494**

**Int. Cl.² G08B** *29/00;* **H03K** *13/04*

**U.S. Cl. 340—172** **7 Claims**




1. An event stacker and display device for encoding a multiplicity of event signals into a single output source comprising:

a. optical isolator means for transmitting event signals produced by test equipment;

b. Darlington amplification means for amplifying said event signals transmitted by said optical isolator means;

c. display means connected to said Darlington amplification means for indicating the presence of said event signals;

d. resistive means connected between a summing junction and said display means; and

e. operational amplification means connected to said summing junction for amplitude encoding said event signals into a single output source.

## 4,017,837

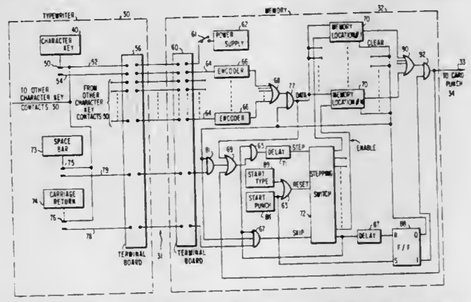
## DATA ENTRY SYSTEM

**Charles W. Lansing, Lake Monroe, and Joseph S. Zajicek, Orlando, both of Fla., assignors to TDX, Inc., Orlando, Fla.**

**Continuation of Ser. No. 392,663, Aug. 29, 1973, abandoned. This application July 25, 1975, Ser. No. 599,119**

**Int. Cl.² G06F** *3/08, 3/10*

**U.S. Cl. 340—172.5** **2 Claims**




1. A system for recording data characters on a form in a written representation, permitting use of the form as a business document, and in a punched code representation, permitting use of the form as a data processing system input device, said system comprising:

first means for generating written representations of data characters on the form in any locations desired for making the form usable as a business document, said means comprising a typewriter having a plurality of character keys, each character key corresponding uniquely with a data character, each character having sensing means for sensing actuation of the character key;

second means for generating first coded representations of

the data characters which are defined by the generation of said written representations of data characters by said first means, said means comprising encoding means responsive to the sensing means for generating the first coded representation of the data character associated with an actuated character key;

memory means coupled to the second means for storing the first coded representations of the data characters;

card punch means coupled to the memory means for receipt therefrom of the first coded representations of the data characters for punching second coded representations of the data characters in the form in locations making the form usable as an input device for a data processing system; and

control means for said memory means capable of alternatively assuming a first state in which said memory means is enabled to store the first coded representations of the data characters and a second state in which said memory means is enabled to apply the stored first coded representations of the data characters to said card punch means.

## 4,017,838

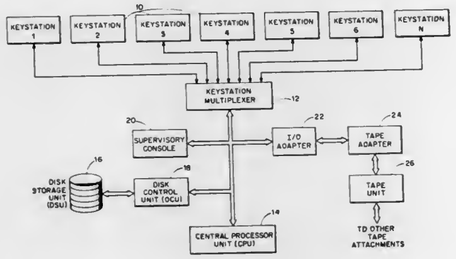
## DATA ENTRY AND RECORDING SYSTEM HAVING FIELD CORRECT CAPABILITY

**Janice K. Breyer, Herndon, Va., assignor to Honeywell Information Systems, Inc., Waltham, Mass.**

**Continuation of Ser. No. 348,783, April 6, 1973, abandoned. This application Sept. 19, 1974, Ser. No. 507,507**

**Int. Cl.² G06F** *7/22*

**U.S. Cl. 340—172.5** **2 Claims**




1. In a data entry and correction system comprising at least one data entry means and a processor including storage means having a plurality of locations, each of said locations having a unique address, means for addressing said locations in said storage means, means, included in said data entry means, said processor and said means for addressing and responsive to a determination by decoder means that data received by means of said data entry means in a data character, for entering said data received in one of said locations of said storage means, first and second registers and said decoder means, a method for entering and correcting data comprising the steps of:

A. determining, by means of said decoder means, whether data received from said data entry means is a function character or a said data character, said function character indicating that data correction is to be performed;

B. storing in said first register the address of a one of said locations in said storage means in which a data character was last entered, said last-mentioned location hereinafter referred to as said latest location, and wherein said method further comprises the following method steps upon determining that said data received is a function character;

C. addressing, by means of said means for addressing, a one of said locations in said storage means in which a said data character has been previously incorrectly entered and which is to be corrected, said last-mentioned location hereinafter referred to as the update location;

D. storing the address of said update location in said second register;

E. entering, by means of said data entry means and by means of said means for addressing in response to the address stored in said second register, the correct data character in said update location;

F. reentering, by means of said data entry means, previously entered data characters in a predetermined number of locations following said update location;

G. automatically addressing, by means of said means for addressing and in response to the address stored in said second register, said update location immediately after reentering data in the last location of said predetermined number of locations;

H. detecting that said update location has been addressed during said step of automatically addressing; and

I. addressing, in response to the detection that said update location has been automatically addressed, said latest location whose address is contained in said first register, whereby an operator may proceed to enter a data character beginning with a one of said locations succeeding said latest location after said data correction has been performed.

## 4,017,839

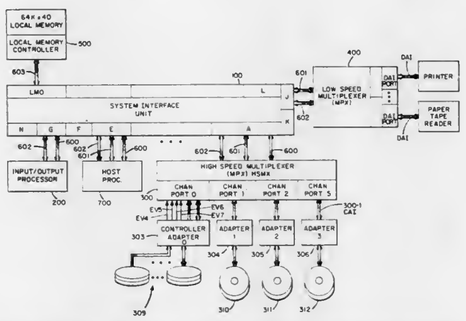
## INPUT/OUTPUT MULTIPLEXER SECURITY SYSTEM

**Jaime Calle, Glendale, and V. Michael Griswold, Phoenix, both of Ariz., assignors to Honeywell Information Systems, Inc., Waltham, Mass.**

**Filed June 30, 1975, Ser. No. 591,563**

**Int. Cl.² G06F** *9/18, 3/00*

**U.S. Cl. 340—172.5** **25 Claims**




22. In a data processing system having addressable memory module means for storing program instructions, processor module means for generating commands in response to said program instructions, said processor module means including control means for processing detected conditions using a number of control routines stored in said memory module, at least one input/output multiplexer module means having a plurality of ports coupled to a plurality of peripheral devices for processing event signals occurring during input/output operations executed in response to user program instructions and said memory module means and system interface means interconnected between each of said module means for establishing paths of communication between pairs of said module means, said multiplexer module means comprising:

a plurality of channel sections, each section being coupled to a different one of said ports, each of said channel sections including a number of registers arranged for storing data and control information transferred by said commands, generated in response to instructions for controlling the operation of said channel sections, required for execution of said input/output operations by said multiplexer module means;

first and second registers, said first register connected to receive each of said commands and said second register connected to receive the data to be transferred in accordance with said commands; and,



control means for controlling the operation of said multiplexer module means, said control means being coupled to each of said registers, said control means including:

logic gating means for generating output signals, said logic gating means being coupled to different ones of said number of registers; and,

input means coupled to said first register and to said logic gating means, said input means being operative in response to each command coded to specify the loading of one of said number of registers designated as restricted to condition said logic gating means to generate an output signal for enabling the loading of said one register of said number of registers only when each said command is coded to indicate that said loading is permitted by said system and to inhibit said logic gating means from generating said output signal when each said command is coded to indicate that said loading is required to be effected by one of said control routines in lieu of said instructions controlling one of said channel sections to ensure the security of the system.

## 4,017,840

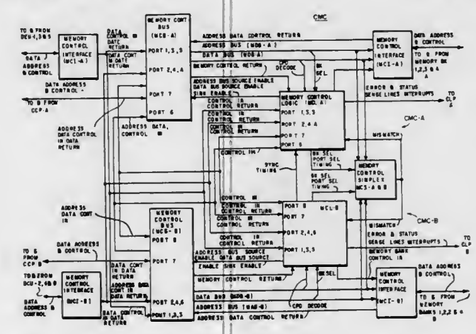
## METHOD AND APPARATUS FOR PROTECTING MEMORY STORAGE LOCATION ACCESSES

**Kasimir W. Schild, Needham Heights, Mass.; Richard D. Fleming, Geneva, Ohio, and Phil R. Harrington, Mount Prospect, Ill., assignors to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.**

**Filed June 15, 1973, Ser. No. 370,559**

**Int. Cl.² G06F** *13/00*

**U.S. Cl. 340—172.5** **11 Claims**



1. In a communication switching system, including switching network means, data processing means for controlling apparatus to effect connections over said switching network means, said data processing means including a memory control arrangement including a central processor means, a computer main memory means having a plurality of addressable locations for storing data and instructions for said central processor means, a plurality of auxiliary memory means for storing additional data and instructions for said central processor means, and memory control means for providing access to said computer main memory means for said auxiliary memory means and said central processor means, different predetermined blocks of said data storage locations in said main memory means being assigned to different ones of said auxiliary memory means as an initialization table for the auxiliary memory means for storing data transferred to said main memory means from the corresponding auxiliary memory means to enable access thereof by the central processor means, said memory control means including first means responsive to a memory access request provided by one of said auxiliary memory means, said request including an address of said main memory means and a control input indicating a read or write operation, to determine if the address provided by a given auxiliary memory means corresponds to one of the data storage locations of the initialization table of a different one of said auxiliary memory means, and second means responsive to said first means for aborting a write operation whenever a given auxiliary memory means addresses a data storage location in the initialization table assigned to a different one of said auxiliary memory means as determined by said second means.

## 4,017,841

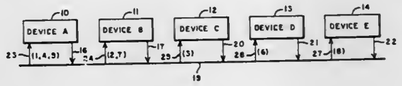
## BUS ALLOCATION CONTROL APPARATUS

**Earl D. Jensen, Bloomington, Minn., assignor to Honeywell Inc., Minneapolis, Minn.**

**Continuation of Ser. No. 418,407, Nov. 23, 1973. This application July 21, 1975, Ser. No. 597,858**

**Int. Cl.² G06F** *9/18*

**U.S. Cl. 340—172.5** **4 Claims**




1. In a digital processing system:

a data bus;

a plurality of devices containing data to be communicated on said data bus, the data communicated by each device including at least an END OF DATA signal;

self-recycling counter means in each device adapted for incrementation through a repeating cycle of counts in response to successive END OF DATA signals;

means in each device connecting said counter means to said bus so that the counter means in all of said devices are synchronously incremented by each END OF DATA signal;

output means in each device selectively operable to permit transmission of data in said device to said data bus; and

further means in each device for causing operation of said output means only when the count of END OF DATA signals has one or more predetermined values in the cycle of counts.

## 4,017,842

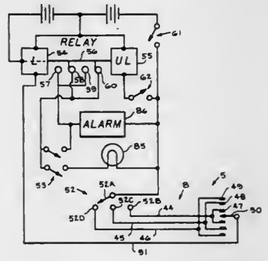
## SWIMMING POOL ALARM SYSTEM AND METHOD WITH ADJUSTABLE SENSITIVITY

**Mark K. Vineyard, 1617 Fannin - Apt. 1114, Houston, Tex. 77002**

**Filed Oct. 21, 1974, Ser. No. 516,143**

**Int. Cl.² G08B** *21/00*

**U.S. Cl. 340—261** **7 Claims**




1. A security system for a swimming pool and the like, including

a detector section having a plurality of stationary electrodes spaced different predetermined distances from a reference point functionally related to the normal water level in said pool and further having a contactor electrode

movable toward said stationary electrodes through distances functionally related to the heights of disturbances of the surface of the water in said pool,

an electrical cable extending from said detector section to an observation site and having a plurality of conductors each connected to a different one of said electrodes in said detector section,

an alarm section located at said observation site and having a selector switch interconnected with said conductor coupled to said movable electrode and connectable to a selected one of said conductors coupled with said stationary electrodes,

said detector section further comprising an arcuately movable lever arm having said contactor electrode fixed to one end for positioning at a reference location relative to said stationary electrodes,

a bouyant member fixed to the other end of said lever arm for disposition in said water, and

attachment means for pivotally supporting said lever arm adjacent the side of said swimming pool directing movement of said contactor arcuately in a generally vertical plane relative to said surface of said water in said pool.

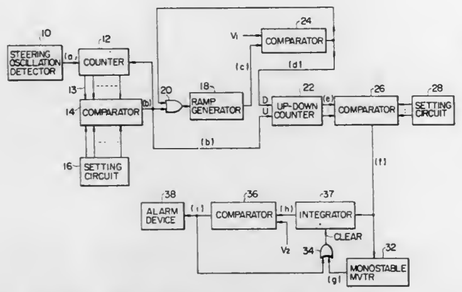
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**4,017,843**

## VEHICLE DRIVER ALERTNESS APPARATUS MONITORING STEERING WHEEL OSCILLATIONS

**Takayuki Yanagishima, Yokohama, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan**

**Filed Feb. 5, 1976, Ser. No. 655,580**
**Claims priority, application Japan, Feb. 7, 1975, 50-16476**
**Int. Cl.² G08B 21/00; B60Q 5/00**
**U.S. Cl. 340—279** **7 Claims**




1. A vehicle safety apparatus comprising:

means for detecting movements associated with the driving activity of a vehicle driver to produce a first signal in response to a predetermined number of said movements;

means for producing a second signal when the interval between successive first signals is greater than a predetermined period of time;

an integration circuit for producing a third signal of which the magnitude increases in response to the first signal and decreases in the presence of the second signal;

means for producing a fourth signal when the magnitude of the third signal reaches a preset value; and

a utilization circuit responsive to the fourth signal to alert the vehicle driver.

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**4,017,844**

## FIRE PROTECTION APPARATUS

**Enio Facchini, Framingham, and Carl I. Swanson, Boylston, both of Mass., assignors to Walter Kidde & Company, Inc., Clifton, N.J.**

**Filed July 14, 1975, Ser. No. 595,626**
**Int. Cl.² G08B 25/00**
**U.S. Cl. 340—289** **7 Claims**

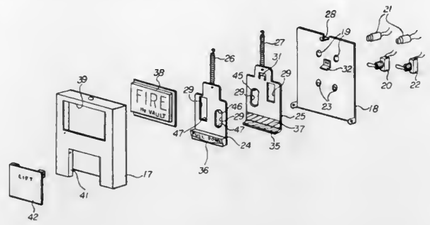
1. Fire control apparatus comprising:

a box for mounting on a support surface;

a first electrical switch mounted in said box and manually operable from an open to a closed position;

latch means for latching said first switch in said closed position;

a second electrical switch mounted in said box and manually operable from an open to a closed position;




restoring means for returning said second switch to said open position after being manually actuated into said closed position; and

mechanical indicator means for providing a visual indication in response to movement of said first switch into said closed position.

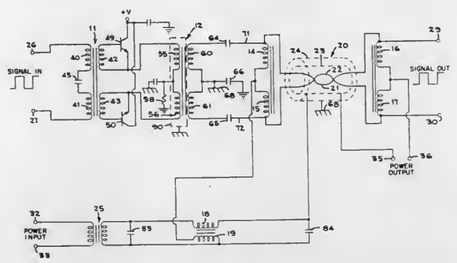
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**4,017,845**

## CIRCUITRY FOR SIMULTANEOUS TRANSMISSION OF SIGNALS AND POWER

**Thomas M. Kilian, Blaine, and Mark D. Ryan, Fridley, both of Minn., assignors to FMC Corporation, San Jose, Calif.**

**Filed June 16, 1975, Ser. No. 587,525**
**Int. Cl.² H04M 11/04**
**U.S. Cl. 340—310 R** **8 Claims**




4. Circuitry for simultaneous transmission of high frequency signals and low frequency power between distant points, for use with a source of high frequency signals having a pair of output leads and a low frequency power supply, said circuitry comprising: a transmission line having a twisted pair of wires and a shield enclosing said wires; means for connecting said power supply between said shield and each of said wires at a first end of said transmission line; means for connecting one of said output leads from said source of high frequency signals to a first one of said wires; means for connecting the other of said output leads to a second one of said wires at said first end of said transmission line, said means for connecting said source of high frequency signals to said first wire and to said second wire each including means for preventing said low frequency power from being coupled to said source of high frequency signals; a pair of power output terminals, one of said power output terminals being connected to said shield at a second end of said transmission line; and means for coupling the other of said power output terminals to each of said wires at said second end of said transmission line so that said high frequency signals are available between said first and said second wires at said second end of said transmission line.



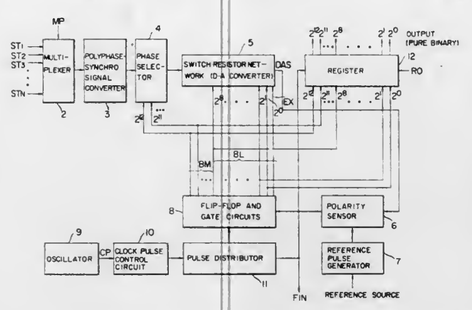
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**4,017,846**

## SYNCHRO-TO-DIGITAL CONVERTER

**Shigeru Aramaki, Tokyo, Japan, assignor to Tamagawa Seiki Kabushiki Kaisha, Japan**

**Continuation of Ser. No. 347,339, April 2, 1973, abandoned.**
**This application Apr. 17, 1975, Ser. No. 568,982**
**Int. Cl.² G08C 9/00**
**U.S. Cl. 340—347 SY** **1 Claim**




1. A synchro-to-digital signal converter comprising, in combination, a polyphase-synchro signal converter connected to a synchro system to receive synchro signals therefrom, and including operational circuits each comprising an operational amplifier, first and second resistors connected in the input side of said operational amplifier, and a third resistor provided in a feedback circuit of said operational amplifier, whereby, upon reception of an output signal from a synchro rotor corresponding to an input rotational angle $\theta$ thereof, said operational circuits provide $2^n$ electrical output signals where $n$ is an integer greater than zero, having a phase angle $\alpha$ for the input rotational angle $\theta$ in the form of

$$E_m K \sin(\theta+\alpha)$$

where $E_m$ is a maximum value of a voltage

$$K=\sqrt{\left(a-\frac{b}{2}\right)^2+\left(\frac{\sqrt{3}}{2}b\right)^2},\quad a=\frac{r_3}{r_1}\text{ and }b=\frac{r_3}{r_2}$$

$$\alpha=\tan^{-1}\frac{\frac{\sqrt{3}}{2}b}{a-\frac{b}{2}},$$

thereby to obtain output signals corresponding to an $2^n$ phase synchro; a phase selector connected to the output of said synchro signal converter and operable to supply two selected adjacent output phase signals; a single D-A converter connected to the output of said phase selector and receiving said two selected phase signals therefrom, and driven by pure binary coded signals; and an operational device, connected to said D-A converter, having a reference pulse generator for generating timing pulses synchronized with a half period of a carrier for the synchro system and operable to initiate operation of said operational device and also to generate a train of polarity discriminating pulses, a polarity sensor connected to said reference pulse generator and to said D-A converter for discriminating polarity of an output signal from said D-A converter, an oscillator generating clock pulses, a pulse distributor connected to said oscillator, flip-flop and gate circuits connected to said pulse distributor, and a clock pulse control circuit connected between said oscillator and said pulse distributor for controlling the introduction of said clock pulses to said pulse distributor and said flip-flop and gate circuits, whereby the operation of said operational device is initiated upon generation of said timing pulses, with all of the flip-flops outputs from said flip-flop and gate circuits being set to "0" upon reception of a first allocating pulse from said pulse generator, and the subsequent delivery of a second allocating pulse ad succeeding allocating pulses from said pulse distributor temporarily setting the flip-flop outputs, from the higher bit to the lower bit, to "1" through the flip-flop and gate circuits, the "1" state of the flip-flop outputs being maintained or converted to "0" depending on a polarity signal simultaneously delivered to said flip-flop and gate circuits from the said polarity sensor, thereby to carry out operation up to the least significant bit, and, when the operation up to the least significant bit is completed, delivering an operation completion signal; said operational device being connected to said phase selector to supply the higher bit signals thereto to select said two adjacent phase signals from said polyphase-synchro signal converter for supply to said single D-A converter; said operational device being connected to said D-A converter to supply the lower bit signals thereto for driving said D-A converter to convert the rotational angle of a synchro input shaft into a value expressed in a pure binary code.

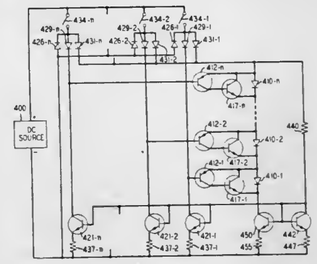
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**4,017,847**

## LUMINOUS INDICATOR WITH ZERO STANDBY POWER

**Thomas Maynard Burford, Summit, and George Raymond Westerman, Denville, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed Nov. 14, 1975, Ser. No. 631,921**
**Int. Cl.² G09F 9/32**
**U.S. Cl. 340—336** **4 Claims**




1. An indicator circuit comprising a plurality of LED elements each having an anode and a cathode, said LEDs being connected in like polarity series relation to form a series circuit having an anode end and a cathode end; a voltage source having first and second terminals; a switching device for each LED comprising a path connected in parallel with said LED and a control electrode; first means connected to said control electrode for applying a first signal to said control electrode for rendering said path conductive and for applying a second signal to said control electrode for rendering said path nonconductive; each first means comprising a switch having first and second terminals, a first diode having an anode and a cathode, a first transistor having a collector, an emitter and a base, and a first impedance; said voltage source first terminal being connected to said switch first terminal; said switch second terminal being connected to said first diode anode; said first diode cathode being connected to said first transistor collector and to said control electrode; said first transistor emitter being connected to said voltage source second terminal through said first impedance; means for applying a predetermined current to said series circuit only when at least one of said switches is closed comprising a plurality of second diodes each having an anode and a cathode, a second transistor and a third transistor each having a collector, an emitter and a base, and second, third and fourth impedances; one second diode anode being connected to the second terminal of one of said switches; the cathode of each second diode being connected to the anode end of said series LED circuit and to said second transistor collector through said second

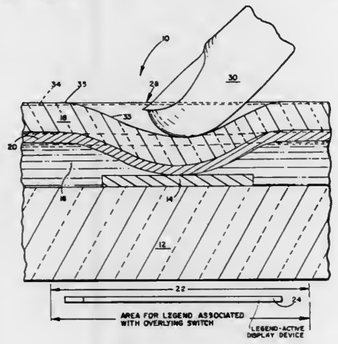
impedance; said second transistor collector being connected to said second transistor base, the base of each first transistor, and the base of said third transistor; said second transistor emitter being connected through said third impedance to the voltage source second terminal; said third transistor collector being connected to the cathode end of said series LED circuit; and said third transistor emitter being connected to said voltage source second terminal through said fourth impedance.

## 4,017,848

### TRANSPARENT KEYBOARD SWITCH AND ARRAY

**Lawrence E. Tannas, Jr., Orange, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.**

**Filed May 19, 1975, Ser. No. 579,114**
**Int. Cl.² G08C** *1/00*
**U.S. Cl. 340—365 R** **8 Claims**



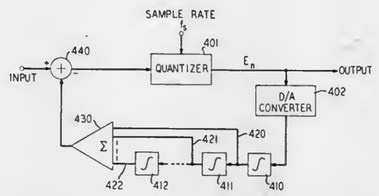

**1.** An operator guiding switch array comprising:
transparent switch array means having a plurality of switch areas and comprising:
transparent, electrically insulating, switch substrate means having upper and lower surfaces;
transparent lower switch electrode means disposed on said upper surface of said switch substrate means;
a layer of transparent dielectric fluid disposed over said upper surface of said switch substrate means and said lower switch electrode means;
transparent flexible film means disposed over said said dielectric fluid;
transparent upper switch electrode means disposed on said film means, interposed between said film means and said dielectric fluid at least in selected locations and overlapping said lower switch electrode means at at least one location within each switch area of the array;
within each switch area of the array, said upper and lower switch electrode means together comprising the contacts of a normally open switch which may be closed by application of pressure to said flexible film means within said switch area;
legend means disposed beneath said lower surface of said switch substrate means for indicating the functions of the individual switch areas;
means for selectively obscuring images viewed through selected ones of said switch areas in accordance with external control signals, said means for obscuring comprising liquid crystal display means disposed between said switch substrate means and said legend means, said liquid crystal display means comprising:
transparent electrically insulating display substrate means having upper and lower surfaces;
transparent display lower electrode means disposed on said upper surface of said display substrate means;
a layer of a nematic liquid crystal disposed over said upper surface of said display substrate means and said lower display electrode means;
transparent display faceplate means disposed over said layer of liquid crystal material;
transparent upper display electrode means disposed on said display faceplate means, interposed between said faceplate means and said liquid crystal at least in selected locations and overlapping said lower display electrode means within areas aligned with selected switch areas;
said upper and lower display electrodes being configured to define liquid crystal display areas which are substantially coextensive with switch areas vertically aligned therewith, said display areas being selectively controllable for obscuring images viewed through said display areas and the aligned switch areas, in accordance with an external display control signal whereby the legend associated with an individual switch area may be obscured in response to said external control signals to indicate that the associated switch should not be activated.

## 4,017,849

### APPARATUS FOR ANALOG TO DIGITAL CONVERSION

**Stuart Keene Tewksbury, Middletown, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed Aug. 28, 1975, Ser. No. 608,524**
**Int. Cl.² H03K** *13/22*
**U.S. Cl. 340—347 AD** **7 Claims**




**1.** A differential pulse code modulation encoder for converting an analog input signal to a digital output signal, said output signal representing the difference between said input signal and a decoded version of said output signal, comprising
a comparator for generating an error signal formed by subtracting said decoded version of said output signal from said input signal,
quantizing means substantially instantaneously responsive to said comparator for generating said digital output signal by sampling said error signal and converting said samples to digital form, and
means for generating said decoded version of said output signal characterized by a digital to analog converter for generating an intermediate analog signal in response to said digital output signal, a serial chain of at least three integrators for receiving said intermediate analog signal, and means for summing the outputs of each of said integrators of said chain.

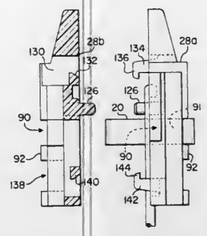
## 4,017,850

### MAGNETIC KEYSWITCH WITH TWO-PIECE SUPPORT ASSEMBLY

**Edward W. Wanatowicz, Jr., Elk Grove Village, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.**

**Filed Feb. 2, 1976, Ser. No. 654,429**
**Int. Cl.² G08C** *1/00*
**U.S. Cl. 340—365 L** **10 Claims**

**1.** A keyboard switch comprising a housing, an actuating member and at least one permanent magnet coupled to said actuating member so as to change from a first position to a second position when said actuating member is actuated, a support assembly comprising at least one magnet core, a drive wire threaded through said core, at least one sense wire threaded through said core and an electrically insulating support element for supporting said magnetic core in a loosely retained manner and for also supporting said drive and sense wires, said drive and sense wires being configurated so that their terminating permanent ends may be connected into the apertures of a printed circuit board, said magnetic core being magnetically saturated when said permanent magnets are in one of their positions and said magnetic core being unsaturated when said permanent magnets are in other of their positions, said support assembly comprising two substantially identical molded plastic members which receive said core




therein and interlocking, snapped-together retention means provided on said plastic members whereby the insertion of said core and said drive and sense wires may be achieved at a location remote from the location at which said plastic members are molded.

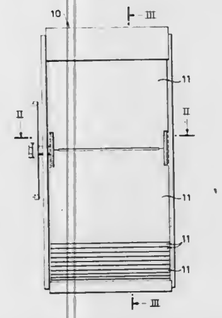


## 4,017,851

### POSITION-CONTROL MECHANISM FOR STEPWISE ROTATING MEMBERS

**Fortunato Felice, Udine, Italy, assignor to Solari & C. Udine S.p.A., Udine, Italy**

**Filed Aug. 27, 1975, Ser. No. 608,325**
**Claims priority, application Italy, Sept. 4, 1974, 26931/74**
**Int. Cl.² G08B** *5/00*
**U.S. Cl. 340—379** **2 Claims**



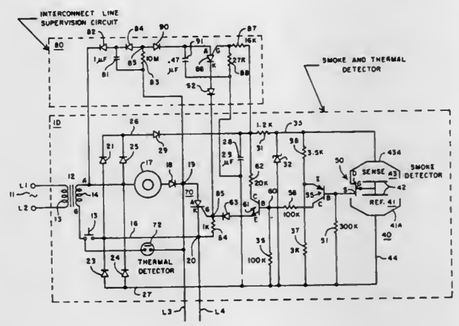

**1.** In a signalling apparatus including a signalling member, a step-by-step polarized motor having a rotor provided with a succession of poles of alternate polarity and a stator provided with two pole shoes alternately excited with different polarities, continuous drive transfer means connecting the signalling member to the motor rotor in such a manner as to cause the signalling member to be rotated stepwise at a speed which is a first integral submultiple of the rotating speed of the motor rotor, first sensing means for sensing the steps of rotation of the signalling member and second sensing means for sensing the passage of the signalling member through a predetermined angular position, the improvement comprising a rotating magnet having opposite poles, said first and second sensing means being constituted by respective first and second magneto-sensitive members, said first magneto-sensitive member being located in a fixed position near the rotor of the motor so as to sense successively the passage of the poles of the said rotor during rotation thereof and the second magneto-sensitive member being associated in a fixed position relative to said rotating magnet so as to sense the passage of one of the poles thereof at each rotation of said rotating magnet, discontinuous drive transfer means connecting said rotating magnet to the motor rotor in such a manner that each rotation of the motor rotor causes the rotating magnet to be rotated at the same speed thereof through a step of rotation which is a second integral sub-multiple of a complete rotation of the rotating magnet, said first and second submultiples being equal to one another so that the rotating magnet makes a complete rotation for each rotation of the signalling member.

## 4,017,852

### APPARATUS FOR SUPERVISING LEADS INTERCONNECTING A PLURALITY OF SELF-CONTAINED ABNORMAL CONDITION SENSING AND ALARM ANNUNCIATING UNITS

**John L. Kabat, Bloomington, Minn., assignor to Honeywell Inc., Minneapolis, Minn.**

**Filed June 24, 1976, Ser. No. 699,420**
**Int. Cl.² G08B** *17/00*
**U.S. Cl. 340—409** **4 Claims**




**1.** An alarm system comprising:
a. a plurality of self-contained abnormal condition sensing and alarm annunciating units with each of said units comprising:
i. a pair of terminals adapted to be connected to a source of alternating current electric power;
ii. an alarm annunciator;
iii. normally open switch means;
iv. condition sensing means including means connected to said normally open switch means and responsive to an abnormal condition for causing said normally open switch means to close;
v. diode means; and
vi. means connecting said annunciator, said diode means and said normally open switch means in series and to said terminals whereby closing of said normally open switch means functions to allow half wave current to flow through said alarm annunciator to thereby annunciate an alarm;
b. a pair of leads interconnecting said plurality of units, said leads being connected respectively to opposite sides of said normally open switch means of said units whereby operation of the condition sensing means of any of said units in response to an abnormal condition functions to close its associated switch means to thus actuate the alarm annunciators of all of said units;
c. second diode means connected across said interconnecting leads and poled in opposition to said first-recited diode means; and
d. line supervision means integral with at least one of said units and being connected to said interconnecting leads and to the normally open switch means of said one of said units, said line supervision means including circuit means which cause half wave current flow through said second diode means as long as there is line continuity in said interconnecting leads, said circuit means further having means responsive to an interruption of such half wave current flow through said second diode means so as to cause said one of said normally open switch means to intermittently close and open to thereby actuate its asso-

ciated alarm annunciator to produce an intermittent alarm.

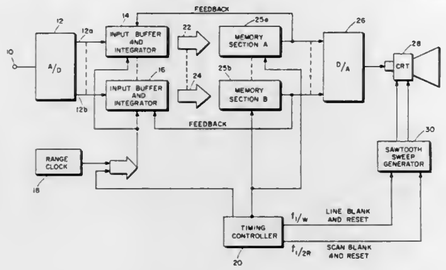
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**4,017,853**

## RADAR DISPLAY SYSTEM

**Ruy L. Brandao, and Robert A. Taylor, both of Fort Lauderdale, Fla., assignors to The Bendix Corporation, Southfield, Mich.**

**Filed July 11, 1975, Ser. No. 595,967**
**Int. Cl.² G01S 9/02; G11C 8/00**
**U.S. Cl. 343—5 DP** **3 Claims**




1. A digital data display system for displaying digital data bursts comprised of digitized data, each said data burst being related to a particular azimuth line of data to be displayed and including a memory means having a plurality of memory cells, said memory means being divided into groups of memory cells, each said group being associated with and for storing one of said data bursts, and addressing means for addressing each memory cell, seriatim, of a particular group at least twice before addressing the memory cells of a successive group, said display system having display means normally responsive to the data stored in a memory cell being then addressed and an input buffer for storing said data bursts prior to being stored in said memory means and until the particular group of memory cells associated with a data burst stored in said input buffer is addressed by said addressing means, said input buffer and memory means being responsive when the group of memory cells associated with a data burst stored in said input buffer is addressed for storing said data burst stored in said input buffer into its associated group of memory cells, said addressing means including means for suppressing said response of said input buffer and memory means to enter data bursts into said memory means after a group of cells is addressed once and until a subsequent group of cells is addressed.

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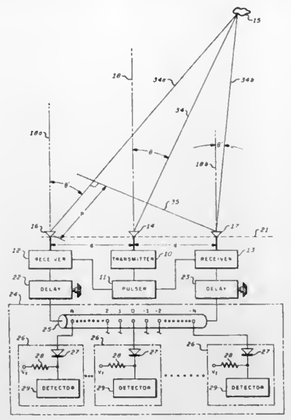
**4,017,854**

## APPARATUS FOR ANGULAR MEASUREMENT AND BEAM FORMING WITH BASEBAND RADAR SYSTEMS

**Gerald Fred Ross, Lexington, Mass., assignor to Sperry Rand Corporation, New York, N.Y.**

**Filed Aug. 21, 1975, Ser. No. 606,673**
**Int. Cl.² G01S 9/02, 3/50**
**U.S. Cl. 343—16 R** **5 Claims**

1. An apparatus for angular measurement and beam forming with baseband radar systems comprising:
transmitter means for radiating baseband electromagnetic pulses to illuminate an object to be detected;
first and second receiver means spaced apart and symmetrically disposes with respect to said transmitter means for receiving baseband electromagnetic pulses reflected from said object; and
means coouppled to said first and second receiver means for determining the time delay between the reception of said reflected baseband pulse at said first receiver means and the reception of said reflected baseband pulse at said second receiver means said time delay determining said angular position of said object within a beam in space having an effective beam width that is a function of the




ratio of the width of said baseband pulse to said spacing between said receiver means.

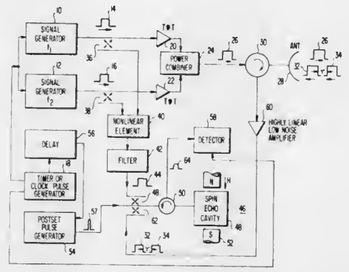
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**4,017,855**

## SPIN ECHO MATCHED FILTER ECM DETECTOR

**Daniel C. Buck, Hanover, and Dickron Mergerian, Baltimore, both of Md., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed Jan. 29, 1973, Ser. No. 327,538**
**Int. Cl.² G01S 7/36**
**U.S. Cl. 343—18 E** **11 Claims**




1. An intermodulation product frequency detector of a received RF signal comprising in combination:
a first and second RF source respectively generating transmitted pulses of a first and second instantaneous carrier frequency simultaneously and having a predetermined frequency difference therebetween;
means coupled to said first and second RF source for sampling a portion of said pulses transmitted and providing a composite RF pulse therefrom having intermodulation product frequencies substantially the same as those to be detected;
a spin echo system operable as a matched filter coupled to said above recited means and having a microwave cavity with a paramagnetic sample located therein tuned to a paramagnetic resonance center frequency in the region of said intermodulation product frequencies, said spin echo system receiving as a first input signal said composite RF pulse;
another RF source generating a RF pulse having a bandwidth substantially covering the frequency spectrum of said intermodulation product frequencies after a predetermined time delay and including means coupling said RF pulse as a second input to said spin echo system for setting the spin system of the paramagnetic sample to said composite RF pulse; and
relatively highly linear circuit means coupling said received RF signal to said spin echo system, said RF signal causing a spin echo signal to be produced after said predetermined time delay in the event that intermodulation product frequencies to be detected are present.



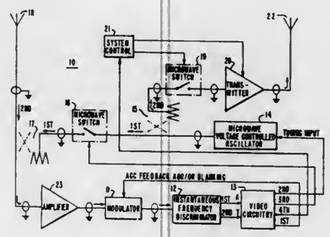
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**4,017,856**

## SELF-CALIBRATING MICROWAVE TRANSPONDER

**Richard J. Wiegand, Severna Park, Md., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed Mar. 10, 1976, Ser. No. 665,464**
**Int. Cl.² G01S 7/38, 7/40**
**U.S. Cl. 343—18 E** **9 Claims**




1. A self-calibrating microwave transponder for generating RF signals in response to the carrier frequency of received RF signals comprising:
an RF amplifier coupled to an input for receiving and amplifying said received RF signals;
a modulator coupled to said RF amplifier for limiting the amplitude of said RF signals;
an instantaneous frequency discriminator coupled to said modulator and having a first and second output terminal for providing a first and second video signal in response to said RF signals;
circuit means coupled to said first and second output terminal for generating a memory address signal;
memory means coupled to said circuit means for providing a memory output in response to said memory address signal;
a microwave voltage controlled oscillator coupled to said memory means and responsive to said memory output for providing an RF output signal; and
self-calibrating means for storing voltage values into said memory means.

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**4,017,857**

## COMPUTER TIME CLOCK

**Howard M. Evans, Jr., 6043 Bayou Grande Blvd., NE., St. Petersburg, Fla. 33703, and Lawrence F. Trodd, 3621 19th St., North, St. Petersburg, Fla. 33713**

**Filed Mar. 3, 1975, Ser. No. 555,079**
**Int. Cl.² G01B 9/00; G01D 15/34; G11B 25/04**
**U.S. Cl. 346—33 M** **8 Claims**

1. A time recording system primarily designed for use in a computerized time accounting system, said time recording system comprising: information card means configured and dimensioned to include predetermined segregated portions, said information card means comprising a magnetic portion thereon, recording clock means including an inlet aperture and an outlet aperture disposed in aligned relation to one another, card passageway means disposed at least in part on the interior of said recording clock means and in interconnected relation between said inlet and outlet apertures, card transporting means comprising drive roller means disposed in said passageway means in driving engagement with said information card means passing therealong; electromagnetic encoder means including clock means and converter means electrically connected to one another such that information signals are sent to said converter means from said clock means, said electromagnetic encoder means further comprising electromagnetic write means electrically connected to said converter means and in predetermined location adjacent to said card passageway means and in operative relation to said magnetic portion of said information card means, whereby information is encoded thereon, said electromagnetic encoder means further comprising printer means electrically connected to said converter means to receive actuating signals therefrom, whereby information is printed on said information




card means; recorder/encoder means comprising electromagnetic read means disposed in predetermined location adjacent to said information card means for reading time information on said magnetic portion, said recorder/encoder means further comprising memory means disposed in electrical communication with said electromagnetic read means, whereby said time information from said information card means is stored; said read means disposed in electromagnetic communication with a predetermined portion of said recorder/encoder means, said memory means disposed in electrical communication with said electromagnetic read means, said electromagnetic encoder means is in electromagnetic communication with a predetermined portion of said recorder/encoder means and in direct electrical communication with said memory means.

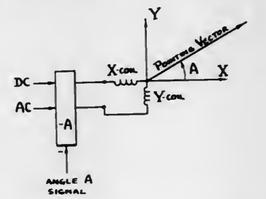
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**4,017,858**

## APPARATUS FOR GENERATING A NUTATING ELECTROMAGNETIC FIELD

**Jack Kuipers, Grand Rapids, Mich., assignor to Polhemus Navigation Sciences, Inc., Burlington, Vt.**

**Division of Ser. No. 383,688, July 30, 1973, Pat. No. 3,868,565. This application Feb. 24, 1975, Ser. No. 552,339**
**Int. Cl.² G01R 33/02; G01S 1/02**
**U.S. Cl. 343—100 R** **4 Claims**




2. Apparatus for generating a nutating electromagnetic field which comprises:
a. at least two orthogonal radiators adapted to pass a current; and
b. means for supplying the appropriate mixture of signals from sources supplying a DC signal, and a first AC signal to the radiators such that the electromagnetic field generated by

the currents in the radiators is caused to nutate about an arbitrarily specified pointing vector of the field.

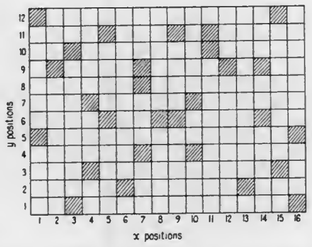
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**4,017,859**

## MULTI-PATH SIGNAL ENHANCING APPARATUS

**Herman Medwin, Pebble Beach, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Dec. 22, 1975, Ser. No. 643,047**
**Int. Cl.² G01S *1/02*; H04B *1/18***
**U.S. Cl. 343—100 CL** **5 Claims**




1. Signal-processing apparatus for enhancing the signal strength of multi-path signals derived from a signal source, comprising:

a signal-processing channel for each of said derived multi-path signals, each channel including:

a directional signal-energy transducer,

a signal-processing receiver coupled to the transducer output,

an A/D converter for said receiver output, and

a FFT digital computer coupled to said converter, said computer providing a plurality of data outputs each containing the amplitude and phase information of each of a plural number of frequencies present in said signal energy,

means for constructively adding in-phase the amplitude information of each identical frequency present in each of said channels, and

means coupled to said adding means for totalling the adder outputs for providing an output representative of the combined signal strength of fluctuating multi-path signal energy.

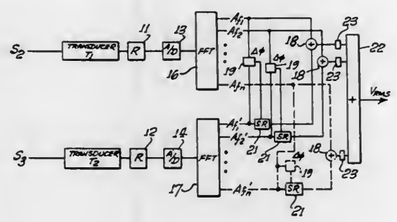
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**4,017,860**

## RADIO NAVIGATION BEACON

**Charles W. Earp, London, England, assignor to International Standard Electric Corporation, New York, N.Y.**

**Filed July 21, 1975, Ser. No. 597,369**
**Claims priority, application United Kingdom, July 30, 1974, 33574/74**
**Int. Cl.² G01S *1/40***
**U.S. Cl. 343—106 D** **9 Claims**



1. In a radio navigation device, the combination comprising:

an antenna array of $m$ elements in a plane, said array having $x$ and $y$ mutually orthogonal coordinates where $m$ $x$ $y$;

and ordering means for providing a program of utilization in $n$ successive steps, one pair of said elements being utilized during each of said steps, the elements of said pairs utilized during any one step being at the same coordinate position in a first of said coordinates and being spaced a distance along the second of said coordinates which remains fixed during each of said steps but changes a varying amount in a predetermined sense between successive ones of said steps, said programming further being such as to cause said first coordinate position of the elements of said pair along said first coordinate and the mean coordinate position of said elements of the $n$ pairs of elements along said second coordinate to vary by differing amounts between succeeding ones of said steps.

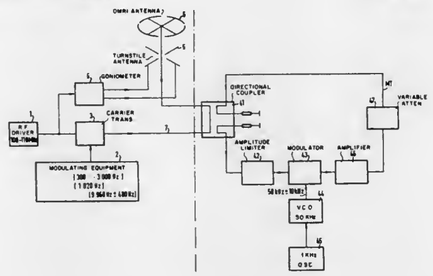
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**4,017,861**

## GROUND STATION FOR A VOR NAVIGATION SYSTEM WITH MEANS FOR IDENTIFYING SPURIOUS RESPONSES AT A REMOTE VOR RECEIVER

**Leopold Wimmer, Norderstedt; Günter Höfgen, and Werner Poschadel, both of Kornwestheim, all of Germany, assignors to International Standard Electric Corporation, New York, N.Y.**

**Filed Dec. 10, 1975, Ser. No. 639,254**
**Claims priority, application Germany, Dec. 11, 1974, 2458708**
**Int. Cl.² G01S *1/44***
**U.S. Cl. 343—106 R** **13 Claims**




1. In a ground station for VOR navigation having at least one transmitter and a plurality of radiating devices, said station radiating azimuth-dependent and azimuth-independent information, said azimuth-dependent information comprising a wave effectively amplitude-modulated at 30 Hz in the field, said azimuth-dependent information being generated by superposition of a nondirectionally radiated VHF carrier on a VHF figure-eight directional pattern, the latter being effectively rotated at an equivalent rate of 30 Hz, and said azimuth-independent reference wave comprising a 30 Hz wave contained as frequency modulation on a 9960 Hz subcarrier wave, said frequency modulated wave being a subcarrier itself contained on said VHF carrier by amplitude modulation, the combination comprising:

first means responsive to said VHF carrier for diverting a portion of said carrier and for eliminating modulation therefrom to provide an unmodulated VHF signal at the frequency of said carrier;

and second means for amplitude modulating said unmodulated VHF signal to produce a first remodulated signal with a frequency lying between the frequencies of a pair of harmonics of the modulation frequency occurring at the limits of the bandwidth of a responsive airborne receiver set to a channel adjacent to the channel of transmission of said transmitter.



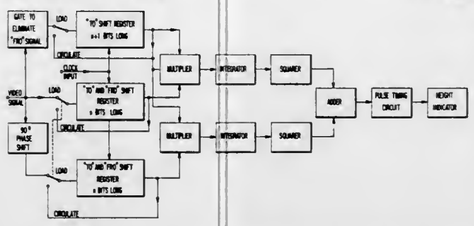
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**4,017,862**

## AIRCRAFT GUIDANCE SYSTEM

**John Paul Wild, Strathfield, Australia, assignor to Commonwealth Scientific and Industrial Research Organization, Campbell, Australia**

**Filed Oct. 15, 1974, Ser. No. 514,713**
**Claims priority, application Australia, Oct. 15, 1973, 5243/73**
**Int. Cl.² G01S *1/18***
**U.S. Cl. 343—108 M** **5 Claims**



1. A method of decoding signals received from a moving source ground installation, for an aircraft guidance system of the type comprising an array of transmitting elements located on the arc of a circle, said elements being activated progressively at the same radio frequency, first in one direction around the arc and then in the other direction said method comprising:

i. mixing the signals received from the array of transmitting elements with the signal from a continuously transmitting reference source of constant frequency, thereby obtaining, for each sweep of the signal from the array, a wave train in which the beat frequency varies progressively, and

ii. cross-correlating the wave trains thus obtained from consecutive to and fro sweeps of the signal from the array to establish the time delay between them.

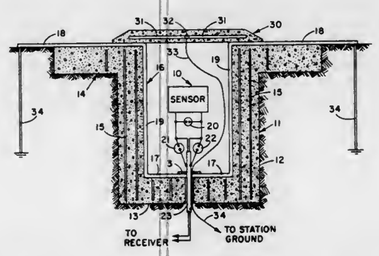
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**4,017,863**

## HARDENED ELECTROMAGNETIC WAVE ENERGY SENSOR

**Nelson B. Tharp, Ellicot City, Md.; John W. Henry, Paeonian Springs, Va., and George F. Leydorf, Birmingham, Mich., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Mar. 10, 1976, Ser. No. 665,668**
**Int. Cl.² H01Q *1/04***
**U.S. Cl. 343—719** **10 Claims**




1. Apparatus for hardening an electromagnetic wave energy sensor comprising, in combination

a concrete housing embedded in the ground and adapted to accommodate said sensor at a below ground location, said housing being constructed with an opening which is located at ground level;

a cage formed by a plurality of conductors supported by said housing and partially surrounding said sensor,

each conductor of said cage having a horizontal length portion which extends outside of said housing whereby electromagnetic wave energy appearing in the vicinity of said housing produces a current flow in said cage that provides signal coupling to said sensor; and

a protective cover closing the opening of said housing.

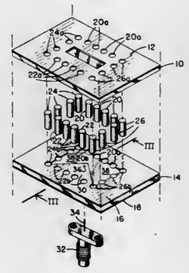
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**4,017,864**

## MODE-LAUNCHER FOR SIMULATED WAVEGUIDE

**David Proctor, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Continuation-in-part of Ser. No. 585,142, June 9, 1975. This application July 17, 1975, Ser. No. 596,930**
**Int. Cl.² H01Q *13/10***
**U.S. Cl. 343—767** **8 Claims**



1. In a coaxial to waveguide transition assembly including a coaxial connector having an inner conductor and an outer conductor, a waveguide having a conducting backwall electrically and mechanically connected to said coaxial connector outer conductor, said waveguide having top and bottom walls, sidewalls and a frontwall radiating slot, the improvement comprising:

a triangular conducting element having an apex and first and second vertices, said element being disposed intermediate said conducting backwall and said frontwall radiating slot, said element being electrically connected to said coaxial connector inner conductor.

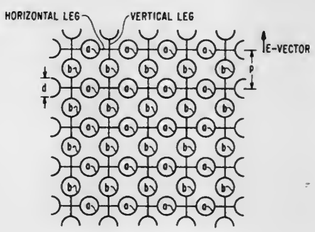
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**4,017,865**

## FREQUENCY SELECTIVE REFLECTOR SYSTEM

**Oakley McDonald Woodward, Princeton, N.J., assignor to RCA Corporation, New York, N.Y.**

**Filed Nov. 10, 1975, Ser. No. 630,696**
**Int. Cl.² H01Q *19/14***
**U.S. Cl. 343—781 CA** **9 Claims**



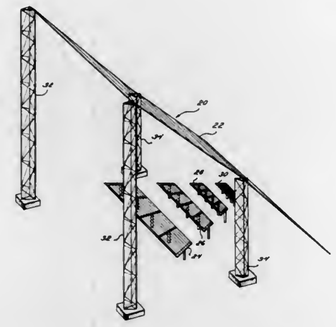

1. A self-supporting reflector adapted to pass signals at frequency $f_1$ and reflect signals at a higher frequency $f_2$ comprising:

a plurality of conductive square grids having equal length connecting legs of conductive material, at least some of said legs including a conductive ring of a diameter approximately one-third wavelength long at the frequency $f_2$

to reflect signals at frequency $f_2$, said legs being of a selected length and construction such that the inductive reactance presented by said legs at frequency $f_1$ equals the capacitive reactance of said rings at frequency $f_1$ giving parallel resonance and said reflector passes signals at frequency $f_1$ with low attenuation.

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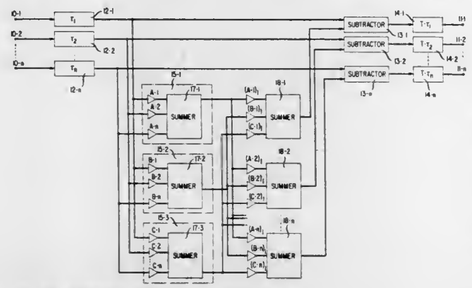
**4,017,866**
**LOG SEQUENTIAL ANTENNAS**
**Homer A. Ray, Jr., Dallas, Tex., assignor to Continental Electronics Manufacturing Co., Dallas, Tex.**
**Filed June 19, 1975, Ser. No. 589,155**
**Int. Cl.² H01Q** *11/10*
**U.S. Cl. 343—792.5** **7 Claims**



1. A log sequential antenna array for high frequency broadcasting and for communication systems comprising:
a. a plurality of feed antennas;
b. a single slanted reflector screen positioned above and overlying all of said feed antennas said slanted reflector screen having its lower end attached to the surface of the earth; and
c. means for adjusting the angle between the screen and the ground from about 8° to 45° whereby said angle is adjustable for optimum performance at any given frequency for any given target area.

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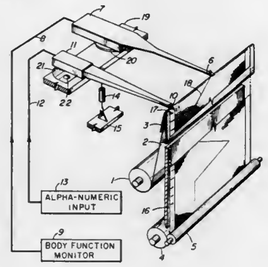
**4,017,867**
**ANTENNA ASSEMBLY PRODUCING STEERABLE BEAM AND NULL**
**Alfons Jozef Claus, Morristown, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**
**Filed Feb. 25, 1976, Ser. No. 661,060**
**Int. Cl.² H01Q** *3/26*; **G01S** *3/86*
**U.S. Cl. 343—854** **4 Claims**




1. In an antenna assembly comprising
an array of antenna elements,
a steerable beamformer which when connected to said elements establishes a sensitivity pattern containing a steerable beam, and
a processor having input ports identifiable as 1 through $n$ and output ports identifiable as 1 through $n$, said processor being connected between said elements and said steerable beamformer for reducing the sensitivity of said assembly in a steerable direction,
an improvement CHARACTERIZED IN THAT said processor comprises
at least two nonsteerable beamformers having their input ports connected in common,
means connected between said nonsteerable beamformer input ports and said processor input ports to steer a beam produced by a first of said nonsteerable beamformers in a desired direction,
said nonsteerable beamformers constructed so that said first nonsteerable beamformer establishes a sensitivity pattern with a single beam and each subsequent nonsteerable beamformer establishes a sensitivity pattern having a pair of beams whose axes of maximum sensitivity form an angle which includes all such angles formed by its predecessors,
a plurality of summers identifiable as 1 through $n$ for summing predetermined portions of the outputs from said nonsteerable beamformers, and
means for subtracting the output of each of said summers from the input to the similarly identified processor input port and applying the difference to the similarly identified processor output port, whereby signals in said differences have the same phase relations with respect to one another as they have in said processor inputs.

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**4,017,868**
**THERMAL RECORDER**
**Daniel William Keating, Wayland, Mass., assignor to American Optical Corporation, Southbridge, Mass.**
**Filed Nov. 28, 1975, Ser. No. 636,329**
**Int. Cl.² G01D** *9/28*, *15/10*
**U.S. Cl. 346—61** **7 Claims**

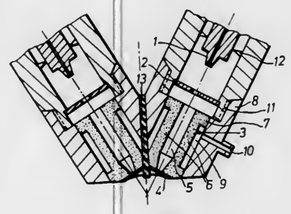



1. A medical data strip chart recorder comprising:
a strip of thermally sensitive chart paper controlled to move across a viewing platen at a predetermined linear velocity;
a knife edge member disposed transversely of the strip having at least a portion of its apex in contact therewith, the apex having a cord length and diameter greater than approximately 0.062 inch;
a galvanometric stylus responsive to a medical signal having a heated tip on its distal end in contact with the strip in a region of contact with the apex of the knife edge, thereby recording analog signals relative to the medical signal; and
a thermal printout head mounted to the distal underside of an extended cantilever arm having a matrix of resistively heated elements which when selectively energized imprint a predetermined digital code on the strip, the matrix comprising a single row of the heated elements, the row arrayed transversely of the strip having a dimension of approximately 0.1 inch in the transverse direction and a dimension of approximately 0.01 inch longitudinally of the strip, the arm being resiliently urged and positioned so as to place the head in contact with the strip in the region of contact with the knife edge, the head being transversely aligned with the heated tip and responsive to a second medical signal thereby imprinting on the strip digital indicia relative thereto in time registration with the analog signals.



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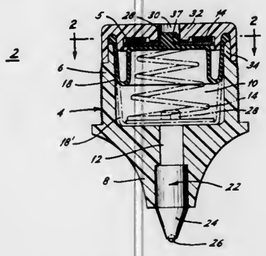
**4,017,869**
**INK RECORDER FOR THE JET-INK-PROCESS**
**Rudolf Meyer, and Klaus Hoffmann, both of Leverkusen, Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Germany**
**Filed July 8, 1975, Ser. No. 594,110**
**Claims priority, application Germany, July 13, 1974, 2433719**
**Int. Cl.² G01D** *15/18*
**U.S. Cl. 346—75** **7 Claims**



1. An ink recorder comprising a recording support; nozzles for producing at least three differently colored ink jets which are directed on to a common point lying in the plane of the recording support; and a control electrode for each nozzle, an extraction system for the ink which is not required for recording and an apertured diaphragm associated with each nozzle, the control electrodes, extraction systems and diaphragms being combined into a block, the control electrodes being electrically insulated with respect to one another and with respect to earth and the nozzles being at electrical earth potential, each nozzle and its associated control electrode, extraction system and diaphragm being concentrically disposed about a nozzle centerline, and each nozzle centerline being disposed along the generatrix of a cone whose apex is the common point.

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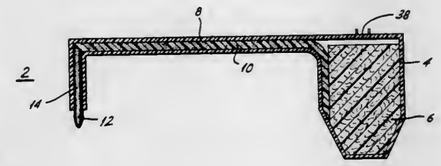
**4,017,870**
**TRUNCATED BALL PEN**
**James R. Hubbard, Moorestown, and Charles A. Erdman, Marlton, both of N.J., assignors to Graphic Controls Corporation, Cherry Hill, N.J.**
**Filed Feb. 26, 1976, Ser. No. 661,815**
**Int. Cl.² G01D** *15/16*; **B43K** *5/04*, *7/00*
**U.S. Cl. 346—140 A** **10 Claims**



1. A pen, designed to have a large internal volume contained within a short length body, comprising in combination:
a. a short axial length wide diameter barrel, said barrel having a proximal end and a distal end;
b. an ink reservoir housed inside of said barrel;
c. a writing tip assembly, one end thereof extending from a bore in said proximal end of said barrel to contact a writing surface, the other end thereof mating with said ink reservoir inside of said barrel;
d. pressure regulation means housed within said barrel adapted to exert a constant pressure across the entire cross-sectional area of said ink reservoir and in the direction of said writing tip assembly; and
e. a rollable fluid impervious diaphragm inserted inside of said barrel adapted to separate said ink supply from said pressure means.

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**4,017,871**
**MARKER WITH THREE PHASE INK CIRCUIT**
**James R. Hubbard, Moorestown, N.J., assignor to Graphic Controls Corporation, Cherry Hill, N.J.**
**Filed Feb. 9, 1976, Ser. No. 656,333**
**Int. Cl.² G01D** *15/16*
**U.S. Cl. 346—140 R** **13 Claims**



1. A pen, designed to include a writing tip remote from the pen's ink supply, including in combination:
a. a reservoir body;
b. capillary reservoir material, housed inside of said reservoir body, having a degree of capillarity suitable to retain an ink supply under normal handling, yet able to release the ink to a member of preferred capillarity;
c. an intermediate conduit having a distal end and a proximal end;
d. intermediate capillary material, housed inside of said intermediate conduit having a higher degree of capillarity than said capillary reservoir material, said intermediate capillary material to have both a distal and proximal end;
e. a generally porous writing tip, having a higher degree of capillarity than said intermediate capillary material, said distal end of said intermediate capillary material mating with said capillary reservoir material, and said proximal end of said intermediate capillary material mating with said writing tip.

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**4,017,872**
**SHUTTER FOR CAMERA**
**Hiroshi Iwata, Osaka, and Katsuji Ishikawa, Daito, both of Japan, assignors to West Electric Company, Ltd., Osaka, Japan**
**Filed Feb. 18, 1975, Ser. No. 550,367**
**Claims priority, application Japan, Feb. 22, 1974, 49-21153**
**Int. Cl.² 354** *60 A*, *234*; **G03B** *7/14*, *7/08*
**U.S. Cl. 354—29** **4 Claims**

1. The shutter for cameras comprising
a. shutter blades, shutter driving means for opening and closing said shutter blades in a succession of incremental opening motions, each of said incremental opening motions being in response to a concurrence of a shutter driving pulse and a first driving direction signal, said shutter driving means further comprising means for closing said shutter blades in a succession of incremental closing motions, each of said incremental closing motions

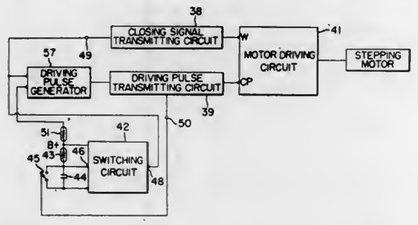
being in response to a concurrence of a shutter driving pulse and a second driving direction signal,

b. a first brightness detecting element connected to said switching circuit for providing a first brightness signal proportional to the integral with respect to time of said brightness,

c. a second brightness detecting element for providing a second brightness signal,

d. switching circuit means connected to said first brightness detecting element for providing a first switching circuit output in response to a level of said first brightness signal below a predetermined signal level and for providing a second switching circuit output in response to a level of said brightness signal above said predetermined signal level,

e. a shutter driving pulse generator connected to said switching circuit means and to said second brightness




detecting element for generating a train of pulses having a controlled pulse frequency,

f. a pulse frequency control circuit for setting the frequency of said pulse generator to a first frequency varying as a function of the magnitude of said second brightness signal in response to said first switching circuit output and for setting the frequency of said pulse generator to a second predetermined frequency higher than said first frequency in response to said second switching circuit output,

g. a pulse transmitting circuit means for transmitting said shutter driving pulses from said shutter driving pulse generator to said shutter driving means for a predetermined time, and

h. a driving direction indicating circuit for generating said first and second driving direction signals in response to said first and second switching circuit outputs from said switching circuit means to said first and second switching circuit outputs from said switching circuit means

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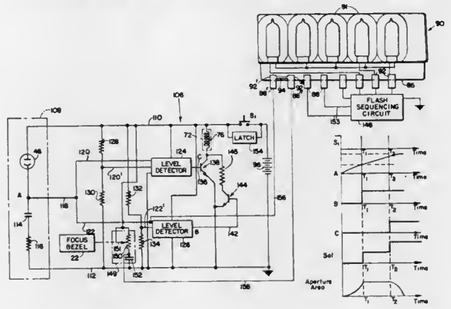
**4,017,873**

## EXPOSURE CONTROL SYSTEM WITH BRAKING CAPABILITY

**Edwin K. Shenk, Westford, and Jüerg Muggli, Woburn, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.**

**Filed Oct. 3, 1975, Ser. No. 619,385**
**Int. Cl.² G03B *7/14***
**U.S. Cl. 354—29** **22 Claims**

1. A photographic camera comprising:
a housing;
an objective lens mounted on said housing;
means within said housing for receiving a source of electrical energy;
means within said housing for defining a film exposure plane;
a blade assembly mounted and arranged within said housing for displacement from an initial closed arrangement wherein said blade assembly precludes scene light from impinging on said exposure plane to a second arrangement wherein said blade assembly defines a maximum aperture through which scene light is permitted to impinge on said exposure plane and then to a final closed arrangement wherein said blade assembly again precludes scene light from impinging on said exposure plane, such a displacement of said blade assembly serving to define an exposure interval during which scene light is incident upon said film exposure plane;
scene light detecting means energizable by the source of electrical energy for providing an output signal in correspondence to the amount of scene light detected subsequent to the commencement of an exposure interval; and
means, at least in part energizable by the source of electrical energy, for intiating the displacement of said blade assembly from its said initial closed arrangement towards its said second arrangement thereby commencing a particular exposure program defined by a plurality of exposure parameters and then, responsive to said output signal of




said scene light detecting means reaching a first predetermined value, for effecting the displacement of said blade assembly into its said final closed arrangement, and, responsive to said output signal of said scene light detecting means reaching a second predetermined value less than said first predetermined value prior to said blade assembly reaching its said second arrangement, for effecting a modification of a characteristic of a given exposure parameter associated with said particular exposure program from the character said given exposure parameter assumes in situations wherein said blade assembly arrives at its said second arrangement before said output signal of said scene light detecting means reaches its said second predetermined value.

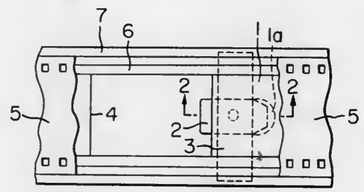
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**4,017,874**

## LIGHT INTERCEPTING DEVICE FOR DATA PHOTOGRAPHING CAMERAS

**Sachio Ohmori, Yokohama, Japan, assignor to Nippon Kogaku K.K., Tokyo, Japan**

**Filed June 12, 1975, Ser. No. 586,410**
**Claims priority, application Japan, June 21, 1974, 49-71875[U]**
**Int. Cl.² G03B *17/24***
**U.S. Cl. 354—108** **5 Claims**




1. In a camera comprising:
a camera body;
a camera aperture defined by said camera body;
lens means disposed on one side of said camera body for directing light through said camera aperture; and



a film guide mounted on the other side of said camera body to guide a length of film relatively to said aperature;
a light intercepting device which comprises:
a light intercepting member extending into said camera aperture for intercepting a part of the light passing through said camera aperture; and
fitting means formed of a resilient member and a part of said camera body cooperating therewith provided on said one side of said camera body for frictionally receiving said light intercepting member in an attachable and detachable manner.

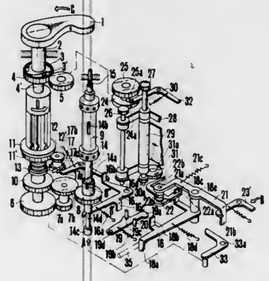
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**4,017,875**

## CAMERA ALLOWING MULTIPLE EXPOSURE

**Masayoshi Yamamichi, Kawasaki, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Aug. 26, 1975, Ser. No. 607,914**
**Claims priority, application Japan, Aug. 29, 1974, 49-99123**
**Int. Cl.² G03B *19/12***
**U.S. Cl. 354—209** **3 Claims**



1. A single lens reflex camera for multiple exposure photography including a shutter comprising:
winding means for shutter cocking;
film takeup means linked with said winding means;
manually operable clutch means normally maintained in an engaged position;
a film advancing sprocket linked with said film takeup means through said manually operable clutch means;
operating means for manually operating said clutch means;
displaceable retaining means adapted to be engaged with said operating means for retaining said clutch means in a disengaged position;
shutter releasing means; and
relieving means performing a reciprocating motion linked with said shutter releasing means; said relieving means actuating said retaining means in the advancing motion thereof to relieve said clutch means from said disengaged position to said engaged position prior to the opening function of the shutter.

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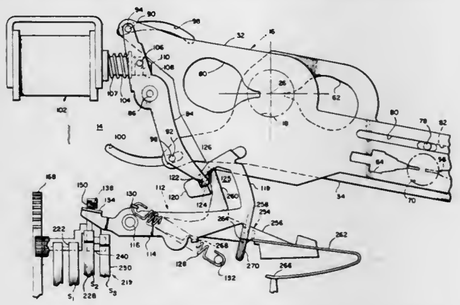
**4,017,876**

## SHUTTER LATCH SYSTEM WITH AUTOMATIC RELEASE FOR SHOCK DAMPING MEMBER

**Edward H. Coughlan, Dedham, and George D. Whiteside, Lexington, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.**

**Filed Jan. 13, 1976, Ser. No. 648,661**
**Int. Cl.² G03B *9/08*, *17/38***
**U.S. Cl. 354—230** **6 Claims**

1. A photographic camera having means for mounting photographic film material at a given focal plane, said camera comprising:
a blade mechanism;
means for mounting said blade mechanism for displacement between at least one blocking arrangement precluding transmission of scene light to the focal plane and an unblocking arrangement defining at least one aperture value structured for transmission of scene light to the focal plane;
drive means actuable for displacing said blade mechanism between its said arrangements;
latch means for initially retaining said blade mechanism in one of its said arrangements;
means at least in part electrically energizable for actuating said drive means to effect the displacement of said blade mechanism from its said arrangement wherein it is retainable by said latch means to another of its said arrangements and then back to its said arrangement wherein it is retainable by said latch means to define an exposure cycle of said blade mechanism, said latch means being structured for displacement responsive to actuation of said drive means to effect its normal release of said blade



mechanism to facilitate the movement of said blade mechanism under the influence of said drive means to define said exposure cycle, said blade mechanism also being responsive to a sudden shocking thereof for movement from its said arrangement wherein it is retainable by said latch means to another of its said arrangements; and
shock stabilizing means responsive to said shocking of said blade mechanism not resulting from said actuation of said drive means for prohibiting the release of said blade mechanism by said latch means, said latch means including means responsive to said displacement of said latch means to effect said normal release of said blade mechanism for inhibiting the operative influence of said shock stabilizing means on said blade mechanism until said blade mechanism is returned to its said arrangement wherein it is retainable by said latch means.

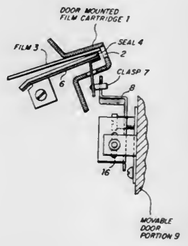
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**4,017,877**

## DEVICE FOR PREVENTING FOGGING OF FILM WITHIN A CAMERA BACK

**Robert H. Powers, Rochester, N.Y., assignor to Itek Corporation, Lexington, Mass.**

**Filed Oct. 2, 1975, Ser. No. 618,991**
**Int. Cl.² G03B *17/26***
**U.S. Cl. 354—277** **3 Claims**




1. A movable camera back member coupled to a camera,

which is placed in a closed position with respect to said camera for exposure of photosensitive material and in an open condition for access thereto comprising:

a. a cartridge within said camera back member having a feed orifice means therein through which said photosensitive material passes;

b. a light sealing member associated with said cartrdige for sealing off said feed orifice means when said sealing member is placed in a closed position and for opening said feed orifice means when said sealing member is placed in an open position; and,

c. sealing member actuation means for causing said sealing member to be placed in said open position when said movable camera back member is placed in said closed position for exposure, and for causing said sealing member to be placed in said closed position when said movable camera back member is placed on said open position, said sealing member actuation means further including a pusher rod mounted upon said camera back housing which is translated back and forth with respect to said camera back housing upon the opening and closing of said camera back member, and wherein said pusher rod is spring biased for permitting said rod to be translated upon contacting a wall portion of said camera when said camera back member is placed in said closed position with respect to said camera, said sealing member actuation means further including a clasp member coupled to said pusher rod for actuating said light sealing member upon the translation of said pusher rod and wherein a hook member is coupled between said clasp member and said pusher rod for actuating said clasp member upon the translation of said pusher rod.

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**4,017,878**

## BAYONET MOUNT ADAPTER FOR A CAMERA

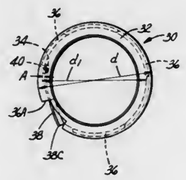
**Teruo Hagiwara, Kawagoe, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed July 7, 1975, Ser. No. 593,548**

**Claims priority, application Japan, July 5, 1974, 49-78710[U]**

**Int. Cl.² G03B** *17/00*

**U.S. Cl. 354—286** **7 Claims**




1. A bayonet mount adapter for attaching to a camera of the bayonet type mount a lens barrel of the screw type mount having a screw mount diameter smaller than an inner claw diameter defined by the internal bayonet claws of the camera bayonet mount, said bayonet mount adapter including a substantially cylindrical sidewall portion having an outer circumference adapted to be received within the inner claw diameter and also having a resilient engaging element fixed thereto, said resilient engaging element having a first end thereof fixed to said sidewall portion and extending substantially tangentially from said sidewall portion to an opposite second end thereof disposed radially outward of the inner claw diameter, said bayonet mount adapter in a received position within the camera bayonet mount being relatively rotatable to a stop position with said resilient engaging element under the confining regulation of the internal bayonet claws and within the inner claw diameter, said resilient engaging element being free of said confining regulation at said stop position to allow movement of said second end thereof into engagement with a rotation stopper carried by the camera and located radially outward of the inner claw diameter, and said second end of said resilient engaging element being manually movable to a position radially inward of the inner claw diameter to disengage said resilient engaging element from the rotation stopper.

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**4,017,879**

## SELF-DEVELOPING TYPE PHOTOGRAPHIC APPARATUS WITH SPREAD ROLLER SYSTEM

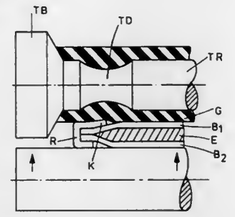
**Peter Lermann, Narring; Günter Fauth, Unterhaching, and Herbert Müller, Assling, all of Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Germany**

**Filed Sept. 29, 1975, Ser. No. 617,448**

**Claims priority, application Germany, Sept. 30, 1974, 2446595**

**Int. Cl.² G03D** *9/02*

**U.S. Cl. 354—304** **12 Claims**




1. In a photographic apparatus, a combination comprising self-developing film packet means including a pair of juxtaposed sheet elements having margin portions and a supply of film-processing fluid provided intermediate said sheet elements, at least one of the sheet elements forming part of an area having border regions to be coated and thereby developed by said fluid; a pair of juxtaposed roller members defining a pressure-generating gap therebetween through which said packet means is adapted to be advanced during spreading of said fluid, one of said roller members having a first sheet-contacting surface and the other of said roller members having an outer resilient material layer forming a second sheet contacting surface; means for facilitating the uniform spreading of said fluid over said area and being located at laterally-spaced side regions of said packet means for permitting said fluid to flow over said border regions of said area; and edge-binding means for securing the opposite side regions of said juxtaposed sheet elements, each of said edge-binding means overlapping the longitudinal edges and the external surfaces of said sheet elements and having bracket portions extending inwardly away from the respectively associated longitudinal edge, one of said bracket portions projecting inwardly to a greater extent than the other of said bracket portions, said margin portions in part overlying said border regions together with said longer bracket portions, at least one of said sheet elements and said one longer bracket portion being weakened.

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**4,017,880**

## RED LIGHT EMITTING GALLIUM PHOSPHIDE DEVICE

**Akinobu Kasami, Yokohama; Masaru Kawachi, Tokyo, and Hiroki Mineo, Yokohama, all of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan**

**Continuation-in-part of Ser. No. 437,639, Jan. 29, 1974, abandoned. This application July 25, 1975, Ser. No. 599,098**

**Claims priority, application Japan, Feb. 12, 1973, 48-17210**

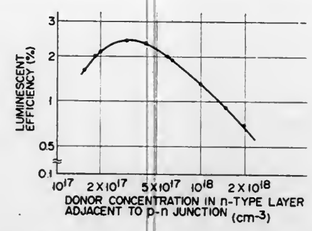
**Int. Cl.² H01L** *33/00*

**U.S. Cl. 357—17** **6 Claims**

1. A red light emitting gallium phosphide device comprising an n-type gallium phosphide substrate, an n-type gallium phosphide layer formed on said substrate and a p-type gallium phosphide layer formed on said n-type layer to define a pn-junction contributing to emission of a red light between both



layers, wherein the n-type layer has doped oxygen having a concentration of less than $1 \times 10^{14}$ cm$^{-3}$, the portion of the




n-type layer adjacent the pn-junction having a net donor concentration of from $1 \times 10^{17}$ cm$^{-3}$ to $5.8 \times 10^{17}$ cm$^{-3}$.

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**4,017,881**

## LIGHT EMITTING SEMICONDUCTOR DEVICE AND A METHOD FOR MAKING THE SAME

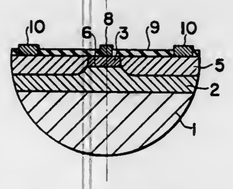
**Yuichi Ono, Honde; Kazuhiro Kurata, Hachioji; Masao Kawamura, Fuchu; Makoto Morioka, Honde, and Kazuhiro Ito, Hinode, all of Japan, assignors to Hitachi, Ltd., Japan**

**Filed Sept. 11, 1975, Ser. No. 612,282**

**Claims priority, application Japan, Sept. 20, 1974, 49-107824**

**Int. Cl.² H01S** *33/19*

**U.S. Cl. 357—18** **8 Claims**




1. A high power light emitting semiconductor device comprising:

a semiconductor body which has first and second surfaces and which contains

a first semiconductor region having a third surface, the forbidden band gap width of said first semiconductor region increasing from said third surface into said first region,

a second semiconductor region of a first conductivity type, disposed on said third surface of said first semiconductor region, and having a forbidden band gap width which is narrower than the width of the forbidden gap of said first region at said third surface thereof,

a third semiconductor region of a second conductivity type, opposite said first conductivity type, disposed on a prescribed surface portion of said second semiconductor region and defining a first PN junction with said prescribed surface portion of said second semiconductor region, the width of the forbidden band gap of said third semiconductor region being narrower than the width of the forbidden gap of said first semiconductor region at said third surface, and

a fourth semiconductor region, of said first conductivity type and having an impurity concentration greater than that of said second semiconductor region, disposed on a portion of the surface of said second semiconductor region, which portion of the surface of said second semiconductor region surrounds said prescribed surface portion of said second semiconductor region, the width of the forbidden band gap of said fourth semiconductor region being narrower than the width of the forbidden gap of said first semiconductor region at said third surface;

a first electrode disposed on the surface of said third semiconductor region; and

a ring-shaped second electrode disposed on the surface of said fourth semiconductor region so as to surround said first electrode; and wherein

the surfaces of said third and fourth semiconductor regions upon which said first and second respective electrodes are disposed form the first surface of said semiconductor body, while the second surface of said semiconductor body, which extends to the first surface thereof, is hemispherically shaped.

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**4,017,882**

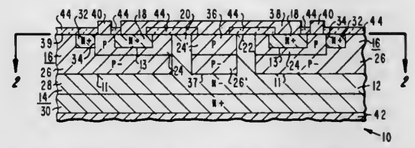
## TRANSISTOR HAVING INTEGRATED PROTECTION

**Peter Joseph Kannam, Princeton, and Wilfred Potter Bennett, Belle Mead, both of N.J., assignors to RCA Corporation, New York, N.Y.**

**Filed Dec. 15, 1975, Ser. No. 641,138**

**Int. Cl.² H01L** *29/90, 29/72, 29/00, 27/04*

**U.S. Cl. 357—13** **8 Claims**




1. An integrated transistor having a base region of a one type conductivity, a collector region of a second type conductivity adjacent to said base region and forming a base-collector PN junction at the interface therewith, an emitter region of said second type conductivity adjacent said base region and forming a base-emitter PN junction at the interface therewith, said transistor comprising:

a first protective region having said second type conductivity contacting and surrounding said base region and forming a first PN junction therewith; and

a second protective region having said one type conductivity adjacent said collector region and forming a PN diode therewith.

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**4,017,883**

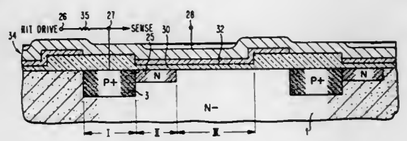
## SINGLE-ELECTRODE CHARGE-COUPLED RANDOM ACCESS MEMORY CELL WITH IMPURITY IMPLANTED GATE REGION

**Irving T. Ho, and Jacob Riseman, both of Poughkeepsie, N.Y., assignors to IBM Corporation, Armonk, N.Y.**

**Continuation of Ser. No. 159,907, July 6, 1971, abandoned. This application Sept. 24, 1973, Ser. No. 400,480**

**Int. Cl.² H01L** *29/78*

**U.S. Cl. 357—24** **5 Claims**




1. A charge coupled random access memory array comprising:

a semiconductor body having embodied therein an impurity of a first conductivity type,

a plurality of charge coupled memory cells arranged in columns and rows on said body,

bit lines extending in the column direction, each bit line in operative relation to a column of said cells,

word lines extending in the row direction, each word line in operative relation to a row of said cells,

each of said cells comprised of a first region in said semiconductor body formed of an impurity of a second opposite conductivity type, said first region of said cell in operative electrical connection with one of said bit lines,

a second region in said body in adjacent lateral relationship to said first region in the row direction and having embodied therein an impurity of a first conductivity type in a concentration greater than the concentration of the impurity in said semiconductor body,

a third region in said body in adjacent lateral relationship to said second region, and spaced from said first region by said second region and having embodied therein an impurity of a first conductivity type in a concentration less than the concentration in said second region, said third region spaced from the first region of the adjacent memory cell,

the threshold voltage of said second region being higher in absolute magnitude than the threshold voltage of said third region, the threshold voltages of said second and third regions being determined at least in part by the relative impurity concentrations in said second and third regions,

a surface layer of dielectric material overlying at least said second region and said third region,

a single conductive electrode on said surface layer of dielectric material and extending over said second and third regions in superimposed relation and in operative electrical connection with one of said word lines, said electrode having a first portion over said second region of said body and a second portion over said third region of said body,

a means of applying at least two voltage levels to said conductive electrode to control the storage of charges in, and flow of charges to, said third region, the first of said voltage levels applied to said conductive electrode is of an absolute magnitude less than said first predetermined threshold voltage of said second region, but equal to or greater than said second threshold voltage of said third region, thereby inverting only said third region for charge storage capability,

the second of said voltage levels of an absolute magnitude equal to or greater than said first predetermined threshold voltage of said second region thereby inverting both of said second and third regions for charge flow capability.

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**4,017,884**

## MAGNETIC FIELD SENSITIVE DIODE AND METHOD OF MAKING SAME

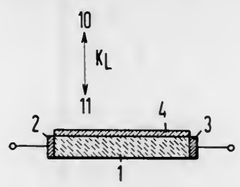
**Ignaz Eisele, Ottobrunn; Hans Pfleiderer, and Ekkehard Preuss, both of Munich, all of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Germany**

**Continuation of Ser. No. 496,558, Aug. 12, 1974, abandoned. This application May 4, 1976, Ser. No. 683,208**

**Claims priority, application Germany, Aug. 13, 1973, 2340895**

**Int. Cl.² H01L** *27/22, 29/82, 29/96, 43/00*

**U.S. Cl. 357—27** **7 Claims**




1. A magnetic field sensitive diode comprising a silicon body, an n-injecting contact electrode and a p-injecting contact electrode located at spaced portions of said body, said electrodes being capable of producing n charges and p charges respectively in said body, said body having opposed parallel surfaces having different recombination rates with respect to pairs of free charge carriers, the surface having the lower recombination rate consisting of silicon dioxide formed by means of thermal oxidation and extending between said electrodes and parallel to the current path through said diode, said n-injecting contact electrode consisting of diffused in lithium, with substantially all of the acceptors in the silicon body being compensated by incorporated lithium ions, the silicon dioxide surface being free of lithium.

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**4,017,885**

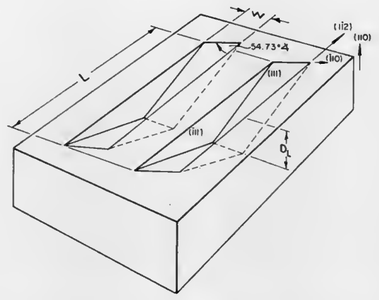
## LARGE VALUE CAPACITOR

**Don L. Kendall, and Walter T. Matzen, both of Richardson, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.**

**Continuation-in-part of Ser. No. 409,509, Oct. 25, 1973, Pat. No. 3,962,713, which is a continuation of Ser. No. 259,332, June 2, 1972, abandoned. This application Dec. 13, 1974, Ser. No. 532,334**

**Int. Cl.² H01L** *27/04, 29/04, 29/92*

**U.S. Cl. 357—51** **7 Claims**




5. A semiconductor high value capacitor comprising:

a. a semiconductor substrate having a major surface oriented in a 110 plane;

b. selectively spaced, parallel grooves in said surface crystallographically oriented such that the groove sidewalls are aligned with 111 planes, two of said sidewalls being perpendicular to said 110 surface and the other two 111 sidewalls sloping from the groove ends to a central V-shaped bottom;

c. a layer of dielectric material coating said surfce;

d. a layer of conductor overlying and coating said dielectric layer and adapted to receive an electrical contact.

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**4,017,886**

## DISCRETE SEMICONDUCTOR DEVICE HAVING POLYMER RESIN AS INSULATOR AND METHOD FOR MAKING THE SAME

**Masami Tomono, Kokubunji; Akira Abe, Takasaki; Seiki Harada, Hachioji; Kikuji Sato, Kokubunji; Takeshi Takagi, Takasaki; Genichi Kamoshita, Koganei; Yuichiro Oya, Kodaira, and Atsushi Saiki, Musashimurayama, all of Japan, assignors to Hitachi, Ltd., Japan**

**Continuation-in-part of Ser. No. 407,447, Oct. 18, 1973, abandoned. This application May 16, 1975, Ser. No. 578,174**

**Claims priority, application Japan, Oct. 18, 1972, 47-103588**

**Int. Cl.² H01L** *23/30*

**U.S. Cl. 357—54** **42 Claims**

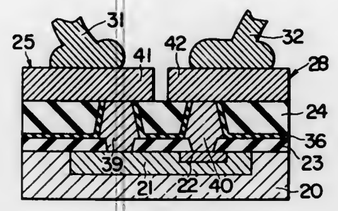
1. A semiconductor device comprising:

a semiconductor body including a semiconductor region of a conductivity type opposite to that of the body;

an insulating layer disposed on a surface of the semiconductor body;



a polymer resin layer on said insulating layer, said polymer comprising a modified polyimide that is the reaction product of about 5 mol %, 4,4′-diaminodiphenylether-3-carbonamide; about 45 mol % 4,4′-diaminodiphenylether; about 25 mol % pyromellitic acid dianhydride; and about 25 mol % 3,3′,4,4′-benzophenontetracarboxylic acid dianhydride;




an electrode reaching into a part of the semiconductor region, said electrode penetrating the polymer resin layer and the insulating layer and extending on the surface of the polymer resin layer; and

a wire bonded to said electrode.

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**4,017,887**

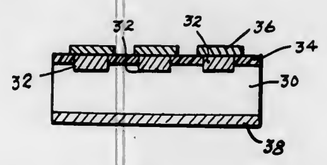
## METHOD AND MEANS FOR PASSIVATION AND ISOLATION IN SEMICONDUCTOR DEVICES

**D. Eirug Davies, Belmont; Sven A. Roosild, Billerica, and Russell P. Dolan, Jr., Concord, all of Mass., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**

**Continuation-in-part of Ser. No. 275,018, July 25, 1972, abandoned. This application Dec. 20, 1974, Ser. No. 535,062**

**Int. Cl.² H01L** *29/34, 27/04, 29/161, 29/167*

**U.S. Cl. 357—52** **5 Claims**




1. A radiation resistant semiconductor device comprising: a wafer of n-type gallium arsenide semiconductor material; islands of p-type material located in the wafer and forming a portion of the surface thereof, said p and n material so positioned as to form p-n junctions; implanted regions of compensating chromium ions having a concentration between $10^{14}$ to $10^{18}$ ions per cubic centimeter, said ions being of insufficient concentration to form a new compound, but of sufficient concentration to form a semi-insulating layer of carrier depleted gallium arsenide, having a resistivity of between $10^{6}$ and $10^{9}$ ohm centimeters, extending to the surface of the wafer and surrounding said islands of p material; and contact means affixed to the n and p material for attaching electrical conductors.

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**4,017,888**

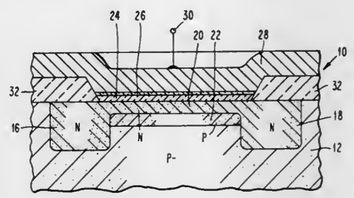
## NON-VOLATILE METAL NITRIDE OXIDE SEMICONDUCTOR DEVICE

**Kenneth Howard Christie, Hopewell Junction, N.Y.; David DeWitt, Los Gatos, Calif., and William Stanford Johnson, Hopewell Junction, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Dec. 31, 1975, Ser. No. 645,770**

**Int. Cl.² H01L** *29/34, 29/78, 29/00;* **G11B** *13/00*

**U.S. Cl. 357—54** **5 Claims**




1. A memory element comprising a conductive substrate of one conductivity type having first and second spaced apart regions of another conductivity forming a source and a drain for the element, respectively, said regions being interconnected by a thin region of said other conductivity type forming a channel between the source and drain;

first and second insulating layers on the surface of said substrate overlying said channel and at least part of said source and drain regions to form a gate for said element, and

a region of material of said one conductivity type provided in the substrate contiguous with said channel, said region having an active impurity concentration higher than that of said substrate and a resistivity lower than that of said substrate.

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**4,017,889**

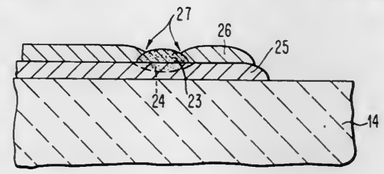
## TERNARY BARRIER STRUCTURE FOR CONDUCTIVE ELECTRODES

**Lewis F. Miller, LaGrangeville, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.**

**Filed Dec. 23, 1974, Ser. No. 535,261**

**Int. Cl.² H01L** *23/48, 29/44, 29/46*

**U.S. Cl. 357—67** **8 Claims**




1. A corrosion resistant microminiature circuit structure comprising:

a substrate having a conductive electrode pattern with a plurality of connecting areas which are wettable by solder;

said conductive electrode is composed predominently of silver and a lesser quantity of platinum group metal;

regions surrounding said connecting areas not wettable by solder;

at least a portion of said regions surrounding including a gold bearing, glasseous layer over a portion of a said conductive electrode including a silver and gold alloy;

a chip of semiconductor material having a planar face with solder wettable terminal areas; and

solder contacts establishing a unified joint between the

terminal areas of said chip and said connecting areas, said solder contacts forming the means for physically supporting said chip from said substrate.

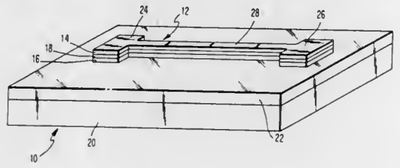
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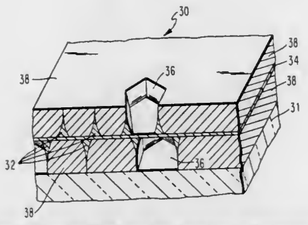
**4,017,890**

## INTERMETALLIC COMPOUND LAYER IN THIN FILMS FOR IMPROVED ELECTROMIGRATION RESISTANCE

**James Kent Howard, Fishkill, and Paul Siu-Chung Ho, Mahopac, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Oct. 24, 1975, Ser. No. 625,439**
**Int. Cl.² H01L** *23/48, 29/46, 29/62, 29/64*
**U.S. Cl. 357—67** **17 Claims**




1. A current conductive stripe having minimum physical dimensions and being supported upon a substrate comprising:
aluminum and at least one region within the aluminum stripe containing an intermetallic compound of aluminum and a transition metal.

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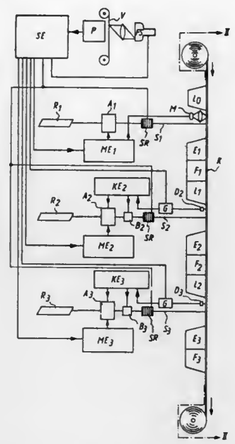
**4,017,891**

## METHOD AND EQUIPMENT FOR LINE-BY-LINE RECORDING OF COLOR COMPONENT IMAGES ON A REPRODUCTION CARRIER

**Josef Helmberger, Munich, and Klaus Stadler, Irschenhausen, both of Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Germany**

**Filed Sept. 10, 1975, Ser. No. 611,976**
**Claims priority, application Germany, Sept. 11, 1974, 2443378**
**Int. Cl.² H04N** *5/84, 5/76*
**U.S. Cl. 358—6** **24 Claims**

1. In a method for line-by-line recording of color component images on a reproduction carrier by means of a controlled beam wherein recording of a first color component image takes place at a first recording station and recording of a second color component image takes place at a second recording station separated from said first recording station by at least one further processing station, the improvement comprising the steps of creating a mark on said reproduction carrier indicative of the position of said first color component image; sensing said mark at said second recording station and creating a position signal corresponding to the position of said mark relative to a determined position; and fine positioning the raster of said beam at said second recording station in accordance with said position signal, whereby said second color component image is superimposed in registry upon said first color component image.



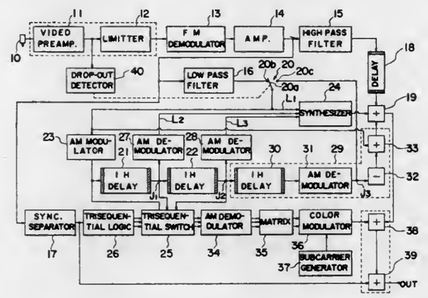

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**4,017,892**

## VIDEO INFORMATION REPRODUCTION CIRCUITRY HAVING DROP-OUT COMPENSATION CIRCUIT

**Ichiro Takahara, Kadoma; Yoshiharu Toyoshima, Katano, and Yuzo Yamamoto, Hirakata, all of Japan, assignors to Sanyo Electric Co., Ltd., Osaka, Japan**

**Filed Mar. 5, 1976, Ser. No. 664,388**
**Claims priority, application Japan, Mar. 5, 1975, 50-27466**
**Int. Cl.² H04N** *5/76*
**U.S. Cl. 358—8** **3 Claims**




1. In a video information reproduction circuitry for use in a video disc player of a type utilizing a combination of a flexible foil-type video disc having at least one surface formed with a spirally extending information-carrier groove and a transducer adapted to be slidingly engaged in said information-carrier groove on said video disc during reproduction of video information, said reproduction circuitry comprising means for detecting at least frequency-modulated video information being picked up by said transducer, said frequency-modulated video information including a luminance signal and a trisequential color signal superimposed sequentially and in line-by-line fashion upon low-frequency components of said luminance signal; means for separating said frequency-modulated video information into high and low components of said luminance signal; first and second delay circuits connected in series with each other; means coupled to said separating means, said first delay circuit and said second delay circuit for



simultaneously receiving different color components included in said trisequential color signal and generating a synthesized output signal; means for summing the low and high frequency components of the luminance signal to give a complete luminance signal; a trisequential switching circuit coupled to receive said different color components included in said trisequential color signal simultaneously and for generating color difference signals; means for preparing a chrominance signal upon receipt of said color difference signal; means for preparing a composite video signal by the summation of said chrominance signal and said complete luminance signal, which composite video signal being adapted to be reproduced by a television receiver; and a vertical resolution compensating circuit including a third delay line coupled to said second delay line for delaying one line period the trisequential color signal which has been delayed one line period by said first delay circuit and another one line period by said second delay circuit, thereby providing color components outputted in the same sequence as that of the color components emerging from said separating means, and means for applying a difference signal to said simultaneously receiving means, said difference signal being indicative of the difference in level between said trisequential color signal of one cycle and that of the next succeeding cycle, the improvement which comprises a drop-out compensation circuit including means for detecting the presence of a drop-out in said video information being picked up by said transducer, said detecting means generating a trigger signal of a duration substantially equal to a drop-out period in response to the presence of said drop-out in said video information, and a switching means for interrupting the passage between said separating means and said simultaneously receiving means and first delay circuit and, at the same time, completing a loop from said third delay line back to said first delay circuit, in response to and during the duration of said trigger signal for applying one portion of the color components of the trisequential color signal, which has been omitted by the drop-out in the video information, to said simultaneously receiving means and also to said switching means.

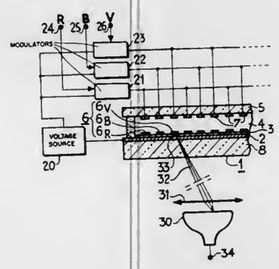
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**4,017,893**

## DISPLAY DEVICE FOR PRODUCING POLYCHROMATIC LUMINOUS IMAGES

**Georges Broussaud, Paris, France, assignor to Thomson-CSF, Paris, France**

**Filed Sept. 9, 1975, Ser. No. 611,837**
**Claims priority, application France, Sept. 13, 1974, 74.31150**
**Int. Cl.² H04N** *9/12, 5/70*
**U.S. Cl. 358—59** **8 Claims**




1. A display device for producing a polychromatic luminous image, externally controlled by both electrical signals and an invisible scanning radiating beam, comprising:
a display panel comprising two main faces facing each other and forming a gas-tight enclosure for retaining an ionizable gas, at least one of said faces being transparent to said radiating beam which beam has a wave length lower than the wave length of visible radiation;
electrical means comprising a first group of electrodes and a second group of electrodes respectively located on said two main faces, which when facing each other determine elementary zones of ionization in said gas-tight enclosure, said two groups of electrodes being adapted for receiving a supply voltage;
photoconductive elements placed in said elementary zones between said two groups of electrodes, responsive to said invisible scanning radiating beam, which scans said transparent main face for enabling local ionization of said zones; and
several groups of luminescent elements arranged in said elementary zones, responsive to the charges produced by said ionization and adapted for respectively emitting primary radiations and forming by addition the synthesis of said image, said electrical signals modulating said primary radiations.

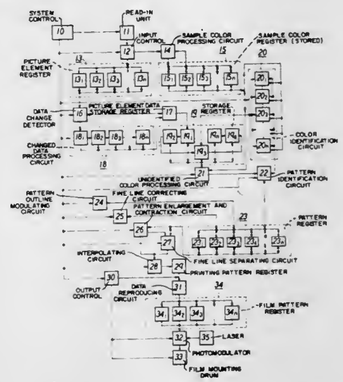
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**4,017,894**

## METHOD FOR PREPARING COLOR SEPARATION PRINTING PATTERNS

**Hitoshi Akami, Yokohama; Shigeru Nishikawa, Aikawa; Toshio Ikeda, Kyoto, and Akira Tsukokura, Joyo, all of Japan, assignors to Agency of Industrial Science & Technology, Tokyo and Daido-Maruta Finishing Co., Ltd., both of, Japan**

**Filed Sept. 26, 1974, Ser. No. 509,499**
**Claims priority, application Japan, Oct. 1, 1973, 48-110764; Jan. 28, 1974, 49-11590**
**Int. Cl.² H04N** *1/46*
**U.S. Cl. 358—80** **9 Claims**




1. In a method for preparing color separation printing pattern films suitable for use in an additive color printing process by irradiating a multi-colored original design with light; scanning the original design to detect optical energy levels of reflected red, blue and green components of quantized picture elements in said design; generating picture element data representative of the red, green and blue components thereof; and using said data to control the formation of a black and white pattern on a photosensitive film corresponding to a primary color content in said original design, the improvement which comprises:
a. sequentially comparing picture element data to determine the existence of a predetermined differential in optical energy levels therebetween;
b. recording standard picture element data not exceeding said differential as a single data group coded with the number of said picture elements and the representative optical energy level thereof;
c. comparing non-standard picture element data exceeding said differential with a series of pre-recorded picture element data groups characteristic of changes in said

original design due to unevenly applied color, fidelity of the system, irregular original surfaces, overlapped colors and color boundaries;

d. recording a non-standard picture element data pattern as a single data group coded with the number of said picture elements and a change identification code representative of a corresponding pre-recorded picture element data pattern;

e. comparing said standard single data groups with sample color data to identify the color thereof and encoding a color identification therewith;

f. interpolating non-standard picture element data groups into preceding and succeeding standard picture element data groups with a predetermined interpolation coefficient based on said change identification code; and

g. using the resultant modified picture element data to modulate the irradiation and non-irradiation of a laser beam on said photosensitive film to form said black and white pattern thereon.

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**4,017,895**

## METHOD OF DETECTING DEFECTS IN READ OUT SIGNALS, AND APPARATUS FOR IMPLEMENTING THE SAME

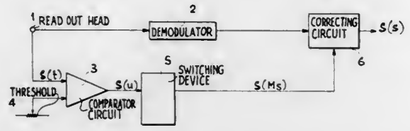
**Pierre Oprandi, and René Romeas, both of Paris, France, assignors to Thomson-Brandt, Paris, France**

**Filed July 21, 1975, Ser. No. 597,634**

**Claims priority, application France, July 23, 1974, 74.25491**

**Int. Cl.² H04N** *5/76*

**U.S. Cl. 358—127** **9 Claims**




1. A method of detecting defects in read-out signals supplied from a head reading the information stored upon a data carrier in the form of an angularly modulated waveform, said waveform being recorded with an instantaneous frequency lying within a predetermined frequency range; said method comprising the steps of: converting said read-out signals into a square-wave waveform having two levels; demodulating said square-wave waveform; deriving from said square-wave waveform trigger pulses supplied each time a transition occurs from the first to the second of said levels; triggering with said trigger pulses a monostable switching circuit having a predetermined relaxation duration; said relaxation duration being selected outside a range of values which are the reciprocals of the frequency values of said predetermined frequency range; and controlling a defect correcting circuit receiving said read-out signals demodulated with the switching signal arising from the switching of said monostable switching circuit.

7. A system for detecting defects undergone by read-out signals supplied from a head reading the information stored upon a data carrier in the form of an angularly modulated waveform, said waveform being recorded with an instantaneous frequency lying within a predetermined frequency range; said system comprising: means for converting said read-out signals into a two level square-wave waveform; means for deriving from said two level square-wave waveform trigger pulses supplied each time a transition occurs between the first and the second of said levels; and, monostable switching means triggered with said trigger pulses.

**4,017,896**

## REVERSING CASSETTE TAPE MACHINE

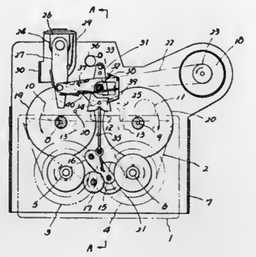
**Shigeji Takemoto, 8-7, Gakuen Asahimachi, Nara, Japan**

**Filed June 17, 1975, Ser. No. 587,614**

**Claims priority, application Japan, July 19, 1974, 49-83394; July 19, 1974, 49-83395; July 19, 1974, 49-83396; July 19, 1974, 49-83397; July 19, 1974, 49-83398**

**Int. Cl.² G11B** *15/06, 15/29, 23/04*

**U.S. Cl. 360—74** **7 Claims**



1. A tape cassette recorder comprising a pair of reel shafts which accommodate both winding and rewinding shafts contained within a tape cassette, a pair of capstan shafts to be rotated in opposite directions for transferring magnetic tape in said cassette alternatively in opposite directions, each of said capstan shafts including a flywheel and at least one of said flywheels being provided with a projecting pin, an idle roller including mounting means for shifting the idle roller between two positions and for alternatively rotating each of said reel shafts in opposite directions, a driving motor including belt means for rotating said flywheels, capstans and idle roller, a sensor which senses the end of a magnetic tape and electromagnetic relay including a contact plate which is shifted by said electromagnetic relay in response to said sensor to a position to be engaged by said pin for movement by said pin to another position, and means connecting said contact plate with said mounting means for the idle roller for shifting the idle roller alternatively between said two positions in response to movement of said contact plate to said another position.

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**4,017,897**

## MAGNETIC TAPE GUIDE HAVING A TAPERED ROLLER AND AN ADJUSTABLE CONTOURED EDGE

**Douglass L. Blanding, Leroy, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.**

**Filed Sept. 17, 1975, Ser. No. 614,720**

**Int. Cl.² G11B** *15/60, 23/04*; **B65H** *23/32*

**U.S. Cl. 360—85** **15 Claims**

1. A tape guide for use with a tape recorder of the type wherein a tape is transported along a tape path having more than one level from a supply reel to a takeup reel, comprising:

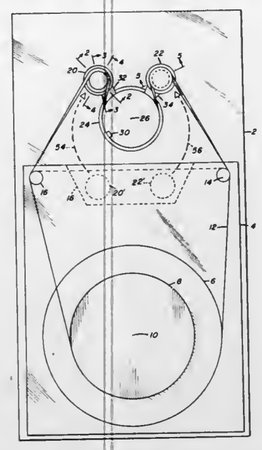
a post;

a roller supported for rotation on said post in the path of the tape, said roller having a tapered guiding surface for guidedly inclining the tape from a first tape path level to a second tape path level, the tape further entering and exiting said tapered guidng surfaces at predetermined points. thereon and defining a curved tape path therebetween; and

means arcuately disposed along a portion of the edge of said curved tape path, and adapted to be fixedly secured relative to said roller, for completely guiding an edge of the tape along the arcuate length of said means from said



first tape path level to said second tape path level, said means extending radially outward from said post and



adjacent one end of said roller for cooperaton with said tapered guiding surface.

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**4,017,898**

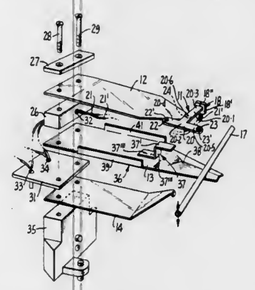
## METHOD AND APPARATUS FOR RECORDING AND REPRODUCING VIDEO SIGNALS

**Harold G. Toombs, Sunnyvale, and Royce R. Sullivan, San Jose, both of Calif., assignors to Redlake Corporation, Santa Clara, Calif.**

**Continuation of Ser. No. 513,996, Oct. 11, 1974, abandoned, which is a continuation-in-part of Ser. No. 315,336, Dec. 15, 1972, abandoned. This application Apr. 28, 1976, Ser. No. 681,347**

**Int. Cl.² G11B** *21/22, 5/54, 5/48*

**U.S. Cl. 360—105** **12 Claims**



1. An electromagnetic transducer assembly for the contact recording or reproducing of video information on a moving magnetic recording surface, comprising:

electromagnetic transducer means having an active surface traversed by a head gap;

first and second bearing means having smooth bearing surfaces;

an open frame for maintaining said transducer means and said bearing means in such juxtaposition that said active surface and said smooth bearing surfaces can simultaneously contact said magnetic recording surface, said frame consisting of a first elongated member to a first end of which said transducer means is affixed, a second elongated member to a first end of which said first bearing means is affixed, and a third elongated member to a first end of which said second bearing means is affixed, said elongated members being united at their ends remote from said first ends and being unprovided with rigidifying means;

first cantilever spring means for resiliently supporting said frame, transducer means, and bearing means near said moving magnetic recording surface but not in contact therewith and for maintaining the position of said frame against the urging of forces arising from contact between said transducer means and bearing means and said moving magnetic recording surface, said frame being attached to the free end of said first cantilever spring means; and

second cantilever spring means resiliently urging said frame toward said moving magnetic recording surface and thus maintaining said transducer means and said bearing means in contact with said moving magnetic recording surface during the recording and reproducing of video information thereon.

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**4,017,899**

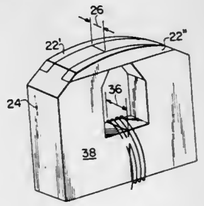
## SINGLE-TRACK VIDEO FERRITE RECORD/REPRODUCE HEAD AND MANUFACTURING METHOD THEREFOR

**John F. Bagby, Encinitas, Calif., assignor to Spin Physics, Inc., San Diego, Calif.**

**Continuation-in-part of Ser. No. 519,358, Oct. 29, 1974, abandoned. This application Mar. 22, 1976, Ser. No. 668,873**

**Int. Cl.² G11B** *5/221*

**U.S. Cl. 360—122** **3 Claims**




1. A narrow, single-track video magnetic head comprising:

a. first and second ferrite parts, each having an arcuately contoured front part and a back part;

b. non-magnetic means bonding said ferrite front and back parts together, thereby to form transducer front and back gaps between said ferrite front and back parts, said ferrite front parts at said front gap being 10 mils or less in width and substantially less in width than said ferrite back parts at said back gap, the side walls of said front part having ferrite wall portions that extend across said front gap substantially parallel to each other on both sides of said front gap; and

c. separate ceramic pieces, mounted in parallel and glass-bonded to both said ferrite wall portions at both sides of said front gap, for protecting said gap from deteriorating, said ceramic having slightly less wear resistance than said ferrite such that said ceramic wears slightly faster than said ferrite first and second parts.

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**4,017,900**

## TAPE RECORDER CASSETTE EJECTING DEVICE

**Hiromasa Katsurayana, Nagoya, Japan, assignor to Shin-Shirasuna Electric Corporation, Nagoya, Japan**

**Filed July 22, 1975, Ser. No. 597,997**

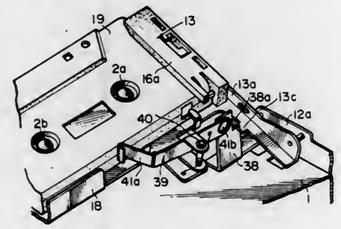
**Int. Cl.² G11B** *23/04*

**U.S. Cl. 360—137** **2 Claims**

1. In a cassette tape recorder having a chassis, a pair of reel spindles for removably mounting thereon a magnetic tape cassette, drive means for rotating said reel spindles, a plurality of depressible operable keys, including at least playback key and an eject key, which are arranged in a row along one side

of said recorder, magnetic head means adapted to be brought into engagement with a magnetic tape in said cassette by depressing said playback key, means for locking said playback key in the depressed position, and cassette receptacle means mounted for pivotal movement between a position inclined through a predetermined angle with respect to said chassis where said cassette can be inserted into or removed from said cassette receptacle means and a position substantially parallel with respect to said chassis, the improvement comprising a cassette eject mechanism which comprises, in combination:

resiliently operable actuator means comprising a first slide member slidable along a surface of said chassis and normally biased toward said eject key by means of a spring, said first slide member being arranged to be slid forwardly of said eject key against said spring by depressing said eject key, an engaging piece provided on said first slide member, a connector member having a pair of first and second arms extending substantially perpendicularly with respect to each other and a base portion through which said first and second arms are integrally connected with each other, said connector member being rotatably attached at a first position to an upright bracket provided on said chassis, said first position being in or adjacent to said base portion, said connector member being also movably coupled at a second position to said cassette receptacle means, said second position being adjacent to the free end of said first arm, the free end of said second arm being adapted to be engaged by said engaging piece, and a toggle spring means having one end thereof coupled to said connector member at a third position adjacent to




the end of said base portion, said first position being between said second position and said third position but closer to said third position, the other end of said spring being coupled to said cassette receptacle means, wherein when said cassette receptacle means is in said parallel position, said connector member is positioned so that said first and second arms thereof are respectively substantially parallel and perpendicular to said chassis while said spring means is compressed wherein said connector member and said cassette receptacle means are maintained in said positions respectively, and wherein when said eject key is depressed, said second arm is pushed by said engaging piece so that said connector member is rotated in one direction against the action of said spring means and at the same time said toggle spring means is rotated in the opposite direction while being expanded, as a result of which said cassette receptacle means is moved from said parallel position to said inclined position; and

cassette push-out means comprising a second slide member provided with an upright portion at the front end thereof, said second slide member being disposed in overlapping relationship with said first slide member and connected thereto through a spring so as to be slidable therewith, a stepped portion formed in said upright portion at one end thereof, an inwardly directed projection means provided on said cassette receptacle means, said inwardly directed projection means being arranged to be positioned at a lower level than said stepped portion when said receptacle means is in said parallel position and to be moved up to a higher level than said stepped portion at the time when said receptacle means has substantially been moved from said parallel position to said inclined position through the depression of said eject key, thereby permitting of a forward movement of said upright portion, and a push-out member mounted on said receptacle means for pivotal movement and rotationally biased by a spring, one end of said push-out member being disposed in engagement with said upright portion of said second operating lever, the other end of said push-out member being adapted for engagement with the rear wall of the cassette which is fully inserted in said receptacle means, said push-out member being arranged to be pivotally moved by said forward movement of said upright portion so that said cassette is thereby pushed out of said receptacle means.

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**4,017,901**

## DEVICE FOR LOADING AND UNLOADING CARTRIDGES INTO AND FROM A RECORDING AND/OR PLAYBACK APPARATUS

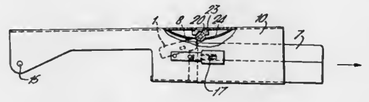
**Theophiel Clement Jozef Lodewijk Staar, Kraainem, Belgium, assignor to Staar, S.A., Brussels, Belgium**

**Filed July 29, 1975, Ser. No. 600,090**

**Claims priority, application France, July 30, 1974, 74.26452**

**Int. Cl.² G11B** *23/08*

**U.S. Cl. 360—137** **4 Claims**



1. In a device for loading and unloading cartridges into and from a recording and/or playback apparatus for magnetic tapes stored in cartridges of the type provided with a pivotable door on their front face for the withdrawal of the magnetic tape, spring means acting to pivot the door to its open position, and latch means for holding the door in closed position against the action of the spring means, said device including a housing member into which a cartridge is slidably inserted having a lower wall and roller means spaced above the lower wall engaging the bottom and top surfaces of the cartridge respectively upon such insertion, and means coacting with means on the cartridge to release the latch means and enable the spring means to open the door of the cartridge automatically as the cartridge is inserted; the improvement in said housing member comprising:

means on said housing member for supporting said roller means for vertical movement; and resilient means

a. biasing said roller means downwardly to a normal position below the plane on the top surface of the cartridge to engage the front of the door of the cartridge when the cartridge is inserted, front face forward, while allowing the roller means to raise and ride along the top surface of the cartridge,

b. including an element connected to said roller means, located in the path of an inserted cartridge, and extending longitudinally of said path to be engaged by the opened door of a cartridge for cooperative raising of the roller means and lowering of the door to clear the door and cartridge and allow insertion of a cartridge with its door open, and

c. acting to bias said roller means downwardly to engage and forcefully pivot the door of the cartridge to its closed position automatically as the latter is slidably removed from the housing member.



**4,017,902**

## CASSETTE EJECTOR FOR TAPE RECORDER

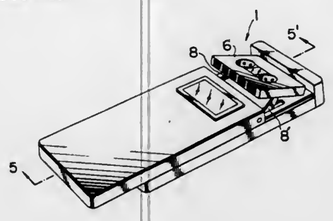
**Masaaki Sato, Hachioji, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan**

**Filed Oct. 3, 1975, Ser. No. 619,252**

**Claims priority, application Japan, Oct. 8, 1974, 49-115902; Oct. 8, 1974, 49-115903**

**Int. Cl.² G11B** *23/04*

**U.S. Cl. 360—137** **5 Claims**




1. A cassette ejector for use with a cassette tape recorder having a slidable cassette cover movable from a closed to an open position, comprising:

a sliding plate which carries at least one member associated with a recording or play back operation of the tape recorder, the sliding plate being movable from an operative position wherein the at least one member associated with a recording or play back operation is in operative contact with the cassette to an inoperative position wherein the at least one member associated with a recording or play back operation is out of operative contact with the cassette, the sliding plate being movable into the operative position when the slidable cassette cover is moved into the closed position and movable into the inoperative position when the slidable cassette cover is moved into the open position;

an actuating roller mounted on the slidable cassette cover for movement with the slidable cassette cover;

an operating pawl and an eject lever pivotally mounted on the sliding plate about a single axis, the operating pawl being movable from a first position wherein the operating pawl is positioned in the path of movement of the activating roller to a second position wherein the operating pawl is removed from the path of movement of the activating roller;

means for causing the eject lever to rotate with the operating pawl and to cause an ejecting operation of the cassette when the operating pawl is engaged by the actuating roller when the slidable cassette cover is being moved from the closed to the open position;

means for removing the operating pawl from the path of movement of the actuating roller when the sliding plate is in the operative position, thereby preventing an ejecting operating when the sliding plate is in the operative position.

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**4,017,903**

## PULSE CODE MODULATION RECORDING AND/OR REPRODUCING SYSTEM

**Peter F. Chu, Poway, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.**

**Filed Aug. 27, 1975, Ser. No. 608,139**

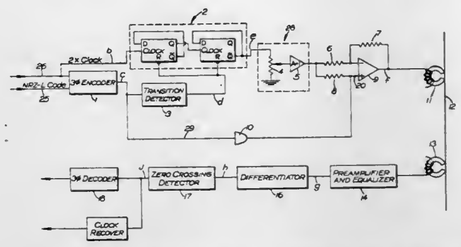
**Int. Cl.² G11B** *5/09*

**U.S. Cl. 360—40** **10 Claims**

1. A method for recording on magnetic tape encoded digital data, the method comprising the steps of:

generating a unipolar digital signal having transitions between a first state and a second state in response to said digital data, said unipolar digital signal representing said data through the use of preselected delay periods between said transitions and having no more than one transition for each bit represented;

generating a bipolar digital signal in response to said unipolar digital signal by alternately producing a positive pulse, then a negative pulse, said pulses being of approximately equal duration and being spaced at intervals approximately equal to the delay periods between the transitions




between said first and second states of said unipolar digital signal:

holding said bipolar signal at an intermediate potential when not producing said positive and negative pulses; and

producing magnetic impressions on said magnetic tape in response to said bipolar digital signal.

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**4,017,904**

## TAPE DRIVING DEVICE INCLUDING PINCH ROLLER AND TAPE GUIDE MOUNTING MEANS

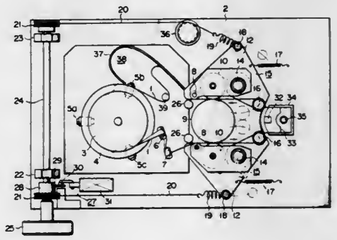
**Hiroyuki Tsukamoto, Kawasaki; Morio Akino, Fujisawa; Satoshi Hara, Naka, all of Japan; Kazuyoshi Kikuchi, deceased, late of Kawasaki, Japan; Yumiko Kon, representative, and Jun Kon, representative, both of Sagamihara, Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan**

**Filed Sept. 11, 1975, Ser. No. 612,556**

**Claims priority, application Japan, Sept. 14, 1974, 49-106495**

**Int. Cl.² G11B** *15/29*, *15/60*; **B65H** *17/22*; **G03B** *1/56*

**U.S. Cl. 360—90** **9 Claims**



1. A tape driving device comprising:

a base,

a capstan rotatably mounted on said base,

a stationary magnetic head provided near the capstan,

a pair of supporting members pivotably disposed on opposite sides of the capstan,

a pinch roller having an elastic peripheral surface and rotatably supported near the capstan on each one of the supporting members,

a head facing tape guide supported near the magnetic head on each one of the supporting members,

means mounting each of said supporting member on said base for pivotal movement between a first position in which the pinch roller thereof and tape guide thereof press a magnetic tape against the capstan and the magnetic head, respectively, so as to facilitate the drive of said tape by said pinch rollers and said capstan and the recording and reproduction of material upon said tape by said magnetic head, and a second position in which the

pinch roller and the tape guide are spaced apart from the capstan and the magnetic head, respectively so as to facilitate the loading or removal of said tape with respect to said pinch rollers, said capstan, and said magnetic head,

a first pivotable force-imparting means normally pivoting each of the supporting members to the second position,

a second pivotable force-imparting means selectively pivoting each of the supporting members to the first position against the force of the first pivotable force-imparting means, and

a limiting member limiting the pivotable movement of each of the supporting members in the first position against the force of the second pivotable force-imparting member.

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**4,017,905**

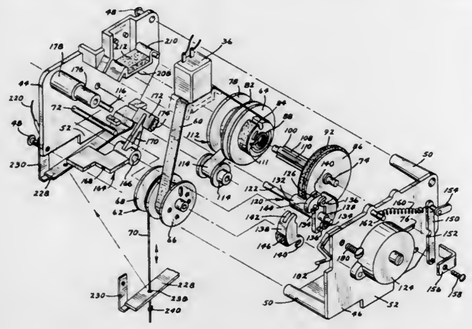
**TOY RECORDER AND PLAYBACK APPARATUS**

**Frank J. Convertine, Cincinnati, Ohio, and John F. Mayer, Fort Thomas, Ky., assignors to General Mills Fun Group, Inc., Minneapolis, Minn.**

**Continuation-in-part of Ser. No. 243,165, April 12, 1972, abandoned. This application Oct. 19, 1973, Ser. No. 408,231**

**Int. Cl.[2] G11B** *15/10, 15/18, 5/12, 15/12*

**U.S. Cl. 360—96** **11 Claims**



1. A recording and reproducing apparatus comprising means for detecting an audible sound signal, a movable recording medium comprising a magnetic tape having first and second ends, sound recording means for magnetically recording the audible sound signal detected by said detecting means, means for operatively connecting said recording means and said sound detecting means together, sound reproducing means for magnetically reproducing the signals from said movable recording medium, a tape deck, means including a constant force spring motor for imparting movement to said magnetic tape, said means permitting relative movement of the magnetic tape in more than one direction, said spring motor being positioned in said tape deck and including a storage drum, a wind-up drum, a spring member having means for attaching one of its ends to the storage drum and its other end to the wind-up drum, said spring member normally biased to wind itself onto said storage drum, a tape storage reel and a tape wind-up reel, said tape storage reel being comprised of two components, clutch means for operatively connecting said two components together, said clutch means including a coil spring which is secured at one end to the first component and which surrounds a hub forming a part of the second component, said coil spring adapted to grip said hub as said first component rotates in one direction, means for connecting said first component to the spring wind-up drum, said first component being rotatable in either direction, said clutch means permitting the second component to rotate in only a single direction, means for securing a first end of said tape to said storage reel and a second end of said tape to said wind-up reel, said tape storage reel and said spring wind-up reel being operatively connected together, governor means for controlling the rate of travel of said magnetic tape, amplifier means for amplifying the sound signal detected by said detecting means and the sound reproduced by said sound reproducing means, manually operable switch means for controlling the recording and reproducing of sound signals on said magnetic tape, means for erasing the recording signal on said magnetic tape, said erasing means comprising a magnet and a movable member for supporting said magnet proximate the magnetic tape, means for actuating said switch means between recording and reproducing positions, and means for actuating said erasing means into an erase position at substantially the same time that the switch means is actuated to said recording position, and a non-erase position at substantially the same time that the switch means is actuated to said reproducing position.

# DESIGN PATENTS

## GRANTED APRIL 12, 1977

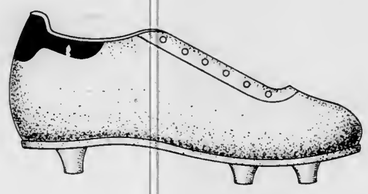
### ERRATA

| For CLASS | See PATENT NO. |
|---|---|
| 006–187 | 224,019 |
| 013–013 | 244,026 |
| 013–030 | 244,027 |
| 014–043 | 244,034 |
| 014–065 | 244,035 |
| 014–052 | 244,036 |
| 014–036 | 244,037 |
| 014–086 | 244,038 |
| 014–086 | 244,039 |
| 014–086 | 244,040 |
| 014–080 | 244,052 |
| 014–002 | 244,053 |
| 016–006 | 244,054 |
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| 024–062 | 244,057 |
| 024–064 | 244,058 |
| 010–104 | 244,059 |

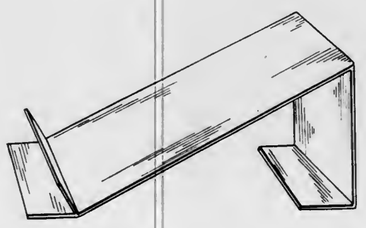
# DESIGNS

APRIL 12, 1977

243,976
**ATHLETIC SHOE OR THE LIKE**
Horst Rudolf Dassler, Eckartswiller, France, assignor to Fabriques de Chaussures de Sport S.A.R.L., Dettwiller, France
Filed Aug. 13, 1975, Ser. No. 604,217
Term of patent 14 years
Int. Cl. D2—*04*
U.S. Cl. D2—311

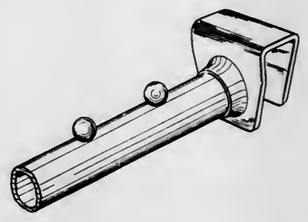


243,977
**COMPUTER STAND**
John E. Roberts, 2198 Garden Drive, Wickliffe, Ohio 44092
Filed July 7, 1975, Ser. No. 593,886
Term of patent 14 years
Int. Cl. D6—*99*
U.S. Cl. D6—85

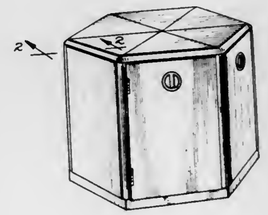


243,978
**BRACKET FOR GARMENT HANGERS OR THE LIKE**
Georges Lallement, 115, rue Pelleport, 75020 Paris, France
Filed Dec. 9, 1975, Ser. No. 639,122
Claims priority, application France, June 20, 1975, 75.73957
Term of patent 14 years
Int. Cl. D6—*04;* D8—*08*
U.S. Cl. D6—116

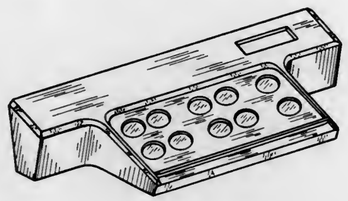




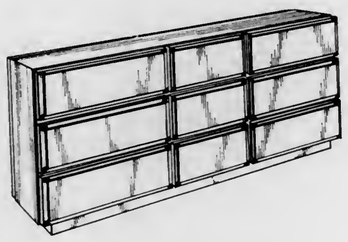
243,979
**HEXAGONAL COMMODE**
Roland P. Carter, Lynchburg, Va., assignor to The Lane Company, Inc., Altavista, Va.
Filed Sept. 10, 1975, Ser. No. 611,966
Term of patent 7 years
Int. Cl. D6—*06*
U.S. Cl. D6—146



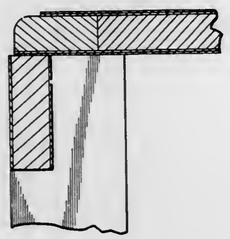
243,980
**COMBINED DISPLAY AND DEMONSTRATION UNIT FOR LENSES OR THE LIKE**
Joseph A. A. Mankowski, Corning, N.Y., assignor to Corning Glass Works
Filed Nov. 14, 1975, Ser. No. 632,138
Term of patent 14 years
Int. Cl. D20—*02;* D6—*04*
U.S. Cl. D6—157



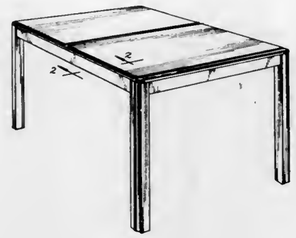
243,981
**DRESSER**
Roland P. Carter, Lynchburg, Va., assignor to The Lane Company, Inc., Altavista, Va.
Filed Sept. 10, 1975, Ser. No. 611,970
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—166



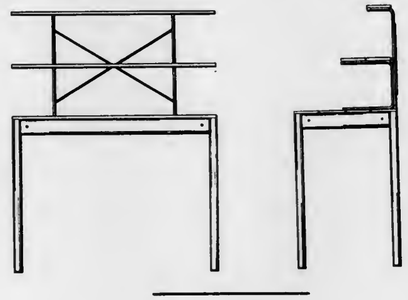
243,982
**COCKTAIL TABLE**
Roland P. Carter, Lynchburg, Va., assignor to The Lane Company, Inc., Altavista, Va.
Filed Sept. 10, 1975, Ser. No. 611,965
Term of patent 7 years
Int. Cl. D6—*03*
U.S. Cl. D6—177



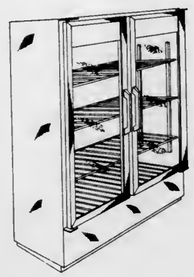
243,983
**TABLE**
Roland P. Carter, Lynchburg, Va., assignor to The Lane Company, Inc., Altavista, Va.
Filed Sept. 10, 1975, Ser. No. 611,969
Term of patent 7 years
Int. Cl. D6—*03*
U.S. Cl. D6—177



243,984
**PLANT DISPLAY TABLE**
Louis J. Christen, Jr., St. Louis, Mo., assignor to Christen Incorporated, St. Louis, Mo.
Filed Oct. 31, 1975, Ser. No. 627,509
Term of patent 14 years
Int. Cl. D6—*04;* D20—*02*
U.S. Cl. D6—179

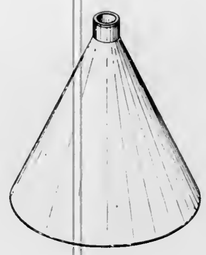


243,985
**REFRIGERATED DISPLAY CASE**
Robert I. Brown, 2519 Wendell Ave., Lima, Ohio 45802
Filed Dec. 17, 1973, Ser. No. 425,271
Term of patent 14 years
Int. Cl. D6—*04;* D15—*07*
U.S. Cl. D6—187

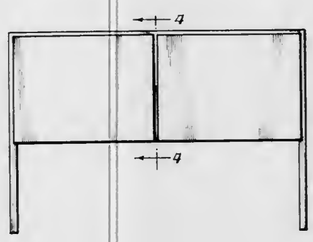




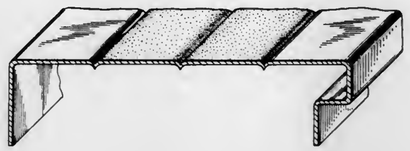
243,986
**BASE SUPPORT**
Daniel W. O'Leary, Jr., 4119 Verner Drive, Murrysville, Pa. 15668
Filed June 2, 1975, Ser. No. 582,846
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D6—194



243,987
**BED HEADBOARD**
Roland P. Carter, Lynchburg, Va., assignor to The Lane Company, Inc., Altavista, Va.
Filed Sept. 10, 1975, Ser. No. 611,964
Term of patent 7 years
Int. Cl. D6—*06*
U.S. Cl. D6—198

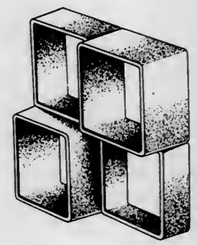


243,988
**FRAME MOLDING**
Greg Copeland, 114 Beach Terrace, Wayne, N.J. 07470
Filed July 17, 1975, Ser. No. 596,887
Term of patent 14 years
Int. Cl. D6—*07*
U.S. Cl. D6—232





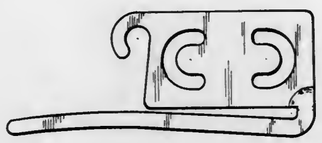
243,989
**PHOTOGRAPH HOLDER**
Bernard Cohen, S. Line St., Lansdale, Pa. 19446
Filed Jan. 23, 1975, Ser. No. 543,238
Term of patent 14 years
Int. Cl. D6—*07*
U.S. Cl. D6—234



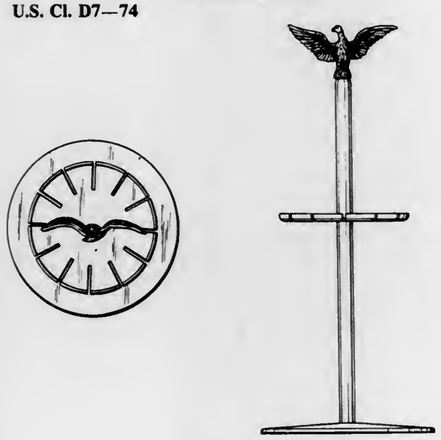
243,990
**PICTURE FRAME AND EASEL**
Cole Williams, 2408 Allanjay Place, Glendale, Calif. 91208
Filed Jan. 16, 1975, Ser. No. 541,607
Term of patent 14 years
Int. Cl. D6—*07*
U.S. Cl. D6—236



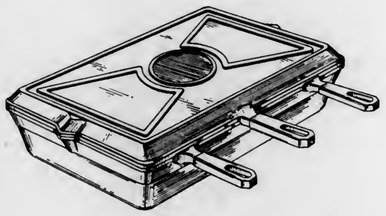
243,991
DISPLAY HANGER
Joseph D. Schmidt, Jr., 1909 Lincoln Ave., Chicago, Ill. 60614
Filed July 9, 1975, Ser. No. 594,441
Term of patent 14 years
Int. Cl. D6—*08*
U.S. Cl. D6—247



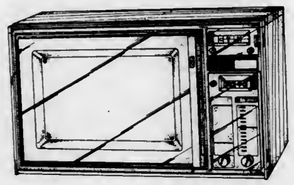
243,992
KNIFE CADDY
Earl Baxter, Fremont, Ohio, assignor to The Scott & Fetzer Company, Freemont, Ohio
Filed Nov. 17, 1975, Ser. No. 632,638
Term of patent 14 years
Int. Cl. D7—*06*
U.S. Cl. D7—74



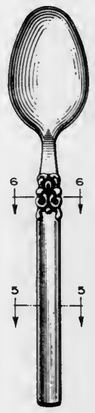
243,993
COOKWARE UNIT
Lorence O'Russa, 314 Lincoln, Metamora, Ill. 61548, and Richard L. O'Russa, 5121 No. Isabell, Peoria, Ill. 61614
Filed July 31, 1975, Ser. No. 600,795
Term of patent 14 years
Int. Cl. D7—*02*
U.S. Cl. D7—95



243,994
MICROWAVE OVEN
Yoshiaki Kawata, Nara; Daisaku Mori, Yamato-koriyama, and Masamichi Yamamura, Osaka, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan
Filed Mar. 25, 1976, Ser. No. 670,566
Claims priority, application Japan, Sept. 29, 1975, 50-39508
Term of patent 14 years
Int. Cl. D7—*04*
U.S. Cl. D7—128



243,995
SPOON OR SIMILAR ARTICLE
Z. George Zephries, Roselle, Ill., assignor to American Home Products Corporation, New York, N.Y.
Filed Nov. 7, 1975, Ser. No. 629,999
Term of patent 14 years
Int. Cl. D7—*03*
U.S. Cl. D7—137






243,996
SPOON OR SIMILAR ARTICLE
Z. George Zephries, Roselle, Ill., assignor to American Home Products Corporation, New York, N.Y.
Filed Nov. 7, 1975, Ser. No. 630,000
Term of patent 14 years
Int. Cl. D7—*03*
U.S. Cl. D7—137




243,997
SPOON OR SIMILAR ARTICLE
Z. George Zephries, Roselle, Ill., assignor to American Home Products Corporation, New York, N.Y.
Filed Nov. 7, 1975, Ser. No. 630,001
Term of patent 14 years
Int. Cl. D7—*03*
U.S. Cl. D7—137




243,998
SPOON OR SIMILAR ARTICLE
Z. George Zephries, Roselle, Ill., assignor to American Home Products Corporation, New York, N.Y.
Filed Nov. 7, 1975, Ser. No. 630,003
Term of patent 14 years
Int. Cl. D7—*03*
U.S. Cl. D7—137




243,999
SPOON OR SIMILAR ARTICLE
Z. George Zephries, Roselle, Ill., assignor to American Home Products Corporation, New York, N.Y.
Filed Nov. 7, 1975, Ser. No. 630,004
Term of patent 14 years
Int. Cl. D7—*03*
U.S. Cl. D7—137



244,000
SPOON OR SIMILAR ARTICLE
Z. George Zephries, Roselle, Ill., assignor to American Home Products Corporation, New York, N.Y.
Filed Nov. 7, 1975, Ser. No. 630,005
Term of patent 14 years
Int. Cl. D7—*03*
U.S. Cl. D7—137



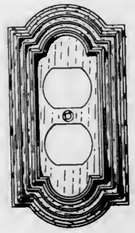
244,001
SPOON OR SIMILAR ARTICLE
Z. George Zephries, Roselle, Ill., assignor to American Home Products Corporation, New York, N.Y.
Filed Nov. 7, 1975, Ser. No. 629,994
Term of patent 14 years
Int. Cl. D7—*03*
U.S. Cl. D7—151



244,002
CORK RETRIEVER
Bernard R. Bonin, 7 Linden Ave., Westbrook, Conn. 06498
Filed Oct. 24, 1975, Ser. No. 625,371
Term of patent 14 years
Int. Cl. D7—*06*
U.S. Cl. D8—42



244,003
WALL PLATE-CONCENTRIC MARGIN
Joan Grieb, Westfield, N.J., assignor to General Electric Company
Filed Oct. 20, 1975, Ser. No. 624,088
Term of patent 14 years
Int. Cl. D8—*09*
U.S. Cl. D8—350



244,004
DOUBLE ACTING DOOR LIFT AND CLOSING DEVICE
Glenn V. Searer, Elkhart, Ind., assignor to Elkhart Rivet & Register Co., Inc., Elkhart, Ind.
Filed Nov. 13, 1975, Ser. No. 631,709
Term of patent 14 years
Int. Cl. D8—*09*
U.S. Cl. D8—330





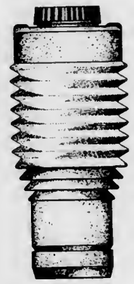
244,005
UTILITY POLE TOP INSULATOR BRACKET
Joseph W. Dimiceli, San Rafael, and Edgardo R. Labra, Corte Madera, both of Calif., assignors to Utilities Hardware, Inc., Richmond, Calif.
Filed Apr. 5, 1976, Ser. No. 673,650
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—364



244,006
CLOSET ROD AND SHELF SUPPORT BRACKET
Robert J. Vanderley, Jenison, Mich., assignor to Leslie Metal Arts Company, Inc., Grand Rapids, Mich.
Filed Apr. 11, 1975, Ser. No. 567,319
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—366



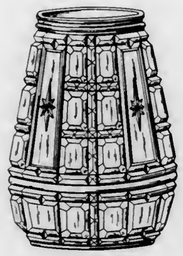
244,007
TONER BOTTLE
Ronald F. Feldeisen, Fairport, N.Y., assignor to Xerox Corporation, Stamford, Conn.
Filed Sept. 11, 1975, Ser. No. 612,528
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—2



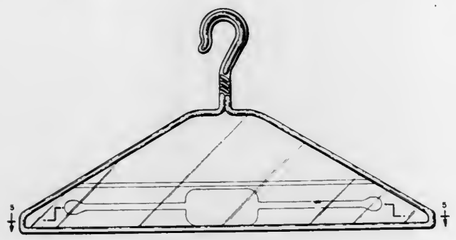
244,008
DISPENSING CONTAINER
Hans-Peter Aeschlimann, Dielheim, Germany, assignor to Dr. Molter GmbH, Heidelberg, Germany
Filed Sept. 3, 1975, Ser. No. 610,508
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—3



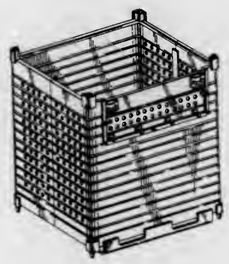
244,009
JAR
Marvin L. Kayne, Glenwood, Ill., assignor to Candle Corporation of America, Chicago, Ill.
Filed Sept. 17, 1975, Ser. No. 614,270
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—120



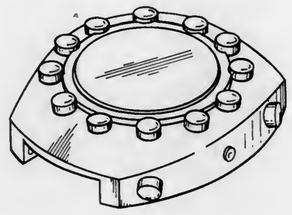
244,010
PACKAGING CONTAINER FOR A BRACELET OR THE LIKE
William Henry Young, Coventry, R.I., assignor to Textron, Inc.
Filed Jan. 3, 1975, Ser. No. 538,303
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—195



244,011
STACKABLE MATERIAL HANDLING BOX
William R. Powell, Hubbard, Ohio, assignor to The Powell Pressed Steel Company, Hubbard, Ohio
Filed Nov. 13, 1975, Ser. No. 631,491
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—246



244,012
COMBINED WATCH AND CALCULATOR
Arthur F. Cake, Stamford, Conn.; Morris M. Levine, Scarsdale, N.Y.; Alena Rolny, and Paul Rolny, both of Watertown, Conn., assignors to Uranus Electronics Inc., Port Chester, N.Y.
Filed July 24, 1975, Ser. No. 598,678
Term of patent 14 years
Int. Cl. D10—*02;* D18—*01*
U.S. Cl. D10—31



244,013
HANGING CONTAINER FOR ROOTING PLANTS
David R. Perkins, Gloucester, Mass., assignor to Glass Dimensions, Inc., Magnolia, Mass.
Filed Oct. 22, 1975, Ser. No. 624,953
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D11—147

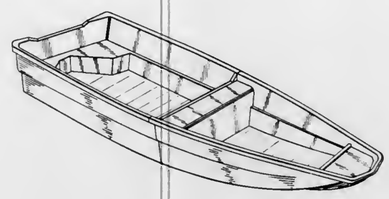


244,014
UNIVERSAL ADJUSTABLE FLAGPOLE
Sang In Kim, 4815 W. Belle Plaine Ave., Chicago, Ill. 60641
Filed Oct. 8, 1975, Ser. No. 616,352
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D11—182

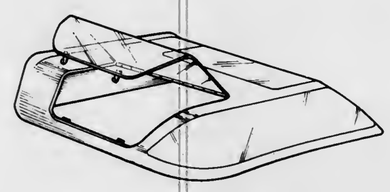




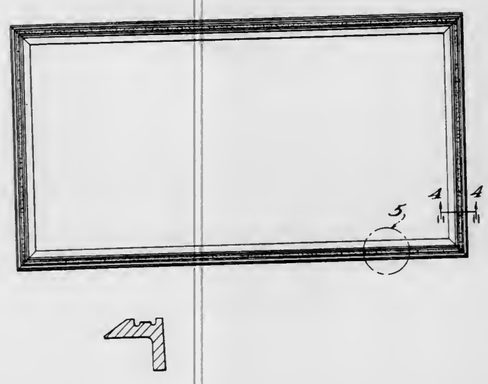
244,015
SECTIONAL BOAT
Robert E. Grind, 512 Fairview Court, Placerville, Calif. 95667
Filed Mar. 17, 1975, Ser. No. 559,317
Term of patent 14 years
Int. Cl. D12—*06*
U.S. Cl. D12—62



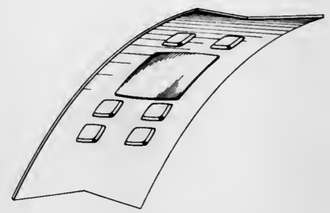
244,016
VAN TOP EXTENSION
Charles K. Waldman, 733 Saphire St., Redondo Beach, Calif. 90277
Filed Feb. 23, 1976, Ser. No. 659,988
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—156



244,017
LICENSE PLATE HOLDER
John A. Bott, 931 Lakeshore Drive, Grosse Pointe Shores, Mich. 48236
Filed May 5, 1976, Ser. No. 683,420
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—193



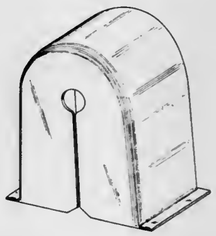
244,018
PASSENGER SERVICE UNIT PANEL
Rashad Shaker Greiss, Mercer Island, and James Stephen Yates, Seattle, both of Wash. 98146, assignors to The Boeing Company
Filed June 30, 1975, Ser. No. 591,970
Term of patent 14 years
Int. Cl. D12—*07*
U.S. Cl. D12—195



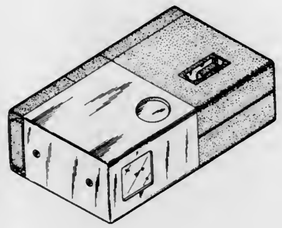
244,019
REFRIGERATED DISPLAY CASE
Robert I. Brown, 2519 Wendell Ave., Lima, Ohio 45802
Filed Mar. 16, 1973, Ser. No. 342,269
Term of patent 14 years
Int. Cl. D15—*07;* D20—*02*
U.S. Cl. D15—81

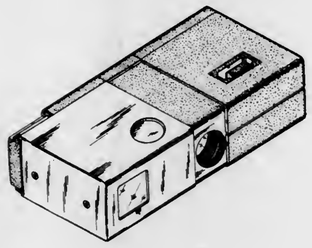


244,020
COUPLING GUARD
Richard H. Hanson, 1699 Alcan Drive, Menasha, Wis. 54952; Robert D. Roedel, 12323 Christine Drive, Wauwatosa, Wis. 53213, and Frank R. Forrest, Box No. 1, Saxeville, Wis. 54976
Filed June 16, 1975, Ser. No. 586,993
Term of patent 7 years
Int. Cl. D15—*99*
U.S. Cl. D15—148

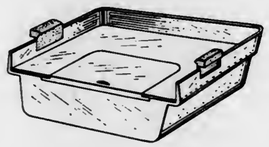


244,021
POCKET CAMERA
Paul D. Miller, New York, and V. Lorenzo Porcelli, Ossining, both of N.Y., assignors to GAF Corporation, New York, N.Y.
Filed Mar. 4, 1976, Ser. No. 663,990
Term of patent 14 years
Int. Cl. D16—*01*
U.S. Cl. D16—05

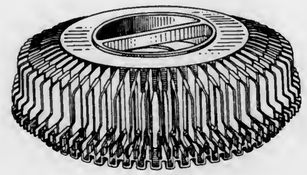




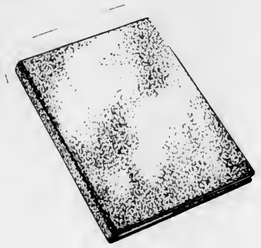
244,022
CAMERA POWER-PACK UNIT
John De Filippis, South Amboy, N.J., assignor to International Telephone and Telegraph Corporation, Nutley, N.J.
Division of Ser. No. D. 453,657, Mar. 21, 1974. This application May 15, 1975, Ser. No. 577,825
Term of patent 14 years
Int. Cl. D16—*99*
U.S. Cl. D16—10

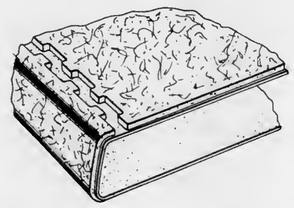


244,023
PHOTOGRAPHIC SLIDE TRAY
Herbert Wilsch, Unterhaching, and Jurgen Sylla, Munich, both of Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Germany
Filed Sept. 30, 1974, Ser. No. 511,296
Claims priority, application Germany, Apr. 1, 1974, MR 423
Term of patent 14 years
Int. Cl. D16—*05*
U.S. Cl. D16—26



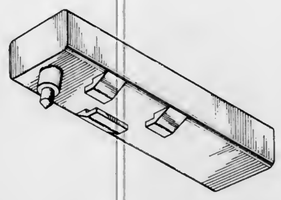
244,024
PROTECTIVE FOLDER HAVING TRANSPARENT POCKETS
Maurice Audeguy, Saint-Mande, France, assignor to Etablissements Doret S.A., Sainte Mande, France
Filed Aug. 13, 1974, Ser. No. 497,081
Claims priority, application France, Mar. 22, 1974, 74.37265
Term of patent 14 years
Int. Cl. D19—*04*
U.S. Cl. D19—27



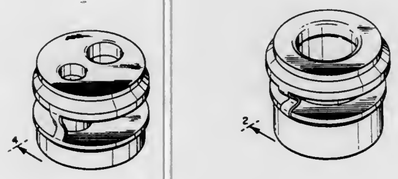




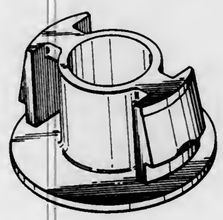
244,025
DISPOSABLE RECORDING PEN
Jerald Carl Raahauge, Escondido, Calif., assignor to Kingmann-White, Inc., Placentia, Calif.
Filed June 9, 1975, Ser. No. 584,711
Term of patent 14 years
Int. Cl. D19—*06*
U.S. Cl. D19—41



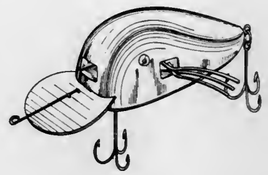
244,026
COMBINED CLAMPING GLAND AND RING FOR AN ELECTRICAL CONDUIT
Jonah Eidelberg, Huntington Station, and Thomas Mooney, Mount Sinai, both of N.Y., assignors to I-T-E Imperial Corporation, East Farmingdale, N.Y.
Filed May 1, 1975, Ser. No. 573,776
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D13—13



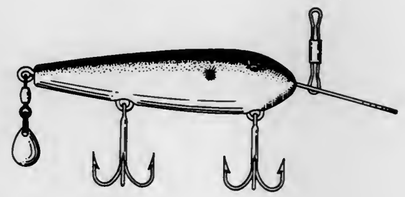
244,027
PLUG FOR ELECTRICAL JUNCTION BOXES AND CONNECTORS
Thomas Mooney, Mount Sinai, and Stephen Veselaski, Shirley, both of N.Y., assignors to I-T-E Imperial Corporation, East Farmingdale, N.Y.
Filed Sept. 17, 1975, Ser. No. 614,234
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D13—30



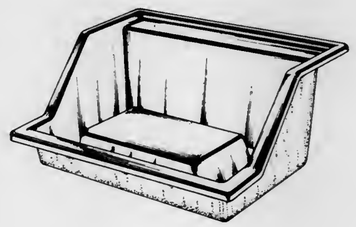
244,028
FISHING LURE
Cecil Lewis, P.O. Box 219, Smilax, Ky. 41764
Filed Aug. 1, 1975, Ser. No. 595,362
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—27



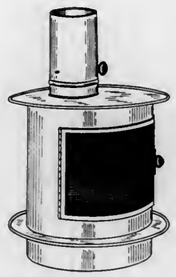
244,029
FISHING LURE
Wadere S. Shahid, Foley, Ala., assignor to Lew Childre & Sons, Inc., Foley, Ala.
Filed Apr. 12, 1976, Ser. No. 675,989
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—28



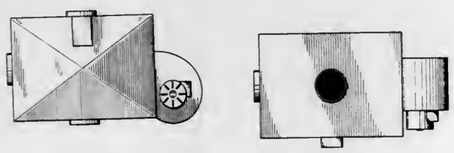
244,030
SINK
Leo K. Tongish, 10206 San Juan Ave., South Gate, Calif. 90280
Filed Oct. 28, 1975, Ser. No. 626,085
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D23—58



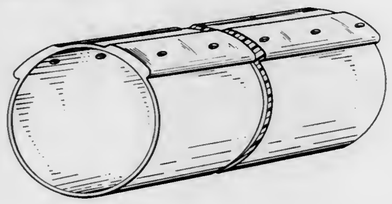
244,031
**FREE STANDING FIREPLACE**
Gary E. Baughman, Santa Rosa, Calif., assignor to Malm Fireplaces, Inc.
Filed Mar. 22, 1976, Ser. No. 669,176
Term of patent 14 years
Int. Cl. D23—*03*
U.S. Cl. D23—97



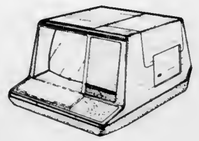
244,032
**HEAT SAVING UNIT FOR USE WITH FURNACES OR THE LIKE**
Niles Ellis Deetz, and Arcadio Alvarez Garcia, both of Canton, Ohio, assignors to Stack Heater's Inc.
Filed Sept. 15, 1975, Ser. No. 613,567
Term of patent 14 years
Int. Cl. D23—*03*
U.S. Cl. D23—127



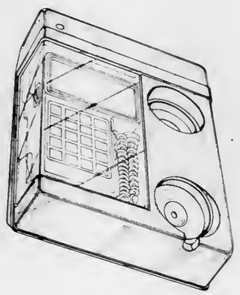
244,033
**HOSE**
Arthur M. Elson, Hamilton Township, Mercer County, N.J., assignor to Acme-Hamilton Manufacturing Corporation, Trenton, N.J.
Filed July 11, 1975, Ser. No. 595,154
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—45



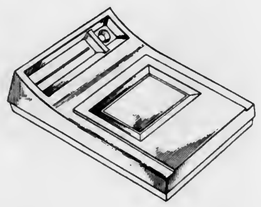
244,034
**HOUSING FOR A VIDEO TERMINAL DISPLAY UNIT**
Paul A. Jenkins, Groton, Mass., assignor to Digital Equipment Corporation, Maynard, Mass.
Filed Feb. 18, 1975, Ser. No. 550,691
Term of patent 14 years
Int. Cl. D14—*02*
U.S. Cl. D14—43



244,035
**TELEPHONE COUPLER — CARRYING CASE AND HAND-HELD COMPUTER TERMINAL**
Charles Michael Ault, Arlington, Mass., assignor to Termiflex Corporation, Nashua, N.H.
Filed May 6, 1974, Ser. No. 467,249
Term of patent 14 years
Int. Cl. D14—*03*; D13—*03*; D14—*02*
U.S. Cl. D14—65

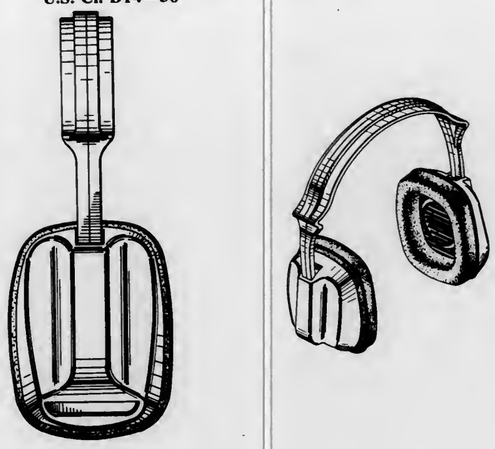


244,036
**MEMO TRANSMITTER**
Joseph L. Tyrrell, Palos Verdes, Calif., assignor to Telautograph Corporation, Los Angeles, Calif.
Filed May 4, 1976, Ser. No. 682,952
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—52

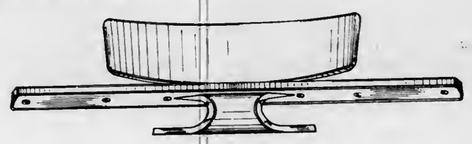


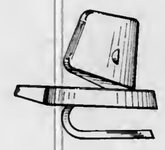


244,037
**ACOUSTICAL HEAD-SET**
Donald E. Warner, North Hollywood, and George C. Oyama, Tujunga, both of Calif., assignors to Audiotronics Corporation, North Hollywood, Calif.
Filed June 16, 1976, Ser. No. 696,798
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—36

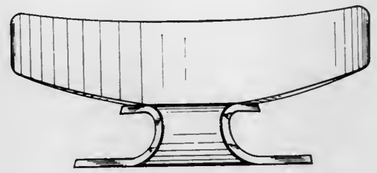


244,038
**EASEL TYPE BOOMERANG ANTENNA**
Ernest Pizon, Saint Cloud, France, assignor to Mecaniplast, Clichy, France
Filed July 2, 1976, Ser. No. 702,484
Claims priority, application France, July 7, 1976, 76.74457
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—86





244,039
**EASEL TYPE ANTENNA**
Ernest Pizon, Saint Cloud, France, assignor to Mecaniplast, Clichy, France
Filed July 2, 1976, Ser. No. 702,485
Claims priority, application France, July 7, 1976, 74.457
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—86



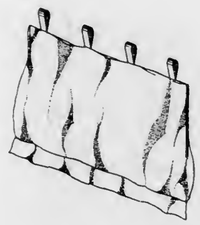


244,040
**BOOMERANG ANTENNA**
Ernest Pizon, Saint Cloud, France, assignor to Mecaniplast, Clichy, France
Filed July 2, 1976, Ser. No. 702,486
Claims priority, application France, July 7, 1976, 74.457
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—86

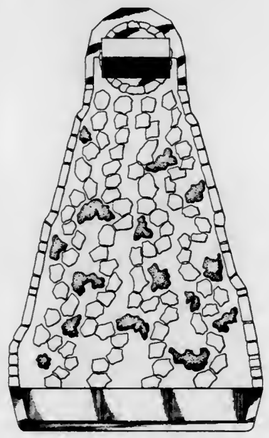




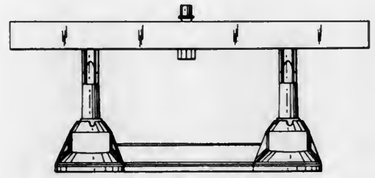
244,041
CATTLE DUSTING BAG
Scott Stewart, 901 Watson Ave., Madison, Wis. 53713
Filed Nov. 6, 1975, Ser. No. 629,309
Term of patent 14 years
Int. Cl. D30—*99*
U.S. Cl. D30—02



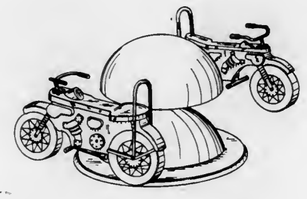
244,042
GAME BOARD
Adolph E. Goldfarb, 4614 Monarca Drive, Tarzana, Calif. 91345, and Erwin Benkoe, 17965 Medley Drive, Encino, Calif. 91316
Filed Feb. 10, 1975, Ser. No. 548,693
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 SS



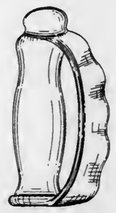
244,043
TOY BALANCING BEAM
Osamu Takahashi, Tokyo, Japan, assignor to Tomy Kogyo Co., Ltd., Tokyo, Japan
Filed July 7, 1975, Ser. No. 593,237
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 K



244,044
AMUSEMENT RIDE APPARATUS
Claude W. Ahrens, W. Highway 6, Grinnell, Iowa 50112
Filed July 11, 1975, Ser. No. 595,099
Term of patent 14 years
Int. Cl. D21—*03*
U.S. Cl. D34—5 L

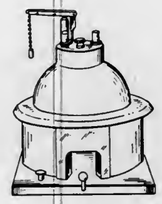


244,045
SKI POLE HANDGRIP OR SIMILAR ARTICLE
Josef Lah, 31020 Meadowbrook Drive, Willoughby Hills, Ohio 44094, and Anthony M. Gentile, 25080 Edgemont Drive, Richmond Heights, Ohio 44143
Filed Aug. 29, 1975, Ser. No. 609,025
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—14 D

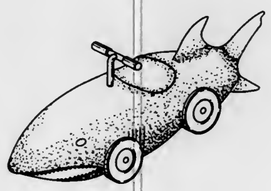




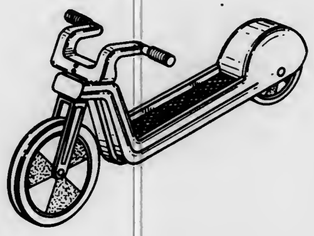
244,046
TOY STEAM ENGINE
Jockum Krumlinde, Vittsjo, Sweden, assignor to AB Alga, Vittsjo, Sweden
Filed May 30, 1975, Ser. No. 582,111
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 S



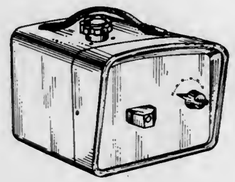
244,047
RIDING TOY
Donald R. Daverin, 1017 Kim Place, and Mikel R. Powell, 1021 Kim Place, both of, Lemont, Ill. 60439
Filed Dec. 8, 1975, Ser. No. 638,343
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 AJ

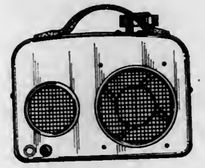


244,048
SCOOTER
Donald R. Daverin, 1017 Kim Place, Lemont, Ill. 60439
Filed Dec. 8, 1975, Ser. No. 638,344
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 AT

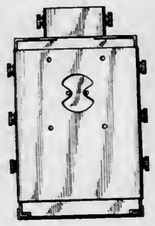


244,049
FIBER OPTIC LIGHT SOURCE OR SIMILAR ARTICLE
Richard E. Feinbloom, New York, and Laszlo Endrodi, Elmhurst, both of N.Y., assignors to Designs for Vision, Inc., New York, N.Y.
Filed Dec. 3, 1974, Ser. No. 529,221
Term of patent 14 years
Int. Cl. D26—*05*
U.S. Cl. D48—20 E

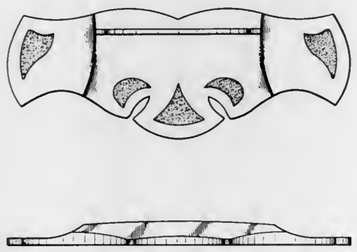




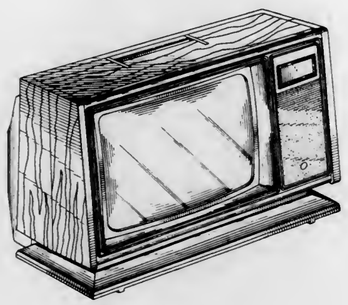
244,050
ADJUSTABLE HOUSING FOR HIGH INTENSITY LAMPS
Edwin H. Lauth, 1025 Augusta Drive, Sun City Center, Fla. 33570
Filed May 21, 1975, Ser. No. 579,556
Term of patent 14 years
Int. Cl. D26—*05*
U.S. Cl. D48—20 E



244,051
GUITAR BRIDGE
Bozo Podunavac, 713 E. Valley Parkway Blvd., Escondido, Calif. 92025
Filed Dec. 30, 1974, Ser. No. 537,340
Term of patent 14 years
Int. Cl. D17—*99*
U.S. Cl. D56—1 A



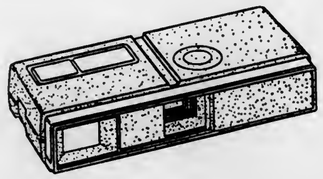
244,052
TELEVISION RECEIVER
Melvin H. Boldt, Glenview, and David P. Chuboff, North Barrington, both of Ill., assignors to Zenith Radio Corporation, Glenview, Ill.
Filed Apr. 4, 1975, Ser. No. 565,334
Term of patent 7 years
Int. Cl. D14—*01*
U.S. Cl. D14—80



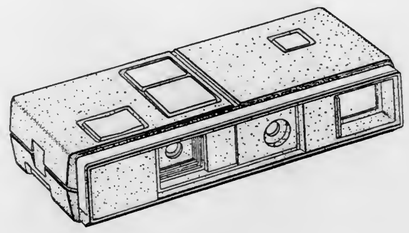
244,053
AUDIO VISUAL RECORD PLAYER
Rebertus Van De Poel, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.
Filed Jan. 30, 1975, Ser. No. 545,624
Claims priority, application Switzerland, Aug. 19, 1974, 59308/74
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D14—2



244,054
CAMERA
Moto Shimano, and Walter Nakano, both of Los Angeles, Calif., assignors to Optigon Research & Development Corporation, Santa Monica, Calif.
Division of Ser. No. 419,591, Nov. 28, 1973, Pat. No. Des. 236,546.
This application Oct. 11, 1974, Ser. No. 514,189
Term of patent 14 years
Int. Cl. D16—*01*
U.S. Cl. D16—6

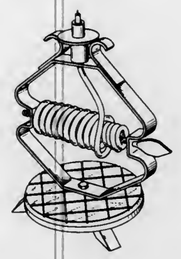


244,055
CAMERA
Moto Shimano, and Walter Nakano, both of Los Angeles, Calif., assignors to Optigon Research & Development Corporation, Santa Monica, Calif.
Division of Ser. No. 419,591, Jan. 28, 1973, Pat. No. Des. 236,546.
This application Oct. 11, 1974, Ser. No. 514,190
Term of patent 14 years
Int. Cl. D16—*01*
U.S. Cl. D16—6

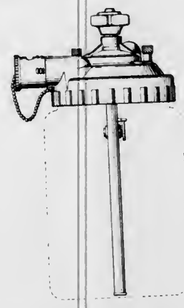




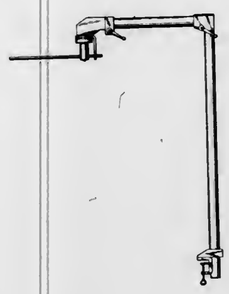
244,056
COMBINED TAPER AND HOLDER THEREFOR
Louis Phillip Jimenez, 1878 15th Ave., San Francisco, Calif. 94122, and Charles Houck, 47 Muth Drive, Orinda, Calif. 94563
Filed Aug. 11, 1975, Ser. No. 603,389
Term of patent 14 years
Int. Cl. D26—*01*
U.S. Cl. D73—1 R



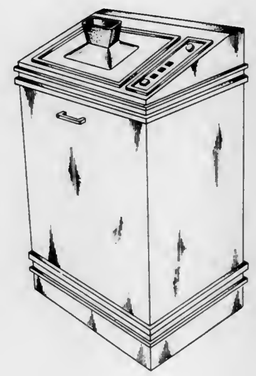
244,057
NEBULIZER COVER OR SIMILAR ARTICLE
Robert J. Aul, Perrysburg, Ohio; Robert S. Babington, McLean, Va.; Glenn H. Dunlap, Maumee, and Wayne J. Zitkus, Toledo, both of Ohio, assignors to American Hospital Supply Corporation, Evanston, Ill.
Filed May 14, 1975, Ser. No. 577,529
Term of patent 14 years
Int. Cl. 24—*02*
U.S. Cl. D24—62



244,058
SUPPORTING DEVICE FOR SLINGS AND THE LIKE
Adolf Kowal, Tagarp 10, S-270 54 Tommarp, Sweden
Filed May 20, 1975, Ser. No. 579,083
Claims priority, application Sweden, Nov. 21, 1974, 741942
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D24—64



244,059
PARCEL AND LETTER X-RAY INSPECTION UNIT
Victor E. De Lucia, and William R. Ivy, both of Los Angeles, Calif., assignors to Torr Laboratories, Inc.
Filed June 30, 1975, Ser. No. 591,357
Term of patent 14 years
Int. Cl. D24—*01*
U.S. Cl. D10—104



244,060
COIN HOLDER
Terry M. Friend, Alameda, Calif., assignor to Tom Numelin, Woodacre, Calif.
Filed June 26, 1975, Ser. No. 590,436
Term of patent 14 years
Int. Cl. D3—*02*
U.S. Cl. D87—3 B





# LIST OF PATENTEES

TO WHOM

## PATENTS WERE ISSUED ON THE 12TH DAY OF APRIL, 1977

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

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Abbott Laboratories: *See—*
Jones, Peter Hadley; Kyncl, Jaroslav; Ours, Carroll Wayne; and Somani, Pitambar, 4,017,636.
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Born, Ellis H.; and Thurston, David L., 4,017,219.
Abraham, Norman J. Appliance for coin-operated devices. 4,016,937, Cl. 273-1.00R.
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Adams, Arthur: *See—*
Hawley, Lee E., 4,017,267.
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Adddressograph Multigraph Corporation: *See—*
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Aerojet-General Corporation: *See—*
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AGA Aktiebolag: *See—*
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AGA Radiator AB: *See—*
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Meyer, Rudolf; and Hoffmann, Klaus, 4,017,869.
Wick, Richard; Bestenreiner, Friedrich; Giglberger, Dieter; Wetzel, Gunter; Schott, Walter; V. Engeland, Josef Leonard; and Verlinden, Willy Gommaire, 4,017,171.
AGFA-GEVAERT N.V.: *See—*
De Cat, Arthur Henri; Danckaert, Valere Frans; Sels, Francis Jeanne; and Pollet, Robert Joseph, 4,017,473.
Agnew, S. J.: *See—*
Jones, Allen Jacob, 4,017,254.
Ahrweiler, Karl-Heinz, to Kusters, Edward. Apparatus for avoiding an excess of pressure in a continuous press. 4,017,235, Cl. 425-149.000.
Aichinger, Dietmar; and Obrist, Albert, to Albert Obrist AG. Container with screw cap and seal. 4,016,996, Cl. 215-344.000.
Aidlin, Samuel S.; and Aidlin, Stephen H. Method and apparatus for internal spray cleaning of containers. 4,017,330, Cl. 134-21.000.
Aidlin, Stephen H.: *See—*
Aidlin, Samuel S.; and Aidlin, Stephen H., 4,017,330.
Airco, Inc.: *See—*
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Ulm, Ralph E., 4,016,906.
Aizawa, Tatsuo: *See—*
Washio, Takaji; and Aizawa, Tatsuo, 4,017,175.
Akami, Hitoshi; Nishikawa, Shigeru; Ikeda, Toshio; and Tsukokura, Akira, to Agency of Industrial Science & Technology; and Daido-Maruta Finishing Co., Ltd. Method for preparing color separation printing patterns. 4,017,894, Cl. 358-80.000.
Akashi, Mitsumasa; and Makio, Toshio, to Kabushiki Kaisha Komatsu Seisakusho. Pilot operated pressure and vacuum relief valve. 4,016,903, Cl. 137-493.500.
Akebono Brake Industry Co., Ltd.: *See—*
Kurata, Masayuki; and Watanabe, Yusiyo, 4,017,089.
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Akino, Morio: *See—*
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Aktiebolaget Karlstads Mekaniska Werkstad: *See—*
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Aktiengesellschaft Adolph Saurer: *See—*
Porter, Allan William Henry, 4,016,909.
Albany International Corporation: *See—*
Coplan, Myron J.; and Brooks, Thomas W., 4,017,030.
Albee, Percy Frederick, Jr., to Q-Panel Company. Easel. 4,017,049, Cl. 248-464.000.
Albert Obrist AG: *See—*
Aichinger, Dietmar; and Obrist, Albert, 4,016,996.
Albertson, Orris E., to Dorr-Oliver Incorporated. Split treatment phosphorus removal from waste. 4,017,388, Cl. 210-5.000.
Aldrich, Paul Harwood, to Hercules Incorporated. Aqueous dispersions of wax blends and a water-soluble cationic resin and paper sized therewith. 4,017,431, Cl. 260-18.00N.
Alestig, Ludvig Rune Ingvar; and Gustavsson, Gote Ivar, to Aktiebolaget Karlstads Mekaniska Werkstad. Runner for hydrodynamic machines. 4,017,211, Cl. 416-183.000.
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Allen Group Inc., The: *See—*
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Allen, William P. Portable projection screen. 4,017,152, Cl. 350-117.000.
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Plate, John R.; and Heisig, Charles P., 4,016,949.
Allison, Robert D. Garment for impedance plethysmograph use. 4,016,868, Cl. 128-2.10E.
Allison, William D., to Ford Motor Company. Suspension arm and joint assembly. 4,016,950, Cl. 280-674.000.
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Allport, Walter F. Apparatus for copying translucent documents. 4,017,184, Cl. 355-109.000.
Almer, Friedrich Hermann Raymund; and Kostlin, Heiner, to U.S. Philips Corporation. Incandescent lamp with infrared filter. 4,017,758, Cl. 313-112.000.
Altenburger, Otto, to Stromberg-Carlson Corporation. Number translator. 4,017,691, Cl. 179-18.0ET.
Alter, S.A.: *See—*
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Alvarez, Robert T. Polyalloy of polyphenylene sulfide and polyimide. 4,017,555, Cl. 260-857.0PA.
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Gordon, John Edson; and Ralston, Robert A., 4,017,501.
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Schaub, Robert Eugene; Floyd, Middleton Brawner, Jr.; and Weiss, Martin Joseph, 4,017,534.
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Reavis, Robert Philmore, Jr.; and Soderstrom, Melvin Andrew, 4,017,140.
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Anderberg, Paul-Henry Botvid; Hambitzer, Hans Gunnar Gunther; and Sander, Nils Borje Lennart, to Svenska Aktiebolaget Bromsregulator. Method and device for dynamically measuring brake forces. 4,016,755, Cl. 73-121.000.
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Anderson, John Erling, to Union Carbide Corporation. Pyrolysis process for converting refuse to fuel gas. 4,017,273, Cl. 48-209.000.
Anderson, John M., to General Electric Company. Electrodeless fluorescent lamp having a radio frequency gas discharge excited by a closed loop magnetic core. 4,017,764, Cl. 315-248.000.
Anderson, Larry W.; and McDonald, Michael P., to Westinghouse Electric Corporation. Train vehicle control apparatus. 4,017,044, Cl. 246-182.00B.
Anderson, Otis F. Pneumatic impacter. 4,016,873, Cl. 128-54.000.
Anderson, Raymond L. Holding device for screw drivers and the like. 4,016,913, Cl. 145-52.000.
Anderson, Robert William; Knowles, William Ralph; and Culley, John Edward, to Image Analysing Computers Limited. Methods and apparatus involving light pen interaction with a real time display. 4,017,680, Cl. 358-242.000.
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Anwer, Jamil; Banchik, Ira Norman; Bode, Gerhard Wilhelm; Lemberg, Werner; and Sud, Kuldip Kumar, to Bamag Verfahrenstechnik GmbH. Process for gasifying solid carbonaceous fuel. 4,017,272, Cl. 48-197.00R.
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Spicuzza, John P., Jr.; and Mills, Frank J. E., 4,017,670.
Arend, Gunter; Schaffner, Heinz; and Schramm, Jurgen, to Bayer Aktiengesellschaft. Process for the production of (meth)allyl phosphonic acid dialkyl esters. 4,017,564, Cl. 260-969.000.
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Ashton, Wallace T.; and Rogers, Edward F., to Merck & Co., Inc. Antifungal 1-substituted benzimidazoles. 4,017,504, Cl. 260-302.00H.
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Astley, Edward Pryce; Jones, Owen Morris; and Law, Kenneth William, to Dunlop Limited. Pneumatic tires. 4,016,915, Cl. 152-355.000.
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Bailey, August V.; Boudreaux, Gordon J.; Sumrell, Gene; and Novak, Arthur F., to United States of America, Agriculture. N-(furoyloxyethyl) fatty acid amides. 4,017,522, Cl. 260-347.500.
Bailey, Fay W., to Phillips Petroleum Company. Inhibition of poly(arylene sulfide) resin induced metal corrosion. 4,017,450, Cl. 260-37.00R.
Bailey, Ronald Barry, to General Electric Company. Load voltage clamping circuit for voltage turn-off chopper. 4,017,777, Cl. 318-342.000.
Baird, William Chalmers, Jr.; Bearden, Roby, Jr.; and Bollinger, Ralph Louis, Jr., to Exxon Research and Engineering Company. Process for desulfurization of residua with sodamide-hydrogen and regeneration of sodamide. 4,017,381, Cl. 208-143.000.
Baker, Alfred Lynn, to RCA Corporation. Squelch circuit for a video record player. 4,017,677, Cl. 358-127.000.
Baker, Alfred Lynn, to RCA Corporation. End-of-play control system. 4,017,678, Cl. 358-128.000.
Baker, Don R., to Stauffer Chemical Company. Inhibiting growth of bacteria, fungi and algae with a lower alkyl tri-n-octyl phosphonium diphenyl phosphate. 4,017,610, Cl. 424-204.000.
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Baker, Kenneth L., to Sperry Rand Corporation. Data recovery system resistant to frequency deviations. 4,017,803, Cl. 329-104.000.
Baker, William C.; and Chapman, John J., to Teledyne, Inc. Fluid flowmeter. 4,016,759, Cl. 73-204.000.
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Baranyi, Sandor J., to Trochoidal Gear Technology, Inc. Hypotrochoidal cluster gear drives. 4,016,780, Cl. 74-804.000.
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Barbey, Jacques, to Rhone-Poulenc-Textile. Process and apparatus for manufacturing non-woven webs of continuous thermoplastic filaments. 4,017,580, Cl. 264-210.00F.
Barclay, Kenneth M.; Birk, James R.; and Parkins, William E., to Rockwell International Corporation. Process for production of synthesis gas. 4,017,271, Cl. 48-197.00R.
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Barrett, Harrison H., to Raytheon Company. Radiographic imaging system for high energy radiation. 4,017,730, Cl. 250-363.00S.
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Barthalon, Maurice; and Subtil, Andre, to Barthalon, Maurice. Electromagnetic system for propulsion and programmed positioning. 4,017,001, Cl. 221-5.000.
Bartlett, Joseph E. Sighting device for a vehicle. 4,016,653, Cl. 33-264.000.
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Benson, Rudolph T., Jr.: *See*—
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Berens, Heinrich; and Fule, Stefan, to P.I.V. Antrieb Werner Reimers Kommanditgesellschaft. Mounting for a cone pulley transmission. 4,016,771, Cl. 74-230.17M.

Berger, Bruce H., Jr.: *See*—
Freeman, Ardee H.; and Berger, Bruce H., Jr., 4,017,384.

Bergeron, Charles R., to Ethyl Corporation. Phosphonitrilate polymers and method of preparation. 4,017,562, Cl. 260-927.00N.

Bergwerksverband GmbH: *See*—
Gappa, Gunther; Juntgen, Harald; and Klein, Jurgen, 4,017,422.

Beriger, Ernst; and Pinter, Ladislaus, to Ciba-Geigy AG. Control of insects with 3-hydroxymethacrylic acid methyl ester dimethylthionophosphate. 4,017,611, Cl. 424-212.000.

Beriger, Ernst; Boger, Manfred; Drabek, Jozef; and Kristiansen, Odd, to Ciba-Geigy Corporation. Combatting insects and acarids with certain O-methyl/ethyl-S-propyl/butyl-O-phenyl-thiophosphate and -dithiophosphates. 4,017,612, Cl. 424-219.000.

Bernasconi, Raymond: *See*—
Wilhelm, Max; Bernasconi, Raymond; Storni, Angelo; Beck, Dieter; and Schenker, Karl, 4,017,542.

Bernasek, Jiri: *See*—
Batscheider, Alfred; and Bernasek, Jiri, 4,016,656.

Bertland, Alexander U.; Tytell, Alfred A.; Lampson, George P.; and Buynak, Eugene, to Merck & Co., Inc. Method for purifying hepatitis B antigen. 4,017,360, Cl. 195-1.400.

Bessin, Pierre Alfred Rene: *See*—
Thuillier born Nachmias, Germaine; Laforest born Boutillier du Retail, Jacqueline Suzanne; Cariou, Bernard Jean Marie; Bessin, Pierre Alfred Rene; Bonnet born Roux, Jacqueline Suzanne; and Thuillier, Jean Eugene, 4,017,632.

Best, William J., to Clark Equipment Company. Fifth wheel connection for a tractor-trailer combination. 4,017,095, Cl. 280-438.00R.

Bestenreiner, Friedrich: *See*—
Wick, Richard; Bestenreiner, Friedrich; Giglberger, Dieter; Wetzel, Gunter; Schott, Walter; V. Engeland, Josef Leonard; and Verlinden, Willy Gommaire, 4,017,171.

Betensky, Ellis I., to Minnesota Mining and Manufacturing Company. Continuously variable anamorphic lens. 4,017,160, Cl. 350-182.000.

Bethlehem Steel Corporation: *See*—
Webster, Geoffrey R., 4,017,237.

Beyer, Reinhard: *See*—
Keusgen, Heinz-Everhard; Seeger, Gunter; and Beyer, Reinhard, 4,017,233.

Beynon, John O., to Ceiling and Drywall Products Limited. Controlled expansion suspended ceiling grid member. 4,016,701, Cl. 52-735.000.

Bible, Harley V., to Robertshaw Controls Company. Control system and improved pneumatically operated temperature controlled valve construction therefor or the like. 4,016,853, Cl. 123-198.00R.

Bible, Harley V.; and Moon, William T., Jr., to Robertshaw Controls Company. Condition responsive valve construction. 4,017,054, Cl. 251-61.400.

Bibler Brother, Inc.: *See*—
Bibler, David R., 4,016,979.

Bibler, David R., to Bibler Brother, Inc. Log sorting conveyor. 4,016,979, Cl. 209-74.00R.

Billings Energy Research Corporation: *See*—
MacKay, Donald B.; Nielson, Brian C.; Henriksen, Dale L.; Billings, Roger Evan; Simons, Harold M.; and Hindmarsh, Paul P., 4,016,836.

Billings, Roger Evan: *See*—
MacKay, Donald B.; Nielson, Brian C.; Henriksen, Dale L.; Billings, Roger Evan; Simons, Harold M.; and Hindmarsh, Paul P., 4,016,836.

Billmyer, Jerrold Bain: *See*—
Larsen, Donald Wayne; and Billmyer, Jerrold Bain, 4,017,447.

Bills, Lloyd W.: *See*—
Lauk, David V.; and Bills, Lloyd W., 4,016,812.

Birk, James R.: *See*—
Barclay, Kenneth M.; Birk, James R.; and Parkins, William E., 4,017,271.

Bischoff, Robert F., Jr. Testing of automobile headlights. 4,017,189, Cl. 356-121.000.

Bison-werke Bahre & Greten GmbH & Co. KG: *See*—
Keusgen, Heinz-Everhard; Seeger, Gunter; and Beyer, Reinhard, 4,017,233.

Bittner, Friedrich; Haschke, Heinz; Suchsland, Helmut; Schreyer, Gerd; and Schwarze, Werner, to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler. Process for the production of solutions or suspensions of cyanuric chloride in aqueous organic solvents. 4,017,413, Cl. 252-187.00R.

Bjork, Jan; and Holmgren, Kjell Ake Bertil, to Aktiebolaget Thulinverken. Depth charge igniter. 4,016,815, Cl. 102-7.000.

Black, Alvin P. Water treatment system. 4,017,391, Cl. 210-44.000.

Black Clawson Company, The: *See*—
Hatton, Derald R.; and Lehman, Donald F., 4,017,387.

Black and Decker Manufacturing Company, The: *See*—
Moores, Robert Gordon, Jr.; and Walton, Richard Eugene, II, 4,016,680.
Moores, Robert Gordon, Jr.; and Walton, Richard Eugene, II, 4,016,685.

Black, James B., to Twin Disc, Incorporated. Vibration resistant mechanical clutch. 4,016,962, Cl. 192-70.200.

Black, Robert M., to Airmag Surveys, Inc. Method and apparatus for measuring variations in magnetic field orientations. 4,017,791, Cl. 324-43.00R.

Black, Stanley A.; and Jenkins, James F., to United States of America, Navy. Powdered metal source for production of heat and hydrogen gas. 4,017,414, Cl. 252-188.000.

Blackwell, Elliott H., to Houdaille Industries, Inc. Axial thrust adjustment for dual screw-type pump. 4,017,223, Cl. 418-107.000.

Blake, June Arlene, executrix: *See*—
Blake, Ralph Kingsley, deceased, 4,017,314.

Blake, Ralph Kingsley, deceased (by Blake, June Arlene, executrix), to Du Pont de Nemours, E. I., and Company. Use of crown compounds (cyclic polyethers) in litho developers to improve halftone dot quality and gradation. 4,017,314, Cl. 96-66.00R.

Blake, Richard E. Plastic holder for safety matches. 4,016,973, Cl. 206-107.000.

Blanchard, Kenneth F.: *See*—
Lasher, David C.; and Blanchard, Kenneth F., 4,017,066.

Blanding, Douglass L., to Eastman Kodak Company. Magnetic tape guide having a tapered roller and an adjustable contoured edge. 4,017,897, Cl. 360-85.000.

Blankenstein, Gunter: *See*—
Miessen, Ralf; Blankenstein, Gunter; Korte, Siegfried; and Suling, Carlhans, 4,017,561.

Bloem, Bert, to Lummus Company, The. Deoxygenation of water. 4,017,276, Cl. 55-51.000.

Bloemers, James L., to Brunswick Corporation. Ported cylinder construction for a two-cycle engine. 4,016,850, Cl. 123-193.00C.

Blomstedt, Hans Carl Magnus, to Interoc Fasad Aktiebolag. Structural sheet metal bar member for use in heat insulating building parts. 4,016,700, Cl. 52-735.000.

Blum, Jean. Phenoxy substituted thiolcarboxylic acid amino acid substituted esters. 4,017,530, Cl. 260-455.00R.

Bode, Gerhard Wilhelm: *See*—
Anwer, Jamil; Banchik, Ira Norman; Bode, Gerhard Wilhelm; Lemberg, Werner; and Sud, Kuldip Kumar, 4,017,272.

Bodman, Robert R., to United Technologies Corporation. Turbine rotor construction. 4,017,209, Cl. 416-97.00R.

Boehringer Mannheim G.m.b.H.: *See*—
Bosies, Elmar; Stach, Kurt; Schmidt, Felix Helmut; Heerdt, Ruth; and Weber, Helmut, 4,017,539.

Boeing Company, The: *See*—
Champoux, Louis A.; Falcioni, Joseph G.; and Mendels, Morton, 4,016,703.
Tieden, Jansey D.; and Woodruff, Forester E., Jr., 4,017,831.

Boger, Manfred: *See*—
Beriger, Ernst; Boger, Manfred; Drabek, Jozef; and Kristiansen, Odd, 4,017,612.

Bognolo, Guido: *See*—
Demessemaekers, Emiel Mathilde Anna Alfons; Bognolo, Guido; and Spadini, Gianfranco Luigi, 4,017,409.

Bogoyavlensky, Konstantin Nikolaevich: *See*—
Lapin, Vladimir Viktorovich; Bulgakov, Boris Sergeevich; Bogoyavlensky, Konstantin Nikolaevich; Rozhdestvensky, Jury Lvovich; Granosky, Simon Pavlovich; Maizelis, Genrikh Semenovich; Lazutin, Vladimir Ivanovich; and Sauskan, Ilya Alexandrovich, 4,016,739.

Bohner, Beat; Dawes, Dag; and Meyer, Willy, to Ciba-Geigy Corporation. 1-p-Alkylphenyl-1-p-(alkoxyphenyl)-2-nitroalkanes. 4,017,640, Cl. 424-340.000.

Boldt, Melvin H.; Chuboff, David P.; and Becker, Robert W., to Zenith Radio Corporation. Television receiver cabinet with formed decorative front. 4,017,129, Cl. 312-7.0TV.





Boliden Aktiebolag: *See*—
Lindstrom, Nils Folke Rune, 4,017,369.
Peterson, Stig Arvid; and Lundquist, Sven Anders, 4,017,308.

Bolie, Victor W. Vertical axis windmill. 4,017,205, Cl. 415-2.000.

Bollinger, Ralph Louis, Jr.: *See*—
Baird, William Chalmers, Jr.; Bearden, Roby, Jr.; and Bollinger, Ralph Louis, Jr., 4,017,381.

Bomboire, Rene F., to Eurofloor S.A. Composite textured products and their manufacture. 4,017,658, Cl. 428-172.000.

Bonnefoy-Claudet, Jean-Paul; Martin, Michel; and Tournier, Edmond, to Commissariat a l'Energie Atomique. Method of processing a signal, and corresponding devices. 4,017,812, Cl. 333-70.00A.

Bonnell, William S.; Christman, Robert D.; Lasher, Jordan S.; Paraskos, John A.; and Yanik, Stephen J., to Gulf Research & Development Company. Hydrodesulfurization process with upstaged reactor zones. 4,017,382, Cl. 208-210.000.

Bonnet born Roux, Jacqueline Suzanne: *See*—
Thuillier born Nachmias, Germaine; Laforest born Boutillier du Retail, Jacqueline Suzanne; Cariou, Bernard Jean Marie; Bessin, Pierre Alfred Rene; Bonnet born Roux, Jacqueline Suzanne; and Thuillier, Jean Eugene, 4,017,632.

Bonzom, Albert Julus Lucien: *See*—
Fauveau, Christian Pierre Maurice; Bonzom, Albert Julus Lucien; and Moutard nee Andre, Anne Marie Eugenie, 4,017,378.

Boomer, Virginia M. Trash bag caddy. 4,017,092, Cl. 280-47.260.

Booth, Bruce Lee, to Du Pont de Nemours, E. I., and Company. Spatial frequency carrier and process of preparing same. 4,017,158, Cl. 350-162.0SF.

Booth, Vernard S., to Olinkraft, Inc. Paperboard container. 4,017,019, Cl. 229-39.00R.

Borg, Veine Bernt: *See*—
Soukup, Franz; Larsson, Tore Ingvar; and Borg, Veine Bernt, 4,017,247.

Borg-Warner Corporation: *See*—
Davidson, Hugh McDermand, 4,017,756.

Born, Ellis H.; and Thurston, David L., to Abex Corporation. Control system for variable displacement pumps. 4,017,219, Cl. 417-216.000.

Bosche, Horst Guenter; Baer, Karl; and Schneider, Kurt, to BASF Aktiengesellschaft. Catalyst for the manufacture of triethylenediamine. 4,017,494, Cl. 260-268.00T.

Bosies, Elmar; Stach, Kurt; Schmidt, Felix Helmut; Heerdt, Ruth; and Weber, Helmut, to Boehringer Mannheim G.m.b.H. Biguanide compounds and anti-diabetic compositions. 4,017,539, Cl. 260-564.00B.

Boudreaux, Gordon J.: *See*—
Bailey, August V.; Boudreaux, Gordon J.; Sumrell, Gene; and Novak, Arthur F., 4,017,522.

Bowie, Betty Anne; and Pagano, Joseph F., to SmithKline Corporation. Stable oxidase reagent solutions. 4,017,420, Cl. 252-408.000.

Bowley, Wallace W., to Intech, Inc. Defoamer apparatus. 4,017,279, Cl. 55-178.000.

Boyens, Virgil C. Pipeline and leak locater and method. 4,016,748, Cl. 73-40.50R.

Boynton, Robert James: *See*—
Baraff, David Robbin; Boynton, Robert James; and Westwood, William Dickson, 4,017,712.

Brack, Alfred; and Psaar, Hubertus, to Bayer Aktiengesellschaft. Cationic dyestuffs. 4,017,484, Cl. 260-240.00R.

Bradley, Robert Wayne. Energy engine number two. 4,016,767, Cl. 74-25.000.

Bradley, William Jack, to Procter & Gamble Company, The. Bleaching composition. 4,017,412, Cl. 252-186.000.

Bradshaw, Janice: *See*—
Cook, Martin C.; Gregory, Gordon I.; and Bradshaw, Janice, 4,017,515.

Braker, Frederick William; Heckman, Russell William; Nickey, George Allen; and Potter, Terry Clair, to Owens-Illinois, Inc. Method of controlling shrinkage of a sleeve wrap on a container. 4,016,706, Cl. 53-14.000.

Brand, Jay J., to PPG Industries, Inc. Flow dividing mechanism for a conveyor system. 4,016,969, Cl. 198-435.000.

Brandao, Ruy L.; and Taylor, Robert A., to Bendix Corporation, The. Radar display system. 4,017,853, Cl. 343-5.0DP.

Brander, James Edward; and Davies, John David, to International Combustion Australia Limited. Tuned vibratory feeders. 4,017,060, Cl. 259-1.00R.

Brandon, Bobby C.: *See*—
DePriest, Donald R.; and Brandon, Bobby C., 4,017,349.

Brannan, Jack D., to United States of America, Navy. Weapon retention device. 4,016,796, Cl. 89-1.806.

Brantigan, John W. Tissue tonometer device for use in measuring gas in body tissue. 4,016,863, Cl. 128-2.00G.

Breault, Richard D., to United Technologies Corporation. Electrodes for electrochemical cells. 4,017,663, Cl. 429-12.000.

Breault, Richard D., to United Technologies Corporation. Silicon carbide electrolyte retaining matrix for fuel cells. 4,017,664, Cl. 429-44.000.

Bremmer, Sten Anders Harald: *See*—
Bengtsson, Berndt Harry; and Bremmer, Sten Anders Harald, 4,016,630.

Breyer, Janice K., to Honeywell Information Systems, Inc. Data entry and recording system having field correct capability. 4,017,838, Cl. 340-172.500.

Bridoux, Edouard: *See*—
Desormiere, Bernard; and Bridoux, Edouard, 4,017,751.

Briggs, George Roland, to RCA Corporation. Dynamic shift register cell. 4,017,741, Cl. 307-221.00C.

Briggs, Robert E., to 'Totes' Incorporated. Method of fabricating and installing the grip of a hand-held implement. 4,016,640, Cl. 29-450.000.

Briggs, William Scott, to Georgia-Pacific Corporation. Coating composition. 4,017,430, Cl. 260-17.500.

Brimhall, Gary C.: *See*—
Fairbanks, John B., Jr.; and Brimhall, Gary C., 4,017,377.

Bristol-Myers Company: *See*—
Lim, Gary; and Hooper, John W., 4,017,497.

British Petroleum Company Limited, The: *See*—
Fauveau, Christian Pierre Maurice; Bonzom, Albert Julus Lucien; and Moutard nee Andre, Anne Marie Eugenie, 4,017,378.

Broadwin, Alan; Weiss, Steven N.; and Enker, Stanley H., to Cavitron Corporation. Neurosonic aspirator and method. 4,016,882, Cl. 128-305.000.

Brock, Reginald L. Severing apparatus for plastic material. 4,017,012, Cl. 225-96.500.

Brodesser, Klaus J. Light flasher system for travel trailers. 4,017,827, Cl. 340-81.00R.

Broding, Robert A., to Standard Oil Company (Indiana). Summer for group recorder. 4,017,833, Cl. 340-15.5TS.

Brogdon, Glenn F., Jr.; and Cosby, Algar H., to C. T. Inc. Quick-release roller attachment for supporting a rope or hose and the like on an aerial ladder. 4,017,047, Cl. 248-55.000.

Brois, Stanley J.; Ryer, Jack; and Winans, Esther, to Exxon Research and Engineering Company. Carboxylate half esters of 1-aza-3,7-dioxabicyclo[3.3.0] oct-5-yl methyl alcohols, their preparation and use as additives for oleaginous compositions. 4,017,406, Cl. 252-51.50A.

Brooks, Lester A.: *See*—
Beadle, Howard C.; and Brooks, Lester A., 4,017,439.

Brooks, Thomas W.: *See*—
Coplan, Myron J.; and Brooks, Thomas W., 4,017,030.

Broussaud, Georges, to Thomson-CSF. Display device for producing polychromatic luminous images. 4,017,893, Cl. 358-59.000.

Brouwers, Alexander P.: *See*—
Karaba, Albert M.; Brouwers, Alexander P.; and Pearsall, Thomas J., 4,016,841.

Brown, Garrett W. Equipment for use with hand held motion picture cameras. 4,017,168, Cl. 352-243.000.

Brown, Gordon W.: *See*—
Roe, Norman P.; and Brown, Gordon W., 4,017,579.

Brown, Lee A. Musical instrument saliva collector. 4,016,794, Cl. 84-397.000.

Brown, Raymond J., to United States of America, Energy Research and Development Administration. Tool setting device. 4,016,784, Cl. 82-2.00R.

Brown, Roger S.; Shepard, Charles L.; and Richard, Laurey J., to United States of America, Agriculture. Fiber blending mechanism. 4,016,629, Cl. 19-243.000.

Brown, Ronald D.; and Stolin, Billy L., to Caterpillar Tractor Co. Method of and means for spacing control of plasma arc torch. 4,017,707, Cl. 219-121.00P.

Brown & Williamson Tobacco Corporation: *See*—
Sexstone, John H., 4,016,830.

Browning, Vernon D.: *See*—
Holden, Homer N.; Hunt, James P.; Browning, Vernon D.; Hoglen, Edward L.; and Kleykamp, Donald L., 4,017,232.

Brownlie, Alan W.: *See*—
Daly, Lewis J.; and Brownlie, Alan W., 4,017,069.

Bruhn, Esben; and Jensen, Finn Hansen, to A/S Weston Toeppefabrik. Process for producing pile fabrics and an apparatus for carrying out the process. 4,017,345, Cl. 156-72.000.

Brumlik, George C., to Ingrip Fasteners Inc. Team lattice fibers. 4,017,659, Cl. 428-397.000.

Bruner, James D., to Sandoz, Inc. Pressure indicators for inflatable cuff-type catheters. 4,016,885, Cl. 128-349.00B.

Brunner, Hans: *See*—
Hartmann, Otto; Brunner, Hans; and Hartmann, Thomas, 4,017,398.

Bruno, Philip. Automatic golf ball teeing apparatus. 4,017,087, Cl. 273-201.000.

Brunswick Corporation: *See*—
Bloemers, James L., 4,016,850.

Brusich, Joseph J. Food processing board. 4,017,063, Cl. 269-302.100.

Bryden, William: *See*—
Hawley, Lee E., 4,017,267.

Buchholz, Rainer, to Jagenberg Werke AG. Bottle labeling system. 4,017,774, Cl. 318-39.000.

Buck, Daniel C.; and Mergerian, Dickron, to Westinghouse Electric Corporation. Spin echo matched filter ECM detector. 4,017,855, Cl. 343-18.00E.

Buckle, Derek Richard: *See*—
Cantello, Barry Christian Charles; Buckle, Derek Richard; and Smith, Harry, 4,017,639.

Budd Company, The: *See*—
Eggert, Walter S., Jr., 4,017,117.

Budecker, Ludwig, to International Telephone and Telegraph Corporation. Flow control valve. 4,016,895, Cl. 137-101.000.

Budrick, Ronald G.; King, Frank T.; Martin, Alfred J.; Nolen, Robert L., Jr.; and Solomon, David E., to KMS Fusion, Inc. Method and apparatus for making uniform pellets for fusion reactors. 4,017,290, Cl. 65-21.000.

Buell, Bennett George; and Loffelman, Frank Fred, to American Cyanamid Company. Cationic alpha-cyano-p-dimethylaminocinnamoyl dyes and paper dyed therewith. 4,017,486, Cl. 260-240.900.

Builders Equipment Co.: *See—*
Thomas, Paul M., 4,016,986.

Bulgakov, Boris Sergeevich: *See—*
Lapin, Vladimir Viktorovich; Bulgakov, Boris Sergeevich; Bogoyavlensky, Konstantin Nikolaevich; Rozhdestvensky, Jury Lvovich; Granosky, Simon Pavlovich; Maizelis, Genrikh Semenovich; Lazutin, Vladimir Ivanovich; and Sauskan, Ilya Alexandrovich, 4,016,739.

Bunge, Konrad, to Bayer Aktiengesellschaft. Two-beam photometer with rotatable graded interference filter. 4,017,191, Cl. 356-188.000.

Burdett, David F.; and Mitchell, Doren, to Bell Telephone Laboratories, Incorporated. High speed multiplex data transmission system. 4,017,799, Cl. 325-55.000.

Burford, Thomas Maynard; and Westerman, George Raymond, to Bell Telephone Laboratories, Incorporated. Luminous indicator with zero standby power. 4,017,847, Cl. 340-336.000.

Burk, Duane L.; and Moore, Huber A., to Caterpillar Tractor Co. Dual-speed setting underspeed system. 4,017,218, Cl. 417-216.000.

Burke Company, The: *See—*
Holt, Jack A.; and Torbet, Philip A., 4,017,115.

Burlington Industries, Inc.: *See—*
James, Forrest T.; and Guy, Stephen L., 4,016,831.
London, Joe F., Jr., 4,016,715.

Burnap, Raymond W. Anesthetic and sedative composition. 4,017,619, Cl. 424-244.000.

Burnside, Ernest. Turn signal wiring replacement harness. 4,017,772, Cl. 361-428.000.

Burnside, Walter M., to Bally Manufacturing Corporation. Matrix transformation pin ball machine with score multiplier option. 4,017,077, Cl. 273-121.00A.

Burroughs Corporation: *See—*
Miller, Donald E., 4,017,759.

Burrows, Leonard H.: *See—*
Smith, Jack R.; and Burrows, Leonard H., 4,016,717.

Bury, Allen J.; and Gruhn, William D., Jr. Connectors with primary and secondary lock structure. 4,017,141, Cl. 339-217.00S.

Butler, Ralph G., to Caterpillar Tractor Co. Infinitely variable orifice for part throttle control. 4,017,215, Cl. 417-216.000.

Butler, Robert J. Push-pull transducer system. 4,016,953, Cl. 181-144.000.

Buxton, Inc.: *See—*
Corey, Donald Wyman, 4,016,605.

Buynak, Eugene: *See—*
Bertland, Alexander U.; Tytell, Alfred A.; Lampson, George P.; and Buynak, Eugene, 4,017,360.

Byler, William H.; and Montagna, Angelo A., to Gulf Research & Development Company. Sequential residue hydrodesulfurization and thermal cracking operations in a common reactor. 4,017,380, Cl. 208-89.000.

Bystedt, Hjalmar Sten Ingemar, to Defibrator AB. Apparatus and method for manufacturing wood pulp by grinding wood block material. 4,017,356, Cl. 162-26.000.

C. T. Inc.: *See—*
Brogdon, Glenn F., Jr.; and Cosby, Algar H., 4,017,047.

Cadeddu, Leonardo, to Benditalia S.p.A. Pressure failure warning device. 4,017,124, Cl. 303-6.00C.

Calabek, Milan: *See—*
Sandera, Josef; Calabek, Milan; Kouril, Oldrich; Cenek, Miroslav; Vanacek, Josef; Malik, Jiri; and Koudelka, Vojtech, 4,017,665.

Cale, Roland E., to Schaefer Equipment Company. Reversible foot for railway hopper car inclined braces. 4,016,691, Cl. 52-298.000.

California Cement Shake Co., Inc.: *See—*
Jakel, Gus R., 4,017,230.

Calle, Jaime; and Griswold, V. Michael, to Honeywell Information Systems, Inc. Input/output multiplexer security system. 4,017,839, Cl. 340-172.500.

Callens, Paul Raymond; Picard, Jean Louis; and Poulet, Alain Jean, to International Business Machines Corporation. Method and devices for inserting additional pattern in, or removing same from, a message. 4,017,688, Cl. 179-15.0AF.

Callery, Patrick Stephen: *See—*
Loberg, Michael Dewey; Callery, Patrick Stephen; and Cooper, Malcolm, 4,017,596.

Callisto: *See—*
Delest, Rene, 4,017,112.

Camenisch, Johann L., to J. Gestle, AG. Maximum density mobile storage system. 4,017,131, Cl. 312-198.000.

Camiener, Gerald W.: *See—*
Hanze, Arthur R.; and Camiener, Gerald W., 4,017,606.

Campbell, Francis J.; and Graham, Douglas J., to United States of America, Navy. Connector hinge for oil containment booms. 4,016,726, Cl. 61-1.00F.

Canada, Her Majesty the Queen in right of, as represented by the Minister of the Environment: *See—*
Foggett, H. Rodney, 4,017,393.

Canon Kabushiki Kaisha: *See—*
Komaba, Shiro; and Goshima, Yoshitomo, 4,017,181.
Komori, Shigehiro; Sakamaki, Hisashi; Hattori, Hiroyuki; Iida, Toshihide; Miyamoto, Koichi; and Umezawa, Kazumi, 4,017,170.
Komori, Shigehiro; Sakamaki, Hisashi; Ariga, Masao; Nitanda, Hiroshi; and Nagasawa, Seigi, 4,017,173.
Tsuji, Sadahiko, 4,017,161.
Yamamichi, Masayoshi, 4,017,875.

Cantello, Barry Christian Charles; Buckle, Derek Richard; and Smith, Harry, to Beecham Group Limited. 2-Hydroxy-3-nitro-1,4-naphthoquinones for the prophylaxis of certain allergies. 4,017,639, Cl. 424-331.000.

Cantor, Abraham; and Winicov, Murray W., to West Laboratories, Inc. Methods for preparing solid iodine carrier mixtures and solid formulations of iodine with iodine carriers. 4,017,407, Cl. 252-106.000.

Capocci, Gerald A., to United States of America, Army. Abrasion resistant, non-discoloring polyurethane foams and method of making. 4,017,428, Cl. 260-2.5AM.

Carbonnel, Henri; and Hamon, Ludovic, to Groupement Atomique Alsacienne Atlantique. Highly porous conductive ceramics and a method for the preparation of same. 4,017,426, Cl. 252-520.000.

Cardus, Francis. Electrically operable apparatus for the application of a treating product. 4,016,617, Cl. 15-4.000.

Carey, James E., to Shell Oil Company. Polyepoxide compositions exhibiting improved physical properties. 4,017,432, Cl. 260-18.0EP.

Carey, Thomas H., to Columbia Research Laboratories, Inc. Vibration probe for detecting the radial displacement of rotating shaft. 4,016,752, Cl. 73-71.000.

Cariou, Bernard Jean Marie: *See—*
Thuillier born Nachmias, Germaine; Laforest born Boutillier du Retail, Jacqueline Suzanne; Cariou, Bernard Jean Marie; Bessin, Pierre Alfred Rene; Bonnet born Roux, Jacqueline Suzanne; and Thuillier, Jean Eugene, 4,017,632.

Carl Zeiss-Stiftung: *See—*
Weber, Klaus; and Trapp, Lothar, 4,017,147.

Carlson, E. Frank, to United States of America, Navy. Finger actuated controller. 4,016,775, Cl. 74-471.0XY.

Carlson, Elwood L.; Gunkler, Albert A.; Miller, Conrad O. M.; and Paalman, H. Hunter, to Dow Chemical Company, The. Production of hot brines from liquid-dominated geothermal wells by gas-lifting. 4,017,120, Cl. 299-5.000.

Carlson, Gordon A.: *See—*
Milam, Joseph E.; and Carlson, Gordon A., 4,017,551.

Carrison, Lynn Cloyd; and Wetzel, Robert George, to General Electric Company. Lubricant packed wire drawing dies. 4,016,736, Cl. 72-41.000.

Carstens, Marion R., to Georgia Tech Research Institute. Vehicle transport pipeline pumping system. 4,017,039, Cl. 243-6.000.

Casanova, John V.: *See—*
Pressman, Gerald L.; and Casanova, John V., 4,016,813.

Case, John M. Letter of credit device. 4,017,101, Cl. 283-57.000.

Casino, Sergio: *See—*
Spector, George; and Casino, Sergio, 4,016,783.

Castel, David; and Suess, Stephen E., to Foundation for Ocean Research. Heater and humidifier for breathing apparatus. 4,016,878, Cl. 128-212.000.

Caterpillar Tractor Co.: *See—*
Brown, Ronald D.; and Stolin, Billy L., 4,017,707.
Burk, Duane L.; and Moore, Huber A., 4,017,218.
Butler, Ralph G., 4,017,215.
Chamberlain, Richard W., 4,016,947.
Clemens, Donald E.; and Haslett, Glenn M., 4,016,772.
Dezelan, Joseph E., 4,017,221.
Easterling, Gene B.; and Strabala, Joseph L., 4,016,936.
Engel, Simon L.; Gale, Preston L.; and Lenzen, Glenn H., Jr., 4,017,708.
Evans, Duane E.; Tabor, Thomas M.; and Tyler, David A., 4,016,716.
Moore, Huber A., 4,017,216.

Cavitron Corporation: *See—*
Broadwin, Alan; Weiss, Steven N.; and Enker, Stanley H., 4,016,882.

Cawley, Reginald E. Patient supporting device. 4,017,118, Cl. 297-284.000.

Cazorla, Jean; and Tillon, Yves, to Roger & Gallet. Process for preparing products for use in aerosol form. 4,017,602, Cl. 424-44.000.

Ceiling and Drywall Products Limited: *See—*
Beynon, John O., 4,016,701.

Celanese Coatings & Specialties Company: *See—*
Panush, Sol, 4,017,448.

Celchovska, Olga: *See—*
Svoboda, Vlastimil; and Celchovska, Olga, 4,017,261.

Cenek, Miroslav: *See—*
Sandera, Josef; Calabek, Milan; Kouril, Oldrich; Cenek, Miroslav; Vanacek, Josef; Malik, Jiri; and Koudelka, Vojtech, 4,017,665.

Central Safety Equipment Co.: *See—*
Gordon, Edmund A., 4,016,904.

Centre de Recherche Industrielle du Quebec: *See—*
Rioux, Jacques E.; Turp, Gerald; and Jacques, Francois, 4,016,881.

Centre European de Recherches Pharmacologiques C.E.R.P.H.A.: *See—*
Thuillier born Nachmias, Germaine; Laforest born Boutillier du Retail, Jacqueline Suzanne; Cariou, Bernard Jean Marie; Bessin, Pierre Alfred Rene; Bonnet born Roux, Jacqueline Suzanne; and Thuillier, Jean Eugene, 4,017,632.

Cereijo, Manuel Ramon; and Dougherty, Timothy Stephen, to Western Electric Company, Inc. Apparatus for monitoring cellular dielectric material. 4,017,228, Cl. 425-71.000.

CERPHA: *See—*
Thuillier, Germaine; and Laforest, Jacqueline. 4,017,618.

Cesca, Sebastiano; Priola, Aldo; and Ferraris, Giuseppe, to Snam Progetti, S.p.A. Process for the preparation of linear alpha-olefin oligomers, subsequent hydrogenation thereof and saturated products thus obtained. 4,017,553, Cl. 260-683.15D.

Chamberlain, Richard W., to Caterpillar Tractor Co. Means for securing axle to frame. 4,016,947, Cl. 180-88.000.

Champagne, Ronald E., to General Instrument Corporation. Delinearization circuit. 4,017,800, Cl. 325-464.000.

Champoux, Louis A.; Falcioni, Joseph G.; and Mendels, Morton, to





Boeing Company, The. Combination of a wedge head pin fastener and overlapped work pieces. 4,016,703, Cl. 403-404.000.

Chandramouli, Pitchaiya: *See—*
Vasishth, Ramesh C.; and Chandramouli, Pitchaiya, 4,017,437.

Chang, Long Fei; and Kontz, Robert F., to Owens-Illinois, Inc. Apparatus for blow molding. 4,017,250, Cl. 425-387.00B.

Channing, Charles E.; and Darrell, George H., to Channing, Charles E. Means and method for placing a golf ball position marker on a putting green and for removal thereof. 4,017,082, Cl. 273-162.00D.

Chapman, Christopher Charles, to United States of America, Energy Research and Development Administration. Method for starting operation of a resistance melter. 4,017,674, Cl. 13-23.000.

Chapman, John J.: *See—*
Baker, William C.; and Chapman, John J., 4,016,759.

Cheeseman, Robert Andrew, to Xerox Corporation. Developer assembly support. 4,017,174, Cl. 355-10.000.

Chemetron Corporation: *See—*
Crompton, Charles Edward; and Kazi, Abdulla M. Z., 4,017,418.

Chemische Werke Huls Aktiengesellschaft: *See—*
Grosse-Wortmann, Hans; Hentschel, Bernhard; Rauth, Peter; Schoenberg, Karl-Heinz; Terwiesch, Bernd; and Winter, Hermann, 4,017,445.
Turck, Ulrich; and Tetzner, Heinz, 4,017,443.

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Rice, Warren A.; Vinton, Clarence S.; and Norris, Hugh Richard, 4,017,570.
Rice, Warren A.; Vinton, Clarence S.; and Norris, Hugh Richard, 4,017,571.

Chen, Evan Nai-keung; and Beddall, Edward A., to Warner-Lambert Company. Safety razor. 4,016,648, Cl. 30-47.000.

Chenoweth, Vaughn Charles: *See—*
Sanford, Steve Douglas; Chenoweth, Vaughn Charles; and Faulkner, Duane Harold, 4,017,294.

Cherry, Louis E., to John Zink Company. Curb-duct for roof top air conditioners. 4,016,729, Cl. 62-259.000.

Cheseldine, David M., to Sprague Electric Company. Solid valve-metal capacitor with buried graphite in the particles in the electrolyte. 4,017,773, Cl. 361-433.000.

Chevron Research Company: *See—*
Backskai, Robert, 4,017,465.
Schneider, Ronald A., 4,017,521.

Chicago Pneumatic Tool Company: *See—*
Spring, Edward F., Sr., 4,016,940.

Chisso Corporation: *See—*
Inukai, Takashi; Sato, Hideo; Sugimori, Shigeru; and Ishibe, Tetsuya, 4,017,416.

Choay S.A.: *See—*
Febvre, Henri Lucien, 4,017,361.

Chodorow, Ingram S., to Placontrol, Inc. Dental floss holder. 4,016,892, Cl. 132-91.000.

Chore-Time Equipment, Inc.: *See—*
Wert, John M., 4,016,970.

Christie, Kenneth Howard; DeWitt, David; and Johnson, William Stanford, to International Business Machines Corporation. Non-volatile metal nitride oxide semiconductor device. 4,017,888, Cl. 357-54.000.

Christman, Robert D.: *See—*
Bonnell, William S.; Christman, Robert D.; Lasher, Jordan S.; Paraskos, John A.; and Yanik, Stephen J., 4,017,382.

Christy, Marcia Elizabeth, to Merck & Co., Inc. α,α-Dialkyl-4-phenethyl-benzylamines and the salts thereof. 4,017,543, Cl. 260-570.80R.

Chu, Peter F., to Hewlett-Packard Company. Pulse code modulation recording and/or reproducing system. 4,017,903, Cl. 360-40.000.

Chuboff, David P.: *See—*
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Chugai Seiyaku Kabushiki Kaisha: *See—*
Nakayama, Toshimasa; and Kitamura, Motoshi, 4,017,365.

Chupp, Vernon L., to Varian Associates. Optical arrangements for coupling monochromators with external systems. 4,017,185, Cl. 356-96.000.

Churikova, Ideya Antonovna: *See—*
Gorbunov, Boris Nikolaevich; Efremova, Galina Dmitrievna; Kukartsev, Evgeny Maximovich; Erokhina, Lidia Vladimirovna; Lukashov, Anatoly Ivanovich; Orlyansky, Vitaly Vasilievich; Khardin, Alexandr Pavlovich; Churikova, Idcya Antonovna; and Valdman, Daniil Iosifovich, 4,017,518.

Ciba-Geigy AG: *See—*
Beriger, Ernst; and Pinter, Ladislaus, 4,017,611.
Hegar, Gert; and Riat, Henri, 4,017,477.
Kaupp, Gunther; and Voltz, Jacques, 4,017,479.
Oswald, Alexis A.; and Valint, Paul L., 4,017,563.

Ciba-Geigy Corporation: *See—*
Audykowski, Thaddeus; and Amsler, Kurt, 4,017,449.
Beriger, Ernst; Boger, Manfred; Drabek, Jozef; and Kristiansen, Odd, 4,017,612.
Bohner, Beat; Dawes, Dag; and Meyer, Willy, 4,017,640.
Dittrich, Volker; Topfl, Werner; and Kristiansen, Odd, 4,017,638.
Habicht, Ernst; and Kuhnis, Hans, 4,017,629.
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Wilhelm, Max; Bernasconi, Raymond; Storni, Angelo; Beck, Dieter; and Schenker, Karl, 4,017,542.

CilleroGrafulla, Fernando: *See—*
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Clark, Daniel M.: *See—*
Hawley, Lee E., 4,017,267.

Clark Equipment Company: *See—*
Best, William J., 4,017,095.
Pease, Bobbylee; and Simpson, Clark C., 4,017,110.

Clark, Stephen Larry; and Thoms, William Charles, to Du Pont de Nemours, E. I., and Company. Self-staking circuit board pin contact. 4,017,142, Cl. 339-220.00T.

Clark, Walter E.; and Thompson, Clarence T., to United States of America, Energy Research and Development Administration. Immobilization of iodine in concrete. 4,017,417, Cl. 252-301.10W.

Claus, Alfons Jozef, to Bell Telephone Laboratories, Incorporated. Antenna assembly producing steerable beam and null. 4,017,867, Cl. 343-854.000.

Claxton, Gerald L., to Up-Right, Inc. Vine-fruit harvesting machine with inclined-tip striker rods. 4,016,711, Cl. 56-330.000.

Cleman, Charles F.; and Gilligan, David E. Anti-pollution device for incinerators and the like. 4,017,280, Cl. 55-255.000.

Clemens, Donald E.; and Haslett, Glenn M., to Caterpillar Tractor Co. Sprocket member configuration. 4,016,772, Cl. 74-243.00R.

Cleveland, Joseph J., to GTE Sylvania Incorporated. Method for producing ceramic cellular structure having high cell density. 4,017,347, Cl. 156-89.000.

Cleveland Machine Controls, Inc.: *See—*
Artrip, Robert W., 4,017,775.

Cline, Devin R.: *See—*
Hauser, Hans; and Cline, Devin R., 4,016,709.

Cline, Melvin N.; Augustine, Robert John; and Westphal, Donald John, to Sunbeam Corporation. Electric pressing iron. 4,016,663, Cl. 38-77.830.

Cluett, Peabody & Co., Inc.: *See—*
Crawford, Douglas J.; LeMere, Roger; and Hughes, Francis H., 4,017,064.

Coats & Clark Inc.: *See—*
Einhorn, Ruediger, 4,017,048.

Cobb, Malcolm Carnie, to Imperial Chemical Industries. Dyed textile materials. 4,017,255, Cl. 8-21.00B.

Coburn, Theodore Robert; and Kilcoyne, James Edward, to Marshall and Williams Company. Apparatus for physically conditioning plastic tape. 4,017,251, Cl. 425-404.000.

Cohen, Enrico: *See—*
Morton, Peter Harlow; Cohen, Enrico; and Good, Jeremy Andrew, 4,017,385.

Cohen, Irvin, to Construction Fasteners, Inc. Closure strip. 4,017,090, Cl. 277-206.00R.

Cohen, Morton. Accessory tool for burglar alarm foil. 4,017,353, Cl. 156-574.000.

Colby, S. Robert: *See—*
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Cole, Edward L.: *See—*
Holmes, Jeffrey W.; Purcell, Bruce K.; Franz, William F.; and Cole, Edward L., 4,017,263.

Cole, Paul Morrison. Apparatus and method for traversing a strand. 4,016,631, Cl. 28-1.0CL.

Colgate-Palmolive Company: *See—*
Joshi, Hargovind Himatlal, 4,017,573.
Joshi, Hargovind Himatlal, 4,017,574.

Collette, John Wilfred; Ro, Rolland Shin-Yuan; and Sonnenberg, Fred Max, to Du Pont de Nemours, E. I., and Company. Functionally substituted terpolymers and tetrapolymers of alpha-olefins and process for manufacturing functional substituted copolymers. 4,017,669, Cl. 526-169.000.

Collins, John W., III; and Douds, E. Scott, to Aluminum Company of America. Induction heating apparatus and method for using the same. 4,017,704, Cl. 219-10.790.

Colston, John R.: *See—*
Martin, Frank E.; Colston, John R.; and Smith, Norman E., 4,016,876.

Columbia Research Laboratories, Inc.: *See—*
Carey, Thomas H., 4,016,752.
Laessig, John D., 4,017,797.

Colville, William T.: *See—*
Audesse, Emery G.; Colville, William T.; Shaffer, John W.; and Mecone, David W., 4,017,728.

Combustion Power Company, Inc.: *See—*
Reese, Richard G., 4,017,278.

Commissariat a l'Energie Atomique: *See—*
Barraud, Andre; and Messier, Jean, 4,017,660.
Bonnefoy-Claudet, Jean-Paul; Martin, Michel; and Tournier, Edmond, 4,017,812.

Commonwealth of Australia Care of the Department of Health, The: *See—*
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Commonwealth Scientific and Industrial Research Organization: *See—*
Wild, John Paul, 4,017,862.

Compagnie Generale d'Electricite: *See—*
Schermesser, Andre, 4,017,763.

Comprimo N.V.: *See—*
Penard, Herbert F. L.; and Risseeuw, Johannis I., 4,017,592.

Conroy, Gary D.; and Scott, John D., to Anchor Hocking Corporation. Apparatus and method for differentiating between polymer coated

glass containers and uncoated containers. 4,017,194, Cl. 356-240.000.

Consolidated Controls Corporation: *See—*
Pien, Hsia-Si, 4,017,819.

Consolidated Products Corporation: *See—*
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Consortium fur Elektrochemische Industric GmbH: *See—*
Deinhammer, Wolfgang; Vulic, Marco; Wick, Manfred; and Prigge, Helmut, 4,017,613.

Constance, Chris. Bubble pull toy. 4,016,673, Cl. 46-6.000.

Construction Fasteners, Inc.: *See—*
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Contamination Control Laboratories, Inc.: *See—*
Austin, Philip R., 4,016,809.

Continental Electronics Manufacturing Co.: *See—*
Ray, Homer A., Jr., 4,017,866.

Continental Group, Inc., The: *See—*
Stelter, Ronald B., 4,016,968.

Controls Southeast, Inc.: *See—*
Henderson, James R., 4,017,102.

Convertine, Frank J.; and Mayer, John F., to General Mills Fun Group, Inc. Toy recorder and playback apparatus. 4,017,905, Cl. 360-96.000.

Conwed Corporation: *See—*
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Cook, Martin C.; Gregory, Gordon I.; and Bradshaw, Janice, to Glaxo Laboratories Limited. α-(Etherified oximino) carboxylic acids and acid chlorides. 4,017,515, Cl. 260-332.30R.

Cooke, David A.; and Edison, David M., to Subsea Equipment Associates Limited. Position control system for a subsea vehicle. 4,017,823, Cl. 340-3.00D.

Cooke, William C., to ASG Industries, Inc. Electric heater plate and terminal thereof. 4,016,645, Cl. 29-611.000.

Cooper, Malcolm: *See—*
Loberg, Michael Dewey; Callery, Patrick Stephen; and Cooper, Malcolm, 4,017,596.

Cooperative Marketing Co., The: *See—*
Krautsack, Richard G., 4,016,977.

Copeland, Shannon B. Filter device for diesel engines. 4,017,397, Cl. 210-238.000.

Coplan, Myron J.; and Brooks, Thomas W., to Albany International Corporation. Devices for controlled release of vapors. 4,017,030, Cl. 239-44.000.

Coppola, Gary M.: *See—*
Hardtmann, Goetz E.; and Coppola, Gary M., 4,017,499.

Cor Tech Research Limited: *See—*
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Corey, Donald Wyman, to Buxton, Inc. Belt assembly. 4,016,605, Cl. 2-338.000.

Cormier, William E.; and Sand, Leonard B., to Zeochem Corporation. Preparation of synthetic ferrierite. 4,017,590, Cl. 423-329.000.

Corning Glass Works: *See—*
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Cosby, Algar H.: *See—*
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Cosper, Dale L. Support for storing and shipping small boats. 4,016,976, Cl. 206-335.

Coughlan, Edward H.; and Whiteside, George D., to Polaroid Corporation. Shutter latch system with automatic release for shock damping member. 4,017,876, Cl. 354-230.000.

Cowan, Robert L., II: *See—*
Wax, Daniel E.; and Cowan, Robert L., II, 4,017,368.

Cowett, Philip M., Jr., to United States of America, Army. Dynamic temperature compensating circuit for power transistor converters. 4,017,780, Cl. 321-2.000.

Cowles, Mary M. Hairpiece. 4,016,889, Cl. 132-56.000.

Cowling, Donald William. Table trolley. 4,016,819, Cl. 108-19.000.

Crandall, Julian Titsworth; and Crandall, Steven Julian, to Ashaway Line & Twine Mfg. Co. String construction. 4,016,714, Cl. 57-149.000.

Crandall, Steven Julian: *See—*
Crandall, Julian Titsworth; and Crandall, Steven Julian, 4,016,714.

Crawford, Douglas J.; LeMere, Roger; and Hughes, Francis H., to Cluett, Peabody & Co., Inc. Apparatus for manufacturing and stacking hemmed fabric pieces. 4,017,064, Cl. 270-58.000.

Crelier, Arnold M.: *See—*
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Crespolini, Giancarlo: *See—*
Vargiu, Silvio; Crespolini, Giancarlo; and Grazzini, Giulio, 4,017,523.

Cretella, Salvatore J. Turbine blade edge grinder. 4,016,683, Cl. 51-143.000.

Creusot-Loire: *See—*
Gordienne, Jean; and Dousse, Georges, 4,017,212.

Criscimagna, Tony Nick; and Steinmetz, Michael J., to International Business Machines Corporation. Voltage controlled sustain frequency in a gas display panel. 4,017,762, Cl. 315-169.0TV.

Crompton, Charles Edward; and Kazi, Abdulla M. Z., to Chemetron Corporation. Process for making colloidal sols of antimony pentoxide in polar organic solvents. 4,017,418, Cl. 252-309.000.

Crooks, Donald D.: *See—*
Webster, Donald; and Crooks, Donald D., 4,017,333.

Cross, Barrington; and Walworth, Bryant Leonidas, to American Cyanamid Company. 1,2,4-Trialkyl-3,5-diphenylpyrazolium salts as herbicides. 4,017,298, Cl. 71-92.000.

Cross Europa-Werk GmbH: *See—*
Froschle, Gerhard, 4,016,769.

Crow, Morgan LeVon, to Dresser Industries, Inc. Boring rig alignment apparatus and method. 4,016,655, Cl. 33-286.000.

Crowell, Maclean: *See—*
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Crudgington, Cleveland B. Coin roll. 4,017,021, Cl. 229-87.200.

Cruz, Mamerto M., Jr.; Tenery, John H.; and Tressler, LaVerne C., to Avicon, Inc. Fibrous collagen derived web having hemostatic and wound sealing properties. 4,016,877, Cl. 128-156.000.

Cryar, Herbert B., Jr., to Dow Chemical Company, The. Method of forming a consolidated gravel pack. 4,016,931, Cl. 166-276.000.

Cryox Corporation: *See—*
Gifford, William E., 4,017,284.

Crystal, Richard G.: *See—*
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Cubic Corporation: *See—*
Watt, Richard Edwin, 4,017,717.

Cullen, Roy H.; and Aker, Jimmie R., to Cullen, Roy H. Method for connecting electrical conductors for electric earth boring means. 4,016,943, Cl. 175-65.000.

Cullen, Roy H.; Aker, Jimmie R.; and Witovek, Jim, Jr., to General Electric Company. Electrical cable overshot-grappling tool. 4,017,113, Cl. 294-86.220.

Culley, John Edward: *See—*
Anderson, Robert William; Knowles, William Ralph; and Culley, John Edward, 4,017,680.

Curtis Instruments, Inc.: *See—*
Finger, Eugene P., 4,017,724.

Cuttill, William E.; and Wagner, Vilma M. Credit card construction for automatic vending equipment and credit purchase systems. 4,017,834, Cl. 340-149.00A.

Cyprus Mines Corporation: *See—*
Dyas, Keith E., 4,017,032.

Dadisman, Andrew J. Compressed gas bottle handler. 4,016,983, Cl. 214-1.00R.

Dahlin, Ake Bertil Ingemar, to Norba Aktiebolag. Apparatus for introducing waste or the like into a collecting container. 4,016,988, Cl. 214-17.00C.

Daido-Maruta Finishing Co., Ltd.: *See—*
Akami, Hitoshi; Nishikawa, Shigeru; Ikeda, Toshio; and Tsukokura, Akira, 4,017,894.

Daigle, Donald J.; Pepperman, Armand B., Jr.; and Vail, Sidney L., to United States of America, Agriculture. Treatment of organic textiles with adduct polymers and phenols. 4,017,462, Cl. 260-72.00R.

Dainippon Pharmaceutical Co., Ltd.: *See—*
Minami, Shinsaku; Matsumoto, Jun-Ichi; Sugita, Minoru; Shimizu, Masanao; Takase, Yoshiyuki; and Nakamura, Shinichi, 4,017,622.

Daitoseiki Co. Ltd.: *See—*
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Daly, Lewis J.; and Brownlie, Alan W., to Stevens, Robert C.; and Loftus, John M. Diving platform. 4,017,069, Cl. 272-66.000.

Damani, Nalinkant C.: *See—*
Theeuwes, Felix; and Damani, Nalinkant C., 4,016,880.

Danckaert, Valere Frans: *See—*
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Danfoss A/S: *See—*
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Daniels, Ruthven H.: *See—*
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Danna, Frank, Jr. Cement mixer apparatus. 4,016,978, Cl. 209-2.000.

Darrell, George H.: *See—*
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Darrow, Kenneth A., to General Electric Company. Liquid-cooled turbine bucket with integral distribution and metering system. 4,017,210, Cl. 416-97.00R.

Daugherty, Donald A.: *See—*
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Daughetee, Calvin C.; and Winski, Sidney Z., to Vought Corporation. Pneumatic valve apparatus. 4,017,055, Cl. 251-62.000.

Davidson, Eric, to Scottish Agricultural Industries Limited. Manufacture of solid ammonium phosphate. 4,017,588, Cl. 423-313.000.

Davidson, Hugh McDermand, to Borg-Warner Corporation. Automatic sensor positioner. 4,017,756, Cl. 310-168.000.

Davies, D. Eirug; Roosild, Sven A.; and Dolan, Russell P., Jr., to United States of America, Air Force. Method and means for passivation and isolation in semiconductor devices. 4,017,887, Cl. 357-52.000.

Davies, David Allen Lewis, to G. D. Searle & Co. Immunological compounds. 4,017,471, Cl. 260-112.00B.

Davies, John David: *See—*
Brander, James Edward; and Davies, John David, 4,017,060.

Davis, Chester. Enhancement of iridescent colors to provide vivid recording colors. 4,017,326, Cl. 106-291.000.

Davis, James F., to Griffin, Frank S., a part interest. Eyeglass frames. 4,017,165, Cl. 351-153.000.

Davis, Robert B., to Koehler-Dayton, Inc. Recirculating sewerage system. 4,017,395, Cl. 210-167.000.

Davis, Robert S. Retractable sailboat mast. 4,016,823, Cl. 114-90.000.

Davis, Walter Lee, to Motorola, Inc. Monolithic AC level detector. 4,017,748, Cl. 307-296.00R.



Dawes, Dag: *See—*
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Dayco Corporation: *See—*
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Dayton Sure-Grip & Shore Co., The: *See—*
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De Cat, Arthur Henri; Danckaert, Valere Frans; Sels, Francis Jeanne; and Pollet, Robert Joseph, to AGFA-GEVAERT N.V. Hardening of proteinaceous materials. 4,017,473, Cl. 260-117.000.

DeCou, Donald F., Jr., to Machlett Laboratories, Incorporated, The. Multi-target X-ray tube. 4,017,757, Cl. 313-56.000.

Deets, Gary L.; and Kruse, Robert L., to Monsanto Company. Polyblend containing two grafted rubber components. 4,017,559, Cl. 260-876.00R.

Defibrator AB: *See—*
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Defibrator Aktiebolag: *See—*
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Degen, Roberto: *See—*
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DeHart, John R., to Docutronix, Inc. Envelope processing machine. 4,016,708, Cl. 53-381.00R.

DeHart, John R.; and Nelson, Larry L., to Docutronix, Inc. Device for checking envelopes for enclosed documents. 4,016,980, Cl. 209-111.70T.

Deigner, Paul: *See—*
Koester, Eberhard; Wunsch, Gerd; Deigner, Paul; Stumpfi, Werner; and Schneehage, Hans Henning, 4,017,303.

Deinhammer, Wolfgang; Vulic, Marco; Wick, Manfred; and Prigge, Helmut, to Consortium fur Elektrochemische Industrie GmbH. 2,4,4-Trichlorobutadienyl-1-phosphates and phosphonates and pesticides made therefrom. 4,017,613, Cl. 424-219.000.

Delest, Rene, to Callisto. Device for releasing a load from its support. 4,017,112, Cl. 294-83.00R.

Dell'Acqua, Ernani: *See—*
Ferrari, Rodolfo; and Dell'Acqua, Ernani, 4,017,603.

DeMajistre, Robert, to PPG Industries, Inc. Radiation-sensitive compounds and methods of using same. 4,017,649, Cl. 427-44.000.

Demessemaekers, Emiel Mathilde Anna Alfons; Bognolo, Guido; and Spadini, Gianfranco Luigi, to Procter & Gamble Company, The. Liquid household cleaner. 4,017,409, Cl. 252-109.000.

Demichelis, Jacques A., to FORATRAC "Societe Civile". Method and device for driving the driving wheels of a vehicle. 4,016,946, Cl. 180-74.000.

Denzer, Alan R., to Zamax Manufacturing Co., Inc. Air evacuating closure. 4,016,999, Cl. 220-231.000.

DePriest, Donald R.; and Brandon, Bobby C., to Humboldt Products Corporation. Apparatus for manufacturing large disposable specialty drapes. 4,017,349, Cl. 156-361.000.

Derieg, Michael Edward; Earley, James Valentine; Fryer, Rodney Ian; and Sternbach, Leo Henryk, to Hoffmann-La Roche Inc. Intermediates for the production of tricyclic benzodiazepines. 4,017,531, Cl. 260-463.000.

Derieg, Michael Edward; Earley, James Valentine; Fryer, Rodney Ian; and Sternbach, Leo Henryk, to Hoffmann-La Roche Inc. Intermediates for the production of tricyclic benzodiazepines. 4,017,532, Cl. 260-463.000.

Derval, Victor E.: *See—*
Wells, Richard E.; Derval, Victor E.; and Muchow, John D., 4,017,053.

Derzhavets, Jury Adolfovich: *See—*
Ryzhkov, Nikolai Stepanovich; Nikolaev, Viktor Petrovich; Krylov, Viktor Alexeevich; Ioffe, Leonid Yakovlevich; Krotov, Veniamin Vasilievich; and Derzhavets, Jury Adolfovich, 4,016,777.

Desaunay, Jean-Louis: *See—*
Lenglin, Thierry; Lissillour, Albert; Desaunay, Jean-Louis; Le Corvec, Robert; Simonneau, Robert; and Rouquaud, Richard, 4,017,134.

de Somer, Pierre Marie Hendrik Frans: *See—*
Stewart, William Edgar; and de Somer, Pierre Marie Hendrik Frans, 4,017,600.

Desormiere, Bernard; and Bridoux, Edouard, to Thomson-CSF. Elastic volume wave convolution device. 4,017,751, Cl. 310-8.100.

Deutsche Gold- und Silber-Scheideanstalt vormals Roessler: *See—*
Bittner, Friedrich; Haschke, Heinz; Suchsland, Helmut; Schreyer, Gerd; and Schwarze, Werner, 4,017,413.

DeVilliers, Paul Hendrik. Refrigerators. 4,016,730, Cl. 62-476.000.

DeWitt, David: *See—*
Christie, Kenneth Howard; DeWitt, David; and Johnson, William Stanford, 4,017,888.

Dezelan, Joseph E., to Caterpillar Tractor Co. Combined unloading and relief valve for pump unloading circuit. 4,017,221, Cl. 417-305.000.

Diagnostic Data, Inc.: *See—*
Huber, Wolfgang; Saifer, Mark G.; and Williams, Lewis D., 4,017,605.

Diamond, Martin J.: *See—*
Freedman, Bernard; and Diamond, Martin J., 4,017,666.
Freedman, Bernard; and Diamond, Martin J., 4,017,667.
Freedman, Bernard; and Diamond, Martin J., 4,017,668.

Diamond Shamrock Corporation: *See—*
Pohto, Gerald R., 4,017,375.

Dick, Charles W.; Johnston, Otis A.; Paitson, John L.; and Savit, Carl H., to Western Geophysical Company of America. Air transportable seismic exploration system for use on ice-covered waters. 4,016,951, Cl. 181-109.000.

Dictaphone Corporation: *See—*
Garcia, Mario; and Bell, Robert C., 4,017,692.

Dieffenbacher, Gerhard; and Pfeiffer, Heinrich, to Maschinenfabrik J. Dieffenbacher & Co. Continuously operating panel press. 4,017,248, Cl. 425-371.000.

Diehl, Francis Louvaine; Marsan, Mario Stephen; and Edwards, James Byrd, to Procter & Gamble Company, The. Bleaching articles. 4,017,411, Cl. 252-186.000.

Diehl, Robert Eugene; and Walworth, Bryant Leonidas, to American Cyanamid Company. Phthalimide derivatives as plant growth regulants. 4,017,299, Cl. 71-96.000.

Dietzsch, Gunter; Frers, Gerd; Henning, Klaus; and Lux, Helmut, to Andreas Stihl Maschinenfabrik. Rotor for centrifugal clutch. 4,016,964, Cl. 192-105.0CD.

DiGiulio, David Neil, to Procter & Gamble Company, The. Skin moisturizing compositions containing 2-pyrrolidinone. 4,017,641, Cl. 424-365.000.

Dillinger, Robert B.; and Stone, W. James, to United States of America, Navy. Steerable extraction rocket. 4,017,040, Cl. 244-3.220.

Ditson, J. D., to Ingersoll-Rand Company. Method for forming threads. 4,016,801, Cl. 90-11.420.

Ditter, Jerome F.; Gerhart, Francis J.; and Williams, Robert E., to United States of America, Navy. Boron carbide. 4,017,587, Cl. 423-291.000.

Dittrich, Volker; Topfl, Werner; and Kristiansen, Odd, to Ciba-Geigy Corporation. Iso-(thio)-urea derivatives. 4,017,638, Cl. 424-326.000.

Docutronix, Inc.: *See—*
DeHart, John R., 4,016,708.
DeHart, John R.; and Nelson, Larry L., 4,016,980.

Doering, Arthur Albert, to American Cyanamid Company. Process for the restoration of the chemical lighting potential of a chemiluminescent lighting formulation. 4,017,415, Cl. 252-188.3CL.

Doge, Klaus; Manig, Gerd; Hentsch, Wolfgang; and Mucke, Johannes, to VEB Kombinat Fortschritt Landmaschinen. Winnowing blower for combine harvester-thresher. 4,017,206, Cl. 415-102.000.

Dolan, Douglas B. Hand combat weapon. 4,017,073, Cl. 273-84.000.

Dolan, Russell P., Jr.: *See—*
Davies, D. Eirug; Roosild, Sven A.; and Dolan, Russell P., Jr., 4,017,887.

Dolbin, Benjamin Howard, deceased: *See—*
Gerrity, Robert John; Wandrey, Clarence Dwight; and Dolbin, Benjamin Howard, deceased, 4,017,718.

Dombrowski, Frank R.; and Larson, Raymond L., to General Electric Company. Apparatus and method for stripping windings from a stator. 4,016,639, Cl. 29-762.000.

Domtar Limited: *See—*
Vos, Hendrikus, 4,017,017.

Dore, Jacky, to Sandoz Ltd. Water-soluble azo dyes having a 2-acetoacetamidofluorenyl coupling component radical. 4,017,478, Cl. 260-158.000.

Doric Foods Corporation: *See—*
Lindsay, Michael L., 4,017,243.

Dornier System GmbH: *See—*
Lauger, Alfred; and Schrade, Jochen, 4,016,713.

Dorr-Oliver Incorporated: *See—*
Albertson, Orris E., 4,017,388.
Angevine, Peter A.; and Leyshon, David W., 4,017,585.
Fitch, Elliot Bryant, 4,017,402.

Dorrego, Juan Antonio Castanos, to Fabrica Espanola Magnetos, S.A. Ignition devices for automobiles. 4,016,843, Cl. 123-117.00R.

Doss, James D.; and McCabe, Charles W., to United States of America, Energy Research and Development Administration. Method for localizing heating in tumor tissue. 4,016,886, Cl. 128-422.000.

Doss, Richard C., to Phillips Petroleum Company. Sulfur-curable compositions. 4,017,467, Cl. 260-79.000.

Douds, E. Scott: *See—*
Collins, John W., III; and Douds, E. Scott, 4,017,704.

Dougherty, Timothy Stephen: *See—*
Cereijo, Manuel Ramon; and Dougherty, Timothy Stephen, 4,017,228.

Dousse, Georges: *See—*
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Dow Chemical Company, The: *See—*
Carlson, Elwood L.; Gunkler, Albert A.; Miller, Conrad O. M.; and Paalman, H. Hunter, 4,017,120.
Cryar, Herbert B., Jr., 4,016,931.
Gibbs, Dale S.; Wagener, Earl H.; and Wessling, Ritchie A., 4,017,442.
Gross, James R., 4,017,653.
Harty, M. Fillmore, 4,016,611.
Small, Hamish; and Stevens, Timothy S., 4,017,262.
Smith, Hubert Stacy, 4,017,346.
Wagener, Earl H.; Wessling, Ritchie A.; and Gibbs, Dale S., 4,017,372.

Downing, James Herbert; and Wells, James Enoch, III, to Union Carbide Corporation. Method for making strontium additions to ferrosilicon. 4,017,310, Cl. 75-129.000.

Doyle, Ross L.; and Harrison, Thomas S., to Sterling Drug Inc. Dispensing moist treated towels or tissues. 4,017,002, Cl. 221-63.000.

Drabek, Jozef: *See—*
Beriger, Ernst; Boger, Manfred; Drabek, Jozef; and Kristiansen, Odd, 4,017,612.

Dragerwerk Aktiengesellschaft: *See—*
Heiland, Gerhard; and Kohl, Claus Dieter, 4,017,792.

Seidel, Peter, 4,017,566.

Dravnieks, Konstantins; and Sylvester, Gordon C., to Wehr Corporation. Variable volume control box and system incorporating same. 4,017,025, Cl. 236-49.000.

Dresser Industries, Inc.: *See—*
Crow, Morgan LeVon, 4,016,655.

Drucker, Howard. Push toy. 4,016,675, Cl. 46-205.000.

Duboff, Irving: *See—*
Lorber, Harold; and Duboff, Irving, 4,017,344.

Duckworth, Albert: *See—*
Finn, Charles A.; and Duckworth, Albert, 4,016,666.

Dudley, Alex. Device for gumming and sharpening circle saws. 4,016,781, Cl. 76-40.000.

Dumas, Andre Pierre Fernand: *See—*
Giudicelli, Don Pierre Rene Lucien; Najer, Henry; Manoury, Philippe Michel Jacques; and Dumas, Andre Pierre Fernand, 4,017,623.

Dumpis, Janis; and Sutcliffe, Grenville G., to Husky Corporation. Fuel dispensing nozzle with automatic shut-off responsive to vapor pressure. 4,016,910, Cl. 141-226.000.

Duncan Electric Company, Inc.: *See—*
Milligan, James W., 4,017,795.

Dunlop, Andrew P.; and Macander, Rudy F., to Quaker Oats Company, The. Method for manufacturing liquid resinous furan-formaldehyde condensation products. 4,017,461, Cl. 260-67.00R.

Dunlop Limited: *See—*
Astley, Edward Pryce; Jones, Owen Morris; and Law, Kenneth William, 4,016,915.

Dunning, Kenneth G.: *See—*
Smith, Carleton H.; and Dunning, Kenneth G., 4,016,633.

Du Pont de Nemours, E. I., and Company: *See—*
Blake, Ralph Kingsley, deceased, 4,017,314.
Booth, Bruce Lee, 4,017,158.
Clark, Stephen Larry; and Thoms, William Charles, 4,017,142.
Collette, John Wilfred; Ro, Rolland Shin-Yuan; and Sonnenberg, Fred Max, 4,017,669.
Evans, Robert Franklin, 4,017,138.
Fuchs, Julius Jakob, 4,017,529.
Glaeser, Hans Hellmut, 4,017,304.
Hammer, Clarence Frederick; and Sinclair, Harold King, 4,017,557.
Hanke, Albert Robert, 4,017,496.
Hartzler, Harris Dale, 4,017,313.
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Hernandez, Turney John, 4,017,297.
Heyer, David E., 4,017,575.
Higgins, James Francis, 4,017,328.
Setterquist, Robert Alton, 4,017,525.

Duprey, Richard H.: *See—*
Benoit, Roland; and Duprey, Richard H., 4,016,613.

Durling, Harold, to Midland-Ross Corporation. Inversion brake valve and system therefor. 4,017,125, Cl. 303-7.000.

Durney, Carl: *See—*
Rozzell, Thomas C.; Johnson, Curtis; Durney, Carl; and Lords, James, 4,016,761.

Dutta, Sunil K., to United States of America, Army. Hot pressing of reaction sintered $CaB_6$. 4,017,577, Cl. 264-102.000.

Dutz, Karl-Heinz; and Linke, Adolf, to Krupp-Koppers GmbH. Method and arrangement for gasifying finely divided fluidized solid combustible material. 4,017,269, Cl. 48-86.00R.

Dyas, Keith E., to Cyprus Mines Corporation. Formation and transportation of slurried unconsolidated overburden. 4,017,032, Cl. 241-15.000.

Dybas, Richard A.: *See—*
Rogers, Edward F.; Ashton, Wallace T.; and Dybas, Richard A., 4,017,505.

Dynasciences Corporation: *See—*
Mellor, Eli K., 4,016,879.

Earley, James Valentine: *See—*
Derieg, Michael Edward; Earley, James Valentine; Fryer, Rodney Ian; and Sternbach, Leo Henryk, 4,017,531.
Derieg, Michael Edward; Earley, James Valentine; Fryer, Rodney Ian; and Sternbach, Leo Henryk, 4,017,532.

Earp, Charles W., to International Standard Electric Corporation. Radio navigation beacon. 4,017,860, Cl. 343-106.00D.

Easterling, Gene B.; and Strabala, Joseph L., to Caterpillar Tractor Co. Motor grader having improved guide shoes for circle-mounted implement. 4,016,936, Cl. 172-796.000.

Eastman Kodak Company: *See—*
Blanding, Douglass L., 4,017,897.
McCollum, Anthony W.; and Hagemeyer, Hugh J., Jr., 4,017,537.
Pond, David Martin, 4,017,508.
Simmons, Kenneth E.; and Williams, James E., 4,017,547.

Eaton Corporation: *See—*
Gehrig, Robert G.; and Goetz, George W., 4,017,100.
Pipes, George R., 4,016,984.

Economics Laboratory, Inc.: *See—*
Maloney, James E., 4,017,335.

Eder, Ulrich: *See—*
Sauer, Gerhard; Lorenz, Hans Peter; Eder, Ulrich; Haffer, Gregor; Ruppert, Jurgen; and Wiechert, Rudolf, 4,017,545.

Edison, David M.: *See—*
Cooke, David A.; and Edison, David M., 4,017,823.

Edwards, James Byrd: *See—*
Diehl, Francis Louvaine; Marsan, Mario Stephen; and Edwards, James Byrd, 4,017,411.

Edwards, Thomas C., to Rovac Corporation, The. Heat pump-refrigeration system with water injection and regenerative heat exchanger. 4,017,285, Cl. 62-2.000.

Efremova, Galina Dmitrievna: *See—*
Gorbunov, Boris Nikolaevich; Efremova, Galina Dmitrievna; Kukartsev, Evgeny Maximovich; Erokhina, Lidia Vladimirovna; Lukashov, Anatoly Ivanovich; Orlyansky, Vitaly Vasilievich; Khardin, Alexandr Pavlovich; Churikova, Ideya Antonovna; and Valdman, Daniil Iosifovich, 4,017,518.

Eggers, Warren J., to IMC Chemical Group, Inc. Clay slurries. 4,017,324, Cl. 106-288.00B.

Eggert, Walter S., Jr., to Budd Company, The. Roof hinged door in an automobile. 4,017,117, Cl. 296-146.000.

Einhorn, Ruediger, to Coats & Clark Inc. Method of forming a push pin article and articles produced by the method. 4,017,048, Cl. 248-216.100.

Eisele, Ignaz; Pfleiderer, Hans; and Preuss, Ekkehard, to Siemens Aktiengesellschaft. Magnetic field sensitive diode and method of making same. 4,017,884, Cl. 357-27.000.

Eisenman, Carl H. Bath sponge. 4,016,622, Cl. 15-222.000.

Elder, Ronald C.: *See—*
Kozak, Milan F.; Taylor, Mark W.; and Elder, Ronald C., 4,017,338.

Electro-Therm, Inc.: *See—*
Kreiser, C. Fred, 4,017,714.

Electroprint, Inc.: *See—*
Pressman, Gerald L.; and Casanova, John V., 4,016,813.

Eli Lilly and Company: *See—*
Suarez, Tulio; and Jones, C. David, 4,017,546.

Ellefson, Charlotte Vivian, executrix: *See—*
Ellefson, Clarence L., deceased, 4,016,679.

Ellefson, Clarence L., deceased (by Ellefson, Charlotte Vivian, executrix), to Rusco Industries, Inc. Traffic control apparatus. 4,016,679, Cl. 49-49.000.

Elliott, Vincent R., to Remington Arms Company, Inc. Apparatus for testing flexibility of ammunition link belts. 4,016,757, Cl. 73-167.000.

Ellis, Gaylord O.: *See—*
Tokarchuk, E. Stephen; and Ellis, Gaylord O., 4,016,898.

Ellzey, Floyd P. Monorail switch. 4,016,818, Cl. 104-103.000.

Empire Tool Company: *See—*
Barnes, William E., 4,016,634.

Enabnit, Robert S., to Goodyear Tire & Rubber Company, The. Method and apparatus for extending the operating range of a condition monitoring system. 4,017,826, Cl. 340-58.000.

Engel, Simon L.; Gale, Preston L.; and Lenzen, Glenn H., Jr., to Caterpillar Tractor Co. Method and apparatus for heat treating an internal bore in a workpiece. 4,017,708, Cl. 219-121.0LM.

Engelhardt, Hans-Peter: *See—*
Renkey, Albert Lajos; and Engelhardt, Hans-Peter, 4,017,316.

English, William A.; and Robinson, Charles J., to Westinghouse Electric Corporation. Heat pump suction line vent. 4,017,286, Cl. 62-160.000.

Enker, Stanley H.: *See—*
Broadwin, Alan; Weiss, Steven N.; and Enker, Stanley H., 4,016,882.

Enkkeli, Melvin: *See—*
Hawley, Lee E., 4,017,267.

Enters, Edward W., to Gilson Bros. Co. Pulley assembly. 4,016,770, Cl. 74-230.300.

Environmental Systems Corporation: *See—*
Shofner, Frederick M.; and Kreikebaum, Gerhard, 4,017,186.

Erdman, Charles A.: *See—*
Hubbard, James R.; and Erdman, Charles A., 4,017,870.

Ericksen, Clarence H. Latching mechanism adaptable for use with stretchable farm gates. 4,016,921, Cl. 160-328.000.

Ericson, Richard, to United States Gypsum Company. Construction unit. 4,016,697, Cl. 52-622.000.

Erokhina, Lidia Vladimirovna: *See—*
Gorbunov, Boris Nikolaevich; Efremova, Galina Dmitrievna; Kukartsev, Evgeny Maximovich; Erokhina, Lidia Vladimirovna; Lukashov, Anatoly Ivanovich; Orlyansky, Vitaly Vasilievich; Khardin, Alexandr Pavlovich; Churikova, Ideya Antonovna; and Valdman, Daniil Iosifovich, 4,017,518.

Erskine, William; Gerber, Raymond; and Mentienne, Francis, to Mitsubishi Plastics Industries, Limited; and Battelle Memorial Institute. Method of manufacturing an article carrying a relief image receptor material comprising exposure and heating steps. 4,017,312, Cl. 96-35.000.

Essex Group, Inc.: *See—*
King, John A., 4,017,694.

Essilor International (Compagnie Generale d'Optique): *See—*
Legendre, Serge, 4,016,682.

Ethyl Corporation: *See—*
Bergeron, Charles R., 4,017,562.
Marsee, Frederick J., 4,016,845.

Ethylene Plastique: *See—*
Nicoud espouse Le Brasseur, Genevieve, 4,017,469.

Eue, Ludwig: *See—*
Rohe, Lothar; Schramm, Jurgen; Klauke, Erich; Eue, Ludwig; and Schmidt, Robert Rudolf, 4,017,300.

Eurofloor S.A.: *See—*
Bomboire, Rene F., 4,017,658.

Evans, Duane E.; Tabor, Thomas M.; and Tyler, David A., to Caterpillar Tractor Co. Gas turbine engine dump valve. 4,016,716, Cl. 60-39.09R.

Evans, Howard M., Jr.; and Trodd, Lawrence F. Computer time clock. 4,017,857, Cl. 346-33.00M.





Evans, Robert Franklin, to Du Pont de Nemours, E. I., and Company. Substrate connector. 4,017,138, Cl. 339-75.0MP.

Evans, Theodore A.; and Watts, William A., to Goodyear Tire & Rubber Company, The. Cured rubber article and method of preparation. 4,017,654, Cl. 428-40.000.

Ewald, Robert F.; and Normos, Norbert, to Seaquist Valve Company, Div. of Pittway Corporation. Child safety closure (Method III). 4,017,009, Cl. 222-402.110.

Exxon Reseaarch and Engineeering Company: *See—*
Foroulis, Z. Andrew, 4,017,336.

Exxon Research and Engineering Company: *See—*
Baird, William Chalmers, Jr.; Bearden, Roby, Jr.; and Bollinger, Ralph Louis, Jr., 4,017,381.
Brois, Stanley J.; Ryer, Jack; and Winans, Esther, 4,017,406.

F. L. Smithe Machine Company, Inc.: *See—*
Helm, Herbert W., 4,016,789.

F. von Langsdorff Bauverfahren GmbH: *See—*
Jordan, Reinhard; and von Langsdorff, Fritz, 4,016,692.

Fabrica Espanola Magnetos, S.A.: *See—*
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Facchini, Enio; and Swanson, Carl I., to Walter Kidde & Company, Inc. Fire protection apparatus. 4,017,844, Cl. 340-289.000.

Fahrbach, Gerhard: *See—*
Schmidt, Franz; Fahrbach, Gerhard; Schenk, Wolfgang; and Seiler, Erhard, 4,017,558.

Fairbanks, John B., Jr.; and Brimhall, Gary C. Process and fluid media for treatment of tar sands to recover oil. 4,017,377, Cl. 208-11.0LE.

Falcioni, Joseph G.: *See—*
Champoux, Louis A.; Falcioni, Joseph G.; and Mendels, Morton, 4,016,703.

Falk, Robert James, to Bell Telephone Laboratories, Incorporated. Initializing circuit. 4,017,696, Cl. 179-175.000.

Falkinger, Willard; and Asberg, Per Anders, to Defibrator Aktiebolag. Conveyor plate for wet sheets or dry sheets. 4,017,246, Cl. 425-338.000.

Fansteel Inc.: *See—*
Bates, Victor T.; Fry, Stanley S.; and Hakko, James B., 4,017,302.

Farkas, Walter G.; Hoehn, Willard M.; and Zawadzki, Joseph F., to G. D. Searle & Co. Process for isolation of aspartyl dipeptide esters. 4,017,472, Cl. 260-112.50R.

Farley, Earl T., to Westinghouse Electric Corporation. Speed measurement system for turbine power plant. 4,016,723, Cl. 60-660.000.

Farnbach, William A.; and Small, Charles T., to Hewlett-Packard Company. Synchronization of digital circuits by bus triggering. 4,017,740, Cl. 307-208.000.

Farooq, Saleem: *See—*
Karrer, Friedrich; and Farooq, Saleem, 4,017,536.
Karrer, Friedrich; and Farooq, Saleem, 4,017,549.

Faroy, Inc.: *See—*
Frazier, Preston J., Jr., 4,017,729.

Farrant, David John Rowland, to Automotive Products Company Limited. Ball joint with wear indicator means. 4,017,197, Cl. 403-27.000.

Farrington, Grant M.; Harris, J. Donald; and Foessel, Alfred H., to General Refractories Company. Pitch water soluble resin and alkyd resin as binder composition for refractory particles. 4,017,433, Cl. 260-17.500.

Fast Heat Element Manufacturing Co., Inc.: *See—*
Lodi, Frank, 4,017,713.

Faulkner, Duane Harold: *See—*
Sanford, Steve Douglas; Chenoweth, Vaughn Charles; and Faulkner, Duane Harold, 4,017,294.

Fauth, Gunter: *See—*
Lermann, Peter; Fauth, Gunter; and Muller, Herbert, 4,017,879.

Fauveau, Christian Pierre Maurice; Bonzom, Albert Julus Lucien; and Moutard nee Andre, Anne Marie Eugenie, to British Petroleum Company Limited, The. Binders for electrodes. 4,017,378, Cl. 208-41.000.

Febvre, Henri Lucien, to Choay S.A. Process for obtaining continuous lines of tumoral cells in vitro. 4,017,361, Cl. 195-1.800.

Federal-Mogul Corporation: *See—*
Smith, John R.; and Thompson, Ronald J., 4,017,127.

Fein, Michael E.; and Salisbury, Charles W., to Owens-Illinois, Inc. Gas laser with sputter-resistant cathode. 4,017,808, Cl. 331-94.50T.

Felice, Fortunato, to Solari & C. Udine S.p.A. Position-control mechanism for stepwise rotating members. 4,017,851, Cl. 340-379.000.

Felix, Ernst; and Locher, Hans, to Zellweger, Ltd. Regulation of electronically operated quality control equipment. 4,016,790, Cl. 83-371.000.

Felter, John V. Automatic damper. 4,017,026, Cl. 236-93.00R.

Fenton, Donald M.; and Vaell, Raoul P., to Union Oil Company of California. Reducing the consumption of anthraquinone disulfonate in Stretford solutions using thiocyanate ion precursors. 4,017,594, Cl. 423-573.00R.

Ferment, George R.; and Skinner, David B., to GAF Corporation. Textured polyurethane surface. 4,017,493, Cl. 427-257.000.

Ferrari, Rodolfo; and Dell'Acqua, Ernani, to SPA-Societa Prodotti Antibiotici S.p.A. Water-soluble pharmaceutical complexes of partricin or an alkyl ester thereof with sodium desoxycholate or sodium dehydrocholate. 4,017,603, Cl. 424-122.000.

Ferrarin, Francesco, to Societa' Italiana Materiali Pressati Resinati e Simili - S.I.M.P.R.E.S. - S.r.l. Stored electronic device for producing pulses having predetermined rate and sequence. 4,017,802, Cl. 328-130.000.

Ferraris, Giuseppe: *See—*
Cesca, Sebastiano; Priola, Aldo; and Ferraris, Giuseppe, 4,017,553.

Fiarman, Irwin S.: *See—*
Gehman, David R.; and Fiarman, Irwin S., 4,017,662.

Fibreboard Corporation: *See—*
Pellation, Ernest C., 4,017,018.

Fickes, Ellwood Donald, to General Electric Company. Apparatus for controlling repetitive cutting cycles on a work piece being cut by a cutting tool of a lathe. 4,017,723, Cl. 235-151.110.

Fiedler, Bernhard, to Maschinenfabrik Buckau R. Wolf Aktiengesellschaft. Centrifuge arrangement and method of making a conical container therefor. 4,017,022, Cl. 233-1.00R.

Fiegel, Josef, to International Standard Electric Corporation. Reversible shaded pole motor and control arrangement therefor. 4,017,776, Cl. 318-208.000.

Fife, Merrill E.; and Pell, James W., Jr., to Bendix Corporation, The. Acceleration-insensitive hydrophone. 4,017,824, Cl. 340-10.000.

Figgins, Richard W.: *See—*
Hartger, Richard W.; and Figgins, Richard W., 4,016,686.

Finch, Leonard. Drinking vessel. 4,016,998, Cl. 220-90.200.

Findley, Joseph D., Jr.: *See—*
Kuhn, Edmund W.; Uber, Jesse L.; and Findley, Joseph D., Jr., 4,017,698.

Finger, Eugene P., to Curtis Instruments, Inc. Apparatus for measuring battery depletion by monitoring reductions in voltage. 4,017,724, Cl. 235-151.310.

Finn, Charles A.; and Duckworth, Albert. Clipboard incorporating weapon. 4,016,666, Cl. 42-1.00J.

Fiorenza, Joseph J.: *See—*
Fiorenza, Joseph J., Sr.; and Kalikow, Irving, 4,016,890.

Fiorenza, Joseph J., Sr.; and Kalikow, Irving, to Fiorenza, Joseph J. Power-driven fingernail file. 4,016,890, Cl. 132-75.600.

Firestone Tire & Rubber Company, The: *See—*
Lohr, Delmar Frederick, Jr., 4,017,458.
Ravagnani, Frederick Joseph, 4,016,916.

Fischel, Halbert. Blood leak detector comparing intensities of high absorption band and low absorption band of a single beam of light passing through a sample. 4,017,190, Cl. 356-178.000.

Fish, Thomas M.: *See—*
King, Loyd L.; Wheeler, Robert G.; and Fish, Thomas M., 4,016,867.

Fiske, Larry B.: *See—*
Ludwig, Charles H.; and Fiske, Larry B., 4,017,419.

Fiss, Edward C. Apparatus for recapturing lost energy in a thermoelectric generating plant. 4,016,725, Cl. 60-690.000.

Fitch, Elliot Bryant, to Dorr-Oliver Incorporated. Sedimentation tank having a rotary rake structure. 4,017,402, Cl. 210-528.000.

Fitting, Valve & Control Corporation: *See—*
Fletcher, Willard J., 4,016,899.

Fitzgerald, Mary E., surviving spouse: *See—*
Milligan, Robert J.; Fitzgerald, Walter P., Jr., deceased; and Fitzgerald, Mary E., surviving spouse, 4,017,466.

Fitzgerald, Walter P., Jr., deceased: *See—*
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Fleck, Horst G.: *See—*
Hudson, Donald C.; Morris, Charles R.; Fleck, Horst G.; and Senghaas, Karl A., 4,017,737.

Fleissner, Heinz, to Vepa AG. Device for the wet treatment of material lengths in several treatment bowls. 4,016,733, Cl. 68-9.000.

Fleming, Richard D.: *See—*
Schild, Kasimir W.; Fleming, Richard D.; and Harrington, Phil R., 4,017,840.

Fleming, Robert B.: *See—*
Bartels, Eugene L.; and Fleming, Robert B., 4,016,928.

Fletcher, Willard J., to Fitting, Valve & Control Corporation. Relief valve. 4,016,899, Cl. 137-115.000.

Flores, Sergio: *See—*
Adams, Claude L.; and Flores, Sergio, 4,017,201.

Flowers Tool Inc.: *See—*
Adams, Claude L.; and Flores, Sergio, 4,017,201.

Floyd, Middleton Brawner, Jr.: *See—*
Schaub, Robert Eugene; Floyd, Middleton Brawner, Jr.; and Weiss, Martin Joseph, 4,017,534.

FMC Corporation: *See—*
Kilian, Thomas M.; and Ryan, Mark D., 4,017,845.
Tiffin, Joseph B.; Quinn, Daniel G.; and Vroonland, Evart J., 4,016,688.
Wilson, Donald C.; Mencacci, Samuel A.; and Strasser, Jurgen H., 4,016,705.

Foessel, Alfred H.: *See—*
Farrington, Grant M.; Harris, J. Donald; and Foessel, Alfred H., 4,017,433.

Foggett, H. Rodney, to Canada, Her Majesty the Queen in right of, as represented by the Minister of the Environment. Apparatus for dispensing a liquid. 4,017,393, Cl. 210-101.000.

Foley, Kevin M.; McCombs, Frank P.; and Vigo, Francesco M., to Owens-Corning Fiberglas Corporation. PVC foams. 4,017,657, Cl. 428-95.000.

FORATRAC "Societe Civile": *See—*
Demichelis, Jacques A., 4,016,946.

Forbes, Andrew P., Jr. Corrugated discharge control device for a dispenser. 4,017,005, Cl. 222-47.000.

Forbes, John P. Side spring door action. 4,016,667, Cl. 42-6.000.

Ford Motor Company: *See—*
Allison, William D., 4,016,950.

Forenade Fabriksverken: *See—*
Larsson, Bengt Hakan; and Karlsson, Hans Erik Valdemar, 4,016,816.

Foroulis, Z. Andrew, to Exxon Reseaarch and Engineeering Company. Surface treatment of metals. 4,017,336, Cl. 148-6.350.

Foster Grant Co., Inc.: *See—*
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Foster Wheeler Energy Corporation: *See—*
Johnson, Richard C.; and Lee, Kenneth E., 4,016,820.

Foundation for Ocean Research: *See—*
Castel, David; and Suess, Stephen E., 4,016,878.

Foushee, Charles F., to General Electric Company. Flexible coupling assembly. 4,016,731, Cl. 64-15.00B.

Foxboro Company, The: *See—*
Richardson, David A.; and Robinson, Robert J., 4,016,721.

Frank, Carl A. Nozzle outlet in the stretchable flexible wall for a container. 4,017,020, Cl. 229-62.000.

Franz, William F.: *See—*
Holmes, Jeffrey W.; Purcell, Bruce K.; Franz, William F.; and Cole, Edward L., 4,017,263.

Frazer, John S., to Plastipak Packaging. Liquid container. 4,016,995, Cl. 215-10.000.

Frazier, Gerald Joseph, to Frazier Gun Co. Firing mechanism for firearm. 4,016,668, Cl. 42-69.00R.

Frazier Gun Co.: *See—*
Frazier, Gerald Joseph, 4,016,668.

Frazier, Preston J., Jr., to Faroy, Inc. Decorative lamp. 4,017,729, Cl. 240-13.000.

Fredricks, Richard N. Cervical-vaginal spatula. 4,016,865, Cl. 128-002.00B.

Freed, Jacob B.; and Reiling, Victor G., to Union Pump Company. Method of lining a plug valve. 4,017,576, Cl. 264-91.000.

Freedman, Bernard; and Diamond, Martin J., to United States of America, Agriculture. Photodegradable polyolefins containing an haloalkyl disulfide. 4,017,666, Cl. 526-3.000.

Freedman, Bernard; and Diamond, Martin J., to United States of America, Agriculture. Photodegradable polyolefin composition containing an N-halo benzenesulphonamide. 4,017,667, Cl. 526-3.000.

Freedman, Bernard; and Diamond, Martin J., to United States of America, Agriculture. Photodegradable polyolefin composition containing an halogenated isocyanuric acid. 4,017,668, Cl. 526-6.000.

Freeman, Ardee H.; and Berger, Bruce H., Jr., to Wheelabrator-Frye, Inc. Pneumatic bypass system for air wash separators. 4,017,384, Cl. 209-149.000.

Freeman, James Harry, to United Kingdom Atomic Energy Authority. Ion beam separators. 4,017,403, Cl. 250-492.00A.

French, William George; and MacChesney, John Burnette, to Bell Telephone Laboratories, Incorporated. Method for making optical fibers with helical gradations in composition. 4,017,288, Cl. 65-2.000.

Frers, Gerd: *See—*
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Friedlander, Erich Siegfried, to Associated Electrical Industries Limited. Alternating current power transmission systems. 4,017,790, Cl. 323-110.000.

Froschle, Gerhard, to Cross Europa-Werk GmbH. Indexing drive for transfer lines. 4,016,769, Cl. 74-37.000.

Fry, Stanley S.: *See—*
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Fuchs, Hugo: *See—*
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Fuchs, Julius Jakob, to Du Pont de Nemours, E. I., and Company. Herbicidal allophanimidates. 4,017,529, Cl. 260-453.00R.

Fujii, Kenji: *See—*
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Fujimoto, Rokuro: *See—*
Honma, Hiroyuki; Yoshimura, Hirofumi; Nishi, Takeshi; and Fujimoto, Rokuro, 4,017,711.

Fujio, Masaaki. Method and apparatus for encapsulating container with tubular wrapping member. 4,016,704, Cl. 53-3.000.

Fujio, Yoshiharu: *See—*
Suzui, Akio; Nose, Shinji; Kodama, Takashi; Yokoyama, Kenji; Matsumoto, Kazuya; and Fujio, Yoshiharu, 4,017,434.

Fujita, Teruo: *See—*
Yamada, Naohei; Yamada, Katsuhiko; and Fujita, Teruo, 4,016,926.

Fujiwara, Shinobu; and Tanaka, Hitoshi, to TDK Electronics Company, Limited. Ceramic dielectric composition. 4,017,320, Cl. 106-73.300.

Fukai, Masakazu: *See—*
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Fukase, Hiroshi: *See—*
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Fukunaga, Motoaki: *See—*
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Fule, Stefan: *See—*
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Fuller, John Rodney Dyson: *See—*
Bell, John Kenneth Alexander; and Fuller, John Rodney Dyson, 4,017,207.

Fults, Elmer H. Water soluble liquid iodine concentrate, aqueous iodine bacteriocidal solution and methods of making the same. 4,017,408, Cl. 252-106.000.

Funk, Erwin D.; and Sherman, Michael I., to Kamyr, Inc. Coal gasification process with improved procedures for continuously feeding lump coal under pressure. 4,017,270, Cl. 48-197.00R.

Furnari, Anthony. Work handling apparatus. 4,016,989, Cl. 214-38.00R.

Fushimi, Hisakazu: *See—*
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G. D. Searle & Co.: *See—*
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Davies, David Allen Lewis, 4,017,471.
Farkas, Walter G.; Hoehn, Willard M.; and Zawadzki, Joseph F., 4,017,472.
Jokay, Louis, 4,017,644.

Gaeddert, Melvin Victor; and McWhirt, Bobby Dwayne, to Hesston Corporation. Machine for forming high density round bales. 4,016,712, Cl. 56-341.000.

GAF Corporation: *See—*
Ferment, George R.; and Skinner, David B., 4,017,493.

Galas, Jacques; and Marie, Daniel, to Automobiles Peugeot; and Regie Nationale des Usines Renault. Synchronized gearboxes having at least one non-synchronized speed. 4,016,773, Cl. 74-333.000.

Gale, Preston L.: *See—*
Engel, Simon L.; Gale, Preston L.; and Lenzen, Glenn H., Jr., 4,017,708.

Galstaun, Lionel S., to Bechtel Associates Professional Corporation. Process for the methanation of gases containing high concentration of carbon monoxide. 4,017,274, Cl. 48-214.00A.

Gannon, Charles R., to Ashland Oil, Inc. Pitch-aluminum pigment composition. 4,017,323, Cl. 106-281.00R.

Gant, Orland J., Jr.: *See—*
Howell, Eddie P.; and Gant, Orland J., Jr., 4,017,731.

Gappa, Gunther; Juntgen, Harald; and Klein, Jurgen, to Bergwerksverband GmbH. Method and apparatus for regenerating absorption particles. 4,017,422, Cl. 252-417.000.

Garching Instrumente Gesellschaft zur industriellen Nutzung von Forschungsergebnissen m.b.H.: *See—*
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Garcia, Mario; and Bell, Robert C., to Dictaphone Corporation. Telephone call-diverter system. 4,017,692, Cl. 179-81.00R.

Gardner-Denver Company: *See—*
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Porter, Arthur Paul; Morris, James William; and Gasson, Roy Alfred George, 4,016,658.

Gates, Robert B. Step ladder with paint carrier apparatus. 4,016,955, Cl. 182-122.000.

Gath, Rudolph Hans; and Fuchs, Hugo, to BASF Aktiengesellschaft. Method of purifying caprolactam. 4,017,482, Cl. 260-239.30A.

Gauri, Kailash Kumar, to Robugen GmbH, Pharmazeutische Fabrik. Fungicidally active uracil derivatives. 4,017,626, Cl. 424-251.000.

Gehman, David R.; and Fiarman, Irwin S., to Rohm and Haas Company. Polishing method. 4,017,662, Cl. 428-443.000.

Gehrig, Robert G.; and Goetz, George W., to Eaton Corporation. Fluid supply, filter pack used therein and method of assembly. 4,017,100, Cl. 280-736.000.

Geisler, Robert L.; Crelier, Arnold M.; and Roberto, Francisco Q., to United States of America, Air Force. Method for improving metal combustion in solid rocket propellants. 4,017,342, Cl. 149-5.000.

Gemrich, Edwin G., II: *See—*
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General Electric Company: *See—*
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General Refractories Company: *See—*
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General Telephone Company of California: *See—*
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Georgia-Pacific Corporation: *See—*
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Gerrity, Robert John; Wandrey, Clarence Dwight; and Dolbin, Benjamin Howard, deceased (by Rossi, Arlene M. Dolbin, executor), to Lear Siegler, Inc. Altitude control system for drones. 4,017,718, Cl. 235-150.200.

Gibbs, Dale S.; Wagener, Earl H.; and Wessling, Ritchie A., to Dow Chemical Company, The. Structured-particle latexes. 4,017,442, Cl. 260-29.6RB.

Gibbs, Dale S.: *See—*
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Gifford, William E., to Cryox Corporation. Air distillation apparatus comprising regenerator means for producing oxygen. 4,017,284, Cl. 62-40.000.

Giglberger, Dieter: *See—*
Wick, Richard; Bestenreiner, Friedrich; Giglberger, Dieter; Wetzel, Gunter; Schott, Walter; V. Engeland, Josef Leonard; and Verlinden, Willy Gommaire, 4,017,171.

Gilbert, Donald Edmond, to Powell Electrical Manufacturing Company. Two wire command and monitoring system. 4,017,832, Cl. 340-147.0LP.

Gilissen, Hermanus Petrus Johannes, to AMP Incorporated. Method of forming a matrix connector. 4,016,647, Cl. 29-629.000.

Gill, Peter John, to GKN Screws & Fasteners Limited. Self-drilling screws. 4,016,795, Cl. 85-41.000.

Gillery, Frank H., to PPG Industries, Inc. Electrically conductive transparent laminated window. 4,017,661, Cl. 428-412.000.

Gilley, E. Gene. Hydrocarbon fuel containing dispersed hydrogen and method of use thereof. 4,017,268, Cl. 44-52.000.

Gilligan, David E.: *See—*
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Gilligan, Patrick J.: *See—*
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Gilson Bros. Co.: *See—*
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Giudicelli, Don Pierre Rene Lucien; Najer, Henry; Manoury, Philippe Michel Jacques; and Dumas, Andre Pierre Fernand, to Synthelabo. Esters of 2-[(4-quinolyl)amino]-benzoic acids in analgesic and anti-inflammatory compositions. 4,017,623, Cl. 424-250.000.

GKN Screws & Fasteners Limited: *See—*
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Glaeser, Hans Hellmut, to Du Pont de Nemours, E. I., and Company. Process for selectively chlorinating the titanium content of titaniferous materials. 4,017,304, Cl. 75-33.000.

Glass, Alexander J., to United States of America, Energy Research and Development Administration. Angle amplifying optics using plane and ellipsoidal reflectors. 4,017,163, Cl. 350-294.000.

Glasser, Wolfgang Gerhard; and Hsu, Oscar Hsien-Hsiang, to Research Corporation. Polyurethane intermediates and products and methods of producing same from lignin. 4,017,474, Cl. 260-124.00A.

Glaxo Laboratories Limited: *See—*
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Gliemeroth, Georg; and Meckel, Lothar, to Jenaer Glaswerk Schott & Gen. Process for the treatment of glass by metal migration. 4,017,291, Cl. 65-30.00R.

Globe-Union Inc.: *See—*
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Glory Kogyo Kabushiki Kaisha: *See—*
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Gminder, Rolf, to Mauser-Jagdwaffen GmbH. Firearm having trigger blocking mechanism. 4,016,669, Cl. 42-70.00A.

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Goldberg, Monroe B.; and Voorhis, William B., to General Instrument Corporation. Process for making a brazed lead electrode, and product thereof. 4,017,266, Cl. 428-600.000.

Goldfarb, Adolph E.; and Benkoe, Erwin. Air table handball game apparatus. 4,017,078, Cl. 273-126.00A.

Gomez, Eloy A.; and Levin, Howard J., to American Home Products Corporation. Parenteral benzodiazepine compositions. 4,017,616, Cl. 424-244.000.

Gondo, Hisashi; Takechi, Hiroshi; Kawano, Tsuyoshi; Masui, Hiroaki; and Kovama, Kazuo, to Nippon Steel Corporation. Method and an apparatus for the manufacture of a steel sheet. 4,016,740, Cl. 72-128.000.

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Gorbunov, Boris Nikolaevich; Efremova, Galina Dmitrievna; Kukartsev, Evgeny Maximovich; Erokhina, Lidia Vladimirovna; Lukashov, Anatoly Ivanovich; Orlyansky, Vitaly Vasilievich; Khardin, Alexandr Pavlovich; Churikova, Ideya Antonovna; and Valdman, Daniil Iosifovich. Method of preparing 4,4-dimethyldioxane-1,3. 4,017,518, Cl. 260-340.700.

Gorbunov, Eduard Matveevich: *See—*
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Gordienne, Jean; and Dousse, Georges, to Creusot-Loire. Bladed rotor. 4,017,212, Cl. 416-198.00A.

Gordon, Edmund A., to Central Safety Equipment Co. Safety vent valve. 4,016,904, Cl. 137-493.900.

Gordon, John Edson; and Ralston, Robert A., to American Cyanamid Company. Process for preparing pyridinium chloride salts of alkyl esters of 2-chloro-N-2-hydroxyethylacetamide. 4,017,501, Cl. 260-295.00Q.

Gordon, Paul, to Strategic Medical Research Corporation. Therapeutic composition and method of therapeutically treating warm blooded animals therewith. 4,017,608, Cl. 424-180.000.

Gordy, Robert S.; Anderson, Alfred T.; and Sanders, David E., to NCR Corporation. Spread spectrum demodulator. 4,017,798, Cl. 325-42.000.

Goshima, Yoshitomo: *See—*
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Graham, J. Thomas. Flush operated sanitary facility. 4,016,609, Cl. 4-10.000.

Graham-White Manufacturing Co.: *See—*
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Granosky, Simon Pavlovich: *See—*
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Green Cross Corporation, The: *See—*
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Green, John Charles; and Wheeler, Ronald Edward. Combination bulk tobacco rack loader and unloader and method of unloading a bulk tobacco rack. 4,016,985, Cl. 214-5.500.

Green, Philip S., to Stanford Research Institute. Ultrasonic imaging method and apparatus. 4,016,750, Cl. 73-67.50R.

Greenwood, Ruth: *See—*
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Gregory, Gordon I.: *See—*
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Greskovich, Charles D.; and Prochazka, Svante, to General Electric Company. $Si_3N_4$ formed by nitridation of sintered silicon compact containing boron. 4,017,319, Cl. 106-55.000.

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Griffin, Frank S.: *See—*
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Griffith, Carl D.: *See—*
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Griffith, Edwin; and Stickley, Edward S., to Krause Milling Company. Art of dry milling sorghum and other cereal grains. 4,017,034, Cl. 241-74.000.

Griffith, T. W.; and Taylor, Arthur T., to Gardner-Denver Company. Angular adjustment for drill rig mast. 4,016,687, Cl. 52-116.000.

Grindheim, Earl A., to Rosemount Inc. Two wire current transmitter responsive to a resistive temperature sensor input signal. 4,016,763, Cl. 73-362.0AR.

Griswold, V. Michael: *See—*
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Gross, James R., to Dow Chemical Company, The. Absorbent articles and methods for their preparation. 4,017,653, Cl. 427-385.00A.

Grosse-Wortmann, Hans; Hentschel, Bernhard; Rauth, Peter; Schoenberg, Karl-Heinz; Terwiesch, Bernd; and Winter, Hermann, to Chemische Werke Huls Aktiengesellschaft. Process for the removal of vinyl chloride from polyvinyl chloride dispersions. 4,017,445, Cl. 260-29.60R.

Grostick, Martin Coiner; and Hayes, Thomas Edward, to Johnson Controls, Inc. Stack damper control arrangement. 4,017,024, Cl. 236-16.000.

Groupement Atomique Alsacienne Atlantique: *See—*
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Gruber, Gerald W., to PPG Industries, Inc. Photocatalyst system and ultraviolet light curable coating compositions containing the same. 4,017,652, Cl. 427-54.000.

Gruber, Robert J., to Xerox Corporation. Photoelectrophoretic imaging suspension. 4,017,311, Cl. 96-1.500.

Gruhn, William D., Jr.: *See—*
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GTE Automatic Electric Laboratories Incorporated: *See—*
Schild, Kasimir W.; Fleming, Richard D.; and Harrington, Phil R., 4,017,840.

GTE Sylvania Incorporated: *See—*
Audesse, Emery G.; Colville, William T.; Shaffer, John W.; and Mecone, David W., 4,017,728.
Cleveland, Joseph J., 4,017,347.

Guillermin, Rene; Joly, Jean; and Sangalli, Sylvio, to Rhone-Poulenc-Textile. Apparatus for simultaneously texturizing and cutting continuous yarns. 4,016,626, Cl. 19-.460.

Guimarin, Henry L. Adjustable ratchet wrench. 4,016,782, Cl. 81-63.000.

Gulf Oil Corporation: *See—*
Heilman, William J.; Peterson, Frank C.; Renz, Mical C.; and Theard, Leslie P., 4,017,453.

Gulf Research & Development Company: *See—*
Bonnell, William S.; Christman, Robert D.; Lasher, Jordan S.; Paraskos, John A.; and Yanik, Stephen J., 4,017,382.
Byler, William H.; and Montagna, Angelo A., 4,017,380.

Gunkler, Albert A.: *See—*
Carlson, Elwood L.; Gunkler, Albert A.; Miller, Conrad O. M.; and Paalman, H. Hunter, 4,017,120.

Gustafsson, Sven-Goran; Larsson, Hans Gunnar; Lilja, Kjell; Lundback, Bertil; Nilsson, Jan; and Syvakari, Pertti, to Allmanna Svenska Elektriska Aktiebolaget. High pressure press. 4,016,737, Cl. 72-60.000.

Gustavsson, Gote Ivar: *See—*
Alestig, Ludvig Rune Ingvar; and Gustavsson, Gote Ivar, 4,017,211.

Guy, Stephen L.: *See—*
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H. Berthold A.G.: *See—*
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H. S. Mason Pty. Limited: *See—*
Mason, Henry Stanford, 4,017,198.

Haas, Rainer, to Hans Hollmuller, Maschinenbau, Firma. Method of and apparatus for etching. 4,017,343, Cl. 156-642.000.

Habeger, Larry E., to United States of America, Health, Education and Welfare. Apparatus for low temperature ashing using radio frequency excited gas plasma. 4,017,404, Cl. 250-531.000.

Habicht, Ernst; and Kuhnis, Hans, to Ciba-Geigy Corporation. Certain 1,4-dihydro-3-sulfinyl or sulfonyl-pyridines. 4,017,629, Cl. 424-266.000.

Hackstein, Karl-Gerhard: *See—*
Hrovat, Milan; Wolff, Willi; and Hackstein, Karl-Gerhard, 4,017,567.

Haferkorn, Herbert, to Veba-Chemie AG. Production of maleic anhydride by azeotropic dehydration of maleic acid solutions derived from benzene oxidation processes. 4,017,520, Cl. 260-346.80M.

Haffer, Gregor: *See—*
Sauer, Gerhard; Lorenz, Hans Peter; Eder, Ulrich; Haffer, Gregor; Ruppert, Jurgen; and Wiechert, Rudolf, 4,017,545.

Haga, Takahiro: *See—*
Takahashi, Ryohei; Yokomichi, Isao; Maeda, Kazuyuki; and Haga, Takahiro, 4,017,295.

Hagemeyer, Hugh J., Jr.: *See—*
McCollum, Anthony W.; and Hagemeyer, Hugh J., Jr., 4,017,537.

Hagiwara, Teruo, to Asahi Kogaku Kogyo Kabushiki Kaisha. Bayonet mount adapter for a camera. 4,017,878, Cl. 354-286.000.

Haines, Fred E. Printed circuit board circuit tester. 4,017,793, Cl. 324-73.0PC.

Hajos, Gyorgy: *See—*
Hideg, Kalman; Hankovszky, Olga; Palosi, Eva; Hajos, Gyorgy; and Szporny, Laszlo, 4,017,507.

Hakko, James B.: *See—*
Bates, Victor T.; Fry, Stanley S.; and Hakko, James B., 4,017,302.

Hall, Charles M.; and Wright, John B., to Upjohn Company, The. Alkyl thio sulfinyl and sulfonyl oxamic compounds, compositions and methods of use. 4,017,538, Cl. 260-518.00R.

Hall, George H. Epoxy bond diamond saw. 4,016,857, Cl. 125-21.000.

Hamabe, Takafumi: *See—*
Yamamura, Yukio; Hamabe, Takafumi; and Sugai, Haruo, 4,016,872.

Hamako Hartmann, Firma: *See—*
Hartmann, Otto; Brunner, Hans; and Hartmann, Thomas, 4,017,398.

Hambitzer, Hans Gunnar Gunther: *See—*
Anderberg, Paul-Henry Botvid; Hambitzer, Hans Gunnar Gunther; and Sander, Nils Borje Lennart, 4,016,755.

Hamblin, Richard David, to Archibald Kenrick and Sons Limited. Window stay. 4,017,108, Cl. 292-262.000.

Hamer, Martin; and Batzer, Othmer F., to International Minerals & Chemical Corporation. Organic peroxides as slime settling agents. 4,017,392, Cl. 210-54.000.

Hamilton Communications, Inc.: *See—*
Webb, William E., 4,016,967.

Hammann, Ingeborg: *See—*
Lorenz, Walter; Hammann, Ingeborg; and Stendel, Wilhelm, 4,017,609.

Hammer, Clarence Frederick; and Sinclair, Harold King, to Du Pont de Nemours, E. I., and Company. Novel elastomeric graft copolymers. 4,017,557, Cl. 260-857.00G.

Hammer, Ilse M. Nipple closure for fluid container. 4,016,975, Cl. 206-390.000.

Hammer, Robert N.: *See—*
Baldwin, Bruce B.; and Hammer, Robert N., 4,016,894.

Hammond Corporation: *See—*
Schrecongost, Ray B., 4,016,792.

Hamon, Ludovic: *See—*
Carbonnel, Henri; and Hamon, Ludovic, 4,017,426.

Hanchett, Leland. Electric door strike. 4,017,107, Cl. 292-341.160.

Hanke, Albert Robert, to Du Pont de Nemours, E. I., and Company. Process for preparing pigmentary quinacridone in predetermined crystal form. 4,017,496, Cl. 260-279.0QA.

Hankovszky, Olga: *See—*
Hideg, Kalman; Hankovszky, Olga; Palosi, Eva; Hajos, Gyorgy; and Szporny, Laszlo, 4,017,507.

Hanning, Robert, to Societa Internazionale per lo Sfruttamento di Brevetti S.A. Apparatus for the production of synthetic-resin bodies having core and skin of different density. 4,017,225, Cl. 425-4.00R.

Hans Hollmuller, Maschinenbau, Firma: *See—*
Haas, Rainer, 4,017,343.

Hanson, Jerry D., to Structural Concepts Corporation. Display case. 4,017,130, Cl. 312-128.000.

Hanze, Arthur R.; and Camiener, Gerald W., to Upjohn Company, The. Organic compounds and process. 4,017,606, Cl. 424-180.000.

Hapeman, Martin Jay; and Turley, Barry Jay, to General Electric Company. Lifting force responsive load control for electrically propelled earthmoving vehicles. 4,017,739, Cl. 290-14.000.

Hara, Hirohito; and Shimamura, Hironori, to Nippon Electronics Memory Industry Co. Ltd. Switching regulator having a load responsive alternate biasing circuit. 4,017,787, Cl. 321-45.00S.

Hara, Satoshi: *See—*
Tsukamoto, Hiroyuki; Akino, Morio; Hara, Satoshi; Kikuchi, Kazuyoshi, deceased; Kon, Yumiko, representative; and Kon, Jun, representative, 4,017,904.

Harada, Seiki: *See—*
Tomono, Masami; Abe, Akira; Harada, Seiki; Sato, Kikuji; Takagi, Takeshi; Kamoshita, Genichi; Oya, Yuichiro; and Saiki, Atsushi, 4,017,886.

Hardison, Jack E.: *See—*
Reed, Dale H.; and Hardison, Jack E., 4,016,952.

Hardtmann, Goetz E.; and Coppola, Gary M., to Sandoz, Inc. 6H(1)-Benzopyrano(3,2-c)quinolines. 4,017,499, Cl. 260-289.00C.

Hardy, Peter D., to Metal Box Company Limited, The. Conveyor systems. 4,016,788, Cl. 83-72.000.

Harger, Richard W.: *See—*
Hartger, Richard W.; and Figgins, Richard W., 4,016,686.

Harmon, Larry R.; and Simon, Donald J., to General Electric Company. Microwave oven including apparatus for varying power level. 4,017,702, Cl. 219-10.55B.

Harrington, Phil R.: *See—*
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Harris, J. Donald: *See—*
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Harrison, Thomas S.: *See—*
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Hart, Richard N.: *See—*
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Hartger, Harold V.: *See—*
Hartger, Richard W.; and Figgins, Richard W., 4,016,686.

Hartger, Richard W.; and Figgins, Richard W., to Harger, Richard W.; and Hartger, Harold V. Storage enclosure for small vehicles. 4,016,686, Cl. 52-65.000.

Hartman, Clyde E., to United States of America, Army. Elimination of crosstalk in two sequentially operated Darlington amplifier channels. 4,017,743, Cl. 307-237.000.

Hartmann, Otto; Brunner, Hans; and Hartmann, Thomas, to Hamako Hartmann, Firma. Device for the continuous separation of mixtures of solids and fluids. 4,017,398, Cl. 210-350.000.

Hartmann, Thomas: *See—*
Hartmann, Otto; Brunner, Hans; and Hartmann, Thomas, 4,017,398.

Harty, M. Fillmore, to Dow Chemical Company, The. Sofa bed and mechanism therefor. 4,016,611, Cl. 5-13.000.





Hartzler, Franklin R.; and Wechsler, Michael V., to United States of America, Navy. Device for minimizing interchannel crosstalk in high rate commutator multiplexers. 4,017,687, Cl. 179-15.00A.

Hartzler, Harris Dale, to Du Pont de Nemours, E. I., and Company. Photosensitive composition containing a leuco dye, a photosensitizer, an aromatic aldehyde and a secondary or tertiary amine and the use thereof in a direct-print process. 4,017,313, Cl. 96-48.0QP.

Harvey, Ronald B.: *See—*
Pone, John, Jr.; Schrupp, Kenneth B.; Gilligan, Patrick J.; Harvey, Ronald B.; and Jensen, Gerald A., 4,017,179.

Haschke, Heinz: *See—*
Bittner, Friedrich; Haschke, Heinz; Suchsland, Helmut; Schreyer, Gerd; and Schwarze, Werner, 4,017,413.

Hasegawa, Toru; Hatano, Kazunori; Fukase, Hiroshi; and Iwasaki, Hidesuke, to Takeda Chemical Industries, Ltd. 7-Methoxycephalosporin derivatives. 4,017,485, Cl. 260-240.00J.

Haslett, Glenn M.: *See—*
Clemens, Donald E.; and Haslett, Glenn M., 4,016,772.

Hass, Wynn M., to Southwire Company; and National Steel Corporation. Anode vibrator and press. 4,017,569, Cl. 264-40.200.

Hatano, Kazunori: *See—*
Hasegawa, Toru; Hatano, Kazunori; Fukase, Hiroshi; and Iwasaki, Hidesuke, 4,017,485.

Hatton, Derald R.; and Lehman, Donald F., to Black Clawson Company, The. Screening apparatus. 4,017,387, Cl. 209-240.000.

Hattori, Hiroyuki: *See—*
Komori, Shigehiro; Sakamaki, Hisashi; Hattori, Hiroyuki; Iida, Toshihide; Miyamoto, Koichi; and Umezawa, Kazumi, 4,017,170.

Hattori, Katsuji: *See—*
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Hauni-Werke Korber & Co., KG: *See—*
Komossa, Werner; Neustadt, Werner; and Tolasch, Gerhard, 4,016,971.

Hauser, Hans; and Cline, Devin R., to J. B. Foote Foundry Co., The. Safety system for lawn mowers. 4,016,709, Cl. 56-10.200.

Hawk, Robert M.; and Racki, Jerome G., to Corning Glass Works. Multiple fiber end preparation. 4,017,013, Cl. 225-96.500.

Hawley, Lee E., to Hawley, Ronald; Enkkeli, Melvin; Clark, Daniel M.; Bryden, William; Adams, Arthur; Hillison, Dennis; Hillison, Mrs. Dennis; Hillison, Irving; and Hillison, Mrs. Irving, part interest to each. Method of die construction using joint structure. 4,017,267, Cl. 29-407.000.

Hawley, Ronald: *See—*
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Hayashi, Hideo: *See—*
Kiyota, Takashi; Araki, Yoshihiko; and Hayashi, Hideo, 4,017,355.

Hayes, Thomas Edward: *See—*
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Hazemag Dr. E. Andreas KG: *See—*
Stuttmann, Jurgen, 4,017,035.

Heath, James E.; and Sawyer, Webster M., to Shell Oil Company. Method and apparatus for continuously separating emulsions. 4,017,389, Cl. 210-23 R.

Hecke, Paul: *See—*
Lenz, Werner; Woellhaf, Josef; Spreng, Klaus; Zuerger, Manfred; Hecke, Paul; Hoffmann, Gerhard; and Obradovic, Milan, 4,017,183.

Heckenkamp, Edward B., to Allis-Chalmers Corporation. Universal dust cover for a hydraulic coupling socket. 4,016,908, Cl. 138-96.00R.

Heckman, Russell William: *See—*
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Heerdt, Ruth: *See—*
Bosies, Elmar; Stach, Kurt; Schmidt, Felix Helmut; Heerdt, Ruth; and Weber, Helmut, 4,017,539.

Heeres, Jan: *See—*
Janssen, Paul Adriaan Jan; Heeres, Jan; and Hermans, Hubert Karel Frans, 4,017,631.

Hegar, Gert; and Riat, Henri, to Ciba-Geigy AG. 3-Halogeno-6-hydroxy-pyridone-(2) azo dyestuffs. 4,017,477, Cl. 260-153.000.

Hegel, Robert W.; West, Burke A.; and Verb, Robert H., to Monroe Auto Equipment Company. Vehicle leveling system. 4,017,099, Cl. 280-707.000.

Hcian, Glenn A., to Allis-Chalmers Corporation. Pan agglomeration with mechanical pellet classification. 4,017,264, Cl. 23-313.00R.

Heiland, Gerhard; and Kohl, Claus Dieter, to Dragerwerk Aktiengesellschaft. Device for determining and/or measuring alcohol content in a gas and method of manufacturing a semi-conductor body for use in alcohol detection. 4,017,792, Cl. 324-71.0SN.

Heilman, William J.; Peterson, Frank C.; Renz, Mical C.; and Theard, Leslie P., to Gulf Oil Corporation. Homogeneous polyepoxide-polyanhydride compositions. 4,017,453, Cl. 260-42.180.

Heino, Richard N., to Lakso Company, Incorporated, The. Article dispensing machine. 4,017,003, Cl. 221-81.000.

Heisig, Charles P.: *See—*
Plate, John R.; and Heisig, Charles P., 4,016,949.

Hellman, Robert R., to Westport Development & Mfg. Co., Inc. Dual acting snap switch. 4,017,699, Cl. 200-67.00D.

Helm, Herbert W., to F. L. Smithe Machine Company, Inc. Drive for rotatable cutter mechanisms. 4,016,789, Cl. 83-355.000.

Helmberger, Josef; and Stadler, Klaus, to AGFA-Gevaert, A.G. Method and equipment for line-by-line recording of color component images on a reproduction carrier. 4,017,891, Cl. 358-6.000.

Hemfort, Heinrich, to Westphalia Separator Aktiengesellschaft. Self-cleaning air-tight centrifugal separator. 4,017,023, Cl. 233-1.00A.

Henderson, James R., to Controls Southeast, Inc. Jacket construction for pipe coupling. 4,017,102, Cl. 285-41.000.

Henderson, Timothy M.; and Wuttke, Gilbert H., to KMS Fusion, Inc. Variable leak gas source. 4,016,743, Cl. 73-1.00R.

Henning, Klaus: *See—*
Dietzsch, Gunter; Frers, Gerd; Henning, Klaus; and Lux, Helmut, 4,016,964.

Henriksen, Dale L.: *See—*
MacKay, Donald B.; Nielson, Brian C.; Henriksen, Dale L.; Billings, Roger Evan; Simons, Harold M.; and Hindmarsh, Paul P., 4,016,836.

Henry, John W.: *See—*
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Hensley, Roy A. Water screen. 4,017,394, Cl. 210-157.000.

Hentsch, Wolfgang: *See—*
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Hentschel, Bernhard: *See—*
Grosse-Wortmann, Hans; Hentschel, Bernhard; Rauth, Peter; Schoenberg, Karl-Heinz; Terwiesch, Bernd; and Winter, Hermann, 4,017,445.

Hercules Incorporated: *See—*
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Hermans, Hubert Karel Frans: *See—*
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Hernandez, Turney John, to Du Pont de Nemours, E. I., and Company. Phosphonates for control of bindweed. 4,017,296, Cl. 71-86.000.

Hernandez, Turney John, to Du Pont de Nemours, E. I., and Company. Phosphonates for the control of bindweed. 4,017,297, Cl. 71-86.000.

Herubel, Jean Frederic, to N. Schlumberger & Cie. Needle bar securing means on chain gill machines. 4,016,627, Cl. 19-127.000.

Hesston Corporation: *See—*
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Farnbach, William A.; and Small, Charles T., 4,017,740.
Hunsinger, Dan M., 4,017,804.
Riedel, Ronald J., 4,017,801.
West, William J., 4,017,700.

Heyer, David E., to Du Pont de Nemours, E. I., and Company. Production of a flat thermoplastic film by passing the film over a bearing having a lubricating fluid on the surface thereof. 4,017,575, Cl. 264-89.000.

Hickman, Ronald Price, to Inventec International Limited. Foldable ladder. 4,016,954, Cl. 182-22.000.

Hicks, Chester F. Supporting, aligning and coupling device for pipes. 4,017,046, Cl. 248-55.000.

Hideg, Kalman; Hankovszky, Olga; Palosi, Eva; Hajos, Gyorgy; and Szporny, Laszlo, to Richter Gedeon Vegyeszeti Gyar Rt. 2,3-Dihydro-7-chlorothiazolo[3,2-a]benzimidazole and salt. 4,017,507, Cl. 260-306.70T.

Higgins, James Francis, to Du Pont de Nemours, E. I., and Company. Lead chromate pigment with improved thermal stability. 4,017,328, Cl. 106-298.000.

Hildt, Earl H. Hanger stacker fixture. 4,016,981, Cl. 211-49.00R.

Hilleman, Maurice R.; Miller, William J.; and Provost, Philip J., to Merck & Co., Inc. Hepatitis A antigen. 4,017,601, Cl. 424-89.000.

Hillison, Dennis: *See—*
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Hillison, Irving: *See—*
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Hillison, Mrs. Dennis: *See—*
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Hillison, Mrs. Irving: *See—*
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Hilton, H. Ronald. Training device for pole vaulters. 4,017,070, Cl. 272-104.000.

Hindmarsh, Paul P.: *See—*
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Hirabayashi, Masaya: *See—*
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Hiraoka, Tetsuo; and Sugimura, Yukio, to Sankyo Company Limited. Process for preparing 7β-acylamino-7α-alkoxycephalosporins. 4,017,488, Cl. 260-243.00C.

Hirata, Yasuo: *See—*
Kurihara, Hiroshi; Ogawa, Akira; and Hirata, Yasuo, 4,017,684.

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Tomono, Masami; Abe, Akira; Harada, Seiki; Sato, Kikuji; Takagi, Takeshi; Kamoshita, Genichi; Oya, Yuichiro; and Saiki, Atsushi, 4,017,886.
Ho, Irving T.; and Riseman, Jacob, to International Business Machines Corporation. Single-electrode charge-coupled random access memory cell with impurity implanted gate region. 4,017,883, Cl. 357-24.000.
Ho, Paul Siu-Chung: *See—*
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Hochiki Corporation: *See—*
Ishii, Kanji; and Sato, Haruyoshi, 4,017,733.
Hoda, Syed N., to Corning Glass Works. Opal glasses prepared through clay vitrification. 4,017,289, Cl. 65-18.000.
Hodgson, Robert A.; and Gravis, Charles K., to Maloney-Crawford Tank Corporation. Centrifugal separator. 4,017,275, Cl. 55-1.000.
Hodkin, Lester H.; and Hinson, James L. Rotatable dock. 4,016,990, Cl. 214-38.0BB.
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Hoer, Ralph A.; and Stewart, Michael H., to Ralston Purina Company. Process for producing pH modified protein filaments. 4,017,646, Cl. 426-656.000.
Hoffman, Joseph Adrian, to American Cyanamid Company. Polyolefins and polyesters flame-proofed with carboxyalkyl and carbamoylalkyl substituted poly(phosphine oxides). 4,017,455, Cl. 260-45.70P.
Hoffmann, Gerhard: *See—*
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Derieg, Michael Edward; Earley, James Valentine; Fryer, Rodney Ian; and Sternbach, Leo Henryk, 4,017,532.
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Holden, Homer N.; Hunt, James P.; Browning, Vernon D.; Hoglen, Edward L.; and Kleykamp, Donald L., to Dayco Corporation. Apparatus for producing a continuous flexible reinforced tubular conduit. 4,017,232, Cl. 425-112.000.
Hollins, Jesse R. Remotely controlled externally mounted motor vehicle mirror. 4,016,776, Cl. 74-501.00M.
Hollis, Clinton R., to International Paper Company. Method for the manufacture of dunnage bag liners. 4,016,805, Cl. 93-35.0VL.
Holm, LeRoy W., to Union Oil Company of California. Soluble oil composition. 4,017,405, Cl. 252-8.55D.
Holmes, Jeffrey W.; Purcell, Bruce K.; Franz, William F.; and Cole, Edward L., to Texaco Inc. Apparatus for sulfuric acid catalyzed alkylation process. 4,017,263, Cl. 23-288.00E.
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Holt, Jack A.; and Torbet, Philip A., to Burke Company, The. Lift system for concrete slabs. 4,017,115, Cl. 294-89.000.
Holz, Emil, to Hermann Finckh Metalltuch-und Maschinenfabrik, Firma. Strainer drum and method of making the same. 4,017,401, Cl. 210-493.000.
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Honma, Hiroyuki; Yoshimura, Hirofumi; Nishi, Takeshi; and Fujimoto, Rokuro, to Nippon Steel Corporation. Welding material for low temperature steels. 4,017,711, Cl. 219-146.000.
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Hopkins, Melvyn D.; and Wolf, Charles B., to Westinghouse Electric Corporation. Junction box for high voltage gas insulated conductors. 4,017,675, Cl. 174-21.00C.
Hopper, Roger J., to Goodyear Tire & Rubber Company, The. N-chlorothiocarboxylic acid amide/imide-modified terpolymers. 4,017,468, Cl. 260-79.50B.
Horner, Richard F.; and Vander Veen, Jaring, to Bendix Corporation, The. Dual layer heat shield for wheels. 4,017,123, Cl. 301-6.0WB.
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Hotine, William. Reversible pump with positive valving. 4,017,220, Cl. 417-273.000.
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Howard, James Kent; and Ho, Paul Siu-Chung, to International Business Machines Corporation. Intermetallic compound layer in thin films for improved electromigration resistance. 4,017,890, Cl. 357-67.000.
Howell, Alleyne C., Jr. Rail construction for rail-type electrification systems. 4,016,961, Cl. 191-23.00A.
Howell, Eddie P.; and Gant, Orland J., Jr., to Atlantic Richfield Company. Method and apparatus for prospecting for buried mineral deposits. 4,017,731, Cl. 250-253.000.
Hrovat, Milan; Wolff, Willi; and Hackstein, Karl-Gerhard, to Nukem G.m.b.H. Process for the production of block fuel elements for gas cooled high temperature power reactor. 4,017,567, Cl. 264-.500.
Hsieh, Paul Y.; and Rogall, Eugene W., to Ing. C. Olivetti & C., S.p.A. Thermographic printing method. 4,017,366, Cl. 204-2.000.
Hsu, Oscar Hsien-Hsiang: *See—*
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Hubbard, James R.; and Erdman, Charles A., to Graphic Controls Corporation. Truncated ball pen. 4,017,870, Cl. 346-140.00A.
Hubbard, James R., to Graphic Controls Corporation. Marker with three phase ink circuit. 4,017,871, Cl. 346-140.00R.
Huber, Wolfgang; Saifer, Mark G.; and Williams, Lewis D., to Diagnostic Data, Inc. Acylated orgotein. 4,017,605, Cl. 424-177.000.
Hudson, Donald C.; Morris, Charles R.; Fleck, Horst G.; and Senghaas, Karl A. Conveyer apparatus for medical patients. 4,017,737, Cl. 250-453.000.
Hughes Aircraft Company: *See—*
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Hulsey, William J. Recreation vehicle. 4,017,116, Cl. 296-26.000.
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Hunt, James P.: *See—*
Holden, Homer N.; Hunt, James P.; Browning, Vernon D.; Hoglen, Edward L.; and Kleykamp, Donald L., 4,017,232.
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Hutcheson, Lynn D.; and Hughes, Richard Swart, to United States of America, Navy. Electronically controlled digital laser. 4,017,807, Cl. 331-94.50C.
Hyman, Mark, Jr. Scintillator. 4,017,738, Cl. 250-483.000.
I É R Impression Enregistrement des Resultats: *See—*
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Iida, Tetsuya; Saori, Hideo; Inoguchi, Masao; and Tominaga, Hiroo, to Showa Oil Company, Ltd. Conversion process of hydrocarbons. 4,017,379, Cl. 208-68.000.
Iida, Toshihide: *See—*
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Palmer, William Earl, 4,016,927.
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Inouye, Sus, to Northrop Corporation. Gun to rudder interconnect system. 4,016,798, Cl. 89-37.50R.
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Inukai, Takashi; Sato, Hideo; Sugimori, Shigeru; and Ishibe, Tetsuya, to Chisso Corporation. P-cyanophenyl 4-alkyl-4'-biphenylcarboxylate, method for preparing same and liquid crystal compositions using same. 4,017,416, Cl. 252-299.000.
Inventec International Limited: *See—*
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Ishida, Nobuhiro; and Saito, Kazuyuki, to Mitsubishi Chemical Industries Ltd.; and Oriental Sangyo Co., Ltd. Pencil lead and manufacturing method of the same. 4,017,451, Cl. 260-38.000.
Ishidoshiro, Hiroshi: *See—*
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Ishiguro, Takeo, to Shionogi & Co., Ltd. Miticidal compositions comprising 2-(p-tert.-butylphenoxy)cyclohexyl 2-propynyl sulfite and dibenzyl disulfide. 4,017,635, Cl. 424-303.000.
Ishihara Sangyo Kaisha Ltd.: *See—*
Takahashi, Ryohei; Yokomichi, Isao; Maeda, Kazuyuki; and Haga, Takahiro, 4,017,295.
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Ishiwata, Junichi; Suzuki, Hideo; and Sekiguchi, Masakichi, to Kabushiki Kaisha Meidensha. Shaped quartz crystal resonator. 4,017,753, Cl. 310-9.600.
Isowa, Yoshikazu; and Kurita, Hideaki, to Sagami Chemical Research Center. Process for producing N-alkylhydroxylamines. 4,017,512, Cl. 260-326.00N.
Itek Corporation: *See—*
Powers, Robert H., 4,017,877.
Robbins, Daniel H., 4,017,182.
Ito, Kazuhiro; Ono, Yuichi; Ueyanagi, Kiichi; Morioka, Makoto; and Kawamura, Masao, to Hitachi, Ltd. Apparatus for crystal growth. 4,016,829, Cl. 118-64.000.
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Iwata, Hiroshi; and Ishikawa, Katsuji, to West Electric Company, Ltd. Shutter for camera. 4,017,872, Cl. 354-29.000.
IWN, Inc.: *See—*
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Izaka, Ken-ichi; and Takechi, Kazuo, to Green Cross Corporation, The. Method for preparing a heat-stable plasma protein solution from paste IV-1. 4,017,470, Cl. 260-112.00B.
J. B. Foote Foundry Co., The: *See—*
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J. E. Love Company: *See—*
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J. Gestle, AG: *See—*
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Jackson, Robert W.: *See—*
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Jacobson, Darwin J. Airplane parcel ejector. 4,017,042, Cl. 244-137.00R.
Jaconetty, George Richard; and Palmquist, Steven Robert, to Bell Telephone Laboratories, Incorporated. Customer operated gain control circuit. 4,017,695, Cl. 179-170.00R.
Jacques, Francois: *See—*
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Jaffe, Donald; and Soos, Nicholas Alec, to Bell Telephone Laboratories, Incorporated. Encapsulation of integrated circuits. 4,017,495, Cl. 264-272.000.
Jagenberg Werke AG: *See—*
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Jahraus, Rudi, to Moriz Hausch GmbH. Writing implement and method of manufacturing the same. 4,017,195, Cl. 401-104.000.
Jakel, Gus R., to California Cement Shake Co., Inc. Means for forming tapered slabs. 4,017,230, Cl. 425-84.000.
James, Forrest T.; and Guy, Stephen L., to Burlington Industries, Inc. Apparatus for applying a foam backing to fabric. 4,016,831, Cl. 118-415.000.
James, Lawrence W., to Varian Associates. Solar cells employing stacked opposite conductivity layers. 4,017,332, Cl. 136-89.0PC.
James, Robert L., to Bendix Corporation, The. Multiple input, multiple failure operational voter circuit. 4,017,742, Cl. 307-357.000.
Jamesbury Corporation: *See—*
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Janssen, Paul Adriaan Jan; Heeres, Jan; and Hermans, Hubert Karel Frans, to Janssen Pharmaceutica N.V. Imidazolium salts. 4,017,631, Cl. 424-273.000.
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Japan Inorganic Material Co., Ltd.: *See—*
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Jarboe, Thomas R.; and Baker, William R., to United States of America, Energy Research and Development Administration. Method for producing laser targets. 4,017,578, Cl. 264-143.000.

Jarrett, Boaz Antony; and Seilly, Alec Harry, to Simms Group Research & Development Limited. Actuating devices. 4,017,754, Cl. 310-26.000.
Jefferson, Ray. Disposable biodegradable environmental animal feces waste scoop and container. 4,017,015, Cl. 229-19.000.
Jeffery, Ernest. Golf putting and chipping device. 4,017,084, Cl. 273-176.0FB.
Jenaer Glaswerk Schott & Gen.: *See—*
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Jenkins, James F.: *See—*
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Jensen, Earl D., to Honeywell Inc. Bus allocation control apparatus. 4,017,841, Cl. 340-172.500.
Jensen, Finn Hansen: *See—*
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Jensen, Joseph C., to NCR Corporation. Transformer saturation control circuit for a high frequency switching power supply. 4,017,786, Cl. 321-45.00R.
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Jensen, Poul Wilfred, to AGA Radiator AB. Boiler with condenser. 4,016,834, Cl. 122-264.000.
Jensen, Thomas H., to PPG Industries, Inc. Control apparatus and system for closely spaced heating elements for forming glass fibers and method of using same. 4,017,287, Cl. 65-2.000.
Jerabek, Robert D.; Marchetti, Joseph R.; and Zwack, Robert R., to PPG Industries, Inc. Ketimine-blocked primary amine group-containing cationic electrodepositable resins. 4,017,438, Cl. 260-29.2EP.
Jerie, Hans Georg, to Stichting Internationaal Instituut voor Lucktkaartering en Aarkunde (ITC). Device mountable in a craft for the recording of data from a remote object. 4,017,145, Cl. 350-7.000.
John Zink Company: *See—*
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Johnson, Frederick O., to Westinghouse Electric Corporation. Digital firing pulse generator for thyristor power converters. 4,017,744, Cl. 307-252.00Q.
Johnson, James A. Putter. 4,017,083, Cl. 273-164.000.
Johnson, Marvin M.; and Nowack, Gerhard P., to Phillips Petroleum Company. Hydrocarbon steam reforming and methanation catalysts. 4,017,424, Cl. 252-437.000.
Johnson, Paul H., to Holmes & Narver, Inc. Thin layer leaching method. 4,017,309, Cl. 75-101.00R.
Johnson, Richard C.; and Lee, Kenneth E., to Foster Wheeler Energy Corporation. Closure assembly for a furnace. 4,016,820, Cl. 110-173.00R.
Johnson Service Company: *See—*
Pederson, Carl N.; and Angelopoulos, Peter G., 4,017,683.
Johnson, William Stanford: *See—*
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Johnstone, Duncan. Industrial vacuum loader with dust removal means for bag house filtration system. 4,017,281, Cl. 55-334.000.
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Joncas, Armand. Guillotine type animal trap. 4,016,672, Cl. 43-78.000.
Jones, Allen Jacob, to Agnew, S. J. Recirculating furnace-dryer combination. 4,017,254, Cl. 432-72.000.
Jones, C. David: *See—*
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Jones, Peter Hadley; Kyncl, Jaroslav; Ours, Carroll Wayne; and Somani, Pitambar, to Abbott Laboratories. Esters of γ-glutamyl amide of dopamine. 4,017,636, Cl. 424-309.000.
Jons, Claus, to Robert Bosch G.m.b.H. Gear machine with cutouts in the shaft journals. 4,017,224, Cl. 418-131.000.
Jordan, Reinhard; and von Langsdorff, Fritz, to F. von Langsdorff Bauverfahren GmbH. Composite paving structures and laying units therefor. 4,016,692, Cl. 52-314.000.
Joshi, Hargovind Himatlal, to Colgate-Palmolive Company. Process for making variegated soap. 4,017,573, Cl. 264-75.000.
Joshi, Hargovind Himatlal, to Colgate-Palmolive Company. Process for making variegated soap. 4,017,574, Cl. 264-75.000.
Julinot, Helmut. Air pulsed hydroponic unit. 4,016,677, Cl. 47-64.000.
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Kabat, John L., to Honeywell Inc. Apparatus for supervising leads interconnecting a plurality of self-contained abnormal condition sensing and alarm annunciating units. 4,017,852, Cl. 340-409.000.
Kabushiki Kaisha Daini Seikosha: *See—*
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Kadin, Saul B., to Pfizer Inc. Anti-allergic N-(5-tetrazolyl)-1-oxo-1H-6-alkoxypyrimido-[1,2-a]quinoline-2-carboxamides and intermediates therefor. 4,017,625, Cl. 424-251.000.
Kagayama, Jo, to Tsuyama Mfg. Co., Ltd. Bicycle side reflector. 4,017,151, Cl. 350-99.000.
Kakehi, Sasuga; Miyazaki, Jiro; and Inoue, Jiro, to Murata Manufacturing Co., Ltd. Piezoelectric ceramic resonator mounting means. 4,017,752, Cl. 310-9.400.
Kalata, Daniel R.; and Huston, Henry H., to Owens-Illinois, Inc. Nestable containers. 4,016,976, Cl. 206-519.000.
Kalfoglou, George, to Texaco Inc. Surfactant oil recovery method for use in high temperature formations containing water having high salinity and hardness. 4,016,932, Cl. 166-303.000.
Kalikow, Irving: *See—*
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Kao, Charles K., to International Telephone and Telegraph Corporation. Multiple access fiber optical bus communication system. 4,017,149, Cl. 350-96.00C.
Kaplan, Gerald Stanley; and Ritzie, Andrew David, to RCA Corporation. Binary rate multiplier with means for spacing output signals. 4,017,719, Cl. 235-150.300.
Karaba, Albert M.; Brouwers, Alexander P.; and Pearsall, Thomas J., to Teledyne Industries, Inc. Variable compression ratio piston. 4,016,841, Cl. 123-78.00B.
Karlsson, Borje E. Apparatus for lubricating saw chains in guide bars. 4,016,956, Cl. 184-15.00R.
Karlsson, Hans Erik Valdemar: *See—*
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Karlsson, Hans Ingemar Reimertz. Steam engine. 4,016,724, Cl. 60-672.000.
Karlsson, Hugo. Device on apparatus for pressing powder or granules into candles. 4,017,231, Cl. 425-110.000.
Karrer, Friedrich; and Farooq, Saleem, to Ciba-Geigy Corporation. Ether and thioether containing thiolesters. 4,017,536, Cl. 260-470.000.
Karrer, Friedrich; and Farooq, Saleem, to Ciba-Geigy Corporation. Diphenylmethane ether derivatives. 4,017,549, Cl. 260-613.00R.
Kasami, Akinobu; Kawachi, Masaru; and Mineo, Hiroki, to Tokyo Shibaura Electric Co., Ltd. Red light emitting gallium phosphide device. 4,017,880, Cl. 357-17.000.
Kasha, Michael, to Norlin Music, Inc. Bridge for stringed musical instrument. 4,016,793, Cl. 84-307.000.
Katsube, Junki: *See—*
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Katsurayana, Hiromasa, to Shin-Shirasuna Electric Corporation. Tape recorder cassette ejecting device. 4,017,900, Cl. 360-137.000.
Katzakian, Arthur, Jr.: *See—*
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Kaufmann, Arthur E., to William F. Blake, Inc. Pocket holder for interchangeable worksheets. 4,016,664, Cl. 40-10.00R.
Kaugars, Girts; and Gemrich, Edwin G., II, to Upjohn Company, The. Method of use, composition, and compounds. 4,017,540, Cl. 260-566.00B.
Kaupp, Gunther; and Voltz, Jacques, to Ciba-Geigy AG. Cationic indazole-azo-5-amino pyrazole dyestuffs. 4,017,479, Cl. 260-158.000.
Kawachi, Masaru: *See—*
Kasami, Akinobu; Kawachi, Masaru; and Mineo, Hiroki, 4,017,880.
Kawahara, Haruyuki; and Hirabayashi, Masaya, to Kyoto Ceramic Co., Ltd. Device for implanting an artificial endosseous element of ceramics and an implant method for use of the device. 4,016,651, Cl. 32-10.00A.
Kawai, Motochika; and Shimozawa, Izuru, to Japan Inorganic Material Co., Ltd. Method for reinforcing aqueous hydraulic cement. 4,017,322, Cl. 106-99.000.



Kawamura, Masao: *See—*
Ito, Kazuhiro; Ono, Yuichi; Ueyanagi, Kiichi; Morioka, Makoto; and Kawamura, Masao, 4,016,829.
Ono, Yuichi; Kurata, Kazuhiro; Kawamura, Masao; Morioka, Makoto; and Ito, Kazuhiro, 4,017,881.
Kawano, Tsuyoshi: *See—*
Gondo, Hisashi; Takechi, Hiroshi; Kawano, Tsuyoshi; Masui, Hiroaki; and Kovama, Kazuo, 4,016,740.
Kawasaki, Toyoaki: *See—*
Inouye, Shigeharo; Omoto, Shoji; Iwamatsu, Katsuyoshi; Tsuruoka, Takashi; Niida, Taro; and Kawasaki, Toyoaki, 4,017,607.
Kazi, Abdulla M. Z.: *See—*
Crompton, Charles Edward; and Kazi, Abdulla M. Z., 4,017,418.
Keating, Daniel William, to American Optical Corporation. Thermal Recorder. 4,017,868, Cl. 346-61.000.
Kemner, Rudolf; and Marquerinck, Joost Egbert, to U.S. Philips Corporation. Television pick-up and display system suitable for continuous and short-duration information pick-up and for continuous display. 4,017,679, Cl. 358-111.000.
Kemper, Hermanus Christoffel: *See—*
Stubbs, Christopher Edward; Nooi, Jacobus Roelof; and Kemper, Hermanus Christoffel, 4,017,541.
Kendale Industries, Inc.: *See—*
Setele, William O.; and Miller, Donald A., 4,017,128.
Kendall, Don L.; and Matzen, Walter T., to Texas Instruments Incorporated. Large value capacitor. 4,017,885, Cl. 357-51.000.
Kenny, Thomas M., to Ogontz Controls Company. Thermostatic valve. 4,016,901, Cl. 137-340.000.
Kent, Arthur P.; and Marks, Mortimer, to Marks Polarized Corporation. Motion picture film for three dimensional projection. 4,017,166, Cl. 352-57.000.
Kerr, William B.: *See—*
Wielang, Joseph A.; Palmer, William B.; and Kerr, William B., 4,017,253.
Keusgen, Heinz-Everhard; Seeger, Gunter; and Beyer, Reinhard, to Bison-werke Bahre & Greten GmbH & Co. KG. Device for producing chip boards and the like. 4,017,233, Cl. 425-145.000.
Khan, Aman Ullah, to Whirlpool Corporation. Snap fasteners for drop-in assemblies. 4,016,608, Cl. 4-187.00A.
Khardin, Alexandr Pavlovich: *See—*
Gorbunov, Boris Nikolaevich; Efremova, Galina Dmitrievna; Kukartsev, Evgeny Maximovich; Erokhina, Lidia Vladimirovna; Lukashov, Anatoly Ivanovich; Orlyansky, Vitaly Vasilievich; Khardin, Alexandr Pavlovich; Churikova, Ideya Antonovna; and Valdman, Daniil Iosifovich, 4,017,518.
Kiener, Volker: *See—*
Voelkl, Erfried; Schreiner, Siegfried; Wunsch, Gerd; Kiener, Volker; Waibel, Rudi; and Koester, Hartwig, 4,017,593.
Kiestra, Philippus Pope. Apparatus for determining the quantity of milk and for drawing a sample during the milking of cows. 4,016,832, Cl. 119-14.140.
Kikuchi, Kazuyoshi, deceased: *See—*
Tsukamoto, Hiroyuki; Akino, Morio; Hara, Satoshi; Kikuchi, Kazuyoshi, deceased; Kon, Yumiko, representative; and Kon, Jun, representative, 4,017,904.
Kikuchi, Shintaro: *See—*
Yurugi, Shojiro; and Kikuchi, Shintaro, 4,017,490.
Kilcoyne, James Edward: *See—*
Coburn, Theodore Robert; and Kilcoyne, James Edward, 4,017,251.
Kilian, Thomas M.; and Ryan, Mark D., to FMC Corporation. Circuitry for simultaneous transmission of signals and power. 4,017,845, Cl. 340-310.00R.
Killam, H. Scott, to Rohm and Haas Company. Polymers stabilized with polymerizable vinylbenzyltrialkyl ammonium salt surfactant. 4,017,440, Cl. 260-29.6HN.
Kimball, Michael E., to Goodyear Tire & Rubber Company, The. Polytetramethylene ether urethane cured with 2,2'-diaminodiphenyl disulphide. 4,017,464, Cl. 260-77.5AM.
King, Frank T.: *See—*
Budrick, Ronald G.; King, Frank T.; Martin, Alfred J.; Nolen, Robert L., Jr.; and Solomon, David E., 4,017,290.
King, John A., to Essex Group, Inc. Method for making loudspeaker with magnetic fluid enveloping the voice coil. 4,017,694, Cl. 179-115.5VC.
King, Loyd L.; Wheeler, Robert G.; and Fish, Thomas M., to United States of America, Health, Education and Welfare. Uterine caliper and depth gauge. 4,016,867, Cl. 128-2.00S.
Kirchhein, Albert T., to Bendix Corporation, The. Flap compensation system for use when controlling the pitch attitude of an aircraft. 4,017,045, Cl. 244-194.000.
Kirsch, Bernhard. Safety bindings for skis. 4,017,098, Cl. 280-625.000.
Kishi, Takao; and Nozawa, Takamitsu, to Yoshino Kogyosho Co., Ltd. Miniature atomizer of manual type. 4,017,031, Cl. 239-333.000.
Kitamura, Motoshi: *See—*
Nakayama, Toshimasa; and Kitamura, Motoshi, 4,017,365.
Kittler, Milton J. Resilient throttle stop means. 4,016,842, Cl. 123-98.000.
Kiyota, Takashi; Araki, Yoshihiko; and Hayashi, Hideo, to Nippon Oil Company Ltd. Process for treating latices. 4,017,355, Cl. 159-49.000.
Klauke, Erich: *See—*
Rohe, Lothar; Schramm, Jurgen; Klauke, Erich; Eue, Ludwig; and Schmidt, Robert Rudolf, 4,017,300.
Klein, Jurgen, to Accumulatorenwerk Hoppecke Carl Zoellner & Sohn. Device for assembling the storage plates and insulating plates of lead-acid batteries. 4,016,638, Cl. 29-730.000.
Klein, Jurgen: *See—*
Gappa, Gunther; Juntgen, Harald; and Klein, Jurgen, 4,017,422.
Kleykamp, Donald L.: *See—*
Holden, Homer N.; Hunt, James P.; Browning, Vernon D.; Hoglen, Edward L.; and Kleykamp, Donald L., 4,017,232.
Klockner-Humboldt-Deutz Aktiengesellschaft: *See—*
Winterhager, Helmut; Kammel, Roland; and Weigel, Horst, 4,017,307.
Kloster, James R., to Kloster Pattern Company. Circular saw guide. 4,016,649, Cl. 30-373.000.
Kloster Pattern Company: *See—*
Kloster, James R., 4,016,649.
Klushin, Valery Alexandrovich: *See—*
Puchko, Alexandr Vladimirovich; Klushin, Valery Alexandrovich; Andreev, Georgy Vasilievich; Gorbunov, Eduard Matveevich; Makushok, Evgeny Markellovich; Schukin, Valery Yakovlevich; and Segal, Vladimir Mironovich, 4,016,738.
KMS Fusion, Inc.: *See—*
Budrick, Ronald G.; King, Frank T.; Martin, Alfred J.; Nolen, Robert L., Jr.; and Solomon, David E., 4,017,290.
Henderson, Timothy M.; and Wuttke, Gilbert H., 4,016,743.
Nolen, Robert L., Jr.; and Siebert, Larry D., 4,017,164.
Knowles, Robert Gordon, to Litton Systems, Inc. Solderless electrical contact. 4,017,143, Cl. 339-221.00R.
Knowles, William Ralph: *See—*
Anderson, Robert William; Knowles, William Ralph; and Culley, John Edward, 4,017,680.
Kobayashi, Masanori, to Kabushiki Kaisha Seikosha. Display device. 4,017,154, Cl. 350-159.000.
Kobayashi, Tadashi. Golf ball washing machine. 4,016,618, Cl. 15-21.00A.
Kobe Steel Ltd.: *See—*
Okuda, Naoki; and Tanaka, Kazuo, 4,017,339.
Watanabe, Toshihiko; and Maruyama, Tokuji, 4,017,709.
Koch, Erich O., to Robertshaw Controls Company. Motor protection circuit. 4,017,778, Cl. 318-473.000.
Kodama, Takashi: *See—*
Suzui, Akio; Nose, Shinji; Kodama, Takashi; Yokoyama, Kenji; Matsumoto, Kazuya; and Fujio, Yoshiharu, 4,017,434.
Koehler-Dayton, Inc.: *See—*
Davis, Robert B., 4,017,395.
Koester, Eberhard; Wunsch, Gerd; Deigner, Paul; Stumpfi, Werner; and Schneehage, Hans Henning, to BASF Aktiengesellschaft. Manufacture of acicular ferromagnetic metal pigments containing iron. 4,017,303, Cl. 75-.5AA.
Koester, Hartwig: *See—*
Voelkl, Erfried; Schreiner, Siegfried; Wunsch, Gerd; Kiener, Volker; Waibel, Rudi; and Koester, Hartwig, 4,017,593.
Kogel, Gerhard; Degen, Roberto; and Mundwiler, Walter, to Ciba-Geigy Corporation. Process for the printing and pad-dyeing of mixed fabric. 4,017,256, Cl. 8-21.00C.
Kohl, Claus Dieter: *See—*
Heiland, Gerhard; and Kohl, Claus Dieter, 4,017,792.
Koike, Masahiko, to Nippon Gakki Seizo Kabushiki Kaisha. Automatic rhythm playing apparatus. 4,016,791, Cl. 84-1.030.
Koike, Yuji: *See—*
Yagi, Kenjiro; Koike, Yuji; and Hirai, Hirotomo, 4,017,155.
Kokusai Denshin Denwa Kabushiki Kaisha: *See—*
Kurihara, Hiroshi; Ogawa, Akira; and Hirata, Yasuo, 4,017,684.
Kolbach, Charles C., to Scott Paper Company. Method and apparatus for forming absorbent articles. 4,016,628, Cl. 19-148.000.
Kollmorgen Corporation: *See—*
Taylor, William H., 4,017,148.
Komaba, Shiro; and Goshima, Yoshitomo, to Canon Kabushiki Kaisha. Copy medium carrier. 4,017,181, Cl. 355-72.000.
Komaki, Yoshihide: *See—*
Motojima, Kenji; Iwasaki, Matae; Suzuki, Kazuya; Komaki, Yoshihide; and Ichiyanagi, Katsuaki, 4,017,583.
Komori, Shigehiro; Sakamaki, Hisashi; Hattori, Hiroyuki; Iida, Toshihide; Miyamoto, Koichi; and Umezawa, Kazumi, to Canon Kabushiki Kaisha. Electrophotographic device. 4,017,170, Cl. 355-3.00R.
Komori, Shigehiro; Sakamaki, Hisashi; Ariga, Masao; Nitanda, Hiroshi; and Nagasawa, Seigi, to Canon Kabushiki Kaisha. Copying apparatus for copying a plurality of original surfaces with a single scan. 4,017,173, Cl. 355-8.000.
Komossa, Werner; Neustadt, Werner; and Tolasch, Gerhard, to Hauni-Werke Korber & Co., KG. Conveyor for use in tobacco shredding apparatus. 4,016,971, Cl. 198-850.000.
Komura, Masaru; and Arai, Kenichi, to Minolta Camera Kabushiki Kaisha. Copy paper transporting unit for use in electro-photographic copying apparatus. 4,017,169, Cl. 355-3.00R.
Kon, Jun, representative: *See—*
Tsukamoto, Hiroyuki; Akino, Morio; Hara, Satoshi; Kikuchi, Kazuyoshi, deceased; Kon, Yumiko, representative; and Kon, Jun, representative, 4,017,904.
Kon, Yumiko, representative: *See—*
Tsukamoto, Hiroyuki; Akino, Morio; Hara, Satoshi; Kikuchi, Kazuyoshi, deceased; Kon, Yumiko, representative; and Kon, Jun, representative, 4,017,904.
Kondo, Taizo; Matsui, Komaharu; and Yamamoto, Kunio, to Kansai Paint Company, Ltd. Powder coating composition for electrodeposition. 4,017,435, Cl. 260-22.00A.
Konishi, Masami; and Yanagihara, Hiromichi, to Toyota Jidosha Kogyo Kabushiki Kaisha. Apparatus for preventing after-burning in internal combustion engine. 4,016,852, Cl. 123-198.0DB.

Kontz, Robert F.: *See—*
Chang, Long Fei; and Kontz, Robert F., 4,017,250.

Korner, Siegfried, to VEB polygraph Leipzig Kombinat fur Polygraphische Maschinen und Ausrustungen. Method of and apparatus for stamping out sheet material blanks. 4,016,786, Cl. 83-9.000.

Korte, Siegfried: *See—*
Miessen, Ralf; Blankenstein, Gunter; Korte, Siegfried; and Suling, Carlhans, 4,017,561.

Kossoff, George, to Commonwealth of Australia Care of the Department of Health, The. Ultrasonic beam forming technique. 4,016,751, Cl. 73-71.5US.

Kostlin, Heiner: *See—*
Almer, Friedrich Hermann Raymund; and Kostlin, Heiner, 4,017,758.

Kosuge, Yukio: *See—*
Nakada, Hiroshi; and Kosuge, Yukio, 4,016,702.

Koudelka, Vojtech: *See—*
Sandera, Josef; Calabek, Milan; Kouril, Oldrich; Cenek, Miroslav; Vanacek, Josef; Malik, Jiri; and Koudelka, Vojtech, 4,017,665.

Kouril, Oldrich: *See—*
Sandera, Josef; Calabek, Milan; Kouril, Oldrich; Cenek, Miroslav; Vanacek, Josef; Malik, Jiri; and Koudelka, Vojtech, 4,017,665.

Kovaleski, Joseph J. Tension brush for wire spool. 4,017,037, Cl. 242-129.800.

Kovama, Kazuo: *See—*
Gondo, Hisashi; Takechi, Hiroshi; Kawano, Tsuyoshi; Masui, Hiroaki; and Kovama, Kazuo, 4,016,740.

Kozak, Milan F.; Taylor, Mark W.; and Elder, Ronald C., to Monsanto Company. Steel member for reinforcing rubber composites and method of making same. 4,017,338, Cl. 148-12.00B.

Kraft, Derald H.; and St. John, Richard C., to Aspro, Inc. Method of making clutch housing and bearing assembly. 4,016,642, Cl. 29-509.000.

Kramer, Wolfgang: *See—*
Mose, Luciano; Kramer, Wolfgang; Strewe, Wolfgang; and Strasser, Bernd, 4,017,376.

Krause Milling Company: *See—*
Griffith, Edwin; and Stickley, Edward S., 4,017,034.

Krautsack, Richard G., to Cooperative Marketing Co., The. Assemblage with dual support. 4,016,977, Cl. 206-526.000.

Kreikebaum, Gerhard: *See—*
Shofner, Frederick M.; and Kreikebaum, Gerhard, 4,017,186.

Kreiser, C. Fred, to Electro-Therm, Inc. Segmented sacrificial anode attachment to water heating element. 4,017,714, Cl. 219-322.000.

Kristiansen, Odd: *See—*
Beriger, Ernst; Boger, Manfred; Drabek, Jozef; and Kristiansen, Odd, 4,017,612.
Dittrich, Volker; Topfl, Werner; and Kristiansen, Odd, 4,017,638.

Krock, Friedrich Wilhelm; and Neeff, Rutger, to Bayer Aktiengesellschaft. Anthraquinone dyestuffs. 4,017,524, Cl. 260-380.000.

Krommes, Gerd: *See—*
Pan Lei, Peter, 4,016,849.

Krotov, Veniamin Vasilievich: *See—*
Ryzhkov, Nikolai Stepanovich; Nikolaev, Viktor Petrovich; Krylov, Viktor Alexeevich; Ioffe, Leonid Yakovlevich; Krotov, Veniamin Vasilievich; and Derzhavets, Jury Adolfovich, 4,016,777.

Krupp-Koppers GmbH: *See—*
Dutz, Karl-Heinz; and Linke, Adolf, 4,017,269.

Kruse, Robert L.: *See—*
Deets, Gary L.; and Kruse, Robert L., 4,017,559.

Krylov, Viktor Alexeevich: *See—*
Ryzhkov, Nikolai Stepanovich; Nikolaev, Viktor Petrovich; Krylov, Viktor Alexeevich; Ioffe, Leonid Yakovlevich; Krotov, Veniamin Vasilievich; and Derzhavets, Jury Adolfovich, 4,016,777.

Kubota Tekko Co., Ltd.: *See—*
Osujo, Masahide; Ikegami, Seiiti; Murayama, Yoshinobu; Omura, Takaho; and Morimoto, Tadashi, 4,016,957.

Kuester, Donald A., to J. I. Case Company. Dual steering system for vehicle. 4,016,948, Cl. 180-132.000.

Kuhn, Edmund W.; Uber, Jesse L.; and Findley, Joseph D., Jr., to Westinghouse Electric Corporation. Draw-out type circuit interrupter with modular construction. 4,017,698, Cl. 200-50.0AA.

Kuhnis, Hans: *See—*
Habicht, Ernst; and Kuhnis, Hans, 4,017,629.

Kuhnle, Siegfried, to H. Berthold A.G. Photosetter. 4,017,177, Cl. 355-43.000.

Kuipers, Jack, to Polhemus Navigation Sciences, Inc. Apparatus for generating a nutating electromagnetic field. 4,017,858, Cl. 343-100.00R.

Kukartsev, Evgeny Maximovich: *See—*
Gorbunov, Boris Nikolaevich; Efremova, Galina Dmitrievna; Kukartsev, Evgeny Maximovich; Erokhina, Lidia Vladimirovna; Lukashov, Anatoly Ivanovich; Orlyansky, Vitaly Vasilievich; Khardin, Alexandr Pavlovich; Churikova, Ideya Antonovna; and Valdman, Daniil Iosifovich, 4,017,518.

Kulite Semiconductor Products, Inc.: *See—*
Kurtz, Anthony D., 4,016,644.

Kummer, Rudolf, to BASF Aktiengesellschaft. Manufacture of 1,4-butanediol. 4,017,550, Cl. 260-635.00E.

Kunkle, Donald E., to Beloit Corporation. Nip load sensing device. 4,016,756, Cl. 73-141.00A.

Kunkler, Hans: *See—*
Schminke, Wolfgang; Stolting, Klaus; Macholdt, Hans; and Kunkler, Hans, 4,017,671.

Kupperman, Dennis I.: *See—*
Kupperman, Sam; and Kupperman, Dennis I., 4,016,891.

Kupperman, Sam; and Kupperman, Dennis I., to R B Toy Development Co. Dental floss holder for detachable securement to toothbrush handle and the like for supporting a strip of floss in taut condition ready for use. 4,016,891, Cl. 132-84.00A.

Kurata, Kazuhiro: *See—*
Ono, Yuichi; Kurata, Kazuhiro; Kawamura, Masao; Morioka, Makoto; and Ito, Kazuhiro, 4,017,881.

Kurata, Masayuki; and Watanabe, Yusiyo, to Akebono Brake Industry Co., Ltd. Sealing device for hydraulically or pneumatically operated equipment. 4,017,089, Cl. 277-152.000.

Kurihara, Hiroshi; Ogawa, Akira; and Hirata, Yasuo, to Kokusai Denshin Denwa Kabushiki Kaisha. System for determining burst sending timing in TDMA communication. 4,017,684, Cl. 178-69.100.

Kurita, Hideaki: *See—*
Isowa, Yoshikazu; and Kurita, Hideaki, 4,017,512.

Kurtz, Anthony D., to Kulite Semiconductor Products, Inc. Methods of fabricating low pressure silicon transducers. 4,016,644, Cl. 29-583.000.

Kurtz, Lynn C. Electrically operated game apparatus. 4,017,072, Cl. 273-1.00E.

Kusters, Edward: *See—*
Ahrweiler, Karl-Heinz, 4,017,235.

Kuwada, Yutaka; Meguro, Kanji; Tawada, Hiroyuki; Sohda, Takashi; Natsugari, Hideaki; and Sato, Yoshiaki, to Takeda Chemical Industries, Ltd. Thienodiazepine derivatives. 4,017,620, Cl. 424-248.510.

Kuzmin, Anatoly Alexandrovich: *See—*
Paton, Boris Evgenievich; Lakomsky, Viktor Iosifovich; Torkhov, Gennady Fedorovich; Trigub, Vladimir Kirillovich; Sheiko, Ivan Vasilievich; Verkhovtsev, Emil Vasilievich; Bakumenko, Sergei Panteleevich; Ponomarev, Nikolai Alexeevich; and Kuzmin, Anatoly Alexandrovich, 4,017,672.

Kvam, Ole Jacob. Ski bindings. 4,017,097, Cl. 280-615.000.

Kwan-Gett, Clifford S. Atriotomy access device. 4,016,884, Cl. 128-348.000.

Kyncl, Jaroslav: *See—*
Jones, Peter Hadley; Kyncl, Jaroslav; Ours, Carroll Wayne; and Somani, Pitambar, 4,017,636.

Kyoto Ceramic Co., Ltd.: *See—*
Kawahara, Haruyuki; and Hirabayashi, Masaya, 4,016,651.

LaBounty, Roy E. Multidirectional grapple. 4,017,114, Cl. 294-88.000.

Lachema, narodni podnik: *See—*
Svoboda, Vlastimil; and Celchovska, Olga, 4,017,261.

Laessig, John D., to Columbia Research Laboratories, Inc. Headset for receiving and transmitting signals. 4,017,797, Cl. 325-16.000.

Laforest, Jacqueline: *See—*
Thuillier, Germaine; and Laforest, Jacqueline. 4,017,618.

Laforest born Boutillier du Retail, Jacqueline Suzanne: *See—*
Thuillier born Nachmias, Germaine; Laforest born Boutillier du Retail, Jacqueline Suzanne; Cariou, Bernard Jean Marie; Bessin, Pierre Alfred Rene; Bonnet born Roux, Jacqueline Suzanne; and Thuillier, Jean Eugene, 4,017,632.

Laine, Gabriel, to Automobiles Peugeot. Device for stressing with a limited force, in particular for a belt tensioner. 4,017,059, Cl. 254-54.000.

Lakomsky, Viktor Iosifovich: *See—*
Paton, Boris Evgenievich; Lakomsky, Viktor Iosifovich; Torkhov, Gennady Fedorovich; Trigub, Vladimir Kirillovich; Sheiko, Ivan Vasilievich; Verkhovtsev, Emil Vasilievich; Bakumenko, Sergei Panteleevich; Ponomarev, Nikolai Alexeevich; and Kuzmin, Anatoly Alexandrovich, 4,017,672.

Lakso Company, Incorporated, The: *See—*
Heino, Richard N., 4,017,003.

Lam, Hsiao-Ling; and Pallos, Ferenc M., to Stauffer Chemical Company. Insect growth regulators. 4,017,634, Cl. 424-300.000.

Lamers, Robert P., to Westinghouse Electric Corporation. Overspeed protection system. 4,017,217, Cl. 417-214.000.

Lampson, George P.: *See—*
Bertland, Alexander U.; Tytell, Alfred A.; Lampson, George P.; and Buynak, Eugene, 4,017,360.

Lanam, Richard: *See—*
Winter, Joseph; Lanam, Richard; and Graham, Douglas L., 4,017,337.

Lancee, Charles T.; and van Zwieten, Gerardus. Echoscope for examination of objects. 4,016,862, Cl. 128-2.00V.

Landowski, Edmund A. Pre-cast fireplace and flue assembly. 4,016,859, Cl. 126-120.000.

Lang, Theo, to Foster Grant Co., Inc. Apparatus for extruding expandable thermoplastic material. 4,017,245, Cl. 425-327.000.

Lansing, Charles W.; and Zajicek, Joseph S., to TDX, Inc. Data entry system. 4,017,837, Cl. 340-172.500.

Lapin, Vladimir Viktorovich; Bulgakov, Boris Sergeevich; Bogoyavlensky, Konstantin Nikolaevich; Rozhdestvensky, Jury Lvovich; Granosky, Simon Pavlovich; Maizelis, Genrikh Semenovich; Lazutin, Vladimir Ivanovich; and Sauskan, Ilya Alexandrovich. Method of shaping ring blanks. 4,016,739, Cl. 72-105.000.

Lardy, Jean-Louis A.: *See—*
Roche, Bernard G.; Majos, Jacques; and Lardy, Jean-Louis A., 4,017,693.

Larsen, Donald Wayne; and Billmyer, Jerrold Bain, to W. R. Grace & Co. Flow control agent for ultra thin epoxy resin powder coatings. 4,017,447, Cl. 260-31.20R.

Larsen, Paul F. Fishing lure. 4,016,671, Cl. 43-42.170.

Larsen, Richard L.; and Robnett, James J., to Raygo Wagner, Inc. Lift truck with rotatable load-handling apparatus. 4,016,992, Cl. 214-147.00G.





Larsen, Ronald Leslie, to Conwed Corporation. Seedling transplant containers. 4,016,678, Cl. 47-77.000.

Larson, Curtis L.; and Ward, John R., to Minnesota Mining and Manufacturing Company. System and device for inflating and sealing air inflated cushioning material. 4,017,351, Cl. 156-494.000.

Larson, Philip C. Method of restoring hydraulic systems. 4,017,329, Cl. 134-21.000.

Larson, Raymond L.: *See—*
Dombrowski, Frank R., and Larson, Raymond L., 4,016,639.

Larson, Willis August, to Globe-Union Inc. Keyboard membrane switch having threshold force structure. 4,017,697, Cl. 200-5.00A.

Larsson, Bengt Hakan; and Karlsson, Hans Erik Valdemar, to Forenade Fabriksverken. Shell especially for mortars. 4,016,816, Cl. 102-67.000.

Larsson, Hans Gunnar: *See—*
Gustafsson, Sven-Goran; Larsson, Hans Gunnar; Lilja, Kjell; Lundback, Bertil; Nilsson, Jan; and Syvakari, Pertti, 4,016,737.

Larsson, Tore Ingvar: *See—*
Soukup, Franz; Larsson, Tore Ingvar; and Borg, Veine Bernt, 4,017,247.

Laser Technology, Inc.: *See—*
McLaughlin, Howard B., 4,016,856.

Lasher, David C.; and Blanchard, Kenneth F., to Xerox Corporation. Set separator. 4,017,066, Cl. 271-80.000.

Lasher, Jordan S.: *See—*
Bonnell, William S.; Christman, Robert D.; Lasher, Jordan S.; Paraskos, John A.; and Yanik, Stephen J., 4,017,382.

Lasman, Henry R.; Lebenson, Robert J.; and Wisotzky, Reuben, to Pandel-Bradford, Inc. Imitation leather material and method of preparing such material. 4,017,656, Cl. 428-86.000.

Latimer, William R., Jr., to I-T-E Imperial Corporation. Ferrule fuse terminal clip with pivoted rejector. 4,017,816, Cl. 337-227.000.

Lauck, Lawrence J., to United Technologies Corporation. Gas turbine engine having an improved transition duct support. 4,016,718, Cl. 60-39.320.

Lauger, Alfred; and Schrade, Jochen, to Dornier System GmbH. Drive for high-speed axles or shafts of spindles. 4,016,713, Cl. 57-100.000.

Lauk, David V.; and Bills, Lloyd W. Device for cleaning ink from a printing apparatus. 4,016,812, Cl. 101-425.000.

Launderville, Paul Calvin: *See—*
Simmons, David Harry; and Launderville, Paul Calvin, 4,017,784.

Laurent-Atthalin, Albert: *See—*
Batoux, Bernard; Laurent-Atthalin, Albert; and Salmon, Michel, 4,017,306.

Lavins, Paul N., Jr.; and Vanek, Willard J., to American Induction Heating Corporation. Multiple station induction heating machine. 4,017,703, Cl. 219-10.690.

Law, Kenneth William: *See—*
Astley, Edward Pryce; Jones, Owen Morris; and Law, Kenneth William, 4,016,915.

Lawrence, James F., Jr. Magnetically coupled indicator means for control setting. 4,016,827, Cl. 116-129.00D.

Lawrence, John P., to Goodyear Tire & Rubber Company, The. Process of preparing unsymmetrical disulfides. 4,017,489, Cl. 260-243.00B.

Lawrence Peska Associates, Inc.: *See—*
Tepedino, Patrick, 4,016,654.

Lawton, Richard W., to General Electric Company. Implantable electrochemical sensor. 4,016,866, Cl. 128-2.00E.

Lazutin, Vladimir Ivanovich: *See—*
Lapin, Vladimir Viktorovich; Bulgakov, Boris Sergeevich; Bogoyavlensky, Konstantin Nikolaevich; Rozhdestvensky, Jury Lvovich; Granosky, Simon Pavlovich; Maizelis, Genrikh Semenovich; Lazutin, Vladimir Ivanovich; and Sauskan, Ilya Alexandrovich, 4,016,739.

Lear Siegler, Inc.: *See—*
Gerrity, Robert John; Wandrey, Clarence Dwight; and Dolbin, Benjamin Howard, deceased, 4,017,718.

Lebenson, Robert J.: *See—*
Lasman, Henry R.; Lebenson, Robert J.; and Wisotzky, Reuben, 4,017,656.

Le Corvec, Robert: *See—*
Lenglin, Thierry; Lissillour, Albert; Desaunay, Jean-Louis; Le Corvec, Robert; Simonneau, Robert; and Rouquaud, Richard, 4,017,134.

Ledoux, Andre: *See—*
Menard, Pierre R.; and Ledoux, Andre, 4,016,959.

Lee, Kenneth E.: *See—*
Johnson, Richard C.; and Lee, Kenneth E., 4,016,820.

Lee, Tsao-Piao. Pipette controller with graduate reading plunger. 4,016,765, Cl. 73-425.600.

Legendre, Serge, to Essilor International (Compagnie Generale d'Optique). Copying machine notably for grinding concave surfaces. 4,016,682, Cl. 51-50.0PC.

Lehman, Donald F.: *See—*
Hatton, Derald R.; and Lehman, Donald F., 4,017,387.

Lehman, James A. Spring type bottle cap pistol. 4,016,854, Cl. 124-27.000.

Leitermann, Wulf; and Zimmermann, Hans-Georg, to Audi NSU Auto Union Aktiengesellschaft; and Wankel GmbH. Method of manufacturing piston sealing strips of rotary piston machines. 4,016,635, Cl. 29-156.600.

Leliaert, Raymond M., to Wheelabrator-Frye, Inc. Surface treatment device for large diameter pipe sections. 4,016,681, Cl. 51-9.00M.

Lemberg, Werner: *See—*
Anwer, Jamil; Banchik, Ira Norman; Bode, Gerhard Wilhelm; Lemberg, Werner; and Sud, Kuldip Kumar, 4,017,272.

LeMere, Roger: *See—*
Crawford, Douglas J.; LeMere, Roger; and Hughes, Francis H., 4,017,064.

Lemin, Alan J.; and O'Connell, Paul W., to Upjohn Company, The. Certain diphenylalkanoamides used as bird and murine repellents. 4,017,630, Cl. 424-267.000.

Lenglin, Thierry; Lissillour, Albert; Desaunay, Jean-Louis; Le Corvec, Robert; Simonneau, Robert; and Rouquaud, Richard, to L'Etat Francais, represente par le Ministre des Postes et Telecommunications; and Socotel Societe Mixte pour le Developpement de la Technique de la Commutation dans le Domaine des Telecommunications. Rack-mounting for electronic equipments. 4,017,134, Cl. 312-351.000.

Lenk, Erich, to Barmag Barmer Maschinenfabrik Aktiengesellschaft. Melt spinning apparatus. 4,017,249, Cl. 425-382.200.

Lenz, Werner; Woellhaf, Josef; Spreng, Klaus; Zuerger, Manfred; Hecke, Paul; Hoffmann, Gerhard; and Obradovic, Milan, to BASF Aktiengesellschaft. Apparatus for the production of exposed printing plates. 4,017,183, Cl. 355-85.000.

Lenzen, Glenn H., Jr.: *See—*
Engel, Simon L.; Gale, Preston L.; and Lenzen, Glenn H., Jr., 4,017,708.

Le Pierres, Gildas, to International Vibration Engineering. Shock absorber for firearms and the like. 4,016,799, Cl. 89-42.00B.

Lerjen, Georg, to BBC Brown Boveri & Company Limited. Shaft seal for turbomachines. 4,017,088, Cl. 277-53.000.

Lermann, Peter; Fauth, Gunter; and Muller, Herbert, to AGFA-Gevaert, A.G. Self-developing type photographic apparatus with spread roller system. 4,017,879, Cl. 354-304.000.

Les Cables de Lyon: *See—*
Aupoix, Marcel; and Trezeguet, Jean-Pierre, 4,017,814.

Leslie, Donald J. Planetary acoustic phase shift mechanism. 4,017,685, Cl. 179-1.500.

Lesney Products Corporation: *See—*
Resnick, Charles; and Zant, Fred, 4,016,674.

Lester, Joseph H., to Western Food Equipment Company. Process for standardizing milk by monitoring the fat content of the blended milk product. 4,017,643, Cl. 426-231.000.

L'Etat Francais, represente par le Ministre des Postes et Telecommunications: *See—*
Lenglin, Thierry; Lissillour, Albert; Desaunay, Jean-Louis; Le Corvec, Robert; Simonneau, Robert; and Rouquaud, Richard, 4,017,134.

Letelier, Carlos Sunkel; and CilleroGrafulla, Fernando, to Alter, S.A. Process for purifying the mixed ester, ethylene glycol 1-(2-p-chlorophenoxy)-2-methylpropionate nicotinate. 4,017,502, Cl. 260-295.50R.

Leusner, Bernd W.; and Schulz, Hans-Hermann, to Bayer Aktiengesellschaft. Impression tray for dental purposes. 4,016,650, Cl. 32-17.000.

Lever Brothers Company: *See—*
Stubbs, Christopher Edward; Nooi, Jacobus Roelof; and Kemper, Hermanus Christoffel, 4,017,541.

Levesque, Alston L., to Raymond Lee Organization, Inc. Penis locking and lacerating vaginal insert. 4,016,875, Cl. 128-132.00R.

Levin, Howard J.: *See—*
Gomez, Eloy A.; and Levin, Howard J., 4,017,616.

Lewis, Arthur E., to United States of America, Energy Research and Development Administration. Method for rubblizing an oil shale deposit for in situ retorting. 4,017,119, Cl. 299-2.000.

Lewis, Irwin Charles; McHenry, Edgar Ronald; and Singer, Leonard Sidney, to Union Carbide Corporation. Process for producing mesophase pitch. 4,017,327, Cl. 106-273.00R.

Leydorf, George F.: *See—*
Tharp, Nelson B.; Henry, John W.; and Leydorf, George F., 4,017,863.

Leyshon, David W.: *See—*
Angevine, Peter A.; and Leyshon, David W., 4,017,585.

Lichtman, Samuel W., to United States of America, Navy. Transmitter for use in a laser communication and ranging system. 4,017,146, Cl. 350-7.000.

Lilja, Kjell: *See—*
Gustafsson, Sven-Goran; Larsson, Hans Gunnar; Lilja, Kjell; Lundback, Bertil; Nilsson, Jan; and Syvakari, Pertti, 4,016,737.

Lim, Gary; and Hooper, John W., to Bristol-Myers Company. Process for the preparation of 14-hydroxymorphinan derivatives. 4,017,497, Cl. 260-285.000.

Lindsay, George F.; and Whitehouse, Harper John, to United States of America, Navy. Inverse Wiedemann effect torsional delay line matched filter device. 4,017,811, Cl. 333-30.00M.

Lindsay, Michael L., to Doric Foods Corporation. Adjustable flash removal assembly for molded containers. 4,017,243, Cl. 425-292.000.

Lindstrom, Nils Folke Rune, to Boliden Aktiebolag. Method for the electrolytic recovery of Sb, As, Hg and/or Sn. 4,017,369, Cl. 204-121.000.

Linke, Adolf: *See—*
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Lissillour, Albert: *See—*
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Litton Business Systems, Inc.: *See—*
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Roen, Stephen A., 4,017,725.

Litton Systems, Inc.: *See—*
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Simmons, David Harry; and Launderville, Paul Calvin, 4,017,784.

Litz, Donald C., to Westinghouse Electric Corporation. Fluid-cooled rotating member with improved coolant exhaust structure suitable for superconducting dynamoelectric machinery. 4,017,755, Cl. 310-40.00R.

Loberg, Michael Dewey; Callery, Patrick Stephen; and Cooper, Malcolm, to Research Corporation. Radiopharmaceutical chelates and method of external imaging. 4,017,596, Cl. 424-1.000.

Locher, Hans: *See—*
Felix, Ernst; and Locher, Hans, 4,016,790.

Lock, Chuck. Electronic acupuncture point finder. 4,016,870, Cl. 128-2.10C.

Lock, William E. Dump bar transfer mechanism. 4,016,797, Cl. 89-34.000.

Lockheed Missiles & Space Company, Inc.: *See—*
Webster, Donald; and Crooks, Donald D., 4,017,333.

Lockshaw, John E. Rotary-valve device for internal-combustion engines. 4,016,840, Cl. 123-75.00B.

Lodi, Frank, to Fast Heat Element Manufacturing Co., Inc. Heater for severing plastic film. 4,017,713, Cl. 219-243.000.

Loffelman, Frank Fred: *See—*
Buell, Bennett George; and Loffelman, Frank Fred, 4,017,486.

Loftus, John M.: *See—*
Daly, Lewis J.; and Brownlie, Alan W., 4,017,069.

Lohr, Delmar Frederick, Jr., to Firestone Tire & Rubber Company, The. Stabilization of poly(phosphazenes). 4,017,458, Cl. 260-45.75W.

Loiterman, Leo. Apparatus for measuring the transmittance or opacity of a gaseous medium carrying particulate matter through a conduit. 4,017,193, Cl. 356-206.000.

London, Joe F., Jr., to Burlington Industries, Inc. High stretch yarn texturing, dycing and package production. 4,016,715, Cl. 57-157.0TS.

Long, Joe E. Apparatus for lining a continuous concrete pipe. 4,017,226, Cl. 425-59.000.

Looker, Robert, to Satron, Inc. Woven rope. 4,016,911, Cl. 139-383.00R.

Lopker, Edwin B., to Pullman Incorporated. Method and apparatus for filtration of slurries. 4,017,399, Cl. 210-408.000.

Lorber, Harold; and Duboff, Irving. Magnetically enhanced coaxial cable with improved time delay characteristics. 4,017,344, Cl. 156-52.000.

Lords, James: *See—*
Rozzell, Thomas C.; Johnson, Curtis; Durney, Carl; and Lords, James, 4,016,761.

Lorenz, Hans Peter: *See—*
Sauer, Gerhard; Lorenz, Hans Peter; Eder, Ulrich; Haffer, Gregor; Ruppert, Jurgen; and Wiechert, Rudolf, 4,017,545.

Lorenz, Walter; Hammann, Ingeborg; and Stendel, Wilhelm, to Bayer Aktiengesellschaft. O-alkyl-O-[7-nitrobenzisoxazol(3)yl]-thionophosphoric (phosphonic) acid esters. 4,017,609, Cl. 424-200.000.

Lorkowski, Jonathan L., to Raymond Lee Organization, Inc., The, a part interest. Garden hose coupler. 4,017,103, Cl. 285-155.000.

Los, Marinus, to American Cyanamid Company. Imidazoisoindolediones and the use thereof as herbicidal agents. 4,017,510, Cl. 260-309.600.

Ludwig, Charles H.; and Fiske, Larry B., to Georgia-Pacific Corporation. Cationic bituminous emulsions. 4,017,419, Cl. 252-311.500.

Ludwig, Charles H., to Georgia-Pacific Corporation. Lignin composition and a process for its preparation. 4,017,475, Cl. 260-124.00A.

Lukashov, Anatoly Ivanovich: *See—*
Gorbunov, Boris Nikolaevich; Efremova, Galina Dmitrievna; Kukartsev, Evgeny Maximovich; Erokhina, Lidia Vladimirovna; Lukashov, Anatoly Ivanovich; Orlyansky, Vitaly Vasilievich; Khardin, Alexandr Pavlovich; Churikova, Ideya Antonovna; and Valdman, Daniil Iosifovich, 4,017,518.

Lummus Company, The: *See—*
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Lundback, Bertil: *See—*
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Lundquist, Sven Anders: *See—*
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Luscher, Rene, to Gretag Aktiengesellschaft. Apparatus for sensing notches. 4,017,014, Cl. 226-45.000.

Lux, Helmut: *See—*
Dietzsch, Gunter; Frers, Gerd; Henning, Klaus; and Lux, Helmut, 4,016,964.

Lynch, Thomas, to Xerox Corporation. Document feeding apparatus. 4,017,172, Cl. 355-8.000.

M. H. Sanders et al.: *See—*
Sanders, David H., 4,016,826.

Maas, Hermann; and von Bormann, Georg, to August Thyssen-Hutte AG. Process for hot topping by electro-slag-remelting. 4,016,923, Cl. 164-52.000.

Maatschappij Van Berkel's Patent N.V.: *See—*
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Macander, Rudy F.: *See—*
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MacChesney, John Burnette: *See—*
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Machlett Laboratories, Incorporated, The: *See—*
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Macholdt, Hans: *See—*
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MacKay, Donald B.; Nielson, Brian C.; Henriksen, Dale L.; Billings, Roger Evan; Simons, Harold M.; and Hindmarsh, Paul P., to Billings Energy Research Corporation. Hydride fuel system. 4,016,836, Cl. 123-3.000.

Madison, Theodore N., to Royal Business Machines, Inc. Typewriter jam release mechanism. 4,016,966, Cl. 197-16.000.

Maeda, Kazuyuki: *See—*
Takahashi, Ryohei; Yokomichi, Isao; Maeda, Kazuyuki; and Haga, Takahiro, 4,017,295.

Maffei, Ernest J.; and Patch, David W. Three-part intramedullary bone-setting pin. 4,016,874, Cl. 128-92.0BC.

Magnesital-Feuerfest GmbH: *See—*
Renkey, Albert Lajos; and Engelhardt, Hans-Peter, 4,017,316.

Magone, Raymond L.; and Saaty, Samir N., to Upjohn Company, The. Method of molding articles of polymeric foam substantially free from flashing. 4,017,572, Cl. 264-51.000.

Maher, Francis William, Jr.; and Pirc, Vladimir Valentine, to Perkin-Elmer Corporation, The. Apparatus for blood film preparation. 4,016,828, Cl. 118-6.000.

Maier, Ralph D., to Aluminum Company of America. Method of continuous casting with weighted float-distributor. 4,016,924, Cl. 164-82.000.

Main, Glen A. Canoe portaging kit. 4,016,615, Cl. 9-1.400.

Maisch, Wolfgang, to Robert Bosch G.m.b.H. Short circuit protected electronic control system. 4,017,765, Cl. 361-88.000.

Maizelis, Genrikh Semenovich: *See—*
Lapin, Vladimir Viktorovich; Bulgakov, Boris Sergeevich; Bogoyavlensky, Konstantin Nikolaevich; Rozhdestvensky, Jury Lvovich; Granosky, Simon Pavlovich; Maizelis, Genrikh Semenovich; Lazutin, Vladimir Ivanovich; and Sauskan, Ilya Alexandrovich, 4,016,739.

Majos, Jacques: *See—*
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Maki, Hiroshi: *See—*
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Makio, Toshio: *See—*
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Makushok, Evgeny Markellovich: *See—*
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Malik, Jiri: *See—*
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Maloney-Crawford Tank Corporation: *See—*
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Maloney, James E., to Economics Laboratory, Inc. Liquid phosphatizing composition and use thereof. 4,017,335, Cl. 148-6.15R.

Maly, Neil A.: *See—*
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Manig, Gerd: *See—*
Doge, Klaus; Manig, Gerd; Hentsch, Wolfgang; and Mucke, Johannes, 4,017,206.

Mann, George H., to Corning Glass Works. Process for making multifocal photochromic ophthalmic lens. 4,017,292, Cl. 65-33.000.

Manor, Giora. Temperature differential sensing and control device. 4,017,028, Cl. 237-1.00A.

Manoury, Philippe Michel Jacques: *See—*
Giudicelli, Don Pierre Rene Lucien; Najer, Henry; Manoury, Philippe Michel Jacques; and Dumas, Andre Pierre Fernand, 4,017,623.

Manz, Vernon F.; and Metcalfe, Robert A., to United Technologies Corporation. Conveyor tube for a particulate heating furnace. 4,017,061, Cl. 266-173.000.

Marantette, Ruth B.: *See—*
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Marantette, William F.; and Marantette, Ruth B. High speed drill system. 4,017,203, Cl. 408-240.000.

Marchenko, Alexandr Nikolaevich; and Tjutjunnikov, Anatoly Borisovich. Rotary film evaporating apparatus. 4,017,354, Cl. 159-6.00R.

Marchetti, Joseph R.: *See—*
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Marie, Daniel: *See—*
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Marinoff, George: *See—*
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Marlatt, John W., Sr. Regulator for liquefied petroleum gas systems. 4,016,905, Cl. 137-505.410.

Marquerinck, Joost Egbert: *See—*
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Marsee, Frederick J., to Ethyl Corporation. Fuel induction system. 4,016,845, Cl. 123-122.0AC.

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Marshall and Williams Company: *See—*
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Marsili, Leonardo; Rossetti, Vittorio; and Pasqualucci, Carmine, to Archifar Industrie Chimiche del Trentino S.p.A. Rifamycin compounds. 4,017,481, Cl. 260-239.30P.

Martin, Alfred J.: *See—*
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Martin, Eugene G.; and Martin, Harold C., to Victor F. Weaver, Inc. Poultry cut-up machine. 4,016,624, Cl. 17-11.000.

Martin, Frank E.; Colston, John R.; and Smith, Norman E., to Westinghouse Electric Corporation. Breathing apparatus. 4,016,876, Cl. 128-142.00R.

Martin, Harold C.: *See—*
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Martin, Michel: *See—*
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Maruyama, Isamu; Nakao, Masaru; Sasajima, Kikuo; Inaba, Shigeho; and Yamamoto, Hisao, to Sumitomo Chemical Company, Limited. N-(ω-Amino)alkylaniline derivatives. 4,017,624, Cl. 424-250.000.

Maruyama, Isamu: *See—*
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Maruyama, Tokuji: *See—*
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Maschinenfabrik Buckau R. Wolf Aktiengesellschaft: *See—*
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Maschinenfabrik J. Dieffenbacher & Co.: *See—*
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Mashburn, Douglas N.; Stevens, Richard H.; and Woodall, Harold C., to United States of America, Energy Research and Development Administration. Traversing probe system. 4,016,768, Cl. 74-23.000.

Mason, Burton Hoster. Device for severing underwater cables. 4,016,728, Cl. 61-69.00R.

Mason, Henry Stanford, to H. S. Mason Pty. Limited. Pivotal connection. 4,017,198, Cl. 403-43.000.

Masui, Hiroaki: *See—*
Gondo, Hisashi; Takechi, Hiroshi; Kawano, Tsuyoshi; Masui, Hiroaki; and Kovama, Kazuo, 4,016,740.

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Matsushita Electric Industrial Co., Ltd.: *See—*
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Mattern, John, to Westinghouse Electric Corporation. Four quadrant analog by digital multiplier. 4,017,720, Cl. 235-150.520.

Matzen, Walter T.: *See—*
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Mauell, Helmut. Snap-connectable lattice assembly for electrical-circuit tiles. 4,016,694, Cl. 52-475.000.

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Max Sandherr AG: *See—*
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Maxwell, Charles Stephen. Golf game. 4,017,085, Cl. 273-176.0FA.

May, Donald L.; and Neal, Archie E., to J. E. Love Company. Bat support spider for a harvester reel. 4,016,710, Cl. 56-220.000.

Mayer, John F.: *See—*
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Mayer, Joseph; and Sherlock, Margaret H., to Schering Corporation. Certain 8-amino-1,7-naphthyridines. 4,017,500, Cl. 260-294.80C.

McAfee, John Gilmour: *See—*
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McCabe, Charles W.: *See—*
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McCollum, Anthony W.; and Hagemeyer, Hugh J., Jr., to Eastman Kodak Company. Noncatalyzed aldol reaction. 4,017,537, Cl. 260-494.000.

McCombs, Frank P.: *See—*
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McCullough, John F.; and Sheridan, Richard C., to Tennessee Valley Authority. Production of ammonium polyphosphates from melamine phosphates. 4,017,589, Cl. 423-315.000.

McDonald, James Anthony; and Schatz, Ralph Arthur, to Motorola, Inc. Battery isolator. 4,017,779, Cl. 320-15.000.

McDonald, Michael P.: *See—*
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McHenry, Edgar Ronald: *See—*
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McKay, Glenn E.: *See—*
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McKee, James W., to True Data Corporation. Card transport apparatus. 4,017,068, Cl. 271-275.000.

McLaughlin, Howard B., to Laser Technology, Inc. Wire cutting machine. 4,016,856, Cl. 125-21.000.

McMahon, William Henry, to American Laser Corporation. Switching regulator power supply. 4,017,745, Cl. 307-254.000.

McMullen, William H.; and Andino, Rosemary, to Novo Industri A/S. Production of high purity glucose syrups. 4,017,363, Cl. 195-31.00R.

McWhirt, Bobby Dwayne: *See—*
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Mecone, David W.: *See—*
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Medwin, Herman, to United States of America, Navy. Multi-path signal enhancing apparatus. 4,017,859, Cl. 343-100.0CL.

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Kuwada, Yutaka; Meguro, Kanji; Tawada, Hiroyuki; Sohda, Takashi; Natsugari, Hideaki; and Sato, Yoshiaki, 4,017,620.

Meier, Ernst, to Stopinc Aktiengesellschaft. Closure element for a slide closure and process for the manufacture thereof. 4,017,010, Cl. 222-590.000.

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Baraff, David Robbin; Boynton, Robert James; and Westwood, William Dickson, 4,017,712.

Northrop Corporation: *See—*
Inouye, Sus, 4,016,798.

Nose, Shinji: *See—*
Suzui, Akio; Nose, Shinji; Kodama, Takashi; Yokoyama, Kenji; Matsumoto, Kazuya; and Fujio, Yoshiharu, 4,017,434.

Novak, Arthur F.: *See—*
Bailey, August V.; Boudreaux, Gordon J.; Sumrell, Gene; and Novak, Arthur F., 4,017,522.

Novo Industri A/S: *See—*
McMullen, William H.; and Andino, Rosemary, 4,017,363.

Nowack, Gerhard P.: *See—*
Johnson, Marvin M.; and Nowack, Gerhard P., 4,017,424.

Nozawa, Takamitsu: *See—*
Kishi, Takao; and Nozawa, Takamitsu, 4,017,031.

Nukem G.m.b.H.: *See—*
Hrovat, Milan; Wolff, Willi; and Hackstein, Karl-Gerhard, 4,017,567.

Obradovic, Milan: *See—*
Lenz, Werner; Woellhaf, Josef; Spreng, Klaus; Zuerger, Manfred; Hecke, Paul; Hoffmann, Gerhard; and Obradovic, Milan, 4,017,183.

O'Brien, John B.; Pisanchyn, John; and Colby, S. Robert, to Allied Chemical Corporation. Plant growth regulants. 4,017,301, Cl. 71-118.000.

Obrist, Albert: *See—*
Aichinger, Dietmar; and Obrist, Albert, 4,016,996.

O'Connell, Gerard P., to Baltimore Brushes, Inc., a part interest. Scribing tool. 4,016,802, Cl. 90-12.00R.

O'Connell, Paul W.: *See—*
Lemin, Alan J.; and O'Connell, Paul W., 4,017,630.

O'Connell, Ronald B.; and Prueter, Albert H., Jr., to Goodyear Tire & Rubber Company, The. Molding apparatus. 4,017,239, Cl. 425-175.000.

Ogawa, Akira: *See—*
Kurihara, Hiroshi; Ogawa, Akira; and Hirata, Yasuo, 4,017,684.

Ogawa, Toshio: *See—*
Watanabe, Kazutaka; Shimizu, Misao; Ogawa, Toshio; Sugawara, Akihiro; and Inou, Kiyoharu, 4,017,828.

Ogontz Controls Company: *See—*
Kenny, Thomas M., 4,016,901.

Ohama, Yasumichi: *See—*
Nakano, Soichi; Ohama, Yasumichi; and Watanabe, Masao, 4,016,846.

Ohmori, Sachio, to Nippon Kogaku K.K. Light intercepting device for data photographing cameras. 4,017,874, Cl. 354-108.000.

Ohno, Shigeru; Hoshi, Noboru; and Sekigawa, Fujio, to Shin-Etsu Chemical Company Limited. Preparation of readily disintegrable tablets. 4,017,598, Cl. 424-35.000.

Ohno, Shigeru; Hoshi, Noboru; and Sekigawa, Fujio, to Shin-Etsu Chemical Company Limited. Method for providing enteric coatings on solid dosage forms. 4,017,647, Cl. 427-3.000.

Ohta, Yoshimoto, to Tokico Ltd. Vehicle anti-skid braking device. 4,017,126, Cl. 303-115.000.

Ohtsuka, Yozo, to Sagami Chemical Research Center. Diaminomaleonitrile derivatives and processes for preparing the same. 4,017,533, Cl. 260-465.00E.

Oikarinen, Eino Heikki. Device for the de-airing of a liquid system, preferably a system for hydraulic brakes. 4,016,896, Cl. 137-205.000.

Oka, Hideo: *See—*
Matsushima, Yasunobu; Oka, Hideo; Noji, Katsuyoshi; and Nakagawa, Hiroyoshi, 4,017,334.

Okubo, Ichiro: *See—*
Tsujimoto, Michihiro; Tsukahara, Ryoichi; Torisu, Masaaki; and Okubo, Ichiro, 4,017,509.

Okuda, Naoki; and Tanaka, Kazuo, to Kobe Steel Ltd. Flux for use in submerged arc welding of steel. 4,017,339, Cl. 148-24.000.

Okuhara, Shinji: *See—*
Suzuki, Takaya; Mimura, Akio; Yagyu, Seturo; and Okuhara, Shinji, 4,017,341.

Okuzumi, Yuzi, to Goodyear Tire & Rubber Company, The. High melting N,N-terephthaloyl bis-phthalimide and its use as an ester interlinking agent for polyesters. 4,017,463, Cl. 260-75.00T.

Olah, George Andrew: *See—*
Messina, Giuseppe; Olah, George Andrew; and Moraglia, Riccardo, 4,017,584.

Oldford, William G. Railway loading and unloading system. 4,016,991, Cl. 214-38.00C.

Olinkraft, Inc.: *See—*
Booth, Vernard S., 4,017,019.

Olympus Optical Co., Ltd.: *See—*
Imai, Toshihiro, 4,017,150.
Sato, Masaaki, 4,017,902.

Omoto, Shoji: *See—*
Inouye, Shigeharo; Omoto, Shoji; Iwamatsu, Katsuyoshi; Tsuruoka, Takashi; Niida, Taro; and Kawasaki, Toyoaki, 4,017,607.

Omura, Takaho: *See—*
Osujo, Masahide; Ikegami, Seiiti; Murayama, Yoshinobu; Omura, Takaho; and Morimoto, Tadashi, 4,016,957.

Onder, Besir K., to Upjohn Company, The. Polyamide-imides. 4,017,459, Cl. 260-47.0CP.

Ono, Yuichi; Kurata, Kazuhiro; Kawamura, Masao; Morioka, Makoto; and Ito, Kazuhiro, to Hitachi, Ltd. Light emitting semiconductor device and a method for making the same. 4,017,881, Cl. 357-18.000.

Ono, Yuichi: *See—*
Ito, Kazuhiro; Ono, Yuichi; Ueyanagi, Kiichi; Morioka, Makoto; and Kawamura, Masao, 4,016,829.

Onoe, Katsuhiko; Abe, Masahiro; and Tamura, Masashi, to Glory Kogyo Kabushiki Kaisha. Paper money dispensing apparatus. 4,017,004, Cl. 221-94.000.

Oprandi, Pierre; and Romeas, Rene, to Thomson-Brandt. Method of detecting defects in read out signals, and apparatus for implementing the same. 4,017,895, Cl. 358-127.000.

Ordonez, Emil, to Raymond Lee Organization, Inc., The, a part interest. Combination bed and desk. 4,016,610, Cl. 5-2.00R.

Oriental Sangyo Co., Ltd.: *See—*
Ishida, Nobuhiro; and Saito, Kazuyuki, 4,017,451.

Orlyansky, Vitaly Vasilievich: *See—*
Gorbunov, Boris Nikolaevich; Efremova, Galina Dmitrievna; Kukartsev, Evgeny Maximovich; Erokhina, Lidia Vladimirovna; Lukashov, Anatoly Ivanovich; Orlyansky, Vitaly Vasilievich; Khardin, Alexandr Pavlovich; Churikova, Idéya Antonovna; and Valdman, Daniil Iosifovich, 4,017,518.

Orth, George O.: *See—*
Orth, George O., Jr.; and Orth, Richard D., 4,017,642.

Orth, George O., Jr.; and Orth, Richard D., to Orth, George O. Process of making food for ruminant animals from wood and/or woody products. 4,017,642, Cl. 426-69.000.

Orth, Richard D.: *See—*
Orth, George O., Jr.; and Orth, Richard D., 4,017,642.

Osaka Soda Co., Ltd.: *See—*
Suzui, Akio; Nose, Shinji; Kodama, Takashi; Yokoyama, Kenji; Matsumoto, Kazuya; and Fujio, Yoshiharu, 4,017,434.

Osaka, Tomikazu; and Otsuka, Morihisa, to Fukuvi Chemical Industry Co., Ltd. Drain trough member and its connector. 4,016,727, Cl. 61-11.000.

Osujo, Masahide; Ikegami, Seiiti; Murayama, Yoshinobu; Omura, Takaho; and Morimoto, Tadashi, to Kubota Tekko Co., Ltd. Ball-ramp cam actuated disk brake. 4,016,957, Cl. 188-72.700.

Oswald, Alexis A.; and Valint, Paul L., to Ciba-Geigy AG. O-ethyl-S-n-butyl-O-(2- or 3-nitrophenyl) phosphorothiolates. 4,017,563, Cl. 260-954.000.

Othmer, Donald F. Wet combustion process. 4,017,421, Cl. 252-416.000.

Otsuka, Morihisa: *See—*
Osaka, Tomikazu; and Otsuka, Morihisa, 4,016,727.

Otto, Oberdan W., to Hughes Aircraft Company. Surface acoustic wave notch filter. 4,017,813, Cl. 333-72.000.

Ours, Carroll Wayne: *See—*
Jones, Peter Hadley; Kyncl, Jaroslav; Ours, Carroll Wayne; and Somani, Pitambar, 4,017,636.

Owens-Corning Fiberglas Corporation: *See—*
Foley, Kevin M.; McCombs, Frank P.; and Vigo, Francesco M., 4,017,657.

Owens-Illinois, Inc.: *See—*
Braker, Frederick William; Heckman, Russell William; Nickey, George Allen; and Potter, Terry Clair, 4,016,706.
Chang, Long Fei; and Kontz, Robert F., 4,017,250.
Fein, Michael E.; and Salisbury, Charles W., 4,017,808.
Kalata, Daniel R.; and Huston, Henry H., 4,016,976.
Moan, Kenneth L., 4,016,860.
Rapp, James R., 4,017,317.

Oxy Metal Industries Corporation: *See—*
Matsushima, Yasunobu; Oka, Hideo; Noji, Katsuyoshi; and Nakagawa, Hiroyoshi, 4,017,334.





Oya, Yuichiro: *See—*
Tomono, Masami; Abe, Akira; Harada, Seiki; Sato, Kikuji; Takagi, Takeshi; Kamoshita, Genichi; Oya, Yuichiro; and Saiki, Atsushi, 4,017,886.

P.I.V. Antrieb Werner Reimers Kommanditgesellschaft: *See—*
Berens, Heinrich; and Fule, Stefan, 4,016,771.

Paalman, H. Hunter: *See—*
Carlson, Elwood L.; Gunkler, Albert A.; Miller, Conrad O. M.; and Paalman, H. Hunter, 4,017,120.

Paepke, Horst. Tensioning device for traveling yarns and the like. 4,017,038, Cl. 242-152.100.

Pagano, Joseph F.: *See—*
Bowie, Betty Anne; and Pagano, Joseph F., 4,017,420.

Paitson, John L.: *See—*
Dick, Charles W.; Johnston, Otis A.; Paitson, John L.; and Savit, Carl H., 4,016,951.

Pako Corporation: *See—*
Pone, John, Jr.; Schrupp, Kenneth B.; Gilligan, Patrick J.; Harvey, Ronald B.; and Jensen, Gerald A., 4,017,179.

Pallos, Ferenc M.: *See—*
Lam, Hsiao-Ling; and Pallos, Ferenc M., 4,017,634.

Palmer, William B.: *See—*
Wielang, Joseph A.; Palmer, William B.; and Kerr, William B., 4,017,253.

Palmer, William Earl, to Ingersoll-Rand Company. Condenser contamination removal arrangement. 4,016,927, Cl. 165-70.000.

Palmquist, Steven Robert: *See—*
Jaconetty, George Richard; and Palmquist, Steven Robert, 4,017,695.

Palosi, Eva: *See—*
Hideg, Kalman; Hankovszky, Olga; Palosi, Eva; Hajos, Gyorgy; and Szporny, Laszlo, 4,017,507.

Pan Lei, Peter, to Krommes, Gerd. Apparatus for increasing the ignition voltage of internal combustion engines. 4,016,849, Cl. 123-148.0DC.

Pandel-Bradford, Inc.: *See—*
Lasman, Henry R.; Lebenson, Robert J.; and Wisotzky, Reuben, 4,017,656.

Panush, Sol, to Celanese Coatings & Specialties Company. Transparent pigment dispersion process. 4,017,448, Cl. 260-31.40R.

Papinchak, Michael J.; and Ravasio, Dino, to United States Steel Corporation. Notched-flight feeder screws for briquetting operation. 4,017,241, Cl. 425-237.000.

Paraskos, John A.: *See—*
Bonnell, William S.; Christman, Robert D.; Lasher, Jordan S.; Paraskos, John A.; and Yanik, Stephen J., 4,017,382.

Paredes-Galvan, Ricardo. System and detector for measuring by means of sound the liter weight of the material in satellite coolers for rotative ovens. 4,016,746, Cl. 73-32.00R.

Parker, Roger Alan, to Richardson-Merrell Inc. Hypolipidemic agents. 4,017,514, Cl. 260-332.20G.

Parkins, William E.: *See—*
Barclay, Kenneth M.; Birk, James R.; and Parkins, William E., 4,017,271.

Parks, William E., to Wiremold Company, The. Electrical raceway and receptacle assemblies. 4,017,137, Cl. 339-21.00R.

Pasqualucci, Carmine: *See—*
Marsili, Leonardo; Rossetti, Vittorio; and Pasqualucci, Carmine, 4,017,481.

Passey, Arjun Dev, now by change of name Chand Arjun Passey. Heat pump freeze drying system. 4,016,657, Cl. 34-92.000.

Patch, David W.: *See—*
Maffei, Ernest J.; and Patch, David W., 4,016,874.

Paton, Boris Evgenievich; Lakomsky, Viktor Iosifovich; Torkhov, Gennady Fedorovich; Trigub, Vladimir Kirillovich; Sheiko, Ivan Vasilievich; Verkhovtsev, Emil Vasilievich; Bakumenko, Sergei Panteleevich; Ponomarev, Nikolai Alexeevich; and Kuzmin, Anatoly Alexandrovich. Plasma-arc furnace for remelting metals and alloys. 4,017,672, Cl. 13-2.00P.

Patterson, James W.: *See—*
Soures, Nicholas M.; Patterson, James W.; and Powley, Wayne C., 4,017,067.

Patterson, John F., Jr., to Westinghouse Electric Corporation. Nuclear core inlet flow arrangement. 4,017,357, Cl. 176-61.000.

Paulson, Wesley R., to United States of America, Navy. Event stacker and display device. 4,017,836, Cl. 340-172.000.

Paxton, Lee C. Lock for sliding windows and doors. 4,017,105, Cl. 292-288.000.

Payne, William J., to Modulus Corporation. Temperature indicator. 4,016,762, Cl. 73-358.000.

Pean, Pierre Jean-Louis; Mauroux, Josette Andree; and Rey, Bernard. Union for coupling members. 4,017,196, Cl. 403-2.000.

Pearsall, Thomas J.: *See—*
Karaba, Albert M.; Brouwers, Alexander P.; and Pearsall, Thomas J., 4,016,841.

Pease, Bobbylee; and Simpson, Clark C., to Clark Equipment Company. Cylinder and piston assembly. 4,017,110, Cl. 294-81.0SF.

Pederson, Carl N.; and Angelopoulos, Peter G., to Johnson Service Company. Digital multiplexing system employing remote scanning of a plurality of monitoring points. 4,017,683, Cl. 178-69.100.

Peickert, Wilfried R.: *See—*
Sielaff, Ulrich; and Peickert, Wilfried R., 4,016,864.

Pell, James W., Jr.: *See—*
Fife, Merrill E.; and Pell, James W., Jr., 4,017,824.

Pellation, Ernest C., to Fibreboard Corporation. Carton closure. 4,017,018, Cl. 229-39.00R.

Penard, Herbert F. L.; and Risseeuw, Johannis I., to Comprimo N.V. Process for production of aqueous hypochlorous acid solution. 4,017,592, Cl. 423-473.000.

Penkman, Dave; and Rees, Herbert, to Husky Injection Molding Systems Inc. Mold-clamping mechanism for injection-molding machine. 4,017,236, Cl. 425-150.000.

Pepperman, Armand B., Jr.: *See—*
Daigle, Donald J.; Pepperman, Armand B., Jr.; and Vail, Sidney L., 4,017,462.

Perkin-Elmer Corporation, The: *See—*
Maher, Francis William, Jr.; and Pirc, Vladimir Valentine, 4,016,828.

Permanence Corporation: *See—*
Baum, Charles S., 4,017,480.

Perper, Lloyd J., to Iota Engineering Inc. Power source for fluorescent lamps and the like. 4,017,785, Cl. 321-4.000.

Peterson, Frank C.: *See—*
Heilman, William J.; Peterson, Frank C.; Renz, Mical C.; and Theard, Leslie P., 4,017,453.

Peterson, Robert S., to Westinghouse Electric Corporation. Range control for an automatic gauge control system of a rolling mill. 4,016,735, Cl. 72-9.000.

Peterson, Stig Arvid; and Lundquist, Sven Anders, to Boliden Aktiebolag. Smelting and reduction of oxidic and sulphated lead material. 4,017,308, Cl. 75-77.000.

Petrille, Dennis G., to Standard Oil Company (Indiana). Borontrifluoride recovery from alkyl phenol mixture. 4,017,548, Cl. 260-606.50B.

Pfeiffer, Heinrich: *See—*
Dieffenbacher, Gerhard; and Pfeiffer, Heinrich, 4,017,248.

Pfizer Inc.: *See—*
Kadin, Saul B., 4,017,625.

Pfleiderer, Hans: *See—*
Eisele, Ignaz; Pfleiderer, Hans; and Preuss, Ekkehard, 4,017,884.

Pfluger Apparatebau GmbH & Co. KG: *See—*
Pfluger, Ulrich; and Waterkotte, Klemens, 4,016,929.

Pfluger, Ulrich; and Waterkotte, Klemens, to Pfluger Apparatebau GmbH & Co. KG. Heat-exchanger. 4,016,929, Cl. 165-159.000.

Phillips, David C.: *See—*
Smith, James D. B.; and Phillips, David C., 4,016,745.

Phillips Petroleum Company: *See—*
Bailey, Fay W., 4,017,450.
Doss, Richard C., 4,017,467.
Johnson, Marvin M.; and Nowack, Gerhard P., 4,017,424.
Rion, Pat F., 4,017,446.

Picard, Jean Louis: *See—*
Callens, Paul Raymond; Picard, Jean Louis; and Poulet, Alain Jean, 4,017,688.

Pichey, Paul J. Intersection emergency warning system. 4,017,825, Cl. 340-32.000.

Pichl, Heinz. Device for driving a boat propeller and cooling water pump. 4,016,825, Cl. 115-17.000.

Pien, Hsia-Si, to Consolidated Controls Corporation. Pressure transducer. 4,017,819, Cl. 338-4.000.

Pierson, Joseph E.; and Stookey, Stanley D., to Corning Glass Works. Photosensitive colored glasses. 4,017,318, Cl. 106-52.000.

Pihlaja, Eino. Artificial hand. 4,016,607, Cl. 3-12.000.

Pihlaja, Eino; and Hirvasoja, Risto. Ice fishing device. 4,016,670, Cl. 43-17.000.

Pilcher, Robert Dwayne. Steering converter apparatus. 4,017,094, Cl. 280-404.000.

Pinsonnault, Maurice. Ski harness. 4,017,096, Cl. 280-615.000.

Pinter, Ladislaus: *See—*
Beriger, Ernst; and Pinter, Ladislaus, 4,017,611.

Pipeline Dehydrators, Inc.: *See—*
Powers, Marvin D., 4,016,620.

Pipes, George R., to Eaton Corporation. Shuttle assembly for a load handling apparatus. 4,016,984, Cl. 214-1.0BB.

Pirc, Vladimir Valentine: *See—*
Maher, Francis William, Jr.; and Pirc, Vladimir Valentine, 4,016,828.

Pirotte, Franz Lucien Ghislain, to U.S. Philips Corporation. Method of making a resistor. 4,016,646, Cl. 29-613.000.

Pisanchyn, John: *See—*
O'Brien, John B.; Pisanchyn, John; and Colby, S. Robert, 4,017,301.

Placontrol, Inc.: *See—*
Chodorow, Ingram S., 4,016,892.

Plastipak Packaging: *See—*
Frazer, John S., 4,016,995.

Plate, John R.; and Heisig, Charles P., to Allis-Chalmers Corporation. Hydrostatic load sensitive regenerative steering system. 4,016,949, Cl. 180-160.000.

Poehlein, Raymond E., to Xerox Corporation. Transfer-fusing speed compensation. 4,017,065, Cl. 271-80.000.

Pohto, Gerald R., to Diamond Shamrock Corporation. Bipolar electrode for an electrolytic cell. 4,017,375, Cl. 204-255.000.

Polansky, Robert G.: *See—*
Wallis, David E., Jr.; Polansky, Robert G.; and Rahm, Peter R., 4,016,942.

Polaroid Corporation: *See—*
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Shenk, Edwin K.; and Muggli, Juerg, 4,017,873.

Polhemus Navigation Sciences, Inc.: *See—*
Kuipers, Jack, 4,017,858.

Pollet, Robert Joseph: *See—*
De Cat, Arthur Henri; Danckaert, Valere Frans; Sels, Francis Jeanne; and Pollet, Robert Joseph, 4,017,473.
Pommerening, Uwe A.: *See—*
Richards, Glenn L.; and Pommerening, Uwe A., 4,017,689.
Pond, David Martin, to Eastman Kodak Company. Benzoxazole ultraviolet stabilizers and their use in organic compositions. 4,017,508, Cl. 260-307.00D.
Pone, John, Jr.; Schrupp, Kenneth B.; Gilligan, Patrick J.; Harvey, Ronald B.; and Jensen, Gerald A., to Pako Corporation. Automatic density control. 4,017,179, Cl. 355-68.000.
Ponomarev, Nikolai Alexeevich: *See—*
Paton, Boris Evgenievich; Lakomsky, Viktor Iosifovich; Torkhov, Gennady Fedorovich; Trigub, Vladimir Kirillovich; Sheiko, Ivan Vasilievich; Verkhovtsev, Emil Vasilievich; Bakumenko, Sergei Panteleevich; Ponomarev, Nikolai Alexeevich; and Kuzmin, Anatoly Alexandrovich, 4,017,672.
Porter, Allan William Henry, to Aktiengesellschaft Adolph Saurer. Device for fastening the reed to the slay of a loom. 4,016,909, Cl. 139-188.00R.
Porter, Arthur Paul; Morris, James William; and Gasson, Roy Alfred George, to Redifon Limited. Video ground-based flight simulation apparatus. 4,016,658, Cl. 35-12.00N.
Poschadel, Werner: *See—*
Wimmer, Leopold; Hofgen, Gunter; and Poschadel, Werner, 4,017,861.
Potter, Terry Clair: *See—*
Braker, Frederick William; Heckman, Russell William; Nickey, George Allen; and Potter, Terry Clair, 4,016,706.
Poulet, Alain Jean: *See—*
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Powell Electrical Manufacturing Company: *See—*
Gilbert, Donald Edmond, 4,017,832.
Power Parts Company: *See—*
Sasgen, Peter J., 4,017,136.
Powers, Marvin D., to Pipeline Dehydrators, Inc. Pipeline cleaning pig. 4,016,620, Cl. 15-104.06R.
Powers, Robert H., to Itek Corporation. Device for preventing fogging of film within a camera back. 4,017,877, Cl. 354-277.000.
Powley, Wayne C.: *See—*
Soures, Nicholas M.; Patterson, James W.; and Powley, Wayne C., 4,017,067.
PPG Industries, Inc.: *See—*
Brand, Jay J., 4,016,969.
DeMajistre, Robert, 4,017,649.
Gillery, Frank H., 4,017,661.
Gruber, Gerald W., 4,017,652.
Jensen, Thomas H., 4,017,287.
Jerabek, Robert D.; Marchetti, Joseph R.; and Zwack, Robert R., 4,017,438.
Milam, Joseph E.; and Carlson, Gordon A., 4,017,551.
Prazska akumulatorka, narodni podnik: *See—*
Sandera, Josef; Calabek, Milan; Kouril, Oldrich; Cenek, Miroslav; Vanacek, Josef; Malik, Jiri; and Koudelka, Vojtech, 4,017,665.
Precision Metalsmiths, Inc.: *See—*
Simmons, John H.; and Daugherty, Donald A., 4,016,922.
Presco International, Inc.: *See—*
Sandnes, Edward S., 4,017,111.
Press, Henry. Combined reamer and screwdriver. 4,016,614, Cl. 7-14.10R.
Pressman, Gerald L.; and Casanova, John V., to Electroprint, Inc. Electrostatic line printer. 4,016,813, Cl. 101-426.000.
Presto Products, Incorporated: *See—*
Schwarz, Eckhard C. A., 4,017,452.
Preuss, Ekkehard: *See—*
Eisele, Ignaz; Pfleiderer, Hans; and Preuss, Ekkehard, 4,017,884.
Pricemaster Ltd.: *See—*
Thomas, James Ernest, 4,017,350.
Prigge, Helmut: *See—*
Deinhammer, Wolfgang; Vulic, Marco; Wick, Manfred; and Prigge, Helmut, 4,017,613.
Priola, Aldo: *See—*
Cesca, Sebastiano; Priola, Aldo; and Ferraris, Giuseppe, 4,017,553.
Prochazka, Svante: *See—*
Greskovich, Charles D.; and Prochazka, Svante, 4,017,319.
Procter & Gamble Company, The: *See—*
Bradley, William Jack, 4,017,412.
Demessemaekers, Emiel Mathilde Anna Alfons; Bognolo, Guido; and Spadini, Gianfranco Luigi, 4,017,409.
Diehl, Francis Louvaine; Marsan, Mario Stephen; and Edwards, James Byrd, 4,017,411.
DiGiulio, David Neil, 4,017,641.
Proctor, David, to United States of America, Navy. Mode-launcher for simulated waveguide. 4,017,864, Cl. 343-767.000.
Provost, Philip J.: *See—*
Hilleman, Maurice R.; Miller, William J.; and Provost, Philip J., 4,017,601.
Prueter, Albert H., Jr.: *See—*
O'Connell, Ronald B.; and Prueter, Albert H., Jr., 4,017,239.
Przirembel, Hans Rainer, to United Technologies Corporation. Turbomachinery vane or blade with cooled platforms. 4,017,213, Cl. 416-97.00A.
Psaar, Hubertus: *See—*
Brack, Alfred; and Psaar, Hubertus, 4,017,484.
PSC Technology, Inc.: *See—*
Wohlrab, Hans Chr., 4,017,178.
Pucel, Robert A.; and Benjamin, James A., to Raytheon Company. Overlay metallization field effect transistor. 4,016,643, Cl. 29-571.000.
Puchko, Alexandr Vladimirovich; Klushin, Valery Alexandrovich; Andreev, Georgy Vasilievich; Gorbunov, Eduard Matveevich; Makushok, Evgeny Markellovich; Schukin, Valery Yakovlevich; and Segal, Vladimir Mironovich. Traverse wedge forming machine. 4,016,738, Cl. 72-90.000.
Puchosic, John Edward, to Johns-Manville Corporation. Method of vacuum packaging compressible materials and apparatus. 4,016,707, Cl. 53-24.000.
Pugliese, Antonio, to Shap, Inc. Seam folding and pressing attachment for sewing machines. 4,016,822, Cl. 112-217.000.
Pullman Incorporated: *See—*
Lopker, Edwin B., 4,017,399.
Purcell, Bruce K.: *See—*
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Q-Panel Company: *See—*
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Quaker Oats Company, The: *See—*
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Quinn, Daniel G.: *See—*
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Quirk, James F., to Westinghouse Electric Corporation. Technique for compression sealing electrical conductors in a right circular cylinder resin casting. 4,017,568, Cl. 264-27.000.
R B Toy Development Co.: *See—*
Kupperman, Sam; and Kupperman, Dennis I., 4,016,891.
R. T. Vanderbilt Company, Inc.: *See—*
Beadle, Howard C.; and Brooks, Lester A., 4,017,439.
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Radev, Hristo Kirilov, to VMEI "Lenin" -NIS. Method of and apparatus for checking the cylindricity of a test surface. 4,016,747, Cl. 73-37.900.
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Aas, Flemming; and Jensen, Ole Dollerup, 4,017,374.
Raetzel, Charlotte; and Tihanyi, Jenoe, to Siemens Aktiengesellschaft. Integrated circuits and method of producing the same. 4,017,769, Cl. 361-419.000.
Rahm, Peter R.: *See—*
Wallis, David E., Jr.; Polansky, Robert G.; and Rahm, Peter R., 4,016,942.
Raitport, Eli. Spray container. 4,017,008, Cl. 222-94.000.
Ralph M. Parsons Company: *See—*
Beavon, David K., 4,017,383.
Ralston Purina Company: *See—*
Hoer, Ralph A.; and Stewart, Michael H., 4,017,646.
Ralston, Robert A.: *See—*
Gordon, John Edson; and Ralston, Robert A., 4,017,501.
Randolph, Richard D. System for verifying credit status. 4,017,835, Cl. 340-152.00R.
Ranzanigo, Pierluigi, to Bassani Ticino S.p.A. Fuse strips. 4,017,817, Cl. 337-290.000.
Rapp, James R., to Owens-Illinois, Inc. Glass-ceramics and process for making same. 4,017,317, Cl. 106-39.600.
Rauth, Peter: *See—*
Grosse-Wortmann, Hans; Hentschel, Bernhard; Rauth, Peter; Schoenberg, Karl-Heinz; Terwiesch, Bernd; and Winter, Hermann, 4,017,445.
Ravagnani, Frederick Joseph, to Firestone Tire & Rubber Company, The. Tire ply steer control. 4,016,916, Cl. 152-361.00R.
Ravasio, Dino: *See—*
Papinchak, Michael J.; and Ravasio, Dino, 4,017,241.
Rawstron, William W., to Jamesbury Corporation. Tank bottom internal valve housing. 4,016,907, Cl. 137-797.000.
Ray, Homer A., Jr., to Continental Electronics Manufacturing Co. Log sequential antennas. 4,017,866, Cl. 343-792.500.
Ray, Ronald C., to Tech Serv Inc. Modular animal cage. 4,016,833, Cl. 119-17.000.
Rayburn, Charles Calvin, to Illinois Tool Works Inc. Thermal switch device and method of making. 4,017,818, Cl. 337-403.000.
Raychem Corporation: *See—*
Whitney, Wells; and Horsma, David August, 4,017,715.
Raygo Wagner, Inc.: *See—*
Larsen, Richard L.; and Robnett, James J., 4,016,992.
Raymond Lee Organization, Inc., The: *See—*
Barry, Samuel M., 4,017,386.
Levesque, Alston L., 4,016,875.
Lorkowski, Jonathan L., 4,017,103.
Ordonez, Emil, 4,016,610.
Raytheon Company: *See—*
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Pucel, Robert A.; and Benjamin, James A., 4,016,643.
RCA Corporation: *See—*
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Baker, Alfred Lynn, 4,017,678.



Briggs, George Roland, 4,017,741.
Kannam, Peter Joseph; and Bennett, Wilfred Potter, 4,017,882.
Kaplan, Gerald Stanley; and Ritzie, Andrew David, 4,017,719.
Sheng, Abel Ching Nam, 4,017,747.
Staebler, David Lloyd, 4,017,144.
Woodward, Oakley McDonald, 4,017,865.
Reavis, Robert Philmore, Jr.; and Soderstrom, Melvin Andrew, to AMP Incorporated. Wire-in-slot electrical connections. 4,017,140, Cl. 339-98.000.
Redifon Limited: *See—*
Porter, Arthur Paul; Morris, James William; and Gasson, Roy Alfred George, 4,016,658.
Redlake Corporation: *See—*
Toombs, Harold G.; and Sullivan, Royce R., 4,017,898.
Reed, Dale H.; and Hardison, Jack E., to Atlantic Richfield Company. Marine gas exploder. 4,016,952, Cl. 181-118.000.
Reed Tool Company: *See—*
Wohlfeld, William I., 4,016,944.
Rees, Herbert: *See—*
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Reese, Richard G., to Combustion Power Company, Inc. Method and apparatus for removing finely divided solids from gas. 4,017,278, Cl. 55-96.000.
Reeves, Adam A. Stack gas treatment. 4,017,586, Cl. 423-242.000.
Rege, James R.: *See—*
White, James F.; and Rege, James R., 4,017,423.
Regie Nationale des Usines Renault: *See—*
Galas, Jacques; and Marie, Daniel, 4,016,773.
Reichenberger, Helmut, to Siemens Aktiengesellschaft. Signal collector system. 4,016,869, Cl. 128-2.10E.
Reighter, David H., to I-T-E Imperial Corporation. Void free electrical cement-concrete. 4,017,321, Cl. 106-98.000.
Reiling, Victor G.: *See—*
Freed, Jacob B.; and Reiling, Victor G., 4,017,576.
Reimann, Hans, to Schering Corporation. Novel monoesters of rosamicin. 4,017,516, Cl. 260-343.000.
Remer, Robert K., to Hull-Smith Chemicals, Inc. Pigment composition. 4,017,325, Cl. 106-288.00Q.
Remington Arms Company, Inc.: *See—*
Elliott, Vincent R., 4,016,757.
Renkey, Albert Lajos; and Engelhardt, Hans-Peter, to Magnesital-Feuerfest GmbH. Fireproof stamping mass for tap spouts and flues in blast furnaces. 4,017,316, Cl. 106-15.0FP.
Renz, Mical C.: *See—*
Heilman, William J.; Peterson, Frank C.; Renz, Mical C.; and Theard, Leslie P., 4,017,453.
Research Corporation: *See—*
Glasser, Wolfgang Gerhard; and Hsu, Oscar Hsien-Hsiang, 4,017,474.
Loberg, Michael Dewey; Callery, Patrick Stephen; and Cooper, Malcolm, 4,017,596.
Murray, David George; and Somerset, James Henry, 4,016,606.
Subramanian, Gopal; and McAfee, John Gilmour, 4,017,595.
Resnick, Charles; and Zant, Fred, to Lesney Products Corporation. Miniature toy vehicle launcher for launching a toy vehicle under the influence of gravity. 4,016,674, Cl. 46-202.000.
Ressa, Rick P. Threading device. 4,017,011, Cl. 223-102.000.
Revlon, Inc.: *See—*
Smiley, Alan Michael, 4,016,888.
Rey, Bernard: *See—*
Pean, Pierre Jean-Louis; Mauroux, Josette Andree; and Rey, Bernard, 4,017,196.
Reynolds, John H., to Monsanto Company. Unitized solid phase immunoassay kit and method. 4,017,597, Cl. 424-1.500.
Rhone-Poulenc-Textile: *See—*
Barbey, Jacques, 4,017,580.
Guillermin, Rene; Joly, Jean; and Sangalli, Sylvio, 4,016,626.
Riat, Henri: *See—*
Hegar, Gert; and Riat, Henri, 4,017,477.
Riccio, Pasquale R., to Ciba-Geigy Corporation. Single dose air pressure operated dispenser. 4,017,007, Cl. 222-80.000.
Rice, Edwin Eugene, to Ingersoll-Rand Company. Method for fastener tensioning. 4,016,938, Cl. 173-1.000.
Rice, John H., to United States of America, Navy. Temperature compensated, high resolution pressure transducer based on capacitance change principles. 4,016,764, Cl. 73-398.00C.
Rice, Warren A.; Vinton, Clarence S.; and Norris, Hugh Richard, to Chemotronics International, Inc. Method of producing three dimensional skeletal structures. 4,017,570, Cl. 264-42.000.
Rice, Warren A.; Vinton, Clarence S.; and Norris, Hugh Richard, to Chemotronics International, Inc. Method of producing three dimensional skeletal structures. 4,017,571, Cl. 264-42.000.
Richard, Laurey J.: *See—*
Brown, Roger S.; Shepard, Charles L.; and Richard, Laurey J., 4,016,629.
Richards, Glenn L.; and Pommerening, Uwe A., to Stromberg-Carlson Corporation. Digit analysis system for private automatic branch exchange telephone system. 4,017,689, Cl. 179-18.0EB.
Richardson, Cletus. Structural members for panel wall and glazing systems. 4,016,690, Cl. 52-238.000.
Richardson, David A.; and Robinson, Robert J., to Foxboro Company, The. Positioning device using negative spring-rate tensioning means. 4,016,721, Cl. 60-528.000.
Richardson-Merrell Inc.: *See—*
Parker, Roger Alan, 4,017,514.
Richter Gedeon Vegyeszeti Gyar Rt.: *See—*
Hideg, Kalman; Hankovszky, Olga; Palosi, Eva; Hajos, Gyorgy; and Szporny, Laszlo, 4,017,507.
Riedel, Ronald J., to Hewlett-Packard Company. Low frequency triangular waveform generator. 4,017,801, Cl. 328-35.000.
Rion, Pat F., to Phillips Petroleum Company. Frictionally stable emulsions. 4,017,446, Cl. 260-29.7GP.
Rioux, Jacques E.; Turp, Gerald; and Jacques, Francois, to Centre de Recherche Industrielle du Quebec. Instrument for use in laparoscopic tubal cauterization. 4,016,881, Cl. 128-303.170.
Riseman, Jacob: *See—*
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Risseeuw, Johannis I.: *See—*
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Ro, Rolland Shin-Yuan: *See—*
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Robbins, Daniel H., to Itek Corporation. Photosensitive material positioning system. 4,017,182, Cl. 355-74.000.
Robert Bosch G.m.b.H.: *See—*
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Maisch, Wolfgang, 4,017,765.
Roberto, Francisco Q.: *See—*
Geisler, Robert L.; Crelier, Arnold M.; and Roberto, Francisco Q., 4,017,342.
Roberts, Goodwin N. Table baseball game. 4,017,074, Cl. 273-89.000.
Robertshaw Controls Company: *See—*
Bible, Harley V., 4,016,853.
Bible, Harley V.; and Moon, William T., Jr., 4,017,054.
Koch, Erich O., 4,017,778.
Robinson, Charles C., to American Optical Corporation. Mold for casting contact lenses utilizing and electron beam to polymerize the resin lens. 4,017,238, Cl. 425-174.600.
Robinson, Charles J.: *See—*
English, William A.; and Robinson, Charles J., 4,017,286.
Robinson, Robert J.: *See—*
Richardson, David A.; and Robinson, Robert J., 4,016,721.
Robnett, James J.: *See—*
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Robugen GmbH, Pharmazeutische Fabrik: *See—*
Gauri, Kailash Kumar, 4,017,626.
Roche, Bernard G.; Majos, Jacques; and Lardy, Jean-Louis A. Synthesizer of multifrequency code signals. 4,017,693, Cl. 179-84.0VF.
Rockwell International Corporation: *See—*
Barclay, Kenneth M.; Birk, James R.; and Parkins, William E., 4,017,271.
Tannas, Lawrence E., Jr., 4,017,848.
Yoak, Gene A.; and McKay, Glenn E., 4,016,958.
Zavodny, Eugene N., 4,016,811.
Roe, Norman P.; and Brown, Gordon W., to Consolidated Products Corporation. Method for forming a sheathed electrical cable. 4,017,579, Cl. 264-174.000.
Roen, Stephen A., to Litton Business Systems, Inc. Solar powered portable calculator. 4,017,725, Cl. 235-152.000.
Roffler, Josua, to Sulzer Brothers Limited. Vessel for conveying a liquid/gas mixture. 4,016,997, Cl. 220-10.000.
Rogall, Eugene W.: *See—*
Hsieh, Paul Y.; and Rogall, Eugene W., 4,017,366.
Roger & Gallet: *See—*
Cazorla, Jean; and Tillon, Yves, 4,017,602.
Rogers, Bruce J., to Sperry Rand Corporation. Phase locked oscillator. 4,017,806, Cl. 331-1.00A.
Rogers, Delmar R., to United Steel Products Co. Bracing for stud walls. 4,016,698, Cl. 52-656.000.
Rogers, Edward F.; Ashton, Wallace T.; and Dybas, Richard A., to Merck & Co., Inc. 1-(n-Octylthiocarbonyl)-2-(4-thiazolyl)benzimidazole. 4,017,505, Cl. 260-302.00H.
Rogers, Edward F.: *See—*
Ashton, Wallace T.; and Rogers, Edward F., 4,017,503.
Ashton, Wallace T.; and Rogers, Edward F., 4,017,504.
Rohe, Lothar; Schramm, Jurgen; Klauke, Erich; Eue, Ludwig; and Schmidt, Robert Rudolf, to Bayer Aktiengesellschaft. Halogenated 4-trifluoromethyl-diphenyl-ether herbicidal compositions. 4,017,300, Cl. 71-98.000.
Rohm and Haas Company: *See—*
Gehman, David R.; and Fiarman, Irwin S., 4,017,662.
Killam, H. Scott, 4,017,440.
Rolleberg, Kjell Ove: *See—*
Assow, Bengt Holger; and Rolleberg, Kjell Ove, 4,017,783.
Rolls-Royce (1971) Limited: *See—*
Bell, John Kenneth Alexander; and Fuller, John Rodney Dyson, 4,017,207.
Romeas, Rene: *See—*
Oprandi, Pierre; and Romeas, Rene, 4,017,895.
Romrell, Delwin M., to United States of America, Energy Research and Development Administration. Circuit for measuring time differences among events. 4,017,794, Cl. 324-78.00D.
Roosild, Sven A.: *See—*
Davies, D. Eirug; Roosild, Sven A.; and Dolan, Russell P., Jr., 4,017,887.
Rosemount Inc.: *See—*
Grindheim, Earl A., 4,016,763.
Rosenau, Gordon G. Fishing rod holder apparatus. 4,017,050, Cl. 248-534.000.

Rosenthal, Robert D., to Neotec Corporation. Optical analysis of biomedical specimens. 4,017,192, Cl. 356-201.000.

Rosing, George Leonard, to General Telephone Company of California. Guard circuit for ground start telephone equipment. 4,017,690, Cl. 179-18.0AH.

Ross, Bernd, to Illinois Tool Works Inc. Humidity sensor with multiple electrode layers separated by a porous monolithic ceramic dielectric structure. 4,017,820, Cl. 338-35.000.

Ross, Gerald Fred, to Sperry Rand Corporation. Apparatus for angular measurement and beam forming with baseband radar systems. 4,017,854, Cl. 343-16.00R.

Ross, Henry M. Water purification system utilizing ultraviolet radiation. 4,017,734, Cl. 250-431.000.

Ross, Henry M. Air purification system utilizing ultraviolet radiation. 4,017,736, Cl. 250-435.000.

Rossetti, Vittorio: *See—*
Marsili, Leonardo; Rossetti, Vittorio; and Pasqualucci, Carmine, 4,017,481.

Rossi, Arlene M. Dolbin, executor: *See—*
Gerrity, Robert John; Wandrey, Clarence Dwight; and Dolbin, Benjamin Howard, deceased, 4,017,718.

Roteman, Robert, to Abbott Laboratories. Method for making aminoacid amides. 4,017,513, Cl. 260-326.200.

Rouam, Jean Simon Rene, to Societe d'Etudes de Machines Thermiques. Safety control method and device for limiting the temperature of a fluid to a given upper value. 4,016,851, Cl. 123-198.00D.

Rouquaud, Richard: *See—*
Lenglin, Thierry; Lissillour, Albert; Desaunay, Jean-Louis; Le Corvec, Robert; Simonneau, Robert; and Rouquaud, Richard, 4,017,134.

Rovac Corporation, The: *See—*
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Royal Business Machines, Inc.: *See—*
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Rozzell, Thomas C.; Johnson, Curtis; Durney, Carl; and Lords, James, to United States of America, Navy. Optical temperature probe. 4,016,761, Cl. 73-356.000.

Rubbermaid Incorporated: *See—*
Nelson, Robert F., 4,017,240.

Rubino, Andrew M., to Armour Pharmaceutical Company. Aluminum-zirconium anti-perspirant systems with salts of amino acids. 4,017,599, Cl. 424-47.000.

Runciman, Herbert Morrison, to Barr and Stroud Limited. Radiation scanning system. 4,017,732, Cl. 250-334.000.

Ruppert, Jurgen: *See—*
Sauer, Gerhard; Lorenz, Hans Peter; Eder, Ulrich; Haffer, Gregor; Ruppert, Jurgen; and Wiechert, Rudolf, 4,017,545.

Rusbach, Maurice, to Sarmac S.A. Portable firearm with a retractable barrel. 4,016,800, Cl. 89-177.000.

Rusch, William T., to United States of America, Navy. Bearing determining apparatus including single channel multiplexing. 4,017,822, Cl. 340-2.000.

Rusco Industries, Inc.: *See—*
Ellefson, Clarence L., deceased, 4,016,679.

Russell, Peter B.: *See—*
Yardley, John P.; and Russell, Peter B., 4,017,637.

Ryan, Mark D.: *See—*
Kilian, Thomas M.; and Ryan, Mark D., 4,017,845.

Rychlik, Frank J. Inertia fuel separator and vaporizer. 4,016,847, Cl. 123-122.0AA.

Ryer, Jack: *See—*
Brois, Stanley J.; Ryer, Jack; and Winans, Esther, 4,017,406.

Ryzhkov, Nikolai Stepanovich; Nikolaev, Viktor Petrovich; Krylov, Viktor Alexeevich; Ioffe, Leonid Yakovlevich; Krotov, Veniamin Vasilievich; and Derzhavets, Jury Adolfovich. Ship reduction gear for contrarotating screws. 4,016,777, Cl. 74-665.00K.

S.T. Dupont: *See—*
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Saaty, Samir N.: *See—*
Magone, Raymond L.; and Saaty, Samir N., 4,017,572.

Sagami Chemical Research Center: *See—*
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Saifer, Mark G.: *See—*
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Saiki, Atsushi: *See—*
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St-Amour, Lionel. Screwdriver for slotted head screw. 4,016,912, Cl. 145-50.00A.

St. John, Richard C., to Aspro, Incorporated. Centrifugal clutch construction. 4,016,963, Cl. 192-105.0BA.

St. John, Richard C.: *See—*
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Saito, Kazuyuki: *See—*
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Sakamaki, Hisashi: *See—*
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Sakamoto, Yoshio: *See—*
Seki, Kunio; Suzuki, Yukio; and Sakamoto, Yoshio, 4,017,749.

Sakota, Mitsushi. Signboard using marcromolecular elastomer having adhesive layer. 4,016,665, Cl. 40-135.000.

Salazar, Charles. Strike plate for spring bolt door latches. 4,017,106, Cl. 292-340.000.

Salisbury, Charles W.: *See—*
Fein, Michael E.; and Salisbury, Charles W., 4,017,808.

Salmon, Michel: *See—*
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Sand, Leonard B.: *See—*
Cormier, William E.; and Sand, Leonard B., 4,017,590.

Sander, Nils Borje Lennart: *See—*
Anderberg, Paul-Henry Botvid; Hambitzer, Hans Gunnar Gunther; and Sander, Nils Borje Lennart, 4,016,755.

Sandera, Josef; Calabek, Milan; Kouril, Oldrich; Cenek, Miroslav; Vanacek, Josef; Malik, Jiri; and Koudelka, Vojtech, to Prazska akumulatorka, narodni podnik. Composition for a zinc electrode. 4,017,665, Cl. 429-229.000.

Sanders, David E.: *See—*
Gordy, Robert S.; Anderson, Alfred T.; and Sanders, David E., 4,017,798.

Sanders, David H., to M. H. Sanders et al. Water spider. 4,016,826, Cl. 115-26.000.

Sanders, William H. Hand-size fluid-powered tool reciprocator. 4,016,941, Cl. 173-170.000.

Sandnes, Edward S., to Presco International, Inc. Safety hook. 4,017,111, Cl. 294-82.00R.

Sando Iron Works Co., Ltd.: *See—*
Sando, Yoshikazu; Ishidoshiro, Hiroshi; and Minakata, Matsuo, 4,017,258.

Sando, Yoshikazu; Ishidoshiro, Hiroshi; and Minakata, Matsuo, to Sando Iron Works Co., Ltd. Method of forming a pressure seal employing an air-balance in a high pressure steamer. 4,017,258, Cl. 8-149.300.

Sandoz, Inc.: *See—*
Bruner, James D., 4,016,885.
Hardtmann, Goetz E.; and Coppola, Gary M., 4,017,499.

Sandoz Ltd.: *See—*
Dore, Jacky, 4,017,478.

Sanford, Steve Douglas; Chenoweth, Vaughn Charles; and Faulkner, Duane Harold, to Johns-Manville Corporation. Furnace outlet. 4,017,294, Cl. 65-326.000.

Sangalli, Sylvio: *See—*
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Sanka, Tsugio: *See—*
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Sankyo Company Limited: *See—*
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Sanno, Yasushi: *See—*
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Sanyo Electric Co., Ltd.: *See—*
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Saori, Hideo: *See—*
Iida, Tetsuya; Saori, Hideo; Inoguchi, Masao; and Tominaga, Hiroo, 4,017,379.

Sardos, Rene, to Agence Nationale de Valorisation de la Recherche (ANVAR). Polarization analyzers and duplexers. 4,017,153, Cl. 350-152.000.

Sarmac S.A.: *See—*
Rusbach, Maurice, 4,016,800.

Sasajima, Kikuo: *See—*
Maruyama, Isamu; Nakao, Masaru; Sasajima, Kikuo; Inaba, Shigeho; and Yamamoto, Hisao, 4,017,624.

Sasgen, Peter J., to Power Parts Company. Permanent tri-headed jumper cable for locomotives. 4,017,136, Cl. 339-28.000.

Sato, Haruyoshi: *See—*
Ishii, Kanji; and Sato, Haruyoshi, 4,017,733.

Sato, Hideo: *See—*
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Sato, Kikuji: *See—*
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Sato, Masaaki, to Olympus Optical Co., Ltd. Cassette ejector for tape recorder. 4,017,902, Cl. 360-137.000.

Sato, Yoshiaki: *See—*
Kuwada, Yutaka; Meguro, Kanji; Tawada, Hiroyuki; Sohda, Takashi; Natsugari, Hideaki; and Sato, Yoshiaki, 4,017,620.

Satron, Inc.: *See—*
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Sauer, George E., to General Electric Company. Impulse voltage distribution improving partial-turn electrostatic shields for disc windings. 4,017,815, Cl. 336-70.000.

Sauer, Gerhard; Lorenz, Hans Peter; Eder, Ulrich; Haffer, Gregor; Ruppert, Jurgen; and Wiechert, Rudolf, to Schering Aktiengesellschaft. Process for the preparation of bicycloalkane derivatives. 4,017,545, Cl. 260-590.0FA.

Saunders, William T., to National Steel Corporation. Ironing container stock manufacturing method. 4,017,367, Cl. 204-28.000.

Sauskan, Ilya Alexandrovich: *See—*
Lapin, Vladimir Viktorovich; Bulgakov, Boris Sergeevich; Bogoyavlensky, Konstantin Nikolaevich; Rozhdestvensky, Jury Lvovich; Granosky, Simon Pavlovich; Maizelis, Genrikh Semenovich; Lazutin, Vladimir Ivanovich; and Sauskan, Ilya Alexandrovich, 4,016,739.

Savit, Carl H.: *See—*
Dick, Charles W.; Johnston, Otis A.; Paitson, John L.; and Savit, Carl H., 4,016,951.

Sawatari, Takeo, to Bendix Corporation, The. Surface profile measuring device and method. 4,017,188, Cl. 356-120.000.

Sawyer, Webster M.: *See—*
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Schade, Harvey R. Oil filter. 4,017,400, Cl. 210-439.000.

Schaefer Equipment Company: *See—*
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Schaffner, Heinz: *See—*
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Schank, Richard L.; and Crystal, Richard G., to Xerox Corporation. Planographic printing master. 4,016,814, Cl. 101-467.000.

Schatz, Ralph Arthur: *See—*
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Schaub, Robert Eugene; Floyd, Middleton Brawner, Jr.; and Weiss, Martin Joseph, to American Cyanamid Company. 16-Fluoro-11-deoxy-13-dihydro-prostaglandin. 4,017,534, Cl. 260-468.00D.

Schellenberg, Walter, to Max Sandherr AG. Box and method of covering a box edge. 4,016,807, Cl. 93-39.00C.

Schenk, Wolfgang: *See—*
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Schenker, Karl: *See—*
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Schermesser, Andre, to Compagnie Generale d'Electricite. Device for triggering the discharge of flash tubes. 4,017,763, Cl. 315-240.000.

Schick-Kalb, Jurgen: *See—*
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Schiff, Peter. Electronic synchronizer-monitor system for controlling the timing of mechanical assistance and pacing of the heart. 4,016,871, Cl. 128-2.06R.

Schild, Kasimir W.; Fleming, Richard D.; and Harrington, Phil R., to GTE Automatic Electric Laboratories Incorporated. Method and apparatus for protecting memory storage location accesses. 4,017,840, Cl. 340-172.500.

Schlogl, Gunter: *See—*
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Schmidt, Franz; Fahrbach, Gerhard; Schenk, Wolfgang; and Seiler, Erhard, to BASF Aktiengesellschaft. Thermoplastic molding compositions of high impact resistance. 4,017,558, Cl. 260-876.00B.

Schmidt, Gerhard, to Siemens Aktiengesellschaft. Circuit assembly as for a T-element. 4,017,821, Cl. 338-95.000.

Schmidt, Robert Rudolf: *See—*
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Schmidt, Willi Johann, to Hoechst Aktiengesellschaft. Apparatus for increasing the production output of stretched flat film webs composed of thermoplastic material. 4,017,227, Cl. 425-66.000.

Schminke, Wolfgang; Stolting, Klaus; Macholdt, Hans; and Kunkler, Hans, to Hoechst Aktiengesellschaft. Process for the continuous manufacture of cellulose glycolate. 4,017,671, Cl. 536-98.000.

Schneehage, Hans Henning: *See—*
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Schneider, Kurt: *See—*
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Schneider, Raymond P.; Marshall, James F.; and Crowell, Maclean, to United Technologies Corporation. Compressor construction. 4,016,636, Cl. 29-156.80R.

Schneider, Ronald A., to Chevron Research Company. Process for the manufacture of maleic anhydride using high surface area catalyst. 4,017,521, Cl. 260-346.80A.

Schoenberg, Karl-Heinz: *See—*
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Schreiber, Klaus-Gunther, to Messrs. Berendsohn AG. Holder for a writing implement. 4,016,982, Cl. 211-69.100.

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Schwartz, Bernard, to Sperry Rand Corporation. Double rotation inertial measurement apparatus. 4,017,187, Cl. 356-106.0LR.

Schwarz, Eckhard C. A., to Presto Products, Incorporated. Polymer modified hydrophilic inorganic fillers for thermoplastic polymeric materials. 4,017,452, Cl. 260-42.140.

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Scottish Agricultural Industries Limited: *See—*
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Seidel, Peter, to Dragerwerk Aktiengesellschaft. Vaporizer for anaesthetics. 4,017,566, Cl. 261-56.000.

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Shionogi & Co., Ltd.: *See—*
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Smeulers, Wouter; and Amsen, Willem Hendrik, to U.S. Philips Corporation. Television receiver including a beam current limiting circuit. 4,017,681, Cl. 358-171.000.
Smiley, Alan Michael, to Revlon, Inc. Adjustable wigs. 4,016,888, Cl. 132-53.000.
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Smith, James D. B.; and Phillips, David C., to Westinghouse Electric Corporation. Monitoring electrical apparatus against overheating by the use of coating compositions containing thermoparticulatable diazonium salts. 4,016,745, Cl. 73-19.000.
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Smith, Lawrence Sidney, to United Technologies Corporation. Lead-lag compensated temperature sensor. 4,017,027, Cl. 236-99.00E.
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Stapley, Edward O.; and Mata, Justo M., to Merck & Co., Inc. 7β-(D-5-amino-5-carboxyvaleramido)-7-methoxy-3-substituted-3-cephem-4-carboxylic acid antibiotics. 4,017,487, Cl. 260-243.00C.
Stauff, Joachim; Jaeschke, Wolfgang; and Schlogl, Gunter, to Stauff, Joachim. Method of measuring sulphur dioxide. 4,017,260, Cl. 23-232.00E.
Stauffer Chemical Company: *See—*
Baker, Don R., 4,017,610.
Lam, Hsiao-Ling; and Pallos, Ferenc M., 4,017,634.
Weil, Edward D., 4,017,257.
Stecker, Alvin, Sr. Vehicle step. 4,017,093, Cl. 280-163.000.
Steele, Roger B.; and Katzakian, Arthur, Jr., to Aerojet-General Corporation. Preparation of 2-hydroxyalkyl esters. 4,017,429, Cl. 260-2.0EP.
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Criscimagna, Tony Nick; and Steinmetz, Michael J., 4,017,762.
Stelter, Ronald B., to Continental Group, Inc., The. Method and apparatus for orienting can ends. 4,016,968, Cl. 198-394.000.
Stendel, Wilhelm: *See—*
Lorenz, Walter; Hammann, Ingeborg; and Stendel, Wilhelm, 4,017,609.
Stepp, Elvin Duane; and Talley, James Reggie, to Texas Instruments Incorporated. Programmable shunt voltage regulator circuit. 4,017,788, Cl. 323-8.000.
Sterling Drug Inc.: *See—*
Doyle, Ross L.; and Harrison, Thomas S., 4,017,002.
Sternat, Hugo, to Siemens Aktiengesellschaft. Method and circuit arrangement for testing data processors. 4,017,829, Cl. 340-146.10C.
Sternbach, Leo Henryk: *See—*
Derieg, Michael Edward; Earley, James Valentine; Fryer, Rodney Ian; and Sternbach, Leo Henryk, 4,017,531.
Derieg, Michael Edward; Earley, James Valentine; Fryer, Rodney Ian; and Sternbach, Leo Henryk, 4,017,532.
Stevens, Richard H.: *See—*
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Stevens, Robert C.: *See—*
Daly, Lewis J.; and Brownlie, Alan W., 4,017,069.
Stevens, Timothy S.: *See—*
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Stewart, Michael H.: *See—*
Hoer, Ralph A.; and Stewart, Michael H., 4,017,646.
Stewart, William Edgar; and de Somer, Pierre Marie Hendrik Frans. Reactivation of interferon. 4,017,600, Cl. 424-85.000.
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Jerie, Hans Georg, 4,017,145.
Stick, Philip P.: *See—*
Willenbecher, James F.; Stick, Philip P.; and Tedeschi, Rinaldo R., 4,016,753.
Stickley, Edward S.: *See—*
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Stoakes, Richard Lewis. Structural assemblies. 4,016,695, Cl. 52-476.000.
Stolin, Billy L.: *See—*
Brown, Ronald D.; and Stolin, Billy L., 4,017,707.
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Schminke, Wolfgang; Stolting, Klaus; Macholdt, Hans; and Kunkler, Hans, 4,017,671.
Stolzer, Paul, to Stopa Stahlbau GmbH & Co. Storage system. 4,016,987, Cl. 214-16.40A.
Stone, W. James: *See—*
Dillinger, Robert B.; and Stone, W. James, 4,017,040.
Stookey, Stanley D.: *See—*
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Stopa Stahlbau GmbH & Co.: *See—*
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Meier, Ernst, 4,017,010.
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Strasser, Bernd: *See—*
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Strasser, Jurgen H.: *See—*
Wilson, Donald C.; Mencacci, Samuel A.; and Strasser, Jurgen H., 4,016,705.
Strassle, Marcel, to Syma Intercontinental S.A. Elastically-deformed adjustable T-joint. 4,017,199, Cl. 403-264.000.
Strategic Medical Research Corporation: *See—*
Gordon, Paul, 4,017,608.

Stratman, Urban Frederick, to United States of America, Army. Biaxial leaf sight. 4,016,652, Cl. 33-254.000.

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Strewe, Wolfgang: *See—*
Mose, Luciano; Kramer, Wolfgang; Strewe, Wolfgang; and Strasser, Bernd, 4,017,376.

Stromberg-Carlson Corporation: *See—*
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Richards, Glenn L.; and Pommerening, Uwe A., 4,017,689.

Structural Concepts Corporation: *See—*
Hanson, Jerry D., 4,017,130.

Strybel, Richard V., to Imperial-Eastman Corporation. Adjustable valve core depressor. 4,017,057, Cl. 251-149.100.

Stubbs, Christopher Edward; Nooi, Jacobus Roelof; and Kemper, Hermanus Christoffel, to Lever Brothers Company. Organic builder. 4,017,541, Cl. 260-535.00P.

Studiengesellschaft Kohle m.b.H.: *See—*
Wilke, Gunther; and Muller, Ernst Willi, 4,017,526.

Stumpfi, Werner: *See—*
Koester, Eberhard; Wunsch, Gerd; Deigner, Paul; Stumpfi, Werner; and Schneehage, Hans Henning, 4,017,303.

Stumpp & Schule KG: *See—*
Zwirner, Eckhard, 4,017,062.

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Stuttmann, Jurgen, to Hazemag Dr. E. Andreas KG. Impact crusher with adjustable impact or grinding means. 4,017,035, Cl. 241-189.00R.

Suarez, Tulio; and Jones, C. David, to Eli Lilly and Company. Novel antifertility agents. 4,017,546, Cl. 260-591.000.

Sublistatic Holding S.A.: *See—*
Beguin, Rene; and Monti, Roland, 4,017,176.

Subramanian, Gopal; and McAfee, John Gilmour, to Research Corporation. Bone-seeking indium-113m or indium-111 organic phosphonate complexes. 4,017,595, Cl. 424-1.000.

Subsea Equipment Associates Limited: *See—*
Cooke, David A.; and Edison, David M., 4,017,823.

Subtil, Andre: *See—*
Barthalon, Maurice; and Subtil, Andre, 4,017,001.

Suchsland, Helmut: *See—*
Bittner, Friedrich; Haschke, Heinz; Suchsland, Helmut; Schreyer, Gerd; and Schwarze, Werner, 4,017,413.

Sud, Kuldip Kumar: *See—*
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Sudo, Michio. Apparatus for uniting concentrically extruded tubular films of thermoplastic synthetic resin. 4,017,229, Cl. 425-71.000.

Suess, Stephen E.: *See—*
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Sugai, Haruo: *See—*
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Sugawara, Akihiro: *See—*
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Sugihara, Hirosada: *See—*
Murata, Tadakazu; Nohara, Akira; Sugihara, Hirosada; and Sanno, Yasushi, 4,017,517.

Sugimori, Shigeru: *See—*
Inukai, Takashi; Sato, Hideo; Sugimori, Shigeru; and Ishibe, Tetsuya, 4,017,416.

Sugimoto, Tadahiro, to Daitoseiki Co. Ltd. Method for controlling the cutting feed speed of a saw frame of band-sawing machine or similar machine. 4,016,787, Cl. 83-13.000.

Sugimura, Yukio: *See—*
Hiraoka, Tetsuo; and Sugimura, Yukio, 4,017,488.

Sugita, Minoru: *See—*
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Suling, Carlhans: *See—*
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Sullivan, Royce R.: *See—*
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Sulzer Brothers Limited: *See—*
Roffler, Josua, 4,016,997.
Witt, Karel, 4,017,283.

Sumida, Tokunobu, to Mitsui Mining & Smelting Co., Ltd. Method for continuously manufacturing endless lead sheet. 4,016,925, Cl. 164-87.000.

Sumitomo Chemical Company, Limited: *See—*
Maruyama, Isamu; Nakao, Masaru; Sasajima, Kikuo; Inaba, Shigeho; and Yamamoto, Hisao, 4,017,624.
Tabana, Minoru; Mitsuno, Tatsuyuki; and Maki, Hiroshi, 4,017,436.
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Sumitomo Electric Industries, Ltd.: *See—*
Yamada, Naohei; Yamada, Katsuhiko; and Fujita, Teruo, 4,016,926.

Sumrell, Gene: *See—*
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Sun, Shan C.: *See—*
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Sunbeam Corporation: *See—*
Cline, Melvin N.; Augustine, Robert John; and Westphal, Donald John, 4,016,663.

Sussman, Milton H., to American Optical Corporation. Two-element eyepiece. 4,017,159, Cl. 350-175.00E.

Sutcliffe, Grenville G.: *See—*
Dumpis, Janis; and Sutcliffe, Grenville G., 4,016,910.

Suzui, Akio; Nose, Shinji; Kodama, Takashi; Yokoyama, Kenji; Matsumoto, Kazuya; and Fujio, Yoshiharu, to Osaka Soda Co., Ltd. Diallyl phthalate resin-containing aqueous emulsions. 4,017,434, Cl. 260-21.000.

Suzuki, Hideo: *See—*
Ishiwata, Junichi; Suzuki, Hideo; and Sekiguchi, Masakichi, 4,017,753.

Suzuki, Kazuya: *See—*
Motojima, Kenji; Iwasaki, Matae; Suzuki, Kazuya; Komaki, Yoshihide; and Ichiyanagi, Katsuaki, 4,017,583.

Suzuki, Takaya; Mimura, Akio; Yagyu, Seturo; and Okuhara, Shinji, to Hitachi, Ltd. Method of manufacturing semiconductor integrated circuit with prevention of substrate warpage. 4,017,341, Cl. 148-174.000.

Suzuki, Yukio: *See—*
Seki, Kunio; Suzuki, Yukio; and Sakamoto, Yoshio, 4,017,749.

Svedala-Arbra AB: *See—*
Bengtsson, Berndt Harry; and Bremmer, Sten Anders Harald, 4,016,630.

Svenska Aktiebolaget Bromsregulator: *See—*
Anderberg, Paul-Henry Botvid; Hambitzer, Hans Gunnar Gunther; and Sander, Nils Borje Lennart, 4,016,755.

Svoboda, Vlastimil; and Celchovska, Olga, to Lachema, narodni podnik. Biological diagnostic test strip and method of producing same. 4,017,261, Cl. 23-253.0TP.

Swanson, Carl I.: *See—*
Facchini, Enio; and Swanson, Carl I., 4,017,844.

Swanson, S. Keith, to Measurex Corporation. Control system for textile tenter frame. 4,017,722, Cl. 235-151.100.

Swensen, Donald E. Apparatus for aligning pipes. 4,016,637, Cl. 29-281.400.

Swiss Aluminium Ltd.: *See—*
Winter, Joseph; Lanam, Richard; and Graham, Douglas L., 4,017,337.

Sylvester, Gordon C.: *See—*
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Syma Intercontinental S.A.: *See—*
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Syntex Corporation: *See—*
Shastri, Subramaniam; and Shaikh, Zafaruzzaman I., 4,017,615.

Synthelabo: *See—*
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Systron Donner Corporation: *See—*
Morris, Harold D., 4,016,766.

Syvakari, Pertti: *See—*
Gustafsson, Sven-Goran; Larsson, Hans Gunnar; Lilja, Kjell; Lundback, Bertil; Nilsson, Jan; and Syvakari, Pertti, 4,016,737.

Szamborski, Edmund, to Szamborski, Edmund. Display container for neck chains and the like. 4,016,972, Cl. 206-45.340.

Szikla, Leslie. Jewelry imprinting device. 4,016,810, Cl. 101-4.000.

Szporny, Laszlo: *See—*
Hideg, Kalman; Hankovszky, Olga; Palosi, Eva; Hajos, Gyorgy; and Szporny, Laszlo, 4,017,507.

Tabana, Minoru; Mitsuno, Tatsuyuki; and Maki, Hiroshi, to Sumitomo Chemical Company, Limited. Thermoplastic resin composition. 4,017,436, Cl. 260-27.0BB.

Tabor, Thomas M.: *See—*
Evans, Duane E.; Tabor, Thomas M.; and Tyler, David A., 4,016,716.

Taguchi, Hiroshi, to AMP Incorporated. Electrical contact element. 4,017,135, Cl. 339-17.0LM.

Takagi, Takeshi: *See—*
Tomono, Masami; Abe, Akira; Harada, Seiki; Sato, Kikuji; Takagi, Takeshi; Kamoshita, Genichi; Oya, Yuichiro; and Saiki, Atsushi, 4,017,886.

Takahara, Ichiro; Toyoshima, Yoshiharu; and Yamamoto, Yuzo, to Sanyo Electric Co., Ltd. Video information reproduction circuitry having drop-out compensation circuit. 4,017,892, Cl. 358-8.000.

Takahashi, Ryohei; Yokomichi, Isao; Maeda, Kazuyuki; and Haga, Takahiro, to Ishihara Sangyo Kaisha Ltd. Herbicidal composition. 4,017,295, Cl. 71-66.000.

Takase, Yoshiyuki: *See—*
Minami, Shinsaku; Matsumoto, Jun-Ichi; Sugita, Minoru; Shimizu, Masanao; Takase, Yoshiyuki; and Nakamura, Shinichi, 4,017,622.

Takashima, Yoshinori; Maruyama, Isamu; and Katsube, Junki, to Sumitomo Chemical Company, Limited. 2-Morpholinyl tricyclic dibenzazepine compounds. 4,017,621, Cl. 424-248.400.

Takechi, Hiroshi: *See—*
Gondo, Hisashi; Takechi, Hiroshi; Kawano, Tsuyoshi; Masui, Hiroaki; and Kovama, Kazuo, 4,016,740.

Takechi, Kazuo: *See—*
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Takeda Chemical Industries, Ltd.: *See—*
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Kuwada, Yutaka; Meguro, Kanji; Tawada, Hiroyuki; Sohda, Takashi; Natsugari, Hideaki; and Sato, Yoshiaki, 4,017,620.
Murata, Tadakazu; Nohara, Akira; Sugihara, Hirosada; and Sanno, Yasushi, 4,017,517.
Yurugi, Shojiro; and Kikuchi, Shintaro, 4,017,490.

Takemoto, Shigeji. Reversing cassette tape machine. 4,017,896, Cl. 360-74.000.

Takesue, Hitoshi: *See—*
Miura, Yuichi; Yutani, Kiyohiko; Takesue, Hitoshi; and Fujii, Kenji, 4,017,362.

Talley, James Reggie: *See—*
Stepp, Elvin Duane; and Talley, James Reggie, 4,017,788.

Tallonneau, Georges, to S.T. Dupont. Method for the storage of a liquefied gas in the presence of an adsorbant support having open cells. 4,017,252, Cl. 431-12.000.

Tamagawa Seiki Kabushiki Kaisha: *See—*
Aramaki, Shigeru, 4,017,846.

Tamura, Masashi: *See—*
Onoe, Katsuhiko; Abe, Masahiro; and Tamura, Masashi, 4,017,004.

Tanaka, Hitoshi: *See—*
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Tanaka, Kazuo: *See—*
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Tanaka, Minoru; Nakamura, Akihisa; and Fushimi, Hisakazu, to Honda Giken Kogyo Kabushiki Kaisha. Operation control system for vehicle engine. 4,016,844, Cl. 123-117.00A.

Tannas, Lawrence E., Jr., to Rockwell International Corporation. Transparent keyboard switch and array. 4,017,848, Cl. 340-365.00R.

Tausanovitch, Dusan: *See—*
Mess, Richard C.; and Tausanovitch, Dusan, 4,016,696.

Tawada, Hiroyuki: *See—*
Kuwada, Yutaka; Meguro, Kanji; Tawada, Hiroyuki; Sohda, Takashi; Natsugari, Hideaki; and Sato, Yoshiaki, 4,017,620.

Tax, Hans. Package for transporting units of a modular crane. 4,016,974, Cl. 206-321.000.

Tax, Hans; and Bauer, Dieter, to Tax, Hans. Load clamping apparatus. 4,016,993, Cl. 214-394.000.

Taylor, Arthur T.: *See—*
Griffith, T. W.; and Taylor, Arthur T., 4,016,687.

Taylor, David W. Ferromagnetic memory layer, methods of making and adhering it to substrates, magnetic tapes, and other products. 4,017,265, Cl. 428-675.000.

Taylor, Julian S. Thermal gauge probe. 4,016,758, Cl. 73-204.000.

Taylor, Mark W.: *See—*
Kozak, Milan F.; Taylor, Mark W.; and Elder, Ronald C., 4,017,338.

Taylor, Max F. Solar heating system. 4,016,861, Cl. 126-270.000.

Taylor, Robert A.: *See—*
Brandao, Ruy L.; and Taylor, Robert A., 4,017,853.

Taylor, Thomas D., to Graham-White Manufacturing Co. Differential flowmeter. 4,016,760, Cl. 73-205.00R.

Taylor, William H., to Kollmorgen Corporation. Tri-power periscope head assembly. 4,017,148, Cl. 350-37.000.

Tazuma, James J.; and Zadra, Mario D., to Goodyear Tire & Rubber Company, The. Soap solution of maleic anhydride-modified resin backbone. 4,017,441, Cl. 260-29.6PM.

Tazuma, James J.; and Zadra, Mario D., to Goodyear Tire & Rubber Company, The. Aqueous emulsion latex derived rubbery copolymer. 4,017,560, Cl. 260-888.000.

TDK Electronics Company, Limited: *See—*
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TDX, Inc.: *See—*
Lansing, Charles W.; and Zajicek, Joseph S., 4,017,837.

Tech Serv Inc.: *See—*
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Technion Research and Development Foundation, Ltd.: *See—*
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Tedeschi, Rinaldo R.: *See—*
Willenbecher, James F.; Stick, Philip P.; and Tedeschi, Rinaldo R., 4,016,753.

Teiling, Carl Torbern, to AGA Aktiebolag. Method and apparatus for directing an observation member. 4,017,716, Cl. 235-061.50S.

Teledyne, Inc.: *See—*
Baker, William C.; and Chapman, John J., 4,016,759.

Teledyne Industries, Inc.: *See—*
Karaba, Albert M.; Brouwers, Alexander P.; and Pearsall, Thomas J., 4,016,841.

Telefonaktiebolaget L M Ericsson: *See—*
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Tenery, John H.: *See—*
Cruz, Mamerto M., Jr.; Tenery, John H.; and Tressler, LaVerne C., 4,016,877.

Tennessee Valley Authority: *See—*
McCullough, John F.; and Sheridan, Richard C., 4,017,589.

Tepedino, Patrick, to Lawrence Peska Associates, Inc., a part interest. Range finder. 4,016,654, Cl. 33-277.000.

Terrell, Ross C.: *See—*
Moore, George L.; and Terrell, Ross C., 4,017,519.

Terwiesch, Bernd: *See—*
Grosse-Wortmann, Hans; Hentschel, Bernhard; Rauth, Peter; Schoenberg, Karl-Heinz; Terwiesch, Bernd; and Winter, Hermann, 4,017,445.

Tessler, Martin M., to National Starch and Chemical Corporation. Novel starch ethers. 4,017,460, Cl. 536-50.000.

Tetra Pak Developpement SA: *See—*
Soukup, Franz; Larsson, Tore Ingvar; and Borg, Veine Bernt, 4,017,247.

Tetzner, Heinz: *See—*
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Tewksbury, Stuart Keene, to Bell Telephone Laboratories, Incorporated. Apparatus for analog to digital conversion. 4,017,849, Cl. 340-347.0AD.

Texaco Inc.: *See—*
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Texas Instruments Incorporated: *See—*
Kendall, Don L.; and Matzen, Walter T., 4,017,885.
Naden, Rex Alan; and Noe, Terry Wayne, 4,017,604.
Stepp, Elvin Duane; and Talley, James Reggie, 4,017,788.

Textured Yarn Co., Inc.: *See—*
Stanley, Robert K., 4,016,632.

Thacker, Stephen Ernest William, to Scovill Manufacturing Company. Clamp in valves. 4,016,918, Cl. 152-427.000.

Tharp, Nelson B.; Henry, John W.; and Leydorf, George F., to United States of America, Navy. Hardened electromagnetic wave energy sensor. 4,017,863, Cl. 343-719.000.

Thatcher, Imbrie: *See—*
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Theard, Leslie P.: *See—*
Heilman, William J.; Peterson, Frank C.; Renz, Mical C.; and Theard, Leslie P., 4,017,453.

Theeuwes, Felix; and Damani, Nalinkant C., to Alza Corporation. Osmotically driven active agent dispenser. 4,016,880, Cl. 128-260.000.

Thiokol Corporation: *See—*
Villa, Jose L., 4,017,554.

Thoelen, Walter P., Sr. Swimming pool cleaning apparatus. 4,017,331, Cl. 134-167.00R.

Thomas, James Ernest, to Pricemaster Ltd. Labelling machine. 4,017,350, Cl. 156-384.000.

Thomas, Paul M., to Builders Equipment Co. Closure system. 4,016,986, Cl. 214-16.40A.

Thompson, Charles. Shoe construction. 4,016,662, Cl. 36-29.000.

Thompson, Clarence T.: *See—*
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Thompson, Ronald J.: *See—*
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Thoms, William Charles: *See—*
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Thomson-Brandt: *See—*
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Thomson-CSF: *See—*
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Broussaud, Georges, 4,017,893.
Desormiere, Bernard; and Bridoux, Edouard, 4,017,751.

Thron, Harry Marshall. Board game apparatus. 4,016,939, Cl. 273-134.0AT.

Thuillier, Germaine; and Laforest, Jacqueline, to CERPHA. Derivatives of 3-oxo-2,3-dihydro-1,4-benzoxazine for use as analgesics and antioedematous agents. 4,017,618, Cl. 424-248.54.

Thuillier born Nachmias, Germaine; Laforest born Boutillier du Retail, Jacqueline Suzanne; Cariou, Bernard Jean Marie; Bessin, Pierre Alfred Rene; Bonnet born Roux, Jacqueline Suzanne; and Thuillier, Jean Eugene, to Centre European de Recherches Pharmacologiques C.E.R.P.H.A. Phenoxyacetic acid derivatives. 4,017,632, Cl. 424-275.000.

Thuillier, Jean Eugene: *See—*
Thuillier born Nachmias, Germaine; Laforest born Boutillier du Retail, Jacqueline Suzanne; Cariou, Bernard Jean Marie; Bessin, Pierre Alfred Rene; Bonnet born Roux, Jacqueline Suzanne; and Thuillier, Jean Eugene, 4,017,632.

Thurston, David L.: *See—*
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Thyvold, Olav. Rudder post tube assembly. 4,016,824, Cl. 114-165.000.

Tibbitts, Allen Ben. Western-type boot pac with insulated waterproof construction. 4,016,661, Cl. 36-4.000.

Tieden, Jansey D.; and Woodruff, Forester E., Jr., to Boeing Company, The. N/C machine paging, status and report system. 4,017,831, Cl. 340-147.00P.

Tiffin, Joseph B.; Quinn, Daniel G.; and Vroonland, Evart J., to FMC Corporation. Extensible crane boom structure. 4,016,688, Cl. 52-118.000.

Tihanyi, Jenoe: *See—*
Raetzel, Charlotte; and Tihanyi, Jenoe, 4,017,769.

Tillon, Yves: *See—*
Cazorla, Jean; and Tillon, Yves, 4,017,602.

Tjutjunnikov, Anatoly Borisovich: *See—*
Marchenko, Alexandr Nikolaevich; and Tjutjunnikov, Anatoly Borisovich, 4,017,354.

Tobias, Martin B. Electrical circuit means for use in analogue display and/or control systems. 4,017,796, Cl. 324-122.000.

Todd, Leonard M. Telephone line voltage actuated switches. 4,017,686, Cl. 179-2.00R.

Tojo, Takayuki, to Victor Company of Japan, Limited. Radio frequency converter. 4,017,682, Cl. 358-167.000.

Tokarchuk, E. Stephen; and Ellis, Gaylord O., to Sperry Rand Corporation. Means for suppressing cavitation in a high pressure relief valve. 4,016,898, Cl. 137-115.000.

Tokico Ltd.: *See—*
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|---|---|---|---|---|---|---|---|
| B 48,560 | 4,002,772 | Mar. 30, 1976 | Jan. 11, 1977 | B 371,912 | 3,995,738 | Mar. 2, 1976 | Dec. 7, 1976 |
| B 54,859 | 4,000,101 | Feb. 17, 1976 | Dec. 28, 1976 | B 372,016 | 3,989,685 | Mar. 9, 1976 | Nov. 2, 1976 |
| B 59,512 | 3,999,216 | Mar. 16, 1976 | Dec. 21, 1976 | B 372,232 | 4,000,967 | Mar. 16, 1976 | Jan. 4, 1977 |
| B 66,272 | 4,014,978 | Feb. 24, 1976 | Mar. 29, 1977 | B 372,722 | 3,998,925 | Mar. 9, 1976 | Dec. 21, 1976 |
| B 71,613 | 4,008,393 | Mar. 16, 1976 | Feb. 15, 1977 | B 373,354 | 3,989,870 | Jan. 27, 1976 | Nov. 2, 1976 |
| B 73,017 | 4,001,879 | Mar. 9, 1976 | Jan. 4, 1977 | B 374,553 | 4,008,394 | Mar. 30, 1976 | Feb. 15, 1977 |
| B 78,315 | 3,982,192 | Feb. 10, 1976 | Sep. 21, 1976 | B 374,588 | 3,985,899 | Jan. 27, 1976 | Oct. 12, 1976 |
| B 79,099 | 3,982,177 | Jan. 13, 1976 | Sep. 21, 1976 | B 376,749 | 4,014,856 | Mar. 30, 1976 | Mar. 29, 1977 |
| B 97,259 | 3,999,614 | Mar. 9, 1976 | Dec. 28, 1976 | B 378,513 | 3,981,750 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 105,006 | 4,007,074 | Mar. 23, 1976 | Feb. 8, 1977 | B 378,760 | 4,001,477 | Mar. 9, 1976 | Jan. 4, 1977 |
| B 111,130 | 4,001,380 | Mar. 16, 1976 | Jan. 4, 1977 | B 379,177 | 3,981,976 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 141,968 | 4,013,442 | Mar. 30, 1976 | Mar. 22, 1977 | B 380,137 | 4,014,802 | Mar. 23, 1976 | Mar. 29, 1977 |
| B 150,142 | 3,981,767 | Jan. 27, 1976 | Sep. 21, 1976 | B 381,006 | 4,009,447 | Apr. 6, 1976 | Feb. 22, 1977 |
| B 160,045 | 3,983,446 | Jan. 13, 1976 | Sep. 28, 1976 | B 381,709 | 3,984,587 | Jan. 13, 1976 | Oct. 5, 1976 |
| B 160,099 | 3,987,221 | Jan. 13, 1976 | Oct. 19, 1976 | B 381,985 | 3,990,775 | Feb. 3, 1976 | Nov. 9, 1976 |
| B 163,463 | 3,981,659 | Jan. 27, 1976 | Sep. 21, 1976 | B 382,120 | 4,013,639 | Mar. 23, 1976 | Mar. 22, 1977 |
| B 167,470 | 4,001,101 | Mar. 2, 1976 | Jan. 4, 1977 | B 383,697 | 4,008,211 | Feb. 17, 1976 | Feb. 15, 1977 |
| B 181,208 | 4,001,391 | Mar. 9, 1976 | Jan. 4, 1977 | B 384,225 | 3,998,523 | Mar. 16, 1976 | Dec. 21, 1976 |
| B 200,759 | 3,986,872 | Feb. 3, 1976 | Oct. 19, 1976 | B 384,330 | 3,985,613 | Jan. 27, 1976 | Oct. 12, 1976 |
| B 208,916 | 3,987,106 | Jan. 13, 1976 | Oct. 19, 1976 | B 384,654 | 3,992,681 | Feb. 24, 1976 | Nov. 16, 1976 |
| B 214,925 | 3,997,648 | Mar. 9, 1976 | Dec. 14, 1976 | B 385,024 | 3,994,911 | Feb. 10, 1976 | Nov. 30, 1976 |
| B 223,678 | 3,989,159 | Mar. 9, 1976 | Nov. 2, 1976 | B 385,483 | 3,993,684 | Feb. 17, 1976 | Nov. 23, 1976 |
| B 231,416 | 4,000,054 | Mar. 30, 1976 | Dec. 28, 1976 | B 385,631 | 3,982,924 | Jan. 27, 1976 | Sep. 28, 1976 |
| B 236,266 | 4,013,624 | Mar. 23, 1976 | Mar. 22, 1977 | B 386,257 | 3,981,915 | Feb. 3, 1976 | Sep. 21, 1976 |
| B 236,342 | 4,001,182 | Feb. 10, 1976 | Jan. 4, 1977 | B 386,673 | 3,993,717 | Feb. 3, 1976 | Nov. 23, 1976 |
| B 248,240 | 3,983,556 | Jan. 13, 1976 | Sep. 28, 1976 | B 386,828 | 3,992,440 | Feb. 3, 1976 | Nov. 16, 1976 |
| B 257,143 | 4,000,111 | Mar. 16, 1976 | Dec. 28, 1976 | B 387,337 | D 243,157 | Mar. 16, 1976 | Jan. 25, 1977 |
| B 270,274 | 3,982,223 | Feb. 17, 1976 | Sep. 21, 1976 | B 388,675 | 4,012,459 | Mar. 30, 1976 | Mar. 15, 1977 |
| B 270,351 | 3,997,893 | Mar. 30, 1976 | Dec. 14, 1976 | B 389,155 | 4,000,970 | Mar. 30, 1976 | Jan. 4, 1977 |
| B 271,743 | 4,001,195 | Mar. 16, 1976 | Jan. 4, 1977 | B 389,304 | 3,986,829 | Jan. 27, 1976 | Oct. 19, 1976 |
| B 276,026 | 3,992,405 | Feb. 3, 1976 | Nov. 16, 1976 | B 390,031 | 3,985,799 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 279,415 | 4,000,697 | Mar. 16, 1976 | Jan. 4, 1977 | B 390,408 | 3,992,426 | Feb. 3, 1976 | Nov. 16, 1976 |
| B 279,969 | 3,986,073 | Jan. 13, 1976 | Oct. 12, 1976 | B 390,979 | 4,003,850 | Mar. 23, 1976 | Jan. 18, 1977 |
| B 281,162 | 4,009,481 | Mar. 23, 1976 | Feb. 22, 1977 | B 391,473 | 3,988,370 | Mar. 2, 1976 | Oct. 26, 1976 |
| B 283,941 | 3,995,313 | Feb. 3, 1976 | Nov. 30, 1976 | B 391,797 | 3,988,046 | Mar. 9, 1976 | Oct. 26, 1976 |
| B 288,757 | 4,001,072 | Mar. 30, 1976 | Jan. 4, 1977 | B 391,828 | 4,014,933 | Apr. 6, 1976 | Mar. 29, 1977 |
| B 301,143 | 3,991,107 | Jan. 27, 1976 | Nov. 9, 1976 | B 391,844 | 3,999,165 | Mar. 16, 1976 | Dec. 21, 1976 |
| B 302,160 | 3,985,774 | Feb. 3, 1976 | Oct. 12, 1976 | B 392,798 | 3,996,249 | Mar. 30, 1976 | Dec. 7, 1976 |
| B 306,668 | 3,985,713 | Feb. 3, 1976 | Oct. 12, 1976 | B 394,248 | 3,989,764 | Jan. 27, 1976 | Nov. 2, 1976 |
| B 307,698 | 3,993,763 | Feb. 3, 1976 | Nov. 23, 1976 | B 394,350 | 3,982,200 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 308,659 | 3,981,947 | Jan. 27, 1976 | Sep. 21, 1976 | B 394,742 | 4,009,285 | Apr. 13, 1976 | Feb. 22, 1977 |
| B 311,450 | 3,988,976 | Mar. 9, 1976 | Nov. 2, 1976 | B 395,554 | 3,998,156 | Mar. 9, 1976 | Dec. 21, 1976 |
| B 311,779 | 4,013,481 | Feb. 10, 1976 | Mar. 22, 1977 | B 395,975 | 4,001,085 | Mar. 2, 1976 | Jan. 4, 1977 |
| B 313,280 | 4,003,591 | Apr. 6, 1976 | Jan. 18, 1977 | B 396,164 | 3,989,590 | Feb. 3, 1976 | Nov. 2, 1976 |
| B 326,211 | 3,988,272 | Mar. 23, 1976 | Oct. 26, 1976 | B 396,377 | D 243,148 | Apr. 6, 1976 | Jan. 25, 1977 |
| B 328,065 | 4,014,752 | Mar. 30, 1976 | Mar. 29, 1977 | B 397,674 | 3,998,438 | Mar. 16, 1976 | Dec. 21, 1976 |
| B 328,077 | 4,014,860 | Apr. 13, 1976 | Mar. 29, 1977 | B 398,084 | 3,996,239 | Feb. 3, 1976 | Dec. 7, 1976 |
| B 328,116 | 4,000,774 | Mar. 9, 1976 | Jan. 4, 1977 | B 398,220 | 3,990,834 | Feb. 3, 1976 | Nov. 9, 1976 |
| B 330,719 | 4,001,121 | Mar. 16, 1976 | Jan. 4, 1977 | B 398,488 | 3,987,991 | Feb. 24, 1976 | Oct. 26, 1976 |
| B 330,736 | 3,996,299 | Feb. 3, 1976 | Dec. 7, 1976 | B 399,098 | 3,997,665 | Feb. 24, 1976 | Dec. 14, 1976 |
| B 332,442 | 4,001,231 | Mar. 30, 1976 | Jan. 4, 1977 | B 399,632 | 4,001,046 | Mar. 9, 1976 | Jan. 4, 1977 |
| B 333,110 | 3,989,867 | Mar. 16, 1976 | Nov. 2, 1976 | B 399,908 | 3,983,323 | Jan. 13, 1976 | Sep. 28, 1976 |
| B 333,247 | 4,001,201 | Mar. 16, 1976 | Jan. 4, 1977 | B 400,871 | 3,988,893 | Feb. 17, 1976 | Nov. 2, 1976 |
| B 333,838 | 4,006,263 | Mar. 23, 1976 | Feb. 1, 1977 | B 401,042 | D 242,197 | Mar. 16, 1976 | Nov. 9, 1976 |
| B 335,783 | 4,013,744 | Mar. 30, 1976 | Mar. 22, 1977 | B 401,221 | 4,014,791 | Apr. 6, 1976 | Mar. 29, 1977 |
| B 336,754 | 3,989,805 | Mar. 16, 1976 | Nov. 2, 1976 | B 402,162 | 3,994,902 | Mar. 2, 1976 | Nov. 30, 1976 |
| B 337,023 | 4,013,188 | Mar. 30, 1976 | Mar. 22, 1977 | B 402,328 | 3,995,545 | Apr. 6, 1976 | Dec. 7, 1976 |
| B 337,823 | 4,002,746 | Mar. 23, 1976 | Jan. 11, 1977 | B 402,553 | 3,983,219 | Feb. 17, 1976 | Sep. 28, 1976 |
| B 339,194 | 3,982,215 | Feb. 3, 1976 | Sep. 21, 1976 | B 402,657 | 4,013,665 | Apr. 6, 1976 | Mar. 22, 1977 |
| B 339,446 | 4,001,067 | Feb. 24, 1976 | Jan. 4, 1977 | B 402,929 | 3,991,251 | Feb. 3, 1976 | Nov. 9, 1976 |
| B 340,170 | 4,000,444 | Mar. 30, 1976 | Dec. 28, 1976 | B 403,076 | 4,014,917 | Apr. 20, 1976 | Mar. 29, 1977 |
| B 344,669 | 4,013,655 | Mar. 16, 1976 | Mar. 22, 1977 | B 403,243 | 3,996,232 | Mar. 30, 1976 | Dec. 7, 1976 |
| B 347,661 | 3,999,218 | Mar. 16, 1976 | Dec. 21, 1976 | B 403,326 | 4,001,212 | Mar. 23, 1976 | Jan. 4, 1977 |
| B 348,433 | 3,984,405 | Feb. 3, 1976 | Oct. 5, 1976 | B 403,477 | 3,995,315 | Feb. 3, 1976 | Nov. 30, 1976 |
| B 349,370 | 3,989,684 | Jan. 27, 1976 | Nov. 2, 1976 | B 403,507 | 3,982,095 | Feb. 10, 1976 | Sep. 21, 1976 |
| B 351,455 | 4,001,309 | Feb. 24, 1976 | Jan. 4, 1977 | B 403,766 | 3,994,834 | Feb. 10, 1976 | Nov. 30, 1976 |
| B 354,222 | 4,012,305 | Mar. 23, 1976 | Mar. 15, 1977 | B 403,883 | 4,001,481 | Mar. 23, 1976 | Jan. 4, 1977 |
| B 354,959 | 3,995,996 | Feb. 17, 1976 | Dec. 7, 1976 | B 405,726 | 3,981,241 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 356,187 | 3,981,222 | Jan. 20, 1976 | Sep. 21, 1976 | B 406,546 | D 242,966 | Mar. 16, 1976 | Jan. 11, 1977 |
| B 356,470 | 4,014,789 | Mar. 23, 1976 | Mar. 29, 1977 | B 407,205 | 4,000,966 | Mar. 16, 1976 | Jan. 4, 1977 |
| B 357,526 | 4,001,319 | Mar. 23, 1976 | Jan. 4, 1977 | B 407,737 | 3,992,546 | Feb. 3, 1976 | Nov. 16, 1976 |
| B 358,260 | 3,989,661 | Mar. 30, 1976 | Nov. 2, 1976 | B 407,812 | 4,010,006 | Mar. 23, 1976 | Mar. 1, 1977 |
| B 358,427 | 3,989,896 | Feb. 3, 1976 | Nov. 2, 1976 | B 408,123 | 4,014,887 | Apr. 13, 1976 | Mar. 29, 1977 |
| B 359,768 | 4,013,684 | Mar. 30, 1976 | Mar. 22, 1977 | B 409,848 | 3,983,270 | Jan. 27, 1976 | Sep. 28, 1976 |
| B 359,901 | 3,981,729 | Jan. 13, 1976 | Sep. 21, 1976 | B 410,074 | 4,001,303 | Feb. 24, 1976 | Jan. 4, 1977 |
| B 361,954 | 4,014,753 | Apr. 6, 1976 | Mar. 29, 1977 | B 410,694 | 3,995,530 | Mar. 23, 1976 | Dec. 7, 1976 |
| B 363,565 | 4,004,821 | Mar. 30, 1976 | Jan. 25, 1977 | B 411,471 | 3,982,933 | Feb. 17, 1976 | Sep. 28, 1976 |
| B 364,797 | 3,996,131 | Feb. 17, 1976 | Dec. 7, 1976 | B 411,624 | 4,001,205 | Mar. 16, 1976 | Jan. 4, 1977 |
| B 367,092 | 4,014,920 | Apr. 13, 1976 | Mar. 29, 1977 | B 411,765 | 3,993,428 | Feb. 24, 1976 | Nov. 23, 1976 |
| B 367,305 | 3,998,640 | Mar. 2, 1976 | Dec. 21, 1976 | B 412,068 | 3,981,244 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 367,621 | 3,989,589 | Feb. 3, 1976 | Nov. 2, 1976 | B 412,124 | 4,007,000 | Mar. 23, 1976 | Feb. 8, 1977 |
| B 369,221 | 3,985,834 | Feb. 24, 1976 | Oct. 12, 1976 | B 413,379 | 4,001,325 | Mar. 9, 1976 | Jan. 4, 1977 |
| B 369,373 | 4,013,683 | Mar. 23, 1976 | Mar. 22, 1977 | B 414,028 | 3,993,738 | Feb. 17, 1976 | Nov. 23, 1976 |
| B 369,379 | 4,013,754 | Mar. 30, 1976 | Mar. 22, 1977 | B 414,266 | 3,993,614 | Feb. 10, 1976 | Nov. 23, 1976 |
| B 370,309 | 3,989,640 | Jan. 20, 1976 | Nov. 2, 1976 | B 414,481 | 3,982,979 | Jan. 20, 1976 | Sep. 28, 1976 |
| B 371,095 | 4,005,074 | Mar. 23, 1976 | Jan. 25, 1977 | B 414,971 | D 242,208 | Feb. 10, 1976 | Nov. 9, 1976 |
| B 371,635 | 4,010,290 | Mar. 23, 1976 | Mar. 1, 1977 | B 415,021 | 3,994,173 | Mar. 2, 1976 | Nov. 30, 1976 |

# CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

| DOCUMENT NUMBER | PATENT NUMBER | PUB. DATE | ISSUE DATE |
|---|---|---|---|
| B 415,122 | 3,997,503 | Feb. 10, 1976 | Dec. 14, 1976 |
| B 415,590 | 4,009,317 | Mar. 23, 1976 | Feb. 22, 1977 |
| B 416,257 | 4,001,335 | Mar. 16, 1976 | Jan. 4, 1977 |
| B 416,589 | 3,990,363 | Jan. 27, 1976 | Nov. 9, 1976 |
| B 417,014 | 3,981,851 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 417,164 | 4,001,360 | Mar. 2, 1976 | Jan. 4, 1977 |
| B 417,349 | 3,985,076 | Mar. 9, 1976 | Oct. 12, 1976 |
| B 417,498 | 4,013,471 | Mar. 23, 1976 | Mar. 22, 1977 |
| B 418,489 | 3,989,592 | Jan. 13, 1976 | Nov. 2, 1976 |
| B 419,173 | 3,999,728 | Mar. 9, 1976 | Dec. 28, 1976 |
| B 419,582 | 3,989,681 | Mar. 2, 1976 | Nov. 2, 1976 |
| B 420,176 | 4,001,017 | Mar. 16, 1976 | Jan. 4, 1977 |
| B 420,321 | 3,990,645 | Mar. 30, 1976 | Nov. 9, 1976 |
| B 420,472 | 3,993,934 | Feb. 24, 1976 | Nov. 23, 1976 |
| B 421,373 | 4,001,326 | Mar. 23, 1976 | Jan. 4, 1977 |
| B 421,608 | 4,013,806 | Mar. 23, 1976 | Mar. 22, 1977 |
| B 421,975 | 3,994,693 | Mar. 2, 1976 | Nov. 30, 1976 |
| B 422,063 | 3,994,835 | Feb. 3, 1976 | Nov. 30, 1976 |
| B 422,156 | 4,010,401 | Mar. 23, 1976 | Mar. 1, 1977 |
| B 423,365 | 3,996,186 | Feb. 17, 1976 | Dec. 7, 1976 |
| B 423,404 | 3,990,958 | Mar. 2, 1976 | Nov. 9, 1976 |
| B 423,441 | 3,997,137 | Feb. 17, 1976 | Dec. 14, 1976 |
| B 423,867 | 3,990,844 | Feb. 3, 1976 | Nov. 9, 1976 |
| B 423,883 | 3,986,871 | Jan. 27, 1976 | Oct. 19, 1976 |
| B 424,354 | D 242,416 | Feb. 10, 1976 | Nov. 23, 1976 |
| B 424,989 | 3,990,569 | Feb. 3, 1976 | Nov. 9, 1976 |
| B 425,193 | 4,002,107 | Mar. 23, 1976 | Jan. 11, 1977 |
| B 425,285 | 4,014,676 | Apr. 13, 1976 | Mar. 29, 1977 |
| B 425,462 | 3,998,396 | Mar. 9, 1976 | Dec. 21, 1976 |
| B 425,588 | 3,985,111 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 426,157 | 4,013,714 | Mar. 23, 1976 | Mar. 22, 1977 |
| B 426,227 | 3,999,028 | Mar. 2, 1976 | Dec. 21, 1976 |
| B 426,266 | 3,998,839 | Mar. 2, 1976 | Dec. 21, 1976 |
| B 426,274 | 4,014,949 | Jan. 20, 1976 | Mar. 29, 1977 |
| B 426,424 | 3,993,742 | Feb. 3, 1976 | Nov. 23, 1976 |
| B 426,639 | 3,992,539 | Feb. 3, 1976 | Nov. 16, 1976 |
| B 426,819 | 3,995,868 | Feb. 17, 1976 | Dec. 7, 1976 |
| B 427,883 | 3,982,277 | Jan. 20, 1976 | Sep. 21, 1976 |
| B 427,946 | 4,006,161 | Mar. 23, 1976 | Feb. 1, 1977 |
| B 428,103 | 4,000,211 | Feb. 10, 1976 | Dec. 28, 1976 |
| B 428,271 | 3,987,415 | Mar. 23, 1976 | Oct. 19, 1976 |
| B 428,408 | 3,995,252 | Mar. 2, 1976 | Nov. 30, 1976 |
| B 428,877 | 3,984,649 | Jan. 27, 1976 | Oct. 5, 1976 |
| B 429,018 | 3,990,061 | Feb. 10, 1976 | Nov. 2, 1976 |
| B 429,027 | 4,001,260 | Mar. 23, 1976 | Jan. 4, 1977 |
| B 429,157 | 3,990,628 | Jan. 27, 1976 | Nov. 9, 1976 |
| B 429,434 | 3,989,223 | Feb. 17, 1976 | Nov. 2, 1976 |
| B 430,157 | 3,992,465 | Feb. 17, 1976 | Nov. 16, 1976 |
| B 430,172 | 3,982,563 | Jan. 13, 1976 | Sep. 28, 1976 |
| B 430,213 | 4,013,514 | Mar. 30, 1976 | Mar. 22, 1977 |
| B 430,276 | 3,982,171 | Jan. 20, 1976 | Sep. 21, 1976 |
| B 430,287 | D 242,489 | Feb. 10, 1976 | Nov. 23, 1976 |
| B 430,326 | 4,003,581 | Mar. 23, 1976 | Jan. 18, 1977 |
| B 430,334 | 3,981,677 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 431,072 | 3,985,610 | Jan. 20, 1976 | Oct. 12, 1976 |
| B 431,334 | 3,988,095 | Mar. 16, 1976 | Oct. 26, 1976 |
| B 431,713 | 4,000,167 | Feb. 10, 1976 | Dec. 28, 1976 |
| B 431,785 | 3,999,950 | Feb. 24, 1976 | Dec. 28, 1976 |
| B 431,797 | 4,007,290 | Mar. 30, 1976 | Feb. 8, 1977 |
| B 432,049 | 3,995,123 | Mar. 23, 1976 | Nov. 30, 1976 |
| B 432,140 | 3,999,163 | Mar. 23, 1976 | Dec. 21, 1976 |
| B 432,265 | 4,013,480 | Mar. 23, 1976 | Mar. 22, 1977 |
| B 432,594 | 4,003,404 | Mar. 30, 1976 | Jan. 18, 1977 |
| B 432,969 | 3,997,017 | Mar. 2, 1976 | Dec. 14, 1976 |
| B 432,991 | 3,991,669 | Mar. 2, 1976 | Nov. 16, 1976 |
| B 433,094 | 3,987,768 | Jan. 27, 1976 | Oct. 26, 1976 |
| B 433,707 | 4,013,594 | Mar. 23, 1976 | Mar. 22, 1977 |
| B 433,892 | 4,016,061 | Apr. 6, 1976 | Apr. 5, 1977 |
| B 433,930 | 4,012,324 | Mar. 23, 1976 | Mar. 15, 1977 |
| B 434,206 | 3,994,610 | Feb. 3, 1976 | Nov. 30, 1976 |
| B 434,441 | D 242,849 | Mar. 16, 1976 | Dec. 28, 1976 |
| B 435,481 | 4,000,892 | Mar. 9, 1976 | Jan. 4, 1977 |
| B 435,570 | 4,000,908 | Mar. 16, 1976 | Jan. 4, 1977 |
| B 435,617 | 4,001,234 | Mar. 16, 1976 | Jan. 4, 1977 |
| B 436,724 | 3,991,856 | Feb. 24, 1976 | Nov. 16, 1976 |
| B 437,209 | 4,001,193 | Feb. 3, 1976 | Jan. 4, 1977 |
| B 437,559 | 3,993,287 | Feb. 3, 1976 | Nov. 23, 1976 |
| B 437,596 | 3,985,638 | Jan. 27, 1976 | Oct. 12, 1976 |
| B 437,894 | 4,001,015 | Mar. 2, 1976 | Jan. 4, 1977 |
| B 437,986 | 4,011,399 | Apr. 20, 1976 | Mar. 8, 1977 |
| B 438,048 | 4,001,394 | Mar. 23, 1976 | Jan. 4, 1977 |
| B 438,484 | 3,992,451 | Feb. 17, 1976 | Nov. 16, 1976 |
| B 438,882 | 3,983,719 | Feb. 24, 1976 | Oct. 5, 1976 |
| B 438,916 | 3,983,050 | Jan. 13, 1976 | Sep. 28, 1976 |
| B 439,542 | 3,982,199 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 439,778 | 4,001,455 | Feb. 3, 1976 | Jan. 4, 1977 |
| B 440,548 | 4,001,271 | Mar. 16, 1976 | Jan. 4, 1977 |
| B 440,632 | 4,014,955 | Apr. 13, 1976 | Mar. 29, 1977 |
| B 440,633 | 4,000,116 | Feb. 10, 1976 | Dec. 28, 1976 |
| B 440,858 | 3,993,670 | Feb. 3, 1976 | Nov. 23, 1976 |
| B 441,543 | 4,014,755 | Mar. 23, 1976 | Mar. 29, 1977 |
| B 441,723 | 3,988,249 | Mar. 16, 1976 | Oct. 26, 1976 |
| B 441,789 | 4,001,449 | Mar. 30, 1976 | Jan. 4, 1977 |
| B 442,163 | D 242,192 | Mar. 16, 1976 | Nov. 9, 1976 |
| B 442,295 | 4,000,477 | Mar. 16, 1976 | Dec. 28, 1976 |
| B 442,431 | 4,011,260 | Mar. 23, 1976 | Mar. 8, 1977 |
| B 442,810 | 3,997,533 | Feb. 24, 1976 | Dec. 14, 1976 |
| B 442,866 | 3,982,351 | Feb. 24, 1976 | Sep. 28, 1976 |
| B 442,953 | 4,002,657 | Mar. 23, 1976 | Jan. 11, 1977 |
| B 442,970 | 3,989,890 | Feb. 3, 1976 | Nov. 2, 1976 |
| B 443,163 | 3,981,242 | Feb. 3, 1976 | Sep. 21, 1976 |
| B 443,446 | D 242,494 | Apr. 6, 1976 | Nov. 23, 1976 |
| B 443,563 | 3,996,204 | Feb. 24, 1976 | Dec. 7, 1976 |
| B 443,647 | 3,990,737 | Feb. 17, 1976 | Nov. 9, 1976 |
| B 443,712 | 3,982,233 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 444,078 | 4,014,854 | Mar. 23, 1976 | Mar. 29, 1977 |
| B 444,294 | 4,013,634 | Mar. 30, 1976 | Mar. 22, 1977 |
| B 444,437 | 3,995,171 | Mar. 9, 1976 | Nov. 30, 1976 |
| B 445,166 | 4,001,252 | Mar. 2, 1976 | Jan. 4, 1977 |
| B 445,459 | 3,988,889 | Feb. 3, 1976 | Nov. 2, 1976 |
| B 445,493 | 3,994,903 | Mar. 2, 1976 | Nov. 30, 1976 |
| B 445,690 | 3,999,584 | Feb. 3, 1976 | Dec. 28, 1976 |
| B 446,107 | 4,001,276 | Mar. 9, 1976 | Jan. 4, 1977 |
| B 446,956 | 4,014,765 | Apr. 13, 1976 | Mar. 29, 1977 |
| B 447,000 | 3,984,419 | Feb. 3, 1976 | Oct. 5, 1976 |
| B 447,440 | 3,991,724 | Feb. 17, 1976 | Nov. 16, 1976 |
| B 449,892 | 3,997,919 | Mar. 23, 1976 | Dec. 14, 1976 |
| B 449,988 | 4,014,794 | Mar. 30, 1976 | Mar. 29, 1977 |
| B 450,196 | 3,997,701 | Feb. 10, 1976 | Dec. 14, 1976 |
| B 450,413 | 4,007,463 | Mar. 23, 1976 | Feb. 8, 1977 |
| B 450,521 | 3,982,838 | Feb. 17, 1976 | Sep. 28, 1976 |
| B 450,701 | 3,991,084 | Mar. 16, 1976 | Nov. 9, 1976 |
| B 450,708 | 3,989,724 | Mar. 9, 1976 | Nov. 2, 1976 |
| B 450,870 | 3,998,951 | Mar. 16, 1976 | Dec. 21, 1976 |
| B 450,967 | 3,983,055 | Jan. 13, 1976 | Sep. 28, 1976 |
| B 451,248 | 3,997,758 | Mar. 2, 1976 | Dec. 14, 1976 |
| B 451,308 | 3,991,037 | Feb. 17, 1976 | Nov. 9, 1976 |
| B 451,396 | 4,000,450 | Apr. 13, 1976 | Dec. 28, 1976 |
| B 451,438 | Re. 29,066 | Mar. 2, 1976 | Dec. 7, 1976 |
| B 451,534 | 3,986,033 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 452,034 | 4,002,367 | Mar. 23, 1976 | Jan. 11, 1977 |
| B 452,138 | 4,004,278 | Mar. 23, 1976 | Jan. 18, 1977 |
| B 452,293 | 4,014,726 | Mar. 30, 1976 | Mar. 29, 1977 |
| B 452,501 | 4,001,111 | Mar. 16, 1976 | Jan. 4, 1977 |
| B 452,672 | 3,981,602 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 452,879 | 4,001,089 | Mar. 16, 1976 | Jan. 4, 1977 |
| B 452,883 | 3,981,735 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 452,915 | 4,013,933 | Mar. 30, 1976 | Mar. 22, 1977 |
| B 452,938 | 3,994,719 | Feb. 17, 1976 | Nov. 30, 1976 |
| B 452,944 | 4,009,773 | Mar. 30, 1976 | Mar. 1, 1977 |
| B 453,031 | 3,998,678 | Mar. 16, 1976 | Dec. 21, 1976 |
| B 453,067 | 4,005,394 | Mar. 23, 1976 | Jan. 25, 1977 |
| B 453,238 | 3,997,063 | Mar. 2, 1976 | Dec. 14, 1976 |
| B 453,432 | 4,000,514 | Mar. 16, 1976 | Dec. 28, 1976 |
| B 453,533 | 3,997,744 | Feb. 17, 1976 | Dec. 14, 1976 |
| B 453,616 | 3,987,376 | Jan. 27, 1976 | Oct. 19, 1976 |
| B 453,759 | 3,989,790 | Jan. 27, 1976 | Nov. 2, 1976 |
| B 453,960 | 4,014,701 | Apr. 13, 1976 | Mar. 29, 1977 |
| B 454,283 | 3,995,153 | Feb. 3, 1976 | Nov. 30, 1976 |
| B 454,833 | 4,008,733 | Mar. 30, 1976 | Feb. 22, 1977 |
| B 455,425 | 3,990,060 | Feb. 3, 1976 | Nov. 2, 1976 |
| B 455,481 | 3,991,092 | Feb. 24, 1976 | Nov. 9, 1976 |
| B 455,486 | 4,001,353 | Mar. 16, 1976 | Jan. 4, 1977 |
| B 455,686 | 4,001,156 | Mar. 2, 1976 | Jan. 4, 1977 |
| B 455,759 | 3,984,242 | Feb. 24, 1976 | Oct. 5, 1976 |
| B 455,806 | 3,998,919 | Mar. 23, 1976 | Dec. 21, 1976 |
| B 456,069 | 3,998,991 | Mar. 9, 1976 | Dec. 21, 1976 |
| B 456,148 | 3,984,269 | Jan. 13, 1976 | Oct. 5, 1976 |
| B 456,153 | 3,997,992 | Mar. 9, 1976 | Dec. 21, 1976 |
| B 456,384 | 4,014,859 | Apr. 6, 1976 | Mar. 29, 1977 |
| B 456,579 | 3,993,715 | Feb. 10, 1976 | Nov. 23, 1976 |
| B 456,869 | 4,001,277 | Mar. 9, 1976 | Jan. 4, 1977 |
| B 456,900 | 3,996,262 | Feb. 3, 1976 | Dec. 7, 1976 |
| B 456,905 | 4,013,431 | Mar. 23, 1976 | Mar. 22, 1977 |
| B 457,547 | 3,996,397 | Feb. 17, 1976 | Dec. 7, 1976 |
| B 457,850 | 3,993,586 | Feb. 10, 1976 | Nov. 23, 1976 |
| B 457,862 | 3,987,195 | Jan. 27, 1976 | Oct. 19, 1976 |
| B 457,886 | 3,988,498 | Jan. 13, 1976 | Oct. 26, 1976 |
| B 457,931 | 4,001,229 | Mar. 16, 1976 | Jan. 4, 1977 |
| B 458,500 | 3,997,805 | Feb. 24, 1976 | Dec. 14, 1976 |
| B 458,617 | 3,984,422 | Feb. 3, 1976 | Oct. 5, 1976 |
| B 458,964 | 3,996,615 | Mar. 2, 1976 | Dec. 7, 1976 |
| B 459,190 | 4,010,786 | Mar. 30, 1976 | Mar. 8, 1977 |
| B 459,381 | 4,000,017 | Mar. 9, 1976 | Dec. 28, 1976 |



# CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

| DOCUMENT NUMBER | PATENT NUMBER | PUB. DATE | ISSUE DATE |
|---|---|---|---|
| B 459,597 | 3,996,711 | Feb. 17, 1976 | Dec. 14, 1976 |
| B 459,811 | 3,982,173 | Jan. 20, 1976 | Sep. 21, 1976 |
| B 459,821 | 4,005,954 | Mar. 30, 1976 | Feb. 1, 1977 |
| B 460,388 | 3,989,448 | Jan. 27, 1976 | Nov. 2, 1976 |
| B 460,441 | 3,981,828 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 460,846 | 3,985,817 | Feb. 24, 1976 | Oct. 12, 1976 |
| B 461,184 | 3,992,482 | Feb. 17, 1976 | Nov. 16, 1976 |
| B 461,250 | 4,000,768 | Mar. 16, 1976 | Jan. 4, 1977 |
| B 461,336 | 3,982,231 | Feb. 3, 1976 | Sep. 21, 1976 |
| B 461,352 | 3,981,681 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 461,685 | 4,013,661 | Mar. 30, 1976 | Mar. 22, 1977 |
| B 461,752 | 4,016,541 | Apr. 20, 1976 | Apr. 5, 1977 |
| B 461,874 | 3,982,276 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 462,030 | 4,009,342 | Mar. 23, 1976 | Feb. 22, 1977 |
| B 462,386 | 3,988,188 | Jan. 13, 1976 | Oct. 26, 1976 |
| B 462,424 | 3,989,602 | Feb. 24, 1976 | Nov. 2, 1976 |
| B 462,828 | 3,998,395 | Mar. 9, 1976 | Dec. 21, 1976 |
| B 462,893 | 3,984,253 | Feb. 24, 1976 | Oct. 5, 1976 |
| B 463,322 | 3,989,982 | Jan. 20, 1976 | Nov. 2, 1976 |
| B 463,388 | 3,992,605 | Feb. 10, 1976 | Nov. 16, 1976 |
| B 463,473 | 4,002,068 | Mar. 23, 1976 | Jan. 11, 1977 |
| B 463,591 | 4,015,051 | Mar. 30, 1976 | Mar. 29, 1977 |
| B 463,671 | 3,985,385 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 464,027 | 3,999,390 | Mar. 16, 1976 | Dec. 28, 1976 |
| B 464,290 | 3,990,307 | Feb. 3, 1976 | Nov. 9, 1976 |
| B 464,491 | 4,015,612 | Mar. 30, 1976 | Apr. 5, 1977 |
| B 464,587 | 3,991,091 | Feb. 3, 1976 | Nov. 9, 1976 |
| B 464,593 | 3,997,659 | Mar. 9, 1976 | Dec. 14, 1976 |
| B 465,145 | 3,981,148 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 465,202 | 3,989,757 | Feb. 24, 1976 | Nov. 2, 1976 |
| B 465,393 | 3,987,390 | Jan. 27, 1976 | Oct. 19, 1976 |
| B 465,688 | 3,989,770 | Jan. 27, 1976 | Nov. 2, 1976 |
| B 465,955 | 3,997,502 | Feb. 3, 1976 | Dec. 14, 1976 |
| B 466,304 | 4,007,095 | Mar. 23, 1976 | Feb. 8, 1977 |
| B 466,318 | 3,999,115 | Mar. 9, 1976 | Dec. 21, 1976 |
| B 466,390 | 3,983,349 | Feb. 24, 1976 | Sep. 28, 1976 |
| B 466,419 | 4,011,087 | Mar. 23, 1976 | Mar. 8, 1977 |
| B 466,444 | 3,986,039 | Jan. 20, 1976 | Oct. 12, 1976 |
| B 466,906 | 3,993,037 | Mar. 16, 1976 | Nov. 23, 1976 |
| B 466,929 | 3,991,195 | Jan. 27, 1976 | Nov. 9, 1976 |
| B 467,250 | 3,997,428 | Feb. 3, 1976 | Dec. 14, 1976 |
| B 467,328 | 3,997,599 | Mar. 9, 1976 | Dec. 14, 1976 |
| B 467,412 | 3,981,265 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 467,486 | 3,991,725 | Mar. 16, 1976 | Nov. 16, 1976 |
| B 467,971 | 3,983,453 | Jan. 13, 1976 | Sep. 28, 1976 |
| B 468,052 | 3,988,335 | Feb. 10, 1976 | Oct. 26, 1976 |
| B 468,100 | 3,995,107 | Mar. 9, 1976 | Nov. 30, 1976 |
| B 468,330 | 4,001,475 | Mar. 16, 1976 | Jan. 4, 1977 |
| B 468,350 | 3,981,922 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 468,421 | 4,014,739 | Mar. 30, 1976 | Mar. 29, 1977 |
| B 468,603 | 4,003,839 | Mar. 23, 1976 | Jan. 18, 1977 |
| B 469,036 | 4,005,926 | Mar. 16, 1976 | Feb. 1, 1977 |
| B 469,468 | 4,000,220 | Mar. 16, 1976 | Dec. 28, 1976 |
| B 469,947 | 3,984,153 | Jan. 20, 1976 | Oct. 5, 1976 |
| B 470,170 | 3,986,410 | Jan. 13, 1976 | Oct. 19, 1976 |
| B 470,305 | 4,014,043 | Apr. 6, 1976 | Mar. 22, 1977 |
| B 470,348 | 3,981,929 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 470,576 | 3,997,507 | Feb. 24, 1976 | Dec. 14, 1976 |
| B 470,601 | 3,985,655 | Mar. 9, 1976 | Oct. 12, 1976 |
| B 470,798 | 3,987,480 | Jan. 20, 1976 | Oct. 19, 1976 |
| B 470,853 | 4,002,101 | Mar. 23, 1976 | Jan. 11, 1977 |
| B 470,899 | 3,996,441 | Mar. 2, 1976 | Dec. 7, 1976 |
| B 470,900 | 4,001,213 | Mar. 2, 1976 | Jan. 4, 1977 |
| B 470,945 | 4,014,848 | Apr. 13, 1976 | Mar. 29, 1977 |
| B 471,116 | 4,001,318 | Feb. 17, 1976 | Jan. 4, 1977 |
| B 471,221 | 3,981,974 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 471,405 | 3,993,576 | Feb. 10, 1976 | Nov. 23, 1976 |
| B 471,494 | 3,993,660 | Mar. 16, 1976 | Nov. 23, 1976 |
| B 471,579 | 3,985,689 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 471,617 | 3,994,871 | Feb. 10, 1976 | Nov. 30, 1976 |
| B 471,681 | 4,012,844 | Apr. 13, 1976 | Mar. 22, 1977 |
| B 471,735 | 3,989,408 | Feb. 3, 1976 | Nov. 2, 1976 |
| B 471,836 | 4,000,150 | Feb. 24, 1976 | Dec. 28, 1976 |
| B 472,241 | 3,992,453 | Feb. 17, 1976 | Nov. 16, 1976 |
| B 472,256 | 3,985,789 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 472,284 | 3,982,078 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 472,591 | 4,013,029 | Apr. 6, 1976 | Mar. 22, 1977 |
| B 472,760 | 4,001,330 | Apr. 13, 1976 | Jan. 4, 1977 |
| B 473,039 | 3,985,747 | Feb. 10, 1976 | Oct. 12, 1976 |
| B 473,040 | 3,985,738 | Feb. 10, 1976 | Oct. 12, 1976 |
| B 473,813 | 3,989,071 | Mar. 9, 1976 | Nov. 2, 1976 |
| B 473,972 | 3,984,043 | Jan. 13, 1976 | Oct. 5, 1976 |
| B 474,573 | 3,988,375 | Jan. 20, 1976 | Oct. 26, 1976 |
| B 474,747 | 3,997,704 | Feb. 24, 1976 | Dec. 14, 1976 |
| B 475,236 | 3,989,990 | Feb. 3, 1976 | Nov. 2, 1976 |
| B 475,385 | 4,001,071 | Mar. 9, 1976 | Jan. 4, 1977 |
| B 475,681 | 3,983,332 | Jan. 20, 1976 | Sep. 28, 1976 |
| B 476,267 | 4,005,068 | Apr. 6, 1976 | Jan. 25, 1977 |
| B 476,372 | 3,985,771 | Feb. 24, 1976 | Oct. 12, 1976 |
| B 476,542 | 4,013,549 | Mar. 30, 1976 | Mar. 22, 1977 |
| B 476,568 | 3,999,456 | Mar. 16, 1976 | Dec. 28, 1976 |
| B 476,577 | 3,982,070 | Jan. 20, 1976 | Sep. 21, 1976 |
| B 476,681 | 3,986,181 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 476,776 | 3,998,715 | Mar. 23, 1976 | Dec. 21, 1976 |
| B 476,967 | 3,995,206 | Mar. 9, 1976 | Nov. 30, 1976 |
| B 477,252 | 3,985,759 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 477,481 | 3,991,076 | Feb. 3, 1976 | Nov. 9, 1976 |
| B 477,584 | D 242,855 | Apr. 6, 1976 | Dec. 28, 1976 |
| B 477,597 | 3,993,912 | Feb. 17, 1976 | Nov. 23, 1976 |
| B 477,892 | 4,010,355 | Mar. 30, 1976 | Mar. 1, 1977 |
| B 478,234 | 4,010,421 | Mar. 30, 1976 | Mar. 1, 1977 |
| B 478,739 | 3,992,253 | Feb. 17, 1976 | Nov. 16, 1976 |
| B 479,175 | 3,985,700 | Feb. 17, 1976 | Oct. 12, 1976 |
| B 479,242 | 3,983,074 | Feb. 17, 1976 | Sep. 28, 1976 |
| B 479,502 | 3,999,030 | Mar. 16, 1976 | Dec. 21, 1976 |
| B 479,681 | D 242,672 | Mar. 16, 1976 | Dec. 14, 1976 |
| B 479,969 | 4,001,132 | Mar. 9, 1976 | Jan. 4, 1977 |
| B 480,114 | 4,001,327 | Mar. 2, 1976 | Jan. 4, 1977 |
| B 480,251 | 4,008,700 | Mar. 23, 1976 | Feb. 22, 1977 |
| B 480,287 | 4,006,029 | Mar. 30, 1976 | Feb. 1, 1977 |
| B 480,292 | 3,994,011 | Mar. 16, 1976 | Nov. 23, 1976 |
| B 480,350 | 3,994,164 | Feb. 10, 1976 | Nov. 30, 1976 |
| B 480,384 | 3,999,737 | Mar. 23, 1976 | Dec. 28, 1976 |
| B 480,452 | 3,994,923 | Feb. 10, 1976 | Nov. 30, 1976 |
| B 480,473 | 3,995,608 | Mar. 2, 1976 | Dec. 7, 1976 |
| B 480,604 | 3,985,251 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 480,625 | 3,996,227 | Feb. 24, 1976 | Dec. 7, 1976 |
| B 480,662 | 3,988,382 | Mar. 2, 1976 | Oct. 26, 1976 |
| B 480,740 | 3,996,431 | Mar. 2, 1976 | Dec. 7, 1976 |
| B 480,749 | 3,999,207 | Mar. 9, 1976 | Dec. 21, 1976 |
| B 480,987 | 4,001,459 | Mar. 30, 1976 | Jan. 4, 1977 |
| B 481,048 | 3,998,542 | Mar. 16, 1976 | Dec. 21, 1976 |
| B 481,190 | 4,013,468 | Mar. 30, 1976 | Mar. 22, 1977 |
| B 481,600 | 3,981,235 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 481,737 | 3,982,057 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 481,778 | 4,001,385 | Mar. 30, 1976 | Jan. 4, 1977 |
| B 481,930 | 3,992,717 | Feb. 24, 1976 | Nov. 16, 1976 |
| B 481,989 | 4,008,337 | Mar. 23, 1976 | Feb. 15, 1977 |
| B 482,058 | 4,001,398 | Mar. 2, 1976 | Jan. 4, 1977 |
| B 482,660 | 3,995,026 | Feb. 10, 1976 | Nov. 30, 1976 |
| B 482,709 | 3,985,733 | Feb. 24, 1976 | Oct. 12, 1976 |
| B 482,907 | 3,984,811 | Jan. 20, 1976 | Oct. 5, 1976 |
| B 483,247 | 4,001,889 | Apr. 13, 1976 | Jan. 4, 1977 |
| B 483,256 | 3,981,723 | Feb. 10, 1976 | Sep. 21, 1976 |
| B 483,268 | 3,995,215 | Mar. 9, 1976 | Nov. 30, 1976 |
| B 483,606 | 3,986,990 | Jan. 27, 1976 | Oct. 19, 1976 |
| B 483,615 | 3,988,637 | Jan. 27, 1976 | Oct. 26, 1976 |
| B 483,746 | 4,014,923 | Mar. 23, 1976 | Mar. 29, 1977 |
| B 483,762 | 3,993,608 | Feb. 10, 1976 | Nov. 23, 1976 |
| B 483,865 | 3,985,693 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 484,029 | 3,983,558 | Feb. 10, 1976 | Sep. 28, 1976 |
| B 484,067 | 3,992,374 | Feb. 17, 1976 | Nov. 16, 1976 |
| B 484,068 | 3,994,937 | Mar. 2, 1976 | Nov. 30, 1976 |
| B 484,121 | 3,997,770 | Mar. 16, 1976 | Dec. 14, 1976 |
| B 484,269 | 4,000,159 | Feb. 10, 1976 | Dec. 28, 1976 |
| B 484,332 | 3,986,540 | Mar. 2, 1976 | Oct. 19, 1976 |
| B 484,365 | 3,983,578 | Jan. 27, 1976 | Sep. 28, 1976 |
| B 484,419 | 4,001,292 | Mar. 9, 1976 | Jan. 4, 1977 |
| B 484,437 | 4,013,740 | Mar. 30, 1976 | Mar. 22, 1977 |
| B 484,482 | 3,994,017 | Mar. 23, 1976 | Nov. 23, 1976 |
| B 484,769 | 3,999,498 | Mar. 16, 1976 | Dec. 28, 1976 |
| B 485,051 | 3,992,418 | Feb. 17, 1976 | Nov. 16, 1976 |
| B 485,060 | 3,983,067 | Feb. 17, 1976 | Sep. 28, 1976 |
| B 485,169 | 3,989,791 | Mar. 16, 1976 | Nov. 2, 1976 |
| B 485,188 | 4,001,170 | Mar. 16, 1976 | Jan. 4, 1977 |
| B 485,401 | 3,985,859 | Jan. 27, 1976 | Oct. 12, 1976 |
| B 485,575 | 3,996,565 | Feb. 24, 1976 | Dec. 7, 1976 |
| B 485,926 | 4,006,357 | Mar. 23, 1976 | Feb. 1, 1977 |
| B 485,972 | 4,017,472 | Mar. 23, 1976 | Apr. 12, 1977 |
| B 486,280 | 3,983,130 | Feb. 3, 1976 | Sep. 28, 1976 |
| B 486,614 | 3,995,835 | Feb. 17, 1976 | Dec. 7, 1976 |
| B 486,678 | 4,001,273 | Mar. 2, 1976 | Jan. 4, 1977 |
| B 486,828 | 3,989,651 | Mar. 2, 1976 | Nov. 2, 1976 |
| B 487,062 | D 241,256 | Feb. 10, 1976 | Nov. 9, 1976 |
| B 487,078 | 4,012,895 | Mar. 30, 1976 | Mar. 22, 1977 |
| B 487,133 | 3,989,826 | Jan. 27, 1976 | Nov. 2, 1976 |
| B 487,260 | 3,990,610 | Jan. 27, 1976 | Nov. 9, 1976 |
| B 487,411 | 3,983,579 | Feb. 24, 1976 | Sep. 28, 1976 |
| B 487,423 | 3,998,810 | Mar. 2, 1976 | Dec. 21, 1976 |
| B 487,427 | 3,995,788 | Mar. 2, 1976 | Dec. 7, 1976 |
| B 487,467 | 4,014,847 | Apr. 13, 1976 | Mar. 29, 1977 |
| B 488,111 | 3,985,765 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 488,395 | 3,982,245 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 488,634 | 3,982,158 | Jan. 20, 1976 | Sep. 21, 1976 |

# CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

| DOCUMENT NUMBER | PATENT NUMBER | PUB. DATE | ISSUE DATE |
|---|---|---|---|
| B 488,756 | 3,991,810 | Mar. 16, 1976 | Nov. 16, 1976 |
| B 488,836 | 4,013,121 | Mar. 30, 1976 | Mar. 22, 1977 |
| B 489,290 | 3,998,081 | Feb. 17, 1976 | Dec. 21, 1976 |
| B 489,328 | 3,990,088 | Jan. 20, 1976 | Nov. 2, 1976 |
| B 489,331 | 3,996,175 | Feb. 17, 1976 | Dec. 7, 1976 |
| B 489,485 | D 243,266 | Apr. 13, 1976 | Feb. 1, 1977 |
| B 489,550 | 4,000,710 | Mar. 16, 1976 | Jan. 4, 1977 |
| B 489,685 | 3,984,085 | Feb. 24, 1976 | Oct. 5, 1976 |
| B 490,067 | 3,986,600 | Jan. 27, 1976 | Oct. 19, 1976 |
| B 490,547 | 3,999,439 | Feb. 24, 1976 | Dec. 28, 1976 |
| B 490,551 | D 243,168 | Apr. 6, 1976 | Jan. 25, 1977 |
| B 490,589 | 3,990,680 | Feb. 3, 1976 | Nov. 9, 1976 |
| B 490,623 | 3,996,964 | Mar. 2, 1976 | Dec. 14, 1976 |
| B 490,647 | 3,985,196 | Feb. 24, 1976 | Oct. 12, 1976 |
| B 490,806 | 3,989,486 | Feb. 3, 1976 | Nov. 2, 1976 |
| B 490,812 | 3,998,842 | Mar. 30, 1976 | Dec. 21, 1976 |
| B 490,946 | 3,993,652 | Feb. 17, 1976 | Nov. 23, 1976 |
| B 490,995 | 3,995,031 | Feb. 3, 1976 | Nov. 30, 1976 |
| B 491,032 | 3,981,892 | Feb. 10, 1976 | Sep. 21, 1976 |
| B 491,052 | 3,985,790 | Mar. 2, 1976 | Oct. 12, 1976 |
| B 491,111 | 3,997,916 | Feb. 17, 1976 | Dec. 14, 1976 |
| B 491,455 | 3,991,167 | Feb. 3, 1976 | Nov. 9, 1976 |
| B 491,501 | 3,984,914 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 491,618 | 4,007,950 | Mar. 16, 1976 | Feb. 15, 1977 |
| B 491,650 | 3,999,044 | Mar. 9, 1976 | Dec. 21, 1976 |
| B 491,673 | 3,994,770 | Feb. 17, 1976 | Nov. 30, 1976 |
| B 491,776 | 3,986,298 | Mar. 16, 1976 | Oct. 19, 1976 |
| B 491,883 | 3,984,412 | Feb. 3, 1976 | Oct. 5, 1976 |
| B 491,906 | D 242,223 | Feb. 10, 1976 | Nov. 9, 1976 |
| B 492,039 | 3,997,541 | Feb. 24, 1976 | Dec. 14, 1976 |
| B 492,093 | 4,003,658 | Mar. 23, 1976 | Jan. 18, 1977 |
| B 492,120 | 3,995,692 | Feb. 24, 1976 | Dec. 7, 1976 |
| B 492,301 | 3,981,073 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 492,373 | 4,010,908 | Mar. 30, 1976 | Mar. 8, 1977 |
| B 492,688 | 3,983,415 | Jan. 20, 1976 | Sep. 28, 1976 |
| B 492,716 | 3,998,739 | Mar. 2, 1976 | Dec. 21, 1976 |
| B 492,774 | 4,001,843 | Mar. 9, 1976 | Jan. 4, 1977 |
| B 492,902 | 3,993,859 | Feb. 24, 1976 | Nov. 23, 1976 |
| B 492,946 | 3,991,303 | Jan. 27, 1976 | Nov. 9, 1976 |
| B 493,254 | D 243,267 | Apr. 13, 1976 | Feb. 1, 1977 |
| B 493,370 | 3,984,792 | Mar. 16, 1976 | Oct. 5, 1976 |
| B 493,463 | 4,013,510 | Mar. 23, 1976 | Mar. 22, 1977 |
| B 493,474 | 4,013,565 | Mar. 23, 1976 | Mar. 22, 1977 |
| B 493,501 | 3,988,061 | Feb. 3, 1976 | Oct. 26, 1976 |
| B 493,686 | 4,008,338 | Mar. 23, 1976 | Feb. 15, 1977 |
| B 493,955 | 3,989,830 | Mar. 9, 1976 | Nov. 2, 1976 |
| B 493,981 | 3,990,165 | Mar. 9, 1976 | Nov. 9, 1976 |
| B 494,234 | 3,983,808 | Feb. 10, 1976 | Oct. 5, 1976 |
| B 494,339 | 4,001,255 | Mar. 16, 1976 | Jan. 4, 1977 |
| B 494,383 | 3,991,289 | Feb. 3, 1976 | Nov. 9, 1976 |
| B 494,669 | 3,991,104 | Feb. 3, 1976 | Nov. 9, 1976 |
| B 494,691 | 3,987,457 | Mar. 16, 1976 | Oct. 19, 1976 |
| B 494,806 | 3,989,210 | Feb. 3, 1976 | Nov. 2, 1976 |
| B 494,944 | 3,992,469 | Feb. 17, 1976 | Nov. 16, 1976 |
| B 495,185 | 3,999,166 | Mar. 9, 1976 | Dec. 21, 1976 |
| B 495,331 | 4,000,456 | Mar. 16, 1976 | Dec. 28, 1976 |
| B 495,402 | 3,983,988 | Feb. 17, 1976 | Oct. 5, 1976 |
| B 495,408 | 4,000,222 | Feb. 3, 1976 | Dec. 28, 1976 |
| B 495,489 | 3,984,571 | Feb. 3, 1976 | Oct. 5, 1976 |
| B 495,550 | 3,993,666 | Feb. 3, 1976 | Nov. 23, 1976 |
| B 495,554 | 3,993,665 | Feb. 3, 1976 | Nov. 23, 1976 |
| B 495,759 | 3,989,998 | Feb. 3, 1976 | Nov. 2, 1976 |
| B 495,781 | 4,013,699 | Mar. 23, 1976 | Mar. 22, 1977 |
| B 495,903 | 3,995,997 | Feb. 17, 1976 | Dec. 7, 1976 |
| B 496,430 | 3,991,140 | Feb. 10, 1976 | Nov. 9, 1976 |
| B 496,431 | 3,985,894 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 496,487 | 3,982,261 | Jan. 20, 1976 | Sep. 21, 1976 |
| B 496,500 | 3,985,962 | Feb. 3, 1976 | Oct. 12, 1976 |
| B 496,502 | 3,987,444 | Jan. 20, 1976 | Oct. 19, 1976 |
| B 496,792 | 3,999,959 | Feb. 17, 1976 | Dec. 28, 1976 |
| B 496,964 | 3,999,219 | Apr. 20, 1976 | Dec. 21, 1976 |
| B 496,999 | 3,983,804 | Jan. 27, 1976 | Oct. 5, 1976 |
| B 497,021 | 3,985,039 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 497,194 | 3,988,267 | Feb. 3, 1976 | Oct. 26, 1976 |
| B 497,292 | 3,994,052 | Feb. 3, 1976 | Nov. 30, 1976 |
| B 497,293 | 4,011,412 | Mar. 30, 1976 | Mar. 8, 1977 |
| B 497,473 | 3,990,839 | Feb. 3, 1976 | Nov. 9, 1976 |
| B 497,571 | 4,009,997 | Mar. 23, 1976 | Mar. 1, 1977 |
| B 497,584 | 3,988,184 | Feb. 24, 1976 | Oct. 26, 1976 |
| B 497,702 | 3,996,589 | Mar. 2, 1976 | Dec. 7, 1976 |
| B 497,780 | 3,997,500 | Feb. 24, 1976 | Dec. 14, 1976 |
| B 497,853 | 3,987,934 | Feb. 17, 1976 | Oct. 26, 1976 |
| B 497,896 | D 243,091 | Apr. 6, 1976 | Jan. 18, 1977 |
| B 497,960 | 3,991,325 | Jan. 20, 1976 | Nov. 9, 1976 |
| B 498,208 | 4,001,480 | Apr. 13, 1976 | Jan. 4, 1977 |
| B 498,288 | 4,013,657 | Mar. 23, 1976 | Mar. 22, 1977 |
| B 498,775 | 3,993,868 | Mar. 2, 1976 | Nov. 23, 1976 |
| B 498,205 | 3,989,611 | Feb. 10, 1976 | Nov. 2, 1976 |
| B 498,500 | 3,982,241 | Jan. 20, 1976 | Sep. 21, 1976 |
| B 498,775 | 3,993,868 | Mar. 2, 1976 | Nov. 23, 1976 |
| B 498,820 | 3,996,670 | Mar. 9, 1976 | Dec. 14, 1976 |
| B 498,951 | 3,996,907 | Mar. 2, 1976 | Dec. 14, 1976 |
| B 499,171 | 3,985,192 | Jan. 27, 1976 | Oct. 12, 1976 |
| B 499,209 | 3,995,907 | Feb. 24, 1976 | Dec. 7, 1976 |
| B 499,227 | 3,981,344 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 499,324 | 4,001,375 | Mar. 16, 1976 | Jan. 4, 1977 |
| B 499,352 | 3,981,391 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 499,370 | 4,013,544 | Mar. 30, 1976 | Mar. 22, 1977 |
| B 499,718 | 3,990,058 | Jan. 27, 1976 | Nov. 2, 1976 |
| B 499,786 | 4,000,663 | Mar. 16, 1976 | Jan. 4, 1977 |
| B 500,171 | 3,997,262 | Mar. 30, 1976 | Dec. 14, 1976 |
| B 500,176 | 3,995,316 | Feb. 3, 1976 | Nov. 30, 1976 |
| B 500,408 | D 242,721 | Mar. 16, 1976 | Dec. 14, 1976 |
| B 500,945 | 3,996,817 | Feb. 24, 1976 | Dec. 14, 1976 |
| B 500,959 | 4,014,853 | Apr. 13, 1976 | Mar. 29, 1977 |
| B 500,981 | 3,984,681 | Jan. 27, 1976 | Oct. 5, 1976 |
| B 501,122 | 3,981,385 | Feb. 17, 1976 | Sep. 21, 1976 |
| B 501,181 | 3,984,761 | Feb. 10, 1976 | Oct. 5, 1976 |
| B 501,253 | 3,994,015 | Feb. 3, 1976 | Nov. 23, 1976 |
| B 501,317 | 3,985,643 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 501,379 | 4,013,696 | Mar. 30, 1976 | Mar. 22, 1977 |
| B 501,415 | 3,982,051 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 501,482 | 4,012,650 | Jan. 13, 1976 | Mar. 15, 1977 |
| B 501,503 | 4,001,640 | Mar. 2, 1976 | Jan. 4, 1977 |
| B 501,540 | 3,985,694 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 501,975 | 3,998,466 | Mar. 2, 1976 | Dec. 21, 1976 |
| B 501,993 | 3,981,606 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 502,151 | 3,998,614 | Mar. 23, 1976 | Dec. 21, 1976 |
| B 502,161 | 4,000,500 | Mar. 2, 1976 | Dec. 28, 1976 |
| B 502,289 | 3,982,274 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 502,381 | D 242,231 | Mar. 16, 1976 | Nov. 9, 1976 |
| B 502,540 | 3,983,698 | Jan. 13, 1976 | Oct. 5, 1976 |
| B 502,571 | D 242,433 | Apr. 6, 1976 | Nov. 23, 1976 |
| B 502,589 | 3,989,652 | Jan. 27, 1976 | Nov. 2, 1976 |
| B 502,652 | 3,989,186 | Feb. 24, 1976 | Nov. 2, 1976 |
| B 502,667 | 3,991,431 | Feb. 24, 1976 | Nov. 16, 1976 |
| B 502,973 | 3,982,161 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 502,993 | 3,992,489 | Feb. 17, 1976 | Nov. 16, 1976 |
| B 503,029 | 3,986,879 | Jan. 27, 1976 | Oct. 19, 1976 |
| B 503,345 | 4,001,235 | Feb. 24, 1976 | Jan. 4, 1977 |
| B 503,371 | 4,009,401 | Mar. 30, 1976 | Feb. 22, 1977 |
| B 503,436 | 3,988,819 | Feb. 24, 1976 | Nov. 2, 1976 |
| B 503,456 | 4,007,702 | Mar. 23, 1976 | Feb. 15, 1977 |
| B 503,521 | 3,999,646 | Mar. 16, 1976 | Dec. 28, 1976 |
| B 503,579 | 3,989,680 | Feb. 10, 1976 | Nov. 2, 1976 |
| B 503,618 | 3,997,782 | Mar. 9, 1976 | Dec. 14, 1976 |
| B 503,742 | 3,989,756 | Feb. 17, 1976 | Nov. 2, 1976 |
| B 503,776 | 4,016,000 | Mar. 23, 1976 | Apr. 5, 1977 |
| B 503,780 | 3,990,055 | Mar. 16, 1976 | Nov. 2, 1976 |
| B 503,817 | 3,988,307 | Jan. 13, 1976 | Oct. 26, 1976 |
| B 504,056 | 3,993,923 | Feb. 24, 1976 | Nov. 23, 1976 |
| B 504,061 | 3,987,534 | Mar. 16, 1976 | Oct. 26, 1976 |
| B 504,156 | 3,999,048 | Mar. 23, 1976 | Dec. 21, 1976 |
| B 504,169 | 3,981,219 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 504,404 | 3,996,499 | Feb. 24, 1976 | Dec. 7, 1976 |
| B 504,405 | 4,007,401 | Apr. 13, 1976 | Feb. 8, 1977 |
| B 504,439 | 3,999,398 | Mar. 16, 1976 | Dec. 28, 1976 |
| B 504,503 | 3,999,210 | Mar. 9, 1976 | Dec. 21, 1976 |
| B 504,582 | 4,005,138 | Mar. 30, 1976 | Jan. 25, 1977 |
| B 504,778 | 3,986,650 | Feb. 24, 1976 | Oct. 19, 1976 |
| B 504,877 | 3,997,564 | Feb. 24, 1976 | Dec. 14, 1976 |
| B 504,899 | 3,991,273 | Mar. 9, 1976 | Nov. 9, 1976 |
| B 505,126 | 3,981,745 | Feb. 10, 1976 | Sep. 21, 1976 |
| B 505,221 | 4,013,627 | Mar. 30, 1976 | Mar. 22, 1977 |
| B 505,582 | 4,001,659 | Mar. 23, 1976 | Jan. 4, 1977 |
| B 505,689 | 3,987,631 | Mar. 2, 1976 | Oct. 26, 1976 |
| B 505,813 | 3,985,175 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 506,144 | 3,991,147 | Feb. 10, 1976 | Nov. 9, 1976 |
| B 506,148 | 3,988,319 | Feb. 3, 1976 | Oct. 26, 1976 |
| B 506,167 | 3,990,652 | Feb. 10, 1976 | Nov. 9, 1976 |
| B 506,286 | 3,982,085 | Jan. 20, 1976 | Sep. 21, 1976 |
| B 506,461 | 3,987,348 | Jan. 20, 1976 | Oct. 19, 1976 |
| B 506,566 | 3,985,402 | Jan. 20, 1976 | Oct. 12, 1976 |
| B 506,624 | 3,999,695 | Mar. 9, 1976 | Dec. 28, 1976 |
| B 506,648 | 3,994,857 | Feb. 3, 1976 | Nov. 30, 1976 |
| B 506,744 | 3,981,176 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 506,760 | 4,012,835 | Apr. 13, 1976 | Mar. 22, 1977 |
| B 506,839 | 4,005,389 | Mar. 23, 1976 | Jan. 25, 1977 |
| B 506,840 | 4,002,928 | Mar. 23, 1976 | Jan. 11, 1977 |
| B 506,916 | 3,986,140 | Feb. 3, 1976 | Oct. 12, 1976 |
| B 506,926 | 3,993,232 | Feb. 17, 1976 | Nov. 23, 1976 |
| B 507,087 | 3,991,389 | Feb. 17, 1976 | Nov. 9, 1976 |
| B 507,131 | 4,000,499 | Mar. 2, 1976 | Dec. 28, 1976 |
| B 507,166 | 4,014,738 | Apr. 13, 1976 | Mar. 29, 1977 |



# CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

| DOCUMENT NUMBER | PATENT NUMBER | PUB. DATE | ISSUE DATE |
|---|---|---|---|
| B 507,396 | 3,995,167 | Feb. 10, 1976 | Nov. 30, 1976 |
| B 507,476 | 3,994,680 | Feb. 10, 1976 | Nov. 30, 1976 |
| B 507,647 | 3,982,240 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 508,118 | 3,992,283 | Feb. 17, 1976 | Nov. 16, 1976 |
| B 508,119 | 3,992,285 | Feb. 17, 1976 | Nov. 16, 1976 |
| B 508,369 | 3,985,847 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 508,639 | 4,004,194 | Mar. 23, 1976 | Jan. 18, 1977 |
| B 508,817 | 3,989,891 | Feb. 3, 1976 | Nov. 2, 1976 |
| B 508,878 | 3,994,117 | Feb. 3, 1976 | Nov. 30, 1976 |
| B 508,940 | 3,981,321 | Feb. 17, 1976 | Sep. 21, 1976 |
| B 508,961 | 3,987,477 | Feb. 3, 1976 | Oct. 19, 1976 |
| B 509,043 | 3,996,767 | Feb. 24, 1976 | Dec. 14, 1976 |
| B 509,165 | 3,999,155 | Mar. 2, 1976 | Dec. 21, 1976 |
| B 509,185 | 3,989,996 | Feb. 3, 1976 | Nov. 2, 1976 |
| B 509,238 | 3,982,399 | Feb. 24, 1976 | Sep. 28, 1976 |
| B 509,474 | 3,997,260 | Feb. 17, 1976 | Dec. 14, 1976 |
| B 509,586 | 4,006,645 | Feb. 3, 1976 | Feb. 8, 1977 |
| B 509,606 | 3,989,986 | Feb. 3, 1976 | Nov. 2, 1976 |
| B 509,772 | 3,999,004 | Mar. 16, 1976 | Dec. 21, 1976 |
| B 509,819 | 4,014,712 | Apr. 13, 1976 | Mar. 29, 1977 |
| B 510,026 | 4,016,763 | Apr. 13, 1976 | Apr. 12, 1977 |
| B 510,184 | D 242,784 | Apr. 6, 1976 | Dec. 21, 1976 |
| B 510,278 | 4,008,972 | Mar. 30, 1976 | Feb. 22, 1977 |
| B 510,281 | 3,993,215 | Mar. 9, 1976 | Nov. 23, 1976 |
| B 510,346 | D 242,207 | Feb. 10, 1976 | Nov. 9, 1976 |
| B 510,458 | 4,000,221 | Feb. 10, 1976 | Dec. 28, 1976 |
| B 510,521 | 3,990,656 | Mar. 2, 1976 | Nov. 9, 1976 |
| B 510,588 | 3,981,539 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 510,677 | 3,989,541 | Feb. 24, 1976 | Nov. 2, 1976 |
| B 510,682 | 4,000,978 | Mar. 30, 1976 | Jan. 4, 1977 |
| B 510,836 | 4,013,795 | Mar. 23, 1976 | Mar. 22, 1977 |
| B 510,850 | 3,989,841 | Feb. 3, 1976 | Nov. 2, 1976 |
| B 510,855 | 3,981,059 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 511,907 | 3,999,622 | Mar. 30, 1976 | Dec. 28, 1976 |
| B 510,998 | 3,992,336 | Feb. 10, 1976 | Nov. 16, 1976 |
| B 511,002 | 3,998,717 | Mar. 2, 1976 | Dec. 21, 1976 |
| B 511,099 | 3,990,162 | Feb. 3, 1976 | Nov. 9, 1976 |
| B 511,156 | 3,981,364 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 511,346 | 3,984,072 | Jan. 27, 1976 | Oct. 5, 1976 |
| B 511,407 | 3,981,485 | Feb. 10, 1976 | Sep. 21, 1976 |
| B 511,454 | 3,982,333 | Feb. 24, 1976 | Sep. 28, 1976 |
| B 511,665 | 4,001,037 | Mar. 2, 1976 | Jan. 4, 1977 |
| B 511,885 | 3,981,346 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 511,886 | 3,989,991 | Feb. 3, 1976 | Nov. 2, 1976 |
| B 511,909 | 3,981,183 | Feb. 17, 1976 | Sep. 21, 1976 |
| B 512,324 | 3,985,084 | Feb. 17, 1976 | Oct. 12, 1976 |
| B 512,547 | 3,984,193 | Jan. 13, 1976 | Oct. 5, 1976 |
| B 512,745 | 3,981,294 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 512,779 | 4,014,897 | Apr. 13, 1976 | Mar. 29, 1977 |
| B 512,818 | 3,997,363 | Apr. 6, 1976 | Dec. 14, 1976 |
| B 512,849 | 3,982,141 | Feb. 3, 1976 | Sep. 21, 1976 |
| B 512,964 | 3,995,279 | Feb. 10, 1976 | Nov. 30, 1976 |
| B 513,014 | 3,991,113 | Feb. 10, 1976 | Nov. 9, 1976 |
| B 513,027 | 3,995,143 | Feb. 17, 1976 | Nov. 30, 1976 |
| B 513,134 | 4,006,764 | Mar. 23, 1976 | Feb. 8, 1977 |
| B 513,280 | 3,988,211 | Jan. 20, 1976 | Oct. 26, 1976 |
| B 513,368 | 3,982,138 | Feb. 3, 1976 | Sep. 21, 1976 |
| B 513,706 | 3,986,064 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 513,756 | 3,993,869 | Feb. 3, 1976 | Nov. 23, 1976 |
| B 513,781 | 4,001,324 | Feb. 24, 1976 | Jan. 4, 1977 |
| B 513,789 | 3,981,599 | Feb. 3, 1976 | Sep. 21, 1976 |
| B 513,791 | 4,008,608 | Mar. 30, 1976 | Feb. 22, 1977 |
| B 514,259 | 4,013,649 | Mar. 23, 1976 | Mar. 22, 1977 |
| B 514,687 | 3,986,522 | Jan. 27, 1976 | Oct. 19, 1976 |
| B 515,135 | 3,990,085 | Feb. 17, 1976 | Nov. 2, 1976 |
| B 515,303 | 3,987,939 | Jan. 20, 1976 | Oct. 26, 1976 |
| B 515,368 | 4,014,733 | Apr. 6, 1976 | Mar. 29, 1977 |
| B 515,452 | 3,995,243 | Feb. 10, 1976 | Nov. 30, 1976 |
| B 515,455 | 3,982,149 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 515,642 | 4,001,258 | Feb. 24, 1976 | Jan. 4, 1977 |
| B 515,908 | 3,984,676 | Jan. 20, 1976 | Oct. 5, 1976 |
| B 516,002 | 3,988,638 | Jan. 13, 1976 | Oct. 26, 1976 |
| B 516,032 | 3,986,634 | Jan. 27, 1976 | Oct. 19, 1976 |
| B 516,047 | 3,985,741 | Feb. 10, 1976 | Oct. 12, 1976 |
| B 516,060 | 3,983,572 | Feb. 17, 1976 | Sep. 28, 1976 |
| B 516,069 | 3,986,208 | Mar. 16, 1976 | Oct. 12, 1976 |
| B 516,296 | 3,984,404 | Feb. 3, 1976 | Oct. 5, 1976 |
| B 516,537 | 3,996,784 | Feb. 17, 1976 | Dec. 14, 1976 |
| B 516,564 | 3,993,931 | Feb. 17, 1976 | Nov. 23, 1976 |
| B 516,609 | 3,994,486 | Feb. 24, 1976 | Nov. 30, 1976 |
| B 516,625 | 4,013,542 | Mar. 30, 1976 | Mar. 22, 1977 |
| B 516,804 | 3,991,209 | Mar. 23, 1976 | Nov. 9, 1976 |
| B 516,825 | 3,988,885 | Feb. 3, 1976 | Nov. 2, 1976 |
| B 517,273 | D 242,798 | Mar. 16, 1976 | Dec. 21, 1976 |
| B 517,504 | 3,999,855 | Mar. 9, 1976 | Dec. 28, 1976 |
| B 517,668 | 4,013,423 | Apr. 6, 1976 | Mar. 22, 1977 |
| B 517,762 | 3,986,065 | Mar. 16, 1976 | Oct. 12, 1976 |
| B 517,858 | 4,000,999 | Feb. 17, 1976 | Jan. 4, 1977 |
| B 517,956 | D 243,088 | Apr. 6, 1976 | Jan. 18, 1977 |
| B 517,957 | D 243,089 | Apr. 6, 1976 | Jan. 18, 1977 |
| B 518,076 | 4,014,914 | Mar. 30, 1976 | Mar. 29, 1977 |
| B 518,226 | 3,993,509 | Feb. 10, 1976 | Nov. 23, 1976 |
| B 518,326 | 4,008,282 | Mar. 23, 1976 | Feb. 15, 1977 |
| B 518,656 | 3,989,732 | Feb. 17, 1976 | Nov. 2, 1976 |
| B 518,859 | 3,989,971 | Feb. 3, 1976 | Nov. 2, 1976 |
| B 518,999 | 3,990,323 | Feb. 3, 1976 | Nov. 9, 1976 |
| B 519,095 | 3,993,621 | Feb. 24, 1976 | Nov. 23, 1976 |
| B 519,355 | 4,014,829 | Apr. 13, 1976 | Mar. 29, 1977 |
| B 519,377 | 3,987,223 | Jan. 27, 1976 | Oct. 19, 1976 |
| B 519,446 | 3,985,815 | Feb. 24, 1976 | Oct. 12, 1976 |
| B 519,485 | 3,991,134 | Feb. 10, 1976 | Nov. 9, 1976 |
| B 519,486 | 3,992,481 | Feb. 17, 1976 | Nov. 16, 1976 |
| B 519,487 | 3,992,337 | Feb. 17, 1976 | Nov. 16, 1976 |
| B 519,599 | 3,995,350 | Feb. 17, 1976 | Dec. 7, 1976 |
| B 519,623 | 4,012,049 | Apr. 6, 1976 | Mar. 15, 1977 |
| B 519,680 | 4,014,660 | Mar. 30, 1976 | Mar. 29, 1977 |
| B 519,932 | 3,988,618 | Feb. 3, 1976 | Oct. 26, 1976 |
| B 519,979 | 3,982,067 | Feb. 3, 1976 | Sep. 21, 1976 |
| B 520,063 | 3,989,934 | Mar. 2, 1976 | Nov. 2, 1976 |
| B 520,075 | 3,989,935 | Feb. 24, 1976 | Nov. 2, 1976 |
| B 520,076 | 3,989,936 | Mar. 2, 1976 | Nov. 2, 1976 |
| B 520,082 | 3,989,937 | Mar. 23, 1976 | Nov. 2, 1976 |
| B 520,115 | 4,003,072 | Mar. 23, 1976 | Jan. 11, 1977 |
| B 520,227 | 4,002,823 | Mar. 30, 1976 | Jan. 11, 1977 |
| B 520,256 | 3,985,730 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 520,277 | 3,995,635 | Feb. 17, 1976 | Dec. 7, 1976 |
| B 520,341 | 3,992,028 | Mar. 16, 1976 | Nov. 16, 1976 |
| B 520,384 | 3,986,592 | Jan. 27, 1976 | Oct. 19, 1976 |
| B 520,514 | 3,988,308 | Mar. 9, 1976 | Oct. 26, 1976 |
| B 520,534 | 3,997,119 | Feb. 17, 1976 | Dec. 14, 1976 |
| B 520,543 | 3,986,768 | Jan. 27, 1976 | Oct. 19, 1976 |
| B 520,546 | 4,001,133 | Mar. 2, 1976 | Jan. 4, 1977 |
| B 520,613 | 3,991,341 | Mar. 16, 1976 | Nov. 9, 1976 |
| B 520,658 | 3,998,778 | Mar. 9, 1976 | Dec. 21, 1976 |
| B 520,878 | 4,014,849 | Apr. 6, 1976 | Mar. 29, 1977 |
| B 520,884 | 4,000,433 | Mar. 16, 1976 | Dec. 28, 1976 |
| B 520,924 | 3,982,113 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 520,928 | 3,983,617 | Jan. 13, 1976 | Oct. 5, 1976 |
| B 520,952 | 4,000,876 | Mar. 16, 1976 | Jan. 4, 1977 |
| B 520,995 | 4,009,996 | Mar. 23, 1976 | Mar. 1, 1977 |
| B 521,025 | 3,998,838 | Mar. 23, 1976 | Dec. 21, 1976 |
| B 521,044 | 3,983,435 | Feb. 24, 1976 | Sep. 28, 1976 |
| B 521,045 | 3,983,433 | Feb. 24, 1976 | Sep. 28, 1976 |
| B 521,046 | 3,983,434 | Feb. 24, 1976 | Sep. 28, 1976 |
| B 521,125 | 3,994,865 | Feb. 10, 1976 | Nov. 30, 1976 |
| B 521,126 | 3,997,510 | Feb. 10, 1976 | Dec. 14, 1976 |
| B 521,127 | 3,996,201 | Feb. 17, 1976 | Dec. 7, 1976 |
| B 521,128 | 3,997,511 | Feb. 10, 1976 | Dec. 14, 1976 |
| B 521,324 | 3,983,143 | Jan. 27, 1976 | Sep. 28, 1976 |
| B 521,480 | 3,982,665 | Jan. 13, 1976 | Sep. 28, 1976 |
| B 521,600 | 3,981,458 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 521,612 | 4,000,251 | Mar. 9, 1976 | Dec. 28, 1976 |
| B 521,620 | 3,983,749 | Jan. 27, 1976 | Oct. 5, 1976 |
| B 521,643 | 3,997,567 | Mar. 2, 1976 | Dec. 14, 1976 |
| B 521,711 | 3,989,835 | Feb. 10, 1976 | Nov. 2, 1976 |
| B 521,793 | 3,996,981 | Feb. 24, 1976 | Dec. 14, 1976 |
| B 521,984 | 3,983,220 | Feb. 17, 1976 | Sep. 28, 1976 |
| B 521,985 | 4,012,404 | Mar. 23, 1976 | Mar. 15, 1977 |
| B 521,986 | 3,981,607 | Feb. 3, 1976 | Sep. 21, 1976 |
| B 522,009 | 3,995,444 | Feb. 17, 1976 | Dec. 7, 1976 |
| B 522,038 | 3,993,119 | Feb. 3, 1976 | Nov. 23, 1976 |
| B 522,227 | 3,992,904 | Mar. 30, 1976 | Nov. 23, 1976 |
| B 522,309 | 3,991,603 | Feb. 3, 1976 | Nov. 16, 1976 |
| B 522,354 | 3,984,959 | Jan. 20, 1976 | Oct. 12, 1976 |
| B 522,446 | 4,001,194 | Mar. 30, 1976 | Jan. 4, 1977 |
| B 522,537 | 3,999,587 | Mar. 30, 1976 | Dec. 28, 1976 |
| B 522,567 | 3,996,238 | Feb. 17, 1976 | Dec. 7, 1976 |
| B 522,568 | D 242,785 | Apr. 6, 1976 | Dec. 21, 1976 |
| B 522,577 | 3,982,123 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 522,629 | 4,001,155 | Mar. 16, 1976 | Jan. 4, 1977 |
| B 523,226 | 4,006,367 | Mar. 23, 1976 | Feb. 1, 1977 |
| B 523,696 | 3,986,071 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 523,885 | 3,981,040 | Feb. 17, 1976 | Sep. 21, 1976 |
| B 523,952 | 3,988,707 | Mar. 23, 1976 | Oct. 26, 1976 |
| B 524,026 | 3,992,206 | Feb. 10, 1976 | Nov. 16, 1976 |
| B 524,121 | 3,982,536 | Feb. 3, 1976 | Sep. 28, 1976 |
| B 524,179 | 3,985,872 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 524,464 | 3,985,580 | Feb. 10, 1976 | Oct. 12, 1976 |
| B 524,806 | 4,000,065 | Mar. 2, 1976 | Dec. 28, 1976 |
| B 524,849 | 4,014,938 | Mar. 23, 1976 | Mar. 29, 1977 |
| B 525,133 | 3,996,481 | Mar. 23, 1976 | Dec. 7, 1976 |
| B 525,204 | 4,001,109 | Mar. 16, 1976 | Jan. 4, 1977 |
| B 525,809 | 3,985,040 | Feb. 24, 1976 | Oct. 12, 1976 |
| B 525,961 | 3,985,557 | Jan. 13, 1976 | Oct. 12, 1976 |

# CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

| DOCUMENT NUMBER | PATENT NUMBER | PUB. DATE | ISSUE DATE |
|---|---|---|---|
| B 526,106 | 3,990,073 | Jan. 27, 1976 | Nov. 2, 1976 |
| B 526,190 | 3,982,129 | Feb. 17, 1976 | Sep. 21, 1976 |
| B 526,279 | 4,013,138 | Apr. 13, 1976 | Mar. 22, 1977 |
| B 526,289 | 3,992,641 | Feb. 24, 1976 | Nov. 16, 1976 |
| B 526,388 | 3,992,017 | Feb. 3, 1976 | Nov. 16, 1976 |
| B 526,445 | 3,984,978 | Jan. 20, 1976 | Oct. 12, 1976 |
| B 526,447 | 4,000,052 | Feb. 24, 1976 | Dec. 28, 1976 |
| B 526,510 | 3,989,708 | Jan. 20, 1976 | Nov. 2, 1976 |
| B 526,654 | 4,011,534 | Mar. 23, 1976 | Mar. 8, 1977 |
| B 526,942 | 4,013,700 | Mar. 30, 1976 | Mar. 22, 1977 |
| B 526,997 | 3,985,695 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 527,040 | 4,013,515 | Mar. 23, 1976 | Mar. 22, 1977 |
| B 527,054 | 3,981,559 | Feb. 17, 1976 | Sep. 21, 1976 |
| B 527,171 | 3,998,248 | Mar. 9, 1976 | Dec. 21, 1976 |
| B 527,187 | 3,995,202 | Feb. 17, 1976 | Nov. 30, 1976 |
| B 527,333 | 3,999,732 | Mar. 23, 1976 | Dec. 28, 1976 |
| B 527,669 | 3,982,206 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 527,693 | 3,995,233 | Feb. 3, 1976 | Nov. 30, 1976 |
| B 527,788 | D 242,337 | Feb. 10, 1976 | Nov. 16, 1976 |
| B 527,972 | 4,000,016 | Mar. 9, 1976 | Dec. 28, 1976 |
| B 527,999 | 3,981,682 | Feb. 3, 1976 | Sep. 21, 1976 |
| B 528,297 | 4,001,138 | Mar. 16, 1976 | Jan. 4, 1977 |
| B 528,303 | 3,991,023 | Feb. 10, 1976 | Nov. 9, 1976 |
| B 528,401 | 3,991,619 | Feb. 3, 1976 | Nov. 16, 1976 |
| B 528,756 | 3,990,476 | Feb. 3, 1976 | Nov. 9, 1976 |
| B 528,761 | 3,982,221 | Feb. 10, 1976 | Sep. 21, 1976 |
| B 528,962 | 3,989,666 | Feb. 24, 1976 | Nov. 2, 1976 |
| B 528,966 | 3,989,667 | Feb. 24, 1976 | Nov. 2, 1976 |
| B 529,156 | 3,989,158 | Jan. 13, 1976 | Nov. 2, 1976 |
| B 529,194 | 4,000,776 | Mar. 23, 1976 | Jan. 4, 1977 |
| B 529,214 | 4,013,004 | Apr. 20, 1976 | Mar. 22, 1977 |
| B 529,659 | 3,996,875 | Feb. 24, 1976 | Dec. 14, 1976 |
| B 529,836 | 3,994,345 | Feb. 3, 1976 | Nov. 30, 1976 |
| B 529,925 | 4,014,003 | Mar. 30, 1976 | Mar. 22, 1977 |
| B 529,974 | 3,987,098 | Feb. 17, 1976 | Oct. 19, 1976 |
| B 530,174 | 3,993,635 | Feb. 24, 1976 | Nov. 23, 1976 |
| B 530,255 | 3,996,103 | Mar. 2, 1976 | Dec. 7, 1976 |
| B 530,263 | 4,009,736 | Mar. 30, 1976 | Mar. 1, 1977 |
| B 530,285 | 4,013,903 | Apr. 6, 1976 | Mar. 22, 1977 |
| B 530,303 | 4,006,029 | Mar. 23, 1976 | Feb. 1, 1977 |
| B 530,318 | 3,985,752 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 530,437 | 4,014,857 | Apr. 13, 1976 | Mar. 29, 1977 |
| B 530,569 | 3,999,865 | Mar. 16, 1976 | Dec. 28, 1976 |
| B 530,580 | 4,001,151 | Mar. 2, 1976 | Jan. 4, 1977 |
| B 530,605 | 3,989,064 | Feb. 3, 1976 | Nov. 2, 1976 |
| B 530,709 | 4,012,944 | Apr. 6, 1976 | Mar. 22, 1977 |
| B 530,813 | 3,986,131 | Feb. 17, 1976 | Oct. 12, 1976 |
| B 530,873 | 4,001,016 | Feb. 17, 1976 | Jan. 4, 1977 |
| B 530,925 | 3,983,161 | Feb. 24, 1976 | Sep. 28, 1976 |
| B 531,096 | 3,984,415 | Feb. 10, 1976 | Oct. 5, 1976 |
| B 531,267 | 3,997,040 | Feb. 24, 1976 | Dec. 14, 1976 |
| B 531,425 | 3,992,595 | Feb. 3, 1976 | Nov. 16, 1976 |
| B 531,566 | 3,997,820 | Mar. 16, 1976 | Dec. 14, 1976 |
| B 531,686 | 3,990,017 | Mar. 23, 1976 | Nov. 2, 1976 |
| B 531,753 | 3,988,843 | Mar. 2, 1976 | Nov. 2, 1976 |
| B 531,929 | 3,986,067 | Jan. 20, 1976 | Oct. 12, 1976 |
| B 532,005 | 3,992,397 | Feb. 24, 1976 | Nov. 16, 1976 |
| B 532,140 | 4,001,299 | Mar. 2, 1976 | Jan. 4, 1977 |
| B 532,319 | 3,990,292 | Feb. 3, 1976 | Nov. 9, 1976 |
| B 532,326 | 3,993,959 | Mar. 23, 1976 | Nov. 23, 1976 |
| B 532,424 | D 242,292 | Feb. 10, 1976 | Nov. 9, 1976 |
| B 532,476 | 3,992,756 | Feb. 3, 1976 | Nov. 23, 1976 |
| B 532,477 | 4,014,895 | Apr. 13, 1976 | Mar. 29, 1977 |
| B 532,679 | 4,010,706 | Apr. 6, 1976 | Mar. 8, 1977 |
| B 532,901 | 3,984,318 | Jan. 13, 1976 | Oct. 5, 1976 |
| B 532,969 | 3,981,706 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 532,976 | 4,000,837 | Mar. 23, 1976 | Jan. 4, 1977 |
| B 533,056 | 3,983,969 | Jan. 13, 1976 | Oct. 5, 1976 |
| B 533,259 | 3,999,556 | Feb. 24, 1976 | Dec. 28, 1976 |
| B 533,454 | 3,996,566 | Mar. 2, 1976 | Dec. 7, 1976 |
| B 533,580 | 3,982,255 | Feb. 3, 1976 | Sep. 21, 1976 |
| B 533,652 | 4,000,196 | Mar. 23, 1976 | Dec. 28, 1976 |
| B 533,734 | 3,984,799 | Jan. 27, 1976 | Oct. 5, 1976 |
| B 533,968 | 3,986,576 | Jan. 27, 1976 | Oct. 19, 1976 |
| B 534,016 | 3,983,381 | Feb. 3, 1976 | Sep. 28, 1976 |
| B 534,313 | 3,981,675 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 534,314 | 3,981,786 | Feb. 10, 1976 | Sep. 21, 1976 |
| B 534,333 | 3,981,480 | Feb. 17, 1976 | Sep. 21, 1976 |
| B 534,334 | D 242,722 | Mar. 16, 1976 | Dec. 14, 1976 |
| B 534,443 | 3,989,970 | Jan. 27, 1976 | Nov. 2, 1976 |
| B 534,574 | 3,995,624 | Feb. 24, 1976 | Dec. 7, 1976 |
| B 534,591 | 3,991,141 | Feb. 17, 1976 | Nov. 9, 1976 |
| B 534,680 | 4,014,904 | Apr. 20, 1976 | Mar. 29, 1977 |
| B 534,767 | 3,982,180 | Feb. 3, 1976 | Sep. 21, 1976 |
| B 534,915 | 4,012,668 | Mar. 23, 1976 | Mar. 15, 1977 |
| B 534,991 | 3,983,517 | Jan. 27, 1976 | Sep. 28, 1976 |
| B 535,076 | 3,981,718 | Jan. 20, 1976 | Sep. 21, 1976 |
| B 535,209 | 4,001,873 | Mar. 16, 1976 | Jan. 4, 1977 |
| B 535,256 | 3,999,150 | Mar. 23, 1976 | Dec. 21, 1976 |
| B 535,268 | 3,999,045 | Mar. 30, 1976 | Dec. 21, 1976 |
| B 535,386 | 3,981,150 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 535,391 | 3,981,386 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 535,411 | 3,990,543 | Feb. 24, 1976 | Nov. 9, 1976 |
| B 535,437 | 3,997,555 | Feb. 24, 1976 | Dec. 14, 1976 |
| B 535,448 | 3,997,123 | Mar. 16, 1976 | Dec. 14, 1976 |
| B 535,466 | 3,981,309 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 535,813 | 3,981,819 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 535,928 | 3,981,466 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 536,009 | 3,982,112 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 536,082 | 3,997,783 | Mar. 16, 1976 | Dec. 14, 1976 |
| B 536,322 | 4,001,272 | Mar. 23, 1976 | Jan. 4, 1977 |
| B 536,403 | 3,998,341 | Mar. 23, 1976 | Dec. 21, 1976 |
| B 536,511 | 3,995,989 | Mar. 9, 1976 | Dec. 7, 1976 |
| B 536,675 | 3,985,773 | Jan. 20, 1976 | Oct. 12, 1976 |
| B 536,923 | 4,007,828 | Mar. 30, 1976 | Feb. 15, 1977 |
| B 536,935 | 3,985,729 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 537,058 | 4,000,969 | Mar. 23, 1976 | Jan. 4, 1977 |
| B 537,102 | 3,981,829 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 537,709 | 3,981,368 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 537,711 | 3,985,748 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 537,722 | 3,985,423 | Feb. 3, 1976 | Oct. 12, 1976 |
| B 537,903 | 3,986,492 | Jan. 20, 1976 | Oct. 19, 1976 |
| B 538,472 | 3,992,884 | Feb. 3, 1976 | Nov. 23, 1976 |
| B 538,491 | 3,982,928 | Feb. 17, 1976 | Sep. 28, 1976 |
| B 538,686 | 3,982,199 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 538,753 | 3,993,642 | Feb. 10, 1976 | Nov. 23, 1976 |
| B 539,374 | 3,996,229 | Mar. 9, 1976 | Dec. 7, 1976 |
| B 539,746 | 3,983,423 | Feb. 17, 1976 | Sep. 28, 1976 |
| B 540,078 | 3,984,701 | Jan. 13, 1976 | Oct. 5, 1976 |
| B 540,218 | 3,986,108 | Feb. 10, 1976 | Oct. 12, 1976 |
| B 540,632 | 3,981,600 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 540,703 | 4,013,206 | Apr. 13, 1976 | Mar. 22, 1977 |
| B 540,767 | 3,986,010 | Mar. 16, 1976 | Oct. 12, 1976 |
| B 540,872 | 3,982,135 | Jan. 20, 1976 | Sep. 21, 1976 |
| B 540,888 | 4,005,528 | Mar. 30, 1976 | Feb. 1, 1977 |
| B 541,015 | 3,993,208 | Jan. 27, 1976 | Nov. 23, 1976 |
| B 541,376 | 3,981,690 | Feb. 17, 1976 | Sep. 21, 1976 |
| B 541,415 | 3,982,080 | Feb. 3, 1976 | Sep. 21, 1976 |
| B 541,464 | 3,995,424 | Feb. 17, 1976 | Dec. 7, 1976 |
| B 541,496 | 3,982,232 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 541,501 | 4,005,826 | Apr. 13, 1976 | Feb. 1, 1977 |
| B 541,517 | 3,986,156 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 541,710 | 3,994,472 | Feb. 24, 1976 | Nov. 30, 1976 |
| B 542,135 | 3,986,939 | Feb. 10, 1976 | Oct. 19, 1976 |
| B 542,158 | 3,981,886 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 542,226 | 3,993,748 | Feb. 24, 1976 | Nov. 23, 1976 |
| B 542,258 | 4,013,536 | Mar. 23, 1976 | Mar. 22, 1977 |
| B 543,078 | 3,995,687 | Feb. 17, 1976 | Dec. 7, 1976 |
| B 543,941 | 3,985,528 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 544,034 | 3,997,175 | Feb. 17, 1976 | Dec. 14, 1976 |
| B 544,476 | 3,993,585 | Feb. 24, 1976 | Nov. 23, 1976 |
| B 544,899 | 3,994,962 | Feb. 17, 1976 | Nov. 30, 1976 |
| B 544,961 | 3,983,492 | Jan. 13, 1976 | Sep. 28, 1976 |
| B 545,050 | 3,982,073 | Jan. 20, 1976 | Sep. 21, 1976 |
| B 545,265 | D 243,090 | Apr. 13, 1976 | Jan. 18, 1977 |
| B 545,299 | 4,001,259 | Feb. 24, 1976 | Jan. 4, 1977 |
| B 545,344 | 4,012,746 | Mar. 30, 1976 | Mar. 15, 1977 |
| B 545,464 | 3,992,387 | Feb. 10, 1976 | Nov. 16, 1976 |
| B 545,630 | 3,981,337 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 545,777 | 4,004,906 | Jan. 27, 1976 | Jan. 25, 1977 |
| B 545,856 | 4,006,939 | Mar. 30, 1976 | Feb. 8, 1977 |
| B 545,935 | 3,990,337 | Jan. 27, 1976 | Nov. 9, 1976 |
| B 545,945 | 3,995,260 | Jan. 27, 1976 | Nov. 30, 1976 |
| B 546,097 | 3,999,309 | Mar. 23, 1976 | Dec. 28, 1976 |
| B 546,295 | 3,987,070 | Jan. 20, 1976 | Oct. 19, 1976 |
| B 546,426 | 3,982,063 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 546,631 | 3,983,729 | Feb. 3, 1976 | Oct. 5, 1976 |
| B 546,665 | 3,990,062 | Jan. 20, 1976 | Nov. 2, 1976 |
| B 546,677 | 4,015,654 | Apr. 6, 1976 | Apr. 5, 1977 |
| B 546,911 | 3,981,058 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 546,922 | 3,987,742 | Mar. 16, 1976 | Oct. 26, 1976 |
| B 547,016 | 3,999,741 | Mar. 23, 1976 | Dec. 28, 1976 |
| B 547,208 | 4,001,218 | Feb. 24, 1976 | Jan. 4, 1977 |
| B 547,547 | 3,997,670 | Feb. 24, 1976 | Dec. 14, 1976 |
| B 547,994 | 3,990,081 | Jan. 20, 1976 | Nov. 2, 1976 |
| B 548,028 | 3,991,517 | Feb. 3, 1976 | Nov. 16, 1976 |
| B 548,058 | 3,983,050 | Feb. 17, 1976 | Sep. 28, 1976 |
| B 548,155 | 3,981,477 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 548,440 | 3,993,401 | Feb. 3, 1976 | Nov. 23, 1976 |
| B 548,302 | 3,983,414 | Feb. 17, 1976 | Sep. 28, 1976 |
| B 548,440 | 3,993,401 | Feb. 3, 1976 | Nov. 23, 1976 |
| B 548,462 | D 242,283 | Feb. 10, 1976 | Nov. 9, 1976 |
| B 548,688 | 3,995,984 | Mar. 9, 1976 | Dec. 7, 1976 |
| B 548,719 | 3,990,553 | Feb. 17, 1976 | Nov. 9, 1976 |



# CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

| DOCUMENT NUMBER | PATENT NUMBER | PUB. DATE | ISSUE DATE |
|---|---|---|---|
| B 548,978 | 3,998,139 | Mar. 9, 1976 | Dec. 21, 1976 |
| B 549,198 | 3,981,975 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 549,244 | 3,981,125 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 549,394 | 3,981,611 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 549,931 | 3,986,141 | Jan. 20, 1976 | Oct. 12, 1976 |
| B 549,964 | 3,995,899 | Feb. 24, 1976 | Dec. 7, 1976 |
| B 550,693 | 3,982,194 | Jan. 20, 1976 | Sep. 21, 1976 |
| B 550,744 | 3,993,550 | Feb. 17, 1976 | Nov. 23, 1976 |
| B 550,810 | 4,000,910 | Mar. 23, 1976 | Jan. 4, 1977 |
| B 551,133 | 3,996,740 | Mar. 2, 1976 | Dec. 14, 1976 |
| B 551,463 | 3,996,254 | Feb. 17, 1976 | Dec. 7, 1976 |
| B 551,527 | 3,982,599 | Jan. 13, 1976 | Sep. 28, 1976 |
| B 551,809 | 3,996,743 | Feb. 24, 1976 | Dec. 14, 1976 |
| B 551,952 | Re. 29,059 | Mar. 2, 1976 | Dec. 7, 1976 |
| B 552,006 | 3,992,129 | Feb. 3, 1976 | Nov. 16, 1976 |
| B 552,489 | 3,994,864 | Feb. 10, 1976 | Nov. 30, 1976 |
| B 552,498 | 3,983,139 | Jan. 13, 1976 | Sep. 28, 1976 |
| B 552,508 | 4,001,250 | Mar. 16, 1976 | Jan. 4, 1977 |
| B 552,629 | 3,994,773 | Mar. 23, 1976 | Nov. 30, 1976 |
| B 552,709 | 4,001,467 | Mar. 23, 1976 | Jan. 4, 1977 |
| B 552,932 | 3,989,292 | Feb. 3, 1976 | Nov. 2, 1976 |
| B 553,421 | 4,001,146 | Mar. 23, 1976 | Jan. 4, 1977 |
| B 553,460 | 3,990,019 | Feb. 3, 1976 | Nov. 2, 1976 |
| B 553,584 | 3,992,456 | Feb. 17, 1976 | Nov. 16, 1976 |
| B 553,629 | 3,999,242 | Feb. 24, 1976 | Dec. 28, 1976 |
| B 554,039 | 3,999,944 | Feb. 24, 1976 | Dec. 28, 1976 |
| B 554,164 | 4,001,465 | Mar. 9, 1976 | Jan. 4, 1977 |
| B 554,283 | 3,981,152 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 554,291 | 4,001,209 | Mar. 9, 1976 | Jan. 4, 1977 |
| B 554,380 | 4,001,147 | Mar. 9, 1976 | Jan. 4, 1977 |
| B 554,594 | 3,985,960 | Jan. 20, 1976 | Oct. 12, 1976 |
| B 554,655 | 4,015,048 | Feb. 24, 1976 | Mar. 29, 1977 |
| B 554,848 | 4,001,265 | Feb. 24, 1976 | Jan. 4, 1977 |
| B 554,939 | 3,994,013 | Feb. 10, 1976 | Nov. 23, 1976 |
| B 555,146 | 4,007,636 | Apr. 20, 1976 | Feb. 15, 1977 |
| B 555,437 | 3,991,152 | Feb. 3, 1976 | Nov. 9, 1976 |
| B 555,456 | 3,993,423 | Mar. 30, 1976 | Nov. 23, 1976 |
| B 555,772 | 3,982,641 | Jan. 13, 1976 | Sep. 28, 1976 |
| B 556,057 | 3,985,349 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 556,496 | 3,990,244 | Mar. 16, 1976 | Nov. 9, 1976 |
| B 556,897 | 3,992,972 | Feb. 3, 1976 | Nov. 23, 1976 |
| B 557,153 | 3,991,603 | Feb. 3, 1976 | Nov. 16, 1976 |
| B 557,274 | 4,016,375 | Mar. 23, 1976 | Apr. 5, 1977 |
| B 557,299 | 3,990,357 | Feb. 3, 1976 | Nov. 9, 1976 |
| B 557,621 | 3,990,800 | Feb. 3, 1976 | Nov. 9, 1976 |
| B 557,721 | 4,013,435 | Mar. 23, 1976 | Mar. 22, 1977 |
| B 557,856 | 3,991,019 | Feb. 10, 1976 | Nov. 9, 1976 |
| B 558,220 | 3,990,009 | Jan. 27, 1976 | Nov. 2, 1976 |
| B 558,251 | 3,981,289 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 558,813 | 3,989,188 | Feb. 3, 1976 | Nov. 2, 1976 |
| B 558,818 | 3,983,762 | Jan. 13, 1976 | Oct. 5, 1976 |
| B 558,819 | 3,990,160 | Feb. 3, 1976 | Nov. 9, 1976 |
| B 558,973 | 3,981,126 | Feb. 10, 1976 | Sep. 21, 1976 |
| B 559,111 | 3,984,854 | Feb. 24, 1976 | Oct. 5, 1976 |
| B 559,142 | 4,001,124 | Mar. 2, 1976 | Jan. 4, 1977 |
| B 559,394 | 4,016,094 | Apr. 20, 1976 | Apr. 5, 1977 |
| B 559,441 | 4,013,609 | Mar. 23, 1976 | Mar. 22, 1977 |
| B 559,631 | 4,011,406 | Mar. 23, 1976 | Mar. 8, 1977 |
| B 559,697 | 3,995,770 | Mar. 16, 1976 | Dec. 7, 1976 |
| B 559,700 | 4,001,189 | Mar. 23, 1976 | Jan. 4, 1977 |
| B 559,701 | 4,001,190 | Mar. 23, 1976 | Jan. 4, 1977 |
| B 559,737 | 3,984,668 | Jan. 20, 1976 | Oct. 5, 1976 |
| B 559,954 | 3,982,673 | Feb. 3, 1976 | Sep. 28, 1976 |
| B 560,261 | 3,987,493 | Mar. 16, 1976 | Oct. 19, 1976 |
| B 560,488 | 3,989,940 | Mar. 16, 1976 | Nov. 2, 1976 |
| B 560,717 | 3,982,034 | Feb. 10, 1976 | Sep. 21, 1976 |
| B 560,765 | 3,983,389 | Feb. 3, 1976 | Sep. 28, 1976 |
| B 561,062 | D 242,248 | Feb. 10, 1976 | Nov. 9, 1976 |
| B 561,165 | 4,013,002 | Mar. 30, 1976 | Mar. 22, 1977 |
| B 561,166 | 4,011,809 | Mar. 30, 1976 | Mar. 15, 1977 |
| B 561,365 | 4,005,078 | Apr. 13, 1976 | Jan. 25, 1977 |
| B 561,387 | 3,985,706 | Feb. 10, 1976 | Oct. 12, 1976 |
| B 561,405 | 4,003,770 | Mar. 30, 1976 | Jan. 18, 1977 |
| B 561,712 | 3,992,126 | Feb. 17, 1976 | Nov. 16, 1976 |
| B 561,732 | 3,991,460 | Feb. 3, 1976 | Nov. 16, 1976 |
| B 561,764 | 3,984,634 | Jan. 27, 1976 | Oct. 5, 1976 |
| B 561,770 | 4,000,366 | Mar. 16, 1976 | Dec. 28, 1976 |
| B 561,784 | 3,984,710 | Jan. 27, 1976 | Oct. 5, 1976 |
| B 562,413 | 4,000,930 | Mar. 16, 1976 | Jan. 4, 1977 |
| B 562,462 | 3,985,836 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 562,519 | 4,013,125 | Mar. 30, 1976 | Mar. 22, 1977 |
| B 562,601 | 3,998,360 | Mar. 16, 1976 | Dec. 21, 1976 |
| B 562,698 | 3,983,972 | Jan. 13, 1976 | Oct. 5, 1976 |
| B 562,813 | 3,985,491 | Feb. 3, 1976 | Oct. 12, 1976 |
| B 563,070 | 3,996,230 | Mar. 9, 1976 | Dec. 7, 1976 |
| B 563,165 | 4,000,977 | Mar. 9, 1976 | Jan. 4, 1977 |
| B 563,244 | 3,983,562 | Jan. 27, 1976 | Sep. 28, 1976 |
| B 563,301 | 3,995,589 | Feb. 17, 1976 | Dec. 7, 1976 |
| B 563,412 | 3,992,127 | Feb. 24, 1976 | Nov. 16, 1976 |
| B 563,419 | 3,999,051 | Mar. 23, 1976 | Dec. 21, 1976 |
| B 563,722 | 3,990,925 | Jan. 13, 1976 | Nov. 9, 1976 |
| B 563,780 | 3,987,769 | Feb. 3, 1976 | Oct. 26, 1976 |
| B 563,932 | 4,000,638 | Mar. 23, 1976 | Jan. 4, 1977 |
| B 564,252 | 4,001,293 | Mar. 2, 1976 | Jan. 4, 1977 |
| B 564,255 | 4,015,996 | Mar. 30, 1976 | Apr. 5, 1977 |
| B 564,314 | 3,984,996 | Jan. 20, 1976 | Oct. 12, 1976 |
| B 564,902 | 4,001,351 | Mar. 23, 1976 | Jan. 4, 1977 |
| B 565,180 | 3,981,685 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 565,275 | 3,990,299 | Apr. 6, 1976 | Nov. 9, 1976 |
| B 565,717 | 3,999,138 | Apr. 13, 1976 | Dec. 21, 1976 |
| B 565,754 | 4,011,626 | Mar. 30, 1976 | Mar. 15, 1977 |
| B 566,464 | 3,996,367 | Feb. 3, 1976 | Dec. 7, 1976 |
| B 566,556 | 3,998,511 | Mar. 23, 1976 | Dec. 21, 1976 |
| B 566,572 | 3,988,590 | Mar. 16, 1976 | Oct. 26, 1976 |
| B 566,585 | 4,001,083 | Mar. 2, 1976 | Jan. 4, 1977 |
| B 567,058 | 3,985,188 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 567,076 | 4,011,187 | Mar. 23, 1976 | Mar. 8, 1977 |
| B 567,158 | 3,988,073 | Mar. 23, 1976 | Oct. 26, 1976 |
| B 567,207 | 3,991,689 | Apr. 13, 1976 | Nov. 16, 1976 |
| B 567,435 | 3,995,724 | Feb. 3, 1976 | Dec. 7, 1976 |
| B 567,854 | 3,985,038 | Feb. 3, 1976 | Oct. 12, 1976 |
| B 567,892 | 4,000,855 | Mar. 16, 1976 | Jan. 4, 1977 |
| B 568,226 | 3,992,698 | Feb. 24, 1976 | Nov. 16, 1976 |
| B 568,770 | 3,982,213 | Feb. 10, 1976 | Sep. 21, 1976 |
| B 569,125 | 3,986,980 | Feb. 24, 1976 | Oct. 19, 1976 |
| B 569,293 | 4,004,149 | Mar. 30, 1976 | Jan. 18, 1977 |
| B 569,501 | 3,999,250 | Mar. 9, 1976 | Dec. 28, 1976 |
| B 569,519 | 3,993,133 | Feb. 3, 1976 | Nov. 23, 1976 |
| B 569,646 | 3,985,222 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 569,859 | 3,994,160 | Mar. 9, 1976 | Nov. 30, 1976 |
| B 570,172 | 3,987,763 | Feb. 3, 1976 | Oct. 26, 1976 |
| B 570,615 | 3,998,570 | Mar. 23, 1976 | Dec. 21, 1976 |
| B 570,862 | 3,991,639 | Feb. 24, 1976 | Nov. 16, 1976 |
| B 571,219 | 3,991,388 | Feb. 24, 1976 | Nov. 9, 1976 |
| B 571,638 | 4,001,244 | Mar. 9, 1976 | Jan. 4, 1977 |
| B 571,659 | 3,995,186 | Apr. 13, 1976 | Nov. 30, 1976 |
| B 572,642 | 3,990,715 | Feb. 10, 1976 | Nov. 9, 1976 |
| B 572,726 | 4,015,020 | Feb. 24, 1976 | Mar. 29, 1977 |
| B 573,033 | 3,995,224 | Mar. 23, 1976 | Nov. 30, 1976 |
| B 573,114 | 4,014,843 | Apr. 6, 1976 | Mar. 29, 1977 |
| B 573,991 | 4,013,704 | Mar. 30, 1976 | Mar. 22, 1977 |
| B 573,994 | 4,000,641 | Mar. 23, 1976 | Jan. 4, 1977 |
| B 574,128 | 3,982,961 | Feb. 17, 1976 | Sep. 28, 1976 |
| B 574,616 | 4,000,424 | Mar. 2, 1976 | Dec. 28, 1976 |
| B 574,996 | 3,989,718 | Feb. 17, 1976 | Nov. 2, 1976 |
| B 575,583 | 4,000,928 | Mar. 16, 1976 | Jan. 4, 1977 |
| B 575,757 | 3,981,170 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 575,761 | 4,013,123 | Apr. 13, 1976 | Mar. 22, 1977 |
| B 575,776 | 4,013,124 | Apr. 20, 1976 | Mar. 22, 1977 |
| B 575,851 | 3,985,826 | Feb. 10, 1976 | Oct. 12, 1976 |
| B 576,385 | 4,009,498 | Mar. 30, 1976 | Mar. 1, 1977 |
| B 576,859 | 3,991,526 | Feb. 24, 1976 | Nov. 16, 1976 |
| B 576,903 | 3,995,032 | Feb. 3, 1976 | Nov. 30, 1976 |
| B 578,447 | 3,982,658 | Jan. 20, 1976 | Sep. 28, 1976 |
| B 579,104 | 3,982,081 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 579,116 | 3,986,227 | Feb. 3, 1976 | Oct. 19, 1976 |
| B 579,153 | 4,013,745 | Mar. 30, 1976 | Mar. 22, 1977 |
| B 579,806 | 3,995,318 | Feb. 3, 1976 | Nov. 30, 1976 |
| B 580,379 | 4,000,796 | Apr. 6, 1976 | Jan. 4, 1977 |
| B 580,826 | 3,988,391 | Feb. 17, 1976 | Oct. 26, 1976 |
| B 580,921 | 3,984,054 | Jan. 13, 1976 | Oct. 5, 1976 |
| B 581,843 | 4,000,562 | Mar. 16, 1976 | Jan. 4, 1977 |
| B 583,051 | 3,990,714 | Feb. 3, 1976 | Nov. 9, 1976 |
| B 583,089 | 3,982,174 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 583,712 | 3,995,064 | Feb. 10, 1976 | Nov. 30, 1976 |
| B 584,520 | 3,981,149 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 584,997 | 4,000,030 | Mar. 9, 1976 | Dec. 28, 1976 |
| B 585,247 | 3,989,914 | Feb. 3, 1976 | Nov. 2, 1976 |
| B 585,731 | 3,993,603 | Feb. 3, 1976 | Nov. 23, 1976 |
| B 586,215 | 3,985,302 | Jan. 20, 1976 | Oct. 12, 1976 |
| B 586,380 | 3,983,885 | Mar. 2, 1976 | Oct. 5, 1976 |
| B 586,387 | 3,981,311 | Feb. 3, 1976 | Sep. 21, 1976 |
| B 586,663 | 3,992,080 | Feb. 3, 1976 | Nov. 16, 1976 |
| B 587,118 | Re. 29,067 | Mar. 2, 1976 | Dec. 7, 1976 |
| B 587,786 | 3,991,204 | Feb. 17, 1976 | Nov. 9, 1976 |
| B 587,936 | 3,999,052 | Mar. 23, 1976 | Dec. 21, 1976 |
| B 589,179 | 4,001,102 | Mar. 23, 1976 | Jan. 4, 1977 |
| B 589,687 | 3,995,349 | Mar. 23, 1976 | Dec. 7, 1976 |
| B 589,966 | 3,985,828 | Feb. 17, 1976 | Oct. 12, 1976 |
| B 590,158 | 3,985,163 | Feb. 10, 1976 | Oct. 12, 1976 |
| B 590,159 | 3,985,164 | Feb. 3, 1976 | Oct. 12, 1976 |
| B 590,502 | 4,001,171 | Mar. 23, 1976 | Jan. 4, 1977 |
| B 591,141 | 4,013,631 | Mar. 23, 1976 | Mar. 22, 1977 |
| B 592,143 | 3,984,713 | Jan. 27, 1976 | Oct. 5, 1976 |

# CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

| DOCUMENT NUMBER | PATENT NUMBER | PUB. DATE | ISSUE DATE | DOCUMENT NUMBER | PATENT NUMBER | PUB. DATE | ISSUE DATE |
|---|---|---|---|---|---|---|---|
| B 592,146 | 4,001,084 | Mar. 2, 1976 | Jan. 4, 1977 | B 657,438 | 3,985,701 | Jan. 20, 1976 | Oct. 12, 1976 |
| B 592,658 | 4,001,164 | Mar. 23, 1976 | Jan. 4, 1977 | B 747,785 | 3,981,899 | Feb. 10, 1976 | Sep. 21, 1976 |
| B 593,781 | 4,015,953 | Mar. 16, 1976 | Apr. 5, 1977 | B 750,679 | 4,007,049 | Mar. 23, 1976 | Feb. 8, 1977 |
| B 594,871 | 3,999,245 | Mar. 16, 1976 | Dec. 28, 1976 | B 843,038 | 3,981,785 | Feb. 3, 1976 | Sep. 21, 1976 |
| B 596,692 | 3,992,349 | Feb. 17, 1976 | Nov. 16, 1976 | B 845,044 | 4,001,338 | Mar. 30, 1976 | Jan. 4, 1977 |
| B 597,410 | 4,000,925 | Mar. 30, 1976 | Jan. 4, 1977 | B 848,336 | 3,993,752 | Mar. 30, 1976 | Nov. 23, 1976 |

# LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 12TH DAY OF APRIL, 1977

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Arthur D. Little, Inc.: *See*—
Loeffler, Herbert H., Re. 29,176.

Clark, Wallace. Moineau pump with rotating outer member. Re. 29,180, Cl. 418-48.000.

Colwill, Richard H. Sheet recirculator. Re. 29,178, Cl. 271-6.000.

Davidge, Ronald V.; Hobgood, George W.; Queener, Carl A.; Spears, Jesse W.; and Thompson, Bernard G., to International Business Machines Corporation. Reproduction apparatus incorporating alternate redevelopment and reimaging cycles for multiple copies. Re. 29,179, Cl. 355-14.000.

Dixon, Charles H., III, to RBP Chemical Corporation. Method of preparing printed circuit boards with terminal tabs. Re. 29,181, Cl. 156-656.000.

Greneker, Gene, III. Telephone range expander. Re. 29,183, Cl. 179-41.00A.

Hobgood, George W.: *See*—
Davidge, Ronald V.; Hobgood, George W.; Queener, Carl A.; Spears, Jesse W.; and Thompson, Bernard G., Re. 29,179.

International Business Machines Corporation: *See*—
Davidge, Ronald V.; Hobgood, George W.; Queener, Carl A.; Spears, Jesse W.; and Thompson, Bernard G., Re. 29,179.

Loeffler, Herbert H., to Arthur D. Little, Inc. Product pressurized compressed air dispenser. Re. 29,176, Cl. 222-389.000.

McCune, Homer W.; and Tucker, Nathaniel B., to Procter & Gamble Company, The. Oral composition for calculus retardation. Re. 29,182, Cl. 424-49.000.

Michaelis, Theodore Donald, to RCA Corporation. Solar torque compensation for a satellite. Re. 29,177, Cl. 244-166.000.

Procter & Gamble Company, The: *See*—
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Spears, Jesse W.: *See*—
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Tauer, Kenneth A. Compact lift for van. Re. 29,175, Cl. 214-77.00R.

Thompson, Bernard G.: *See*—
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Buck, Griffith J., to Iowa State University Research Foundation, Inc. Geranium plant named Hazel. 4,040, 4-12-77, Cl. 68.000.

Buck, Griffith J., to Iowa State University Research Foundation, Inc. Geranium plant named Marian. 4,041, 4-12-77, Cl. 68.000.

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Lake County Nursery Exchange, Inc.: *See*—
Zampini, James W., 4,038.

Zampini, James W., to Lake County Nursery Exchange, Inc. Flowering crab apple tree. 4,038, 4-12-77, Cl. 34.000.

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AGFA-Gevaert, A.G.: *See*—
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Ault, Charles Michael, to Termiflex Corporation. Telephone coupler — carrying case and hand-held computer terminal. 244,035, 4-12-77, Cl. D14-65.000.

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Bonin, Bernard R. Cork retriever. 244,002, 4-12-77, Cl. D8-42.000.

Bott, John A. License plate holder. 244,017, 4-12-77, Cl. D12-193.000.

Brown, Robert I. Refrigerated display case. 243,985, 4-12-77, Cl. D6-187.000.

Brown, Robert I. Refrigerated display case. 244,019, 4-12-77, Cl. D15-81.000.

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Carter, Roland P., to Lane Company, Inc., The. Cocktail table. 243,982, 4-12-77, Cl. D6-177.000.
Carter, Roland P., to Lane Company, Inc., The. Table. 243,983, 4-12-77, Cl. D6-177.000.
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Daverin, Donald R. Scooter. 244,048, 4-12-77, Cl. D34-15.0AT.
Deetz, Niles Ellis; and Garcia, Arcadio Alvarez, to Stack Heater's Inc. Heat saving unit for use with furnaces or the like. 244,032, 4-12-77, Cl. D23-127.000.
De Filippis, John, to International Telephone and Telegraph Corporation. Camera power-pack unit. 244,022, 4-12-77, Cl. D16-10.000.
De Lucia, Victor E.; and Ivy, William R., to Torr Laboratories, Inc. Parcel and letter X-ray inspection unit. 244,059, 4-12-77, Cl. D10-104.000.
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64 4,016,677
66 4,016,676
77 4,016,678

**CLASS 48**

86 R 4,017,269
197 R 4,017,270
4,017,271
4,017,272
209 4,017,273
214 A 4,017,274

**CLASS 49**

49 4,016,679

**CLASS 51**

5 D 4,016,680
9 M 4,016,681
50 PC 4,016,682
143 4,016,683
170 R 4,016,684
219 R 4,016,685

**CLASS 52**

65 4,016,686
116 4,016,687
118 4,016,688
145 4,016,689
238 4,016,690
298 4,016,691
314 4,016,692
405 4,016,693
475 4,016,694
476 4,016,695
514 4,016,696
622 4,016,697
656 4,016,698
663 4,016,699
735 4,016,700
4,016,701
743 4,016,702

**CLASS 53**

3 4,016,704
11 4,016,705
14 4,016,706
24 4,016,707
381 R 4,016,708

**CLASS 55**

1 4,017,275
51 4,017,276
54 4,017,277
96 4,017,278
178 4,017,279
255 4,017,280
334 4,017,281
428 4,017,282

**CLASS 56**

10.2 4,016,709
220 4,016,710
330 4,016,711
341 4,016,712

**CLASS 57**

100 4,016,713
149 4,016,714
157 TS 4,016,715

**CLASS 60**

39.09 R 4,016,716
39.28 R 4,016,717
39.32 4,016,718
416 4,016,719
524 4,016,720
528 4,016,721
531 4,016,722
660 4,016,723
672 4,016,724
690 4,016,725

**CLASS 61**

1 F 4,016,726
11 4,016,727
69 R 4,016,728

**CLASS 62**

2 4,017,285
40 4,017,283
4,017,284
160 4,017,286
259 4,016,729
476 4,016,730

**CLASS 64**

15 B 4,016,731

**CLASS 65**

2 4,017,287
4,017,288
18 4,017,289
21 4,017,290
30 R 4,017,291
33 4,017,292
107 4,017,293
326 4,017,294

**CLASS 66**

163 4,016,732

**CLASS 68**

9 4,016,733

**CLASS 69**

8 4,016,734

**CLASS 71**

66 4,017,295
86 4,017,296
4,017,297
92 4,017,298
96 4,017,299
98 4,017,300
118 4,017,301

**CLASS 72**

9 4,016,735
41 4,016,736
60 4,016,737
90 4,016,738
105 4,016,739
128 4,016,740
415 4,016,741
465 4,016,742

**CLASS 73**

1 R 4,016,743
11 4,016,744
19 4,016,745
32 R 4,016,746
37.9 4,016,747
40.5 R 4,016,748
45.5 4,016,749
67.5 R 4,016,750
71 4,016,752
71.5 US 4,016,751
116 4,016,753
117.3 4,016,754
121 4,016,755
141 A 4,016,756
167 4,016,757
204 4,016,758
4,016,759
205 R 4,016,760
356 4,016,761
358 4,016,762
362 AR 4,016,763
398 C 4,016,764
425.6 4,016,765
517 R 4,016,766

**CLASS 74**

23 4,016,768
25 4,016,767
37 4,016,769
230.17 M 4,016,771
230.3 4,016,770
243 R 4,016,772
333 4,016,773
424.6 4,016,774
471 XY 4,016,775
501 M 4,016,776
665 K 4,016,777
687 4,016,778
724 4,016,779
804 4,016,780

**CLASS 75**

.5 AA 4,017,303
.5 BB 4,017,302
33 4,017,304
34 4,017,305
66 4,017,306
72 4,017,307
77 4,017,308
101 R 4,017,309
129 4,017,310

**CLASS 76**

40 4,016,781

**CLASS 81**

63 4,016,782
71 4,016,783

**CLASS 82**

2 R 4,016,784
53 4,016,785

**CLASS 83**

9 4,016,786
13 4,016,787
72 4,016,788
355 4,016,789
371 4,016,790

**CLASS 84**

1.01 4,016,792
1.03 4,016,791
307 4,016,793
397 4,016,794

**CLASS 85**

41 4,016,795

**CLASS 89**

1.806 4,016,796
34 4,016,797
37.5 R 4,016,798
42 B 4,016,799
177 4,016,800

**CLASS 90**

11.42 4,016,801
12 R 4,016,802

**CLASS 91**

43 4,016,803

**CLASS 92**

34 4,016,804

**CLASS 93**

35 R 4,016,806
35 VL 4,016,805
39 C 4,016,807
62 4,016,808

**CLASS 96**

1.5 4,017,311
35 4,017,312
48 QP 4,017,313
66 R 4,017,314

**CLASS 98**

115 LH 4,016,809

**CLASS 101**

4 4,016,810
148 4,016,811
425 4,016,812
426 4,016,813
467 4,016,814

**CLASS 102**

7 4,016,815
67 4,016,816
92.4 4,016,817

**CLASS 104**

103 4,016,818

**CLASS 106**

14 4,017,315
15 FP 4,017,316
39.6 4,017,317
52 4,017,318
55 4,017,319
73.3 4,017,320
98 4,017,321
99 4,017,322
273 R 4,017,327
281 R 4,017,323
288 B 4,017,324
288 Q 4,017,325
291 4,017,326
298 4,017,328

**CLASS 108**

19 4,016,819

**CLASS 110**

173 R 4,016,820

**CLASS 112**

158 E 4,016,821
217 4,016,822

**CLASS 114**

90 4,016,823
165 4,016,824

**CLASS 115**

17 4,016,825
26 4,016,826

**CLASS 116**

129 D 4,016,827

**CLASS 118**

6 4,016,828
64 4,016,829
406 4,016,830
415 4,016,831

**CLASS 119**

14.14 4,016,832
17 4,016,833

**CLASS 122**

264 4,016,834
483 4,016,835

**CLASS 123**

3 4,016,836
25 R 4,016,837
59 PC 4,016,838
69 R 4,016,839
75 B 4,016,840
78 B 4,016,841
98 4,016,842
117 A 4,016,844
117 R 4,016,843
122 AA 4,016,847
122 AB 4,016,846
122 AC 4,016,845
136 4,016,848
148 DC 4,016,849
193 C 4,016,850
198 D 4,016,851
198 DB 4,016,852
198 R 4,016,853

**CLASS 124**

27 4,016,854

**CLASS 125**

13 R 4,016,855
21 4,016,856
4,016,857

**CLASS 126**

116 B 4,016,858
120 4,016,859
270 4,016,860
4,016,861

**CLASS 128**

2 E 4,016,866
2 G 4,016,863
4,016,864
2 S 4,016,867
2 V 4,016,862
2.06 R 4,016,871
2.1 C 4,016,870
2.1 E 4,016,868
4,016,869
44 4,016,872
54 4,016,873
92 BC 4,016,874
002 B 4,016,865
132 R 4,016,875
142 R 4,016,876
156 4,016,877
212 4,016,878
214.4 4,016,879
260 4,016,880
303.17 4,016,881
305 4,016,882
325 4,016,883
348 4,016,884
349 B 4,016,885
422 4,016,886

**CLASS 131**

261 R 4,016,887

**CLASS 132**

53 4,016,888
56 4,016,889
75.6 4,016,890
84 A 4,016,891
91 4,016,892

**CLASS 134**

21 4,017,329
4,017,330
115 R 4,016,893
167 R 4,017,331

**CLASS 136**

89 PC 4,017,332

**CLASS 137**

13 4,016,894
101 4,016,895
107 4,016,897
115 4,016,898
4,016,899
205 4,016,896
223 4,016,900
340 4,016,901
344 4,016,902
493.5 4,016,903
493.9 4,016,904
505.41 4,016,905
516.21 4,016,906
797 4,016,907

**CLASS 138**

96 R 4,016,908

**CLASS 139**

188 R 4,016,909
383 R 4,016,911

**CLASS 141**

226 4,016,910

**CLASS 145**

50 A 4,016,912
52 4,016,913

**CLASS 148**

2 4,017,333
6.15 R 4,017,334

4,017,335
6.35 4,017,336
11.5 A 4,017,337
12 B 4,017,338
24 4,017,339
33.3 4,017,340
174 4,017,341

**CLASS 149**

5 4,017,342

**CLASS 151**

41.76 4,016,914

**CLASS 152**

355 4,016,915
361 R 4,016,916
400 4,016,917
427 4,016,918

**CLASS 156**

52 4,017,344
72 4,017,345
89 4,017,347
185 4,017,346
189 4,017,348
361 4,017,349
384 4,017,350
494 4,017,351
502 4,017,352
574 4,017,353
642 4,017,343
656 Re.29,181

**CLASS 159**

6 R 4,017,354
49 4,017,355

**CLASS 160**

130 4,016,919
133 4,016,920
328 4,016,921

**CLASS 162**

26 4,017,356

**CLASS 164**

45 4,016,922
52 4,016,923
82 4,016,924
87 4,016,925
147 4,016,926

**CLASS 165**

70 4,016,927
141 4,016,928
159 4,016,929

**CLASS 166**

266 4,016,930
276 4,016,931
303 4,016,932

**CLASS 172**

59 4,016,933
555 4,016,934
601 4,016,935
796 4,016,936

**CLASS 173**

1 4,016,938
169 4,016,940
170 4,016,941

**CLASS 174**

21 C 4,017,675

**CLASS 175**

45 4,016,942
65 4,016,943
92 4,016,944

**CLASS 176**

61 4,017,357
65 4,017,358

**CLASS 178**

69.1 4,017,683
4,017,684

**CLASS 179**

1.5 4,017,685
2 R 4,017,686
15 A 4,017,687
15 AF 4,017,688
18 AH 4,017,690
18 EB 4,017,689
18 ET 4,017,691
41 A Re.29,183
81 R 4,017,692
84 VF 4,017,693
115.5 VC 4,017,694
170 R 4,017,695
175 4,017,696

**CLASS 180**

33 R 4,016,945
74 4,016,946
88 4,016,947
132 4,016,948
160 4,016,949

**CLASS 181**

109 4,016,951
118 4,016,952
144 4,016,953

**CLASS 182**

22 4,016,954
122 4,016,955

**CLASS 184**

15 R 4,016,956

**CLASS 188**

72.7 4,016,957
78 4,016,958
196 B 4,016,959
282 4,016,960

**CLASS 191**

23 A 4,016,961

**CLASS 192**

70.2 4,016,962
105 BA 4,016,963
105 CD 4,016,964

**CLASS 195**

1.3 4,017,359
1.4 4,017,360
1.8 4,017,361
30 4,017,362
31 R 4,017,363
68 4,017,364
103.5 R 4,017,365

**CLASS 197**

1 R 4,016,965
16 4,016,966
19 4,016,967

**CLASS 198**

394 4,016,968
435 4,016,969
524 4,016,970
850 4,016,971

**CLASS 200**

5 A 4,017,697
50 AA 4,017,698
67 D 4,017,699
314 4,017,700

**CLASS 204**

2 4,017,366
28 4,017,367
32 R 4,017,368
121 4,017,369
147 4,017,370
159.18 4,017,371
181 4,017,372
195 P 4,017,374
195 R 4,017,373
255 4,017,375
258 4,017,376

**CLASS 206**

45.34 4,016,972
107 4,016,973
321 4,016,974
390 4,016,975
519 4,016,976
526 4,016,977

**CLASS 208**

11 LE 4,017,377
41 4,017,378
68 4,017,379
89 4,017,380
143 4,017,381
210 4,017,382
309 4,017,383

**CLASS 209**

2 4,016,978
74 R 4,016,979
111.7 T 4,016,980
149 4,017,384
214 4,017,385
215 4,017,386
240 4,017,387

**CLASS 210**

5 4,017,388
42 R 4,017,390
44 4,017,391
54 4,017,392
101 4,017,393
157 4,017,394
167 4,017,395
232 4,017,396
238 4,017,397
350 4,017,398
408 4,017,399
439 4,017,400
493 4,017,401
528 4,017,402

**CLASS 211**

49 R 4,016,981
69.1 4,016,982

**CLASS 214**

1 BB 4,016,984
1 R 4,016,983
5.5 4,016,985
16.4 A 4,016,986
4,016,987
17 C 4,016,988
38 BB 4,016,990
38 C 4,016,991
38 R 4,016,989
77 R Re.29,175
147 G 4,016,992
394 4,016,993
508 4,016,994

**CLASS 215**

10 4,016,995
344 4,016,996

**CLASS 219**

10.49 4,017,701
10.55 B 4,017,702
10.69 4,017,703
10.79 4,017,704
69 C 4,017,705
69 M 4,017,706
121 LM 4,017,708
121 P 4,017,707
126 4,017,709
130 4,017,710
146 4,017,711
202 4,017,712
243 4,017,713
322 4,017,714
553 4,017,715

**CLASS 220**

10 4,016,997
90.2 4,016,998
231 4,016,999
270 4,017,000

**CLASS 221**

5 4,017,001
63 4,017,002
81 4,017,003
94 4,017,004

**CLASS 222**

47 4,017,005
67 4,017,006
80 4,017,007
94 4,017,008
389 Re.29,176
402.11 4,017,009
590 4,017,010

**CLASS 223**

102 4,017,011

**CLASS 225**

96.5 4,017,012
4,017,013

**CLASS 226**

45 4,017,014

**CLASS 229**

19 4,017,015
23 BT 4,017,016
38 4,017,017
39 R 4,017,018
4,017,019
62 4,017,020
87.2 4,017,021

**CLASS 233**

1 A 4,017,023
1 R 4,017,022

**CLASS 235**

92 CA 4,017,717
061.5 S 4,017,716
150.2 4,017,718
150.3 4,017,719
150.52 4,017,720
151.1 4,017,722
151.11 4,017,723
151.3 4,017,721
151.31 4,017,724
152 4,017,725
186 4,017,726

**CLASS 236**

16 4,017,024
49 4,017,025
93 R 4,017,026
99 E 4,017,027

**CLASS 237**

1 A 4,017,028

**CLASS 239**

15 4,017,029
44 4,017,030
333 4,017,031

**CLASS 240**

1.3 4,017,727
4,017,728
13 4,017,729

**CLASS 241**

15 4,017,032
28 4,017,033
74 4,017,034
189 R 4,017,035
207 4,016,630

**CLASS 242**

75.5 4,017,036
129.8 4,017,037
152.1 4,017,038

**CLASS 243**

6 4,017,039

**CLASS 244**

3.22 4,017,040
40 R 4,017,041
137 R 4,017,042
138 A 4,017,043
166 Re.29,177
194 4,017,045

**CLASS 246**

182 B 4,017,044

**CLASS 248**

55 4,017,046
4,017,047
216.1 4,017,048
464 4,017,049
534 4,017,050

**CLASS 249**

50 4,017,051
183 4,017,052

**CLASS 250**

253 4,017,731
334 4,017,732
363 S 4,017,730
381 4,017,733
430 4,017,735
431 4,017,734
435 4,017,736
453 4,017,737
483 4,017,738
492 A 4,017,403
531 4,017,404

**CLASS 251**

58 4,017,053
61.4 4,017,054
62 4,017,055
131 4,017,056
149.1 4,017,057
328 4,017,058

**CLASS 252**

8.55 D 4,017,405
51.5 A 4,017,406
106 4,017,407
4,017,408
109 4,017,409
156 4,017,410
186 4,017,411
4,017,412
187 R 4,017,413
188 4,017,414
188.3 CL 4,017,415
299 4,017,416
301.1 W 4,017,417
309 4,017,418
311.5 4,017,419
408 4,017,420
416 4,017,421
417 4,017,422
437 4,017,423
4,017,424
453 4,017,425
520 4,017,426

**CLASS 254**

54 4,017,059

**CLASS 259**

1 R 4,017,060

**CLASS 260**

2 EP 4,017,429
2.5 AM 4,017,428
2.5 B 4,017,427
17.5 4,017,430
4,017,433
18 EP 4,017,432
18 N 4,017,431
21 4,017,434
22 A 4,017,435
27 BB 4,017,436
29.2 EP 4,017,438
29.3 4,017,437
29.6 H 4,017,444
29.6 HN 4,017,440
29.6 PM 4,017,441
29.6 R 4,017,445
29.6 RB 4,017,442
29.6 T 4,017,443
29.7 GP 4,017,446
31.2 R 4,017,447
31.4 R 4,017,448
33.6 EP 4,017,449
37 R 4,017,450
38 4,017,451
42.14 4,017,452
42.18 4,017,453
42.52 4,017,454
45.7 P 4,017,455
45.75 P 4,017,457
45.75 W 4,017,458
45.8 R 4,017,456
47 CP 4,017,459
67 R 4,017,461
72 R 4,017,462
75 T 4,017,463
77.5 AM 4,017,464
78 P 4,017,465
78 TF 4,017,466
79 4,017,467
79.5 B 4,017,439
4,017,468
112 B 4,017,470
4,017,471
112.5 R 4,017,472
117 4,017,473
124 A 4,017,474
4,017,475
144 4,017,476
153 4,017,477
158 4,017,478
4,017,479
239.3 A 4,017,482
239.3 P 4,017,481
240 D 4,017,483
240 J 4,017,485
240 R 4,017,484
240.9 4,017,486
243 B 4,017,489
243 C 4,017,487
4,017,488
246 B 4,017,490
247.5 E 4,017,491
248 AS 4,017,492
268 T 4,017,494
279 QA 4,017,496
285 4,017,497
289 C 4,017,499
294.8 C 4,017,500
295 Q 4,017,501
295.5 R 4,017,502
302 H 4,017,503
4,017,504
4,017,505
306.6 R 4,017,506
306.7 T 4,017,507
307 D 4,017,508
308 A 4,017,509
309.6 4,017,510
326 N 4,017,511
4,017,512
326.2 4,017,513
332.2 G 4,017,514
332.3 R 4,017,515
340.5 4,017,517
340.7 4,017,518
340.9 4,017,519
343 4,017,516
346.8 A 4,017,521
346.8 M 4,017,520
347.5 4,017,522
348.6 4,017,523
380 4,017,524
429.3 4,017,525
439 CY 4,017,526
448 AD 4,017,527
448.8 R 4,017,528
453 R 4,017,529
455 R 4,017,530
463 4,017,531
4,017,532
465 E 4,017,533
468 D 4,017,534
4,017,535
470 4,017,536
494 4,017,537
518 R 4,017,538
535 P 4,017,541
564 B 4,017,539
566 B 4,017,540
570.6 4,017,542
570.8 R 4,017,543
576 4,017,544
590 FA 4,017,545
591 4,017,546
599 4,017,547
606.5 B 4,017,548
613 R 4,017,549
635 E 4,017,550
650 R 4,017,551
666 PY 4,017,552
683.15 D 4,017,553
830 S 4,017,554
856 4,017,556
857 G 4,017,557
857 PA 4,017,555
876 B 4,017,558
876 R 4,017,559
888 4,017,560
898 4,017,561
927 N 4,017,562
954 4,017,563
969 4,017,564

**CLASS 261**

36 R 4,017,565
56 4,017,566

**CLASS 264**

.5 4,017,567
27 4,017,568
40.2 4,017,569
42 4,017,570
4,017,571
51 4,017,572
75 4,017,573
4,017,574
89 4,017,575
91 4,017,576
102 4,017,577
143 4,017,578
174 4,017,579
210 F 4,017,580
220 4,017,581
272 4,017,495
291 4,017,582

**CLASS 266**

173 4,017,061

**CLASS 267**

166 4,017,062

**CLASS 269**

302.1 4,017,063

**CLASS 270**

58 4,017,064

**CLASS 271**

6 Re.29,178
80 4,017,065
4,017,066
4,017,067
275 4,017,068

**CLASS 272**

66 4,017,069
85 4,017,071
104 4,017,070

**CLASS 273**

1 E 4,017,072
1 R 4,016,937
84 4,017,073
89 4,017,074
94 R 4,017,075
102 R 4,017,076
121 A 4,017,077
126 A 4,017,078
126 R 4,017,079
134 AT 4,016,939
135 R 4,017,080
138 A 4,017,081
162 D 4,017,082
164 4,017,083
176 FA 4,017,085
176 FB 4,017,084
183 B 4,017,086
201 4,017,087

**CLASS 277**

53 4,017,088
152 4,017,089
206 R 4,017,090

**CLASS 280**

30 4,017,091
47.26 4,017,092
163 4,017,093
404 4,017,094
438 R 4,017,095
615 4,017,096
4,017,097
625 4,017,098
674 4,016,950
707 4,017,099
736 4,017,100

**CLASS 283**

57 4,017,101



**CLASS 285**

41 4,017,102
155 4,017,103

**CLASS 290**

14 4,017,739

**CLASS 292**

262 4,017,108
268 4,017,104
288 4,017,105
340 4,017,106
341.16 4,017,107

**CLASS 294**

67 AA 4,017,109
81 SF 4,017,110
82 R 4,017,111
83 R 4,017,112
86.22 4,017,113
88 4,017,114
89 4,017,115

**CLASS 296**

26 4,017,116
146 4,017,117

**CLASS 297**

284 4,017,118

**CLASS 299**

2 4,017,119
5 4,017,120
11 4,017,121
4,017,122

**CLASS 301**

6 WB 4,017,123

**CLASS 303**

6 C 4,017,124
7 4,017,125
115 4,017,126

**CLASS 307**

208 4,017,740
221 C 4,017,741
237 4,017,743
252 Q 4,017,744
254 4,017,745
293 4,017,746
4,017,747
296 R 4,017,748
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95 4,017,821

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28 4,017,136
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3 D 4,017,823
10 4,017,824
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162 SF 4,017,158
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17 4,017,880
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242 4,017,680

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315 4,017,589
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473 4,017,592
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573 R 4,017,594

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600 4,017,266
601 4,017,480
675 4,017,265

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44 4,017,664
229 4,017,665

**CLASS 431**

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**CLASS 432**

58 4,017,253
72 4,017,254

**CLASS 526**

3 4,017,666
4,017,667
6 4,017,668
19 4,017,469
169 4,017,669
233 4,017,670

**CLASS 536**

50 4,017,460
98 4,017,671

## CLASSIFICATION OF DESIGNS

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| D2— | 311 | 243,976 | | 247 | 243,991 | | 364 | 244,005 | | 195 | 244,018 | D16— | 6 | 244,054 | | 64 | 244,058 |
| D6— | 85 | 243,977 | D7— | 74 | 243,992 | | 366 | 244,006 | D13— | 13 | 244,026 | | | 244,055 | D30— | 99 | 244,041 |
| | 116 | 243,978 | | 95 | 243,993 | D9— | 2 | 244,007 | | 30 | 244,027 | | 05 | 244,021 | D34— | 5 K | 244,043 |
| | 146 | 243,979 | | 128 | 243,994 | | 3 | 244,008 | D14— | 2 | 244,053 | | 10 | 244,022 | | 5 L | 244,044 |
| | 157 | 243,980 | | 137 | 243,995 | | 120 | 244,009 | | 36 | 244,037 | | 26 | 244,023 | | 5 SS | 244,042 |
| | 166 | 243,981 | | | 243,996 | | 195 | 244,010 | | 43 | 244,034 | D19— | 27 | 244,024 | | 14 D | 244,045 |
| | 177 | 243,982 | | | 243,997 | | 246 | 244,011 | | 52 | 244,036 | | 41 | 244,025 | | 15 AJ | 244,047 |
| | | 243,983 | | | 243,998 | D10— | 31 | 244,012 | | 65 | 244,035 | D22— | 27 | 244,028 | | 15 AT | 244,048 |
| | 179 | 243,984 | | | 243,999 | | 104 | 244,059 | | 80 | 244,052 | | 28 | 244,029 | | 15 S | 244,046 |
| | 187 | 243,985 | | | 244,000 | D11— | 147 | 244,013 | | 86 | 244,038 | D23— | 45 | 244,033 | D48— | 20 E | 244,049 |
| | 194 | 243,986 | | 151 | 244,001 | | 182 | 244,014 | | | 244,039 | | 58 | 244,030 | | | 244,050 |
| | 198 | 243,987 | D8— | 42 | 244,002 | D12— | 62 | 244,015 | | | 244,040 | | 97 | 244,031 | D56— | 1 A | 244,051 |
| | 232 | 243,988 | | 330 | 244,004 | | 156 | 244,016 | D15— | 81 | 244,019 | | 127 | 244,032 | D73— | 1 R | 244,056 |
| | 234 | 243,989 | | 350 | 244,003 | | 193 | 244,017 | | 148 | 244,020 | D24— | 62 | 244,057 | D87— | 3 B | 244,060 |
| | 236 | 243,990 | | | | | | | | | | | | | | | |

## CLASSIFICATION OF PLANTS

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P.— | 34 | 4,038 | | 68 | 4,039 | | 4,040 | | 4,041 | | | | |

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| 1 : | 4,017,589 | | 4,017,076 | | 4,017,666 | | 4,017,043 | | 4,017,748 | | 4,017,608 |
| | 4,017,743 | | 4,017,078 | | 4,017,667 | | 4,017,137 | | 4,017,798 | | 4,017,636 |
| 4 : | 4,016,842 | | 4,017,104 | | 4,017,668 | | 4,017,143 | | 4,017,825 | | 4,017,644 |
| | 4,016,986 | | 4,017,105 | | 4,017,685 | | 4,017,180 | | 4,017,837 | | 4,017,645 |
| | 4,017,032 | | 4,017,106 | | 4,017,687 | | 4,017,213 | | 4,017,853 | | 4,017,683 |
| | 4,017,072 | | 4,017,115 | | 4,017,690 | | 4,017,279 | | 4,017,857 | | 4,017,701 |
| | 4,017,726 | | 4,017,118 | | 4,017,700 | | 4,017,301 | 13 : | Re.29,183 | | 4,017,707 |
| | 4,017,727 | | 4,017,119 | | 4,017,708 | | 4,017,337 | | 4,017,019 | | 4,017,710 |
| | 4,017,785 | | 4,017,120 | | 4,017,715 | | 4,017,363 | | 4,017,039 | | 4,017,713 |
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| | 4,016,979 | | 4,017,163 | | 4,017,784 | | 4,017,439 | | 4,016,902 | 18 : | Re.29,180 |
| | 4,017,016 | | 4,017,167 | | 4,017,786 | | 4,017,459 | | 4,017,253 | | 4,016,681 |
| 6 : | Re.29,178 | | 4,017,178 | | 4,017,793 | | 4,017,556 | 17 : | 4,016,639 | | 4,016,774 |
| | 4,016,616 | | 4,017,185 | | 4,017,804 | | 4,017,585 | | 4,016,652 | | 4,016,812 |
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| | 4,016,666 | | 4,017,203 | | 4,017,820 | | 4,017,692 | | 4,016,772 | | 4,017,384 |
| | 4,016,679 | | 4,017,214 | | 4,017,823 | | 4,017,699 | | 4,016,792 | | 4,017,546 |
| | 4,016,705 | | 4,017,220 | | 4,017,824 | | 4,017,735 | | 4,016,811 | | 4,017,677 |
| | 4,016,711 | | 4,017,226 | | 4,017,836 | | 4,017,757 | | 4,016,823 | | 4,017,678 |
| | 4,016,726 | | 4,017,230 | | 4,017,848 | | 4,017,819 | | 4,016,847 | | 4,017,795 |
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| | 4,016,798 | | 4,017,309 | | 4,017,898 | | 4,017,158 | | 4,016,936 | | 4,016,921 |
| | 4,016,806 | | 4,017,329 | | 4,017,899 | | 4,017,296 | | 4,016,947 | | 4,017,093 |
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| | 4,016,827 | | 4,017,342 | | 4,016,671 | | 4,017,313 | | 4,016,968 | | 4,016,712 |
| | 4,016,835 | | 4,017,368 | | 4,016,885 | | 4,017,431 | | 4,016,977 | | 4,016,873 |
| | 4,016,839 | | 4,017,372 | | 4,017,051 | | 4,017,525 | | 4,017,009 | | 4,016,990 |
| | 4,016,840 | | 4,017,373 | | 4,017,094 | | 4,017,529 | | 4,017,029 | | 4,017,034 |
| | 4,016,854 | | 4,017,383 | | 4,017,121 | | 4,017,557 | | 4,017,057 | | 4,017,204 |
| | 4,016,856 | | 4,017,397 | | 4,017,201 | | 4,017,669 | | 4,017,074 | | 4,017,394 |
| | 4,016,870 | | 4,017,405 | | 4,017,586 | 12 : | 4,016,612 | | 4,017,077 | 21 : | 4,016,641 |
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| | 4,016,878 | | 4,017,414 | | 4,017,740 | | 4,016,708 | | 4,017,129 | | 4,016,830 |
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| 23 : | 4,017,083 | | 4,017,630 | | 4,017,659 | | 4,017,764 | | 4,017,086 | | 4,017,417 |
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| | 4,016,981 | | 4,016,622 | | 4,017,810 | 37 : | 4,016,676 | | 4,016,699 | | 4,016,899 |
| | 4,017,006 | | 4,016,649 | | 4,017,847 | | 4,016,715 | | 4,016,717 | | 4,016,930 |
| | 4,017,192 | | 4,016,678 | | 4,017,849 | | 4,016,725 | | 4,016,745 | | 4,016,932 |
| | 4,017,371 | | 4,016,698 | | 4,017,865 | | 4,016,831 | | 4,016,749 | | 4,016,943 |
| | 4,017,447 | | 4,016,763 | | 4,017,867 | | 4,016,985 | | 4,016,752 | | 4,016,944 |
| | 4,017,596 | | 4,016,796 | | 4,017,870 | | 4,017,071 | | 4,016,754 | | 4,016,951 |
| | 4,017,650 | | 4,017,050 | | 4,017,871 | | 4,017,102 | | 4,016,762 | | 4,016,952 |
| | 4,017,720 | | 4,017,091 | | 4,017,882 | | 4,017,140 | | 4,016,789 | | 4,017,026 |
| | 4,017,780 | | 4,017,114 | 35 : | 4,016,741 | | 4,017,232 | | 4,016,808 | | 4,017,055 |
| | 4,017,855 | | 4,017,179 | | 4,016,886 | | 4,017,338 | | 4,016,871 | | 4,017,058 |
| | 4,017,856 | | 4,017,335 | | 4,017,205 | 38 : | 4,016,955 | | 4,016,901 | | 4,017,066 |
| | 4,017,863 | | 4,017,404 | 36 : | 4,016,606 | 39 : | Re.29,182 | | 4,016,904 | | 4,017,075 |
| 25 : | Re.29,176 | | 4,017,841 | | 4,016,654 | | 4,016,640 | | 4,016,914 | | 4,017,113 |
| | 4,016,605 | | 4,017,845 | | 4,016,662 | | 4,016,642 | | 4,016,924 | | 4,017,446 |
| | 4,016,643 | | 4,017,852 | | 4,016,673 | | 4,016,691 | | 4,016,927 | | 4,017,537 |
| | 4,016,668 | 28 : | 4,017,349 | | 4,016,674 | | 4,016,696 | | 4,016,969 | | 4,017,604 |
| | 4,016,675 | 29 : | 4,016,690 | | 4,016,735 | | 4,016,706 | | 4,016,989 | | 4,017,653 |
| | 4,016,721 | | 4,016,757 | | 4,016,776 | | 4,016,709 | | 4,017,008 | | 4,017,729 |
| | 4,016,802 | | 4,016,858 | | 4,016,780 | | 4,016,722 | | 4,017,044 | | 4,017,731 |
| | 4,016,857 | | 4,016,910 | | 4,016,783 | | 4,016,734 | | 4,017,056 | | 4,017,737 |
| | 4,016,907 | | 4,017,081 | | 4,016,797 | | 4,016,736 | | 4,017,090 | | 4,017,832 |
| | 4,017,003 | | 4,017,597 | | 4,016,810 | | 4,016,767 | | 4,017,111 | | 4,017,842 |
| | 4,017,030 | | 4,017,646 | | 4,016,814 | | 4,016,778 | | 4,017,117 | | 4,017,866 |
| | 4,017,082 | 31 : | 4,016,935 | | 4,016,820 | | 4,016,779 | | 4,017,138 | | 4,017,885 |
| | 4,017,101 | 32 : | 4,016,610 | | 4,016,865 | | 4,016,860 | | 4,017,142 | 49 : | 4,016,836 |
| | 4,017,107 | | 4,017,021 | | 4,016,866 | | 4,016,887 | | 4,017,168 | | 4,016,884 |
| | 4,017,148 | 33 : | 4,016,667 | | 4,016,874 | | 4,016,916 | | 4,017,217 | | 4,016,984 |
| | 4,017,223 | | 4,016,837 | | 4,016,882 | | 4,016,922 | | 4,017,234 | | 4,017,377 |
| | 4,017,238 | | 4,017,007 | | 4,016,892 | | 4,016,928 | | 4,017,237 | | 4,017,582 |
| | 4,017,245 | | 4,017,282 | | 4,016,919 | | 4,016,937 | | 4,017,241 | | 4,017,745 |
| | 4,017,444 | | 4,017,822 | | 4,016,940 | | 4,016,941 | | 4,017,265 | 50 : | 4,017,773 |
| | 4,017,498 | 34 : | Re.29,177 | | 4,016,965 | | 4,016,958 | | 4,017,277 | | 4,017,782 |
| | 4,017,559 | | 4,016,614 | | 4,016,972 | | 4,016,963 | | 4,017,286 | 51 : | 4,016,759 |
| | 4,017,577 | | 4,016,644 | | 4,016,976 | | 4,017,046 | | 4,017,287 | | 4,016,760 |
| | 4,017,590 | | 4,016,664 | | 4,016,978 | | 4,017,103 | | 4,017,305 | | 4,016,761 |
| | 4,017,656 | | 4,016,744 | | 4,017,013 | | 4,017,128 | | 4,017,321 | | 4,016,973 |
| | 4,017,730 | | 4,016,801 | | 4,017,015 | | 4,017,194 | | 4,017,344 | | 4,017,047 |
| | 4,017,738 | | 4,016,821 | | 4,017,028 | | 4,017,219 | | 4,017,347 | | 4,017,149 |
| | 4,017,800 | | 4,016,877 | | 4,017,048 | | 4,017,239 | | 4,017,357 | | 4,017,268 |
| | 4,017,815 | | 4,016,995 | | 4,017,064 | | 4,017,240 | | 4,017,360 | | 4,017,370 |
| | 4,017,840 | | 4,017,002 | | 4,017,065 | | 4,017,242 | | 4,017,380 | | 4,017,474 |
| | 4,017,844 | | 4,017,005 | | 4,017,067 | | 4,017,250 | | 4,017,382 | | 4,017,723 |
| | 4,017,854 | | 4,017,020 | | 4,017,069 | | 4,017,294 | | 4,017,407 | | 4,017,734 |
| | 4,017,868 | | 4,017,045 | | 4,017,079 | | 4,017,317 | | 4,017,420 | | 4,017,736 |
| | 4,017,873 | | 4,017,070 | | 4,017,087 | | 4,017,327 | | 4,017,427 | | 4,017,838 |
| | 4,017,876 | | 4,017,073 | | 4,017,109 | | 4,017,348 | | 4,017,438 | 53 : | 4,016,703 |
| | 4,017,887 | | 4,017,144 | | 4,017,159 | | 4,017,352 | | 4,017,440 | | 4,016,710 |
| 26 : | 4,016,608 | | 4,017,189 | | 4,017,166 | | 4,017,375 | | 4,017,453 | | 4,016,775 |
| | 4,016,611 | | 4,017,193 | | 4,017,172 | | 4,017,387 | | 4,017,495 | | 4,016,863 |
| | 4,016,634 | | 4,017,288 | | 4,017,182 | | 4,017,409 | | 4,017,543 | | 4,016,867 |
| | 4,016,686 | | 4,017,298 | | 4,017,184 | | 4,017,411 | | 4,017,568 | | 4,017,011 |
| | 4,016,743 | | 4,017,299 | | 4,017,187 | | 4,017,412 | | 4,017,601 | | 4,017,042 |
| | 4,016,781 | | 4,017,314 | | 4,017,208 | | 4,017,423 | | 4,017,616 | | 4,017,263 |
| | 4,016,809 | | 4,017,328 | | 4,017,210 | | 4,017,441 | | 4,017,637 | | 4,017,280 |
| | 4,016,841 | | 4,017,331 | | 4,017,244 | | 4,017,458 | | 4,017,649 | | 4,017,419 |
| | 4,016,845 | | 4,017,336 | | 4,017,257 | | 4,017,463 | | 4,017,652 | | 4,017,430 |
| | 4,016,894 | | 4,017,366 | | 4,017,266 | | 4,017,464 | | 4,017,661 | | 4,017,475 |
| | 4,016,898 | | 4,017,415 | | 4,017,270 | | 4,017,468 | | 4,017,662 | | 4,017,642 |
| | 4,016,938 | | 4,017,432 | | 4,017,273 | | 4,017,489 | | 4,017,670 | | 4,017,674 |
| | 4,016,950 | | 4,017,433 | | 4,017,274 | | 4,017,514 | | 4,017,675 | | 4,017,794 |
| | 4,016,991 | | 4,017,455 | | 4,017,284 | | 4,017,544 | | 4,017,698 | | 4,017,831 |
| | 4,017,041 | | 4,017,456 | | 4,017,289 | | 4,017,552 | | 4,017,704 | 54 : | 4,017,367 |
| | 4,017,092 | | 4,017,460 | | 4,017,292 | | 4,017,560 | | 4,017,728 | | 4,017,457 |
| | 4,017,099 | | 4,017,476 | | 4,017,293 | | 4,017,575 | | 4,017,739 | | 4,017,551 |
| | 4,017,100 | | 4,017,486 | | 4,017,310 | | 4,017,641 | | 4,017,744 | 55 : | Re.29,181 |
| | 4,017,110 | | 4,017,487 | | 4,017,311 | | 4,017,654 | | 4,017,755 | | 4,016,637 |
| | 4,017,125 | | 4,017,493 | | 4,017,318 | | 4,017,657 | | 4,017,766 | | 4,016,660 |
| | 4,017,127 | | 4,017,496 | | 4,017,319 | | 4,017,694 | | 4,017,777 | | 4,016,756 |
| | 4,017,130 | | 4,017,499 | | 4,017,330 | | 4,017,696 | | 4,017,778 | | 4,016,770 |
| | 4,017,164 | | 4,017,501 | | 4,017,340 | | 4,017,721 | | 4,017,797 | | 4,016,850 |
| | 4,017,188 | | 4,017,503 | | 4,017,353 | | 4,017,775 | | 4,017,803 | | 4,016,859 |
| | 4,017,262 | | 4,017,504 | | 4,017,421 | | 4,017,788 | | 4,017,806 | | 4,016,861 |
| | 4,017,290 | | 4,017,505 | | 4,017,428 | | 4,017,808 | 44 : | 4,016,714 | | 4,016,864 |
| | 4,017,315 | | 4,017,510 | | 4,017,500 | | 4,017,816 | | 4,017,049 | | 4,016,908 |
| | 4,017,346 | | 4,017,516 | | 4,017,511 | | 4,017,826 | | 4,017,251 | | 4,016,948 |
| | 4,017,410 | | 4,017,519 | | 4,017,581 | | 4,017,905 | 45 : | 4,016,625 | | 4,016,949 |
| | 4,017,442 | | 4,017,527 | | 4,017,595 | | 4,016,729 | 46 : | 4,017,133 | | 4,017,025 |
| | 4,017,448 | | 4,017,531 | | 4,017,617 | 40 : | 4,016,758 | 47 : | 4,016,645 | | 4,017,080 |
| | 4,017,480 | | 4,017,532 | | 4,017,648 | | 4,016,992 | | 4,016,693 | | 4,017,264 |
| | 4,017,492 | | 4,017,534 | | 4,017,686 | | 4,017,165 | | 4,016,768 | | 4,017,267 |
| | 4,017,535 | | 4,017,542 | | 4,017,689 | | 4,017,275 | | 4,016,784 | | 4,017,281 |
| | 4,017,538 | | 4,017,554 | | 4,017,691 | | 4,017,424 | | 4,016,853 | | 4,017,302 |
| | 4,017,540 | | 4,017,563 | | 4,017,706 | | 4,017,450 | | 4,016,900 | | 4,017,351 |
| | 4,017,570 | | 4,017,573 | | 4,017,712 | | 4,017,467 | | 4,017,054 | | 4,017,400 |
| | 4,017,571 | | 4,017,574 | | 4,017,724 | | 4,017,833 | | 4,017,116 | | 4,017,452 |
| | 4,017,576 | | 4,017,591 | | 4,017,725 | 41 : | 4,016,609 | | 4,017,186 | | 4,017,697 |
| | 4,017,606 | | 4,017,599 | | 4,017,762 | | | | | | |



| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 : | 244,029 | | 244,054 | | 243,997 | 21 : | 244,028 | | 244,007 | | 244,057 |
| 6 : | 243,990 | | 244,055 | | 243,998 | 25 : | 244,013 | | 244,021 | 42 : | 243,986 |
| | 244,005 | | 244,056 | | 243,999 | | 244,034 | | 244,026 | | 243,989 |
| | 244,015 | | 244,059 | | 244,000 | | 244,035 | | 244,027 | 44 : | 244,010 |
| | 244,016 | | 244,060 | | 244,001 | 26 : | 244,006 | | 244,049 | 51 : | 243,979 |
| | 244,025 | 9 : | 244,002 | | 244,009 | | 244,017 | 39 : | 243,977 | | 243,981 |
| | 244,030 | | 244,012 | | 244,014 | 29 : | 243,984 | | 243,985 | | 243,982 |
| | 244,031 | 12 : | 244,050 | | 244,047 | 34 : | 243,988 | | 243,992 | | 243,983 |
| | 244,036 | 17 : | 243,991 | | 244,048 | | 244,022 | | 244,011 | | 243,987 |
| | 244,037 | | 243,993 | | 244,052 | | 244,033 | | 244,019 | 53 : | 244,018 |
| | 244,042 | | 243,995 | 18 : | 244,004 | 36 : | 243,980 | | 244,032 | 55 : | 244,020 |
| | 244,051 | | 243,996 | 19 : | 244,044 | | 244,003 | | 244,045 | | 244,041 |

## PLANT PATENTS

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 19 : | 4,039 | 4,040 | 4,041 | 39 : | 4,038 | | |

U. S. GOVERNMENT PRINTING OFFICE : O - 1977

# OFFICIAL GAZETTE of the UNITED STATES PATENT and TRADEMARK OFFICE

April 19, 1977 Volume 957 Number 3


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# PATENT NOTICES

## Certificates of Correction for the Week of Apr. 19, 1977

| | | | |
|---|---|---|---|
| D. 242,774 | 3,982,448 | 3,996,318 | 4,002,557 |
| 3,617,166 | 3,983,175 | 3,996,412 | 4,002,669 |
| 3,646,343 | 3,983,622 | 3,996,531 | 4,002,720 |
| 3,650,196 | 3,984,389 | 3,996,559 | 4,002,742 |
| 3,744,898 | 3,984,407 | 3,996,621 | 4,002,753 |
| 3,746,568 | 3,984,463 | 3,996,658 | 4,002,808 |
| 3,762,105 | 3,984,563 | 3,996,673 | 4,002,974 |
| 3,778,242 | 3,984,760 | 3,996,760 | 4,003,030 |
| 3,846,479 | 3,985,397 | 3,996,795 | 4,003,153 |
| 3,865,742 | 3,985,624 | 3,997,022 | 4,003,158 |
| 3,885,912 | 3,986,799 | 3,997,432 | 4,003,532 |
| 3,887,624 | 3,987,837 | 3,997,493 | 4,003,916 |
| 3,887,903 | 3,988,510 | 3,997,500 | 4,003,981 |
| 3,910,153 | 3,988,596 | 3,997,880 | 4,004,028 |
| 3,912,030 | 3,989,843 | 3,997,896 | 4,004,217 |
| 3,914,517 | 3,989,879 | 3,998,015 | 4,004,329 |
| 3,915,686 | 3,989,880 | 3,998,044 | 4,004,393 |
| 3,926,521 | 3,990,005 | 3,998,508 | 4,004,400 |
| 3,929,802 | 3,990,188 | 3,998,643 | 4,004,797 |
| 3,931,623 | 3,991,167 | 3,998,865 | 4,004,924 |
| 3,939,248 | 3,991,214 | 3,998,932 | 4,005,021 |
| 3,948,631 | 3,991,553 | 3,998,992 | 4,005,030 |
| 3,948,639 | 3,991,772 | 3,999,246 | 4,005,387 |
| 3,951,946 | 3,992,234 | 3,999,372 | 4,005,391 |
| 3,952,036 | 3,992,367 | 3,999,549 | 4,005,829 |
| 3,956,774 | 3,992,872 | 3,999,605 | 4,005,839 |
| 3,956,871 | 3,993,163 | 4,000,261 | 4,005,923 |
| 3,957,744 | 3,993,282 | 4,000,295 | 4,005,956 |
| 3,959,071 | 3,993,312 | 4,000,479 | 4,006,114 |
| 3,963,575 | 3,993,815 | 4,000,565 | 4,006,376 |
| 3,965,187 | 3,993,847 | 4,000,611 | 4,006,716 |
| 3,965,328 | 3,994,055 | 4,000,672 | 4,006,837 |
| 3,966,315 | 3,994,260 | 4,001,227 | 4,007,112 |
| 3,966,478 | 3,994,366 | 4,001,305 | 4,007,213 |
| 3,970,178 | 3,994,435 | 4,001,324 | 4,007,362 |
| 3,975,632 | 3,994,536 | 4,001,413 | 4,007,442 |
| 3,976,207 | 3,994,730 | 4,001,479 | 4,007,743 |
| 3,976,673 | 3,994,902 | 4,001,972 | 4,008,098 |
| 3,976,796 | 3,994,996 | 4,002,211 | 4,008,168 |
| 3,977,794 | 3,995,457 | 4,002,303 | 4,008,224 |
| 3,978,009 | 3,995,970 | 4,002,384 | 4,008,464 |
| 3,979,329 | 3,996,124 | 4,002,474 | 4,008,523 |
| 3,979,936 | 3,996,137 | 4,002,477 | 4,008,630 |
| 3,980,757 | 3,996,152 | 4,002,515 | 4,009,142 |
| 3,981,844 | 3,996,276 | 4,002,526 | 4,009,212 |

## Disclaimers

3,280,758.—*Wilson Leeming, James E. Knabe,* and *Richard C. Britton,* Rockford, Ill. CYLINDER BLOCK OF A HYDRAULIC UNIT AND METHOD OF MAKING SAME. Patent dated Oct. 25, 1966. Disclaimer filed Feb. 25, 1977, by the assignee, *Sundstrand Corporation.*

Hereby enters this disclaimer to claims 1, 5, 8, 10 to 12, 14 and 17 of said patent.

---

3,985,617.—*Yasumi Yugari,* Kamakura, and *Yoshiki Minamoto,* Chigasaki, Japan. IMMOBILIZATION OF BIOLOGICALLY ACTIVE PROTEINS WITH A POLYPEPTIDE AZIDE. Patent dated Oct. 12, 1976. Disclaimer filed Feb. 4, 1977, by the assignee, *Ajinomoto Co., Inc.*

Hereby enters this disclaimer to claims 1 and 2 of said patent.

---

4,011,899.—*John M. Chamberlin,* St. Louis, Mo. STEEL MEMBER FOR REINFORCING RUBBER COMPOSITIONS AND METHOD OF MAKING SAME. Patent dated Mar. 15, 1977. Disclaimer filed Feb. 24, 1977, by the assignee, *Monsanto Company.*

The term of this patent subsequent to Apr. 27, 1993, has been disclaimed.

---

## Dedication

3,095,716.—*Richard L. Smirl,* La Grange Park, Ill. TORSIONAL VIBRATIONAL DAMPENER DEVICE. Patent dated July 2, 1963. Dedication filed Feb. 11, 1977, by the assignee, *Borg-Warner Corporation.*

Hereby dedicates the remaining term of said patent to the Public.

---

## Erratum

All reference to Patent No. 4,015,078 to Charles E. Dawson of Florida for "Optional Prepay Coin Operated Telephone System" appearing in the OFFICIAL GAZETTE of March 29, 1977 should be deleted since no patent was granted.



# PATENT EXAMINING CORPS

**RENE D. TEGTMEYER, Assistant Commissioner**

**WILLIAM FELDMAN, Deputy Assistant Commissioner**

## CONDITION OF PATENT APPLICATIONS AS OF MARCH 26, 1977

| PATENT EXAMINING GROUPS | Actual Filing Date of Oldest New Case Awaiting Action |
|---|---|
| **CHEMICAL EXAMINING GROUPS** | |
| GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices. | 7-22-76 |
| GENERAL ORGANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director. Heterocyclic, Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides. | 7-13-76 |
| HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes. | 3-18-76 |
| COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—R. FRIEDMAN, Director. Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography. | 6-23-76 |
| SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—H. S. VINCENT, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes. | 4-8-76 |
| **ELECTRICAL EXAMINING GROUPS** | |
| INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Illumination; Horology; Acoustics; Recorders; Weighing Scales. | 10-15-75 |
| SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director. Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material. | 1-15-76 |
| INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts. | 6-1-76 |
| RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—N. ANSHER, Director. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating. | 10-5-76 |
| ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring. | 4-27-76 |
| DESIGNS, GROUP 290—C. D. QUARFORTH, Director. Industrial Arts; Household, Personal and Fine Arts. | 10-2-75 |
| **MECHANICAL EXAMINING GROUPS** | |
| HANDLING AND TRANSPORTING MEDIA, GROUP 310—D. J. STOCKING, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment. | 5-24-76 |
| MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus: Plastics Working Apparatus; Plastic Block and Earthenware Apparatus: Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks. | 9-10-76 |
| AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—G. M. FORLENZA, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination. | 6-1-76 |
| HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—B. R. GAY, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication. | 4-19-76 |
| GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—M. M. NEWMAN, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors: Miscellaneous Hardware; Locks; Building Structures; Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Coating; Textiles; Apparel and Shoes; Sewing Machines. | 9-13-76 |

**Expiration of patents:** The patents within the range of numbers indicated below expire during April 1977, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 2,931,038 to 2,934,765, inclusive
Plant Patents..... Numbers 1,926 to 1,948, inclusive

# REISSUES

APRIL 19, 1977

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

## Re. 29,184

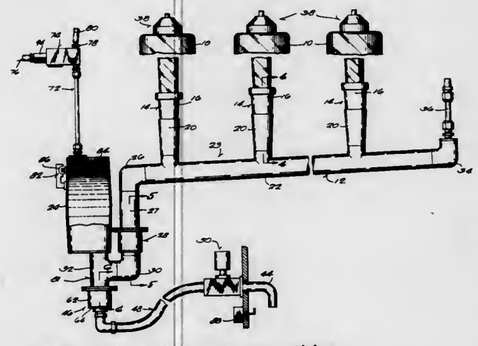
## APPARATUS FOR DISPENSING LIQUID FROM A LIQUID SUPPLY MANIFOLD

**John F. Petranyi, Madison, Wis., assignor to DEC International, Inc., Madison, Wis.**

**Original No. 3,815,792, dated June 11, 1974, Ser. No. 304,367, Nov. 7, 1972. Application for reissue May 27, 1976, Ser. No. 690,531**

**Int. Cl.² B67D** *5/52*

**U.S. Cl. 222—373** **16 Claims**



*13. A liquid dispensing system comprising:*

*a liquid dispensing reservoir means,*

*a liquid supply container means in fluid communication with said reservoir means, said container means comprising a manifold assembly and a plurality of liquid containers removably connected to said manifold assembly with one end of said manifold assembly being connected to said liquid reservoir means and the other end of said assembly being connected to the atmosphere, said liquid containers being bottles which have been inverted and then connected to said manifold while in inverted position so that the fluid in said bottles will flow by gravity from said bottles into said manifold assembly and then into said liquid dispensing reservoir means, said bottles being mounted on said manifold in such a way so that the elevation of the bottle at said other end of said manifold assembly is higher than the next adjacent bottle and so on down the line of bottles to the bottle at said one end of the manifold assembly, which bottle is at an elevation lower than all the other bottles;*

*a check valve means interposed between said container means and said reservoir means to permit liquid flow from said container means to said reservoir means and to prevent reverse flow from said reservoir means to said container means;*

*a liquid dispenser outlet means in fluid communication with said liquid dispensing reservoir means;*

*a liquid dispenser valve means adapted to control liquid flow through said outlet means:*

*a source of air under pressure connected to said liquid dispensing reservoir means;*

*a vent means to atmosphere connected to said liquid dispensing reservoir means; and*

*a control valve means associated with said liquid dispensing reservoir means, said source of air under pressure and said reservoir vent means, said control valve means operative to alternately place said reservoir means into communication with said source of air under pressure and subsequently cut off said source of air under pressure and place said reservoir means into communication with the atmosphere through said vent means.*

## Re. 29,185

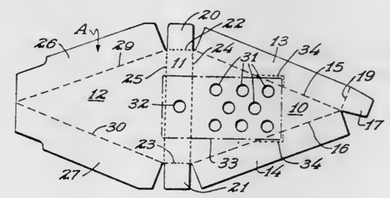
## WEDGE SHAPED CARTON

**William M. Tolaas, St. Paul, Minn., assignor to Hoerner Waldorf Corporation, St. Paul, Minn.**

**Original No. 3,876,131, dated Apr. 8, 1975, Ser. No. 375,599, July 2, 1973. Application for reissue July 19, 1976, Ser. No. 706,192**

**Int. Cl.² B65D** *5/18, 85/00*

**U.S. Cl. 229—22** **12 Claims**



*11. A generally triangular carton for use in containing a wedge-shaped piece of pizza or the like including:*

*a generally triangular bottom panel having a base edge and converging side edges,*

*a generally rectangular end wall hingedly connected to the base edge of said bottom panel and extending upwardly therefrom,*

*a generally triangular top panel hingedly connected to the upper edge of said end wall, said top panel being substantially identical in size and shape to said bottom panel, and extending parallel to said bottom panel,*

*inner side wall panels secured to the converging edges of said bottom panel and extending upwardly therefrom,*

*outer side wall panels secured to the converging edges of said top panel and extending downwardly therefrom outwardly of said inner side wall panels,*

*means securing said inner and outer side wall panels in face contact,*

*corner flaps connecting the converging ends of side walls, and connecting the ends of said end wall to said side walls,*

*said bottom panel having a series of spaced apertures therethrough,*

*a strip of film secured to the under surface of said bottom panel,*

*the strip of film being secured in a manner to be readily detachable to expose said apertures.*

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## Re. 29,186

## ELECTROPHOTOGRAPHIC COPYING APPARATUS OF SLIT EXPOSURE TYPE

**Shigehiro Komori, Yokohama; Juro Sato, Kawasaki, and Hiroyuki Hattori, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Original No. 3,740,133, dated June 19, 1973, Ser. No. 211,383, Dec. 23, 1971. Application for reissue June 19, 1975, Ser. No. 588,227**

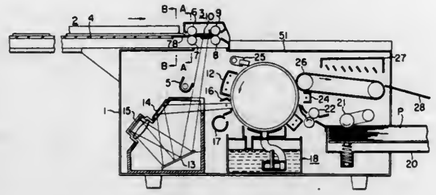
**Claims priority, application Japan, Dec. 30, 1970, 45-126316**

**Int. Cl.² G03G** *15/30*

**U.S. Cl. 355—8** **26 Claims**

*6. Electrophotographic copying apparatus selectively operable in a first mode for copying relatively thick originals and in a second mode for copying sheet originals comprising an exposure station through which an original to be copied is to be moved, an imaging station, an optical system for projecting an image of an original moving through said exposure station to said imaging*

*station, means for moving an electrically photosensitive member through said imaging station for the formation of an electrostatic latent image of said original thereon, means for transferring images from said photosensitive member to copy material, an original support carriage capable of supporting relatively thick originals, means for moving said original support carriage*



*along a path to carry such originals through said exposure station when the apparatus is operated in said first mode, a sheet conveyor integrally mounted on said carriage and operable to transport sheet originals through said exposure station, and releasable means for maintaining said carriage stationary when the apparatus is operated in said second mode.*

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**Re. 29,187**

## COPYING APPARATUS

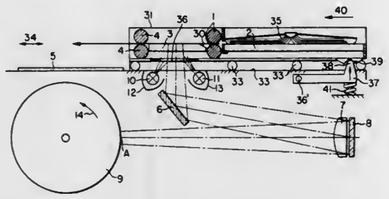
**Wilhelm Knechtel, Biebertal; Gerhard Petersdorf, Pohlheim, W-Stg., and Winfried Sandner, Rechtenbach, all of Germany, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Original No. 3,741,646, dated June 26, 1973, Ser. No. 225,483, Feb. 11, 1972. Application for reissue June 25, 1975, Ser. No. 590,148**

**Claims priority, application Germany, Feb. 16, 1971, 2107321**

**Int. Cl.² G03B** *27/50*

**U.S. Cl. 355—51** **24 Claims**



*8. Photocopying apparatus selectively operable in a first mode for copying relatively thick originals and in a second mode for copying sheet originals, comprising an exposure station through which an original to be copied is to be moved, an optical system for projecting an image of an original moving through said exposure station to an imaging station, means for moving a photosensitive member through said imaging station for the formation of an image of said original thereon, a support carriage capable of supporting relatively thick originals, means for permitting said carriage to be moved along a path such as to carry such originals through said exposure station when the apparatus is operated in the first mode, a sheet conveyor operable to transport sheet originals through said exposure station while said carriage is stationary when the apparatus is operated in the second mode, said sheet conveyor being mounted in tandem with said support carriage and being movable therewith when the apparatus is operated in the first mode, and an endless flexible transmission member engaged with said sheet conveyor for transmitting drive thereto, said transmission member including a portion which extends along said path of movement of said carriage so that, during operation of the apparatus in the first mode, said transmission member remains in engagement with said sheet conveyor.*

**Re. 29,188**

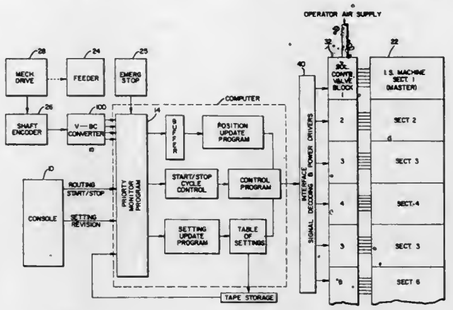
## COMPUTER CONTROL FOR GLASSWARE FORMING MACHINE

**William J. Croughwell, Wilmington, N.C., assignor to Emhart Industries, Inc., Hartford, Conn.**

**Original No. 3,905,793, dated Sept. 16, 1975, Ser. No. 516,424, Oct. 21, 1974. Application for reissue Dec. 18, 1975, Ser. No. 626,286**

**Int. Cl.² C03B** *7/00, 9/18, 9/40*

**U.S. Cl. 65—163** **10 Claims**




1. In a multi-section glassware forming machine, each of which sections includes at least the following mechanical means:

a. means for delivering gobs of molten glass to a blank station in the machine section at a rate which can be varied,

b. a blank mold operable to and from an active position at the blank station,

c. a split neck ring mold operable between open and closed positions and cooperating with the blank mold to define a parison cavity at the blank station,

d. means for settling the gob into the neck mold at said blank station, and a plunger operable to and from an active position at the blank station,

e. secondary parison mold defining means operable to and from an active position at said blank station, and cooperating with said blank mold to define said parison cavity,

f. transfer means for moving said split neck molds and the parison formed in said cavity out of said blank station and into a blow station,

g. a split blow mold operable between open and closed positions at said blow station,

h. means for final forming the parison at said blow station,

i. take-out means for removing the final blown article from said blow station, said machine being further characterized by the improvement comprising:

j. drive means for said gob delivery means, and including a position indicator shaft so geared to said drive means as to make one revolution between delivery of succeeding gobs to said blank station associated with one of said individual machine sections,

k. [ electromechanical transducer ] means *including a shaft encoder* driven by said position indicator shaft , [ for generating a variable electrical output voltage indicative of the angular position of the said shaft, ]

l. [ converter ] *said last mentioned* means [ for said transducer output voltage to generate ] *generating* a coded digital signal indicative of the instantaneous position of said shaft in binary [ coded decimal ] form,

m. digital computer means including accessible memory means,

n. comparator means for continuously comparing said digital shaft position signal to a preprogrammed value stored in said computer memory means in order to provide a first signal when said shaft position is equal to or greater than its programmed value and providing a second signal when said shaft position is equal to or less than its programmed value,



o. said computer memory means including means for storing a programmed value of said shaft position corresponding to a desired sequence in event timing of the operation of each of said mechanical mechanisms,

p. manually operable means by which the machine operator can select other values of shaft position for certain boundary [ even ] *event* timings, other event timings being preprogrammed to occur at predetermined shaft displacement therefrom [ , and said manually operable means being permitted only during a succeeding cycle of operation of the machine, and only when the value so selected is within a predetermined interval also preprogrammed in said digital computer means ] .

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**Re. 29,189**

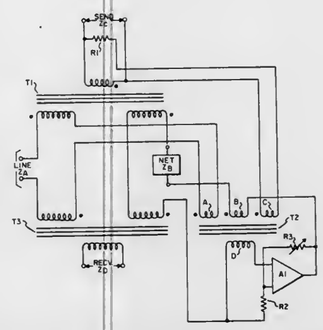
## SELF-BALANCING HYBRID CIRCUIT

**Russell C. Fischer, Wheaton, Ill., assignor to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.**

**Original No. 3,875,350, dated Apr. 1, 1975, Ser. No. 402,564, Nov. 5, 1973. Application for reissue June 28, 1976, Ser. No. 700,414**

**Int. Cl.² H04B** *1/52, 3/38*

**U.S. Cl. 179—170 D** **3 Claims**




1. A self balancing hybrid circuit comprising: a hybrid transformer including a plurality of windings; a first conjugate pair of ports comprising a first port connectible to a two-way transmission line and to *at least* a first [ pair ] *one* of said transformer windings and a second port connectible to a balancing network and to *at least* a second [ pair ] *one* of said hybrid transformer windings, a second pair of conjugate ports comprising a first port connectible to a send channel and to a third winding of said hybrid transformer and a second port connectible to a receive channel and to [ a fourth winding ] *at least one winding of said plurality of winding* of said hybrid transformer; sensing means including a first input circuit connection from said first port of said first conjugate pair, a second input circuit connection from said second port of said *first* conjugate pair and a third input circuit connection from said port of said second conjugate pair connected to said send channel; whereby in response to detection of an unbalanced electrical relationship between signals at said first conjugate pair of ports resulting in electrical signals in said send channel port, said sensing means are operated to insert a compensating signal into said second port of said first conjugate pair to correct error signals resulting from electrical unbalance between said first and second ports of said first conjugate pair.

**Re. 29,190**

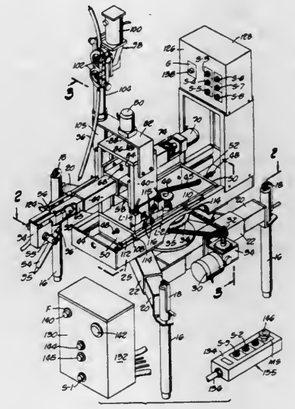
## AUTOMATIC DREDGE PUMP REBUILDER

**Theodore C. Braucht, Stanton, Calif., assignor to Mark K Industries, San Diego, Calif.**

**Original No. 3,769,486, dated Oct. 30, 1973, Ser. No. 249,342, May 1, 1972. Application for reissue July 18, 1975, Ser. No. 597,033**

**Int. Cl.² B23K** *9/04*

**U.S. Cl. 219—76** **38 Claims**



1. In an apparatus employing a welding device to deposit a series of contiguous weld beads on the interior wall of a hollow workpiece having coaxial upper and lower openings with the pattern of the series of the welding beads of a desired eccentricity relative to the axis of said openings,

the combination:

a base structure intersecting said axis in the region of said openings;

a horizontal guideway mounted on the base structure radially of said axis for rotation about the axis;

a carriage movable along said guideway;

a support for said welding device mounted on said carriage;

first power means on said base structure to turn the guideway about said axis;

second power means on the [ base structure ] *carriage* to extend and retract said support for the welding device relative to the carriage to or from the interior wall of the hollow workpiece;

third power means to raise and lower said support for the welding device relative to the carriage;

fourth power means to swing said welding device up and down in an arc relative to the support; and

means responsive to rotation of the guideway relative to the base structure to shift the carriage along the guideway in accord with the desired eccentricity of the pattern of the series of beads.

31. In an apparatus for rebuilding a workpiece by a welding torch wherein the torch makes successive traverses of an area of the workpiece with automatic stepover and automatic reversal of the direction of travel of the torch at the end of each traverse,

the improvement comprising:

means to cause the torch to pause in its travel for a predetermined time period at the end of each traverse; and

means to cut off the supply of heat to the torch during the pause;

said pause serving to permit the molten metal to cool at the end of each bead before the next succeeding bead is started and in the welding of a relatively narrow area of the workpiece preventing overheating of the narrow area.

**Re. 29,191**

## BASE REACH-THROUGH ACTIVE SERIES VOLTAGE REGULATOR

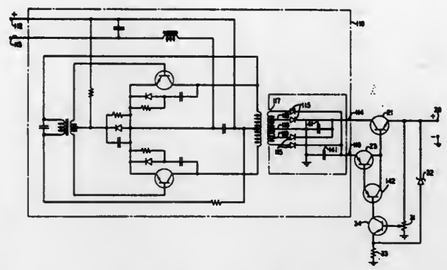
**Thomas George Harrigan, Denville, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Original No. 3,652,919, dated Mar. 28, 1972, Ser. No. 129,349, Mar. 30, 1971. Application for reissue Apr. 15, 1975, Ser. No. 568,293**

**Int. Cl.² H02M** *7/217*

**U.S. Cl. 321—18** **5 Claims**

1. A direct current voltage regulator for providing *a load current at* a regulated voltage to an output terminal comprising a first source of direct current having a voltage that may drop below said regulated voltage, a pass transistor having its collector connected to said first source and its emitter connected to said output terminal, a second source of direct current having a voltage that remains above said regulated voltage, a driver transistor having its [ collector-emitter path ] *collector and emitter* connected *in a low impedance path* between said second source and the base of said pass transistor, and feedback means connected between said output terminal and said driver transistor for driving said driver transistor in response to the voltage at said output terminal [ whereby during periods when said first source voltage is below said regulated voltage ], said driver transistor [ supplies ] *operating to supply said load* current *at said regulated voltage* to said output terminal through the base-emitter junction of said pass transistor [ to maintain ] *during periods when said first source voltage is lower than* said regulated voltage.



# PLANT PATENTS

## GRANTED APRIL 19, 1977

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

**4,042**

## NECTARINE TREE

**John J. Kovacevich, P.O. Bin 488, Arvin, Calif. 93203**

**Filed May 28, 1976, Ser. No. 690,972**

**Int. Cl.² A01H** *5/03*

**U.S. Cl. Plt.—41** **1 Claim**

1. A new and distinct variety of nectarine tree, substantially as illustrated and described, which is generally similar in tree and fruit to the Sunrise Nectarine Tree of U.S. Plant Pat. No. 1,256, of which it is a sport, but which bears fruit which ripens from 10 days to 2 weeks earlier than the Sunrise, approximately at the same time as the Armking of U.S. Plant Pat. No. 2,943 and 7 to 10 days after the Mayred of U.S. Plant Pat. No. 2,758.

# PATENTS

## GRANTED APRIL 19, 1977

### ERRATA

| For CLASS | See PATENT NO. |
|---|---|
| 098-040 VM | 4,018,159 |
| 098-040 D | 4,018,160 |
| 110-038 | 4,018,168 |
| 223-078 | 4,018,382 |
| 273-035 B | 4,018,436 |
| 428-678 | 4,018,569 |
| 152-359 | 4,018,570 |
| 250-511 | 4,018,716 |
| 428-425 | 4,018,850 |
| 106-057 | 4,018,858 |
| 426-021 | 4,018,898 |
| 426-055 | 4,018,899 |
| 426-072 | 4,018,900 |
| 426-075 | 4,018,902 |
| 426-104 | 4,018,903 |
| 426-115 | 4,018,904 |
| 426-124 | 4,018,905 |
| 426-237 | 4,018,906 |
| 426-250 | 4,018,907 |
| 426-281 | 4,018,908 |
| 426-532 | 4,018,909 |
| 426-537 | 4,018,910 |
| 358-128 | 4,018,984 |
| 358-285 | 4,018,985 |
| 358-142 | 4,018,986 |
| 358-128 | 4,018,987 |
| 358-164 | 4,018,988 |
| 235-105 | 4,019,030 |
| 235-131 FD | 4,019,031 |
| 250-543 | 4,019,064 |
| 361-220 | 4,019,094 |
| 361-079 | 4,019,095 |
| 361-086 | 4,019,096 |
| 361-093 | 4,019,097 |
| 361-385 | 4,019,098 |
| 361-399 | 4,019,099 |
| 361-186 | 4,019,100 |
| 361-313 | 4,019,101 |
| 361-225 | 4,019,102 |

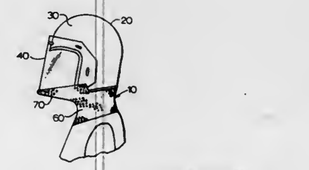
# PATENTS

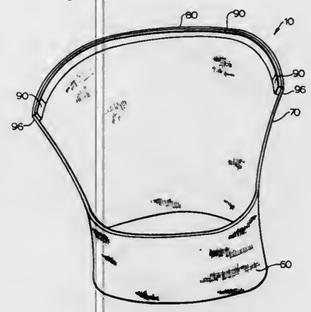
## GRANTED APRIL 19, 1977

NOTE—A cross reference listing of applications published under the second Trial Voluntary Protest Program is located in the back of this Issue. These entries will be in numerical order by document publication number.

## GENERAL AND MECHANICAL

**4,017,906**
**PROTECTIVE GARMENT FOR THE FACE**
**Frank J. Bochynsky, Highland Park, and George J. Przybylek, Martinsville, both of N.J., assignors to The Byke Co., Highland Park, N.J.**
**Filed May 28, 1975, Ser. No. 570,003**
**Int. Cl.² A42B *3/00***
**U.S. Cl. 2—10** **7 Claims**

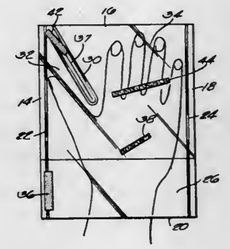




1. A cold weather garment comprising
a first relatively wide collar portion to be worn on and surrounding the neck and shaped to cover the neck of an individual for providing warming muffler action therefor, said collar portion having a lower edge and an upper edge, said collar portion being made of fabric,
a second portion made of a stretchable fabric and comprising a flap, said flap having a lower edge which is secured to a portion of the upper edge of said first collar portion, said flap thus being adapted to be raised and lowered with respect to said first collar portion, said flap having an inner surface and an outer surface,
said flap being generally rectangular in shape and having an upper edge spaced from its lower edge and from said first collar portion, said flap being extendible from side collar portion so that said upper edge of said flap can engage the outer surface of the face shield of a helmet worn by the individual whereby said flap blocks the open space between the face of the individual and the face shield of the helmet and prevents excessive wind from entering said space, the upper edge of said flap portion having a first end and a second end spaced apart from each other,
a length of elastic secured to said upper edge of said flap portion and extending along substantially the entire length of said upper edge from said first end to said second end, the upper edge of said flap and said elastic being adapted to be stretched and placed in tension, and
fastening means secured to the inner surface of said first and second ends of the upper edge of said flap portion, said fastening means being adapted to be secured to spaced-apart portions of the outer surface of the face shield of a helmet worn by the individual with said elastic and the upper edge of said flap stretched and in tension,
the attachment of said first and second ends of said upper edge of said flap to the spaced-apart portions of the outer surface of said face shield permitting the remainder of said upper edge of said flap either to be stretched and placed in engagement with the outer surface of the face shield or removed from engagement with the outer surface of the face shield.

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**4,017,907**
**SANITARY HAND COVERING WITH SHAPING FASTENERS**
**Hyman J. Margolis, 3036 N. 45th St., Milwaukee, Wis. 53210**
**Filed Mar. 3, 1976, Ser. No. 663,322**
**Int. Cl.² A41D *19/00***
**U.S. Cl. 2—158** **6 Claims**



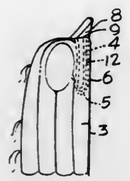
1. In a rectangular sanitary hand covering made by two adjacent sheets of plastic film material having three closed sides and one open side surrounding a central portion, a divider portion of said sheets being sealed together around an opening that does not intersect any side to divide the interior thereof into a thumb stall and a finger stall, the improvement comprising at least one pair of fasteners affixed to the outer surface of one sheet, one of said fasteners being positioned adjacent to the junction of said open side and one closed side of said hand covering, and the other fastener being positioned in the central portion of the outer surface of the same sheet in position to interact with the first mentioned fastener in closing the slack portion around the open side of said hand covering when it is on a person's hand to prevent the hand covering from falling off the person's hand.

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**4,017,908**
**RESCUE GARMENT**
**Edward L. Murnane, 3327 La Mesa Drive No. 3, San Carlos, Calif. 94070**
**Filed Nov. 3, 1975, Ser. No. 628,351**
**Int. Cl.² A41D *9/00***
**U.S. Cl. 2—84** **4 Claims**

1. In combination with a rescue/survival garment having at least a neck portion:
a. means defining a stowage pocket in said garment, said pocket having an opening around said neck portion,
b. head covering means stowed in said stowage pocket,
c. a visor on said head covering means, at least a portion of said visor extending out of said stowage pocket when said head covering means is stowed therein to define a collar-like tab constituting a collar of said garment and by which

said head covering means is extractable from said stowage pocket for use, and




d. radar-reflective/high visibility means associated with said head covering means.

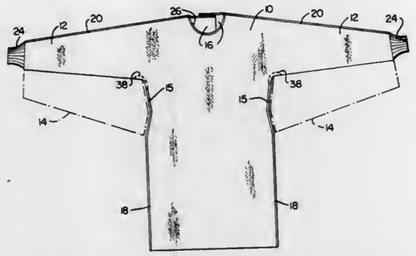
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**4,017,909**

## DISPOSABLE OPERATING ROOM GOWN

**Robert Brandriff, 19472 Country Club Drive, Tequesta, Fla. 33458**

**Filed Oct. 3, 1975, Ser. No. 619,248**
**Int. Cl.² A41D *13/00***
**U.S. Cl. 2—114** **15 Claims**




1. A surgical gown, comprising a front panel formed of a single section of material, two sleeves with the front portion of each one integral with the front panel so that no seams are located at the front of the gown, each sleeve being formed of said single section of material which is folded and joined by a seam located along the upper edge of the sleeve so that no seams are located in the front or bottom portions thereof, the gown further including a back portion joined to the front panel and sleeves.

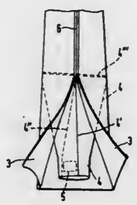
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**4,017,910**

## TROUSERS FOR COMBINED TRAINING AND LEISURE SUIT

**Alfred Bente, Herzogenaurach, Germany, assignor to Messrs. adidas Sportschuhfabriken Adi Dassler K.G., Germany**

**Filed Feb. 9, 1976, Ser. No. 656,409**
**Claims priority, application Germany, Mar. 5, 1975, 2509449**
**Int. Cl.² A41D *1/08***
**U.S. Cl. 2—232** **5 Claims**




1. Trousers for a combined training suit and leisure suit which comprises:

a pair of trouser legs, each of said trouser legs having a substantially vertically extending slit extending upwardly a distance from a lower end thereof;

an operable fastener adapted to close said substantially vertically extending slit of each of said trouser legs;

a gaiter positioned within each of said trouser legs proximate to said vertically extending slit of each of said trouser legs, said gaiter being fixed to said trouser legs a short distance below a knee region of said trouser legs and extending downwardly to a location below a calf region of said trouser legs, said gaiter being formed of overlapping portions; when wrapped around the circumference of the wearer's leg. and

a touch and close fastener means disposed on said overlapping portions of said gaiter to permit variable width adjustment of said gaiter.

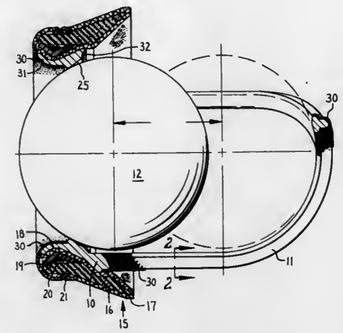
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**4,017,911**

## HEART VALVE WITH A SINTERED POROUS SURFACE

**Ralph R. Kafesjian, Irvine; Norman G. Masse, Newport Beach, and David P. Keller, Mission Viejo, all of Calif., assignors to American Hospital Supply Corporation, Evanston, Ill.**

**Continuation of Ser. No. 473,748, May 28, 1974, abandoned. This application June 3, 1976, Ser. No. 692,428**
**Int. Cl.² A61F *1/22***
**U.S. Cl. 3—1.5** **4 Claims**




1. A heart valve having a metal orifice ring and cage struts confining a movable valve member, said valve member in closed position seating on a contact area of said orifice ring and in moving between closed and open positions engaging contact areas on said cage struts, said orifice ring and cage struts having surfaces exposed to a blood stream flowing through the valve and subject to the growth of connective tissue on said surfaces and a porous metal coating of controlled porosity and thickness sintered on said exposed metal surfaces other than said valve member contact areas to promote the ingrowth of said tissue so as to anchor the tissue to the metal in selected areas and prevent said tissue from breaking off and entering the blood stream, said coating comprising substantially a monolayer of sinterable metal particles of substantially uniform size and shape adhered to said selected areas and sintered on said selected areas, said particles being bonded to said arifice ring and cage struts and to each other without gross deformation of the particles so as to leave intercommunicating openings around the particles for said ingrowth of tissue.

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**4,017,912**

## METERABLE WATER CLOSET

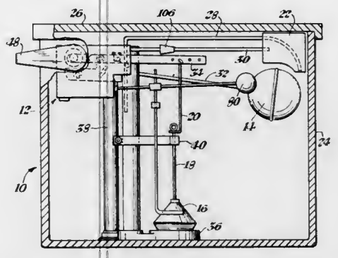
**Daniel J. Young, Sr., 3137 Capri Road, Lake Park, Fla. 33410**

**Filed Nov. 5, 1975, Ser. No. 629,144**
**Int. Cl.² A47K *17/00***
**U.S. Cl. 4—1** **4 Claims**

1. In a water closet having a trap, a flush tank, a water inlet valve, an overflow pipe coupled into the toilet bowl, a flush bowl and a flush bowl actuating mechanism, a device for conserving the amount of water received in said trap comprising:

a trap fill meter tank disposed within said flush tank;

a conduit from said inlet water valve connected into said meter tank;




a siphon tube disposed with one end in said meter tank and the opposite end disposed in said overflow pipe, said siphon tube being positioned below the uppermost level in the meter tank when filled and said meter tank having an open top whereby during the flushing operation of the flush tank, the inlet water valve will fill the meter tank and the siphon conduit will empty the meter tank into the overflow pipe filling said trap with a predetermined amount of water.

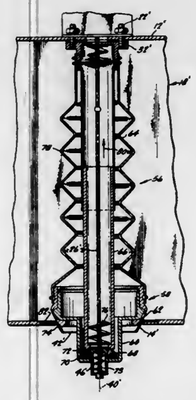
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**4,017,913**

## SELF-ALIGNING VALVE ASSEMBLY

**Ronald Iliff Judd, Anaheim, Calif., assignor to McDonnell Douglas Corporation, Long Beach, Calif.**

**Filed Sept. 18, 1975, Ser. No. 614,529**
**Int. Cl.² E03D *1/34***
**U.S. Cl. 4—52** **4 Claims**



1. A valve assembly for use inside of an enclosed container comprising:

a support structure capable of being mounted on the inside of the container opposite of an annulus defining a drain hole, said drain hole having an inlet side and an outlet side;

telescoping alignment tubes engaging said structure;

a spherical ring member engaging said tubes on the end opposite said support structure to provide a spherical joint, said spherical joint having a center of rotation and a spherical contact surface;

a circular valve plug with spherical sealing surface attached to said ring member;

a compressible helical spring in axial alignment with said telescoping tubes to urge said plug into said drain hole;

the location of said contact surface between the spherical ring member and telescoping alignment tubes and the location of the center of rotation of said spherical joint being on the outside of said drain hole when said plug has engaged said annulus.

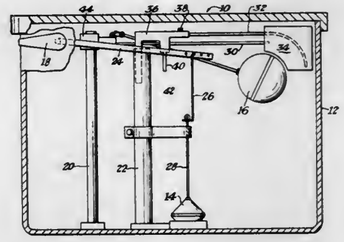
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**4,017,914**

## WATER CLOSET METERING DEVICE

**Daniel J. Young, Sr., 3137 Capri Road, Lake Park, Fla. 33410**

**Continuation-in-part of Ser. No. 629,144, Nov. 5, 1975. This application June 18, 1976, Ser. No. 697,359**
**Int. Cl.² E03D *1/34, 5/02;* A61B *19/00***
**U.S. Cl. 4—67 A** **2 Claims**




1. A water closet having a flush tank, a water inlet valve, and overflow pipe is coupled into the toilet bowl, a flush bowl and a flush bowl actuating mechanism, said flush tank including:

a trap fill meter tank disposed within said flush tank;

a conduit from said inlet water valve connected into said meter tank;

a siphon tube disposed with one end in said reserve tank and the opposite end disposed in said overflow pipe, said siphon tube being positioned below the uppermost level of the water in the meter tank when filled and said receptacle having an open top whereby during the flushing operation of the flush tank, the inlet water valve will fill the meter tank and the siphon conduit will empty the meter tank into the overflow pipe and toilet trap; and

an adjustable valve connected to said siphon tube between said fill meter tank and said overflow pipe for adjusting the rate of flow from the meter tank into the overflow pipe.

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**4,017,915**

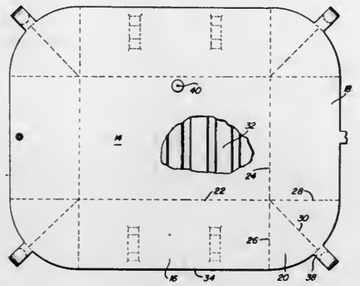
## FOLDING BASIN

**Era Pauline Prewitt, Rte. No. 1, Grandview, Tex. 76050**

**Filed Aug. 29, 1975, Ser. No. 609,098**
**Int. Cl.² A47K *3/062***
**U.S. Cl. 4—177 R** **4 Claims**

1. A foldable liquid retaining basin comprising a sheet of liquid impervious flexible material having a bottom panel portion bordered by peripheral side panel portion interconnected by foldable flap portions, said side panel portions being connected along folds to the bottom panel portion and foldable to erect positions relative to the bottom panel portions, a plurality of parallel spaced rigidifying slat elements secured to each of the bottom and side panel portions forming a plurality of foldlines therebetween, two of the side panel portions spaced from each other and extending transversely of the rigidifying elements when folded onto the bottom panel portion being foldable with the bottom panel portion along said foldlines into a compact form, the slat elements secured to said two of the side panel portions and the bottom panel portion, respectively, being separated from each other along

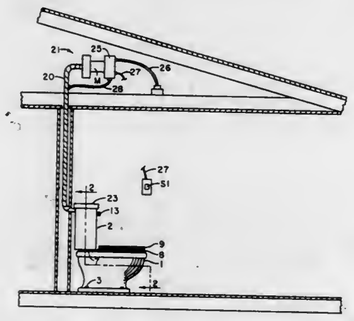
the folds between said two of the side panel portions and the bottom panel portion, and fastener means for holding the side panel portions in said erect positions with the rigidifying ele-



ments on said two of the side panel portions being in substantially perpendicular relation to the rigidifying elements on the bottom panel portion and the other of the side panel portions.

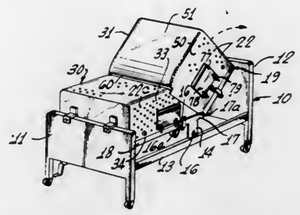
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**4,017,916**
**TOILET VENTILATOR INCLUDING MOTION-RESPONSIVE ELECTRICAL TRANSDUCER**
**Raymond H. Pearson, 627 Sherwood Drive, Richardson, Tex. 75080**
**Continuation-in-part of Ser. No. 540,538, Jan. 13, 1975, Pat. No. 3,942,400, which is a continuation-in-part of Ser. No. 496,954, Aug. 13, 1974, Pat. No. 3,939,506. This application Dec. 4, 1975, Ser. No. 637,646**
**Int. Cl.² E03D *9/04*; A47K *13/00***
**U.S. Cl. 4—213** **2 Claims**



1. A deodorizing accessary for water closets, said water closet including a toilet bowl and water tank, said water tank including a flushing mechanism having an external operating appendage disposed on the outside of said water tank, said accessary comprising electric air blower means suitably communicative with said water closet so as to remove odorous air from said toilet bowl, and control means, said control means including switching means operable to initiate said air blower means, said control means also including electrical transducer means responsive to the motion of said flushing mechanism, said electrical transducer means having at least one parameter which is a function of said motion, whereby said air blower means may be terminated in response to the motion of said flushing mechanism when said water closet is flushed.

**4,017,917**
**COVER**
**Murray Hunter Brown, Santa Monica, Calif., assignor to John R. Puckett, Pacific Palisades, Calif., a part interest**
**Filed Mar. 3, 1976, Ser. No. 663,367**
**Int. Cl.² A47C *19/22***
**U.S. Cl. 5—60** **1 Claim**



1. A security enclosure for a patient in a hospital bed of the type having a mattress support frame with head and foot ends and a transverse pivot joint in an intermediate location thereof, dividing said frame into normally horizontally outstretched head and foot portions, said head portion being adjustable between a horizontal lying position and a range of angularly up-tilted sitting positions, comprising:
two relatively rigid patient enclosure shells articulated for pivotal movement relative to one another on a pivot axis substantially coinciding with said transverse pivot joint of said mattress support frame, one of said shells comprising a leg and foot enclosure, and the other of said shells an upper body, arm and head enclosure, with the first adapted for mounting on said foot portion of said support frame, and the second on said head portion thereof,
said shells being formed to substantially confine a patient throughout a range of relative positions of said head portion of said bed frame from horizontal to an up-tilted sitting position,
said shells having side wall portions adapted to partially and relatively closely overlap one another on each side throughout said pivotal movement of said shells relatively to one another,
a top wall for said leg and foot enclosure, formed with a convex rearward extension wall struck on an arc whose center coincides with said pivot axis, and
a top wall for the upper body, arm and head enclosure shaped to move with a relatively close fit over said convex rearward extension wall of said leg and foot enclosure when said body, head and arm enclosure swings pivotally upward with said head portion of said bed frame.

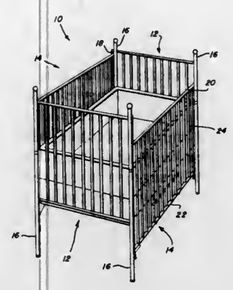
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**4,017,918**
**METAL CRIB STRUCTURE**
**George M. Harris, Chicago, Ill., assignor to Harris-Hub Co., Inc., Harvey, Ill.**
**Filed Jan. 8, 1976, Ser. No. 647,576**
**Int. Cl.² E03D *11/10*; A47F *3/00*; F16M *11/20***
**U.S. Cl. 5—100** **8 Claims**

1. In a crib having a plurality of sides with at least one side including upper and lower circular horizontal metal rods and a plurality of spaced hollow vertical metal rods with interconnecting means between said horizontal and vertical rods, the improvement of said interconnecting means including a plurality of inserts respectively received into opposite ends of said vertical rods, each of said inserts having opposite ends, one of said ends having a size corresponding to the internal dimension of said vertical rods to be received therein, each of said inserts having an enlarged portion engaging an end of a vertical rod, the opposite end of each insert having a concave arcuate surface corresponding in configuration to the periphery of said horizontal rods and a projection extending from



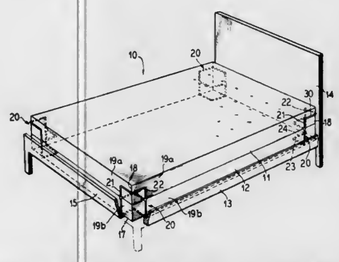
said concave surface, said upper and lower horizontal rods having openings receiving said projections, and connecting



means between said upper and lower horizontal rods for maintaining said rods and inserts in assembled relation.

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**4,017,919**
**MATTRESS GUARD**
**John H. Hemmeter, 128 Sterling Lane, Wilmette, Ill. 60091**
**Filed Feb. 12, 1976, Ser. No. 657,493**
**Int. Cl.² A47C *22/00***
**U.S. Cl. 5—317 R** **6 Claims**

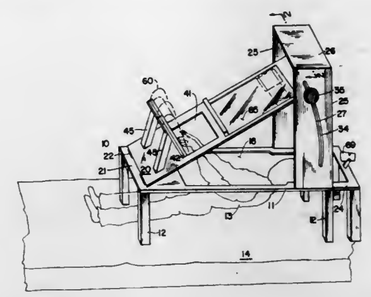


1. A mattress guard for aligning a mattress with a box spring thereunder, each of said mattress and box spring having vertical sides and corners, and said box spring having at least two edges resting upon a support thereunder, the guard comprising:
a horizontal portion adapted to be captured between said box spring and said support thereof at one of said corners of said box spring,
said horizontal portion extending beneath said box spring from a first side to a second, adjacent side thereof; and
a pair of vertical portions secured at lower ends thereof to said horizontal portion at said first and second sides of said box spring, each of said vertical portions extending upwardly to ends adjacent said sides of the mattress,
whereby said guard prevents said mattress from slipping outwardly past either of said first and second sides of said box spring at said corner.

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**4,017,920**
**BED DESK**
**Robert C. Sieg, Shanghai, Va., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest**
**Filed July 26, 1976, Ser. No. 708,325**
**Int. Cl.² A47C *21/00*; A61G *7/02***
**U.S. Cl. 5—317 R** **3 Claims**

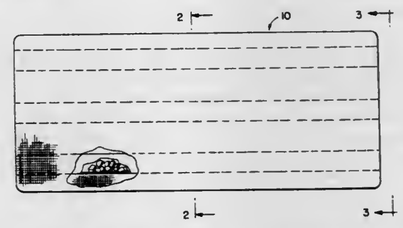
1. A desk assembly adaptable for mounting on a bed above a reclining invalid comprising
an open frame fitted with legs,
a panel hinged to a foot end of the panel and supported at an adjustable height above the opposed head end of the frame by support members extending above the head end of the frame,
said panel fitted with an opening, and a shelf extending



alongside said opening in an angular plane to the plane of the panel,
said shelf fitted with detachable means to fasten a typewriter to said shelf.

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**4,017,921**
**COOLING BLANKET**
**Carmen T. Hernandez, 201 E. 17th St., New York, N.Y. 10003**
**Filed Jan. 30, 1975, Ser. No. 545,578**
**Int. Cl.² A47G *23/00***
**U.S. Cl. 5—347** **1 Claim**



1. A blanket adapted to receive ice; said blanket comprising : a pair of elongated sheets of water impervious material; said sheets being substantially congruent and being disposed adjoining each other as layers, said sheets being sealably adhered to each other along a plurality of spaced apart parallel elongated strip regions running length of said sheets in a manner that a plurality of parallel elongated chambers between said sheets and running the length of said sheets are defined in alternating relationship with said elongated strip regions; a plurality of zipper closure members respectively located at one end of said plurality of chambers for allowing said chambers to be filled with ice; and a facing material permanently adhered over said sheets.

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**4,017,922**
**FURNITURE DECK CONSTRUCTION**
**Henry J. Tischler, Bloomfield Hills, Mich., assignor to Gulf & Western Metals Forming Company, Southfield, Mich.**
**Filed Nov. 24, 1975, Ser. No. 634,414**
**Int. Cl.² A47C *23/00***
**U.S. Cl. 5—354** **13 Claims**

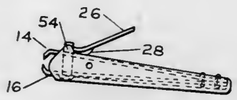


1. In a furniture construction, the combination comprising a frame,
a plurality of sinuous springs fastened to the frame,
a composite pad overlying said springs,

said pad comprising a layer of relatively thick, flexible, compressible material,
and a plurality of transversely spaced longitudinally extendng wires woven therethrough with longitudinally spaced portions of the wires being exposed along one surface only of said layer,
a sheet of flexible material over said pad,
and means for fastening said sheet and said pad to said frame.

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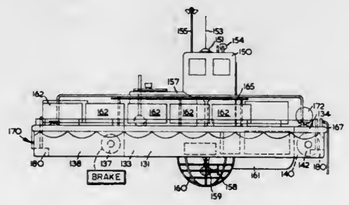
**4,017,923**
**FINGER NAIL RETAINER AND TWEEZER**
**John S. Schantz, Marine, Ill., assignor to Raymond G. Shantz and Socrates J. Schantz, both of Marine, Ill., part interest to each**
**Filed Mar. 10, 1976, Ser. No. 665,554**
**Int. Cl.² B25F *1/00*; B25B *9/02***
**U.S. Cl. 7—1 C** **4 Claims**




1. A nail clipping retainer and tweezer for use with a nail clipper having a pair of elongated cutting blades fastened together at a rear end and spaced apart at a forward end by spring action and having a retractable operating lever moveable form a flat rest position on the top of an uppermost one of the blades to a raised operating position where it can force said blade from an open position to a closed cutting position against a bottommost one of the blades, said retainer being of generally V-shaped construction formed by two arms connected to one another in spring-like relation at a bight portion and having diverging free front ends moveable against each other, said retainer being adapted to fit in close biasing relation with the arms engaging the outer edges of the pair of cutting blades and covering the space therebetween said retainer arms having inturned bottom flanges and inturned guide elements spaced above the flanges to receive the opposed sides of the bottommost cutter blade therebetween, said retainer when removed from the cutter being manually operable to cause the front ends of said arms to be forced together for use as a tweezer.

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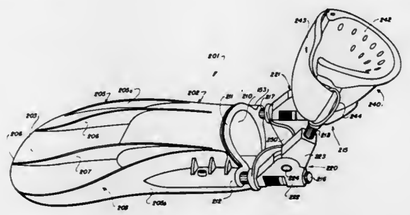
**4,017,924**
**LIFE SAVING EQUIPMENT FOR VESSELS**
**William York Higgs, Gibsons, Canada, assignor to Intercontinental Marine Limited, Vancouver, Canada**
**Division of Ser. No. 471,964, May 21, 1974, abandoned. This application Dec. 15, 1975, Ser. No. 640,787**
**Claims priority, application United Kingdom, May 21, 1973, 24113/73**
**Int. Cl.² B63C *9/02***
**U.S. Cl. 9—14** **18 Claims**




1. Lifesaving apparatus for vessels comprising a buoy suitable for being carried by a vessel in a manner permitting easy launching of the buoy should the vessel sink, said buoy including a buoyant body and a cable reel rotatably mounted on the buoy and carrying a cable of adequate strength to act as an anchor cable, said cable being suitable for connection with the vessel so as to maintain connection between the floating buoy and the vessel after the vessel has sunk, wherein said buoy includes a deck area suitable for accommodating at least one crew member and several passengers and having a configuration which provides a stable loading deck to receive passengers from the vessel and to allow the passengers to enter life rafts held close to the buoy, and also accommodates a plurality of inflatable life rafts together with pressurized gas containers for inflating the rafts said rafts having a combined capacity greatly in excess of the number of persons that can be carried on the buoy itself, said rafts being contained in canisters releasably held on said deck, said buoy including a mooring line normally stowed on a reel carried by the buoy but releasable therefrom under the control of a crew member after the buoy has been released from the vessel, said mooring line being capable of holding said plurality of life rafts when inflated and floating on the water and when carrying passengers.

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**4,017,925**
**SWIM FIN INCLUDING MEANS FOR RESTRICTING ANKLE MOVEMENT**
**Ralph B. Shamlian, San Francisco, Calif., assignor to Farallon Industries, Inc., Belmont, Calif.**
**Continuation-in-part of Ser. No. 540,908, Jan. 14, 1975, Pat. No. 3,978,537. This application Jan. 30, 1976, Ser. No. 653,943**
**Int. Cl.² A63B *31/08***
**U.S. Cl. 9—309** **20 Claims**



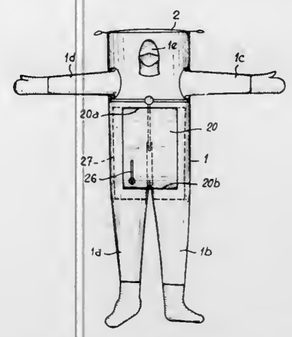
1. In a swim fin having a foot pocket, the improvement comprising:
a tubular assembly having a free end extending from a pair of opposite sides of said foot pocket;
a cuff member fitted to said free end for engaging a lower rear portion of a leg;
a heel strap coupled to said tubular assembly; and
means for adjusting the position of said cuff member and said heel strap relative to said foot pocket to accommodate different sized feet.

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**4,017,926**
**LIFE-SAVING GARMENT**
**Michel Piel, Etampes, France, assignor to Societe Industrielles des Etablissements Piel, Etampes, France**
**Filed July 14, 1975, Ser. No. 595,794**
**Int. Cl.² B63C *9/12***
**U.S. Cl. 9—331** **14 Claims**

1. A life-saving garment for a person in water, including a front portion adapted to be worn on the person's chest, and an inflatable pocket of substantially rectangular shape located on the exterior of said front portion, said pocket being secured to said front portion of the garment at an upper edge of said pocket, which edge defines the hinge axis of said pocket, the pocket being swingable about an axis substantially parallel to the line of the person's shoulders and located below the armpits, said garment being made of flexible, water-proof, thermally insulating material and including legs, sleeves and a hood, the garment having the general form of a capacious sack which includes said front portion and extends along a longitudinal axis from a lower end, which is shaped to define the legs, to an upper end, which is completely open and which comprises the entry opening permitting entry into and out from the sack, said longitudinal axis passing through a medium zone where the sack is provided with exterior pockets which merge with the sack, two of said projecting pockets forming the sleeves and one the hood, said open end of the sack defining,

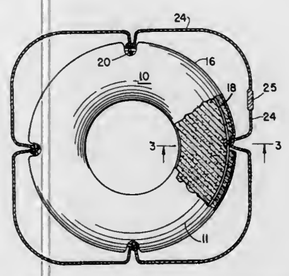





when the garment is laid flat, a straight line substantially at right angles to the longitudinal axis of the sack and substantially parallel to a shoulder line extending between points where the sleeves begin, said entry opening being defined by two lips which can be applied to each other to close the sack, with at least one of said lips being provided with a reinforming element enabling an upper flat part of the sack located above a zone where the hood begins to be rolled over upon itself around the reinforcing element without forming creases along the length of the opening in such manner as to form a roll immediately above said zone where the hood begins, said roll being adapted then to be looped around the neck of a wearer.

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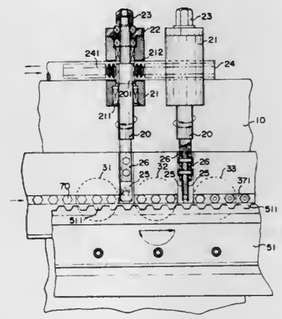
**4,017,927**
**RING BUOY**
**David H. Massey, 139 Hawthorne, Glencoe, Ill. 60022**
**Filed Jan. 22, 1976, Ser. No. 651,421**
**Int. Cl.² B63C *9/10***
**U.S. Cl. 9—340** **7 Claims**




1. A ring buoy having a generally toroidalshaped body substantially of plastic foam material having great buoyancy, said body when horizontally viewed showing in plan two concentric circles defining respectively the inner and outer body sides and the circle center defining the straight axis of the toroid body, the annular region between the concentric circles comprising the top face of the body, a transverse section of the ring body in a plane containing the straight toroid axis having a rounded shape, said body also having a bottom face, said body having a tough adherent plastic coating thereover, a metal ring in the body symmetrically between the top and bottom body faces and symmetrically within the outer body side and substantially closer to the outer body side than to the inner body side, said body having a plurality of shallow recesses inwardly from the outer body side at spaced angular intervals, each recess being so shaped and dimensioned as to expose a small length of ring, said ring length having sufficient free space around it to accommodate rope attachment thereto after buoy fabrication whereby the ballistic properties of the buoy are maximized and the shallowness of the recesses minimizes structural weakening.

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**4,017,928**
**BLANK TURN-OVER DEVICE FOR HIGH SPEED NUT FORMERS**
**Yuan Ho Lee, 85 Jen Ho Road, Tainan, China /Taiwan**
**Filed Dec. 29, 1975, Ser. No. 645,078**
**Int. Cl.² B21K *1/64*, *27/00*; B21J *5/12***
**U.S. Cl. 10—76 T** **3 Claims**



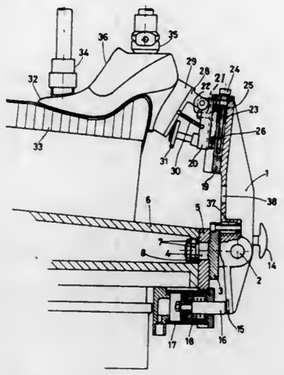

1. A blank turn-over device for use in a high speed nut former machine which includes a machine body having at least a pair of spaced dies and means defining a feeding path for workpieces between the centers of at least a successive pair of said spaced dies comprising:
a shaft which is rotatable about its axis and positioned relatively perpendicularly to said feeding path; and
gripping means, located at the end of said shaft and coaxial with said shaft, for gripping workpieces in said feeding path, said gripping means cooperating with said shaft to perform the successive functions of receiving a workpiece in said feeding path and turning over said workpiece in said feeding path without lateral displacement of said workpiece from said path upon a rotation of the shaft about its axis on the order of 180° for subsequent removal of said workpiece from said gripping means in said feeding path.

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**4,017,929**
**DEVICE FOR PRESSING LOUIS SHOE HEELS**
**Antonio Capuano, Vigevano, Italy, assignor to SIGMA S.p.A., Vigevano, Italy**
**Filed Apr. 1, 1976, Ser. No. 672,667**
**Claims priority, application Italy, Apr. 18, 1975, 22502/75**
**Int. Cl.² A43D *63/00***
**U.S. Cl. 12—16.4** **8 Claims**

1. A device for pressing Louis shoe heels mounted on a cushion press for cementing soles to shoes comprising
a lever having pivotal mounting on said cushion press;
said lever having a first part extending longitudinally in one direction from said pivotal mounting and including a pad mounted at the end thereof for applying pressure against the heel;
said lever having a second part extending longitudinally in

the opposite direction from said pivotal mounting to terminate in an end portion; and



pressure means located on said cushion press to apply pressure against said end portion to provide a first rotational movement of said lever whereby said pad is pressed against the heel.

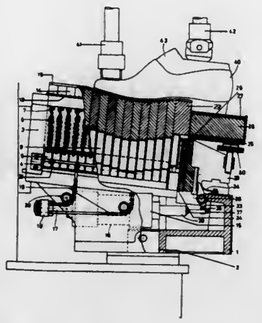
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**4,017,930**

**UNIVERSAL DEVICE FOR PRESSING SOLES ON SHOES**

**Antonio Capuano, Vigevano, Italy, assignor to Sigma S.p.A., Vigevano, Italy**

**Filed Jan. 23, 1976, Ser. No. 651,945**
**Claims priority, application Italy, Jan. 29, 1975, 19723/75**
**Int. Cl.² A43D *89/00***
**U.S. Cl. 12—33** **8 Claims**



1. A device for pressing soles on shoes comprising
a cushion formed of a plurality of blocks for mating with the lower face of the shoe;
a base portion;
actuating means mounted on said base portion;
a frame mounted on said base portion and having said blocks resiliently movable in a vertical direction therewithin;
means connecting said blocks to said frame exerting a downward biasing force on said blocks;
a plurality of first locking means corresponding to and mounted respectively on each of said blocks;
a plurality of second locking means mounted on said frame, said second locking means corresponding in number with said first locking means, and each of said first and second locking means engageable in selective locking engagement in pairs to maintain a corresponding block in its pressing vertical position; and
means associated with said second locking means to provide release of said locking engagement upon selective operation of said actuating means.

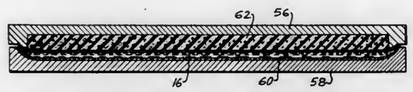
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**4,017,931**

**LIQUID FILLED INSOLES**

**Preston L. Golden, Miami Beach, Fla., assignor to The Jonathan-Alan Corporation, Miami Beach, Fla.**

**Filed May 20, 1976, Ser. No. 688,299**
**Int. Cl.² A43D , *29/00***
**U.S. Cl. 12—146 B** **2 Claims**



1. A method of making a liquid-filled insole of the character described, said method comprising the following steps:
a. forming a flexible, thermoplastic, dish-shaped bottom sheet in the outline of an insole,
b. introducing a liquid into said dish-shaped bottom sheet,
c. placing a second flexible, thermoplastic sheet in the outline of an insole upon said liquid-filled dish-shaped bottom sheet,
d. applying pressure to said second sheet to displace any air between it and the liquid in the dish-shaped bottom sheet,
e. heat-sealing the two sheets to each other along their peripheral edged to form a liquid-tight, liquid-filled envelope, and
f. heat-sealing the two sheets to each other in an orthopedic pattern between said sealed peripheral edges,
g. thereby forming a plurality of non-communicating, liquid-tight, liquid-filled compartments between the two sheets to provide a cushion effect.

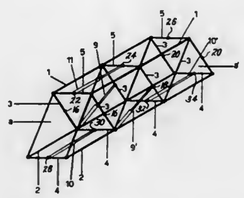
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**4,017,932**

**TEMPORARY, MODULAR, SELF-ERECTING BRIDGE**

**Sergio Lotto, and Francesco Saggin, both of via Andrea Memmo, 11, Padua, Italy**

**Filed Dec. 13, 1974, Ser. No. 532,604**
**Claims priority, application Italy, Dec. 20, 1973, 41684**
**Int. Cl.² E01D *15/12***
**U.S. Cl. 14—2.4** **23 Claims**



1. A temporary, modular self-erecting bridge comprising:
a. At least one module for spanning a distance, said module being mobile for movement from place to place,
b. said module comprising a pair of load-bearing side elements, a base element and a top element,
c. a number of mechanical means for opening said module by changing the height and width of said module,
d. said side elements comprising a number of diagonal elements including a number of elements pivotable about a point between their ends and responsive to said mechanical opening means, wherein
e. the number of pivotable elements is greater than the number of mechanical means,
whereby said bridge is transportable as a single structure having smaller physical dimension in its collapsed, transported state than in an open, erected state, and whereby a small number of mechanical means are used to erect a module comprising a substantially larger number of pivotable elements.



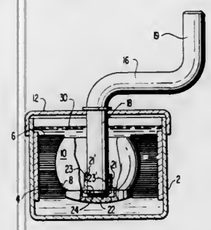
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**4,017,933**

**TYPEBALL CLEANING APPARATUS**

**Raymond A. Aja, 2 Murray Road, Essex Junction, Vt. 05452, and Alphonse C. Dufault, 1835 North Ave., Burlington, Vt. 05401**

**Filed May 14, 1976, Ser. No. 686,647**
**Int. Cl.² A46B *11/00*; B41J *29/00***
**U.S. Cl. 15—21 A** **6 Claims**



1. A typeball cleaning apparatus for cleaning typewriter and terminal typeballs of the type having a bore therein with an engaging mechanism in the bore for engaging a mounting on the typewriter or terminal, said apparatus comprising:
a. a liquid container having an open top;
b. a plurality of brushes having one end mounted on the interior sides of said container, and the other end extending toward the axis of the container;
c. a top means for covering said container said top means having an aperture therein; and
d. a crank having an engaging portion means, which passes through the aperture in said top means into said container, for insertion into the bore in said typeball for engaging and coupling with the engaging mechanism in the typeball, and a handle for turning said crank wherein when said crank is turned, a typeball coupled therewith is rotated such that its type face contacts said brushes whereby it is cleaned.

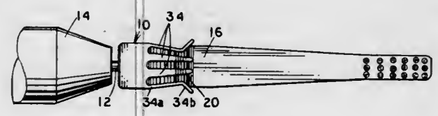
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**4,017,934**

**MOUNTING FOR POWER TOOTHBRUSH**

**Harold E. Callahan, 2841 Windy Hill Road, Apt. 1147, Marietta, Ga. 30067**

**Filed Apr. 9, 1976, Ser. No. 675,477**
**Int. Cl.² A46B *13/02***
**U.S. Cl. 15—176** **1 Claim**



1. An adapter for coupling a toothbrush handle to the vibratory output shaft of a motor means, said handle having a central axially directed bore at its end and a circumferential groove proximate said end, said adapter comprising: a generally cylindrical body having front and rear bores for respectively receiving said handle and said shaft, said adapter comprising a resilient plastic body formed coaxially about a cup shaped metal insert, said rear bore being defined by the interior surface of said insert, plural roughening projections on said interior surface for frictionally engaging said shaft; said front bore being defined by plural angularly spaced axially extending fingers of said plastic body configured for snapping into said circumferential groove; a pin recessed coaxially within said front opening for engaging said bore in the end of said handle for centralizing said handle in said adapter, said pin being formed by the exterior surface of said metal insert.

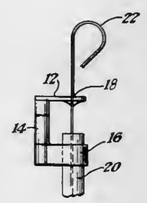
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**4,017,935**

**DIP STICK CLEANER**

**Reginaldo A. Hernandez, 33 NW. 59th Ave., Miami, Fla. 33126**

**Filed Dec. 4, 1975, Ser. No. 637,707**
**Int. Cl.² G01F *15/12, 23/04***
**U.S. Cl. 15—210 B** **1 Claim**



1. A dip stick cleaner for use in cleaning a dip stick as utilized in a conventional oil containing combustion engine, said engine having a conventional dip stick tube, the invention comprising:
a supporting means attachable about said conventional dip stick tube;
a resilient planar member having a slotted portion for receiving and cleaning a dip stick;
a means for highly connecting said planar member to said supporting means and rotatable from a first position away from said conventional tube to a second position over the top of said tube, with the planar member substantially at right angles to the length of the tube.

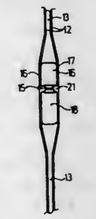
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**4,017,936**

**WINDSHIELD WIPER ARRANGEMENT**

**Karl Schweikert, Buhl, Germany, assignor to Robert Bosch G.m.b.H., Stuttgart, Germany**

**Filed Sept. 11, 1975, Ser. No. 612,578**
**Claims priority, application Germany, Oct. 5, 1974, 2447640**
**Int. Cl.² B60S *1/40***
**U.S. Cl. 15—250.32** **6 Claims**



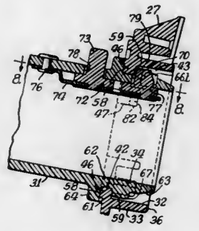
1. A windshield wiper carrier arm which is adapted to be connected to a wiper arm, comprising a channel-shaped body having two spaced side walls and a transverse rear wall extending between said side walls; and means for pivotally connecting said channel-shaped body to a wiper arm, including two integral tongues forming portions of said transverse rear wall and being bent from the plane of said rear wall to form a tubular pivot which extends between said walls and is adapted for engagement with the wiper arm.

**4,017,937**

## HOSE COUPLING FOR A SUCTION CLEANER

**William E. Hanold, Bloomington, Ill., assignor to National Union Electric Corporation, Greenwich, Conn.**

**Filed May 14, 1975, Ser. No. 577,284**
**Int. Cl.² A47L 5/00, 9/24**
**U.S. Cl. 15—327 R** **8 Claims**



1. In a suction cleaner including a casing having suction generating means therein and a wall having a suction opening for receiving a portion of one end of a cleaning tool hose, the opposite end of said hose being adapted to receive different types of cleaning tools, the improvement of coupling means for effecting rapid and positive coupling and uncoupling of said one end portion of said hose with said suction opening, said coupling means comprising a female coupling portion carried by said casing and a male coupling portion on the outer end of a fitting secured on one end of said hose, said female coupling portion including flange means extending radially inwardly into said suction opening and having axially inner and outer bearing surfaces, said flange means also having at least one recess in the periphery thereof, said male coupling portion including at least one radially outwardly extending lug, said lug being shiftable through said recess and movable into engagement with said inner bearing surface of said flange means to prevent disengagement of said male coupling portion from said suction opening when said male coupling portion is in a locked position, said fitting also having a collar on the outer periphery thereof and spaced axially from said lug, said collar extending radially outwardly from said fitting and having a combined annular bearing and sealing surface for engaging the axially outer bearing surface of said flange means and limiting axially inward movement of said male coupling portion into said suction opening so that said lug can be moved into engagement with said inner bearing surface of said flange means, catch means carried by said male coupling portion for engaging said female coupling portion and holding said male coupling portion in an operative, locked position in said suction opening, and manually actuated means on said fitting for releasing said catch means so that said male coupling portion can be disengaged from said opening.

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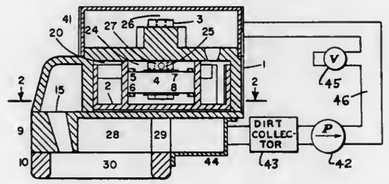
**4,017,938**

## CLEANER USING INTERMITTENT JETS OF FLUID SUPPLIED AT ABOVE AMBIENT PRESSURE

**W. Paul Crise, 4921 NE. 2nd Ave., Pompano Beach, Fla. 33064**

**Continuation-in-part of Ser. No. 210,914, Dec. 22, 1971, abandoned. This application July 24, 1975, Ser. No. 598,811**
**Int. Cl.² A47L 5/14**
**U.S. Cl. 15—346** **6 Claims**

6. A cleaning tool for carpet and the like comprising:
an elongated member having a normally substantially horizontal elongated opening therethrough, the lower portion of which member comprises means for engaging the surface of the material being cleaned;
a fluid flow means, superimposed upon, and sealingly secured to, said rectangular member, said flow means having a plurality of nozzle passages therethrough communicating with said opening and having an elongated cavity therethrough communicating with said opening at a site remote from the point of entry of said nozzle passage, said elongated cavity having an exhaust opening therein adapted to be sealingly connected to a means for evacuating gas;
a member, superimposed upon, and sealingly secured to, said fluid flow means, said member having a circular valve rotor cavity interiorly thereof, having a plurality of passages individually intersecting said rotor cavity about the circumference thereof and connecting said rotor cavity with discrete groups of said nozzle passages, and having a plurality of holes in the top of said member communicating with said cavity and disposed radially about the axis thereof, said holes being uniformily tilted from the vertical;
mounting means attached to said member interiorly of said circular valve rotor cavity;
a circular valve rotor adapted to fit into said circular valve rotor cavity and rotatably mounted upon said mounting means, said valve rotor having a solid bottom, an outer wall, having a plurality of openings therein of a size and shape similar to the passage intersections, an inner wall, and a number of radial walls equal to the number of openings in said outer wall and connecting said inner wall with said outer wall and connecting said inner wall with said



outer wall immediately adjacent one side of each of said openings;
an intake manifold superimposed upon, and sealingly secured to, said member, having an opening therein adapted to be sealingly connected to a source or pressurized gas and having a second opening therein communicating with said holes in said member,
a gas pump having the exhaust side thereof sealingly connected to said opening of said intake manifold and the intake side thereof sealingly connected to said exhaust opening of said fluid flow means,
a pressure release means connected between said exhaust side of said pump and said intake manifold,
so constructed and arranged that pressurized gas supplied to the intake manifold will be forced generally downward through the tilted holes in the member and into the circular valve rotor cavity where the tilted gas streams will impinge upon the radial walls of the rotor causing the rotor to rotate about the mounting means, sequentially matching the openings in the outer wall of the rotor with individual passages of the member and allowing the gas to sequentially pass through the passages, to the nozzle passages associated therewith and therethrough, to impinge upon the portion of the material enclosed by the elongated rectangular opening of the elongated rectangular member and to, thereafter, be exhausted through the elongated cavity.

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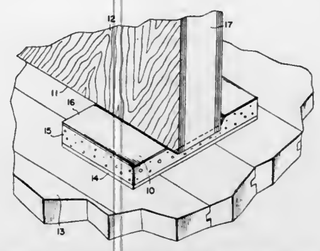
**4,017,939**

## DOOR STOP

**Minnie Schofield, St. Paul, Minn., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest**

**Filed Apr. 12, 1976, Ser. No. 676,315**
**Int. Cl.² B32B 3/26; E05F 5/02**
**U.S. Cl. 16—82** **4 Claims**

1. A door stop device adaptable for fixing an open door in a specific position when squeezed between the bottom edge of the door and the underlying floor surface, in the form of a



laminar structure comprising a base metal plate, a cover sheet of flexible sheeting, together with a section of soft foam material retained between the base plate and the cover sheet.

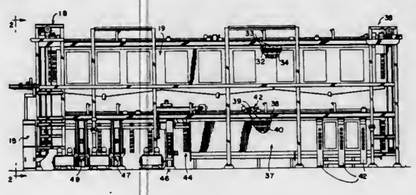
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**4,017,940**

## METHOD AND APPARATUS FOR STUFFING LOAF MOLDS

**Charles H. Johnson, and Carroll P. Hartl, both of Madison, Wis., assignors to Oscar Mayer & Co. Inc., Madison, Wis.**

**Filed Mar. 11, 1975, Ser. No. 557,399**
**Int. Cl.² A22C 7/00**
**U.S. Cl. 17—32** **10 Claims**



1. Apparatus for stuffing meat material into a horizontally arranged elongated tubular loaf mold open at one end and closed at the other end, which apparatus comprises: a stationary stuffing horn, a stuffing platform, a stuffing carriage for receiving the mold and movable along the stuffing platform relative the stuffing horn, means mounting the stuffing platform for vertical movement to align the mold with the stuffing horn, means for driving the carriage to position the stuffing horn within the mold at the closed end thereof, control means for connecting the stuffing horn to a pressurized source of meat material, means for actuating the control means to commence discharging meat material from the stuffing horn, the pressure of the meat material being such as to force the mold and carriage to move off the stuffing horn, means retarding the movement of the carriage to assure proper filling of the mold, and means for actuating the control means to end the discharge of meat material from the stuffing horn.

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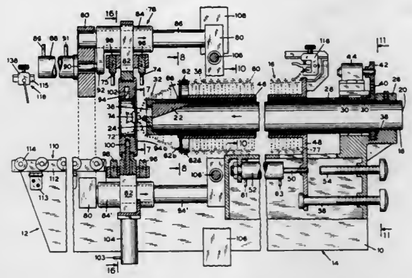
**4,017,941**

## CASING SENSING MEANS FOR STUFFING APPARATUS

**Vytas Andrew Raudys, Chicago, and Anton Leroy Mika, Downers Grove, both of Ill., assignors to Union Carbide Corporation, New York, N.Y.**

**Filed Oct. 30, 1975, Ser. No. 627,254**
**Int. Cl.² A22C 11/02**
**U.S. Cl. 17—41** **29 Claims**

1. In an apparatus for stuffing flowable product into shirred casing comprising a stuffing horn assembly adapted for mounting a shirred tubular casing, and including a tube having an inlet end for receiving flowable product from a pressurized supply and a discharge end for discharging the product; product stoppering means adapted to be indexed to a first position so as to allow the passage of pressurized product out through the discharge end of the tube into a mounted shirred casing and adapted to be indexed to a second position so as to prevent the flow of pressurized product out through said discharge end of the tube; means associated with said stuffing horn assembly and adapted for providing a closure after a selected length of casing is stuffed; and first control means for automatically providing consecutive cycles of a stuffing and



closing operation for producing stuffed products of a desired length; the improvement comprising sensing means adapted to detect movement of a trailing end portion of a mounted shirred casing, and second control means associated with said sensing means for interrupting the stuffing and closing operation so as to terminate the flow of product from the tube before the mounted shirred casing is completely expended.

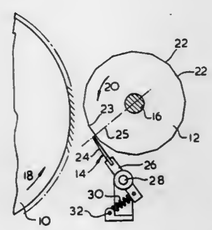
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**4,017,942**

## TEXTILE CARDING

**Malcolm Clayton, Huddersfield, and Keith Grimshaw, Todmorden, both of England, assignors to The English Card Clothing Company Limited, England**

**Filed July 15, 1974, Ser. No. 488,818**
**Claims priority, application United Kingdom, July 31, 1973, 36353/73**
**Int. Cl.² D01G 15/46**
**U.S. Cl. 19—106 R** **10 Claims**



1. Apparatus for removing a carded web of fibres from a rotating member, comprising a stripping roller mounted adjacent said rotating member for rotation about its own axis, and a blade-like member at least part of which is disposed close to the periphery of the stripping roller and means for deliberately imparting predetermined continuous controlled oscillation of said blade-like member relative to the periphery of said stripping roller for continuous opening and closing of the mouth formed between the stripping roller and the blade-like member.

4,017,943

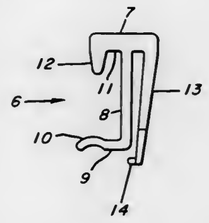
## BRACKET AND CLIP FOR MOUNTING A CROSS-BAR TO A BRACKET

David M. Moore, Pittsburgh, Pa., assignor to Armstrong Store Fixture Corporation, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 544,968, Jan. 29, 1975, Pat. No. 3,965,540. This application Feb. 9, 1976, Ser. No. 656,142

Int. Cl.² A44B *13/00*

U.S. Cl. 24—84 R 4 Claims




1. A bracket and clip construction for supporting a cross-bar on which merchandise display hooks or the like are mounted comprising:

a. a clip element having a top portion and a depending wall and a clip element at the rear of the top portion extending downwardly from the top portion alongside of the depending wall, the clip element being resiliently flexible in a direction away from the depending wall to frictionally grip an object inserted between the clip element and the depending wall,

b. the bracket having an arm for attachment to a support and a clip-supporting portion with upper and lower edges and of a thickness to be received between the depending wall of the clip and said clip element by springing the clip element in a direction away from the depending wall,

c. the bracket having an opening through the clip-supporting portion thereof and the clip having a projection on the clip element adapted to fit into said opening, the opening and projection being so positioned that the projection will enter the opening only when the clip is positioned on the clip-supportion portion of the bracket with the clip forced over the clip-supporting portion of the bracket to the full limit of movement provided between the clip element, the depending wall, and the top portion of the clip, said clip element being longer than the depending wall portion with the projection being on the terminal portion of the clip element, said opening in the clip supporting portion of the bracket arranged to receive said projection being located below the lowermost edge of said depending wall portion and above the lower edge of the clip-supporting portion,

d. the clip having attaching means forwardly of the depending wall for securing a bar thereto.

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4,017,944

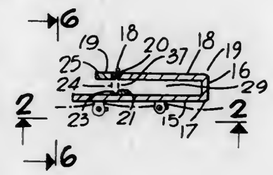
## SHOULDER BAG CLASP

Hilda Cohen, 1010 Autumn Ave., Brooklyn, N.Y. 11208

Filed Mar. 14, 1975, Ser. No. 558,267

Int. Cl.² A44B *9/00, 13/00*

U.S. Cl. 24—86 R 2 Claims




1. A shoulder bag clasp, which comprises:

a. a rectangularly shaped bottom base member;

b. an upwardly extending flange communicating perpendicularly with a right end of said base member;

c. a shorter rectangularly shaped member communicating perpendicularly with an upper end of said flange, said shorter rectangularly shaped member extends inwardly over said base member, said flange, said base member, and said shorter rectangularly shaped member describing an opening therethrough;

d. means for securing said clasp to a shoulder portion of a garment, a strap of a shoulder bag adapted to be received in said opening, said securing means including a pair of saftey pin members affixed transversely to a bottom face of said rectangularly shaped bottom base member;

e. a rectangularly shaped stop member;

f. a hinge assembly joining said rectangularly shaped stop member to a left end of said shorter rectangularly shaped member, said rectangularly shaped stop member of sufficient length to engage a top face of said rectangularly shaped bottom base member, when said rectangularly shaped stop member extends vertically downward; and

g. means for maintaining said stop member in a vertical downward position.

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4,017,945

## FASTENER FOR POCKETS, CASES OR THE LIKE

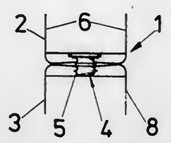
Raimund Stanik, Wuppertal-Beyenburg; Horst Gustav Appelt, Wuppertal-Barmen, and Walter Ramspott, Wuppertal-Elberfeld, all of Germany, assignors to Firma Schaeffer-Homberg GmbH, Wuppertal-Barmen, Germany

Filed July 28, 1975, Ser. No. 599,761

Claims priority, application Germany, Sept. 28, 1974, 2446469

Int. Cl.² A44G *17/00*

U.S. Cl. 24—208 R 15 Claims




1. A fastener in the form of a release fastener, snap fastener and the like for pockets, cases and the like, comprising

two identically formed female type members,

one of said member serving as a female part and formed with an insert opening,

a closing head operatively releaseably lockingly engaging in said insert opening,

the other of said female type members constituting a male holding part formed with a hold carrying said closing head, said closing head extending through said hole and being formed with a rearward collar supported on said male holding part,

means on each of said two female type members, respectively defining said hole of said male holding part and defining said insert opening of said female part, for a plug-in catch connection between said male holding part and said closing head and for a plug-in snap-catch connection between said female part and said closing head, respectively,

said closing head comprises a closing head pin formed with two catch grooves disposed one behind the other in a longitudinal direction of said pin, said pin including a center zone of enlarged cross-section separating said two catch grooves from each other,

one of said catch grooves lies adjacent said collar and cooperates in a snap-catch connection relationship with an edge range of said hole of said male holding part cooperatively constituting said plug-in snap-catch connection means of said male holding part,



the other of said catch grooves is formed adjacent a free end of said pin and cooperates in a locking position of the fastener in a releasable snap-catch locking engagement relationship with an edge range of said insert opening of said female part cooperatively constituting said plug-in snap-catch connection means of said female part,

said male holding part and said female part are identically formed and each have a front surface facing each other and an outer peripheral edge, the latter aligned in a common plane with said center zone in the locking position of the fastener, respectively,

said front surface of said male holding part and said front surface of said female part are funnel shaped and cooperatively form a trough which widens toward a center point thereof in the locking position of the fastener, and

said front surface of said male holding part and said front surface of said female part are clamped abuttingly against each other adjacent said outer edges respectively in the releasable locking position of the fastener by said catch grooves of said closing head engaging with said plug-in snap-catch connecting means of said male holding part and said female part, respectively.

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4,017,946

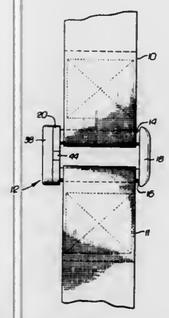
## LOCK SCREW FOR RIGGING CONNECTOR OR THE LIKE

Frank John Soja, Sun Valley, Calif., assignor to Alta Engineering, Inc., Burbank, Calif.

Filed Mar. 1, 1976, Ser. No. 662,343

Int. Cl.² A44C *5/18*

U.S. Cl. 24—265 AL 9 Claims



1. In a locking device:

a. a pair of companion hardware parts adapted to be locked together;

b. one of said hardware parts having a threaded female fastener element;

c. said other of said hardware parts having a recess facing outwardly, there being an access opening in the bottom of said recess registrable with said female fastener element;

d. a screw in said recess having a shank extended through said access opening and threadedly engaging said female fastener element;

e. said screw having a head entirely accommodated in said recess;

f. said recess having, near its outer end, an internal groove;

g. said recess and said head having companion keyways; and

p1 h. a spring retaining member snapped in said groove, said retaining member having a key extending into both of said keyways whereby said screw is releasably retained in position notwithstanding shock and vibration.

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4,017,947

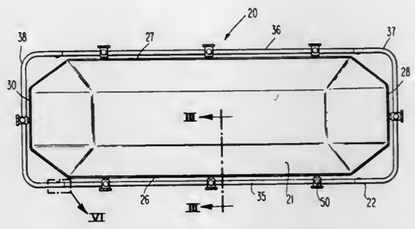
## CASKET AND CASKET SUPPORT

Hugh Collier Acton, Augusta, Mich., assignor to Boyertown Burial Casket Company, Boyertown, Pa.

Filed Oct. 20, 1975, Ser. No. 624,300

Int. Cl.² A61G *17/00*

U.S. Cl. 27—27 19 Claims




1. A casket comprising a tub portion and a lid portion, each of said tub portion and lid portion being free of any connected handles, said tub portion having generally upstanding walls and a bottom wall, and having engagement means integral with and completely around a lower portion of said upstanding walls, said engagement means comprising a u-shaped channel-like means for ready-detachably receiving portions of a normally separate reusable carrying structure in engagement therein.

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4,017,948

## HEDDLE CARRYING RODS WITH CONNECTORS AND/OR PIECES

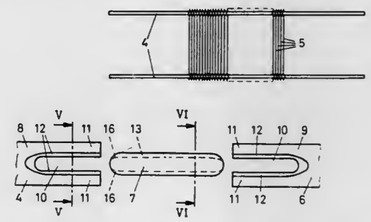
Erich Vogelbacher, Horgen, Switzerland, assignor to Grob & Co. Aktiengesellschaft, Horgen, Switzerland

Filed Mar. 23, 1976, Ser. No. 669,561

Claims priority, application Switzerland, Apr. 3, 1975, 4259/75

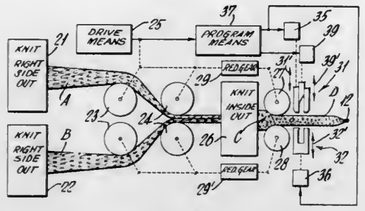
Int. Cl.² D03J *1/14*; D03C *9/00*

U.S. Cl. 28—46 9 Claims



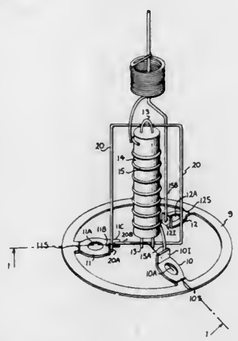

1. In a heddle rod of the type having a flat elongated substantially rectilinear configuration adapted to carry heddles having closed end loops, the improvement comprising said rod having a longitudinally extending open ended slot in at least one end thereof defining a pair of shanks and attachment means being of a thickness substantially equal to the thickness of the rod so that the closed end loops of heddles can pass over said attachment means; said attachment means being detachably secured to said end of said rod including a flat elongated projection having upper most and lower most surfaces slidably disposed within said slot in engagement with said shanks, the opposing surfaces of said shanks and said projection having substantially complementary interfitting configurations to prevent lateral separation of said projection and said rod.

4,017,949
**METHOD OF MAKING A SCOURING PAD OR THE LIKE**
George B. Botvin, Cumberland, R.I., assignor to ACS Industries, Inc., Woonsocket, R.I.
Filed Feb. 27, 1975, Ser. No. 553,509
Int. Cl.² D05B 1/08
U.S. Cl. 28—77 10 Claims



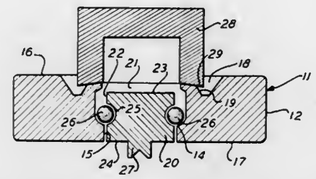

1. The method of making a scouring pad or the like which comprises loosely knitting an elongate pliant outer tube around a loosely knitted elongate pliant inner tube of stuffing material, one of said tubes being inside-out knitted with respect to the other, whereby the grain of adjacent surafaces of said tubes may be in essentially the same predominant direction, locally compressing the outer tube upon the stuffing material at longitudinally spaced locations to define first and second transversely extending end alignments of a pad, locally securing the compressed materials at said alignments, such securing including the step of stitching separate seams along said end alignments, and severing individual pads thus end-secured.

4,017,950
**METHOD FOR MAKING A GAS SENSOR ASSEMBLY**
William J. Schultz, Lynnfield, Mass., assignor to General Electric Company, Schenectady, N.Y.
Filed June 16, 1976, Ser. No. 696,608
Int. Cl.² H01J 9/36
U.S. Cl. 29—25.15 9 Claims



1. A method for making a gas sensor assembly comprising the steps of:
providing a metal annulus having a plurality of inwardly extending spaced tongues, each of said tongues being provided with a clamping means-receiving aperture therethrough,
welding opposite ends of a heater wire, respectively, to each of two of said tongues,
welding a combination support wire and electrical connector to a third of said tongues,
positioning portions of said heater wire and said support wire within a cup-shaped housing having a plurality of clamping means mounted thereon whereby each of said apertures in the respective tongues has one of said clamping means inserted partly through it,
fastening said clamping means to clamp the respective tongues against said housing, and
separating each of the tongues from the annulus.

4,017,951
**METHOD FOR MANUFACTURING BALL BEARINGS HAVING A SINTERED METAL POWDER OUTER RACE**
Nick A. Aromando, Lyndhurst, N.J., assignor to Hillside Metal Products, Inc., Newark, N.J.
Continuation-in-part of Ser. No. 324,733, Jan. 18, 1973, abandoned. This application Jan. 23, 1974, Ser. No. 435,683
Int. Cl.² B21D 53/10
U.S. Cl. 29—149.5 PM 28 Claims



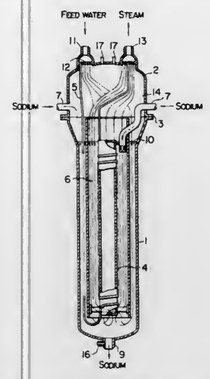
1. A method for manufacturing ball bearings having a generally annular outer race of molded and sintered metal powder, a cooperative inner race within an opening defined by the outer race and a plurality of ball bearings entrapped in a raceway formed by the inner and outer races comprising:
a. forming a generally annular outer race preform of molded and sintered metal powder, said preform having substantially concentric inner and outer annular faces, the said inner annular face having radially inwardly disposed first ball bearing entrapment means, and a side face joining said inner and outer annular faces, said side face having a generally annular wedge-shaped flange substantially concentric with the inner and outer annular faces, the wall of said flange distal to said opening being straight from top to bottom and inclined radially inwardly toward said opening:
b. positioning the inner race within said opening;
c. positioning a plurality of ball bearings intermediate the inner and outer race;
d. the ball bearings being entrapped on one side by said first entrapment means on the outer race; and
e. engaging a deforming tool having a flat working face against the wedge-shaped flange deforming at least a portion of said flange radially inwardly to generate an entrapment from the deformed portion which entraps the ball bearings between the inner and outer races on the side of the preform opposite the said first entrapment means of the outer race.

4,017,952
**METHOD FOR DISASSEMBLING AND REPAIRING A SODIUM-HANDLING APPARATUS**
Kiyomitsu Nemoto, Mito; Kesahiro Naito, Hitachi; Megumu Urata, Ibaraki, and Norihiko Sagawa, Hitachi, all of Japan, assignors to Hitachi, Ltd., Japan
Filed Nov. 4, 1974, Ser. No. 520,905
Claims priority, application Japan, Nov. 9, 1973, 48-125283
Int. Cl.² B23P 15/26, 17/00
U.S. Cl. 29—157.3 R 15 Claims

1. A method for disassembling and repairing sodium-handling apparatus for use at a high temperature, said sodium-handling apparatus having a sodium-handling space therein for handling sodium, which comprises:
1. discharging metallic sodium from the sodium-handling space of said apparatus,
2. filling an inert gas in the sodium-handling space of the apparatus,



3. cooling metallic sodium retained on the surfaces of the sodium-handling space of the apparatus to lower than the sodium solidification temperature,
4. flushing the inert gas from said sodium-handling space with a reacting gas capable of reacting with metallic sodium to form a weak alkali soluble in metallic sodium,
5. forming a solid film of a neutral salt on the surfaces of the metallic sodium by reaction of the reacting gas with metallic sodium,
6. discharging the reacting gas from the apparatus,
7. disassembling and repairing the apparatus in the atmosphere, and thereafter
8. putting the apparatus in a high temperature operation while retaining the solid films of the neutral salt on the surfaces of the metallic sodium.

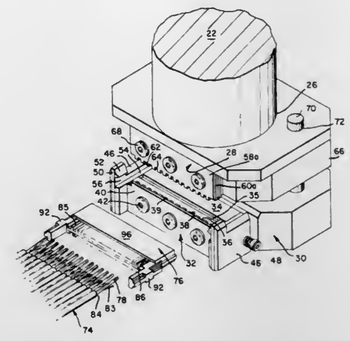



4,017,953
**HEAT EXCHANGERS**
Gordon Robert Creighton, Cambridge, England, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.
Filed Apr. 9, 1975, Ser. No. 566,567
Claims priority, application United Kingdom, Apr. 11, 1974, 16126/74
Int. Cl.² B23P 15/26
U.S. Cl. 29—157.3 V 14 Claims




1. A method of making a heat exchanger consisting of a conduit having a plurality of passes joined by integral return bends which comprises
i. stacking at least three pairs of oblong strips of material together so that alternate pairs of strips overhang the stack along one of the shorter edges thereof and the remaining alternate pairs of strips overhang the stack along the other of the shorter edges thereof,
ii. bonding the individual strips of each pair together along the shorter edge which does not overhang the stack, bonding the adjacent strips of adjacent pairs along both longer edges of said strips and bonding the adjacent overhang areas of said alternate pairs of strips along the three peripheral edges of said overhang, thereby forming a flat, serpentine conduit, and
iii. inflating the conduit by applying internally a fluid under pressure.

4,017,954
**TOOL FOR GANG CRIMPING RIBBON COAXIAL CABLE**
Daniel Baker Grubb, Hummelstown, Pa., assignor to AMP Incorporated, Harrisburg, Pa.
Filed Sept. 22, 1975, Ser. No. 615,273
Int. Cl.² H01R 43/00; H05K 13/06
U.S. Cl. 29—749 1 Claim

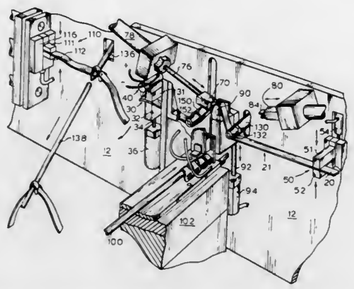


1. An assembly for staking a plurality of parallel wires to a connector having a wire-receiving section and a housing portion and further said wire-receiving section having two rows of wire-in-slot blade contacts with the slot openings in one row facing in a diametric direction relative to the slot openings in the other row, said assembly being positionable in a tool having a base and movable means above the base for vertical reciprocal movement, said assembly comprising:
a. a staker plate assembly comprising three plates each having a plurality of teeth depending from the bottom edges, said plates being positioned front to rear on the movable means with said teeth on each plate being in alignment with the teeth on the other plates, further, said assembly having means to space each plate one from the other predetermined distance; and
b. a stationary assembly mounted on the base and comprising a connector receiving platform having a first and second level, said first level being in alignment with the staker plate assembly and adapted to receive thereover the wire-receiving portion of the connector, said second level lying behind and below the first level and adapted to receive the housing portion of the connector, and further said stationary assembly having retaining and centering means comprising a first rib member extending across the front of the first level and adapted to receive thereagainst the rear face of the connector, and a second rib member extending across the first level immediately behind and displaced below the first rib member, said second rib member having teeth spaced along the top edge thereof and adapted to receive thereon the contact-containing cavities so as to center the connector on the stationary assembly.

4,017,955
**APPARATUS FOR ATTACHING A WORKPIECE TO A CONTINUOUS LENGTH OF LINE**
Gerald Peter Hermanson; David Murray Rickel, both of Maitland, and Robert Joseph Carr, Winter Park, all of Fla., assignors to Dayron Corporation, Orlando, Fla.
Filed June 9, 1976, Ser. No. 694,243
Int. Cl.² B23P 19/04
U.S. Cl. 29—564.8 21 Claims

1. An apparatus for coupling a workpiece of the type having a one way aperture therein to a specified position along a continuous length of line and then cutting said line to a predetermined length, said apparatus comprising in combination:
workpiece receiving means for receiving the workpiece

thereon and for moving the workpiece into communication with the line adjacent the specified position therealong for tensioning the line over the workpiece;
tension adjusting means for regulating the tension of the line over the workpiece;



stuffing means for inserting the line through the one way aperture in the workpiece, thereby coupling the workpiece to the line; and
cutting means for severing the line at the predetermined length.

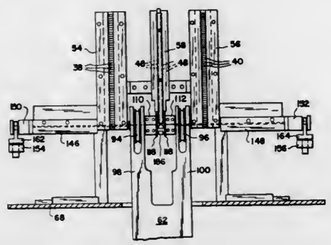
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**4,017,956**

## APPARATUS FOR MAKING INCANDESCENT LAMPS AND THE LIKE

**Donald J. Belknap, P.O. Box 325, Mountain Home, N.C. 28758**

**Division of Ser. No. 372,535, June 22, 1973, Pat. No. 3,914,640, which is a division of Ser. No. 147,747, May 28, 1971, Pat. No. 3,762,900. This application Aug. 8, 1975, Ser. No. 603,159**
**Int. Cl.² B23Q 7/10**
**U.S. Cl. 29—810** **7 Claims**



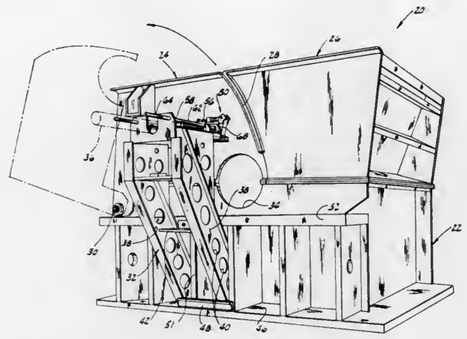
1. Apparatus for manufacturing lamp envelopes or the like, comprising a pair of magazines for receiving stacks of components, said magazines having a pair of spaced aligned ends and a transport arranged to move into and out of the space between said ends of the said magazines, said transport having a pair of component-receiving platforms alignable with said ends of said magazines, respectively, and a pair of pusher means associated with said magazines, respectively, for pushing an end component of each stack onto said platforms, respectively, said platforms being supported upon rotatable hubs on said transport, said hubs having axial bores through which said components are pushed onto said platforms by said pusher means, respectively.

**4,017,957**

## HAMMERPIN PULLER

**Fredrick B. Dreyer, Maplewood, Mo., assignor to Gruendler Crusher & Pulverizer Co., St. Louis, Mo.**

**Filed June 6, 1975, Ser. No. 584,606**
**Int. Cl.² B23P 19/04**
**U.S. Cl. 29—252** **13 Claims**



1. A means for pulling a hammerpin adapted for use with a hammermill frame and having hammerpins supporting a plurality of hammers, said pulling means including a support frame attached to the hammermill frame, a clamp for gripping a selected one of said hammerpins, a means for opening and closing the clamp on the selected hammerpin, a support plate having first and second sides, said support plate pivotally supporting the clamp on the first side and attached to a means to reciprocate the plate on the second side, first and second hammerpin engaging means for supporting the hammerpin as it is pulled, said reciprocating means attached to the first of said hammerpin engaging means, and a pair of guide rod means interconnecting the first and second hammerpin engaging means and the support plate, said first and second hammerpin engaging means supported by said support frame.

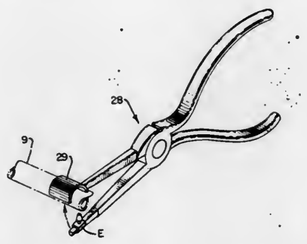
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**4,017,958**

## IRRIGATION APPARATUS

**Richard E. Diggs, 12A Road R3, P.O. Box 776, Carthage, Mo. 64836**

**Division of Ser. No. 549,556, Feb. 13, 1975, Pat. No. 3,966,233, which is a continuation-in-part of Ser. No. 498,181, Aug. 16, 1974, Pat. No. 3,973,732, which is a division of Ser. No. 213,927, Dec. 30, 1971, Pat. No. 3,833,019. This application Dec. 11, 1975, Ser. No. 639,860**
**Int. Cl.² B23P 19/04**
**U.S. Cl. 29—268** **1 Claim**



1. A tool for installing a self-piercing irrigation fitting to a length of plastic pipe, comprising:
a long-nose plier having a pair of tapered gripping jaws with one jaw having a gripping end portion which has a first tip and a flat face presented toward the other gripping jaw, the taper of said one jaw being sufficient to receive the fitting which is to be forced into the pipe, and the other jaw having a back surface, a pair of side surfaces and a second tip; and
a semi-cylindrical backing member for supporting a pipe to which the fitting is being installed, said backing member having a pair of sides with one side integrally attached to said second tip and the other side located to coincide with said first tip, said backing member having a back surface which extends outwardly of said back surface and a pair of ends which are each located outwardly of each of said side surfaces so that the inner surface of said backing member is presented toward said one jaw flat face so that pipe held in said backing member is located above said one jaw flat face.



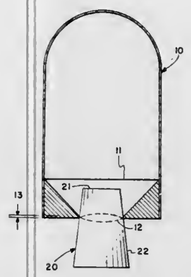
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**4,017,959**

## METHOD OF FORMING SHRINK-FIT COMPRESSION SEAL

**James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention of Ted J. Podgorski, St. Paul, Minn.**

**Filed Apr. 1, 1976, Ser. No. 672,815**
**Int. Cl.² B23P 11/02**
**U.S. Cl. 29—447** **5 Claims**



1. A method of making a noncontaminated glass-to-metal seal between a glass post and a metal enclosure having an opening therein, the periphery of the opening being a seal edge of controlled dimensions, comprising the steps of:
shaping said glass post such that its cross section is in the shape of said opening and such that it is tapered along its length with the resulting smaller end being slightly smaller than said opening; and such that its surface has a desired surface finish;
placing said shaped glass post in an upright position with said smaller end up;
placing said opening of said metal enclosure over said small end of said post so that the metal enclosure is supported by said post;
heating said metal enclosure thereby causing it to expand and slip down said post; and
cooling said metal enclosure whereby the seal edge of said metal enclosure crushes against said glass post forming the desired seal.

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**4,017,960**

## METHOD OF REPAIRING INJURED PORTION OF REFRACTORY FURNACE-LINING

**Naoshi Kawabe; Toshikatu Haga, both of Iwaki; Taiitu Nakajima, Tokyo; Takeshi Takahashi, Sagamihara; Hiroshi Shinoda, Gifu, and Shuji Hayakawa, Nagoya, all of Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo and NGK Insulators, Ltd., Nagoya, both of, Japan**

**Filed Nov. 26, 1975, Ser. No. 635,354**
**Int. Cl.² B23P 7/00; F27D 1/16**
**U.S. Cl. 29—401 E** **5 Claims**

1. A method of repairing an injured portion of a refractory furnace-lining which comprises:
cutting off the injured portion of said lining through the outside furnace shell of said portion together with said shell using a supersonic flame jet cutter without using thermit;
inserting a rigid refractory lining block, having substantially the same shape and size as said through-cut hole, into said through-cut hole; and
welding the surrounding periphery of the inserted block to the contact surface of said through-cut hole using the above-mentioned supersonic flame jet cutter as a welder without using thermit, followed by repairing the outside cut-off shell portion of the furnace.

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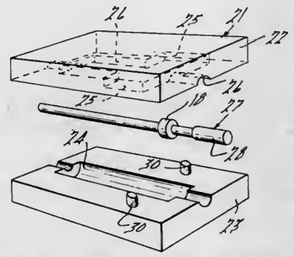
**4,017,961**

## METHOD OF PRODUCING DRAG ON AN OPERATING ROD

**Werner W. F. K. Kochte, Ravenna, Ohio, and Donald D. Bartholomew, Utica, Mich., assignors to Merit Plastics, Inc., East Canton, Ohio**

**Continuation of Ser. No. 353,591, April 23, 1973, abandoned. This application June 5, 1975, Ser. No. 584,145**
**Int. Cl.² B23P 11/02**
**U.S. Cl. 29—450** **3 Claims**





1. The method of constructing an operation rod assembly to prevent the rod from rattling within its holder which includes the steps of: supporting an elastomeric ring on a rod-like core said elastomeric ring being of a smaller inner diameter than the diameter of an operating rod to be inserted therein, supporting the rod-like core with said elastomeric ring thereon in a mold across a cavity therein, injecting a plastic material within the cavity about said rod-like core and elastomeric ring to form the holder, removing said holder from the mold, removing said rod-like core from said holder to provide a longitudinally extending aperture, and inserting said operating rod having a diameter slightly smaller than said rod-like core within said aperture and through said elastomeric ring for longitudinal movement within said aperture with the operating rod retained in place after movement by said elastomeric ring which also prevents the rattling of the operating rod within the aperture.

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**4,017,962**

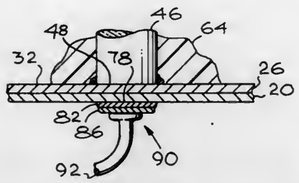
## INTEGRATED ARRAY OF OPTICAL FIBERS AND THIN FILM OPTICAL DETECTORS, AND METHOD FOR FABRICATING THE SAME

**John P. Palmer, Pomona, Calif., assignor to General Dynamics Corporation, Pomona, Calif.**

**Division of Ser. No. 591,200, June 27, 1975, Pat. No. 3,987,300. This application July 23, 1976, Ser. No. 708,164**
**Int. Cl.² B01J 17/00**
**U.S. Cl. 29—572** **10 Claims**

1. A method for registering an optical fiber and a thin film optical detector, which comprises the steps of:
a. mounting a light emitting portion of an optical fiber in fixed relationship with, and in close proximity to, a first surface of a semiconducting film;
b. applying a photosensitive emulsion film to a second surface of said semiconducting film;

c. directing light through said optical fiber and out said light emitting portion thereof to activate only that portion of said emulsion film in registration with said light emitting portion;
d. removing only said activated portions of said emulsion




film and thereby creating a window in said emulsion film in optical registration with said light emitting portion of said optical fiber; and
e. forming an optical detecting element by depositing a metallic film through said window onto the exposed portion of semiconducting film therebelow.

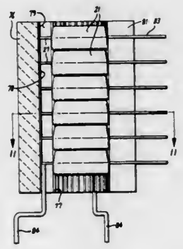
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**4,017,963**

## SEMICONDUCTOR ASSEMBLY AND METHOD

**Fritz W. Beyerlein, Sunnyvale, Calif., assignor to Signetics Corporation, Sunnyvale, Calif.**

**Division of Ser. No. 335,542, Feb. 26, 1973, Pat. No. 3,905,038. This application May 19, 1975, Ser. No. 578,673**
**Int. Cl.² B01J** *17/00*
**U.S. Cl. 29—577** **3 Claims**



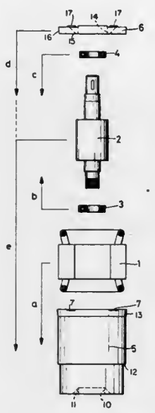
1. In a method for fabricating a semiconductor assembly of the type utilizing a package comprising a semiconductor body having at least a portion of an electrical circuit formed therein with a plurality of contact pads in a predetermined pattern carried by the body and lying in a common plane, a plurality of first leads bonded to said plurality of contact pads, said first leads extending outwardly from the semiconductor body and having outer extremities which lie in a predetermined pattern, first encapsulating means encapsulating said semiconductor body and portions of said first leads in engagement with said contact pads and so that the outer extremities of the first leads are free of the first encapsulating means and are readily accessible, the method comprising positioning a plurality of said packages one above the other and electrically interconnecting corresponding leads of each of the packages wherein the step of interconnecting the corresponding leads of the packages includes the steps of providing a tube, forming slots in the tube and placing the corresponding leads of the packages in the slots and providing means within the slots interconnecting the leads.

**4,017,964**

## METHOD OF MANUFACTURING ELECTRICAL MACHINERY HAVING A ROTOR

**Siegfried Schulte, Gevelndorf, and Wilhelm Schmitt, Ringenberg, both of Germany, assignors to Firma Schulte Elektrotechnik KG, Luedenscheid, Germany**

**Filed Oct. 6, 1975, Ser. No. 619,794**
**Claims priority, application Germany, Oct. 12, 1974, 2448699; May 28, 1975, 2523604**
**Int. Cl.² H02K** *15/14*
**U.S. Cl. 29—596** **10 Claims**



1. A method of manufacturing an electrical machinery assembly including a rotor with a shaft, a stator having an inner bore of given diameter, a housing and bearing means having an outer diameter smaller than said stator bore diameter and supporting said rotor in said housing, comprising deep drawing said housing as two separate housing members from sheet metal, deep drawing in each of said housing members a respective bearing seating surface, deep drawing in at least one of the housing members a stator supporting shoulder, inserting said stator into said one housing member to rest against said shoulder, first placing said bearing means on said rotor shaft and then inserting the rotor with its bearings into said one housing member, aligning the one housing member with the other housing member and applying axially directed pressure to form the assembly whereby the bearing means are centered and seated on said bearing seating surfaces of said housing members, wherein said bearing seating surface and said shoulder in said one housing member are formed in a single deep drawing step, wherein said one housing member is provided, also by deep drawing, with a conical inner rim around its open end, and wherein the other housing member is provided with a matching conical outer rim fitting into said inner rim and securing said housing members to each other by pressing said rims together whereby said conical rims provide an automatic self-centering of the entire assembly.

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**4,017,965**

## METHOD OF MAKING A TRANSDUCER HEAD WITH NARROW CORE STRUCTURE

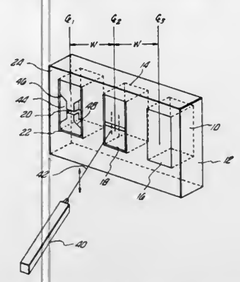
**Werner Brutsch, Garberville; Michael Isaac Behr, South Pasadena, and Ko Ko Gyl, Thousand Oaks, all of Calif., assignor to Burroughs Corporation, Detroit, Mich.**

**Filed June 16, 1975, Ser. No. 587,429**
**Int. Cl.² G11B** *5/42*
**U.S. Cl. 29—603** **16 Claim**

1. A method of manufacturing a core for a magnetic tran ducer so as to provide a high density transducing capabilit comprising the steps of:
inserting a core having a gap into an aperture in a base the transducer;



filling remaining portions of said aperture with a bonding material;
lapping the exposed surfaces of said core and bonding material to form a plane surface with the base;



reducing the core gap width to approximately 0.5 mil by exposing the core material adjacent the gap to a laser beam of energy sufficient to remove the material; and
relapping the exposed surfaces of said core and bonding material to form a plane surface with the base.

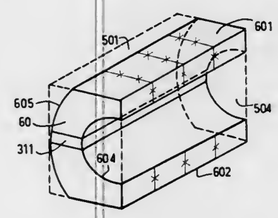
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**4,017,966**

## METHOD OF MANUFACTURING A MAGNETIC HEAD HAVING A RELATIVELY LARGE AIR-GAP AND A GOOD RESISTANCE TO MECHANICAL WEAR

**Antoinette Morell, and Jean Nicolas, both of Paris, France, assignors to Thomson-CSF, Paris, France**

**Filed Aug. 22, 1975, Ser. No. 607,019**
**Claims priority, application France, Sept. 6, 1974, 74.30336**
**Int. Cl.² G11B** *5/42*
**U.S. Cl. 29—603** **2 Claims**



1. A method of manufacturing a magnetic head assembly, including a U-shaped component consisting of a pair of magnetic ferrite sections, each of them having at least one flat face, and a gap, serving as an air-gap, consisting of a non-magnetic ferrite layer interposed between said flat faces, said method comprising the steps of:
cutting a disc of magnetic ferrite material into at least two slices having two large opposite faces and grinding them so as to achieve parallelism therebetween of the order of approximately 10 microns;
preparing a powder of zinc and iron oxides able to yield by sintering a non-magnetic ferrite, and mixing the same with a binder so as to form a paste;
depositing a layer of said paste by silk-screen printing on one face of at least one of said slices, and drying said layer so as to eliminate the binder;
bonding said two slices together, by sintering the same under pressure, for obtaining a composite member in which said layer in sandwiched between the two slices; and
machining said composite member by a) cutting said member for obtaining at least one elongate bar which is a rectangular parallelepiped; b) drilling and grinding said bar in the longitudinal direction so as to obtain an elongate U-shaped block; and c) transversely cutting said block for obtaining a series of U-shaped components, one of which is to be used in said assembly.

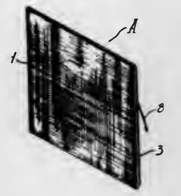
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**4,017,967**

## METHOD OF MAKING INFRARED EMITTER

**Harold D. Wells, St. Louis County; E. Warner Hughes, Baldwin, and Robert F. Bales, Maryland Heights, all of Mo., assignors to Black Body Corporation, Fenton, Mo.**

**Continuation of Ser. No. 563,621, March 31, 1975, abandoned. This application June 7, 1976, Ser. No. 693,162**
**Int. Cl.² H05B** *3/18*
**U.S. Cl. 29—611** **3 Claims**



1. A method for forming a refractory panel for emission of infrared radiation comprising providing a sheet of dielectrical material of mesh character, applying to one face of said dielectric sheet a slurry of refractory material and a binder, applying a vacuum through the opposite face of said dielectrical sheet for partial drying of said slurry, providing a non-helical resistance wire heating element, placing said heating element upon said partially dried slurry of refractory material, then making a second application of said slurry upon said partially dried slurry to fully encase said heating element, and then applying a current to said heating element for causing heating of the same to fully cure the refractory material and simultaneously cause expansion of said heating element to effect development of an enlarged chamber within the refractory material as cured.

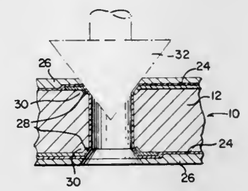
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**4,017,968**

## METHOD OF MAKING PLATED THROUGH HOLE PRINTED CIRCUIT BOARD

**Walter Weglin, Bellevue, Wash., assignor to Jerobee Industries, Inc., Redmond, Wash.**

**Filed Sept. 18, 1975, Ser. No. 614,533**
**Int. Cl.² B41M** *3/08*
**U.S. Cl. 29—625** **23 Claims**



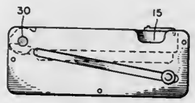
1. In a circuit board having generally planar first and second surfaces and comprising a substrate, a first circuit element on one side of the substrate, and a second circuit element on the opposite side of the substrate,
a method of making a connection from one circuit element to the other through the substrate, said method comprising:
a. providing in the circuit board a through hole extending through both circuit elements and through the substrate,
b. forming portions of the first and second circuit elements adjacent said hole from the planes of, respectively, the

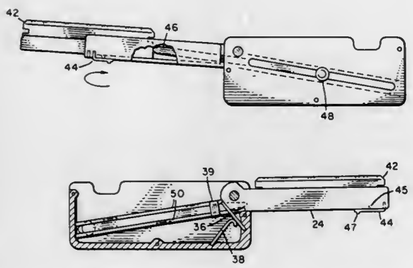
first and second surfaces into the hole to make first and second inwardly flared circuit element portions, and covering the first and second planar surfaces of the board with a substantially uniform plating resist material, while providing as exposed areas the inwardly flared circuit element portions and the hole area therebetween exposed, and

c. plating the exposed areas of the board to form a through hole connection having a middle portion extending through the hole and two end portions overlapping the two inwardly flared circuit element portions.

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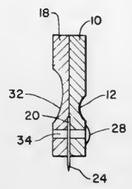
**4,017,969**
**CUTTING INSTRUMENT**
**Robert E. Stonebraker, Box 222, R.D. No. 3, Tyrone, Pa. 16686**
**Filed Apr. 20, 1976, Ser. No. 678,478**
**Int. Cl.² B26B 3/06; F41B 13/02; F41C 27/02**
**U.S. Cl. 30—156** **8 Claims**




1. A cutting instrument comprising in combination:
A case having a track groove on one side thereof;
A blade pivot rotably attached to said case;
A blade holder having a blade track integrally attached to said blade pivot and adapted to receive a blade, said blade pivot being generally circular in shape with a flat cam surface thereon;
A blade slidably positionable upon said blade holder;
An ejector rod positioned within said case and aligned with said blade track when the instrument is in its open position;
An ejector button integrally attached to said ejector rod and extending through said track groove to the outside portion of said case;
A blade lock member positioned within said case and against said blade pivot;
A blade lock spring attached to said case and biasing said blade lock member against said blade pivot;
A stop member integrally positioned on said case at the end of said track groove and adapted to stop said ejector button when it is slid up said track groove.

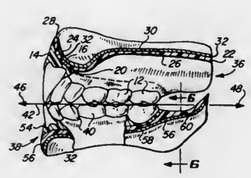
**4,017,970**
**TILE AND TUB SCRAPER**
**Ann Williams, Chicago, Ill., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest**
**Filed Oct. 6, 1975, Ser. No. 620,211**
**Int. Cl.² A47L 13/08**
**U.S. Cl. 30—169** **3 Claims**




1. A hand held scraper comprising a first flat blade holder means having a flat surface, said first blade holder having a substantially horizontal concave groove on the surface opposite said flat surface for gripably receiving a forefinger, said flat surface of said first blade holder abuttingly positioned against the flat surface of a second flat blade holder, said second blade holder having a concave indentation thereon opposite its flat surface for gripably receiving a thumb, said indentation being substantially vertical to said groove, said first blade holder and said second blade holder having opposed recessed surfaces along one side, said holders being positioned so that the flat surfaces of each abut one another flushly for positioning a scraper blade between said recessed surfaces so that the edge of said blade is exposed and substantially parallel to said groove, removable pin means securingly inserted through said first and second holders for attaching said holders to one another and holding a scraper blade in a fixed position in said scraper, said first and second blade holders being of a size sufficient to fit in the palm of the hand so that said scraper may be manipulated by the thumb and forefinger and optionally may be urged towards a work surface by the heel of the hand.

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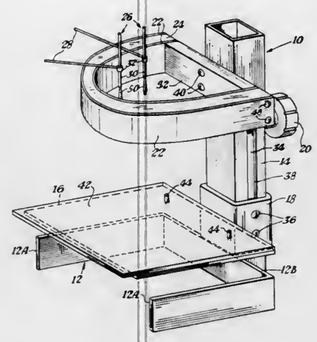
**4,017,971**
**MODULAR PROSTHETIC DENTURES**
**Mitchell M. Hazar, Phoenix, Ariz., assignor to American Denture Corporation, Scottsdale, Ariz.**
**Filed Dec. 11, 1975, Ser. No. 639,982**
**Int. Cl.² A61C 13/00**
**U.S. Cl. 32—2** **6 Claims**




1. Modular prosthetic dentures comprising maxillary and mandibular units; each unit being fittable to a variety of patients; each unit having a hard base; teeth fixed to said hard base; a deflectably formable layer bonded to said hard base and being deflectably fittable to an edentulus ridge; the teeth of one of said units having flat plane occlusion geometry.

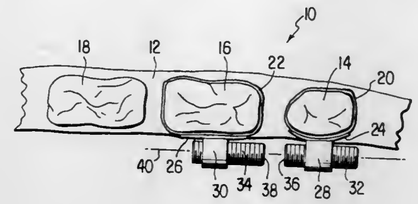


**4,017,972**
**DOWEL PIN POSITIONER**
**Edward C. Glenn, 1455 NE. 55th St., Fort Lauderdale, Fla. 33334**
**Filed July 7, 1975, Ser. No. 593,280**
**Int. Cl.² A61C 13/00**
**U.S. Cl. 32—11** **2 Claims**




1. A dowel pin positioning device for positioning dowel pins utilized in the construction of dental prosthetic appliances from impression devices comprising:
a rigid, hollow vertical support shaft, said shaft having a vertical slot;
a base member connected to one end of said rigid, vertical support shaft, said base member supporting said shaft in a vertical position;
a rigid, horizontally disposed dowel pin holder supporting member rigidly connected to said vertical support shaft near the upper free end of said support shaft, said dowel pin holder support member including a horseshoe shaped magnet and a connecting bar disposed between the free ends of said horseshoe magnet, said connecting bar rigidly fixed to said vertical support member;
a rigid platform;
a slip ring connected around the outer circumference of said vertical shaft, said slip ring rigidly fixed to said rigid platform, said platform being horizontally disposed,
a gear rack connected within said hollow interior of said support shaft and connected to said slip ring;
a fastening means connected to said slip ring and said gear rack through said vertical shaft slot;
a ring gear rotatably connected within said hollow vertical shaft and engaged with said gear rack;
means for rotating said ring gear connected to said ring gear and mounted on said vertical shaft;
a removeable tray mountable on said rigid, planar platform, said tray adapted to receive impressionable materials;
a means for aligning said removeable tray with said rigid platform when said removeable tray is mounted on said platform; and
at least one dowel pin holder magnetically attachable to said horseshoe magnet upper surface, said dowel pin holder including a flat, magnetizable bar, said bar having a friction clip disposed at one end, and a dowel pin receiving mandrel frictionally moveable, disposed in said clip, said mandrel being frictionably adjustable in position relative to said clip.

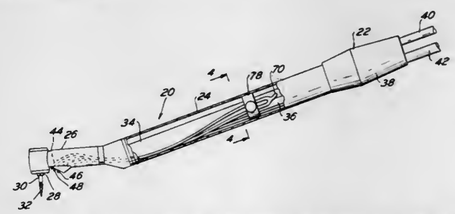
**4,017,973**
**MAGNETIC TOOTH STRAIGHTENER**
**John E. Nelson, Holtwood, Pa., assignor to HMW Industries, Inc., Lancaster, Pa.**
**Filed June 16, 1976, Ser. No. 696,511**
**Int. Cl.² A61C 7/00**
**U.S. Cl. 32—14 A** **14 Claims**




1. An orthodontic assembly for intraoral use comprising a pair of internally threaded tubular members, means connected to said members for mounting them on adjacent teeth in a human mouth, and a pair of screws threadedly received in said members whereby said screws may be advanced and retracted by rotation in said members, said screws being permanently magnetized in a direction parallel to their axes of rotation so that rotation of said screws in said members varies the magnetic force acting between adjacent ends of said screws when mounted on adjacent teeth to vary the orthodontic correction force between the teeth.

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**4,017,974**
**HANDPIECE WITH ADJUSTABLE WATER SPRAY**
**Kurt Sotman, Penn Wynne, and John E. Nash, Downingtown, both of Pa., assignors to Star Dental Manufacturing Co., Inc., West Conshohocken, Pa.**
**Filed Sept. 30, 1974, Ser. No. 510,280**
**Int. Cl.² A61C 1/68**
**U.S. Cl. 32—28** **11 Claims**



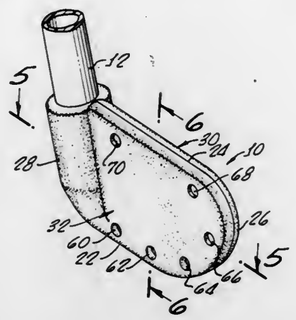

1. For use with a dental handpiece adapted for use with various length cutting burs the improvement comprising means for providing an atomized water spray and for adjusting the direction of the spray to the tip of the bur irrespective of the length of said bur, said means comprising a tube for carrying water and having a free end generally directed at said bur, a first tube for carrying compressed air located laterally of said water tube and having a free end disposed adacent the free end of the water tube, a second tube for carrying compressed air located laterally of said water tube and having a free end disposed adjacent the free end of said water tube, the compressed air and water mixing at the free end of the water tube to create an atomized water spray, and metering means for varying the flow of air through said first air tube and said second air tube to effect the control of the direction of the atomized spray.

**4,017,975**

## SALIVA EJECTOR AND CHIN HOLDER THEREFOR

**Wesley Grant Johnson, 1642 Mockinbird Place, Orange, Calif. 92667**

**Filed Mar. 22, 1976, Ser. No. 669,244**
**Int. Cl.² A61C *17/04***
**U.S. Cl. 32—33** **35 Claims**



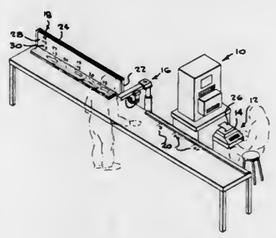
1. A combined saliva ejector and tongue restraint adapted to be placed within the oral cavity between the tongue and teeth, said ejector comprising,
a flattened body having upper and lower portions, said body including,
first and second plates in face to face contiguity, at least one of said plates being formed with a recess extending along a surface thereof that faces the other of said plates to define a suction passage between said plates in at least said lower portion,
and means for holding said plates in said face to face contiguity,
said body being formed with a plurality of apertures communicating with said passage, said body having a height sufficient to extend from the floor of the mouth to said teeth whereby said body may extend along inner sides of said teeth to block contact between said tongue and at least some of said teeth and means formed in at least one of said plates for receiving a vacuum tube in communication with said suction passage.

**4,017,976**

## APPARATUS AND METHOD FOR MAXIMUM UTILIZATION OF ELONGATED STOCK

**Anthony J. Barr, 2713 Vanderbilt Road, Raleigh, N.C. 27607, and Alexander G. Mullin, 118 Hawthorne Road, Raleigh, N.C. 27605**

**Filed July 3, 1974, Ser. No. 485,736**
**Int. Cl.² G05B *13/00***
**U.S. Cl. 33—1 S** **8 Claims**



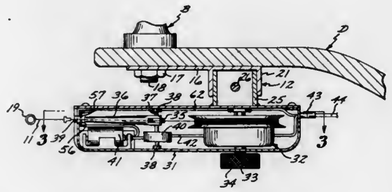
1. A method of selecting the indicators for a backgauge on a cross cut saw or the like to optimize the yield of required usable lengths of stock from a grade mix of stock being processed such as boards of lumber having randomly located unusable lengths containing knots, discoloration or the like, said method comprising: establishing the required lengths and the quantities of pieces of each length to be cut, determining a value factor for each desired length, establishing the probability of having a given length of usable stock in each of the grades of stock, establishing the grade mix of the various grades of stock being processed, determining from said required lengths, required quantities, value factors, probabilities and grade mix, the optimum possible combination of desired lengths for each usable length to be cut into the desired lengths, and visually displaying the optimum combinations of lengths thereby providing the indicators for the backgauge.

**4,017,977**

## TRAILER HITCH ALIGNMENT DEVICE

**Glenn M. Light, 15051 Clark Circle, Irvine, Calif. 92705, and Michael V. Richardi, 6561 Britain St., Long Beach, Calif. 90808**

**Filed Aug. 27, 1975, Ser. No. 607,991**
**Int. Cl.² B60Q *1/00*; G01B *7/28***
**U.S. Cl. 33—1 LE** **12 Claims**



1. A trailer alignment device for use in coupling a hitch to a drawbar, comprising:
a housing adapted for attachment to said drawbar;
a spring loaded spool mounted in said housing having the axis of rotation thereof aligned substantially along in vertical direction;
a guide roller mounted for rotation along an axis substantially parallel to the axis of rotation of said spool and in substantial alignment with the point of connection between said hitch and drawbar;
a tubular guide pivotally mounted in said housing about the axis of said roller;
a flexible cable stored on said spool and aligned to pass over a peripheral section of said roller and through said guide;
a potentiometer mounted for articulation by said tubular guide; and
meter means connected to said potentiometer for providing an indication of the displacement thereof.

**4,017,978**

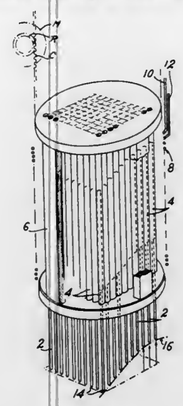
## DEVICE FOR TAKING AN IMPRESSION AND VISUALIZING SAID IMPRESSION

**Edouard Peruchon, and Pierre Rabischong, both of Montpellier, France, assignors to Societe Nationale Elf Aquitaine (Production), Courbevoie, France**

**Filed Jan. 19, 1976, Ser. No. 650,402**
**Claims priority, application France, Jan. 17, 1975, 75.01502**
**Int. Cl.² G01B *7/28***
**U.S. Cl. 33—174 L** **6 Claims**

1. A device for taking an impression and visualizing said impression, wherein said device comprises:
a multidetector constituted by a lattice of N rods, wherein N is a whole number greater than one, each having a ferromagnetic portion, said rods being slidably mounted within N coils, said coils being such as to constitute the N secondary windings of a transformer in which the common primary circuit is formed by a single coil which surrounds the N secondary windings, the primary circuit being supplied with alternating current from a source of alternating current of constant amplitude, the association of a rod with a coil being such as to constitute a detector, wherein the individual positions of said N rods within said N coils are determined by the shape of an external surface of an object with which the multi-detector is brought into contact,
a multiplexer for sequentially transmitting the N voltages developed at the terminals of the N secondary coils to a visualization means defining at least two coordinates on





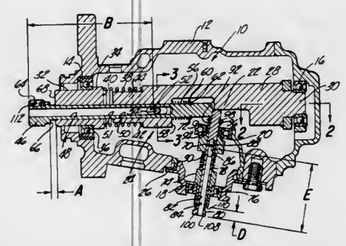
the viewing portion thereof for reconstituting from said N voltages the impression of the object by means of N points, a coordinate of each point indicated on the visualization means being a linear function of the voltage developed at the terminal of the corresponding secondary coil.

**4,017,979**

## BEVEL GEAR SHIMMING GAGE

**Herman N. Lenz, Lambertville, Mich., assignor to Teledyne Industries, Inc., Los Angeles, Calif.**

**Filed Oct. 9, 1975, Ser. No. 620,925**
**Int. Cl.² G01B *3/00***
**U.S. Cl. 33—174 R** **8 Claims**



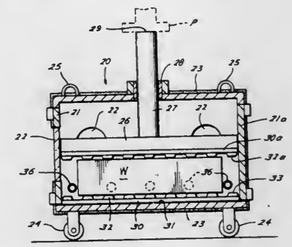
1. A bevel gear shimming gage for use in conjunction with a bevel gear housing having a first and second stationary bearing in registration with each other, and a third and fourth stationary bearing in registration with each other, said shimming gage comprising:
a first main housing having a bore therein and having a portion adapted to abut against said first bearing,
a first bearing support having a bore therein and having a portion adapted to abut against said second bearing,
a second main housing having a bore therein and having a portion adapted to abut against said third bearing,
a second bearing support having a bore therein and having a portion adapted to abut against said fourth bearing,
first gaging rod means positioned through said first main housing and said first bearing support bores for defining the distance between reference points on said gaging rod means and said first bearing support and between reference points on said gaging rod means and said first main housing, and
second gaging rod means positioned through said second main housng and said second bearing support bores for defining the distance between reference points on said second gaging rod means and said second bearing support and between reference points on said gaging rod means and said second main housing.

**4,017,980**

## APPARATUS AND PROCESS FOR TREATING WOOD AND FIBROUS MATERIALS

**Robert A. Kleinguenther, Rte. 4, Box 433, Seguin, Tex. 78155**

**Continuation-in-part of Ser. No. 355,342, April 30, 1973, abandoned. This application Jan. 2, 1975, Ser. No. 538,131**
**Int. Cl.² F26B *5/04, 9/04***
**U.S. Cl. 34—13.4** **23 Claims**



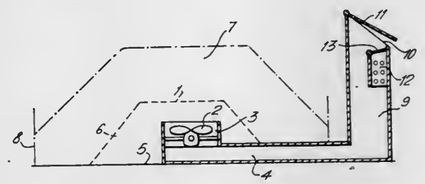
1. A process for treating wood comprising the steps of introducing the wood into a closed chamber,
applying a continuous mechanical force in the range of 1–150 kilograms/square centimeter to at least one surface of said wood,
applying a temperature in the range of 70°–200° Centigrade to said wood,
increasing the atmospheric pressure within said chamber to 2 –45 atmospheres before steam is formed in said wood,
reducing the atmospheric pressure within said chamber and removing the moisturized air from said chamber,
applying a vacuum to said wood when the pressure in said chamber is at approximate room pressure, and
cooling the wood, releasing the vacuum, releasing the mechanical pressure, and removing the wood from the chamber.

**4,017,981**

## PROCESS FOR DRYING YOUNG GRASS AND SIMILAR PRODUCTS AND AN APPARATUS FOR CARRYING OUT THE PROCESS

**Bernt Ingvaldsen, Solbakken 43, –N3000 Drammen, Norway**

**Continuation of Ser. No. 451,793, March 18, 1974, abandoned. This application Sept. 15, 1975, Ser. No. 613,458**
**Claims priority, application Norway, Mar. 23, 1973, 731199**
**Int. Cl.² F26B *3/06***
**U.S. Cl. 34—26** **2 Claims**



1. A process for drying goods such as young grass, green fodder, seaweed and similar products having a high moisture content of about 80% by forcing uniformly distributed air through a stationary bed of at least 1 m of the goods to be dried, said air absorbing moisture from the goods in a drying front of 20 to 30 cm, at the forward end of which the air is

substantially saturated with moisture and produces no further drying, said drying front advancing through the bed as the goods are dried, while using towards the end of the drying process drying air that has been slightly heated to reduce its relative humidity to 35% or less such that the drying of the major part of the goods is completed when the drying front has advanced to the outer surface of the bed, to provide a major inner layer of completely dried goods of about 12% moisture content and an outer minor layer of a thickness of about ¼ to ⅛ the total thickness of the bed but not exceeding 30 cm and having an increasing moisture content of up to approximately 65% and with the humidity of the air emerging from the bed still approximating 100%, and then terminating the drying process and removing the minor layer for drying in another drying process and the major layer as a finished product.

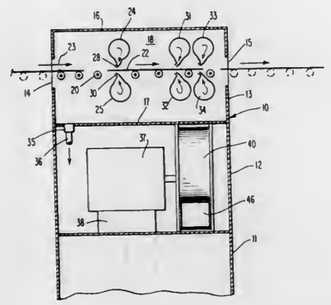
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**4,017,982**

## DRYING APPARATUS

**Daniel L. Goffredo, Riverton, N.J., assignor to Chemcut Corporation, State College, Pa.**

**Filed July 28, 1975, Ser. No. 599,597**
**Int. Cl.² F26B** *3/04*
**U.S. Cl. 34—31** **5 Claims**



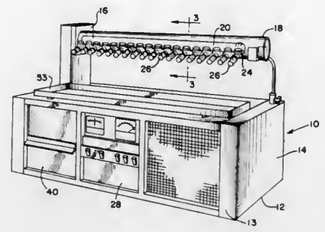
1. Apparatus for drying treated articles following treatment of the articles in such a way that liquid substance remains on the articles, comprising a chamber means, conveyor means in said chamber means for receiving articles with liquid substance on at least one of their surfaces at an inlet of said chamber means and for conveying articles through said chamber means in a forward direction for discharge at an outlet of said chamber means, and gas knife means for drying the articles by removing the liquid substance from the articles through a serial combination of physical impelling and evaporation, wherein said gas knife means comprises first gas knife means located in said chamber means along said conveyor means, for delivering a sufficiently forceful stream of gas at a cooler temperature, substantially unheated by the apparatus, for blowing liquid substance from the articles, and second gas knife means located in said chamber means along said conveyor means for delivering a sufficiently forceful stream of gas at a warmer temperature, heated by said apparatus, for evaporating residual liquid film from the articles; said apparatus including means for supplying gas to said first and second gas knife means and means for heating gas being supplied to said second gas knife means, wherein said means for supplying gas includes a duct and wherein said duct is provided with first and second channels; said first channel being connected for delivering gas to said first gas knife means and said second channel being connected for delivering gas to said second gas knife means, with said heating means being disposed in said second channel for heating the gas by the flow of gas therepast, wherein flow controller means is provided in said duct means for altering the relative proportions of gas being provided to said first and second channels.

**4,017,983**

## FREEZE DRYER

**Douglas S. Fraser, New Paltz, N.Y., assignor to FTS Systems Inc., Stone Ridge, N.Y.**

**Filed May 21, 1975, Ser. No. 579,679**
**Int. Cl.² F26B** *13/30*
**U.S. Cl. 34—92** **14 Claims**



1. A freeze drying apparatus of the manifold type particularly adapted for quickly and efficiently dehydrating heat sensitive materials contained in a number of independent containers simultaneously, including

elongated manifold communication having a plurality of ports formed therein, each for commuication with one of said containers containing said material to be freeze dried,

a refrigeration system, comprising a freeze drying condenser means and refrigeration means, being a self-contained system and fluid-tight for the prevention of the entrance of foreign fluids and the exit of refrigerant fluids,

said freeze drying condenser means for subjecting said materials in said containers to extremely low temperatures during a freeze drying cycle,

said condenser means being disposed within said manifold means and extending along the length of said manifold means,

said condenser means being located within said mainifold means such that an exterior surface of said condenser means is positioned in relatively constant spaced relationship and minimal distance from each of said ports formed in said manifold means to provide rapid, uniform sublimation of the material contained in each of said containers in communication with said ports,

vacuum means in communication with said manifold means for applying a vacuum throughout said manifold and said ports to said material contained in said containers during a freeze drying cycle, and

said refrigeration means in communication with said condenser means to supply and circulate refrigerant fluid through said condenser to thereby maintain said condenser means at a low temperature during said freeze drying cycle.

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**4,017,984**

## SHOE TYING INSTRUCTIONAL DEVICE

**Daniel J. Bonfigli, 88 Hacienda Drive, Tiburon, Calif. 94920**

**Filed Mar. 22, 1976, Ser. No. 669,186**
**Int. Cl.² G09B** *19/00*
**U.S. Cl. 35—8 R** **7 Claims**

1. An educational device for teaching one to lace and tie shoes comprising:

a base member;

a pair of panel flaps hingedly carried on said base member along generally parallel lines in the nature of the side flaps of a lace-up shoe;

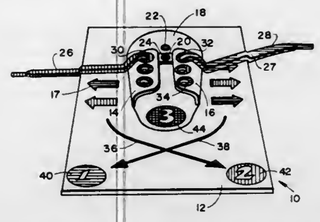
a series of holes along the edge of each of said flaps;

the opposite flaps, in the area around the corresponding holes thereof being of first and second colors, and each flap around holes therein being alternately of said first and second colors;



a shoe lace having the opposite ends thereof in said first and second colors;

paths delineated on said base member in said first and second colors to define the proper disposition of said shoe lace opposite ends for commencing a knot after same has been fully laced;



a point delineated on said base member on which one's finger is to be placed so that one of said lace ends may be looped around said finger for one-half of a bow; and

an area delineated on the other of said lace ends displaced from the extremity thereof to indicate placement of one's finger to push said other lace end through a loop formed by wrapping said other lace end around said one-half bow.

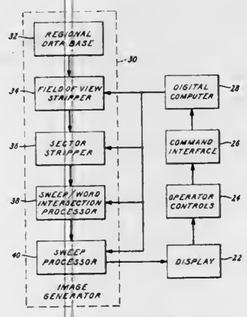
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**4,017,985**

## MULTISENSOR DIGITAL IMAGE GENERATOR

**Robert A. Heartz, Deland, Fla., assignor to General Electric Company, Fairfield, Conn.**

**Filed Aug. 22, 1975, Ser. No. 607,063**
**Int. Cl.² G09B** *9/00*
**U.S. Cl. 35—10.4** **2 Claims**




1. A simulator of a visual image, seen from an elevated viewpoint, of terrain described by a store comprising the three-dimensional coordinates of the endpoints of terrain lines defining the boundaries between terrain planes approximating the surfaces of the terrain and encoded descriptions of the optical characteristics of the surfaces, comprising:

a. means to define a series of sweeps, each in a vertical sweep plane including the elevated viewpoint and its ground position, at successive scan angles measured in a ground plane, the totality of such scans extending over the portion of the terrain to be simulated;

b. means to calculate the coordinates of the intersection with each sweep plane of each terrain line intersecting the sweep plane;

c. means to calculate the tangent of the angle between a reference line extending from the viewpoint in the sweep plane and a view line from the viewpoint to each said intersection;

d. means to compare the said tangent for each intersection with the tangents for the intersections preceding it in range in the sweep plane, measured from the ground position of the observation point, and to produce, responsively to the result of such comparison, an output signal indicating that the view line to the said intersection lies above the view line to any preceding intersection and the said intersection is therefore visible from the viewpoint;

e. means responsive to the said comparator means output signal to store for presentation the coordinates of each visible intersection and the encoded optical characteristics of the terrain planes bounded by it;

f. image formation means adapted to be deflected vertically by a vertical deflection signal and to be deflected horizontally by a horizontal deflection signal, and to produce at any point to which it is thereby deflected a measure of visibility of intensity controllable by an intensity signal;

g. means to receive the data stored for presentation and, responsively thereto, to apply to the image formation means

1. a horizontal deflection signal proportional to the tangent of the scan angle;

2. a vertical deflection signal varying continuously between a minimum and a maximum value during the existence of a given horizontal deflection signal;

3. an intensity signal produced by decoding the encoded optical characteristics stored for display, during the time when the vertical deflection signal lies between values proportional to the tangent for a first visible intersection and the tangent for the next visible intersection bounding the terrain plane having the said encoded optical characteristics, and the horizontal deflection signal has a value proportional to the tangent of the scan angle of the sweep plane in which are the said intersections.

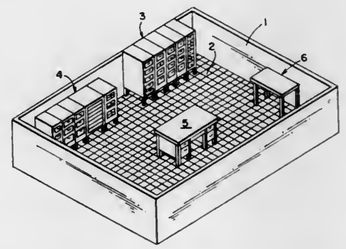
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**4,017,986**

## ROOM PLANNING KIT

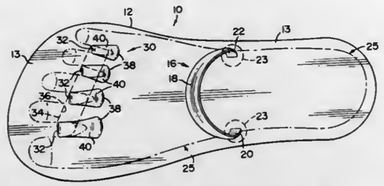
**Charles Miller, 3319 Lonefeather Crescent, Mississauga, Ontario, Canada**

**Filed Apr. 5, 1976, Ser. No. 673,959**
**Int. Cl.² G09B** *19/00*
**U.S. Cl. 35—16** **10 Claims**



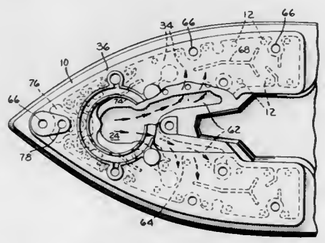
1. A room planning kit comprising a planner mounting surface having first magnetic attraction means adapted to magnetically attract the lowermost lateral surfaces of a plurality of individual models, said models having a horizontal projection in proportion to the horizontal projection of the articles represented thereby, said models adapted to lie entirely in a plane when unfolded and to have surfaces lying in one or more of three planes normal to each other when folded, one of said three planes parallel to said lowermost lateral surface, said lowermost lateral surface having a second magnetically attractive means thereupon, means to selectively maintain said models in a folded three dimensional shape, means to removably apply a layout sheet having a plurality of grid lines thereupon intermediate said planner mounting surface and said lowermost lateral surfaces.

4,017,987
**PEDICURE SANDAL**
Louis A. Perez, Jr., 5215 N. Blvd., Apt. 107, Tampa, Fla. 33603, and Galina Tatarenko, 486 S. Arnez Drive, Los Angeles, Calif. 90048
Filed Jan. 28, 1976, Ser. No. 653,196
Int. Cl.² A43B 3/12
U.S. Cl. 36—11.5 8 Claims



1. A footwear assembly of the type primarily designed for use after pedicure, said footwear assembly comprising: base means including a sole portion configured to correspond to at least a portion of a foot on which said footwear assembly is mounted, foot connecting means interconnected to said base means and disposed in at least partially surrounding relation to the foot, spacer means mounted on said base means and including a plurality of finger elements extending outwardly from said base means between the toes of the foot, each of said spacer means further comprising a plug element mounted on said base means, each of said finger elements having one end integrally attached to said plug element, each of said plurality of finger elements further comprising a free end disposed opposite to the end thereof attached to said plug element, each free end defined by an enlarged surface portion, said plurality of finger elements extending from said plug element and disposed to extend outwardly from said base means into separating relation to the toes of the foot.

4,017,988
**SELF-CLEANING STEAM IRON**
James P. Coggiola, Pomona, Calif., assignor to General Electric Company, Bridgeport, Conn.
Filed Apr. 7, 1976, Ser. No. 674,636
Int. Cl.² D06F 75/06
U.S. Cl. 38—77.83 4 Claims

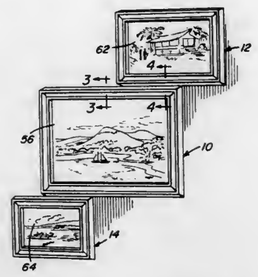


1. In a steam iron having steam control means, a fill ooening to an interior water tank, a soleplate with ports, a steam generating boiler and coverplate thereover with steam distribution passages therebetween, and means to purge the iron of water and loose residues including a substantially large first opening in said tank with means operable to control said opening to suddenly dump the water and means conducting the water directly into said boiler, the improvement comprising,

said boiler having at least a pair of separate symmetrical legs extending towards the rear of said iron, each said leg having outlet means extending substantially over the entire one side thereof and communicating with said ports,

whereby the tank water may be suddenly dumped directly into the boiler to traverse the entire boiler rearwardly through each leg and then through the outlet means to said ports to scrub the entire boiler clear of deposits.

4,017,989
**WALL FRAMES WITH INTERLOCKING CLIPS**
Douglas J. Murray, Portland, Oreg., assignor to Dimensional Industries, Inc., Portland, Oreg.
Filed Dec. 24, 1975, Ser. No. 644,145
Int. Cl.² G09F 1/12
U.S. Cl. 40—152 4 Claims

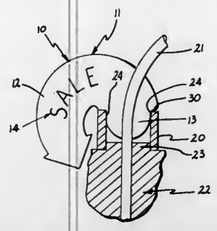


1. In combination, a plurality of different size mounting frames each defined by at least three elongated interconnected straight sides having front and rear faces, each side of each of said frames including means defining first and second pairs of opposite end cylindrical recesses opening outwardly of the rear face thereof as well as at least one pair of intermediate cylindrical recesses opening outwardly of the longitudinal mid-portion thereof, the recesses of each pair of recesses being spaced apart the same distance along the corresponding frame side and spaced equally from the outer edge thereof, the juncture between adjacent sides of each frame defining a corner portion thereof and each corner portion including one of said recesses comprising the endmost recess of the corresponding pair of end recesses of the adjacent sides, at least two connecting members each comprising a body member having front and rear faces, said body members each including two laterally spaced pairs of spaced cylindrical projections projecting outwardly from the front face thereof, said frames being disposed in side by side substantially co-planar relation with opposing sides thereof disposed in juxtaposition, one of said body members being positioned with its front side closely opposing and bridging the rear faces of said opposing sides and with the projections thereof removably frictionally telescoped into laterally registered pairs of recesses of said opposing sides, and said connecting member thereby retaining said opposing sides of said frames against lateral separation and against relative longitudinal shifting, the pairs of projections on each body member are disposed in parallel rows of projections and the body member includes a weakened zone thereof paralleling and spaced generally equally between said rows of projections along which said body member may be separated into individual pieces thereof each including one pair of projections, each of said body member pieces including an aperture formed therethrough intermediate the projections supported therefrom.

4,017,990
**ACCESSORY FOR ARTICLE DISPLAY TALLY**
Judd F. Garrison, Grand Rapids, Mich., assignor to John Thomas Batts, Inc., Zeeland, Mich.
Filed Jan. 7, 1976, Ser. No. 646,981
Int. Cl.² G09F 3/00
U.S. Cl. 40—322 7 Claims

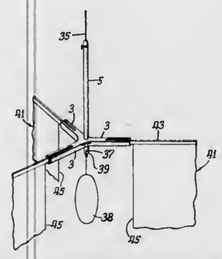
1. In combination a suspended article support having a supporting hook and a tubular tally secured to the article support and surrounding the supporting hook, said tally having an internal chamber opening through its top, an attachment display member comprising a body member having an indicia receiving arm and an integral foot; said arm having an indicia receiving display surface; said foot depending from





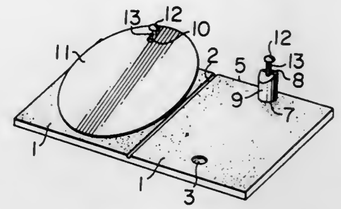
said arm and of a width greater than the inside diameter of said tally; said foot being received in said tally and being bent about said support hook for urging the edges of said foot into tight frictional engagement with the inside wall of said tally.

4,017,991
**DISPLAY CLIP FOR POINT OF PURCHASE DISPLAYS**
Sol J. Berger, 310 Melvin Drive, Northbrook, Ill. 60062
Filed Aug. 29, 1974, Ser. No. 501,475
Int. Cl.² G09F 7/22
U.S. Cl. 40—128 13 Claims



1. A one piece molded article comprising (1) an element having arms uniformly spaced fron one another about a common center, each arm having at its outer end a socket for receiving a display, and said element having means at the common center of the arms for mounting the element and (2) a rod of the same shape at both ends and having means for cooperating with said common center mounting means for supporting the element on the rod and (3) a disc; said element, rod and disc being joined into one unitary structure by frangible bridges that permit molding of the article as a unit and thereafter separating them by fracturing the bridges, each arm comprising a pair of side by side spaced apart parallel side walls extending from said common center, the bottom edges of the side walls being joined at one end of the side walls and the top edges of the side walls being joined at opposite ends of the side walls, and the space between the side walls being open at the end opposite the common center, the means at the center of the mounting element for supporting the element comprising a hole therethrough for receiving either end of the rod, and the means on the rod for supporting the element comprising a shoulder on the rod, said shoulder being adjacent to one end of the rod.

4,017,992
**DECORATIVE SHEET**
Akira Kajitani, Onojo, Japan, assignor to Toshikiyo Shiraki, Fukuoka, Japan
Filed Aug. 11, 1975, Ser. No. 603,388
Int. Cl.² G09F 7/06
U.S. Cl. 40—138 9 Claims



1. A decorative sheet comprising:

a. a base sheet whose surface is divided into a plurality of unit squares defined by continuous vertical and horizontal grooves which intersect at right angles;

b. a plurality of circular support means each said support means mounted on one of said unit squares, said support means having a bottom surface parallel to said base sheet and in contact therewith, and a top surface formed by two intersecting planes at an angle of about 35° to said base sheet;

c. a plurality of circular sheet means, each circular sheet means having a hole therethrough, said hole having straight sides and circular ends, the length of said hole being 2/15 of the length of a side of said unit square and the width being 1/15 of the length of a side of said unit square; and through

d. a plurality of rivets each rivet passing through said hole in one of said circular sheet means and said support means into said base sheet thereby movably mounting said circular sheet means on the top surface of said support mesns said rivet has a hemisphere head having a diameter larger than the width of said hole in said circular sheet and a neck portion with a length and diameter both of 1/15 of the length of a side of said unit square.

4,017,993
**ROTARY FILE**
H. Coleman Norris, Pewaukee, and Gordon D. Kelly, Elm Grove, both of Wis., assignors to Columbian Art Works, Inc., Milwaukee, Wis.
Continuation-in-part of Ser. No. 467,902, May 8, 1974, abandoned, which is a continuation-in-part of Ser. No. 316,497, Dec. 19, 1972, abandoned. This application Nov. 20, 1975, Ser. No. 633,927
Int. Cl.² G09F 11/02
U.S. Cl. 40—68 14 Claims

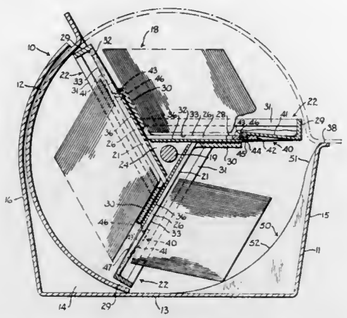
1. A card file wherein the cards are carried by a rotor mounted in a housing for rotation about a horizontal axis, characterized by:

A. the rotor having a plurality of tray carrying arms that project substantially radially from the rotor axis so that upon rotation of the rotor arms point downwardly as they traverse the lower part of their orbit;

B. a plurality of trays, one for each arm, having means thereon to hold a pack of file cards, and having front edges;

C. cooperating means on the arms and the trays freely slidably connecting the same and constraining the trays to movement along the arms towards and from the rotor axis and hence to and from a position fully engaged with the arms, in which position the front edges of the trays are their radially outermost extremities and travel in a circular orbit substantially concentric with the rotor axis as the rotor is turned; and

D. inwardly facing track means in the lower portion of the housing spaced from the rotor axis a distance such that as



the trays traverse that part of their orbit spanned by the track means the front edges of the trays are contiguous to said track means.

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**4,017,994**
**SIGNATURE PROTECTION SYSTEM**
**Andrew S. Fraser, 120 Ashley Road, Hopkins, Minn. 55343**
**Filed Aug. 26, 1974, Ser. No. 500,401**
**Int. Cl.² G09F *3/02*; B42D *15/00***
**U.S. Cl. 40—2.2** **2 Claims**

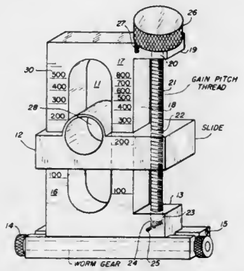



1. An element such as a credit card having a authorized signature which is protected against effacement, alteration or substitution, comprising, in combination:
a surface on the element, at the area intended for the signature, which is recognizable as a warning signal;
an overlay on said surface of masking material, capable of receiving and retaining a signature, which adheres to said surface with a first degree of adhesion;
and a strip of transparent, abrasion resistant material covering said overlay and said signature, and adhering to said layer with a second degree of adhesion greater than that between said overlay and said surface,
so that after said strip is affixed to said overlay said signature is visible and yet protected from abrasion and alteration, and intentional removal of said strip is accompanied by removal of said overlay to display said warning signal.

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**4,017,995**
**RANGE FINDING SIGHT**
**James B. Hughes, Jr., Houston, Tex., assignor to Deep River Armory, Inc., Houston, Tex.**
**Filed Mar. 28, 1975, Ser. No. 563,083**
**Int. Cl.² F41G *1/08*, *1/16***
**U.S. Cl. 42—1 S** **4 Claims**

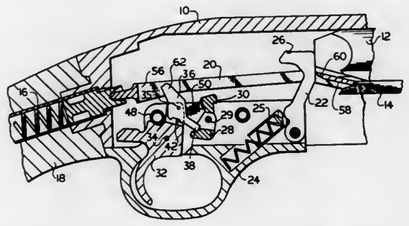
1. An open gunsight of rugged construction and suitable for military usage on a firearm having a barrel and a receiver, comprising:
an upright front blade sight portion fixedly mounted on a muzzle end of a firearm;
a rear sight portion laterally translatably mounted toward the receiver end of the barrel of a firearm and comprising a baseplate member and an upright member integral therewith, said upright member having an elongated aperture coextensive over at least a portion of its vertical extent and interior from its transverse edges, a slide member moveably mounted on said upright member over at least a portion of its vertical extent by a co-acting variable pitch screw member, the portion of said aperture above said slide member defining a variable length aperture, said screw member being rotatably attached to one edge of said upright member and terminating in a rotatable mount in said baseplate member, said upright member being provided on one edge face thereof toward the receiver end of the firearm with a first range scale keyed to the apparent angular extent of a predetermined known sized target whereby when the known sized target is




observed through said variable length aperture and said screw member turned to move said slide member until the target height completely fills the vertical extent of said variable aperture, the range to the target may be read off from said range scale, and wherein said screw member is provided on the upper end thereof with a knob portion having on its underside surface a plurality of radially extending serrations which are sized to cooperatively engage a spring loaded detent member housed in the upper edge of said upright member and wherein the variable pitch of said screw member and the separation of said radial serrations are chosen in conjunction with said first range scale so that as said knob is turned and said spring loaded detent jumps from one radial serration into another, each such jump or angular rotation of said knob represents a predetermined interpolation distance between distance marks on said first range scale.

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**4,017,996**
**SEAR-DISCONNECTOR FOR FIREARMS**
**Carl F. Liedke, North Haven, Conn., assignor to O. F. Mossberg & Sons, Inc., North Haven, Conn.**
**Filed Mar. 4, 1976, Ser. No. 663,866**
**Int. Cl.² F41C *19/00***
**U.S. Cl. 42—69 B** **2 Claims**

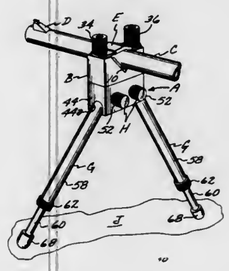


1. In a firing mechanism for a repeating firearm having a reciprocal breech-bolt mechanism, a spring-loaded firing member mounted for movement into a cocked position on retraction of said breech-bolt mechanism, a sear resiliently urged into a cocking position for cocking said firing member, and a trigger for moving said sear out of such cocking position, a sear-disconnecting device comprising,
a disconnector pivotally mounted on said trigger for movement therewith upon retraction and release of said trigger and for pivotal movement relative to said trigger about a pivot axis,
said disconnector having a foot portion on one side of said pivot axis disposed for operative engagement with said sear such that said firing member is released when said trigger is retracted,
spring means for resiliently urging said foot portion of said disconnector into operative engagement with said sear,
said disconnector having a finger portion disposed on the opposite side of said pivot axis from said foot portion and extending into the path of said breech-bolt mechanism for movement thereby against the urging of said spring means when said breech-bolt mechanism is retracted, said foot portion being thereby moved to an inoperative position out of engagement with said sear such that said sear is free to return to its cocking position.



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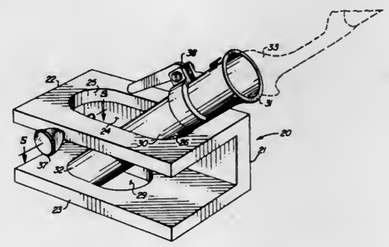
**4,017,997**
**PORTABLE GUN SUPPORT**
**Donald C. Peterson, South Gate, and Jack C. Snyder, Yorba Linda, both of Calif., assignors to Donald C. Peterson, South Gate, Calif.**
**Filed July 25, 1975, Ser. No. 599,170**
**Int. Cl.² F41C *29/00***
**U.S. Cl. 42—94** **1 Claim**



1. A portable gun support that may be removably secured when in a first position to a gun barrel to support the latter from a stationary surface that may be of irregular configuration to shoot in a substantially horizontal direction, said gun support when not in use capable of being disposed in a compact second position where it may be carried conveniently in the pocket of a garment worn by a user of said gun support, said gun support including:
a. a block having a transverse padded groove of V-shape formed therein, said groove permitting gun barrels of different diameter to be disposed therein;
b. first padded means for removably locking said block to said gun barrel when the latter is disposed in said groove, said first means including a padded cross piece pivotally supported from said block and capable of being disposed in a first position to removably engage said barrel when the latter is disposed in a groove; and a lock for removably holding said cross piece to engage said barrel;
c. a head;
d. a pair of legs, each of said legs including first and second tubular sections, said second section being telescopically movable in said first section;
e. second means on each of said legs for removably locking said second sections at a desired longitudinal position relative to said first sections, said second means including:
1. threads formed on the free ends of said first leg sections;
2. two nuts that engage said threads, said nuts having inwardly extending lips; and
3. two resilient rings that rest on said lips and are expanded radially to frictionally grip said second sections when said nuts are tightened by rotating said nuts relative to said threads;
f. third means for pivotally supporting said first leg sections from said head and for locking said legs at a desired angle relative to one another;
g. fourth means for pivotally supporting said block from said head, with said second and third means permitting said block and head when said gun support is in said first position to be supported from an irregular or angularly inclined surface and said fourth means permitting said block and gun barrel to be pivoted in a substantially horizontal plane, and said first means permitting said gun support to be removed from said barrel to permit said third and fourth means to be used to dispose said gun support in said second position where said second leg sections are telescoped substantially into said first leg sections, with said legs adjacently disposed to one another; and
h. resilient tips mounted on free ends of said second sections.

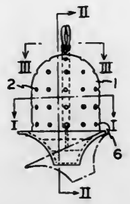
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**4,017,998**
**FISHING ROD HOLDER**
**Donald C. Dumler, 3623 W. North Lane, Phoenix, Ariz. 85021**
**Filed Jan. 28, 1976, Ser. No. 652,989**
**Int. Cl.² A01K *97/10***
**U.S. Cl. 43—21.2** **6 Claims**



1. A fishing rod holder for detachably engaging the handle of a fishing rod and supporting said rod in selective positions, said fishing rod holder comprising:
a. a frame;
b. a tubular socket including:
i. a lower end pivotally connected to said frame for rotation about a horizontal axis, and
ii. an open upper end for receiving the handle of a fishing rod;
c. means carried by said socket for operatively securing said handle within said socket;
d. detent means carried by said frame and engageable with said socket for selectively retaining said socket in a first locked position;
e. stop means carried by said frame for limiting the pivotal movement of said socket and supporting said socket in a second position; and
f. said tubular socket means being permitted unrestricted pivotal movement from said second position to said first position and actuating said detent means to said first locked position when said tubular socket is pivoted from said second position to said first position.

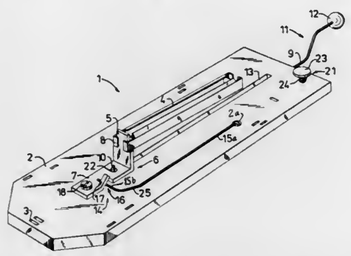
**4,017,999**
**FISH-FEEDER**
**Sakae Muko, 515, Kamitsutsui, Oonojo, Fukuoka, Japan**
**Filed July 11, 1975, Ser. No. 595,245**
**Int. Cl.² A01K** *97/02*
**U.S. Cl. 43—44.99** **1 Claim**



1. A fish-feeder comprising a bell-shaped container having a peripheral bottom, said bell-shaped container having a plurality of apertures formed along the entire outer surface thereof, a bottom lid for discharging bait from said container, said bottom lid having a peripheral brim which is in contact with the entire peripheral bottom of said container when said lid is closed, connecting means tightly and releasably connecting said container and said bottom lid whereby bait is adapted to be contained in said container when the lid is in a closed position and to be released from the container when the lid is opened, said connecting means comprising a hinge means and a latching means, said hinge means pivotally securing said bottom lid to said container, said lid having a sleeve extending transversely thereof, said latching means comprising a suspending means on said container which is shaped like a pincette having a distal end formed as a generally inverted U-shaped configuration for holding said sleeve and said bottom lid in a closed position, said pincette being adapted to release said sleeve to thereby open said lid to discharge said bait from the container.

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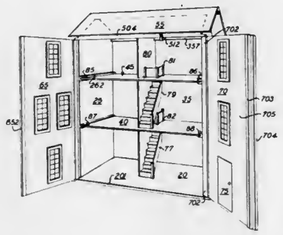
**4,018,000**
**BURNER UNIT ESPECIALLY FOR TOY STEAM ENGINES**
**Jockum Krumlinde, Vittsjo, Sweden, assignor to Aktiebolaget Alga, Vittsjo, Sweden**
**Filed Nov. 21, 1975, Ser. No. 634,199**
**Claims priority, application Sweden, Dec. 6, 1974, 7415337**
**Int. Cl.² A63H** *19/06*
**U.S. Cl. 46—1 R** **7 Claims**



1. A burner unit adapted for use with toy steam engines and the like comprising:
a base plate having an elongated slot;
an operating assembly comprising a slidable lever disposed along said slot and having an actuating end extending through said slot and an actuatable handle extending beyond one end of the base plate;
slide means icluding a slide member movable along the base plate and having one end thereof affixed to said lever actuating end;
said slide means including means extending into said slot and displaced from and cooperating with said lever actuating end for maintaining alignment of said slide with said slot;
said slide means further having a receptacle mounted upon said slide member and movable therewith whereby said slide member and hence said receptacle are reciprocally movable between end positions substantially coinciding with the ends of said slot;
spring biased locking means normally engageable with said slide means when said slide means is in one of said end positions to prevent movement of said slide means towards the remaining end position;
said locking means including manually operable means movable against the biasing force to displace said locking means from said slide means to realease and thereby permit movement of said slide means.

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**4,018,001**
**DOLL HOUSE**
**Harry E. Walmer, 721 N. Overlook Drive, Alexandria, Va. 22305**
**Filed Sept. 23, 1975, Ser. No. 615,896**
**Int. Cl.² A63H** *3/52*
**U.S. Cl. 46—19** **6 Claims**

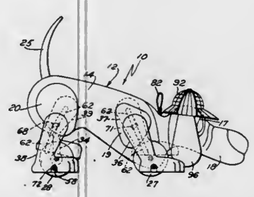


1. An easily assembled knock-down doll house having a front wall capable of being opened to expose the interior rooms thereof, the parts of which are fitted together and held together only with pegs comprising:
a. a generally rectangular first floor member comprising left, right, and rear grooves in the top surface thereof, at least one intermediate groove parallel to said left and right grooves, and a pair of upstanding peg means in the left and right front corners;
b. a rear wall member having a size and shape adapting it to have its bottom edge engage said rear groove of said first floor member, comprising vertical L-shaped side beams and a top horizontal beam member disposed on the inner front wall containing at least one vertical slot;
c. left and right side wall members having respective sizes and shapes adapting them to have their rear edges engage said L-shaped beams of said rear wall and their bottom edges engage said respective left and right grooves of said first floor, each of said side walls containing a top, inner horizontal beam member having an inward side groove, at least one inner horizontal beam member having an inward side groove disposed between said top beam and the lower edge of said wall; each of said side walls comprising inwardly angled top edges, and a slot disposed at the terminus of said angled top edges;
d. at least one intermediate wall member having a size and shape adapting it to have its lower edge engage a respective said intermediate groove in said first floor and a said vertical slot of said rear wall top beam member, comprising at least one intermediate horizontal slot extending rearwardly from the front edge;
e. at least one intermediate floor member having a size and shape adapting it to have its side edges engage said grooves of said horizontal beam members of said side walls and comprising a stairwell near the rear edge porion thereof containing an opening to said rear edge and at least one horizontal slot extending forwardly from the rear edge, said slot being positioned to register with a said horizontal slot of said intermediate wall member;
f. a top floor member having a size and shape adapting it to have its side edges engage said grooves of said top horizontal beam member of said side walls, and comprising a top horizontal beam member disposed across the front edge of said top floor, arm members containing hole means extending from each of the end extremities of said top floor beam members;
g. front and rear roof panels each comprising a horizontal beam member disposed along the underportion of one edge containing a slot near each end, said roof panels being constructed and arranged to adapt said roof beams to enter said terminus slots of said side walls and the slots thereof to receive the edges of said terminus slots, said respective roof beams disposed adjacent to each other and said panels disposed along said angled edges of said side walls;
h. front wall means comprising left and right sections, said left section comprising left and center vertical beams disposed at the vertical edges thereof, said left vertical beam comprising vertical hole means in the top and bottom ends; said right section comprising right and center vertical beams disposed at the vertical edges thereof, said right vertical beam comprising vertical hole means in the upper and lower ends; said left and right sections having respective sizes and shapes adapting them to have said respective bottom vertical holes engage said respective upstanding pegs of said first floor members, and retaining means adapted to be disposed through said respective top holes when aligned with respective holes in said arm members of said top floor beam member, whereby said left and right sections can be opened and closed across the front of said doll house;
i. a plurality of pegs having respective sizes and shapes adapting them to be inserted in holes contained in said beams, grooves, wall and floor members at their junctures with each other for retaining said assembled structure together.



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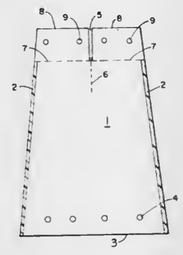
**4,018,002**
**TOY SIMULATING A WALKING ANIMAL**
**John Holden, Mount Joy, Pa., assignor to Hasbro Development Corporation, Pawtucket, R.I.**
**Continuation of Ser. No. 518,621, Oct. 29, 1974, abandoned. This application Jan. 2, 1976, Ser. No. 644,247**
**Int. Cl.² A63H** *13/02*
**U.S. Cl. 46—105** **8 Claims**



7. A toy simulating a walking animal, comprising a body, a front axle mounted on said body and having front wheels secured to the outer ends thereof, a rear axle mounted on said body in spaced relation relative to said front axle and having rear wheels secured to the outer ends thereof, a lever simulating a leg of said animal secured to each of at least an opposed pair of said wheels in offset eccentric relation with respect thereto and being movable upon rotation of said wheels in a direction relative thereto, a pulley mounted on one of said axles for rotation therewith interiorly of said body, a draw-string wound on said pulley and extending exteriorly of said body for manipulation by the user of said toy, a reduced pin mounted in the interior of said body in parallel relation to said axles and spaced from the axle on which said pulley is mounted, a tension spring having one end secured to said pulley and the other end fixed to said pin, wherein rotation of said pulley by withdrawal of the draw-string from said body winds said spring on said pulley under tension, and release of said draw-string causes said spring to unwind from said pulley onto said pin, thereby rotating said pulley and the axle on which the pulley is mounted for producing rotation of the wheels on which said pulley is mounted, wherein a corresponding propelling motion of said body on said wheels is produced that causes said legs secured to said wheels to move relative thereto for simulating a walking action of said toy.

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**4,018,003**
**HOT CAP**
**Walter Mirecki, c/o Anthony J. Pieragostini, Esq., 61 Smith Ave., Mount Kisco, N.Y. 10549**
**Filed Apr. 14, 1976, Ser. No. 677,014**
**Int. Cl.² A01G** *13/00*
**U.S. Cl. 47—26** **8 Claims**



1. A hot cap comprising two layers of semi-rigid material in juxtaposed position, each of said layers having edges in a generally trapezoidal shape with a first continuous edge parallel to a second edge having a length shorter than the length of said first continuous edge, a third edge joining one free end of said first continuous edge to one free end of said second edge, a fourth edge joining the other free end of said first continuous edge to the other free end of said second edge, a rectangular knotch interruptingly severing a portion of said second edge intermediate and midway the ends thereof, two side edges of said rectangular knotch perpendicular to said first continuous edge, said two side edges having a length greater than the length of said interrupted portion in said second edge, said interrupted portion in said second edge having a length equal to the length of the remaining edge of said rectangular knotch, a first line in the surface of each layer of said semi-rigid material alongst which said semi-rigid material is weakened extending to said third edge at one end thereof and to said fourth edge at the other end thereof, said first line parallel to said second edge and passing through said remaining edge of said rectangular knotch, a second line in the surface of each layer of said semi-rigid material alongst which said semi-rigid material is weakened, said second line having one end terminating midway along the length of said remaining edge of said rectangular knotch, said second line perpendicular to said second edge and said remaining edge of said rectangular knotch, the other end of said second line intermediate said first line and said first continuous edge, means to join a portion of the interstitial surfaces adjacent said third edges of each of said layers together, means to join a portion of the interstitial surfaces adjacent said fourth edges of each of said layers together, said joined portion of said third edges extending from one end of said first continuous edge to the first end of said first line, said first end of said first line terminating at said third edges, said joined portion of said fourth edges extending

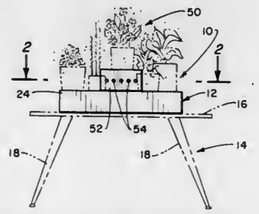
from the other end of said first continuous edge to the second end of said first line, said second end of said first line terminating at said fourth edges, a plurality of holes piercing through each layer of said semi-rigid material wherein each hole is centered along a third line parallel to said first continuous edge, said third line intermediate said first continuous edge and said first line, four holes piercing coaxially through each of said layers of said semi-rigid material wherein each of said four holes are centered on a fourth line, said fourth line parallel to and intermediate said second edge and said first line, two of said four holes lying intermediate said third edge and a fifth line coextensive with said second line extending through said interrupted portion of said second edge, second two of said four holes lying intermediate said fourth edge and said fifth line.

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## 4,018,004
## HUMIDIFYING PLANT TABLE

**Anita Soffer, 14968 Dickens St., Sherman Oaks, Calif. 91403**

**Filed Dec. 24, 1975, Ser. No. 644,081**
**Int. Cl.² A47G 7/00; B01D 47/16; F24F 3/14**
**U.S. Cl. 47—39** **3 Claims**




1. A humidifying plant table comprising:

a housing having first opening means therein, an internal chamber located within said housing, said opening means providing access into said internal chamber, said housing having a top surface and a bottom surface interconnected by sidewalls, said first opening means being located within said top surface with plants being adapted to rest upon said top surface, said first opening means comprises a substantial number of separate openings of equal size;

a quantity of liquid adapted to be located within said internal chamber but not filling said internal chamber so as to leave a space above the level of the liquid, said first opening means communicating with said space; and

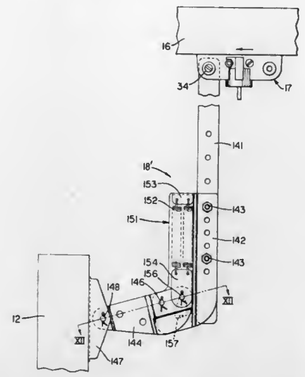
mist producing means connected to said housing and including a liquid supply tube extending to below the level of liquid within said internal chamber, said mist producing means additionally comprising means to rotate said tube and cause the water picked up by said tube to be formed into fine mist droplets, whereby upon activation of said mist producing means said fine mist droplets are conducted into the proximity of any plants which are placed upon said top surface of said housing, said mist producing means further comprising an electric motor centrally mounted upon said top surface, a cover attached to said housing and located about said motor, said cover including a plurality of second openings therein in order to provide access of air to said motor, said second openings being physically located substantially above the plane of said top surface of said housing; and

a motor housing closely surrounding said motor and located within said cover, said motor housing having third openings therein to provide access of air directly into said motor.

## 4,018,005
## DRAWBAR ARM FOR DOOR OPERATOR

**Donald S. Harris, Dallas, Tex., assignor to Overhead Door Corporation, Dallas, Tex.**

**Filed Dec. 24, 1975, Ser. No. 644,194**
**Int. Cl.² E05F 15/16**
**U.S. Cl. 49—199** **9 Claims**




1. In a door operator for moving a door between a closed position wherein the door extends substantially vertically and closes a door opening and an open position wherein the door extends substantially horizontally and is disposed adjacent the upper edge of the door opening, said operator including elongated guide means extending in a substantially horizontal direction away from the door opening, carriage means engaged with said guide means and movable therealong, a drawbar assembly connected between said carriage means and said door, and motor means drivingly interconnected to said carriage means for moving same along said guide means to result in movement of said door between said open and closed positions, comprising the improvement wherein said drawbar assembly includes a first arm member hingedly connected to said carriage means at a first pivot axis, a second arm member hingedly connected to said door at a second pivot axis which is substantially parallel to but spaced from said first pivot axis, said first and second arm members being hingedly connected together for relative pivotal movement therebetween about a third pivot axis which is substantially parallel to but spaced from said first and second pivot axes, and spring means connected between said first and second arm members for permitting relative movement therebetween.

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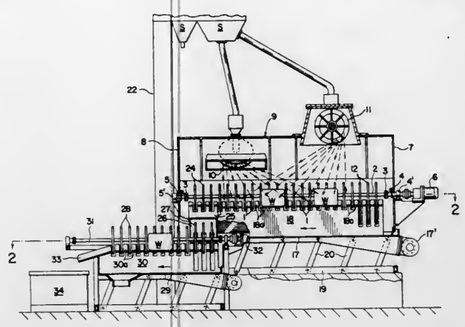
## 4,018,006
## SPINNING JET BLASTING PLANT FOR CLEANING SHAPED WORKPIECES

**Johann Moelders, Cologne, Germany, assignor to Berger Maschinenfabriken G.m.b.H. & Co., Bergish-Gladbach, Germany**

**Filed Nov. 17, 1975, Ser. No. 632,786**
**Claims priority, application Germany, Nov. 20, 1974, 2454866**
**Int. Cl.² B24C 3/00**
**U.S. Cl. 51—9 R** **10 Claims**

1. Apparatus for jet blasting workpieces comprising a housing, an elongated cage axially rotatable in said housing for containing the workpieces during blasting and having longitudinally spaced rings, means mounted on the housing for axially rotating said cage, means for jetting a blast medium onto said workpieces in said cage, a series of arms mounted in said housing and extending between said rings for engaging said workpieces, and means for oscillating said arms to move said workpieces axially through the cage as it rotates.



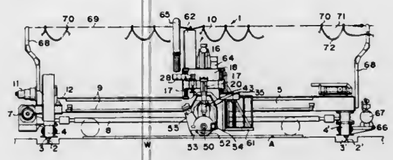



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## 4,018,007
## APPARATUS FOR GRINDING SURFACE PORTIONS OF THICK PLATES

**Tetsuro Oshimi, Nagoya, Japan, assignor to Nippon Toki Kabushiki Kaisha, Japan**

**Division of Ser. No. 572,822, April 29, 1975. This application Nov. 10, 1975, Ser. No. 630,529**
**Claims priority, application Japan, May 2, 1974, 49-50030**
**Int. Cl.² B24B 7/02**
**U.S. Cl. 51—33 R** **2 Claims**

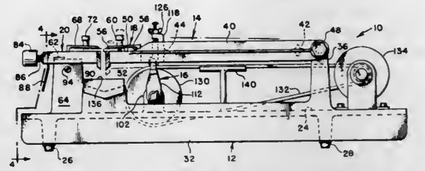



1. An apparatus for grinding surface portions of thick plates comprising parallel pair rails spaced a broad distance apart from each other, a gate-shaped wagon supported on and movable along said rails, and a transversal grinding unit supported on and movable along a transversal beam provided in said wagon, said grinding unit including a stationary frame, a transversal beam movably supported on said stationary frame, a hollow cylindrical member secured to a central front portion of said second-mentioned transversal beam, a shaft member rotatably received in said cylindrical member, fork-shaped pair frames fixed to and depending from the lower end of said shaft member, a vertically pivotable frame pivotably supported between the lower ends of said fork-shaped pair frames, a bearing sleeve secured to a front portion of said vertically pivotable frame, a grinder wheel shaft carrying a grinding wheel and rotatably received in said sleeve, means for swing said fork-shaped pair frames about an axis of said shaft member, cam means providing a gap, said cam means being mounted on the underside of a base member secured to the top of said cylindrical member receiving said shaft member, a roller capable of rolling along said gap in said cam means, said roller being rotatably supported on the top of a L-shaped vertically pivotable link pivoted to the top of said fork-shaped pair frames, the other end of said vertically pivotable link being linked via an air cylinder to a front upper portion of said sleeve.

## 4,018,008
## LAPPING DEVICE

**Francis M. Young, 13628 37th Ave. South, Seattle, Wash. 98168**

**Continuation of Ser. No. 366,596, June 4, 1973, abandoned. This application Mar. 17, 1975, Ser. No. 558,777**
**Int. Cl.² B24B 15/00**
**U.S. Cl. 51—26** **14 Claims**




1. Lapping device for abrasively grinding two work pieces together to form a matched fit thereof, comprising:

a. a supporting base,

b. a first clamping assembly on said base for holding one work piece and being designed for generally vertically reciprocable movement, said first clamping assembly including a generally flat first surface on which said one work piece is supported and a first clamping plate for bearing down on and holding one work piece in place on said first surface, said first plate being shaped so as to allow access to an overhanging edge portion of said one work piece,

c. a second clamping assembly positioned for holding another work piece against said one work piece, said second clamping assembly being vertically stationary and mounted for generally horizontal movement towards and away from said first clamping assembly, said second assembly including a second clamping plate for bearing down on and holding said other work piece in place on generally flat second surface, said second plate being shaped generally like said first plate so as to allow access to an overhanging edge portion of said other work piece,

d. means for driving said first clamping assembly through an up-and-down stroke generally perpendicular to said flat first and second surfaces for a predetermined distance movement so that said work pieces are not out of contact with each other while being worked, and

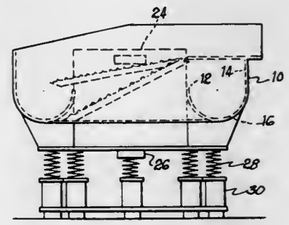
e. said second clamping assembly including resilient means for biasing the same towards said first clamping assembly to resiliently urge said work peices together.

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## 4,018,009
## VIBRATORY FINISHING DEVICE

**Raymond M. Leliaert, South Bend, Ind., assignor to Wheelabrator-Frye, Inc., New York, N.Y.**

**Filed June 9, 1975, Ser. No. 584,760**
**Int. Cl.² B24B 31/06**
**U.S. Cl. 51—163.2** **19 Claims**




1. In a finishing device having an annular bowl adapted to contain a charge of treating media and work pieces or parts of larger cross-sectional dimension than the media, and means

for vibrating said bowl to cause the media and parts to travel circumferentially about the bowl, a means for unloading the parts without removal of the media from the bowl comprising a plurality of elongate rigid bars spaced one from the other across the bowl by an amount greater than the cross-sectional dimension of the media but less than the cross-sectional dimension of the parts, means mounting the bars for rocking movement between a raised position above the level of the parts and media in the bowl and a lowered position in which the bars extend angularly downwardly into the bowl in a direction opposite the direction of movement of the parts and media about the bowl and in which the bars are dimensioned to have a length to extend from the bottom of the bowl to a level above the parts and media in the bowl when in lowered position, whereby the media passes between the bars for continued excursion about the bowl while the parts are diverted by the bars for travel on the surfaces of the inclined bars up the incline, and a means at the upper level of the bars for receiving parts displaced on the bars to the upper level.

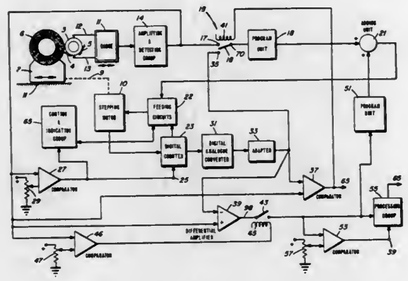
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**4,018,010**

## METHOD AND RELATIVE APPARATUS FOR CONTROLLING AND REGULATING THE WORKING CYCLES OF A MACHINE TOOL

**Mario Pozzetti, Bologna, and Roberto Rossi, Sofia, both of Italy, assignors to Finike Italiana Marposs-Soc. In Accomandita Semplice di Mario Possati & C., Bentivoglio, Italy**

**Filed Apr. 8, 1975, Ser. No. 566,674**
**Claims priority, application Italy, May 9, 1974, 3378/74**
**Int. Cl.² B24B *49/16***
**U.S. Cl. 51—165.71** **13 Claims**



1. Method for automatically controlling the working cycles of a machine tool on a workpiece, the machine tool including a tool and a movable tool support, comprising:

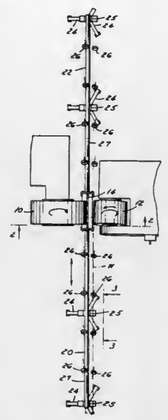
measuring the workpiece during the machining for generating a signal responsive to the workpiece size; programming the feed speed of the tool support, at least in the last phases of the machining, depending on the measured sizes of the workpiece; generating a signal responsive to the tool support position with respect to a reference condition; comparing said signals to obtain a signal responsive to the elastic strains suffered, during the machining, by the kinematic chain including the workpiece and the tool, as a consequence of the tool thrust; and changing the programmed feed speed of the tool support depending on said signal responsive to the elastic strains.

**4,018,011**

## CENTERLESS GRINDER WORK SUPPORT AND BOOTY ROLLER THEREFOR

**George R. Whittenberg, 11860 Freud Ave., Detroit, Mich. 48214**

**Filed May 12, 1975, Ser. No. 576,554**
**Int. Cl.² B24B *41/06***
**U.S. Cl. 51—236** **3 Claims**



1. In a centerless grinder work support having an elongated floor supported guide tube adapted to extend along beneath a work piece to be machined in the grinder and with a plurality of upwardly extending V-shaped supports arranged on the guide tube in spaced relation therealong with the arms of the V disposed on opposite sides of the work to be supported, a pair of work supporting booty rollers mounted in confronting cooperative work supporting relation on the arms of each V-shaped support with the axes of the rollers skewed to the axis of the work to be supported, an axle for each booty roller, said axle comprising integral opposite end portions, one being a booty roller receiving portion and the other an axle mounting portion, said portions being arranged in end-to-end angled relation, and means supporting said axle mounting portions for adjustable rotation on the arms of the V-shaped supports about axes extending parallel to the axis of the work to be supported and for locking said axle mounting portions in fixed positions on such arms, whereby the skew angle of the booty roller receiving portion may be adjustably fixed relative to the work to be supported.

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**4,018,012**

## METHOD OF GRINDING METAL BILLETS, BLOOMS OR SLABS

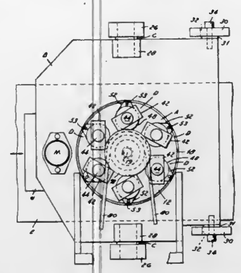
**Richard G. Hopkins, Bennington Township, Shiawassee County, Mich., and Paul E. Stockhausen, Canfield, Ohio, assignors to MWA Company, Owosso, Mich.**

**Continuation-in-part of Ser. No. 405,298, Oct. 11, 1973, Pat. No. 3,874,123. This application Mar. 7, 1975, Ser. No. 556,398**
**Int. Cl.² B24B *1/00***
**U.S. Cl. 51—281 R** **2 Claims**

1. A method of removing metal from the surface of a metal workpiece such as a steel slab, bloom or billet, comprising supporting a plurality of grinding wheels in spaced relation about an axis extending transversely of said surface, holding said grinding wheels in contact with said surface under a yielding pressure so that each grinding wheel can follow the contour of said surface independently of the others, rotating said grinding wheels about their own axes, orbiting said grinding wheels as a group about said first-mentioned axis, relatively moving said plurality of grinding wheels and said workpiece back and forth in directions parallel to said workpiece



surface, and simultaneously tilting said plurality of grinding wheels one way and then the other about an axis transverse to



the direction of relative movement at each reversal of such relative movement so that they grind said workpiece surface with a negative rake.

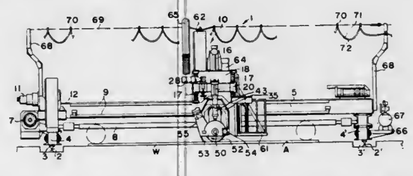
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**4,018,013**

## METHOD FOR GRINDING SURFACE PORTIONS OF THICK PLATES

**Tetsuro Oshimi, Nagoya, Japan, assignor to Nippon Toki Kabushiki Kaisha, Japan**

**Filed Apr. 29, 1975, Ser. No. 572,822**
**Claims priority, application Japan, May 2, 1974, 49-50030**
**Int. Cl.² B24B *1/00***
**U.S. Cl. 51—281 R** **1 Claim**



1. A method of grinding surface portions of thick steel plates comprising the steps of moving a grinding wheel rotating on a horizontal axis into grinding engagement with the surface of a workpiece disposed in a horizontal plane, oscillating said grinding wheel throughout a path extending in a horizontal direction, maintaining said grinding wheel rotating on said horizontal axis in grinding engagement with said workpiece surface throughout all but the end portions of said path, raising said grinding wheel out of said grinding engagement with said workpiece surface during the reversal of direction of said grinding wheel along said path end portions during said oscillating movement and lowering said grinding wheel into grinding engagement with said workpiece surface along the said path between said path end portions upon completion of said reversal of direction of said grinding wheel at each end of said path.

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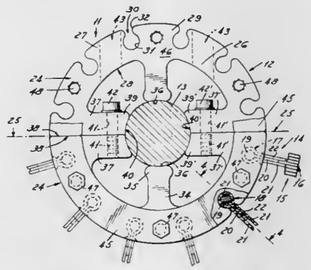
**4,018,014**

## HUB STRUCTURE FOR ROTARY FINISHING WHEELS

**James A. Belanger, Northville, Mich., assignor to Belanger, Inc., Northville, Mich.**

**Filed May 7, 1976, Ser. No. 684,440**
**Int. Cl.² B24D *13/06***
**U.S. Cl. 51—337** **32 Claims**

1. A hub structure for a rotary finishing wheel having a rotational axis and being adapted for replaceably mounting a plurality of circumferentially spaced pack units each of which includes a flap-like member of fill material having a radially outer finishing portion for engaging a workpiece and a radially inner slot-engaging portion for mounting said pack unit, said hub structure comprising two substantially identical hub sections generally representing the two halves of a longitudinally bisected cylinder, the radially outer surface of each of said hub portions having a generally semi-circular exterior contour provided with a plurality of integrally-formed, circumferentially-spaced, quasi-cylindrical, key-hole-type, slot-forming means each having a longitudinal slot axis parallel to said rotational axis, each of the longitudinal slots defined by said slot-forming means being adapted to slideably and telescopically receive the slot-engaging portion of said flap-like member to mount the pack unit for limited hinge-type pivotal movement about said slot axis, the interior of each of said hub portions including an integrally-formed, centrally-disposed, radially inwardly extending member having its inner end adapted to form a clamp seat having the general contour of the shaft to which said hub structure is to be secured, said member being generally normal to the plane of bisection of



said hub portions, the interior of each of said hub portions further including a pair of flange portions generally parallel to said plane of bisection and integral with the longitudinally bisected edge portions of the hub portion, said flange portions extending radially inwardly toward one another and each having its radially inner end adapted to form onehalf of another shaft-engaging seat, said hub structure further including means for adjustably securing each of said pair of flange portions of one hub portion to corresponding opposed flange portions of the other hub portion to form a pair of oppositely disposed shaft-engaging seats from said flange portions while securely clamping said shaft between the clamp seats of the oppositely disposed members of the two hub portions to secure said hub structure to said shaft for rotation therewith and means for removeably retaining the slot-engaging means of said flap-like members axially within said longitudinal slots.

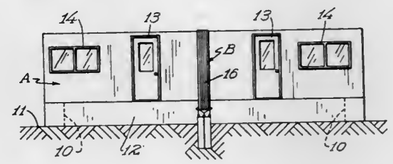
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**4,018,015**

## TRAILER ANCHORING DEVICE

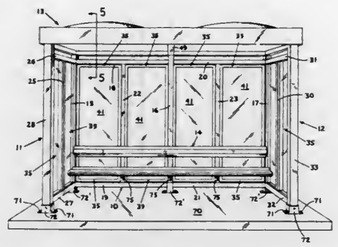
**Gladys B. Swanson, P. O. Box 403, Shevlin, Minn. 56676**

**Filed Oct. 20, 1975, Ser. No. 623,774**
**Int. Cl.² E04D *1/34*; E02D *5/80***
**U.S. Cl. 52—23** **1 Claim**



1. A trailer anchoring device including a belt extending over the top of the trailer and down the sides thereof, an anchoring block on each side of the trailer, a transversely extending bar at each end of the belt, said bars extending longitudinally of said trailer and extending transversely beyond said belt, three anchoring rings extending upwardly from anchoring block, a pair of means connecting said bars to the anchoring ring most remote from the end of said belt, an independent means securing the ends of said bars to the remaining anchoring means.

**4,018,016**
**WAITING STATION FOR BUSES**
**Theodore R. Zale, 160 E.65th St., New York, N.Y. 10021**
**Filed Feb. 6, 1976, Ser. No. 655,728**
**Int. Cl.² E04H *1/12***
**U.S. Cl. 52—36** **5 Claims**

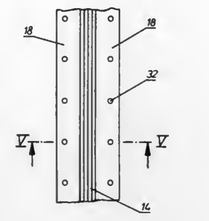


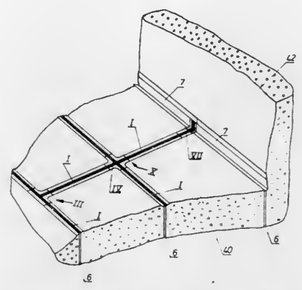
1. A waiting station comprising a wall structure constructed of vertical and horizontal members made of tubing of rectangular cross-section and having open ends, and pairs of cooperative interlatching elements connecting said tubular members together, each of said pairs comprising a latch plate and a catch, said latch plate being wholly contained within the opening in an end of one tubular member in transverse relation to the longitudinal axis of such member and so that the outer surface of such plate is flush with the terminal end of the tubular member, said latch plate extending from one side wall of said tubular member and the area of such latch plate being less than the area of said opening so that such opening is only partially closed by such plate to provide a space between one free side of such plate and the side wall of said tubular member opposite said one side wall thereof, and said catch being constituted of a member having one end portion secured to a side wall of a second tubular member intermediate the terminal ends of the latter and having its other end portion spaced from and in substantial parallelism with such surface, said other end portion being disposed in opposed relation to said latch plate and being insertable through said space adjoining the free side of said latch plate, and after being so inserted interlatchable with said latch plate, said latch plate and catch, in interlatched condition, being entirely concealed by the connected end of said one tubular member and said side wall of the second tubular member.

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**4,018,017**
**EXPANSION JOINT MEANS**
**Traugott K. Schoop, Mellinger Strass 48, 5401 Baden, Switzerland**
**Filed Apr. 23, 1975, Ser. No. 570,963**
**Claims priority, application Germany, Apr. 25, 1974, 7414474[U]; June 19, 1974, 2429430; Mar. 21, 1975, 2512655**
**Int. Cl.² E04D *1/35***
**U.S. Cl. 52—58** **17 Claims**

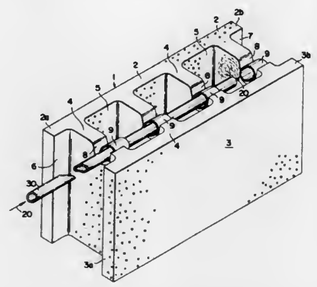
1. The improvement in expansion joint means in combination with a flat roof and bituminous type roofing material, said combination comprising:
- a flat roof having at least one structural joint formed by adjacent structural components,
- expansion joint means for bridging said joint and including a centre portion made solely of stretchable synthetic rubber and two parallel side portions integrally connected respectively on opposite longitudinal sides of said centre portion and being made of substantially unstretchable material including synthetic rubber, the centre portion being of less thickness than said side portions,
- means securing said side portions respectively to said adjacent structural components with said centre portion over said joint, and
- roofing material of the bituminous type secured on top of said structural components and being bonded to said synthetic rubber of said side portions.





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**4,018,018**
**ARCHITECTURAL BLOCK AND THE STRUCTURE COMPOSED THEREOF**
**Momotoshi Kosuge, No. 834-9 Kitaishigaki, Beppu, Oita, Japan**
**Filed Nov. 26, 1974, Ser. No. 527,367**
**Claims priority, application Japan, Dec. 17, 1973, 48-141605**
**Int. Cl.² E02D *35/00***
**U.S. Cl. 52—127** **10 Claims**

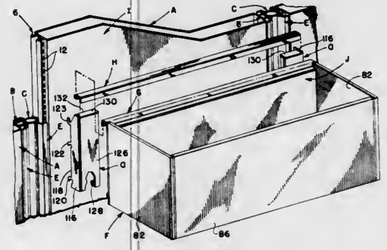


6. A structural member including a plurality of architectural blocks, said member comprising:
- a. a plurality of blocks aligned in at least one row, each block including two opposed side walls, at least two parallel partitions between said side walls and perpendicular thereto, said partitions and side walls defining chambers within said block and groove means, formed in one edge of each of said partitions, wherein the groove means in each row of said blocks are aligned with each other, said groove means having a removable hollow pipe means therethrough for carrying a foamable synthetic resin composition into said chambers from the exterior of said block during the construction of said wall;
- b. cover plate means extending between the outside ends of the first blocks at the end of each said row; and
- c. a foamable synthetic resin composition within said chambers, said composition comprising a lightweight heat insulator and moisture proof material.



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**4,018,019**
**PANEL AND STRUCTURAL UNITS FOR WALL ASSEMBLIES**
**Richard L. Raith, Solon, and Joseph A. Davenport, Middleburg Heights, both of Ohio, assignors to Hauserman, Inc., Cleveland, Ohio**
**Division of Ser. No. 498,418, Aug. 19, 1974, Pat. No. 3,886,698, which is a continuation of Ser. No. 370,477, June 15, 1973, abandoned. This application May 27, 1975, Ser. No. 581,115**
**Int. Cl.² A47B *5/02*; A47G *19/02***
**U.S. Cl. 52—239** **18 Claims**

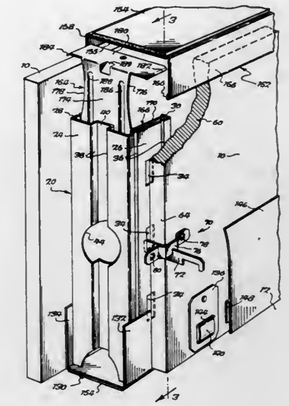


1. A sheet metal face for a rectangular panel, said sheet metal face having at least one edge portion bent and folded to define a recessed double-thickness flange, a plurality of longitudinally spaced slots in said flange, said face having a substantially plane rectangular central portion and opposite side edge portions, both of said side edge portions being bent and folded to have said recessed double-thickness flange thereon, each of said edge portions being bent to define a web portion extending inwardly from said central portion, each of said edge portions being reversely folded to define a main folded portion extending outward from said web portion relative to said central portion, said main folded portion extending back toward said web portion and being bent to define an inwardly extending terminal flange which extends inward relative to said central portion in the same direction as said web portion, and said main folded portions defining said double-thickness flanges.

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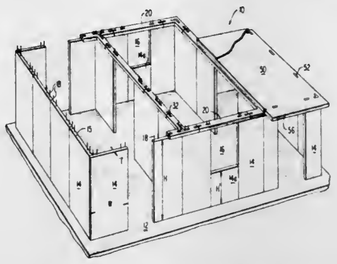
**4,018,020**
**MODULAR WALL CONSTRUCTION**
**Gale E. Sauer, Williamsville, and Barton G. Hansen, Cheektowaga, both of N.Y., assignors to Roblin Industries, Inc., Buffalo, N.Y.**
**Division of Ser. No. 411,703, Nov. 1, 1973, Pat. No. 3,925,948. This application Apr. 16, 1975, Ser. No. 568,397**
**Int. Cl.² E04B *2/28***
**U.S. Cl. 52—241** **5 Claims**

1. A stud extender clip in combination with a stud having a channel shaped opening and a right angularly related member having a channel shaped opening, said stud extender clip comprising an elongated body having a web and a pair of opposite flanges extending in a direction normal to the plane of said web, an extension formed integral with said web and extending axially therefrom past said flanges, a flat head extending in a direction normal to said extension and formed integral therewith, said head projecting laterally past the lateral edges of said extension and terminating in end portions inclined toward said body wherein said body and said head of said clip are received in said channel shaped openings of said stud and said right angularly related member respectively so that a clearance is provided between said right angularly related member and the opposite lateral edges of said extension whereby the reception of a structural panel therein is facilitated.



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**4,018,021**
**BUILDING AND METHOD OF MAKING SAME**
**Jimmy Dow, 9 Alley 5, Lane 12, Jen-Ai Road, Sec. 4, Taipei, China /Taiwan**
**Filed Sept. 13, 1974, Ser. No. 505,701**
**Int. Cl.² E04B *1/04***
**U.S. Cl. 52—251** **10 Claims**



1. A building of a type having exterior and interior walls formed of precast vertical panels of a selected width juxtaposed in a manner to provide the outline of the building and its interior partitioning, wherein some of said panels are spaced a panel width from its nearest panel to provide door openings, wherein a number of panels have less vertical height than others to provide window openings and wherein the remainder of said panels are of the same height such that their upper surfaces fall in the same horizontal plane, the improvement comprising,
- a plurality of linking bars of substantially rectangular configuration having lengths in multiples equal to the widths of said panels and positioned over said panels so that their respective ends are positioned at the mid-width points of said panels,
- said bars having linking slots at their ends formed by relatively narrow slots leading to enlarged sectors and wherein the adjacent narrow slots form a narrow passageway communicating the enlarged sectors thereof to form a chamber,
- a reinforcing member having a narrow midportion and enlarged ends for reception as a unit in said chamber,

reinforcing bars embedded in said wall panels and having portions extending upwardly beyond the upper surface of said panel,

said linking bars having openings intermediate their lengths for the reception of said portions,

a precast roof supported by and extending over said linking bars and formed with roof openings disposed in vertical alignment with said intermediate openings of said linking bars.

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**4,018,022**

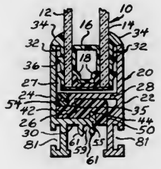
## INSULATED FRAME ASSEMBLY

**Frederick M. Fink, Barrington Hills, Ill., assignor to Continental Aluminum Products Company, McHenry, Ill.**

**Continuation-in-part of Ser. No. 335,624, Feb. 26, 1973, abandoned. This application Dec. 2, 1974, Ser. No. 528,677**

**Int. Cl.² E06B** *3/62*

**U.S. Cl. 52—398** **5 Claims**



1. A frame strip assembly comprising laterally spaced side walls forming a channel between parallel edge zones thereof to receive a member to be framed, and interlocking means positioned to leave said channel free and including webs extending inwardly relative to the side walls, said webs including closely spaced overlapped portions, narrow flanges on the ends of the overlapped web portions, each flange projecting toward the web portion on which the other flange is formed and presenting a steep locking shoulder approximately opposing the shoulder of the other flange, a rigid spline strip in said space grooved from opposite sides to receive said flanges, a gap between the end of the one of the webs closest to said channel and a portion rigid with the side wall on which the other web is formed and which, when unfilled, permits pivoting of the said side walls toward and away from each other to facilitate relative transverse movement of the parts into an assembly from fully separated positions to a position for interlocking of the said spline strip with the overlapped web portions and flanges, and a locking strip in said gap dimensioned to hold said walls spread apart to the limit permitted by the spline strip and of sufficient compressive strength to lock said assembly while said channel remains empty.

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**4,018,023**

## CERAMIC ELEMENTS AND INSULATION ASSEMBLY INCLUDING SUCH ELEMENTS

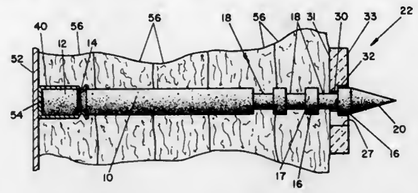
**Ralph A. Anderson, Niagara Falls, N.Y., assignor to The Carborundum Company, Niagara Falls, N.Y.**

**Continuation of Ser. No. 448,791, March 6, 1974, abandoned. This application July 18, 1975, Ser. No. 597,109**

**Int. Cl.² E04B** *1/62*; **F16B** *21/04*

**U.S. Cl. 52—410** **2 Claims**

1. A high temperature furnace insulation assembly including, in combination with a furnace wall and a body of flexible insulation material, a fastener supporting said body on said furnace wall, wherein the improvement comprises: said fastener including a socket attached at its inner end to said furnace wall; a removable and replaceable, unitary ceramic pin inserted into said socket and over which pin said body is impaled, and a ceramic washer holding said body in place on said pin between said furnace wall and said washer; said pin having an inner end portion provided with an annular groove, and an outer end portion having a reduced part and an external and inwardly facing, annular shoulder; said socket having flexible wall means slid over said inner end portion and provided at the outer end of said socket with interior lip means snap fit into said groove, and a ceramic washer moved on said outer end portion and including an aperture defining two intersecting through openings having intersections separated by spacing larger than said reduced part but smaller than said



outer end portion, with one of said openings being larger than said outer end portion, and the other of said openings being alignable with said reduced part and including an inner part larger than said reduced part but smaller than said outer end portion, an outer part larger than and removably engagable with said outer end portion, and an internal and outwardly facing, greater than semi-annular shoulder removably engaging said external shoulder.

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**4,018,024**

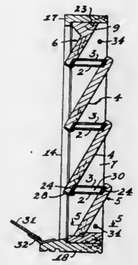
## LOUVERED WINDOWS COMPRISING INSULATING PAIRS OF SUPERIMPOSED PANES

**William Stelzer, 1354 Blue Heron Drive, Milford, Mich. 48042**

**Filed Sept. 22, 1975, Ser. No. 615,540**

**Int. Cl.² E06B** *7/08*

**U.S. Cl. 52—473** **1 Claim**



1. A window for admitting light to a building, comprising pairs of horizontally level superposed transparent panes sealingly held in spaced relationship to contain a layer of still air to serve as a heat and cold insulator, each of said pairs consisting of an upper pane and a lower pane, said panes being disposed at right angle to the force of gravity to prevent heat convection in said still air, structural means to support said pairs of transparent panes, said structural means and said transparent panes composing a sash as a self-contained unit, and a window frame, said sash being adapted to fit into said window frame to be easily removed from said window frame and selectively reinserted into said window frame in a reversed position so that for use in cold weather said upper pane in a pair of panes is exposed to the inside of said building and said lower pane is exposed to the outside of said building, and that for use in hot weather said upper pane is exposed to the outside of said building and said lower pane to the inside of said building, said structural means comprising cross-members extending longitudinally parallel with said panes to form louvers, each of said cross-members having an outside edge and an inside edge, each of said pairs of panes being disposed between said outside edge of one of said cross-members and said inside edge of the next one of said cross-members, said



pairs of panes being sealingly supported by said cross-members.

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**4,018,025**

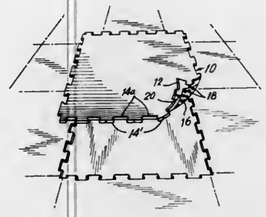
## VENTILATED INTERLOCKING FLOOR TILE

**Roderick E. Collette, Pawling, N.Y., assignor to Pawling Rubber Corporation, Pawling, N.Y.**

**Filed Nov. 28, 1975, Ser. No. 635,958**

**Int. Cl.² E04C** *1/30*, *2/30*

**U.S. Cl. 52—590** **5 Claims**



1. A ventilated, interlocking floor tile, which comprises

a. a heavy, substantially solid edge region, the periphery of said edge region provided with a plurality of interlocks to interconnect said tile with contiguous tiles whereby a floor surface covering can be constructed,

b. said interlocks comprising projecting elements extending from said edge region and alternating dove tailed slots formed thereby,

c. said projecting elements interlocking with the adjacently positioned dove tail slots of a contiguous tile,

d. said tile including an inner region integral with said heavy, substantially solid edge region,

e. said heavy edge region defining a cavity on the back side of said tile beneath said inner region, whereby said heavy, substantially solid edge region provides added support to the tile at the junction area between contiguous tiles and said tile contains an open air space beneath said inner region,

f. said cavity including a plurality of knob-like projections extending from the back side of said tile at said inner region to floor level to support said tile, while providing an air space within said cavity, and

g. said heavy edge region including ventilating grooves extending from the cavity to the tile edges to accommodate the flow of air to and from said cavity.

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**4,018,026**

## AUTOMATIC CONTINUOUS BARREL FILLING METHOD

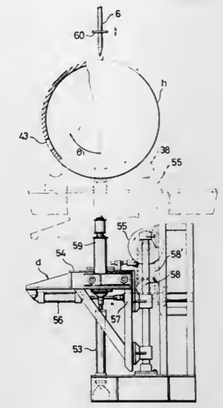
**Makoto Kamisaka; Kanji Kojima; Tatsuya Negoro; Toshichika Uchikubo; Yusho Okamoto, Honishi, and Sadao Minato, all of Mihara, Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Japan**

**Division of Ser. No. 469,852, May 14, 1974, Pat. No. 3,977,154. This application Dec. 15, 1975, Ser. No. 640,760**

**Int. Cl.² B65B** *1/04*, *43/60*

**U.S. Cl. 53—37** **7 Claims**

1. An automatic, continuous barrel-filling method comprising the steps of supplying empty barrels, having bungholes, to dollies for movement of the empty barrels radially towards the periphery of an intermittently rotated turntable; while each empty barrel is supported on a dolly during such radial movement, centering the bunghole axially relative to the dolly; moving the dolly radially to transfer the empty barrel, with its thus axially-centered bunghole, to a carrier on the periphery of the turntable; retracting the dolly from the turntable; engaging a filling nozzle with the barrel in circumferential alignment with the bunghole; rotating the barrel on the carrier at a relatively high speed to detect when the bunghole faces vertically downward; responsive to such detection, halting the high speed rotation with the bunghole less than 180° past its downwardly facing position; rotating the barrel on the carrier at a relatively low speed until the filling nozzle engages into the bunghole when the bunghole faces vertically upward; responsive thereto, immediately halting the low speed rotation of the barrel; then initiating filling of the barrel through the filling



nozzle inserted into the barrel through the bunghole; interrupting the filling of the barrel when the liquid level reaches a predetermined height in the barrel; retracting the filling nozzle from the filled barrel; bunging the bunghole of the filled barrel; and then removing the filled barrel from the carrier.

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**4,018,027**

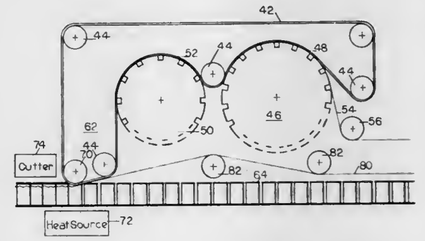
## HEAT INSTALLED MULTI-PACK CARRIER MACHINE

**Byron V. Curry, Santa Barbara, and Teofil L. Bonkowski, Stockton, both of Calif., assignors to Byron V. Curry et al., Santa Barbara, Calif.**

**Filed June 2, 1975, Ser. No. 583,183**

**Int. Cl.² B65B** *21/00*, *21/24*, *27/04*

**U.S. Cl. 53—48** **8 Claims**




1. A machine for packaging an array of elements with a shrinkable sheet material in which the shrinkable sheet material is formed as a sheet having a multiplicity of openings, one for each element intended to be interconnected as a package, the machine including:

means to pre-form said shrinkable sheet material about said openings into a shape closely approximating but larger than the shape said material will assume on interconnecting said elements,

means for applying said shrinkable, pre-formed sheet material about an array of said elements,

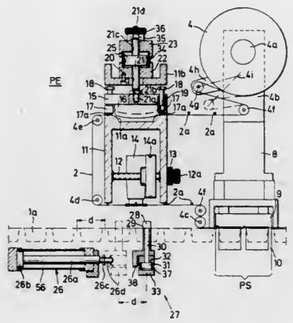
means for shrinking said material by application of an external force after the material is applied about the array of elements to interconnect the elements into a package, and

means for directing a sheet of said material in sequence to said pre-forming means then to said applying means.

## 4,018,028
## ARRANGEMENT FOR ALIGNING HEAT-SEALABLE LIDS ON MATING PRODUCT-FILLED CONTAINERS

**Henry Donnet, Falaise, France, assignor to Societe d'Application Plastique Mecanique et Electronique, Plastimecanique S.A., Courbevoie, France**

**Continuation-in-part of Ser. No. 273,273, July 19, 1972, abandoned. This application Oct. 23, 1975, Ser. No. 625,325**
**Claims priority, application France, July 23, 1971, 71.27006**
**Int. Cl.² B65B 9/04**
**U.S. Cl. 53—51** **3 Claims**

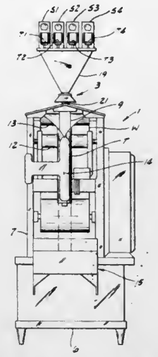


1. In an apparatus for producing a succession of identical heat-sealed containers, comprising means for indexing into a heat-sealing station a plurality of troughs preformed on a first strip through equal first intervals and for simultaneously indexing a second strip into the station, the troughs being disposed at equal distances corresponding to the first interval, the second strip having disposed thereon detectable markings which are initially disposed therealong at equal second intervals slightly smaller than the first interval, detecting means associated with the path of movement of the second strip for generating a control signal when a marking of the second strip comes into alignment therewith, means for stretching a portion of the second strip by an amount sufficient to increase the spacing between the successive markings on at least the front end of the stretched portion of the second strip to the first interval upon the occurrence of the control signal, whereby the stretched regions between successive markings on the front portion of the second strip define lids which are heat-sealable to the associated troughs, said stretching means including preforming means disposed upstream of the station and responsive to the control signal for initiating an elongation of an intermediate portion of the second strip, corresponding in length to the difference between the first and second intervals, between successive indexing movements, the improvement wherein the preforming means comprises, in combination, first and second clamping means disposed in spaced relation for gripping and immobilizing the ends of the intermediate section of the second strip in response to the control signal, each of the first and second clamping means being disposed upstream of the detecting means, and means independent of the first and second clamping means for imparting a longitudinal deformation to the so-gripped intermediate section of the second strip; and wherein the apparatus further comprises means for positioning the detecting means relative to the second strip for initiating the generation of the control signal at the end of each indexing movement.

## 4,018,029
## PACKAGING APPARATUS

**Richard W. Safranski, and Lloyd Kovacs, both of Sheboygan, Wis., assignors to Hayssen Manufacturing Co., Sheboygan, Wis.**

**Filed Oct. 7, 1975, Ser. No. 620,329**
**Int. Cl.² B65B 1/32, 61/26**
**U.S. Cl. 53—59 W** **20 Claims**

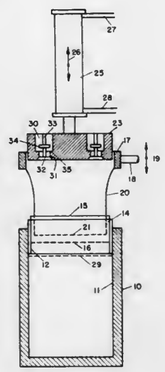


1. Packaging apparatus comprising a plurality of means each adapted to measure out a batch of a product for delivery to a package, means for delivering the batch measured out by any one of the measuring means to a package, and means operable in accordance with the delivery of each batch to a package for marking on that package a code designating the particular measuring means which measured out that batch.

## 4,018,030
## ARRANGEMENT FOR VACUUM PACKING OF FOODSTUFFS AND THE LIKE

**Od Wikar Christensson, Stockholm-Bromma, Sweden, assignor to Christenssons Maskiner & Patenter AB, Stockholm-Bromma, Sweden**

**Division of Ser. No. 340,197, March 12, 1973. This application May 6, 1975, Ser. No. 575,076**
**Int. Cl.² B65B 1/24**
**U.S. Cl. 53—124 B** **7 Claims**



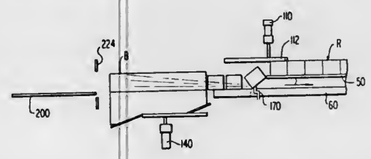
1. An arrangement for compressing a product to be packed in a package before evacuation and closing of said package which comprises a piston, means for lowering the piston into the package to act on substantially the entire-free upper surface of the product in said package so as to compress the product in the interior of the package unidirectionally to such an extent that the product to be packed will assume at least approximately the volume which the product would assume in said package if no mechanical compression had existed but the only compression had been the one subjected to the package after closing in an evacuation chamber and thereafter being brought out into the ambient atmosphere, said means for lowering the piston including guide means for the piston movable in such a way that the piston will be directed during its downward movement into the mouth of the package, a frame for carrying up said guide means, said frame being provided to lower the guide means into the mouth of the package before the piston has been lowered, means for subjecting said package after said compression to evacuation to further reduce the internal pressure of the product to be packed and means for sealing and closing said package.



## 4,018,031
## ARTICLE PACKAGING MACHINE

**Jesse B. Smaw, East Paterson, N.J., assignor to Marcal Paper Mills, Inc., East Paterson, N.J.**

**Division of Ser. No. 254,989, May 19, 1972, Pat. No. 3,877,562. This application Dec. 23, 1974, Ser. No. 535,789**
**Int. Cl.² B65B 5/06, 7/06, 43/36; B65H 1/14**
**U.S. Cl. 53—159** **18 Claims**



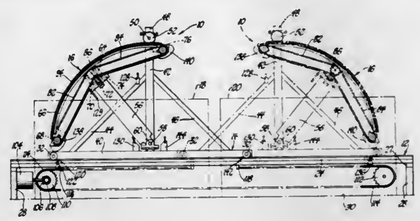
1. An article packaging assembly comprising: receptacle supporting means; article transfer means reciprocable forwardly and rearwardly and having a substantially horizontal supporting surface for underlying and supporting a quantity of articles; conveyor means for delivering articles onto a rear end of said supporting surface and continuously urging said articles in the forward direction of reciprocation of said article transfer means, so that said supporting surface continuously carries a plurality of continuously forwardly urged articles; means for sensing arrival of an article at a forward end of said supporting surface and for actuating said reciprocating means in response thereto; a second substantially horizontal surface spaced at a lower elevation than the first-mentioned surface, means for advancing a plurality of articles substantially horizontally along said supporting surface to establish a horizontal row of articles aligned substantially horizontally on said supporting surface above said second surface; means for reciprocating the article transfer means relative to said second surface: rearwardly from underlying support of a selected plurality of said articles to displace the selected plurality of articles to the lower level of the second surface while maintaining others of said articles in supported relation on said supporting surface; and thereafter to forwardly engage and push all of the displaced selected articles into a receptacle carried by the receptacle supporting means, and stop means for resisting forward movement of said other articles as they are continuously urged forwardly by said conveyor means, while said supporting surface pushes said selected articles into the receptacle.

## 4,018,032
## CONVEYOR MECHANISM

**John E. Dempsey, Miamisburg, and Russell F. Meinke, Germantown, both of Ohio, assignors to General Motors Corporation, Detroit, Mich.**

**Filed May 24, 1976, Ser. No. 689,584**
**Int. Cl.² B65B 5/10**
**U.S. Cl. 53—247** **3 Claims**

1. A conveyor mechanism supported by a base for alternately depositing articles into a pair of spaced containers each of which has a bottom floor, said conveyor mechanism including an elongated frame, a plurality of rollers on said frame supporting an endless belt for moving said articles towards one end or the other end of said frame, an arm having its upper end secured to said frame, a carriage supporting the lower end of said arm, said carriage being supported by said base for horizontal movement between a first position wherein said arm is located adjacent one of said containers and a second

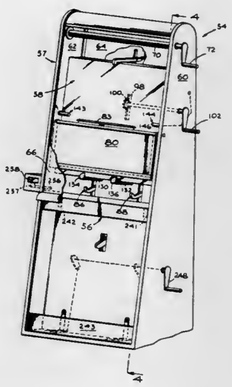


position wherein said arm is located adjacent the other of said containers, the lower end of said arm being pivotally connected to said carriage about a horizontal axis for permitting one end of said frame to be moved downwardly about said horizontal axis to a point near the bottom floor in the adjacent container and gradually raised upwardly as the adjacent container is filled when the carriage is located in said first position and in said second position.

## 4,018,033
## DAYLIGHT FILM HANDLING SYSTEM

**Gunter Schmidt, Malibu, Calif., assignor to Cubic Productron Inc., Chula Vista, Calif.**

**Division of Ser. No. 401,441, Sept. 27, 1973, Pat. No. 3,934,735, which is a division of Ser. No. 52,848, July 7, 1970, Pat. No. 3,790,160. This application Oct. 9, 1975, Ser. No. 621,008**
**Int. Cl.² B43M 7/02**
**U.S. Cl. 53—381 R** **2 Claims**



1. An apparatus useful together with a film package comprised of a stack of film sheets contained within an envelope having a first end thereof extending beyond one edge of said stack for removing said stack without exposing said film sheets to light, said apparatus comprising:

light tight housing means adapted to accommodate said film package therein in a substantially vertical orientation with the part of said envelope extending beyond said stack disposed uppermost;

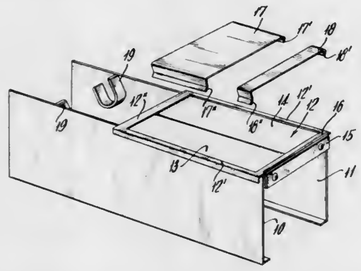
a rotatable bar disposed in said housing means;

means carried by said bar for engaging said first end of said envelope extending beyond said stack;
means disposed outside of said housing for rotating said bar to lift said envelope from said stack; and
cutting means supported on said housing means for cutting a second end of said envelope remote from said first end.

## 4,018,034
## PACKAGING APPARATUS

**Eitan Keren, Wayne, N.J., assignor to Sealed Air Corporation, Fair Lawn, N.J.**

**Filed Nov. 20, 1975, Ser. No. 633,823**
**Int. Cl.² B65B** *67/10*
**U.S. Cl. 53—390** **5 Claims**



1. Packaging apparatus for articles comprising a frame including means for supporting a roll of self-sealing packaging material in strip form, a table carried by said frame, said table being concave to receive an article or articles to be packaged, cutting means disposed along the outer edge of said table and means transversely bridging said concave table and spaced from said cutting means whereby articles to be packaged are placed on said packaging material overlying said table and centered by said concavity and said material upon being folded over upon itself and at least partially overlying said bridging member and sealed about the edges to complete the packaging is severed from said strip by said cutting means.

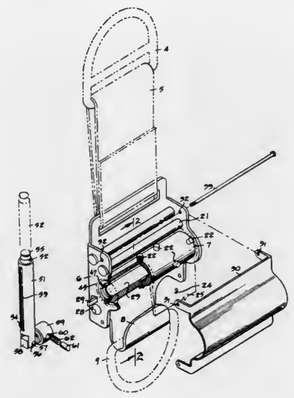
## 4,018,035
## CINCH WINCH FOR SADDLING A HORSE

**Neolan V. Morrison, 326 Addison St., Palo Alto, Calif. 94301**

**Filed Mar. 12, 1976, Ser. No. 666,159**
**Int. Cl.² B68C** *1/00*
**U.S. Cl. 54—23** **7 Claims**

1. In a device for use in adjusting the saddle belt on a horse, an improved winch device comprising:
a hollow rotating member of generally cylindrical configuration,
the internal cylindrical surface of said member comprising a ratchet having teeth disposed about its circumference; said teeth extending axially along the entire length of said member;
a plurality of projectors positioned radially around the exterior surface of said member and disposed to engage holes in said belt;
means for positively engaging and disengaging said projectors to control the rotation of said member;
a sliding shaft positioned concentrically inside said rotating member in axially slidable relation therewith;
a pawl positioned at one end of said shaft in hinged relation therewith and disposed for engagement with said ratchet;
means for limiting the travel of said shaft in an axial direction in said rotating member;
a housing and means for positioning said rotating member within said housing;
means for engaging one end of said housing with one end of an underbelly strap on said horse;
means for engaging the opposite end of said housing with said saddle belt;
handle means for rotating said shaft while said shaft is slid axially within said rotating member;
whereby said saddle belt may be adjusted regardless of the axial position of said pawl in said rotating member.

5. A cylindrical ratcheting device for producing intermittent motion to a follower member comprising:
a stationary housing;
a hollow rotating member of generally cylindrical configuration positioned in said housing;
a plurality of teeth comprising a ratchet positioned around the inside circumference of said rotating member, said teeth extending axially along the entire length of said member;
a sliding shaft positioned concentrically inside said rotating member in axially slidable relation therewith;
a pawl positioned at one end of said shaft in hinged relation therewith and disposed for engagement with said ratchet;
means for limiting the travel of said shaft in an axial direction in said rotating member;
handle means in cooperative relation with said shaft;
means positioned on said rotating member for engaging said follower member.



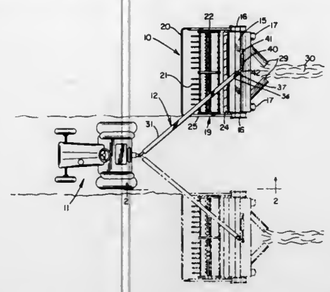
## 4,018,036
## METHOD FOR HARVESTING CROPS USING A TRACTOR-PULLED CROP HARVESTER

**George B. Cicci, Broadview, Ill., Guy O. Tufts, Phoenix, Ariz., assignor to International Harvester Company, Chicago, Ill.**

**Continuation of Ser. No. 492,632, July 29, 1974, which is a division of Ser. No. 353,037, April 20, 1973, Pat. No. 3,868,811. This application May 20, 1976, Ser. No. 688,204**
**Int. Cl.² A01D** *43/10*
**U.S. Cl. 56—1** **3 Claims**

1. A method of harvesting adjacent rows of standing crops in a field using a wheeled crop harvester having forwardly mounted harvesting apparatus and rearwardly mounted windrowing apparatus and pulled by a tractor, said harvester being adapted to operate on either side of said tractor, comprising:
positioning the harvester with the harvesting apparatus outboard of one side of said tractor, said standing crops being located on said one side;
pulling said harvester with said tractor through a first row of said crops to one end of said field, said harvester operating to harvest and windrow said crops and said tractor being outboard of said standing crops;
turning said tractor and said harvester in the opposite direction of travel at the end of said field;
positioning said harvester on the opposite side of said tractor from said one side while said harvester and said tractor are moving; and
pulling said harvester through a row of standing crops adjacent to said first row to an end of said field opposite said one end, said harvester operating to harvest and windrow said crops in said adjacent row and said tractor riding in said first row and being outboard of said adjacent row.

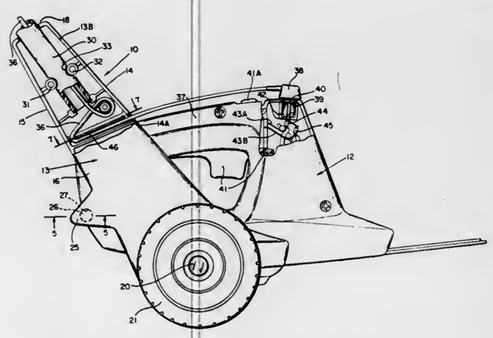




## 4,018,037
## ATTACHING MEANS FOR CONVERTING A CONVENTIONAL HAND-HELD PORTABLE POWER TOOL OR APPLIANCE FOR STAND-UP USAGE

**Edwin Joseph Weber, Baltimore, Md., assignor to The Black and Decker Manufacturing Company, Towson, Md.**

**Filed Aug. 25, 1975, Ser. No. 607,636**
**Int. Cl.² A01D** *35/00*
**U.S. Cl. 56—16.7** **9 Claims**

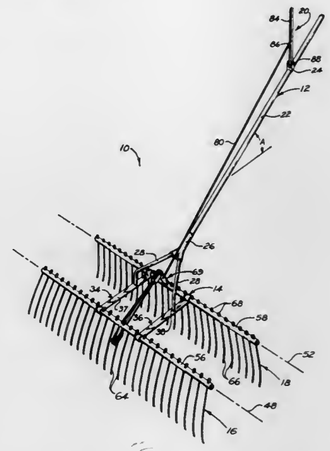


1. In attaching means for converting a conventional hand-held portable-power tool or appliance to provide a device for convenient stand-up usage, wherein the attaching means for retaining the tool has an upwardly-extending wand means, and wherein a top handle provided with switch means is secured to the wand means, and electrical cable means is connected to the switch means and extends downwardly therefrom, the improvement in electrical connection means between the switch means and the tool, which comprises plug means formed on the end of the electrical cable means, receptacle means formed on the tool housing for receiving the plug, a pair of spaced electrical contacts in the receptacle means for engaging the plug means, a second pair of electrical contacts in the tool housing, one of which is stationary and the other of which is movable and is normally engaged by a switch operating member on the tool, means connecting the pair of contacts in the receptacle means in parallel with the respective pair of switch contacts, thereby bypassing the tool switch and facilitating manual control of the stand-up device by the switch means on the top handle, and resilient means in the attaching means for taking up the slack on the end of the electrical cable means and maintaining it substantially taut.

## 4,018,038
## HAND RAKE WITH GRASPING TINES

**Charles B. Sipe, 4121 Glencairn Lane, Indianapolis, Ind. 46226**

**Filed Jan. 5, 1976, Ser. No. 646,858**
**Int. Cl.² A01D** *7/10*
**U.S. Cl. 56—400.12** **10 Claims**

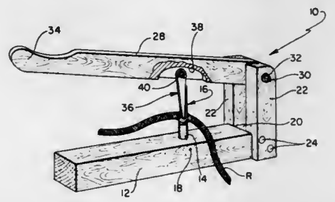


1. A hand rake with grasping tines comprising,
a pair of multitined fork members,
frame means for pivotally holding both of said fork members for rocking movement about a pair of separated pivot axes,
handle means secured to said frame means for carrying said fork members, and
mechanism means for cooperatively varying the pivotal dispositions of both of said fork members with respect to said frame means from an open material raking condition to a closed material transporting condition.

## 4,018,039
## DEVICE FOR SPLICING ROPE

**Ralph S. Leeper, 177 Steamboat Ave., North Kingstown, R.I. 02852**

**Filed Oct. 20, 1975, Ser. No. 624,178**
**Int. Cl.² B65H** *69/06*
**U.S. Cl. 57—23** **12 Claims**



1. A device for splicing rope having a hard terminal end formed as by melt cutting comprising, a hollow conical fid having an open slot along one face thereof, means for mounting said fid in position to impale and pierce a running length of said rope so as to form an opening therethrough, means for forcing said rope downwardly on said fid toward said base thereof to progressively expand said opening, said fid temporarily maintaining said opening in said expanded condition so as to permit the hard end of said rope to be positioned adjacent said opening for subsequent passage therethrough, said slot decreasing in width at least along that extent thereof

adapted to temporarily receive said running length of rope from the base to the apex thereof and said slot further adapted to receive said hard rope end and to temporarily wedge said end against relative movement therein by reason of its decreasing width configuration when said running length of rope proximate said opening is upwardly withdrawn from said fid, whereby said hard end automatically threads through said opening as the rope is upwardly withdrawn, said means for forcing said rope downwardly on said fid comprising a downwardly tapered blade having a narrow apex adapted for receipt in said slot and said opening, and means for moving said blade downwardly relative to said fid.

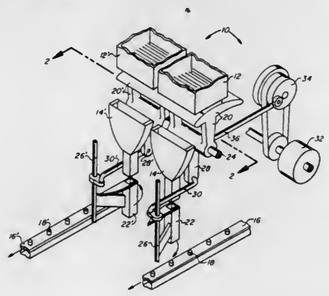
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**4,018,040**

## STOP-MOTION FOR AUTOMATIC DOFFING APPARATUS

**Clinton C. Zerfoss, Liberty, and William H. Drake, Greenville, both of S.C., assignors to Platt Saco Lowell Corporation, Easley, S.C.**

**Filed Sept. 26, 1975, Ser. No. 617,216**
**Int. Cl.² D01H 9/18**
**U.S. Cl. 57—34 R** **10 Claims**



1. In an automatic doffing apparatus for a textile spinning machine, said apparatus including bobbin supply means, bobbin conveyor means, and bobbin transporting means for transporting bobbins from said supply means and to said conveyor means, said bobbin transporting means being oscillatorily movable between bobbin receiving and bobbin discharging positions substantially continuously during normal operation of said apparatus, the improvement comprising:
   - switch means including a switch element mounted adjacent the path of oscillatory movement of said bobbin transporting means for regular periodic actuation by said bobbin transporting means during normal operation of said apparatus;
   - and stop-motion circuit means including said switch means for halting operation of said apparatus in response to significant variation in the regular periodic actuation of said switch element by said bobbin transporting means.

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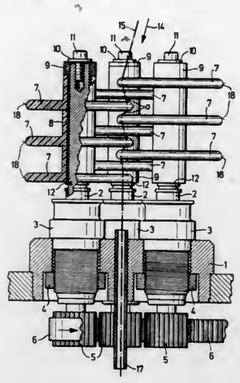
**4,018,041**

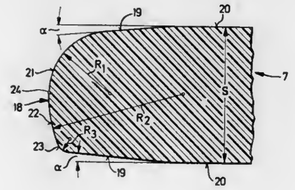
## FRICTION DISC FOR FALSE TWISTING APPARATUS

**Hans Weigert, Schweinfurt, and Kirit Patel, Elfershausen, both of Germany, assignors to Kugelfischer Georg Schafer & Co., Schweinfurt, Germany**

**Filed Apr. 13, 1976, Ser. No. 676,412**
**Claims priority, application Germany, Apr. 25, 1975, 2518538**
**Int. Cl.² D02G 1/08**
**U.S. Cl. 57—77.4** **4 Claims**

1. In a friction disc for friction false twisting of threads, said disc having a thread-engaging surface having a high co-efficient of friction and a convexly curved asymmetrical profile which is divided into three portions, each forming an arc of a circle of different radius of curvature, the portion at the thread entry face extending over an arcuate length of about 90° up to the apex of the profile and having a radius of curvature equal to between 0.4S and 0.5S, while the intermediate portion of the profile has a radius of curvature substantially





equal to S and the portion of the profile at the thread exit face has a radius of curvature equal to between 0.075S and 0.1S S being the thickness of the disc.

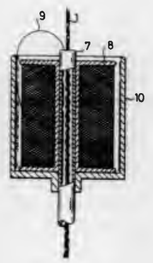
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**4,018,042**

## WRAPPED YARN

**Fritjof Maag, Kelkheim, Taunus, and Friedrich Unger, Lorsbach, Taunus, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany**

**Filed June 10, 1975, Ser. No. 585,607**
**Claims priority, application Germany, June 12, 1974, 2428483**
**Int. Cl.² D02G 3/02, 3/38**
**U.S. Cl. 57—144** **12 Claims**



1. Yarn consisting of an untwisted staple sliver and at least one filamentary yarn wrapped around this staple sliver, characterized in that:
   - a. the denier of the filamentary wrapping yarn is less than 15 dtex
   - b. the elongation at break of the filamentary wrapping yarn is greater than the elongation at break of the staple fibers,
   - c. the stress/strain relationship of the filamentary wrapping yarn is such that a force of at least 10 grams is required to produce an elongation of 4%,
   - d. the shrinkage of the filamentary wrapping yarn is within the same range as the shrinkage of the staple fibers, and,
   - e. at least 85% of the staple fibers are oriented longitudinally in the yarn direction.



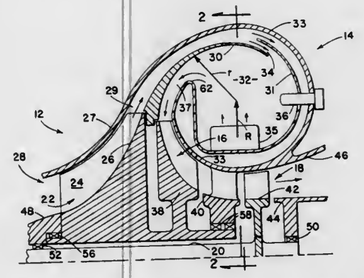
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**4,018,043**

## GAS TURBINE ENGINES WITH TOROIDAL COMBUSTORS

**William B. Clemmens, Ann Arbor, Mich., assignor to Avco Corporation, Stratford, Conn.**

**Filed Sept. 19, 1975, Ser. No. 614,754**
**Int. Cl.² F02C 9/08**
**U.S. Cl. 60—39.27** **10 Claims**



1. A gas turbine engine comprising, in series flow relationship,
   - a compressor, including a rotor, for pressurizing an annular stream of air and imparting thereto a tangential flow vector component,
   - a combustor comprising a toroidal combustion chamber having inlet means for the introduction of the compressed air therein and a discharge exit for a hot gas stream generated in the combustor, said chamber being generally a circular section rotated about the rotor axis, said combustor comprising liner means also of toroidal configuration, the inner surface of which defines the outer bounds of the combustion chamber,
   - said engine including a housing also of toroidal configuration and outwardly spaced from said liner means and defining in combination therewith the compressed air flow path from the compressor to the combustion chamber, the housing and liner means extending from their upstream ends at the compressor discharge, to downstream end portions leading to the combustion chamber inlet means, said inlet means comprising a primary annular inlet for at least the major portion of the pressurized air, said primary inlet guiding the pressurized air tangentially of the minor axis of the toroidal combustion chamber, whereby the compressed air creates an annular vortex within said combustion chamber,
   - said combustor further comprising means for introducing fuel into said vortex and maintaining combustion thereof in an endless combustion path to thereby generate the high energy hot gas stream,
   - said housing extending through at least 360° relative to said minor toroid axis with the outer surface of the downstream end thereof being spaced inwardly from the inner surface of said combustor liner means, to define an annular combustion chamber discharge exit tangentially of the minor axis of the chamber, through which the hot gas stream passes with a substantial tangential component derived from the compressor, and
   - a turbine having a rotor driven by the hot gas stream discharged from the combustion chamber exit and coupled to the compressor rotor to drive the latter.

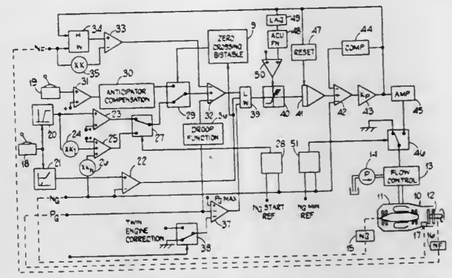
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**4,018,044**

## ELECTRONIC FUEL CONTROL FOR A GAS TURBINE ENGINE

**Michael John Joby, Solihull, and Paul Manwaring Maker, Loughton, both of England, assignors to Lucas Industries Limited, Birmingham, England**

**Filed July 7, 1975, Ser. No. 593,388**
**Claims priority, application United Kingdom, July 9, 1974, 30314/74**
**Int. Cl.² F02C 9/04**
**U.S. Cl. 60—39.16 R** **5 Claims**



1. An electronic fuel control for a gas turbine engine having a gas turbine gas generator and a separate power turbine driven by the gas generator, the control comprising means for generating a gas generator speed demand signal, a first difference amplifier for comparing said gas generator speed demand signal with a gas generator actual speed signal to produce a gas generator speed error signal, means for generating a power turbine speed demand signal, a second difference amplifier for comparing the power turbine speed demand signal with a power turbine actual speed signal to produce a power turbine speed error signal, an error signal selection circuit connected to said difference amplifiers and arranged to pass foward the lower of said error signals, an acceleration control connected to limit the magnitude of the selected error signal, an integrator for integrating the selected error signal, an output difference amplifier for comparing the output of the integrator with the gas generator actual speed signal to produce a fuel error signal and a fuel flow control device sensitive to said fuel error signal to vary the flow of fuel to the engine.

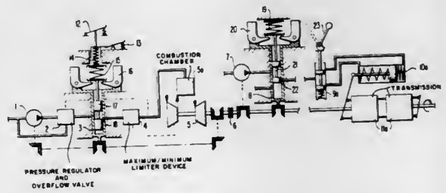
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**4,018,045**

## REGULATING DEVICE FOR A PRIME MOVER, MORE PARTICULARLY FOR A SINGLE-SPOOL GAS TURBINE

**Christian Greune, Furstenfeldbruck; Bruno Herrmann, Lambertheim, and Siegfried Steuer, Unterhaching, all of Germany, assignors to Motoren- und Turbinen-Union Munchen GmbH, Germany**

**Continuation of Ser. No. 265,478, June 23, 1972, abandoned. This application Nov. 14, 1974, Ser. No. 523,801**
**Claims priority, application Germany, June 25, 1971, 2331524**
**Int. Cl.² F02C 9/08**
**U.S. Cl. 60—39.28 R** **11 Claims**



1. System for regulating a prime mover for propelling a

vehicle in which the prime mover includes means providing fuel therefore and means providing a speed signal indicative of the speed of the prime mover, the regulating system comprising a first governor operatively connected with said speed means and directly responsive to the speed signal thereof for continuously controlling the flow of fuel to regulate the power input of the prime mover independently of other operating parameters of the prime mover over at least a predetermined range of the other operating parameters of the prime mover, and a second governor operatively connected with said speed means and directly responsive to the speed signal thereof for regulating the load of the prime mover, said first and second speed governors operating concurrently and independently of one another over the entire operating range of the prime mover.

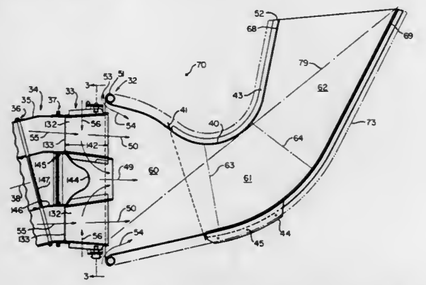
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**4,018,046**

## INFRARED RADIATION SUPPRESSOR FOR GAS TURBINE ENGINE

**John F. Hurley, Huntington, Conn., assignor to Avco Corporation, Stratford, Conn.**

**Filed July 17, 1975, Ser. No. 596,593**
**Int. Cl.² F02C 7/18, 7/24**
**U.S. Cl. 60—264** **29 Claims**



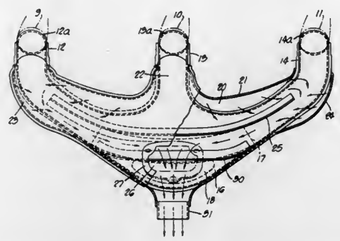
1. An apparatus for suppressing infrared radiation emitted from hot metal parts at the aft end of a gas turbine engine and from the exhaust gas plume thereof during engine operation comprising of dogleg duct and means supporting said duct adjacent said engine to receive its exhaust gases, said duct comprising, an inlet mixing section having a circular inlet arranged concentrically around said aft end with an annular space therebetween and having a substantially rectangular outlet, said annular space being adapted to receive cooling ambient air therethrough by ejector action during engine operation, said circular inlet and rectangular outlet having a smooth transition portion therebetween which provides efficient mixing of said ambient air with said exhaust gases, a curved acceleration section adjoining said inlet section, said acceleration section curving about an axis and having a substantially rectangular cross-sectional outline and a gradually decreasing cross-sectional area at each position therealong assuring acceleration and turning of fluid flowing therethrough in a nonturbulent manner, and a diffuser section adjoining said acceleration section and having a substantially rectangular outline at each position therealong, each of said rectangular outlines at each of said positions along said acceleration and diffuser sections having its longer dimension side arranged substantially parallel to said axis to thereby provide visual blockage of said hot metal parts.

**4,018,047**

## EXHAUST REACTION APPARATUS FOR INTERNAL COMBUSTION ENGINE HAVING IN-LINE CYLINDERS

**Kenji Kimura, Wako, and Takao Kajiware, Saitama, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Nov. 28, 1975, Ser. No. 635,929**
**Claims priority, application Japan, Dec. 3, 1974, 49-137719**
**Int. Cl.² F01N 3/10**
**U.S. Cl. 60—282** **3 Claims**



1. For use with an internal combustion engine which discharges exhaust gases from a plurality of in-line cylinders, the improvement comprising, in combination: a series of exhaust pipes each having an inlet end connected to receive exhaust gases from said cylinders, walls forming a first reaction chamber connected to receive exhaust gases from each of said exhaust pipes, walls forming a second reaction chamber surrounding and enclosing said first reaction chamber and surrounding and enclosing each of said exhaust pipes, means for discharging exhaust gases from the first reaction chamber into the second reaction chamber, and a deflector secured to the outside of the walls forming said first reaction chamber and secured to the inside of the walls forming the second reaction chamber, said deflector extending continuously from a position adjacent the inlet end of the exhaust pipe at one end of the series to a position adjacent the inlet end of another exhaust pipe at the other end of said series, said deflector extending along the exhaust pipes at both ends of said series, said deflector acting to cause exhaust gases in said second reaction chamber to divide and flow left and right and to pass over the major portion of the length of each of the exhaust pipes.

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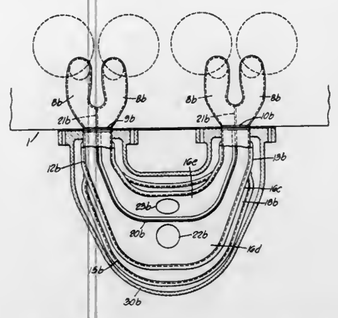
**4,018,048**

## EXHAUST REACTION CHAMBER ASSEMBLY FOR INTERNAL COMBUSTION ENGINE

**Saburo Matsuoka, and Kenji Kimura, both of Wako, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Dec. 9, 1975, Ser. No. 639,204**
**Claims priority, application Japan, Dec. 18, 1974, 49-144548**
**Int. Cl.² F01N 3/10**
**U.S. Cl. 60—282** **6 Claims**

1. In an exhaust reaction chamber assembly for use with an internal combustion engine having a plurality of exhaust ports of different exhaust timing, the improvement comprising, in combination: walls forming an upstream reaction chamber, exhaust branches each having an intake end for connection to one of said exhaust ports, respectively, and each communicating with said upstream reaction chamber, a downstream reaction chamber enclosing and surrounding said upstream reaction chamber and enclosing and surrounding a major portion of the length of each of said exhaust branches, a metal partition of high thermal conductivity dividing said upstream reaction chamber and at least one of said exhaust branches into two compartments sealed from each other, so that exhaust gas discharges occur alternately to said upstream chamber on opposite sides of said partition, and openings whereby exhaust



gases may pass from said compartments into said downstream reaction chamber.

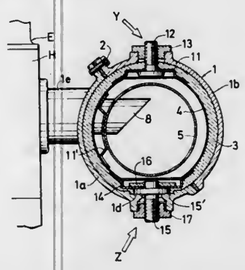
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**4,018,049**

## EXHAUST MANIFOLD REACTOR ASSEMBLY

**Masami Konishi, and Kazumasa Futamura, both of Toyota, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Japan**

**Filed Dec. 12, 1975, Ser. No. 640,185**
**Claims priority, application Japan, July 22, 1975, 50-88872**
**Int. Cl.² F01N 3/10**
**U.S. Cl. 60—282** **9 Claims**



1. An exhaust manifold reactor assembly for an internal combustion engine comprising a reactor casing having a generally hollow longitudinal cylindrical configuration, inlet means communicating said casing with an exhaust port of said internal combustion engine, outlet means communicating said casing with the exhaust pipe of said internal combustion engine exhaust system, a core having a generally cylindrical configuration inserted in said reactor casing generally concentrically therewith, insulating material between said casing and said core, first mounting means fixedly connecting said core to said casing in at least one location, and second mounting means connecting said core to said casing in another location, said second mounting means being configured to enable relative sliding movement between said core and said casing in directions longitudinally of said casing, said second mounting means between said reactor casing and said core comprising a bolt and a nut, said bolt being formed with two flange portions, a support member including a portion defining through said support member a slot through which said bolt extends, said portion of said support member defining said slot being interposed between said two flange portions of said bolt.

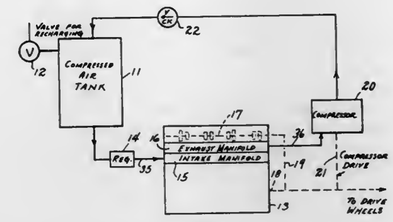


**4,018,050**

## COMPRESSED AIR-OPERATED MOTOR EMPLOYING DUAL LOBE CAMS

**John R. Murphy, Smithville, Miss., assignor to Coy F. Glenn, Sulligent, Ala., a part interest**

**Filed July 16, 1976, Ser. No. 705,940**
**Int. Cl.² F15B 11/06**
**U.S. Cl. 60—370** **10 Claims**



1. In an engine system for driving a vehicle, a compressed air storage tank, an engine provided with a plurality of cylinders containing pistons and a crankshaft having crank elements connected to said pistons, compressed air supply conduit means connecting said storage tank to the cylinders and including respective intake valves controlling admission of compressed air to the cylinders for generating power strokes, exhaust conduit means connected to the cylinders and including respective exhaust valves controlling discharge of expanded air from the cylinders, camshaft means drivingly coupled with the crankshaft, said camshaft means including a plurality of dual-lobed cams, and respective follower means engaging said cams and being operatively coupled to said intake and exhaust valves, said cams and follower means being arranged to open the intake valves shortly after the pistons pass their extended dead center positions in the cylinders to generate the power strokes, and to open the exhaust valves shortly before the pistons reach their retracted dead center positions in the cylinders at the ends of said power strokes.

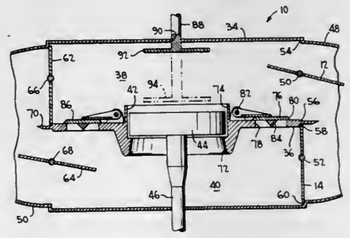
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**4,018,051**

## OMNIDIRECTIONAL AIR DRIVEN POWER GENERATING SYSTEM

**David Gay, c/o Mr. W. S. Lewis, 80, Church Lane, Sale, Cheshire M33 5QG, England**

**Continuation-in-part of Ser. No. 583,530, June 4, 1975, abandoned. This application Apr. 22, 1976, Ser. No. 679,508**
**Int. Cl.² F03D 3/04**
**U.S. Cl. 60—398** **14 Claims**



1. An omnidirectional air driven power generating system for emplacement in a structure which, when exposed to wind, causes the formation of higher than ambient atmospheric pressures in a space adjacent to one surface of the structure and lower than ambient atmospheric pressures in a space adjacent to another, generally opposed surface of the structure, the system comprising

a hollow housing having an internal partition mounted therein so as to divide the interior volume of the housing into two separated cavities, the partition having an orifice therethrough whereby air can move from one cavity to the other,

an air driven power converter mounted within and generally filling the orifice in the partition so that air moving through any portion of the orifice drives the converter,

means for connecting a different one of the two separated cavities to a different one of the spaces adjacent to the surfaces of the structure so that a pressure differential can be produced between the two cavities thereby producing a flow of air through the orifice to drive the power converter, and

means for switching the connections between cavities and spaces adjacent to the surfaces of the structure in response to a reversal of pressure polarity caused by a shift in wind direction so that the polarity of the pressure differential across the partition remains constant.

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**4,018,052**

## ACCUMULATOR TO STORE AND RELEASE BRAKING ENERGY

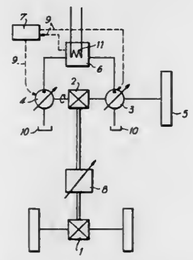
**Friedrich Laussermair, Fafnerstrasse 2, 8000 Munich 19, Germany**

**Filed Oct. 28, 1975, Ser. No. 626,203**

**Claims priority, application Germany, Oct. 26, 1974, 2451021**

**Int. Cl.² F16D *61/00***

**U.S. Cl. 60—414** **9 Claims**



1. In a vehicular transmission including a power plant for driving an output shaft through the intermediary of a flywheel, an improvement comprising a gear drive having two degrees of freedom connected to said shaft, said gear drive having a first output; a first device operable selectively as a generator or motor connected to said first output and to said flywheel; a second device selectively operable as a generator or motor; said gear drive having a second output connected to said second drive; and buffer means interconnecting said first and second devices for the transfer of energy therebetween.

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**4,018,053**

## METHOD AND APPARATUS FOR OPERATING AN INTERNAL COMBUSTION ENGINE WITH AN EXHAUST GAS TURBO-CHARGER AND A COMBUSTION CHAMBER

**Wolfgang Rudert, Langenargen; Robert Schulmeister, Friedrichshafen, both of Germany; Manfred Schlaupitz, Kongsberg, Norway, and Norbert Braetsch, Friedrichshafen, Germany, assignors to Motoren- und Turbinen-union Friedrichshafen GmbH, Germany**

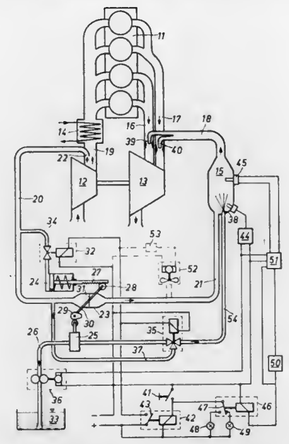
**Filed Aug. 1, 1975, Ser. No. 601,331**

**Claims priority, application Germany, Aug. 8, 1974, 2438162**

**Int. Cl.² F02B *33/44***

**U.S. Cl. 60—606** **33 Claims**

1. A method for operating an internal combustion engine, the engine includes an exhaust gas turbo-supercharger having an exhaust gas turbine, a combustion chamber means for supplying additional gas to the exhaust gas turbine of the supercharger, and an air line means for supplying supercharged air from the supercharger to the combustion chamber means, the method comprising the steps of operating the combustion chamber with a low fuel consumption at a partial output such that an increased starting supercharging air pressure favorable for a load acceptance behavior of the internal



combustion engine is established in the air line means during an idling of the internal combustion engine increasing the output of the combustion chamber during an acceleration of the internal combustion engine for a rapid increase of the supercharged air pressure in the air line means to obtain a substantially spontaneous load acceptance behavior of the internal combustion engine, and reducing the output of the combustion chamber during a further increase of the supercharged air pressure in the air line means.

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**4,018,054**

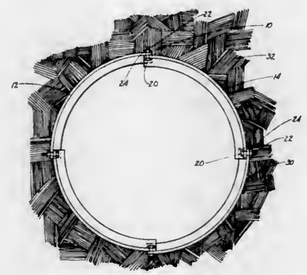
## YIELDABLE JOINT

**Robert S. Standley, Middletown, Ohio, assignor to Armco Steel Corporation, Middletown, Ohio**

**Filed Nov. 6, 1975, Ser. No. 629,275**

**Int. Cl.² E21D *11/22***

**U.S. Cl. 61—45 R** **6 Claims**



1. A yieldable joint between one pair in combination with a plurality of joined pairs of adjacent arcuate plates forming an arcuate structure surrounded by soil such that the adjacent lapped edges of the arcuate plates will shift relative to each other, comprising a pair of arcuate plates to be joined by lapping adjacent edges thereof, at least one pair of corresponding perforations in said lapped plate edges, and a bolt



passing radially through each of said pairs of corresponding perforations, at least one perforation of each pair of corresponding perforations comprising a keyhole elongated in the direction along the line of relative movement of said pair of plates, one end of each said keyhole being of such size as to freely receive the shank of said bolt and the remaining elongated portion thereof being of a width less than the diameter of the shank of said bolt, whereby said elongated perforations will permit relative movement of said plates only upon deformation and widening of said remaining elongated portions, the shape of said remaining elongated portions determining the force required for said relative movement of said plates, whereby said underground structure may be designed to carry a substantial and predetermined overfill before any controlled circumferential yielding occurs, and whereby said plates provide a practical slotted type bolted joint for field assembled structures because they may be readily positioned as desired in relation to each other.

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**4,018,055**

## STEEL CAISSONS

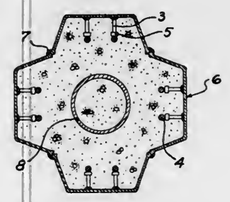
**Pierre Alphonse León Marie Ghislain Le Clercq, 22, Avenue des Ormeaux, Brussels, Belgium**

**Filed Oct. 29, 1974, Ser. No. 518,959**

**Claims priority, application Belgium, Oct. 26, 1973, 806547; Oct. 18, 1974, 149671**

**Int. Cl.² E04C *3/32*; E04B *1/16*; E02D *5/22***

**U.S. Cl. 61—53** **6 Claims**



1. A prefabricated hollow metal caisson for a building structure and to be placed below ground level and filled with concrete, comprising: at least two prefabricated longitudinal metal wall components each being secured to adjacent components along the longitudinal outer side edges thereof to form a prefabricated hollow caisson, each wall component being provided with a plurality of longitudinally spaced projecting connecting means arranged along each wall component and extending inwardly and perpendicularly from the inner surfaces of the hollow caisson, said projecting connecting means terminating short of the central area of the caisson for providing an open area for admission of concrete into the caisson, and a plurality of longitudinal reinforceing members secured to the inner ends of said projecting connecting means and spaced from the central open area of said caisson.

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**4,018,056**

## APPARATUS FOR FORMING CAST-IN-PLACE CASELESS CONCRETE PILES AND THE LIKE

**Luis Poma, San Salvador, El Salvador, assignor to Interpile USA, Inc., New Orleans, La.**

**Filed July 18, 1975, Ser. No. 597,089**

**Int. Cl.² E02B *5/66***

**U.S. Cl. 61—53.64** **3 Claims**

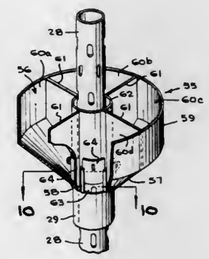
1. Apparatus for use with pile driving equipment for forming in the earth a cast-in-place caseless pile of fill material such as concrete or the like introduced in fluid condition into the vertically elongated pile-forming hole in the earth to set upon curing, comprising

a. a driving tip member adapted to be driven into the ground having a transversely enlarged portion of the cross section and configuration corresponding to that of the desired pile,

b. a vertically elongated driving mandrel for releasably engaging the driving tip member and for transmitting the driving force of the pile driving equipment to the driving tip member, the mandrel being smaller transversely than the diameter of said transversely enlarged portion and having a cross-sectional configuration that affords a large void area for gravity flow of the fill material downwardly throughout the pile-forming hole, and

c. movable fill hopper to be disposed in surrounding relation with the mandrel at the upper end of the pile-forming hole forming an upwardly opening receptacle portion having a bottom discharge opening sized to correspond substantially to the maximum cross-sectional area of the driving tip member and receive said mandrel therethrough and having downwardly sloping walls converging to locations closely adjacent the perimeter of said discharge opening for guiding the fill material in said hopper along downwardly converging paths to the discharge opening,

d. said fill hopper further including a rigid thin-wall tubular sealing skirt joined to and extending downwardly from



said walls adjacent the perimeter of the discharge opening in concentric relation to a vertical center axis through said discharge opening and mandrel and having a configuration corresponding to and slightly smaller than the transversely enlarged portion of the driving tip member to telescopically advance to the depth of the skirt under the weight of the hopper into the upper portion of the pile-forming hole as the hole is formed during initial penetration of the ground by the tip member to substantially form a seal with the walls of the hole against lateral flow of fill material along the ground surface, said fill hopper including a plurality of radial substantially planiform partitions lying in vertical radial planes relative to the axis of the mandrel and discharge opening joined along their radially inner edges to a cylindrical annular wall member joined to said downwardly sloping walls at the perimeter of said discharge opening to define a plurality of substantially like capacity subdivision compartments of said receptacle portion each adapted to receive a predetermined quantity of flowable fill material therein, and fill material discharge control means provided for each of said compartments movable between closed and open positions for permitting the pile-forming hole being formed by the driving mandrel and tip member.

**4,018,057**

## OFF SHORE STRUCTURES

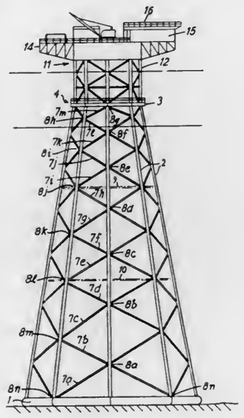
**Cevdet Erzen, The Hague, Netherlands; Robert Tillyer, Maidstone, and Norman Elliott Williams, Billingham, both of England, assignors to King-Wilkinson, Limited, London, England**

**Filed May 28, 1974, Ser. No. 473,930**

**Claims priority, application United Kingdom, June 1, 1973, 26347/73**

**Int. Cl.² E02B *17/00*; F02D *23/02***

**U.S. Cl. 61—88** **8 Claims**



1. A tower structure adapted to be supported on a bed beneath a body of water with the upper end of the tower structure above the surface of the water, said tower structure comprising a rigid top frame, an even number greater than four of straight tubular columns, an annular polygonal base support member for resting on said bed having the same number of sides as the number of said tubular columns, said columns sloping downwardly and outwardly from said top frame to said base member, said columns being secured at their lower ends to respective apexes of said base member and at their upper ends to said top frame and having a length predetermined to extend adjacent or above the surface of the water, and an even number of similar sets of coplanar tubular bracing members respectively interconnecting each pair of adjacent columns, the bracing members of each set being arranged in a zig-zag pattern without intersecting each other but with adjacent ends of adjacent bracing members of each set secured to the respective column of the pair at the same anchor point, with the axes of said bracing members substantially intersecting the axis of said respective column at each said anchor point, not more than two bracing members of each set meeting a column at any anchor point, one such bracing member being inclined above the horizontal and the other below the horizontal, the anchor points on each column for the two sets of bracing members connected to the column being in register.

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**4,018,058**

## METHOD OF RECOVERING NON-FERROUS METAL CONDUCTORS FROM A TELECOMMUNICATION CABLE LAID IN THE EARTH

**Heinrich Eichenseher, and Wolfgang Eichenseher, both of 721 Rottweil 1, Bohringer-Steige 3/1, Germany**

**Filed Jan. 14, 1976, Ser. No. 649,163**

**Claims priority, application Germany, Jan. 17, 1975, 2501656**

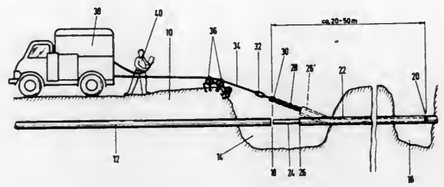
**Int. Cl.² F16L *1/00***

**U.S. Cl. 61—105** **6 Claims**

1. A method of recovering non-ferrous metal conductors from a sheathed cable laid in the ground comprising;

a. excavating the earth so as to expose a short length of the cable,

b. cutting through the cable at the excavation and at a location spaced from the excavation, to thereby provide a severed length of the cable,



c. stripping the sheath from the end of the severed length of the cable in the excavation to expose the conductors at the end of the severed length, and

d. withdrawing the cable conductor by pulling on the thus stripped end of the conductor of the severed cable.

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**4,018,059**

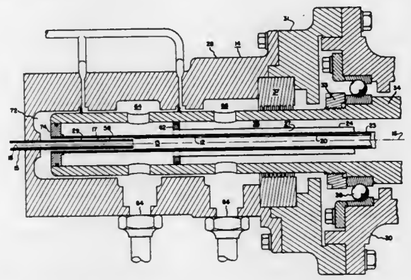
## CRYOGENIC FLUID TRANSFER JOINT EMPLOYING GASEOUS SEALS

**Burton D. Hatch, Ballston Lake, N.Y., assignor to General Electric Company, Schenectady, N.Y.**

**Filed Apr. 30, 1975, Ser. No. 573,170**

**Int. Cl.² F17C *7/02***

**U.S. Cl. 62—55** **9 Claims**



1. In cryogenic apparatus including a rotor wherein the interior portion thereof is bathed in liquefied coolant at cryogenic temperatures, a joint for supplying said liquefied coolant to a conduit within said rotor rotating in unison with said rotor, said joint comprising:

a hollow shaft coupled to said rotor so as to be rotatable therewith, said conduit extending from said rotor into the hollow interior of said shaft;

stationary bayonet means penetrating into the interior of said conduit and delivering said liquefied gas into the interior of said conduit;

an outer wall disposed concentrically about, and spaced apart from, said bayonet means so as to define a relative-motion gap therewith, said outer wall being rigidly coupled to said conduit and rotatable in unison therewith;

first means gaseously communicating with said relative-motion gap and facilitating flow of gasified coolant from the interior of said conduit completely through said gap in a direction opposite to flow of said liquefied coolant through said bayonet means to help cool said bayonet means; and

second means gaseously communicating with said relative-motion gap to regulate the flow of gasified coolant through said relative-motion gap.



**4,018,060**

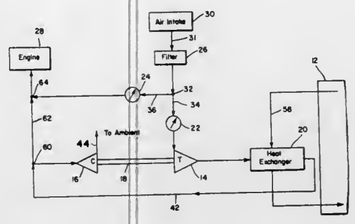
## AIR CONDITIONING SYSTEM FOR AIRCRAFT

**Robert C. Kinsell, Los Angeles; James C. Noe, Canoga Park, and Carl D. Campbell, Cerritos, all of Calif., assignors to The Garrett Corporation, Los Angeles, Calif.**

**Filed Aug. 29, 1975, Ser. No. 609,130**

**Int. Cl.² F25D *17/06***

**U.S. Cl. 62—91** **17 Claims**



1. In combination:

an enclosure to be cooled;

an engine having an air intake;

a source of air at substantially ambient pressure;

turbine means for receiving air from the source and lowering the temperature and pressure thereof;

heat exchanger means having a first flow path for receiving air from the turbine means to remove heat from the heat exchanger means;

compressor means driven by the turbine means for receiving air from the heat exchanger means, compressing the air and transmitting it to the engine air intake; and

means for circulating fluid from the enclosure through a second flow path of the heat exchanger means for giving up heat to the heat exchanger means.

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**4,018,061**

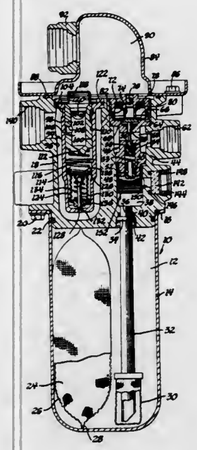
## MOISTURE INDICATOR

**Victor A. Williamitis, Kettering, Ohio, assignor to General Motors Corporation, Detroit, Mich.**

**Continuation-in-part of Ser. No. 527,610, Nov. 27, 1974, abandoned. This application May 24, 1976, Ser. No. 689,372**

**Int. Cl.² F25B *49/00***

**U.S. Cl. 62—125** **3 Claims**



1. A moisture indicator for detecting the relative degree of water mixed with refrigerant in a refrigeration system comprising:

an indicator base made from hygroscopic plastic material mounted within a housing of the refrigerant system in contact with the flow of refrigerant therethrough;

a paint applied to the surface of said indicator base made up of a solution of a hygroscopic plastic and a solvent and with finely divided particles of a cobalt salt therein whereby said paint is characterized by one color when in the absence of significant quantities of water and by a gradual color change to a second color with the presence of increasing quantities of water;

a reference band of colored material on said indicator base adjacent to said painted surface for visual comparison with the color of said painted surface.

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**4,018,062**

## DEVICES FOR CONNECTING TWO CO-AXIAL SHAFTS FOR ROTATION AND IN THE AXIAL DIRECTION

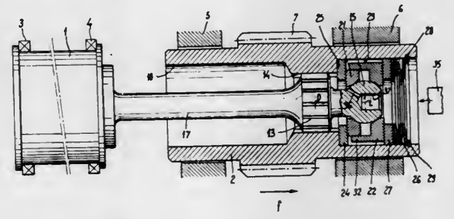
**Georges Léon Marcel Bulliot, Illzach, France, assignor to Societe Alsacienne de Constructions Mecaniques de Mulhouse, Mulhouse Cedex, France**

**Filed June 10, 1975, Ser. No. 585,565**

**Claims priority, application France, June 27, 1974, 74.22385**

**Int. Cl.² F16D *3/02***

**U.S. Cl. 64—7** **5 Claims**



1. A coupling joining two co-axial shafts for rotation and relative axial movement, comprising a male part integral with one of said shafts, a set of teeth for rotatably driving said male part, a female part on the other of said shafts, a conjugate set of teeth on said female part, said one part being engaged in said other part with a certain amount of radial play which allows the axis of the set of teeth of the male part to pivot slightly with respect to the axis of the set of teeth of the female part, and means for axial interconnection of the two shafts, said means comprising a ball carried by the end of said one shaft adjacent said male part, two cups axially connected to said other shaft, said cups having conjugate surfaces between which said ball is closely held, means mounting said cups so that said cups are slightly displaceable in the radial direction relative to said other shaft, the two sets of teeth having profiles which permit the axes of the two shafts to pivot slightly relative to one another about a point which is at the center of the sets of teeth and which also allows the two shafts to transmit torque under the right conditions.

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**4,018,063**

## APPARATUS AND METHOD FOR PRODUCING MESHWARE

**Alfred Buck, 7401 Hailfingen, Germany**

**Filed Feb. 24, 1975, Ser. No. 552,263**

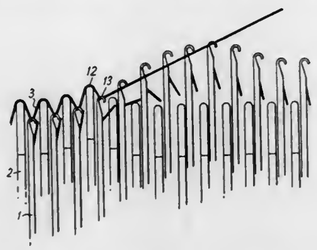
**Claims priority, application Germany, Feb. 25, 1974, 2408924**

**Int. Cl.² D04B *35/00***

**U.S. Cl. 66—90** **10 Claims**

1. An apparatus for producing meshware comprising a needle cylinder, a plurality of needles in said cylinder movable longitudinally therein in a first direction between a first position in which they accept yarn and a second position in which a stitch is formed, a plurality of sinkers positioned between

said needles and movable longitudinally and parallel to said needles and cam means including a first cam surface defining a first smooth curve adapted for smoothly moving said needles between said first and second positions and a second cam surface defining second smooth curve adapted for moving said sinkers in a second direction from a rest position into a loop



forming position and thereafter moving said sinkers in said first direction into a stitch forming position in which a stitch is formed with the said movements of said sinkers in said second and first directions from said rest position through said loop forming position to said stitch forming positon taking place during movement of said needles from said first position to said second position.

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**4,018,064**

## ELECTRONIC CONTROL OF KNITTING MACHINES

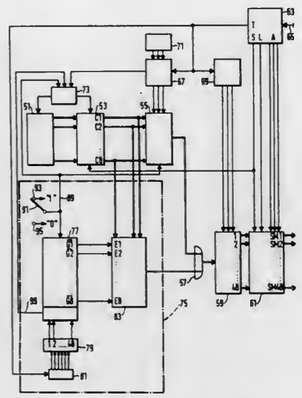
**Peter Raymond Doslik, Stuttgart, Germany, assignor to Sulzer Morat GmbH, Bonlanden, Germany**

**Filed Oct. 18, 1974, Ser. No. 516,078**

**Claims priority, application Germany, Oct. 24, 1973, 2353252**

**Int. Cl.² D04B** *15/66*

**U.S. Cl. 66—154 A** **8 Claims**



1. Apparatus for the electronic control of a knitting machine having knitting systems for knitting a fabric, said apparatus comprising: a storage device including an information store, in which the information of a knitting pattern can be stored in block form with every information block containing all the information for one knitted course of said fabric, and including means for producing color lines for deriving color lines from every information block, each color line containing all the information relating to a particular color or property of one of said courses; and further comprising a plurality of storage units, a distributor means for feeding the color lines derived by said color lines produced means to said plurality of storage units, the storage units being positively associated with said knitting systems and said distributor means including a programming means for feeding the color lines derived from each information block to any pre-selected number of the plurality of storage units and for feeding each color line derived from an information block to any pre-selected storage unit of said number of storage units.

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**4,018,065**

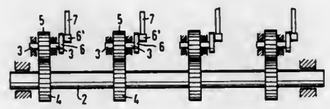
## DRIVING APPARATUS FOR THE KNITTING IMPLEMENT BARS OF WARP KNITTING MACHINES

**Gunnar Liebrandt, Pltschhausenweg 1a, Naila (8674); Adolf Hägel, Hauptstrasse 68, Bobengrun (8671), and Gerhard Gallwitz, Neulandstrasse 8, Naila (8674), all of Germany**

**Filed Feb. 19, 1976, Ser. No. 659,354**

**Int. Cl.² D04B** *23/00*

**U.S. Cl. 66—208** **2 Claims**



1. Driving apparatus for the knitting implement bars of warp knitting machines, comprising a main shaft, a plurality of individual axles each with a separate bearing arrangement and independent driving connection with said main shaft, each of said axles being provided with at least one eccentric means for generating the desired motions of said bars, and a plurality of linkages each acting on a knitting implement bar and being driven independently from the others by an associated eccentric means.

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**4,018,066**

## MACHINE FOR PRINTING PILE FABRICS

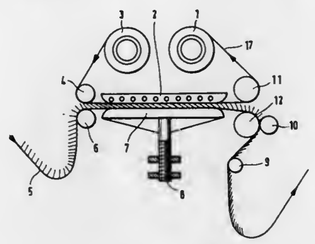
**Peter Fennekels, Kempen-Huls, and Herbert Schütze, Grefrath, both of Germany, assignors to Girmes-Werke A.G., Grefrath, Germany**

**Filed Apr. 26, 1974, Ser. No. 464,464**

**Claims priority, application Germany, Apr. 28, 1973, 2321592**

**Int. Cl.² D06P** *7/00;* **D06B** *1/10*

**U.S. Cl. 68—5 D** **4 Claims**



1. A machine for printing pile fabrics containing thermoplastic fibres, comprising

a. means conveying said pile fabric through a printing zone,

b. a thermoprinting web containing sublimable dyes, and means for winding and guiding said web into contact with the pile of said pile fabric and the web away from said pile fabric after heating thereof,

c. flat heating means, the lower surface of which engages said thermoprinting web for heating the thermoplastic fibres of the pile to a temperature at which they begin to undergo plastic deformation,

d. guide means for supporting said pile fabric, said guide means being positioned below and spaced from said heating means,

e. means for vertically adjusting said guide means toward or away from said heating means to adjustably compress the pile fabric between said guide means and said heating means to effect sublimation of the dyes into the heating thermoplastic fibres, and

f. an embossing roller positioned beyond the printing area for embossing the printed pile fabric, and means for synchronizing the movement of said thermoprinting web and said embossing roller to permit coordination between the printed color and the embossed pattern on the pile fabric.



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**4,018,067**

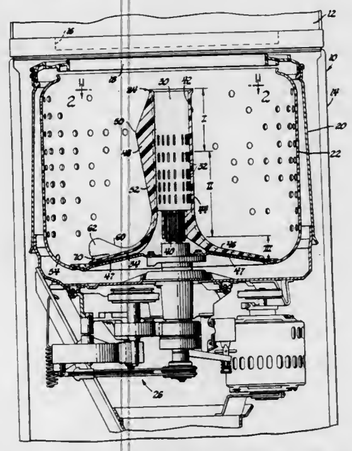
## OSCILLATING WASHER AGITATOR

**Nick Vona, Jr., Springboro, and Kenneth O. Sisson, Dayton, both of Ohio, assignors to General Motors Corporation, Detroit, Mich.**

**Filed May 26, 1976, Ser. No. 690,190**

**Int. Cl.² D06F** *13/02*

**U.S. Cl. 68—134** **3 Claims**



1. An agitator adapted to effect cleaning of fabrics in a washing machine having a liquid and fabric receiving tub and a drive mechanism adapted to impart to said agitator pivotal oscillation about a vertical axis, said agitator comprising:

a. a center column flaring at the bottom thereof into a skirt having means adapted for mounting the agitator generally vertically in the tub and for connecting the agitator to the drive mechanism, said center column including an upper level portion, a middle level action portion and a lower level action portion,

b. a plurality of generally vertical fins integral with said center column, each of said fins projecting radially from said center column in each of said action portions,

c. each of said fins configured as a flat obtuse triangle in the upper and middle level action portions to pull dry fabrics downwardly into liquid in the tub whie channelizing them loosely suspended in a toroidal turnover between vertical planes formed by adjacent fins,

d. each of said fins configured in the lower level action portion as a radial vane gradually increasing in height in the radially outer direction to form a rounded terminus projecting vertically upwardly from said skirt for imparting energy to the liquid to move the fabric being washed radially outwardly along said skirt and upwardly along a wall of the tub, thereby to maintain the toroidal turnover, the rounded terminus of said vane being flexible with respect to said center column by being rooted to said skirt by a web at the radially outer end thereof which is thinner than said rounded terminus.

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**4,018,068**

## APPARATUS HAVING OSCILLATING PERMEABLE WALLS FOR FABRIC TREATMENT

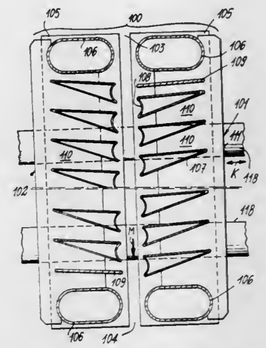
**Attilio Bertoldi, Via Luzzago 27, Manerbio (Brescia), Italy**

**Filed Sept. 3, 1975, Ser. No. 609,922**

**Claims priority, application Italy, Sept. 12, 1974, 27218/74; June 10, 1975, 24180/75**

**Int. Cl.² D06B** *3/20*

**U.S. Cl. 68—175** **8 Claims**



1. In an apparatus for treating fabrics, at least one pair of channel walls defining between themselves a channel adapted to be filled with liquid and adapted to have a fabric which is to be treated spread out and extending through said channel, each of said channel walls comprising a series of sections and shoulders interconnecting said sections, and each of said sections including at least a pair of section walls intersecting distant from said channel to form an apex facing away from said channel, and said section walls of each section diverging with respect to each other from said apex toward said channel to form a substantially V-shaped structure, said sections being spaced from each other along each channel wall and forming pairs of adjoining sections with each pair of adjoining sections respectively having a pair of adjoining section walls which converge toward each other from the apexes of each pair of adjoining sections toward said channel to define between each pair of adjoining sections a liquid passage the section of which decreases from said apexes toward said channel, whereby said channel walls are permeable to liquid capable of travelling through said liquid passages toward said channel, and means connected to said channel walls for transversely oscillating said channel walls in the general direction of said liquid passages to provide a high speed for liquid travelling through said liquid passages toward said channel, and said sections of each channel wall being inclined with respect to said channel for providing from the liquid issuing from between each pair of adjoining sections into said channel a component of movement tending to advance the fabric in the channel in a given direction.

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**4,018,069**

## KEY-ACTUATED BARREL-TYPE LOCKS

**Paul Lipschutz, Croissy, France, assignor to Neiman, S.A., Courbevoie, France**

**Filed Mar. 25, 1976, Ser. No. 670,313**

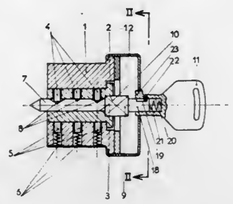
**Claims priority, application France, May 5, 1975, 75.13894**

**Int. Cl.² E05B** *19/00*

**U.S. Cl. 70—395** **6 Claims**

1. In combination, a lock having a body and a rotary barrel and a key comprising a manipulating head and an operating stem for insertion into, and cooperation with, said barrel, means mounting said head to be axially shiftable relative to said stem between a first and a second position, abutment means on said head and means on said lock defining two angularly spaced abutment surfaces cooperating with said

abutment means, said abutment surfaces being axially disposed to be engageable by said abutment means in said first position to permit rotation of said head in said first position



between said surfaces and to preclude rotation beyond said surfaces and, in said second position, to be disengaged from said surfaces to permit rotation of said head beyond at least one of said surfaces.

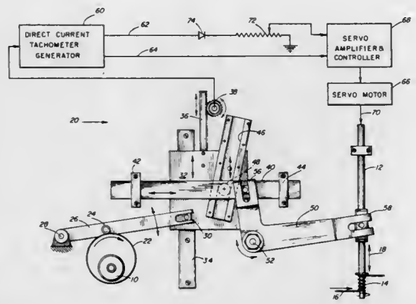
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**4,018,070**

## ELECTRO-MECHANICAL DRIVE FOR TORSION WINDERS AND THE LIKE

**George Joseph Yagusic, Litchfield, and Bernard Pierre Lampietti, Goshen, both of Conn., assignors to Torin Corporation, Torrington, Conn.**

**Filed Sept. 30, 1975, Ser. No. 618,169**
**Int. Cl.² B21F** *3/04*
**U.S. Cl. 72—19** **21 Claims**



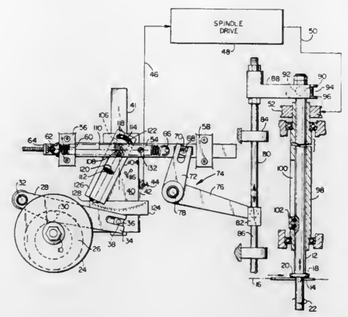

1. The combination in a torsion winder comprising mechanically independent master and slave rotary elements, said elements comprising respectively a cam shaft and a spring winding spindle, signal generator and transducer means connected with said master rotary element and operable to provide an electrical output signal in the form of a variable voltage having a cyclically repetitive waveform with sloped leading and trailing wave edges, and a servo motor and controller connected with and operated by said signal generator and transducer means, said servo motor and controller comprising a precisely regulated high response DC motor and associated power supply and control amplifier, said motor having a response characteristic at least equal to the slope of said leading and trailing wave edges and being capable of high positive and negative accelerations on the order of one thousand RPM per 50 milliseconds, and said servo motor and controller also being connected in driving relationship with said slave rotary element and operable to rotate the latter at an angular velocity variable within approximately 1% of said electrical output signal.

**4,018,071**

## SPRING WINDING MACHINE WITH IMPROVED PITCH MECHANISM

**Bernard Pierre Lampietti, Goshen, Conn., assignor to Torin Corporation, Torrington, Conn.**

**Filed Oct. 9, 1975, Ser. No. 621,209**
**Int. Cl.² B21F** *3/04*
**U.S. Cl. 72—23** **25 Claims**




1. In a spring winding machine or the like, the combination comprising a rotary cam shaft, a cam mounted thereon and rotatable therewith, cam follower means operatively associated with the cam and moved in one and an opposite direction by the cam during each cam rotation, a first motion transmitting means connected with and driven by said follower means and having an output movement in one and an opposite direction, a spring winding spindle mounted both for rotation for winding springs and for axial movement for pitching the same, electrical spindle drive means connected with and receiving said output movement from said first motion transmitting means and operable to rotate said spindle in one and an opposite direction in response thereto, said electrical means including a first manual adjustment means for preselecting the number of spindle turns for each rotation of said cam shaft, a second motion transmitting means including a slide connected between said first motion transmitting means and said spindle and operable to effect axial spindle movement in one and an opposite direction in response to said output movement of said first motion transmitting means, and a second manual adjustment means including a guideway mounted on said first motion transmitting means and angularly adjustable about a point on a centerline of movement of said slide and a follower on said slide, said second adjustment means preselecting the extent of spindle axial or pitch movement during each cam rotation and being operable to maintain a constant axial starting position of said spindle irrespective of the extent of axial spindle movement.

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**4,018,072**

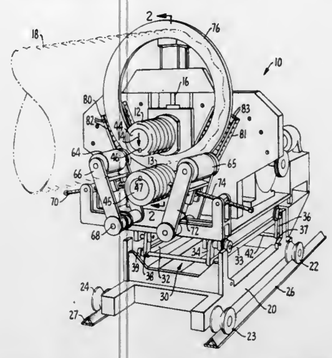
## END RECORRUGATOR

**Paul K. Davis, Alameda, Calif., assignor to Pacific Roller Die Co., Inc., Hayward, Calif.**

**Filed Oct. 22, 1975, Ser. No. 624,675**
**Int. Cl.² B21D** *19/04*
**U.S. Cl. 72—106** **13 Claims**

1. In a machine for recorrugating a portion of a helically corrugated pipe which comprises a juxtaposed pair of recorrugating rollers between which one end of the pipe to be recorrugated is inserted and the portion thereof to be recorrugated engaged, a pair of rotatable shafts to which the recorrugating rollers are mounted, and means for driving the rollers to recorrugate said portion of the pipe, the improvement comprising a rotatable annular thrust ring having a marginal portion passing between the shafts so that at least a portion of said one end of the pipe is abutted against said thrust ring, and means for mounting said thrust ring to prevent axial movement of the ring and thereby prevent axial movement of the pipe as the pipe is recorrugated, said mounting means including means for allowing rotation of the thrust ring corresponding to the rotation of the pipe as the pipe is being recorrugated to minimize the damage to said one end of the pipe during said recorrugating.





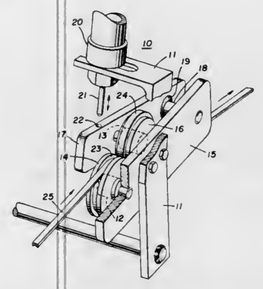
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**4,018,073**

## APPARATUS FOR SHAPING WIRE AND RIBBON STRUCTURES OBTAINED BY SLITTING METALLIC COIL STOCK

**Ronald D. Bartram, Raleigh, N.C., and Charles J. Runkle, Guntersville, Ala., assignors to Monsanto Company, St. Louis, Mo.**

**Filed May 3, 1976, Ser. No. 682,412**
**Int. Cl.² B21B** *27/00, 15/00*
**U.S. Cl. 72—199** **4 Claims**



1. In an apparatus for eliminating the burr on a slit metal wire or ribbon product by means of a pair of engaged rolls wherein a first roll has a continuous annular groove having a curved bottom portion and a second roll has a continuous annular land adapted to engage said groove so as to force the burr of said slit product into contact with the curved bottom portion of said groove, the improvement which comprises: a first stationary support member upon which said first roll is rotatably mounted and a second movable support member having said second roll rotatably mounted thereon, said support members being spaced apart a predetermined distance with said first and second rolls being positioned therebetween in an engaging relationship; means for permitting movement of said second support member, said means consisting of a shaft that connects said support members together and a journaled bearing member disposed in said second movable support member, wherein one end of said shaft is fixedly attached to said first stationary support member and the opposing end of said shaft is positioned within said journaled bearing member to permit pivotal movement of said second support member; and means for applying a constant downward force on said second movable support member to control the engagement of said second roll with said first roll.

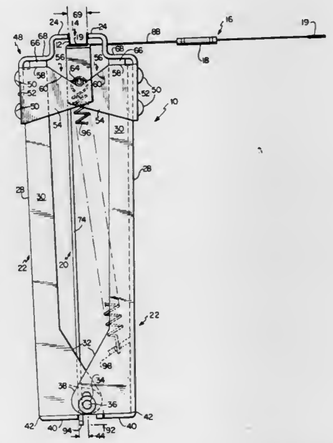
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**4,018,074**

## BELTED AXIAL LEAD ELECTRONIC COMPONENT SPLICING CLIP CRIMPING TOOL

**Michael D. Snyder, Chenango Bridge, N.Y., assignor to Universal Instruments Corporation, Binghamton, N.Y.**

**Filed Mar. 8, 1976, Ser. No. 665,086**
**Int. Cl.² B21D** *7/06*
**U.S. Cl. 72—410** **5 Claims**



1. Apparatus for bending and crimping a splicing clip having a base with linear spacing of opposed upstanding bendable clasps attached to both sides thereof, which interconnects discontinuous belts of axial lead electronic components comprised of:

a pair of rows of opposed movable hammers, said opposed pairs of hammers being spaced apart allowing passage therebetween of said clip,

an anvil surface between said rows of hammers to support said clip, said anvil surface being positioned apart from and substantially paralleling said rows of hammers to receive and position said clip passed between said rows of hammers, each of said hammers being aligned with one of said clasps,

a support holding said anvil surface in a predetermined position relative to said hammers for each position of said movable hammers,

said opposed rows of movable hammers being individually and rigidly attached to a pair of opposed extended handles, said handles being pivotally connected at their ends remote from said hammers, whereby compressing said handles together moves said opposed pairs of hammers closer together translating over said anvil surface until hammer travel terminates with said hammers adjacent said anvil surface.

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**4,018,075**

## PLASTIC WORKING DIES FOR CYLINDRICAL PARTS

**Hiroyuki Kawawa; Yasushi Ohuchi, and Hisanobu Kanamaru, all of Katsuta, Japan, assignors to Hitachi, Ltd., Japan**

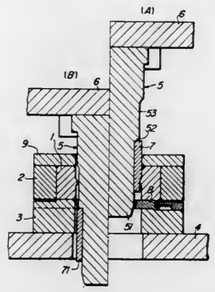
**Filed Apr. 30, 1976, Ser. No. 682,044**
**Claims priority, application Japan, May 12, 1975, 50-54550**
**Int. Cl.² B21C** *3/00*
**U.S. Cl. 72—467** **1 Claim**

1. A plastic working die with a hollow portion having an ironing portion thereof, said ironing portion being inwardly

disposed and provided at the front thereof with a die angle portion and at the back thereof with a relief surface, and used for plastic working on cylindrical parts at an ironing rate of less than 50%, characterized in that:

the die angle portion has a die angle $\theta$ between 70° and 20°;

the ironing portion has a radius $r$ between 0.7 and 2.0 mm;



the relief surface has a relief S between 0.2 and 0.5 mm; and a curved surface connecting the ironing portion and the relief surface, the curved surface having a radius of curvature R between 10 and 15 mm with its center being on the hollow side of the die.

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**4,018,076**

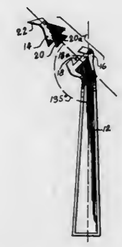
**FIN COMB WITH INTERCHANGEABLE HEADS**

**Stuart J. Wagner, 19930 NE. 22nd Court, North Miami Beach, Fla. 33180**

**Filed June 11, 1976, Ser. No. 694,923**

**Int. Cl.² B21D *1/06, 37/04***

**U.S. Cl. 72—481** **4 Claims**



1. A fin straightening and cleaning comb, comprising:

a. a handle and a plurality of heads interchangeably mountable on said handle,

b. each said head having a plurality of comb teeth formed thereon in spaced relationship,

c. the comb teeth being angled relative to the head to define a generally hook-shaped comb oriented in one direction relative to the handle for a pull-stroke fin straightening or cleaning operation,

d. the head being reversible on the handle to orient the hook-shaped comb in the opposite direction relative to the handle for a push-stroke fin straightening or cleaning operation,

e. the thickness and spacing of the comb teeth on each said head differing from the thickness and spacing of the comb teeth on each of the other heads to complement the thickness and spacing of the fins which are to be straightened or cleaned,

f. each said head and said handle being adapted to be joined by a dovetail-shaped mortise and tenon joint,

g. the base wall of the mortise and the base wall of the tenon being disposed at an angle of approximately 45° to the longitudinal axis of the handle,

h. whereby the heads are disposed at an angle of approximately 135° to said longitudinal axis,

i. said comb teeth having base walls between them which are normally held parallel to the fins to which the comb is being applied,

j. said base walls between the comb teeth being parallel to the base walls of the mortise and tenon joint, and

k. said comb teeth being angled relative to the base walls between them and to the base walls of the mortise and tenon joint to form a hook-shaped configuration relative to the longitudinal axis of the handle.

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**4,018,077**

**APPARATUS FOR PROVIDING A CONTROLLED CONCENTRATION OF A SUBSTANCE IN A FLOW OF LIQUID**

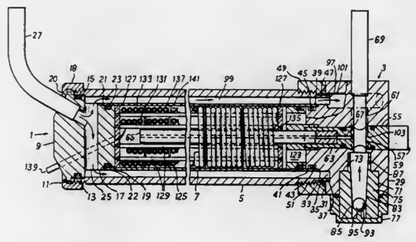
**Robert J. Leach, Luton, England, assignor to George Kent Limited, Luton, England**

**Filed Nov. 21, 1975, Ser. No. 634,282**

**Claims priority, application United Kingdom, Nov. 22, 1974, 50789/74**

**Int. Cl.² G01N *27/00*; B01F *1/00***

**U.S. Cl. 73—1 R** **16 Claims**



1. Apparatus for providing a controlled concentration of a soluble gas in a flow of liquid, comprising a liquid flow path having first and second parallel connected sections, means for forming a saturated solution of the gas in the liquid flowing along the second section, and means for ensuring that the fraction of the total flow which passes along the second section is substantially independent of the magnitude of the total flow, the concentration of the gas in the liquid flow whereby being controlled at a location downstream in the flow path from the first and second sections thereof by virtue of the contribution to the flow in the first section of flow from the second section of the flow path.

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**4,018,078**

**CALIBRATION SYSTEM FOR MAGNETIC SWITCHES USED IN WRIST INSTRUMENTS**

**Terry M. Haber, 3197 Airport Loop Drive B, Costa Mesa, Calif. 92626**

**Filed Apr. 26, 1976, Ser. No. 680,154**

**Int. Cl.² G01P *21/00***

**U.S. Cl. 73—1 D** **4 Claims**

1. An apparatus for calibrating a magnetic switch including a body having an end bore for receiving a magnet in the upper portion thereof wherein said magnet normally holds a conducting member in spaced relationship, along an axis of said body coaxial with said bore, from switch contacts in said body adjacent to its opposite end such that a sudden acceleration and/or deceleration movement of said body in the direction of said axis frees the member from said magnet so that it will move in the direction of said axis and momentarily bridge said switch contacts, said apparatus including, in combination:

a. a housing having an upper vertical opening for receiving and holding said body in a fixed position with its said axis vertically oriented and its end bore and magnet exposed at the top of said housing and with said conducting member held in bridging engagement with said switch contacts by gravity;

b. a signalling device;

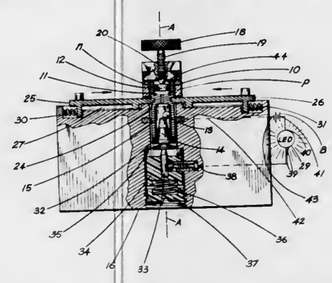
c. a source of electrical energy for said signalling device;

d. circuit means in said housing connecting said source of energy to said signalling device through said switch contacts in series so that said signalling device is continuously energized so long as said conducting member is bridging said switch contacts; and

e. a threaded bore receiving a threaded shaft coaxially positioned over said end bore so that said shaft is positioned to engage the upper end of said magnet and upon rotation, gradually force said magnet downwardly relative to said body and housing along said bore towards said conducting member until a point in travel of said magnet along said bore is reached at which the attraction of said magnet lifts said conducting member from said switch contacts, said point of travel being indicated by de-energization of said signalling device

whereby said magnet is then known to be properly positioned in said body for proper operation of said magnetic switch and can then be secured and sealed in said end bore of said body at said point of travel.





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**4,018,079**

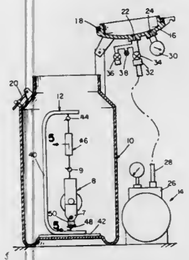
**METHOD AND APPARATUS FOR TESTING HYDRAULIC RELEASES**

**George E. Landrigan, Lynnfield, Mass., assignor to Landrigan Corporation, Boston, Mass.**

**Filed June 16, 1975, Ser. No. 586,988**

**Int. Cl.² G01L *27/00*; G01M *3/02***

**U.S. Cl. 73—4 R** **1 Claim**



1. A method of testing a marine Hydraulic Release of the type used to secure life rafts and the like to ships comprising placing the Hydraulic Release on a test stand and applying tension to it to approximate service conditions, enclosing the thus tensioned Hydraulic Release in a superatmospheric pressure vessel, applying compressed air to the interior of the closed vessel in a manner to subject the Hydraulic Release directly to air under superatmospheric pressure, gradually increasing superatmospheric air pressure simulating corresponding hydraulic pressure related to submergence of the device below the surface of the sea while monitoring an air pressure gauge sensitive to the superatmospheric pressure within the vessel, detecting the instant of release of the Hydraulic Release in response to the directly contacting superatmospheric air pressure and noting the reading of said air pressure gauge at the time of such release, only those Hydraulic Releases which release in a predetermined superatmospheric air pressure range being accepted.

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**4,018,080**

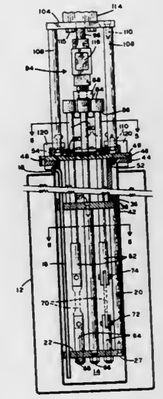
**DEVICE FOR TENSIONING TEST SPECIMENS WITHIN AN HERMETICALLY SEALED CHAMBER**

**James C. Fletcher, Administrator of the National Aeronautics & Space Administration, with respect to an invention of; Page K. Evans, Athens, and Dan L. Shady, Huntsville, both of Ala.**

**Filed Feb. 13, 1976, Ser. No. 657,995**

**Int. Cl.² G01N *3/18***

**U.S. Cl. 73—15.6** **1 Claim**



1. In combination with a dewar, a device for tensioning test specimens disposed within a bath of cryogenic fluid confined within a chamber comprising:

A. a support column adapted to be received within said chamber comprising a pair of plates including a bottom plate and a top plate and a plurality of compression members for supporting the plates in a mutually spaced relationship, each plate of said pair being of a disk-shaped configuration and characterized by an array of bores formed therein in coaxial alignment with the bores of the other plate of the pair;

B. a plurality of anchor pins fixed within the array of bores characterizing the bottom plate, each pin of said plurality being adapted to receive a test specimen in an interconnected relationship therewith for thereby securing a plurality of test specimens to said support column;

C. a plurality of axially displaceable pull rods extended into said chamber, each of said plurality being projected through a bore formed in the top plate of said support column and adapted to be connected at one end thereof to a test specimen rigidly secured to said support column, and characterized by a head formed at the opposite end thereof adapted to be received by a female connector;

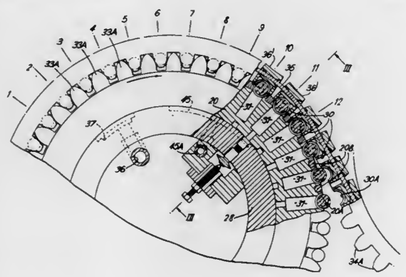
D. a cover plate seated on said dewar for sealing the chamber and characterized by an array of bores through which sid plurality of pull rods are extended in an hermetically sealed relationship therewith;

E. a spacer of a cylindrical configuration interposed between said cover plate and said support column and connected thereto for securing said support column in place within said chamber;

F. an actuator support releasably mounted on said cover plate comprising a base plate and a top plate interconnected through a plurality of vertically oriented compression members;
G. an actuator including an axially retractable, vertically oriented shaft mounted on said actuator support;
H. a connecting link including a female coupling adapted to receive a head of a pull rod in a coupled relationship therewith; and
I. a load cell connected to said link between said shaft and said pull rod for measuring tensile stress induced in the link.

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**4,018,081**
**TESTING OF CIGARETTES**
**John Loxham, Bletchley, England, assignor to Molins Limited, England**
**Filed Nov. 10, 1975, Ser. No. 630,403**
**Claims priority, application United Kingdom, Nov. 12, 1974, 48841/74**
**Int. Cl.² G01M** *3/26*
**U.S. Cl. 73—41** **20 Claims**

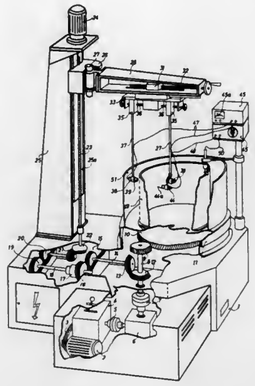


1. A device for testing the wrappers of cigarettes for leaks, comprising a conveyor arranged to carry the cigarettes successively through a test region, means defining in the test region a plurality of similar test chambers partly bounded by the respective cigarette wrappers, a source of pressure which communicates with each test chamber in turn at a first station in the test region to produce a predetermined initial pressure in each test chamber, and a pressure detector arranged to detect the pressure left in each test chamber in turn at a second station in the test region downstream of the first station.

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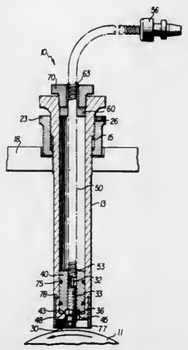
**4,018,082**
**DEVICE FOR NONDESTRUCTIVE ULTRASONIC TESTING OF CYLINDRICAL PARTS**
**Victor Manoliu; Andrei Lutescu; Gheorghe Ionescu; Silviu Heretolu; Victor Frangopol, and Lucuta Petru, all of Bucharest, Romania, assignors to Institutul Pentru Creatie Stintifica si Tehnica-Increst, Bucharest, Romania**
**Filed Sept. 30, 1975, Ser. No. 618,205**
**Claims priority, application Romania, Dec. 30, 1974, 80986**
**Int. Cl.² G01N** *29/04*
**U.S. Cl. 73—67.5 R** **5 Claims**

1. A device for the nondestructive testing with ultrasonics of cylindrical parts, comprising:
a turntable provided with a basin adapted to receive a cylindrical part to be tested and provided with a gear;
a pinion meshing with said gear;
drive means for rotating said pinion;
a vertically disposed leadscrew;
a pair of change gears operatively connecting said leadscrew with said drive means;
a horizontal arm vertically displaced by said leadscrew and overhanging said part;
a pair of piezoelectric transducers carried by said arm for scanning said part;
an arcograph carried by said arm and having a trace element energizable to mark a fault directly on the part scanned by said transducers; and
a fault detector connected to said piezoelectric transducers and operatively connected to said arcograph for energizing said trace element upon detection of a fault by said transducers, said transducers sweeping along the surfaces of said part a generally helical path of a pitch determined by the relative rates of rotation of said turntable and said leadscrew.



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**4,018,083**
**VIBRATION DETECTION PROBE HOLDER**
**Herbert N. Hoffman, Lunenburg, Mass., assignor to General Electric Company, Schenectady, N.Y.**
**Filed Aug. 22, 1975, Ser. No. 606,838**
**Int. Cl.² G01H** *11/00*
**U.S. Cl. 73—70** **4 Claims**

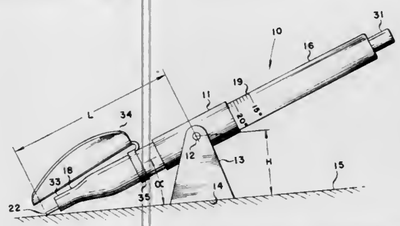


1. In combination with a large rotating shaft machine, a probe for measuring vibrations occurring in said rotating shaft and said probe being a non-contact vibration detection probe which is maintained out of contact with the rotating shaft, said combination further comprising:
a probe housing which is supported by said machine having an end portion which is located a first proximate distance from said shaft; said probe housing being disposed substantially radial with respect to said shaft;
a bore formed within said probe housing receiving said probe;
stop means formed within said probe housing for limiting the travel of said probe through said probe housing in the radial direction toward said shaft, said probe having an end portion which is located a second more proximate distance from said shaft but out of contact therewith, said probe housing permanently locating said probe with respect to said shaft whereby said probe may be removed and replaced into said housing so as to always be identically repositioned with respect to said shaft; and,
a splash shield defined by a cylindrical member depending radially inward from the end portion of said probe holder and concentric about the radially inward end of said probe.



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**4,018,084**
**ACOUSTIC EMISSIONS SIMULATOR**
**Nelson N. Hsu, Lexington, Ky., assignor to Lockheed Aircraft Corporation, Burbank, Calif.**
**Filed May 13, 1976, Ser. No. 686,071**
**Int. Cl.² G01N** *29/00*
**U.S. Cl. 73—71.5 R** **7 Claims**

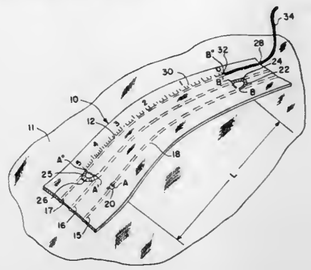


1. An instrument adapted to generate a stress pulse on a localized area of a metal specimen simulating the acoustic emission which emanates from an actual crack in said specimen comprising:
an outer cylindrical tube tapered at its forward end;
a core mounted for limited sliding movement in said tube;
a gripping element carried by said core at its forward end adjacent said tapered tube end and adapted to secure a frangible element when said core moves toward said tapered tube end and to release said frangible element when said core moves toward the aft end of said tube, whereby said frangible element is moved a predetermined distance toward and extended a predetermined distance beyond said tapered tube end; and
an angularly adjustable support carried by said tube for abutment against said specimen to dispose said frangible element when extended as aforesaid at a preselected angle relative to the surface of said specimen whereby a force applied thereon moves the frangible element against said specimen until it breaks.

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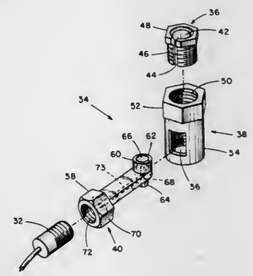
**4,018,085**
**AMPLIFYING RIBBON EXTENSOMETER**
**Vernon L. Alley, Jr., Newport News, and Austin D. McHatton, Hampton, both of Va., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.**
**Filed Nov. 14, 1975, Ser. No. 632,112**
**Int. Cl.² G01B** *5/30*
**U.S. Cl. 73—88 R** **12 Claims**

1. A strain gauge comprising: an elongated inextensible member associated with a test object; said inextensible member traversing said test object in differing directions along a strain axis of the test object and being moveable relative thereto in response to strain of the test object, thereby providing means to amplify strain experienced by the test object; and means for indicating said amplified strain.



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**4,018,086**
**SYSTEM FOR MAINTAINING A DIESEL ENGINE**
**Gary E. Clark, and Art J. Miller, both of Chicago, Ill., assignors to Sun Electric Corporation, Chicago, Ill.**
**Division of Ser. No. 619,463, Oct. 3, 1975, Pat. No. 3,978,721.**
**This application Apr. 5, 1976, Ser. No. 673,389**
**Int. Cl.² G01M** *15/00*
**U.S. Cl. 73—119 A** **4 Claims**



1. Means for coupling a transducer and a diesel engine including a fuel pump and a fuel injection line, said fuel pump having a discharge port, comprising in combination:
a retaining nut adapted to receive said fuel injection line therein;
an adapter having a first and second end, said first end being adapted to securingly receive said discharge port of said fuel pump, said second end being adapted to receive said retaining nut and said fuel injection line, said first end defining an opening, and
a transducer boss having an external end adapted to receive said transducer and an internal end, said opening being adapted to receive said internal end in an assembled state, said internal end defining a fuel line seat and a discharge port seat for substantially sealing said coupling means to said fuel pump and said fuel injection line in said assembled state, said retaining nut urging said fuel injection line and said discharge port against said fuel line seat and said discharge port seat, respectively, said transducer boss defining a communicating channel between said external and internal ends.

**4,018,087**

## METHOD AND APPARATUS FOR TESTING THE UNIFORMITY OF A ROTARY BODY

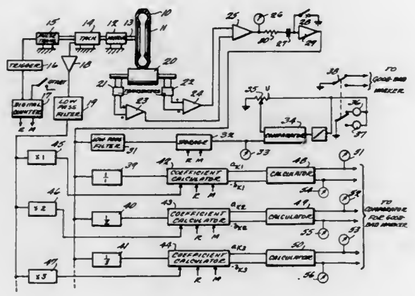
**Friedrich Wenz, Seeheim, Germany, assignor to Gebr. Hofmann KG, Darmstadt, Germany**

**Filed Aug. 2, 1976, Ser. No. 711,073**

**Claims priority, application Germany, Aug. 14, 1975, 2536332**

**Int. Cl.² G01M** *17/02*

**U.S. Cl. 73—146** **13 Claims**



1. A method of testing the uniformity of a rotary body comprising the steps of:
   rotating said body;
   producing, by means of transducers coupled to receive vibrations from the rotary body, an electrical analysis signal having an amplitude which varies as a function of the non-uniformities;
   producing a direct current voltage signal which varies in amplitude as a function of the speed of rotation of the rotary body;
   multiplying said direct current voltage and analysis signals to produce a further signal;
   integrating the said further signal to provide the harmonic Fourier coefficients of the Fourier development series of the analysis signal; and
   determining the magnitude and phase position of the non-uniformities from said Fourier coefficients.

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**4,018,088**

## BOREHOLE PRESSURE MEASUREMENT APPARATUS HAVING A HIGH PRESSURE FLOAT VALVE

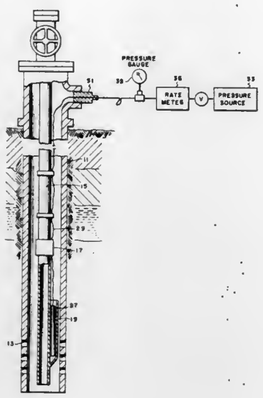
**Billy Walton McArthur, Wallis, Tex., assignor to Sperry-Sun Well Surveying Company, Sugar Land, Tex.**

**Filed Dec. 8, 1975, Ser. No. 638,392**

**Int. Cl.² E21B** *47/06*

**U.S. Cl. 73—151** **7 Claims**

1. Borehole pressure measurement apparatus, comprising:
   a pressure source at the surface;
   a microtube in fluid communication with the pressure source and extending into the borehole;
   a chamber positioned in said borehole in the area where pressure is to be measured and in fluid communication with the microtube on its upper side,
   said chamber being open on its lower end to the entry of borehole fluids and having a float positioned in said chamber to close the opening to said microtube when buoyantly supported by the borehole fluids; and



   flexible means for partially supporting the weight of the float when said float is in contact with borehole fluid.

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**4,018,089**

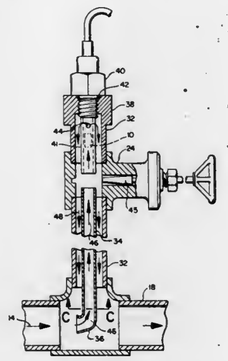
## FLUID SAMPLING APPARATUS

**Gregory Dzula, N. Caldwell, N.J.; Melvin Levine, New York, N.Y., and Elmer Ambrose Sperry, III, Pompton Plains, N.J., assignors to Beckman Instruments, Inc., Fullerton, Calif.**

**Filed May 5, 1976, Ser. No. 683,569**

**Int. Cl.² G01N** *1/14*

**U.S. Cl. 73—422 R** **10 Claims**



1. Improved insertion type sampling apparatus for sampling a moving fluid in a main conduit comprising:
   a. a body adapted to be mounted on the main conduit and having a first opening and a second opening into the interior of the main conduit, said body further having a passageway therein communicating on one end with said first opening and communicating on the other end with said second opening whereby fluid can enter said passageway from said main conduit through one of said openings, flow through said passageway and re-enter the fluid in the main conduit through the other of said openings, the portion of said passageway up to said means for holding a sensor and the portion of said passageway after said means for holding a sensor being a pair of conduits one within the other;
   b. first nozzle means connected to said first opening and being disposed with an opening in the moving fluid whereby the kinetic energy of the moving fluid will force a portion of the fluid through said passageway;



   c. valve means operably attached to said body and being adapted to open and close said passageway in two locations with one movable actuator; and,
   d. means for holding a sensor disposed between said two locations of valve opening and closing in said passageway and being so shaped and positioned that when said valve means is in the open position a portion of the fluid passing through said passageway will contact a sensor held by said holding means.

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**4,018,090**

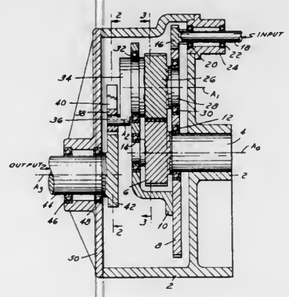
## ROTARY AND LINEAR REVERSIBLE INDEXING MECHANISM

**John Henry Brems, 32867 White Oaks Trail, Birmingham, Mich. 48010**

**Filed May 15, 1975, Ser. No. 577,943**

**Int. Cl.² F16H** *37/12*

**U.S. Cl. 74—52** **8 Claims**



1. An intermittent reversible indexing system having a rotary input and a rotary output, with variable kinematic characteristics comprising:
   a. a frame,
   b. a circular reaction member mounted in said frame and concentric about a first axis,
   c. a first rotating member mounted for rotation in said frame and rotating about said first axis,
   d. a second rotating member of different diameter than said circular reaction member mounted for rotation on said first rotating member and rotating about a second axis displaced from said first axis and adapted for tangential driving engagement with said circular reaction member,
   e. an eccentric member mounted on said second rotating member concentric about a third axis displaced from said second axis,
   f. an output member mounted for rotation in said frame and rotating about a fourth axis displaced from said first axis and in driven engagement with said eccentric member, and
   g. input power means driving one of said rotating members.

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**4,018,091**

## PIVOTABLE EXTRACTOR HOLD DOWN APPARATUS

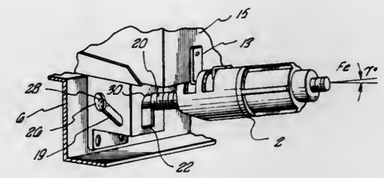
**Robert Allen Hollingsead, Yorba Linda, and Clyde Robert Pryor, Anaheim, both of Calif., assignors to Hollingsead-Pryor Enterprises, Inc., Santa Fe Springs, Calif.**

**Continuation of Ser. No. 360,113, May 14, 1973, abandoned. This application Aug. 28, 1975, Ser. No. 608,565**

**Int. Cl.² F16H** *27/02*

**U.S. Cl. 74—89.15** **6 Claims**

1. Apparatus for inserting an electronic unit in and removing it from a supporting structure having a supporting surface by applying forces at one end of said electronic unit, relative to said supporting structure, whereby the electronic unit is inserted and removed along an axis of movement parallel with the supporting surface, said apparatus comprising:
   means for applying insertion forces to said one end of said electronic unit, said insertion forces having a force component perpendicular and directed towards said supporting surface and a force component parallel to said supporting surface;
   means for applying extraction forces to said one end of said electronic unit, and for controlling the angle of application of said extraction forces such that a force component parallel to said supporting surface and substantially no components in a direction perpendicular to said supporting surface are exerted for the duration of travel of said electronic unit along said axis; and
   means for locking said extraction force applying means into a position that prevents said electronic unit from being lifted out of contact with said supporting surface despite any extraneous force being applied to said electronic unit during extraction.



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**4,018,092**

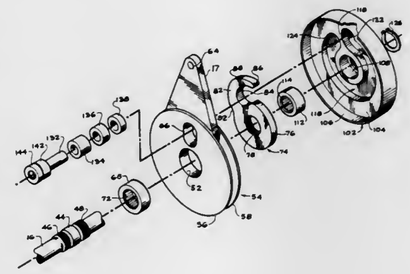
## MECHANICAL SEQUENCER

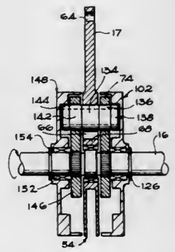
**James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention of Walter Thomas Appleberry, Long Beach, Calif.**

**Filed Feb. 17, 1976, Ser. No. 658,450**

**Int. Cl.² F16H** *21/44*

**U.S. Cl. 74—96** **14 Claims**





1. A mechanical sequencing module comprising:
   a rotatable drive shaft having a shaft spline formed thereon;
   a freely rotatable shaft having a plurality of rollers positioned thereon, the axis of the freely rotatable shaft hav-

ing an axis parallel to and offset from the axis of the drive shaft;

a drive fitting having an opening therein, said drive fitting being positioned on said drive shaft spline for rotating said fitting upon rotation of said drive shaft, and a finger portion for enabling said drive fitting to move said rollers and said freely rotatable shaft;

a crank structure positioned in a plane perpendicular to the axes of said drive shaft and said freely rotatable shaft, said crank structure having a drive shaft opening through which said drive shaft passes, and a slot into which said freely rotatable shaft and one of said rollers extends for driving said crank structure during movement of said freely rotatable shaft; and

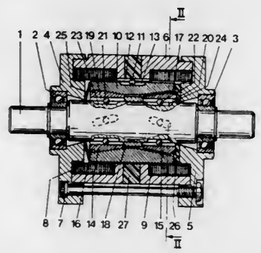
a housing formed in a plane parallel to said crank structure, having a track formed therein, said track forming a guideway for said freely rotatable shaft and another of said rollers.

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## 4,018,093
## DEVICE FOR TRANSFORMING RECIPROCATING MOTIONS INTO TURNING MOTIONS

**Sven Walter Nilsson, Partille, Sweden, assignor to SKF Nova A.B., Goteborg, Sweden**

**Filed Sept. 30, 1975, Ser. No. 618,146**
**Claims priority, application Sweden, Nov. 4, 1974, 7413796**
**Int. Cl.² F16H** *27/02*
**U.S. Cl. 74—126** **11 Claims**

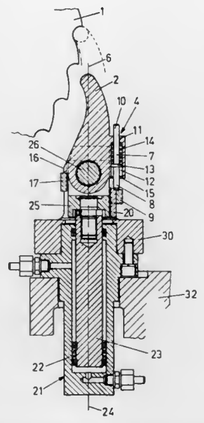



1. A device for transforming a reciprocating linear movement into a rotary movement comprising a first member adapted for reciprocating axial movement relative to a turnable second member, means for displacing said reciprocating first member in opposite linear directions, at least a pair of annular sleeves disposed in a space between said first and second members, each sleeve having a frustoconical tapered surface confronting and adapted for torque transmitting engagement with a corresponding tapered surface on one of said members, the surface of each sleeve opposite the frustoconical surface confronting a surface of the other one of said members and guide means including at least one helical groove in one of said confronting surfaces and a guide element engageable in said grooves, actuation of said one member linearly in one axial direction causing engagement with the frustoconical surface of one sleeve to prevent turning relative to said one member and through said guide means rotation of said other member, actuation of said one member linearly in an opposite axial direction causing engagement with the frustoconical surface of said other sleeve and through said guide means rotation of said other member.

## 4,018,094
## APPARATUS FOR INTERMITTENTLY TURNING A TURBINE SHAFT

**Horst Schmidt, Saalfelden, Austria, assignor to Sulzer Turbomaschinen AG, Zurich, Switzerland**

**Filed Aug. 27, 1975, Ser. No. 608,289**
**Claims priority, application Switzerland, Sept. 11, 1974, 12342/74**
**Int. Cl.² F16H** *27/02*
**U.S. Cl. 74—128** **8 Claims**




1. Apparatus for turning a power driven shaft such as a turbine rotor shaft about its axis in a step-by-step manner comprising a toothed ratchet wheel mounted on the shaft, a ratchet arm engageable with the teeth on said ratchet wheel, means pivotally mounting said ratchet arm on a support for deflection about an axis parallel to the axis of said ratchet wheel, actuating means for effecting a to and fro rectilinear movement of said ratchet arm support and hence also said ratchet arm from a starting position towards and away from said ratchet wheel, means producing during said to and fro rectilinear movement of said ratchet arm a deflection thereof about its pivot axis towards and away from the toothed periphery of said ratchet wheel, and means carried by said ratchet arm and operable in the event the ratchet wheel is put into rotation by starting up of the turbine while said ratchet arm is engaged with said ratchet wheel for detaining said ratchet arm against a return movement towards said ratchet wheel after being hurled outwardly therefrom to a predetermined position.

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## 4,018,095
## DRIVING DEVICE FOR BICYCLE

**Keizo Shimano, Sakai, Japan, assignor to Shimano Industrial Company Limited, Osaka, Japan**

**Filed Mar. 29, 1976, Ser. No. 671,705**
**Claims priority, application Japan, June 6, 1975, 50-73488; June 6, 1975, 50-73490; June 6, 1975, 50-73489**
**Int. Cl. F16h** *55/30*
**U.S. Cl. 74—217 B** **5 Claims**

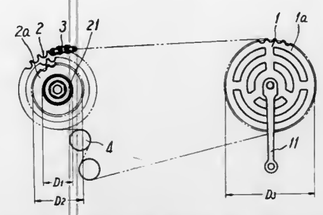
1. A driving device for a bicycle, which comprises a front gear comprising one or more toothed sprockets mounted to a gear crank,

a rear gear comprising one or more toothed sprockets mounted to a rear hub, and

a driving chain stretched across said front and said rear gears,



the teeth of te sprockets of the front gear and the rear gear have a pitch in the range of 8.5mm to 11.5mm respec-



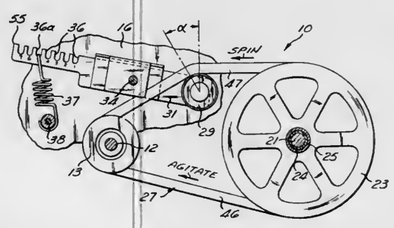

tively, and said driving chain having its pitch equal or multiples of said teeth pitch of the sprockets.

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## 4,018,096
## SLIPPING BELT CLUTCH

**James R. Foster, Webster City, Iowa, assignor to Franklin Manufacturing Company, St. Cloud, Minn.**

**Division of Ser. No. 599,178, July 25, 1975, Pat. No. 3,965,768. This application Mar. 8, 1976, Ser. No. 664,912**
**Int. Cl.² F16H** *55/42, 55/36*
**U.S. Cl. 74—230.01** **3 Claims**




1. A shaft mountable pulley for cooperation with a drive belt, comprising an outer peripheral rim portion including a circumferential V-groove engageable by the V-belt, a hub portion having an axial cylindrical bore for reception therein of a shaft, means on said hub portion for fixing said pulley on a shaft positioned in said bore, a web portion intermediate said rim and hub portions, said rim, intermediate web, and hub portions being integral, said web portion including at least one axially extending cylindrical tubular land portion formed by at least two axial grooves concentric with said bore and each other, each of said grooves extending axially inward from an associated pulley end face towards the opposite pulley end face of the other groove, said grooves being radially relatively close to one another such that said land portion is relatively thin in comparison to the rim and hub portions, said grooves having sufficient axial length relative to the length of the pulley that relatively thin end walls, in comparison to the rim and hub portions, are formed at their respective opposite pulley faces.

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## 4,018,097
## AXLE LUBRICATION SYSTEM

**Alan R. Ross, Lyndhurst, Ohio, assignor to Eaton Corporation, Cleveland, Ohio**

**Filed Jan. 7, 1976, Ser. No. 647,280**
**Int. Cl.² F16H** *57/04, 1/40;* **F01M** *9/00, 1/00*
**U.S. Cl. 74—467** **16 Claims**

1. An axle mechanism operable to be mounted in either a right-side-up or an upside-down position and receive a rotating input drive, said axle mechanism comprising:

a. an axle housing;

b. a differential carrier housing adapted to be mounted on said axle housing and defining a differential bearing support;

c. a pinion gear driven by the input drive and carried by said differential carrier housing;

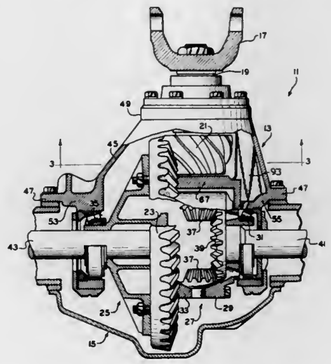
d. a ring gear in meshing engagement with said pinion gear;

e. a differential secured to said ring gear and rotatably disposed adjacent said differential bearing support;

f. a lubricant sump within said differential carrier housing, said lubricant sump having a static level sufficient to submerge at least a portion of said pinion gear;

g. said differential bearing support defining first and second lubricant passages, said first lubricant passage disposed to communicate lubricant flow to said differential when said axle mechanism is in the right-side-up position and said second lubricant passage disposed to communicate lubricant flow to said differential when said axle mechanism is in the upside-down position;

h. said differential carrier housing defining a first lubricant trough having a first opening, said first trough and said




first opening being oriented generally parallel to the axis of rotation of said pinion gear, said first opening being disposed adjacent said pinion gear to receive lubricant splash from said pinion gear as said pinion gear rotates through said lubricant sump with said axle mechanism in said right-side-up position;

i. said differential carrier housing defining a second lubricant trough having a second opening, said second trough and said second opening being oriented generally parallel to the axis of rotation of said pinion gear, said second opening being disposed adjacent said pinion gear to receive lubricant splash from said pinion gear as said pinion gear rotates through said lubricant sump with said axle mechanism in said upside-down position; and

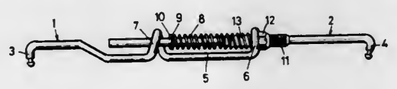
j. said first and second lubricant troughs being in open communication with said first and second lubricant passages, respectively.

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## 4,018,098
## EXHAUST GAS RETURN VALVE ACTUATING ROD

**Alfred Beier, Hondelage, Germany, assignor to Volkswagenwerk Aktiengesellschaft, Germany**

**Filed Mar. 4, 1976, Ser. No. 663,691**
**Claims priority, application Germany, Apr. 12, 1975, 2516112**
**Int. Cl.² G05G** *1/00;* **F16B** *7/10*
**U.S. Cl. 74—470** **7 Claims**



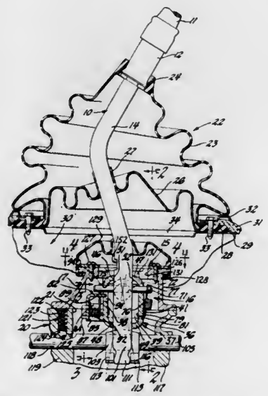

1. An actuating rod for interconnecting a throttle with an exhaust gas return valve, comprising;

a first rod portion;

a second rod portion, having a first section axially aligned with said first rod portion, and a second section having an axis essentially parallel to said first rod portion, the end of said second section having a first loop surrounding said first rod portion;
and a spring concentrically surrounding said first rod portion and acting upon said first loop.

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**4,018,099**
**MULTISPEED SHIFT LINKAGE CONTROL**
**Patrick H. O'Brien, Birmingham, and William J. Zabritski, Sterling Heights, both of Mich., assignors to General Motors Corporation, Detroit, Mich.**
**Filed Sept. 15, 1975, Ser. No. 613,332**
**Int. Cl.² G05G** *5/02, 9/12*
**U.S. Cl. 74—473 R** **5 Claims**

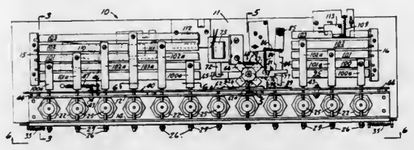


1. In a transmission shift control linkage; a support; a shift shaft mounted on said support for reciprocating shifting movement along its axis and rotary selecting movement about its axis and having connecting means thereon; a shift lever having a handle end and connecting means at the opposite end connected to said connecting means on said shift shaft to pivotally mount said lever on said shift shaft for selecting pivotal movement about the shift shaft axis conjointly with said rotary selecting movement of said shift shaft; a pivot bracket located at an intermediate portion of said shift lever; shifting pivot means between said pivot bracket and said support to mount the pivot bracket for shifting pivotal movement about an axis transverse to the longitudinal axis of said shift lever; guide and stop means on said pivot bracket and said shift lever to guide said lever for selecting movement relative to said pivot bracket and to limit said selecting movement at end neutral positions and to prevent relative shifting movement of said shift lever and said pivot bracket for conjoint pivotal shifting movement of said shift lever and pivot bracket; said connecting means on said shift lever and shift shaft having guide means to prevent turning of said shift lever about its longitudinal axis and motion transfer means to transfer pivotal shifting movement of said shift lever to axial shifting movement of said shift shaft.

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**4,018,100**
**SELECTION CONSOLE AND LOCKING MECHANISM FOR VENDING MACHINE**
**James A. Moe, 503 Carolyn Lane, White Bear Lake, Minn. 55110**
**Filed Aug. 20, 1975, Ser. No. 606,163**
**Int. Cl.² G05G** *5/08, 13/02*
**U.S. Cl. 74—483 PB** **11 Claims**

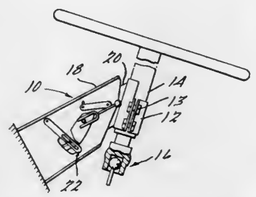
1. In a selection console for a vending machine, the combination of
a plurality of pins reciprocatably movable independently in parallel paths,
a slide bar extending across and normal to said paths, said slide bar having a plurality of slots each receiving one of said pins, said slots having a surface to be engaged by a said pin to cause movement of said slide bar upon movement of a pin in a said path,
means defining a plurality of detents spaced along said slide bar in the direction of movement thereof,
an actuating member,
a pair of pawls pivoted on an axis,



means for biasing one of said pawls into engagement with said slide bar and the other of said pawls into engagement with said actuating member,
said actuating member being movably supported relative to said pawls to pivot said one pawl to permit movement of said slide bar in only one direction during movement of a said pin in one direction and restrict movement of said slide bar in the other, and to shift said pawls to restrict movement of said slide bar in said one direction upon the return movement of said pin and slide bar.

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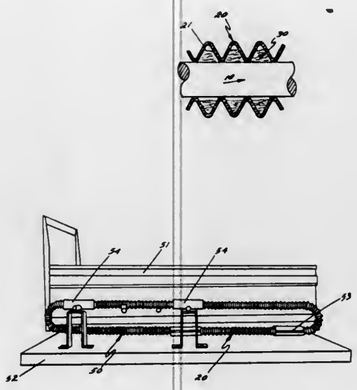
**4,018,101**
**POSITIONING DEVICE FOR ADJUSTABLE STEERING COLUMNS**
**William T. Mihalic, Southfield, Mich., assignor to Eaton Corporation, Cleveland, Ohio**
**Filed Aug. 28, 1975, Ser. No. 608,414**
**Int. Cl.² B62D** *1/18*; **G05G** *5/24*
**U.S. Cl. 74—493** **18 Claims**



1. A positioning device for use with a steering column in a vehicle, the steering column being adapted to be operatively connected to the steering gear of the vehicle in a manner allowing the steering column to be translatively and pivotally moveable in the plane of the steering column, the positioning device comprising:
a support member adapted to be secured to the body of said vehicle;
an elongated slider member adapted to be fixedly secured at one end to said column;
means mounting said slider member on said support member for;
selective pivotal movement in said steering column plane between a plurality of the tilt positions thereby effecting pivotal movement of said column;
selective movement along its axis between a plurality of translational positions in each of said tilt positions thereby effecting translational movement of said column;
tilt latching means for holding said slider member in any of said tilt positions; and
translation latching means for holding said slider member in any of said translational positions.



**4,018,102**
**MOVEMENT DEVICE**
**Frederick S. Faiks, Comstock Park, Mich., assignor to Steelcase, Inc., Grand Rapids, Mich.**
**Division of Ser. No. 310,411, Nov. 29, 1972, Pat. No. 3,883,192. This application Sept. 6, 1973, Ser. No. 394,829**
**Int. Cl.² F16C** *1/10*
**U.S. Cl. 74—501 R** **3 Claims**

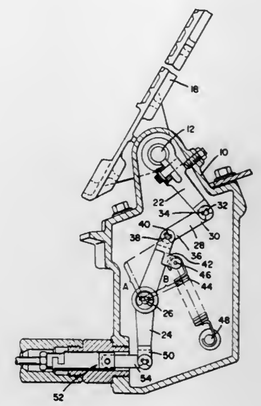


1. A drive pulley device comprising: a rigid, generally rod-like support of a closed circuit configuration, said support being sufficiently rigid to be self-sustaining whereby it can have a configuration suitable for any drive function and capable of passing around obstructions and the like without requiring additional pulley wheels to do so; a flexible sleeve slidably mounted on said support and entirely enclosing said support to define a closed circuit, said sleeve being filled with a lubricating fluid whereby friction between said sleeve and said rigid support is minimized; and at least two pulley wheels mounted on mounting means and supportably engaging said flexible sleeve at two spaced points whereby rotation of one of said wheels causes said sleeve to slide on said support and thereby rotate the other of said wheels.

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**4,018,103**
**CONTROL LINKAGE MECHANISM**
**Richard W. Chamberlain, Aurora, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.**
**Filed July 14, 1975, Ser. No. 595,823**
**Int. Cl.² G05G** *1/04*
**U.S. Cl. 74—519** **11 Claims**

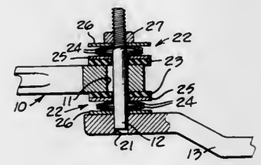
1. A linkage mechanism comprising:
support means;
a first link pivotally mounted on a first fixed pivot relative to the support means and pivotable in first and second directions;
a second link pivotally mounted on a second fixed pivot relative to the support means and pivotable in first and second directions;
a third link having (i) a first portion pivotally mounted to a portion of the first link spaced from said first fixed pivot, and (ii) a second portion mounted to a portion of the second link spaced from said second fixed pivot;
the first, second and third links being arranged to provide that pivoting of the first link in said first direction thereof pivots the second link in said first direction thereof through said third link;
resilient means for resiliently resisting pivoting of the first and second links in said respective first directions thereof;
the first, second and third links being positioned so that as the first link is pivoted through the full travel thereof in said first direction thereof to pivot the second link in said first direction thereof through the third link, the third link shifts in position to provide, through the full travel of the



first link, a continuously increasing effective lever arm about the second fixed pivot through which force is applied from the third link to pivot the second link in said first direction thereof.

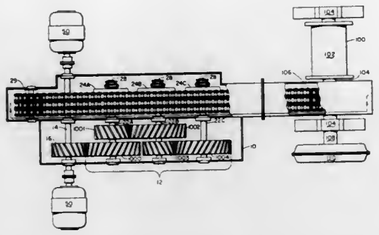
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**4,018,104**
**FRICTIONALLY HELD CONTROL LINKAGE FOR ENGINE THROTTLE CONTROLS AND THE LIKE**
**James R. Bland, and Rueben R. Brunka, both of Aurora, Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.**
**Filed Mar. 17, 1975, Ser. No. 558,980**
**Int. Cl.² G05G** *5/06*
**U.S. Cl. 74—531** **14 Claims**



1. A control linkage operatively connected to a control mechanism of an engine comprising
a control member movably mounted on a support member and operatively connected to said control mechanism,
a pin secured to said support member,
an operator's control handle operatively connected to said control member for selectively moving the same on said support member, and
means, including an annular elastomeric washer mounted on said pin and frictionally engaging a side of said control member, for frictionally holding said control member relative to said support member upon movement of said control handle.

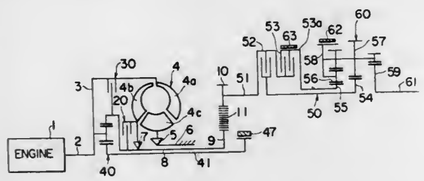
**4,018,105**
## MULTIPLE OUTPUT GEARED TRANSMISSION
**Elbert Walker, Pampa, Tex., assignor to Cabot Corporation, Boston, Mass.**
**Filed May 9, 1975, Ser. No. 575,956**
**Int. Cl.² F16H *37/06***
**U.S. Cl. 74—665 GE** **9 Claims**



1. A multiple output transmission comprising a gearcase, a geared power input shaft input shaft extending into and being journalled to said gearcase, a reduction gear train comprising a plurality of gears journalled in said gearcase in driven communication with said geared input shaft, a plurality of power output shafts affixed to said driven gears of said reduction gear train and extending outwardly from a common side of said gearcase, a plurality of selectively clutchable rotational power output elements coupled to said outwardly extending power output shafts and a flexible continuous belt means in driven relationship with said plurality of rotational power output elements and reeved thereabout so as to be driven in a common direction upon selective clutching of any one of said rotational power output elements.

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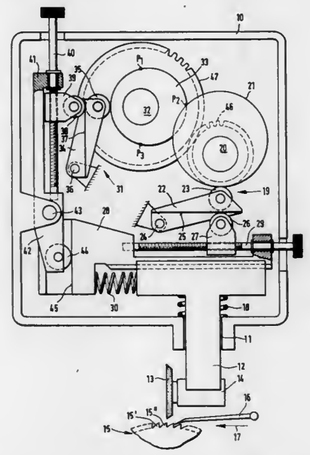
**4,018,106**
## POWER TRANSMISSION SYSTEM
**Sumio Uozumi, and Fmibiro Ushijima, both of Toyota, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Japan**
**Filed Feb. 6, 1975, Ser. No. 547,497**
**Claims priority, application Japan, Aug. 19, 1974, 49-94319**
**Int. Cl.² F16H *3/44***
**U.S. Cl. 74—688** **5 Claims**




1. A power transmission system for a vehicle including an engine and a drive member for delivering power from said engine, said system comprising a fluid transmission system including an impeller and a turbine, means connecting said drive member to said impeller, a speed change gear unit including an input shaft, first clutch means operative to connect said turbine to said input shaft of said speed change gear unit, second clutch means for bypassing said fluid transmission system operative to connect said drive member with said input shaft of said speed change gear unit, and an overdrive unit including frictional coupling means mounted intermediate said engine drive member and said input shaft of said speed change gear unit, said overdrive unit being adapted to provide overdrive operation when said fluid transmission system is bypassed by operation of said second clutch means, said input shaft of said speed change gear unit being coupled to an intermediate shaft to receive power therefrom, said overdrive unit including a sun gear, pins affixed to said engine drive member, pinion means rotatably mounted about said pins, a hub member fixed to said intermediate shaft and having formed thereon a ring gear, said ring gear being arranged for intermeshing engagement with said pinion means, and a braking band for locking said sun gear against rotation, said pins being thereupon operative to transmit power to said intermediate shaft through said pinion means, said ring gear and said hub.

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**4,018,107**
## SAW SHARPENING MACHINE
**Otto Stier, Biberach an der Riss, Germany, assignor to Vollmer Werke Maschinenfabrik GmbH, Germany**
**Continuation-in-part of Ser. No. 464,317, April 26, 1974, abandoned. This application Aug. 4, 1975, Ser. No. 601,912**
**Claims priority, application Germany, Apr. 26, 1973, 2321160; Feb. 13, 1975, 2505985**
**Int. Cl.² B23D *63/14***
**U.S. Cl. 76—41** **11 Claims**



1. A saw sharpening machine having a grinding tool and a saw blade mounting with a push rod reciprocating in a lifting direction to vary the spatial relation of the grinding tool and saw blade, a cam and follower drive for the push rod including a rocker arm carrying the follower and an adjustable carriage actuated by the rocker arm developing the reciprocation of the push rod, a slide member forming a part of said push rod and adjustably slidable on the push rod transversely of the direction of reciprocation, and an additional lifting drive shifting said slide to impart first a positive and then a negative lifting action to the push rod.

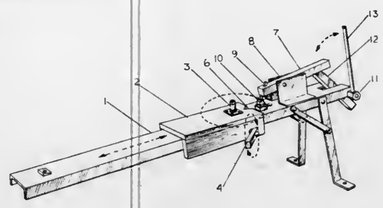
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**4,018,108**
## DEVICE FOR SETTING CIRCLE SAWS
**Alex Dudley, 220 Edgewood Road, Lansing, Mich. 48910**
**Filed Aug. 4, 1975, Ser. No. 574,361**
**Int. Cl.² B23D *63/02***
**U.S. Cl. 76—63** **2 Claims**

1. A circular saw setting apparatus comprising, in combination:
a. a bench supporting an elongated channel iron base, and means for locking said base to said bench;
b. a slidable open-end box supporting a saw holding arbor, means for locking said slidable box at any required point on said channel iron base;
c. an anvil received through a slot in said channel iron base, means for adjusting said anvil elevationally and longitudinally;



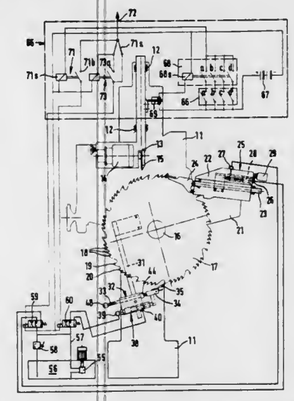
d. means for securing a circular saw on said saw holding arbor, and means for adjusting the peripheral edge of said saw in operable contact with said anvil;
e. two angle iron plates so spaced as to support between them a metal bar arm, means for pivotally supporting said bar arm between said plates;
f. a tool bit set in a striking end of said bar arm and secured with set screws;



g. an elongated slot in one end of said channel iron base sufficiently wide to support an eccentric throw, a threaded shaft pivotally supporting said eccentric throw in said slot;
h. and means for activating said eccentric throw to thereby move said bar arm and thus said tool bit set against said anvil, said means being a hex nut on one end of said threaded shaft, said hex nut being drilled on all flats to receive a lever for activating said eccentric throw.

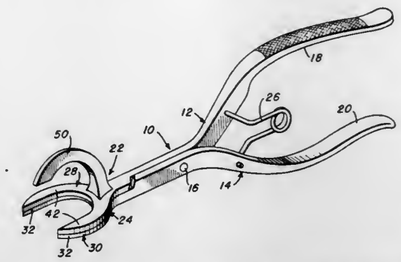
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**4,018,109**
## FEED DEVICE FOR SAW MACHINING APPARATUS
**Otto Stier, Biberach an der Riss, Germany, assignor to Vollmer Werke Maschinenfabrik GmbH, Germany**
**Filed Aug. 27, 1975, Ser. No. 608,381**
**Claims priority, application Germany, July 31, 1975, 2534289**
**Int. Cl.² B23D *63/08***
**U.S. Cl. 76—77** **12 Claims**



1. A saw feeding device for a saw machining apparatus which comprises a first mechanism acting on a saw in the machine to advance the saw a preset distance, a second mechanism acting on the saw to advance the saw in the machine in the same direction as the first mechanism a preset distance beyond the distance advanced by the first mechanism, and control means selectively activating said mechanisms for accurately positioning the teeth of the saw for a machining operation by said machining apparatus.

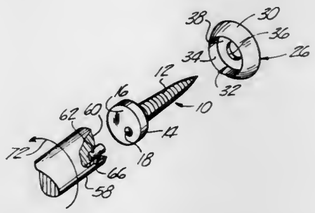
**4,018,110**
## STOPPER REMOVER
**Samuel C. Spriggs, 1076 Shadow Lane, Mount Pleasant, S.C. 29464**
**Filed July 13, 1976, Ser. No. 704,779**
**Int. Cl.² B67B *7/02***
**U.S. Cl. 81—3.1 B** **6 Claims**



1. A device for removing a headed stopper from a container, said device comprising first and second jaws, handle means engaged with said jaws for a manipulation of said jaws between a first overlying closed position and a second spaced open position, said first jaw comprising force reaction means for engaging and positioning said device on a container adjacent a stopper to be removed, said second jaw including force transmitting means engageable below the head of a stopper and between the stopper head and the container for effecting an upwardly directed stopper removing force on the head of a stopper, said second jaw also including retaining means extending in outwardly spaced overlying relation to said force transmitting means and engageable over the head of a stopper for a retention thereof within the second jaw as the stopper removing force is being applied.

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**4,018,111**
## TAMPER RESISTANT FASTENER AND TOOL FOR OPERATING SAME
**Marvin L. Goldhaber, 10005 Talbot, Huntington Woods, Mich. 48070**
**Filed Sept. 2, 1975, Ser. No. 609,385**
**Int. Cl.² B26D *5/30***
**U.S. Cl. 81—71** **5 Claims**



1. A tamper resistant fastener comprising:
a screw having a threaded body with a driving end portion having a circular contour, said driving portion end having a bore located eccentrically with respect to the longitudinal axis of said screw;
a retainer having a circular step bore receiving said screw such that said threaded body extends through the smaller diametered portion of said step bore while the driving end portion of said screw is disposed within the larger diametered portion of said step bore such that said driving end portion of said screw is below the outer edge of the larger diametered portion of said step bore; and
a tool for drivingly engaging said screw, said tool comprising:

a driving member having an end with a circular contour sized to be received within said large diametered portion of said step bore of said screw and abuttingly engaging the upper surface of said driving end portion;

key means carried by said end of said driving member and received in said bore of said driving end portion; and

means carried by said driving member for engaging said retainer to maintain said retainer at said driving end portion of said screw such that said driving end portion of said screw remains disposed below the outer edge of the large diametered portion of said screw step bore.

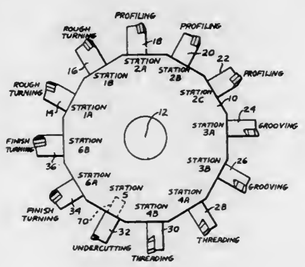
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**4,018,112**

## MACHINE TOOL HAVING A SPECIAL INDEXABLE TURRET AND METHOD OF OPERATION

**James W. Heaton, Greensburg; Donald W. Warren, Latrobe, and Albert B. Albrecht, Ligonier, all of Pa., assignors to Kennametal Inc., Latrobe, Pa.**

**Filed Nov. 29, 1974, Ser. No. 528,159**
**Int. Cl.² B23B** *1/00*
**U.S. Cl. 82—1 C** **6 Claims**




1. In a method of operating a machine tool which includes an indexable turret with a plurality of tool stations each having a cutting tool unit of a respective type therein and each tool unit being presentable in workpiece operating position in a respective indexed position of the turret, said method comprising; providing a group of at least two identical tool units, placing the identical tool units in adjacent ones of said turret stations, indexing the turret a predetermined number of times for a complete rotation thereof during a complete work cycle to present respective tool unit types carried thereby sequentially to workpiece operating position, and presenting a single one only of the tool units of said group thereof to workpiece operating position during a single work cycle.

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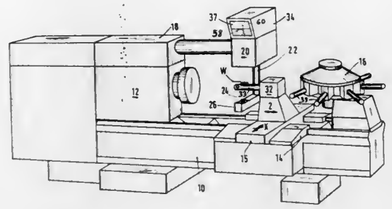
**4,018,113**

## APPARATUS FOR ADJUSTING THE CUTTING EDGE OF A TOOL IN A MACHINE TOOL

**Miroslav Blazenin, Goppingen; Hans-Günter Rohs, Rechberghausen, and Bruno Zeller, Weissenstein, all of Germany, assignors to Gebr. Boehringer G.m.b.H., Germany**

**Filed Mar. 1, 1976, Ser. No. 662,380**
**Claims priority, application Germany, Mar. 5, 1975, 2509586**
**Int. Cl.² B23B** *25/06*
**U.S. Cl. 82—2 B** **4 Claims**

1. In a machine tool of the type including a bed, a tool support, means for mounting said tool support on said bed for relative movement in a first direction and in a second direction at right angles to said first direction, feeding means for feeding said tool support in said directions, and control means for controlling said feeding means, the combination comprising a projector mounted on said bed at a distance from the tip of a tool mounted on said tool support and including optical means for producing a picture of a cutting edge of said tool tip within a plane, the axis of said optical means extending at right angles to said feeding directions, said picture travelling in a first travel direction within said plane, when said support is fed in said first direction, and travelling in a second travel direction, when said support is fed in said second direction, a single electronic integrated circuit element forming a linear photodiode array mounted in stationary relationship to said bed within said plane and extending parallel to said second travel direction and in the path described by said picture when travelling in said first travel direction, detecting means connected with said photodiodes and responsive to arrival of said picture substantially in tangential relationship to said array, electrical means connected with said detecting means and



with said control means and being operative in response to said arrival to start a feed of said support which causes said picture to travel into a transitional position located on the longitudinal axis of said array and spaced from said array and, thereafter, to travel in said second direction towards said array and into an overlapping relationship to a predetermined photodiode of said array, and registering means connected with said array and with said electrical means to register the positions of said support, when said picture arrives in said tangential relationship and in said predetermined overlapping relationship.

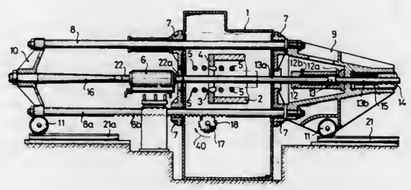
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**4,018,114**

## DEVICE ON PEELING MACHINE

**Klaus Heiermann; Carl-Ludwig Pohler, and Joachim Bertenburg, all of Solingen, Germany, assignors to Th. Kieserling & Albrecht, Solingen, Germany**

**Filed Sept. 30, 1975, Ser. No. 618,018**
**Int. Cl.² B23B** *5/00*
**U.S. Cl. 82—20** **7 Claims**



1. In an apparatus including a peeling machine having a stationary hollow shaft carrying a cutter-head, the machine being adapted for peeling short workpieces including those having a length smaller than the axial length of the hollow shaft and cutter head, the improvement comprising: clamping means constructed and arranged to axially move as a whole relative to said cutter head and including a single clamping carriage; said clamping means further comprising first and second clamping elements adapted to securely clamp by frictional engagement axially opposed external ends of a workpiece externally of the cutter head and means for axially moving both of said clamping elements in unison and said clamped workpiece through the hollow shaft and said cutterhead while maintaining the workpiece in clamped condition during the entire peeling operation.

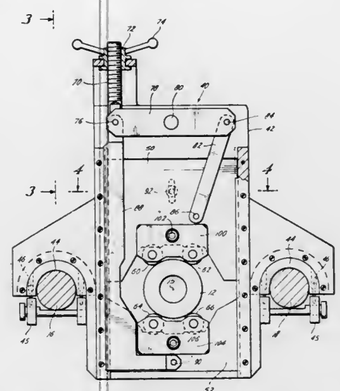


**4,018,115**

## SELF-CENTERING STEADY REST FOR A MACHINE TOOL

**Francis D. Logan, Houston, Tex., assignor to Camco, Incorporated, Houston, Tex.**

**Filed Mar. 29, 1976, Ser. No. 671,216**
**Int. Cl.² B23B** *25/00*
**U.S. Cl. 82—39** **4 Claims**



1. A self-centering steady rest for supporting the free end of a cylindrical workpiece held in the chuck of a drilling machine having a pair of ways and a drill tool support slidably supported from the ways comprising,

a base adapted to be secured to the ways of the drilling machine,

a first support including a first pair of supporting rollers and movably connected to the base on one side of the axis of the chuck,

a second support including a second pair of supporting rollers and movably connected to the base on the opposite side of the axis of the chuck from the first support,

said first and second supports being positioned for supporting the first pair of rollers and the second pair of rollers an equal distance from the axis of the chuck,

means connected between the base and said first and second supports for simultaneously and equally moving said first and second supports toward the axis of the chuck for engaging and supporting the free end of the workpiece coaxially with the chuck axis,

said means for moving the first and second supports includes,

an arm connected to one of the supports,

a pivoting lever connected to the other of said supports, and

actuating means connected to the arm and lever.

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**4,018,116**

## METHOD AND APPARATUS FOR CUTTING PLASTICS MATERIALS

**Peter Treffner, and Charles Treffner, both of 43 Yangoora Road, Belmore, Sydney, New South Wales, Australia**

**Filed Feb. 21, 1975, Ser. No. 551,631**
**Claims priority, application Australia, Feb. 27, 1974, 6747/74**
**Int. Cl.² B26D** *4/00, 7/10*
**U.S. Cl. 83—4** **7 Claims**

1. Apparatus for cutting a body of rigid plastics foam material comprising in combination;

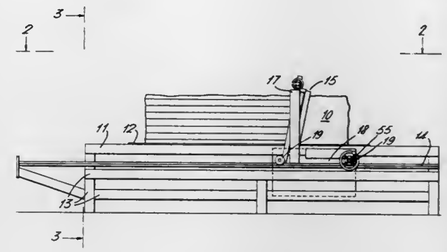
a. means for supporting said body of plastics material;

b. a plurality of cutting elements including at least one set of substantially co-planar mutually parallel cutting elements;

c. means for oscillating the cutting elements of said set so that any pair of mutually adjacent cutting elements of said set oscillate directly out of phase with each other;

d. means for heating said cutting elements to a temperature not exceeding the fusion temperature of the plastics material to be cut; and

e. means for causing relative movement between said body and said cutting elements in a direction having a component perpendicular to the plane defined by said set of cutting elements;



f. said cutting elements having a length greatly in excess of their maximum cross sectional dimension, and a cross section which varies along the length of each element, whereof those parts protruding furthest from the longitudinal axis of each element lie in a smooth notional envelope of constant cross section; the ratio of the maximum to minimum cross sectional dimension of that envelope being less than 2 to 1.

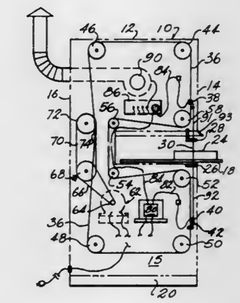
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**4,018,117**

## CUTTING METHOD AND MACHINE EMPLOYING HEATED RECIPROCATING WIRE

**Jan J. Patterson, 2450 Rollingview Drive, Smyrna, Ga. 30080**

**Filed Aug. 18, 1975, Ser. No. 605,732**
**Int. Cl.² B26F** *3/12*
**U.S. Cl. 83—16** **21 Claims**

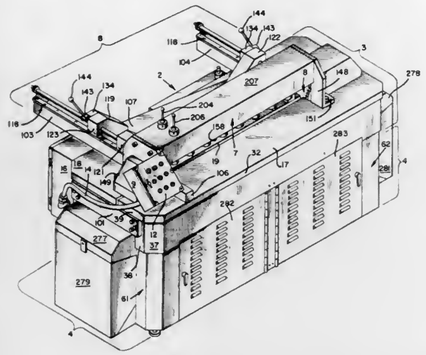


1. In a cutting device: an elongated cutting wire, support means for elongating and supporting said cutting wire at spaced locations for reciprocating to be engaged by a material (including sheet plastic and the like) for the cutting thereof, drive means for driving said support means to reciprocate said wire substantially to retrace the path of the wire in one direction of substantial longitudinal movement and thence in the opposite direction, and electrical means connected to said wire for supplying electrical current to cause said wire to become heated to maintain a cutting temperature in excess of 1,000° F. while in motion.

## 4,018,118
## HIGH SPEED PRECISION METAL CUTTING SAW ASSEMBLY

**Edward W. Goff, 1165 Ribier Court, Sunnyvale, Calif. 94087**

**Filed Nov. 25, 1974, Ser. No. 526,847**
**Int. Cl.² B23D** *45/02*; **B26D** *7/00*
**U.S. Cl. 83—167** **25 Claims**



1. A high speed precision metal cutting power saw assembly, comprising:

a. a saw table assembly including front and rear sections having horizontal plate portions with corresponding surfaces arranged in planar alignment and connected in spaced relation to define a saw slot therebetween;

b. a saw table support base assembly including a pair of pedestals spaced to underlie opposite ends of said saw table assembly whereby said front and rear sections thereof span the space between the pedestals and are supported thereby so that said corresponding surfaces of said front and rear sections lie in planar alignment;

c. a saw blade carriage assembly mounted on said saw table assembly below said horizontal plate portions and including:

1. elongated carriageways extending longitudinally of the saw table assembly and parallel to said saw slot,

2. a saw blade carriage body movably mounted on said carriageways for selective translation therealong parallel to said saw slot,

3. a circular saw blade rotatably mounted on said carriage body and arranged to extend through said saw slot so as to cut a workpiece supported thereabove on said horizontal plate portions of said saw table assembly, and

4. a motor mounted on said carriage body and operatively connected to effect rotation of said saw blade when energized;

d. means for accurately positioning a workpiece to be cut including a stop plate movably mounted on the rear section of the saw table assembly independently of the front section thereof and adjustable toward and away from said saw slot, and means for locking the stop plate in a selected position;

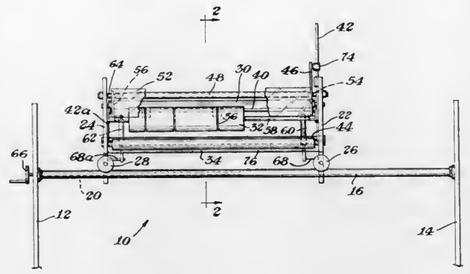
e. means for clamping a workpiece to be cut to the saw table assembly including a plurality of independently operated rams adapted to selectively impinge on the workpiece; and

f. means for effecting translation of the saw blade carriage body along said carriageways whereby said saw blade passes along said saw slot, said means including a toothed rack mounted on said saw table assembly parallel to said carriageways and a motor driven pinion on said carriage body operatively engaging the toothed rack whereby rotation of the pinion effects movement thereof and of said carriage body longitudinally along the carriageways.

## 4,018,119
## FILM SLITTING APPARATUS

**Forrest R. Lennox, Coleman, Mich., assignor to The Dow Chemical Company, Midland, Mich.**

**Filed May 4, 1976, Ser. No. 682,935**
**Int. Cl.² B26D** *5/02*, *7/06*
**U.S. Cl. 83—425.3** **6 Claims**

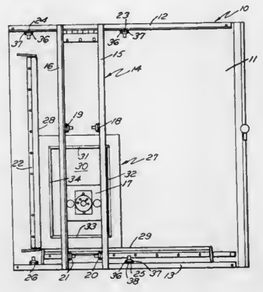


1. Film slitting apparatus comprising a frame comprising side members maintained in fixed position with respect to each other, means for laterally moving said side members, a slitted roll, said slitted roll being rotatably supported between said side members, an array of knives each of which has a cutting edge, knife supporting means extending between said side members adjacent to said slitted roll, each of said knives being coupled to said knife supporting means with its blade extending into a slit in said slitted roll, the cutting edge of said blade extending towards the outer surface of said roll, and means for moving said knife supporting means toward and away from said slitted roll.

## 4,018,120
## STOP ATTACHMENT FOR MAT CUTTING DEVICE

**John B. Pastore, 34 Fox Ridge Crescent, Warwick, R.I. 02886**

**Filed Apr. 15, 1976, Ser. No. 677,312**
**Int. Cl.² B26D** *5/10*, *7/26*
**U.S. Cl. 83—529** **5 Claims**



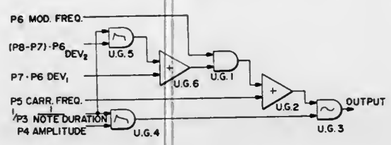
1. In a mat cutting device wherein plural sheets are to be cut to provide different size openings in each sheet, said device comprising a cutter carriage, means to guide the carriage, primary stop means to be engaged by the carriage to limit the movement of the carriage along said means to enable a first sized opening to be cut, second stop means removably mounted on said primary stop means to change the stop position of the carriage whereby a second sheet may be cut with finite dimensional difference.



## 4,018,121
## METHOD OF SYNTHESIZING A MUSICAL SOUND

**John M. Chowning, Palo Alto, Calif., assignor to The Board of Trustees of Leland Stanford Junior University, Stanford, Calif.**

**Continuation-in-part of Ser. No. 454,790, March 26, 1974, abandoned. This application May 2, 1975, Ser. No. 573,933**
**Int. Cl.² G10H** *1/00*, *5/00*
**U.S. Cl. 84—1.01** **14 Claims**




1. A method of synthesizing a musical sound composed of a plurality of component frequencies and characterized by a time-varying amplitude envelope having a time-varying attack portion, a substantialy steadystate portion and a time-varying decay portion, the steps comprising,

generating a signal $\omega_c$ to define a carrier frequency in the audio range,

generating a signal $\omega_m$ to define a modulation frequency in the audio range,

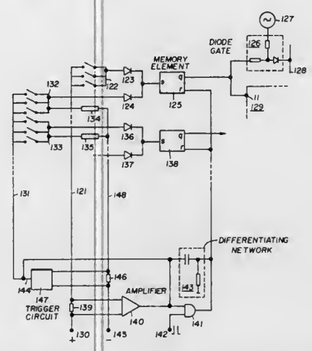
generating a signal $I(t)$ to define a time-varying modulation index,

frequency modulating $\omega_c$ with $\omega_m$ to form a frequency modulated wave defined by $e = A\sin[\omega_c t + I(t)\sin\omega_m t]$ where $e$ defines the instantaneous amplitude of said wave, A defines the peak amplitude of said wave, and $[\omega_c t + I(t)\sin\omega_m t]$ defines the frequency spectrum of said wave wherein the frequency spectrum of said wave changes as a function of the modulation index $I(t)$ to form a representation of said sound.

## 4,018,122
## ELECTRONIC MUSICAL INSTRUMENT WITH AUTOMATIC BASS ACCOMPANIMENT

**Tijmen van der Kooij, Bodegrave, Netherlands, assignor to B.V. "Eminent" Fabriek van Electronische Orgels, Bodegraven, Netherlands**

**Continuation-in-part of Ser. No. 443,375, Feb. 19, 1974, abandoned. This application Aug. 14, 1975, Ser. No. 604,827**
**Int. Cl.² G10F** *1/00*
**U.S. Cl. 84—1.03** **20 Claims**

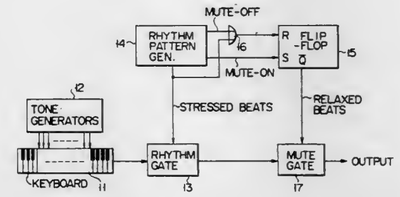



1. In an electronic musical instrument having bass program generator means for furnishing a rhythmic bass program: an accompaniment system, comprising, in combination, a plurality of input means for furnishing a plurality of input signals each in response to activation of a corresponding one or a corresponding combination of said input means; reduction circuit means connected to said input means for furnishing one of a plurality of predetermined tone or chord signals in response to each of said input signals, said plurality of predetermined tone or chord signals being substantially less in number than said plurality of input signals, said reduction circuit means having five outputs, said chord signals comprising 32 5 bit words; and output means connected to said reduction circuit means and said bass program generator means and including a sound reproduction system for furnishing a sound output in response to said tone or chord signals and under control of said bass program generator means.

## 4,018,123
## AUTOMATIC RHYTHM PERFORMING APPARATUS CAPABLE OF EXPRESSING STRESSED AND RELAXED BEATS OF RHYTHM

**Toshio Sugiura, Hamamatsu, Japan, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Japan**

**Filed Mar. 15, 1976, Ser. No. 666,906**
**Claims priority, application Japan, Mar. 20, 1975, 50-33573**
**Int. Cl.² G01H** *1/00*
**U.S. Cl. 84—1.03** **10 Claims**




1. An automatic rhythm performing apparatus comprising:

rhythm pattern generating means for generating stressed beat pattern pulses representative of stressed beats of a rhythm to be generated and relaxed beat pattern pulses representative of relaxed beats of the rhythm;

tone signal generating means;

rhythm gate means coupled to said tone signal generating means to receive a tone signal and to said rhythm pattern generating means to receive the stressed beat pattern pulses for providing a decayed envelope to the tone signal in response to each of the stressed beat pulses; and

mute gate means coupled to said rhythm gate means to receive the decayed tone signal and to said rhythm pattern generating means to receive the relaxed beat pattern pulses for suppressing a portion of the output tone signal of said rhythm gate means in response to each of the relaxed beat pulses.

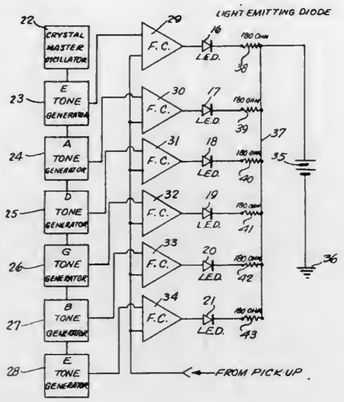
## 4,018,124
## AUTOMATIC GUITAR TUNER FOR ELECTRIC GUITARS

**Ruperto L. Rosado, 2231 Nothrop Ave., Sacramento, Calif. 95825**

**Filed Nov. 26, 1975, Ser. No. 635,766**
**Int. Cl.² G10D** *5/00*
**U.S. Cl. 84—1.16** **4 Claims**

1. An electric guitar attachment for tuning the guitar comprising a plurality of standard tone generators for generating the correct tone frequency desired to the guitar strings, a light emitting diode positioned beneath each of the strings of the guitar, a pick-up mounted beneath each of the strings of the guitar, a plurality of frequency comparators mounted within the guitar and electrically connected respectively to said tone generators and to said light emitting diodes, means electrically connecting a respective one of said tone generators and a

respective one of said light emitting diodes to said frequency comparator to illuminate said light emitting diodes upon




matching of frequencies in each of said frequency comparators.

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**4,018,125**

## ELECTRONIC MUSICAL INSTRUMENT

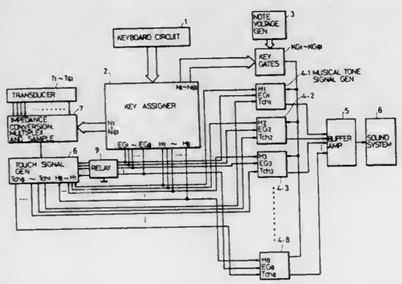
**Tetsuo Nishimoto, Hamamatsu, Japan, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Japan**

**Filed Oct. 21, 1975, Ser. No. 624,496**

**Claims priority, application Japan, Oct. 24, 1974, 49-122854**

**Int. Cl.² G10H** *1/02, 5/02*

**U.S. Cl. 84—1.19** **6 Claims**




1. An electronic musical instrument capable of time-shared multiplexing of information identifying a plurality of depressed keys by respective channels equal in number to a maximum number of musical tones to be simultaneously played which is substantially smaller than the number of tones that can otherwise be played, and producing and simultaneously playing musical tones corresponding to the depressed keys in response to the multiplexed information, said instrument comprising:

a. transducers for detecting a characteristic of the finger touch applied to each key upon depression thereof and producing a touch detection signal in accordance therewith;

b. a circuit for sampling, by each corresponding key, the touch detection signals for the respective keys produced by said transducers, the sampling being in synchronization with said time-shared multiplexing of the depressed key information and being such that the sampled touch detection signals themselves are multiplexed in a time-sharing manner;

c. a touch signal generation circuit, including capacitors for storing the time-shared multiplexed touch detection signals by each channel and discharging circuits for said capacitors, for delivering out voltages at one terminal of said capacitors as touch signals; and

d. a musical tone signal generation system including control means for controlling at least one parameter among the pitch, tone color and volume parameters of the musical tones corresponding to the depressed keys in accordance with said touch signals, whereby touch control is realized for each tone of the maximum number of tones to be simultaneously played.

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**4,018,126**

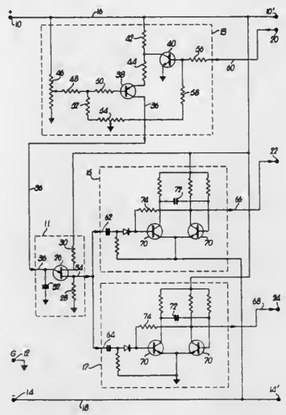
## TONE GENERATION AND MODIFICATION APPARATUS

**Brian I. Walmann, 6823 N. Michigan, Kansas City, Mo. 64118**

**Filed Mar. 26, 1975, Ser. No. 562,357**

**Int. Cl.² G10H** *1/02, 3/00, 1/04;* **H03H** *7/10*

**U.S. Cl. 84—1.24** **29 Claims**



1. In apparatus for generating an audio frequency electrical signal adapted for transduction to produce a series of audible tones providing a musical effect:

time reference means having an output terminal, for generating and presenting at said output terminal thereof a first electrical signal having the character of a series of pulses occurring at a first repetition rate,

said time reference means including current controlled, clock oscillator means having a control input terminal and configured to oscillate at a frequency determined as a function of the level of an electrical control current applied to said control input terminal thereof,

said time reference means further including current source means having an output terminal electrically coupled with said control input terminal of said clock oscillator means for delivering an electrical control current to the latter;

gating means having a switchable electrical path therethrough and a control input terminal electrically coupled with said output terminal of said time reference means, for rendering said switchable path electrically conductive in response to said first electrical signal at intervals corresponding in predetermined manner with said first repetition rate;

variable electrical level reference means having an output terminal, for generating and presenting at said output terminal thereof a second electrical signal having the character of a series of sawtooth waves occurring at a second repetition rate and each having an instantaneous level varying as a function of time;

memory means having an output terminal and an input terminal electrically coupled with said output terminal of



said level reference means through said switchable path of said gating means, for storing the instantaneous level of said second electrical signal whenever said switchable path is electrically conductive and for presenting at said output terminal thereof a third electrical signal having the character of a stepped-level wave in which the successive steps are initiated at intervals corresponding in predetermined manner with said first repetition rate and are of levels corresponding in predetermined manner with the instantaneous level of said second electrical signal that was last previously stored by said memory means; and

tone signal producing means having an output terminal and an input terminal electrically coupled with said output terminal of said memory means, for generating and presenting of said output terminal thereof a fourth electrical signal having the character of a series of tone-representing, audio frequency waveforms occurring in time concurrence with the steps of said third electrical signal and of frequency corresponding in predetermined manner with the concurrent level of said third electrical signal.

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**4,018,127**

## ELECTRONIC MUSICAL INSTRUMENT

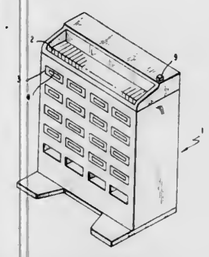
**David W. Biro, 14 Hillside Lane, Yalesville, Conn. 06492**

**Filed June 2, 1975, Ser. No. 582,790**

**Claims priority, application United Kingdom, Nov. 25, 1974, 50864/74**

**Int. Cl.² G10H** *3/00*

**U.S. Cl. 84—1.28** **9 Claims**



1. A musical instrument, comprising:

a. a plurality of magnetic tape player means for driving and transducing an endless magnetic tape having sound intelligence recorded thereon; each player means comprising a transducing means for transducing a magnetic tape and tape drive means for transporting the magnetic tape across the transducing means, the tape drive means of each player means being operated independently of the tape drive means of the other player means; a plurality of said player means each having operatively associated therewith an endless magnetic tape having sound intelligence recorded thereon; each player means being operable, when energized and in the play mode, independently of the other player means, continuously to drive and transduce its associated tape and thereby continuously produce an output signal;

b. means connected to the player means for mixing and amplifying said output signals;

c. audio means connected to said mixing and amplifying means for audibly broadcasting the output of said mixing and amplifying means applied thereto; and

d. manually operated keyboard means having a plurality of keys for selecting the sound information of a desired tape, said keys being movable between a normally raised position and a depressed position, and a plurality of normally open switch means operated by said keys to remain closed for as long as a key associated with a switch means is manually held in the depressed position and to open when the key moves to the raised position, there being a key for each switch means and a switch means connected in circuit with each said player means and said mixing and amplifying means; said audio means being operable continuously to broadcast an audible tone corresponding to the sound intelligence on the tapes selected by depressing one or more of said keys for as long as said keys are depressed.

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**4,018,128**

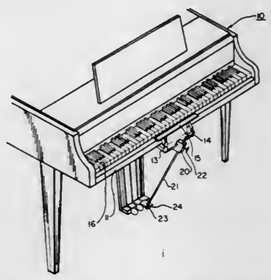
## PEDAL OPERATOR FOR PIANO AND THE LIKE

**Robert Luther Megee, 8250 Lankersheim, North Hollywood, Calif. 91605**

**Filed Jan. 12, 1976, Ser. No. 648,263**

**Int. Cl.² G10C** *3/26*

**U.S. Cl. 84—231** **5 Claims**



1. An operator for pedals of a piano and the like comprising an elongated bar;

means positioning said bar adjacent to and extending generally parallel to the front of the keyboard of said piano or the like for movement by the forearms or wrists of the player while the player's fingers engage the keys of said keyboard;

means for engaging a pedal of said piano or the like; and

means coupling said operator to said engaging means to deflect said pedal upon the movement of said operator.

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**4,018,129**

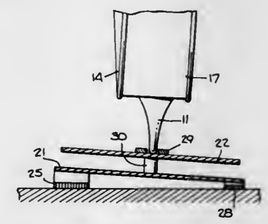
## END-PIN HOLDER FOR STRING INSTRUMENTS

**Ralph Hollander, 425 W. 57th St., New York, N.Y. 11220**

**Filed Nov. 26, 1974, Ser. No. 527,220**

**Int. Cl.² G10D** *3/02*

**U.S. Cl. 84—294** **4 Claims**



1. A resonating holder for a string instrument having a body formed by a sound box provided with a back plate acoustically coupled to a top plate by a sound post, the body having an end-pin extending from the lower end thereof, the end-pin when in direct engagement with the ground producing a dampening effect, said holder comprising:

A. a back plate provided with ground-engaging feet formed of material serving to acoustically isolate the back plate from the ground whereby the back plate floats acoustically and is free to vibrate,

B. a top plate supported in spaced relation above said back plate to define an open zone therebetween,

C. a sound post interposed between and acoustically inter-

coupling said top plate and back plate, each plate being characterized by multiple natural resonance frequencies, and

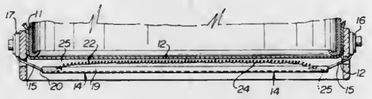
D. a socket for receiving the end-pin of the instrument and mounted on said top plate whereby said back plate and said top plate are excited into vibration by instrument vibrations transmitted thereto through said end-pin and said holder serves to acoustically reinforce said instrument without damping, said top and back plates being formed of material acoustically compatible with the top and back plates of the instrument being played.

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## 4,018,130
## SNARE ASSEMBLY

**Frank J. Gariepy, Sr., Montreal, Canada, assignor to John H. Chartbrand and Robert E. Chartbrand, Ottawa, Canada, a part interest to each**

**Filed Jan. 20, 1976, Ser. No. 650,681**
**Int. Cl.² G10D** *13/02*
**U.S. Cl. 84—415** **9 Claims**



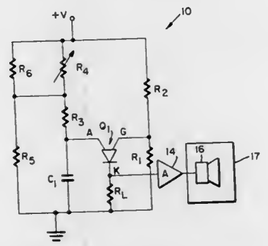
1. A snare assembly for use with a snare drum, comprising an elongate mounting frame; a pair of carrier means positioned at locations spaced longitudinally of said mounting frame; and a series of generally parallel snare strands extending longitudinally between and each attached at opposite end portions thereof to respective ones of said carrier means, said carrier means supporting said snare strands in an outwardly bowed configuration such that the lengths of the snare strands between said end portions project outwardly of said mounting frame and said carrier means and can be engaged resiliently against the lower drum head of the snare drum while the carrier means and mounting frame remain out of contact with the lower drum head.

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## 4,018,131
## ELECTRONIC METRONOME

**Robert L. Cannon, 17 Lakeview Terrace, Waltham, Mass. 02154**

**Filed May 27, 1975, Ser. No. 581,132**
**Int. Cl.² G04F** *5/02*; **G08B** *3/10*
**U.S. Cl. 84—484** **9 Claims**



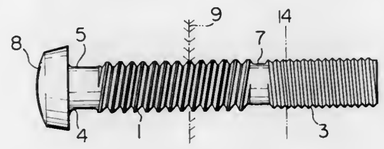
1. An electronic metronome comprising:
circuit means providing a plurality of pulses;
timing means in circuit association with said circuit means for controlling the rate of said pulses and including:
a linear potentiometer;
a compensation network for providing a non-linear sequence of pulse rates in response to uniform incremental adjustment of said linear potentiometer to provide a non-linear sequence of tempi calibrations according to Maelzel markings;
means for manual adjustment of said linear potentiometer; and
output means operative in response to said pulses to provide an output indication of tempo.

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## 4,018,132
## CONNECTING-ROD BOLT

**Michio Abe, Kasugai, Japan, assignor to Tokai Cold Forming Co., Ltd., Kasugai, Japan**

**Continuation of Ser. No. 480,378, June 18, 1974, abandoned, which is a continuation of Ser. No. 389,245, Aug. 17, 1973, abandoned, which is a continuation of Ser. No. 172,974, Aug. 23, 1971, abandoned. This application July 24, 1975, Ser. No. 598,725**
**Int. Cl.² F16B** *27/00*
**U.S. Cl. 85—1 L** **4 Claims**



1. A self-tightening fastening bolt for interconnecting separable members having coaxial, bolt-receiving bores therein to present an assembly, the latter being subjected to tensile loads tending to separate said members and elongate said bolt, said fastening bolt being of unitary construction and comprising:
an elongate bolt shank;
a bolt head at one end of said shank for engaging one of said members;
a fastening thread portion presenting fastening threads adjacent the opposite end of said shank configured for fastenably engaging complementally threaded fastening means forming a part of said assembly; and
a fitting thread portion in the form of a single, continuous fitting thread between said head and fastening thread portion and spaced from the latter with an unthreaded shank portion therebetween, said fitting thread portion being of length to bridge said members when the bolt is operably positioned within said coaxial bores and of a diameter to fit closely within the latter,
the root diameter of said fitting thread portion being less than that of said fastening thread portion, and less than the diameter of said unthreaded shank portion, for causing the majority of the elastic elongation of said bolt under said tensile loads to occur in the region of said fitting thread portion,
the threads of said fitting and fastening thread portions being reversed in hand relative to each other, with the pitch of the fitting thread being greater than the pitch of the fastening threads, for causing said bolt to twist during said tensile load-induced elongation in a direction for screwing said fastening thread portion into said fastening means to thereby self-tighten said bolt.

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## 4,018,133
## CAPPED WHEEL NUT

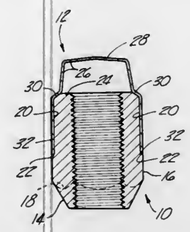
**Joseph W. Chaivre, and Albert A. Jadach, both of Royal Oak, Mich., assignors to Towne Robinson Fastener Company, Southfield, Mich.**

**Filed Oct. 31, 1975, Ser. No. 627,613**
**Int. Cl.² F16B** *37/14*
**U.S. Cl. 85—35** **10 Claims**

1. A capped nut for use with a vehicle axle hub having a projecting stud and a wheel having conical depressions



adapted to surround the stud, comprising: a nut body having a conical end adapted to mate with said depression and polygonal wrench flats forming the body sides, the wrench flats being recessed adjacent the end opposite to the conical end, the recessed wrench flats being parallel to non-recessed wrench flats adjacent the conical end and extending closer to the



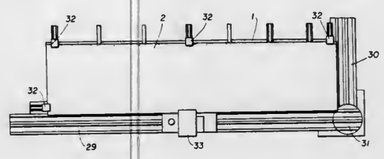
central axis of the nut than the non-recessed wrench flats and being joined to the non-recessed wrench flats by a shoulder extending transversely to the axis of the nut; and a sheath formed of sheet material having a section closing the end of the nut opposite to the conical end and sections extending over the recessed wrench flats with the edge of the sheath in proximity to said shoulder.

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## 4,018,134
## APPARATUS FOR TRIMMING AND EDGE-CUTTING A PLATE-LIKE METALLIC WORKPIECE

**Ernst Linsinger, Steyrermuhl, Austria**

**Division of Ser. No. 400,266, Sept. 24, 1973, Pat. No. 3,922,951. This application Aug. 18, 1975, Ser. No. 605,304**
**Int. Cl.² B23C** *3/12*; **B24B** *9/04*
**U.S. Cl. 90—15 R** **6 Claims**



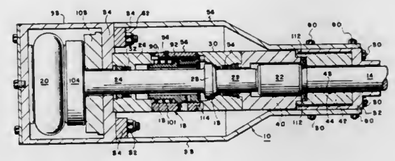
1. Apparatus for trimming and edge cutting a plate-like metallic workpiece having a major face and a plurality of edges narrower than said major face and bounding the same, comprising:
a. a base;
b. a first, straight, elongated guide track fixedly mounted on said base;
c. supporting means on said base for supporting said workpiece in a position in which said face extends in a predetermined plane parallel to said first guide track;
d. a second straight guide track fixedly mounted on said base, said second guide track being elongated at right angles to said first guide track and parallel to said plane;
e. interconnecting means interconnecting said first and second guide tracks in a common plane, said interconnecting means including a turntable;
f. at least one milling cutter unit, said at least one unit including
1. a carrier,
2. engagement means shaped for engagement with each of said first and second guide tracks on said carrier engagement with at least one said guide tracks for longitudinally guided movement of said at least one unit on the engaged guide track,
3. a milling cutter,
4. guide means for guiding said milling cutter on said cutter transversely to the direction of elongated of the engaged guide track toward and away form an edge of said workpiece.

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## 4,018,135
## HYDRAULICALLY POWERED IMPACT DEVICE

**Raymond E. Lance, Fort Worth, and Ronald N. James, Arlington, both of Tex., assignors to Construction Technology, Inc., Grand Prairie, Tex.**

**Filed Dec. 26, 1973, Ser. No. 428,093**
**Int. Cl.² F01B** *7/18*; **F01L** *17/00*; **F16J** *15/18*
**U.S. Cl. 91—321** **14 Claims**



1. A hydraulic impact device comprising
a cylinder member having a lower gland portion, a center portion having a stepped bore with an upper section having a diameter less than a lower section, and an upper gland portion,
a hammer member reciprocally disposed in the cylinder having lower and upper shaft portions slidably and sealingly received in the lower and upper gland portions, respectively, and a piston portion disposed generally in the center portion, the piston portion having a diameter less than the maximum diameter of the stepped bore to permit fluid to bypass the piston within the bore and permit the hammer member to be driven downwardly by an external biasing force,
a sleeve valve reciprocally disposed within the cylinder member around the upper shaft portion, the sleeve valve having a first peripheral seal with the upper section of the stepped bore and a second peripheral seal with the lower section of the stepped bore to form an annular cavity between the first and second peripheral seals, the sleeve valve and the cylinder member, and a first annular portion on said sleeve valve forming a seal with the upper face of the piston section, the effective diameter of the first annular seal being less than the diameter of the lower section of the stepped bore and greater than the diameter of the upper section of the stepped bore,
high pressure port means continually communicating with the interior of the cylinder below the second peripheral seal and with the annular cavity formed by the first and second peripheral seal means, the sleeve valve, and the clyinder member,
low pressure port means communicating with the interior of the sleeve valve between the first peripheral seal and the first annular seal, and
means for separating the sleeve valve from the piston portion at the top of the stroke of the piston to break the first annular seal and bypass fluid around the piston portion and within the bore to allow the piston portion to be driven downwardly by the external biasing force applied to the hammer member.

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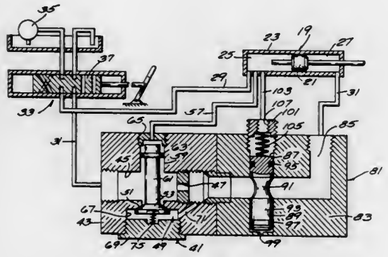
## 4,018,136
## HYDRAULIC APPARATUS FOR CONTROLLING MOVEMENT OF A MEMBER UNDER LOADING

**Lorell D. Kaetterhenry, Rte. No. 1, Hartford, Wis. 53027**

**Filed Dec. 18, 1974, Ser. No. 533,976**
**Int. Cl.² F15B** *11/08*, *13/042*
**U.S. Cl. 91—420** **1 Claim**

1. Apparatus including a supporting frame, a member mounted on said frame for biased movement in one direction,

a hydraulic cylinder-piston assembly connected between said frame and said member and including a piston and a cylinder which houses said piston and includes opposed ends, a first fluid line extending from the one of said cylinder ends toward which said piston moves incident to movement of said member in said one direction, a second fluid line extending from the other of said cylinder ends, a source of pressure fluid, a control valve operatively connected to said source of pressure fluid and to said first and second fluid lines and including selectively operable means for supplying fluid to said one cylinder end and draining fluid from said other cylinder end and for supplying fluid to said other cylinder end and draining fluid from said one cylinder end, a first safety valve in said first fluid line responsive to pressure less than atomspheric and comprising a first body including therein a first main bore, and a cross bore extending transversely of and communicating with said first main bore, a first valve member movable in said cross bore between a position blocking said first main bore and a position permitting flow through said first main bore, said valve member including a face against which pressure can be applied to displace said valve member relative to said positions, means biasing said first valve member toward said flow permitting position, and first hydraulic means operatively



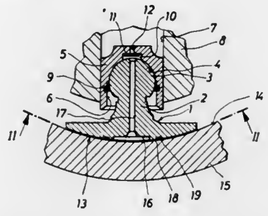
connected to said first valve member for displacing said first valve member from said flow permitting position against the action of said means biasing said first valve member and including a first conduit communicating with said valve member face and with said other cylinder end for transmitting said pressure less than atmospheric, and a second safety valve responsive to pressure greater than atmospheric in said first fluid line and comprising a second body including therein a second main bore having therein a restriction, a duct in said second body communicating with said second main bore in by-passing relation to said restriction and including therein a valve seat, a second valve member movable relative to a position in engagement with said valve seat so as to close said duct, said second valve member including a face against which pressure can be applied to displace said second valve member relative to said duct closing position, means biasing said second valve member toward said duct closing position, and second hydraulic means operatively connected to said second valve member for displacing said second valve member from said duct closing position against the action of said means biasing said second valve member and including a second conduit communicating said second valve member face with said other cylinder end.

**4,018,137**

## PISTON MACHINE CONSTRUCTION

**Hans-Jürgen Fricke, Stuttgart; Gerhard Nonnenmacher, Korntal; Walter Robeller, Boblingen, and Günter Kersten, Stuttgart, all of Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany**

**Division of Ser. No. 432,742, Jan. 11, 1974, Pat. No. 3,948,149. This application Sept. 4, 1975, Ser. No. 610,402**
**Claims priority, application Germany, Feb. 17, 1973, 2307997**
**Int. Cl.² F01B** *13/06*
**U.S. Cl. 91—488** **9 Claims**



**1.** In a radial piston machine of the type having a housing, a reciprocable piston in said housing and having an axial end portion, and a piston-reciprocatng element having a glide surface located opposite said end portion with one of said elements and piston being movable relative to the other in a manner resulting in the reciprocation of said piston, a combination comprising a glide shoe articulately connected to said end portion of said piston and having a glide face in gliding contact with said glide surface, said glide face being of substantially rectangular outline and having two spaced longitudinal edges and two spaced transverse edges which extend from one to the other of said longitudinal edges, said glide face being formed with a polygonal recess which communicates via a passage with a source of pressure fluid, a sealing rim of substantially constant width surrounding said recess, and a plurality of face portions which are located outwardly of said sealing rim and configurated so that hydrodynamic pressure fields develop between said face portions and the respectively juxtaposed surface portions of said glide surface, said glide face being further provided with a pair of additional recesses each extending from one of said transverse edges inwardly towards said recess, and said glide face having two strip-shaped wider surface portions each extending along the entire length of one of said longitudinal edges, and two strip-shaped narrower surface portions each extending from one to the other of said wider surface portions intermediate said recess and one of said additional recesses, said rim being constituted by said narrower surface portions and by parts of said wider surface portions.

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**4,018,138**

## RADIAL PISTON PUMP/MOTORS

**Rollin Douglas Rumsey, 138 Summer St., Buffalo, N.Y. 14222**

**Division of Ser. No. 108,089, Jan. 20, 1971, Pat. No. 3,935,794. This application Sept. 22, 1975, Ser. No. 615,405**
**Int. Cl.² F01B** *13/06*
**U.S. Cl. 91—488** **15 Claims**

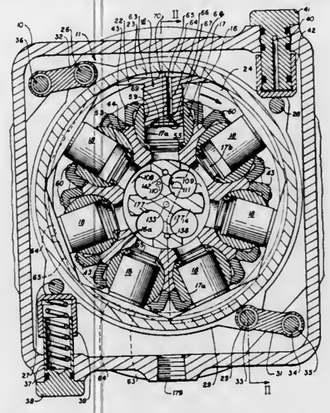
**1.** In a pump or motor assembly including a housing providing a chamber having therein hydraulically driven and driving members provided with telescoped slidably relatively rotative surfaces whereby one of the members supports the other member for relative running rotation, the members being liable to be affected by off-center forces tending to shift the members eccentrically during rotation, and one of said members having passage means for hydraulic pressure fluid during said running rotation:

hydraulic bearing means between said surfaces at substantially opposite sides of the axis of rotation of said surfaces;



means effecting hydraulic pressure fluid communication between said passage means and said bearing means; and

valve means for controlling distribution of hydraulic pressure fluid from said passage means through said communication means to said bearing means to counteract the off-center forces which act to relatively shift said members eccentrically and thereby restrict the bearing means



at one side of said axis relative to the bearing means at the other side of said axis;

said valve means operating to increase the flow of hydraulic pressure fluid to the bearing means at the restricted side and to substantially proportionately decrease the flow of hydraulic pressure fluid to the bearing means at said other side, whereby to maintain substantially running rotation of the members.

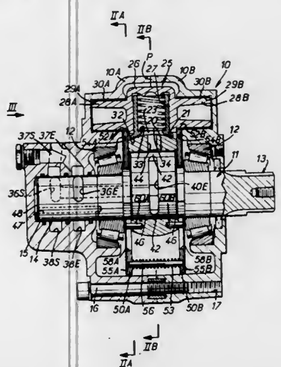
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**4,018,139**

## ROTARY HYDRAULIC MACHINE

**Jean Florent François Marcel Robert Landreau, Auzay, France, assignor to Societe Anonyme Francaise du Ferodo, Paris, France**

**Filed July 29, 1975, Ser. No. 600,183**
**Claims priority, application France, Aug. 8, 1974, 74.27514**
**Int. Cl.² F01B** *13/06*
**U.S. Cl. 91—490** **16 Claims**



**1.** A rotary hydraulic machine comprising a casing, a shaft mounted for rotation in said casing, said shaft having an eccentric bearing surface intermediate its ends, a plurality of cylinder-piston assembly units disposed radially of and spaced around and exerting radial thrust toward said bearing surface, means individually oscillatingly mounting each of said assembly units on said casing about an axis substantially parallel to said shaft so that the cylinders and pistons of the cylinder-piston assembly units reciprocate relative to each other in a predetermined order upon rotation of said shaft, inlet and outlet passageways disposed in said shaft parallel to the axis thereof for circulating hydraulic fluid through said machine, angularly spaced inlet and outlet cavities in said shaft in communication with said inlet and outlet passageways respectively and opening onto said bearing surface, protruding change-over zones formed on said bearing surface effectively separating said inlet and outlet cavities from each other, and a distribution ring received on said bearing surface cooperating with said change-over zones and disposed between said bearing surface and said cylinder-piston assembly units, said distribution ring having a plurality of generally radial passages each facing and communicating with one of said cylinder-piston assembly units and also communicating alternately with said inlet and outlet cavities, and means permitting eccentric circular movement of said distribution ring while preventing its rotation with said bearing surface on said shaft comprising at least one annular plate arranged around said shaft and adjacent to said distribution ring member, there being a plurality of arcuate guiding openings in said annular plate and a corresponding plurality of guiding pin means in contact therewith, said pin means being fixed relative to one of said casing and distribution ring.

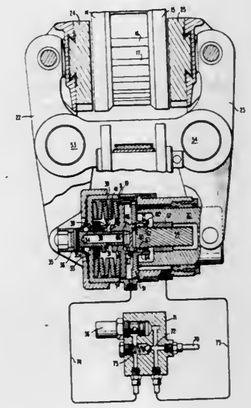
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**4,018,140**

## HYDRAULIC DISC BRAKE ACTUATOR

**Thomas H. Engle, Cape Vincent, N.Y., assignor to General Signal Corporation, Rochester, N.Y.**

**Filed June 17, 1974, Ser. No. 480,439**
**Int. Cl.² F01B** *3/00*
**U.S. Cl. 92—31** **3 Claims**



**1.** An improved brake actuator comprising:

a fluid pressure motor having a reciprocating piston member for effecting brake applications;

spring motor means normally restrained by said fluid pressure motor for urging said piston to effect said applications in response to a reduction in pressure in said fluid pressure motor;

threaded means for threadably engaging said piston member along its axis of reciprocation, said threaded means establishing a frictional resistance with said piston means and including means for selectively, manually rotating said threaded means in a first direction to retract said piston member and compress said spring motor means following brake application by said spring motor or in a second direction to extend said piston member under the action of said spring motor means to effect a brake appli-

cation without repressurization of said fluid pressure motor; and

resilient torque means engaging said threaded means and being wound during rotation in said first direction to produce a torque initially insufficient to overcome said frictional resistance when said pressure released motor is depressurized but adequate for automatically rotating said threaded means in said second direction when said pressure released motor has been pressurized to compress said spring motor means and to reduce the frictional force between said piston and said threaded means sufficiently to thereby allow said threaded means to rotate under the influence of said resilient means.

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**4,018,141**

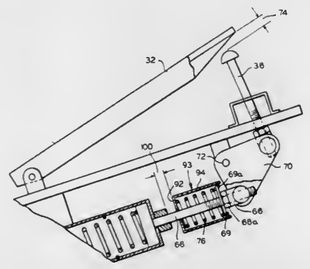
## VEHICLE SPEED CONTROL

**Ralph M. Duttarer, St. Joseph, and Richard R. Hushower, Buchanan, both of Mich., assignors to Clark Equipment Company, Buchanan, Mich.**

**Division of Ser. No. 488,336, July 15, 1974, Pat. No. 3,954,152. This application Aug. 11, 1975, Ser. No. 603,409**

**Int. Cl.² F01B** *11/02*

**U.S. Cl. 92—85 A** **6 Claims**



1. A control device for a vehicle comprising a hollow cylinder having a head end and a rod end, a piston reciprocal in the said cylinder, a rod secured to the said piston for reciprocal movement therewith and projecting through the said rod end, an abutment member connected to the said rod for reciprocal movement responsive to movement of the said rod, a first compression spring located between the said head end and the said piston urging the piston toward the said rod end, a stop in the said cylinder limiting the movement of the said piston toward the said head end, and resisting means carried by said rod externally of said cylinder for resisting movement of said piston toward said stop, the said resisting means comprising a washer at a predetermined location on said rod, a housing surrounding the said rod and encompassing the said washer and including abutment means for preventing separation of said housing and said washer, the said housing extending from said washer toward said cylinder and having an end portion adjacent the cylinder, and a second compression spring located internally of said housing between said washer and said end portion.

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**4,018,142**

## BOX-BAG WITH PERMANENTLY SECURED HANDLE

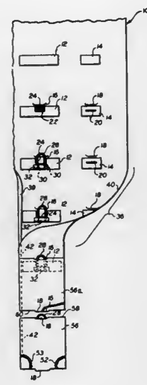
**Leonard E. Canno, New York, N.Y., assignor to Equitable Bag Co., Inc., Long Island City, N.Y.**

**Filed Apr. 19, 1976, Ser. No. 677,896**

**Int. Cl.² B31B** *1/86, 49/04*

**U.S. Cl. 93—35 H** **11 Claims**

1. The method of making a container with a bag-like lower end portion and a top portion that is constructed with features of a folding box, including advancing a web in the direction of its length, making successive transverse cuts through the web at locations that correspond to a mid-region of the top of successive container blanks that are made from the web, securing reinforcing sheets to the web over areas that will form the top portion at the front and rear of each container blank, cutting away at least a part of the front top panelarea for a distance extending down from the upper end of the container blank and of a width greater than the width of a handle that is to be applied to the upper part of the front of the container, forming a slot through the reinforcing sheet of the rearward top area in a direction transverse of the length of the



web and at a distance below the top of the container blank approximately equal to the depth of the cut-away part of the front top panel area, applying a handle to the front top panel area with the handle permanently connected to said front top panel area at a location below the level of the cut-away part, folding the web lengthwise to form container blanks, and severing successive blanks from the folded web at the top end of the rear top panel area.

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**4,018,143**

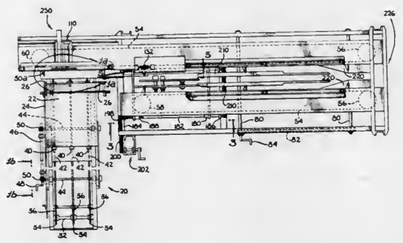
## CARDBOARD BOX ERECTING MACHINE

**S. Virgil Dice, Jr., Rowland Heights, and Harry R. Lobdell, Rolling Hills Estate, both of Calif., assignors to Cal Crown Corporation, Los Angeles, Calif.**

**Filed May 2, 1975, Ser. No. 573,895**

**Int. Cl.² B31B** *5/02, 5/60, 1/80*

**U.S. Cl. 93—36.3** **2 Claims**



1. A case erector comprising:

a transport means for transporting boxes through said case erector;

a magazine means for holding a plurality of folded boxes;

a pull-out station means for sequentially removing individual folded boxes from said magazine means and disposing said boxes so as to be received by said transport means;

a set-up station means for sequentially receiving folded boxes from said transport means and opening said boxes;



first folding means, located at said set-up station, for folding the lateral flaps on the bottom of each box, said first folding means comprising (a) first and second members, (b) actuating means for moving each of said first and second members from a first lower position through a path of travel generally upward and toward each other to intercept and fold the lateral flaps on a box, (c) support means coupled to said first and second members, and (d) adjustment means for adjusting the position of said support means in accordance with the characteristics of the boxes being erected wherein said adjustment means comprises at least one lead screw, said support means having at least one lead screw follower cooperatively disposed with respect to said lead screw whereby said support means is positioned by the rotation of said lead screw;

application means for applying adhesive to at least one flat of each box as said boxes are advanced by said transport means;

second folding means for encouraging the longitudinal flaps of each box into the folded position as each box is advanced by said transport means; and

a press-station means for pressing the folded lateral and longitudinal flaps into firm face to face abutment to secure good adhesion of said flaps.

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**4,018,144**

## FLAP FOLDING MECHANISM FOR CARTON MAKING MACHINES

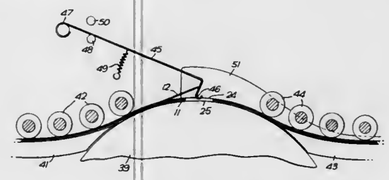
**Colin Stutt, Bristol; Anthony John Noble, Skipton, and Reginald Arthur Ford, Bristol, all of England, assignors to Masson Scott Thrissell Engineering Limited, Bristol, England**

**Filed July 25, 1975, Ser. No. 599,252**

**Claims priority, application United Kingdom, Aug. 2, 1974, 34123/74**

**Int. Cl.² B31B** *1/52*

**U.S. Cl. 93—52** **12 Claims**



1. A carton making machine including means for conveying a succession of carton blanks along a feed path, each blank comprising a body portion and a flap connected to said body portion at the leading end thereof, as considered in the direction of movement, along a crease line at right angles to said direction, and folding means to fold said flap about said crease line, wherein said feed path is of convex configuration, in the direction of movement of said blanks, along a section of its length, so that said flap projects tangentially to the curve of said convex section of said feed path, and said folding means is positioned adjacent said convex section of said feed path for engagement by said projecting flap so that said flap is folded by said folding means as said carton blank is fed along said convex section of said feed path by said conveying means.

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**4,018,145**

## APPARATUS FOR DRAINING WHEY FROM CHEESE

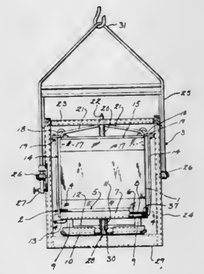
**Otis O. Hensel, P.O. Box 185, Hustisford, Wis. 53084**

**Filed Aug. 19, 1974, Ser. No. 498,512**

**Int. Cl.² A01J** *11/06;* **B30B** *9/06;* **B01D** *39/10*

**U.S. Cl. 99—458** **3 Claims**

1. An apparatus for draining whey from cheese curd, comrising an open ended container to contain the cheese curd, said container having a generally rectangular cross section, a frame to support the container and including a base, a support plate mounted on the base and enclosing the lower end of said container, a removable lid to enclose the open top of the container and having a series of openings therein, a cradle including a first cradle member and a second cradle member to support the frame, first journaling means for journaling the base of the frame with respect to the second cradle member, second journaling means for journaling the lid with respect to the second cradle member, said first and second journaling means being arranged to permit rotation of said frame and said container, means pivotally connecting the second cradle means to the first cradle member for moving the frame and the container from a generally upright position to an inclined position, said support plate having a series of downwardly extending grooves, said grooves having a generally V-shaped cross section and terminating at a relatively sharp lower edge



and having a greater depth than width, each groove having at least one open end disposed at the peripheral edge of the support plate, said support plate also being provided with a series of drain holes, the whey draining through said holes and along said grooves and being discharged through said open ends, at least a first of said grooves being located along a side extremity of said support plate and said first groove terminating in a side edge, the upper extremity of said side edge being at a lower level than the upper extremity of the portion of the support plate located adjacent said first groove, the lower end of the container being spaced upwardly from said side edge to provide a clearance therebetween, and a plastic liner disposed on the inner surface of the container and having a lower end doubled back over the lower open end of the container and disposed within said clearance.

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**4,018,146**

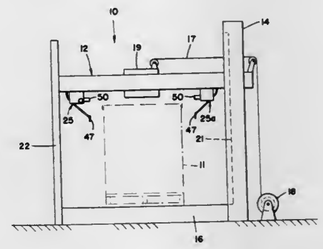
## STRAP SNUBBER HORN

**Elferd L. Evans, 1235 W. I St., Oakdale, Calif. 95361**

**Filed Apr. 16, 1976, Ser. No. 677,688**

**Int. Cl.² B65B** *13/04*

**U.S. Cl. 100—26** **11 Claims**



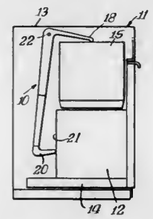
1. In a strapping machine for affixing a tautened strap under, up the sides of and across the top of a load, said machine having a vertically movable platform and a strapping head carried by said platform, said strapping head being operable to

tauten the straps around the load and clamp the ends of the tautened strap together, the improvement comprising:

a. a pair of probes mounted on said platform on opposite sides of said strapping head and positioned to intercept said strap during initial strapping operation;
b. means for positioning said probes adjacent opposed upper edges of said load;
c. means for holding said probes against movement relative to said platform when said probes are positioned adjacent said opposed upper edges of said load; and
d. means for removing said probes from between said strap and said load after tautening and clamping of said strap.

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**4,018,147**
**REFUSE COMPACTOR WITH AUTOMATIC DRAWER OPENER**
**Roque Denis Marcade, Stevensville, and Vincent Paulraj Gurubatham, St. Joseph, both of Mich., assignors to Whirlpool Corporation, Benton Harbor, Mich.**
**Filed July 22, 1975, Ser. No. 598,050**
**Int. Cl.² B30B *15/14***
**U.S. Cl. 100—45** **11 Claims**

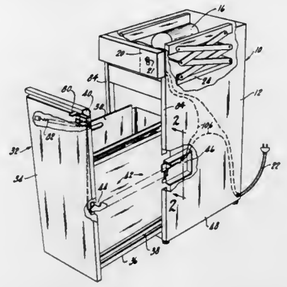


1. In a refuse compactor having a receptacle for receiving refuse to be compacted, means for movably mounting the receptacle for selective manual positioning in a compacting position and an exposed refuse-receiving position, a ram, and powered means for selectively moving the ram in a compacting cycle from a retracted position into said receptacle in said compacting position for compacting refuse in the receptacle, said powered means returning the ram to the retracted position with the receptacle retained in the compacting position upon completion of the compacting cycle, the improvement comprising means for selectively causing an operation of said powered means in an opening cycle to cause said receptacle to move from said compacting position toward said exposed position.

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**4,018,148**
**LATCH FOR TRASH COMPACTORS**
**David W. Wolbrink, Hartford, Wis., assignor to Broan Manufacturing Co., Inc., Hartford, Wis.**
**Filed Sept. 16, 1975, Ser. No. 613,923**
**Int. Cl.² B30B *15/14***
**U.S. Cl. 100—53** **7 Claims**

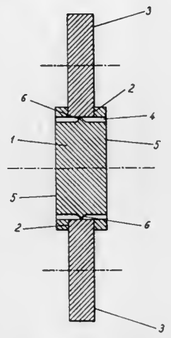
1. In a trash compactor having means positioning a compaction means energized from a power source for movement along a compaction axis into and out of a trash containing receptacle, said compactor having panel means movable with respect to the positioning means between an access position and a blocking position, an improved latch means for the panel means comprising: catch means mounted on one of said positioning means and panel means insertable in an engagement means mounted on the other of said positioning means and panel means, one of said catch means and engagement means being mounted at a pivot point for pivotal movement about an axis perpendicular to the direction of insertion of said catch means into said engagement means, said catch means having a portion extending along the direction of insertion and containing a notch having a surface normal to the direction of insertion; said engagement means having a bar engagable with said extension portion and insertable in said notch in abutment with the normal surface by the pivotal movement of one of said catch means or engagement means upon insertion of said catch means in said engagement means for restraining said catch means from removal from said engagement means for locking said panel means in the blocking position, the location of the abutting surface and bar being



displaced from said pivot point in a direction normal to the direction of insertion such that forces tending to move the panel means to the access position tend to pivot the movable element into the engaged condition, said engagement means including switch means interposed between said compaction means and said power source and operable by the movement of said catch means to the restrained state for rendering said compaction means operable.

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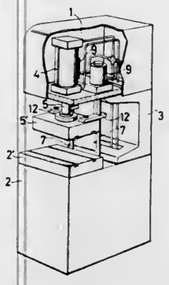
**4,018,149**
**PRESS FOR PRODUCTION OF A DRY FODDER**
**Bjorn Adler Zeuthen Bruun, Majlund, 9870 Sindal, Denmark**
**Filed Oct. 21, 1974, Ser. No. 516,741**
**Claims priority, application Denmark, Oct. 22, 1973, 5726/73; Jan. 29, 1974, 448/74; Oct. 8, 1974, 5254/74**
**Int. Cl.² B30B *3/04, 3/06, 11/12***
**U.S. Cl. 100—160** **16 Claims**



1. A press for compressing vegetable material beyond the yielding point to produce dry fodder, comprising a cylindrical matrix having at least one radially extending flange with a wall extending at right angles to a rotational axis of said matrix and defining an annular circumferential stepped portion adjacent said wall having a smaller diameter than said flange and rotatable pressing means rotatable about an axis parallel to the axis of said matrix and pressing said matrix in said stepped portion, said matrix having axially extending cutouts connecting an axially extending cylindrical surface of said stepped portion to at least the side of said matrix containing said flange and having a length greater than the thickness of said flange.



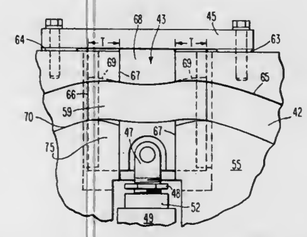
**4,018,150**
**OPEN-SIDED PRESS**
**Seiji Shiokawa, 110-6 Matsumoto, Mishima, Shizuoka, Japan**
**Filed June 11, 1975, Ser. No. 585,803**
**Int. Cl.² B30B *1/32***
**U.S. Cl. 100—231** **3 Claims**



1. In an open-sided press which comprises an upper frame having a rear and a forward end, a main cylinder at the forward end, a lower frame having a rear end, the lower frame being opposed to said upper frame across a vertical spacing, and a shank frame attached integrally to the rear ends of said upper and lower frames so as to provide support therefor, the press being adapted to produce pressure by hydraulically actuating said main cylinder, the improvement wherein said open-sided press further comprises a corrective mechanism having an auxiliary cylinder means including at least one auxiliary cylinder disposed parallel to the main cylinder of the upper frame between said main cylinder and the shank frame, a rod projected from the forward end of each auxiliary cylinder and forming a tension bar fastened onto the lowerframe, and flow path means adapted to deliver the hydraulic actuating fluid to the auxiliary cylinder means in a direction opposite that of the fluid in the flow path to the main cylinder.

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**4,018,151**
**APPARATUS FOR VARYING A CYCLIC PATH**
**Joseph J. Urban, Pleasantville, N.Y., and Robert H. Hoenes, Holland, Pa., assignors to Crown Cork & Seal Company, Inc., Philadelphia, Pa.**
**Filed Dec. 8, 1975, Ser. No. 638,644**
**Int. Cl.² B41F *17/22***
**U.S. Cl. 101—40** **8 Claims**

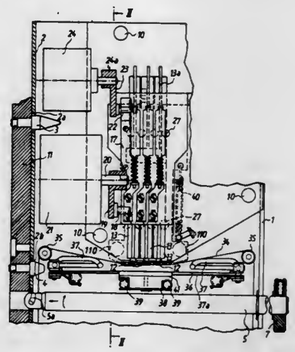


1. Apparatus for transporting a series of cylindrical containers past a printer station to allow a coating to be deposited upon the containers, comprising:

a carrier for conveying containers including a plurality of mandrels for engaging ones of the containers, a plurality of support means movably locating said mandrels on said carrier, and a plurality of followers each carried by ones of said support means;
a cam assembly defining an endless groove of substantially constant width for engaging said followers to cause said mandrels to follow a predetermined path, said groove comprising inner and outer side walls and being interrupted by a generally transverse slot having a T-shaped cross-section to form a T-slot, the opposed side walls of reduced height intercepted by the lateral segments of the T-slot diverging by a distance *d* to broaden the groove and form a pair of transition zones;
a movable portion having a T-shaped cross-section and slidably received in said T-shaped slot, the center segment of said T-shaped portion defining upstanding side walls of a height generally the same as the height of said groove, the edge segments at either side of the movable portion defining side walls of a height substantially less than the depth of said groove and overlying the opposed side walls of reduced height, the side walls defined by the edge segments of said movable portion diverging by said distance *d*; and
means coupled to said movable portion for controllably displacing said movable portion by said distance *d*.

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**4,018,152**
**APPARATUS FOR APPLYING INDICIA ON PHOTOGRAPHIC PAPER OR THE LIKE**
**Gunter Heidrich, Munich, Germany, assignor to AGFA-Gevaert, A.G., Leverkusen, Germany**
**Filed Sept. 18, 1975, Ser. No. 614,634**
**Claims priority, application Germany, Sept. 21, 1974, 2445279**
**Int. Cl.² B41J *3/54, 7/48, 29/38***
**U.S. Cl. 101—45** **17 Claims**

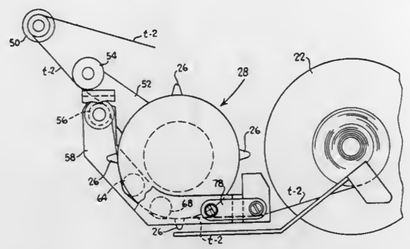


1. Apparatus for applying indicia to carriers of information, particularly for applying colored impressions, to rear sides of webs of the type having a layer of photosensitive material at the front side thereof, comprising a frame; a housing mounted in and movable up and down relative to said frame; means for moving said housing to a raised first position; means for releasing said housing from said first position so that it descends from said first position by gravity; a support for information carriers located below said housing, a deformable source of coloring matter intermediate said housing and said support; a plurality of modules vertically movably mounted in said housing, each of said modules having a holder for a plurality of symbols and each of said holders being indexible to move a selected symbol opposite said source; biasing means for yieldably opposing downward movement of said modules relative to said housing; and means for intercepting the descending housing in a second position in which said selected symbols are at least slightly spaced from the carrier on said support whereby said modules begin to move downwardly by inertia relative to said housing and against the opposition of said biasing means and said selected symbols press said source against the carrier on said support so that the source applies to the carrier indicia constituting reproductions of selected symbols.

## 4,018,153
## TAPE HANDLING APPARATUS UTILIZING TANGENTIAL WEB CONTACT FOR POSTAGE METER

**Gerald C. Freeman, Darien, Conn., assignor to Pitney-Bowes, Inc., Stamford, Conn.**

**Filed May 16, 1975, Ser. No. 578,121**
**Int. Cl.² B41F** *1/08*
**U.S. Cl. 101—93** **3 Claims**

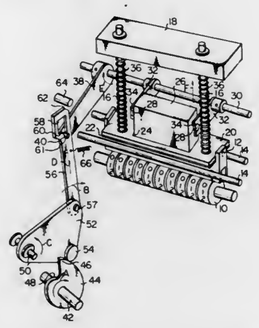


1. In an apparatus for advancing a multi-layered tape having a plurality of spaced perforations along an edge thereof through a predetermined distance said apparatus being of the type wherein said tape is advanced along a support means by a drive means, and a control means initiates the operation of said drive means to advance said tape and deactivates the operation of said drive means after said tape has advanced through a predetermined distance, and wherein said control means includes a rotatable wheel having radial projections disposed at spaced intervals around its circumference to engage the spaced perforations along the edge of the tape as the tape is advanced, wherein the improvement comprises guide means adjacent to the circumference of said wheel for maintaining said tape in a finite series of at least two substantially tangential relationships to the circumference of said wheel in the path of rotation of said radial projections, each of said tangential relationships in said series being separated from any other by a portion of said tape strip not in tangential relationship with said wheel, whereby as said tape is advanced said wheel is rotated by the perforations in said tape engaging said projections on said wheel.

## 4,018,154
## PRINTING APPARATUS FOR CASH REGISTER

**Jyusei Matsumoto; Minoru Itoh; Chuzi Ishikawa, and Yoshio Hashimoto, all of Tokyo, Japan, assignors to Ricoh Co., Ltd., Tokyo, Japan**

**Filed Feb. 11, 1975, Ser. No. 549,118**
**Claims priority, application Japan, Feb. 14, 1974, 49-17104**
**Int. Cl.² B41J** *9/02*
**U.S. Cl. 101—93.02** **6 Claims**



1. Printing apparatus comprising, in combination:

a printing member engageable with a printing medium to perform printing;

a mechanism for moving the printing member into and out of engagement with the printing medium, the mechanism including biasing means to resiliently urge the printing member to engage with the printing medium in a manner causing the printing member to rebound from the printing medium after engagement therewith, an engaging member being releasably disposed between the biasing means and the printing member, said engaging member being mounted for movement towards and away from said printing member, and a stopper member disposed in a position spaced from said printing member and arranged to stop movement of the engaging member before the printing member engages with the printing medium so that the printing member is accelerated toward the printing medium by the biasing means through the engaging member and the printing member continues movement due to inertia to engage with the printing medium after the engaging member is stopped by the stopper member;

catching means operable to catch the printing member upon rebound from the printing medium and hold the printing member between a position in contact with the printing medium and a position in contact with the engaging member;

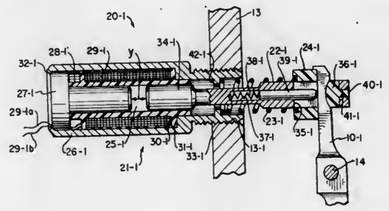
release means engageable with the mechanism and catching means to release and reset the catching means; and

a motor driven cam shaft carrying a cam, said cam being operably connected to said mechanism for initiating actuation of said mechanism, whereby rotation of said cam causes said mechanism to effect said movement of said printing member into engagement with the printing medium.

## 4,018,155
## BALLISTIC PRINT HAMMER ASSEMBLY

**N. Allen Cargill, Warminster, Pa., assignor to Mohawk Data Sciences Corporation, Herkimer, N.Y.**

**Filed June 2, 1975, Ser. No. 583,010**
**Int. Cl.² B41J** *9/30*
**U.S. Cl. 101—93.33** **8 Claims**



1. In a print hammer assembly having an elongated hammer with a head portion near one of its ends and being mounted on a rigid pivot, the other end of the hammer being coupled to the armature of an electromagnetic actuator, the actuation of the actuator imparting axial motion to the armature and rotational motion to the hammer about the pivot from a rest position to a printing position in which a printing medium and a type character situated on a type carrier are impacted into engagement, the improvement comprising:

said electromagnetic actuator including said armature and a stator having a generally cylindrical cavity which has a bottom and a mouth, said armature being elongated and partially disposed within said cavity so that a portion thereof extends outside the cavity mouth, an elongated slot extending through said portion, said slot having first and second ends, and a central armature cavity having a bottom and a mouth which opens into the first end of the armature slot;

the other end of the hammer extending through said slot and being adapted for motion within the slot between its first and second ends;



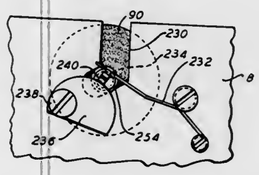
impression control spring means located within said armature cavity and arranged to continually urge said hammer toward the second end of the slot; and

means for actuating the stator to produce said axial and rotational motions of the armature and hammer, said armature bottoming against the stator cavity bottom prior to the hammer head portion reaching the printing position such that the hammer continues to rotate due to its rotational inertia toward the printing position in a free-flight condition, the duration of which is a function of the thickness of the print medium, the impression control spring means continually acting upon the other end of the hammer to decelerate the hammer during the free-flight condition so that the rotational hammer velocity is relatively higher for a thick print medium than for a thin print medium.

## 4,018,156
## DOCUMENT IMPRINTER

**Benjamin B. Giordano, Tenafly, N.J., assignor to Litton Business Systems, Inc., Belleville, N.J.**

**Filed Nov. 11, 1974, Ser. No. 522,958**
**Int. Cl.² B41F** *31/00*
**U.S. Cl. 101—106** **3 Claims**



1. In a document imprinter having a frame on which are mounted: printing means for printing information on documents, said printing means comprising a rotary printing unit including type faces to be inked to print said information on said documents; an inking roller mounted for rotation about a longitudinal axis of rotation and cooperable with said rotary printing unit to ink said type faces; axis-defining means defining said longitudinal axis of rotation of said inking roller, said axis-defining means being movably adjustable in a direction transverse to said longitudinal axis; means for adjusting in said transverse direction the position of said axis-defining means, and therefore of said longitudinal axis of rotation and said inking roller; said adjusting means comprising:

a plurality of individual, discrete locating surfaces each corresponding to a different transversely shifted position of said axis-defining means;

said locating surfaces defining in cross section a rectangle;

said axis of rotation of said inking roller intersecting said rectangle at a point which is eccentric relative to the center of said rectangle;

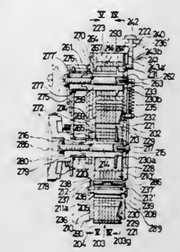
a reference surface means;

any selected one of said locating surfaces being selectively engageable with said reference surface means, each of said locating surfaces when engaged with said reference surface means being effective to cause said axis-defining means, and therefore said longitudinal axis of rotation and said inking roller, to be held in a different transversely shifted position, each such shifted position corresponding to a different one of said locating surfaces.

## 4,018,157
## PRINTING HEAD FOR PRINTING BAR CODE CHARACTERS

**Yo Sato, Tokyo, Japan, assignor to Kabushiki Kaisha Sato Kenkyusho, Tokyo, Japan**

**Filed Apr. 21, 1976, Ser. No. 678,761**
**Claims priority, application Japan, Apr. 26, 1975, 50-50221; Sept. 11, 1975, 50-109474**
**Int. Cl.² B41J** *1/60*
**U.S. Cl. 101—110** **22 Claims**



1. A printing head, which is mountable on a printing machine for selecting and printing indicia on labels, or the like, said printing head comprising:

a plurality of type rings; each said type ring having a periphery and having a plurality of sides around its periphery; each said type ring side carrying a respective printable indicium;

a common rotation support for all said type rings, around which each said type ring is rotatable independently of the other said type rings;

type ring pressing means engageable with said type rings to press said type rings into contact together, thereby eliminating clearance spaces between adjacent said type rings such that an individual said type ring is prohibited from rotation independently of the other said type rings; said type ring pressing means being positionable in a second manner with respect to said type rings so as to stop pressing said type rings together to permit clearance spaces to develop between said type rings, such that said type rings may be independently rotated;

type selector means movable with respect to said type rings along said common support to be in engagement with a selected said type ring, and when said type selector means is in engagement with a said type ring, said type selector means being movable to rotate that said type ring.

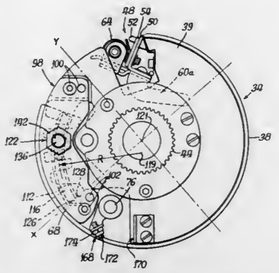
## 4,018,158
## UNIVERSAL MASTER CYLINDER FOR OFFSET PRESSES

**Lawrence A. Borneman, Lombard, Ill., assignor to A. B. Dick Company, Chicago, Ill.**

**Filed Dec. 29, 1975, Ser. No. 644,931**
**Int. Cl.² B41F** *1/28*
**U.S. Cl. 101—132.5** **17 Claims**

1. A master cylinder assembly for an offset or the like printing press including in combination: a hollow cylindrical member having a stationary master receiving surface of a predetermined length extending less than 360° about the periphery thereof, lead and trailing end master sheet holding means at opposite ends of said master receiving surface, one of said holding means mounted for movement between a first position adjacent a first end of said master receiving surface for accommodating a master sheet of a first predetermined length and a second position internally of said cylinder member away from said first end of said master receiving surface, and an arcuate master receiving cylinder surface extension section mounted for movement between a first position internally of said cylinder when said one holding means is in said first position, and a second position in engagement with said first end of said stationary master receiving surface when said one holding

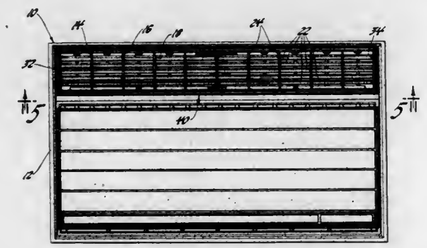
means is in said second position for providing an extension of said master sheet receiving surface to accommodate a master



sheet of a second predetermined length, greater than said first predetermined length.

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**4,018,159**
**AIR FLOW GUIDE MECHANISM**
**George Thomas Bennett, Kettering, Ohio, assignor to General Motors Corporation, Detroit, Mich.**
**Filed Sept. 4, 1975, Ser. No. 610,405**
**Int. Cl.² F24F *13/10***
**U.S. Cl. 98—40 VM** **2 Claims**



1. Air flow guide mechanism for guiding air flowing through an opening having top and bottom walls and end walls, said opening being adapted to deliver air flow into an enclosure commonly having one or more human occupants, said mechanism comprising:

a first louver array having first rack means pivotally mounted in said opening on a horizontal axis for pivotal movement in vertical planes and including a plurality of horizontally extending louvers,

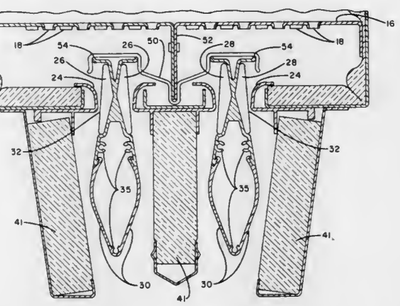
a second louver array mounted in said opening adjacent said first louver array in series air flow relation therewith and having a plurality of vertically extending louvers each pivotally mounted on a vertical axis for pivotal movement in horizontal planes,

actuating rack means attached to said vertically extending louvers and movable to cause said vertically extending louvers to pivot about their vertical axes,

a motor driven rotatable cam mounted on one of said rack means and having a first cam follower fixed to one of said opening walls and selectively engaging said cam whereby when said cam is rotated and said first cam follower is engaged in cam following relation with said cam, said cam and said first cam follower coact to cause said cam and said one of said rack means to pivotally oscillate the louvers associated therewith and cause a sweeping action of air flow in a first plane, said cam having a second cam follower attached to the other of said rack means whereby when said cam is rotated said cam and said second cam follower coact to drive the other of said rack means to cause pivotal oscillation of the louvers associated therewith and cause a sweeping action of air flow in another plane at substantially right angles to said first plane, said sweeping action combining to give a combination horizontal and vertical air flow sweep.

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**4,018,160**
**AIR CONDITIONING TERMINAL**
**Kenneth K. Cunningham, N. Syracuse, and Carl C. Herb, Camillus, both of N.Y., assignors to Carrier Corporation, Syracuse, N.Y.**
**Filed June 10, 1975, Ser. No. 585,560**
**Int. Cl.² F24F *13/08***
**U.S. Cl. 98—40 D** **1 Claim**



1. In an air conditioning terminal for supplying conditioned air into a space and including a plenum section connected to a source of conditioned air and a distribution chamber having a pair of assemblies for regulating the quantity of conditioned air discharged into the space, and means interposed between said plenum section and said distribution chamber for passage of conditioned air from said plenum section into said chamber, the improvement comprising:

each of said air regulating assemblies including a pair of inflatable bladders mounted on a support member, each support member having at least two spaced apart upstanding arms; and

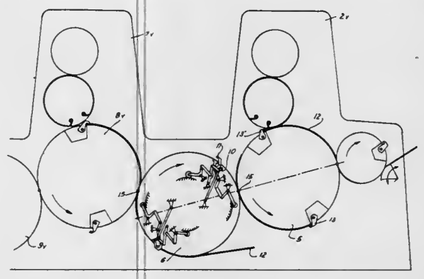
a restraining member formed from spring-like material and connected to a non-movable portion of said terminal and to the outer surface of each upstanding arm of said support members to provide opposed horizontal forces on said upstanding arms to prevent relative movement in any direction in at least one plane between said air regulating assemblies and said non-movable portion whereby generation of noise by the relative movement of said assemblies is prevented.

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**4,018,161**
**PRINTING MACHINE WITH SHEET-TRANSFER ARRANGEMENT**
**Hans Johne, Redebeul; Arndt Jentzsch, Coswig, and Otfried Rudolph, Dresden, all of Germany, assignors to VEB Polygraph Leipzig Kombinat fur Polygraphische Maschinen und Ausrustungen, Leipzig, Germany**
**Filed Mar. 25, 1975, Ser. No. 561,676**
**Int. Cl.² B41F *21/00***
**U.S. Cl. 101—231** **4 Claims**

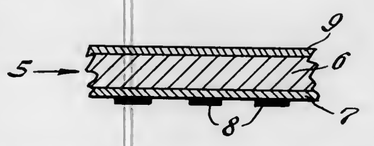
1. In a printing machine, a combination comprising a first printing station having a first printing roller for printing one side of a sheet which travels with the same; a second printing station having a second printing roller for printing the other side of the same sheet; a sheet transfer roller located between and cooperating with said first and second printing rollers; suction gripper means on said transfer roller for lifting a trailing edge portion of the sheet off said first printing roller; means for temporarily advancing said suction gripper means relative to said transfer roller circumferentially of the same and in the direction of rotation thereof along a arcuate path, so as to cause the trailing edge region of the sheet to bulge away from said first printing roller, said advancing means comprising a rocker linkage including a first link member having a free end and another end pivoted at a first location inwardly of the periphery of said transfer roller, a larger second link member also having a free end and another end which is pivoted at a second location inwardly of the periphery of said transfer roller and radially and circumferentially offset from said first location, and a third link member having spaced ends each of which is pivoted to one of said free ends of said first and second link members, said suction gripper means being mounted on said third link member, cam means turnable with said transfer roller and having respective portions which are spaced radially and circumferentially of said transfer roller, and cam follower means operatively associated with said first and second link members and cooperating with the respective cam portions for imparting to each of said first and second link members a part-circular pivoting movement about the respective location, so that said suction gripper means on said third link member moves with said second and third link means relative to said transfer roller in a first curved path in the direction of rotation of the same and also moves relative to said second and third link means in a second curved path, and mechanical gripper means on said transfer roller and operative for receiving said trailing edge portion of said sheet from said suction gripper means prior to disengagement of the latter from said trailing edge portion, and for pulling the sheet after such disengagement off the first printing roller, turning it and presenting it to said second printing roller during continued rotation of said transfer roller.





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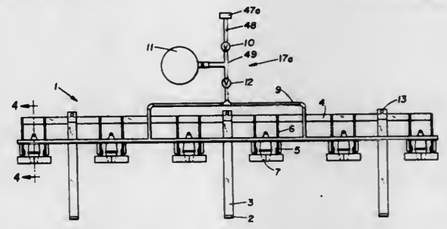
**4,018,162**
**CONTINUOUS DUPLICATING SHEETS**
**Melvin Sharkey, 1614 Hereford Road, Hewlett, Long Island, N.Y. 11557, and Douglas A. Newman, Soundside Lane, Glen Cove, N.Y. 11542**
**Filed Aug. 10, 1973, Ser. No. 387,532**
**Int. Cl.² B41M *5/02*; B32B *33/00***
**U.S. Cl. 101—473** **9 Claims**



1. A pressure-duplicating master sheet comprising a paper foundation which normally is absorbent of liquid oils, an oil-barrier layer of synthetic thermoplastic resin on the working surface of said paper foundation, an image applied to said oil-barrier layer as a composition comprising a pressure-non-transferable microporous network of solid binder material containing within the pores thereof a pressure-exudable ink comprising coloring matter and a liquid oil vehicle which is inert with respect to the resin of said barrier layer, the opposite surface of the paper foundation being treated so as to be non-absorptive of said oil and inert with respect thereto, said image containing a sufficient amount of said pressure-exudable ink to produce a relatively large number of duplicate copies thereof under the effects of pressure.

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**4,018,163**
**PLACEMENT METHOD FOR Q.D. CHARGES USING MINIMUM DIVING TIME**
**Claude H. Brown, Arlington, Tex., assignor to Jet Research Center, Inc., Arlington, Tex.**
**Division of Ser. No. 522,542, Nov. 11, 1974, Pat. No. 3,972,285. This application Jan. 30, 1976, Ser. No. 653,985**
**Int. Cl.² F42D *1/00***
**U.S. Cl. 102—23** **3 Claims**



1. A method of detonating an array of explosive charges using a framework, which comprises the steps of:

a. individually loading each of a plurality of explosive charges on a framework so as to form an array of the objects;

b. placing said loaded framework at a given location;

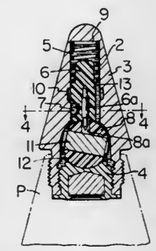
c. simultaneously releasing said array of explosive charges from said framework;

d. recovering said framework; and

e. thereafter detonating said explosive charges.

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**4,018,164**
**PROJECTILE FUZE CONTAINING A FLOATING BODY**
**David S. Breed, Boonton; Torbjorn Thuen, Roseland, and Allen K. Breed, Boonton, all of N.J., assignors to Breed Corporation, Fairfield, N.J.**
**Continuation of Ser. No. 395,962, Sept. 10, 1973, abandoned. This application June 12, 1975, Ser. No. 586,434**
**Int. Cl.² F42C *15/24***
**U.S. Cl. 102—78** **15 Claims**



1. A fuze adapted to be fitted to one end of a munitions projectile, said fuze comprising an elongate housing member having an elongate cavity therein between its forward and rearward ends, arming means mounted in said housing member rearward of said elongated cavity and in communication therewith, and being movable between safe and armed positions; said cavity and said housing member having elongate axes coinciding substantially with one another; a fluid con-

tained in and substantially filling said cavity; a body member accommodated in said cavity for free sliding movements fore and aft of said cavity and immersed in said fluid, said fluid having a specific gravity greater than the average specific gravity of said body member whereby said body member is buoyant; resilient means acting on said body member and being of such capacity as to overcome the buoyancy of said body member and bias the latter to a position at the rearward end of said cavity; fluid passage means between said members enabling sufficient fluid flow aft of said cavity in response to forward acceleration of said housing member to overcome the bias of said resilient means and displace said body member forwardly of said cavity; and releasable locking means mounted on said body member acting on said arming means to maintain the latter in its safe position when said body member is in a position at the rearward end of said cavity and responsive to forward displacement of said body member to release said arming means whereby the latter is enabled to move to its armed position.

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**4,018,165**

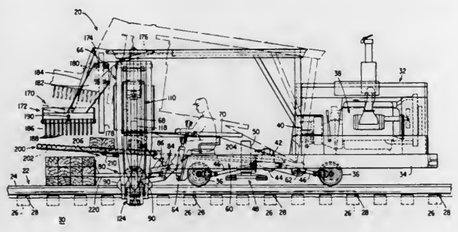
## TIE REPLACING SYSTEM

**John F. Bryan, Jr., 3212 Mapleleaf Circle, Dallas, Tex. 75233**

**Division of Ser. No. 319,004, Dec. 27, 1972, Pat. No. 3,881,422. This application Dec. 5, 1974, Ser. No. 530,016**

**Int. Cl.² E02F** *5/00;* **E01B** *29/06*

**U.S. Cl. 104—9** **14 Claims**



1. A process for replacing worn ties from a railroad track of the type comprising longitudinally extending metal rails supported on transversely extending wooden ties by metal tie plates and a ballast roadbed supporting and at least partially surrounding the ties including the steps of:

applying a substantially axially directed force to a worn tie in the railroad track and thereby pushing the worn tie out from under the rails and the tie plates and out of the roadbed of the railroad track; and

simultaneously scarifying the portion of the roadbed immediately adjacent the position previously occupied by the worn tie and thereby facilitating the positioning of a replacement tie in the roadbed beneath the rails and the tie plates of the railroad track.

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**4,018,166**

## COMBINATION SEAT AND BERTH

**Jack E. Gutridge, Dyer, and Walter J. Marulic, Gary, both of Ind., assignors to Pullman Incorporated, Chicago, Ill.**

**Filed Mar. 29, 1976, Ser. No. 671,237**

**Int. Cl.² B61D** *1/02*

**U.S. Cl. 105—316** **9 Claims**

1. A railway car passenger compartment including an outer side wall;

longitudinally spaced laterally extending partition walls, and

a divider wall extending longitudinally in laterally spaced relation with respect to said outer wall, the improvement comprising a convertible seating arrangement including;

a seat back, adjacent each of said partitions,

a seat disposed below each seat back;

means slidingly supporting each said seat back on each said partition wall for movement from an upright position to a lowered horizontal position,

means hingedly connecting said seat backs to each said seat,

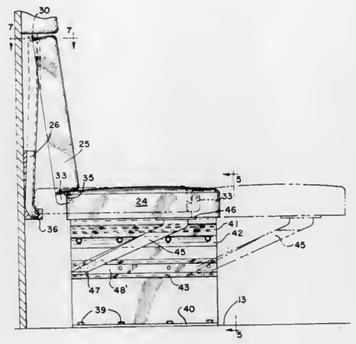
a seat support pedestal vertically and longitudinally supported within said compartment below each said seat,

first upper and lower horizontal tracks mounted on said pedestals,

upper second tracks supported on said outer side wall,

upper slide brackets on said seats slidingly supported on said first and second upper tracks,

a support arm for each seat,



said support arms being connected adjacent forward portions of said seats and extending diagonally downwardly and rearwardly,

and slide means on said arms slidingly engaging said lower track,

whereby in the horizontal position of said backs and seats, said seats extend forwardly from said pedestals and are supported thereon in cantilevered relation, and

said backs and seats providing a horizontal continous lower berth.

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**4,018,167**

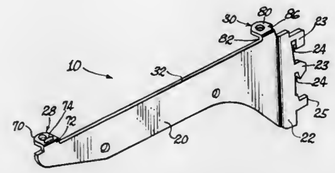
## PREASSEMBLED BRACKET AND SHELF ASSEMBLY

**Morris H. Spangler, Streamwood, Ill., assignor to Reflector Hardware Corporation, Melrose Park, Ill.**

**Filed May 2, 1975, Ser. No. 573,982**

**Int. Cl.² A47B** *57/16*

**U.S. Cl. 108—152** **8 Claims**



1. A shelf assembly for attachment to at least one standard, comprising an expansive shelf having an upper shelf surface and a lower portion defining at least two groups of spaced slots opening into hollows within said shelf; shelf support brackets for ready selective attachment and removal from said shelf, each bracket having an expansive main body portion, hooks for supporting the assembly on a standard and at least one mounting ear extending laterally from the upper regions of said main body portion, said mounting ears on said bracket being adapted to enter a corresponding group of said slots and to be seated within said hollows, at least one of said ears on each bracket having a protuberance, the combined width of the ear and the protuberance being slightly greater than the width of the slot portion through which the ear entered for accommodating snap-fitting interlocking engagement between the bracket and said shelf, whereby each of said brackets resists withdrawal and separation from the shelf and in which each said slot associated with a protuberance has a flexible peripheral portion comprising a flexible locking flap, said locking flap being positioned to be flexed inwardly by a said protuberance as said protuberance is pushed inwardly through said slot, and which flap is reflexed outwardly thereby to narrow the slot portion to resist withdrawal of the ear having the protuberance from the shelf.



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**4,018,168**

## INCINERATOR FEED

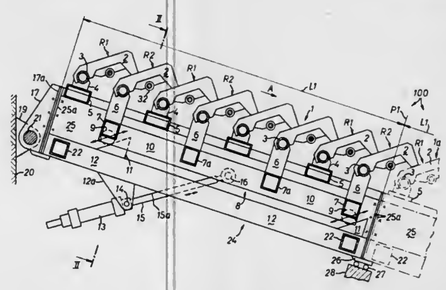
**Bruno Andreoli, Mannedorf; Trauterose Fiebig, Zurich, and Gustav Maurer, Volketswil, all of Switzerland, assignors to Von Roll AG, Switzerland**

**Filed Mar. 10, 1976, Ser. No. 665,722**

**Claims priority, application Switzerland, Mar. 17, 1975, 3386/75**

**Int. Cl.² F23B** *1/18*

**U.S. Cl. 110—38** **20 Claims**



1. In combination, a furnace grate comprising transverse rows of grate elements whereof the elements of each row are arranged side-by-side with one another; clamping means associated with each of said rows and arranged to urge elements of the row towards one another to press their sides into contact with one another; sealing means at the ends of the rows for sealing against said ends of the rows; and biassing means arranged to urge said sealing means into sealing contact with said ends of the rows with urging force independent of the clamping force provided by said clamping means.

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**4,018,169**

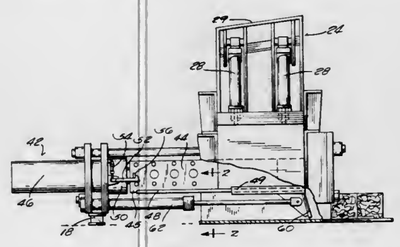
## METHOD AND APPARATUS FOR PROCESSING METAL MATERIAL INTO BALES

**Roman Schmalz, Milwaukee, Wis., assignor to Logemann Brothers Company, Milwaukee, Wis.**

**Filed Feb. 9, 1976, Ser. No. 656,708**

**Int. Cl.² B30B** *9/32*

**U.S. Cl. 100—39** **11 Claims**



9. A method of processing a car body or similar article into bales comprising the following steps:

a. introducing a car body partially into an upwardly opening baling chamber with a portion of the car body positioned inside the chamber and a portion of the car body positioned outside the chamber;

b. partially crushing and bending the car body by forcing a cover member partially over the open top of the baling chamber to thereby bend the car body into a substantially L-shape with one leg of the L positioned inside the baling chamber and the other leg of the L protruding out of the baling chamber adjacent the free end of the cover member;

c. shearing off the portion of the car body protruding out of the baling chamber and partially crushing the portion of the car body in the baling chamber by moving the head of a first compression ram into the baling chamber, said ram head and cover member having cutting edges thereon which cooperate to produce a shearing action therebetween; and

d. compressing the material in the baling chamber into a completed bale by moving the head of a second compression ram into the baling chamber underneath the cover, the travel path of said second compression head being at right angles to the travel path of said first compression head.

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**4,018,170**

## ROTARY HARROWS

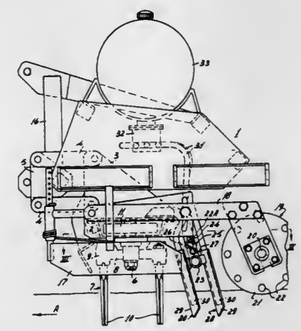
**Ary van der Lely, 10, Weverskade, Maasland, and Cornelis Johannes Gerardus Bom, 36, Esdoornlaan, Rozenburg, both of Netherlands**

**Filed June 26, 1975, Ser. No. 590,520**

**Claims priority, application Netherlands, June 28, 1974, 7408749**

**Int. Cl.² A01C** *23/02*

**U.S. Cl. 111—7** **9 Claims**



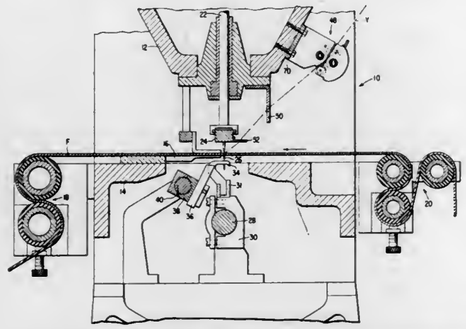
1. A soil cultivating implement or rotary harrow comprising a frame and a plurality of rotatable soil working members, positioned in a row that extends transverse to the direction of travel, said members being supported on said frame to work overlapping strips of soil, driving means engaging said soil working members and rotating same about corresponding upwardly extending axes, at least one elongated roller connected to the frame and extending transverse to the direction of travel, said roller being positioned at the rear of said row of soil working members and having a soil engaging periphery that is formed by elongated elements which extend lengthwise with respect to the axis of rotation of said roller, support means connected to said implement and injectors for introducing fluid material into the worked soil being mounted on said support means and located between the row of soil working members and said roller, said injectors extending downwardly from said support means and below the surface of the ground during operation.

4,018,171

## YARN TENSIONING MEANS FOR TUFTING MACHINES

William David Stone, East Ridge, and Alvin Truit Bonner, Sr., Chattanooga, both of Tenn., assignors to The Singer Company, New York, N.Y.

Filed Sept. 29, 1976, Ser. No. 727,828
Int. Cl.² D05C 15/18
U.S. Cl. 112—79 R 4 Claims



1. In a muliple-needle tufting machine having a multiplicity of yarns fed from guide means to a like member of needles, a pair of rolls between which said yarns pass from said guide means to said needles, means for driving said rolls at a peripheral speed greater than the speed at which said yarns are fed to said rolls, and mounting means for supporting said rolls, said mounting means comprising a first bracket member at each end of a first roll of said pair of rolls and a second bracket member at each end of the second roll of said pair of rolls, means mounting said first bracket members on said tufting machine, means pivotably supporting each second bracket member from a respective first bracket member at a location spaced from one side of a line passing through the centers of said first and second rolls, and quick-connect, quick-disconnect means located on the other side of said line for securing said second bracket members to the first bracket members to lock said second roll in operative position and for releasing said second bracket members from said first bracket members to separate said rolls rapidly.

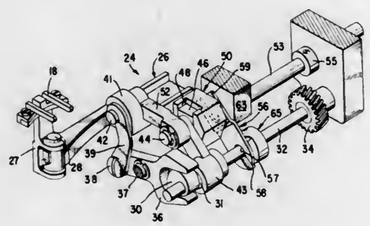
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4,018,172

## FEED REGULATOR CLAMPING DEVICE

Stanley Joseph Ketterer, Jamesburg, N.J., assignor to The Singer Company, New York, N.Y.

Filed Aug. 12, 1976, Ser. No. 713,952
Int. Cl.² D05B 27/02
U.S. Cl. 112—215 4 Claims



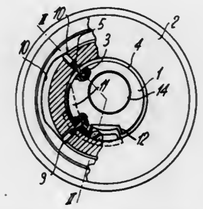
1. In a sewing machine having stitch forming mechanism including a work feeding mechanism actuated cyclically in timed relation with said stitch forming mechanism, a stitch length regulator associated with said work feeding mechanism, and clamp means for said stitch length regulator effective for only a portion of each cycle of operation of said work feeding mechanism.

4,018,173

## DEVICE COMPRISING TWO PIECES HELD TOGETHER IN SPACED APART RELATION BY JOINING ELEMENTS

Antonio Jimenez, Meyrin-Geneva, Switzerland, assignor to Mefina S.A., Fribourg, Switzerland

Filed Dec. 10, 1975, Ser. No. 639,432
Claims priority, application Switzerland, Dec. 19, 1974, 16989/74
Int. Cl.² D05B 57/14
U.S. Cl. 112—231 7 Claims



1. In a sewing machine, the combination with a needle hole plate, a bobbin carrier, a plate member fixed to the lower part of the frame of the sewing machine beneath said needle hole plate and having an opening surrounding said bobbin carrier, of means for suspending said bobbin carrier within said plate member surrounding it, said means comprising connecting elements mounted in said plate member, means normally holding said elements retracted within said plate member, a cam barrier beneath said plate member and said bobbin carrier, cam means on said cam carrier facing one end of said connecting elements and normally holding the other end of said elements in engagement with said bobbin carrier, a hook attached to said cam carrier, means for rotating said cam carrier and hook to momentarily and successively retract said connecting elements from said bobbin carrier in synchronization with the driving of a loop of the upper thread around the bobbin carrier and produce engagement of the upper thread with a lower thread fed from a bobbin in the bobbin carrier for the formation of a stitch.

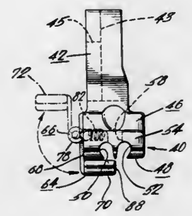
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4,018,174

## SEWING MACHINE PRESSER FOOT ASSSEMBLY

Ernest A. DiBenedetto, Philadelphia, and Harold S. Lerner, Norristown, both of Pa., assignors to Gordon Clothes, Inc., Conshohocken, Pa.

Filed Jan. 23, 1976, Ser. No. 651,908
Int. Cl.² D05B 29/08
U.S. Cl. 112—235 13 Claims



1. A sewing machine presser foot assembly for setting a concealed zipper and closing the zipper seam comprising a zipper foot adapted for setting a concealed zipper, means for attaching said zipper foot to the presser bar of a sewing machine, said zipper foot having a pair of substantially parallel spaced grooves in the sole thereof aligned with the flow of material through the machine, and a needle hole passing vertically through said zipper foot between said grooves, each of said grooves being adapted to receive the teeth or coil of a concealed zipper, a cording foot bar, and means pivotally connecting said cording foot bar to said zipper foot for selective movement thereof into either a raised inoperative position or a lowered operative position beneath said zipper foot.



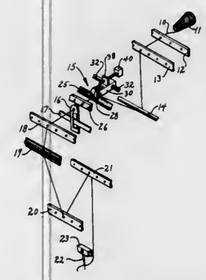
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4,018,175

## THREAD-TENSIONING MECHANISM FOR THE STOP MOTION MEANS OF A MULTI-NEEDLE SEWING MACHINE

Harold C. Forrester, and Harold E. Tatum, both of Louisville, Ky., assignors to Louisville Bedding Company, Louisville, Ky.

Filed Nov. 17, 1975, Ser. No. 632,384
Int. Cl.² D05B 47/02
U.S. Cl. 112—254 5 Claims



1. An improved thread-tensioning mechanism for the stop motion means of a multi-needle sewing machine of the type having a group of needle threads wherein each needle thread of the group, in extending from its supply spool to its needle, normally travels through a thread-tensioning section at a speed and tension proportional to its individual rate of variable usage within a given range of usages, embracing all threads in said group, and wherein the tension section of each thread normally carries a sag-sensor for operating the stop motion means when the thread usage falls below said given range, comprising:

A. a common take-over shaft extending across the machine at the beginning of the thread-tensioning section;

B. means for rotating said shaft at a substantially constant speed such that the lineal speed of its periphery is slightly below the slowest normal lineal thread speed created in said given range by the slowest normal rate of thread usage;

C. an idler wheel at the beginning of the tensioning section of each thread; and

D. means mounting each idler wheel with its periphery not only in continuous frictional engagement with its moving thread so as to be continuously rotated thereby during normal operation but also continuously pressing said thread with a constant force into frictional engagement with the periphery of said common shaft so as to cause that shaft normally to operate as a frictional brake tensioning each thread in accordance with the corresponding wheel-shaft speed differential, which varies with the variable rate said thread is used up in a sewing operation,

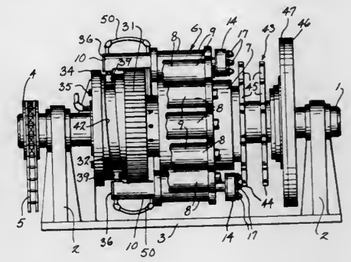
1. said wheel mounting means being independent of and out of operative engagement with the tensioned thread so that said constant idler wheel pressure is not affected by variations in any operating speed or tension condition of the tensioned thread.

4,018,176

## APPARATUS FOR SPIN FLANGING CONTAINERS

Andrew Gnyp, and Karl Elert, both of Franklin, Wis., assignors to Jos. Schlitz Brewing Company, Milwaukee, Wis.

Filed Nov. 6, 1972, Ser. No. 304,093
Int. Cl.² B21D 51/00
U.S. Cl. 113—1 G 1 Claim



1. A machine for spin flanging the open ends of containers comprising, a supporting structure, a drive shaft mounted for rotation with respect to the supporting structure, a turret secured to the drive shaft and disposed to rotate with the drive shaft, container holding means carried by the turret for holding the containers during the spin flanging operation, a series of flanging heads carried by the turret, each flanging head being mounted for rotation about its axis and being mounted for reciprocating axial movement with respect to the turret, a fixed drive gear mounted on the supporting structure and disposed concentrically of said drive shaft, each flanging head including a series of circumferentially spaced freely rotatable flanging rollers disposed to engage the open end of the container to flange the same, a pinion connected to each flanging head and operably engaged with said gear to rotate the flanging heads about their axes as the turret rotates, each pinion and the respective gear having substantially different axial lengths to enable the pinion to move axially with respect to the gear and maintain a driving connection therebetween when the head is moved axially with respect to the turret, cam means interconnecting each flanging head and the supporting structure for moving the flanging heads axially with respect to the turret in programmed sequence to thereby move the heads toward and away from the containers being held by said container holding means, gas supply means for introducing a gas under pressure through each flanging head and into the interior of the container to aid in stripping the container from the flanging head as the head is moved away from the container after the flanging operation, each flanging head includes a flanging head shaft journalled with respect to the turret, said gas supply means includes a chamber in said turret and communicating with a source of gas under pressure, and a passage located axially of each flanging head shaft and communicating with said chamber for conducting gas to the interior of each container.

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4,018,177

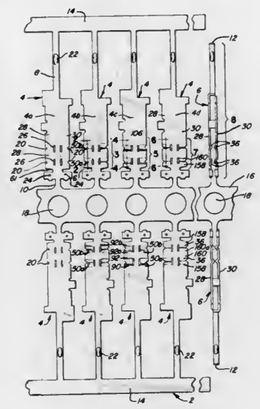
## TERMINAL CONNECTORS AND METHOD OF MAKING THE SAME

William H. McKee, West Covina, Calif., and Anthony E. Schubert, Villa Park, Ill., assignors to TRW Inc., Elk Grove Village, Ill.

Continuation of Ser. No. 545,353, Jan. 30, 1975, abandoned. This application Mar. 3, 1976, Ser. No. 663,457
Int. Cl.² B21D 13/02
U.S. Cl. 113—119 25 Claims

1. A method of forming a contact jaw in a first portion of a sheet of electrically conductive sheet metal, said first portion being joined to said sheet at opposite ends of said first portion and said sheet being continuous between said ends externally of said first portion, comprising deforming said first portion laterally of the plane of said sheet to form such a jaw, without

corresponding deformation of the joined continuous portion of said sheet, by drawing said first portion into a broad shallow wave form extending on one side of said sheet, said wave form having a first base width; reforming opposite end portions of said first portion within said base width to have curvature opposite that of the center of said wave form and to extend on the opposite side of said sheet therefrom while maintaining the direction of extension and reducing the radius of curvature of



the portion defining the center segment of said wave form; and subsequently further forming said first portion by returning said end portions toward the plane of said sheet and correspondingly further extending said center segment therebetween on said one side of said sheet and further reducing the radius of curvature of said center segment, thereby providing dispersed elongation of the material of said first portion in forming said jaw.

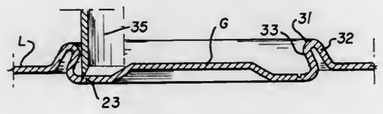
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**4,018,178**

## METHOD OF MANUFACTURE OF A GATED CAN LID WITH SCORE AT UPPER SURFACE

**Gerald B. Klein, Broomfield, and Frank C. Lowe, Idaho Springs, both of Colo., assignors to Gerald B. Klein, Broomfield, Colo.**

**Division of Ser. No. 562,559, March 27, 1975, abandoned.**
**This application Oct. 24, 1975, Ser. No. 625,716**
**Int. Cl.² B21D** *51/44*
**U.S. Cl. 113—121 C** **5 Claims**



1. The method of forming a can lid blank having a push-down gate in a panel portion of the lid below an aperture in the lid, with a narrow spacing rim underfolded about the aperture whose outward edge joins with the panel portion therebelow, and including the steps of:

a. drawing a cup downwardly in the lid blank having a bottom area approximating the aforesaid panel portion;

b. drawing a ridge upwardly from the lid blank whose inner wall forms the wall of the aforesaid cup;

c. forming the aforesaid panel portion in the bottom of the cup;

d. cutting a disruptible score line in the formed panel portion adjacent to the ridge to define the outline of the gate therein; and

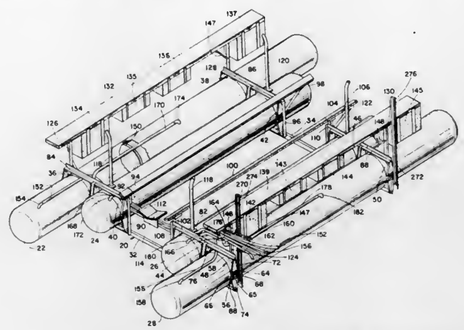
e. folding the ridge inwardly and downwardly to overlie the score line and form the aforesaid aperture.

**4,018,179**

## PONTOON SYSTEM FOR SUPPORTING WATERCRAFT ON A BODY OF WATER

**Henry A. Rutter, Claremore, Okla., assignor to National Hydro-Hoist Company, Claremore, Okla.**

**Filed Nov. 28, 1975, Ser. No. 635,861**
**Int. Cl.² B63C** *1/06*
**U.S. Cl. 114—45** **8 Claims**



2. Pontoon system for supporting watercraft above a body of water comprising a longitudinally extending frame having a longitudinally extending center line, a forward end and a rear end, a plurality of longitudinally extending pontoons held by said frame in substantially parallel spaced relation and substantially parallel to the center line of said frame, each pontoon having a forward end and a rear end, each pontoon having a plurality of longitudinally spaced and separate chambers, each chamber having a lower opening in communication with the water, valve means connected to said chambers for selectively directing gas under pressure into chambers for forming gas pockets therein to force water out of the chambers through the lower openings thereof thereby elevating said frame whereby the frame will engage lower portions of a watercraft for elevation thereof to a position out of the water, said valve means also being adapted to release gas from said chambers selectively for lowering said frame whereby the water craft is lowered into water, and a compressor for supplying gas under pressure to said valve means, said means also adapted to direct gas initially to the chambers at the the forward ends of said pontoons for allowing said forward end of said frame to engage the lower portion of a forward end of the watercraft adjacent said forward end of said frame to elevate the forward end of said watercraft for stabilizing the watercraft prior to the elevation of the entire watercraft; said valve means subsequently also adapted to direct gas under pressure to all of said chambers for completing the supporting of said watercraft above the body of water.

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**4,018,180**

## SYSTEM FOR BUILDING AND LAUNCHING SHIPS

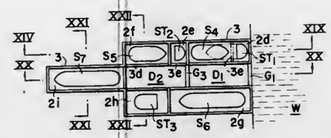
**Toshio Yoshida, Kobe, Japan, assignor to Kawasaki Jukogyo Kabushiki Kaisha, Kobe, Japan**

**Filed Mar. 26, 1976, Ser. No. 670,975**
**Claims priority, application Japan, Apr. 1, 1975, 50-40095**
**Int. Cl.² B63B** *3/00*
**U.S. Cl. 114—65 R** **1 Claim**

1. A system for building and launching ships comprising a first dock having a first gate facing open water; a second dock disposed adjacent to and in alignment with said first dock, a second gate connecting said second dock to the end of the first dock remote from said first gate; a plurality of side ship building berth space means located laterally adjacent to said first and second docks; an end ship building berth space means located adjacent to the end of the second dock remote from said second gate, said side and end ship building berth space means having floors at a ground level higher than the bottom



of the docks; detachable water retaining wall means surrounding the docks and all the berth space means, respectively, for retaining water therein; detachable sub-partitioning wall means dividing the space of at least one of said berth space means into at least two berth space sections to enable selective retention of water in only one of the two berth space sections; said water retaining wall means comprising a plurality of wall panels erected on the ground with side edges thereof in sealing abutment with each other; buttresseblocks disposed adjacent



to the inner and outer lower edges of said wall panels to detachably receive therebetween the lower edges of the wall panels, and bracing struts connected between the top of each wall panel and outside anchors on the ground; said docks and berth space means being dimensioned to be supplied with water therein to such a level that a ship placed in any of the berth space means is floated off the floor thereof, such that the ship can be floatingly moved from within the berth space means to the open water through at least said first dock.

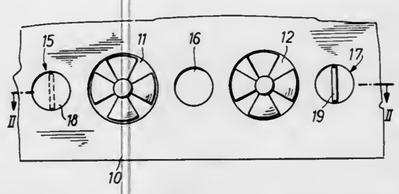
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**4,018,181**

## LATERAL THRUST CONTROL UNIT FOR WATERCRAFTS

**Jochim Brix, Hamburg, Germany, assignor to Schottel-Werft Josef Becker KG, Apay am Rhine, Germany**

**Filed Mar. 28, 1975, Ser. No. 563,211**
**Claims priority, application Germany, May 14, 1974, 2423468**
**The portion of the term of this patent subsequent to Sept. 9, 1992, has been disclaimed.**
**Int. Cl.² B63H** *25/46*
**U.S. Cl. 114—151** **14 Claims**



1. A lateral thrust control unit for the hull of a watercraft, comprising:

means defining a pair of tunnels which extend transversely to the longitudinal axis of said watercraft and generally between the sidewalls of said watercraft and have propulsion means therein;

means defining zones of differing pressure fields created on the sidewalls of said hull of said watercraft during a longitudinal and simultaneous lateral movement of said watercraft to resist the lateral movement of said watercraft, said zones being positioned longitudinally along said sidewalls of said hull from said pair of tunnels; and

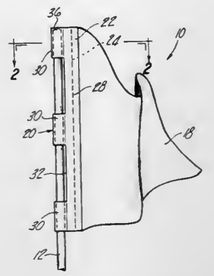
pressure-compensating channel means for connecting at least one of said zones of differing pressure fields to a pressure field of different potential to equalize the pressure differential therebetween and to reduce the resistance to said lateral movement, said pressure-compensating channel means being free of propulsion means therein.

**4,018,182**

## GOLF FLAG ASSEMBLY

**Carl W. Knaack, Bloomfield Hills, Mich., assignor to Morris Associates, Inc., Southfield, Mich.**

**Filed Dec. 11, 1975, Ser. No. 639,801**
**Int. Cl.² G09F** *17/00*
**U.S. Cl. 116—173** **1 Claim**



1. In combination a golf flagpole and a golf flag assembly, said golf flagpole being of substantially uniform cross-sectional area throughout its length, said golf flag assembly comprising a flag and means for attaching said flag to said flagpole, said attaching means comprising a pair of facing panel members receiving one edge of said flag therebetween, means for securing said panel members to said edge of said flag, said attaching means further comprising a plurality of spaced cylindrical members integrally attached to said panel members, each of said cylindrical members having an inside diameter which is smaller than the outside diameter of said golf flagpole, said cylindrical members being constructed of resilient material so that each said cylindrical members resiliently grasps said flagpole, and the uppermost of said cylindrical members having an upper closed portion to maintain the flag assembly at a fixed position on the top of the flagpole.

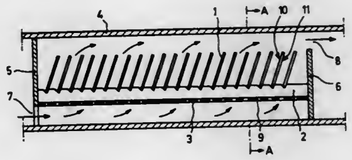
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**4,018,183**

## APPARATUS FOR TREATING A PLURALITY OF SEMICONDUCTOR SLICES TO A REACTING GAS CURRENT

**Johannes Meuleman, Caen, France, assignor to U.S. Philips Corporation, New York, N.Y.**

**Continuation of Ser. No. 523,439, Nov. 13, 1974, abandoned.**
**This application Jan. 29, 1976, Ser. No. 653,498**
**Claims priority, application France, Nov. 15, 1973, 73.40669**
**Int. Cl.² C23C** *13/08*
**U.S. Cl. 118—49** **2 Claims**



1. Apparatus for treating a plurality of semiconductor slices to a reacting gas current, comprising:

a reactor tube having a longitudinal axis;

means for supporting a plurality of semiconductor slices in a parallel spaced row along said longitudinal axis, said slices being equally spaced to create identical transversely oriented interspaces between slices;

an apertured wall along one side of said row, parallel to said axis and having apertures in the form of slits oriented one to each interspace and parallel thereto;

partitions cooperating with said apertured wall to confine

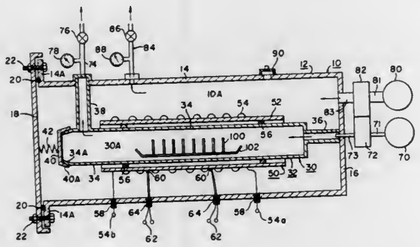
and direct gas flow to one side of said apertured wall, through said slits and the spacing between said slices and out of the reactor tube, the cross-sectional area of the apertures in said apertured wall increasing in the direction of overall gas flow, so that equal flow occurs in each interspace.

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**4,018,184**
**APPARATUS FOR TREATMENT OF SEMICONDUCTOR WAFER**

**Koichi Nagasawa, Amagasaki, and Koichi Kijima, Itami, both of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed July 28, 1975, Ser. No. 599,471**
**Int. Cl.² C23C *13/12***
**U.S. Cl. 118—49.1** **1 Claim**



1. Apparatus for the treatment of a semiconductor wafer comprising:
an inner treating vessel,
an outer vessel,
the inner treating vessel being disposed within the outer vessel,
a semiconductor wafer disposed within the inner treating vessel,
a first gas feeder,
a first pressure adjuster,
a second gas feeder,
a second pressure adjuster,
means connecting the first gas feeder to the first pressure adjuster,
means connecting the first pressure adjuster to the inner treating vessel,
means connecting the second gas feeder to the second pressure adjuster,
means connecting the second pressure adjuster to the outer vessel,
the first pressure adjuster maintaining the pressure within the inner treating vessel substantially the same as the pressure in the outer vessel,
the second pressure adjuster maintaining the pressure within the outer vessel substantially the same as the pressure in the inner treating vessel,
a heater disposed within the outer vessel surrounding the inner treating vessel and having no portion thereof within the inner treating vessel to heat the first gas and to prevent the first gas from being contaminated by the heater.

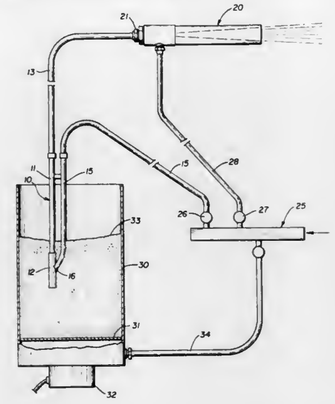
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**4,018,185**
**POWDER FEEDER PICK-UP TUBE**

**James Lewis Myers, Golden, Colo., assignor to Coors Container Company, Golden, Colo.**

**Filed Dec. 15, 1975, Ser. No. 640,396**
**Int. Cl.² B05B *7/14***
**U.S. Cl. 118—308** **12 Claims**

1. A powder feeder pick-up tube for use with a supply of compressed propellant gas and a hopper containing finely divided powder, comprising
a. a powder delivery tube carrying powder entrained in propellant gas from said hopper to a point of use and having an open end for receiving the powder and propellant gas,
b. a propellant delivery tube concentric with said powder delivery tube and forming an annular area between the walls of the two tubes, the annular area having an orifice adjacent the opening of the powder delivery tube for delivering propellant gas through said orifice



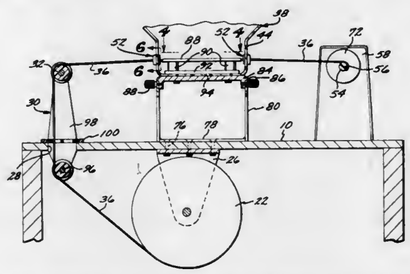
c. means directing the gas flow from the propellant delivery tube through said orifice and into a converging conical jet of high velocity gas for deagglomerating powder from said hopper and evenly entraining the powder in the gas, and
d. means supplying said propellant gas to the propellant delivery tube from said supply of compressed propellant gas.

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**4,018,186**
**GAUZE IMPREGNATOR**

**Charles E. Schrader, 8536 Oak Park Ave., Northridge, Calif. 91325**

**Filed May 5, 1975, Ser. No. 574,439**
**Int. Cl.² B05C *3/12***
**U.S. Cl. 118—405** **15 Claims**



1. An apparatus for the uniform impregnation of a viscous material into the open pores of a fibrous band at atmospheric pressure which comprises:
a chamber charged with said viscous material;
first and second slots in opposite side walls of said chamber open to atmospheric pressure;
first and second resilient membrane seals overlying each of said slots and each bearing a fabric band receiving slit;
means for removably supporting a roll of continuous fabric band and supplying said band to the first of said silts;
spindle means for receiving said fabric band from the second of said silts and for winding said received band into a roll;



and stationary platform plate means carried fixedly within and above the bottom of said chamber at the level of said slits and extending between said opposite side walls and bearing a plurality of apertures therethrough whereby said continuous fabric band can be passed between said slits, through said chamber and the viscous material and in contact with said plate means, to receive a uniform impregnation of viscous material contained within said chamber.

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**4,018,187**
**GROOVED MAGNETIC BRUSH ROLL**

**Jerry Joe Abbott, Longmont, and Allison Holland Caudill, Lafayette, both of Colo., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed June 30, 1976, Ser. No. 701,251**
**Int. Cl.² G03G *15/08***
**U.S. Cl. 118—658** **7 Claims**



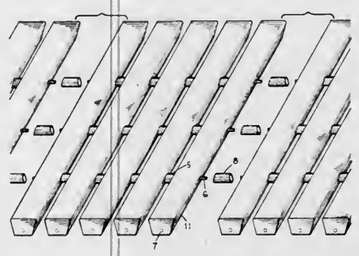
1. A magnetic brush developer wherein a developer material comprising a toner coated magnetic carrier is supplied to a rotating magnetic brush roll to be conveyed by said roll to an elevated development zone, said roll comprising:
a rotatably mounted hollow roll;
magnetic means disposed within said hollow roll for creating a magnetic field in the path of the periphery of said roll;
means to bring said developer material into contact with the roll surface;
said roll surface containing axially located grooves spaced apart in a range from 15–25 times the diameter of said carrier.

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**4,018,188**
**REINFORCED CONCRETE SLAT FLOOR**

**James Reuben Burdette, 418 Moody, Martin, Tenn. 38237**

**Filed June 10, 1975, Ser. No. 585,717**
**Int. Cl.² A01K *1/00***
**U.S. Cl. 119—28** **5 Claims**



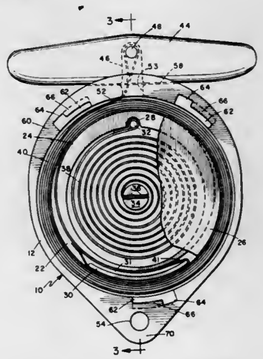
1. A load distributing and interconnecting slat floor module which may be connected to other interconnecting slat floor modules for supporting loads while simultaneously permitting waste and debris to drop through spaces between the slats, said slat floor module comprising spaced apart elongated slats of trapezoidal cross section, each slat having a top surface wider then the bottom surface and generally parallel to the bottom surface and having inwardly sloping slat sides, a longitudinal reinforcing member extending along the length of the slat adjacent the bottom surface of each slat for increasing the strength of the slat, a transverse reinforcing member fixed to the slats and extending in a generally perpendicular direction between the slats and through the slats, said transverse reinforcing members being spaced from the ends of the slats and extending beyond the outer slats in each module, and means for rigidly connecting the transverse reinforcing members between adjacent modules thereby providing load distributing interconnections between the slats and adjacent modules.

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**4,018,189**
**RETRACTABLE DOG LEASH**

**James Otis Umphries, 14602 Rodeo Drive, Victorville, Calif. 92392, and William Howard Brawner, 1174 Cloverleaf Drive, El Cajon, Calif. 92020**

**Filed Dec. 18, 1975, Ser. No. 642,179**
**Int. Cl.² A01K *27/00***
**U.S. Cl. 119—109** **2 Claims**



1. A retractable animal leash comprising:
a casing having a circumferential wall, said wall having circumferentially extending slots therein with undercut flanges over portions of said slots,
a flexible leash member,
a reel rotatably supported within the casing for carrying said leash member, said leash member being wound about said reel and extending externally of said casing for the unwinding of said leash member,
spring means engaging said casing and said reel continuously urging the same in opposition to the unwinding of said leash member,
said casing having a cover detachably secured to one side thereof, said cover having hooked lugs for insertion into said slots and engagement under said flanges by rotation of the cover relative to the casing,
said casing and said cover having corresponding extended lugs thereon, said lugs having a common hole therethrough in the closed position of the cover, and
a ring member removably engaged through said hole for attachment to an animal.

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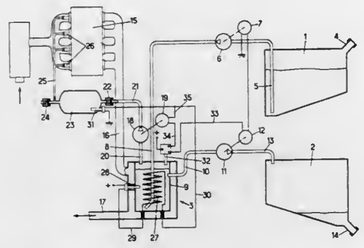
**4,018,190**
**METHOD OF AND APPARATUS FOR FEEDING HYDROGEN FUEL TO ENGINES**

**Claude Henault, Chevilly Larue, France, assignor to Regie Nationale des Usines Renault and Automobiles Peugeot, both of France**

**Filed May 20, 1975, Ser. No. 579,294**
**Claims priority, application France, May 24, 1974, 74.18135**
**Int. Cl.² F02B *43/08***
**U.S. Cl. 123—3** **19 Claims**

1. In a motor vehicle propulsion system including an internal combustion engine, a method of producing gaseous hydro-

gen from metal hydride and feeding the hydrogen as fuel to said engine during operation of the vehicle, said method comprising the steps of providing a supply of fresh hydride in a first tank, providing a second tank for receiving spent hydride, feeding the fresh hydride at a controlled rate from the first



tank to a low-capacity reactor heating the hydride in the reactor to produce gaseous hydrogen, extracting the hydrogen from the reactor and supplying the hydrogen under pressure to the internal combustion engine, and withdrawing the spent hydride from said reactor and delivering it to the second tank.

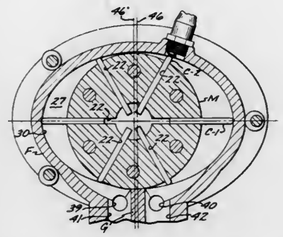
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**4,018,191**

**ROTARY INTERNAL COMBUSTION ENGINE**

**L. Babcock Lloyd, 508 South Bradfield, Compton, Calif. 90221**

**Filed Oct. 14, 1975, Ser. No. 621,866**
**Int. Cl.² F02B** *55/14*
**U.S. Cl. 123—8.45** **1 Claim**



1. An internal combustion rotary engine of the type that includes a housing having an interior open end cavity in the shape of an ellipse that has a continuous surface and a major and a minor axis, and major and minor axis dividing said ellipse to first, second, third and fourth quadrants, said housing having an air-fuel inlet and a products of combustion discharge outlet formed therein that are separated by a transverse partition and are in communication with said first and fourth quadrants of said cavity; an assembly that includes a rotor having circumferentially spaced, radially extending slots formed therein, first and second axially aligned shafts projecting outwardly from opposite ends of said rotor, and a plurality of blades slidably supported in said slots, said blades having outer ends that slidably and sealingly engage the surface of said housing that define said cavity when said blades are moved outwardly by centrifugal force as said rotor rotates, with each of said pair of blades in combination with said rotor and housing cooperatively defining a chamber that varies in volume as said rotor rotates towards said fourth quadrant, and each of said chambers being reduced to substantially zero volume to discharge said products of combustion through said discharge outlet as said chamber moves from said fourth quadrant to said first quadrant; means for firing said air-fuel mixture in each of said chambers as the latter enter said third quadrant and have the exposed surface area of the leading blade defining said chamber greater than the exposed surface area of the trailing blade defining said chamber; wherein the improvement comprises:

a. first and second side plates that sealingly engage opposite sides of said housing to close said cavity thereon, and rotatably support said first and second shafts, with said rotor and blades disposed in said cavity;

b. first means for holding said side plates in sealing engagement with said housing and said first means including:

1. a plurality of bolts, with each bolt including a head and at least a partially threaded shank, with each shank extending through one of said pair of openings; and

2. a plurality of nuts that engage said threaded shanks, with said nuts when tightened cooperating with said heads of said bolts to hold said first and second side plates in sealing engagement with said housing; and

c. second means for sliding said first and second side plates and assembly relative to said housing while maintaining said sealing engagement to increase the volume of each of said chambers as it moves through said third and fourth quadrants relative to the volume thereof when moving through said first and second quadrants, and by so doing discharging said products of combustion at a residual pressure less than that which occurs when said rotor is centered for rotation on said minor axis, said second means including a plurality of cams that extend from said shanks and engage the exterior surface of said housing, with said bolt and cams when rotated shifting said side plates and assembly as a unit relative to said housing.

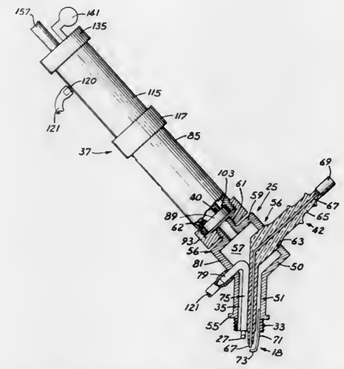
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**4,018,192**

**WATER INJECTION SYSTEM FOR I.C. ENGINES**

**Sheldon E. Eft, 1014 E. Taylor St., Bloomington, Ill. 61701**

**Filed July 3, 1975, Ser. No. 592,823**
**Int. Cl.² F02D** *19/00*
**U.S. Cl. 123—25 C** **8 Claims**



1. A water injection system for an internal combustion engine having a combustion chamber comprising,

an adapter means having an end for attachment to an engine at an opening to admit a spark plug,

means on said adapter means for securing it to the engine at the spark plug opening,

ignition generating electrodes extending inwardly beyond the inner end of said adapter means and having an inner end projecting into said combustion chamber of said engine,

water injector nozzle means extending to the inner end of said adapter means and through the opening into the combustion chamber from said adapter means and having a nozzle in the engine combustion chamber for injecting moisture into a combustion chamber,

and injection means connected to said nozzle means to deliver water under pressure to said injector nozzle means for injecting the water directly into the combustion chamber against the pressure of the compressed air fuel mixture in the combustion chamber.



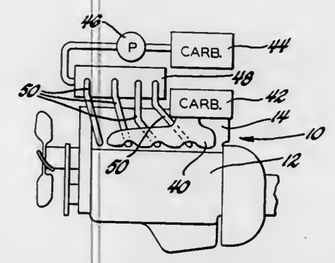
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**4,018,193**

**VORTEX CHAMBER STRATIFIED CHARGE ENGINE**

**Edward D. Klomp, Mount Clemens, Mich., assignor to General Motors Corporation, Detroit, Mich.**

**Filed Feb. 10, 1975, Ser. No. 548,683**
**Int. Cl.² F02B** *3/00*
**U.S. Cl. 123—30 C** **3 Claims**



1. The combination in a four-stroke cycle internal combustion engine of means defining a closed end cylinder

a piston reciprocable in said cylinder and defining therewith a variable volume combustion chamber at said cylinder closed end

main inlet and exhaust ports connecting with said cylinder at said closed end

inlet and exhaust valves respectively associated with said ports and operable to close and open their connections with said cylinder, said inlet port and its associated inlet valve being arranged to direct incoming air in a swirling motion around the axis of said cylinder, said inlet valve being connected for operation in timed relation with said piston to be open during substantially the entire piston intake stroke,

means to supply a lean air-fuel mixture to said inlet port for admission to said cylinder during said intake stroke for formation of a swirling charge in said combustion chamber,

spark ignition means in said cylinder and centered on the closed end thereof.

an auxiliary inlet port, substantially smaller than said main inlet port and connecting with said cylinder,

means to supply a rich air-fuel mixture to said auxiliary inlet port, and

means controlling the admission of said rich mixture to said cylinder from said auxiliary inlet port, said controlling means being operative in timed relation with said piston to permit such admission of rich mixture during only the latter portion of the piston intake stroke, said auxiliary intake port and controlling means being arranged to direct said rich mixture into a swirling pattern at said cylinder end around said spark ignition means, said swirling pattern having the same rotational direction as and remaining relatively undisturbed by the adjacent mass of swirling lean mixture by virture of the swirling motion of the lean mixture being established prior to the admission of the rich mixture to said cylinder.

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**4,018,194**

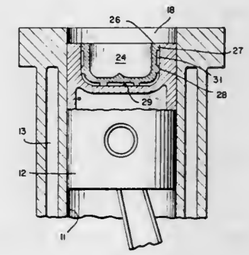
**ENGINE PISTON WITH INSULATED COMBUSTION CHAMBER**

**Edward Mitchell, Hopewell Junction, and John M. Cobb, Cold Spring, both of N.Y., assignors to Texaco Inc., New York, N.Y.**

**Filed Jan. 6, 1975, Ser. No. 538,669**
**Int. Cl.² F02B** *3/00*
**U.S. Cl. 123—32 C** **1 Claim**

1. In a piston for an internal combustion engine which utilizes fuel injection to establish a combustible fuel-air mixture within the engine combustion chamber said piston including; a body with a head having a face which opens into a combustion chamber into which fuel is introduced to establish the combustible mixture,

an insert member fixedly positioned within said piston body and being supportably spaced from the latter to define a thermal barrier whereby to substantially insulate said combustion chamber from the piston thereby to minimize heat flow therebetween,



said insert member having means forming a recessed cavity therein which is communicated with said combustion chamber, said insert member further including an outer wall having a plurality of discretely spaced conical segments depending outwardly from said insert member wall and having the conical points of said segments at least partially embedded into the wall of said piston whereby said thermal barrier comprises an air gap.

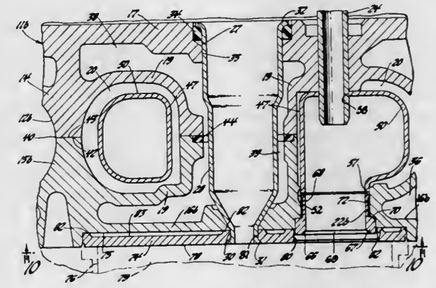
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**4,018,195**

**INSULATED, HIGH EFFICIENCY, LOW HEAT REJECTION, ENGINE CYLINDER HEAD**

**Michael Bandrowski, Jr., Milford, Mich., assignor to General Motors Corporation, Detroit, Mich.**

**Filed Oct. 6, 1975, Ser. No. 619,797**
**Int. Cl.² F01B** *3/14*; **F02F** *1/26*
**U.S. Cl. 123—41.76** **2 Claims**



1. A cylinder head for an internal combustion engine having a lower wall, an upper wall spaced from the lower wall and a side wall interconnecting the upper and lower walls, said lower wall having an outer surface containing a recess adapted for mounting opposite the end of an associated engine cylinder with said recess extending laterally across and beyond the inner diameter of such cylinder,

an exhaust cavity within said head and extending through an opening in said side wall,

a plurality of spaced exhaust ports through the recessed portion of said lower wall and connecting with said exhaust cavity,

a component receiving tubular wall retained in said upper wall and extending through the recessed portion of said lower wall between said exhaust ports,

means defining a coolant jacket in said head along said lower wall and around said exhaust ports and component receiving wall,

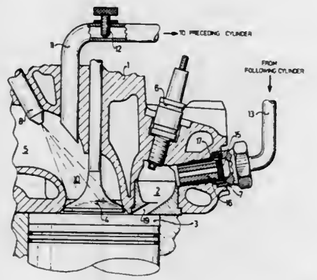
a high temperature metal alloy plate received in and substantially filling said lower wall recess, said plate providing an outer surface engageable with and adapted to close the end of such associated cylinder and having openings in alignment with said exhaust ports and said component receiving wall,

said plate including an inner surface in opposed relation to the recessed outer surface of said head lower wall and spacer means along the peripheries of said plate and said plate openings and separating the remainder of said opposing surfaces to provide clearance between said plate and said head over a major portion of said plate inner surface and enclose an insulating air space that limits the flow of heat from such engine cylinder to the cylinder head coolant jacket.

## 4,018,196
## INTERNAL COMBUSTION ENGINE

**Ernst Linder, Muhlacker, and Hubert Dettling, Hohenacker, both of Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany**

**Filed Nov. 5, 1975, Ser. No. 628,904**
**Int. Cl.² F02B** *75/02*
**U.S. Cl. 123—75 B** **4 Claims**




1. An internal combustion engine including a plurality of cylinders each of which has an induction tube region and an engine inlet valve located therein, and each of which defines a main combustion chamber and a precombustion chamber, said precombustion chamber including ignition means and a secondary inlet valve, the improvement comprising:

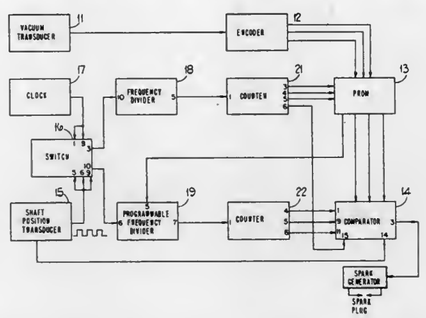
A. a conduit leading from the induction tube region of one cylinder to the precombustion chamber of another cylinder immediately preceding said one cylinder in the firing order of the engine; whereby a portion of the fuel delivered to the induction tube region of said one cylinder is aspirated by said other cylinder and transported into the precombustion chamber thereof.

## 4,018,197
## SPARK IGNITION SYSTEMS FOR INTERNAL COMBUSTION ENGINES

**Peter Hugh Salway, Birmingham, England, assignor to The Lucas Electrical Company Limited, Birmingham, England**

**Filed Aug. 19, 1974, Ser. No. 498,874**
**Claims priority, application United Kingdom, Sept. 12, 1973, 42819/73**
**Int. Cl.² F02P** *1/00*
**U.S. Cl. 123—117 D** **7 Claims**

1. A spark ignition system for an internal combustion engine comprising the combination of an engine having at least one spark plug, an engine driven transducer producing a pulse train at a frequency dependent on the speed of the engine, speed computing means connected to said transducer and periodically operating to produce a first multi-bit digital signal, sensor means for producing a second multi-bit digital signal, corresponding to another engine operating parameter, an empirically programmed read only digital memory device having input terminals connected to said speed computing sensor means and to said means and having output terminals for producing a third multi-bit digital output signal determined by the first and second multi-bit digital input signals supplied thereto, an engine shaft position computing means connected to said transducer and producing a forth multi-bit digital output signal varying with the displacement of the transducer from a datum position, a comparator connected to the read

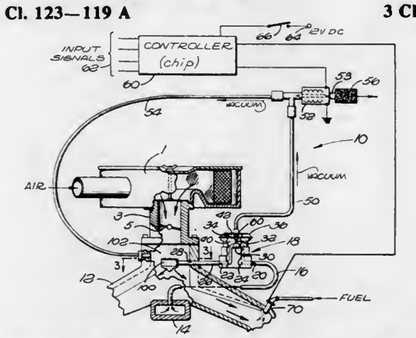



only digital memory device and the position computing means and producing a single pulse trigger signal output when the instantaneous value of the fourth multi-bit digital output signal from the position computing means is equal to the third multi-bit digital output signal from the read only digital memory device, and ignition control means connected to said comparator and to said spark plug so as to be triggered into producing a spark at said spark plug by said trigger output from the comparator.

## 4,018,198
## EXHAUST GAS RECIRCULATING SYSTEM

**Elmer A. Williams, Gardena, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.**

**Filed Aug. 7, 1974, Ser. No. 495,360**
**Int. Cl.² F02M** *25/06*
**U.S. Cl. 123—119 A** **3 Claims**




1. An exhaust gas recirculating system for a vehicle internal combustion engine provided with an intake manifold comprising:

injection means for governing injection of exhaust gases into the intake manifold responsive to application of intake manifold vacuum;

vacuum control means for allowing application of vacuum to said injection means only when activated;

sensing means for sensing vehicle operating parameters, said parameters being transmission position, engine temperature, engine RPM, and manifold vacuum;

control means responsive to input signals from said sensing means for selectively transmitting an activating signal to activate said vacuum control means, said control means transmitting said activating signal only when all said input signals are representative of all said sensed vehicle operating parameters being within a range of preselected values; and

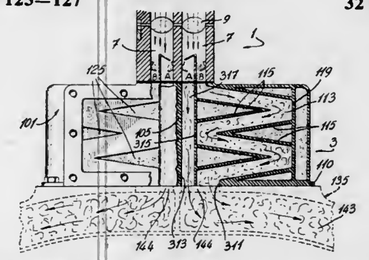
dispersing means connected to said injection means for dispersing the exhaust gases injected into the intake manifold to all cylinders of the engine equally.



## 4,018,199
## CARBURATION SYSTEM FOR AN INTERNAL COMBUSTION

**Istvan Furucz, 3964 rue St-Denis, apt 12, Montreal, Quebec, Canada**

**Filed Feb. 5, 1976, Ser. No. 655,632**
**Claims priority, application Canada, Feb. 7, 1975, 219576**
**Int. Cl.² F02M** *13/06*
**U.S. Cl. 123—127** **32 Claims**



1. Carburation system for internal combustion motor operating with a mixture of fuel vapor and air, said system in its simplest aspect being provided with a carburetor operating in the characteristic manner of an injection system, said carburation system having only one carburation chamber and one fuel reservoir, said carburation chamber being provided with means to control admission of air, said carburation system being characterized in that:

the carburation chamber, below the means for controlling the admission of air is doubled according to a predetermined dimension ratio thus forming two compartments which are independent of one another each having a different function but operating together to enable carburation;

the reservoir of the carburetor is fed by a fuel pump under constant pressure, through an adjustable pressure regulator, enabling to vary the pressure inside the said reservoir so that for a given pressure and independently of the depression exerted by the motor-cylinders on the carburation chamber, the flow of fuel is regularized by adjusting the opening of valves mounted in said reservoir or in communication with the latter;

the pressure regulator is connected to control means enabling to vary the pressure inside the reservoir of the carburetor depending on the behavior of the motor;

a motor fuel variable flow valve feeding the first of the two compartments of the carburation chamber, said valve operating to supply the quantity of the fuel required for all the operating conditions of the motor;

controlled valve operating intermittently feeding into the second compartment of the carburation chamber so that said valve can supply an excess of fuel necessary for starting the motor when it is cold;

means to automatically adjust the opening of the air admission butterfly valve with respect to the opening of said variable flow fuel valve, so as for a given pressure to enable the carburation chamber to introduce a flow of vapor fuel and air having a relatively constant volume ratio under all operating conditions of the motor;

a heat exchanger connected downstream to said carburetor, said heat exchanger and said carburetor being separated by a high-performance thermic insulator, said heat exchanger comprising a body provided with a heat exchange duct, connecting said first compartment of the carburation chamber to the motor-cylinders, means to bring the combustion gases around said heat exchanger duct to heat the heat exchanger, in order that the fuel supplied by the motor fuel variable flow valve when said fuel passes through said duct can be converted into vapor;

the body of said heat exchanger is unitary and removable in order to be easily removed to exchange it or to carry a periodic cleaning;

an unheated passage connecting said compartment of the carburation chamber with the motor-cylinders;

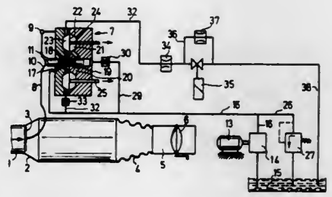
in order to decrease the power losses of the explosion in the motor-cylinders resulting from the prematured dilatation of the air which passes along with the fuel in the heat exchange duct, said heat exchanger being provided with control means to regularize the proportion of the quantitities of air which pass in the heat exchange duct and the direct passage towards the motor-cylinders;

and automatically operated means to adjust the position and the action of said control means depending on the temperature of the combustible mixture at the inlet of the motor-cylinders.

## 4,018,200
## FUEL INJECTION SYSTEM WITH FUEL PRESSURE CONTROL VALVE

**Gerhard Stumpp, Stuttgart; Wolf Wessel, Schwieberdingen; Volkhard Stein, Stuttgart, and Wilfried Sautter, Ditzingen-Schockingen, all of Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany**

**Filed Aug. 13, 1974, Ser. No. 497,123**
**Claims priority, application Germany, Oct. 3, 1973, 2349616**
**Int. Cl.² F02M** *39/00*; **F02D** *1/04*
**U.S. Cl. 123—139 AW** **12 Claims**



1. In a fuel injection system for mixture compressing externally ignited internal combustion engines employing continuous injection into a suction tube which contains a measuring member as well as an arbitrarily actuatable butterfly valve, one disposed behind the other, and wherein said measuring member can be displaced by flowing air depending on air flow rate through said suction tube and in opposition to a resetting force and wherein the flowing air displaces a movable member of a metering valve disposed within a fuel supply line for the purpose of metering out a fuel quantity in proportion to the air quantity, the metering taking place normally while substantially a constant pressure difference prevails, the improvement comprising: a control pressure circuit which includes a first throttle; and a solenoid valve disposed in said control pressure circuit for controlling the flow in the control pressure circuit and thereby changing the pressure difference at said first throttle, said metering valve being controllably associated with said first throttle so that the pressure difference at said metering valve can be changed by the pressure difference at said first throttle.

## 4,018,201
## FUEL SUPPLY SYSTEMS FOR DIESEL ENGINES

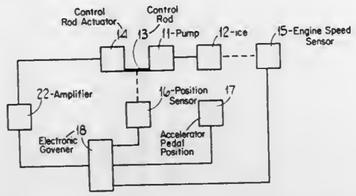
**Malcolm Williams, Solihull, and Christopher Robin Jones, Alcester, both of England, assignors to C.A.V. Limited, Birmingham, England**

**Filed May 15, 1975, Ser. No. 577,644**

**Claims priority, application United Kingdom, May 17, 1974, 22105/74**

**Int. Cl.² H02J** *1/00*

**U.S. Cl. 123—139 E** **5 Claims**




1. A fuel supply system for a diesel engine comprising in combination a pump for supplying fuel to the engine, an electrically operated actuator for controlling the output of the pump, a pair of D.C. supply lines, a voltage regulator for restricting the potential across said supply lines to a first predetermined value, a series circuit connected across said supply lines and including a resistor, a relay winding and a first transistor, first means for turning said transistor off when the current flowing in the actuator exceeds a predetermined value, including a Zener diode which is arranged to break down when the current flow through the actuator exceeds said predetermined value, a second transistor which is turned on by the current flow in the Zener diode, said second transistor removing the base drive to said first transistor when rendered conductive, second means operable upon de-energization of the relay winding when the transistor is turned off for preventing operation of the actuator, switch means for short-circuiting said resistor if the potential between the supply lines falls below a second predetermined value and third means for maintaining the current flow in said Zener diode when the actuator is turned off.

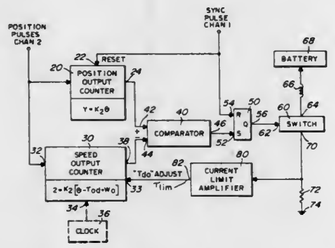
## 4,018,202
## HIGH ENERGY ADAPTIVE IGNITION VIA DIGITAL CONTROL

**Todd Henry Gartner, Elmhurst, Ill., assignor to Motorola, Inc., Schaumburg, Ill.**

**Filed Nov. 20, 1975, Ser. No. 633,737**

**Int. Cl.² F02P** *3/04, 5/04*

**U.S. Cl. 123—148 E** **12 Claims**




1. A system for controlling the ignition dwell of an internal combustion engine comprising

an ignition pulse generating means, coupled to the engine, and producing ignition pulses suitable for ignition firing,

a position pulse generating means coupled to the engine and producing position pulses representative of engine angular position,

a first circuit means for producing the position pulses and producing an output signal representative of engine position said first means being resettable to an initial state prior to the occurrence of the first position pulse following a trigger pulse,

a second circuit means for processing the position pulses and producing an output representative of engine RPM,

a comparator means for comparing the first circuit means output with the second circuit means output and producing a trigger signal in response to a predetermined relationship between the two outputs,

switch means for initiating dwell time in response to a trigger signal from the comparator means and firing the ignition in response to an ignition pulse,

means for generating a feedback signal representative of the ignition energy level and,

control means for predeterminedly altering the occurrence of the trigger signal in response to the feedback signal,

whereby the dwell time is adjusted to maintain a substantially constant ignition energy level.

## 4,018,203
## DECOMPRESSING DEVICE

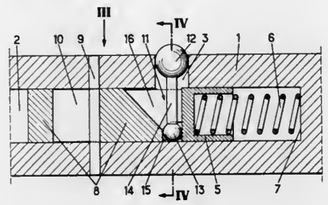
**Andre Legros, Marly le Roi, France, assignor to Bernard-Moteurs, Paris, France**

**Filed Jan. 9, 1976, Ser. No. 647,674**

**Claims priority, application France, Jan. 17, 1975, 75.01559**

**Int. Cl.² F01L** *13/08*

**U.S. Cl. 123—182** **9 Claims**




1. A decompression device for facilitating starting of an internal combustion engine, comprising piston means movable in an axial direction in a bore in an engine camshaft and urged in an axial direction by hydraulic pressure from an engine-driven oil pump against the action of resilient means; and a lever having a first end forming a retractable protrusion able to move radially of the camshaft in an aperture in the camshaft so that in an extended position the protrusion causes opening of an engine valve and in a retracted position does not cause opening of the valve, the other end of the lever being movable by said piston means sliding in the camshaft so that the first end moves from the extended position towards the retracted position as the hydraulic pressure increases.

## 4,018,204
## FUEL SAVING APPARATUS FOR MULTIPLE CYLINDER INTERNAL COMBUSTION ENGINES

**Earl W. Rand, Jr., 2101 Washington, Kansas City, Mo. 64108**

**Filed Jan. 2, 1976, Ser. No. 646,361**

**Int. Cl.² F02D** *9/00*

**U.S. Cl. 123—198 F** **10 Claims**

1. A fuel saving apparatus for multiple cylinder spark ignition internal combustion engines having a carburetor filtered air portion, said apparatus comprising:

a. an elongated tubular body member including an externally threaded first body portion adapted for sealing engagement within an engine cylinder spark plug aperture;

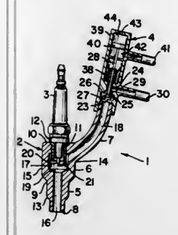
b. an apertured second body portion being internally threaded and adapted for sealingly receiving and engaging therein a spark plug;



c. a third body portion disposed adjacent said second body portion and including an aperture therethrough;

d. said body member including a central longitudinal aperture interconnecting the first, second and third body portions; and

e. a valve member in said third body portion and adapted to move between an open and a closed condition respectively for opening and closing said third body portion



aperture, said valve member having first and second ends; said valve member first end being sealingly attached to said third body portion about the aperture therein; said valve member second end being adapted for connection with said filtered air portion; said valve member, in said open condition causing cylinder intake vacuum to be reduced to the extent that an engine cylinder having connection therewith is rendered temporarily ineffective and engine fuel consumption is thereby reduced.

## 4,018,205
## ARCHERY BOW WITH ARCUATE LIMB ATTACHMENTS

**Leonard S. Meyer, 6449 Bridgewood Road, Columbia, S.C. 29206**

**Division of Ser. No. 278,932, Sept. 8, 1972, Pat. No. 3,965,883. This application Dec. 18, 1975, Ser. No. 642,128**

**Int. Cl.² F41B** *5/00*

**U.S. Cl. 124—24 R** **4 Claims**




1. An archery bow comprising a handle section with a hand grip positioned substantially intermediate the ends thereof the ends of said handle section projecting a substantial distance in opposite directions from the hand grip, thereof and bow limbs each comprising an arcuate member and having a concave configuration with one end thereof connected to the handle section and the other end thereof having a nock for receiving an end of a bow string, the limbs being connected to compression side of the handle section with the concave sides of the limbs presented away from each other.

## 4,018,206
## MACHINE FOR DRESSING FIXED-SUPER-ABRASIVE TOOLS

**Carle W. Highberg, Rolling Meadows, and John Dolido, Northbrook, both of Ill., assignors to Engelhard Minerals & Chemicals Corporation, Murray Hill, N.J.**

**Filed Aug. 11, 1975, Ser. No. 603,669**

**Int. Cl.² B24B** *53/04*

**U.S. Cl. 125—11 CD** **6 Claims**

1. A machine for dressing fixed-super-abrasive tools comprising in combination:

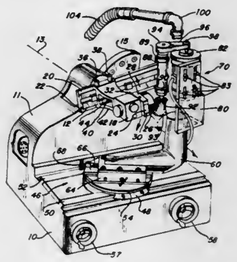
a. a base with upstanding frame;

b. a driven arm pivotally supported on said frame for at least limited vertical arc-like oscillatory movement about a horizontal axis;

c. a workpiece holder assembly suitable for holding the fixed-super-abrasive tool to be dressed and releasably securable to said arm at any predetermined position relative to said horizontal axis whereby the workpiece in said workpiece holder assembly is vertically oscillated about a horizontal axis at a first predetermined radius;

d. a grinder support bed on said base horizontally movable with respect thereto, said grinder support bed also being controllably oscillatable about a vertical axis through at least a limited horizontal arc;

e. a cylindrical grinding wheel rotatable about a vertical axis and upstandingly supported on said grinder support bed,



the abrasive content of said grinding wheel consisting essentially of conventional abrasives having a hardness on the Knoop scale of less than about 3000 kg/mm², said grinding wheel being disposed to traverse adjacent said workpiece holder assembly in a horizontal arc-like movement and to bring its outer surface in line contact with the surface of the fixed-super-abrasive workpiece as said grinder support bed controllably oscillates at a second predetermined radius, whereby the fixed-super-abrasive surface of the workpiece is dressed by the relatively fast wearing conventional abrasives of said outer surface of said rotatable grinding wheel; and

f. means for rotating said grinding wheel.

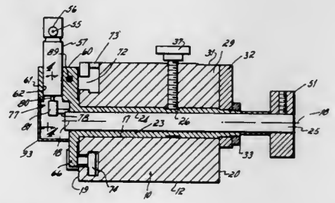
## 4,018,207
## DEVICE FOR DRESSING GRINDING WHEELS

**Wayne O. Garrett, Amelia, Ohio, assignor to William Berry, Cincinnati, Ohio**

**Filed Oct. 14, 1975, Ser. No. 622,152**

**Int. Cl.² B24B** *53/04*

**U.S. Cl. 125—11 B** **9 Claims**



1. A device for dressing a grinding wheel, said device comprising

a body in the form of a block presenting first and second planar mounting faces, said faces being perpendicular one to the other, and each of said faces being adapted to lie flush on a planar support surface in use,

a head mounted at one end of said body for selective rotation on an axis parallel to said perpendicular mounting faces, the angular position of said head relative to said body being adjustable by turning said head about said axis,

a dressing tool mounted on said head for reciprocal sliding

movement relative to said head, said dressing tool being adapted to reciprocate in a linear path that is parallel to a linear path radially extending from said axis,

sine bar means connected to said head, said sine bar means being adapted to accurately set the angulation of said head at a first angle with respect to said first mounting face and at a second angle with respect to said second mounting face,

said sine bar means including a platform removably seatable in a groove in an opposite end of said body to project therefrom as a cantilever parallel to said axis, and a rotatable plate angularly positioned by abutment with gauge blocks when the latter are stacked on said platform,

lock means for fixing said head to said body at that desired angular position as set by said sine bar means, and

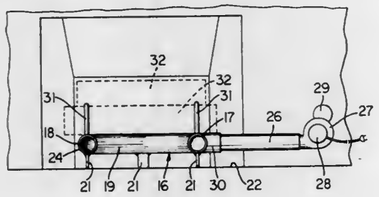
means for moving said dressing tool along said linear path, said linear path determining said first angle when said body rests on said first face and said linear path determining said second angle when said body rests on said second face, thereby providing a dressing device for a grinding wheel adapted to establish two grinding angles with a single setting of said sine bar means.

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**4,018,208**
**HOT AIR ANDIRON**

**David Hamilton, Lee County, Miss., assignor to Tom Lauderdale Machine Shop, Inc., Shannon, Miss., a part interest**

**Filed June 9, 1975, Ser. No. 585,328**
**Int. Cl.² F24B 7/00**
**U.S. Cl. 126—121** **9 Claims**




1. A combined heater-andiron for a fireplace, comprising:

andiron means for supporting thereon logs which are to be burned, said andiron means consisting of a C-shaped member formed from a hollow pipe and including a pair of hollow pipelike leg portions disposed in substantially parallel relationship and interconnected by a pipelike center portion, the space within said C-shaped member being completely open;

leg means attached to said andiron means and projecting downwardly therefrom for supporting said andiron means in a substantially horizontal plane spaced upwardly above a supporting floor, said leg means including a plurality of leg elements attached to said C-shaped member and projecting downwardly therefrom, said leg elements being disposed directly under the pipelike portions forming the C-shaped member;

one of said pipelike leg portions having a discharge opening formed in the free end thereof for permitting a substantially horizontally directed stream of heated air to be discharged from said C-shaped member, the other pipelike leg portion being closed in the vicinity of the free end thereof;

said discharge opening as formed in the free end of said one pipelike leg portion comprising the sole discharge opening for the discharge of heated air, and the free end of said other pipelike leg portion having plug means associated therewith for closing same, said plug means being spaced inwardly from the free end of said other leg portion so as to give the free end of said other leg portion the appearance of an open pipe;

an air supply pipe connected to said other pipelike leg portion at a location spaced inwardly from said plug means for supplying cool air into the interior of said C-shaped member, said air supply pipe having one end thereof connected to said other pipelike leg portion at a location spaced inwardly from the closed free end thereof, said air supply pipe being disposed within substantially the same plane as said C-shaped member and extending outwardly therefrom in substantially transverse relationship to said other pipelike leg portion;

means associated with the other end of said air supply pipe for supplying cool air through said air supply pipe into said C-shaped member; and

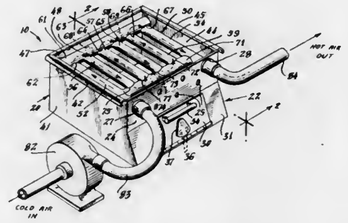
an elongated log holding element associated with each of said pipelike leg portions and projecting upwardly therefrom for engaging the logs which are supported on said C-shaped element and for preventing the logs from rolling out of the fireplace, the elongated log holding elements being located on the pipelike leg portions in the vicinity of but spaced inwardly from the free ends thereof.

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**4,018,209**
**AIR HEATER**

**Gene Ferruccio Bonvicini, Morehouse Road, Easton, Conn. 06612**

**Filed Nov. 12, 1975, Ser. No. 631,369**
**Int. Cl.² F24B 7/04**
**U.S. Cl. 126—121** **5 Claims**




1. An air heater comprising a pipe assembly, said pipe assembly having an intake pipe defining an intake opening at one end, and an outlet pipe defining an outlet opening at one end, said pipe assembly providing a continuous air passageway between said intake opening and said outlet opening, means for horizontally supporting said pipe assembly, a protective sleeving removably attached to said pipe assembly, said sleeving having an open top and bottom and at least partially, vertically surrounding said pipe assembly when in place, said sleeving having a front plate, a rear plate and a pair of side panels, the upper portion of said front plate defining an intake pipe hole and an outlet pipe hole through which the front portion of said intake pipe and said outlet pipe outwardly protrude when said heater is assembled, said front plate having a plurality of vent holes and a centrally disposed door in its lower portion, said sleeving also having an outwardly projecting lip extending around a portion of its top edge, a means for heating said pipe assembly and a means for continuously forcing air into said intake opening and through said pipe assembly.

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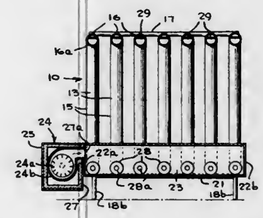
**4,018,210**
**FORCED AIR CONVECTOR/HEATER FIREPLACE GRATE STRUCTURE**

**Reuben L. Christophel, Harrisonburg, Va., assignor to Shenandoah Manufacturing Company, Inc., Harrisonburg, Va.**

**Filed Aug. 28, 1975, Ser. No. 608,740**
**Int. Cl.² F23H 13/00**
**U.S. Cl. 126—164** **4 Claims**

1. A forced-air room air convector and heating fireplace grate structure, comprising a plurality of hollow curved metallic tubes of substantially C-shaped configuration disposed in side-by-side alined relation in parallel vertical planes rigidly assembled in an array defining a forward facing concave cradle structure to be placed in outwardly facing relation in a fireplace chamber and support solid fuel on lower leg portions of the cradle structure, the tubes being correspondingly shaped to each define a lower horizontal leg extending rearwardly from a forward air inlet end and rearwardly joining a rear upwardly extending leg which upwardly joins a forwardly extending top leg terminating in an air outlet opening spaced above the air inlet opening, an elongated duct manifold forming a plenum transversely spanning the array of hollow tubes adjoining the inlet ends of the tubes and in gaseous communication therewith, an air propelling fan means rigidly supported by the grate structure adjacent one end of the plenum within the fireplace chamber for withdrawing ambient air from a






room served by the fireplace and propelling the air into the plenum to pressurize the latter and provide a pressurized air supply to the inlet ends of the tubes for conveyance through the tubes in heat exchange relation to fire burning in the cradle structure and discharge the heated air in predetermined downwardly inclined paths back into the room, and means for directing along downwardly inclined paths the flow of heated air emerging from the outlet openings of the hollow tubes comprising a truncated oval baffle disc supported inside the open outlet end of each tube in a plane which extends through the horizontal diameter of the surrounding tube portion and is inclined downwardly and outwardly relative to the axis thereof with the curved edge portions of the disc which form the oval portion thereof engaging and joined to the inner surface of the associated hollow tube and the truncated edge thereof disposed substantially in a vertical plane alined with the outlet end of the associated tube.

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**4,018,211**
**SOLAR ENERGY COLLECTION AND TRANSFER ARRANGEMENT AND METHOD, AND METHOD OF ASSEMBLY**

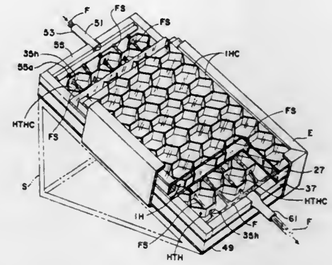
**Irwin R. Barr, Baltimore County, Md., assignor to AAI Corporation, Cockeysville, Md.**

**Continuation of Ser. No. 465,845, May 1, 1974, abandoned.**
**This application July 9, 1975, Ser. No. 594,431**
**Int. Cl.² F24J 3/02**
**U.S. Cl. 126—270** **141 Claims**

1. A solar energy collection and transfer arrangement, comprising,

a honeycomb panel sandwich assembly including a light-transmitting multicelled honeycomb insulation layer having light-transmitting top and bottom sheets with a light-transmitting honeycomb celled core extending in facial interconnection therebetween and a lateral fluid flow heat transfer multicelled honeycomb layer connecting with and extending laterally beneath said insulation layer,

and a plurality of lateral fluid passageways formed in the cell walls of said heat transfer multicelled honeycomb layer for guiding and passing heat transfer fluid beneath the bottom sheet of said insulation layer to absorb solar



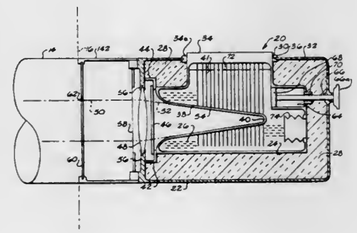

energy transferred thereto through said light-transmitting insulation layer.

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**4,018,212**
**SOLAR HEATING AND COOKING APPARATUS**

**Leopold A. Hein, Rte. 7, Fayetteville, Tenn. 37334, and William N. Myers, 4306B Boxwood Court, Huntsville, Ala. 35805**

**Filed Feb. 13, 1976, Ser. No. 657,820**
**Int. Cl.² F24J 3/02**
**U.S. Cl. 126—270** **19 Claims**




10. A solar heating and cooking apparatus comprising:

a. a housing;

b. a heat transfer medium carried within said housing;

c. a radiation receiver carried by said housing in heat exchange contact with said heat transfer medium;

d. lens means for receiving and focusing a concentrated beam of solar radiation rays upon said radiation receiver;

e. a heat conductive surface carried by said housing in heat exchange relationship with said heat transfer medium for heating and cooking; and

f. control means for regulating the temperature of said heat conductive surface by regulating the distance between the level of said heat transfer medium and said heat conductive surface;

whereby solar energy impinging on said radiation receiver is effectively utilized to heat said heating and cooking surface.

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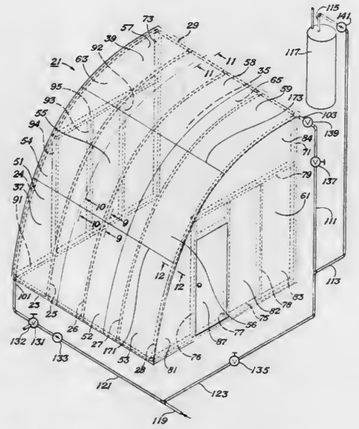
**4,018,213**
**SOLAR HEATING STRUCTURE**

**Harold J. Mann, Jr., 2120 Primrose, Fort Worth, Tex. 76111**

**Filed Apr. 5, 1976, Ser. No. 673,611**
**Int. Cl.² F24J 3/02**
**U.S. Cl. 126—271** **11 Claims**

1. Housing structure for employing solar heat for heating an enclosed space, comprising:

a plurality of conduit members attached to each other forming a frame adapted to be supported on the ground or the like in a position to be exposed to the sun,
said frame formed by said conduit members defining the boundary of a three dimensional space to be heated,
said frame formed by said conduit members defining the support structure of at least a side wall portion and a top wall portion,
the support structure of said side wall position including a plurality of said conduit members which extend in at least two dimensions,
the support structure of said top wall portion including a plurality of said conduit members which extend in at least two dimensions,
a water receiving inlet formed in said conduit members,

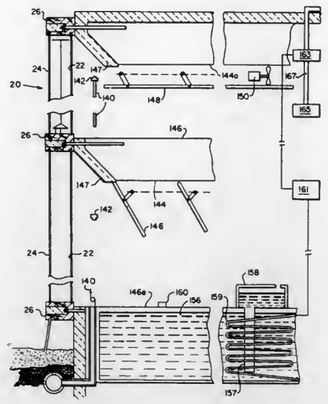


a water outlet formed in said conduit members at a position spaced from said inlet,
said conduit members defining said frame having passages formed therethrough which are in fluid communication with each other and with said inlet and said outlet,
said conduit members being attached to each other in a manner such that said passages form a plurality of different water flow paths through said conduit members from said inlet to said outlet,
said conduit members being formed of the material which has good heat conductivity, and
panel means and supported by said conduit members in a manner to define said side wall portion and said top wall portion,
said panel means being formed of a material capable of transmitting therethrough heat and light from the sun.

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**4,018,214**
**HEATING AND VENTILATION SYSTEM**
**Norman B. Saunders, 15 Ellis Road, Weston, Mass. 02193**
**Division of Ser. No. 529,235, Dec. 3, 1974, Pat. No. 3,952,947.**
**This application Dec. 10, 1975, Ser. No. 639,304**
**Int. Cl.² F24J** *3/02*
**U.S. Cl. 126—271** **8 Claims**

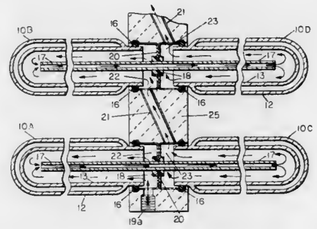
1. In a building including at least one glazing panel for transmitting the light and near infrared heat energy of the sun, a system for storing said heat energy comprising in combination:
a first tank capable of being completely filled with a heat absorbing fluid and positioned relative to said glazing panel so as to be exposed to at least a portion of said heat energy transmitted through said glazing panel and so that said heat absorbing fluid absorbs at least a part of said portion of heat energy,
a second tank in fluid communication with said first tank and disposed above said first tank; and
conduit means connecting the bottom of said first tank and said second tank so that fluid disposed on the bottom of said first tank will flow into said second tank when the



fluid in said first tank expands, and so that fluid disposed in said second tank will flow into said first tank when the fluid in said first tank contracts.

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**4,018,215**
**LIQUID OPERATED SOLAR ENERGY COLLECTOR**
**Yu K. Pei, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio**
**Filed July 28, 1975, Ser. No. 599,558**
**Int. Cl.² F24J** *3/02*
**U.S. Cl. 126—271** **13 Claims**

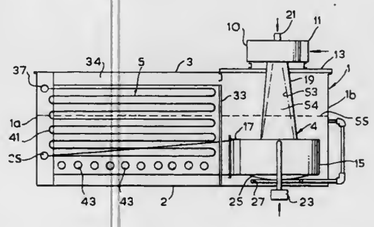


1. In a solar energy collector apparatus, a manifold means interconnecting plural tubular solar energy collectors with each other in series,
said manifold means comprising:
a manifold receptacle for each of said plural tubular solar energy collectors of the apparatus,
said receptacle having an annular side wall providing a chamber having a mouth opening at one exial end,
an end wall means connected with said side wall closing the other axial end of said chamber,
a gasket seat on said side wall adjacent said one axial end,
an annular gasket in said seat,
an aperture in said end wall means,
an annular sealing gasket means encircling said aperture, and
a port in said side wall connected to the chamber;
each of said plural tubular solar energy collectors comprising a double-walled glass collector tube having a closed end and an open end, the open end of said collector tube being sealingly mounted in said mouth opening of a manifold receptacle by engagement with said annular gasket thereof,
an elongated, fluid connecting tube extending through said sealing gasket means and into the interior of a double-walled collector tube, the one end of said fluid connecting tube being disposed adjacent the closed end of said collector tube, a heat exchange fluid, and a fluid conducting means connecting the other end of said fluid connecting tube and the side wall port of another receptacle such that said fluid is adapted for circulation (1) through the plural tubular solar energy collectors in series, and (2) in a reverse flow path within each of said tubular collectors.



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**4,018,216**
**HEAT EXCHANGE APPARATUS**
**John Thurley, Harrogate, England, assignor to John Thurley Limited, England**
**Filed Apr. 21, 1975, Ser. No. 569,653**
**Claims priority, application United Kingdom, Apr. 29, 1974, 18629/74**
**Int. Cl.² F24H** *1/20*
**U.S. Cl. 126—360 R** **13 Claims**

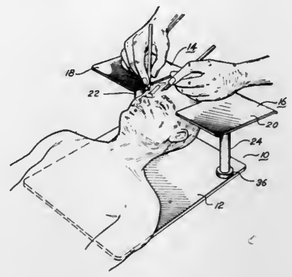


1. Heat exchange apparatus for raising the temperature of a subject fluid comprising:
A. a fuel burner including:
a. an upper tangential air inlet;
b. a lower combustion products outlet;
c. a portion, lying between the air inlet and the combustion products outlet, where combustion takes place and comprising a frusto-conical duct extending downwardly from the air inlet and opening at its lower end into a chamber, the combustion products outlet extending tangentially from the chamber;
d. a fuel inlet, at least the combustion portion being located in a container, and at least part thereof being, in use, immersed in a coolant liquid;
B. fluid passage means, laterally spaced from the fuel burner, through which a subject fluid may be passed, the fluid passage means being located in a vessel and, in use, at least partially immersed in a heat-exchange fluid;
C. means for feeding heated combustion products from the combustion products outlet to a position below said fluid passage means, and, at this position, releasing the combustion products into the heat exchange fluid.

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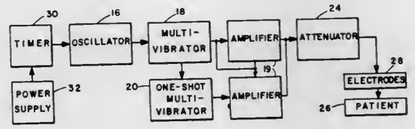
**4,018,217**
**ARM AND HAND REST DEVICE FOR MICROSURGERY**
**Daniel R. Evans, 2005 Valparaiso St., Valparaiso, Ind. 46384**
**Filed Nov. 20, 1975, Ser. No. 633,616**
**Int. Cl.² A61B** *19/00;* **B68G** *5/00*
**U.S. Cl. 128—1 R** **6 Claims**

1. An arm and hand rest device for performing microsurgery on a patient lying on an operating table, comprising a horizontally disposed board for insertion between the patient's body and the operating table for retaining the device in a desired position with relation to the patient's body, a first table mounted on one end of said board and projecting upwardly therefrom and having an arm and hand rest at the top located in a position in close proximity to the patient's head when the operation is being performed, a second table mounted on said board in spaced relation to said first mentioned table and having an arm and hand rest at the top and, with the first table, defining an area for the patient's head, and means for vertically adjusting said tables to different levels relative to one another.



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**4,018,218**
**METHOD AND APPARATUS FOR SLEEP INDUCTION**
**James E. Carlson, 9233 Carthay Circle, Spring Valley, Calif. 92077, and Robert E. Urmston, 4405 Niagara Ave., San Diego, Calif. 92107**
**Filed Mar. 12, 1975, Ser. No. 557,593**
**Int. Cl.² A61N** *1/34*
**U.S. Cl. 128—1 C** **23 Claims**




1. An apparatus to induce sleep in a patient which comprises:
means for generating electrical cycle pulses having a basic control frequency,
first means responsive to said electrical pulses for generating reticular formation stimulus signals that are first in the cycle,
second means for generating visual stimulus signals that are second in the cycle,
third means for generating recovery signals that are third in the cycle,
and electrode means for transmitting the cycle of signals to the patient.

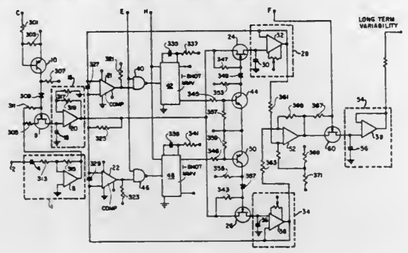
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**4,018,219**
**HEART RATE VARIABILITY MEASUREMENT**
**George Hojaiban, Newington, Conn., assignor to American Home Products Corporation, New York, N.Y.**
**Filed Nov. 3, 1975, Ser. No. 628,084**
**Int. Cl.² A61B** *5/04*
**U.S. Cl. 128—2.06 A** **15 Claims**

1. Apparatus for measuring heart rate variability comprising
means for receiving periodic voltage signals each having a characteristic with a magnitude proportional to a subject's heart rate,
means for storing a first voltage having a characteristic with a magnitude proportional to the previous maximum heart rate of the subject,
means for storing a second voltage having a characteristic with a magnitude proportional to the previous minimum heart rate of the subject,
first means for comparing the magnitude of said characteristic of said received voltage with the magnitude of said characteristic of said first voltage,

means responsive to said first comparing means for storing said received voltage in said first voltage storing means only when the magnitude of said characteristic of said received voltage exceeds the magnitude of said characteristic of said stored first voltage,

second means for comparing the magnitude of said characteristic of said received voltage with the magnitude of said characteristic of said second voltage,



means responsive to said second comparing means for storing said received voltage in said second voltage storing means only when the magnitude of said characteristic of said received voltage is less than the magnitude of said characteristic of said second voltage, and

means for determining the difference between the magnitudes of said characteristics of said first and second voltages respectively.

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**4,018,220**

**METHOD OF INSERTION FOR INTRAUTERINE DEVICE OF C OR OMEGA FORM WITH TUBULAR INSERTER**

**Lionel C. R. Emmett, Kingston-upon Thames, England, assignor to Lionel C. R. Emmett, Surrey, England**

**Division of Ser. No. 489,982, July 19, 1974, Pat. No. 3,973,560. This application Feb. 23, 1976, Ser. No. 660,679**

**Int. Cl.² A61F** *5/46*

**U.S. Cl. 128—130** **7 Claims**



1. A method of inserting an intrauterine contraceptive device into the fundal region of the uterine cavity, using the device and an inserter, the device being a linear type of intrauterine contraceptive device made of flexible material comprising an elongate member which, prior to placement in the inserter and in situ, assumes a linear arch-shape wherein the two terminal portions of the linear form are connected by a non-interrupted continuous arch form, and the terminal portions curve inwardly toward each other and the member being of a material with sufficient flexibility to assume a substantially straight linear form when placed inside the inserter to accommodate insertion, and after expulsion from the inserter to assume the arched, in situ, configuration, which has dimensions substantially encompassing an area enabling the device to be contained within a normal uterus; and the inserter being a hollow tube of sufficient internal diameter to accommodate the device in its substantially straightened out configuration comprising the steps of: substantially straightening the member and inserting it into the hollow tube; inserting the tube through the cervical canal a predetermined distance whereupon the inserted end of the tube is space from the fundal roof a distance at least equal to the depth dimension of the device in its arched configuration; pushing the device from the tube into the fundal cavity; maintaining the extruding end of the device at a fixed distance, slightly spaced from the end of the hollow tube, to cause the body of the device to positively curve into the arched configuration laterally along the facing walls of the fundal cavity until the device is completely pushed from the hollow tube; positively bringing both ends of the device into close juxtaposition and shifting the device in its substantially in situ configuration to a proper location in the fundal cavity; and removing the hollow tube.

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**4,018,221**

**SUPPORT FOR ANESTHETIC GAS DELIVERY HOSES AND ENDOTRACHEAL TUBES**

**Thomas Rennie, 335 Dewey St., Bennington, Vt. 05201**

**Filed Sept. 29, 1975, Ser. No. 617,716**

**Int. Cl.² A61M** *25/02*

**U.S. Cl. 128—185** **2 Claims**



1. A medical band for supporting endotracheal tubes and anesthesia hoses from the forward head portion of a patient, said band comprising an elongated flexible strap of predetermined width, said strap including opposite end portions and being of a length to encircle substantially one and one-half times about a patient's head, one terminal end portion of said strap including a first Velcro strip on one side facing outwardly therefrom, the other end portion of said strap including a second Velcro strip on the other side thereof facing outwardly thereof and spaced from the corresponding terminal end portion, said first and second strips being releasably engageable with each of adjusted end overlapped positions of said one terminal end portion and said other end portion, a thick, arcuate and somewhat deformable but shape retentive pad secured over and extending along said other side of said strap between said second fastening means and said terminal end of said other end of said strap and over which the zone of said one end portion of said strap spaced along the latter from said one terminal end portion may be lapped, said zone of said one end portion and the opposition surfaces of said pad define opposing friction surfaces between which anesthetic gas delivery hoses may be clamped.

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**4,018,222**

**SYRINGE CONTAINING FROZEN VACCINE**

**William J. McAleer, Ambler, and Maurice R. Hilleman, Lafayette Hill, both of Pa., assignors to Merck & Co., Inc., Rahway, N.J.**

**Continuation-in-part of Ser. No. 548,467, Feb. 10, 1975. This application May 13, 1975, Ser. No. 577,244**

**Int. Cl.² A61M** *5/00*

**U.S. Cl. 128—216** **11 Claims**

1. A vaccine delivery system suitable for human administration comprising a single dosage hypodermic syringe having a container portion made of a plastic material which is resiliently flexible at room temperature and a needle portion comprising a hollow sharp needle extending from the plastic container portion to convey fluids from within the container out through the tip of the needle when the needle is inserted under the skin and the container is squeezed, an aqueous vaccine diluted to a concentration suitable for human administration and sealed within the container, the vaccine being in the



frozen state at a temperature of from about −10° C to about −20° C, whereby the vaccine is preserved for storage and shipment and the syringe is protected from leakage during storage and shipment.

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**4,018,223**

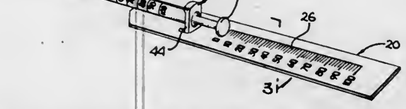
**DOSAGE CONTROL DEVICE**

**Gayle M. Ethington, Postville, Iowa, assignor to Andros Incorporated, Berkeley, Calif.**

**Filed Dec. 9, 1974, Ser. No. 530,811**

**Int. Cl.² A61M** *5/00*

**U.S. Cl. 128—218 C** **6 Claims**



1. A combination for use in controlling the dosage of injections comprising: a syringe having a cylinder body with a needle on one end and at least one cylinder flange on the other end, and a plunger extending into said cylinder body and having a plunger flange on the outer end thereof; and a sheet-like plastic member of generally uniform thickness having a scale for reading in co-operation with the plunger flange and having a slot at a predetermined location with respect to said scale and snapped over said cylinder flange such that said cylinder flange protrudes through said plastic member, said plastic member being cut off at the scale reading for the desired dosage at a position less than the full travel of said plunger flange, whereby said plunger may be moved so that said plunger flange abuts the end of said member, as cut off, to control the dosage in said syringe.

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**4,018,224**

**UNDERWATER DRAINAGE DEVICE WITH DUAL COLLECTION CHAMBERS**

**Leonard D. Kurtz, Woodmere, and Robert E. Bidwell, Melville, both of N.Y., assignors to Deknatel, Inc., Long Island, N.Y.**

**Filed Apr. 7, 1976, Ser. No. 674,482**

**Int. Cl.² A61M** *1/00*

**U.S. Cl. 128—276** **6 Claims**

1. An underwater drainage device comprising, in combination,

a main collection chamber

having an inlet adapted to be connected to a pleural cavity,

an outlet from the main collection chamber,

a U-shaped water seal chamber

a U-shaped manometer chamber,

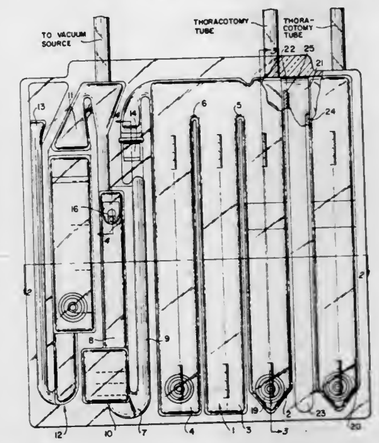


the upper end of one arm of the U-shaped water seal chamber being connected to the outlet from the main collection chamber,

the upper end of the other arm of the U-shaped water seal chamber being connected to the upper end of one arm of the U-shaped manometer chamber,

the other arm of the U-shaped manometer chamber being open to atmosphere,

a connection from said device with a source of suction,



during normal operation the source of suction maintaining the pleural cavity at a negative pressure determined by the fluid in the manometer chamber,

a secondary collection chamber having another inlet adapted to be connected to a plural cavity,

a passageway interconnecting the main collection chamber and the secondary collection chamber,

and an overflow chamber being disposed between the secondary collection chamber and the main collection chamber.

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**4,018,225**

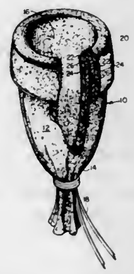
**CATAMENIAL TAMPON**

**Stelio Jack Elmi, Andover, Mass., assignor to The Gillette Company, Boston, Mass.**

**Filed Aug. 18, 1975, Ser. No. 605,427**

**Int. Cl.² A01F** *13/20*

**U.S. Cl. 128—285** **5 Claims**

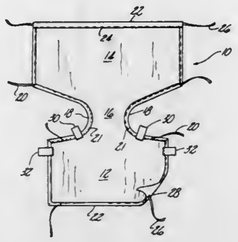


1. A catamenial tampon comprising a hollow cone of absorbent material, said cone being adapted so that the open end of the cone which is the insertable end will face the posterior of the vagina when inserted, a withdrawal cord attached to the outside of the apex at the retrievable closed end of the cone and the walls of the insertable open end of the cone being

furled outwardly and down to form a cuff which covers a portion of the outer walls of said cone, said cuff providing a tighter fit with the vaginal walls when the tampon is in position and said cuff unfurling upon removal to ease said removal.

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**4,018,226**
**ADULT UNDERGARMENT**
**Dorothy Korgemets, 9333 E. Jefferson, Detroit, Mich. 48214**
**Division of Ser. No. 400,550, Sept. 25, 1973, Pat. No. 3,916,901. This application Sept. 2, 1975, Ser. No. 609,792**
**Int. Cl.² A61F** *13/16*
**U.S. Cl. 128—287** **4 Claims**



1. An adult undergarment comprising a cloth material having a back panel and a front panel, each having inside and outside surfaces, connected by a narrow central panel defined by opposed inwardly curved sides constituting crotch portions and convergent end sections disposed along the lower edges of said panels and constituting pant leg portions;

channels extending along the length of the crotch portions, the convergent end sections and along the width of said front and back panels at the outer edges thereof, the channels of the leg portions and the outer edge of the front panel opening to said outside surface of said front panel at locations which are inwardly spaced from the side edges of said front panel, the channels of the leg portions and of the outer edges of the rear panel opening to the side edges of said rear panel, said entire front panel from side edge to side edge being smaller than said back panel; and

tie cords movably carried within each of said channels, the ends of said tie cords existing from said openings, whereby portions of said back panel overlap portions of said front panel when said garment is worn and the ends of said tie cords are fastened together.

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**4,018,227**
**CRYOSURGICAL INSTRUMENT**
**Ronald M. Wallach, Norwalk, Conn., assignor to Cryomedics, Inc., Bridgeport, Conn.**
**Filed Oct. 9, 1975, Ser. No. 621,105**
**Int. Cl.² A61B** *17/36*
**U.S. Cl. 128—303.1** **13 Claims**

1. A cryosurgical instrument comprising:

means defining an expansion chamber, said means including a body formed of a high thermal conductivity material and having a surface thereof shaped for contacting body tissue and providing heat transfer with the tissue,

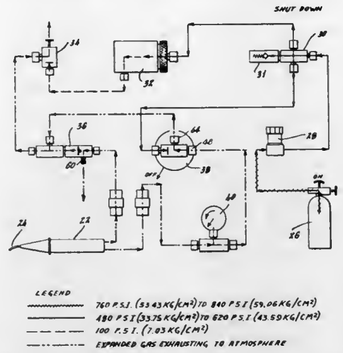
refrigerant supply means for conveying a gaseous refrigerant under pressure from a source to said expansion chamber, said means including

flow restriction means adjacent said chamber for providing an appropriate pressure differential as said pressurized gas passes therethrough to cause a Joule-Thomson expansion of said gas to cool said chamber,

selectively operable pressure regulation means for reducing the pressure of said gaseous refrigerant below that required to effect said Joule-Thomson expansion of said gas prior to its entrance into said expansion chamber, and

selectively operable exhaust means for conveying an effluent gas from said chamber to the atmosphere,

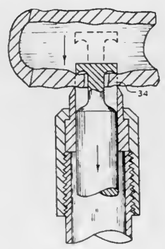
whereby with said pressure regulation means in its inoperative mode and said exhaust means in its operative mode, said gas can expand into said chamber and exhaust to the atmosphere to effect rapid cooling of said chamber; with said pressure regulation means in its inoperative mode and said exhaust means in its inoperative mode,




said gas flow to the atmosphere can be interrupted thereby effecting rapid warming of said chamber; and with said pressure regulation means in its operative mode and said exhaust means in its operative mode said gas will not undergo a Joule-Thomson expansion but will flow through and purge said refrigerant supply means, chamber, and exhaust means of contaminants.

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**4,018,228**
**SURGICAL PUNCH APPARATUS**
**Carl C. Goosen, 1035 Golfside Drive, Winter Park, Fla. 32789**
**Filed Feb. 24, 1975, Ser. No. 552,703**
**Int. Cl.² A61B** *17/32*
**U.S. Cl. 128—305** **8 Claims**



1. A surgical punch apparatus comprising in combination:

an elongated hollow support sleeve having two end portions;

a removably attached annular cutter blade attached to one end portion of said elongated hollow support sleeve and having an axial passage therethrough;

an elongated rod slidably mounted in said hollow support sleeve;

a movable cutter blade fixedly attached to one end of said elongated rod and slidable with said rod in said sleeve, said movable cutter blade being disc-shaped with an annular cutting edge and shaped to slide into the passage in said removably attached cutter blade;

handle means attached to said elongated rod and extending through openings in said elongated hollow support sleeve for sliding said rod;

threaded blade holding member on the end of said elongated hollow support sleeve for holding said removably attached cutter blade to said elongated hollow support sleeve;

said removably attached cutter blade having an annular ledge wrapped around the exterior thereof and said threaded blade holding member having an interior annular ledge therein whereby the interior ledge of the threaded blade holding member will abut against the annular ledge of the blade for holding the blade to the hollow support sleeve;

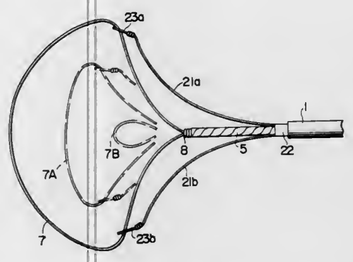
said elongated hollow support sleeve having a raised annular portion therein having substantially the same interior cross-section diameter as said removably attached cutter blade and said elongated rod being slidably supported on said raised annular portion and said removably attached cutter blade; and

a cap attached to the opposite end of said elongated hollow support sleeve from said threaded blade holding member and a spring located between said cap and said elongated rod in said elongated hollow support sleeve, whereby said fixed cutter blade can be inserted in a cut and pulled into said removably attached cutter blade to a cut a predetermined section in tissue.



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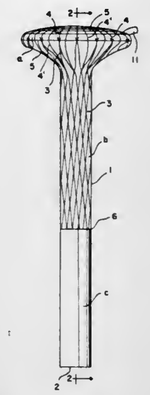
**4,018,229**
**APPARATUS FOR LIGATION OF AFFECTED PART IN COELOMA**
**Osamu Komiya, Hachioji, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan**
**Filed Sept. 10, 1975, Ser. No. 612,253**
**Claims priority, application Japan, Sept. 13, 1974, 49-110382; Sept. 13, 1974, 49-110383**
**Int. Cl.² A61B** *17/12*
**U.S. Cl. 128—326** **9 Claims**




1. An apparatus for ligation of an affected part in coeloma comprising a ligature having a loop formation which is adapted to form a loop for ligating an affected part in an coeloma, the loop being reduced in size by pulling one end of the loop formation; an inner flexible tube into which said one end of the ligature extends; a pair of holding wires each having one end mounted on a distal end portion of the inner tube and having a free end formed as a capture for releaseably engaging the loop formation, the captures being effective to retain the loop formation therein below a given level of tension in the loop formation; and an outer flexible tube for internally housing the loop formation, the holding wires and the inner flexible tube in compacted condition; said outer flexible tube adapted for insertion into a coeloma, the outer tube being adapted to be operated for displacement in a direction to expose the loop formation and the holding wires into the coeloma, the holding wires being resiliently biased in a manner such that their respective captures are effective to extend the loop formation into a loop of an increased size when it is exposed while maintaining engagement with the captures.

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**4,018,230**
**CERVICAL DILATOR**
**Kazuo Ochiai, No. 35-7, 1-chome, Nishiikebukuro, Toshima, Tokyo, and Masayasu Mizutani, No. 7-3-19, Koyama, Shinagawa, Tokyo, both of Japan**
**Filed Apr. 2, 1975, Ser. No. 564,346**
**Claims priority, application Japan, Apr. 4, 1974, 49-038386**
**Int. Cl.² A61M** *29/00*
**U.S. Cl. 128—344** **12 Claims**



1. A cervical dilator comprising:

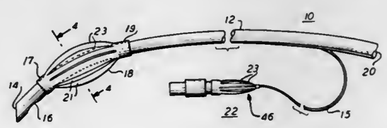
a sack of elastic material expandable under internal pressure, said sack comprising a shaped head and a stem communicating with the head, said head terminating in flat, generally disc-like surface, and

a network of interconnected inelastic members embedded in portions of said material,

said inelastic members being configured to define the shape and limit the size of said sack during expansion under said internal pressure.

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**4,018,231**
**DISPOSABLE BALLOON TYPE CATHETER**
**Dean R. Wallace, Fort Myers, Fla., assignor to Airco, Inc., Montvale, N.J.**
**Continuation-in-part of Ser. No. 436,314, Jan. 24, 1974, Pat. No. 3,901,246. This application June 2, 1975, Ser. No. 583,314**
**The portion of the term of this patent subsequent to Aug. 26, 1992, has been disclaimed.**
**Int. Cl.² A61M** *25/00*
**U.S. Cl. 128—351** **6 Claims**



1. A tracheal tube adapted for insertion into the trachea of a patient for introducing and removing gas, said tube having a main inflatable chamber surrounding the distal end thereof, a gas passageway having one end communicating with the interior of said main inflatable chamber and having the other end adapted to receive an inflating means for delivering gas to inflate said main inflatable chamber; said gas passageway including a valve means for selectively introducing gas through said passageway to said inflatable chamber and a pilot balloon means comprising a tubular extension, a flexible oval-shaped pilot balloon having its outer ends secured to said tubular extension, thereby forming an enclosed pilot chamber;

said pilot chamber being in gas communication with said main inflatable chamber through said gas passageway and an opening provided in said tubular extension; and said flexible pilot balloon being secured to said tubular extension in a prestretched condition along its length, whereby said balloon is characterized in a non-inflated condition by a series of spaced folds extending longitudinally between said secured ends, and is substantially free of transversely oriented folds, the ridges of said longitudinal folds contrasting with the troughs between said folds to constitute a series of spaced visually discernible markings between said secured ends to thereby visually signal said non-inflated condition of said balloon and the corresponding inflation condition of said main chamber.

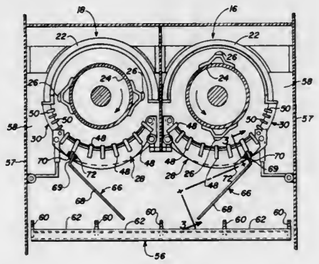
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**4,018,232**

## MATERIAL DISTRIBUTION MEANS FOR CONCAVE OF ROTARY COMBINE

**Edward W. Rowland-Hill, Lancaster, and Robert R. Todd, Leola, both of Pa., assignors to Sperry Rand Corporation, New Holland, Pa.**

**Filed Apr. 1, 1976, Ser. No. 672,582**
**Int. Cl.² A01F** *7/06, 12/00*
**U.S. Cl. 130—27 T** **17 Claims**



1. A mobile combine having a longitudinally extending unit comprising threshing and separating means and including coacting rotor and concave members, crop feeding means on the forward end of said combine operable to deliver cut crop material to said threshing and separating means, material cleaning mechanism comprising a grain pan supported below said threshing and separating means to receive threshed and semi-threshed material therefrom and sieve mechanism supported by said combine rearwardly of said grain pan to receive material therefrom for separation of threshed crop material from waste material, and power means operable to actuate said feeding means and threshing means; the improvement comprising material deflecting means positioned beneath at least portions of said threshing and separating means, and means connecting said deflecting means to said longitudinally extending unit for direct support thereby, said deflecting means being operable to effect relatively even distribution of crop material in a transverse direction across said material cleaning mechanism.

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**4,018,233**

## SHAPED MATTERS OF TOBACCOS AND PROCESS FOR PRODUCING THE SAME

**Toshio Miyake, Okayama, Japan, assignor to Sumitomo Chemical Company Limited, Osaka and Hayashibara Biochemical Laboratories, Incorporated, Okayama, both of, Japan**

**Filed June 16, 1975, Ser. No. 587,167**
**Claims priority, application Japan, June 29, 1974, 49-14829**
**Int. Cl.² A24B** *15/04, 15/05, 3/14*
**U.S. Cl. 131—17 AC** **6 Claims**

1. A shaped solid smoking composition, the smoke produced by its combustion being pleasant in aroma and flavor, which composition comprises starting tobacco materials coated with and coated together with a material selected from the group consisting of pullulan, etherified pullulan, and esterified pullulan.

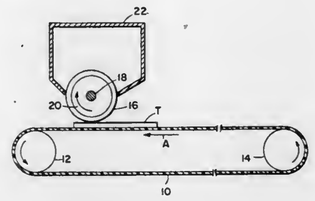
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**4,018,234**

## MECHANICAL LIPID REMOVAL FROM TOBACCO LEAVES

**Joseph V. Fiore, Fairfield, Conn., assignor to AMF Incorporated, White Plains, N.Y.**

**Filed Mar. 6, 1975, Ser. No. 556,025**
**Claims priority, application United Kingdom, Mar. 8, 1974, 10470/74**
**Int. Cl.² A24B** *3/18, 15/00*
**U.S. Cl. 131—140 B** **7 Claims**



1. A process for the selective removal of surface lipids from tobacco leaves comprising contacting the epithelium of whole tobacco leaf in a supple supported condition at a moisture condition of at least 35 percent by weight with means for mechanical disengagement and release of surface lipids associated with the glandular trichome and cuticle, comprising an absorbent surface said contacting being effected in a nonabrasive manner without substantial relative movement between said leaf and said surface and recovering tobacco leaf characterized by substantial retention of physical and chemical integrity and a lipid content reduced as compared to untreated leaf by at least 25%.

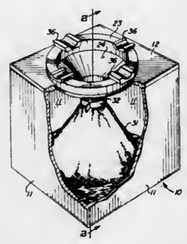
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**4,018,235**

## ASH TRAY

**April A. Smith, 2040 S. Hills Drive, Flagstaff, Ariz. 86001**

**Continuation-in-part of Ser. No. 570,012, April 21, 1975, abandoned. This application June 4, 1975, Ser. No. 583,757**
**Int. Cl.² A24F** *19/14*
**U.S. Cl. 131—236** **2 Claims**



1. An ash tray for receiving and extinguishing ashes and butts for providing for convenient and sanitary disposal of the smokers' waste accumulated therein, said ash tray comprising:
   a. an upright hollow vessel having an opening in the top thereof for receiving smokers' waste therethrough;
   b. a disposable flexible receptacle detachably supported within said vessel and communicating with the opening in the top thereof for receiving said smokers' waste therein; and
   c. means for contacting smokers' waste contained in said disposable receptacle with a fire-extinguishing fluid,

said disposable receptacle being fluid-permeable and detachably supported within said vessel such that at least the lower portion thereof is suspended within a firek-extinguishing fluid contained within the lower portion of said vessel.



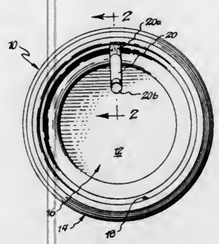
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**4,018,236**

## ASH TRAY

**Albert E. Ehlen, 539 Linwood Ave., Buffalo, N.Y. 14209**

**Filed Mar. 17, 1976, Ser. No. 667,635**
**Int. Cl.² A24F** *15/08, 19/00*
**U.S. Cl. 131—240 R** **12 Claims**



1. In an ash tray having an upwardly opening ash receiving chamber circumscribed by a rim, said rim having at least one support portion adapted to support a cigarette when not being held by a smoker, the improvement wherein said support portion defines a slot inclined upwardly and inwardly towards said chamber, said slot including a pair of facing side wall surfaces disposed respectively relatively adjacent to and remote from said chamber, said side wall surfaces being spaced to frictionally receive therebetween a butt end of said cigarette whereby to position said cigarette to upstand from within said slot with an ash end thereof arranged to overlie said chamber, and said slot having a length as measured in a direction circumscribing said chamber in excess of the distance between said side wall surfaces.

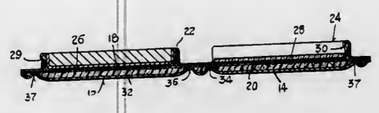
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**4,018,237**

## BOOKLET TYPE COSMETIC COMPACT

**Wolf Steiman, 649 Springer Road, Fairfield, Conn. 06430**

**Filed Oct. 14, 1975, Ser. No. 622,026**
**Int. Cl.² A45D** *33/00*
**U.S. Cl. 132—83 R** **10 Claims**



1. As a new article of manufacture, a cosmetic compact in the form of a small booklet which includes a single outer piece of tough, flexible sheet material, said booklet having front and rear cover portions and comprising:
   a. a base member of flexible and soft sheet-like material,
   b. a cover member of flexible and soft sheet-like material hingedly connected to and adapted to overlie the base member,
   c. a substantially flat retainer sheet carried by one of said members, said sheet having an upstanding yieldable bead formation extending at least around three peripheral side edge portions thereof,
   d. means for securing said retainer sheet to said one member,
   e. a second substantially flat retainer sheet carried by the other of said members, said second sheet having an upstanding yieldable bead formation extending at least partially around its periphery, and
   f. means for securing said second retainer sheet to said other member,
   g. said bead formations being adapted to overlie and frictionally engage and nest with one another when the cover member is swung to a closed position overlying the base member, thereby to maintain the members in the closed position when the compact is not in use,
   h. said base member and cover member being formed of a single sheet whereby they are integral with one another, said single sheet having intermediate portions constituting a "living" hinge.

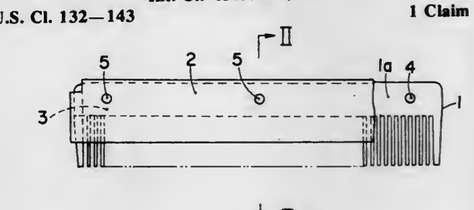
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**4,018,238**

## COMB

**Nobuaki Ishida, 9-24-6 Koganehara, Matsudo, Chiba, Japan**

**Filed Sept. 22, 1975, Ser. No. 615,434**
**Claims priority, application Japan, July 4, 1975, 70-46670**
**Int. Cl.² A45D** *24/08*
**U.S. Cl. 132—143** **1 Claim**



1. A device for simultaneously combing and smoothing the hair which consists of
   a. a comb member that includes
      1. an elongated non-tooth body portion,
      2. a plurality of spaced apart teeth extending in a parallel row downwardly from said elongated body portion, and
      3. a plurality of longitudinally aligned indentations along one side of said nontooth body portion, and
   b. a cover member that includes
      1. an elongated generally U-shaped portion that fits over and along the edge of the elongated non-tooth portion of the comb member that is farthest from the teeth of the comb, and
      2. an elongated generally flat section extending from said U-shaped portion downwardly over a substantial portion of the teeth of the comb member but short of the ends of the teeth so as to leave exposed the outer end portions of all of said comb teeth,
      3. a plurality of generally rectangular openings in said elongated flat section which are large enough to expose large areas of said teeth and permit the passage of hot air to the hair beneath the teeth of the comb, and
      4. a plurality of longitudinally aligned protrusions along the interior surface of said U-shaped portion, said protrusions being spaced apart so as to engage said indentations located on said non-tooth body portion.

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**4,018,239**

## TRAY WASHER APPARATUS

**Frank J. Caldwell, West Carrollton, and Thomas B. Heckman, Troy, both of Ohio, assignors to Hobart Corporation, Troy, Ohio**

**Filed Nov. 17, 1975, Ser. No. 632,869**
**Int. Cl.² B08B** *3/02*
**U.S. Cl. 134—143** **5 Claims**

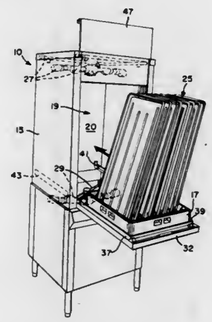
1. A machine for washing upright articles which are of greater height than width dimensions when supported by an article-receiving rack, comprising:
   a cabinet of generally rectangular horizontal cross-section capable of accommodating the horizontal dimensions of a rack, said cabinet enclosing and defining a washing chamber and also defining a front access opening of height and width capable of accommodating lateral, unobstructed movement of a rack containing said upright articles therethrough into said washing 10 chamber,

spray apparatus in said washing chamber above and below said access opening for spraying wash solution and rinse water onto articles in said washing chamber,

horizontal rack receiving tracks in said chamber 15 extending to positions adjacent the sides of the lower edge of said access opening,

a lower door pivotally mounted on said cabinet adjacent to the lower edge of said access opening for movement from a first vertical, closed position in which said lower door covers a lower portion of said access opening to a second horizontal, open position uncovering said lower portion of said access opening, said lower door including a rack supporting surface means, and said door dimensioned to correspond in size to said rectangular horizontal cross-section of said cabinet,

guide track members mounted above said lower door and extending vertically upward therefrom along the sides of said access opening,



an upper door mounted for vertical sliding movement along said guide track members from a first lower position covering the remaining upper portion of said access opening to a second upper position uncovering said upper portion of said access opening, and

means interconnecting said upper door and said lower door and coordinating the movement of said upper door and said lower door between their respective first and second positions, such that a large access opening is provided permitting a rack resting on said lower door and loaded with the upright articles to be moved horizontally onto said rack receiving tracks in said washing chamber when said upper door means and said lower door means are in their respective second positions, and further said access opening is completely covered when said upper door means and said lower door means are in their respective first positions.

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**4,018,240**

**BRUSH CLEANING DEVICE**

**John W. Palthe, Roseville, Minn. 55113**

**Filed Apr. 28, 1975, Ser. No. 572,157**

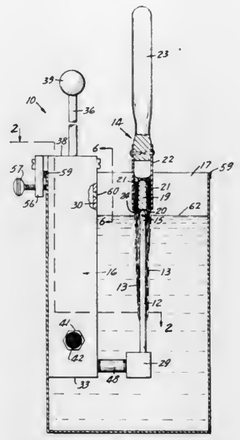
**Int. Cl.² B08B** *3/02*

**U.S. Cl. 134—196** **10 Claims**

1. A device adapted for applying solvent to clean a paint or varnish brush of the conventional type having an elongate divider wedge and a multiplicity of bristles attached around the sides of said divider wedge and projecting a generally uniform predetermined distance in the same direction from the divider wedge to define a brush tip, the thickness and length of the divider wedge causing an elongate opening adjacent the wedge between walls of the bristles projecting from opposite sides of the wedge, said device comprising:

at least one nozzle comprising a tubular wall defining a central opening, having an open end, a closed terminal end opposite said open end, and a plurality of circumferentially spaced radial openings through said tubular wall communicating with said central opening and positioned closely adjacent said terminal end, said nozzle having a transverse thickness adjacent said terminal end adapted to afford insertion of the terminal end of said nozzle into the opening between the walls of bristles in a said brush; and

means coupled to the open end of said nozzle adapted for



passing a said solvent under pressure through the central opening and out through the radial outlet openings of the nozzle so that with the terminal end of said nozzle inserted in the opening between the walls of bristles of a said brush adjacent its divider wedge, solvent passing through the outlet openings of the nozzle will be directed transversely outwardly through the bristles of the brush adjacent its divider wedge to thoroughly clean the bristles.

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**4,018,241**

**METHOD AND INLET CONTROL SYSTEM FOR CONTROLLING A GAS FLOW SAMPLE TO AN EVACUATED CHAMBER**

**Ingvar E. Sodal; Lars Hoivik, both of Boulder; Alexander J. Micco; John V. Weil, both of Denver, and Norman W. Baer, Boulder, all of Colo., assignors to The Regents of the University of Colorado, Boulder, Colo.**

**Division of Ser. No. 508,452, Sept. 23, 1974, Pat. No. 3,926,209, which is a division of Ser. No. 355,792, April 30, 1973, Pat. No. 3,895,231. This application Oct. 3, 1975, Ser. No. 619,441**

**Int. Cl.² F16K** *31/02*

**U.S. Cl. 137—14** **8 Claims**

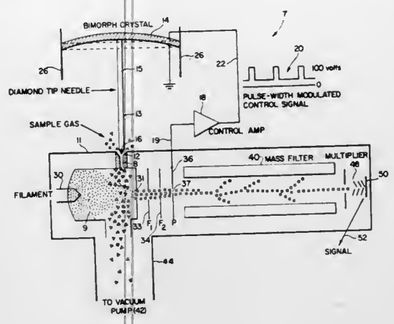
1. A method for maintaining constant gas pressure in an evacuated chamber of minute total volume, said method comprising the steps of:

injecting gas through an inlet of small diameter,

directing a beam of ions from an ion source through the injected stream of gas at a point just below the inlet in the chamber,

detecting the amount of ions at a point opposing the ion source and near the inlet, the amount of ions detected being proportional to the pressure of the chamber,

generating an electrical signal in response to the sensed pressure, the strength of the electrical signal varying with the amount of ions detected, and




occluding the inlet at which the gas is injected in response to the strength of the electrical signal.

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**4,018,242**

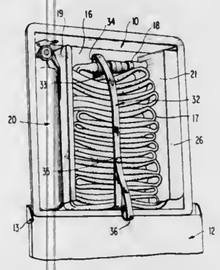
**FIRE HOSE CABINET**

**Herold M. Schlegel, 2812 Fernwood, Ann Arbor, Mich. 48104**

**Filed Dec. 1, 1975, Ser. No. 636,712**

**Int. Cl.² A62C** *35/20*

**U.S. Cl. 137—355.18** **8 Claims**



1. A household fire-fighting station comprising a cabinet body adapted for mounting in a wall opening and having a forward open vertical side and vertical side walls, a movable closure panel for said open side, a stand pipe and valve positioned in the cabinet body near one vertical side wall thereof, a hinged substantially L-shaped guard within the cabinet body adapted in a first position to cover and enclose the stand pipe and valve and in a second position to expose the stand pipe and valve, spring means connected with said guard biasing it to said second position, said cabinet body having a fire hose storage compartment, a fire hose coupled with said valve and adapted to be folded in vertically stacked layers within said storage compartment, and manually releasable retainer means holding said fire hose in said compartment with the fire hose engaging said guard and holding it in said first position against the force of said spring means.

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**4,018,243**

**ADJUSTABLE CHECK VALVE FOR USE IN AN OXYGEN REGULATOR**

**Jack E. Dunbar, Davenport, Iowa, assignor to The Bendix Corporation, South Bend, Ind.**

**Filed Dec. 8, 1975, Ser. No. 638,254**

**Int. Cl.² A62B** *9/00*

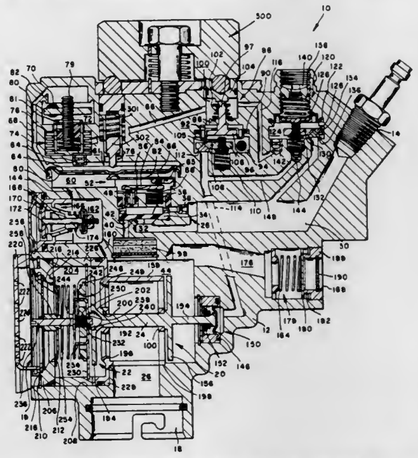
**U.S. Cl. 137—81** **10 Claims**

1. In an oxygen regulator having a housing with a first inlet port connected to oxygen under pressure, a second inlet port connected to receive air at atmospheric pressure from an atmospheric chamber and an outlet port for supplying a fluid mixture to a breathing apparatus, control means for regulating the relationship between said oxygen under pressure and said air at atmospheric pressure in said fluid mixture as a function of altitude, said control means comprising:

oxygen valve means located in said housing between said first inlet port and said outlet port for regulating the rate of flow of oxygen therebetween;

air valve means located in said housing between said second inlet port and said outlet port for regulating the rate of flow of air therebetween;

linkage means connecting said oxygen valve means with said air valve means for proportionally increasing the restriction of one of said oxygen valve means and said air valve means with a decrease in the restriction of the other of said oxygen valve means and said air valve means;



regulating means connected to said linkage means for controlling said restriction of said oxygen valve means and said air valve means as a predetermined function of oxygen inlet pressure;

sensing means responsive to altitude for allowing said linkage means to move to a position in which said air vave means is closed and said oxygen valve means is opened to allow said oxygen under pressure to flow to said outlet port;

check valve means located in said atmospheric chamber for preventing said mixture from being communicated to the atmosphere prior to the closure of said air valve means; and

adjustment means connected to said check valve means for establishing limits at which air at atmospheric pressure is admitted to said atmospheric chamber.

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**4,018,244**

**AUTOMATIC SWITCHOVER VALVE AND SYSTEM UTILIZING SAME**

**James A. Burns, Lake Elmo, Minn., assignor to Airco, Inc., Montvale, N.J.**

**Filed Sept. 10, 1975, Ser. No. 612,136**

**Int. Cl.² F16K** *11/07*; **G05D** *11/00*

**U.S. Cl. 137—113** **6 Claims**

1. An automatic switchover valve for changing from a relatively depleted to a fully pressurized gas supply, comprising:

a valve housing having a bore extending between opposed ends thereof, first and second inlets at opposite ends of said bore for connection to alternate gas supply sources, and first and second outlets extending transverse to said bore intermediate said inlets for providing said gas to a utilization point;

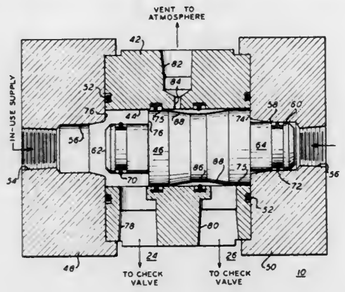
a shuttle body moveable in said bore by the differential pressure of said alternate supplies between a first position whereat said first inlet is placed in communication with said first outlet, and a second position whereat said second inlet is placed in communication with said second outlet;

first sealing means acting at said first inlet when said shuttle body is in said second position for sealing said first inlet from said bore;

second sealing means acting at said second inlet when said shuttle body is in said first position for sealing said second inlet from said bore;

a venting outlet being formed through said housing between said first and second outlets;

third sealing means acting at said bore intermediate said venting outlet and said first inlet and outlet when said body is in said first position for sealing said first inlet and outlet from said venting outlet and said second outlet;

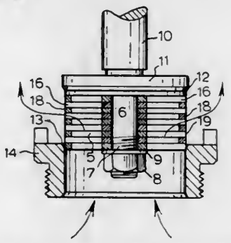



fourth sealing means acting at said bore intermediate said venting outlet and said second inlet and outlet when said body is in said second position for sealing said second inlet and second outlet from said venting outlet and said first outlet; and

said shuttle body being tapered inwardly toward the center thereof to interconnect the venting space defined in said bore between said second and third sealing means with said venting outlet when said shuttle body is in said first position, and to interconnect the venting space defined in said bore between said first and fourth sealing means with said venting outlet when said shuttle body is in said second position.

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**4,018,245**
**PERFORATED VALVE TRIM AND METHOD FOR PRODUCING THE SAME**
**Hans D. Baumann, P.O. Box 471, Rye, N.H. 03870**
**Filed Nov. 12, 1975, Ser. No. 631,203**
**Int. Cl.² F16K** *47/02*
**U.S. Cl. 137—270** **4 Claims**



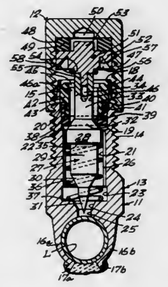
1. Perforated valve trim for the control of fluid flow as part of and between a cylindrical valve plug slidingly engaged in a cylindrical valve orifice comprising:

a vertical stack of horizontal plates, each plate being subdivided into first and second wedge shaped segments, at least one first segment per plate having one or more slotted openings extending in radial fashion throughout a portion of the radial width of said plates, thereby providing access of fluid in the radial direction, at least one second segment per plate having at least one large, vertical flow passage opening therethrough, providing a communicating passage for fluid in the vertical direction; said large vertical opening having a cross-sectional area exceeding the combined cross-sectional areas of the slotted openings of said at least one first segment, all stack plates being angularly displaced with respect to each other about the vertical stack axis, so that in successive stack plates the large opening overlaps the segments encompassing the slotted openings;

whereby are provided a number of separate fluid passages extending through said stack in vertical direction providing access for and communicating with restrictive fluid passages formed by the width of each of said slotted openings and the height of each plate in the horizontal direction.

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**4,018,246**
**LINE TAP VALVE**
**Hall Langstroth, Coral Cables, Fla., assignor to Watsco, Inc., Liechtenstein**
**Filed June 2, 1975, Ser. No. 582,853**
**Int. Cl.² F16K** *43/00*
**U.S. Cl. 137—318** **9 Claims**



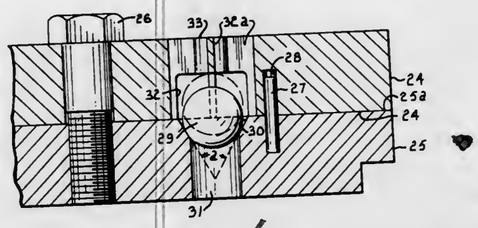
1. A line tap valve comprising, in combination, an integrally-formed, elongated, valve body member, one end portion of said body member being externally threaded, an internally threaded valve cap member having an inner bottom wall portion and being threadingly receivable on said externally-threaded portion of said body member, said body member, at its threaded end, terminating in a relatively short, reduced-diameter, annular ring portion, the other end portion of said body member extending integrally into a laterally opposed pair of leg portions defining therebetween a semi-circular recess for the transverse seating reception therein of a peripheral outer wall portion of a line to be tapped, said leg portions comprising outwardly-extending leg end portions bendable inwardly about undersurface portions of a seated line to be tapped, said body member being formed with an axial through opening concentric with said reduced-diameter annular ring portion and opening into said recess, a needle mechanism receivable in said through opening for piercing a line to be tapped and thereafter releasably sealing the line, said needle mechanism comprising an elongated needle member having a piercing needle portion at one end operative to enter said recess for piercing a line seated therein for tapping, and means operative upon screwing said valve cap in place on said body member for simultaneously effecting said piercing and sealing and for thereafter retaining said needle mechanism in place within said body member in yieldingly withdrawn position with respect to the pierced line upon subsequent removal of said cap member, said piercing and sealing means comprising a flare pin member removably receivable within said valve cap member, said flare pin member being constrained in abutting relation between said inner bottom wall portion of said valve cap member and the other end of said elongated needle member upon the screwing of said valve cap in place upon said body member, said flare pin member comprising an annular recess defining an annular, tapered outer wall operative, upon the screwing of said valve cap in place upon said body member, to inwardly swadge said annular ring portion into abutting



relation against an outer end portion of said needle mechanism for retaining said needle mechanism in place within said body member.

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**4,018,247**
**SPRINGLESS BALL VALVE FOR HIGH SPEED COMPRESSORS**
**Clifford H. Carr, 614 W. 67th St., Kansas City, Mo. 64113**
**Continuation-in-part of Ser. No. 553,970, Feb. 28, 1975, abandoned. This application Jan. 12, 1976, Ser. No. 648,566**
**Int. Cl.² F16K** *15/04*
**U.S. Cl. 137—512.1** **3 Claims**



1. A unidirectional flow control valve for high speed gas compressors, said valve including

a plurality of loose balls arranged in gas passages through the valve and operable to seat and unseat in response to pressure reversal relative to the balls,

each said ball operably supported to be lifted from and return to a seated sealing position in a seat, each said ball further being free from any mechanical constraints against upward movement, other than its own weight, when in the seated position,

each said seat comprising a frusto-conical surface with respect to which the ball is centered, the included angle of said frusto-conical surface falling within a range of from about 55° to about 65°, the ratio of the diameter of the ball to the smallest end of the frusto-conical surface being about 1.11 to 1,

each said passage further including a chamber above the seat having a diameter greater than the ball, and guide means within the chamber for confining movement of the ball to a substantially vertical path of movement.

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**4,018,248**
**VALVE**
**Charles E. Carr, P.O. Box 419, Lawrenceville, Ill. 62439**
**Continuation-in-part of Ser. No. 504,167, Sept. 9, 1974, abandoned. This application July 25, 1975, Ser. No. 598,762**
**Int. Cl.² F16K** *21/10*; **F04B** *21/04*
**U.S. Cl. 137—514.3** **20 Claims**

1. A valve comprising, in combination,

a valve body,

means defining a quiet chamber within the body,

port means in the valve body beneath the quiet chamber,

an aligning pin extending downwardly into the quiet chamber and secured at its upper portion to the body,

a valve havng a stem, a head, and a seating portion on the head,

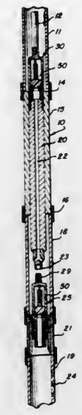
cooperating means coactingly mating the aligning pin and valve stem for sliding coaxial movement,

said stem having a thickness smaller than the quiet chamber cross section to define a portion of the quiet chamber surrounding the stem,

a seat in the lower portion of the body proportioned to coact in seating engagement with the valve head,

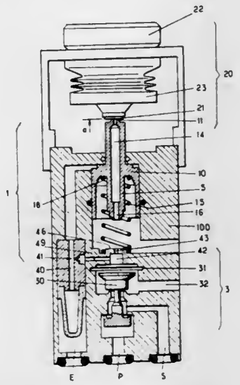
the valve head, port means, and seat being proportioned for the valve head to mask a portion of the port means in the closed and open positions,

whereby a fluid such as oil entrapped in the quiet chamber will remain entrapped during operation, and the flushing of contaminants passes through the ports away from the quiet chamber.



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**4,018,249**
**TIMING DEVICE FOR PNEUMATIC CONTROL**
**Felix Lameyre, Rueil-Malmaison, France, assignor to La Telemecanique Electrique, France**
**Filed Nov. 12, 1975, Ser. No. 631,342**
**Claims priority, application France, Nov. 22, 1974, 74.38398**
**Int. Cl.² F15B** *21/10*
**U.S. Cl. 137—624.11** **5 Claims**



1. In a pneumatic control system of the type comprising a control valve and an inlet for a control pressure, a timing device for adjustably delaying the shifting of said control valve after application of said control pressure to said inlet, said timing device comprising:

a shutter movable from a first to a second position; time delay means for displacing the movable shutter from the first to the second position in a predetermined adjustable time delay; a first conduit provided with the said control pressure inlet; pressure responsive means movable in response to pneumatic pressure, said pressure responsive means being operatively connected to said first conduits; a second conduit having an orifice connected to exhaust a throttle connecting the first conduit to the second con-

duit; a tubular member linked to said pressure responsive means and having first and second openings at the respective first and second ends thereof, said tubular member being movable between a first predetermined position in which the first end thereof engages the shutter and the first opening is closed while the second opening is open and a second predetermined position in which the first opening is open while the first end of the tubular member is separated from the shutter by a predetermined distance and the second opening is connected to the said orifice; resilient means cooperating with the tubular member and being adapted to maintain the first end thereof in engagement with the shutter to place the shutter in its first position; the shutter engaging the first end of the tubular member and closing the first opening thereof when both the shutter and the tubular member are in their second position; and means for shifting said control valve, said shifting means being responsive to a variation of pressure within the second conduit.

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**4,018,250**

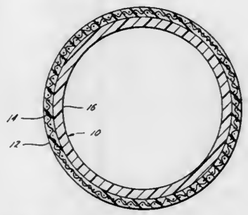
## MODIFIED VINYL ESTER RESIN AND PIPE MADE THEREFROM

**William D. Waters, Tulsa, Okla., assignor to Youngstown Sheet and Tube Company, Youngstown, Ohio**

**Division of Ser. No. 428,116, Dec. 26, 1973, Pat. No. 3,928,491. This application June 23, 1975, Ser. No. 589,539**

**Int. Cl.² F16L** *9/12, 9/14*

**U.S. Cl. 138—140** **5 Claims**



1. In a centrifugally cast pipe of the type having a body of thermosetting plastic reinforced with a fibrous reinforcing material distributed essentially throughout said thermosetting plastic, the improvement which comprises an unreinforced lining on the inside diameter of said pipe of a flexible thermosetting resin comprising an admixture of (1) a neat thermosetting resin comprising the reaction product of an epoxy resin, a carboxyl terminated elastomer selected from the group consisting of carboxyl terminated homopolymers and copolymers of conjugated dienes and an unsaturated monocarboxylic acid, wherein approximately one chemical equivalent of epoxy is provided for each chemical equivalent of carboxyl provided by said elastomer and said acid combined, and (2) an ethylenically unsaturated monomer.

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**4,018,251**

## MACHINE FOR MAKING REINFORCING BASKETS FOR STEEL CONCRETE POSTS, MASTS, PIPES AND THE LIKE

**Günter Mündel, Kehl, and Friedrich Grampp, Rheinbischofsheim-Diersheim, both of Germany, assignors to Ed. Zublin Aktiengesellschaft, Stuttgart, Germany**

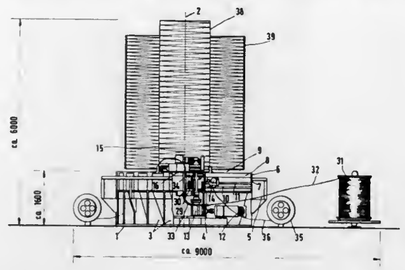
**Filed July 9, 1975, Ser. No. 594,572**

**Claims priority, application Germany, July 9, 1974, 2432855**

**Int. Cl.² B21F** *27/10*

**U.S. Cl. 140—112** **16 Claims**

1. A machine for making reinforcing baskets with longitudinal basket wires and helical wires around said basket wires for steel concrete posts, masts, pipes, and the like, which includes in combination: a displacing device operable to displace longitudinal basket wires and comprising wire storage means and individual guiding means therewith for movement of said longitudinal basket wires, a ring member, said guiding means being arranged in said ring member about a vertical winding axis, a wire winding device mounted on a rotor rotatable about said vertical winding axis and having wire feeding means for helically applying winding wire in contact with said longitudinal basket wires successively for welding thereto, and a wire welding device mounted on said rotor closely following said wire feeding means on rotation with said feeding means for securing said winding wire, while in contact with each longitudinal wire, both said wire winding device and said wire welding device being located inside said ring member for said individual guiding means.



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**4,018,252**

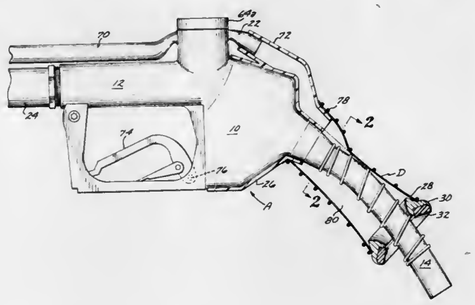
## ANTI-POLLUTION NOZZLE ASSEMBLY

**Wilson A. Burtis, 5011 Harvard Ave., Westminster, Calif. 92683, and William C. Babcock, 3732 Walker Lee Drive, Los Alamitos, Calif. 90720**

**Continuation-in-part of Ser. No. 409,939, Oct. 26, 1973, Pat. No. 3,907,010. This application Sept. 22, 1975, Ser. No. 615,581**

**Int. Cl.² B65B** *31/06*

**U.S. Cl. 141—45** **1 Claim**



1. A device for use in dispensing a volatile liquid hydrocarbon fuel into the fuel inlet tube of a tank without vapor of said fuel escaping to the ambient atmosphere from a first end of said inlet tube, said device including:

a. a valve body assembly that has first and second concurrently operable spring-loaded valve members within the interior thereof that tend to remain in first positions, said first valve member when in said first position obstructing communications between first and second passages in said valve body assembly and said second valve member when in said first position obstructing communications between third and fourth passages in said valve body assembly; and said first and second valve members when moved to second positions so controlling the rate at which liquid fuel discharges into said tank from said second passage relative to the rate at which fuel vapor is withdrawn from said tank through said third and fourth passages that the vapor pressure in said tank is not increased appreciably.

b. first means for supplying said fuel to said first passage from a reservoir for said fuel;

c. a tubular nozzle secured to said valve body assembly and in communication with said second passage, said nozzle of such transverse cross-section as to be slidably inserted in said fuel inlet tube;

d. a resilient longitudinally deformable tubular shroud having first and second end portions, said first end portion of said shroud sealingly supported from said valve body assembly, said shroud cooperating with said nozzle to define an annulus-shaped space therebetween that is in communication with said fourth passage, and said shroud at said second end portion defining a ring-shaped radially tapered surface that sealingly engages said first end of said inlet tube when said nozzle is inserted therein to a predetermined extent;

e. second means for maintaining a negative pressure on said second passage, with said second means in communication with said fuel reservoir; and

g. third manually operable means on said valve body for concurrently moving said first and second valve members from said first positions towards second positions whereupon liquid fuel flows through said first and second passages and said nozzle to said tank at a desired rate and fuel vapor displaced by liquid fuel entering said tank being drawn into said annulus-shaped space and through said third and fourth passages by said third means to be returned to said reservoir at substantially said desired rate.



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**4,018,253**

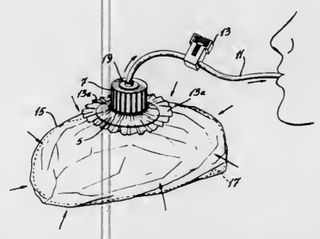
## HOME VACUUM APPARATUS FOR FREEZER BAGS

**Seth Ian Kaufman, 5725 Leger, Cote St. Luc, Quebec, Canada**

**Filed Oct. 9, 1975, Ser. No. 621,067**

**Int. Cl.² B65B** *31/04*

**U.S. Cl. 141—65** **7 Claims**



1. A system for evacuating a flexible container having an open end, comprising;

a hollow retainer member adapted to receive said open end of said container;

a cap member adapted to fit over the outside surface of said retainer member in airtight engagement therewith;

a flexible tube adapted to extend downwardly through the bottom of said cap member into said container and upwardly above said cap member; and

means on the upward part of said tube for opening and closing the passage in said tube;

whereby, the open end of said flexible container is adapted to be inserted through said hollow retainer member and to be draped over the top end thereof; and said cap member is adapted to be mounted over the top surface of said retainer member and said open end of said flexible container in airtight engagement therewith so that the passage of said tube is in airtight communication with the interior of said flexible container.

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**4,018,254**

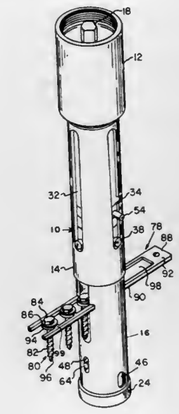
## INSTALLATION TOOL APPARATUS

**Charles J. DeCaro, Marshfield, Mass., assignor to Textron, Inc., Providence, R.I.**

**Filed Nov. 17, 1975, Ser. No. 632,676**

**Int. Cl.² B25B** *23/10*

**U.S. Cl. 144—32 R** **12 Claims**



1. An assembly for attachment to a driving tool having a driver for setting fasteners carried by a strip comprising:

A. a sleeve adapted for attachment to the driving tool;

B. a barrel retractably mounted to the sleeve for retraction therein and having a bore and aligned entry and exit trackways through a wall thereof and into the bore to accommodate the strip;

C. a movable bushing having a strip engaging end and positioned within the sleeve with said end extending into the barrel bore for slidable engagement therewith; and

D. means associating with the bushing to urge said bushing between a first position wherein said bushing end is out of engagement with the strip and a second position wherein the bushing end clamps the strip against the trackways to permit the driver to extract the fastener in a setting stroke.

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**4,018,255**

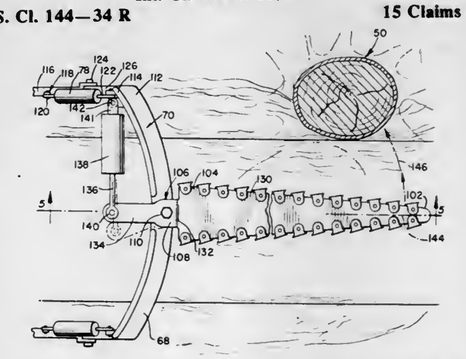
## TREE SAW

**Richard E. Diggs, S. 12A Road, P.O. Box 776, Carthage, Mo. 64836**

**Filed Oct. 7, 1975, Ser. No. 620,261**

**Int. Cl.² A01G** *23/08*

**U.S. Cl. 144—34 R** **15 Claims**

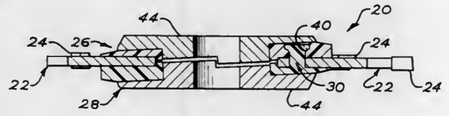


1. An apparatus for sawing trees beneath ground level, comprising:

a mounting means having one end located beneath ground level;
a saw blade having a forward and a rear end and attached to said one end and thus located beneath ground level;
motive power means attached to said mounting means for urging said saw blade against a side of a tree and for alternately moving said saw blade in a forward and then in a rearward direction so that said saw blade undergoes a sawing motion;
a multiplicity of cutting bits attached to said saw blade, each cutting bit having a base pivotally attached to said saw blade and a pair of oppositely directed cutting edges on said base and spaced from said saw blade, said bits being mounted on said saw blade to tip forwardly when said saw moves rearwardly and rearwardly when said saw blade moves forwardly so that during forward movement of said saw blade, one cutting edge is presented outwardly thereof for contacting a tree, and during rearward movement of said saw blade, the other cutting edge is presented outwardly thereof for contacting a tree for cutting a tree beneath ground level during movement of said saw blade in both said forward direction and said rearward direction when said saw blade undergoes said sawing motion, said cutting bits each including a pair of faces, each face having an arcuate cutting edge on one end and an arcuate relief edge on the other end thereof.

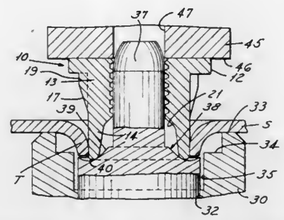
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**4,018,256**
**ADJUSTABLE DADO HEAD**
**Edward J. Niehaus, Tupelo, Miss., and James R. Hosack, Guelph, Canada, assignors to Rockwell International Corporation, Pittsburgh, Pa.**
**Filed Feb. 5, 1976, Ser. No. 655,630**
**Int. Cl.² B27B** *33/00*
**U.S. Cl. 144—238** **4 Claims**




1. A tool rotatable about an axis for milling a groove in a workpiece, comprising a cutter head assembly including a blade having flat opposite faces, a large aperture centrally thereof, and a multiplicity of openings for through fasteners, a pair of clamping plates formed with an aperture centrally thereof and having parallel outer surfaces and complementary inner surfaces inclined relative to said outer surfaces, said plates being positioned on opposite sides of said blade with their inner surfaces against said blade faces, fastening means between said clamping plates and through said openings in said blade to firmly clamp said clamping plates and said blade together as a sub-assembly; a spool sub-assembly including side plates having parallel outer surfaces and complementary inner surfaces inclined relative to said end plate outer surfaces and bearing against the parallel outer surfaces of said clamping plates, hub portions on said side plates and extending towards each other within the apertures of said clamping plates, said side plates having means therewith to prevent relative rotation thereof, and a bore extending through said hub portions adapted to receive a shaft, said blade and clamping plates sub-assembly being mounted on said hub portions between the inclined inner surfaces of said spool side plates for rotation relative to said spool sub-assembly, said clamping plates being firmly fastened to either side of said blade by means permitting assembly in one orientation only.

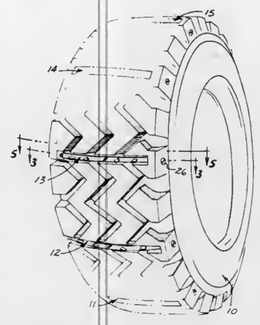
**4,018,257**
**SELF-FLANGING NUT AND JOINT CONSTRUCTION**
**James A. Jack, Windsor, Canada, assignor to Cold Fasteners, Inc., Windsor, Canada**
**Filed Dec. 15, 1975, Ser. No. 640,897**
**Int. Cl.² F16B** *39/28*
**U.S. Cl. 151—41.72** **2 Claims**




1. In a self-flanging nut construction, the combination comprising
a tubular body having a laterally extending annular flange at one end and an opening therethrough,
said flange having a substantially flat outer surface coextensive with said end of said body,
said opening having a first portion and a second portion of differing cross sectional area,
the outer surface of said tubular body being cylindrical,
said first portion of said opening in said body adjacent said flange being formed with a thread substantially throughout its axial extent,
said second portion defining a riveting flange having a free end remote from said first portion,
the inner surface of said second portion being uniformly tapered inwardly in the direction of said first portion substantially throughout its axial extent,
the outer edge of said free end of said riveting flange being curved at a given radius smoothly blending into said cylindrical outer surface,
the inner edge of said free end being curved at a lesser radius than said outer edge and smoothly blending into said tapered inner surfce of said second portion,
a plurality of circumferentially spaced ribs on the cylindrical periphery of said body adjacent said flange and extending axially along said body,
the length of said ribs being substantially equal to the axial length of said first portion of said body,
the thickness of said flange being less than the length of said ribs,
each said rib being generally U-shaped in cross section and having a greater width than thickness,
the circumferential spacing between said ribs being several times greater than the width thereof such that a portion of the cylindrical periphery of said body is interposed between adjacent ribs,
each said rib extending from said flange toward said second portion to form a free end,
said free end of each said rib being tapered,
the radial thickness of said second portion of said body being substantially constant throughout and having an internal surface which is slightly tapered inwardly,
the radial thickness of said second portion being such that when the nut is placed adjacent a sheet metal plate having an opening therein with the opening in alignment with the opening in the nut and the nut is forced against said sheet metal plate, the metal surrounding said opening in said plate is deformed axially of the opening by said second portion to form a tubular portion, and thereafter when an axial force is applied to said free end of the riveting flange, the riveting flange is deformed laterally outwardly over the tubular portion formed on said plate.



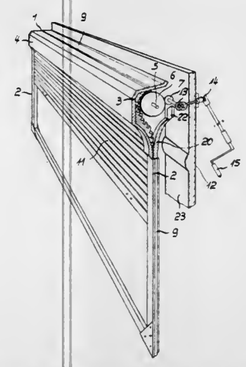
**4,018,258**
**ANTI-SKID DEVICE FOR VEHICLE WHEEL**
**Vay F. Neal, 225 S. Main St., Punxsutawney, Pa. 15767**
**Filed July 29, 1975, Ser. No. 600,050**
**Int. Cl.² B60C** *27/20*
**U.S. Cl. 152—208** **8 Claims**




5. An anti-skid device for vehicle wheels equipped with tires, said anti-skid device comprising:
a plurality of individual anti-skid units mounted on each tire,
each of said units including a resilient member mounted in a recessed portion of the tire, said resilient member having an anti-skid surface, and
an adjusting mechanism mounted on the tire and coupled to the resilient member for loading the resilient member axially to vary the anti-skid surface from a retracted position within the recessed portion of the tire to a position with the anti-skid surface extending beyond the outer surface of the tire.

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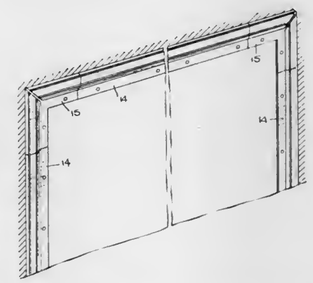
**4,018,259**
**JALOUSIE ELEMENT**
**Günter Herms, Siegburg-Kaldauen, Germany, assignor to Dynamit Nobel Aktiengesellschaft, Troisdorf, Germany**
**Division of Ser. No. 110,698, Jan. 28, 1971, Pat. No. 3,840,061. This application June 27, 1974, Ser. No. 483,838**
**Int. Cl.² E06B** *9/10*
**U.S. Cl. 160—26** **3 Claims**




1. In combination on a rolling closure for a wall opening: a box having end walls, a shaft extending along said box and rotatingly supported by said end walls, a flexible shield having one end connected to said shaft and adapted to be rolled up on the shaft by rotation of the shaft, and a guiding frame guidingly engaging the lateral edges of said shield, said guiding frame being connected to said box and forming an assembly therewith adapted to be mounted as a unit in operative relation to the wall opening, actuating means for driving said shaft, an adjustably mounted transmission outside one of said end walls connecting said actuating means to said shaft and having a housing, and support rails on said one end wall supportingly engaging said housing and providing guiding means therefor, said guiding means being in the form of opposed U shaped support rails.

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**4,018,260**
**FABRIC WALL COVERINGS**
**Floyd M. Baslow, New Bethlehem, Pa. 16242**
**Filed Apr. 27, 1976, Ser. No. 680,703**
**Int. Cl.² A47H** *23/00, 13/00*
**U.S. Cl. 160—327** **4 Claims**



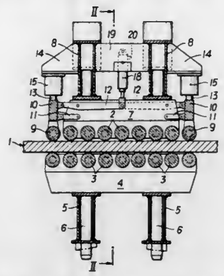

1. An assembly of border pieces for creating a framework attachable to a wall or other flat surface for mounting a fabric sheet which is cut to dimensions at least sufficient to cover the surface, said assembly comprising linear border pieces and right angle corner border pieces which are arranged in end-to-end relation to define a framework that follows the perimeter of the area to be covered, each piece including a raised face, a storage channel running adjacent the outer edge of the piece and having a narrow inlet communicating with said face, the portion of the selvage of said sheet which includes fabric material in excess of that necessary to cover said surface being stuffed in said storage channel so that the exposed selvage of the sheet lies against said face to present a smooth appearance which extends to said inlet and is directly adjacent said perimeter, said linear pieces being formed of an integral one piece plastic material of sufficient elasticity to permit dilation of said inlet whereby said inlet may be temporarily expanded to admit said excess material and then contracted to retain said excess material in said storage channel.

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**4,018,261**
**CONTINUOUS CASTING PLANT STRAND GUIDING MEANS**
**Alois Scheinecker, Linz, and Franz Kagerhuber, Traun, both of Austria, assignors to Vereinigte Osterreichische Eisen- und Stahlwerke-Alpine Montan Aktiengesellschaft, Linz, Austria**
**Filed May 12, 1976, Ser. No. 685,545**
**Claims priority, application Austria, May 13, 1975, 3625/75**
**Int. Cl.² B22D** *11/128*
**U.S. Cl. 164—282** **11 Claims**

1. A continuous casting plant strand guiding means for supporting, guiding and extracting a cast strand or a starter bar, which comprises:
sets of supporting rollers arranged one behind the other in the extraction direction of the strand, each set of supporting rollers including a number of rollers located opposite each other and carried by respective upper and lower roller carrying members also arranged opposite each other, which members are adjustable perpendicular to the strand surface and fixable, the strand or the starter bar

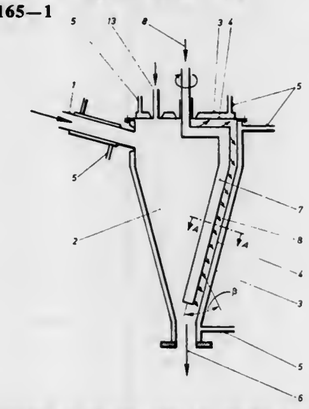
being guided between the respective supporting rollers of the upper and lower carrying members;
a plurality of driving rollers, at least one driving roller being arranged at at least one end of a set of supporting rollers;
cross beams movable perpendicularly to the strand surface, each cross beam carrying at least one driving roller;



parallel motion means connecting each cross beam to a roller carrying member; and
pressure medium cylinder means for adjusting the cross beams.

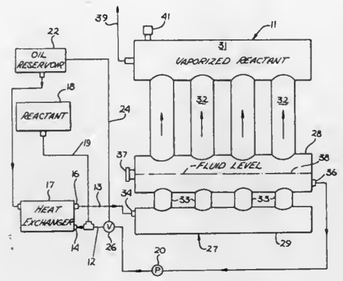
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**4,018,262**
**HEAT EXCHANGE WITH GAS/SOLIDS MIXTURES**
**Klemens Jaschinski; Werner Fuhr, both of Krefeld-Uerdingen, and Karl Brandle, Odenthal-Schildgen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany**
**Filed Feb. 24, 1975, Ser. No. 552,495**
**Claims priority, application Germany, Mar. 6, 1974, 2410724**
**Int. Cl.² F28F *17/00***
**U.S. Cl. 165—1** **5 Claims**



1. A process for indirect heat-exchange between a solids-containing gas and the inner wall of a heat-exchanger through which the solids-containing gas to be cooled or heated flows, comprising continuously introducing a flushing medium separately from the solids-containing gas into the heat exchanger while the gas is flowing therethrough, the flushing medium being impinged obliquely onto the wall and periodically sweeping about said wall whereby said wall is kept substantially free from solid deposits.

**4,018,263**
**METHOD AND APPARATUS FOR GENERATING AND STORING GASEOUS FLUIDS**
**Bernard Ulano, 1952 Coldwater Canyon, Beverly Hills, Calif. 90210**
**Filed Apr. 17, 1975, Ser. No. 568,926**
**Int. Cl.² F22B *1/02***
**U.S. Cl. 165—1** **10 Claims**




1. A process for the generation and storage of a vaporized reactant composition for subsequent utilization of said vaporized reactant in a vapor phase reaction, said process comprising:
heating a fluid heat exchange medium to an operating temperature above the vaporization temperature of said reactant;
introducing said reactant in non-vaporized form into said heat exchange medium and maintaining said heat exchange medium and reactant under confined conditions so that said reactant is at least partially vaporized in said medium and said vapors are entrained therein said heat exchange medium being substantially non-volatile at said operating temperature and inert with respect to said reactant;
expanding said heat exchange medium containing vaporized reactant in an expansion chamber and permitting at least a portion of said reactant vapors to escape from said heat exchange medium in said expansion chamber;
leading said reactant vapors to a collection vessel, said collection vessel interior being maintained at a temperature above the vaporization temperature of said reactant;
maintaining said reactant vapors in said collection vessel at a selected pressure, said pressure level being less than the pressure required to condense said reactant vapors at the temperature maintained in said collection vessel said pressure in said collection vessel being generated by said vaporized reactant collected therein; and
terminating the introduction of said reactant into said heat exchange medium when said pressure in said collection vessel reaches substantially said selected pressure level while continuous circulation of said heat exchange medium through said expansion chamber is maintained, whereby said vaporized reactant is maintained in said collection vessel at a temperature and at said selected pressure level.

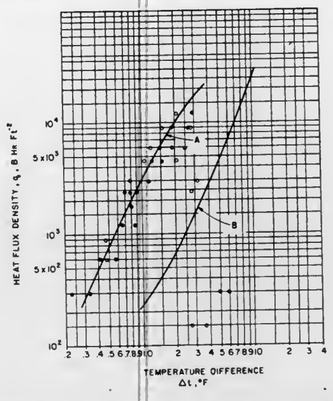
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**4,018,264**
**BOILING HEAT TRANSFER SURFACE AND METHOD**
**Clarence E. Albertson, Villa Park, Ill., assignor to Borg-Warner Corporation, Chicago, Ill.**
**Filed Apr. 28, 1975, Ser. No. 572,376**
**Int. Cl.² F28F *13/18***
**U.S. Cl. 165—1** **2 Claims**

1. A process for transferring heat from a warm fluid to a boiling liquid comprising the steps of: providing heat exchange apparatus having a thermally conductive wall, said wall having a nodularized metallic coating plated on one side thereof, said coating being characterized by a surface having macroscopic



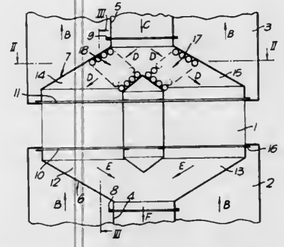
promontories extending generally normal to the surface of said wall, said promontories being irregularly arrayed, the terminal portions of said promontories being deformed laterally in a plane parallel to said coating; completely covering




said coating with said liquid; and contacting the other side of said wall with said warm fluid whereby said coating enhances the formation and discharge of vapor as bubbles emerging over the surface covered by said coating.

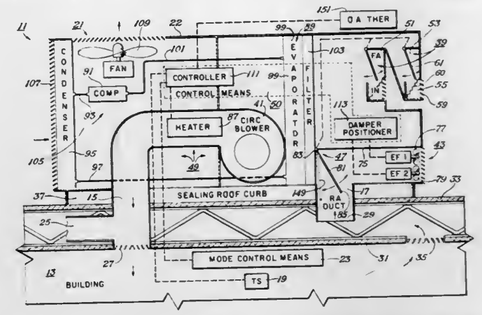
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**4,018,265**
**REGENERATIVE AIR PREHEATER**
**Siegfried Hans-Dietmar Schlüter, Wenden, Germany, assignor to Apparatebau Rothemuhle Brandt & Kritzler, Wenden, Germany**
**Filed July 7, 1975, Ser. No. 593,317**
**Claims priority, application Germany, July 16, 1974, 2434101**
**Int. Cl.² F28D *17/00***
**U.S. Cl. 165—7** **12 Claims**



1. Rotary regenerative air preheater comprising a cylindrical regenerative mass having a central axis, ducts for conducting heat-exchange media to and from the regenerative mass, the media being of different temperatures, means for causing relative rotation about the central axis of at least one of the ducts conducting the media and the regenerative mass, one of the said ducts being for conducting a colder one of the media and comprising side walls extending generally radially of the central axis, and preliminary heating means for the colder medium comprising recuperative heating surfaces in the said one of the said ducts extending generally tangentially of the central axis and defining a plurality of conduction passages for the hotter of the media across the duct, the passages opening in each of the said side walls whereby to contact the hotter of the media with the said surfaces.

**4,018,266**
**BUILDING FRESH AIR VENTILATOR SYSTEM**
**Herbert M. Kay, Waco, Tex., assignor to Command-Aire Corporation, Waco, Tex.**
**Filed Apr. 30, 1975, Ser. No. 573,347**
**Int. Cl.² F25B *29/00***
**U.S. Cl. 165—12** **8 Claims**



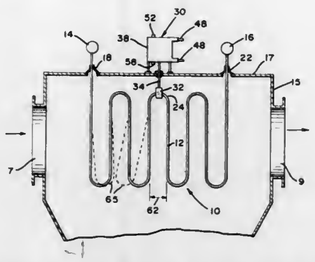

8. A method of operating a fresh air ventilator system for air conditioning a building, comprising the steps of:
a. operating in one of an unoccupied mode and an occupied mode; at least semi-automatically determining which mode in which to operate; and remaining in that mode during operation until a determination is at least semi-automatically made to operate in the other mode;
b. in said unoccupied mode:
i. circulating return air as needed in said building;
ii. conditioning the air being circulated as needed;
iii. at least semi-automatically determining that the occupied mode is to be entered into;
c. in the occupied mode:
i. circulating a mixture of return and fresh air;
ii. automatically determining the type of conditioning to be employed and employing one of a heating operation and a cooling operation;
I. in said heating operation, when determined to be necessary, adding heat as needed until a determination is made that the unoccupied mode is to be employed;
II. in said cooling operation, when determined to be necessary:
A. circulating outside air as needed to obtain the preset temperature; up to the maximum in which all of the air being circulated is fresh air;
B. at a first predetermined proportion of the air being circulated being fresh air, energize a first exhaust fan;
C. at a second predetermined proportion of the air being circulated being fresh air, energize a second exhaust fan serially and in addition to said first exhaust fan;
D. operating with an indicated proportion of outside air to maintain the desired temperature as long as the outside air is below a first predetermined temperature;
E. upon the occurrence of a temperature in the building higher than the preset temperature and the temperature of the outside air rising above said first predetermined temperature, entering upon a heat removal operation as follows:
1. circulating the minimum allowable proportion of fresh air while exhausting the minimum proportion of return air; and
2. energizing the auxiliary cooling to remove heat from the air being circulated to maintain said preset temperature;
F. upon the occurence of outside air dropping below the first predetermined temperature, returning to outside air cooling in accordance with steps A–D; and
G. at least semi-automatically determining that the unoccupied mode is to be entered into, terminating the cooling operation and entering into the unoccupied mode.

**4,018,267**

## CLEANING HEAT EXCHANGER TUBES

**Giorgio Tomasicchio, Milan, Italy, assignor to Dorr-Oliver Incorporated, Stamford, Conn.**

**Filed Jan. 10, 1975, Ser. No. 540,124**
**Int. Cl.² F28D** *11/06;* **F28G** *11/07*
**U.S. Cl. 165—84** **6 Claims**




1. A method for cleaning the external tube surfaces of a tubular array having a looped tube configuration which is exposed to hot dusty gases in a heat exchanger, comprising the step of applying a force in pulses to said tubular array at a frequency corresponding to the resonant frequency of said tubular array, or a low fractional multiple thereof, thereby inducing vibration of said tubular array at the resonant frequency thereof with relatively moderate applied force said applied force being sufficient to induce vibration of a magnitude such that the extremities of adjacent loops of said tubular array are brought into sharp rapping contact to shake the dust and scale from said external tube surface.

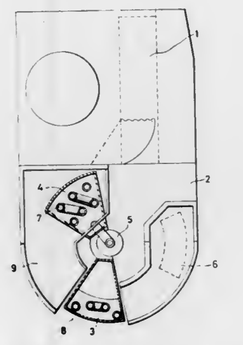
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**4,018,268**

## INDUCTION AIR-CONDITIONING APPARATUS

**Henrik Kallies, Pflugacker 25a, 2 Hamburg 57, Germany**

**Continuation of Ser. No. 499,141, Aug. 21, 1974, abandoned. This application Apr. 19, 1976, Ser. No. 678,399**
**Int. Cl.² F24F** *3/08;* **F28D** *11/04;* **F28F** *5/00, 13/06*
**U.S. Cl. 165—86** **1 Claim**




1. Air-conditioning apparatus comprising, in combination, a housing having an inlet and an outlet and fixed air guiding panels defining a stationary airflow path through said housing, an air heating heat exchanger within said housing, an air cooling heat exchanger within said housing, a rotatable heat exchanger support supporting said heat exchanges within said housing for rotation about an axis whereby said heating and cooling heat exchangers are selectively positionable within said airflow path to selectively heat or cool the air flowing through said housing, said rotatable support being mounted within said housing adjacent said inlet whereby said heat exchangers are selectively rotatable into said inlet and said airflow path, said heat exchangers being mounted on said support in spaced circumferential relation with respect to the axis of support rotation defining a neutral zone for selective positioning within said airflow path whereby upon positioning said neutral zone within said inlet air may enter said housing through said inlet through said neutral zone bypassing said heat exchangers.

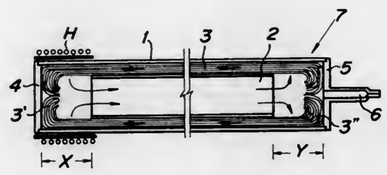
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**4,018,269**

## HEAT PIPES, PROCESS AND APPARATUS FOR MANUFACTURING SAME

**Ichiro Honda; Shigetoshi Takasu, both of Tokyo, and Yoshio Onuki, Yachiyo, all of Japan, assignors to Suzuki Metal Industrial Co., Ltd., Tokyo, Japan**

**Filed May 8, 1974, Ser. No. 468,033**
**Claims priority, application Japan, Sept. 12, 1973, 48-103494; Nov. 8, 1973, 48-129393[U]; Nov. 8, 1973, 48-129394[U]**
**Int. Cl.² F23D** *15/00*
**U.S. Cl. 165—105** **5 Claims**




1. A heat pipe utilizing a heat transfer liquid, comprising an elongated outer metal tubular material, closure means closing each longitudinal end of said outer tubular material, an elongated inner metal tubular material disposed coaxially within said outer tubular material, said inner tubular material having a diameter less than the diameter of said outer tubular material to thereby define an annular space therebetween, said inner tubular material having a longitudinal length less than the longitudinal length of said outer tubular material such that the longitudinal ends of said inner tubular material are spaced from said closure means, a wick of metal fibers disposed longitudinally in said annular space in a substantially uniform layer, said wick being in tow form and having a longitudinal length greater than the longitudinal length of said inner tubular material, said wick having its longitudinal ends turned radially inwardly into the space between the longitudinal ends of the inner tubular material and said closure means, whereby the longitudinal position of said inner tubular material within said outer tubular material is fixed by said wick which is disposed in the space between the longitudinal ends of said inner tubular material and said closure means, said metal fibers of said wick holding said heat transfer liquid by capillary action.

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**4,018,270**

## AUTOMOTIVE FAN SHROUD FOR SCREENING DEBRIS

**Kenneth J. Kollnger, Riverside; Norman E. Williams, Park Ridge; Donald M. Earley, Glen Ellyn, and William R. Golden, Bloomingdale, all of Ill., assignors to International Harvester Company, Chicago, Ill.**

**Filed Nov. 6, 1975, Ser. No. 629,442**
**Int. Cl.² F28F** *19/00*
**U.S. Cl. 165—119** **5 Claims**

1. Power unit guard and cooling structure provided for, and having mounting means to, a vehicle supporting a heat-generating power unit thereon, comprising:

a heat exchanger operatively associated with said power unit for dissipating heat therefrom; and

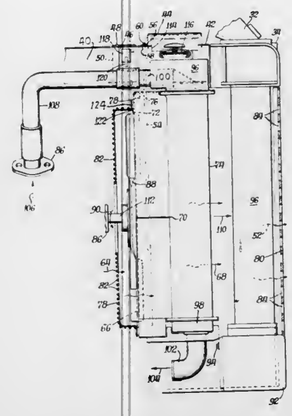
a cooling fan having a driving connection with said power unit;

said structure including a fan shroud and radiator guard secured together, said fan shroud presenting a generally circular, through-opening adapted to surround the fan and, together with said guard defining a longitudinal cooling air path;

upstream grille means across said longitudinal path carried transversely by the shroud in an anterior position thereto;

intervening debris grille means across said air path carried by the shroud transversely in a generally posterior location relative to the through-opening of the shroud;

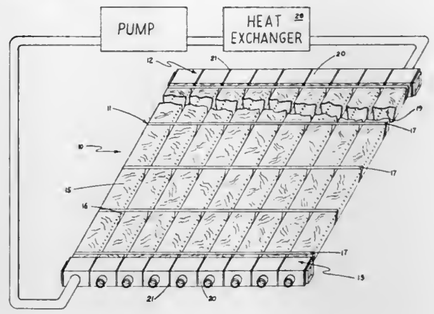
downstream grille means across said longitudinal path carried by the radiator guard transversely in a generally posterior location thereto; and

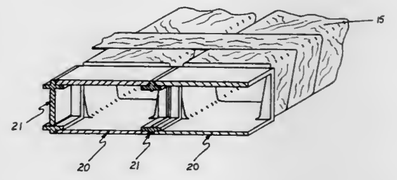


means for mounting the heat exchanger and cooling fan in the guard and cooling structure, with the fan intermediate the upstream and intervening grille means and the heat exchanger intermediate the intervening and downstream grille means, enabling air impelled under pressure to be blown from and by the fan, thence through the intervening debris grille means, heat exchanger, and downstream grille means in that order.



manifold segments between adjacent segment openings to normally engage said lateral segment openings to seal and



separate said adjacent lateral openings and for joining adjacent coupler segments to form said manifolds.

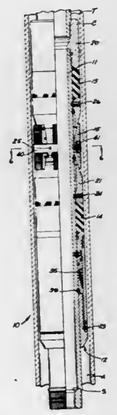
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**4,018,272**

## WELL PACKER APPARATUS

**Joe R. Brown; William C. Lindsey, and Phillip H. Manderscheid, all of Houston, Tex., assignors to Brown Oil Tools, Inc., Houston, Tex.**

**Filed Apr. 7, 1975, Ser. No. 565,385**
**Int. Cl.² E21B** *33/12*
**U.S. Cl. 166—119** **22 Claims**



18. A retrievable well device carried by a tubular well conduit and adapted to be set to anchor to a surrounding well conduit at a subsurface location comprising:

a. a mandrel assembly connected with said tubular well conduit;

b. an anchoring assembly carried on said mandrel assembly;

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**4,018,271**

## FLOORING SYSTEM

**Robert S. Jones, R.R. 3 Box 79A, Pontiac, Ill. 61764; Wesley E. Jones, R.R. 1, Chestnut, Ill. 62518, and Harry W. Smathers, 17 Knollwood Drive, Aurora, Ill. 60538**

**Filed Feb. 24, 1975, Ser. No. 552,285**
**Int. Cl.² F28F** *9/02*
**U.S. Cl. 165—175** **7 Claims**

1. A flooring system comprising elongated tubular slats having given shaped end openings adapted to pass fluid therethrough, means for laterally joining said slats in a laterally adjacent and parallel planar series to form a floor panel, a pair of fluid manifolds for respectively enclosing opposite ends of said slats of said floor panel, said manifolds each being a series of segmented fluid couplers having openings respectively complemental to and longitudinally connected with said slat openings to form longitudinal fluid passing extensions of said slats, said manifold coupler segments having given shaped lateral openings adjacent said slat ends, and coupler joints having outwardly opposed surfaces complemental to adjacent ones of said lateral segment openings and secured to said

c. friction gripping elements included in the anchoring assembly, said gripping elements being expandable radially into a set position to anchor said well device to said surrounding well conduit;
d. setting means including means movable in a first longitudinal direction relative to said mandrel assembly for moving said gripping elements into said set position;
e. locking means between said mandrel assembly and said movable means permitting movement of said movable means relative to said locking means in said first direction but preventing movement of said movable means relative to said locking means in a second direction opposite to said first direction and movement of said locking means relative to said movable means in said first direction for maintaining said gripping elements in said set position;
f. resilient compression seal means including upper and lower seal assemblies disposed above and below said friction gripping elements for forming and maintaining pressure tight seals between said mandrel assembly and said well conduit when said well device is set, said seal assemblies being of the type which maintain said pressure tight seals in the absence of a pressure differential across said set device;
g. said mandrel assembly, said setting means and said locking means at least partially defining an expansion chamber in communication with the interior of said mandrel assembly, said movable means and said locking means defining respective opposed axially facing pressure reaction surfaces within said chamber, said movable means being so movable in said first direction responsive to the application of fluid pressure above a first limit from said mandrel assembly to said expansion chamber to move said gripping elements into said set position; and
h. linking means interconnecting said locking means and said mandrel assembly, said linking means including a retrieving link, for preventing movement of said locking means relative to said mandrel assembly in said second direction and movement of said mandrel assembly relative to said locking means in first direction upon application of fluid pressure below a second limit, greater than said first limit, through said mandrel assembly to said chamber, and severable upon application of fluid pressure above said second limit through said mandrel assembly to said chamber to permit release of said well device from set position by longitudinal, non-rotative movement of said tubular well conduit and said mandrel assembly in said first direction.

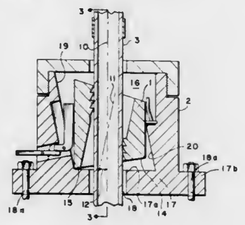
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**4,018,273**

## MANDREL LOCKING SLEEVE

**Robert Frank Berry, Houston, Tex., assignor to Dresser Industries, Inc., Dallas, Tex.**

**Continuation of Ser. No. 579,990, May 22, 1975, Pat. No. 3,976,124, which is a continuation-in-part of Ser. No. 411,983, Nov. 1, 1973, Pat. No. 3,904,233. This application Apr. 2, 1976, Ser. No. 673,164**
**Int. Cl.² E21B** *23/00*
**U.S. Cl. 166—120** **3 Claims**



1. A mandrel gripping sleeve comprising:
a generally cylindrical member having a dual axis bore passage therethrough and adapted for slidable and partially rotatable engagement on a mandrel;
said dual axis bore passage having a first axial bore passage with relatively smooth walls, and a second axial bore passage with internally toothed sections; and,
said member having abutment means thereon, arranged when externally abutted, to induce a rotational moment in said member such that said member is induced to rotate said second axial bore passage toward the mandrel passing through said member.

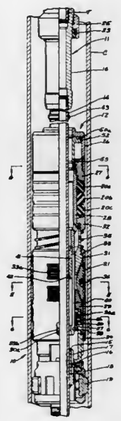
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**4,018,274**

## WELL PACKER

**Chudleigh B. Cochran, Houston, Tex., assignor to Brown Oil Tools, Inc., Houston, Tex.**

**Filed Sept. 10, 1975, Ser. No. 612,226**
**Int. Cl.² E21B** *33/12*
**U.S. Cl. 166—129** **12 Claims**



1. A well packer apparatus adapted to be carried by a tubing string in a well conduit comprising:
a. sealing means extendable between sealing and non-sealing engagement with the well conduit for selectively preventing or permitting fluid flow through said well conduit;
b. anchoring means extendable between anchoring and non-anchoring engagement with said well conduit for selectively anchoring said packer to the conduit or releasing said packer for movement relative to the conduit;
c. primary flow passage means extending through said packer for conducting fluids through said sealing means;
d. secondary flow passage means extending through said packer selectively operable for bypassing fluids through said packer when said sealing means is in sealing engagement with the well conduit;
e. setting means operable by movement of said tubing string in one direction for setting said packer by moving said sealing means into sealing engagement with said well conduit and moving said anchoring means into anchoring engagement with said well conduit;
f. locking means for locking said packer in set condition;
g. blocking means movable between blocking and non-blocking positions for blocking and not blocking, respectively, movement of said locking means toward unlocked position; and
h. means operable by movement of said tubing string in the opposite of said one direction for moving said blocking means to non-blocking position.



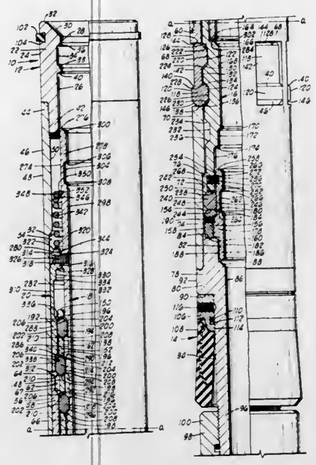
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**4,018,275**

## ANCHORING DEVICE FOR WELL TOOLS

**Robert T. Gaut, 2730 NW. 31st St., Oklahoma City, Okla. 73112**

**Filed May 12, 1976, Ser. No. 685,496**
**Int. Cl.² E21B** *23/00*
**U.S. Cl. 166—137** **14 Claims**



1. For use in pipe strings or the like having one or more annular recesses formed in the interior wall surfaces thereof, an anchoring device anchorable in a selected one of said recesses, comprising:
a tubular body insertable in the interior of a pipe string;
expansion sleeve means disposed within said tubular body for longitudinal movement relative thereto;
setting sleeve means disposed within said tubular body in longitudinal telescopic relation with said expansion sleeve means for longitudinal movement relative to said tubular body and to said expansion sleeve means;
lock sleeve means disposed within said tubular body releasably securable to said setting sleeve means and in longitudinal telescopic relation with said expansion sleeve means for longitudinal movement relative to said tubular body and to said expansion sleeve means;
biasing means operatively engaging said lock sleeve means for urging said lock sleeve means longitudinally toward said expansion sleeve means;
retainer means releasably securing said lock sleeve means to said setting sleeve means against the urging of said biasing means, said retainer means being releasable in response to predetermined longitudinal movement of said setting sleeve means relative to said tubular body;
at least one opening formed in the wall of said tubular body;
anchor member means disposed in said at least one opening for moving radially into and out of a selected one of said recesses;
inwardly projecting shoulder means formed on said anchor member means;
outwardly projecting enlargement means formed on said expansion sleeve means and movable therewith relative to said anchor member means between positions in and out of registration with said shoulder means for displacing said anchor member means radially outwardly into a selected one of said recesses to anchor said device and for releasing said anchor member means to permit radially inward retraction thereof from a selected one of said recesses in response to longitudinal movement of said expansion sleeve means relative to said tubular body;
latch member means carried by said expansion sleeve means and operatively engaging said setting sleeve means and said tubular body for latching said expansion sleeve means in position maintaining said anchoring member means in a selected one of said recesses in response to longitudinal movement of said setting sleeve means relative to said expansion sleeve means;
lock member means carried by said expansion sleeve means and operatively engaging said setting sleeve means and said lock sleeve means for locking said expansion sleeve means in position maintaining said anchor member means in a selected one of said recesses and preventing longitudinal movement of said expansion sleeve means relative to said tubular body in response to longitudinal movement of said setting sleeve means relative to said expansion sleeve means and to the release of said retainer means and longitudinal movement of said lock sleeve means relative to said expansion sleeve means under the urging of said biasing means; and
verification member means carried by said expansion sleeve means and operatively engaging said setting sleeve means and said lock sleeve means for verifying the completion of the locking of said expansion sleeve means in position maintaining said anchor member means in a selected one of said recesses in response to additional longitudinal movement of said setting sleeve means relative to said expansion sleeve means.

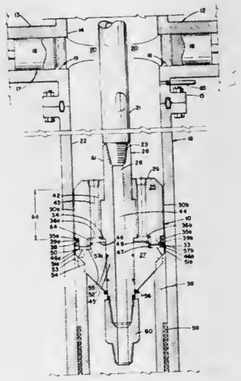
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**4,018,276**

## BLOWOUT PREVENTER TESTING APPARATUS

**Robert Euland Bode, Monikie, Scotland, assignor to Continental Oil Company, Ponca City, Okla.**

**Filed June 14, 1976, Ser. No. 695,340**
**Claims priority, application United Kingdom, Mar. 19, 1976, 11235/76**
**Int. Cl.² E21B** *23/00, 33/12*
**U.S. Cl. 166—183** **6 Claims**

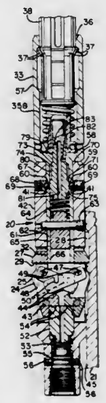


1. A blowout preventer test plug for use in pressure testing a blowout preventer which includes a housing having a housing bore axially formed therethrough and sealably connected to the upper end of a wellhead with said housing bore forming an upward continuation of a wellhead bore through said wellhead and closure means mounted within the housing for extension into said housing bore to seal about a pipe string therein, said plug comprising;
a. a first cylindrical body having an outer diameter slightly smaller than the diameter of said housing bore and said wellhead bore, an axially disposed fluid passageway therethrough and a support means positioned on the upper end of said first body, as positioned for use, for supporting said first body from said pipe string so that it may be raised and lowered within said housing bore and said wellhead bore;

b. a first tubular extension on the lower end of said first body as positioned for use and having an outer diameter less than said outer diameter of said first body and an inner diameter greater than the diameter of said passageway;
c. a circumferential seal means disposed about the outer diameter of said first tubular extension and having an outer diameter substantially equal to or slightly less than said outer diameter of said first body;
d. at least one port communicating through said first body with the axis of said port disposed substantially parallel to the axis of said first body and terminating between the inner diameter of said first tubular extension and the outer diameter of said passageway;
e. a second tubular extension on said lower end of said body, said passageway in said first body extending axially through said second tubular extension;
f. a second cylindrical body slideably positioned on said second tubular extension beneath said first body and having an outer diameter slightly smaller than the diameter of said housing bore and said wellhead bore and a mating circular groove on the upper end of said second cylindrical body, as positioned for use, of a depth and width to mate with said first tubular extension on said first body;
g. means for sealing between the inside of said first tubular extension and said mating groove when said first tubular extension and said mating groove are mated, the portion of said second body between the outer diameter of said circular groove and said outer diameter of said second body being adapted to compress said circumferential seal means when said first tubular extension and said mating groove are mated;
h. means for sealing between said second body and said second tubular extension;
i. at least one port communicating between the bottom portion of said groove and the lower end of said second body as positioned for use; and,
j. retaining means for retaining said second body in position on said second tubular extension.

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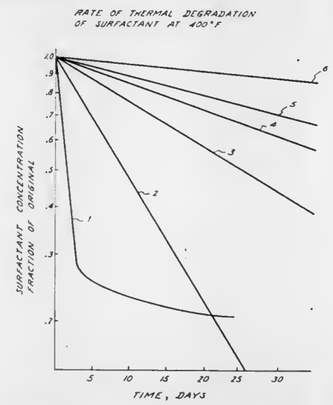
**4,018,277**
**SELECTIVE BOMB HANGER**
**Imre I. Gazda, Saginaw, Tex., assignor to Otis Engineering Corporation, Dallas, Tex.**
**Filed May 17, 1976, Ser. No. 687,191**
**Int. Cl.² E21B *23/00***
**U.S. Cl. 166—214** **30 Claims**



**1. A well equipment hanger constructed for being set in a selected nipple down a well including: housing means; lug means pivotally mounted in said housing means for movement between an inner withdrawn state and an outward position; latch structure means latch holding said lug means in said inner withdrawn state and releasable from the latched state for lug means movement to said outward position; lug means outer position lock member means mounted for longitudinal sliding movement within said housing into and out of lug means outer position; interference lock means positionable for locking said lock member means from movement relative to said housing means and in position to back said lug means in said outer position; and locking member means positionable for unlock moving said interference lock means from the interference lock state to a lock release position.**

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**4,018,278**
**SURFACTANT OIL RECOVERY PROCESS USABLE IN HIGH TEMPERATURE FORMATIONS**
**Russell D. Shupe, Houston, Tex., assignor to Texaco Inc., New York, N.Y.**
**Filed Nov. 25, 1974, Ser. No. 526,780**
**Int. Cl.² E21B *43/22***
**U.S. Cl. 166—252** **16 Claims**




**1. A method for recovering petroleum from a subterranean petroleum containing permeable formation penetrated by at last one injection well and by at least one production well in fluid communication with the formation, said formation temperature being in excess of 120° F, said recovery method being of the type wherein an aqueous fluid is injected into the formation by the injection well and oil is displaced by the injected fluid and recovered from the formation by the production well, wherein the improvement comprises introducing into the formation an aqueous surfactant solution wherein**
**the sole surfactant present in the sufactant solution is selected from the group consisting of water soluble salts of sulfonated ethoxylated alcohols and sulfonated ethoxylated alkylaryl compounds, and mixtures thereof.**

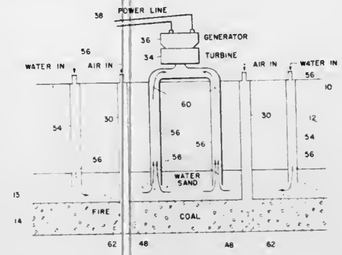
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**4,018,279**
**IN SITU COAL COMBUSTION HEAT RECOVERY METHOD**
**Merrill J. Reynolds, 6111 E. Skelly Drive, Tulsa, Okla. 74135, and Ralph W. Disney, 124 E. 4th St., Tulsa, Okla. 74103**
**Filed Nov. 12, 1975, Ser. No. 631,108**
**Int. Cl.² F28D *21/00*; E21B *43/25***
**U.S. Cl. 166—258** **4 Claims**

**1. In a geologic province where a shallow coal seam is present contiguous to a porous formation, the method of burning the coal in situ and recovering the heat of combustion, comprising:**
**a. drilling one or more vertical first boreholes from the surface through said porous formation and into said coal seam igniting said coal, and supplying air under pressure through said boreholes to maintain the combustion of said coal;**



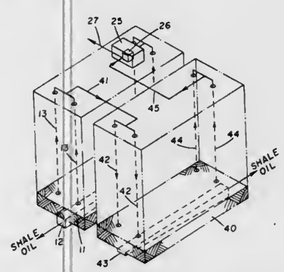
**whereby heat will be transferred from said hot coal seam to said contiguous porous formation;**
**b. drilling at least one vertical second borehole from the surface to said porous formation and flowing water under pressure into said porous formation; whereby said water will be heated to steam; and**




**c. drilling at least one vertical third borehole from the surface to said porous formation, inserting a first casing into said third borehole, and connecting said first casing to a steam energy utilization means and simultaneously utilize the heat energy in said steam.**

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**4,018,280**
**PROCESS FOR IN SITU RETORTING OF OIL SHALE**
**Nicholas Daviduk, Pennington; David W. Lewis, Lawrenceville, both of N.J., and Michael T. Siuta, Torrance, Calif., assignors to Mobil Oil Corporation, New York City, N.Y.**
**Filed Dec. 10, 1975, Ser. No. 639,541**
**Int. Cl.² E21B *43/24***
**U.S. Cl. 166—266** **7 Claims**




**1. A process of in situ retorting an oil shale deposit to recover hydrocarbons therefrom, said process comprising:**
**forming a retort zone of rubblized shale within said deposit;**
**pressurizing a stream of retorting gas by passing it through a compressor means;**
**heating said pressurized retorting gas stream to a temperature required to retort the oil shale by passing said pressurized gas stream through a heating means;**
**injecting said heated retorting gas stream into said retort zone to retort said rubblized shale in said retort zone;**
**recovering gaseous products including said retorting gas from said retort zone;**
**passing at least a portion of said recovered gaseous products through said compressor means, heating means, and said retort zone until a temperature condition is reached wherein the temperature of the gaseous products being recovered substantially equals a value indicative that there is adequate heat available in said retort zone to complete the retorting process without additional externally supplied heat;**
**replacing both said compressor means and said heating means with a fan means when said temperature condition is reached;**
**passing at least a portion of the gaseous products recovered from said retort zone through said fan means; and**
**continuing circulation of said at least a portion of the gaseous products through said retort zone and said fan means until the recovery of hydrocarbons from said retort zone is completed.**

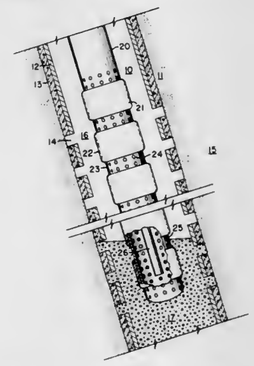
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**4,018,281**
**OIL RECOVERY BY WATERFLOODING WITH IMPROVED MOBILITY CONTROL**
**Harry L. Chang, Dallas, Tex., assignor to Mobil Oil Corporation, New York, N.Y.**
**Filed Nov. 7, 1974, Ser. No. 522,081**
**Int. Cl.² E21B *43/25***
**U.S. Cl. 166—273** **16 Claims**

**1. In the recovery of oil from a subterranean oil reservoir penetrated by spaced injection and production systems, the method comprising:**
**a. introducing into said reservoir via said injection system an initial mobility control slug comprising an aqueous liquid having a predominant continuous aqueous phase the viscosity of which is progressively increased as said initial slug is introduced into said reservoir,**
**b. subsequent to step (a) introducing into said reservoir via said injection system a terminal mobility control slug comprising an aqueous liquid having a predominant continuous aqueous phase the viscosity of which is progressively decreased as said terminal slug is introduced into said reservoir, and**
**c. recovering oil from said production system.**

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**4,018,282**
**METHOD AND APPARATUS FOR GRAVEL PACKING WELLS**
**John W. Graham; William M. Salathiel; Clay Gruesbeck, and Thomas W. Muecke, all of Houston, Tex., assignors to Exxon Production Research Company, Houston, Tex.**
**Filed Feb. 26, 1976, Ser. No. 661,661**
**Int. Cl.² E21B *43/04, 43/08***
**U.S. Cl. 166—278** **29 Claims**

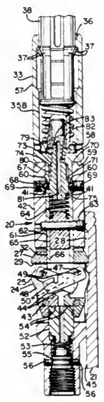


**1. In a method of gravel packing a perforated liner opposite a subterranean formation in a well wherein a carrier liquid having gravel suspended therein is flowed downwardly along the outside of said liner to deposit said gravel around said liner, the improvement comprising:**
**restricting the flow of said carrier liquid into said liner so as to maintain the minimum flow velocity of said carrier liquid along the outside of said liner that is necessary to prevent the premature settling of said gravel and the formation of gravel dunes near the upper portions of said liner.**
**19. Apparatus for gravel packing wells comprising:**
**a perforated liner; and**
**a removable sealant placed on or in said liner to partially**

b. a first tubular extension on the lower end of said first body as positioned for use and having an outer diameter less than said outer diameter of said first body and an inner diameter greater than the diameter of said passageway;
c. a circumferential seal means disposed about the outer diameter of said first tubular extension and having an outer diameter substantially equal to or slightly less than said outer diameter of said first body;
d. at least one port communicating through said first body with the axis of said port disposed substantially parallel to the axis of said first body and terminating between the inner diameter of said first tubular extension and the outer diameter of said passageway;
e. a second tubular extension on said lower end of said body, said passageway in said first body extending axially through said second tubular extension;
f. a second cylindrical body slideably positioned on said second tubular extension beneath said first body and having an outer diameter slightly smaller than the diameter of said housing bore and said wellhead bore and a mating circular groove on the upper end of said second cylindrical body, as positioned for use, of a depth and width to mate with said first tubular extension on said first body;
g. means for sealing between the inside of said first tubular extension and said mating groove when said first tubular extension and said mating groove are mated, the portion of said second body between the outer diameter of said circular groove and said outer diameter of said second body being adapted to compress said circumferential seal means when said first tubular extension and said mating groove are mated;
h. means for sealing between said second body and said second tubular extension;
i. at least one port communicating between the bottom portion of said groove and the lower end of said second body as positioned for use; and,
j. retaining means for retaining said second body in position on said second tubular extension.

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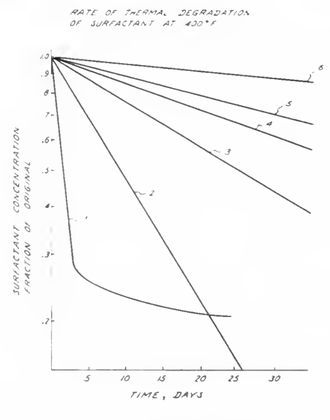
**4,018,277**
**SELECTIVE BOMB HANGER**
**Imre I. Gazda, Saginaw, Tex., assignor to Otis Engineering Corporation, Dallas, Tex.**
**Filed May 17, 1976, Ser. No. 687,191**
**Int. Cl.² E21B** *23/00*
**U.S. Cl. 166—214** **30 Claims**



1. A well equipment hanger constructed for being set in a selected nipple down a well including: housing means; lug means pivotally mounted in said housing means for movement between an inner withdrawn state and an outward position; latch structure means latch holding said lug means in said inner withdrawn state and releasable from the latched state for lug means movement to said outward position; lug means outer position lock member means mounted for longitudinal sliding movement within said housing into and out of lug means outer position; interference lock means positionable for locking said lock member means from movement relative to said housing means and in position to back said lug means in said outer position; and locking member means positionable for unlock moving said interference lock means from the interference lock state to a lock release position.

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**4,018,278**
**SURFACTANT OIL RECOVERY PROCESS USABLE IN HIGH TEMPERATURE FORMATIONS**
**Russell D. Shupe, Houston, Tex., assignor to Texaco Inc., New York, N.Y.**
**Filed Nov. 25, 1974, Ser. No. 526,780**
**Int. Cl.² E21B** *43/22*
**U.S. Cl. 166—252** **16 Claims**




1. A method for recovering petroleum from a subterranean petroleum containing permeable formation penetrated by at last one injection well and by at least one production well in fluid communication with the formation, said formation temperature being in excess of 120° F, said recovery method being of the type wherein an aqueous fluid is injected into the formation by the injection well and oil is displaced by the injected fluid and recovered from the formation by the production well, wherein the improvement comprises introducing into the formation an aqueous surfactant solution wherein
the sole surfactant present in the sufactant solution is selected from the group consisting of water soluble salts of sulfonated ethoxylated alcohols and sulfonated ethoxylated alkylaryl compounds, and mixtures thereof.

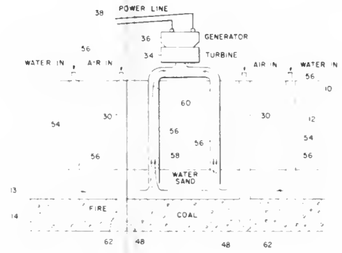
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**4,018,279**
**IN SITU COAL COMBUSTION HEAT RECOVERY METHOD**
**Merrill J. Reynolds, 6111 E. Skelly Drive, Tulsa, Okla. 74135, and Ralph W. Disney, 124 E. 4th St., Tulsa, Okla. 74103**
**Filed Nov. 12, 1975, Ser. No. 631,108**
**Int. Cl.² F28D** *21/00;* **E21B** *43/25*
**U.S. Cl. 166—258** **4 Claims**

1. In a geologic province where a shallow coal seam is present contiguous to a porous formation, the method of burning the coal in situ and recovering the heat of combustion, comprising:
a. drilling one or more vertical first boreholes from the surface through said porous formation and into said coal seam igniting said coal, and supplying air under pressure through said boreholes to maintain the combustion of said coal;



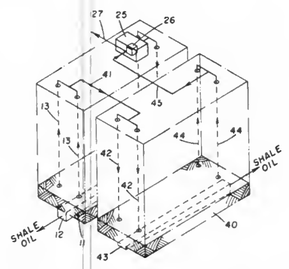
whereby heat will be transferred from said hot coal seam to said contiguous porous formation;
b. drilling at least one vertical second borehole from the surface to said porous formation and flowing water under pressure into said porous formation; whereby said water will be heated to steam; and




c. drilling at least one vertical third borehole from the surface to said porous formation, inserting a first casing into said third borehole, and connecting said first casing to a steam energy utilization means and simultaneously utilize the heat energy in said steam.

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**4,018,280**
**PROCESS FOR IN SITU RETORTING OF OIL SHALE**
**Nicholas Daviduk, Pennington; David W. Lewis, Lawrenceville, both of N.J., and Michael T. Siuta, Torrance, Calif., assignors to Mobil Oil Corporation, New York City, N.Y.**
**Filed Dec. 10, 1975, Ser. No. 639,541**
**Int. Cl.² E21B** *43/24*
**U.S. Cl. 166—266** **7 Claims**




1. A process of in situ retorting an oil shale deposit to recover hydrocarbons therefrom, said process comprising:
forming a retort zone of rubblized shale within said deposit;
pressurizing a stream of retorting gas by passing it through a compressor means;
heating said pressurized retorting gas stream to a temperature required to retort the oil shale by passing said pressurized gas stream through a heating means;
injecting said heated retorting gas stream into said retort zone to retort said rubblized shale in said retort zone;
recovering gaseous products including said retorting gas from said retort zone;
passing at least a portion of said recovered gaseous products through said compressor means, heating means, and said retort zone until a temperature condition is reached wherein the temperature of the gaseous products being recovered substantially equals a value indicative that there is adequate heat available in said retort zone to complete the retorting process without additional externally supplied heat;
replacing both said compressor means and said heating means with a fan means when said temperature condition is reached;
passing at least a portion of the gaseous products recovered from said retort zone through said fan means; and
continuing circulation of said at least a portion of the gaseous products through said retort zone and said fan means until the recovery of hydrocarbons from said retort zone is completed.

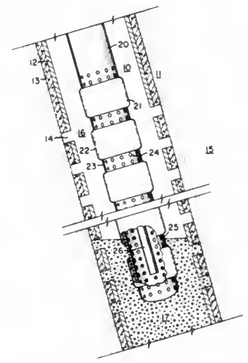
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**4,018,281**
**OIL RECOVERY BY WATERFLOODING WITH IMPROVED MOBILITY CONTROL**
**Harry L. Chang, Dallas, Tex., assignor to Mobil Oil Corporation, New York, N.Y.**
**Filed Nov. 7, 1974, Ser. No. 522,081**
**Int. Cl.² E21B** *43/25*
**U.S. Cl. 166—273** **16 Claims**

1. In the recovery of oil from a subterranean oil reservoir penetrated by spaced injection and production systems, the method comprising:
a. introducing into said reservoir via said injection system an initial mobility control slug comprising an aqueous liquid having a predominant continuous aqueous phase the viscosity of which is progressively increased as said initial slug is introduced into said reservoir,
b. subsequent to step (a) introducing into said reservoir via said injection system a terminal mobility control slug comprising an aqueous liquid having a predominant continuous aqueous phase the viscosity of which is progressively decreased as said terminal slug is introduced into said reservoir, and
c. recovering oil from said production system.

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**4,018,282**
**METHOD AND APPARATUS FOR GRAVEL PACKING WELLS**
**John W. Graham; William M. Salathiel; Clay Gruesbeck, and Thomas W. Muecke, all of Houston, Tex., assignors to Exxon Production Research Company, Houston, Tex.**
**Filed Feb. 26, 1976, Ser. No. 661,661**
**Int. Cl.² E21B** *43/04, 43/08*
**U.S. Cl. 166—278** **29 Claims**



1. In a method of gravel packing a perforated liner opposite a subterranean formation in a well wherein a carrier liquid having gravel suspended therein is flowed downwardly along the outside of said liner to deposit said gravel around said liner, the improvement comprising:
restricting the flow of said carrier liquid into said liner so as to maintain the minimum flow velocity of said carrier liquid along the outside of said liner that is necessary to prevent the premature settling of said gravel and the formation of gravel dunes near the upper portions of said liner.
19. Apparatus for gravel packing wells comprising:
a perforated liner; and
a removable sealant placed on or in said liner to partially

seal said liner, said liner having unsealed perforations substantially throughout its entire length, said sealant being located to selectively seal perforations distributed along said liner to reduce the total flow area of said perforations by at least about 60 percent and to restrict the flow of fluids into said liner.

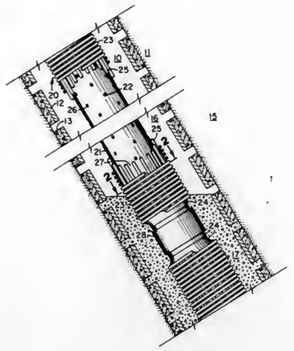
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**4,018,283**

## METHOD AND APPARATUS FOR GRAVEL PACKING WELLS

**Larry A. Watkins, Houston, Tex., assignor to Exxon Production Research Company, Houston, Tex.**

**Filed Mar. 25, 1976, Ser. No. 670,303**
**Int. Cl.² E21B** *43/04, 43/08*
**U.S. Cl. 166—278** **18 Claims**



**1.** In a method of gravel packing a well screen opposite a subterranean formation in a well wherein a carrier liquid having gravel suspended therein is flowed downwardly along the outside of said well screen and upwardly through the bottom of said well screen, said well screen including a tubular pipe having perforations formed therein which is concentrically wrapped with a wire screen, the improvement comprising:

sealing the perforations of said pipe with a temporary plugging material;

adjusting the radial clearance between said pipe and said wire screen so that the resistance to flow in the annular shaped passage defined by the exterior of said pipe and the interior of said wire screen is sufficient to maintain at least the minimum flow velocity of said carrier liquid along the outside of said well screen necessary to prevent premature settling of said gravel and the formation of gravel dunes near the upper portions of said well screen; and

selectively removing said plugging material after said gravel is in place.

**11.** A well screen for packing gravel wells comprising:

a tubular pipe having perforations formed therein;

a selectively removable plugging material sealing the perforations of said pipe;

a wire screen extending circumferentially around said pipe; and

a plurality of standoff wire ribs longitudinally spaced along said pipe, said wire ribs providing a clearance of between about 0.15 inches and 0.25 inches between said pipe mandrel and said wire screen such that the resistance to flow in the annular passages defined by the exterior of said pipe, the interior of said wire screen and the wire ribs is sufficient to maintain at least the minimum velocity of a carrier liquid, having gravel suspended therein, necessary to prevent premature settling of said gravel and the formation of gravel dunes near the upper portions of said well screen during gravel packing.

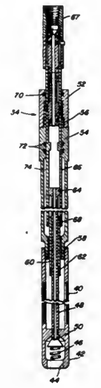
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**4,018,284**

## APPARATUS AND METHOD FOR GRAVEL PACKING A WELL

**Lee E. Perkins, Houma, La., assignor to Kajan Specialty Company, Inc., Houma, La.**

**Continuation of Ser. No. 534,131, Dec. 18, 1974, abandoned.**
**This application Oct. 20, 1975, Ser. No. 623,993**
**Int. Cl.² E21B** *43/04, 43/10*
**U.S. Cl. 166—278** **40 Claims**



**17.** A method for packing a well with a granular material, the method comprising the steps of: detachably connecting a sand screen or liner means with a run-in tool; introducing the run-in tool, with its associated sand screen or liner means, into said well; positioning the sand screen or liner means in the well location wherein packing is to be effected; releasing the sand screen or liner means from the run-in tool; introducing and packing the granular material around said screen or liner means through an opening in the run-in tool; and closing said opening whereby the well can be placed on production without withdrawal of said run-in tool from the well.

**22.** An apparatus for packing a well with a granular material, the apparatus comprising: sand screen or liner means for retaining sand granular material in said well; run-in tool means for introducing said sand screen or liner means to said well; release means for detachably connecting said sand screen or liner means to said run-in tool means; control means for actuating said release means and for releasing said sand screen or liner means from said run-in tool means at a desired location in said well; delivery opening means for introducing said granular material to said well after actuation of said release means by said control means; and means to close said delivery opening means without withdrawal of said run-in tool means from said well.

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**4,018,285**

## METHOD FOR CONTROLLING FINES MIGRATIONS

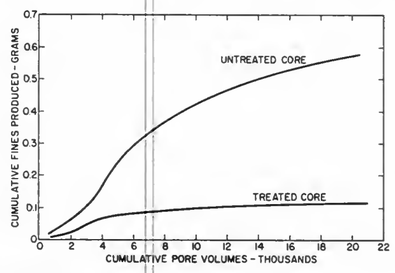
**Larry A. Watkins, Houston; John W. Graham, Alvin, and William M. Salathiel, Houston, all of Tex., assignors to Exxon Production Research Company, Houston, Tex.**

**Filed Mar. 19, 1976, Ser. No. 668,557**
**Int. Cl.² E21B** *33/138*
**U.S. Cl. 166—295** **21 Claims**

**1.** A method for controlling the migration of fine particles in a subterranean formation surrounding a well comprising:

contacting said formation with a dilute resin solution, said resin solution comprising a one-step phenolic type resin dissolved in a diluent, said resin having a concentration of between about 10 and 20 weight percent in said resin solution;

outwardly displacing said resin solution into said formation so as to leave behind a thin residual resin film in the area of said formation which immediately surrounds said well;




extracting said diluent from said resin film; and

thereafter curing said resin film to an infusible state.

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**4,018,286**

## CONTROLLED WELL PLUGGING WITH DILUTE POLYMER SOLUTIONS

**James W. Gall, and Everett L. Johnston, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.**

**Filed Nov. 6, 1975, Ser. No. 629,359**
**Int. Cl.² E21B** *33/138*
**U.S. Cl. 166—295** **4 Claims**

**1.** A method for creating a temporary plug in an underground formation penetrated by at least one wellbore, said method comprising:

1. creating a plug by injecting into said formation a composition comprising:

a. water,

b. a polymer capable of gelling in the presence of a cross-linking agent, said polymer selected from the group consisting of polyacrylamides, partially hydrolyzed polyacrylamides, polyacrylonitrile, polyacrylic acid, polyvinylpyrrolidone, polysaccharides, carboxymethylcellulose, other substituted celluloses, polyvinyl alcohol, polystyrene sulfonates, copolymers of acrylamide and acrylic acid or 2-acrylamido-2-methyl-1-propane sulfonic acid.

c. a complexing agent comprised of multivalent cations selected from the group consisting of $Fe^{2+}$, $Fe^{3+}$, $Al^{3+}$, $Ti^{4+}$, $Sn^{4+}$, $Ca^{2+}$, $Mg^{2+}$, and $Cr^{3+}$, and

d. retarding ions selected from the group consisting of acetate, nitrilotriacetate, tartrate, citrate, tripolyphosphate, metaphosphate, gluconate, and ortho-phosphate; and

2. maintaining a pH of fluids contacting the composition in the formation within the range of about 3 to about 7 for the time desired for temporarily plugging the formation; and

3. thereafter injecting liquid capable of decreasing the pH below 3 or increasing the pH above 7 into contact with said composition.

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**4,018,287**

## SOD CUTTING KNIFE WITH SEPARATE SIDE BLADES

**Gerardus J. Brouwer, Keswick, Canada, assignor to Brouwer Turf Equipment Limited, Keswick, Canada**

**Filed Mar. 3, 1975, Ser. No. 554,812**
**Claims priority, application Canada, Oct. 4, 1974, 210798**
**Int. Cl.² A01B** *45/04*
**U.S. Cl. 172—19** **7 Claims**

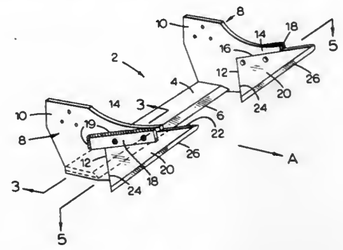
**1.** Sod cutting means adapted to be advanced forwardly along a path of travel to sever a strip of sod and comprising:

a. an elongated undercutting blade;

b. a pair of side support arms, one connected to each side of said undercutting blade and each extending upwardly from said undercutting blade, said side support arms having flat inner opposed surfaces oriented parallel to said path of travel, each side support arm having a rear portion having a forward edge, and a forward projection extending forwardly from the upper part of said forward edge and located substantially above said undercutting blade, said projection having a lower edge;

c. a pair of side cutting blades, each side cutting blade having a top edge, a rear edge, and a lower cutting edge slanting upwardly from rear to front, each side cutting blade having a substantially flat inner surface;

d. means detachably mounting said side cutting blades in fixed relation to said undercutting blade with the rear of each said lower cutting edge being located forwardly of said undercutting blade and with said inner surface of each side cutting blade being aligned with said inner surface of its associated side support arm;



e. said top edge of each side cutting blade abutting against said lower edge of its associated projection and said rear edge of each side cutting blade abutting against said forward edge of the rear portion of its associated side support arm;

f. said lower edges of said side cutting blades extending, at the rear of said lower edges, substantially below said undercutting blade to protect the connection between said undercutting blade and said side support arms.

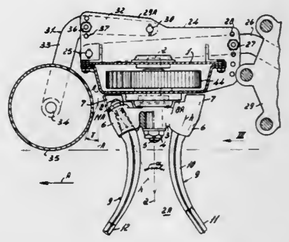
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**4,018,288**

## ROTARY HARROWS

**Cornelis van der Lely, 7, Bruschenrain, Zug, Switzerland**

**Filed Feb. 27, 1975, Ser. No. 553,693**
**Claims priority, application Netherlands, Mar. 1, 1974, 7402788**
**Int. Cl.² A01B** *63/16, 33/12*
**U.S. Cl. 172—395** **11 Claims**



**1.** A rotary harrow comprising a frame and coupling means on said frame for attachment to a prime mover, a plurality of soil working members rotatably mounted on shafts journalled on said frame and driving means connected to rotate said soil working members, said shafts and soil working members extending in a row transverse to the normal direction of travel of the harrow, said soil working members each comprising a support rotatable on a generally vertical shaft and each support being connected to at least one tine that has a lower soil

working portion depending downwardly from said support to contact the ground and trace a general circular path through the soil, screening means mounted on the cultivator and said screening means having an inclined surface that extends across the working width of said row in front of said supports, said screening means terminating above the soil working portion and being positioned to protect said supports, the upper portions of the tines and their support connections from damage by debris encountered in and on the soil during operation while leaving the lower soil working portions of the tines exposed to work the soil, said screening means being a protective roller having a curved surface that faces said supports and said curved surface normally being positioned closely adjacent those supports.

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**4,018,289**

## SOIL CULTIVATING TINES

**Ary van der Lely, 10, Weverskade, Maasland, and Cornelis Johannes Gerardus Bom, 36, Esdoornlaan, Rozenburg, both of Netherlands**

**Filed Jan. 6, 1975, Ser. No. 539,036**

**Claims priority, application Netherlands, Jan. 10, 1974, 7400328**

**Int. Cl.² A01B** *23/02*

**U.S. Cl. 172—713** **6 Claims**




1. A tine for use in a rotary harrow or cultivator comprising an upper fastening portion and a lower elongated soil-working portion that merges into said upper portion at a junction, said soil-working portion tapering downwardly to a tip and at least a majority of its tapering length having a cross-section with a periphery, a segment of that periphery forming an arc with its center of curvature at the longitudinal axis of the soil-working portion, said arc comprising more than half of said periphery and the remainder of the periphery being noncircular and defining a rounded rib, said rib being located at the leading side of the soil-working portion with respect to the normal direction of rotation of said tine.

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**4,018,290**

## HYDRAULICALLY DRIVEN VIBRATOR

**Paul Schmidt, Lennstadt, Saalhausen, Germany, assignor to Tracto-Technik Paul Schmidt, Lennstadt, Saalhausen, Germany**

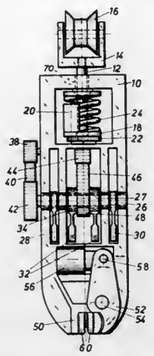
**Filed Aug. 4, 1975, Ser. No. 601,637**

**Claims priority, application Germany, Sept. 4, 1974, 2442367**

**Int. Cl.² E02D** *7/18;* **E21C** *3/02*

**U.S. Cl. 173—49** **8 Claims**

1. A hydraulically driven vibrator comprising a frame, at least two pairs of out-of-balance masses arranged alongside one another, means rotatably mounting the masses in the frame for rotation about a common axis, means for rotating one pair of masses in one direction, means for rotating the other pair of masses synchronously with said first pair of masses, but in an opposite direction thereto, whereby rotation of said masses produces vibratory forces which are additive in a direction longitudinally of said frame, but are mutually cancelling in a direction transversely of said frame, driving means including a hydraulic motor, means mounting said motor to said frame in a position offset longitudinally of said frame from said common rotational axis, two oppositely rotatable drive outputs of said motor and flexible driving means coupling one of said outputs to one of said pairs of masses and




coupling the other of said outputs to the other of said pairs of masses.

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**4,018,291**

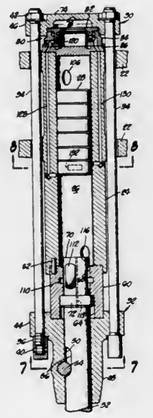
## PNEUMATIC HAMMER

**Jack Anderson, Twinsburg, Ohio, assignor to Allied Steel & Tractor Products, Incorporated, Cleveland, Ohio**

**Filed Dec. 23, 1974, Ser. No. 535,580**

**Int. Cl.² B25D** *17/12*

**U.S. Cl. 173—135** **4 Claims**



1. An air hammer comprising

a body, said body including an elongated cavity;

a ram slidably positioned within said elongated cavity;

inlet means for directing air to said elongated cavity for controlling the position and motion of said ram; and

outlet means for releasing air from said elongated cavity, said outlet means including at least one expansion chamber located in said body adjacent said elongated cavity, said expansion chamber being in communication with said elongated cavity and extending to exhaust from said body into the atmosphere, said expansion chamber being elongated and including ports at each end of said body where said expansion chamber exhausts into the atmosphere.



**4,018,292**

## POWER TOOL WITH DEVICE FOR PREVENTING UNINTENTIONAL TURN-ON OF DRIVE MOTOR

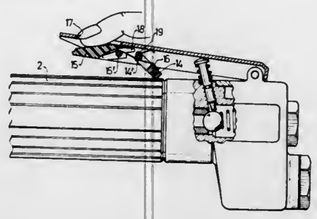
**Karl Roll, Leinfelden, and Klaus-Peter Fritschi, Merklingen, both of Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany**

**Filed Nov. 12, 1975, Ser. No. 631,188**

**Claims priority, application Germany, Dec. 7, 1974, 2457944**

**Int. Cl.² B23B** *45/00*

**U.S. Cl. 173—170** **4 Claims**




1. In a power tool having a drive motor, in combination, a turn-on switch device activatable for turning on the drive motor; a manual activator mounted for swinging movement in a predetermined plane of motion and in a predetermined direction from a normal position to an activating position in which it activates the turn-on switch device, the manual activator being so arranged and configurated as to be depressible in the predetermined direction by a hand of the user of the power tool; and a safety device for preventing unintentional activator depression including a blocking structure mounted for swinging movement relative to the manual activator in generally the predetermined plane and in the predetermined direction from a blocking position in which it prevents activator depression to an unblocking position in which it permits such depression, the blocking structure being so configurated and located relative to the manual activator as to be depressible by a finger of the same hand which depresses the manual activator, the power tool having a housing, and wherein the blocking structure includes a release lever and a blocking lever interengageable and cooperating with each other and both mounted for swinging movement in generally the predetermined plane, with the blocking lever being mounted to rest against the surface of the housing, the blocking lever being arranged to block activator depression when the release lever is in undepressed position, and the release lever being arranged to prevent the blocking lever from blocking activator depression when the release lever is in depressed position.

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**4,018,293**

## METHOD AND APPARATUS FOR CONTROLLED FRACTURING OF SUBTERRANEAN FORMATIONS

**Leonard J. Keller, Dallas, Tex., assignor to The Keller Corporation, Dallas, Tex.**

**Filed Jan. 12, 1976, Ser. No. 648,136**

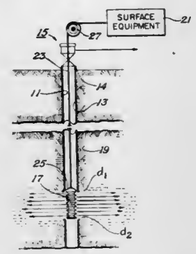
**Int. Cl.² E21B** *43/117*

**U.S. Cl. 175—4.5** **11 Claims**

1. A method of controlled fracturing of a portion of subterranean formations intermediate predetermined depths comprising the steps of:

a. forming a borehole from the surface of the earth to at least the lowest of said predetermined depths so as to allow an explosive charge to be directed against said portion of said formation at said borehole;

b. lowering into said borehole until opposite said portion of said subterranean formation an elongate explosive charge having substantially uniform composition throughout and having a plurality of grooves on its exterior; each of said grooves being deep enough to effect a concentration of explosive forces along the longitudinal axis of said groove so as to effect a fracture extending radially from the center line of the longitudinal axis of said groove; said elongate explosive charge grooves being disposed along one of the following configurations: a plurality of longitudinally extending grooves for effecting vertical fractures along predetermined planes extending radially from the center line of said borehole; and a plurality of peripherally disposed grooves extending peripherally around said elongate explosive charge for fracturing in respective horizontal planes; said peripherally disposed grooves being in planes substantially perpendicular to the center line of said borehole;




c. detonating said explosive charge at only the ambient pressure in said borehole free from superimposed hydraulic fracturing pressure to fracture simultaneously and solely by explosives to the total radial extent desired along said predetermined planes as determined by the nature of said explosive charge and its oriented grooves such that an explosive force in excess of that required to fracture said formation is generated along each plane and said formation is fractured in the respective planes extending radially out-wardly from said borehole.

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**4,018,294**

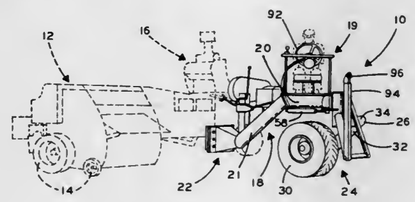
## DRAFT ATTACHMENT FOR WHEELED IMPLEMENTS

**Everett V. Rankins, 329 Flores Court, Manteca, Calif. 95336, and Raymond Keith Foster, P.O. Box 1, Madras, Oreg. 97741**

**Filed Dec. 17, 1975, Ser. No. 641,617**

**Int. Cl.² B62D** *61/08*

**U.S. Cl. 180—13** **5 Claims**




1. An improved draft attachment for a wheeled implement comprising:

A. an elongated vehicle frame of a rigid, segmented configuration characteried by a forwardly extended, horizontally oriented leading segment and a rearwardly extended,-downwardly inclined trailing segment;

B. means for imparting vertical and lateral stability to the vehicle frame including an implement coupling mounted on the trailing segment adapted to rigidly connect the vehicle frame to a wheel-stabilized implement;

C. an operator's platform mounted above the longitudinal axis of the leading segment of the vehicle frame in fixed relation therewith; and

D. hydraulic drive means for propelling said attachment including an angularly displaceable, hydraulically driven

steering assembly coupled to the leading segment of the vehicle frame in a supporting relationship therewith and adapted to oscillate about a turning axis disposed in a vertically oriented plane transversely related to the longitudinal axis of the vehicle frame, including a wheel frame pivotally connected to the leading segment of the vehicle frame, a ground wheel having an axis of rotation disposed in trailing relation with said turning axis, a gear reduction unit mounted on the wheel frame having a rotary output coupling including a wheel mounting ring concentrically related to the ground wheel and connected thereto in a driving relationship therewith, and a hydraulic motor mounted on the wheel frame having a rotary output shaft disposed in juxtaposition with the ground wheel and connected to said gear reduction unit.

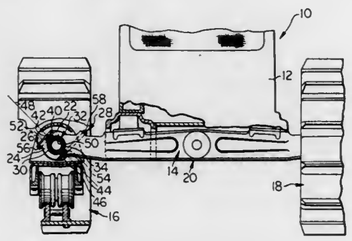
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**4,018,295**

## VEHICLE EQUALIZER BAR MOUNTING MEANS

**Roland E. Hasselbacher, Brimfield, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.**

**Filed Nov. 14, 1975, Ser. No. 631,965**
**Int. Cl.² B62D** *55/00*
**U.S. Cl. 180—9.5** **15 Claims**



1. In a vehicle having a main frame and a track frame;
an equalizer bar comprising a main body pivotally fixed to the main frame and defining a main body end portion;
said equalizer bar further comprising an end cap removably secured to the main body end portion;
bearing means mounted to said track frame, the main body end portion and end cap generally surrounding the bearing means when so secured together, so that the equalizer bar is pivotally connected to the track frame;
the main body end portion defining a portion thereof overlying and in contact with the bearing means for providing that, upon removal of the end cap, the bearing means support the main body end portion and a portion of the weight of the main frame transferred through the equalizer bar to the bearing means,
Wherein the equalizer bar is positioned generally transversely of the vehicle, and wherein the main body end portion and end cap define contacting surfaces on either side of the bearing means when so secured together, said contacting surfaces being substantially aligned and being disposed along a line substantially 45° from a transverse axis of the vehicle.

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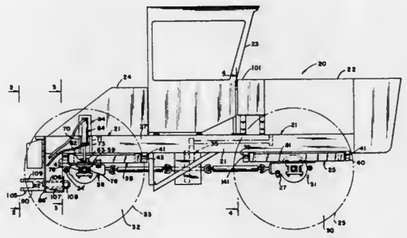
**4,018,296**

## FOUR WHEEL TRACTOR

**Jerome Leslie Knudson, Crosby, N. Dak. 58730**

**Continuation of Ser. No. 457,380, April 19, 1974, abandoned.**
**This application Sept. 29, 1975, Ser. No. 617,840**
**Int. Cl.² B60G** *25/00*
**U.S. Cl. 180—41** **1 Claim**

1. A self leveling tractor comprising an elongated fixed main frame having a motor and cab mounted thereon, rear and front sub frames, said rear and front sub frame being positioned centrally and lengthwise below the rear and front portions respectively of the main frame, said sub frames each having opposing longitudinal side frame members parallel to the length of the main frame and front and rear lateral frame members perpendicular to the length of the main frame, with the longitudinal side frame members being of greater length than the front and rear lateral frame members, so that the length of the sub frames in parallel to the length of the main frame, projecting lug means on opposing side frame members of the rear sub frame projecting outwardly from beneath the main frame to fix a rear axle to the underside of the rear frame so that the rear sub frame rests generally on top of the rear axle, and spaced below the main frame when the rear sub frame is horizontal with the main frame, said front sub frame having means on the opposing side frame members to fix a front axle to the underside of the front sub frame so that the front sub frame rests generally on top of the front axle, said lateral front and rear members of said front and rear sub frame being pivotally mounted to the main frame, said pivotal mounting of said sub frames being each pivotally mounted on generally one common axis to one another, with the axis extending centrally and longitudinally along the length of the sub frames and main frame at a location spaced above the longitudinal center axis of the front and rear axles with the



distance between the pivot points of the front and rear lateral members of the front and rear sub frames greater than the distance between the front and rear edge of their respective axles at the center of the axle, said rear sub frame being spaced above an input shaft to said rear axle, so that a drive shaft means may connect said motor to said rear axle that will pass beneath said rear sub frame member, said front sub frame member being spaced above an input shaft to said front axle so that a drive shaft means may connect said motor to said front axle that will pass beneath said front sub frame member, a fluid cylinder positioned above one of the side frame members on the rear sub frame with one end pivotally connected to the upper surface of said frame member and the other end extending upward and pivotally mounted to an opposing side portion of the main frame, motor and pump means to activate said cylinder, mercury activated leveling means to control the actuation of said valve and pump means to control the activation of said cylinder, with said cylinder when activated by said mercury activated leveling means pivoting said main frame relative to said rear sub frame to level the main frame to horizontal, when said rear sub frame has pivoted to one side or another due to being located on angular terrain.

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**4,018,297**

## FOUR-PIECE FAN SHROUD

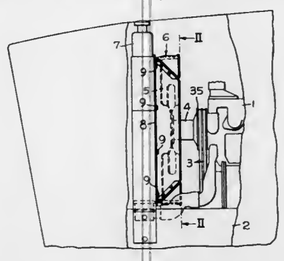
**Robert C. Haupt, Milwaukee, Wis., assignor to Allis-Chalmers Corporation, Milwaukee, Wis.**

**Filed Nov. 3, 1975, Ser. No. 628,522**
**Int. Cl.² B60K** *11/02*
**U.S. Cl. 180—54 A** **10 Claims**

1. A multiple-piece fan shroud for use on a motor vehicle having a radiator and belt driven fan with tips passing closely adjacent the inner periphery of the shroud comprising, at least three individually formed sections of a shroud with each section defining diverging external surfaces forming the external surfaces of the shroud when assembled said diverging external



surfaces adapting each of said sections for removal of the section without interference from a two-piece die each section including a mounting portion defining a mounting flange on the forward portion of the shroud having a linear edge adapted for mounting on a radiator, a venturi portion integral with the mounting portion defining a restricting throat segment converging radially inward at least along a major portion of said



section and providing laminar air flow through the intermediate portion of the shroud, arcurate diffuser on the rearward portion of the shroud and intergral with said venturi portion for quiet discharge of air, aligning means and fastening means for connecting the sections of the shroud to form a rectangular front mounting portion and circular rear discharge portion adapted for providing a laminar air flow structure for operating in conjunction with a fan.

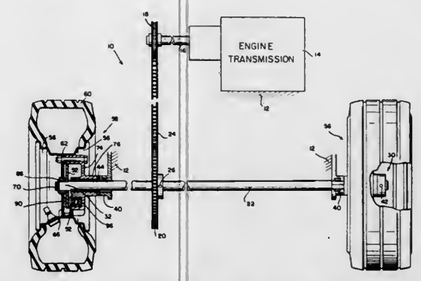
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**4,018,298**

## WHEEL ASSEMBLY WITH SLIP CLUTCH

**Ray D. Frazee, Shelbyville, Ind., assignor to Carlisle Corporation, Cincinnati, Ohio**

**Filed Oct. 23, 1975, Ser. No. 624,864**
**Int. Cl.² B60K** *23/06*
**U.S. Cl. 180—76** **5 Claims**




1. Wheel and axle assembly for a small vehicle such as a riding lawnmower including a frame and an engine mounted upon said frame, said assembly comprising an axle having opposite first and second ends, means for journal mounting said axle for rotation on said frame, means for drivingly connecting said engine to said axle, first and second wheels for mounting, respectively, on said first and second axle ends, in which the improvement comprises means for rigidly connecting said first wheel to said frist axle end for rotation therewith, said second wheel including a rim housing journal mounted on said second axle end for rotation relative to said axle, said rim housing including a rim flange having a concentric central portion and a shell member adjacent said central portion and defining with said central portion a space, and means for fastening said shell member to said central portion, a plate within said space attached to said axle for rotation therewith, said plate having opposite sides and being axially shiftable on said axle, and means for providing a torque-limited driving connection between said plate and said rim housing, said torque-limited connecting means permitting relative rotation between said second wheel and said axle when a predetermined torque level is exceeded, said torque-limited connecting means including a plurality of first friction pads carried by said flange central portion and engaging one side of said plate and a plurality of second friction pads carried by said shell member and engaging the opposite side of said plate, and spring means for urging said second pads against said plate, said fastening means being operative to preload said spring means.

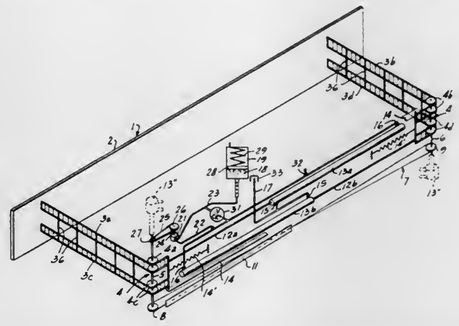
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**4,018,299**

## DECELERATING SAFETY BUMPER FOR VEHICLES AND THE LIKE

**Tony Nagin, Jr., and Tony Nagin, Sr., both of 14016 S. Indiana Ave., Riverdale, Ill. 60627**

**Division of Ser. No. 330,616, Feb. 8, 1973, Pat. No. 3,874,718.**
**This application Feb. 27, 1975, Ser. No. 553,618**
**Int. Cl.² B60R** *19/02*
**U.S. Cl. 180—91** **28 Claims**



1. A bumper structure, particularly for vehicles, comprising an extendible and retractable bumper member adapted to receive impact loads applied thereto in a predetermined direction, means for supporting said bumper member in operative position to receive such loads, and move in a predetermined direction in response thereto, shock absorbing means operatively connected to said supporting means whereby compression forces thereon in retracting directon are transmitted to said shock absorbing means, said shock absorber means having a pair of ports therein, one of which functions as a fluid inlet, and the other a fluid outlet when the shock absorber means is subjected to loads, a fluid passageway operatively connecting the fluid inlet and outlet ports, and a metering valve structure disposed in said connecting passageway for controlling the fluid flow therein, and means for selectively effecting predeterined extension and retraction of said bumper member in the absence of impact loads thereon, said retraction and extension means comprising a power unit mechanically connected to said supporting means, a bypass passageway shunting said first mentioned passageway for effecting free flow between the fluid inlet and outlet, and valve means for selectively directing fluid through said bypass passageway when said power unit is actuated.

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**4,018,300**

## STAIRS

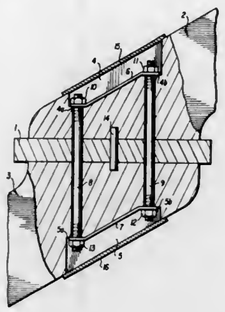
**Gilbert Louis Geay, Cours, France, assignor to Menuiserie du Val de Rhins R. Boucher S.A., France**

**Filed Feb. 12, 1975, Ser. No. 549,147**
**Claims priority, application France, Feb. 26, 1974, 74.06751**
**Int. Cl.² E04F** *11/00*
**U.S. Cl. 182—178** **11 Claims**

1. A stairway comprising a plurality of treads, a plurality of spacer blocks,

each tread being gripped at one of its side edges between two spacer blocks functioning as stringers,

each spacer block having upper and lower free edges, and a mortise located in each of those free edges, the mortise in the lower edge of a block located under a tread and the mortise in the upper edge of an adjacent block located above said tread being symmetrically positioned in relation to the tread,



each block having channels provided in it for interconnecting through a tread the mortise in the upper edge of the block above a tread with the mortise in the lower edge of the block below a tread, and,

compression means for drawing spacer blocks on opposite sides of each tread toward one another to compress a tread therebetween, said compression means being located in said mortises and said channels.

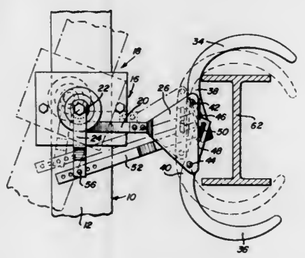
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**4,018,301**

**CLAMP TYPE LADDER WALL ENGAGING BRACKET**

**Alfred E. Nameche, 407 N. West St., Lima, Ohio 45801**

**Filed July 27, 1976, Ser. No. 709,164**
**Int. Cl.² E06C** *1/36, 7/48*
**U.S. Cl. 182—206** **7 Claims**



1. A ladder support bracket assembly, said assembly including elongated support arm means, mounting means for attachment to the upper end of a ladder to be leaned toward and supported from a support structure, said mounting means including pivot means pivotally supporting one end of said support arm means from said mounting means for swinging about a horizontal axis, said mounting means including mounting structure for support from an associated ladder including opposite side rails with said horizontal axis extending transversely of said rails and generally paralleling a plane containing said rails, the free end portion of said arm means including first and second jaw means shiftably supported from said arm means for movement relative thereto toward and away from each other to clamp said support structure therebetween, link means operatively connected to said jaw means at one end and adapted for connection with said ladder at the other end for shifting said jaw relative to said support arm means in response to swinging oscillation of said support arm means relative to said mounting means.

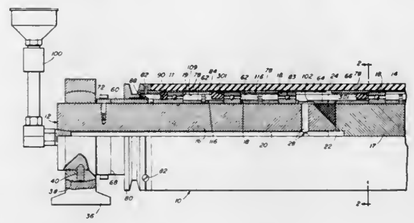
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**4,018,302**

**LIQUID-LUBRICATED ROLL WITH ANTI-FLOODING BARRIERS**

**Richard P. Brown, Assonet, Mass., assignor to Mount Hope Machinery Company, Incorporated, Taunton, Mass.**

**Filed Apr. 4, 1974, Ser. No. 457,726**
**Int. Cl.² F16N** *7/32, 31/00*
**U.S. Cl. 184—6.26** **35 Claims**



1. A liquid lubricated roll comprising

axle means having longitudinal curvature parallel to an axial plane thereof, and adapted to be mounted with said passageway on opposite sides of said barrier ring, together with a centrifugally-operable valve means constructed and arranged to close said duct during non-rotation of said roller means, and to open fluid communication through said duct during rotation of said roller means.

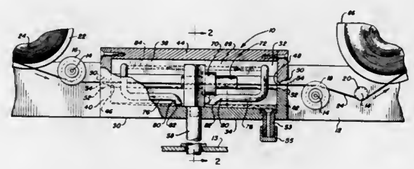
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**4,018,303**

**OIL MIST LUBRICATOR FOR METAL TAPE**

**James Richard White, Everett; George Herbert Dodge, Kirkland, and Jack Rose, Bellevue, all of Wash., assignors to Sundstrand Data Control, Inc., Redmond, Wash.**

**Filed Jan. 27, 1975, Ser. No. 544,487**
**Int. Cl.² F01M** *1/00*
**U.S. Cl. 184—6.26** **6 Claims**



1. In a tape lubricating apparatus having a base, a housing having a plenum chamber therein, means for passing a stretch of tape through said plenum chamber, an oil mist generator carried by said base, nozzle means connected to said generator and having a discharge opening pointing toward one surface of said tape for directing oil mist onto said surface, hood means for substantially encircling said tape in the vicinity of said nozzle means, means for drawing off condensate and excess oil mist from said chamber to prevent contamination of the atmosphere surrounding the apparatus, and said last-named means has two tubes, each tube having an opening positioned close to the bottom wall of the chamber near the midportion of said bottom wall, and suction means connected to said tubes for drawing said condensate and mist.

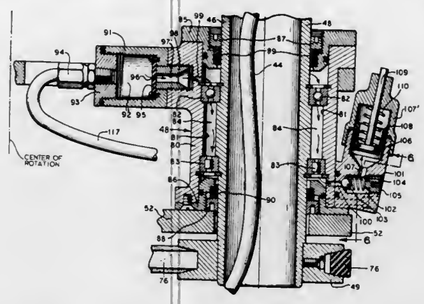


**4,018,304**

**LUBRICATION SYSTEM FOR A CENTRIFUGAL LIQUID PROCESSING SYSTEM**

**Houshang Lolachi, and Herbert Goldsmith, both of Rockville, Md., assignors to Baxter Travenol Laboratories, Inc., Deerfield, Ill.**

**Filed Oct. 8, 1975, Ser. No. 620,513**
**Int. Cl.² F16N** *9/02*
**U.S. Cl. 184—7 R** **12 Claims**



1. A lubrication system for a bearing assembly of the type operable within a centrifugal force field and including at least one bearing adapted to receive a fluid lubricant, said system comprising, in combination:

means including a reservoir for containing a quantity of said lubricant;

means including an accumulator for storing a quantity of said lubricant under pressure;

means defining a first flow path for said lubricant when said bearing assembly is subjected to said force field from said reservoir through said bearing to said accumulator; and

means defining a second flow path from said accumulator to said reservoir when said bearing is not subjected to said force field.

7. In a centrifugal liquid processing apparatus of the type having

a stationary base;

a rotor drive assembly rotatably mounted to said base for rotation about a predetermined axis;

a rotor assembly including at least one cell processing chamber, said rotor assembly being rotatably mounted with respect to said base for rotation about said axis;

means including a flexible umbilical cable segment for establishing fluid communication with said processing container, one end of said cable segment being fixed with respect to said base along said axis at one side of said rotor assembly, the other end of said cable segment being attached along said axis in rotationally locked engagement to the other side of said rotor assembly;

guide means for causing said umbilical cable segment to rotate about said axis with said rotor drive assembly, said guide means including a housing, a hollow guide sleeve for receiving said umbilical cable, and a bearing assembly including at least one bearing for rotatably mounting said guide sleeve to said housing at a location radially spaced from said axis, said bearing assembly being subjected to a centrifugal force field; and

drive means for rotating said rotor assembly and said rotor drive assembly in the same direction with a speed ratio of 2:1 to prevent the umbilical cable from becoming twisted during rotation of said rotor;

a lubrication system for said bearing assembly comprising, in combination:

means including a reservoir for containing a quantity of lubricant in fluid form;

means including an accumulator for storing a quantity of said lubricant under pressure;

means defining a first flow path for said lubricant when said bearing assembly is subjected to said force field from said reservoir through said bearing to said accumulator; and

means defining a second flow path from said accumulator to said reservoir when said bearing is not subjected to said force field.

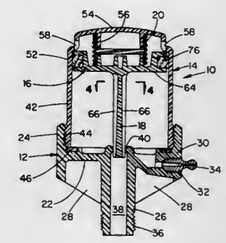
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**4,018,305**

**LUBRICANT METERING ASSEMBLY**

**Helmut G. Tietje, Woodcliff Lake, N.J., assignor to Lube Systems Corporation, Saddle Brook, N.J.**

**Continuation of Ser. No. 295,819, Oct. 10, 1972, abandoned.**
**This application Feb. 24, 1975, Ser. No. 552,725**
**Int. Cl.² F16N** *11/04*
**U.S. Cl. 184—45 R** **3 Claims**



1. A lubricant metering assembly for supplying a substantially constant flow of lubricant to an apparatus to be lubricated which comprises:

a housing including a base member, an outer wall element about said base member and an inner wall member extending downwardly from said base member, said base member being provided with a substantially flat top wall and including thread means, said inner wall member having a lubricant supply passageway formed therethrough with an upper portion thereof of reduced cross-sectional area thereby forming a guide means, said top wall of said base member of said housing being provided with an upwardly extending cylindrically shaped section forming a channel with said outer wall to receive a sealing ring; said top wall being provided with a concentric rib within said channel;

a cylindrical lubricant container comprised of an end wall and side wall positioned within and mounted to said housing, said container having at least one orifice about said end wall, said end wall being provided with a downwardly extending positioning means, said side wall being provided with thread means and a downwardly extending rib formed on lower terminal portion thereof;

a sealing ring compressively disposed in said channel of said base member between said base member and terminal portion of said end wall of said container;

a piston including a downwardly extending stem, said piston being provided with peripheral seal means for contacting the interior surface of the side wall of said container and an upwardly extending positioning means, said stem being cylindrically-shaped and in contacting relationship with said guide means with a spacing of less than 0.010 inches, said stem being provided with at least one exterior channel of increasing cross-sectional area as measured upwardly from the lower terminal portion of said stem, said piston being formed with a substantially flat bottom wall which cooperates with said flat top wall of said base member thereby minimizing the amount of lubricant remaining in said assembly upon completion of travel of said piston with the travel distance of said piston being greater than 35 percent of the overall height of the assembly; and

a coil spring disposed between and about the positioning means of said container means and said positioning means of said piston, said spring having decreasing com-

pressional force compensated by a passageway of increasing cross-sectional area formed by said channel and said guide means to permit substantially constant flow of lubricant.

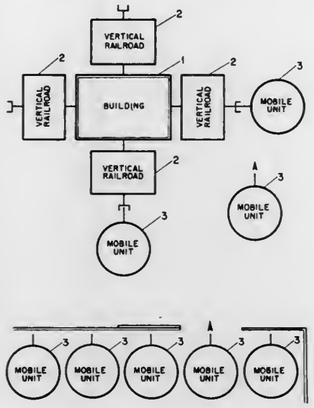
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**4,018,306**

## EMERGENCY BUILDING ACCESS APPARATUS

**Merlyn E. Lyons, 44-022 Aina Moi Place, Kaneohe, Hawaii 96744**

**Continuation-in-part of Ser. No. 469,622, May 13, 1974, abandoned. This application Mar. 3, 1975, Ser. No. 554,462**
**Int. Cl.² B66B** *9/00*
**U.S. Cl. 187—6** **15 Claims**




7. An emergency building access apparatus for evacuating the occupants of the building and to provide access for firemen, which apparatus is self-powered by a portable power plant but dependent structurally upon the building comprising:

a. a vertical railroad comprising:
   1. a vertical rail assembly;
   2. a supporting means attaching the vertical rail assembly to the building in a generally vertical position;
   3. emergency access openings providing access between the building interior and railroad;

b. a mobile unit operatively connected to the vertical railroad comprising:
   1. a railcar for carrying people;
   2. a means to slidably engage the railcar with the vertical railroad for vertical motion thereon;
   3. a power source;
   4. a control means in the railcar to cause the railcar to rise, lower, and stop on the vertical railroad;
   5. a coupling means to join the mobile unit to the vertical railroad; and

c. a railcar position control means comprising:
   1. a mechanically driven hoist;
   2. supporting means attaching the hoist to the building for an operative relationship with the vertical rail assembly;
   3. a hoist rope depending from the hoist and operatively connected thereto;
   4. a means to operatively connect the railcar to the hoist rope so that operation of the hoist will raise, lower, or stop the railcar on the vertical railroad;
   5. a mechanical power inlet fitting operatively connected to the hoist;
   6. a means to operatively connect the power source to the mechanical power inlet fitting for operation of the hoist by the power source;
   7. an electrical hoist control means operatively connected to the mechanically driven hoist for causing the hoist to start, stop, and reverse; and
   8. a means to operatively connect the control means in the railcar with the hoist control means.

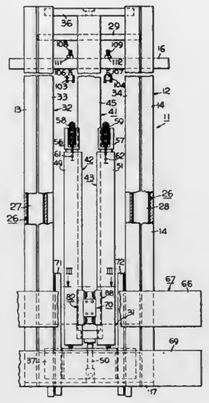
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**4,018,307**

## MECHANICAL AND HYDRAULIC INTERCONNECTION FOR CLUSTERED HYDRAULIC CYLINDERS

**Benonie C. Ehrhardt, Park Forest; Dean A. Matthews, Homewood, and Walter A. Pivarunas, Calumet Park, all of Ill., assignors to Allis-Chalmers Corporation, Milwaukee, Wis.**

**Filed Nov. 10, 1975, Ser. No. 630,660**
**Int. Cl.² B66F** *9/22*
**U.S. Cl. 187—9 E** **6 Claims**



1. In combination a cluster of three hydraulic cylinders associated with the load carriage elevating and mast structure elevating functions of a fork lift truck, including a centrally disposed hydraulic cylinder and a pair of oppositely disposed hydraulic cylinders symmetrically positioned contiguous said centrally disposed hydraulic cylinder, a separate attachment block rigidly secured to the outer surface of each of the respective hydraulic cylinders, a hydraulic passage in each attachment block communicating with a hydraulic passage through the wall of its corresponding hydraulic cylinder, an interconnecting block adapted to interface with each of the three attachment blocks, said interconnecting block including hydraulic manifolding means whereby to hydraulically interconnect said hydraulic cylinders through said interconnecting block when said interconnecting block is in interfaced relation with the attachment blocks of said three hydraulic cylinders, and detachable fastening means securing said interconnecting block to the attachment blocks of said three hydraulic cylinders whereby to detachably connect each of the three cylinders of said cluster to said interconnecting block.

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**4,018,308**

## ELEVATING BY SHAPE MEMORY INDUCTION

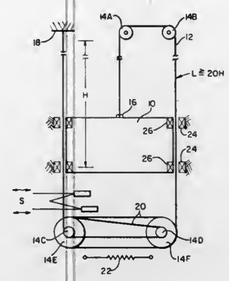
**Neil E. Rogen, 3 Beaver Dam Road, Upper Saddle River, N.J. 07458**

**Filed Oct. 23, 1975, Ser. No. 625,322**
**Int. Cl.² B66B** *11/04*
**U.S. Cl. 187—17** **3 Claims**

1. Elevating apparatus comprising,
means defining an elevator load member for cyclically travelling a limited vertical path,
means defining a shape memory cable carrying and suspending said elevator load and comprising cabled wires of an alloy comprising at least one metal selected from the group consisting of nickel, iron and cobalt and further comprising titanium,



the weight of the elevator load being sufficient to elongate said cable at a first relatively cold temperature,



and specific means for electrically heating said cable to reverse said elongation by induction of shape memory contraction,
to provide lowering and raising portions of elevating cycles.

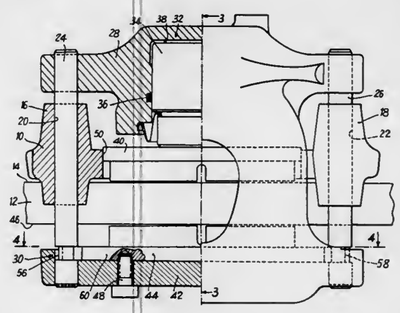
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**4,018,309**

## DISC BRAKE AND LOCKING MEANS THEREFOR

**Jean-Claude Mery, Pavillons sous Bois, France, assignor to Societe Anonyme D.B.A., Clichy, France**

**Filed Oct. 10, 1975, Ser. No. 621,439**
**Claims priority, application France, Oct. 30, 1974, 74.36265**
**Int. Cl.² F16D** *55/18*
**U.S. Cl. 188—72.4** **5 Claims**



1. A disc brake comprising:
a disc having two friction faces;
a torque taking member disposed adjacent the disc;
a caliper slidably mounted by way of at least one column on said torque taking member;
actuating means cooperating with the caliper to urge a first friction element into engagement with one face of the disc and a second friction element, by reaction, into engagement with the other face of the disc;
locking means axially fixing said caliper relative to the one column;
said locking means comprising a portion of the second friction element in engagement with a portion of the one column to axially secure the caliper to the one column.

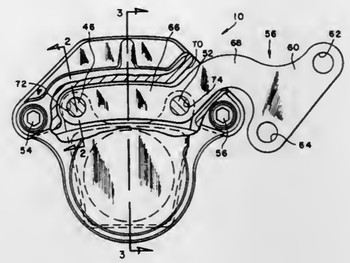
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**4,018,310**

## DISC BRAKE

**Irving R. Ritsema, and James J. Colpaert, both of South Bend, Ind., assignors to The Bendix Corporation, South Bend, Ind.**

**Filed Mar. 15, 1976, Ser. No. 666,835**
**Int. Cl.² F16D** *55/224;* **B62L** *1/00*
**U.S. Cl. 188—73.3** **6 Claims**



1. In a disc brake for a vehicle:
a rotor mounted for rotation with a member to be braked and having a pair of opposed friction faces;
a pair of friction elements carried adjacent said friction faces and adapted to frictionally engage said opposed friction faces when a brake application is effected;
a torque member secured to a non-rotative portion of the vehicle;
a pair of pins carried by said torque member and restrained against relative movement with respect thereto, said pins being circumferentially spaced and extending axially with respect to said rotor, said friction elements being slidably mounted on said pins;
a caliper carried by said torque member, said caliper having a pair of inwardly extending portions disposed adjacent said friction elements for urging the latter into braking engagement with their corresponding friction faces, said caliper further including a bridge portion traversing the periphery of said rotor and interconnecting said inwardly extending portions, and fluid motor means carried by the caliper for effecting a brake application;
each of said inwardly extending portions defining corresponding bores therein located radially outwardly of said periphery of the rotor, the bores in one of said inwardly extending portions registering with corresponding bores in the other portion, said registering bores receiving opposite ends of said pins;
said caliper including at least two separate pieces; and
means for holding said caliper together;
said means for holding said caliper together being separate from said pin means.

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**4,018,311**

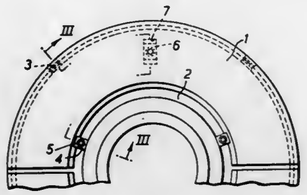
## ROTOR AND BRAKING RING DISC ASSEMBLY

**Colin John Frederick Tickle, Birmingham, England, assignor to Girling Limited, Birmingham, England**

**Filed Nov. 13, 1975, Ser. No. 631,638**
**Claims priority, application United Kingdom, Dec. 20, 1974, 55217/74**
**Int. Cl.² F16D** *65/12*
**U.S. Cl. 188—218 XL** **11 Claims**

1. A railway disc brake assembly comprising a rotor, a braking ring comprising a plurality of arcuate segments, and means attaching said ring to said rotor in a manner permitting thermal expansion and contradiction of said ring relative to said rotor, said attaching means including anchor means for preventing circumferential movement of said ring relative to said rotor and first and second pairs of circumferentially spaced abutment means on said rotor for each of said segments engaging each of said segments only at first and second pairs of circumferentially spaced locations so as to prevent

radially outward and inward movement of each of said segments relative to said rotor at said locations, the first and second circumferentially spaced locations being selected so that said abutment means engage each of said segments at those circumferentially spaced positions thereof having substantially no movement relative to said rotor when said segement undergoes thermal expansion or contraction relative to said rotor whereby there is substantially no movement by said segment into or out of engagement with said abutment means when said segment undergoes said thermal expansion or contraction.



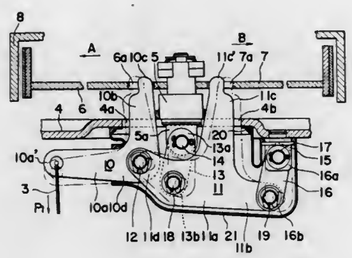
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**4,018,312**

## DUO-SERVO PARKING BRAKE

**Ikuo Muramoto, and Hideki Kita, both of Hiroshima, Japan, assignors to Toyo Kogyo Co., Ltd., Japan**

**Filed Dec. 30, 1975, Ser. No. 645,474**
**Int. Cl.² F16D** *51/22*
**U.S. Cl. 188—333** **5 Claims**



**1.** A duo-servo parking brake system for an automotive wheeled vehicle, said system comprising:

a rigid brake support means;

a drum rotatably mounted adjacent said support means and having coaxially positioned therearound a wheel unit;

first and second brake shoes movably supported by said support means within said drum and normally urged to inoperative positions out of contact with said drum, said first and second shoes being connected to each other at first adjacent ends thereof, each said shoe having an opening therethrough;

an anchor pin fixedly mounted on said support means at a position between second adjacent ends of said first and second shoes;

a link assembly comprising:

a. a primary lever having first and second end portions, said first end portion extending through said opening in said first shoe;

b. a secondary lever having a base portion rotatably connected to said primary lever and a leg portion having a first end portion extending through said opening in said second shoe and a second end portion fixed to said base portion; and

c. first and second link lever means, each having a first end rotatably connected to said support means and a second end rotatably connected to said base portion of said secondary lever, said first and second link lever means being spaced in the longitudinal direction of said base portion, for supporting and guiding said secondary lever;

an actuation cable having first and second end portions, said first end portion being connected to said second end portion of said primary lever and extending therefrom in a direction generally parallel to an axis of rotation of said drum; and

brake actuation means, connected to said second end portion of said actuation cable, for applying a pulling force on said actuation cable and transmitting said force to said link assembly and for causing said first end portion of said primary lever and said first end portion of said leg portion of said secondary lever to move said first and second shoes, respectively, into operative positions thereof in contact with said drum.

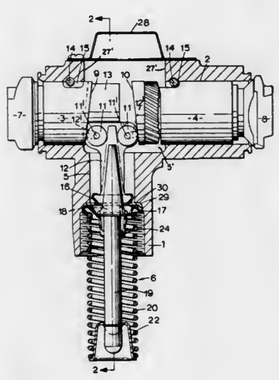
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**4,018,313**

## VEHICLE BRAKE WEDGE ACTUATOR ASSEMBLIES

**John Hart, Solihull, and Clifford John Pride, Lapworth, both of England, assignors to Girling Limited, Birmingham, England**

**Filed June 18, 1975, Ser. No. 587,841**
**Claims priority, application United Kingdom, June 18, 1974, 26852/74**
**Int. Cl.² F16D** *51/62*
**U.S. Cl. 188—343** **8 Claims**



**4.** An actuator assembly for a vehicle brake comprising a housing, a wedge member linearly movable in the housing and formed with wedge surfaces, two follower members displaceable in the housing in opposite directions in response to movement of said wedge member for applying friction means into braking engagement with a rotor, said follower members being formed with surfaces inclined to each other and arranged one on each side of said wedge member, at least one roller interposed between each of said inclined surfaces and a respective one of said wedge surfaces, and a cage in which said rollers are retained as a cage assembly not captive to said wedge member, wherein said housing is provided with means defining an asymmetrical aperture through which said wedge member is inserted during assembly of the wedge member into the actuator housing, said wedge member having a larger end of which the transverse cross-sectional shape is complementary to that of said aperture, whereby insertion of said wedge member into the housing is prevented by baulking between said means and said wedge member when said wedge member is angularly misorientated about its axis of linear movement.

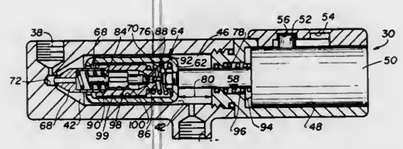


**4,018,314**

## ANTI-THEFT VEHICLE BRAKE-SUPERVISING DEVICE

**Raymond Richmond, 249-20 Thornhill Ave., Little Neck, N.Y. 11362; Edward Parmer, 118 N. Waldinger St., Valley Stream, N.Y. 11580, and Edward G. Parmer, Jr., 167 Caroline Ave., Garden City, N.Y. 11530**

**Filed June 30, 1976, Ser. No. 701,094**
**Int. Cl.² B60R** *25/08*
**U.S. Cl. 188—353** **6 Claims**



**1.** In an anti-theft vehicle brake-supervising device of the type which selectively prevents reverse flow of fluid from at least one vehicle wheel cylinder back to the vehicle master cylinder to thereby maintain the braking function of said fluid within said wheel cylinder, the improvement comprising means defining a flow chamber having opposite distal and proximal ends, a first and a second fluid connection respectively connected from said flow chamber distal end to said vehicle master cylinder and from said flow chamber proximal end to said wheel cylinder to normally allow opposite direction fluid flow between said master cylinder and wheel cylinder through said flow chamber, means defining a main valve opening including a seat in said flow chamber distal end for selectively interrupted to prevent flow between said first and second fluid connections incident to the closing of said valve opening, a valve support member operatively arranged to be manually urged through movement in said flow chamber between opposing operative positions respectively adjacent said distal and said proximal ends of said flow chamber, said valve support member being of a prescribed smaller diameter than said flow chamber so as to define an encircling annular fluid passage for allowing fluid flow through said flow chamber, a first valve and a cooperating biasing spring operatively disposed in said valve support member so that movement of said member from said flow chamber proximal end to said flow chamber distal end correspondingly urges said first valve through closing movement upon said valve seat and only allows directional flow of fluid from said master cylinder fluid connection to said wheel cylinder fluid connection to the extent of opening movement permitted in said first valve relative to said valve opening by said biasing spring, means in said first valve defining an internal flow passage having a pressure release valve opening, a second valve normally closing said pressure release valve opening, and valve-unseating means on said valve support member effective to unseat said second valve incident to further movement of said member towards said flow chamber distal end so as to release pressure fluid from said flow chamber proximal end through said second valve and into said master cylinder through said first fluid connection thereof, whereby the aforesaid release of pressure fluid facilitates the manual urging of said valve support member through movement back to said flow chamber proximal end and the corresponding opening of said main valve for normal use of said fluid for braking service for said vehicle.

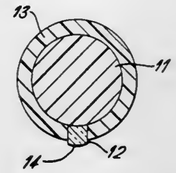
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**4,018,315**

## INSULATED RUNNER FOR USE IN OVERHEAD ELECTRIC TRACTION SYSTEMS

**Stanley Harold Russell Proud, Marlow, England, assignor to BICC Limited, London, England**

**Filed Dec. 30, 1975, Ser. No. 645,332**
**Claims priority, application United Kingdom, Dec. 31, 1974, 56248/74**
**Int. Cl.² B60M** *1/18, 5/00*
**U.S. Cl. 191—39** **16 Claims**



**1.** An insulated runner for use in an overhead electric traction system comprising at least one elongate reinforcing body of high tensile modulus and high tensile strength made at least substantially of insulating material and provided with metal terminal fittings, and at least one body of abrasion-resistant ceramic or vitreous material which is associated with, and extends lengthwise between the terminal fittings of, the reinforcing body and which provides an effective running surface, the outermost surface of the insulated runner between its terminal fittings being of an insulating material that is resistant to tracking.

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**4,018,316**

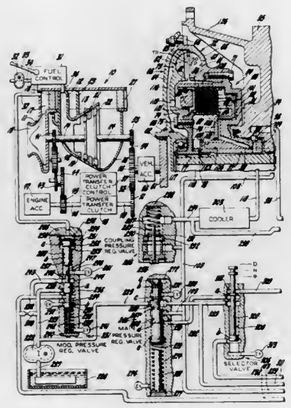
## ENGINE AND TRANSMISSION POWER TRAIN

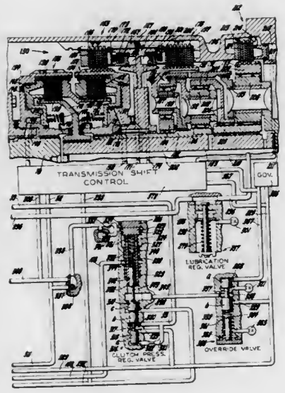
**Ted M. McQuinn, Carmel, and Richard B. Anderson, Indianapolis, both of Ind., assignors to General Motors Corporation, Detroit, Mich.**

**Filed Mar. 7, 1974, Ser. No. 448,991**
**Int. Cl.² F16H** *39/00, 47/08*
**U.S. Cl. 192—3.3** **13 Claims**

**1.** In a transmission an input member adapted to be driven by an engine and having net input torque from a high idle speed low idle input torque, through a low idle speed high idle input torque to a maximum high input torque in a starting high input torque low input torque low input speed range and then reduced input torque in a large drive input speed range to maximum input speed; an intermediate member; a load output member driven from zero speed through a small starting output speed range from zero to a low output speed and a large drive output speed range from said low speed to maximum drive output speed and having load torque requirements from zero to maximum; a low capacity fluid drive means and a variable capacity slipping friction starting clutch means connected in parallel between said input member and said intermediate member; drive connecting means connected between said intermediate member and said load output member and having control means operative to selectively disestablish a drive between said intermediate member and said load member for said zero load torque requirements and establish a starting drive from said intermediate member to said load output member operative when said load output member is stationary to stall said fluid drive means; said fluid drive means having a low idle speed high idle torque capacity at zero speed ratio stall increasing at a greater rate with input member spaced than input member idle torque to reduce input member idle speed from said high idle speed and regulate said input member speed at said low idle speed and at normal drive torque high speed ratio drive substantially zero torque capacity in said starting high torque low input speed range and maximum torque capacity about equal to said low idle speed high torque capacity at maximum input speed; and said clutch means including clutch control means operative in response to

manual control, when said drive connecting means establishes said starting drive and stalls said fluid drive means, for providing a progressively variable torque capacity from substantially zero torque to lock-up torque equal to the load output member torque requirements beginning substantially to stall at said low idle speed and completed in said starting high torque low input speed range of said input member and said small starting speed range of said load output member up to maximum





clutch torque capacity about equal to said maximum high input torque and simultaneously progressively increasing fluid drive speed ratio from zero speed ratio stall to said high speed ratio drive and progressively reducing torque capacity from substantially said high idle torque capacity to zero torque capacity before lock-up for a starting drive of said load member from stall to a lock-up speed in said small starting speed range of said load output member and in said starting high torque low input speed range of said input member.

**4,018,317**

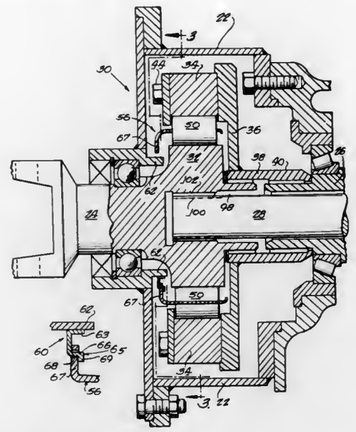
## SPIN PROOF TANDEM AXLE DRIVE MECHANISM

**Robert William Lemon, Farmington, Mich., assignor to Borg-Warner Corporation, Chicago, Ill.**

**Filed Aug. 7, 1975, Ser. No. 602,951**

**Int. Cl.² F16D *13/04***

**U.S. Cl. 192—36** **13 Claims**



**1.** A torque transfer mechanism including an one-way device, said mechanism having an input shaft and a pair of concentric output shafts, said input shaft extending from one side of said device and said output shafts extending from the other side of said device, said output shafts connected to a pair of tandem parallel driving axles for a vehicle, said one-way device including a drive race connected to the input shaft and to one of said output shafts, a driven race connected to the other output shaft, a plurality of wedging elements mounted between said races, whereby torque is normally transmitted to said one output shaft, and said one-way device being responsive to relative rotation between said output shafts to provide for drive to said other output shaft when said one output shaft is rotating faster than said other output shaft.

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**4,018,318**

## WEDGING FREE-WHEEL CLUTCH

**Karl J. Hallerberg, Plankstadt, Germany, assignor to Borg-Warner, GmbH, Heidelberg, Germany**

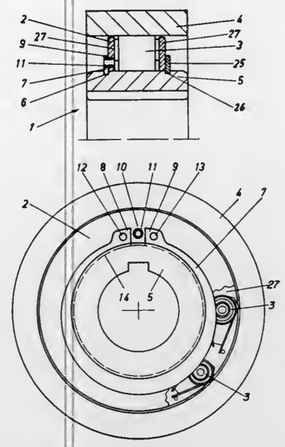
**Filed Dec. 9, 1974, Ser. No. 530,634**

**Claims priority, application Germany, Dec. 13, 1973, 2361916**

**Int. Cl.² F16D *41/07***

**U.S. Cl. 192—41 A** **7 Claims**

**1.** A free-wheel clutch having centrifugally disengageable wedging members in which the cage is frictionally connected with the overrunning race, characterized in that the cage has a positively engageable interlocking connection with at least one retaining ring resiliently gripping the base of a ring groove



in the overrunning race providing frictional connection between said cage and said overrunning race.

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**4,018,319**

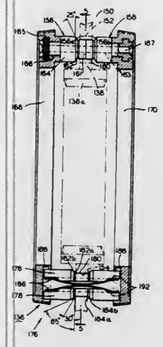
## SYNCHRONIZER ASSEMBLY

**Robert L. Thomas, Jackson, Mich., assignor to Clark Equipment Company, Buchanan, Mich.**

**Filed Jan. 28, 1976, Ser. No. 653,058**

**Int. Cl.² F16D *23/06***

**U.S. Cl. 192—53 E** **18 Claims**



**1.** For use in a transmission having a shaft and two axially spaced gears rotatably mounted about the axis of the shaft and with the gears having jaw clutch teeth and friction clutch elements at the facing sides thereof, the combination of a clutch and synchronizer assembly for selectively coupling either of the two gears to the shaft including, a clutch collar member axially slidable on the shaft and mounted for rotation therewith between the gears, said clutch collar member having jaw clutch teeth adapted to cooperate with the jaw clutch teeth on the gears, said collar member having openings formed therethrough parallel to the shaft, axially movable friction clutch members adapted to cooperate with the friction clutch elements on the gears, means rigidly interconnecting said axially movable friction clutch members, said means being adapted to block axial movement of said clutch collar member relative to said axially movable friction clutch members when the latter and said clutch collar members are rotating asynchronously, longitudinally split pin assemblies disposed through the openings in said clutch collar member, said axially movable friction clutch members having recesses formed therein for freely receiving the ends of said split pin assemblies, and resilient means between the portions of said split pin assemblies for spring loading the latter upon initial axial movement of said clutch member relative to said axially movable friction clutch members for effecting snap engagement of the jaw clutch teeth of the clutch collar member with the jaw clutch teeth of the adjacent gear, wherein the improvement comprises:

a. each of said split pin assemblies including a centrally located annular groove slightly wider than said flange, said groove having opposed dual inner and outer ramps;

b. each of said recesses for receiving said split pin assemblies being loop-shaped; and

c. said resilient means further including means for inhibiting said split pin assemblies from twisting and rotating in said loop-shaped recesses.

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**4,018,320**

## CLUTCH DISK FOR MOTOR VEHICLE MAIN CLUTCHES

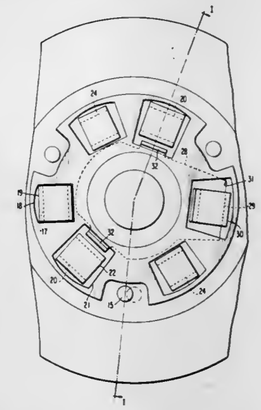
**Peter Schrape, Stuttgart, and Günter Wörner, Rommelshausen, both of Germany, assignors to Daimler-Benz Aktiengesellschaft, Germany**

**Filed Sept. 25, 1974, Ser. No. 509,134**

**Claims priority, application Germany, Oct. 6, 1973, 2350279**

**Int. Cl.² F16D *69/00, 3/14***

**U.S. Cl. 192—106.2** **13 Claims**

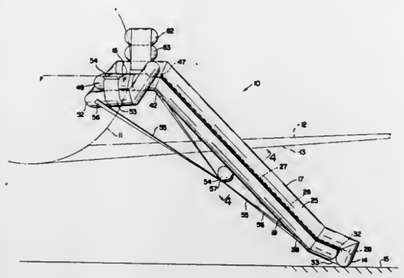


**1.** In a clutch disk arrangement for motor vehicle main clutches which includes a hub means, friction lining means, a disk means for carrying said friction lining means, means for torsionally elastically connecting said disk means with said hub means including a plurality of spring means having different spring characteristics for producing a multi-stage operation of the clutch disk arrangement, a plurality of window means for respectively accommodating said spring means, separate damping means for damping said plurality of spring means, and control means for controlling the start of operation of at least one damping means, the improvement comprising: said control means including a means for engaging a window means accommodating the spring means for producing a second stage of the multi-stage operation, a separate control spring coordinated to the control means, said separate control spring being mounted in said control means and being prestressed to a predetermined spring force in excess of the force necessary to maintain said control spring in said control means such that the point at which said control means is fully effective is determined exclusively by an equilibrium of the force of the control spring and a friction force effective within an operating stage of the clutch disk arrangement during which said control means is effective.

## 4,018,321
## ESCAPE SLIDE AND PLATFORM ASSEMBLY

John Melvin Fisher, Cuyahoga Falls, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

Filed May 21, 1976, Ser. No. 688,748
Int. Cl.² B65G *11/10*; A62B *1/20*
U.S. Cl. 193—25 B 11 Claims

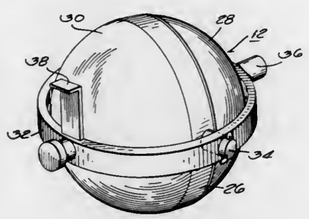


1. An escape slide and platform assembly adapted to be inflated and extend from a supporting structure at an elevated position to a lower surface comprising a generally horizontal platform, an escape slide inclined downwardly from said platform and extending to said lower surface, and an elongated platform supporting tension members means connected at one end to said platform at a first position spaced from said slide and connected at the other end to said slide at a second position spaced from said platform to sustain said platform in said generally horizontal position under the weight of persons using the assembly.

## 4,018,322
## GIMBALED CONVEYOR BALLS

Elwood B. Brown, Cedarburg, and Helmut H. Kropp, Pewaukee, both of Wis., assignors to Rexnord Inc., Milwaukee, Wis.

Filed June 11, 1976, Ser. No. 695,280
Int. Cl.² B65G *39/02*
U.S. Cl. 193—37 8 Claims

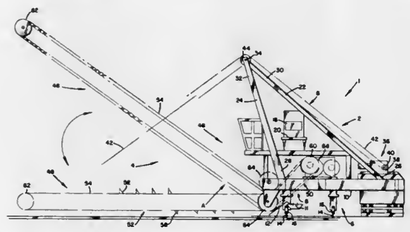


1. Apparatus for the omni-directional movement of objects over the surface of the apparatus comprising
   a. a frame;
   b. a plurality of substantially parallel, spaced support members secured to said frame; and
   c. a plurality of conveyor elements mounted between said support members and providing a support surface for objects being moved over the apparatus, each of said elements comprising
      i. first means rotatably mounted to adjacent support members along a first axis substantially perpendicular to the parallel length of the support members,
      ii. a hub member rotatably mounted to said element along a second axis lying in approximately the same plane as the first axis,
      iii. a plurality of lobes each rotatably mounted to said hub for rotation about a third axis all perpendicular to said second axis, and
      iv. second means associated with each first means for restricting rotation of said first means to a predetermined degree of rotation above and below a plane defined by the first axis of said plurality of conveyor elements.

## 4,018,323
## BACKSTACKING APPARATUS

Edward D. Schultz, 2306 Cherry Ridge Lane, Brandon, Fla. 33511

Filed June 19, 1975, Ser. No. 588,423
Int. Cl.² B65G *65/28*
U.S. Cl. 198—508 9 Claims



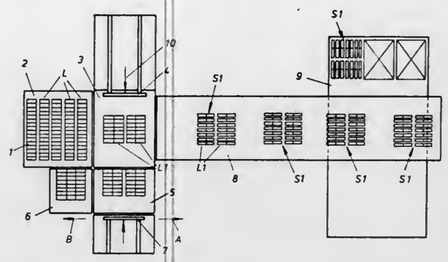
1. A backstacking apparatus for stacking and reclaiming bulk particulate material comprising a particulate handling means operatively supported above a supporting surface by a movable positioning means, said particulate means comprising boom means including a first boom member configured to operatively support a rake means and rake drive means, said rake drive means coupled to said rake means to selectively move said rake means in a first or second direction relative to said first boom member, said rake means comprising a pair of substantially parallel spaced apart endless chain means including at least one blade element disposed between said pair of endless chain means, said rake drive means comprising at least one pair of sprocket means rotatably mounted on said first boom member, said endless chain means engaging said sprocket pair to drive said endless chains, said base means further including feed hopper means to supply particulate material to said backstacking apparatus, said feed hopper including a control means having a first and second position, said control means directing the particulate material to said storage zone when in said first position and to said loading zone when in said second position, said base means comprising a platform including a substantially horizontal element having a loading gate movable between first and second positions formed therein and a first inclined element extending outwardly therefrom to the stacking zone such that said rake means when operatively driven in the first direction moves particulate material outwardly from said base for stacking in a stacking zone and when said rake means is driven in said second direction the particulate material is drawn inwardly to said base to move said particulate material from the stacking zone through said loading gate when in said second position to a loading zone.

## 4,018,324
## PROCESS AND APPARATUS FOR ARRANGING BRICKS IN SETTING LAYERS OF RECTANGULAR CONFIGURATION

Hermann Kamphues, Laggenbeck, Germany, assignor to C. Keller & Co., Laggenbeck, Germany

Filed Aug. 26, 1975, Ser. No. 607,935
Int. Cl.² B65G *47/26*
U.S. Cl. 198—347 3 Claims

1. In apparatus for arranging unfired bricks in setting layers of rectangular configuration suitable for crosswise stacking of one layer above another and including a delivery conveyor for carrying transverse rows of bricks, and a grouping device adapted to receive the brick rows from said delivery conveyor, arrange the bricks into compact layers and spread the bricks in predetermined spacing to create setting layers, the improvement comprising two table surfaces adapted for selective alternate movement into a brick transfer position adjacent said grouping device for receiving excess bricks from the brick rows on said grouping device and storing said bricks until their aggregate number reaches that required for a compact layer, pusher means for selectively moving the excess bricks from said grouping device to the one of said table surfaces which is in the transfer position, and pusher means for selective transferring the stored bricks from the one of said table surfaces which is in the transfer position to said grouping device, said storage table surfaces permitting excess bricks to remain on either one of said table surfaces while the other of said table surfaces is in the brick transfer position.

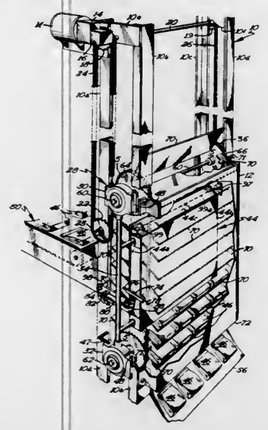




## 4,018,325
## AUTOMATIC PACKAGE ACCUMULATOR

Jack J. Rejsa, Golden Valley, Minn., assignor to The Pillsbury Company, Minneapolis, Minn.

Filed Oct. 9, 1975, Ser. No. 621,189
Int. Cl.² B65G *43/08*
U.S. Cl. 198—347 6 Claims

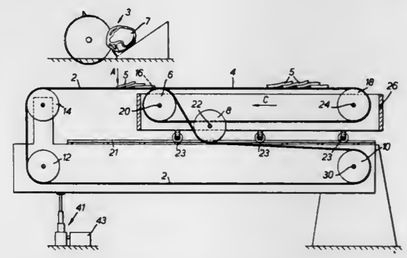


1. An article accumulator for temporarily storing articles being packaged comprising a supporting framework, two vertical stacks of uniformly spaced apart temporary storage shelves, comprising an incoming stack of shelves and an outgoing stack of shelves, in-feed means operatively associated with the incoming stack to guide the articles coming into the apparatus onto the incoming stack, means operatively associated between the stacks for transferring articles from the incoming stack to the outgoing stack and means operatively associated with the outgoing stack to transfer the first article placed in the outgoing stack out of the apparatus upon a demand signal, the incoming shelves are inclined at an oblique angle with respect to the vertical, temporary stop means is operatively associated with the lower side thereof to prevent the articles from passing off the shelves and a means is provided for establishing relative vertical motion between the temporary stop and the incoming shelves to cause a shelf upon a demand signal to be located above the upper edge of the temporary stop whereby the articles in the incoming stack slide under the influence of gravity to the outgoing stack of shelves.

## 4,018,326
## VARIABLE LENGTH RECIPROCATING CONVEYOR SYSTEM FOR SPACING ARTICLES

Peter D. Hardy, Welwyn Garden City, England, assignor to The Metal Box Company Limited, Reading, England

Filed Oct. 1, 1975, Ser. No. 618,335
Claims priority, application United Kingdom, Oct. 2, 1974, 42712/74
Int. Cl.² B65G *117/26*
U.S. Cl. 198—461 8 Claims



1. A conveyor handling system comprising
   a first endless belt defining a variable length wherein the upstream run is of variable length,
   a first pair of rollers supporting the first belt and respectively located at the upstream and downstream ends of the upstream run,
   a second endless belt defining a fixed length and the downstream run is of fixed length,
   a second pair of rollers supporting the second belt and respectively located at the upstream and downstream ends of the downstream run, with the said downstream run being serially arranged downstream of the upstream run defined by the first belt, whereby the two said runs define a predetermined path,
   means supporting the downstream roller of the upstream run and the upstream roller of the downstream run for rotation about a common axis, and
   means for displacing the supporting means along a line parallel to said predetermined path.

## 4,018,327
## HANGER CONVEYING SYSTEM

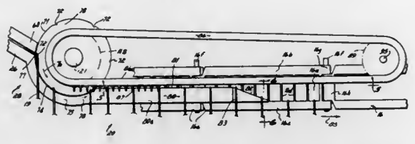
Walter P. Goodman, New Albany, Ind., and Laddie A. DePas, Louisville, Ky., assignors to W. M. Cissell Manufacturing Company, Louisville, Ky.

Filed Feb. 18, 1976, Ser. No. 659,161
Int. Cl.² B65G *47/08*
U.S. Cl. 198—723 11 Claims

1. Apparatus for feeding hangers with a hook formed of wire having a predetermined diameter comprising:
   an elongated stationary slick rail having an input section, an output section, and a concave arcuate section with a specified radius of curvature located intermediate said input and output sections, said input, output and arcuate

sections being stationary and free of hook-impeding obstructions and positioned to permit a hanger hook to be continuously supported thereby and smoothly slide sequentially therealong,

a circular disc having a peripheral edge with notches therein circumferentially spaced at predetermined distances and having a radius substantially equal to said specified radius of said arcuate slick rail section, said disc having an axis of rotation and being rotationally mounted with its peripheral edge overlying and spaced from said arcuate slick rail section a distance less than said hook wire diameter, and



a first drive connected to said disc for rotating it about said axis at a given angular velocity to move said notched disc relative to said arcuate slick rail section for positively slidably transferring hangers engaged in said notches while continuously supported by said slick rail sections from said input slick rail section to said output slick rail section via said arcuate section with a spacing therebetween correlated to said distance between notches and at a transfer velocity correlated to said angular velocity of said disc.

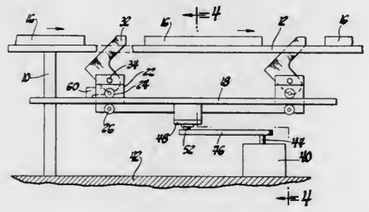
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**4,018,328**

**MEANS FOR PRODUCING A DUAL ACCELERATION-DECELERATION MOVEMENT FOR A TRANSFER SHUTTLE**

**Lawrence A. Galarowic, Dearborn; Glenn B. Waineo, Detroit, and David F. Johnson, Livonia, all of Mich., assignors to Visi-Trol Engineering Company, Detroit, Mich.**

**Filed Oct. 28, 1975, Ser. No. 626,260**
**Int. Cl.² B65G** *25/08*
**U.S. Cl. 198—741** **9 Claims**



1. In a machine for transferring a work piece transfer member along a predetermined path of motion, the combination comprising:

a support;

a dog mounted on the support so as to be movable therealong between a first drive position to a second drive position, the dog being engageable with the work piece transfer member to move it along a portion of the distance between said first drive position and said second drive position;

rotary drive means; and

means for drivingly connecting said rotary drive means with said dog, said connecting means further comprising:

a cam member having a cam slot formed therein; said cam slot having a lineal section and an angled section,

a driving member attached to said rotary drive means and received in said cam slot, whereby as the rotary drive means is rotated at a uniform rate of motion, the dog is accelerated as the driving member moves along the lineal section of the cam slot and then decelerated as the driving member moves along the angled section of the cam slot before it engages the work piece transfer member to move it along said predetermined path of motion.

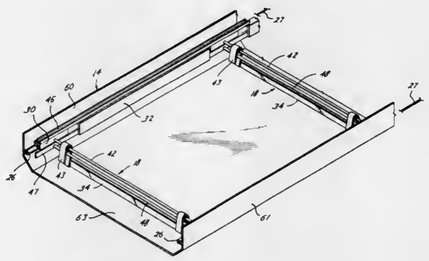
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**4,018,329**

**ABRASIVE RECOVERY SYSTEM**

**James Dean Jarvis, Houston, Tex., assignor to Safety Steel Service, Inc., Victoria, Tex.**

**Filed Feb. 13, 1976, Ser. No. 657,737**
**Int. Cl.² B65G** *25/08*
**U.S. Cl. 198—743** **7 Claims**



1. Apparatus for sweeping particulate matter across a floor comprising

a pair of horizontal parallel, spaced-apart, support members,

a rail mounted on each support member, spaced upwardly from the lower edge of the support member and extending longitudinally thereof,

first and second frames longitudinally movably supported on said rails, each frame including a plurality of rods spanning the space between said rails, said frames having interspaced rail engaging portions allowing relative longitudinal movement of said frames along said rails,

a transverse, horizontally extending sweeping blade removably hanging upon, and unattached to, each of the rods of the first frame, each said blade having a portion engageable by a rod of the second frame upon relative longitudinal movement of said frames, whereby upon continued relative longitudinal movement the blade is pivoted about the rod of the first frame,

drive means operably connected to one of said frames adapted to cause said one frame to move longitudinally of said rails, and

cooperable engagement means on said frames for engagement of said one frame with the other frame, upon longitudinal movement of the said one frame an amount greater than that necessary to pivot the blades, to cause longitudinal movement of said other frame.

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**4,018,330**

**MATCHBOOK WITH SAFETY PANEL**

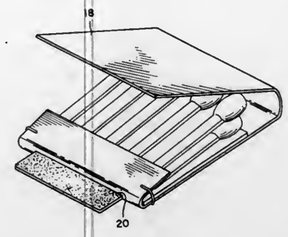
**Mildred M. Jorwa, 71 Lincoln Ave., Fair Lawn, N.J. 07410**

**Filed Aug. 25, 1976, Ser. No. 717,546**
**Int. Cl.² A24F** *27/00*
**U.S. Cl. 206—106** **1 Claim**

1. A matchbook safety system, comprising:

a. a matchbook cover having a narrow transverse opening at or near the area of attachment of the matches to the cover; and

b. a separate safety panel being slidably inserted behind the matches and, further, having a tongue portion upon both sides of which are disposed friction strips, said tongue adapted for press-fittable insertion into and retraction from said narrow transverse opening,



whereby ignition of a match cannot be effectuated except by manual extension of the safety panel.

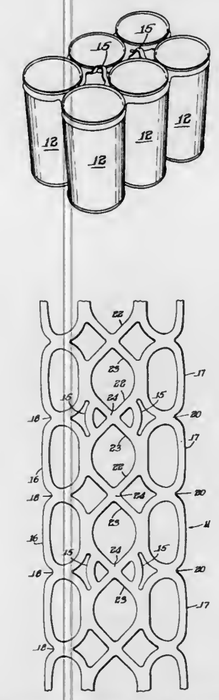
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**4,018,331**

**MULTIPACKAGING DEVICES**

**Mindaugas Julius Klygis, Evergreen Park, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.**

**Filed May 29, 1975, Ser. No. 581,591**
**Int. Cl.² B65D** *85/20*
**U.S. Cl. 206—199** **17 Claims**



1. A multipackaging device for machine application to a plurality of containers to form multipackages of said containers, said multipackaging device comprising an elongated strip of resilient, elastic plastic flat sheet material, said strip comprising a first series of integral interconnected flat bands extending longitudinally of said strip along one side thereof, a second series of integral interconnected flat bands extending longitudinally of said strip along the other side thereof, said first and second series of bands being spaced-apart transversely of said strip and the bands of said first series of bands being in transverse alignment with the bands of said second series of bands, each of said bands having an inner peripheral dimension sufficiently less than the outer circumferential dimension of said containers to enable each of said bands to be capable of being stretched and circumferentially applied to one of said containers, a plurality of intersecting and substantially straight-line flat band segments integrally connected between said first and second series of bands longitudinally of said strip with the longitudinal axes of said band segments extending diagonally of the longitudinal axis of said strip to define intermediate bands within said strip and in substantially transverse alignment with transverse pairs of said first and second series of bands, and each of said intermediate bands having an inner peripheral dimension sufficiently less than the outer circumferential dimension of said containers to enable each of said intermediate bands in cooperation with said first and second series of bands to be capable of being stretched and and circumferentially applied to one of said containers upon application of a transverse stretching force to the transversely adjacent bands of said first and second series of bands, whereby a multipackage of containers may be produced upon transversely stretching said first and second series of bands and circumferentially applying the first and second series of bands simultaneously with said intermediate bands to said containers.

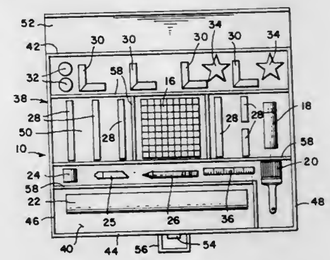
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**4,018,332**

**KIT FOR RENOVATING A PLANAR SURFACE**

**George Benda, Islington, Canada, assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest**

**Filed Aug. 21, 1975, Ser. No. 606,554**
**Int. Cl.² B65D** *69/00*
**U.S. Cl. 206—223** **5 Claims**



1. A kit for renovating a planar surface, which comprises:

a. a knife

b. a roll of plastic material having an adhesive backing and a wood patterned front face, a sheet of said plastic material cut from said roll with said knife, said sheet of said plastic material affixed onto said planar surface by means of said adhesive backing;

c. graph paper; said graph paper removably placed on said front face of said plastic material;

d. at least one pencil, said pencil outlining at least one pattern onto said front face of said plastic material around said graph paper said graph paper being cut by said knife into a plurality of shapes, said graph paper being removed from said front face of said plastic material after formation of said outline of said pattern;

e. a plurality of geometrically shaped members, each said member having an adhesive backing thereon, said geometrically shaped members being affixed onto said front face of said plastic material in a predetermined arrangement within said outlines of said patterns;

f. at least one paint brush;

g. a quantity of paint, said paint applied onto to said geometrically shaped members with said paint brush; and

h. a quantity of finish, said finish applied onto said paint coated on said geometrically shaped members with said paint brush.

4,018,333

## METAL FASTENER STICKS AND PROCESS OF PREPARING SAME BY CURING POLYMERIC BINDER FOR SAID UNDER CONDITIONS OF U.V. IRRADIATION

John C. Blackwood, Melrose, Mass., assignor to Stepan Chemical Company, Northfield, Ill.

Continuation of Ser. No. 579,948, May 22, 1975, abandoned.
This application Sept. 9, 1976, Ser. No. 721,705
Int. Cl.² B05D 3/06; B21G 7/02; B65D 85/54; F16B 15/08
U.S. Cl. 206—343 28 Claims

1. A metal-fastener assembly which comprises a plurality of individual metal fasteners in a closely aligned relationship, the individual fasteners secured together by an adhesive amount of an ultraviolet-radiation, cross-linked polymer, the polymer, prior to irradiation, comprising a polymer composition of an acrylated unsaturated polymer, a multifunctional acrylate monomer and an ultraviolet-photo initiator.

7. A metal staple stick which comprises a plurality of generally inverted, U-shaped, individual, metal staples in a closely aligned relationship in stick form, with a small groove between individual staples, the staples secured together by a thin adhesive amount of a small fillet of an ultraviolet-radiation, cross-linked polymer in the grooves on the exterior top of the metal staples, the polymer, prior to irradiation, comprising a cross-linked, acrylated, unsaturated polymer, a multifunctional acrylate monomer and an ultraviolet-photo initiator.

11. A process of manufacturing a metal-fastener assembly, which assembly comprises a plurality of individual metal fasteners in a closely aligned relationship, which process comprises:

a. applying a coating of an adhesive amount of an ultraviolet-radiation-curing polymer composition onto the metal-fastener assembly, the polymer composition comprising an acrylated unsaturated polymer, a multifunctional acrylate monomer and an ultraviolet-photo initiator; and

b. exposing the applied polymer composition to ultraviolet radiation in an amount to effect the curing of the polymer composition, thereby providing for the securing together of the individual metal fasteners in the fastener assembly.

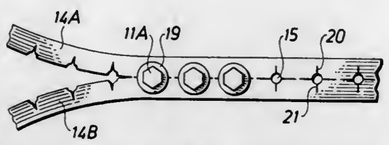
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4,018,334

## FASTENER PACKAGE

Sixten H. Lejdegård, Ramnas, Sweden, assignor to Bulten-Kanthal Aktiebolag, Sweden

Continuation of Ser. No. 446,413, Feb. 27, 1974, abandoned.
This application Mar. 12, 1976, Ser. No. 666,200
Claims priority, application Sweden, Mar. 9, 1973, 7303332
Int. Cl.² B65D 85/24, 73/00, 83/02
U.S. Cl. 206—346 7 Claims




1. A strip of screws for use in a screw applying device, comprising:

a. A nonmetallic flexible carrier tape adapted to be coiled and having a series of holes therein disposed at equal intervals, there being a pair of radial longitudinal slits and a pair of radial transverse slits extending from each hole and defining lips between adjacent slits, said longitudinal slits extending longitudinally into proximity with the longitudinal slits of adjacent holes;

b. a series of metal screws disposed in said holes and each screw having a head disposed against said tape, the shank of each screw having a diameter greater than the diameter of the hole; and

c. said lips being displaced out of the plane of said tape with the distal end of at least one said lip at each hole disposed between adjacent turns of the screwthread in axial locking relationship;

whereby the portion of said strip lying between said adjacent longitudinal slits is fractured as the screw head is driven through the strip.

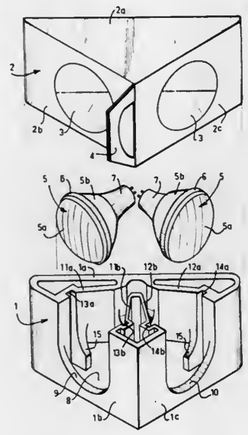
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4,018,335

## DISPLAY PACKAGE

Pascal Marie Henri Jacob, and Gerard Pierre Guichesseux, both of Paris, France, assignors to Societe Anonyme pour l'Equipement Electrique des Venicules S. E. V. Marchal, Issy Les Moulineaux, France

Filed June 21, 1976, Ser. No. 698,024
Claims priority, application France, June 26, 1975, 75.20101
Int. Cl.² B65D 85/42
U.S. Cl. 206—422 20 Claims




1. Display package for storing at least one fragile article comprising a container in the form of a prism having a polygonal bottom, at least one of the sides of the prism being partially hollowed out to define at least one seat open to the outside of the prism through the top thereof, each seat formed in the container having, on each side of the median plane of the seat parallel to the corners of the prism, and behind the outer surface of said at least one side, at least one groove substantially parallel to the corners of the prism.

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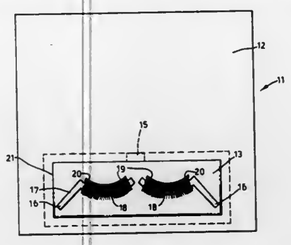
4,018,336

## PACKAGING OF ARTIFICIAL EYELASHES

Eric V. Aylott, Cwmbran, Wales, assignor to Eylure Limited, Cwmbran, Wales

Continuation-in-part of Ser. No. 447,436, March 1, 1974, Pat. No. 3,935,872. This application Nov. 13, 1975, Ser. No. 631,557
Claims priority, application United Kingdom, Aug. 3, 1973, 36971/73; Sept. 26, 1973, 45100/73
The portion of the term of this patent subsequent to Feb. 3, 1993, has been disclaimed.
Int. Cl.² B65D 73/00, 85/54; A45D 40/26
U.S. Cl. 206—460 4 Claims

1. An eyelash presentation pack comprising a pair of eyelash sets each having a plurality of lashes held together by a base strand and said lashes being convex in side view and a supporting surface on which said eyelash sets are releasably adhesively mounted, each said eyelash set being mounted with said convex side in cntact with said supporting surface with said base strand of said eyelash set positioned away from the supporting surface.




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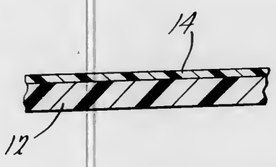


4,018,337

## HEAT SHRINK PACKAGING

Karl F. Barnett, Bloomfield Hills, Mich., assignor to Cadillac Products, Inc., Sterling Heights, Mich.

Continuation of Ser. No. 408,309, Oct. 23, 1973, abandoned.
This application Jan. 13, 1975, Ser. No. 540,697
Int. Cl.² B65D 65/00
U.S. Cl. 206—484 15 Claims




1. A packaged load having an exposed surface thereon formed of a given material, an outer layer of film surrounding said load at least in part and being heat shrunk into relatively intimate engagement therewith said outer layer being formed from a heat-shrinkable material of the same general composition as said given material, and a barrier layer of film material disposed between said exposed surface and said outer layer, said barrier layer being formed from a heat-shrinkable material which will not fuse to said given material when in contact therewith and subjected to film-shrinking temperatures.

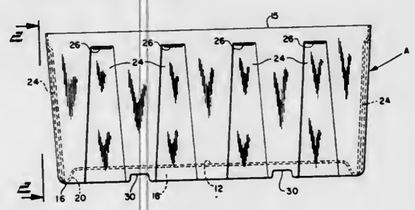
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4,018,338

## BOX AND LID THEREFOR

Jack L. Lemkin, Cincinnati, Ohio, assignor to Midland-Ross Corporation, Cleveland, Ohio

Filed Nov. 3, 1975, Ser. No. 628,391
Int. Cl.² B65D 21/04, 21/02, 55/00, 43/00
U.S. Cl. 206—505 5 Claims




1. A package comprising; a molded box and lid of substantially rigid synthetic plastic material, said box and lid having opposing draft angles, said molded box being nestable with like boxes and including an upwardly extending outwardly inclined box peripheral wall having an upper box peripheral edge substantially coplanar with said box peripheral wall, said molded lid being nestable with like lids and having a downwardly and outwardly extending lid peripheral wall, said lid being positionable on said box with said lid peripheral wall overlapping said upper box peripheral edge outwardly thereof so that the inner surface of said lid peripheral wall and the outer upper surface of said box peripheral wall adjacent said upper box peripheral edge directly face one another in non-parallel relationship at opposed draft angles to define a gap therebetween which increases in width in a direction from said upper box peripheral edge toward the bottom of said box, at least portions of said lid peripheral wall being hinged to define flaps for inward bending movement into close hugging relationship with only the outer upper surface of said box peripheral wall to substantially close said gap when said lid and box are strapped together, said flaps being hinged along molded hinges defined by reduced thickness portions of said lid, said flaps having outer edges of a length slightly less than the length of said flaps along said hinges, and said hinges being molded to normally bias said flaps outwardly of said lid at small angles to the vertical.

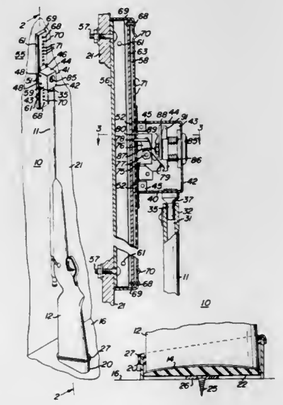
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4,018,339

## ANTI-THEFT GUN PROTECTOR APPARATUS

Peter G. Pritz, c/o Trico non Ferrows Metal Products Inc., Wyandotte Road, Willow Grove, Pa. 19090

Continuation-in-part of Ser. No. 635,642, Nov. 26, 1975, abandoned. This application June 11, 1976, Ser. No. 695,260
Int. Cl.² F05B 73/00; A47F 7/00
U.S. Cl. 211—8 8 Claims



1. Anti-theft gun protector apparatus for use with a rifle or shotgun having a barrel and a fixed stock which comprises

fixedly mounted cup means horizontally disposed to receive said gun stock,

fixedly mounted vertically disposed mounting means comprising a vertical portion having a vertical face and vertical flanges and a mounting plate member secured to said vertical portion and having a front face,

said front face having a plurality of vertically disposed spaced openings,

locking box means vertically slidably carried with respect to said mounting plate member,

said box means including a guide plate member movable along said mounting plate member,

pin means carried by said box means to engage the barrel of the gun,

resiliently urged latch means carried in said box means and having an end portion for selective engagement in one of said vertically spaced openings, and

lock means carried by said box means to control the positioning of said latch means in holding or retracted position.

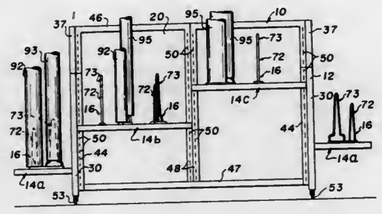
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**4,018,340**

## ADJUSTABLE DISPLAY UNIT

**Joseph Gold, 202-456 W. Broadway, Vancouver, British Columbia, Canada (V5Y 1R3)**

**Filed Nov. 10, 1975, Ser. No. 630,453**
**Claims priority, application Canada, Jan. 14, 1975, 217896**
**Int. Cl.² A47F 7/18**
**U.S. Cl. 211—44** **10 Claims**



1. A display unit for wound rolls of fabric, comprising a support structure, a shelf mounted on said structure, and a plurality of holder units carried by the shelf, each holder unit comprising a base, an elongated holder mounted on and projecting upwardly from the base, said holder being of such dimensions as to fit within a fabric roll and being long enough to support the roll on end in a substantially vertical position, a second holder mounted on the base of at least one holder unit, and a stop formed on said holder to support the lower end of a fabric roll thereon above the lower end of a roll on the adjacent holder.

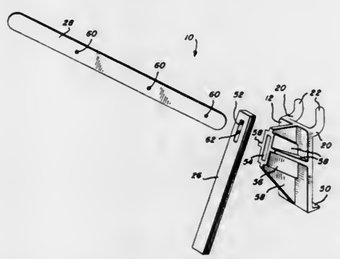
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**4,018,341**

## MERCHANDISE DISPLAY DEVICE

**James J. Jarecki, Greendale, Wis., assignor to E Z Painter Corporation, Milwaukee, Wis.**

**Continuation-in-part of Ser. No. 512,544, Oct. 7, 1974, abandoned. This application May 5, 1975, Ser. No. 574,705**
**Int. Cl.² A47F 7/00**
**U.S. Cl. 211—59.1** **13 Claims**



1. A hanger for securement to a support panel, or the like, for displaying a plurality of articles, said display hanger comprising:

a base including attachment means to secure the base to the support panel;

a generally upwardly canted, elongated hanging arm member secured to the base and protruding outwardly from the support panel for receiving a plurality of articles in stacked relationship therealong; and

a generally downwardly canted positioning arm member movably mounted to the hanging arm member whereby the bottommost of said stacked plurality of articles on said hanging arm is supported in a generally upwardly canted position relative to the support panel with the remainder of the stacked articles so positioned seriatim to facilitate observance and access thereto.

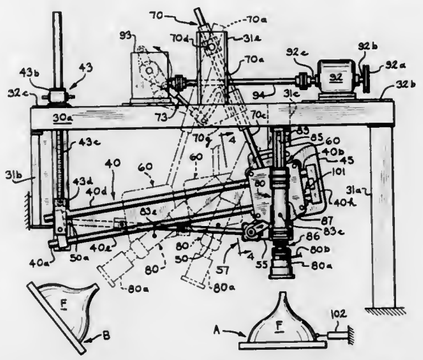
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**4,018,342**

## ARTICLE TRANSFER APPARATUS

**Mario Cuniberti, Columbus, Ohio, and Edwin C. Pinsenschaum, Phoenix, Ariz., assignors to Owens-Illinois, Inc., Toledo, Ohio**

**Filed Feb. 27, 1976, Ser. No. 662,054**
**Int. Cl.² B65G 57/20**
**U.S. Cl. 214—1 BT** **30 Claims**



1. Transfer apparatus for transferring an article from an article loading station at which an article is oriented in one position and depositing the article in a removed article unloading station, said transfer apparatus comprising:

a. transport means having an elongated axially extendable and retractable transport shaft with an article gripping chuck at one axial end for releasably gripping an article at said article loading station and releasing said article at said article unloading station, said transport means also including orientational referencing means providing a horizontally disposed reference axis serving to precisely correlate the orientational positioning of said transport means relative to both said article loading station and said article unloading station;

b. guide means arranged overhead of and stretching between said article loading and article unloading stations for carrying and guiding said transport means along a linear path of travel between interspaced loading and unloading positions located in a common vertical plane intersecting said article loading and article unloading stations, said article loading position being a position for said transport means reference axis correlated to dispose said transport shaft in overhead axially registered alignment with said article loading station, and said article unloading position being a position for said transport means reference axis correlated to dispose said transport shaft in overhead axially registered alignment with said article unloading station,

c. shuttle means carried by said guide means and in turn supporting said transport means for sequential shuttle movements of said transport means along said linear path of travel back and forth between said article loading position and said article unloading position,

d. and control means operative in response to said transport means being in article loading position and in response to an article being at said article loading station for causing said transport shaft to extend and bring said article gripping means into registered article gripping engagement with an article at said article loading station and to thereafter retract said transport shaft with said article chuck carrying said article and shift said shuttle means with said transport means along said linear path of travel from said article loading position to said article unloading position and in response to arrival of said transport means at said article unloading position to terminate the shifting movement of said shuttle means and cause said transport shaft to extend and to cause said article gripping chuck to release and deposit said article at said article unloading station, said control means being further operable to thereafter cause said transport shaft to retract said transport shaft and article gripping chuck and to cause said shuttle means to shift in a reverse direction and return with said transport means along said linear path of travel to said article loading station and upon arrival at said article loading station to terminate the shifting return movement of said shuttle means.



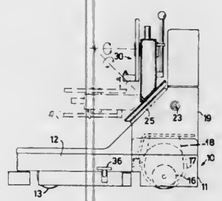
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**4,018,343**

## REMOTE-CONTROLLED, MOTOR-PROPELLED TRANSPORT CAR FOR THE TRANSPORT OF MOTORS DURING ASSEMBLY AND TESTING, AND A TEST STATION FOR USE TOGETHER WITH THE TRANSPORT CAR

**Per-Gunnar Arthur Perhed, Skovde, Sweden, assignor to AB Volvo, Goteborg, Sweden**

**Filed July 7, 1975, Ser. No. 593,455**
**Claims priority, application Sweden, July 11, 1974, 7409137**
**Int. Cl.² B23Q 7/00**
**U.S. Cl. 214—1 Q** **10 Claims**



1. A transport car for transporting motor parts or a complete motor along a path to sequential working stations including a testing station and for supporting said motor parts or motor during various work operations including testing, said transport car comprising a base frame having at least three wheels, at least one of which is steerable and at least one of which is driven, and a fixture mounted on said base frame for carrying said motor parts or motor, said fixture comprising means for selectively connecting said motor to said car in either a rigid, assembly-facilitating condition or a resilient, testing-facilitating condition.

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**4,018,344**

## THREE-POSITION ACTUATOR AND APPARATUS INCORPORATING SAME

**Adam Leshem, West Hartford, Conn., assignor to Combustion Engineering, Inc., Windsor, Conn.**

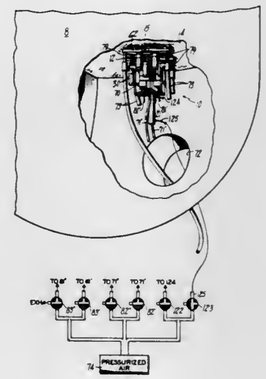
**Filed Nov. 18, 1975, Ser. No. 633,063**
**Int. Cl.² F28G 15/08**
**U.S. Cl. 214—1 BB** **12 Claims**

1. In a surface traversing apparatus adapted to be supported near a member for traversing the surface of the member by stepwise motion, the surface traversing apparatus including base means, first and second anchor means each movably conected to the base means for stepwise lateral relative motion in different respective directions, the first and second anchor means being selectively engageable with the member for resisting lateral motion relative thereto, first and second actuating means operatively connected to the first and second anchor means respectively and to the base means for moving the respective first and second anchor means laterally relative to one another in discrete steps, means to alternately engage the first and second anchor means with the member while the other of the anchor means is disengaged from the member so as to transport the first or second anchor means laterally relative to the other of the anchor means by the first or second actuating means respectively to move the first and second anchor means to new relative positions, the improvement wherein said first and second actuating means respectively each comprises:

a fluid cylinder fixed to said base means, said cylinder having a pair of fluid ports positioned toward respectively opposite ends thereof;

piston means in said cylinder, said piston means having piston rod means affixed thereto and connected to a respective one of said first and second anchor means, said piston means being selectively reciprocably movable axially in either direction from a substantially constant neutral position in said cylinder;

first and second axially compressible mechanical bias means within said cylinder on axially opposite sides of the piston



means, said first and second bias means each including a respective axially inner end for compressive engagement with a respective opposite side of the piston means whenever the piston means is axially displaced from said neutral position in the direction of the respective bias means for applying an axially inward biasing force to the piston; and

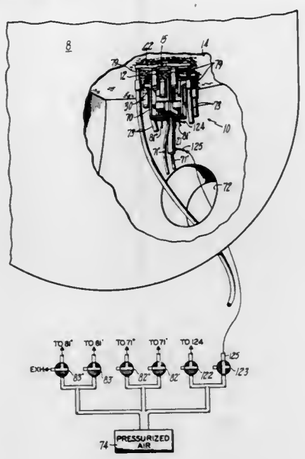
first and second limit means in said cylinder for limiting the axially inward travel of the axially inner end of said first and second bias means respectively such that a net axial biasing force is always applied to said piston means by one or the other of said first and second bias means except at said neutral position of said piston, whereby fluid pressure selectively applied alternatively through one or the other of the cylinder fluid ports to the respective side of the piston means is operative to overcome the respective said first or second bias means and displace said piston means oppositely from said neutral positioning by a step increment and release of fluid pressure from both sides of said piston means allows the respective first or second bias means to return said piston means to said neutral position.

**4,018,345**

## SURFACE TRAVERSING APPARATUS

**Frank Joseph Formanek, West Suffield, and Adam Leshem, West Hartford, both of Conn., assignors to Combustion Engineering, Inc., Windsor, Conn.**

**Filed Nov. 18, 1975, Ser. No. 633,064**
**Int. Cl.² F28G *15/08***
**U.S. Cl. 214—1 BB** **14 Claims**




1. A surface traversing apparatus adapted to be supported near a member for traversing the surface of the member comprising:

first base means;

second base means, said first and second base means being movable relative to one another alternately toward and away from the member to each of three relative positions including an intermediate position and an extreme position on each side of said intermediate position;

first anchor means connected to said first base means;

second anchor means movably connected to said second base means for movement transversely of said second base means and said first anchor means, said first and second anchor means being movable with the respective said first and second base means alternately to and away from the member for respective engagement with and disengagement from the member for respectively restricting and permitting relative lateral motion between the member and the respective said anchor means, both said first and second anchor means being positioned for said engagement with the member at said intermediate one of said three relative positions of said first and second base means and only an opposite one of said first and second anchor means being positioned for said engagement with the member at each opposite one of said two extremes of said three relative positions of said first and second base means;

drive means operatively connected to said second base means and said second anchor means for selectively moving said second anchor means transversely of said second base means and said first anchor means; and

actuator means connected to said first and said second base means for selectively moving said first and said second base means alternatively to each of said three relative positions to engage both said first and said second anchor means with the member at said intermediate one of said three relative positions and to disengage an alternate one of said first and second anchor means at either of said two extreme relative positions of said first and second base means while the other said anchor means remains engaged with the member so as to transport said second anchor means by said drive means transversely relative to said second base means and first anchor means thereby to move said first and second anchor means to new relative lateral positions.

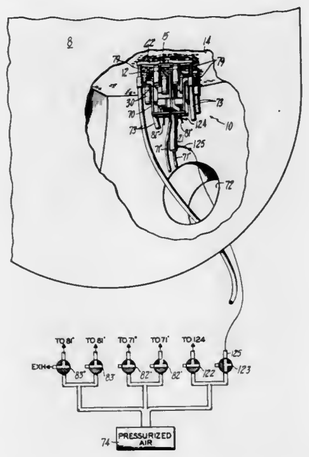
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**4,018,346**

## MOUNTING ARRANGEMENT FOR ANCHOR FINGERS ON A SURFACE TRAVERSING APPARATUS

**Adam Leshem, West Hartford; Martin Lewis Marugg, Enfield, both of Conn., and Dennis Edward Savor, Chattanooga, Tenn., assignors to Combustion Engineering, Inc., Windsor, Conn.**

**Filed Nov. 18, 1975, Ser. No. 633,065**
**Int. Cl.² F28G *15/08***
**U.S. Cl. 214—1 BB** **13 Claims**




1. In a surface traversing apparatus adapted to be supported near a member, the member having an ordered array of laterally spaced openings extending longitudinally thereinto from its surface, the surface traversing apparatus including base means, first and second finger means each sized for relatively close fitting insertion into the member openings, means connecting the respective first and second finger means to the base means to extend longitudinally toward the member, the first and second finger means each being mounted for longitudinal reciprocation toward and away from the member for insertion into and withdrawal from the openings therein respectively, the insertion of a finger means into an opening in the member serving to restrict relative lateral motion therebetween, said first finger means being movable transversely of the base means and said second finger means, drive means operatively connected to the base means and to the first finger means to move the first finger means transversely of the base means and the second finger means from one member opening into near alignment with another member opening, means for selectively alternately inserting the first or second finger means while the other of said finger means is withdrawn so as to transport the first finger means transversely of the base means and the second finger means by said drive means to move the first and second finger means to new relative positions, the improvement wherein the means for connecting the first and second finger means to the base means comprise means interposed in operative engagement between the base means and at least one of the first and second finger means for flexibly mounting said at least one of the first and second finger means for limited lateral deflection relative to the other of the finger means by engagement with a sidewall member of a said member opening thereby to facilitate insertion of said first and second finger means into respective openings in the member.

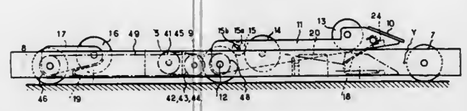


**4,018,347**

## DISPLAY CABINET

**Georges Coppel, Paris, France, assignor to Construction Mills-K, France**

**Continuation-in-part of Ser. No. 411,334, Oct. 31, 1973, abandoned. This application Sept. 29, 1975, Ser. No. 617,549**
**Int. Cl.² B65G *47/00***
**U.S. Cl. 214—16 B** **8 Claims**



1. A package transfer system, for automatically transferring packages along a horizontal lane from a first entrance extremity of the lane to a second exit extremity of the lane, comprising:

i. a lane including electrical supply rails, two laterally-spaced upper horizontal runways to receive packages loaded thereon, and a central lower runway between said upper runways,

ii. an automotive removable carriage placed on said lower runway and including

a. current collector trolley means slidable on said rails,

b. retractible mechanical detecting means on said carriage for detecting the presence of a package in front of the carriage when the carriage moves in the direction from the first extremity towards the second extremity, said mechanical detecting means being arranged to be retracted only when said carriage has partially engaged, in the said direction, under a package encountered, and being arranged to be restored again when, with the carriage having continued to move under said package until eventually wholly supporting said package, the said detecting means do not detect a further package immediately following said encountered package, and

c. further mechanical means and raising means on said carriage to cooperate in raising said encountered package and moving it along with the carriage and depositing it on said upper runway when the said mechanical detecting means detect the presence of a further package adjacent to which the said encountered package is deposited.

d. said mechanical detecting means comprises an assembly angularly movable about a pivot axis into upper and lower limiting positions, said assembly including a feeler roller, a spring urging said feeler roller to a raised position, said spring being selected to be of such strength that it cannot alone raise a package the weight of which is greater than a predetermined value,

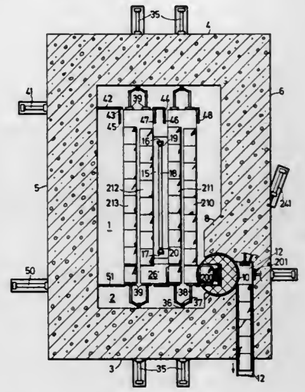
e. said further mechanical means include a first lifting roller carried on said assembly, the distance of the axis of the first lifting roller from the pivot axis being less than the distance of the axis of the feeler roller to the pivot axis, a second lifting roller disposed at the rearward extremity of the carriage, a second spring urging said second lifting roller to a raised position, said second spring being selected to be of such strength that it cannot alone raise a package the weight of which is greater than said predetermined value, said first and second springs being together capable of lifting a package resting on said first and second lifting rollers and of a weight greater than said predetermined weight

**4,018,348**

## APPARATUS FOR IRRADIATING GOODS CONVEYED IN RECEPTACLES

**Ernst Bosshard, Winterthur, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland**

**Filed Aug. 28, 1975, Ser. No. 608,759**
**Claims priority, application Switzerland, Sept. 2, 1974, 11877/74**
**Int. Cl.² B65G *65/30***
**U.S. Cl. 214—17 B** **8 Claims**



1. An apparatus for irradiating goods conveyed in a series of receptacles, said apparatus comprising

a wall defining an irradiation chamber in part;

a conveyor system within said irradiation chamber for conveying the receptacles past a radiation source in said chamber; and

a turntable mounted in said wall, said turntable having a pair of chambers disposed at different vertical levels therein, one of said chambers being adapted to introduce a receptacle into said irradiation chamber and the other of said vertically spaced chambers being adapted to remove a receptacle from said irradiation chamber.

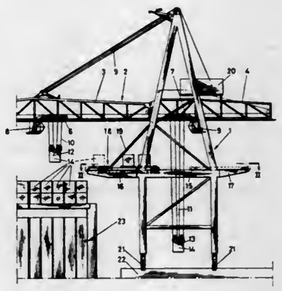
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**4,018,349**

## TRANSHIPMENT INSTALLATION, PARTICULARLY FOR CONTAINERS

**Leonard Hupkes, Heemstede, Netherlands, assignor to Conrad-Stork B.V.**

**Filed Sept. 2, 1975, Ser. No. 609,359**
**Claims priority, application Netherlands, Sept. 6, 1974, 7411880**
**Int. Cl.² B63B *27/12***
**U.S. Cl. 214—87** **5 Claims**



1. A container loading and unloading device wherein containers are raised along a substantially vertical path, thereafter

displaced along a horizontal path and finally lowered along a vertical path, said device comprising:

a first horizontal girder supported by a frame at a predetermined elevation above a floor;

at least two hoists disposed for raising and lowering of the containers, said hoists being supported by and movable over said girder and operatively positioned a distance from each other;

a second horizontal girder supported by the frame beneath said first girder;

a set of horizontal parallel arms extending beyond the frame and pivotally connected to said second horizontal girder such that the arms can be moved with respect to said second horizontal girder, means for raising and lowering said arms; and

at least one substantially horizontally extending continuous conveyor for the horizontal displacement of the containers, said conveyor being mounted on said parallel arms for movement thereon between said hoists, said conveyor including a support for at least one container and means for displacing said support and container placed thereon along a horizontal path from a point near one hoist to a point near the other hoist.

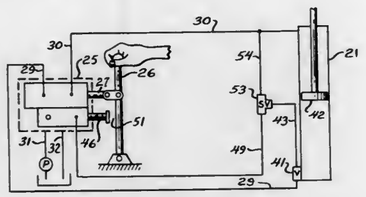
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**4,018,350**

## HYDRAULIC CYLINER SYSTEMS WITH SAFEGUARDED FLOAT ACTION

**Wilburn Kelly Brown, Morton Grove, Ill., assignor to Pettibone Corporation, Chicago, Ill.**

**Filed Mar. 17, 1975, Ser. No. 558,782**
**Int. Cl.² E02F** *3/70*
**U.S. Cl. 214—140** **7 Claims**



1. A hydraulic cylinder system with safeguarded float action, including:

as environment for the invention, double-acting load-lifting cylinder means having a lift port internally subject to pressure from the lifted load, and an opposite port; a pilot-actuated safety valve for the lift port integrated with the lift port, a lift-port line connected to the lift port through the safety valve, an opposite-port line connected to the opposite port, a reversing valve for controlling connection of pressure-source and return connections to said lines, biased to a neutral position, movable from the neutral position in one direction to a load-lifting position and in the opposite direction to a load-lowering position, and

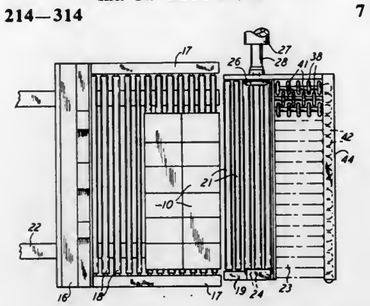
by this invention, said reversing valve having a float position in which the lines are connected together and to a discharge connection; and said reversing valve unit having associated therewith a supplemental valve unit, biased to a neutral position and moved, when the reversing valve is moved to float position, to connect a third line to a pressure-source connection; and said system having a shuttle valve responsive to pressure in either the opposite-port line or the third line for connecting that line to the safety valve to provide a pilot pressure for releasing the safety valve so that hydraulic fluid can flow through the lift port to and from the lift-port line.

**4,018,351**

## APPARATUS FOR HANDLING BUNDLES OF SHEETS

**Walter John Stobb, Pittstown, N.J., assignor to Stobb, Inc., Clinton, N.J.**

**Filed Mar. 4, 1976, Ser. No. 663,825**
**Int. Cl.² B21C** *47/24*
**U.S. Cl. 214—314** **7 Claims**



1. An automatic depalletizer for removing bundles of sheets from a pallet disposed in a horizontal position, comprising a pivotal pallet holder having two legs disposed at a right angle to each other and with said holder being pivotally mounted about an axis at the juncture of said two legs, one of said two legs being horizontally disposed and arranged to support a pallet with bundles of sheets thereon in a prone position, the other of said two legs being uprightly disposed and arranged to abut the pallet and the bundles of sheets thereon, whereby pivoting said holder about said axis positions said other leg in a horizontal position with the bundles thereon in an upstanding position, a conveyor disposed adjacent said holder at the side thereof adjacent said other leg, anti-friction members extending along said other leg for movement of the bundles of sheets off said other leg in a conveying direction and toward said converor whereby all of the bundles resting on said pallet before pivoting of said holder move along said anti-friction members and away from said pallet after pivoting of said holder, said conveyor being arranged with a width to receive a row of the bundles of sheets when the row is moved onto said conveyor from said other leg in the said conveying direction which is in the direction transverse to the length of said row, a second conveyor disposed adjacent the first-mentioned conveyor and being movable in the direction parallel to said width of said first-mentioned conveyor and disposed in communication therewith for receiving the bundles of sheets therefrom one row separately at a time for moving the bundles in the direction of the length of the row thereof, and branch conveyors disposed at spaced locations along said second conveyor and extending oblique to said second conveyor and in bundle movement communication therewith and extending to various locations for the delivery of the bundles of sheets to those locations.

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**4,018,352**

## ANTI-ROLLBACK MECHANISM FOR MATERIAL HANDLING IMPLEMENT

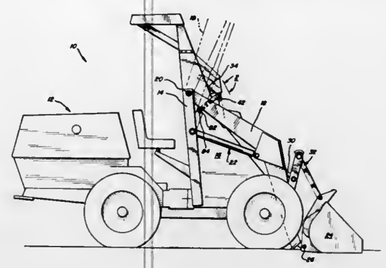
**Edgar K. Lindstrom, Wichita, Kans., assignor to J. I. Case Company, Racine, Wis.**

**Filed July 31, 1975, Ser. No. 600,717**
**Int. Cl.² E02F** *3/86*
**U.S. Cl. 214—761** **6 Claims**

1. In an elongated vehicle having a lift arm pivotally supported at one end with means for raising and lowering said arm, a material handling unit pivotally supported on a free end of said lift arm with hydraulic means for pivoting said unit on said arm, said hydraulic means including a lever pivoted on a pivot axis in opposite directions from a neutral position to pivot said unit forward and rearward with respect to said vehicle; position defining means adjacent said lever defining the position of said arm on said vehicle, said position defining means including an abutment disposed in the pivotal path of



movement of said lever to prevent actuation of said lever in one direction when said arm is in a fully raised position with respect to said vehicle, said lever being laterally shiftable on



said pivot axis to accommodate relative movement between said lever and said abutment and allow pivotal movement of said lever in said one direction beyond said abutment.

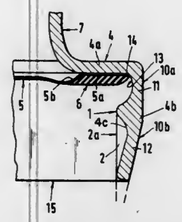
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**4,018,353**

## VACUUM CLOSURE FOR CONTAINERS

**Heinz Marklein, Braunschweig, Germany, assignor to Fa. Schmalbach-Lubeca GmbH, Braunschweig, Germany**

**Filed May 7, 1975, Ser. No. 575,383**
**Claims priority, application Germany, May 11, 1974, 7416495[U]; Feb. 5, 1975, 2504803**
**Int. Cl.² B65D** *41/48*
**U.S. Cl. 215—253** **12 Claims**



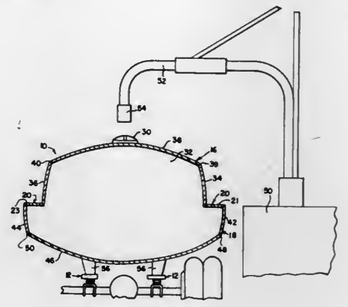
1. Vacuum closure for containers consisting of a substantially flat and relatively rigid closure member having an axis and a cap-like outer fitment of relatively more flexible material, the closure member having means for forming a compression-seal disposed around the periphery thereof by which said closure member is adapted to sealingly engage the end face of the container; said outer fitment including a skirt portion having a smooth outer face adapted to extend downwards, lifting means attached directly to said skirt portion, said skirt portion having a lower edge and including inwardly directed bead means for engaging the outer face of the container when the closure is in closing position and engaging under the outer edge of said closure member when said fitment is lifted by means of the lifting means, wherein the inwardly directed bead means consist of a plurality of beads circumferentially spaced apart from each other each of which being T-shaped including a stem and cross portion when viewed in radial direction and arranged in such a manner that the stem of the said T-shaped bead extends substantially parallel to the axis of the closure member and towards the lower edge of said collar portion.

**4,018,354**

## TANK SHELL WITH INTEGRAL WALKWAY

**James H. Lawler, 5879 Paint Valley Drive, Rochester, Mich. 48063**

**Filed Oct. 31, 1975, Ser. No. 627,524**
**Int. Cl.² B65D** *7/02, 7/34*
**U.S. Cl. 220—20** **13 Claims**



1. In a tank shell for the transport of bulk material the improvement comprising at least one walkway extending longitudinally from end to end of said shell, said walkway being formed integrally in a lateral wall of said shell having a stepped portion disposed substantially horizontally defining the floor of said walkway and the top of a portion of said shell extending below said walkway.

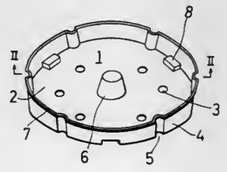
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**4,018,355**

## INNER LID OF A RECEPTACLE FOR INSTANT-COOKING FOODS

**Koki Ando, Osaka, Japan, assignor to Nissin Shokuhin Kaisha, Ltd., Osaka, Japan**

**Filed Dec. 15, 1975, Ser. No. 641,039**
**Claims priority, application Japan, Dec. 13, 1974, 49-151556[U]; Apr. 19, 1975, 50-53589[U]; May 16, 1975, 50-66590[U]**
**Int. Cl.² B65D** *1/34;* **A47G** *19/22*
**U.S. Cl. 220—23** **9 Claims**

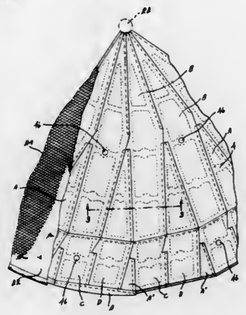


1. A lid for removably fitting within the inside walls of the top of a receptacle, said lid comprising:

a bottom portion having a plurality of openings therethrough; and

a circumferential wall surrounding and extending upward from said bottom portion, said wall having a plurality of longitudinally grooved portions therein the height of said wall, whereby passageways are formed between said grooved portions and the interior of said receptacle when said lid is fitted within the inside walls of said receptacle.

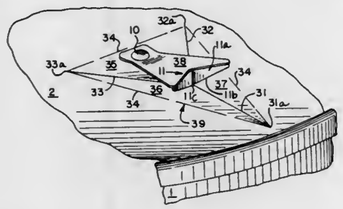
**4,018,356**
**FLOATING DECK FOR LIQUID STORAGE TANK**
**I. Emery Szasz, 7431 Kingsley Road, Montreal, Quebec, and Edmund B. Sandborn, 1001 rue de Kingston, No. 34, Boucherville, Quebec, both of Canada**
**Filed May 28, 1976, Ser. No. 690,836**
**Int. Cl.² B65D** *87/20*
**U.S. Cl. 220—220** **18 Claims**



1. In a floating deck for use in a liquid storage tank, a generally circular planar platform formed of a plurality of interconnected modular units made of cellular foam plastic, said modular units being of different shape and including at least:
a first series of panels, each being in the form of a truncated triangle;
a second series of panels, each having a shape including at least a parallelogram portion and a small triangular-shaped portion outwardly projecting from one side of said parallelogram portion at the upper end thereof; said small triangular-shaped portion having a dimension corresponding to the truncated portion of said truncated triangle of said first series of panels so as to form a continuous platform when said first and second series of panels are interconnected to one another.

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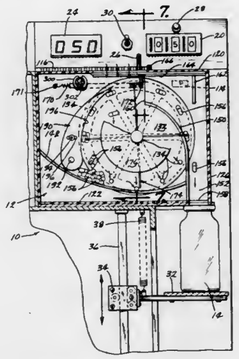
**4,018,357**
**POUR OPENING FOR LIQUID CONTAINERS**
**Obert M. Ostrem, Westmont, Ill., assignor to The Continental Group, Inc., New York, N.Y.**
**Filed Aug. 9, 1976, Ser. No. 712,621**
**Int. Cl.² B65D** *41/32*
**U.S. Cl. 220—268** **4 Claims**



1. An improved easy-opening end closure for a can or similar container, comprising an end panel and an opening member, said end panel having a plurality of substantially straight, interconnected score lines formed therein, the distal ends of said score lines defining the apices of a substantially rectilinear openable member comprising a plurality of substantially rectilinear segments each having at least two sides thereof defined by said score lines and a side comprising an integral hinge nonremovably attaching said segments to the remaining portion of said end panel, means non-removably attaching said opening member proximate one end thereof to said end panel, said opening member being adapted to effect opening of said openable member pursuant to a panelwardly directed application of digital pressure on the opening member distal end, said opening member distal end including force concentration means for focusing an initial opening force proximate at least one of said score lines and a plurality of camming surfaces adapted to separate said segments and urge the same into the container subsequent to initial fracture of said one of said score lines, said opening member being attached to one of said segments.

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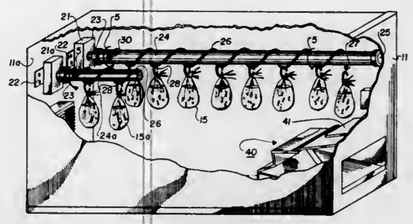
**4,018,358**
**CASSETTE PILL STORING, DISPENSING AND COUNTING MACHINE**
**Robert D. Johnson; John W. Havener; Franklin W. Reyner, Jr.; Loren K. Whitver; Norman W. Kilburn, all of West Union, and Jack M. Hoglan, Independence, all of Iowa, assignors to Pharmaceutical Innovators, Ltd., West Union, Iowa**
**Filed Sept. 18, 1975, Ser. No. 607,782**
**Int. Cl.² B65B** *57/20*
**U.S. Cl. 221—7** **26 Claims**



1. A cassette pill storing, dispensing and counting machine comprising:
a machine enclosure having one side wall on which a cassette for storing and dispensing pills is positioned, said one side wall having a vacuum source and a wheel driving means, said cassette including a pair of side walls, a pair of end walls and top and bottom walls defining a storage chamber,
a rotatable pill conveying wheel engaging said wheel driving means positioned in one of said side walls and including a plurality of openings providing communication between said chamber and the outside vacuum source annularly arranged around the wheel's axis of rotation for holding pills on said wheel under a vacuum from said vacuum source,
a discharge opening in communication with said chamber, and
a pill separator means positioned to operatively separate said pills from said wheel such that said pills are discharged through said discharge opening upon said wheel having conveyed said pills to said separator means, said wheel driving means having an annular rotating wall having an outer edge engaging said pill conveying wheel and being held in engagement by said vacuum applied to said wheel by said vacuum source.



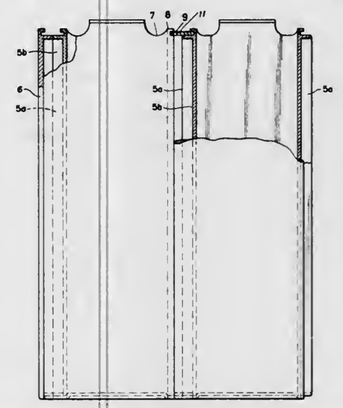
**4,018,359**
**LIVE BAIT VENDING APPARATUS**
**James T. Lambert, Rte. 1, Princeton, Tex. 75077**
**Filed June 6, 1975, Ser. No. 584,282**
**Int. Cl.² G07F** *11/36*
**U.S. Cl. 221—14** **5 Claims**



1. Article vending apparatus, comprising:
a. a rotatably mounted support shaft adapted to support, along its length, articles to be dispensed,
b. conveyer means associated with said support shaft for advancing said articles in the longitudinal direction of said support shaft as said support shaft is rotated,
c. drive means, when actuated, rotating said support shaft, thereby to advance said articles in said longitudinal direction, and
d. means for preventing actuation of said drive means and responsive to the number of articles supported by said support shaft, said deactuator means comprising:
i. spring biased platform means supporting said support shaft and providing a force for urging said support sahft in an upward direction, the extent of the resulting upward movement of said shaft being dependent upon the total weight of articles supported by such shaft, and
ii. switch means operable by said support shaft when the said upward movement of said shaft reaches a predetermined extent, the switch means, when operable, preventing actuation of said drive means.

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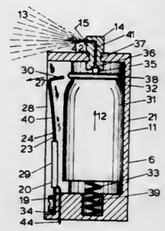
**4,018,360**
**CASSETTE FOR DISPENSING YARN REELS**
**Friedrich Strauss, Bonnigheim, Germany, assignor to Amann & Söhne, Bonnigheim, Germany**
**Filed Jan. 5, 1976, Ser. No. 645,010**
**Int. Cl.² B65H** *49/18*
**U.S. Cl. 221—310** **1 Claim**



1. In combination, at least a pair of quadriform casettes for dispensing yarn reels, said casettes being assembled side-by-side, each casette including front and side walls and a series of vertically spaced laterally elongated channels open at their front walls for dispensing, one at a time, a series of parallel yarn reels stored within each channel;
reel stop means at the front of each channel;
the opposed side walls of each casette having a respective resilient tongue and groove formation, with the tongue on one side wall of one casette resiliently nested within the corresponding groove on the side wall of an adjacent casette laterally interconnecting said casettes;
each casette having along its front wall at its side outwardly directed grooved projections;
the adjacent projection between said casettes being opposed defining an upright channel;
and a color-identifying strip projected into said channel retaining said casettes against relative longitudinal movement.

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**4,018,361**
**FLUID DISPENSING ANTI-BURGLAR DEVICE**
**Charles R. Fegley, 1606 Frush Valley Road, Laureldale, Pa. 19605**
**Filed Feb. 17, 1976, Ser. No. 658,714**
**Int. Cl.² F17C** *13/08*
**U.S. Cl. 222—5** **14 Claims**



1. A fluid dispensing anti-burglar device for use with a pressurized container, the device comprising:
a. a body member;
b. means for supporting said pressurized container in said body member, wherein said pressurized container has a fluid-dispensing element adapted to release fluid under pressure from said pressurized container when actuated;
c. dispensing element actuating means mounted in said body member and adapted to engage and actuate said fluid-dispensing element;
d. a passageway in said dispensing element actuating means having an entry section at one end thereof;
e. spring means biased to force said fluid-dispensing element and said dispensing element actuating means into engagement with each other, thereby causing said fluid-dispensing element to be actuated;
f. an electrothermal actuator releasably retaining said spring means in a cocked position in which said fluid-dispensing element and said dispensing element actuating means are separated from each other, said electrothermal actuator releasing said spring means from its cocked position upon the application of electric current causing said fluid-dispensing element to be actuated, whereby fluid under pressure is released from said container to pass through said entry section and passageway.

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**4,018,362**
**AUTOMATIC CONTROL FOR LIQUID FLOW**
**Patrick Ubaud, Villeurbanne, France, assignor to Union Chimique Continentale-U.C.C., Puteaux, France**
**Filed Nov. 6, 1975, Ser. No. 629,239**
**Int. Cl.² B67D** *5/08*
**U.S. Cl. 222—55** **2 Claims**

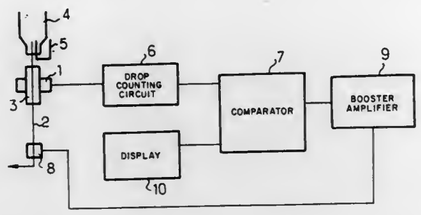
1. A system for automatically regulating liquid flow comprising:
a piston;
a counter-plate;

a flexible tube for conveying a liquid, the tube being positioned between the piston and the counter-plate;

a photoelectric pick-up connected to the tube for detecting the passage of drops of the liquid therethrough;

a first monostable connected to and operated by the photoelectronic pick-up for counting the drops of the liquid passing through the tube;

a bistable connected to the first monostable and responsive to the counting of the first monostable for supplying an output pulse of duration equal to the time interval between the passage of consecutive drops of the liquid through the tube;




a second monostable connected to the bistable for supplying an output pulse of regulatable duration;

a comparator connected to the bistable and to the second monostable for comparing the duration of the output pulses of the bistable and the second monostable;

an amplifier connected to the comparator and activated thereby when the comparator signifies a mismatch between the duration of the output pulses of the bistable and the second monostable; and

a bi-directional motor connected to the amplifier and activated thereby for moving the piston to squeeze the tube against the counter-plate to regulate the flow of drops of liquid passing through the tube.

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**4,018,363**

**SOAP DISPENSER**

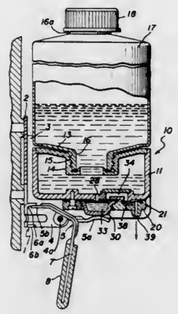
**Antonio Macchi Cassia, La Milan, Italy, assignor to Steiner American Corporation, Salt Lake City, Utah**

**Filed Oct. 6, 1975, Ser. No. 620,179**

**Claims priority, application Italy, Oct. 7, 1974, 28157/74**

**Int. Cl.² B67D** *5/06*

**U.S. Cl. 222—80** **10 Claims**



1. A dispenser for liquid soap comprising a support bracket attachable to a wall, actuating means attached to said support bracket, emitting means removably mountable on said support bracket independently of said actuating means and having a fluid outlet, a liquid soap container removably attachable to said emitting means and communicating with said fluid outlet, and pumping means carried by said emitting means for emitting charges of liquid soap from said fluid outlet, said actuating means being disposed for contact with said pumping means for effecting operation thereof.

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**4,018,364**

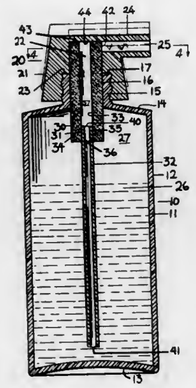
**FOAM DISPENSING DEVICE**

**Hershel Earl Wright, c/o Creative Products, Inc., 2670 E. Garfield Ave., P.O. Box 51, Decatur, Ill. 62525**

**Continuation-in-part of Ser. Nos. 564,700, April 3, 1975, Pat. No. 3,937,364, and Ser. No. 564,701, April 3, 1975. This application Feb. 9, 1976, Ser. No. 656,347**

**Int. Cl.² B65D** *83/14*

**U.S. Cl. 222—190** **12 Claims**



1. A foam dispensing device comprising:

a. a flexible container for holding a foamable liquid and air having a discharge port,

b. a porous member, of rigid porous material, separating the area adjacent said discharge port and the interior of the container and having a passage extending at least partly through the porous member,

c. conduit means including an opening communicating with the porous member by way of said passage, said conduit means extending into the interior of said container and including another opening communicating with the interior of said container.

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**4,018,365**

**VALVE ACTUATORS FOR PRESSURIZED DISPENSERS**

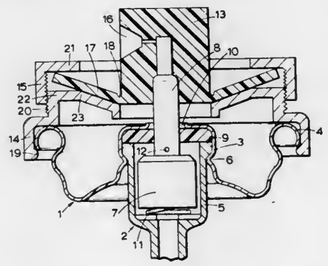
**Roger Anthony Butcher, Horndean, England, assignor to Aerosol Inventions & Development S.A. AIDSA, Fribourg, Switzerland**

**Filed Jan. 30, 1976, Ser. No. 653,706**

**Claims priority, application United Kingdom, Feb. 4, 1975, 4644/75**

**Int. Cl.² F16K** *35/00;* **B65D** *83/14*

**U.S. Cl. 222—402.11** **6 Claims**



1. An actuator assembly for the outlet device of a hand-held dispenser of the kind having a depressible operating stem, comprising an actuator member mountable on the stem, whereby the device can be operated by depression of said member, a stationary component mountable on the dispenser, a collar in screw-threaded engagement with said stationary component and surrounding said actuator means, and means interconnecting said collar and said actuator member, said collar being rotatable to move it between a first position at which said means prevents depression of said actuator member and to a second position in which said actuator is free to be depressed.



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**4,018,366**

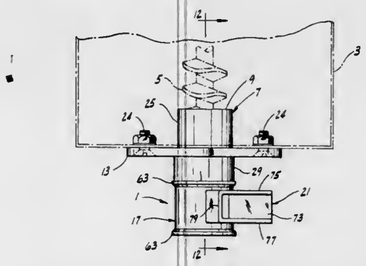
**NOZZLE HAVING A LATERAL CHUTE OUTLET**

**Leonard A. Ficken, Manchester, and Gerald J. Podgorny, St. Louis, both of Mo., assignors to UMC Industries, Inc., New York, N.Y.**

**Filed Sept. 9, 1975, Ser. No. 611,699**

**Int. Cl.² G01F** *11/24*

**U.S. Cl. 222—412** **15 Claims**



1. In apparatus for dispensing a fluent solid product comprising a receptacle for holding a supply of said product: a nozzle comprising a tubular body open at one end constituting its inner end and closed at the other end constituting its outer end, means for attaching said body on the wall of the receptacle closely adjacent the bottom of the receptacle with the open inner end of said body in communication with the interior of the receptable and with said body extending generally horizontally outward from the receptacle, said apparatus having an auger extending generally horizontally over the bottom of the receptacle into the body via the open inner end of the body, said auger being rotatable in said body free of the body and free of the outer closed end of the body, said body having a lateral outlet at one side thereof adjacent its outer end, a sleeve having a telescoping sliding fit on the tubular body and slidable onto and off of the body from the closed outer end of the body, said sleeve having a lateral opening adapted to register with said lateral outlet of said body when the sleeve is in place on the body and said sleeve further having a chute extending laterally outwardly and downwardly from said opening, whereby material fed by the auger through said body is adapted to exit sidewise from the body via said outlet, and pass via said opening in the sleeve to the chute and then down the chute, and whereby the sleeve, in being slid off the body, shears off any accumulation of product in the chute blocking said opening.

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**4,018,367**

**MANIFOLD DISPENSING APPARATUS HAVING RELEASABLE SUBASSEMBLY**

**Richard L. Morine, and James J. Hokes, both of Euclid, Ohio, assignors to Fedco Inc., Mentor, Ohio**

**Filed Mar. 2, 1976, Ser. No. 663,148**

**Int. Cl.² B67D** *3/04;* **A21C** *9/00*

**U.S. Cl. 222—485** **6 Claims**

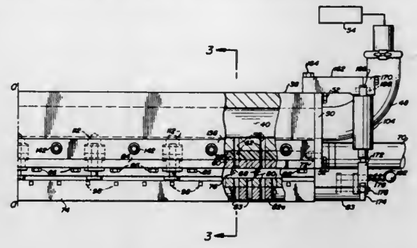
1. Apparatus for dispensing fluent material in a predetermined pattern comprising:

a. a main, elongated body mounted to extend horizontally and defining a horizontal main manifold chamber;

b. a plurality of discharge passageways extending downwardly from said main manifold chamber;

c. first valve means carried by said main body for controlling flow through said passageways;

d. a dispensing outlet subassembly releasably clamped to said main body and defining a secondary manifold chamber for receiving flow from said discharge passageways;



e. a plurality of dispensing orifices extending downwardly from said secondary manifold chamber and laid out in a pattern corresponding to said predetermined pattern; and,

f. second valve means carried by said subassembly and operable independently of said first valve means for controlling flow through said dispensing orifices.

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**4,018,368**

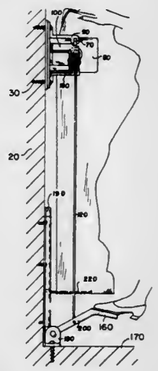
**DEVICE FOR FOLDING SHEETS AND THE LIKE**

**Bernhard A. Haldi, New York, N.Y., assignor to The Raymond Lee Organization, Inc., a part interest**

**Filed Oct. 21, 1975, Ser. No. 624,318**

**Int. Cl.² A41H** *33/00*

**U.S. Cl. 223—37** **3 Claims**



1. A device adapted to be secured both to a wall and a floor to facilitate folding of sheets and the like, said device comprising:

a flat plate disposed vertically and secured to said wall;

a fixed jaw extending perpendicularly outward from the wall in a vertical plane;

a movable jaw parallel to the fixed jaw and horizontally slidable along the plate toward and away from the fixed jaw, said movable jaw being slidably secured to the plate;

means secured to said plate to confine the motion of the movable jaw to the horizontal plane;

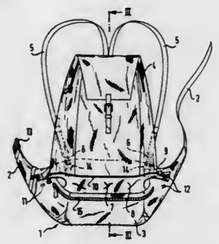
a spring biasing said movable jaw against the fixed jaw; and

a foot operated mechanism on the floor and connected to the movable jaw, said mechanism including a foot operated pedal disposed on one end of an elongated linkage,

said linkage being pivotally secured at its opposite end to the floor, a pulley lying in a vertical plane and rotatable therein, said pulley being disposed adjacent said plate and movable jaw, and a flexible cord secured at one end to a point on the linkage intermediate its ends, said cord extending vertically upwards from the linkage, engaging said pulley to the movable jaw, the other end of the cord being secured to the movable jaw, said cord being attached to the linkage to form a lever of the second class, said pedal when depressed causing said cord to pull said movable jaw away from the fixed jaw against the bias of the spring.

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**4,018,369**
**BACK SADDLE**
**Knut Jaeger, Kirchheim, Teck, Germany, assignor to Herbert Simon and Knut Jaeger, both of Bruckwiesen, Germany**
**Filed Feb. 13, 1975, Ser. No. 549,765**
**Claims priority, application Germany, Feb. 15, 1974, 052554[U]**
**Int. Cl.² A45F *3/00***
**U.S. Cl. 224—9** **2 Claims**

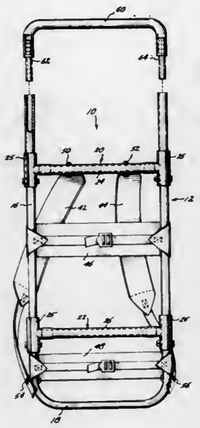


1. A back saddle comprising a back bag member worn at the rear of the waist of a person; a belt means fixedly attached to said bag member, whereby said bag member is secured to the waist of the person; a knapsack fixedly attached to said back bag member; and shoulder belts which are additionally fixedly attached to said knapsack whereby said knapsack is secured to the shoulders of the person, wherein the top side of said back bag member forms the bottom of said knapsack, wherein said knapsack has greater carrying capacity than said back bag, including a closable container upon the top side of said back bag, for storing the knapsack in a folded, compact position and wherein said closable container comprises two top flaps attached to the top side of said back bag member, said top flaps being foldable over said folded knapsack, the two flaps being connectable with each other by suitable closing means.

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**4,018,370**
**BACK PACK FRAME**
**Thomas E. Wood, 3863 42nd NE., Seattle, Wash. 98105**
**Filed June 20, 1975, Ser. No. 588,795**
**Int. Cl.² A45F *3/10***
**U.S. Cl. 224—25 A** **8 Claims**

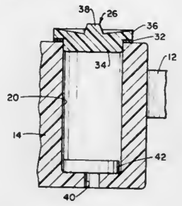
1. A back pack frame comprising:
a generally U-shaped tubular plastic main frame member including a curved transverse bottom portion and a pair of upstanding parallel legs, each of said legs including a plurality of vertically spaced pairs of aligned holes therein;
at least one transverse support member extending between said upstanding legs a distance above said curved transverse bottom portion;
said transverse support member comprising a pair of tee connectors each having a tubular sleeve portion engageable with one of said upstanding legs and a pin portion extending normally outward from said sleeve portion, and a tubular cross member interconnecting said tee connectors in a manner such that the box ends of said cross member engage the pin portions of said tee connectors;
the pin portions of said tee connectors each having a cylindrical surface including at least one axially extending raised rib and at least one circumferentially extending raised rib protruding radially outwardly therefrom, engaging the inner walls of the box ends of said cross member to fix said tee connectors and said cross member against axial disconnection or rotation under normal pack frame use conditions, said cross member being rotatable



on said pin in response to above normal torque applied to said cross member and thereafter being manually rotatable to reform a connection fixed against rotation during normal pack frame use;
the tubular sleeve portions of said tee connectors including a pair of aligned holes positionable adjacent selected pairs of aligned holes on said upstanding parallel legs; and
pin means extending through said aligned pairs of holes to hold said tee connector in fixed engagement with said upstanding parallel legs.

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**4,018,371**
**BEVERAGE BELT**
**Stanley Ross George, 6712 Balcom Ave., Reseda, Calif. 91335**
**Continuation-in-part of Ser. No. 353,226, April 23, 1973, abandoned. This application July 29, 1975, Ser. No. 599,955**
**Int. Cl.² A45C *11/00***
**U.S. Cl. 224—26 R** **4 Claims**

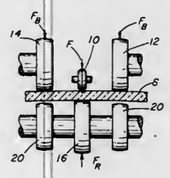


1. A beverage belt comprising:
a belt havng a pair of free ends, securing means connected to said belt at said free ends to secure together the ends of said belt into an integral unit;
a housing having a plurality of beverage retaining pockets, said housing being attached to said belt, said pockets being spaced from each other, each said pocket being adapted to contain a beverage container;
a lid assembly including a separate lid for each of said pockets, each said lid to connect by connecting means with said housing to close its respective said pocket to the ambient;
said housing being constructed of a plastic insulative material, each said lid being constructed of a plastic insulative material;
located within said housing and communicating with each said pocket is an aperture, there being a separate said aperture for each said pocket, each said aperture located within the bottom of each said pocket;
means located within each said pocket for closing each said aperture to the ambient; and
whereby an elongated object is insertable through said aperture to move a beverage container located within the said pocket upwardly and out of its respective said pocket.



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**4,018,372**
**GLASS CUTTING METHOD AND APPARATUS**
**Thomas A. Insolio, Bristol, Conn., assignor to The Fletcher-Terry Company, Farmington, Conn.**
**Filed Dec. 5, 1975, Ser. No. 638,041**
**Int. Cl.² C03B *33/02***
**U.S. Cl. 225—2** **8 Claims**

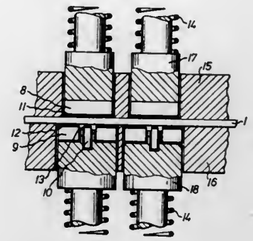


1. A method of cutting relatively thick sheets of glass, comprising
a. scoring one surface of the glass by passing a scoring tool along a line of action while
b. simultaneously bending the glass sheet about the line of action of said tool to decrease the internal compressive stresses adjacent the surface being scored
c. said bending step including the step of moving at least two pressure applying rollers along the said one surface in directions parallel that of the scoring tool but spaced therefrom, and
d. reacting the forces imposed by said rollers by moving a reaction roller along the other side of the glass generally opposite the scoring tool.

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**4,018,373**
**DEVICE FOR BONDING ELECTRODES TO SEMICONDUCTOR DEVICES**
**Wolfgang Beerwerth, Neheim-Husten; Albrecht Geppert, Warstein; Horst Gesing, and Rigobert Schimmer, both of Belecke, all of Germany, assignors to Licentia Patent-Verwaltungs-G.m.b.H., Frankfurt am Main, Germany**
**Division of Ser. No. 484,629, June 28, 1974, Pat. No. 3,965,567. This application Oct. 31, 1975, Ser. No. 627,781**
**Claims priority, application Germany, June 28, 1973, 2332822**
**Int. Cl.² H01L *21/603***
**U.S. Cl. 228—44.1 A** **5 Claims**

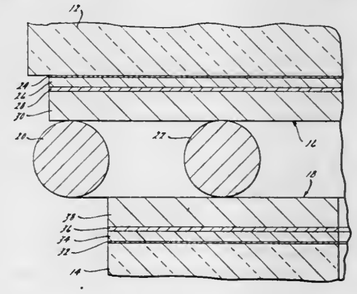
1. A device for simultaneously soldering a plurality of contact electrodes to two sides of a semiconductor wafer comprising in combination:
first and second centering plates between which a semiconductor wafer is clamped by means of its major surfaces, each of said plates being provided with a plurality of bores which are located at positions corresponding to each of the electrodes to be soldered, each of said bores having a peripheral size and shape corresponding to the respectively associated contact electrode;
a rod slideably engaged in each of said bores, each of said rods having means, on the end surface thereof which faces the semiconductor wafer, for receiving the associated contact electrode which has been provided with solder; and



spring means for simultaneously urging said rods toward the semiconductor wafer to press the end surface of the respective contact electrodes against the opposed major surfaces of the semiconductor wafer.

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**4,018,374**
**METHOD FOR FORMING A BOND BETWEEN SAPPHIRE AND GLASS**
**Stuart M. Lee, Palo Alto, and Jerrett D. Stafford, Sunnyvale, both of Calif., assignors to Ford Aerospace & Communications Corporation, Dearborn, Mich.**
**Filed June 1, 1976, Ser. No. 691,913**
**Int. Cl.² B23K *1/20***
**U.S. Cl. 228—121** **14 Claims**



1. A method for forming a bond between sapphire and glass comprising the steps of:
1. with respect to the surface of the sapphire to be bonded to the glass:
a. applying an inner film of metal, capable of adhering to sapphire, on said sapphire surface;
b. applying an intermediate film of metal on the exposed surface of said inner metal film;
c. applying an outer metal film on the exposed surface of said intermediate metal film;
2. with respect to the surface of the glass to be bonded to the sapphire:
a. applying an inner film of metal, capable of adhering to glass, on said glass surface;
b. applying an intermediate film of metal on the exposed surface of said inner metal film;
c. applying an outer metal film on the exposed surface of said intermediate metal film;
3. placing a metal wire between said outer metal films on said sapphire and glass surfaces and applying a force to said sapphire and glass sufficient to deform plastically said metal wire to increase substantially its surface area;
4. applying heat to said metal wire sufficient to cause it to liquify while said force is being applied; and

5. allowing the liquified metal to solidify.

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**4,018,375**

## METHOD OF MANUFACTURING A NONCONSUMABLE COPPER-ZIRCONIUM ELECTRODE

**Vladislav Grigorievich Osintsev, ulitsa Lenina, 6, kv. 6; Jury Grigorievich Naumov, ulitsa Chapaeva, 5, kv. 11, both of Kolchugino Vladimirskoi oblasti; Eduard Migranovich Esibyan, ulitsa Kikvidze, 4, kv. 21, Kiev; Mikhail Evgenievich Danchenko, bulvar B.Likhacheva, 3, kv. 53, Kiev, and Vasily Berkovich Malkin, prospekt Voroshilova, 31, kv. 305, Kiev, all of U.S.S.R.**

**Filed Mar. 5, 1976, Ser. No. 664,072**

**Claims priority, application U.S.S.R., Mar. 10, 1975, 2119847**

**Int. Cl.² B23K** *31/00*

**U.S. Cl. 228—131** **4 Claims**

1. A method of manufacturing a nonconsumable copperzirconium electrode comprising the steps of: positioning within a copper sleeve a zirconium core and an intermediate layer to form a three-component blank, said intermediate layer being made of a cold-deformed copper and having a thickness substantially equal to the diameter of said core; deforming said three-component blank, the deformation of said threecomponent blank being performed successively by, first, joint cold deformation of said intermediate layer on said core and, then, by their hot deformation jointly with said sleeve; and subjecting the thus produced blank to machining, following the said deforming operations.

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**4,018,376**

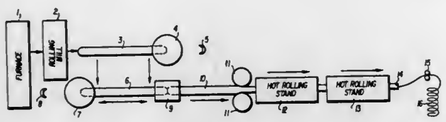
## PROCESS FOR OBTAINING SKEINS OF WIRE ROD OF A WEIGHT WHICH IS A MULTIPLE OF THAT OF A WIREBAR

**Raffaele Capetti, Turin, Italy, assignor to A. Tonolli & C. S.p.A., Milan, Italy**

**Filed June 13, 1975, Ser. No. 586,608**

**Int. Cl.² B21B** *15/00*

**U.S. Cl. 228—158** **4 Claims**




1. A continuous process for obtaining a copper skein from wirebars, comprising the ordered steps of:

a. preheating each wirebar to a normal hot rolling temperature;

b. continuously rough rolling the wirebars at the hot rolling temperature to reduce each wirebar to substantially identical size and shape;

c. cropping first and second ends of each wirebar;

d. butt welding at the hot rolling temperature the first end of one wirebar to the second end of another wirebar while pressing these two ends together;

e. continuously hot rolling the welded wirebars to a required size and length to finish the welded wirebars; and

f. winding the finished welded wirebars into a skein having a weight which is a multiple of the weight of a wirebar.

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**4,018,377**

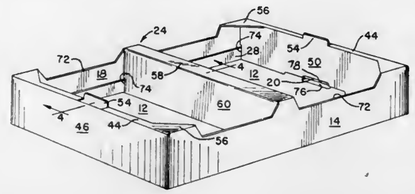
## COMPARTMENTED TRAY HAVING IMPROVED DIVIDER MEANS

**Ronald I. Kent, Whittier, and Albert R. Brown, Hughson, both of Calif., assignors to Continental Can Company, Inc., New York, N.Y.**

**Filed Apr. 8, 1976, Ser. No. 675,044**

**Int. Cl.² B65D** *5/48*

**U.S. Cl. 229—27** **18 Claims**



1. A blank for forming a tray having at least two compartments, comprising a plurality of panels, adjacent ones of the panels being hingedly interconnected, the panels being provided by a bottom panel for forming a bottom wall of the tray, a pair of side panels spaced from one another for forming opposed side walls of the tray, a pair of end panels spaced from one another for forming opposed end walls of the tray, and divider panel means for forming a divider separating adjacent compartments of the tray, the divider panel means comprising a central panel bridging the side panels, a pair of lateral panels extending from opposite sides of the central panel, a pair of base flaps each hingedly extending from a respective one of the lateral panels at a side thereof opposite the central panel, and a pair of locating tabs each projecting from a respective one of the lateral panels at said side thereof, the bottom panel having formed therein a pair of locating slots spaced from one another and each disposed to receive a respective one of the locating tabs when a tray is erected from the blank, the sum of the widths of the base flaps being not greater than the distance between the locating slots in the longitudinal direction relative to the bottom panel.

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**4,018,378**

## CARTON TRAY WITH COVER

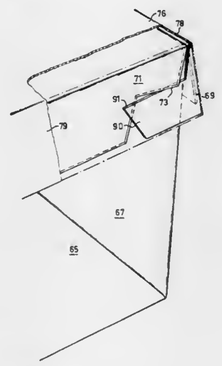
**Karl Rune Persson, Halmstad, Sweden, assignor to Sprinter Pack AB, Halmstad, Sweden**

**Filed Mar. 24, 1976, Ser. No. 669,860**

**Claims priority, application Sweden, Apr. 3, 1975, 7503827**

**Int. Cl.² B65D** *5/24, 5/22*

**U.S. Cl. 229—31 R** **4 Claims**



1. A carton comprising:

a cover having a base and downwardly depending side walls



which form a continuous frame around the edges of said cover base; said side walls of said cover being extended at their ends with end flaps lying along the inside of said frame formed by said side walls of said cover; at least some of said end flaps having a locking edge which is substantially parallel to said cover base and at a predetermined distance below it;

a tray including a tray base and side walls depending upwardly therefrom; said side walls of said tray being fixedly connected to each other by means of a corner construction consisting of a corner wall which forms a part of the inside of said tray and with its side edges engage against the inside of said side wall on either side of said corner; said side edges of said corner wall and the ends of contiguous side walls of said tray being united by means of an intermediate portion lying along the inside of the respective contiguous side wall; said side walls of said tray each including an edge flange lying in a plane substantially parallel to said tray base, said edge flanges being fixedly united to each other by each corner wall being extended with a communicating panel at its upper edge which lies on top of adjacent and portions of said side wall edge flanges and is sealed to them; the end edges of adjacent side walls of said tray being separted such that the bottom edge of each said corner wall forms an obliquely extending bottom edge uniting the ends of the bottom edges of adjacent side walls; each of said edge flanges and said communicating panels being extended with an edge flap which can be folded down along a score line lying along the outer edge of the respective edge flange or communicating panel so that when said cover is placed onto said tray, said edge flaps of said tray will be turned down by said side walls of said cover to give the edge portion of said tray a U-profile with relatively great resistance to bending when said cover is in said tray;

at least some of said edge flaps of said tray having a downwardly turned locking edge for cooperation with a corresponding locking edge of one of said end flaps of said cover in such a way that when said cover is pressed down into said tray, the respective locking edge of said cover passes over said locking edge of an adjacent edge flap of said tray so that said end flap of said cover snaps into position and said locking edges of said tray and cover come into locking abutment with each other.

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**4,018,379**

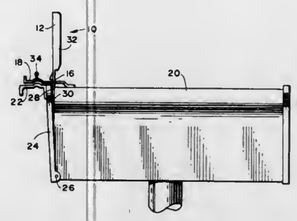
## MAILBOX SIGNAL DEVICE

**Lewis D. Carter, 4990 Central Ave., McKinleyville, Calif. 95521**

**Filed Mar. 23, 1976, Ser. No. 669,511**

**Int. Cl.² B65D** *91/00*

**U.S. Cl. 232—35** **5 Claims**



1. A signal device for a mailbox having a pair of forwardly protruding, engageable latch straps on the box and door, respectively, said signal device comprising:

a plate;

a slot in said plate through along and adjacent the bottom edge thereof adapted to be received freely on the latch strap on said box; and

portions of said plate along said bottom edge being adapted when said plate is held upright to be disposed below the upper surface of said box for engagement by said door when said latch straps are engaged;

said portions being disposed laterally of said slot to avoid interference with said box latch strap when said plate pivots downward.

said plate being unsupported and free to pivot downward by gravity when said door is opened.

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**4,018,380**

## HEATER FOR VEHICLES

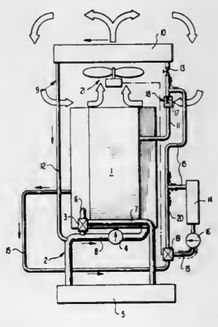
**Kurt Baier, Sindelfingen, Germany, assignor to Daimler-Benz Aktiengesellschaft, Germany**

**Filed Nov. 13, 1974, Ser. No. 523,413**

**Claims priority, application Germany, Nov. 17, 1973, 2357497**

**Int. Cl.² B60H** *1/02*

**U.S. Cl. 237—12.3 C** **18 Claims**



1. A standstill heating system for vehicles with a liquid-cooled internal combustion engine and a controllable heating circulatory system having at least one heat-exchanger means adapted to be traversed by air, the heated-up air being adapted to be fed from said heat-exchanger means to a passenger space, characterized in that a line means is provided which is in communication with the liquid jacket of the internal combustion engine and which includes a circulating pump means and a heater means providing a standstill heater operation independently of the operation of the internal combustion engine, said heating circulatory system including a control means controlling the quantity of flow through the adjoining heat-exchanger means, said line means terminating in said heating circulatory system upstream of said control means, and a closure valve means arranged in the circulatory system upstream of the place where said line means terminates in the heating circulatory system, said closure valve means preventing by-passing of the heat-exchanger means during standstill heater operation by a return flow of the heated-up cooling liquid to the internal combustion engine.

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**4,018,381**

## APPARATUS FOR INCREASING THE EFFICIENCY OF HEATING SYSTEMS FOR BUILDINGS

**Frank A. Bisegna, Salem, Mass., assignor to Red Top Fuel Company, Salem, Mass.**

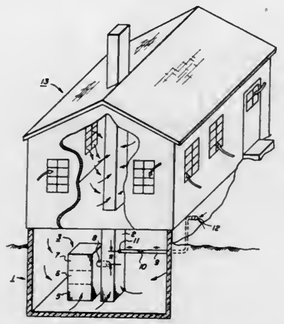
**Continuation of Ser. No. 350,940, April 13, 1973, abandoned. This application Mar. 7, 1975, Ser. No. 556,436**

**Int. Cl.² F24B** *7/00*

**U.S. Cl. 237—55** **2 Claims**

1. Apparatus for reducing convection currents into and throughout the interior of a building having a furnace comprising a flue for discharging hot furnace gases to the outside of the building during and after the furnace is in operation, said flue having a need for replacement air as hot furnace gases are discharged, at least a portion of said replacement air being obtainable by the flue directly from the air filling the

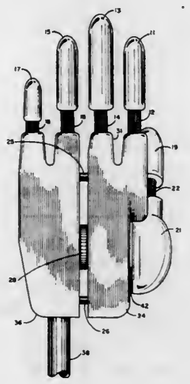
interior of the building, and passage means for bringing air located outside the building into the flue adjacent to the location where the hot exhaust gases enter the flue, said flue comprising a furnace flue and a chimney and said chimney having a furnace end and an exterior end, said passage means being operatively connected to the chimney in the vicinity of the location where the furnace flue is operatively connected to



the chimney between the place where the furnace flue is operatively connected to the chimney and the exterior end of the chimney, the distance between the locations where the passage means and furnace flue are operatively connected to the chimney is at least equal to the width of the furnace flue measuring in the direction parallel with the longitudinal axis of the chimney.

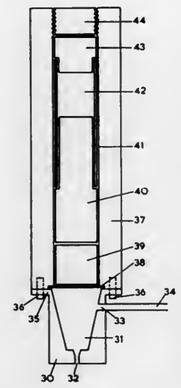
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**4,018,382**
**GLOVE FORM**
**Patsy DiCuya, 4757 Kovall, Las Vegas, Nev. 89109**
**Filed Oct. 15, 1975, Ser. No. 622,671**
**Int. Cl.² A41D *1/00***
**U.S. Cl. 223—78** **5 Claims**



1. A glove form comprising first and second hand portions and adjustable means connecting said hand portions for varying the distance therebetween whereby the width of said glove form may be expanded or contracted, finger portions extending from the hand portions, threaded means connecting each finger portion and a hand portion, and a thumb portion pivotally secured to one of the hand portions.

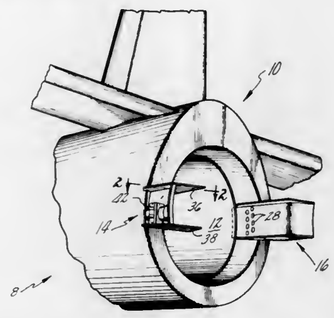
**4,018,383**
**PROCESS FOR PRODUCTION OF DROP STREAMS**
**Anthony David Paton, Chesterton Hall Cresent, and Roger John Rowland, Longstanton, both of England, assignors to Imperial Chemical Industries Limited, London, England**
**Filed June 2, 1975, Ser. No. 582,881**
**Claims priority, application United Kingdom, June 5, 1974, 24889/74**
**Int. Cl.² B05B *17/06***
**U.S. Cl. 239—4** **2 Claims**



1. A process for the production of drop streams by modulating a liquid jet issuing from a nozzle wherein a liquid under pressure is supplied to a chamber which is fitted with a nozzle from which the liquid issues in the form of a jet, and a piezoelectric crystal which surrounds the nozzle or forms a part of a wall of the chamber has applied to it simultaneously a high frequency alternating signal of the fundamental frequency which causes drop formation and a second high frequency alternating signal the frequency of which is twice that of the fundamental signal.

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**4,018,384**
**FLOW ATTACHMENT DEVICE FOR THRUST VECTOR CONTROL**
**Robert Edward Fitzgerald, Wethersfield, and Robert Frederick Kampe, West Hartford, both of Conn., assignors to Chandler Evans Inc., West Hartford, Conn.**
**Filed Feb. 13, 1976, Ser. No. 657,751**
**Int. Cl.² B63H *11/10***
**U.S. Cl. 239—265.19** **6 Claims**



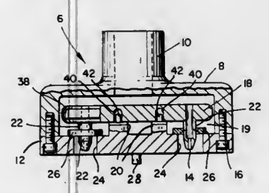
1. A thrust vector control system for generating control forces comprising:
an exhaust nozzle for directing an exhaust stream rearwardly along its longitudinal axis;
means to produce a flow through the exhaust nozzle;



a frame with longitudinally extending sides having an attachment surface defined between the sides thereof, mounted upon the nozzle such that the attachment surface extends outwardly in a radial direction with respect to the longitudinal axis of the nozzle and rearwardly from the rear end of the nozzle in the direction of the longitudinal axis of the nozzle, a front portion of the attachment surface being adjacent the rear end of the nozzle wall so that an exhaust stream emanating therefrom may attach to the attachment surface;
a pair of longitudinally extending side plates mounted upon the sides of the frame projecting radially inwardly toward the longitudinal axis of the nozzle such that a flow channel is defined by the inboard surfaces of the side plates and the attachment surface, the flow channel being positioned to receive only an annular sector of the exhaust stream when the exhaust stream is attached to the attachment surface and when the exhaust stream is detached from the attachment surface and the flow channel being of sufficient radial depth to permit ambient pressure at the attachment surface to detach the exhaust stream therefrom; and
passage forming means for establishing and terminating fluid communication between the attachment surface and the ambient atmosphere so that the annular exhaust stream sector may be respectively separated from or attached to the attachment surface.

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**4,018,385**
**OSCILLATING SPRAY HEAD**
**Leonard Bruno, 87 Lambert Ave., Farmingdale, N.Y. 11735**
**Filed Nov. 6, 1975, Ser. No. 629,487**
**Int. Cl.² B05B *1/34***
**U.S. Cl. 239—102** **7 Claims**

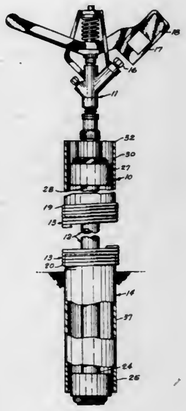


1. An oscillating spray head for securing to a source of fluid under pressure comprising a spray housing provided with an inlet and outlet and an inner wall, a cover secured to said outlet, said cover having a plurality of apertures therethrough disposed spacedly of said outlet and an outer edge portion, said cover having an inner face formed with spaced bars extending midway thereof, an oscillating plate superimposed on said spaced bars, and means in said plate cooperating with said apertures for forming an oscillating spray of fluid comprising a plurality of circumferentially disposed hollow posts integral with said plate, said posts extending through said plate into said apertures and being aligned therewith.

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**4,018,386**
**RESILIENT SPRINKLER RISER**
**Gary Douglas Barichello, Pasco, Wash., assignor to Michener Associates, Inc., Pasco, Wash.**
**Filed Mar. 8, 1976, Ser. No. 665,092**
**Int. Cl.² B05B *3/02***
**U.S. Cl. 239—200** **8 Claims**

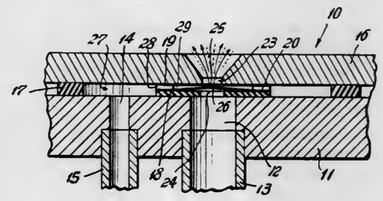
1. A resilient sprinkler riser comprising:
an elongated flexible water supply tube having a desired exterior diameter adapted to be connected to a water supply pipe at a lower end and extending upward therefrom to an upper end for receiving a sprinkler head;
an elongated resilient closed coil spring having an interior diameter greater than the exterior diameter of the water supply tube and extending between a lower end and an upper end and adapted for mounting coaxially about the water supply tube;
mounting means for mounting the closed coil spring coaxially about the water supply tube with the lower end of the closed coil spring being held in relation to the water supply tube and with the upper end of the closed coil spring being free to move axially with respect to the water supply tube when the upper end of the water supply tube



is laterally deflected with respect to the lower end of the water supply tube; and
said closed coil spring being sufficiently pretensioned along its length to: (a) hold the flexible supply tube in an upright condition against normal radial reaction forces applied to the tube by an operating sprinkler head, (b) allow lateral resilient deflection of the tube along its length in response to forces exceeding the normal reaction forces, and (c) return the tube to an upright condition after such deflection.

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**4,018,387**
**NEBULIZER**
**Elisha W. Erb, 444 Main St., Fitchburg, Mass. 01420, and Darrel R. Resch, 30 Walnut St., Leominster, Mass. 01453**
**Division of Ser. No. 588,353, June 19, 1975. This application July 1, 1976, Ser. No. 701,913**
**Int. Cl.² B05B *7/10, 7/04, 1/32***
**U.S. Cl. 239—405** **29 Claims**



1. A nebulizer device capable of reducing a flowable liquid to an ultrafine dispersion of liquid particles having an average diameter of less than about 10 microns and a maximum diameter below about 20 microns in a propellant gas, comprising a compartment adapted to contain a supply of flowable liquid, one or more small liquid orifices having a restricted width

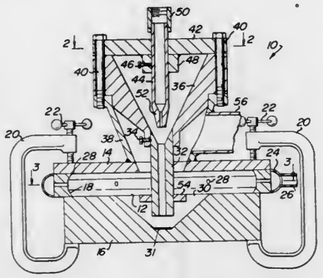
communicating with said compartment and adapted to permit said liquid to pass therethrough from said compartment as a liquid stream less than about 0.01 inch thin, said liquid orifice comprising the space between a pair of closely-spaced members, at least one of said closely-spaced members being a flexible member which is adapted to gradually further change the width of said orifice under the effect of gradual changes in the force of said gas and/or of said liquid whereby the force of said gas and/or said liquid can be adjusted to provide the width of said liquid orifice which will permit said liquid to pass therethrough from said compartment at the desired thinness, a conduit associated with said liquid orifice and adapted to supply a continuous flow of gas across said liquid orifice whereby said flowable liquid which passes from said compartment and through said narrow liquid orifice forms a very thin stream of said liquid which contacts said flowing gas in said conduit to form said ultrafine dispersion.

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**4,018,388**
**JET-TYPE AXIAL PULVERIZER**

**Norwood H. Andrews, Box 68, Moorestown, N.J. 08057**

**Filed May 13, 1976, Ser. No. 686,153**
**Int. Cl.² B02C** *19/06*
**U.S. Cl. 241—39** **8 Claims**



1. A grinding and classifying mill comprising a generally circular chamber defined by an upper wall, a lower wall, and a peripheral wall, said peripheral wall having a plurality of gaseous fluid nozzles arranged to propel gaseous fluid in both a forward and a transverse direction relative to the axis of said chamber to form a fluid vortex in said chamber, said nozzles being connected to a source of gaseous fluid under pressure, a generally conical recess in the central portion of said lower wall, a feed inlet means in the axial plane of said chamber, said feed inlet means having its outlet end aligned with the apex end of said recess, said feed inlet means being coaxial with an exhaust means leading from the central area of said chamber.

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**4,018,389**
**HIGH PRODUCTION MECHANICAL SEPARATOR MACHINE**

**Stephen A. Paoli, c/o Stephen Paoli Manufacturing Company, 2531 Eleventh St., Rockford, Ill. 61108**

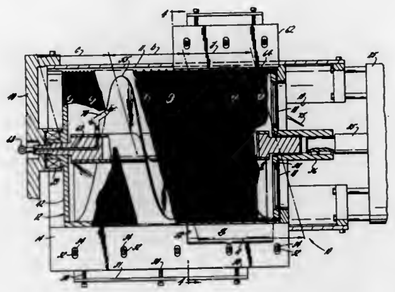
**Filed Sept. 29, 1975, Ser. No. 617,787**
**Int. Cl.² B02C** *21/00*
**U.S. Cl. 241—67** **10 Claims**

1. In a machine for mechanically separating comminuted edible meat from fragments of hard tissue such as bone, sinew and cartilage, said machine having a hollow, power driven rotor with helical cutting elements and initially constricted helical passages communicating with the interior thereof, and a pressure bar extending axially of said rotor spaced from the periphery thereof by an amount not substantially greater than the initial constriction of said helical passages, the combination comprising:

a. a generally cylindrical casing surrounding said power driven rotor, said casing having a feed opening adjacent the driven end of the rotor;

b. an upstanding hopper disposed in register with said feed opening;

c. means defining a relatively deep arcuate digesting pocket in said casing extending from said feed opening around at least 180° of rotor circumference;



d. means for restricting the rotor clearance with respect to said casing at the end of the pocket remote from the pressure bar; and

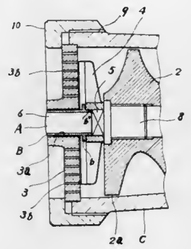
e. a plurality of breaker teeth formed in the peripheral portion of certain of said helical cutting elements in the region of said arcuate digesting pocket.

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**4,018,390**
**SLEEVE FOR USE IN A MEAT CHOPPER**

**Shinnosuke Funakubo, 3-6-1, Gyotoku Ekimae, Ichikawa, Chiba, Japan**

**Filed Jan. 22, 1976, Ser. No. 651,352**
**Int. Cl.² B02C** *18/36*
**U.S. Cl. 241—82.5** **3 Claims**



1. In a meat chopper having a housing, an auger rotatable in a chamber in said housing to drive meat which is to be ground from an opening in one end of the chamber toward a perforated grinder plate which is secured over an opening in the opposite end of chamber, a stud shaft releasably secured at one end to said auger and having on its opposite end a cylindrical journal portion which projects coaxially and rotatably through a bore in said grinder plate, and a rotary knife releasably secured to said stud shaft intermediate the ends thereof for rotation thereby adjacent the inside surface of said grinder plate, the improvement comprising

a bearing member having on one end a tubular portion surrounding said cylindrical portion of said shaft and projecting movably into one end of the bore in said grinder plate coaxially thereof, and

means releasably connecting the opposite end of said bearing member to one end of said knife whereby the rotation of said knife is imparted to said bearing member,

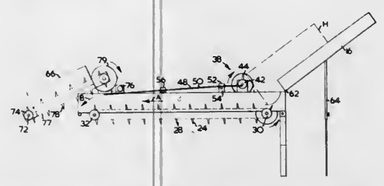
said tubular portion of said bearing member having an outside diameter less than the diameter of said bore in said grinder plate, whereby said tubular portion is disconnected from said grinder plate, and is rotatable in the bore thereof by said blade.



**4,018,391**
**CONTROLLED HAY BALE METERING AND FEEDING DEVICE**

**Ralph O. Jacobsen, Kyle, Saskatchewan, Canada (Solito)**

**Filed May 12, 1975, Ser. No. 576,783**
**Claims priority, application Canada, May 24, 1974, 200739**
**Int. Cl.² B02C** *18/16*
**U.S. Cl. 241—152 A** **3 Claims**



1. A device for the metering and positive feeding of hay bales comprising:

a. a primary conveying channel having a receiving end and a delivery end;

b. means adjacent the receiving end of the primary channel for receiving and metering a hay bale placed therein;

c. a secondary conveying channel extending from the delivery end of the primary channel and being inverted with respect thereto, said secondary conveying channel including a top wall and side walls inverted with respect to the primary channel;

d. means in the primary channel for conveying a metered bale from the receiving end to the delivery end of the channel;

e. means in the secondary channel, operating in conjunction with the primary channel conveying means, for receiving the metered bale material and positively conveying the same from the delivery end of the primary channel, said means in the secondary channel including a pair of spaced shafts, one mounted adjacent each end of said secondary channel, drive means on said spaced shafts and chains extending between said drive means and carrying pushing means thereon adapted to positively convey sections of said bale carried thereto by the conveying means in the primary channels; and

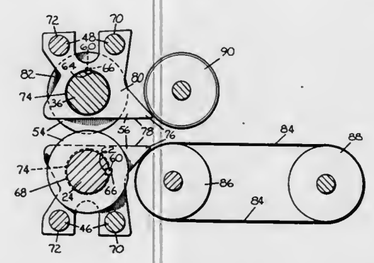
f. power means for operating the metering and conveying means.

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**4,018,392**
**SHREDDING MACHINE**

**John W. Wagner, Murrysville, Pa. 15668**

**Filed Dec. 22, 1975, Ser. No. 643,335**
**Int. Cl.² B02C** *18/14*
**U.S. Cl. 241—167** **10 Claims**



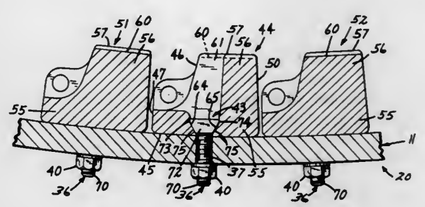
1. A shredding machine having a housing, a first and a second parallel spaced apart rotatably driven shafts rotatably mounted in said housing at end plates fixedly attached to said housing, driving means in said housing and operably connected to said shafts to drive said shafts counter to each other, a plurality of interfitting cutters having annular cutting surfaces disposed on said shafts and locked relative to said shafts to rotate therewith by locking means, at least two support rods fixedly attached at their ends to said end plates, said support rods being parallel to each other and to said first and second shafts, a comber interposed between each said cutters, each said comber having at least two openings therethrough, one said support rod in registration with and of slightly smaller diameter than one of said openings to provide mechanical support for each said comber, said first and second shafts in registration with and of slightly smaller diameter than another of said openings in each said comber to provide further mechanical support for each said comber, each said comber free floating along the axis of said first and second shafts and said support rods to which said comber is coupled, but mechanically supported substantially perpendicular to said axis, each said comber having a tongue protruding forwardly of said cutters to comb and direct the material being fed to said cutting surfaces of said cutters, the combers disposed on said first shaft having faces opposed and generally parallel to faces on the combers disposed on said second shaft, said faces defining the shredding path through said machine.

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**4,018,393**
**MOUNTING FOR GRINDER LINERS**

**Darrell R. Larsen, Salt Lake City, Utah, assignor to Minneapolis Electric Steel Casting Company, Minneapolis, Minn.**

**Filed Nov. 6, 1975, Ser. No. 629,503**
**Int. Cl.² B02C** *17/22*
**U.S. Cl. 241—182** **7 Claims**



1. In combination:

a liner for a grinding mill comprising a casting of tough, abrasion resistant material having a longitudinal axis, inner and outer grinding and mounting surfaces respectively, and a plurality of mounting apertures spaced axially therealong and extending from said grinding surface through said mounting surface, each of said apertures being generally oblong in the longitudinal direction and being defined by a first pair of opposed walls generally perpendicular to and extending through to said mounting surface, and a second pair of opposed walls tapering inward at least in part toward and extending through said mounting surface, the distance between the walls of said first pair extending in the direction of the axis of the liner;

and a plurality of mounting bolts each comprising a threaded shank dimensioned to pass through said aperture and extend beyond said mounting surface, and a head having a first pair of opposed surfaces generally conforming in shape to the first pair of aperture walls, the distance between the first pair of aperture walls being sufficiently large relative to that of the first pair of bolt head surfaces to permit adjustable bolt head movement in the longitudinal direction, and a second pair of opposed surfaces tapering inward for conforming engagement with the second pair of aperture walls.

**4,018,394**

## SHREDDING MACHINE FOR FIBROUS MATERIALS

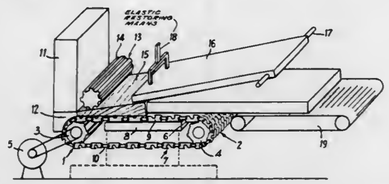
**Pierre Sorbier, Pernes-les-Fontaines, France, assignor to Agence Nationale de Valorisation de la Recherche (ANVAR), Neuilly-sur-Seine, France**

**Filed Nov. 24, 1975, Ser. No. 634,344**

**Claims priority, application France, Nov. 25, 1974, 74.39951**

**Int. Cl.² B02C** *19/00*

**U.S. Cl. 241—200** **12 Claims**



1. Machine for shredding fibrous material, said machine comprising:

an endless belt carrying defibering gouges, front and rear shafts over which said belt travels, to form an upper lap above said shafts and a lower lap beneath them,

stop means positioned near that end of the upper lap toward which said upper lap travels, to receive the end of the unshredded fibrous material and prevent its passage therebeyond,

and a member closely adjacent said upper lap which permits the passage of shredded material therethrough but prevents the passage of large chips, said member having an arcuate surface defining, with the portion of said belt passing over said front shaft, a narrow gap sufficient to prevent said gouges from striking said arcuate surface, but insufficient to pass large chips.

**4,018,395**

## PLATE MILL FOR PEBBLES, GRAVEL OR LIKE MATERIALS

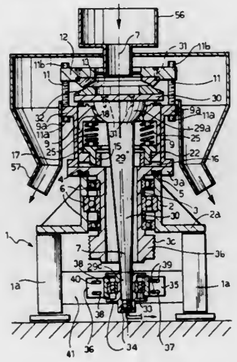
**Tarcisio Pozzato; Mariano Pozzato, and Alberto Pozzato, all of Via Grattacavallo 2, Sandrigo (Vicenza), Italy**

**Filed Feb. 25, 1976, Ser. No. 661,327**

**Claims priority, application Italy, Mar. 20, 1975, 21468/75**

**Int. Cl.² B02C** *7/10, 7/16*

**U.S. Cl. 241—252** **6 Claims**



1. In a plate mill for gravel or like materials, of the type comprising:

a support structure,

a first crusher plate mounted on said support structure for rotation about an axis perpendicular to said plate,

a second crusher plate carried on said support structure facing said first plate,

a shaft carried by said support structure so as to be rotatable about its longitudinal axis and angularly adjustable in relation to the axis of rotation of said first plate, said shaft carrying said second plate at one end thereof for rotation about the axis of said shaft perpendicular to said plate, and

means for driving one of said two plates to rotate,

the improvement wherein there is provided:

a cylinder carried by said support structure coaxial with said first plate and surrounding a portion of said shaft at the upper end thereof,

an inner sleeve fixed to said support structure at one end of said cylinder, said inner sleeve defining, with said cylinder, an annular chamber coaxial with said cylinder, said annular chamber being closed by said support structure at the end remote from said second plate,

a piston assembly with an annular cross-section rotatably and axially slidable within said cylinder and extending into said annular chamber,

a first member of said piston assembly having means defining a part-spherical socket in the end thereof nearest said second plate, said part-spherical socket having means defining a central opening therein larger than the diameter of said shaft,

said shaft extending through said opening,

an enlarged, part-spherical head on the end of said shaft, said part-spherical head being engaged in said part-spherical socket,

means defining an annular groove extending around said part-spherical head coaxially with respect to the axis of said shaft,

means defining a first lubricant conduit in said annular piston said first lubricant conduit communicating at one end thereof with said annular chamber, and at the other end thereof with said annular groove in said part-spherical head of said shaft,

a lubricant reservoir,

means defining a second lubricant conduit in said shaft, said second lubricant conduit communicating at one end thereof with said annular groove in said part-spherical head of said shaft, and at the other end with said lubricant reservoir, and

means for pressurising said lubricant in said reservoir whereby to urge said piston assembly, carrying said second plate, towards said first plate whereby to position said two plates a selected distance apart.

**4,018,396**

## EMBEDDED HOUSING FOR ORE CRUSHER

**Robert S. Shoemaker, Millbrae; Donald H. Moyer, El Cerrito, and Joseph J. Newman, Orinda, all of Calif., assignors to Bechtel International Corporation, San Francisco, Calif.**

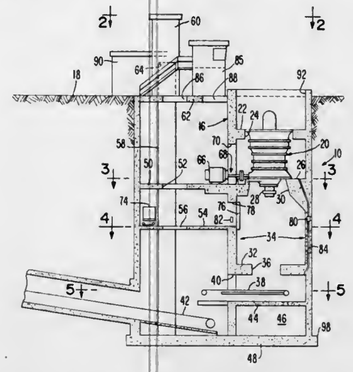
**Filed May 5, 1975, Ser. No. 574,217**

**Int. Cl.² B02C** *23/00*

**U.S. Cl. 241—301** **17 Claims**

1. Structure for containing an ore crusher and associated ore handling equipment below ground level comprising: a hollow, concrete housing having a pair of upright tubular segments and a common wall between the segments at the region of intersection thereof, the segments having convex outer surfaces and defining with the wall a generally figure eight configuration, the housing adapted to be disposed below ground level and having a floor disposed within and integral with one of the segments for supporting an ore crusher, said floor having an opening therethrough, the ore crusher being





operable to discharge through said opening when the ore crusher is supported by said floor.

**4,018,397**

## UNFURLING DEVICE FOR TUBULAR EXTENDIBLE STRUCTURES

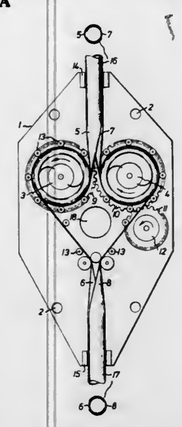
**Dieter Rüsch; Heinz Gläser, both of Wedel, Holstein, and Otto Lübcke, Hamburg, all of Germany, assignors to Licentia Patent-Verwaltungs-G.m.b.H., Frankfurt am Main, Germany**

**Filed Mar. 18, 1976, Ser. No. 668,074**

**Claims priority, application Germany, Mar. 25, 1975, 2513080**

**Int. Cl.² B65H** *75/38;* **E04H** *12/18*

**U.S. Cl. 242—54 A** **6 Claims**



1. A system for establishing tubular structures comprising: two pairs of elongate strips of elastically deformable material, each said strip having been fabricated to normally assume the form of a tube having an axis parallel to the length of said strip and being capable of being coiled about an axis perpendicular to such tube axis and being flattened in the direction of its width while retaining its ability to assume the form of a tube upon being uncoiled; two coiling drums each arranged to receive a respective pair of said strips and each rotatable in a coiling direction of rotation for simultaneously coiling the strips of its respective pair about an axis perpendicular to the lengths of said strips, and in an uncoiling direction of rotation for simultaneously uncoiling the strips of its respective pair; said drums being laterally spaced from one another and being aligned so that the longitudinal center lines of said strips on said drums lie in a common plane; and means defining two guidance exit openings each receiving a respective strip of each said pair in a manner such that during rotation of said drums in their respective uncoiling directions, portions of the two said strips received by each said opening assume the form of a tube and become interengaged to form a dual tubular member.

**4,018,398**

## WINDING HUB FOR A RECORD CARRIER IN THE FORM OF A TAPE

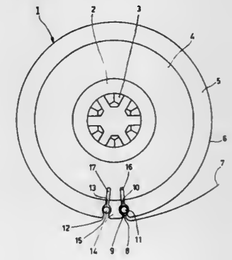
**Friedrich Louzil, Vienna, Austria, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Sept. 30, 1975, Ser. No. 618,217**

**Claims priority, application Austria, Oct. 3, 1974, 7982/74**

**Int. Cl.² B65H** *75/28*

**U.S. Cl. 242—74.1** **2 Claims**



1. A winding hub assembly for a tape comprising a hub having a circumference, and first and second recesses having walls and terminating at said circumference, each recess having a restriction at the respective termination, said recesses defining a hub portion therebetween; said hub comprising means for allowing elastic deformation of said portion; a first clamping member arranged to be clamped in said first recess for clamping a tape between the first clamping member and walls of the first recess; and a second clamping member arranged to be clamped in said second recess so as to bias said portion toward said first recess, thereby clamping said first member.

**4,018,399**

## AUTOMATIC LOCKING DEVICE FOR A VEHICLE SAFETY BELT

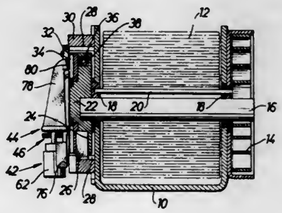
**Gert Ingmar Rex, 84 Stenhuggarvagen, 302 40 Halmstad, Sweden**

**Continuation of Ser. No. 386,380, Aug. 7, 1973, abandoned. This application May 7, 1975, Ser. No. 575,250**

**Claims priority, application Sweden, Aug. 9, 1972, 10354/72**

**Int. Cl.² A62B** *35/02;* **B65H** *75/48*

**U.S. Cl. 242—107.4 A** **8 Claims**



4. An automatic locking device for a safety belt of the type intended to retain a person in a vehicle, comprising

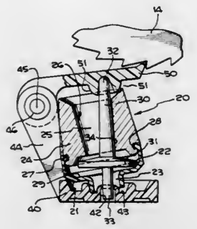
a casing fixedly secured in the vehicle,

a shaft rotatably mounted in said casing,

a belt wound on said shaft,
a coil spring secured at opposite ends to said shaft and casing for winding said belt on said shaft, and
a locking mechanism actuatable, when change of speed of the vehicle exceeds a predetermined g-value, to lock said shaft against rotation, comprising
a bridge member secured in said casing,
a cylindrical pendulum member suspended from said bridge member for universal movement thereon in all directions about points offset equally from a vertical reference line which passes through the center of gravity of said pendulum member when said pendulum member is at rest,
a pivoted movement about an axis extending transverse to and laterally offset from said vertical line,
a cooperating locking member positioned to be engaged by said pivoted locking member, and normally to be rotatable with said shaft,
said pivoted locking member being disposed vertically above said pendulum member and having on its underside a point disposed in contact with the upper end of said pendulum member coaxially thereof, when said pendulum member is at rest, whereby, when the change of speed of the vehicle exceeds said predetermined g-value said locking member will be pivoted about its axis to engage said cooperating locking member and retard its rotation, and
means engaging said cooperating locking member to lock said shaft against rotation in said casing when said cooperating locking member is retarded.

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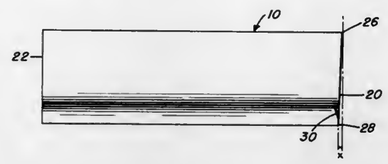
**4,018,400**
**VEHICLE INERTIA SENSORS**
**Cyril Henderson, Woodland Hills, Calif., assignor to American Safety Equipment Corporation, Encino, Calif.**
**Filed Aug. 11, 1975, Ser. No. 603,519**
**Int. Cl.² A62B** *35/02*; **B65H** *75/48*
**U.S. Cl. 242—107.4 A** **17 Claims**



1. In a seat belt webbing retractor for a vehicle for preventing protraction of said webbing when the vehicle undergoes changes in momentum above a predetermined level, the retractor including a retractor frame, a lockable belt storage reel and associated reel lock actuating means including lever means moveable in response to movement of an associated inertia sensing pendulum means, the improvement in such reel lock actuating means comprising the provision of:
a pendulum body including a light weight apertured base of cup-like configuration having an interiorly formed actuator camming surface means, a hollow cylindrical inertia sensing mass of a material relatively heavier than said base and means for securely attaching said mass to said base with said hollow mass and apertured base providing a vertical axial bore therethrough;
actuator shaft means disposed in said axial bore of said pendulum body and including a thrust flange intermediate its upper and lower ends, said flange being contained within said pendulum body and normally resting on said actuator camming surface means and with said upper end extending outwardly of said mass; and
support means on said retractor for supporting said pendulum body with said actuator shaft means upper end positioned for moving said lever means to cause lockup of said retractor upon movement of said pendulum body on said support means and relative to said actuator shaft means, said actuator shaft means being moved by engagment between said thrust flange and said camming surface means.

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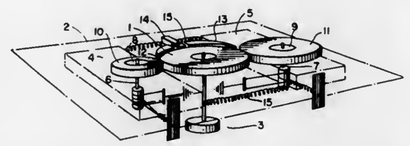
**4,018,401**
**YARN TUBE WITH SLANT CUT END**
**McCleery B. Cunningham, Hartsville, S.C., assignor to Sonoco Products Company, Hartsville, S.C.**
**Filed May 28, 1976, Ser. No. 690,901**
**Int. Cl.² B65H** *75/10*, *75/28*
**U.S. Cl. 242—118.3** **6 Claims**



1. A yarn tube for use on a winding spindle having cutting means thereon, said yarn tube including a linear axis and first and second ends, said ends being planar and oriented at different angles to the linear axis of the tube, the plane of one of said ends forming an acute angle with a plane perpendicular to the linear axis whereby, upon the abutment of the first end of the tube with the second end of a duplicate tube in axial alignment therewith, an abutting surface and a space will be provided between the abutted tube ends with the space extending about a significant portion of the circumference of the tubes in the area of the abutment for passage of yarn therethrough and into engagement with spindle mounted cutting means.

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**4,018,402**
**TAPE TRANSPORT APPARATUS**
**Donald L. Burdorf, Newport Beach, Calif., assignor to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany**
**Filed May 6, 1975, Ser. No. 574,958**
**Int. Cl.² G03B** *1/04*; **G11B** *15/32*
**U.S. Cl. 242—192** **18 Claims**



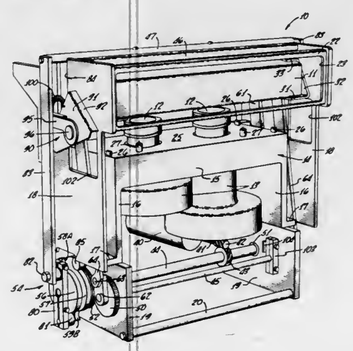
5. In a reversible tape transport of the type having reels which alternately serve as supply and take-up reels on shafts rotatably mounted on supports movable toward and away from a driving capstan having a resiliently deformable peripheral portion and being rotatably mounted on the tape transport base,
the improvement that said transport comprises:
a coupling means including a unidirectional clutch on each of said shafts, each said coupling means having an element coaxial with the corresponding shaft and arranged for free rotation in one direction, and
an elongated flexible brake member/resilient means combination for each of said shafts, both ends of said combination being anchored at said tape transport and at least one of said ends at said base thereof, and each said flexible brake member being at least partially wrapped around said one element of the corresponding coupling means,



such that, due to the joint action of said coupling means and said brake member/resilient means combination, a braking action is exerted substantially on the rotation of said supply reel only, thereby to create a first tensioning component in the span of tape between said supply reel and said take-up reel, and simultaneously a bias is generated between said reels and said capstan which bias is greater between said take-up reel and said capstan than between said supply reel and said capstan, thereby to create, by virtue of the resultant difference in the deformation of the periphery of said capstan at the interfaces between said reels and said capstan, a second tensioning component in said span of tape.

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**4,018,403**
**CASSETTE LOADER FOR VIDEO RECORDER/REPRODUCER**
**Gordon Schulz, Villa Park, Calif., assignor to Odetics, Inc., Anaheim, Calif.**
**Filed Jan. 19, 1976, Ser. No. 650,455**
**Int. Cl.² G03B** *1/04*; **G11B** *15/32*, *23/04*
**U.S. Cl. 242—198** **17 Claims**

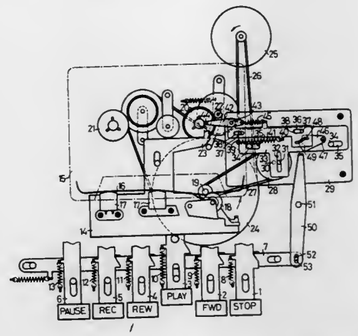


1. A loading mechanism for delivering a standard video cassette onto a pair of reel drive hubs comprising:
means for receiving said video cassette, said receiving means including an open shelf having a bottom and opposed side walls;
means for lowering said receiving means shelf and said video cassette therein onto said drive hubs, said drive hubs extending through a pair of openings in said shelf bottom;
support means extending through said shelf bottom, adjacent the four corners thereof, for contacting the bottom of said cassette in the lowered position of said shelf;
means contacting the top of said cassette for clamping said cassette down onto said support means; and
means operative when said receiving means shelf reaches said lowered position for momentarily applying a force to said top of said cassette, directly above the reels therein, to force said reels onto said reel drive hubs.

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**4,018,404**
**AUTOMATIC TAPE STOPPING DETECTIVE DEVICE IN A MAGNETIC RECORDING AND REPRODUCING APPARATUS**
**Yasuo Sami, Yamatotakada, Japan, assignor to Sanyo Electric Co., Ltd., Osaka, Japan**
**Filed June 4, 1975, Ser. No. 583,695**
**Claims priority, application Japan, June 11, 1974, 49-66718**
**Int. Cl.² G03B** *1/04*; **G11B** *15/32*, *23/04*
**U.S. Cl. 242—200** **8 Claims**

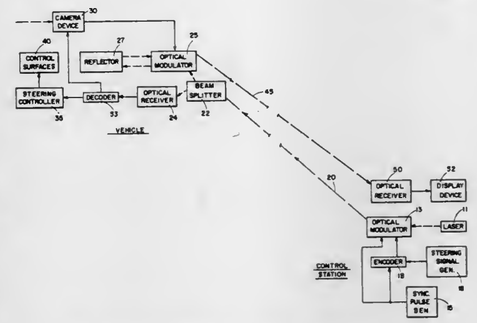
1. An automatic tape stopping detective device in a magnetic recording and reproducing apparatus which detects the stopping of the run of the tape, comprising a take-up reel disk means which rotates with the run of the tape, a crank pulley means which always rotates whether the tape is running or not, a main lever operatively associated with a sliding mechanism, said means lever being driven by said crank pulley means, and moves in the left and right direction in a definite stroke, a sub-lever which is adapted to move in the left and




right direction with said main lever when said take-up reel disk means is rotating and stops regardless of the movement of said main lever when said take-up reel disk means is not rotating, and a control lever pivotally mounted on said main lever, said control lever moving with the movement of said main lever when said sub-lever stops.

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**4,018,405**
**VEHICLE GUIDANCE CONTROL LINK UTILIZING LIGHT BEAM**
**William Gene Baker, Rolling Hills Estates, Calif., assignor to Northrop Corporation, Los Angeles, Calif.**
**Filed Oct. 18, 1974, Ser. No. 516,082**
**Int. Cl.² F41G** *7/00*, *9/00*; **F42B** *15/02*
**U.S. Cl. 244—3.14** **8 Claims**

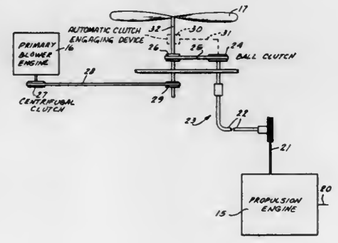



1. A vehicle guidance control link for controlling the steering of a vehicle from a remotely located control station comprising:
means at the control station for generating a laser beam,
means for generating control signals for steering said vehicle, said last mentioned means including a manually operable control,
means for modulating said beam with said control signals, said beam being directed towards said vehicle,
means on the vehicle for receiving said beam and including means for splitting the beam into first and second portions,
means for demodulating the control signals from said second beam portion,
means responsive to said control signals for steering the vehicle,

means for generating a video signal indicating objects in the path of the vehicle,
means for modulating the first beam portion with said last mentioned signal,
means for reflecting the first beam portion back to said control station,
means at said control station for receiving said reflected beam and including means for demodulating said video signal therefrom, and
display means for providing a visual display of said video signal,
whereby an operator by observing said display is enabled to manipulate said manually operable control to determine said control signals.

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**4,018,406**
**REDUNDANT BLOWER DRIVE FOR PRESSURIZED HOT AIR AIRSHIP**
**Roger R. Parsons, Sioux Falls, S. Dak., assignor to Raven Industries, Inc., Sioux Falls, S. Dak.**
**Filed Apr. 12, 1976, Ser. No. 676,246**
**Int. Cl.² B64B *1/58***
**U.S. Cl. 244—98** **8 Claims**

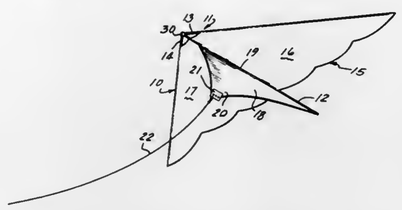



1. A thermal airship comprising in combination:
an elongate gas envelope of soft flexible material being aerodynamic shaped for horizontal flight providing a hull for the airship;
tail members on the aft end of the airship for controlling the horizontal flight;
a gondola carried below the hull for supporting a payload;
a first motor driving a propeller for propelling the airship horizontally being supported by the hull;
means defining a pressurizing inflation opening leading into the hull;
hot air pressure generating means for pressurizing the soft envelope with heated air during flight including a blower carried on the hull driven by a second motor and positioned for moving a flow of air through the opening for inflating the envelope with a superpressure;
a controlled burner positioned in the path of air flow heating the air passing into the envelope interior;
a drive train connected between said first motor and said blower;
and drive train clutch means in said drive train for connecting the blower to be driven by the first motor in the event of failure of the second motor whereby the airship will remain pressurized.

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**4,018,407**
**KITE**
**Arthur B. Aber, Montreal West, Canada, assignor to Stanbel, Incorporated**
**Filed Dec. 29, 1975, Ser. No. 644,962**
**Int. Cl.² B64C *31/06***
**U.S. Cl. 244—153 R** **3 Claims**

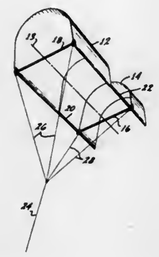
1. A keel kite adapted for flying in any of various wind-strength conditions from a string, said kite comprising:
a central, hollow, tubular frame member lying in a longitudinal, central, vertical plane of said kite;
second and third hollow, tubular frame members lying in a plane transferse to said central vertical plane and detachably joined to said central frame member at a nose piece of said kite;
said nose piece comprising integral first, second, and third lugs each removeably receiveable snugly within an end of a respective one of said frame members for orientation thereof in said central and transverse planes, the second and third lugs forming the same angle to the central plane on either side thereof;
a flexible lifting surface attached to and extending among said frame members;
a flexible keel attached to said central frame member in said central plane;



a string attachment plate affixed to a lowermost portion of said keel opposite the central frame members, the plate comprising a reinforcing material and forming at least three apertures therethrough; and
the apertures being aligned parallel to the central frame member and spaced apart within a distance of about 2 inches (5 centimeters),
whereby said frame members are maintained in their relative planes at said nose piece, and whereby placing said string selectively in a forwardmost one of said apertures decreases the angle of attack of the kite to decrease lift and improve performance in high-speed winds and placing the string in a rearwardmost one of said apertures increases the angle of attack of the kite to increase lift and improve performance in low-speed wind conditions.

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**4,018,408**
**CONCAVE PARABOLIC ARCH KITE**
**Peter J. Pearce, and Toby J. Cowan, both of Studio City, Calif., assignors to Synestructics, Inc., Chatsworth, Calif.**
**Filed July 15, 1975, Ser. No. 596,015**
**Int. Cl.² B64C *31/06***
**U.S. Cl. 244—153 R** **11 Claims**

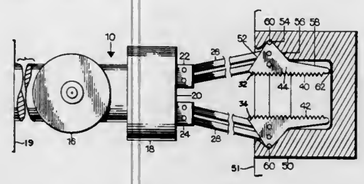


1. A kite comprising:
at least two sails formed from rectangular sheets disposed about sections of the surface of an imaginary right parabolic arch which extends in forward and aft directions so that a first pair of edges of each sail are parallel to the axis of the arch and colinear and a second pair of edges, forward and aft, of each sail are curved and lie in parallel planes, said sails being separated from each other axially; and,
a substantially rectangular frame having a pair of opposite sides to each of which the colinear edges of each sail are secured, the opposite sides extending in the aft direction beyond the end of the rectangle.



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**4,018,409**
**COMBINED DOCKING AND GRASPING DEVICE**
**John L. Burch, Decatur, and James D. Johnston, Madison, both of Ala., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.**
**Filed Aug. 7, 1975, Ser. No. 602,617**
**Int. Cl.² B64G *1/00***
**U.S. Cl. 244—161** **11 Claims**

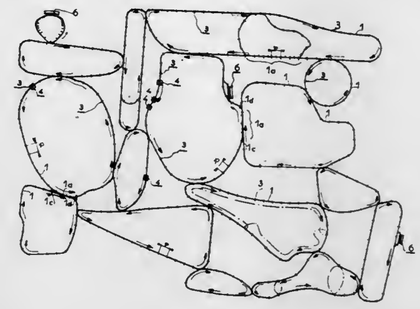


1. A combined docking and grasping device for use with a manipulator arm on a docking vehicle for mechanically connecting together the docking vehicle with a docking payload having a receptacle for receiving said device therein, said manipulator arm including a mechanical wrist joint having a pair of rotatable axes providing said arm with movement about two perpendicular axes, said device comprising:
a. a pair of jaw members movable towards each other and away from each other to a spread apart configuration;
b. an elongated linkage assembly connecting each of said jaw members to said wrist joint;
c. means carried adjacent said wrist joint for moving said elongated assembly causing said jaw members to move towards and away from each other;
d. each of said jaw members having an interface surface enabling said jaw members to grip an object securely between said surfaces; and
e. a cam portion formed on an upper surface of each of said jaw members for engaging a receiving portion formed within said receptacle when said jaw members are in a spread apart condition to interlock said docking vehicle and docking payload together;
whereby said manipulator arm may be selectively utilized either as a docking device or as a general purpose grasping device to pick up an object.

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**4,018,410**
**METHOD FOR THE OPTIMIZED TRANSPORTATION OF PASSENGERS OR OBJECTS**
**Charley Renaux, Jouques, France, assignor to Halberthal S.A., Terville, France**
**Filed Dec. 30, 1974, Ser. No. 537,461**
**Claims priority, application France, Jan. 11, 1974, 74.01066**
**Int. Cl.² B61L *27/04***
**U.S. Cl. 246—5** **1 Claim**

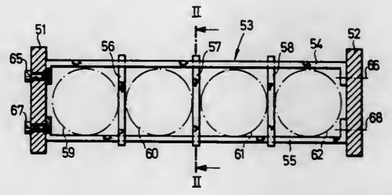
1. A method of transporting objects from plural starting points to plural final destinations in a continuous manner and always in the same directions, said method comprising the steps of providing a network of routes including several one-way closed circuit routes, arranging said routes to have convergent and divergent stretches and common zones between said stretches, providing a plurality of vehicles for movement along said routes, providing guide-marking elements and traversing each route in a one-way sense and in a continuous movement, arranging said guide-marking elements in each common zone at controlled spacing designated as pitch P and moving said guide-marking elements at a controlled speed V, keying said guide-marking elements to said vehicles by a servo system during the movement thereof over said routes, providing said vehicles with means permitting changing of said guide-marking elements, shifting said guide-marking elements in said common zones from one route to another and utilizing said guide-marking elements as pilots for said vehicles, providing said routes with counter means fixed at an exit from each of said divergent stretches for detecting positions of vehicles with respect to said guide-marking elements and controlling



said servo system for resetting the keying of said vehicles on said guide-marking elements, providing said routes with fixed signal means for executing at selected moments orders to change routes of said guide-marking elements, providing said routes with means for executing rekeying of vehicles with said guide-marking elements upon command from said counter means, calculating the number of vehicles anticipated per section of said routes for each selected unit of time, prior to the departure of each vehicle from its starting point fixing the itinerary of said vehicle in accordance with the anticipated congestion of vehicles, and utilizing said counter means and said fixed signal means to follow said fixed itinerary.

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**4,018,411**
**POWER FEED CHAIN**
**Kurt Hennig, Georgensteinstr. 16, 8 Munich 71, Germany**
**Division of Ser. No. 422,206, Dec. 6, 1973, abandoned. This application Mar. 31, 1975, Ser. No. 563,589**
**Claims priority, application Germany, Dec. 19, 1972, 2262018; Sept. 20, 1973, 2347383**
**Int. Cl.² F16L *3/16***
**U.S. Cl. 248—49** **1 Claim**



1. A strut for connecting two chain bands of a power feed chain, wherein the improvement comprises a lightweight structure which is a rigid bridge and therefore resists twisting so as to hold the two chain bands parallel to one another, said rigid bridge being in the form of a rigid grid comprising two cross-ties consisting of strips of flat material arranged in parallel planes, and a plurality of spacers, each consisting of a strip of flat material, arranged in parallel planes that are perpendicular to the planes of the cross-ties, each of said spacers having

two notches to receive the two cross-ties, said notches being formed in opposite sides of the strip and being located adjacent to opposite ends of the strip, and each notch having a depth substantially equal to the width of the cross-tie which is received in the notch, and having parallel sides which fit against the sides of the cross-tie to prevent pivoting of the spacer relative to the cross-tie, thus forming said rigid bridge connecting the chain bands.

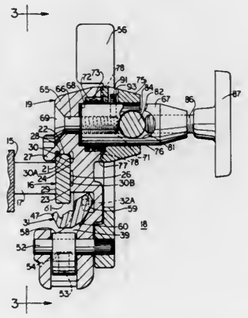
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**4,018,412**

**BRACKET FOR AN OPERATING TABLE**

**George Kees, Jr., Alexandria, Ky., and Horst R. Hickmann, Anderson Township, Hamilton County, Ohio, assignors to Kees Surgical Specialty Company, Cincinnati, Ohio**

**Filed Oct. 14, 1975, Ser. No. 622,362**
**Int. Cl.² A01B *15/00*; F16B *1/00***
**U.S. Cl. 248—214** **4 Claims**



1. An instrument support bracket for an operating table which comprises a body having a downwardly directed support face for overlying an upper face of a support bar of the operating table, an upright face for engaging an upright outer face of the support bar, and a lip for engaging an inner upright face of the support bar, a locking clamp jaw member, said locking clamp jaw member having a locking face engageable with an underside of the support bar, a lip engageable with the inner upright face, and pivot pin means spaced from the lip and from the locking face, upright slot means in the body for guiding the pivot pin means for up and down movement, a cam pivotally mounted in the body under the locking clamp jaw member and engageable with the locking clamp jaw member, in the plane of the slot means being at right angles to the pivotal axis of the cam, and means for swinging the cam, the cam being arranged to swing the locking clamp jaw member between a lowered position in which the lip is free of the support bar and an intermediate position in which the lip of the locking clamp jaw member engages the support bar and the locking face underlies the lower face of the support bar in opposed relation thereto when the cam is swung in a locking direction, further swinging of the cam in locking direction advancing the locking clamp jaw member into locking engagement with the underside of the support bar.

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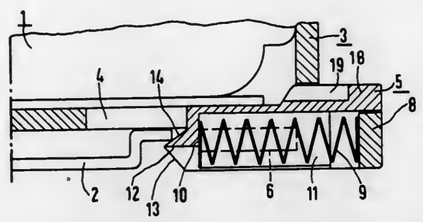
**4,018,413**

**ELECTRICAL EQUIPMENT MOUNTING APPARATUS INCLUDING A MOVABLE MOUNTING MEMBER**

**Johann Bauer, Amberg, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany**

**Continuation of Ser. No. 488,838, July 15, 1974, abandoned. This application Aug. 6, 1975, Ser. No. 602,469**
**Int. Cl.² E04G *3/00*; H01R *9/00***
**U.S. Cl. 248—214** **2 Claims**

1. In an electrical equipment apparatus including an equipment housing (1) and at least one slidable mounting member (5) for fastening the electrical equipment to a support rail (2), said mounting member being guided by guide keys (6) provided in said equipment housing and including a compression spring (9) having one end thereof disposed in engagement with said mounting member and the other end thereof in engagement with said equipment housing, the improvement comprising means for limiting the movement of said mounting member in said equipment housing when said equipment is removed from said rail including a pair of barb-like, resilient stop members (16) formed on said mounting member and extending transversely with respect to the direction of movement thereof, said mounting member including a longitudinally disposed recess for receiving said compression spring, said recess having an elongated slot on one side thereof for permitting said stop members to be compressed inwardly for inserting and removing said mounting member into and from said equipment housing, and said equipment housing including recesses provided therein for receiving said stop members and starting surfaces (21) inclined inwardly toward the sides of said mounting member for guiding said stop members into said recesses, said stop members cooperating with said recesses for limiting the movement of said mounting member in said equipment housing.



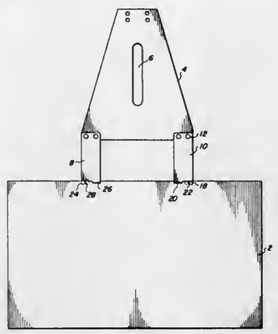
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**4,018,414**

**HOLDING FIXTURE**

**Everett Arthur Rote, Corona, Calif., assignor to Xerox Corporation, Stamford, Conn.**

**Filed Aug. 7, 1975, Ser. No. 602,701**
**Int. Cl.² B42F *13/00***
**U.S. Cl. 248—317** **3 Claims**



1. A board holding fixture comprising:
a. a supporting member
b. said supporting member having a first and second extension connected thereto,
c. each of said first and second extensions having a transverse groove therein to form a pair of flanges,
d. a notch cut into one of the flanges formed by said transverse groove on each extension to form a lip,
e. a notch cut into the other of said flanges on each extension to form a second lip,
f. each of said lips being horizontally displaced relative to the other,
g. a pin mounted on one of said lips on each extension onto which pins the board is mounted.

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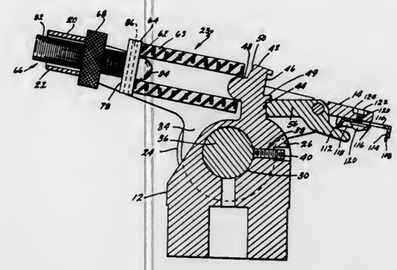


**4,018,415**

**MECHANISM FOR TILTING CHAIRS**

**Richard H. Wolters, Grand Rapids, Mich., assignor to Herman Miller, Inc., Zeeland, Mich.**

**Filed Jan. 13, 1976, Ser. No. 648,793**
**Int. Cl.² A45D *19/04*; F16M *13/00***
**U.S. Cl. 248—381** **13 Claims**



1. A chair tilting mechanism having a vertical spindle support and a tilt plate extending in a plane laterally from and at right angles to said spindle support and pivotally carried by said spindle support; stop means carried by said tilt plate and cooperating with said spindle support for limiting forward pivotal movement of said tilt plate relative to said spindle support, the improvement in said mechanism comprising: an encapsulated, coil spring operatively connected between said spindle support and said tilt plate and having its central axis generally parallel to and substantially in the plane of said tilt plate for providing a return torque opposing backward pivotal movement of said tilt plate.

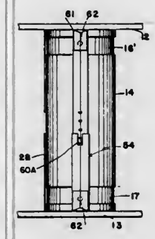
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**4,018,416**

**RESILIENT, DESTRUCTABLE CORE MEANS**

**Erhard Armin Diener, 643 Saskatchewan Crescent E., Saskatoon, Canada**

**Continuation-in-part of Ser. No. 440,589, Feb. 7, 1974, Pat. No. 3,921,953. This application Nov. 14, 1975, Ser. No. 631,881**
**Int. Cl.² B28B *7/30*, *7/34***
**U.S. Cl. 249—62** **6 Claims**



1. A vent forming device for walls and the like of concrete adapted to be embedded in the wall when same is poured between a pair of wall forms, comprising in combination a substantially cylindrical sleeve, a pair of cores of semi-rigid thermoplastic material one in each end of said sleeve being slidably engageable within said sleeve, wall form engaging end caps one on each outer end of said cores, means between said cores normally urging said cores apart from one another, flammable means extending through said cores which, when ignited, partially destroys said cores, and igniting means connected to said flammable means and extending from the outer end of at least one of said cores for igniting said flammable means.

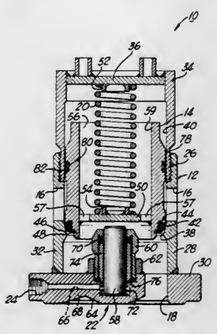
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**4,018,417**

**VALVE AND SEAL ASSEMBLY THEREFOR**

**Herbert G. Hanson, Arlington Heights, Ill., assignor to Vapor Corporation, Chicago, Ill.**

**Continuation of Ser. No. 485,901, July 5, 1974, abandoned. This application Nov. 24, 1975, Ser. No. 634,423**
**Int. Cl.² F16K *31/163***
**U.S. Cl. 251—63.5** **9 Claims**



1. In an internal safety shutoff and operating valve including a housing defining a cylinder having fluid inlet and outlet means, a piston assembly movable in said cylinder comprising a generally cylindrical rigid body having a central axial opening extending throughout its length for balancing pressures acting on the piston assembly, a first groove adjacent an end of said body, valve closure means including a valve seal member mounted in said first groove, valve actuating means for operating said valve to control fluid flow through said inlet and outlet means, a circular cylindrical wall formed on the exterior of said body spaced from said first groove and sized to move with clearance in said cylinder, a seal retention groove extending around said cylindrical wall and having a generally rectangular shape with rounded interior corners, and a plastic seal ring in said groove for sealingly engaging said cylindrical wall, said seal ring including first and second grooves extending respectively around the inner and outer surfaces of said seal ring and passage means intercommunicating said first and second grooves, said seal ring of a configuration including corners substantially of a right angle whereby said seal corners interact with said rounded interior corners to provide a mechanical camming of said seal relative to said groove.

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**4,018,418**

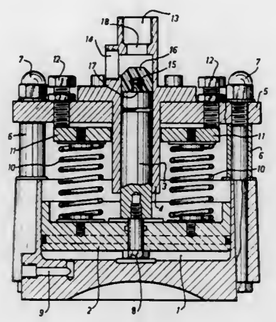
**FLOW GOVERNOR**

**Guy Dion-Biro, 46 Avenue du Chateau, 94300 Vincennes, France**

**Continuation of Ser. No. 494,271, Aug. 2, 1974, abandoned. This application Feb. 27, 1976, Ser. No. 662,208**
**Int. Cl.² F16K *31/363***
**U.S. Cl. 251—63.6** **3 Claims**

1. A flow governor for regulating the inlet of gas from a high pressure liquified source, said governor comprising a body having a cylindrical bore, a piston slidable in said bore and having a lower face with an abutment and an upper face with a central rod thereon, said lower face of the piston defining with said body a control chamber, a bushing fixed to said body and having an axial bore in which said piston rod is slidable, said bushing including a coaxial top cap in which said bore extends, said top cap having a first orifice coaxial with said bore and forming an inlet for high pressure liquified gas from a source thereof, and a second orifice perpendicular to the

first orifice and to said bore for outlet of the gas for expansion thereof and supply of expanded gas to said control chamber, a plunger elastically mounted on said piston rod for free movement thereon and including a frusto-conically shaped end portion, said plunger being slidably displaceable in said bore and being self-centering when sliding in said cap, said cap including a wall with an aperture therein between said first



and second orifices, said frusto-conically shaped end portion of said plunger facing said aperture in said wall which serves as a seat for said end portion, and resilient means acting on said upper face of the piston and on said body to urge the piston in a direction to reduce the size of the control chamber, said resilient means including a plurality of adjustable springs distributed on said upper face of the piston.

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**4,018,419**

**MINIATURE SOLENOID VALVE**

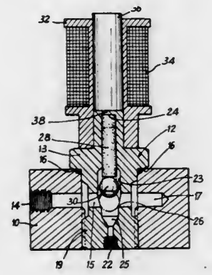
**Louis Monpetit, Foncquevillers, France, assignor to Societe Anonyme D.B.A., Clichy, France**

**Filed Jan. 2, 1976, Ser. No. 646,221**

**Claims priority, application France, Jan. 6, 1975, 75.00210**

**Int. Cl.² F16K** *31/08*

**U.S. Cl. 251—65** **7 Claims**



1. A solenoid valve comprising a body assembly with a first and a second orifices, for controlling fluid communication in passage means defined between said first and second orifices, a valve seat being defined in said passage means, a valve member adapted to engage said valve seat thereby interrupting fluid communication between the first and the second orifices in response to predetermined operative conditions, said solenoid valve comprising coil means cooperating with a fixed core for changing magnetization of the latter in response to energization of the coil means, a magnetized rod to which said valve member is attached, said rod being slidably mounted in said body assembly, said magnetized rod being substantially coaxial with the core so that it is normally attracted toward the core when the coil means are not energized, and that it is pushed away from said core when the coil means are energized for urging said valve member against said valve seat, energization of the coil corresponding to said predetermined operative conditions.

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**4,018,420**

**SLIDE VALVE FOR CLOSING A LARGE PRESSURIZED GAS CONVEYING PIPE**

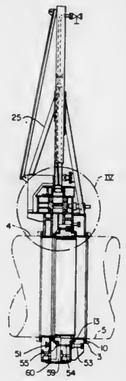
**Rudolf Müller, Merzenich, and Hermann Josef Stolberg, Duren, both of Germany, assignors to Hermann Rappold & Co. GmbH, Duren, Germany**

**Filed Dec. 5, 1975, Ser. No. 638,094**

**Claims priority, application Germany, Dec. 5, 1974, 2457428**

**Int. Cl.² F16K** *3/20*

**U.S. Cl. 251—172** **7 Claims**



1. A slide valve for closing large gas pipes, particularly such pipes carrying dust-containing hot gases, said slide valve comprising:

a housing having an axial passage therethrough connectable to gas pipes, said housing having therein a housing opening;

a stationary sealing seat within said housing;

a movable sealing seat opposed to and axially spaced from said stationary sealing seat within said housing;

a slide plate mounted to be selectively movable from an open position exterior of said housing, through said housing opening to a closed position within said housing between said sealing seats closing said axial passage;

means for urging said movable sealing seat, when said slide plate is in said open position, into contact with said stationary sealing seat, and when said slide plate is in said closed position, into contact with said slide plate;

said slide plate, when in said closed position, being in sealing contact with both said movable sealing seat and said stationary sealing seat;

a closing element on said housing and selectively movable from a first position closing said housing opening when said slide plate is in said open position to a second position opening said housing opening when said slide plate is in said closed position; and

a chamber within said housing exterior of said passage, said chamber, when said slide plate is in said closed position, being sealed in a gas tight manner from the gas pipe and being open to the atmosphere through said housing opening such that any leakage from a pressurized section of the gas pipe will be vented to the atmosphere, and said chamber when said slide plate is in said open position, being closed by said closing element and thus forming a back-up seal to any leakage from the gas pipe.



**4,018,421**

**PORTABLE LIFTING JACK**

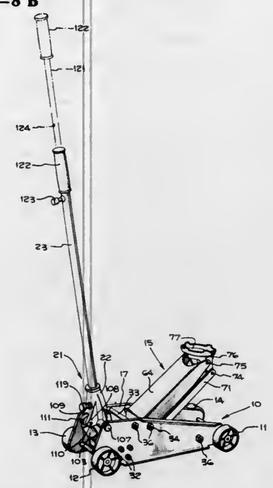
**Erven Tallman, 15934 S. Figueroa, Gardena, Calif. 90247**

**Continuation of Ser. No. 540,121, Jan. 10, 1975, abandoned.**

**This application June 3, 1976, Ser. No. 692,289**

**Int. Cl.² B66F** *5/04*

**U.S. Cl. 254—8 B** **15 Claims**



1. A hydraulic lifting jack mechanism comprising a mobile frame of separate spaced horizontal parallel side plates each having inside and outside faces,

a set of wheels spanning said plates at each end of the frame,

transverse brace members connecting said plates,

an elevating linkage pivotally supported on said frame,

a hydraulic power unit on said frame and an operating handle assembly for said power unit,

said power unit comprising an integral multi-purpose block having a central transverse axis,

a reservoir in said block surrounding said transverse axis for hydraulic fluid,

said block having parallel side walls extending uniformly around said transverse axis,

circumferentially spaced anchoring elements adjacent the perimeter of each side wall of the block in positions spaced from said reservoir and anchored to the inside faces of respective said plates at a location intermediate said sets of wheels whereby the block serves simultaneously as a spacer,

a parallel alignment means and a connection for said plates,

said reservoir being located radially inwardly from said anchoring elements and extending transversely from one side wall to the other,

a vertical inside end wall and a hydraulic power cylinder mounted on said inside end wall and supported by said block in horizontal position and operably connected to said elevating linkage,

an outside end wall,

a pump cylinder member mounted on said outside end wall and supported by said block and a control stem having a valve element thereon mounted on said outside end wall,

a hydraulic fluid network in said block comprising a first bore in communication with said hydraulic power cylinder,

a second bore in communication with said pump cylinder member and connected with said first bore and a third bore having a valve seat therein in communication with said valve element and said stem and connected to said first bore,

a supply passage between the reservoir and said second bore and a discharge passage between said third bore and said reservoir at a location downstream of said valve seat.

**4,018,422**

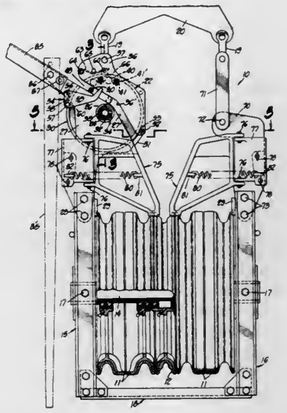
**BUNDLE CONDUCTOR STRINGING BLOCK WITH ROTARY THREADING GATE**

**Hoyt W. Bozeman, Jr., Glendora, Calif., assignor to Lindsey Manufacturing Company, Azusa, Calif.**

**Filed Sept. 9, 1975, Ser. No. 611,679**

**Int. Cl.² B66D** *1/36*

**U.S. Cl. 254—134.3 PA** **36 Claims**



1. A bundle conductor stringing block of the type having a plurality of sheaves mounted on a shaft having its ends mounted in suspension frame means, said frame means including threading means for passing a hauling line for a running board laterally crosswise of said frame means and into the block throat from one exterior side of said frame means, said threading means including rotary gate means journalled on said frame means and having a slot opening through the periphery thereof to receive a hauling line and to transfer the same crosswise of said frame means as said gate means rotates through a partial revolution, and means operable by the entry of a hauling line into said slot to release said gate means and including spring means to rotate said gate means after release through a partial revolution thereby to transfer said line across said frame means and deposit the same onto a central one of said sheaves.

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**4,018,423**

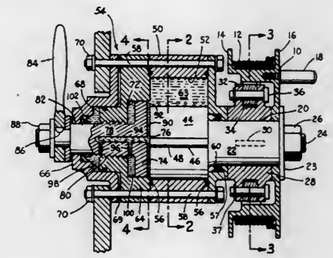
**EMERGENCY DESCENT DEVICE**

**Robert R. Belew, Huntsville, Ala., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.**

**Filed Oct. 16, 1975, Ser. No. 623,188**

**Int. Cl.² A62B** *1/12;* **B66D** *5/04*

**U.S. Cl. 254—158** **7 Claims**

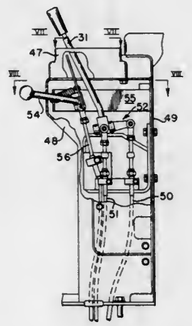


1. A descent device for emergency descents and for lowering equipment from tall structures and the like comprising;

a cylindrical housing having an interior space containing a fluid;
a rotor shaft carried for rotation in said interior space having an end portion of reduced diameter extending through an opening in one end of said housing;
a spool member carried by said reduced end portion of said rotor shaft so as to rotate said rotor shaft when rotated in a first direction while being rotatable relative to said rotor shaft when rotated in a second, opposite direction;
a cable member wound about said spool member having one end connected thereto;
a diametrical slot formed in said rotor shaft carried for rotation in said interior space of said cylindrical housing;
a vane member slideably carried in said diametrical slot extending across said interior space of said housing;
channel means for transferring said fluid from one side of said vane member to the other as said vane member is rotated in said interior space by said rotor shaft to retard the rotation thereof; and
an end cap member enclosing said cylindrical housing on an end opposite said end through which said reduced portion of said rotor shaft extends, means carried by said end cap providing an adjustable bypass channel around said vane member for said fluid contained in said interior of said housing so as to adjust said retarding force thereagainst;
whereby said fluid and said rotating vane member produce a retarding force on the rotation of said spool member in said first direction due to the unwinding of said cable member from said spool member and said adjustable bypass means may be adjusted so as to control the speed of descent of said cable.

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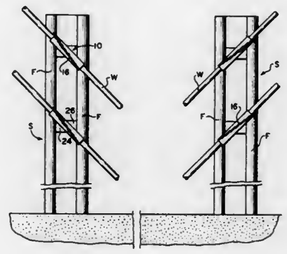
**4,018,424**
**WINCH DISCONNECT CONTROL ARRANGEMENT**
**Robert M. Latimer, Canton, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.**
**Filed July 11, 1975, Ser. No. 595,479**
**Int. Cl.² B66D 1/00**
**U.S. Cl. 254—187.1** **15 Claims**




1. In a winch assembly and control system therefor comprising a rotatable cable drum, drive means normally connectible to said cable drum for selectively rotating the same, first control means, including a first control handle movable between various operational positions, for selectively actuating said drive means to rotate said cable drum, disconnect means for selectively disconnecting said drive means from said cable drum, and second control means, including a second control handle, for selectively engaging or disengaging said disconnect means, the improvement comprising retaining means connected to said second control handle for simultaneous movement therewith for preventing actuation of said first control means when said second control means is actuated to disengage said disconnect means and for permitting actuation of said first control means when said second control means is actuated to engage said disconnect means, said retaining means further operational for automatically engaging and moving said first control handle upon movement of said second control handle only when said first control handle is in one of said operational positions.

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**4,018,425**
**FASTENER FOR FENCE CONSTRUCTION AND FENCING SYSTEM UTILIZING SAME**
**John J. Sasena, Parma, Ohio, assignor to Eaton Corporation, Cleveland, Ohio**
**Continuation-in-part of Ser. No. 536,146, Dec. 24, 1974, Pat. No. 3,959,852. This application Dec. 15, 1975, Ser. No. 640,508**
**Int. Cl.² B21F 27/00**
**U.S. Cl. 256—54** **16 Claims**

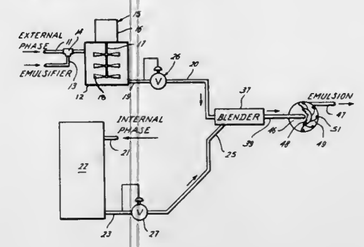



1. A one-piece spring fastener for mounting a wire to a channel-shaped support having inturned flanges to orient the wire at an oblique angle to the support, the wire having a maximum diameter and being mounted by said fastener for axial movement relative to the support, said fastener comprising;
a. a pair of spaced-apart, generally T-shaped wall portions;
b. a bight portion joining said T-shaped wall portions along substantially the entire length thereof and extending generally perpendicularly therebetween;
c. each of said T-shaped wall portions including a top portion contiguous with said bight portion, a generally dart-shaped wall portion, and an intermediate wall portion connecting said top portion and said dart-shaped wall portion;
d. said top portions being generally parallel and cooperating with said bight portion to define a trough for receiving the wire therein;
e. said dart-shaped wall portions being generally parallel and each of said dart-shaped wall portions defining a plane oriented at said oblique angle relative to its associated top portion; and
f. each of said dart-shaped wall portions being configured to be forcibly received therebetween the inturned flanges of the channel-shaped support and retained therebetween.

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**4,018,426**
**SYSTEM FOR PRODUCING EMULSIONS**
**Richard E. Mertz, and Kenneth J. Lissant, both of St. Louis, Mo., assignors to Petrolite Corporation, St. Louis, Mo.**
**Filed Mar. 17, 1976, Ser. No. 667,754**
**Int. Cl.² B01F 7/00**
**U.S. Cl. 259—7** **9 Claims**

1. A system for producing at a selected rate a stable, highly viscous emulsion with an internal phase content of above about 75% by volume within an immiscible external phase comprising:
a. supply means providing individual stream of an inverter phase formed of an internal-in-external emulsifier and an external phase, and an internal phase;
b. first and second flow rate controller means for precisely regulating in said supply means the flow rates of separate streams of the internal phase and the inverter phase in a preselected ratio in the range of between 95 to 5, and 75 to 25 percents by volume within said system;
c. mixing means receiving the separate streams of the internal phase and the inverter phase and distributing loosely the internal phase in stepwise progressive amounts into the inverter phase, thereby forming a composition with the desired ratio of internal phase, emulsifier and external phase of the desired emulsion;
d. pumping means;




e. means for passing said composition of internal phase and inverter phase into said pumping means for moving therethrough said composition at a selected rate;
f. said pumping means providing continuous shear at rates between about 500 and 10,000 reciprocal seconds sufficient to reduce the effective viscosity of said composition near to that of the inverter phase but below the inherent shear stability point of the desired emulsion; said pumping means retaining less than 1% by volume of said emulsion relative of the volume per minute of said composition being moved;
g. outlet means for removing the resultant emulsion from said pumping means to a subsequent utilization.

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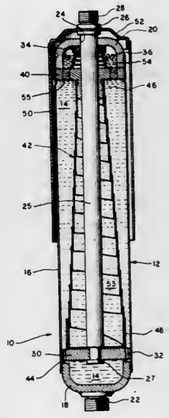
**4,018,427**
**ELECTROPLATING BARREL SIDEWALL CONSTRUCTION**
**Alfred N. Marulli, Bristol, Conn., assignor to National Plastics & Plating Supply Co., Inc., Terryville, Conn.**
**Filed Jan. 23, 1975, Ser. No. 543,641**
**Int. Cl.² C25D 17/22; B01F 9/00**
**U.S. Cl. 259—81 R** **4 Claims**




1. An electroplating barrel comprising a plurality of rectangular panels, and end plates for supporting the panels so that said panels define a generally polygon shaped sidewall for the barrel, each of said panels including:
a. an outer grid portion having longitudinally extending ribs and intersecting cross ribs defining relatively large size rectangular openings therebetween, all of said ribs having a thickness (*t*) and being molded from a chemically inert plastic material,
b. an inner portion of said panel having a generally flat sheet of said chemically inert material which sheet is integrally attached to the inside edges of said ribs in said outer grid portion, said sheet having at least approximately the same thickness (*t*) as that of said ribs, and
c. said inner panel portion further including longitudinally extending load breaker bars formed from said chemically inert plastic material and integrally attached to the inside surface of said sheet, said breaker bars having a height approximately equal to said thickness (*t*) and said bars being so arranged as to form an inwardly projecting extension of each of said longitudinally extending ribs in said outer grid portion.

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**4,018,428**
**SHOCK ABSORBER**
**Thomas J. Weir, Jackson, Mich., assignor to Hayes-Albion Corporation, Jackson, Mich.**
**Filed July 30, 1975, Ser. No. 600,415**
**Int. Cl.² F16F 5/00**
**U.S. Cl. 267—65 R** **9 Claims**



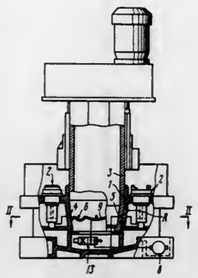

1. An automotive shock absorber assembly comprising an elongated housing containing a viscous liquid, a shaft extending axially into said housing, alignment means disposed within said housing and connected to one end of said shaft, and a volute spring forming a chamber within said liquid, said spring cooperating with said alignment means and adapted to compress or extend in the contained liquid when said shaft is subjected to an axial load, said volute spring also having its ends secured within said housing in substantially sealed relation to necessitate liquid flow through adjacent turns of said spring upon compression or extension thereof, thereby producing viscous shear as the predominant energy absorption means of the assembly.

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**4,018,429**
**VERTICAL MULTIPLE-SPINDLE MACHINE**
**Jury Pavlovich Alafuzov, Bolshaya Cheremushkinskaya, 18, korpus 1, kv. 24, and Artur Markovich Itin, Rostovskaya naberezhnaya, 1, kv. 47, both of Moscow, U.S.S.R.**
**Filed Apr. 29, 1976, Ser. No. 681,523**
**Int. Cl.² B23Q 3/08**
**U.S. Cl. 269—20** **1 Claim**

1. A vertical multiple-spindle machine comprising: a rotary worktable provided with a centre hole; hydraulic clamping devices mounted on said worktable; a stationary column having a taper portion on which said worktable is mounted by the use of the centre hole provided therein; a circular groove provided on the taper portion of said column and arranged to communicate with a fluid source; fluid ducts provided in said worktable for fluid to be force-fed to said hydraulic clamping devices via said circular groove; interconnected passaged provided in said column and arranged to communicate with said fluid source, each of said passages having an outlet located on the surface of the taper portion of said column in such a manner that when the worktable is in a fixed position

each of its ducts connects with one of the passages; said circular groove has portions curved about said outlets from said



passages whereby it connects said worktable fluid ducts with the fluid source during the rotation of said worktable.

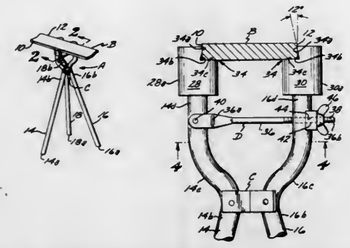
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**4,018,430**

## SKI SUPPORTING DEVICE

**Michael J. Ursich, 1309 Dodson Ave., San Pedro, Calif. 90732**

**Filed July 26, 1976, Ser. No. 708,885**
**Int. Cl.² B25B *5/04***
**U.S. Cl. 269—156** **7 Claims**



1. A pair of portable supports for removably engaging longitudinally spaced sections of a ski that has first and second laterally spaced side surfaces to dispose the latter in an elevated substantially horizontal position above a floor surface to permit the ski to be tuned or maintenance work performed thereon, each of said supports including:

a. first, second and third elongate rigid spaced legs that each have first upwardly disposed ends and second ends that rest on a floor surface, first, second and third leg extensions that project upwardly and outwardly from said first ends of said first, second and third legs, and said first, second and third leg extensions including first, second and third straight vertically disposable end portions;

b. first means for pivotally connecting said first, second and third ends of said first, second and third legs in such a manner that said second and third end portions may be disposed in a common vertical plane and said first end portion moved normal to said vertical plane;

c. first, second and third clamps pivotally supported on said first, second and third end portions; and

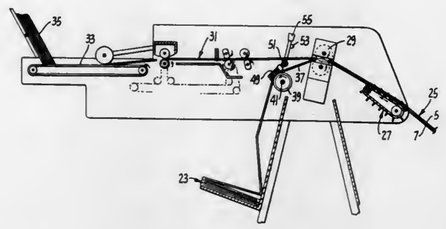
d. second, manually operated means for pivoting said first leg from a first to a second position relative to said second and third legs to force said first clamp into pressure contact with said first side edge surface and said second and third clamps into pressure contact with said second side edge surfaces to frictionally grip a longitudinal section of said ski therebetween, with said second means when in said second position so remaining until manually moved to said first position.

**4,018,431**

## SEPARATOR FOR HANDLING MULTI-FOLDED PAPER

**Marlin Alios Schueler, San Leandro, Calif., assignor to American/Durein Company, Oakland, Calif.**

**Continuation-in-part of Ser. No. 514,008, Oct. 11, 1974, abandoned. This application Dec. 1, 1975, Ser. No. 636,531**
**Int. Cl.² B65H *41/00***
**U.S. Cl. 270—52.5** **8 Claims**



1. In a machine for processing superimposed webs of paper, said superimposed web consisting of at least an upper web and a lower web, comprising in combination:

a. driving means for introducing said superimposed web into said machine at a speed so that said upper web follows a first linear path,

b. separating means for separating said upper web from said lower web and propelling the lower web along a second path which is located beneath said first path, said means including:

1. roller means for receiving said lower web, said roller means including a roller mounted below said first path, said roller having an outer surface positioned to contact the under surface of said lower web and extending for substantially the entire width of web, said outer surface being covered by granules to form a rough surface,

2. means for rotationally driving said roller at a surface speed slightly greater than the speed of the introduced superimposed web,

3. web engaging means located between said first path and said roller to engage the upper surface of said lower web and press same downwardly into contact with said roughened roller substantially across the entire width of said lower web such that said lower web is driven in a positive manner by said roller along said second path to be collected in an intact folded configuration and held out of contact with said upper web; and

c. collecting means located on said second path for collecting said lower web in an intact folded configuration.

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**4,018,432**

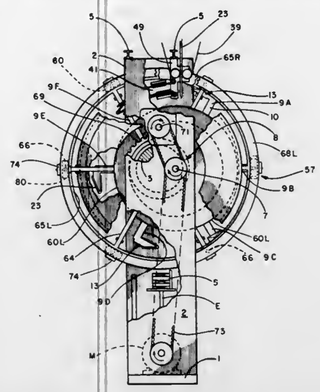
## DIAPER FOLDER AND STACKER MECHANISM

**Richard H. Frick, Neenah, Wis., assignor to Kimberly-Clark Corporation, Neenah, Wis.**

**Filed Nov. 20, 1975, Ser. No. 633,923**
**Int. Cl.² B65H *45/18***
**U.S. Cl. 270—61 R** **3 Claims**

1. In combination, in diaper folding mechanism adapted to receive a diaper in essentially planar shape and to fold it, diaper feed means for feeding a diaper downwardly in a vertical plane, a folding board arranged to move in a closed curved path and to intercept a diaper in said vertical plane along a fold line disposed approximately centrally of the diaper, said folding board having needle means carried on the folding board to engage and penetrate a said diaper as the diaper is contacted by the folding board, and means for folding the diaper about opposed surfaces of the folding board while the diaper is retained by the needle means and folding board, said folding means including opposed members forming a slot in the said path of the folding board through which the folding board moves, said members positioned for contacting and smoothing a diaper on the opposed surfaces of said folding





board, said folding means including cooperable means operable in the movement of the board through the slot to tuck portions of the diaper inwardly of itself.

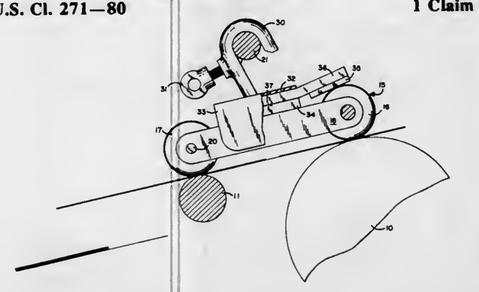
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**4,018,433**

## SHEET MATERIAL TRANSPORTING MACHINE

**Kenneth D. Woods, P.O. Box 141, Spring Valley, Calif. 92077**

**Filed Aug. 8, 1975, Ser. No. 603,096**
**Int. Cl.² B65H *29/20***
**U.S. Cl. 271—80** **1 Claim**



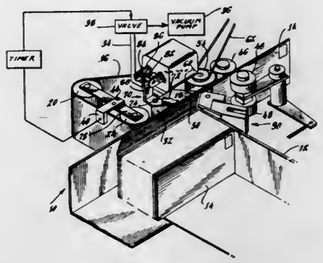
1. An attachment for sheet material transporting machines of the type having a power driven drum, a rotatable shaft in spaced relation to said drum and axially parallel thereto, an idler roller positioned adjacent each end of said drum in frictional engagement therewith and adapted to cause rotation of said parallel shaft, an ejection roller in spaced axially paralled relation to said drum, and a frame member disposed paralled to said drum, said attachment comprising: a pair of parallel frame members in spaced relation, each of said frame members being formed with an aperture at each end thereof; a guide roller disposed between each end of said frame member and formed with an axial bore for axial registry with the apertures of said frame members, one end of each said frame member and one of said guide rollers being in axial allignment to receive said rotatable shaft therethrough whereby said guide roller is laterally positionable on said shaft and is adapted to bear against sheet material being transported therethrough, said second guide roller being formed with an axial bore for rotatable disposition between the other ends of said frame members and adapted to bear against the said ejector roller; and a U-shaped mounting member having means for securing said attachment to said frame member in laterally adjustable relation and including a pair of downwardly extending side members adapted to frictionally engage and support said frame members therebetween.

**4,018,434**

## PNEUMATIC FEED DEVICE

**Thomas J. Mitchell, Darien, and Leonard M. Pengue, Huntington, both of Conn., assignors to Pitney-Bowes, Inc., Stamford, Conn.**

**Filed Apr. 12, 1976, Ser. No. 675,907**
**Int. Cl.² B65H *3/12***
**U.S. Cl. 271—96** **19 Claims**



1. Apparatus for separating substantially flat articles from a stack and for feeding them individually to another position comprising:

a conveyor member having a number of perforations along a fixed length thereof,

means for driving said conveyor member,

a carrier for a stack of articles disposed adjacent one side of said conveyor member,

vacuum shoe means adapted to be connected to a source of vacuum having an outlet disposed adjacent the other side of said conveyor member opposite to said carrier,

means for sensing the perforations in the fixed length of said conveyor member, and

means responsive to the sensing of the perforations on said conveyor member by said sensing means for connecting said vacuum shoe means to said vacuum source for a predetermined time interval.

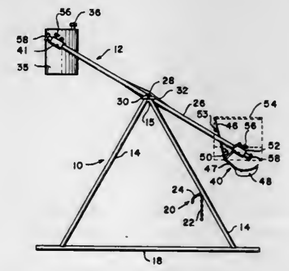
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**4,018,435**

## PLAYGROUND APPARATUS

**George C. Howell, P.O. Box 96, Wilder, Idaho 83676**

**Filed June 13, 1975, Ser. No. 586,594**
**Int. Cl.² A63G *1/14***
**U.S. Cl. 272—33 R** **10 Claims**



1. A playground apparatus comprising:

a. support means for placement on a substantially flat surface, including two vertical support frames, said support means providing a stable base for said apparatus;

b. an elongated member rotatably suspended between said vertical support frames allowing 360° rotation of said elongated member about a horizontal axis at the approximate midpoint of said member;

c. means for supporting occupant in an upright position on one end of said elongated member during said 360° rota-

tion, said occupant supporting means comprising a seat support shaft suspended on said elongated member with a generally vertical seat support member affixed to said seat support shaft, said seat support member including a substantially horizontal seat mount having a saddle-type seat affixed thereto, said occupant supporting means allowing said occupant to propel said elongated member about said horizontal axis by pushing against said surface with the occupant's legs; and

d. a variable weight container means rotatably suspended at the other end of said elongated member, said container means being disposed to rotate 360° about a horizontal axis with the axis of rotation of said container means being above the center of gravity of said container means, said container being disposed to contain materials therein for approximately balancing said elongated member.

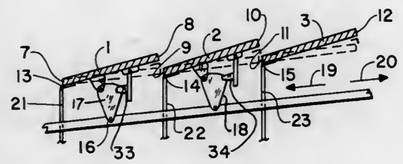
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**4,018,436**

## GOLF PRACTICE DEVICE

**John U. Leigh, Morgan Hill, Calif., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest**

**Filed Apr. 26, 1976, Ser. No. 680,284**
**Int. Cl.² A63B** *69/36*
**U.S. Cl. 273—35 B** **3 Claims**




1. A golf practice device, comprising

a simulated green comprising a plurality of panels positioned in substantially coplanar relation next-adjacent each other to form a substantially continuous surface inclined at a predetermined angle with a horizontal base, each of the panels having spaced opposite substantially parallel first and second edges;

mounting means pivotally mounting each of the panels on the base at the first edge of each of the panels whereby each panel is pivotally movable about its first edge from a closed position in which it is substantially coplanar with the other panels to an open position in which its second edge is raised above and spaced from the first edge of the next-succeeding panel sufficiently to permit the passage of a golf ball between next-adjacent panels; and

control means mounted on the base and coupled to each of the panels for selectively moving the panels in unison to their closed and open positions.

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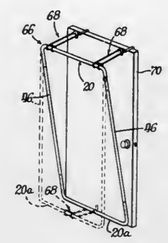
**4,018,437**

## MULTIPOSITIONABLE PORTABLE AND COLLAPSIBLE RECTANGULAR FRAME EXERCISING APPARATUS WITH DETACHABLE SUPPORT MEANS

**Roy F. LoPresti, Chicago, Ill., assignor to Samuel Peskin, Gaithersburg, Md.**

**Division of Ser. No. 567,370, April 11, 1975, Pat. No. 3,944,219. This application Nov. 3, 1975, Ser. No. 627,855**
**Int. Cl.² A63B** *1/00*
**U.S. Cl. 272—62** **6 Claims**

1. A door-stablized, floor supported horizontal bar exercising apparatus comprising a closed rectangular frame having approximately the dimensions of a door and consisting of spaced vertical tubular side members and spaced horizontal top and bottom tubular cross members, substantially rigid means for releasably attaching the frame to a door, said substantially rigid means comprising, at least one substantially rigid member having means at one end for detachably connecting the substantially rigid means to the top tubular cross member, and said substantially rigid means at its opposite end for detachably connecting it directly to the upper marginal edge portion of a door, said means at the opposite end of said substantially rigid means including means respectively engageable with opposite sides of a door to maintain the top tubular




cross member at a selected distance therefrom and to prevent transverse movement of said cross member a relative to a door, while supporting said bottom tubular cross member on a floor adjacent a door, and to enable said top tubular cross member to be used for gymnastic exercising upon attachment of the frame to a door.

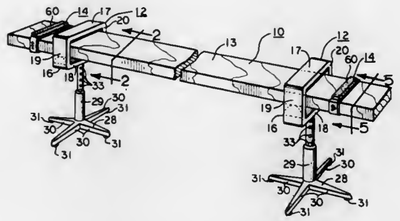
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**4,018,438**

## RECREATIONAL JOUNCING APPARATUS WITH VERTICAL SUPPORTS AND REMOVABLE BOARD TRAVEL STOPS

**James Shoger, 10 S. 391 Washington St., Naperville, Ill. 60540**

**Filed June 9, 1975, Ser. No. 584,758**
**Int. Cl.² A63B** *5/00*
**U.S. Cl. 272—65** **11 Claims**




1. An assemblable jouncing apparatus comprising:

a jouncing board;

a pair of support means effective to loosely support said board above the ground, each engaging said board in supporting relation at selected distances from the ends thereof; each said support means including a supporting member having a configuration defining supporting surfaces upon which said board longitudinally moves during downward deflection thereof;

said support means including a support member having an arcuate board engaging surface so that the downward vertical component of force transmitted by said board to each said support member during said deflection are substantially larger than horizontal component of same force; and

removable board retaining means selectively disposed and positionable on said board at locations adjacent the board support means to retain said board in supporting relation between said support means while users are jouncing.

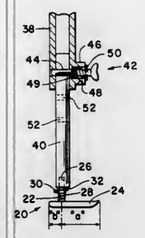


**4,018,439**

## TRAINING DEVICE FOR ICE SKATERS

**Reinhold J. Kauk, 442 Blehn Drive, Kitchener, Ontario, Canada (N2G 3W5)**

**Filed May 7, 1976, Ser. No. 684,381**
**Int. Cl.² A63C** *3/04*
**U.S. Cl. 272—70.3** **6 Claims**




1. A training device for ice skaters comprising:

a rectilinear horizontally disposed frame dimensioned to enclose a skater;

a pair of front support legs and a pair of rear support legs extending downwardly from the corners of said frame;

a runner secured to each of said support legs, the runners on at least said pair of rear support legs being rotatably mounted theron so as to be rotatable through a predetermined arc;

and spring means operatively connecting each of the rotatable runners with their associated support legs, whereby during forward movement of the training device said rotatable runners are caused to rotate against the bias of said spring means into an orientation parallel to the direction of movement and when the training device is at rest said rotatable runners are biased by said springs towards an orientation substantially perpendicular to the longitudinal axis of the training device.

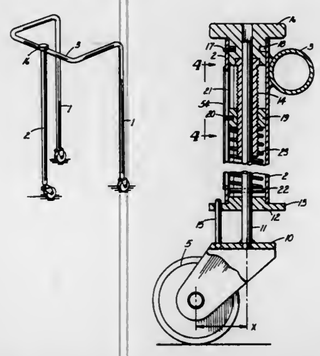
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**4,018,440**

## INVALID WALKER WITH WHEEL CONTROL MECHANISM

**Fritz A. Deutsch, 25801 Lake Shore, Apt. 87, Euclid, Ohio 44132**

**Filed Mar. 31, 1975, Ser. No. 563,615**
**Int. Cl.² A61G** *13/00*
**U.S. Cl. 272—70.3** **3 Claims**



1. A walker device, comprising, a frame having a plurality of support points, roller means for providing full mobility of the device, releasable lock means on said roller means, lock release means operatively associated with said lock means,

means initiated by a user and thereafter independent of operator control for actuating said lock means and said lock release means through a cycle which includes a lock release and subsequent reengagement of the lock whereby the user is free from control judgement over the distance the walker will advance after lock release;

said roller means being a wheel with a drum carried thereby,

said lock means being a series of aligned holes spaced circumferentially around said drum, and a retractable lock pin insertable in any aligned hole in said drum,

said drum having a plurality of laterally spaced circumferential paths of holes therealong, each path having a different number of holes, and means to selectively and manually position said pin in alignment with one of said paths, whereby a lock cycle will release the wheel for advance a distance represented by the circumference of the wheel divided by the number of said holes in the selected path.

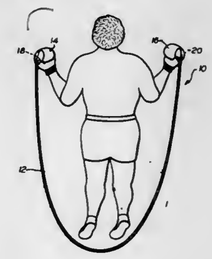
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**4,018,441**

## JUMP-ROPE TRAINING EXERCISE DEVICE

**Howard Greenberg, 97 Allen St., New York, N.Y. 10002**

**Filed Nov. 7, 1975, Ser. No. 629,705**
**Int. Cl.² A63B** *5/22*
**U.S. Cl. 272—75** **6 Claims**




1. Jump-rope Training-Exercise Device, which comprises, in combination:

a jump-rope;

a pair of hand-protective elements, each adapted substantially to envelop and encompass one hand of the user; and

means for releasably connecting one end of said jump-rope to each of said pair of hand-protective elements.

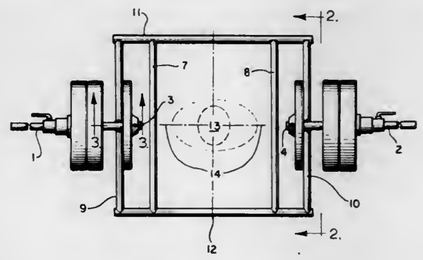
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**4,018,442**

## SAFETY FRAME FOR WEIGHT LIFTING

**William J. Galler, c/o Henry Pillard, Diamond K Lane, Joliet, Ill. 60433**

**Filed June 23, 1975, Ser. No. 589,437**
**Int. Cl.² A63B** *13/00*
**U.S. Cl. 272—123** **3 Claims**




1. A safety device for use in weightlifting exercise wherein the user squats and rises to lift weights with both hands, said device comprising the following characteristics simultaneously:

a. a rigid, free standing, quadrilaterally symmetrical frame,

b. said frame defining an open space of sufficient size so that the user's body can be positioned in it without interferring ring with the frame, and without any part of the frame being above any part of the user's body at any time during the squat exercise,

c. said frame is rectangular in configuration and includes front and rear bar elements extending parallel to said parafrontal plane and at least one straight left side bar

element and at least one straight right side bar element extending perpindicular to said parafrontal plane and interconnecting said front and rear bar elements,

d. said frame having mounted horizontally thereon a left side weight attaching member and a right side weight attaching member, both for the purpose of attaching weights to the frame horizontally,

e. said left side weight attaching member and said right side weight attaching member are rigidly fixed to the respective midpoints of said left side bar element and said right side bar element,

f. said left and right side weight attaching member extend horizontally out on their respective sides, extending perpendicularly to the left and right side bar elements to which they are fixed,

g. said frame further having mounted thereon a left side handgripping member and a right side handgripping member with the midpoints of said handgripping members being closer to the user's body then the weight attaching members,

h. said left and right side weight attaching members, the midpoints of said left and right side handgripping members, the midpoints of said straight left and right side bar elements, and the center of gravity of said entire device lying in the parafrontal plane of the user's body when the user is standing fully erect holding the device down at his sides at arms's length,

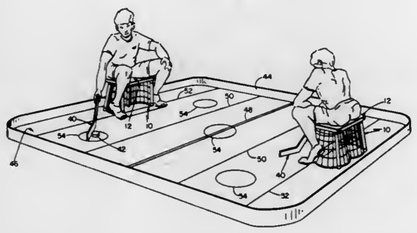
i. when weights are attached to said left and right side weight attaching members, the center of gravity of each of the attached weights will lie in the parafrontal plane of the user's body when the user is standing fully erect holding the device down at his sides at arms's length,

j. the center of gravity of said entire device remaining in the same vertical plane as the center of gravity of the user's body during the squatting movement,

k. furthermore in the preferred form said left side handgripping member and right side handgripping member are located respectively at midpoints of an inner left side bar element and an inner right side bar element, said inner left and right side bar elements being closer to the user's body than said left and right side bar elements and extending parallel to said left and right side bar elements.

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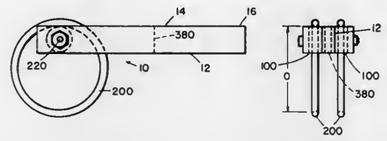
**4,018,443**
**SIMULATED HOCKEY GAME GOAL UNITS**
**David M. Bird, 60 Disamar Rd., Taunton, Mass. 02780**
**Filed May 7, 1975, Ser. No. 575,150**
**Int. Cl.² A63F 7/06**
**U.S. Cl. 273—85 R** **11 Claims**



1. A game apparatus comprising a goal unit in combination with a projectile of predetermined size, said goal unit being adapted for placement on a playing surface as a target for receiving said projectile of said predetermined size projected at said goal unit, said goal unit including a top, members extending from said top to said playing surface for supporting said top, and enclosure means disposed between said top and said playing surface, a continuously open gap in said enclosure means defining a goal mouth, said top being formed as a substantially flat-surface rigid unit for supporting the weight of a player and being spaced from said playing surface by a distance which permits a player to sit on said top with knees bent and feet on said playing surface.

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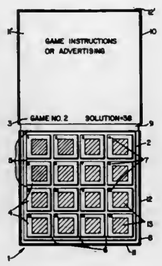
**4,018,444**
**RING WHIRLING DEVICE**
**Otto F. Chew, Jr., Hillside Drive, and Louis W. Hinshaw, Box 111, both of Hays, Kans. 67601**
**Filed Sept. 25, 1975, Ser. No. 616,612**
**Int. Cl.² A63B 71/00**
**U.S. Cl. 273—109** **3 Claims**



3. A toy requiring skill in its operation comprising a frame, said frame having a handle having a forward end, at least two hubs on said frame, a plurality of rings disposed one on each of said hubs and each ring loosely receiving its respective hub therethrough whereby said rings can define motions about their respective hubs as will appear to be generally clockwise and counter-clockwise selectively as said rings are each viewed from a side thereof, said frame having skirt means thereon disposed in positions for preventing said rings from moving sidewise of themselves excessively toward respective sides of said frame for restraining said rings from coming off of said frame by movements sidewise of said rings and toward the outer side of said frame, and in which said hubs are each substantially of cylindrical shape on their exterior, and the cylindrical configurations of the exterior of said hubs being disposed in alignment for defining a hub axis, said handle extending substantially directly rearwardly from said axis.

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**4,018,445**
**EDUCATIONAL PUZZLE GAME**
**James A. Anania, Sr., 801 N. 6th St., No. 716, P.O. Box 186, Newark, N.J. 07107**
**Continuation-in-part of Ser. No. 577,233, May 14, 1975, Pat. No. 3,967,825. This application Sept. 26, 1975, Ser. No. 617,100**
**Int. Cl.² A63F 3/06**
**U.S. Cl. 273—135 B** **10 Claims**




1. An educational game comprising:

a. a game board, said game board being divided by rows and columns of four in number and divided into sixteen spaces, said game board being disposed with container means comprising a hinged cover which folds over and covers said game board contained in the bottom portion of said container;

b. said game board having indicated thereon a numerical solution of 38,

c. said sixteen spaces of said game board being sequentially numbered from one to sixteen and each of said spaces being adapted to receive numbered tokens thereon,

d. a total of sixteen numbered tokens, each of said tokens having affixed thereon a single number, said numbers being consecutive numbers from two to seventeen,

e. random selection means to select a numbered token,

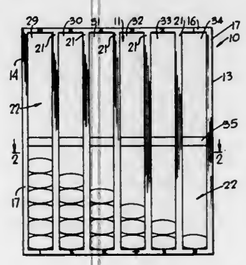
f. means for causing said tokens to remain in the space selected on said game board;

wherein in playing the game, numbered tokens are selected by said random selection means and placed in each of said spaces of said game board in a manner whereby the numbers provide a numerical solution of 38 when the numbers are added in all 16 directions in each row, each column, each diagonal, or any four numbers in a square.



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**4,018,446**
**BOARD GAME**
**Thomas E. Keegan, 404 Green Valley Drive, Naperville, Ill. 60540**
**Filed Jan. 13, 1975, Ser. No. 540,406**
**Int. Cl.² A63F 3/00**
**U.S. Cl. 273—136 F** **7 Claims**



1. A game board, which comprises:

a. a flat bottom base having a top planar playing surface;

b. a pair of upwardly extending sidewalls and end walls affixed to said base;

c. a plurality of strip members affixed perpendicularly to said top playing surface of said bottom base, each said strip member extending between said endwalls, said strip members evenly spaced between said sidewalls and forming a plurality of elongated tracks, each said strip member being of a T-shaped configuration having a top cross bar and a downwardly extending leg, said leg affixed perpendicularly to said top playing surface, one end of said cross bar, said top playing surface and said leg forming an elongated channel;

d. flange members affixed perpendicularly to a top of each said sidewall and each said endwall, each said flange member extending over said elongated tracks, said flange member, said sidewall, and said top playing surface forming an elongated channel; and

e. a plurality of playing members retained by said flange members within said channels, said playing members of a shape to be movable back and forth within said channels.

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**4,018,447**
**PHONOGRAPH TURNTABLE**
**Bruce H. Short, 3537 State Line, Kansas City, Mo. 64111**
**Filed Feb. 2, 1976, Ser. No. 654,613**
**Int. Cl.² G11B 15/00**
**U.S. Cl. 274—10 R** **2 Claims**

1. A record selector comprising:

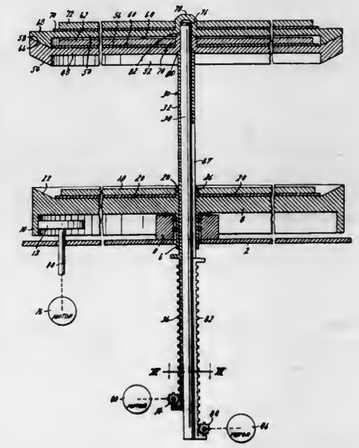
a. a generally circular horizontal main turntable rotatable about its vertical axis and adapted to carry a phonograph record concentrically thereon for playing,

b. drive means operable to rotate said main turntable,

c. a plurality of auxiliary turntables disposed above and concentrically with said main turntable, and each adapted to carry a phonograph record concentrically thereon,

d. means supporting said auxiliary turntables, and

e. operating means controlling said turntable supporting means to raise said auxiliary turntables to a spaced apart relation above said main turntable to admit the tone arm of the phonograph above the record carried by said main turntable, and to lower said auxiliary turntables successively, the first auxiliary turntable engaging said main turntable, but not the record carried by said main turntable, to be driven frictionally thereby to permit playing of the record carried by said first auxiliary turntable by said tone arm, the second auxiliary turntable engaging said first auxiliary turntable, but not the record carried thereby, to be driven frictionally thereby to permit playing of the record carried by said second auxiliary turntable by said tone arm, and so on, said turntable supporting means and said operating means comprising a vertical center post disposed concentrically with said turntables and cooperating with central apertures formed therefor in said turntables, said center post consisting of a plurality of concentrically telescoped sections, the diameter of the central aperture of the main turntable being sufficient to pass all sections of said post slidably therethrough, the diameters of the central apertures of successively higher auxiliary turntables being successively reduced to pass successively one less outer section of said post therethrough, the diameter of the central apertures of the two topmost auxiliary turntables being sufficient to admit only the central section of said post, the central aperture of the topmost auxiliary turntable being closed to prevent the passage of said central post section therethrough, and means operable to raise and lower the sections of said center post independently of each other.

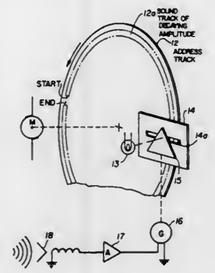


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**4,018,448**
**RECORD FOR THE ARTIFICIAL REPRODUCTION OF SOUNDS**
**Paul Di Matteo, Dix Hills, N.Y., assignor to Dynell Electronics Corporation, Melville, N.Y.**
**Division of Ser. No. 406,236, Oct. 15, 1973, Pat. No. 3,885,110, which is a continuation-in-part of Ser. No. 245,484, April 19, 1972, abandoned. This application May 14, 1975, Ser. No. 577,471**
**Int. Cl.² G10H 3/06**
**U.S. Cl. 274—42 R** **2 Claims**

1. A rotatable record for storing recorded sounds for substantially instantaneous retrieval comprising record means

having a plurality of parallel spaced apart endless data tracks, each adapted to present itself continuously to pickup means in a recurring sequence with respect to a beginning point, and each track having means defining at least one sound recorded along its length, each recorded sound having a predetermined beginning point and a predetermined ending point, the amplitude of the sound decaying from the beginning point to the




ending point, and an address track on the record with means common to all of the data tracks to define the points of beginning of each sound and all subsequent points throughout the lengths of the data tracks, whereby the sounds of the respective tracks can be accessed at points within a predetermined time interval from the beginning to afford a reproduction which closely approximates the original sound.

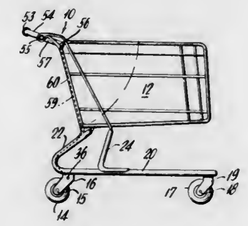
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**4,018,449**

## AUTOMATIC BRAKING DEVICE FOR NESTING CART

**Anders Anderson, Walden, N.Y., assignor to Patrick Suo, Maybrook and Arthur Concors, Walden, both of, N.Y., part interest to each**

**Filed Dec. 16, 1975, Ser. No. 641,295**
**Int. Cl.² B62B** *5/04*
**U.S. Cl. 280—33.99 C** **9 Claims**




1. A wheeled cart having a handle with which to propel said cart; a normally locked wheel lock for at least one wheel of said cart; said wheel being mounted on an axle; said wheel lock comprising means for locking said wheel against forward motion comprising a first member having an edge bearing transversely against the periphery of said wheel, said first member being rotatably mounted on a pivot, said pivot extending in the same direction as the axle of said wheel and being positioned radially outward from the periphery of said wheel and forward of said bearing edge whereby forward pressure on said locked wheel causes said first member to tend to rotate about said pivot thereby increasing the locking force; and means for locking said wheel against rearward motion comprising s second member having an edge bearing transversely against the periphery of said wheel, said second member being rotatably mounted on a pivot, the pivot on which said second member is mounted extending in the same direction as the axle of said wheel and being positioned radially outward from the periphery of said wheel and rearward of the bearing edge of said second member, whereby rearward pressure on said locked wheel causes said second member to tend to rotate about said pivot thereby increasing the locking force; and release means for releasing said means for locking said wheel against forward and rearward motion.

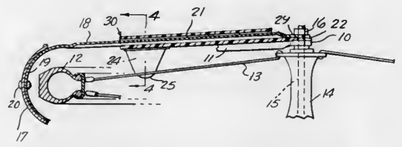
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**4,018,450**

## BICYCLE-MOUNTED NOISE MAKER

**James T. Rutledge, 7779 Royal Lane, Dallas, Tex. 75230**

**Filed June 30, 1975, Ser. No. 591,652**
**Int. Cl.² A63H** *5/00*
**U.S. Cl. 280—289 R** **5 Claims**




1. A noise making attachment adapted to be mounted on a vehicle with at least one wheel having spokes, an elongated brace bar adjacent said wheel and mounted with a wheel axle bolt, comprising:

a. a unitary member comprising a vibratory flap and an elongated, at least partially enclosed, vibratory means for vibrating in response to the vibrations of said flap so that the combined vibrations of said flap and elongated means simulate the sound of a motorcycle, said brace bar extending longitudinally through said elongated vibratory means so as to prevent said attachment from rotating when said wheel rotates; and

b. a member attached to said unitary member provided with an opening therein adapted to receive the wheel axle bolt of said vehicle for mounting said noise making attachment to said vehicle in a manner such that said flap extends between said spokes, causing said flap to vibrate when said wheel rotates.

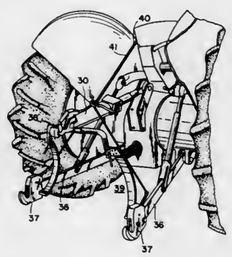
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**4,018,451**

## TRACTOR THREE-POINT CONNECTION HAVING LEAF SPRINGS

**Hubert Geisthoff, and Wilhelm von Allwörden, both of Lohmar, Germany, assignors to Jean Walterscheid GmbH, Lohmar, Rhineland, Germany**

**Filed July 28, 1975, Ser. No. 599,790**
**Int. Cl.² B60D** *1/16*
**U.S. Cl. 280—461 A** **9 Claims**




1. A three-point connection on a tractor for coupling implements and the like to the tractor comprising an upper guide member and a pair of lower guide members below said upper guide member, a coupling hook on each of said upper and lower guide members, a pair of leaf springs each having a lower end and an upper end, said leaf spring lower ends being connected to said lower guide member coupling hooks and said upper ends being nonpivotally connected to said upper guide member, said leaf springs each being curved such that when a force is applied to an end of a said leaf spring the leaf spring will bend in a predetermined direction.



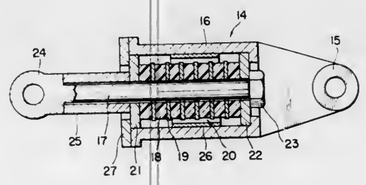
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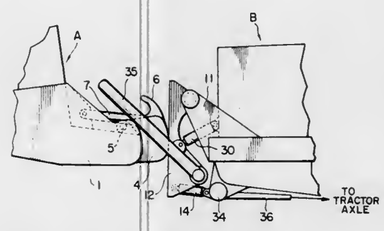
**4,018,452**

## TRACTOR-SCRAPER UNITS WITH PUSH-PULL COUPLING INCLUDING TWO-WAY SHOCK ABSORBERS

**Toshiaki Wagatsuma, Yokohama; Toshitaka Suketomo, Kawasaki; Kouki Yoshida, Kawasaki, and Michio Suga, Kawasaki, all of Japan, assignors to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan**

**Filed Mar. 20, 1975, Ser. No. 560,364**
**Claims priority, application Japan, Mar. 22, 1974, 49-31692**
**Int. Cl.² B60D** *1/04*
**U.S. Cl. 280—481** **2 Claims**




1. A push-pull coupling for a tandem arrangement of earth-moving scraper units comprising:

a first push block fixedly secured to the tail end portion of a forward scraper unit and having a pulling hook projecting therefrom,

a second push block pivotally mounted at the upper end thereof to the front end of a tractor of a rearward scraper unit for contact said first push block to establish a pushing relationship between the scraper units, said second push block having means mounted thereon for engaging said pulling hook in such a manner as to be hooked thereby to establish a pulling relationship between the scraper units, and

at least two sets of two-way, compressive shock absorber means, connected respectively between the lower part of said second push block of said rearward scraper unit and a reinforcing member secured to a tractor framework of said rearward scraper said rearward unit, each of said two-way compressive shock absorbing means being dually effective to lessen shocks between said units both when said forward scraper unit is pushing said forward scraper unit and when said rearward scraper unit is pulling said forward scraping unit.

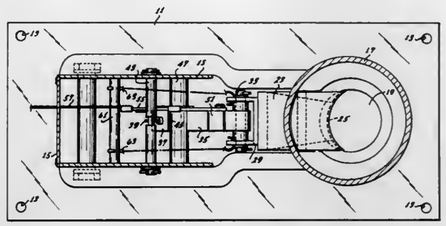
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**4,018,453**

## QUICK RELEASE LOCKING DEVICE

**Leon J. Bigelow, 1305 Emden St., Wilmington, Calif. 90744**

**Filed Feb. 12, 1976, Ser. No. 657,551**
**Int. Cl.² B60D** *1/10*
**U.S. Cl. 280—512** **19 Claims**




1. Apparatus for releasably fixing structures to one another comprising

a generally spherical member including

means for fixing said spherical member to a first structure and

a receiver member comprising

a housing, means in said housing for seating said spherical member including

movable gate means pivotally mounted in said housing for movement between a first, sphere-released position, a second, sphere-engaged position, and a third, sphere-locked position,

locking bar means pivotally connected to said gate means and having

slot means formed near one end thereof,

a locking rod fixed in said housing in position to be received in said locking bar slot when said gate means is in said third position and to guide longitudinal movement of said locking bar during movement of said gate means,

first means for urging said locking bar toward the position in which said locking rod is seated in said slot,

second means for urging said gate means toward said first position, and

means for manually overcoming the force of said first urging means to move said locking bar slot away from said locking rod.

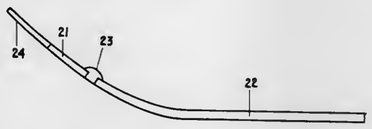
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**4,018,454**

## DEVICE FOR DAMPING VIBRATION OF A SKI

**Oskar Burkart, Forst, Baden, Germany, assignor to Hannes Marker, Garmisch-Partenkirchen, Germany**

**Division of Ser. No. 513,150, Oct. 8, 1974, abandoned. This application Feb. 23, 1976, Ser. No. 660,185**
**Claims priority, application Germany, Oct. 9, 1973, 2350656**
**Int. Cl.² A63C** *5/07*
**U.S. Cl. 280—602** **2 Claims**

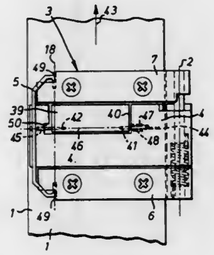



1. A device for damping vibration of a ski comprising, in combination, a tip portion of the ski formed separately from the remaining part of the ski, hinge means including an elastic joint of elastomeric bonding material for connecting said tip portion to the remaining part of the ski to permit independent, resilient movement of said tip portion at substantially a right angle to the tread of the ski, said tip portion comprising a mass

having a reasonant frequency of between 1Hz and 40Hz so as to form a vibratory system for exerting forces on the ski.

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**4,018,455**
**BRAKING DEVICE FOR SKIS**
**Hans Bieler, Haus Sableun, Bonaduz, Switzerland**
**Filed Apr. 11, 1975, Ser. No. 567,102**
**Claims priority, application Switzerland, Apr. 19, 1974, 5431/74; July 8, 1974, 9358/74**
**Int. Cl.² A63C 7/10**
**U.S. Cl. 280—605** **20 Claims**

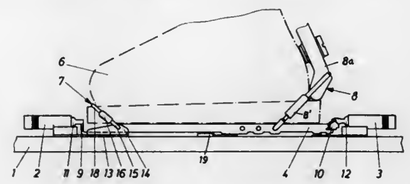


1. A ski braking device for braking a ski when it becomes accidentally detached from a skier's boot, the device comprising a frame adapted to be fixed to the top surface of a ski, a rigid braking lever mounted to pivot about an axis on said frame which extends fore and aft of the ski from a first angular position, in which said braking lever extends from the end thereof at the said pivot transversely across the top surface of the ski to an outer end located essentially on the opposite side of the ski, to a second angular position in which said braking lever pivots more than 180° about said axis to extend downwards beneath the ski, said lever having a low profile positionable beneath the skier's boot in said first position, a holding device located at the outer end of the lever when said lever is in said first position and movably mounted on said frame between a first location at which said holding device engages said outer end of the braking lever to hold the braking lever in said first angular position and a second location at which said holding device is moved out of the path of the lever to release said outer end and hence release said braking device for movement to the second angular position upon separation of the skier's boot therefrom, resilient means operative on said braking lever to turn said braking lever automatically from said first angular position to said second angular position when released by said holding device and upon separation of the skier's boot from the lever, and fixing means for automatically fixing said braking lever, immediately on reaching said second angular position, against resilient turning movement back towards said first angular position.

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**4,018,456**
**SKI BINDING WITH RELEASE PLATE**
**Ulrich Gertsch, Matten, Switzerland, assignor to Gertsch AG, Zug, Switzerland**
**Filed Nov. 18, 1975, Ser. No. 632,994**
**Claims priority, application Switzerland, Nov. 19, 1974, 15349/74**
**Int. Cl.² A63C 9/086**
**U.S. Cl. 280—618** **17 Claims**

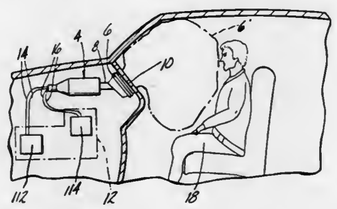
1. A ski binding with release plate for a ski boot having a sole, and a ski having thereon release devices, respectively, for holding the release plate to the ski, comprising
a release plate substantially corresponding to the distance from the heel of the boot to the ball of the foot,
pivot pin means adapted on said ski for rotatably and removeably liftably mounting said release plate in a vicinity of an imaginary extension of the axis of the leg of the skier, said release plate being operatively releaseably held to the side and/or upwardly by the respective release devices, and
a hinge means for permitting a pivotal movement of said release plate relative thereto about a transverse axis disposed in a range corresponding to the ball of the foot of the skier only operative upwardly away from the ski, including a rigid abutment means beneath said release plate for preventing a pivotal movement of said plate



downwardly toward the ski by contacting a lower surface of said release plate,
said hinge means further includes a front holding part extending integrally on said hinge means to a position in front of a front end of said release plate as well as in front of a front tip of the boot. respectively, said front holding part cooperates with a corresponding of said release devices, whereby the latter operatively releaseably holds said release plate via said hinge means.

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**4,018,457**
**INFLATING DEVICE FOR USE WITH VEHICLE SAFETY SYSTEMS**
**Darrell W. Marlow, Herrin, Ill., assignor to Olin Corporation, New Haven, Conn.**
**Filed Sept. 5, 1972, Ser. No. 286,361**
**Int. Cl.² B60R 21/08**
**U.S. Cl. 280—735** **1 Claim**

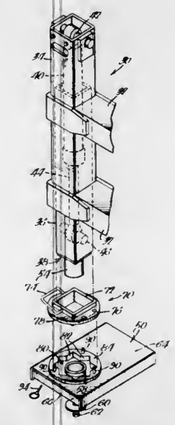


1. An apparatus for use in a safety system of the type utilizing an inflatable member, a stored fluid under pressure, and propellant charge means for the generation of a hot gas, said apparatus including fluid storage means for storing a fluid under pressure, propellant storage means for storing a propellant charge, means normally sealing said propellant storage means from said fluid storage means and operable to provide communication between the propellant storage means and the interior of said fluid storage means if the system is actuated, a nozzle between said fluid storage means and said propellant storage means having a predetermined throat area, means for igniting said propellant charge in response to the sensing of a condition wherein slow deployment of the system can be used and for igniting said propellant charge and for reducing the effective throat area of said nozzle means when fast deployment of the system is required, means for releasing the gas generated by the propellant charge and the stored fluid from the fluid storage means if the system is actuated, said nozzle having at least two orifices therethrough, said means for igniting said propellant charge for slow and fast deployment of the system and for reducing the throat area of said nozzle means for fast deployment including ignitor means for igniting said propellant, means for causing the firing of said first ignitor means in response to the sensing of a condition wherein both slow and fast deployment of the system is desired, and means for at least partially closing at least one of said orifices while leaving at least one of said orifices at least partially open in response to the sensing of a condition wherein fast deployment of the system is required, said means for at least partially closing at least one of said orifices includes a rod member in alignment with and spaced from one of said orifices, an ignitor member associated with said rod member, and means for causing the firing of said second ignitor means in response to the sensing of a condition wherein fast deployment of the system is required to move the rod member into a position closing the orifice with which it is aligned.



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**4,018,458**
**VEHICLE STABILIZER WITH ADJUSTABLE FOOT**
**John F. Shumaker, Mount Pleasant, Iowa, assignor to J. I. Case Company, Racine, Wis.**
**Filed Sept. 22, 1975, Ser. No. 615,246**
**Int. Cl.² B60S 9/12**
**U.S. Cl. 280—766** **11 Claims**

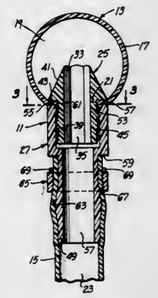


1. A stabilizer for a vehicle comprising an elongated hollow tubular member having an open end, a telescopic member extending through said open end and disposed for reciprocable movement with respect thereto, drive means between said members for reciprocating said members with respect to each other, a ground engaging foot, mounting means rotatably supporting said foot for rotation on a free end of said telescopic member about an axis generally parallel to the telescopic member at said free end thereof with a center of said foot being laterally offset from said axis, and latch means between said telescopic member and said foot for holding said foot in a plurality of rotated positions with respect to said telescopic member.

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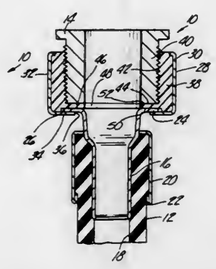
**4,018,459**
**SUBMAIN CONNECTOR**
**David E. Mominee, Covina, and Gilbert W. Vance, El Monte, both of Calif., assignors to Reed Irrigation Systems, El Monte, Calif.**
**Filed July 30, 1975, Ser. No. 600,469**
**Int. Cl.² F16L 41/00**
**U.S. Cl. 285—5** **1 Claim**

1. An assembly comprising:
a first flexible header having a wall and a passage, said passage being adapted to have fluid therein, said wall having an opening providing access to said passage;
first and second coupling sections of plastic material;
said first coupling section having inner and outer ends, a head adjacent the inner end, a shank extending from the head toward the outer end, and an internal surface defining an axially extending passage extending completely through said first coupling section from the inner end to the outer end;
said internal surface of said first coupling section defining at least one wrench flat whereby the first coupling section can be driven by a wrench;
said head having a peripheral surface which tapers radially inwardly as it extends toward said inner end and an annular shoulder adjacent the juncture of the head and the shank, said shoulder lying in a plane which is perpendicular to the axis of said passage;
a plurality of radially extending teeth on said shoulder, said teeth extending from said shank radially outwardly to the periphery of said head whereby the teeth extend for the full radial width of said shoulder;
said shank having external screw threads thereon, said threads being spaced from said shoulder to define an unthreaded portion of said shank;
the material of the wall of said first header around the opening being stretchable to permit the head to be forced through the opening and into the passage of the first header; said shank extending through said opening to the exterior of the first header with the opening surrounding said unthreaded portion;



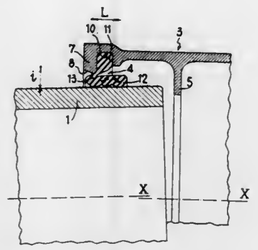
a second coupling section of plastic material having an axially extending passage extending completely through the second coupling section, said second coupling section terminating at one end in an end face;
internal screw threads in said passage of said second coupling section adjacent said one end threof whereby the coupling sections can be attached with the shank at least partially received within the passage of the second coupling section, with said passages being in communication, and with a region of the wall around the opening in the first header being clamped between the end face and the shoulder whereby the coupling sections can be mounted on the first header in substantially fluid tight relationship therewith, said end face and said shoulder having approximately the same radial width and said teeth gripping said region of the wall;
said outer end terminating within said passage of said second coupling section and said second coupling section extending axially beyond said outer end of said first coupling section;
a second header having a passage;
tubular means cooperable with said second coupling section for attaching said second header to the second coupling section; and
said passages of said coupling sections providing communication between the passages of said headers.

**4,018,460**
**HOSE COUPLING**
**Roy H. Morris, Battle Creek; George L. Turner, Hickory Corners, and Walter L. Hixon, Augusta, all of Mich., assignors to American Stamping Company, Battle Creek, Mich.**
**Filed Oct. 28, 1975, Ser. No. 626,116**
**Int. Cl.² F16L *35/00***
**U.S. Cl. 285—39** **11 Claims**



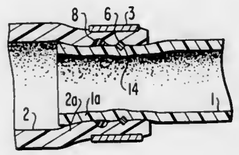
1. A hose coupling comprising; a tubular element having one end adapted for fastening to a hose in nonrotatable relation thereto, a housing assembly including a shell and a lining element disposed in said shell, said lining element having internal threads adapted for threaded attachment to a fitting, said shell having a radially inwardly extending portion, said lining element having a radially inwardly extending flange spaced from the portion of said shell to form an annular groove therebetween, and a collar formed by said tubular element and extending radially outwardly from the other end thereof, said collar being rotatably disposed in said annular groove for rotational movement of said housing relative to said tubular element, said flange of said lining element forming a seal engagable in sealing relationship with said collar upon engagement of said flange by an end of said fitting.

**4,018,461**
**SEALED JOINT HAVING A SOCKET**
**Georges Eugene Bram, Pont-A-Mousson, France, assignor to Everitube, Neullly-sur-Seine, France**
**Filed Oct. 16, 1975, Ser. No. 623,114**
**Claims priority, application France, Oct. 22, 1974, 74.35441**
**Int. Cl.² F16L *17/02***
**U.S. Cl. 285—110** **7 Claims**



1. A sealed pipe joint comprising means defining a socket having an entrance, means defining a male end extending through said entrance into the socket with a radial clearance and capable of angular deviation relative to the socket, two annular planar faces axially defining an inner annular groove in the socket, a first of said annular planar faces adjacent said entrance having an inner peripheral edge defining an annular clearance with the male end, and an annular elastically yieldable sealing element coaxial with the socket and having at one end of the sealing element an annular substantially smooth solid heel portion disposed in the groove of the socket and a single annular lip portion extending from the heel portion axially inwardly of the socket, the lip portion having an annular end portion which is remote from the heel portion and is in gripping relation to the male end and an annular intermediate portion which is flexible and capable of acting as a hinge, the socket radially defining with the end portion of the lip portion an annular space which allows an angular and radial deviation between the male end and the socket and allows fluid pressure in the pipe access to a side of the end portion radially remote from the male end, the heel portion having, when the sealing element is in a free undeformed state, a width axially of the sealing element which is of the same order of magnitude as the thickness of the heel portion radially of the sealing element and exceeds the axial width of the groove so that the heel portion is compressed between said two annular planar faces, the axial width of the groove being greater than the greatest radial clearance which can exist between the male end and said inner peripheral edge of said first one of said annular planar faces.

**4,018,462**
**PIPE FITTING**
**Yoshimi Saka, Suzuka, Japan, assignor to Hitachi Metals, Ltd., Tokyo, Japan**
**Filed Oct. 31, 1975, Ser. No. 627,817**
**Int. Cl.² F16L *13/14***
**U.S. Cl. 285—111** **9 Claims**

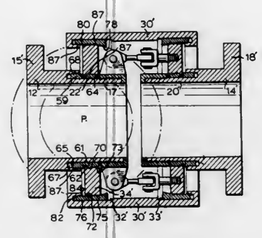


7. In combination telescoping inner and outer elastic synthetic resin pipes, said inner pipe having an outer diameter on the order of the inner diameter of said outer pipe and elastic packing and a hard intrusion ring partially received within respective annular grooves on the periphery of one of said pipes and between telescoping portions of said pipes, and a press ring of an initial diameter on the order of the outer diameter of said outer pipe positioned on said outer pipe overlying said packing and intrusion rings and uniformly compressed to a diameter less than its original diameter with bulged out opposed portions at circumferentially spaced positions such that said synthetic resin pipes are elastically compressed with the packing ring compressed within its annular groove and forming a leak tight seal between said elastic synthetic resin pipes and said intrusion ring including a portion penetrating the part of said pipe opposite that carrying said groove within which said intrusion ring is partially received such that longitudinal slippage between the press fitted pipes is prevented.

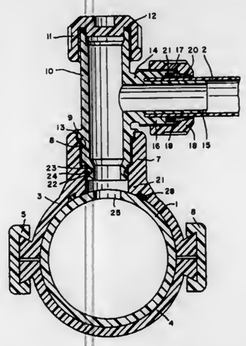
**4,018,463**
**PIPE STRESS/STRAIN NEUTRALIZER**
**Joseph K. Campbell, 423 Shannon Way, Tsawwassen, British Columbia, Canada (V4M 2W7)**
**Filed Apr. 30, 1976, Ser. No. 682,136**
**Claims priority, application Canada, Oct. 7, 1975, 237201**
**Int. Cl.² F16L *27/04***
**U.S. Cl. 285—166** **7 Claims**

1. A pipe joint comprising: a first pipe end and a second pipe end juxtaposed in substantial alignment, each pipe end defining an outer sealing surface, a sleeve member spanning between and externally of both pipe ends and defining two inner sealing surfaces laterally aligned with the outer sealing surfaces of the pipe ends, a first annular ring structure having an inner sealing surface for sliding engagement with the outer sealing surface of said first pipe end, and having an outer sealing surface for sliding engagement with one of the inner sealing surfaces on said sleeve member, a second annular ring structure having an inner sealing surface for sliding engagement with the outer sealing surface of said second pipe end, and having an outer sealing surface for sliding engagement with the other of the inner sealing surfaces on said sleeve member, first articulating means connecting said first annular ring structure to said second pipe end, and second articulating means connecting said second annular ring structure to said first pipe end.



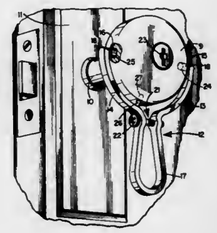


**4,018,464**
**TAPPING TEE**
**Petrus Marinus Acda, Enkhuizen, and Hans Edward Guitoneau, Bovenkarspel, both of Netherlands, assignors to Polva-Nederland B.V., Netherlands**
**Filed Sept. 5, 1975, Ser. No. 610,567**
**Claims priority, application Netherlands, Sept. 17, 1974, 7412287**
**Int. Cl.² F16L *5/00***
**U.S. Cl. 285—197** **2 Claims**



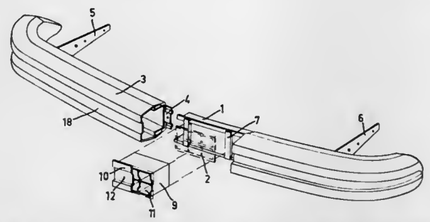
1. Tapping tee for connecting a main pipe to a branch pipe, comprising a saddle-shaped part and a tubular tapping member which is rotatable about an axis at right angles to the main pipe and is provided with a branch-receiving socket for coupling to a branch pipe having a given inner diameter and a given outer diameter, characterized in that the branch-receiving socket of the tubular tapping member has integral coupling parts which comprise a support pipe having an outer diameter which corresponds to said given inner diameter and a sleeve which is arranged coaxially with the support pipe, the inner diameter of at least a portion of the sleeve corresponding to the outer diameter of the branch pipe, the sleeve having an outer surface provided with a screw thread for mounting a nut, a distal end of the sleeve having an enlarged bore having a diameter and a length sufficient to accommodate at least part of a wedge-shaped retainer on a branch pipe to be coupled.

**4,018,465**
**DOOR OPENING DEVICE**
**David A. Ramler, 155 Shaw Road, Chestnut Hill, Mass. 02167**
**Filed Oct. 20, 1975, Ser. No. 624,269**
**Int. Cl.² E05B *3/00***
**U.S. Cl. 292—336.3** **3 Claims**



1. A device for assistance in opening a door having a round knob and a shank extending from the knob through said door, said device comprising:
an elongated lever arm; and
means for coupling said lever arm to said knob in such a manner that said knob rotates when forces are applied to said lever arm which are substantially parallel to the plane of said door;
said lever arm comprising a pair of yolk arms encompassing at the open ends of said yolk arms a portion of the periphery of said knob;
said means for coupling said lever arm to said knob comprising diametrically opposed pins formed on the ends of said yolk arms, said knob being formed with diametrically opposed holes in the periphery thereof, said ends being seated in said holes in said knob.

**4,018,466**
**VEHICLE BUMPER ASSEMBLY**
**Stig Ivar Norlin, Trollhattan, Sweden, assignor to Saab-Scania Aktiebolag, Linkoping, Sweden**
**Continuation of Ser. No. 135,686, April 20, 1971, Pat. No. 3,901,543. This application Aug. 26, 1974, Ser. No. 500,902**
**Claims priority, application Sweden, Apr. 20, 1970, 5441/70**
**Int. Cl.² B60R *21/14***
**U.S. Cl. 293—71 R** **5 Claims**



1. A shock-absorbing bumper comprising a rigid mounting member intented to be securely mounted substantially across the width on at least one end of a vehicle,
a plurality of discrete resilient shock absorbing honeycomb members having honeycomb cells of polygonal cross-sectional shape, wherein adjacent cells have at least one contiguous wall and the longitudinal axes of said cells are disposed substantially parallel to the direction of travel of said vehicle, said honeycomb members being disposed over a width approximating that of the mounting mem-

ber, each honeycomb member having a cell depth greater than the width of an individual cell, said cells having a memory to return to their extended longitudinal configuration after impact;

an outer shell encasing said resilient honeycomb members to provide an exterior surface and to simulate a conventional bumper; and

mounting means for securing the outer shell and said resilient honeycomb members to the mounting member to form a unit for absorbing shock across the width of the vehicle.

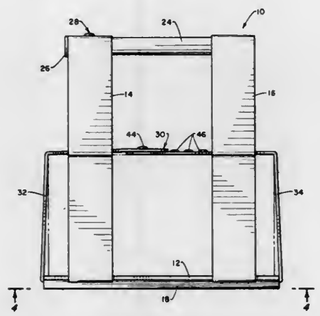
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**4,018,467**

**CARTON CARRIER**

**Harold L. Salvesen, 2127 Grandview S., Oceanside, Calif. 92054**

**Filed Oct. 16, 1975, Ser. No. 622,945**
**Int. Cl.² B65D** *71/02*
**U.S. Cl. 294—31.2** **7 Claims**



**1.** A carton carrier comprising:

a base, said base adapted to receive thereon at least one carton;

a first transverse strap attached to said base and enclosing a first enclosed area;

a second transverse strap attached to said base and enclosing a second enclosed area, said second transverse strap being spaced from said first transverse strap forming a space;

an elongated handle having a first end and a second end, said second end of said handle being fixedly secured to said second transverse strap, said first end of said handle detachably connectable with said first strap with said first strap being capable of being removed from association with said first end of said handle, with one or more cartons located upon said base, said first and second transverse straps are locatable on each side of the carton to laterally restrain the carton, and with the first transverse strap located upon and in frictional engagement with the first end of said handle, a person's hand is to grasp the handle in the space between the first and second transverse straps and thereby carry the carton.

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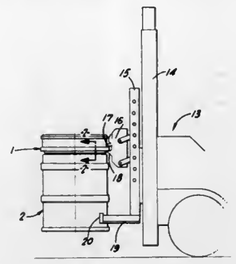
**4,018,468**

**LIFTING RING FOR PLASTIC DRUMS**

**Merlin L. Lundquist, 2626 Country Club Court, Stockton, Calif. 95204**

**Filed May 28, 1976, Ser. No. 690,996**
**Int. Cl.² B66C** *1/10*
**U.S. Cl. 294—67 BA** **3 Claims**

**1.** In the combination of an upright drum, and a lifting ring surrounding, and secured to, the sidewall of the drum; the improvement characterized by the drum sidewall having a horizontal circumferential groove formed therein in spaced relation below the upper end of said drum, and the lifting ring being tightly seated in the groove; said lifting ring including an integral, annular, vertically facing flange projecting radially outwardly from the groove to an outer edge termination a distance beyond the drum sidewall, and an annular lip formed integrally with and upstanding from the outer edge of said



annular flange and spaced substantially said distance from the drum sidewall whereby the upstanding lip is exposed exteriorly of the drum or ready, unobstructed access from above and gripping engagement by a gripping device of a drum lifting and transporting vehicle.

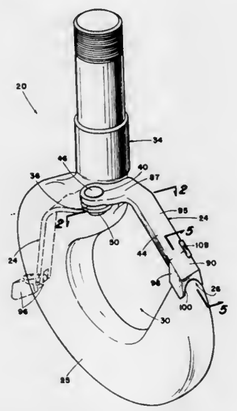
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**4,018,469**

**GATE LATCHING MECHANISM FOR HOIST HOOK**

**Bobby G. Stoops, Tulsa, Okla., assignor to Don R. Hinderliter, Inc., Tulsa, Okla.**

**Filed Oct. 28, 1975, Ser. No. 626,356**
**Int. Cl.² B66C** *1/36*
**U.S. Cl. 294—82 R** **6 Claims**



**1.** A gate latching mechanism for a hook of the type having a stem and a bight terminating in a tip spaced from said stem to form a mouth; said gate latching mechanism including an arm having one end thereof pivotally connected to said stem and rotatable about a first pivot axis spaced from and parallel with the central axis of said stem for movement of said arm towards and away from a position over the mouth of said hook, said arm having an opposite free end engagable with said tip for closing the mouth of said hook for preventing a load line placed within said hook from slipping out of said hook; said arm including a latch pivotally mounted on the free end of said arm and movable towards said tip for engaging the sides thereof and for restraining said arm from moving to open the mouth of said hook; a locking means mounted on said arm and engagable with said latch for locking said latch in its tip-engaging position; said latch being pivotally mounted in said arm on a second and transverse pivot axis such that the



portion of said latch which engages said tip is on the side of the second pivot axis away from said arm; a cam included in said locking means mounted in said arm and rotatable about an axis substantially parallel to the second pivot axis and on the side of the second pivot axis toward said arm; a nib on said latch projecting towards said cam for engaging said cam; said cam being rotatable in a given rotary direction to permit said nib to pass said cam whereby said latch can be pivoted out of engagement with said tip; a lever included in said lock means connected to said cam for manually rotating said cam to permit said nib to pass; and a locking spring biasing said cam in a rotary direction opposite to said given rotary direction for engaging said nib.

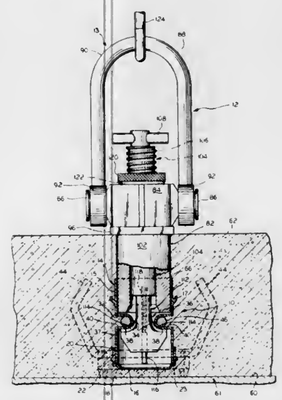
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**4,018,470**

**ANCHOR INSERT FOR EMBEDMENT IN A CONCRETE SLAB**

**Dennis W. Tye, Hayward, Calif., assignor to Superior Concrete Accessories, Inc., Franklin Park, Ill.**

**Filed June 9, 1975, Ser. No. 584,740**
**Int. Cl.² B66C** *1/66*; **E04C** *5/00*
**U.S. Cl. 294—89** **7 Claims**



**1.** In an anchor insert adapted to be embedded in a concrete slab for cooperation with a pick-up unit which includes a locking stem having a pair of lift shoulders extending from opposite sides of the stem, said insert including a concrete-excluding cage having a single-walled hollow body and a base closing one end of the body, the opposite end of said body being adapted for insertion of said locking stem and lift shoulders into the cage, said cage being adapted to be emplaced within a form for a concrete slab with its base lowermost in the form, a pair of spaced apart shoulders formed in the wall of said cage body on opposite sides of the body and spaced from said base, said body shoulders extending inwardly of the body to define a pair of downwardly facing internal thrust surfaces on one side of said wall each adapted for lifting engagement in contact with one of said lift shoulders inserted in said cage, said body shoulders also defining a pair of upwardly facing external lift surfaces on the reverse side of said wall each adapted for lifting engagement in contact with an anchor rod section, and a first pair of spaced apart anchor rod sections each defining a downwardly facing thrust surface contacting one of said lift surfaces on the body, whereby said locking stem of a pick-up unit may be inserted in said cage with said lift shoulders disposed beneath said body shoulders, said locking stem thereafter may be rotated and said lift shoulders may be brought into lifting engagement in contact with said thrust surfaces on the body, and a lifting force when imparted to said locking stem is transmitted to said anchor rod sections for lifting a slab in which the insert is embedded, the combination with

a second pair of spaced apart anchor rod sections extending transversely of said first pair of anchor rod sections and fixedly secured thereto on opposite sides of said body,

a pair of foot members disposed beneath each anchor rod section of said second pair, said second pair of anchor rod sections being seated on said foot members, said foot members in each pair being disposed on opposite sides of said cage and spaced outwardly therefrom, said foot members extending below said first pair of anchor rod sections and being adapted to seat on the floor of a slab form to space both said first and second pairs of anchor rod sections inwardly from the adjacent external surface of a formed slab, and

strut means extending outwardly from said base to each of said foot members and fixedly connecting the foot members to the base.

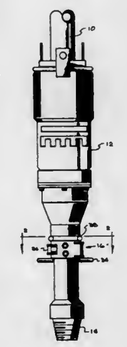
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**4,018,471**

**ROTATING HEAD**

**Clyde J. Shockey, 761 North Ave. B, Kermit, Tex. 79745**

**Filed July 3, 1975, Ser. No. 593,024**
**Int. Cl.² B66C** *1/62*
**U.S. Cl. 294—90** **9 Claims**



**2.** A rotating head clamp adapted to be clamped to a drill pipe below the rotating head to hold same in place comprising:

a. a collar segment in the form of a semicircle,

b. a gate in the form of a semicircle,

c. said gate hinged to the collar segment,

d. latch means interconnecting the collar segment and gate when fastened for holding the gate securely and firmly closed and for forming the collar segment and gate into a circle, and

e. a single arcuate handhold

i. attached to the collar segment and

ii. concentric with the collar segment and

iii. having an opening in its perimeter at least as wide as the collar segment diameter,

iv. the handhold extending at least two-thirds the way around the pipe,

v. the handhold extending further from the collar segment than any other element.

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**4,018,472**

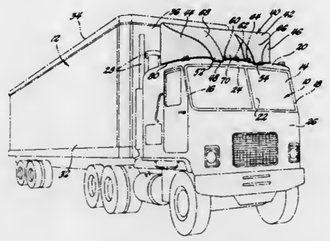
**TRACTOR-TRAILER AERODYNAMIC DRAG REDUCER**

**William T. Mason, Jr., Lake Orion, Mich., assignor to General Motors Corporation, Detroit, Mich.**

**Filed Feb. 4, 1976, Ser. No. 655,258**
**Int. Cl.² B62D** *35/00*
**U.S. Cl. 296—1 S** **3 Claims**

**1.** A tractor-trailer aerodynamic drag reducer for use on the roof of a tractor having roof mounted equipment and comprising: a generally wedge-shaped body having a top surface with

a leading edge faired into the tractor roof, the top surface extending rearwardly from the leading edge and diverging upwardly from the tractor roof to streamline airflow over the trailer roof, the wedge-shaped body having side surfaces extending generally vertically between the top surface and the tractor roof with the juncture of the side surfaces and the tractor roof following a curvilinear path providing a concave-convex contour to the side surfaces to divert air smoothly around the sides of the trailer and to streamline crosswind airflow to reduce aerodynamic drag on the tractor-trailer vehicle, the leading edge of the top surface having a central portion recessed rearwardly of outboard portions of the lead-



ing edge to accommodate roof mounted equipment, said rearwardly recessed central portion of the leading edge dividing the top surface into a pair of laterally spaced outboard top surface portions and a central top surface portion, the central top surface portion diverging upwardly and rearwardly from the central portion of the leading edge and into tangency with the top surface, and a pair of laterally spaced walls depending generally vertically from the laterally spaced top surface portions to the tractor roof and to the central top surface portion to cooperate with the central top surface portion, the tractor roof and the roof mounted equipment to define a recessed channel which imparts a low-drag streamline curvature to the airflow.

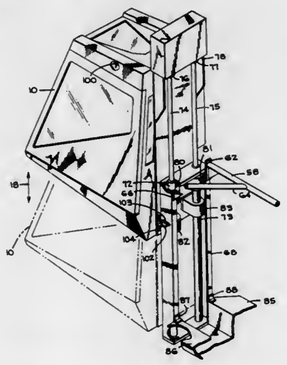
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**4,018,473**

## MATERIAL HANDLING EQUIPMENT OPERATOR'S CAB MOUNTING

**Paul A. Chalupsky, Cedar Rapids, Iowa, assignor to FMC Corporation, San Jose, Calif.**

**Filed Dec. 9, 1974, Ser. No. 530,773**
**Int. Cl.² B62D** *27/00*
**U.S. Cl. 296—28 C** **3 Claims**



1. In material handling equipment, the combination comprising a carrier, a machinery platform being mounted upon the carrier for rotation in a generally horizontal plane about a substantially vertical axis, an elevating mechanism being attached to the machinery platform at a location offset from the axis of rotation of the platform, and an operator's cab being supported by the elevating mechanism to move vertically between a level where overhead clearance above the cab is provided for transport and various elevated levels thereabove where the operator has unobstructed visibility of the work, said elevating mechanism further including a support frame, a pair of hydraulic cylinders being mounted within the support frame and having actuating arms extending upwardly therefrom, a support bracket being attached to the upper rear portion of the operator's cab and being supported by the actuating arms of the hydraulic cylinders adjacent one side of said support frame, and at least one pair of guide brackets projecting rearwardly from the lower portion of the operator's cab, each guide bracket encircling in a horizontal plane the outside circular surface of a respective one of said hydraulic cylinders to bear laterally against the cylinder surface in response to horizontal forces on the bracket existing between said operator's cab and said cylinder and to slide vertically along the cylinder in response to vertical forces on the bracket.

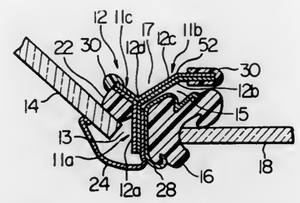
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**4,018,474**

## VEHICLE BODY CONSTRUCTION WITH SLIMLY SHAPED FRONT PILLAR

**Yoshihiro Kajio, Yokohama, and Norimoto Aya, Yokosuka, both of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan**

**Filed Aug. 20, 1975, Ser. No. 606,213**
**Claims priority, application Japan, Aug. 29, 1974, 49-98411**
**Int. Cl.² B60J** *1/00*
**U.S. Cl. 296—28 R** **8 Claims**



1. A vehicle body construction comprising a windshield, a window glass panel and a front pillar consisting of three wall members assembled together to form a substantially central core portion having a minimized cross-sectional area and being substantially hollowless, by joining one another at an edge region of each wall member and extend from said core portion each at angles with the other two wall members such that said front pillar has a cross-section generally in the shape of the letter Y over a length substantially corresponding to the length of a lateral edge of said windshield, said front pillar being arranged such that said windshield being received in a first one of three sides of said front pillar, a weather strip for a front edge of a window glass panel being received in a second side of said front pillar, the third side of said front pillar being exposed to the interior of the body.

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**4,018,475**

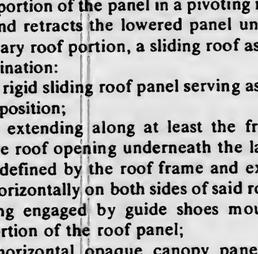
## DOOR SYSTEM FOR VEHICLES

**Heinrich Richtermeier, Barnstorf, Germany, assignor to Volkswagenwerk Aktiengesellschaft, Wolfsburg, Germany**

**Filed Apr. 17, 1975, Ser. No. 569,101**
**Claims priority, application Germany, May 14, 1974, 2423296**
**Int. Cl.² B60J** *5/04*
**U.S. Cl. 296—28 R** **4 Claims**

1. A door system for vehicles, e.g. motor vehicles, comprising:

a door with an inner and an outer door surface and an end face plate connecting them at an end of the door adapted to accept a door lock, said end face plate running diagonally with respect to said door surfaces in top view over at least part of its length such that the width of the door increases in the direction from said inner door surface towards said outer door surface, said outer door surface having a flange region adjacent said end face plate and projecting beyond it; and



a pillar with a diagonal face running substantially parallel to said end face plate and defining a diagonal gap between said pillar face and said end face plate, which gap has a width measured substantially parallel in top view with respect to said door surfaces, said pillar further comprising an outer region that forms a clearance with said flange region measured substantially parallel in top view with respect to said door surfaces, said clearance being dimensioned significantly wider than the width of said gap.

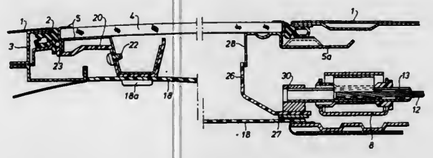
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**4,018,476**

## AUTOMOBILE SLIDING ROOF WITH TRANSPARENT PANEL AND SHUTTER

**Alfons Lutz, Emmering, and Hans Jardin, Krailling, both of Germany, assignors to Webasto-Werk W. Baier KG, Stockdorf near Munich, Germany**

**Filed Nov. 24, 1975, Ser. No. 634,444**
**Claims priority, application Germany, Jan. 24, 1975, 2502775**
**Int. Cl.² B60J** *7/00*
**U.S. Cl. 296—137 F** **10 Claims**



1. In a sliding roof structure for automobiles having a generally horizontal sliding roof panel closing a generally rectangular opening in the roof structure, from which opening said panel is removable by means of an opening mechanism which lowers the rear portion of the panel in a pivoting motion about its front edge and retracts the lowered panel underneath the adjacent stationary roof portion, a sliding roof assembly comprising in combination:

a transparent rigid sliding roof panel serving as a skylight in the closed position;

a roof frame extending along at least the front and side edges of the roof opening underneath the latter;

panel guides defined by the roof frame and extending substantially horizontally on both sides of said roof panel, the guides being engaged by guide shoes mounted on the forward portion of the roof panel;

a generally horizontal opaque canopy panel arranged a distance underneath the sliding roof panel and engaging the roof frame surrounding the roof opening, so as to serve as a closing member or blind to control the amount of light entering through the roof panel;

laterally spaced canopy guides supporting the canopy panel for longitudinal displacement therealong independently of the roof panel, so that the canopy can be opened while the transparent roof panel remains closed; and

shutter means arranged in the space between the roof panel and the canopy panel underneath at least the lateral roof panel edges for covering from view at least a major portion of the roof frame and associated structural elements; the shutter means being connected to the roof panel so as to follow the longitudinal opening and closing motions of the latter;

laterally spaced shutter guides engaged by the shutter means during its longitudinal movement, the shutter means being thus prevented from executing the pivoting motion of the roof panel; and wherein

the shutter means being pivotably connected to the roof panel in the vicinity of the axis about which the roof panel is pivotable.

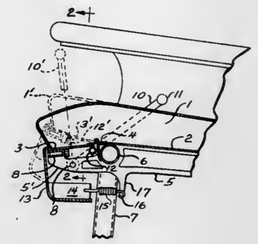
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**4,018,477**

## ADJUSTABLE HEIGHT FRONT EDGE FOR VEHICLE SEAT

**Gerard T. Hogan, Southington, Conn., assignor to UOP Inc., Des Plaines, Ill.**

**Filed Nov. 3, 1975, Ser. No. 627,990**
**Int. Cl.² A47C** *3/00*
**U.S. Cl. 297—284** **5 Claims**



1. A vehicle seat unit having a unitary cushioned seat section, and an adjustable height front edge portion for said cushioned seat section, said portion comprising in combination,

a. a movable and tiltable front edge portion underneath the forward portion of said cushioned seat section that can be raised and lowered with respect to the remaining more-rearward non-moving portion of the cushioned seat section,

b. a transverse hinging support means connecting between the lower rearward part of said movable front edge portion and said non-moving portion of the seat section whereby said front edge portion can pivot up and down with respect to the non-moving portion,

c. a pivoted height adjusting arm member to be moved by a seat occupant that is attached to the side portion of the vehicle seat unit to move in an arc and in a generally vertical plane, and

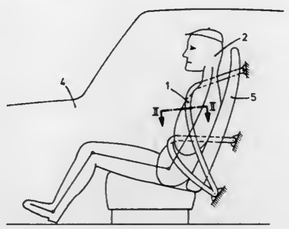
d. a movable transversely positioned horizontal lift bar attached to said pivoted arm member a spaced distance above the pivot point for the latter at a level and in a position to move in a fore and aft manner under said movable front edge portion of the cushioned seat section, whereby such lift bar member can, in turn, be moved through an arcuate path and will serve to raise and lower the superposed movable front edge portion for the cushioned seat section, and

e. a supporting means for said front edge portion of said cushion seat section, said supporting means having a low friction surface from the underside thereof for contact with said movable transversely positioned horizontal lift bar.

**4,018,478**
**SAFETY BELT**

**Ernst Fiala, Braunschweig-Querum, and Andreas Bauer, Falkersleben, both of Germany, assignors to Volkswagenwerk Aktiengesellschaft, Wolfsburg, Germany**

**Filed May 15, 1972, Ser. No. 253,296**
**Claims priority, application Germany, May 29, 1971, 2126939**
**Int. Cl.² A62B** *35/00*
**U.S. Cl. 297—385** **4 Claims**



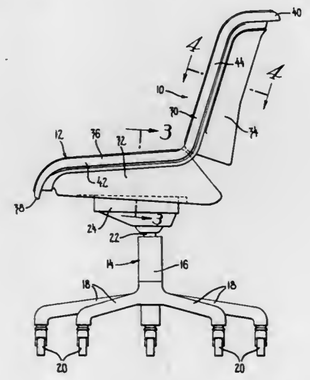
1. A safety belt attached to a vehicle so as to hold passengers secure in the vehicle in the event of a collision, the belt having flexible passenger restraining strands of a generally round crosssectional shape and being elastically compressible to a generally flattened elliptical shape, said strands comprising an outer high tensile strength flexible skin defining a hollow interior, and an interior core of deformable elastic material enclosed by the outer skin and filling the interior, said interior core of deformable material forming the strands into the rounded crosssection absent the application of deforming forces thereto and spreading and flattening the strands to form an increased surface area in contact with the passenger upon the application thereto of forces normally caused by the restraint of the secured passenger by the outer skin.

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**4,018,479**
**OFFICE CHAIR**

**Douglas C. Ball, Senneville, Canada, assignor to Sunar Limited, Waterloo, Canada**

**Filed Nov. 3, 1975, Ser. No. 628,682**
**Int. Cl.² A47C** *7/02*
**U.S. Cl. 297—455** **3 Claims**



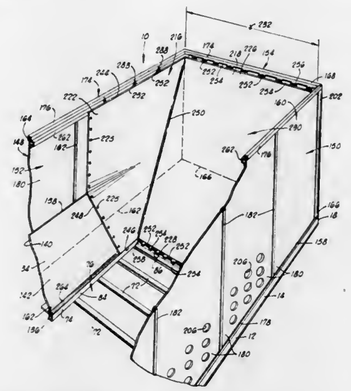
1. A chair comprising: a rigid frame of endless, one piece construction having generally parallel side members each having a seat supporting part and a back supporting part and parallel end members maintaining said side members in spaced apart relationship to each other, said frame being of generally U-shape cross-section having inner and outer parallel legs and a curved surface connecting portion, wherein said inner legs define the inner periphery of said frame and further include flange portions disposed at an angle to said inner leg portions, body support means having a body engaging surface, and having opposite wall portions forming first mounting sufaces projecting away from said body engaging surface for engagement with the inner legs of said frame, said wall portions including second mounting surfaces for complemental engagement with said flange portions of said inner legs, said wall portions at opposite sides of said body support means defining marginal edge lip portions spaced from said first mounting surfaces, said lip portions being in engagement with and partially overlapping said curved surface connecting portions of said frame, and wherein the major portion of said body supporting means, except for said marginal edge lip portions, lie to the side of said curved surface connecting portions of said U-shaped frame from which said legs depend.

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**4,018,480**
**GRANULAR-FLOOR SUPPORTED CARGO HAULING TRAILER APPARATUS CONSTRUCTION**

**Jack C. Stone, 2018 SW. 15, Oklahoma City, Okla. 73108**

**Continuation-in-part of Ser. No. 423,316, Dec. 10, 1973, Pat. No. 3,901,552. This application Aug. 25, 1975, Ser. No. 607,691**
**Int. Cl.² B60P** *1/56*
**U.S. Cl. 298—27** **13 Claims**



1. A trailer apparatus, comprising:
a trailer frame, having a first side, a second side, a forward end, a rearward end and a trailer frame opening formed through a portion thereof;
a first side wall connected to the first side of the trailer frame and extending a distance upwardly therefrom having ventilation openings formed therethrough;
a second side wall connected to the side of the trailer frame and extending a distance upwardly therefrom having ventilation openings formed therethrough;
a forward end wall connected to the forward end of the trailer frame;
a rearward end wall connected to the rearward end of the trailer frame, the first side wall, the second side wall, the rearward end wall and the forward end wall each cooperating to form a substantially continuous wall extending about the trailer frame;
a hopper, having an open upper end defining a hopper inlet opening and an open lower end, the space between the upper end of the lower end defining a hopper material bin space for retainingly storing granular material and the like, the upper end connected to the trailer frame in communication with a portion of the trailer frame opening;
a hopper door connected to the hopper and positionable in a closed position substantially closing the open lower end of the hopper cooperatingly retaining the granular material and the like within the hopper material bin space and an open position discharging the granular material and the like from the hopper material bin space via the open lower end of the hopper; and
a trailer floor assembly positionable in a floor supported cargo hauling position and a granular material hauling position, comprising:
a first floor panel, having opposite ends, opposite sides, and an upper and a lower face removably supported on a portion of the trailer frame, the first floor panel being positionable in a floor supported cargo hauling position, a portion of the lower face of the first floor panel supportingly engaging a portion of the trailer frame and covering a portion of the trailer frame opening in the floor supported cargo hauling portion, the first floor panel being disposed generally adjacent the first side wall and covering the ventilation openings in the first side wall generally near the first floor panel in the granular material hauling position of the first floor panel;
a second floor panel, having opposite ends, opposite sides, and an upper and a lower surface removably supported on a portion of the trailer frame, the second floor panel being positionable in the floor supported cargo hauling position, a portion of the lower face of the second floor panel supportingly engaging a portion of the trailer frame and covering a portion of the trailer frame opening in the floor supported cargo hauling position, the second floor panel being disposed generally adjacent the second side wall and covering the ventilation openings in the second side wall generally near the second floor panel in the granular material hauling position of the second floor panel, the first and the second floor panels cooperating to form a portion of a trailer floor supporting surface for supporting floor supported cargo in the floor supported cargo hauling positions, and communication being established with a portion of the hopper material bin space via a portion of the trailer frame opening in the granular material hauling positions of the first and the second floor panels; and
means removably connected to portions of the first and the second side walls and to the rearward and the forward end walls for cooperating with the first and the second floor panels to form a material bin space retaining granular material and the like in the granular material hauling positions of the first and the second floor panels.



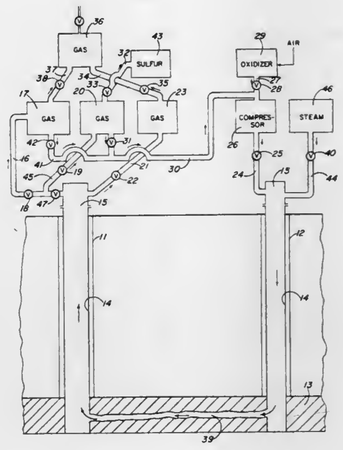
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**4,018,481**
**GASIFICATION OF COAL IN SITU**

**Ruel Carlton Terry, Denver, Colo., assignor to In Situ Technology, Inc., Denver, Colo.**

**Filed Mar. 8, 1976, Ser. No. 665,128**
**Int. Cl.² E21C** *43/00*
**U.S. Cl. 299—4** **18 Claims**

1. A method of gasifying coal in situ wherein the underground coal deposit has been preheated to a temperature above the ignition point temperature comprising the steps of:
establishing fluid injection and fluid removal passages connecting the coal formation to a surface location,
establishing a fluid passage through the coal interconnected with the fluid injection and removal passages,
injecting an oxidizer,
gasifying the coal and
capturing the gases at the surface;
terminating oxidizer injection, then
injecting a reducing reactant fluid,



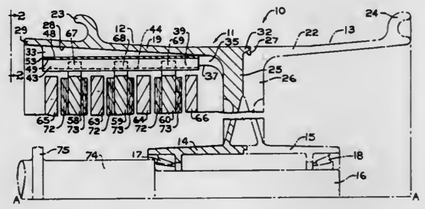

gasifying the coal, and
capturing the gases at the surface.

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**4,018,482**
**RIM CONSTRUCTION FOR WHEELS HAVING BRAKE TORQUE DRIVES**

**Vijay Rastogi, Akron; James Michael Budd, and Daniel Lynn Koehler, both of Troy, all of Ohio, assignors to The B. F. Goodrich Company, Akron, Ohio**

**Filed June 19, 1975, Ser. No. 588,178**
**Int. Cl.² B60B** *21/08*
**U.S. Cl. 301—6 E** **9 Claims**



1. A rim construction for a wheel and brake assembly in which said rim is generally cylindrical and coaxial with the axis of said wheel and brake assembly and in which said rim has a radially inner surface comprising a torque-transmitting lug integral with said rim extending radially inward from and axially across said inner surface from one end to the other end of said lug, axially extending side faces on said lug for transmitting torque to said rim from brake members of said assembly and a radially inner face of said lug spaced radially inward from said inner surface of said rim by a distance equal to a thickness of said lug, said lug being recessed at a position along the axial length thereof, said thickness of said lug at said position being less than said thickness of said lug at another position spaced apart axially along said lug to reduce the stresses in said lug and rim during operation of said wheel and brake assembly.

**4,018,483**

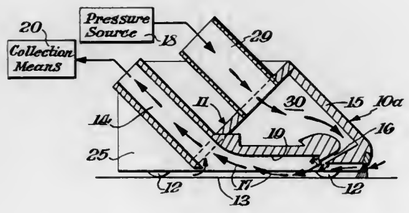
## PROCESS AND APPARATUS FOR DISLODGING AND CONVEYING MATERIAL FROM A SURFACE WITH A POSITIVE PRESSURE FLUID STREAM

**D. Kermit Smith, 1700 Sabra Drive, Kinston, N.C. 28501**

**Continuation-in-part of Ser. No. 507,046, Sept. 18, 1974, abandoned. This application Aug. 11, 1976, Ser. No. 713,398**

**Int. Cl.² B65G** *53/10;* **A47L** *5/00*

**U.S. Cl. 302—25** **19 Claims**




**11.** In a process for dislodging and conveying material from a normally horizontal material containing surface and normally upwardly into a discharge duct with a positive pressure, high-velocity stream of fluid from an unenclosed jet device; the improvement comprising:

(a) jetting the fluid from an exit jet having an upper side terminating to form a lip to impinge obliquely onto the material containing surface to dislodge and entrain the material by locating the exit jet above and away from the material to be conveyed;

(b) maintaining a zone of lower fluid pressure in a cavity above said high-velocity stream of fluid adjacent the lip of the exit jet of the jet device with respect to the fluid pressure in a zone of higher pressure on the opposite side of said high-velocity stream, by,

(1) flowing the stream and entrained material adjacent an unenclosed fluid impervious coanda surface located adjacent to the lip of the exit jet of the jet device and disposed normally above the stream on a side of the stream opposite to that of the material to be conveyed, said fluid impervious coanda surface having said cavity located immediately adjacent and above the lip of the exit jet device, and

(2) allowing substantial fluid outside of said jet device to flow into said zone of higher pressure;

to provide separation of said stream from said fluid impervious coanda surface prior to impingement of said stream onto said material containing surface to dislodge and entrain the material with said stream and entrained material then reattaching to and flowing along said fluid impervious coanda surface to further provide wall-attachment of the stream and entrained material to the fluid impervious coanda surface; and then

(c) directing and guiding the stream and entrained material into the discharge duct and associated collection means.

**4,018,484**

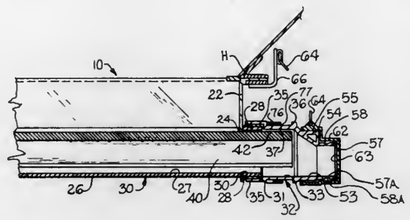
## PNEUMATIC OUTLET FOR RECEIVING FEMALE HOSE CONNECTIONS OF DIFFERENT DIAMETERS

**Richard H. Dugge, St. Louis, and Ronald D. Van Dyke, Florissant, both of Mo., assignors to ACF Industries, Incorporated, New York, N.Y.**

**Filed Nov. 7, 1975, Ser. No. 629,959**

**Int. Cl.² B65G** *53/52*

**U.S. Cl. 302—52** **8 Claims**




**1.** A pneumatic outlet for receiving female hose connections of different diameters comprising: a tubular conduit extending from at least one side of the outlet including a first annular portion having a first outer surface for receiving a female conduit coupling of one diameter from an unloading conduit adapted to extend from said outlet in a first direction; said first annular portion having a first inner surface of one diameter; a second annular portion projecting axially from the first annular portion and having a second outer surface of smaller diameter than said first outer surface for receiving a female hose coupling of smaller diameter from an unloading conduit adapted to extend from said outlet in said first direction; said second annular portion having a second inner surface of smaller diameter than said first inner surface; the first and second annular portions being eccentric with the lower inner surface of the second annular portion being tangent to the lower inner surface of said first annular portion and having a height not greater than the lower inner surface of the first annular portion to provide an effective flow path for lading discharge and clean-out of the outlet.

**4,018,485**

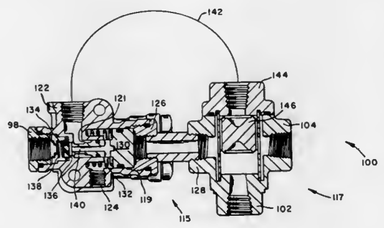
## FLUID PRESSURE BRAKING SYSTEM WITH PARKING BRAKE-SERVICE BRAKE INTERLOCK

**Richard C. Fannin, Elyria, Ohio, assignor to The Bendix Corporation, South Bend, Ind.**

**Filed Feb. 17, 1976, Ser. No. 658,213**

**Int. Cl.² B60T** *15/16*

**U.S. Cl. 303—13** **15 Claims**




**1.** In a vehicle fluid pressure braking system having a service braking circuit and a parking braking circuit, a brake actuator having service braking means connected in said service braking circuit and communicated to a fluid pressure source when a service brake application is effected, said brake actuator including parking means connected in said parking braking circuit for holding said actuator in a brake-applied condition when a parking application is effected, an operator-actuated control valve for controlling communication in said service braking circuit, and actuable to communicate fluid pressure to said service braking means, and interlock valve means responsive to actuation of said control valve to prevent release of said parking means until said control valve is actuated to communicate a predetermined pressure level to said service braking means, said interlock valve means including means responsive to the fluid pressure level in the parking circuit to maintain release of said parking means after the control valve is released until the fluid pressure level in the parking braking circuit drops below a predetermined level.



**4,018,486**

## VEHICLE WHEEL SLIDE PROTECTION SYSTEMS

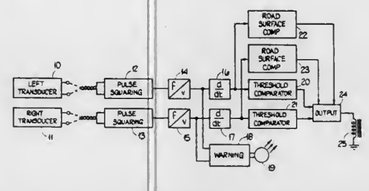
**Christopher John Sutton, Tamworth, England, assignor to The Lucas Electrical Company Limited, Birmingham, England**

**Filed Sept. 17, 1975, Ser. No. 614,021**

**Claims priority, application United Kingdom, Sept. 19, 1974, 40840/74**

**Int. Cl.² B60T** *8/08*

**U.S. Cl. 303—97** **2 Claims**




**1.** A vehicle wheel slide protection system for use with a vehicle wheel provided with brakes, including a wheel speed transducer having first and second output terminals and which produces an oscillatory signal at a frequency dependent on the speed of rotation of the wheel, and a brake control circuit for releasing the brakes of the wheel, in use, when the rate of decrease of said frequency exceeds a predetermined value, said control circuit having an earth terminal and including a comparator input stage for squaring pluses received from the wheel speed transducer and inverting and non-inverting input terminals, comprising first and second input terminals connected to the respective first and second transducer output terminals, a pair of equal value resistors connecting the input terminals of said comparator to the respective inverting and non-inverting input terminals of the comparator, a pair of equal value capacitors connecting the input terminals to said earth terminal of the circuit, a supply with two supply rails, a bias circuit for biasing said comparator input terminals to a d.c. level intermediate the supply voltage, said bias circuit comprising a transistor having a collector, a base and an emitter, said emitter being connected to one supply rail and said collector connected via a load to the other supply rail, a first resistor connecting the base of the transistor to said one supply rail, a second resistor connecting the base of the transistor to one input terminal, and a third resistor connecting the other input terminal to the other supply rail, the transducer normally providing a connection between the input terminals so that the transistor is turned on and current flowing through the base-emitter junction thereof and said second and third resistors biasing the input terminals, the transistor being turned off when the connection between the input terminals by the transducer is severed.

**4,018,487**

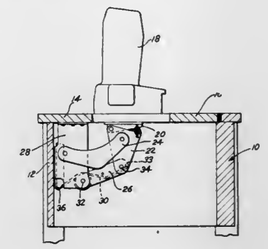
## CAM ADJUSTMENT FOR TENSION SPRING OF SEWING MACHINE HEAD LIFTER MECHANISM

**John L. Orr, and Robert A. Sewell, both of Rockford, Ill., assignors to Keystone Consolidated Industries, Inc., Peoria, Ill.**

**Filed Mar. 25, 1976, Ser. No. 670,280**

**Int. Cl.² A47B** *81/00*

**U.S. Cl. 312—27** **3 Claims**




**1.** In a mechanism for supporting a sewing machine head from a cabinet, said mechanism of the type including a housing for mounting on the cabinet, bracket means for attachment to the machine head, linkage arms pivotally attached between the housing and the bracket means, said bracket means being transportable by the arms between a projected head support position and a retracted position, and spring means for biasing the bracket means toward the head support position, the improvement of adjustable spring tension means engaging the spring means to provide adjustable support force by the bracket means for a head, said spring means including an adjustable cam member attached to the housing, a center fulcrum affixed to the housing, a biasing spring having generally oppositely extending first and second ends flexibly connected, said spring being pivoted at the fulcrum so that a force in a counterclockwise sense on the first end of the spring is transmitted through the coil member to impart a counterclockwise force at the second end and vice versa, the first end being held by the cam member attached to the housing and the second end being biased against the bracket, said cam member being pivoted about an axis generally transverse to the axis of the fulcrum to provide any one of a plurality of sring engaging surfaces for contact with the first end, each of said surfaces being separately spaced from the cam pivot axis to provide a distinct force against the first end of the spring which force is imparted to the bracket means for support of a head mounted thereon.

**4,018,488**

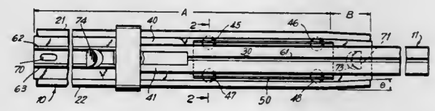
## SLIDE BRACKETS

**Morris Manson, Great Neck, N.Y., assignor to Corax Corporation, Yonkers, N.Y.**

**Filed Nov. 17, 1975, Ser. No. 632,303**

**Int. Cl.² A47B** *88/00;* **F16C** *21/00*

**U.S. Cl. 312—348** **3 Claims**




**1.** A slide bracket comprising first and second elongated members mounted for relative longitudinal sliding movement, said members including respective opposed side walls shaped to define longitudinal ball bearing tracks, ball bearings mounted in said tracks for facilitating the relative longitudinal sliding movement of said members, groove means in at least

one of said members spaced from said tracks for providing longitudinal hinge action for said members to confer lateral deflectability for said side walls of said tracks to minimize retarding pressure of said walls with the ball bearings and noise resulting therefrom, said members having relative longitudinal movement in a first main section and in a second end braking section, said track extending continuously along said first and second sections, and means in said end braking section for gradually overriding said longitudinal hinge action in said end braking section as said members approach a position of maximum relative longitudinal extension, said means for overriding the longitudinal hinge action being constituted by a reduced spacing between the side walls of the ball bearing tracks, said reduced spacing between the side walls of the ball bearing tracks being obtained by a narrowing taper between the side walls of the outer member in said end braking section.

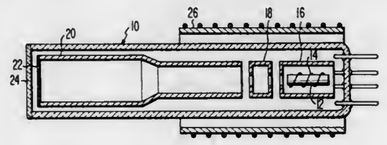
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**4,018,489**

## METHOD FOR EXTENDING CATHODE LIFE IN VIDICON TUBES

**Louis Donald Miller, Leola, and Hans Popp, Strasburg, both of Pa., assignors to RCA Corporation, New York, N.Y.**

**Filed Aug. 28, 1975, Ser. No. 608,562**
**Int. Cl.² H01J** *9/22*
**U.S. Cl. 316—5** **5 Claims**




1. A method for processing a vidicon tube having a low melting point target assembly to reduce cathode contamination, said method comprising:
evacuating the tube;
activating the cathode;
heating some of the electrodes within the tube during and after cathode activation to a temperature which will vaporize any contaminants from the cathode activation while maintaining the target assembly below its melting point; and
pumping any vapors emitted by the evaporating and heating steps out of the tube.

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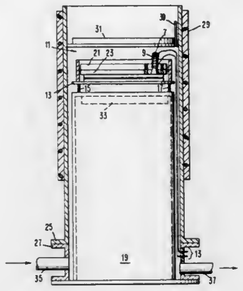
**4,018,490**

## GAS DISCHARGE DISPLAY PANEL FABRICATION

**Melvin Berkenblit, Yorktown Heights; Robert O. Lussow, Hopewell Junction; Kyu Chang Park, and Arnold Reisman, both of Yorktown Heights, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed July 7, 1975, Ser. No. 593,618**
**Int. Cl.² H01J** *9/38*
**U.S. Cl. 316—21** **19 Claims**

1. An in situ process for fabricating gas discharge display panels comprising;
placing unassembled gas panel parts, including panel opposing substrate glass plates having at least a dielectric layer, a layer of conductors, and a layer of secondary emissive material within the chamber of a controlled gas ambient furnace system, so that said plates are separated by a seal frame with at least one of said plates including tubulation means to permit passage of gas between said ambient and the region between said plates;
positioning tip-off means adjacent said tubulation means, so that tip-off may be effected in response to actuation external to said chamber;
initially evacuating said chamber to outgas surfaces therein;
admitting non-contaminating gas into said initially evacuated chamber;
heating said chamber to approximately the sealing temperature of said seal frame to seal said substrate plates together;
evacuating said chamber and sealed panel and admitting inert gas into said chamber and sealed panel after said



chamber has at least cooled to a point where outgassing from said panel parts and chamber has terminated; and
tipping off said tubulation means at a chamber partial pressure and temperature selected so that the panel is at the desired pressure for room temperature.

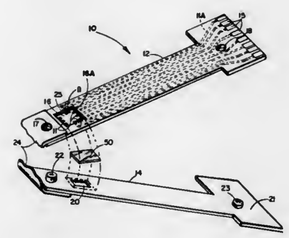
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**4,018,491**

## CARRIER FOR DEVICES

**Andrew J. Niedzwiecke, Perris, and Joseph M. Shaheen, La Habra, both of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.**

**Filed Mar. 8, 1976, Ser. No. 665,141**
**Int. Cl.² H01R** *39/00*
**U.S. Cl. 339—4** **10 Claims**



1. An apparatus for supporting a device comprising:
a first board having at least one cavity for accommodating said device;
at least one electrical conductor disposed on said first board and extending over said cavity to form beam lead interconnections;
resilient means formed to fit around the inner surface of said cavity for applying force to said beam lead interconnections;
a second board;
hinge means joining said first and second boards; and
locking means for said boards.

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**4,018,492**

## ADVANCE GROUNDING SYSTEM FOR ELECTRICAL CONNECTORS

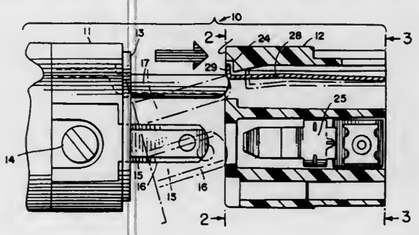
**George R. Eckart, Arlington Heights, Ill., assignor to Daniel Woodhead, Inc., Northbrook, Ill.**

**Filed Sept. 11, 1975, Ser. No. 612,340**
**Int. Cl.² H01R** *3/06*
**U.S. Cl. 339—14 P** **3 Claims**

1. An advance grounding system for electrical connectors, including in combination,



a male attachment portion,
electrical current carrying contact blades secured in said male attachment portion and extending outwardly therefrom,
a ground contact blade secured in said male attachment portion and extending outwardly therefrom, the length of said ground contact blade being greater than the length of said electrical contact means,
a female receptacle portion having therein a cut-out portion in the face thereof and female terminal means adated to receive the blades on said male attachment portion, the female ground terminal means which receives the ground contact blade having an angularly extending lip portion



on the outer end thereof received in said cut-out portion so that said terminal means will terminate substantially at the face of the female receptacle portion, and the female terminal means which receive the other contact blades terminating short of the face of said female receptacle portion, whereby, upon the insertion of said attachment portion into said female receptacle portion, said ground contact blade will contact the female ground terminal means before the electrical circuit can be completed by contact of the current carrying contact blades with the female terminal means regardless of the position assumed by said male attachment portion at the time of insertion into said receptacle portion.

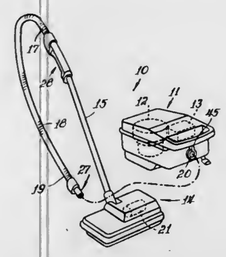
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**4,018,493**

## VACUUM CLEANER HOSE END STRUCTURE

**John Bartholomew Lyman, Bloomington, and Bruce Edmund Stewart, Maplewood, both of Minn., assignors to Whirlpool Corporation, Benton Harbor, Mich.**

**Filed Nov. 7, 1975, Ser. No. 629,843**
**Int. Cl.² H01R** *3/04*
**U.S. Cl. 339—15** **12 Claims**



1. In a vacuum cleaner hose having a flexible duct portion, and electrical conductor wires co-axially helically carried by said duct portion, an improved hose end structure comprising:
a molded end portion on the end of said hose duct portion, the end of said wires being disposed in said molded end portion;
first terminal means carried in said molded end portion, said terminal means being connected to said end of the wires, said terminals having a portion exposed outwardly of said molded end portion;
a hose end adaptor having a first end telescopically positioned in said molded end portion and a second, opposite end extending outwardly of said molded end portion;
second terminal means positioned by said adaptor in electrical contact engagement with said first terminal means; and
cooperating interlock means on said molded end portion and said hose end adaptor preventing rotational forces tending to cause relative coaxial rotation between said hose end adaptor and said molded end portion from being transmitted to said terminal means.

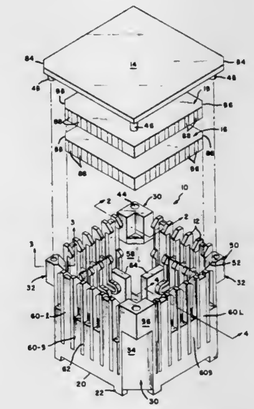
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**4,018,494**

## INTERCONNECTION FOR ELECTRICALLY CONNECTING TWO VERTICALLY STACKED ELECTRONIC PACKAGES

**William Samuel Scheingold, Palmyra, and Frank Christian Youngfleish, Harrisburg, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.**

**Filed June 10, 1975, Ser. No. 585,440**
**Int. Cl.² H05K** *1/07*
**U.S. Cl. 339—17 CF** **9 Claims**

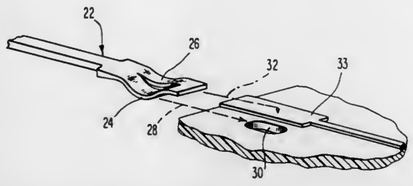


1. An interconnecting device useful for connecting a first and second electronic package stacked vertically therein to a printed circuit board, which comprises:
a. a housing of insulating material including a base and walls, said base having one or more support posts and a plurality of holes along each side thereof and the walls containing a plurality of vertical slots which are connected to the holes in the base by horizontal grooves, said housing further having pillars at each corner, said pillars having means thereon for supporting and retaining the first and second electronic packages which may be stacked in the housing in a spaced, overlying relation;
b. a plurality of conductive spring members positioned in the housing, each spring member having an upper finger positioned in a slot, a base positioned in the horizontal groove and a pin extending through the hole and depending from the housing for connection to a printed circuit board, the top of the upper finger having an inwardly projecting nose comprising an upper contact point, said spring member further having a lower finger integral with the upper finger and having an inwardly projecting nose comprising a lower contact point, said upper and lower fingers being preloaded to bias the upper and lower contact points against conductive pads on the first and second electronic packages which may be positioned in the housing in overlying relation; and
c. a cover removably positioned on the top of the housing.

## 4,018,495
## CONNECTOR DEVICE

Walter O. Freitag, Dresher, Pa., assignor to Sperry Rand Corporation, New York, N.Y.

Filed Oct. 2, 1975, Ser. No. 618,867
Int. Cl.² H01R 13/26
U.S. Cl. 339—17 L 8 Claims




1. An electrical connector device for making a non-slidable ohmic connection with a metal finger of a printed circuit card comprising:

a. an integrally formed member having a slender arm and wider end appendage,

b. a contact means formed on said appendage at a fixed longitudinal distance from its free terminal end,

c. slide means further formed on said appendage at approximately said fixed distance from said free terminal end, and immediately lateral to said contact means,

said contact means and said slide means extending at different levels in a direction toward said printed circuit,

d. means formed in said printed circuit card for receiving said slide means,

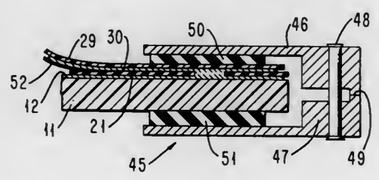
e. said integrally formed member slidably engaging said printed circuit card via said slide means such that said contact means does not meet said metal finger until said slide means reaches said receiving means in said printed circuit,

said contact means thereby making said non-slidable ohmic connection with said metal finger.

## 4,018,496
## INTERCONNECTION FOR CONDUCTOR ASSEMBLIES HAVING CLOSELY SPACED CONDUCTIVE LINES

Malvin S. Bilsback, Woodstock, N.Y., assignor to IBM Corporation, Armonk, N.Y.

Continuation of Ser. No. 482,825, June 24, 1974, abandoned.
This application Jan. 12, 1976, Ser. No. 648,450
Int. Cl.² H05K 1/08
U.S. Cl. 339—17 F 5 Claims




1. An electrical structure comprising:

a first conductor assembly having a first insulating support of a generally rigid material such as glass and a first set of conductive lines on a surface of said first support, said lines extending generally parallel and having a predetermined spacing that does not vary significantly;

a second conductor assembly having a second insulating support and a second set of conductive lines on a surface of said support, said second insulating support being of a thin, flexible, plastic material such that said conductive lines of said second set are formed and maintained less accurately than the conductive lines of said first set, said lines in a first region of said second set having a spacing that varies progressively from a spacing that is greater than said predetermined spacing of said first set to a spacing that is less than said predetermined spacing of said first set, whereby said predetermined spacing of said first set exists along a line in said first region of said second set regardless of variations in the spacing between lines of said first and second sets within predetermined tolerances;

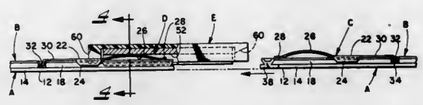
a thin insulation layer covering the regions of said first conductive lines closely adjacent to said line in the region where said spacing of said first lines is less than the spacing of said second lines, and;

means including resilient pads connecting said first and second conductor assemblies to make electrical contact along said line.

## 4,018,497
## JOINT FOR ELECTRICAL CONDUCTORS

William J. Bulanchuk, Pelham, N.Y., assignor to Midland-Ross Corporation, Cleveland, Ohio

Filed Nov. 24, 1975, Ser. No. 634,418
Int. Cl.² H01R 11/22
U.S. Cl. 339—22 B 13 Claims




1. A joint comprising a pair of elongated electrical conductors having end portions which are connected, said end portions having longitudinal axes, main body portions and joining portions, said joining portions having joining portion surfaces facing generally toward said main body portions in spaced relationship thereto, a connecting member having a longitudinal groove therein, said groove having a longitudinal groove opening along the length of said connecting member and opposite end groove openings at the opposite ends of said connecting member, said groove having a groove bottom spaced inwardly of said connecting member from said longitudinal groove opening, said groove having joining groove surfaces facing generally toward said groove bottom, said end portions of said conductors having said joining portions extending into said groove through said end groove openings with said longitudinal axes aligned, said main body portions of said end portions being located outside said groove adjacent said longitudinal groove opening, and independent yieldable biasing means mounted on and carried by each said joining portion on each said end portion independently of said connecting member for biasing against said groove bottom and urging said joining portion surfaces into engagement with said joining groove surfaces.

## 4,018,498
## CONTACT CLAMP

Alain Lascarrou, Epinay-sur-Seine, France, assignor to La Telemecanique Electrique, France

Filed Dec. 3, 1975, Ser. No. 637,257
Claims priority, application France, Dec. 17, 1974, 74.41481
Int. Cl.² H01R 13/12
U.S. Cl. 339—65 2 Claims

1. An electrical distribution board comprising a cabinet, defining a plurality of housing sections, a vertical bus bar structure disposed centrally in said cabinet, said housing sections being disposed in opposed positions on both sides of said bus bar structure,

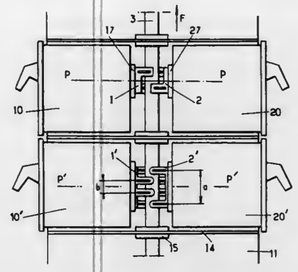
a plurality of electrical units adapted to be positioned in opposed pairs in opposed said sections,



each said electrical unit having at least one connector positioned to engage in electrical relationship with said bus bar structure,

each connector comprising at least one contact clamp having two opposed arms of the same width measured vertically along the bus bar structure, said arms being adapted to contact respective opposite surfaces of a bus bar,

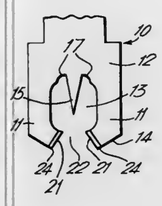
said opposed arms being spaced in the direction of their width dimension by a distance greater than said width.




## 4,018,499
## CONTACT FOR INSULATED WIRE

David William Rickards, Stanmore, England, assignor to AMP Incorporated, Harrisburg, Pa.

Continuation of Ser. No. 525,597, Nov. 20, 1974, abandoned.
This application Jan. 15, 1976, Ser. No. 649,183
Claims priority, application United Kingdom, Dec. 18, 1973, 58635/73
Int. Cl.² H01R 9/08
U.S. Cl. 339—97 C 3 Claims




1. A contact for attachment to an insulating stranded conductor without deforming the conductor, comprising:

a. a plate member stamped and formed from a coplanar sheet of conductive material having a conductor-receiving slot opening into one edge of the plate and defining a pair of spaced arms forming the sides of the slot;

b. a lance protruding into the slot from the base thereof and extending toward the slot opening, said lance adapted to enter between the strands of the undeformed conductor which may be inserted into the slot;

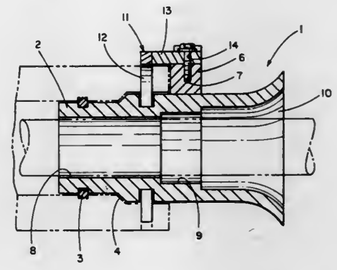
c. said arms and lance being located in the plane of the plate whereby the contact is substantially uniplanar;

d. said arms having free ends adapted to be crimped inwardly towards one another whereby a conductor which may be inserted into the slot will be generally encompassed and secured therein.

## 4,018,500
## JUNCTION PIECE FOR ELECTRICAL LEADS

Martin Hamacher, Nimrodstr. 47, 4352 Herten, Germany

Filed July 3, 1975, Ser. No. 593,026
Claims priority, application Germany, Mar. 27, 1975, 2513829
Int. Cl.² H01R 13/58
U.S. Cl. 339—103 R 3 Claims

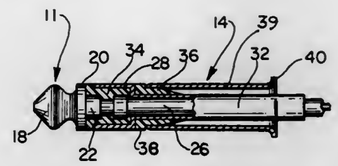



1. An improved unitary junction piece for a cable containing electrical leads for an appliance to be supplied with current comprising a funnel-shaped entry at one end of the junction piece for receiving the cable, the other end of the junction piece having an annular groove in an outer wall for receiving a packing ring therein, a bevelled shoulder formed on the outer wall of the junction piece adjacent said annular groove and adapted to engage the inner wall of a socket of the appliance when the junction piece is in position, a recess around the outer wall of the junction piece intermediate the bevelled shoulder and the funnel-shaped entry, and yoke means having shanks insertable into said recess for locking the yoke means to the junction piece.

## 4,018,501
## MULTIPLE TERMINAL CONNECTOR PLUG

Robert Edward Maloof, East Greenwich, R.I., assignor to Victor Electric Wire & Cable Corporation, West Warwick, R.I.

Filed Aug. 4, 1975, Ser. No. 601,711
Int. Cl.² H01R 17/18
U.S. Cl. 339—183 1 Claim




1. A multiple terminal male connector plug, comprising an outer head pin that defines a first terminal, a first conductor lead joined to said head pin and extending rearwardly thereof, an elongated sleeve formed of a conductive material extending rearwardly of said head pin in coaxial relation and defining a second terminal, a tubular member formed of a conductive material located in surrounding coaxial relation with respect to said sleeve and defining a third terminal, and additional conductor leads joined to said second and third terminals and defining separate circuits therewith, and a body molded onto a portion of said tubular member and locating said terminals in fixed relation relative to each other, portions of the head pin, sleeve and tubular member being exposed to define a continuous plug for being received in a complementary female socket, said first conductor lead extending centrally of said sleeve and tubular member and being secured to said head pin to define an electrical circuit therewith, the other said addi-

tional conductor leads being secured to said sleeve and tubular portion at the rearmost ends thereof and being encapsulated in said molded body, thereby defining separate electrical circuits through said plug, said head pin including a forward contact portion that defines the forwardmost end of said plug and a reduced rear portion, said first conductor lead being joined to said reduced rear portion axially thereof, said sleeve including a forward portion that is spaced rearwardly of the forward contact portion of the head pin and being insulated therefrom and surrounding the reduced rear portion of said head pin and being insulated therefrom, a rearwardly extending portion of said sleeve being integrally joined to the forward portion thereof and enveloping an insulated section of said first conductor lead, an insulator separating the forward end of said tubular member from the forward portion of said sleeve, said molded body projecting between said tubular member and the rearwardly extending portion of said sleeve to provide an insulation therebetween, the forward portion of said sleeve having a cavity formed therein that receives the reduced rear portion of said head pin, said cavity including an annular shoulder spaced rearwardly of said rear portion of said head pin, a second insulator enveloping the reduced rear portion of said head pin in said cavity and extending outwardly of said cavity to space the forwardmost edge of the forward portion of said sleeve from said forward contact portion of said head pin.

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**4,018,502**

## TERMINAL BLOCK RETAINING MEMBER

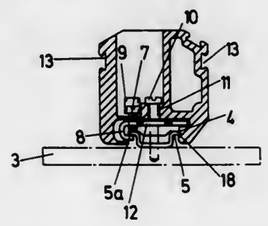
**Gottfried Glaesel, Ascona, Switzerland, assignor to Hego Electric G.m.b.H., Spielhof, Switzerland**

**Filed June 25, 1975, Ser. No. 590,162**

**Claims priority, application United Kingdom, Oct. 1, 1974, 42548/74**

**Int. Cl.² H01R 9/16**

**U.S. Cl. 339—198 GA** **7 Claims**




1. A retaining member for mounting on an elongate supporting member having two opposite outwardly directed edges, for retaining against longitudinal movement electrical terminal blocks mounted on the supporting member, which retaining member comprises a body, with a foot portion provided with a pair of recesses facing one another for engaging respective edges of the supporting member, a clamping screw in the body, with its axis generally transverse to the plane of an edge of the supporting member, a clamping member positively engaged by the clamping screw, defining at least one side of a first said recess and capable of being moved by means of the clamping screw toward and away from the other said recess for respectively engaging under and disengaging from one edge of the supporting member when received by its other edge in the other recess, whereby when the clamping member is disengaged the retaining member can be fitted to and removed from the supporting member by movement of the retaining member transversely to the supporting member, the clamping member being slidable in the body toward and away from the other recess and incorporating the first said recess, and the clamping screw being threaded in the clamping member adjacent to the first said recess for sliding the clamping member and clamping the supporting member between the screw tip and the clamping member.

**4,018,503**

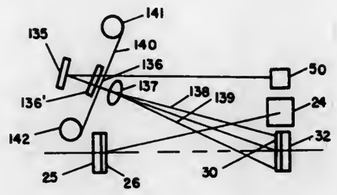
## HOLOGRAPHIC SYSTEMS HAVING REFERENCE BEAM CODED HOLOGRAMS

**Daniel Silverman, 5969 S. Birmingham Ave., Tulsa, Okla. 74105, and Everett A. Johnson, 15 S. Prospect Ave., Park Ridge, Ill. 60068**

**Continuation-in-part of Ser. No. 328,883, Feb. 1, 1973, abandoned, which is a continuation-in-part of Ser. No. 111,992, Feb. 2, 1971, Pat. No. 3,807,828, which is a continuation of Ser. No. 721,989, April 17, 1968, Pat. No. 3,560,071. This application Jan. 14, 1977, Ser. No. 541,046**

**Int. Cl.² G03H 1/12, 1/26**

**U.S. Cl. 350—3.5** **11 Claims**




1. A method of making a hologram comprising the steps of:
a. producing a beam of at least partially coherent light;
b. dividing said light beam into separate angularly displaced reference and object light beams;
c. passing only said reference light beam through a first means to introduce a first unique pattern of intensity variations in said reference light beam;
d. positioning a photosensitive member to intercept at least a portion of the first reference light beam;
e. simultaneously illuminating a first object with the object light beam;
f. simultanously directing at least a portion of the first object-modified light onto the photosensitive member, said object-modified light being sufficiently coherent with respect to the reference light beam to produce an interference pattern on said photosensitive member;
g. passing said reference beam through a second means to introduce a second unique pattern of intensity variations in said reference light beam different from the first unique pattern of intensity variations and to said photosensitive member;
h. illuminating a second object with the object light beam; and
i. simultaneously directing at least a part of the second object modified light onto said photosensitive member to produce in interference pattern, and including the additional step of
j. moving said photosensitive member by a distance $d$, where $d = D/K$, where K has a value greater than 1, and D is the longitudinal dimension of each interference pattern exposure area on the photosensitive member in the direction of motion of the distance $d$, between the steps of directing said first and said second object-modified light beams to said photosensitive member.

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**4,018,504**

## RETRO-REFLECTIVE MULTIPLE-X OPTICAL SCANNING SYSTEM

**Paul S. Wu, and Michael R. Stroll, both of Randolph, N.J., assignors to Sweda International, Inc., Pinebrook, N.J.**

**Filed May 2, 1975, Ser. No. 574,137**

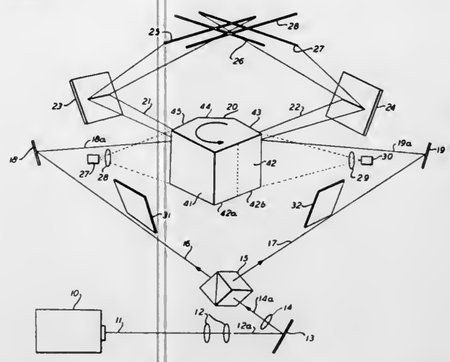
**Int. Cl.² G02B 27/17; H01J 3/14**

**U.S. Cl. 350—7** **12 Claims**

1. Optical scanning apparatus for scanning and sensing information contained on a label-bearing article, comprising:
a light source;
a rotatable member having a reflective surface;



first optical means for directing light from said source to said surface; and
second optical means for directing light reflected from said surface to form a scanning pattern on a predetermined plane;




said second optical means comprising fixed reflective means for directing said light by reflection;
said scanning pattern being comprised of a plurality of segments together forming at least one pair of overlapping cross-shaped traces.

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**4,018,505**

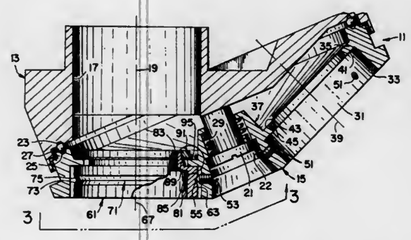
## OBJECTIVE CENTERING NOSEPIECE

**Theodore H. Peck, Irondequoit, N.Y., assignor to Bausch & Lomb Incorporated, Rochester, N.Y.**

**Filed Feb. 24, 1975, Ser. No. 552,675**

**Int. Cl.² G02B 7/04**

**U.S. Cl. 350—39** **9 Claims**




1. Apparatus for supporting optics, such as a microscope objective, and aligning the optical axis of said optics with an axis, said apparatus comprising:
a. support means, said support means including a through opening, said through opening including an inwardly projecting flange having first and second spaced surfaces;
b. an optics supporting cell, said cell including means for supporting said optics, a first shoulder and means for cooperating with a locking means, said cell being received within said through opening with said first shoulder in engagement with one of said first and second spaced surfaces of said inwardly projecting flange;
c. locking means, said locking means engaging said cooperating means and positioned in spaced relation to the other of said first and second spaced surfaces of said inwardly projecting flange;
d. resilient, yieldable means, said means being positioned between and in engagement with both said locking means and said other of said first and second spaced surfaces of said inwardly projecting flange to insure engagement between said one of said first and second spaced surfaces of said inwardly projecting flange and said first shoulder; and
e. position adjusting means, said adjusting means being supported by and moveable relative to said support means and engaging said cell to adjust the position of said cell in a direction perpendicular to said axis to align said optical axis of said optics with said axis.

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**4,018,506**

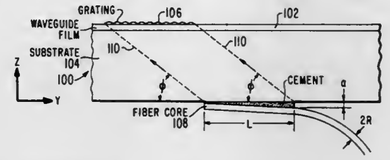
## FIBER-OPTIC TO PLANAR-WAVEGUIDE OPTICAL COUPLER

**Jacob Meyer Hammer, Lawrenceville, N.J., assignor to RCA Corporation, New York, N.Y.**

**Filed Nov. 12, 1975, Ser. No. 631,327**

**Int. Cl.² G02B 5/14**

**U.S. Cl. 350—96 C** **2 Claims**




1. In combination:
a substrate of a first given index of refraction and of a given thickness supporting on one face thereof a planar optical waveguide film having an index of refraction higher than said first given index of refraction, and
a fiber-optic core of given diameter having a coupling portion of given length situated in proximity to the opposite face of said substrate from said one face thereof, said core having a given index of refraction lower than said first index of refraction for coupling light of a given wavelength from said core to said substrate by phase-matched evanescent fields, said given diameter being sufficiently small relative to said given wavelength to cause coupled light in said substrate to diverge by diffraction to a given width in traveling through the given thickness of said substrate from said opposite face thereof to said one face thereof, said given width and said given length being sufficiently large relative to said given wavelength to provide an aperture at said one face having a size which permits said light in said substrate arriving at said aperture to be further coupled by phase-matched evanescent fields into said film with a substantially plane wavefront.

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**4,018,507**

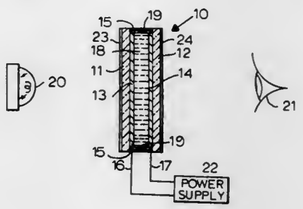
## LIQUID CRYSTAL DEVICE, COMPOSITION THEREFOR, AND METHOD FOR PREPARING THE COMPOSITION

**N.V. Vijaya Raghavan, Mountain View, Calif., assignor to American Micro-Systems, Inc., Santa Clara, Calif.**

**Filed Sept. 5, 1974, Ser. No. 503,241**

**Int. Cl.² G02F 1/13; C09K 3/34**

**U.S. Cl. 350—160 LC** **16 Claims**




1. An electro-optical light-modulating device containing a nematic liquid crystal composition comprising an admixture of 90% to 60% by weight of (A) p-methoxy benzylidene-p-butyl aniline, and 10% to 40% by weight of (B) at least one

fluorinated Schiff base having the general formula X — Ph — HC = N—PH — F, wherein X is an alkoxy group having from 1 to 10 carbon atoms, Ph is phenylene and F is fluorine, and means for applying an electric field to said admixture.

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**4,018,508**

**ELECTROCHROMIC DEVICE AND MEDIUM THEREFOR**

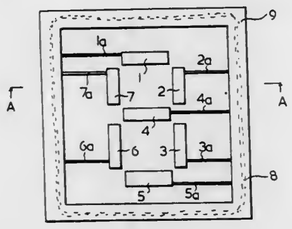
**Michael John McDermott; John Graham Allen; Keith Jones, and Peter Gordon Wright, all of Runcorn, England, assignors to Imperial Chemical Industries Limited, London, England**

**Filed Mar. 14, 1975, Ser. No. 558,362**

**Claims priority, application United Kingdom, Mar. 15, 1974, 11597/74**

**Int. Cl.² G02F *1/36***

**U.S. Cl. 350—160 R** **17 Claims**




1. An electrochromic medium comprising an active material, an auxiliary redox system comprising a substantially colourless complex of reversibly oxidisable metallic ions and a complexing agent for the said metallic ions and an inert solvent.

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**4,018,509**

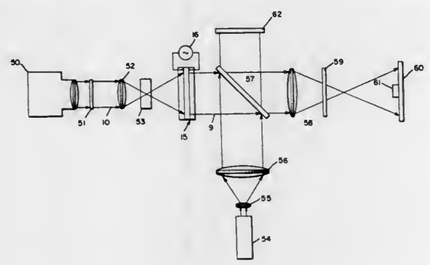
**OPTICAL DATA PROCESSING SYSTEM WITH REFLECTIVE LIQUID CRYSTAL LIGHT VALVE**

**Donald D. Boswell, Granada Hills; Jan Grinberg, Los Angeles; Alexander D. Jacobson, Topanga, and Gary D. Myer, Reseda, all of Calif., assignors to Hughes Aircraft Company, Culver City, Calif.**

**Filed Mar. 8, 1976, Ser. No. 664,777**

**Int. Cl.² G02F *1/13***

**U.S. Cl. 350—160 LC** **10 Claims**




1. A coherent optical data processor comprising:

a. reflective mode alternating current driven liquid crystal light valve means of the hybrid field effect mode type for modulating the polarization state of coherent projection light responsively to a noncoherent input light signal;

b. means for providing a noncoherent input light image signal to the input side of said light valve;

c. means for providing coherent projection light to the output side of said light valve said means comprising a source of polarized light, said light valve means including analyzer means positioned to block the exit from said light valve of light in a first polarization state and to transmit light from said light valve when its polarization state has been modulated to at least one state different from said first state in said light valve;

d. lens means positioned to receive said modulated polarization state light projected from said analyzer of said light valve for effecting a transform of the modulation image in said beam produced by said input signal; and

e. means for detecting said transformed image.

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**4,018,510**

**VARIFOCAL OBJECTIVE CONTAINING MOVABLE LENS COMPONENT OF POSITIVE REFRACTIVITY**

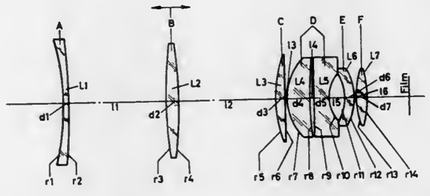
**Ludwig Bertele, Au, Switzerland, assignor to Ludwig Bertele and Jurgen Bertele, both of Au, Switzerland, part interest to each**

**Filed June 9, 1975, Ser. No. 585,360**

**Claims priority, application Switzerland, June 13, 1974, 8226/74**

**Int. Cl.² G02B *15/14***

**U.S. Cl. 350—184** **7 Claims**




1. An objective of variable focal length affording an aperture ratio of about 1:1.0 to 1:1.4 for narrow film projectors and microscopes comprising at least six lens members separated by air spaces and having at least seven lens elements, charcterized by the following construction and arrangement of the lens members:

a. a first lens member confronting the longer conjugate, said first lens member having dispersing power, the surface of said first lens member having the larger radius of curvature confronting the shorter conjugate;

b. a second displaceably arranged lens member having collective power and having outer surfaces of approximately the same radii of curvature;

c. a third collecting lens member having differently curved outer surfaces, the surface confronting the shorter conjugate having the larger radius of curvature, said third collecting lens member being separated from the lens surface of a following fourth lens member by a small air space;

d. a fourth dispersing lens member having an axial thickness and comprising at least one collecting lens element and a dispersing lens element, said collecting lens element having a convex curved lens surface confronting the longer conjugate, said dispersing lens element having a concave curved surface confronting the shorter conjugate, the convex curved lens surface of the collecting lens member having a larger radius of curvature than the radius of curvature of the concave curved surface confronting the shorter conjugate;

e. a fifth lens member comprising a meniscus convex to the shorter conjugate, said meniscus possessing an axial thickness which is smaller than one-half of the radius of curvature of the convex lens surface thereof confronting the shorter conjugate and also smaller than the axial thickness of the fourth lens member: and

f. a sixth lens member having collective power and having convex outer surfaces: and



| | | | $n_d$ | $V_d$ |
|---|---|---|---|---|
| | $r_1 = -45.98$ | | | |
| $L_1$ | | $d_1 = 1.0$ | 1.53172 | 48.8 |
| | $r_2 = -127.43$ | | | |
| | | $l_1 = 0.3 - 38.5$ | | |
| | $r_3 = +95.0$ | | | |
| $L_2$ | | $d_2 = 2.6$ | 1.62041 | 60.3 |
| | $r_4 = -95.0$ | | | |
| | | $l_2 = 38.5 - 0.3$ | | |
| | $r_5 = +26.0$ | | | |
| $L_3$ | | $d_3 = 2.0$ | 1.69100 | 54.7 |
| | $r_6 = +260.0$ | | | |
| | | $l_3 = 0.1$ | | |
| | $r_7 = +10.8$ | | | |
| $L_4$ | | $d_4 = 4.4$ | 1.64050 | 60.1 |
| | $r_8 = +78.0$ | | | |
| | | $l_4 = 0.47$ | | |
| | $r_9 = \infty$ | | | |
| $L_5$ | | $d_5 = 3.0$ | 1.72825 | 28.4 |
| | $r_{10} = +6.97$ | | | |
| | | $l_5 = 4.5$ | | |
| | $r_{11} = -8.18$ | | | |
| $L_6$ | | $d_6 = 0.5$ | 1.69100 | 54.7 |
| | $r_{12} = -8.80$ | | | |
| | | $l_6 = 0.1$ | | |
| | $r_{13} = +23.0$ | | | |
| $L_7$ | | $d_7 = 2.2$ | 1.72875 | 54.2 |
| | $r_{14} = -19.7$ | | | |

wherein the symbol L designates the individual lens elements of the lens members; the symbol *r* designates the different radii of curvature of the lens elements; the symbol *d* designates the different thickness of the lens elements the symbol *l* designates the different air spaces; the symbol $n_d$ designates the refractive index for the helium line; and the symbol $\nu_d$ designates the Abbe number.

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**4,018,511**

**PHOTOGRAPHIC WIDE ANGLE LENS**

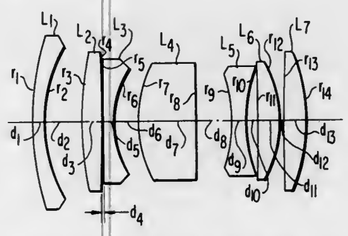
**Yasuo Takahashi, Tokyo, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Nov. 17, 1975, Ser. No. 632,595**

**Claims priority, application Japan, Nov. 18, 1974, 49-132506**

**Int. Cl.² G02B *13/04***

**U.S. Cl. 350—214** **1 Claim**




1. A retro-focus type wide angle lens system composed of seven lenses in two groups, the first group consisting of a first negative meniscus lens $L_1$ convex to the object, a second positive lens $L_2$, and a third negative meniscus lens $L_3$ convex to the object, and the second group consisting of a fourth positive lens $L_4$, a fifth negative lens $L_5$, a sixth positive meniscus lens $L_6$, and a seventh positive lens $L_7$, wherein the focal lengths, the radii of curvature $r_1$ to $r_{14}$, the lens thickness or distance $d_1$ to $d_{13}$, the refractive indices $n_1$ to $n_7$, and the Abbe numbers $\nu_1$ to $\nu_7$ for the lenses $L_1$ to $L_7$ satisfy the following conditions:

F = 100, where F is the focal length of the whole system,

$F_{1.2}$=653.59, where $F_{1.2}$ is the combined focal length of lenses $L_1$ and $L_2$,

$F_{1.2.3}$= −96.15, where $F_{1.2.3}$ is the combined focal length of lenses $L_1$ through $L_3$, and

$F_{1.2.3.4}$= 141.84, where $F_{1.2.3.4}$ is the combined focal length of lenses $L_1$–$L_4$

| Lens | | Radius of Curvature r | Lens Thickness or Distance d | Refractive Index n | Abbe No. $\nu$ |
|---|---|---|---|---|---|
| $L_1$ | $r_1$ = | 161.15 | $d_1$ = 6.15 | $n_1$ = 1.60738 | $\nu_1$ = 56.8 |
| | $r_2$ = | 72.55 | $d_2$ = 19.93 | | |
| $L_2$ | $r_3$ = | 186.64 | $d_3$ = 10.50 | $n_2$ = 1.71300 | $\nu_2$ = 53.9 |
| | $r_4$ = | −402.24 | $d_4$ = 0.59 | | |
| $L_3$ | $r_5$ = | 1834.76 | $d_5$ = 6.41 | $n_3$ = 1.56873 | $\nu_3$ = 63.1 |
| | $r_6$ = | 49.54 | $d_6$ = 14.12 | | |
| $L_4$ | $r_7$ = | 65.07 | $d_7$ = 30.23 | $n_4$ = 1.79952 | $\nu_4$ = 42.2 |
| | $r_8$ = | −362.02 | $d_8$ = 10.91 | | |
| $L_5$ | $r_9$ = | −69.86 | $d_9$ = 7.23 | $n_5$ = 1.80518 | $\nu_5$ = 25.4 |
| | $r_{10}$ = | 152.00 | $d_{10}$ = 6.69 | | |
| $L_6$ | $r_{11}$ = | −235.10 | $d_{11}$ = 11.40 | $n_6$ = 1.73400 | $\nu_6$ = 51.5 |
| | $r_{12}$ = | −60.16 | $d_{12}$ = 2.00 | | |
| $L_7$ | $r_{13}$ = | 381.07 | $d_{13}$ = 12.45 | $n_7$ = 1.64000 | $\nu_7$ = 60.2 |
| | $r_{14}$ = | −105.28 | | | |

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**4,018,512**

**RETROFOCUS TYPE LENS**

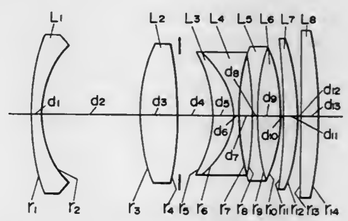
**Yutaka Sakai, Omiya, Japan, assignor to Fuji Photo Optical Co., Ltd., Omiya, Japan**

**Continuation-in-part of Ser. No. 515,221, Oct. 16, 1974, abandoned. This application Oct. 24, 1975, Ser. No. 625,778**

**Claims priority, application Japan, Nov. 9, 1973, 48-126655**

**Int. Cl.² G02B *13/04***

**U.S. Cl. 350—215** **1 Claim**




1. A retrofocus type lens comprising a negative meniscus lens with a face convex to the object side, a biconvex lens located behind the negative meniscus lens with the surface of greater curvature thereof convex to the object side, a cemented biconcave lens located behind said biconvex lens with the surface of greater curvature thereof concave to the object side and the cemented face thereof convex to the image side, a cemented positive meniscus lens located behind said cemented biconcave lens with a surface thereof convex to the image side, a positive meniscus lens located behind said cemented positive meniscus lens with a face thereof convex to the image side, and a positive lens located behind said positive meniscus lens, wherein the conditions;

$0.45f < d2 < 0.75f$,

$$0.33 < \frac{r3}{|r4|} < 0.6$$

$0.05 < N3-N4 < 0.13$ and

$-0.45f < r6 < -0.33f$

are satisfied, where $f$ is the focal length of the lens system as a whole, $d2$ is the air separation between the negative meniscus lens and the biconvex lens, $r3$ is the radius of curvature of the front face of the biconvex lens, $r4$ is the radius of curvature of the rear face of the biconvex lens, N3 is the refractive index of the front lens element of the cemented biconcave lens, N4 is the refractive index of the rear lens element of the cemented biconcave lens, and $r6$ is the radius of curvature of the cemented face of the cemented biconcave lens.

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**4,018,513**

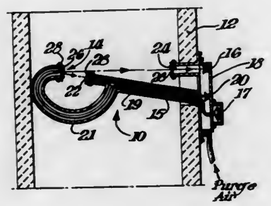
## OPTICAL WINDOW USED IN DEVICE FOR MONITORING CLARITY OF A FLUID

**Jan Boeke, P.O. Box 2511, Chapel Hill, N.C. 27514**

**Division of Ser. No. 455,558, March 28, 1974, Pat. No. 3,954,342. This application Mar. 26, 1976, Ser. No. 670,555**

**Int. Cl.² G01N** *21/12*

**U.S. Cl. 350—319** **7 Claims**




1. A light-transmitting window for a smoke detector having an air purged casing comprising a light-transmitting opening in said casing, and a finely perforated cover over said opening which equalizes and maximizes the velocities of the purging airstreams flowing outwardly through said perforation whereby their obstruction is reduced.

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**4,018,514**

## APPARATUS FOR RETINAL PHOTOGRAPHY

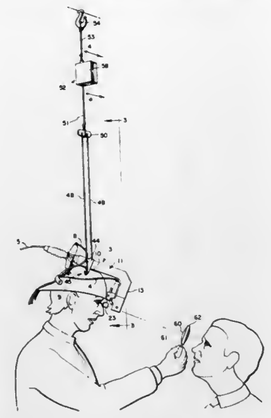
**William T. Plummer, Concord, Mass., assignor to Polaroid Corporation, Cambridge, Mass.**

**Filed Sept. 25, 1975, Ser. No. 616,599**

**Int. Cl.² A61B** *3/14*

**U.S. Cl. 351—7** **9 Claims**

1. Apparatus for retinal photography, comprising headgear, said headgear comprising a helmet adapted to be worn on the head of the photographer, an indirect opthalmoscope mounted on said helmet, a camera mounted on said helmet, means for optically coupling said camera to said ophthalmoscope to photograph a region of the field seen through said ophthalmoscope, and suspension means for partially suspending said headgear from an overhead support for universal



movement in response to a force exerted by the photographer equal to a minor portion of the weight of said headgear.

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**4,018,515**

## SUNGLASSES

**Alexander Derkas, Phoenixville, Pa., assignor to American Polarizers, Inc., Reading, Pa.**

**Filed Mar. 6, 1975, Ser. No. 556,016**

**Int. Cl.² G02C** *7/12, 5/20*

**U.S. Cl. 351—47** **6 Claims**




1. Sunglasses comprising:

a unitary frame of flexible material having a front portion adapted to be supported on the nose and open portions adapted to be in front of the eyes and a pair of temples integral with the said front portion and each having an outer depending end portion adapted to pass behind the ear,

each said end portion having a tab removable to provide for the removal of a portion of the end portion nearest the ear to effectively lengthen the temple, and

a sun screening lens secured to the front portion of the frame and overlying the open portions.

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**4,018,516**

## SPECTACLE FRAME

**Tohyama Hideaki, 4-20-7 Nakaochiai, Shinjuku, Tokyo, and Gotoh Bonpei, 1-25-3 Honkomagome, Bunkyo, Tokyo, both of Japan**

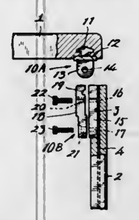
**Filed Oct. 24, 1975, Ser. No. 625,471**

**Claims priority, application Japan, June 10, 1975, 50-77593[U]**

**Int. Cl.² G02C** *5/14*

**U.S. Cl. 351—121** **2 Claims**

1. A spectacle frame comprising a lens receiving body, two temples pivotally and adjustably connected to the opposite ends of said lens receiving body and an articulate connecting device for pivotally connecting between each end of said lens receiving body and each of said temples, characterized by that said articulate connecting device comprises a first half portion associated with said lens receiving body and a second half portion associated with said temple, said first half portion including a base plate integrally having spaced legs extending from one side of said base plate and embedded in said lens receiving body, spaced and opposite brackets extending from the other side of said base plate and a pivot pin extending between said brackets; and said second half portion including a washer member received in a recess in said temple and having at least one threaded through hole, an adjustable washer holding-down member for holding said washer member on said temple and having at least one elongated plain hole




having the elongated dimension greater than the diameter of said threaded hole in the washer member and in communication with the threaded hole, said washer holding-down member further including a recess receiving said pivot pin therein, and threaded fastening means fastening the two members to said temple, said fastening means being in threaded engagement with said threaded hole in the washer member and adjustably extending through said plain hole in the holding-down member for permitting rotation and adjustment of the lens receiving body with respect to said temple.

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**4,018,517**

## MOTION PICTURE CAMERA

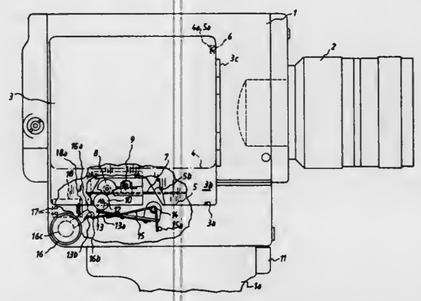
**Peter Ungnadner, Unterhaching, and Wolfgang Geisslinger, Munich, both of Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Germany**

**Filed May 8, 1975, Ser. No. 575,634**

**Claims priority, application Germany, May 10, 1974, 2422716**

**Int. Cl.² G03B** *23/02*

**U.S. Cl. 352—72** **6 Claims**




1. In a motion picture camera, particularly in a motion picture camera for **8-millimeter** film, a combination comprising a bousing having a chamber for reception of relatively small and relatively large film containers whereby a portion of said chamber remains unoccupied when said chamber receives a large container; a blocking device movably mounted in said housing and extending into said portion of said chamber so that a large container moves said device from a first to a second position when such large container is properly inserted into said chamber; a sound recording mechanism mounted in said housing and having a portion movable from a retracted position to an extended position of engagement with film in a large container in said chamber; control means for effecting or permitting the movement of said portion of said mechanism from said retracted to said extended position in response to movement of said blocking device from said first to said second position, comprising a control member which is movable along a predetermined path between operative and inoperative positions to thereby respectively effect the movement of said portion of said mechanism to said extended and retracted positions, said blocking device extending into said path to thereby prevent the movement of said control member to said operative position when said device assùmes said first position thereof, means for permanently biasing said portion of said mechanism to said extended position, and means for moving said portion of said mechanism to said retracted position through the medium of said control member, including a handgrip portion accessible at the exterior of said housing and a carrier for said last mentioned portion, said carrier being biased by said biasing means and being movable against the opposition of said biasing means by said handgrip means through the medium of said control member; and a friction clutch interposed between said handgrip means and said control member so that said handgrip means is movable by hand with and independently of said control member.

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**4,018,518**

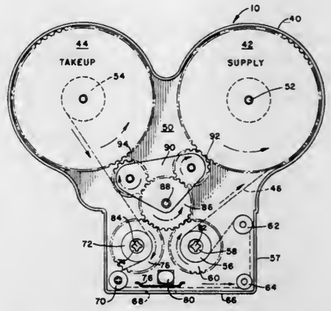
## LARGE CAPACITY FILM CASSETTE

**Joseph H. Wright, Marblehead, Mass., assignor to Polaroid Corporation, Cambridge, Mass.**

**Filed Dec. 10, 1974, Ser. No. 531,340**

**Int. Cl.² G03B** *23/02*

**U.S. Cl. 352—78 R** **7 Claims**




1. A large capacity film cassette for use with projection apparatus having a cassette-receiving well of a size and configuration to receive a limited capacity cassette which includes a pair of radially spaced film strip reels mounted for rotation around parallel axes, and the apparatus including a pair of drive sprockets engagable with the reels of such a limited capacity cassette to effect forward and rewind operation of said reels, said large capacity film cassette comprising:

a large capacity supply reel and large capacity take-up reel;

a housing enclosing and supporting said supply reel and take-up reel in radially spaced relation for rotation around parallel axes, said housing having a projector mounting tongue portion of a size and shape to be received in the receiving well of the projecting apparatus;

means within said housing for guiding a film strip between said supply reel and take-up reel and through an operative projection station within said tongue portion; and

transmission means within said housing for coupling the drive sprockets of the projection apparatus with either said supply reel or said take-up reel while said tongue portion is received in the well, said transmission means including means shiftable between engagement with either said take-up reel or said supply reel in accordance with the direction of rotation of the drive sprockets to effect driving coupling of the drive sprockets respectively

therewith during forward and rewind driving operations, and said tranmission means comprising a pair of shiftable gears alternately engagable with either said supply reel or said take-up reel, and rocker means for supporting said shiftable gears so that one of said pair of gears engages said take-up reel for rotation thereof to take up the film strip during forward operation and the other of said pair of gears engages said supply reel for rotation thereof during rewind operation of the projection apparatus.

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**4,018,519**

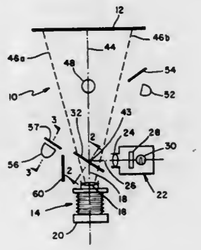
## COMPOSITE PHOTOGRAPHY APPARATUS AND METHOD UTILIZING A POLARIZING BEAM SPLITTING UNIT

**Roy A. Clapp, 10522 Foley Blvd., Coon Rapids, Minn. 55433**

**Filed Aug. 18, 1975, Ser. No. 605,596**

**Int. Cl.² A63J** *5/00*; **G03B** *21/26*, *35/00*, *15/02*

**U.S. Cl. 352—89** **18 Claims**



1. Apparatus for composite photography comprising an autocollimating screen having a planar right reflecting surface facing including a first lens having its axis approximately normal to the plane of said screen, a projector positioned in close proximity to said camera and including a second lens having a second axis for projecting a background image from said projector along said second axis, said second axis intersecting said first axis at a given locus, beam splitting means positioned at said locus for reflecting at least a portion of said background image from said second axis along said first axis toward said screen light reflecting surface, means for directing polarized light lying in a first polarized plane onto a subject located between said beam splitting means and said screen to provide fill light to minimize shadows, said subject dispersing the light striking it into various planes, and polarizing means between said beam splitting means and said camera for transmitting through said first lens to said camera only light reflected from said screen and said subject lying in a second polarized plane generally perpendicular to said first plane of polarized light directed onto said subject.

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**4,018,520**

## PROJECTOR FOCUSING MECHANISM

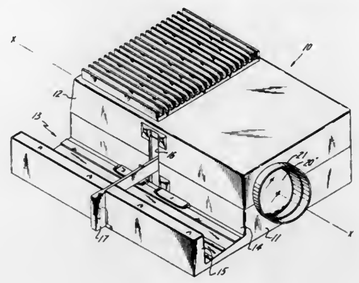
**Fortunato Aste, Sint Niklaas, Belgium, assignor to GAF Corporation, New York, N.Y.**

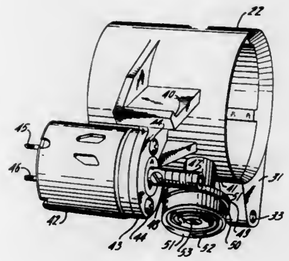
**Filed Apr. 15, 1975, Ser. No. 568,155**

**Int. Cl.² G03B** *3/00*, *21/14*; **G02B** *7/02*

**U.S. Cl. 353—101** **4 Claims**

1. In a transparency projector, the combination comprising a housing, a projection gate within said housing for supporting therein a transparency having an image to be projected upon a remote viewing screen, a source of illumination within the housing, optical means including an objective lens carried in a lens barrel for projecting said image, a lens barrel carrier formed by a cylindrical sleeve mounted for axial movement within said housing, said lens barrel being axially moveable within said sleeve, and means for causing axial movement of said sleeve and thereby said lens barrel to effect focusing adjustment of said transparency image on said remote viewing screen, said means for causing axial movement of said sleeve comprising a reversible electric motor mounted on flange means integral with said sleeve, a driving element carried on the output shaft of said reversible electric motor, a single disc rotatably mounted on said sleeve in driving engagement with said driving element for causing rotation of said disc upon energization of said motor, said disc having a first flat surface facing an external surface of said sleeve and a second flat surface facing away from said external surface of said sleeve, a spiral grooved guideway arranged on said second flat surface of said disc, a stationary pin secured at one end thereof to the





interior of said housing and extending toward said sleeve, the distal end of said pin being engaged in said spiral grooved guideway, cooperating guide means carried by said sleeve and said housing for restricting movement of said sleeve to axial movement along the optical axis of said lens barrel, means for energizing said motor when focusing adjustment is desired, whereby upon energization of said motor said disc will be caused to rotate with said pin guided in said spiral groove thus causing said sleeve to be axially displaced along said lens barrel optical axis by constraint of said guide means to effect focusing adjustment, and means mounted on said housing for limiting axial displacement of said sleeve.

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**4,018,521**

## MIXED SLIDE SEPARATOR

**Nicholas Mischenko, Mount Prospect, Ill., assignor to Bell & Howell Company, Chicago, Ill.**

**Filed Jan. 26, 1976, Ser. No. 652,264**

**Int. Cl.² G03B** *23/00*, *23/02*

**U.S. Cl. 353—104** **1 Claim**

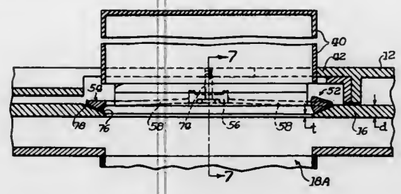
1. Improvements in a slide projector having a slide entry station in a housing for receiving slides from a vertical stack of intermixed thick and thin slides, and having a platen having a plurality of apertures for accepting in each aperture a slide from the bottom of the stack at the entry station and transporting the slide in the aperture to another station, the improvement comprising:

tapered wedge surfaces on said platen at leading and trailing edges of said slide accepting aperture in said platen, said surfaces being inclined constantly from a thickness less than the thickness of said platen which thickness is less than the thickness of a thin slide to the thickness of said platen which thickness is slightly greater than the thickness of a thick slide; and

a separator member fixed in said housing at said entry station, including:

stripper means arranged as leading and trailing members extending along the width of said aperture relative to said platen;

an arcuate inner surface on said stripper means having a depth for engaging said upper slide so as to preclude said upper slide from movement from said station as said lower slide in said platen is moved from alignment in said stack;



a tapered surface on the bottom of said stripper means angled from said inner surface and having an angle substantially complementary to the incline of said tapered wedge surface of said platen for engaging with said tapered wedge on said platen for lifting the trailing of said stripper means onto said platen as said platen moves; and

yieldable arms biasing said stripper means toward said platen, and supporting said stripper means for yieldable movement away from said platen;

whereby an upper slide above a single lower slide accepted in the apparatus of said platen is prevented from moving relative to said entry station by said leading stripper means when said platen is moved to displace said lower slide in said aperture from said station, whether said slides are either thick or thin slides.



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**4,018,522**

## COLOR ELECTROPHOTOGRAPHIC COPYING MACHINE

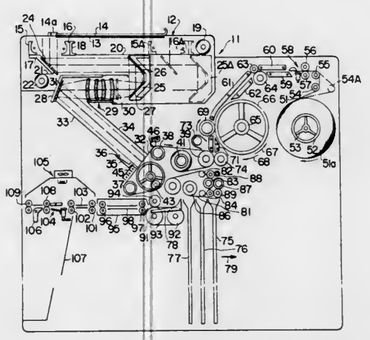
**Nobuo Kasahara, Yokohama, Japan, assignor to Ricoh Co., Ltd., Japan**

**Filed Aug. 22, 1975, Ser. No. 606,980**

**Claims priority, application Japan, Aug. 29, 1974, 49-99170; Sept. 3, 1974, 49-101056**

**Int. Cl.² G03G** *15/01*

**U.S. Cl. 355—4** **9 Claims**



1. A color electrophotographic copying machine comprising

a. a reciprocally rotatable drum;

b. means for supplying a copy sheet to the drum;

c. a roller disposed at a fixed position and maintained in rolling contact with the peripheral surface of said drum, for holding a portion of the length of the copy sheet between said roller and said drum so that said sheet is carried by said drum;

d. means operable to successively form a plurality of electrostatic latent images, corresponding to respective selected color separation images, on the copy sheet carried by the drum, each latent image being formed during a respective rotation of the drum in a first direction;

e. means disposed adjacent said drum for successively developing each electrostatic image with a respective toner developer which is associated with the corresponding color separation image, said developing means being adjustable to bring the respective toner developers successively into receiving relation with a copy sheet having a portion of its length held between said drum and said roller, but remaining stationary during each developing operation;

f. means operable to guide a selected free end of the copy sheet carried by said drum away from the peripheral surface of said drum for feeding of the copy sheet into the then stationary developing means subsequent to the formation of the electrostatic latent image during each such respective rotation of the drum in said first direction; and

g. means operable to treat that surface of each copy sheet which has undergone developing by said developing means, in preparation for the formation of the next electrostatic latent image thereon, during respective rotations of said drum in a second direction opposite to said first direction, said drum rotating alternately in said first and second directions with said roller maintaining said portion of the length of each copy sheet engaged with said drum during such alternate rotations of said drum.

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**4,018,523**

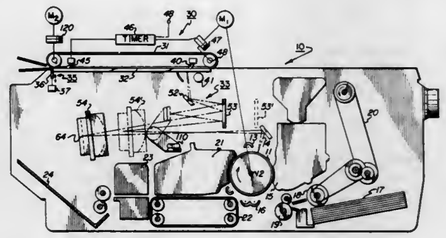
## REPRODUCING APPARATUS AND PROCESS FOR FORMING MULTIPLE COPIES OF A DOCUMENT

**Edwin L. Hughes, Pittsford, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

**Filed July 24, 1975, Ser. No. 598,612**

**Int. Cl.² G03G** *15/30*

**U.S. Cl. 355—8** **22 Claims**



1. A reproducing apparatus for forming multiple copies of a document in a copying run, said apparatus including:

a moving photosensitive surface;

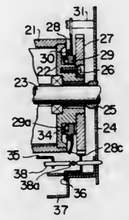
means for forming the first copy of said document in said run while said document is moving in synchronism with said photosensitive surface; and

means automatically responsive to said first copy forming means for forming at least one additional copy of said document in said run while said document is held stationary.

## 4,018,524
## CONSTRUCTION FOR USE WITH AN ELECTROPHOTOGRAPHIC COPYING MACHINE OF WET DEVELOPING TYPE

**Tatsuo Tani formerly Nishikawa, and Kenzo Ariyama, both of Tokyo, Japan, assignors to Ricoh Co., Ltd., Japan**

**Filed Dec. 10, 1975, Ser. No. 639,449**
**Claims priority, application Japan, Dec. 29, 1974, 50-338**
**Int. Cl.² G03G *15/10***
**U.S. Cl. 355—10** **14 Claims**

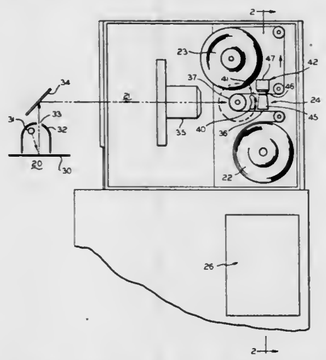


1. A construction for preventing a scattering of liquid applied to the peripheral surface of a rotating photosensitive member beyond the lateral ends thereof in an electrophotographic copying machine of the wet developing type comprising:
   a. end plate means liquid-tightly secured to an end of said photosensitive member and having a boss extending outwardly and concentrically with the axis of rotation of said member,
   b. support means rotatably mounted on said boss,
   c. means for liquid-tightly sealing between said boss and said support means,
   d. a flow guide member secured to said support means and spaced apart from the end surface of said photosensitive member for guiding liquid from the peripheral surface of said photosensitive member to flow down therealong.
   e. means for preventing said guide member from rotating with said photosensitive member to thereby maintain said guide member stationary, and
   f. reservoir means disposed beneath said guide member for receiving liquid flowing down along said guide member.

## 4,018,525
## INSTANT IMAGE FILM CAMERA WITH INSPECTION STATION

**Milan A. Broderick, Riverwoods; Robert F. Porazinski, and Eugene V. Mateja, both of Norridge, all of Ill., assignors to Bell & Howell Company, Chicago, Ill.**

**Filed Mar. 31, 1975, Ser. No. 563,744**
**Int. Cl.² G03B *27/32*, *27/52***
**U.S. Cl. 355—27** **8 Claims**



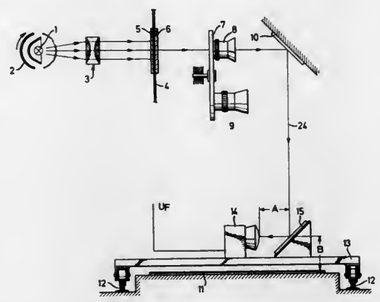
1. A microfilm camera for using a strip of instant image film, said camera comprising a film supply means, a take-up means, and means for causing said strip of film to travel over a path from said supply means to said take-up means, at least one instant developing station means disposed adjacent said film for developing across the entire width of the strip of film in the area adjacent said developing station, means comprising a read-out optical system positioned in the path followed by the film as it travels away from said developing station and through the camera to said takeup means, and desensitizing means for desensitizing the strip film thereof across the entire width in the area adjacent said desensitizing means and for simultaneously projecting the image which was instantly formed on the film through the read-out optical system and onto a display screen, whereby an operator may watch the images as they are formed on the film and recopy any defective image immediately after a defective image is found.

6. A method of maintaining the quality of document images as they are photocopied on a strip of microfilm comprising the steps of:
   a. providing a microfilm camera, which uses an instant image film, with an instant developing station built therein for developing the entirety width of said strip of the film adjacent the developing station;
   b. providing after the developing station an associated read-out optical system, positioned along a path which the film follows as it travels through the camera;
   c. projecting an image formed at said developing station as the film develops through a secondary optical system in said camera and onto a display screen, and
   d. stopping the camera if an inferior image is detected as it is formed on the film, and of recopying the image immediately, whereby all images are properly recorded on the microfilm.

## 4,018,526
## METHOD OF AND APPARATUS FOR CONTROLLING THE EXPOSURE TIME IN AN APPARATUS FOR THE RE-ENLARGEMENT OF MICROFILMS

**Herbert Schroter, Taunusstein, Germany, assignor to Hoechst Aktiengesellschaft, Germany**

**Filed Aug. 12, 1975, Ser. No. 604,059**
**Claims priority, application Germany, Aug. 16, 1974, 2439308**
**Int. Cl.² G03B *27/78***
**U.S. Cl. 355—68** **6 Claims**



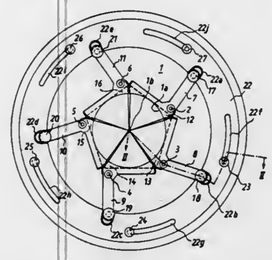
2. An apparatus for controlling the exposure time in apparatuses for the re-enlargement of a microfilm having at least one light-sensitive measuring unit, comprising a movable measuring unit means for ascertaining the density of the microfilm during exposure, said means being arranged in a ray path between the microfilm and a light-sensitive recording material,
   discriminator means which selects the measured signals of the light-sensitive measuring unit means, corresponding to an extreme value of the density of the microfilm,
   and means for controlling the exposure time according to the signal coming from the discriminator means.



## 4,018,527
## APPARATUS FOR CONTROLLING THE MOVEMENTS OF PRINTING FILTERS

**Siegfried Bartel, Gauting; Bernd Payrhammer, and Johann Würf, both of Munich, all of Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Germany**

**Filed Mar. 10, 1975, Ser. No. 557,074**
**Claims priority, application Germany, Mar. 9, 1974, 2411301**
**Int. Cl.² G03B *27/76***
**U.S. Cl. 355—71** **25 Claims**

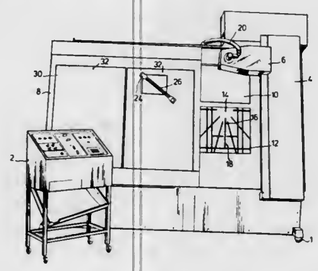


1. Apparatus for continuously coloring a light beam, particularly in a photographic printer wherein a beam of printing light passes in a predetermined direction along a predetermined path toward a plane wherein the beam impinges on photosensitive material, comprising a plurality of sets each composed of a plurality of discrete filters, said sets being disposed one behind the other, as considered in said direction, and the filters of each set being movable transversely of said path to and from inner end positions in which such filters extend at least substantially across the entire path; and discrete actuating means for each of said sets of filters, each of said actuating means comprising a device for simultaneously moving all filters of the respective set toward and away from said inner end positions.

## 4,018,528
## PHOTOMECHANICAL COLOR PRINTING REGISTRATION

**Richard John Dennis, Southport, England, assignor to John Dennis (Graphics) Limited, Liverpool, England**

**Continuation of Ser. No. 314,938, Dec. 14, 1972, abandoned. This application Jan. 20, 1975, Ser. No. 542,428**
**Claims priority, application United Kingdom, Dec. 17, 1971, 58614**
**Int. Cl.² G03B *23/02*, *27/08***
**U.S. Cl. 355—77** **5 Claims**

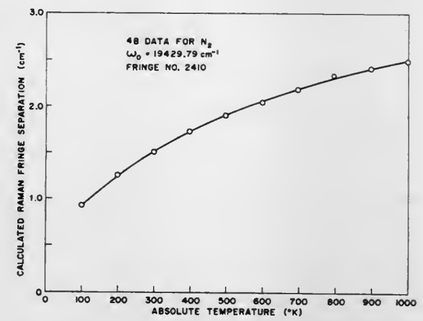


1. The method of using positional electronic recording means for registration of color separations for use in photomechanical color printing of illustrations comprising the steps of:
   1. providing a set of color separations for each illustration with registration means for each set being disposed on each separation outwardly of an image area thereon;
   2. positioning one of the color separations of a set in a registered position according to a layout on a first stable transparent assembly foil which itself is located in a registered position;
   3. positioning each of the remainder of the color separations of the set in a predetermined storage position;
   4. recording by said electronic means the positional coordinates of the predetermined storage position for the remainder of the color separations;
   5. recording by said electronic means the positional coordinates of said one color separation using the registration means of said one color separation on its assembly foil;
   6. replacing in the registered position of the first assembly foil a second stable transparent assembly foil;
   7. using the recorded positional coordinates of the first of the set of color separations and the position of storage of the remainder of said set for automatically transferring another of the set of color separations from the position of storage to a position on the second assembly foil which is in regitration with the corresponding position of the first of said set on said first assembly foil, and
   8. repeating steps 6 and 7 for each of the remaining color separations in the set.

## 4,018,529
## SPECTROSCOPIC TEMPERATURE MEASUREMENT

**Joseph J. Barrett, Morris Plains, N.J., assignor to Allied Chemical Corporation, Morris Township, N.J.**

**Continuation-in-part of Ser. No. 478,405, June 11, 1974, Pat. No. 3,909,132. This application June 5, 1975, Ser. No. 584,085**
**Int. Cl.² G01J *5/60*, *3/44***
**U.S. Cl. 356—45** **18 Claims**




1. Apparatus for determining the temperature of a gaseous material by analyzing light having spectral components periodic in frequency, comprising:
   a. light conditioning means for collecting, collimating and transmitting said light; light for selectively separating periodic spectra therefrom and transmitting said spectra in the form of a detectable signal, said interferometric means having interference-producing means for providing a plurality of transmission windows regularly spaced in frequency, the frequency spacing between adjacent windows being adjusted to depart from an odd integral submultiple, *n*, of the frequency difference between adjacent spectral components of the periodic spectrum of said gaseous material, said odd integral submultiple being at least three so as to produce a split-fringe containing first and second branches of the components, and scanning means for causing the transmission peaks for adjacent nth orders to substantially coincide with the spectral lines of either branch of the components, whereby each branch of

said split-fringe is derived from a plurality of periodic spectral lines and has an integrated intensity substantially equal to their sum;

c. signal conditioning means for measuring the frequency difference between preselected portions of each of said branches; and

d. detecting means for indicating and recording the frequency difference between said preselected portions of the branches, said frequency difference between said preselected portions correlating with the temperature of said gaseous material.

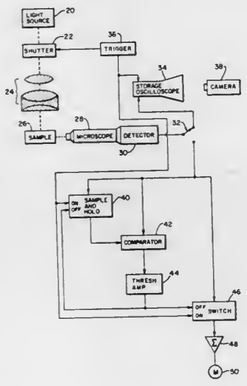
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**4,018,530**

## FLUORESCENCE SPECTROMETRY EMPLOYING EXCITATION OF BLEACHING INTENSITY

**Tomas Hirschfeld, Framingham, Mass., assignor to Block Engineering, Inc., Cambridge, Mass.**

**Filed Nov. 18, 1975, Ser. No. 633,010**
**Int. Cl.² G01J 3/30**
**U.S. Cl. 356—85** **8 Claims**




1. Method of examining fluorescent material, said method comprising the steps of

illuminating said material with radiation at a fluorescent excitation wavelength of said material and at an exposure sufficient to cause bleaching of said material;

detecting over a time interval commencing with initial illumination of said material, fluorescent emission produced by said material during bleaching of the latter by said radiation; and

integrating over said interval the fluorescent emission detected during the bleaching of said material.

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**4,018,531**

## SPECKLE PATTERN INTERFEROMETER

**Jack Albert Leendertz, Bristol, England, assignor to National Research Development Corporation, London, England**

**Filed Mar. 3, 1975, Ser. No. 554,698**
**Claims priority, application United Kingdom, Mar. 5, 1974, 9794/74**
**Int. Cl.² G01B 9/02**
**U.S. Cl. 356—109** **8 Claims**

1. An interferometer comprising:

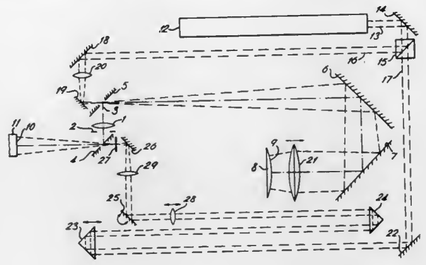
a planar mirror having a small aperture formed therein;

an optical imaging system disposed optically between an object location and an image location with said mirror disposed in the optical path between said imaging system and said image location, whereby light scattered from a surface disposed at said object location will be imaged by said imaging system at said image location after reflection at said mirror;

means for producing from a beam of coherent light directed into the interferometer separate object and reference beams;

means for directing said object beam to said object location to illuminate any surface disposed at said object location; and

means for directing said reference beam to said image location, including means for shaping said reference beam so that it will diverge to said image location through said small aperture from an effective point source located behind said mirror at a position such that at any point of said image location the maximum angle between a ray of said reference beam and a ray of said imaged scattered light will be not greater than the maximum angle between different rays of said imaged scattered light.



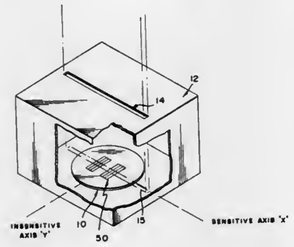
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**4,018,532**

## SUN DIRECTION DETECTION SYSTEM

**James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention of Louis F. Schmidt, Altadena, and George D. Pace, Jr., Sierra Madre, both of Calif.**

**Filed Sept. 24, 1975, Ser. No. 616,472**
**Int. Cl.² G01B 11/26**
**U.S. Cl. 356—141** **14 Claims**




10. A sun direction detection system comprising:

a housing defining a single slit extending in a first direction;

a substrate in said housing defining a top flat surface in a plane perpendicular to a direction, defined as the normal direction;

an illumination detector deposited on said substrate and characterized by a field of view definable as $\pm Z°$ with respect to said normal direction for providing a low resistance output, definable as $R_s$, when sunlight is directed to said illumination detector through said slit, with the sunlight direction from either side of said normal direction forming an angle not greater than Z° with respect to said normal directon, and for providing a high resistance output definable as $R_A$, where $R_A >> R_s$ when the sunlight is directed to said illumination detector through said slit, with the sunlight direction forming an angle greater than Z° with respect to said normal direction; and

a sun angle detector deposited on said substrate and characterized by a field of view definable as $\pm W°$ with respect to said normal direction for providing an output which is a function of the direction of the sunlight directed thereto through said slit with respect to said normal direction when the angle of the sunlight direction with respect to said normal direction is not greater than W°, with the field of view of said sun angle detector being greater than the illumination detector field of view.



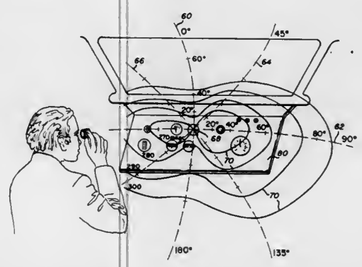
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**4,018,533**

## OPTICAL INSTRUMENT EMPLOYING RETICLE HAVING PRESELECTED VISUAL RESPONSE PATTERN FORMED THEREON

**Richard F. Haines, Los Altos, Calif., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.**

**Filed Mar. 8, 1976, Ser. No. 665,032**
**Int. Cl.² G02B 27/32**
**U.S. Cl. 356—171** **12 Claims**




1. An optical instrument for use in locating indicator lights on a work surface comprising:

a generally tubular housing having first and second ends;

a lens mounted within said housing proximate said first end, said lens including an inner surface coated with a material that is capable of reflecting a portion of the light incident thereon;

a plate mounted within said housing proximate said second end and having a central aperture;

a generally transparent substrate disposed within said housing intermediate said lens and said plate, said substrate including a first surface disposed in a facing relationship to said coated inner surface; and

a reticle formed on said first surface and comprised of a material capable of reflecting light, said reticle including a reference pattern and a plurality of contours each representing an iso-response time for an average viewer to respond to a light of a preselected color, whereby when said aperture is placed in front of the eye of a viewer, ambient light passing through said lens and sriking said reticle is reflected from said reticle against said coated inner surface which in turn reflects a portion of the light through said substrate and said aperture into the eye, and whereby said reference pattern and said contours appear to be projected upon the work surface so as to permit the viewer to locate indicator lights on the work surface such that the lights are capable of being detected and hence responded to within a desired response time.

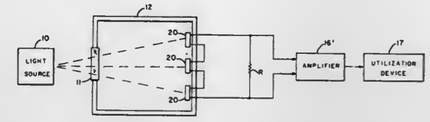
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**4,018,534**

## AEROSOL AVERAGE-DENSITY DETERMINING SYSTEM

**Lawrence B. Thorn, and David R. Dreitzler, both of Huntsville, Ala., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed May 21, 1975, Ser. No. 579,657**
**Int. Cl.² G01N 21/22**
**U.S. Cl. 356—201** **1 Claim**




1. An aerosol average density determining system including a single light source for providing light along plural paths through said aerosol; and means for detecting light from said plural paths, said means for detecting includes a respective photosensitive means for each of said paths, said photosensitive means having outputs connected in series.

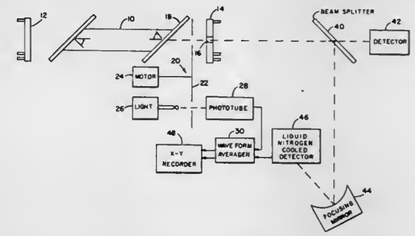
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**4,018,535**

## DEVICE FOR MEASURING ENERGY TRANSFER RATES DURING LASING

**Charles M. Cason, III, Huntsville, Ala., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Oct. 28, 1975, Ser. No. 626,584**
**Int. Cl.² G01J 1/42; H01S 3/00**
**U.S. Cl. 356—218** **4 Claims**




1. Apparatus for measuring energy transfer rates during lasing and comprising: a gas laser having output optical energy, interrupting means disposed in the path of said output energy to establish an output pulse repetition rate, pulse rate measuring means synchronous with said laser output for providing the pulse repetition rate of said laser, a liquid nitrogen cooled detector responsive to the output of said laser to provide an output pulse representative of said laser pulse energy, a pulse waveform averager responsive to said liquid nitrogen cooled detector output and said pulse rate measuring means output to provide respectively pure output signal energy pulses and synchronous time pulse outputs, and recording means responsive to said averager outputs for recording a graph of said output signal energy pulses versus the synchronous pulse repetition rate.

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**4,018,536**

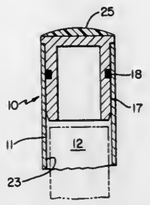
## WRITING INSTRUMENT TOP

**Arthur Walter Brenner, Cranston, R.I., assignor to Anson Incorporated, Providence, R.I.**

**Continuation-in-part of Ser. No. 624,662, Oct. 22, 1975. This application Apr. 28, 1976, Ser. No. 681,341**
**Int. Cl.² G09F 3/00**
**U.S. Cl. 401—292** **3 Claims**

1. A writing instrument top comprising a tube having a top

end and a bottom end, and a wall provided with an inside surface forming an axial passageway, a ferrule provided with a circular surface, a circular recess, a circular ledge, and a top,




an O ring located in said circular recess, said ferrule positioned in said axial passageway with said O ring engaging said inside surface, and said circular ledge abutting said top end to removably secure said ferrule in said tube.

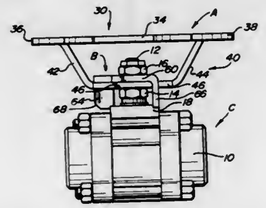
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**4,018,537**

## OPERATING HANDLE

**Ulrich H. Koch; Stephen Matousek, both of Moraga, and Richard S. DiGennaro, Berkeley, all of Calif., assignors to Whitey Research Tool Co., Emeryville, Calif.**

**Filed May 15, 1975, Ser. No. 577,776**
**Int. Cl.² F16B 2/00**
**U.S. Cl. 403—240** **21 Claims**




1. An operating handle assembly adapted to be tightly mounted on an operating member, said operating handle comprising:

a handle member having a first handle mounting opening disposed therein adapted to be received over said operating member; and,

a biasing member including a second mounting opening disposed therein adapted to be received over said operating member in close spaced association with said handle member, said handle and biasing members including cooperating means for forcing opposite sides of said first and second mounting openings toward each other generally axially of said operating member whereby opposed radial clamping forces are applied to opposite sides of said operating member, said biasing member further including handle stops for precisely limiting rotational movement of said operating handle and said operating member.

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**4,018,538**

## CROSS ARM HANGER SUPPORT

**Emanuel S. Smyrnl, and Bobbie L. White, both of Shreveport, La., assignors to Gym-Dandy, Inc., Bossier City, La.**

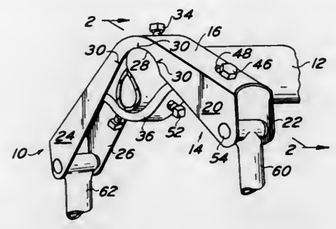
**Filed June 17, 1975, Ser. No. 587,798**
**Int. Cl.² F16D 1/00; B25G 3/00**
**U.S. Cl. 403—346** **6 Claims**

1. A cross arm hanger support adapted to be attached to a horizontally disposed gym set pipe comprising

a. a cross arm having portions converging upwardly from free ends to an apex, said cross arm having generally semi-circular lower edges adjacent and below the apex thereof, each of said portions including a top wall having a hole therein, each of said holes being elongated in a direction towards said apex,

b. a clamp having a flange at each end of a centrally disposed arcuate portion, each flange being generally parallel to one of said top walls, each flange having a hole aligned with one of said holes in said top walls, a bolt for each set of aligned holes,

c. at least one set screw supported by said cross arm adjacent the apex thereof, at least one set screw supported by




said clamp, said set screws being adapted to contact the OD of a pipe to prevent relative rotation of the arm and clamp with respect to the pipe,

d. means at the free ends of said portions for rotatably supporting a hanger, and

e. said cross arm lower edges having one or more arcuately spaced slits extending radially outwardly from said lower edges to permit the lower edges to accommodate and conform to a pipe having an OD of about 2 inches to 2½ inches.

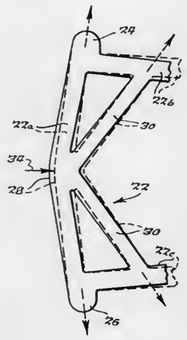
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**4,018,539**

## MODULAR ELASTOMERIC EXPANSION SEAL

**Guy S. Puccio, Lancaster, N.Y., assignor to Acme Highway Products Corporation, Buffalo, N.Y.**

**Filed Dec. 5, 1975, Ser. No. 638,200**
**The portion of the term of this patent subsequent to Nov. 30, 1993, has been disclaimed.**
**Int. Cl.² E01C 11/02**
**U.S. Cl. 404—69** **10 Claims**




1. A sealing member for use in an expansion joint having at least one pair of spaced-apart, elongated retaining members defining a gap therebetween, each said retaining member having in cross-section a generally C-shaped cavity with a preselected radius of curvature, each said cavity opening toward said gap defined between said retaining members wherein each said cavity opening is defined between opposed projecting portions of said respective retaining member, said portions being spaced from each other a distance less than the maximum dimension within said cavity taken generally parallel to said opening, said sealing member comprising:



a top and bottom wall spanning said gap and a pair of end walls, each said end wall disposed along and interconnecting corresponding longitudinal edges of said top and bottom walls wherein each of said end walls is received within said cavity of a respective retaining member, and each of said end walls having in cross-section an outer surface portion for matching engagement with said cavity with opposed portions of each said end wall correspondingly abutting said opposed projecting portions of said retaining member whereby relative lateral movement of each said end wall with respect to said retaining member is resisted, and the radius of curvature of the outer surface of each said end wall in an unstressed, disassembled form beingless than said preselected radius of curvature of said cavity so that upon assembly of each said end wall within said respective retaining member cavity said outer surface of each said end wall is affirmatively urged to assume the relatively greater radius of curvature of said cavity by the abutment of said opposed portions of each said end wall with said opposed projecting portions of said respective retaining member.

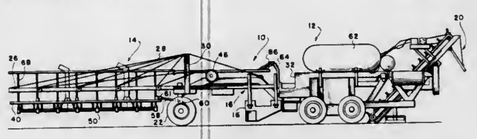
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**4,018,540**

## ROAD MAINTENANCE MACHINE

**James A. Jackson, Sr., 8330 Cantrell Road, Little Rock, Ark. 72207**

**Filed Mar. 5, 1974, Ser. No. 448,404**
**Int. Cl.² E01C 23/14**
**U.S. Cl. 404—95** **15 Claims**




1. In a road maintenance machine for heating and working a paved surface while moving along a roadway, burner apparatus comprising:

a plurality of burner means suspended from said machine at a predetermined distance above the paved surface for heating and substantially softening the paved surface to a predetermined depth,

said burner means being arranged in rows extending across said paved surface and spaced at a distance from each other to provide for alternately heating and cooling of the pavement surface as the rows of burner means move along said surface thereby allowing substantial heat penetration to said predetermined depth while maintaining the surface temperature below a predetermined limit,

insulating means disposed between adjacent pairs of burner means for substantially confining the heat generated by said burners between said burners and the road surface and for providing a heat shield for protecting the portions of the burner apparatus above the insulating means,

a plurality of hoods each mounted on one of the insulating means over an aperture therein for directing heat and products of combustion upward and outward away from the sides of the roadway, and

fuel supply means mounted on said machine for providing said burner means with fuel.

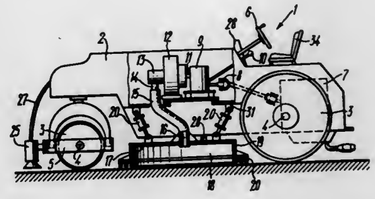
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**4,018,541**

## ROAD ROLLER FOR COMPACTING PAVEMENTS

**Ernst Ivanovich Denikin, Grazhdansky prospekt, 13, korpus 1, kv. 190; Nikolai Yakovlevich Khazkhuta, prospekt Smirnova, 37, korpus 1, kv. 20; Alexandr Andreevich Shestopalov, prospekt Smirnova, 20, korpus 1, kv. 30; Vladimir Vachaganovich Badalov, Grazhdansky prospekt, 124, kv. 441, all of Leningrad; Alexandr Alexandrovich Vasiliev, Volzhsky bulvar, 40, kv. 36, Moscow; Vyacheslav Ivanovich Okunev, ulitsa Schepkina, 12, kv. 47; David Abramovich Kaplan, ulitsa Gertsena, 87, kv. 166, both of Rybinsk Yaroslavskoi oblasti; Jury Borisovich Deinego, ulitsa Druzhby, 2/19, kv. 199, Moscow; Alexandr Danilovich Kazakov, ulitsa 9 aprelya, 68, kv. 5, Kaliningrad; Vladimir Ivanovich Gienko, ulitsa Tovarnaya, 21a, kv. 4, Kaliningrad; Alexei Alexeevich Marchenko, ulitsa Sudostroitelnaya, 72, kv.6, Kaliningrad, and Mikhail Avramovich Laevsky, Moskovsky prospekt, 148, kv.19, Kaliningrad, all of U.S.S.R.**

**Filed Dec. 4, 1975, Ser. No. 637,704**
**Int. Cl.² E01C 19/26**
**U.S. Cl. 404—130** **8 Claims**




1. A road roller for compacting a road comprising: a chassis; at least one compacting roll mounted on said chassis; ballast means connected to said chassis and provided with a source of vacuum and at least one chamber, said chamber having side walls and being open at one side and having a bottom wall at the other side which is connected to said chassis, said chamber communicating with said source of vacuum and arranged so that in the course of operation said open side of the chamber is covered by the road being compacted, said bottom wall of the chamber being connected to the chassis so that, when the vacuum is induced in the chamber, forces are transmitted from the bottom wall of said chamber to the chassis.

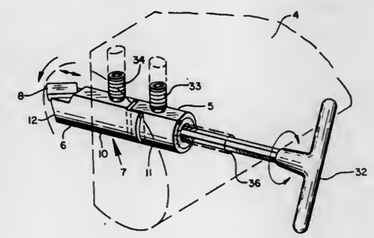
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**4,018,542**

## ADJUSTABLE TOOL HOLDER FOR BORING BAR

**Harold W. Lindsay, 2480 NW. Vaughn, Portland, Oreg. 97210**

**Filed June 3, 1976, Ser. No. 692,429**
**Int. Cl.² B23B 29/02**
**U.S. Cl. 408—153** **3 Claims**




1. In a boring tool, the combination of a boring bar having a constant diameter cylindrical bore extending therein; and a cutting tool disposed within said bore, said tool comprising

a first shank portion;

a cutting tip disposed at one end of said first shank portion;

a second shank portion positioned at the other end of said first shank portion and adapted to mate therewith, said first and second shank portions having cross sections which are equal in exterior dimension, said cross sections conforming to the cross section of said bore in said boring bar, whereby said shank portions are axially slidable with respect to said bore;

a key disposed on the mating end of one of said first and second shank portions;

a keyway disposed on the mating end of the other of said first and second shank portions, said keyway being adapted to receive said key, whereby said shank portions are prevented from axial rotation with respect to each other when said key is received in said keyway, said first and second shank portions cooperating to form a torsionally unitary cutting tool of constant exterior dimension along the entire length thereof;

an axial bore disposed in said first and second shank portions;

said bore extending axially partially into said first shank portion and being screw-threaded therein;

said bore extending axially completely through said second shank portion;

said axial bore having a first lateral enlargement disposed within said second shank portion to provide a first annular shoulder and a first axial extent of enlarged circular cross section therebeyond;

said axial bore having a second lateral enlargement disposed within said second shank portion adjacent said first lateral enlargement and extending to the end of said second shank portion, said second lateral enlargement providing a second annular shoulder adjacent said first lateral enlargement and a socket of still further enlarged circular cross section at the end of said second shank portion; an adjusting screw threadedly received in said axial bore in said first shank portion;

said adjusting screw having an annular laterally enlarged head received and rotatably in said first axial extent of enlarged cross section in said second shank portion, said head abutting said first annular shoulder; and annular retaining means disposed in said socket in said second shank portion;

said annular retaining means abutting said second annular shoulder and being adapted axially to retain said head of said adjusting screw in abutting relation with said first annular shoulder, whereby rotation of said adjusting screw advances or retracts said first shank portion axially with respect to said second shank portion to a desired cutting position within said bore in said boring bar.

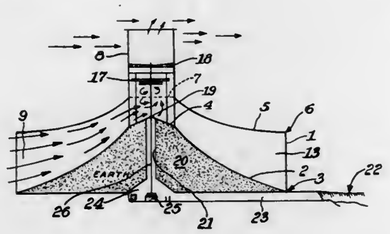
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**4,018,543**

## WHIRLWIND POWER SYSTEM

**Earl L. Carson, Felton, and Donald W. Carson, Ben Lomond, both of Calif., assignors to The Raymond Lee Organization, Inc., New York, N.Y., a part interest**

**Filed Sept. 19, 1975, Ser. No. 614,979**
**Int. Cl.² F03B** *3/04*
**U.S. Cl. 415—2** **2 Claims**




1. A whirlwind power system, comprising

a structural housing having a generally toroidal part substantially horizontally positioned and having an upwardly inclining lower base extending upward from a circumference to a first generally circular central area and an upwardly inclining upper base extending upward from a circumference substantially equidistantly vertically spaced from the circumference of the lower base to a second generally circular central area substantially equidistantly vertically spaced from the first central area, the lower and upper bases being coaxial, and a substantially hollow cylindrical part extending substantially vertically upward from the second central area and substantially coaxial with the lower and upper bases to provide a chimney type flue;

partition means in the toroidal part of the housing for compressing air entering the housing between the circumferences of the lower and upper bases and directing the compressed air in a whirlwind manner to the cylindrical part of the housing and thereby greatly increasing the force of the air, said partition means comprising a plurality of stationary partitions each having the configuration of part of a spiral and extending from the lower base to the upper base, said partitions being equidistantly spaced at the first and second central areas and equidistantly spaced at the circumferences of the lower and upper bases; and

power generating means having rotor means substantially coaxially rotatably mounted in the cylindrical part of the housing and rotated by the air directed via the partition means, said power generating means including a plurality of turbine blades coaxially rotatably supported in the cylindrical part, a chamber formed in the earth under the structural housing, power generating means in the chamber and coupling means coupling the turbine blades to the power generating means for operating said power generating means.

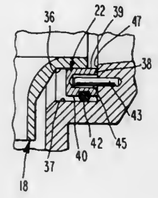
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**4,018,544**

## CENTRIFUGAL PUMP

**H. Alfred Eberhardt, Paoli, Pa., assignor to Hale Fire Pump Company, Conshohocken, Pa.**

**Filed Feb. 20, 1976, Ser. No. 659,742**
**Int. Cl.² F04D** *29/16*
**U.S. Cl. 415—170 A** **1 Claim**



1. In a fluid pump;

a housing formed with a fluid chamber including a fluid suction section and a fluid discharge section;

an impeller mounted for rotation in said chamber to cause fluid to flow from the suction section to the discharge section, the impeller having an exterior cylindrically shaped working surface concentric with its axis of rotation and being disposed adjacent the suction section;

an interior cylindrically shaped surface formed on said housing adjacent the suction section and substantially concentric with said cylindrical surface on the impeller;

an annular radially extending abutment surface formed on said housing and co-axial with said cylindrical surface on the housing;

a clearance ring disposed between said cylindrical surfaces and separating said suction and discharge sections, the clearance ring having a cylindrically shaped outer surface and a cylindrically shaped inner surface;



means connected between the housing and the ring permitting axial and radial motion of the ring and maintaining the ring in a non-rotary condition while the impeller rotates;

the diameter of the inner surface of the ring being greater than the diameter of the impeller cylindrical surface to form minimal clearance therebetween, the clearance permitting the impeller to rotate and causing the impeller cylindrical surface to immediately contact the inside surface of the ring in the event the impeller is misaligned and/or shifts radially and thereby cause the ring to shift radially while minimizing fluid leakage from the discharge section thru the clearance to the suction section;

the diameter of the outer surface of the ring being substantially less than the diameter of the housing cylindrical surface to provide space for the ring to move radially if caused to do so by the impeller and also for the ring to move axially, the fluid pressure of the discharge section causing the ring to move axially whereby the ring engages said radially extending abutment surface; and

seal means between the ring and the housing to prevent fluid leakage from the discharge section thru said space to the suction section.

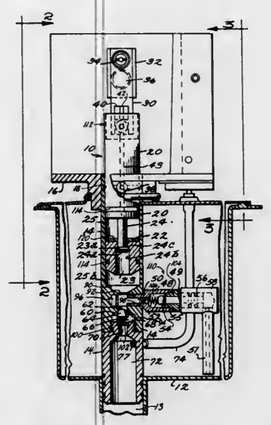
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**4,018,545**

## MIX BLENDING PUMP

**Omar Knedlik, 2203 Prairie Lane, Coffeyville, Kans. 67337**

**Continuation-in-part of Ser. No. 534,871, Dec. 20, 1974, abandoned. This application Dec. 31, 1975, Ser. No. 645,618**
**Int. Cl.² F04B** *3/00, 21/04*
**U.S. Cl. 417—262** **10 Claims**



1. A mix blending pump for introducing a predetermined amount of air into a liquid mix comprising:

a. a first piston means slidably disposed within a casing;

b. means for reciprocating said first piston means through an upstroke and downstroke in said casing;

c. a second piston means slidably disposed within said casing and slidably connected to said first piston means to define a first chamber therebetween;

d. means for admitting air into said first chamber;

e. means for admitting liquid mix into a second chamber disposed adjacent to said second piston means;

f. a connecting rod being secured to said first piston means and slidably arranged in a bore in said second piston means;

g. said bore being further provided with abutment means for limiting the distance between said first and second piston means during the upstroke of said first piston means;

said connecting rod being arranged to enable said first piston means to contact said second piston means at a lowermost portion of said downstroke to further displace said second piston means downwardly in said casing to force the air-liquid mixture from said second chamber;

said connecting rod being provided with adjustable means for selectively changing the distance between said first and second piston means at the top of the upstroke to thereby control the amount of air introduced into said first chamber and correspondingly control the amount of air introduced into the liquid mix;

said adjustable means comprising an additional rod secured to said connecting rod and threadedly secured to said first piston means;

said first piston means drawing a predetermined amount of air through said air admitting means into said first chamber and said second piston means drawing a predetermined amount of liquid mix through said liquid admitting means into said chamber during the upstroke, said first piston means displacing air from said first chamber through at least one port in said second piston means into said second chamber during the downstroke to thereby introduce a predetermined amount of air into the liquid mix.

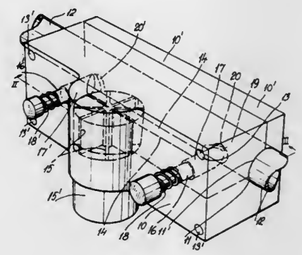
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**4,018,546**

## PUMP DEVICE FOR FLOW RATE CONTROL OF LIQUID IN A PIPING SYSTEM

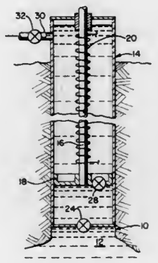
**Sven Runo Vilhelm Gebelius, Fridhemsgatan 27, Stockholm, Sweden (S-11240)**

**Filed Nov. 21, 1974, Ser. No. 525,980**
**Claims priority, application Sweden, Dec. 28, 1973, 7317505**
**Int. Cl.² F04B** *21/00*
**U.S. Cl. 417—313** **6 Claims**



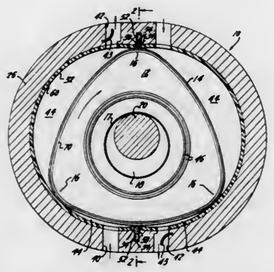
1. A pump device for a flow rate control of liquid in a piping system comprising a pump housing, the pump housing having means sealingly engaging a pipe of the piping system so that the pipe extends axially of the housing, a power driven pump unit having a rotatable part, said pump unit being mounted on the housing, the housing being provided with an axial channel having opposite ends, the channel extending parallel to the pipe, the pipe having a hole communicating with each end of the axial channel, a first guide on the pipe adjacent the upstream hole for guiding a portion of the flow into the axial channel, a second guide on the pipe adjacent the downstream hole for guiding the liquid in the axial channel back into the pipe, and the rotatable part of the pump unit being located in the axial channel so that upon activation of the pump unit, the liquid in the axial channel is pumped via the downstream hole into the pipe thereby accelerating the liquid flow through the pipe.

**4,018,547**
**PUMPING BY WIRE ELONGATION**
**Neil E. Rogen, 3 Beaver Dam Road, Upper Saddle River, N.J. 07458**
**Filed Aug. 28, 1975, Ser. No. 608,504**
**Int. Cl.² F04B** *17/00*
**U.S. Cl. 417—321** **7 Claims**



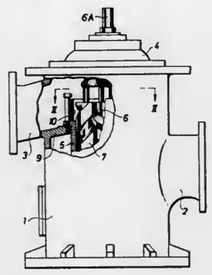
1. Sucker rod type comprising,
means defining a pumping piston member for cyclically engaging a liquid pool and transferring liquid from one face of the piston to an opposite face to produce a liquid column on top of the piston member,
means defining an elongated martensitic transformation member of at least one hundred feet length carrying and suspending said piston member,
means defining a down-stroke driver for elongating said martensitic transformation material by about 5% and inducing said transformation at a first relatively cold temperature,
and means for heating said martensitic material to reverse the transformation and automatically reverse said elongation lifting the liquid column,
to provide lowering and raising portions of a pumping cycle.

**4,018,548**
**ROTARY TROCHOIDAL COMPRESSOR**
**Murray Berkowitz, Woodcliff, N.J., assignor to Curtiss-Wright Corporation, Wood-Ridge Lake, N.J.**
**Filed Dec. 8, 1975, Ser. No. 638,513**
**Int. Cl.² F01C** *19/04, 19/08, 1/02;* **F04C** *27/00*
**U.S. Cl. 418—61 A** **1 Claim**



1. A rotary mechanism such as a compressor, expansion engine or the like comprising:
a. an outer body comprising a pair of axially-spaced end walls and an intermediate wall defining a cavity therebetween;
b. an inner body mounted for relative rotation within said cavity and having its axis eccentric to the axis of said outer body, the peripheral surface of said inner body being substantially a hypotrochoid with three nose portions and the inner peripheral surface of said outer body intermediate wall being substantially the outer envelope of the hypotrochoidal peripheral surface of the inner body such that said intermediate wall peripheral surface has two diametrically opposed regions which generate said hypotrochoidal surface and such that a plurality of working chambers are formed between said inner body and said intermediate wall;
c. said nose portions of the inner body having sealing cooperation with the inner surface of the housing intermediate wall;
d. a radially movable seal bar carried by the outer body intermediate wall at each of said hypotrochoid generating regions and spring means for urging each seal bar into sealing contact with the hypotrochoid peripheral surface of the inner body;
e. said outer body having intake and discharge ports so disposed on opposite sides of each said seal bar such that each working chamber moves out of communication with an intake port before it subsequently moves into communication with a discharge port;
f. axially movable seal strip means carried by and end face of the inner body for sealing engagement with the adjacent outer body end wall, said seal strip means being disposed adjacent and parallel to but radially inwardly of the hypotrochoidal peripheral surface of the inner body; and
g. an axially movable seal pin carried by said last-mentioned end wall of the outer body adjacent to each seal bar with each said seal pin having a recess for receiving an extension of the adjacent end of its associated seal bar, and spring means for urging said axially movable seal pin into sealing engagement with the adjacent portion of the end surface of the inner body extending from said disposed radially outwardly of said seal strip means and with the outer body intermediate wall being recessed adjacent to each seal pin to permit the seal pin to move axially into said sealing engagement with the end surface of the inner body.

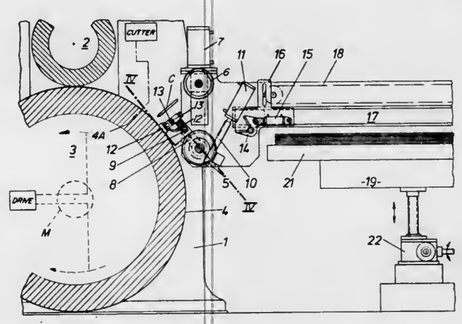
**4,018,549**
**SCREW PUMP**
**Lars Segerström, Skarholmen, Sweden, assignor to Aktiebolaget Imo-Industri, Stockholm, Sweden**
**Filed Mar. 29, 1976, Ser. No. 671,486**
**Claims priority, application Sweden, Apr. 2, 1975, 75037879**
**Int. Cl.² F04C** *17/12*
**U.S. Cl. 418—197** **2 Claims**



1. A screw pump comprising a screw unit having a drive screw and two impeller screws arranged symmetrically around the drive screw, said screws being enclosed in a housing having mutually intersecting passages for accommodating the screws, said unit being so constructed that the screws seal against each other and against the housing to form chambers in which, during rotation of the screws, liquid is carried from the suction side to the pressure side, characterized in that arranged on the pressure side in the passage accommodating one of the impeller screws is a recess which passes from the pressure side and the length of which is such that each chamber is opened at considerable differences in time in the passages of the two impeller screws.



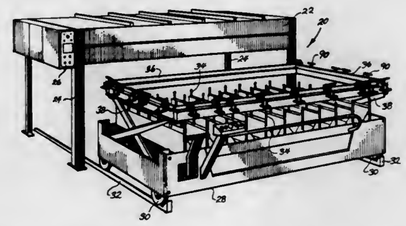
**4,018,550**
**STRIPPING AND DEPOSITING MECHANISM FOR CALENDERED SHEETS**
**Helmuth Theysohn, Weihbergstrasse 25C, 3 Hannover, Germany**
**Filed Sept. 26, 1974, Ser. No. 509,431**
**Claims priority, application Germany, Dec. 10, 1973, 2351265**
**Int. Cl.² B29C** *15/00*
**U.S. Cl. 425—363** **5 Claims**




1. Calender device for producing rubber-asbestos sheets, comprising:
a calender unit including a heatable calender roll and a counter roll, for calendering an asbestos-carrying rubber solution into a hot, calendered layer surrounding the calender roll, the calender roll having more than 1 meter circumference and the two rolls having more than 1 meter length and having axes parallel to one another;
means for cutting the layer on the heatable roll to provide a hot, calendered rubber-asbestos sheet, adhering to said roll and having more than one meter side length on all sides of the sheet;
suction means located alongside the heatable roll for engaging an edge region of the hot, calendered sheet on said roll and for stripping the engaged edge region from said heatable roll, comprising a plurality of suction cups spaced apart along a line parallel to said axes, means for moving the suction cups into locations on and longitudinally spaced along the heatable roll and, with the edge region of the hot sheet engaged thereby, away from the heatable roll;
a pair of draw-off rolls disposed adjacent to and smaller than the heatable roll, parallel to said axes for rotation to facilitate a movement of further portions of the hot sheet, away from the heatable roll regardless of adhesion of the rubber-asbestos of the sheet to said roll; and
means for effecting the movement of the further sheet portions, while the sheet is still hot, comprising draw-off grippers engageable with the stripped edge region of the hot sheet, and a gripper device for longitudinally moving the grippers, engaged with the edge region of the hot sheet, away from the heatable roll.

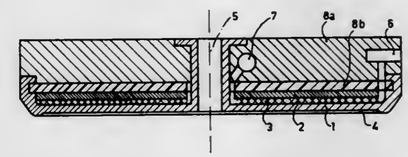
**4,018,551**
**TABLE FOR PLASTIC FORMING APPARATUS**
**Jack N. Shuman, 3330 Foxcroft Road, Charlotte, N.C. 28211**
**Filed July 28, 1975, Ser. No. 599,784**
**Int. Cl.² B29C** *17/04*
**U.S. Cl. 425—388** **13 Claims**

1. Apparatus for use in forming plastic material into predetermined configurations, said apparatus comprising a forming table including a central area having a plurality of upstanding support members arranged in a predetermined pattern spaced from one another, a selectively removable platform member formed with means for engaging the upstanding ends of predetermined ones of said support members whereby said platform member will be supported on said support members, said platform member being adapted to have mounted thereon a vacuum forming mold and including means for connecting the interior of said vacuum forming mold to a vacuum source, and



a clamping frame having selectively adjustable side elements for varying the size of said clamping frame and having clamping means for engaging the side edges of a sheet of said plastic material, said clamping frame being selectively positionable in said central area of said forming table with said adjustable side elements located between predetermined ones of said tubular support members to hold said side edges of said plastic sheet along and beneath the lowermost edges of said vacuum forming mold supported by said platform member.

**4,018,552**
**PRESSING BLOCK FOR DIE PRESSING THERMOPLASTIC MATERIAL**
**Gijsbert Prast; Andries Mijnheer, and Jan Mulder, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.**
**Filed Nov. 5, 1975, Ser. No. 629,146**
**Claims priority, application Netherlands, Nov. 27, 1974, 7415442**
**Int. Cl.² B29D** *17/00;* **B29C** *3/00*
**U.S. Cl. 425—407** **7 Claims**

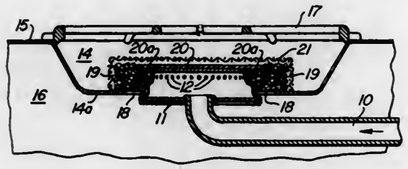


1. A pressing block for die pressing thermoplastic material, comprising
a supporting element;
a double-walled assembly, having a first wall connected to the supporting element for receiving a pressure load during pressing, and a second wall arranged to support a die for pressing, wherein said assembly comprises a thin layer of porous heat conducting material, and said first and second walls are formed by first and second thin metal sheets bonded to respective sides of the thin layer; and
means for conducting pressurized heating and cooling media to said thin layer for flow through said layer.

## 4,018,553
## CATALYTIC FLAME-TYPE GAS BURNER ASSEMBLY AND METHOD OF BURNING GAS

**Nathaniel R. Baker, Los Angeles, Calif., and Frank E. Lynch, Littleton, Colo., assignors to Mountain Fuel Supply Company, Salt Lake City, Utah**

**Filed May 27, 1975, Ser. No. 581,033**
**Int. Cl.² F23D** *13/14*
**U.S. Cl. 431—7** **12 Claims**

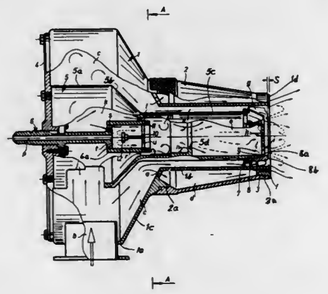


1. A catalytic, flame-type, gas burner assembly, comprising a flame-type gas burner having a burner head adapted to be connected to a source of fuel gas and one or more gas burner jet orifices in said head; a mass of surface-exposed steel wool contiguous to said head as a catalyst and covering each of said gas jet orifices with a sufficient quantity of the surface-exposed steel wool to significantly reduce formation of nitrogen oxides during combustion of the fuel gas; and draft airflow passages leading into and out of the mass of steel wool to provide flow of combustion air through said mass during burning of the fuel gas therein.

## 4,018,554
## METHOD OF AND APPARATUS FOR THE COMBUSTION OF LIQUID FUELS

**Constantin Teodorescu, and Corneliu Vlădut Costache, both of Bucharest, Romania, assignors to Institutul Pentru Creatie Stintifica si Tehnica-Increst, Bucharest, Romania**

**Filed Jan. 14, 1976, Ser. No. 648,872**
**Claims priority, application Romania, Mar. 19, 1975, 81712**
**Int. Cl.² B05B** *7/04, 7/10;* **F23D** *7/00*
**U.S. Cl. 431—9** **10 Claims**

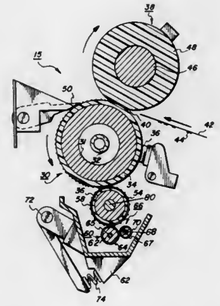


1. A method of burning a high-viscosity low-grade liquid fuel comprising the steps of:
   a. directing a stream of the liquid fuel against a first impingement baffle in an impact chamber to produce rebounding fuel particles;
   b. mixing air with said particles within said chamber to form a fuel-air mixture;
   c. passing said fuel-air mixture around said impingement baffle and along an internal wall of said chamber while preventing deposition of fuel thereon by conducting an annular stream of air along said wall to discharge the fuel-air mixture axially from said chamber;
   d. passing said fuel-air mixture and a further annular stream of air axially away from said chamber while intercepting same in succession with a pair of axially spaced inwardly directed annular steps thereby turbulently mixing said further air and said fuel-air mixture to produce a high velocity fuel-air flow;
   e. introducing said fuel-air flow axially into an expansion chamber and directing the same against a second impingement baffle to further pulverize the fuel in said fuel-air flow, and discharge the same axially from said expansion chamber;
   f. directing a helically flowing stream of air axially beyond the expansion chamber and directly around the fuel-air flow discharged therefrom to mix said helically flowing stream with said fuel-air flow; and
   g. controlling the flame front and frame formed upon ignition of the mixture of fuel and air resulting from step (f) by diverting still another axial air stream outwardly around said helically flowing stream.

## 4,018,555
## CLEANING APPARATUS FOR ROLL FUSER

**Raghulinga R. Thettu, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

**Filed Sept. 24, 1975, Ser. No. 616,454**
**Int. Cl.² F27D** *23/00*
**U.S. Cl. 432—75** **6 Claims**



1. Fuser apparatus for fixing toner images to substrate material, said apparatus comprising:
   a pair of nip-forming members between which said substrate material moves with said toner images contacting a heated one of said nip-forming members;
   means for elevating the surface temperature of said heated member to thereby render said toner images tacky;
   cleaning means for removing contaminants from the surface of said heated member;
   a combination mixing and tacky material supply member supported for contact with said cleaning means to thereby effect thorough mixing of contaminants with tacky material, said tacky material comprising a polymeric material which is tacky at the operating temperature of said fuser apparatus; and
   a smoothing member operatively engaging said combination mixing and supply member for maintaining a substantially uniform surface on said mixing and supply member; said smoothing member comprising an adhesive surface.

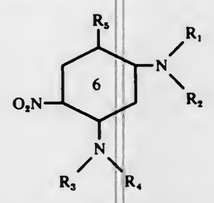


## 4,018,556
## HAIR DYE COMPOUNDS

**Gregoire Kalopissis, Paris, and Andree Bugaut, Boulogne-sur-Seine, both of France, assignors to Societe Anonyme dite: L'Oreal, Paris, France**

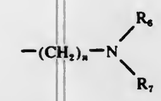
**Continuation-in-part of Ser. No. 550,583, Feb. 18, 1975, which is a division of Ser. No. 70,480, Sept. 8, 1970, Pat. No. 3,904,690, which is a continuation-in-part of Ser. No. 598,179, Dec. 1, 1966, Pat. No. 3,560,136. This application Aug. 11, 1975, Ser. No. 603,583**
**Claims priority, application Luxembourg, Dec. 3, 1965, 49990; Apr. 13, 1966, 50894; Oct. 19, 1966, 52201**
**Int. Cl.² C07D** *295/06*
**U.S. Cl. 8—10.1** **9 Claims**

1. A water soluble compound having the formula



(I)

in which $R_1$, $R_2$, $R_3$, $R_4$ are selected from the group consisting of hydrogen, lower alkyl having 1–4 carbon atoms and only one of $R_1$, $R_2$, $R_3$ or $R_4$ is an extra nuclear amino group having the formula:



in which $R_6$ and $R_7$ together with the N atom form morpholino and piperdino groups, $n$ represents a number between 2 and 6, and $R_5$ is selected from the group consisting of hydrogen, lower alkyl having 1–4 carbon atoms halogen and lower alkoxy having 1–4 carbon atoms and quaternary ammonium salts of said compound obtained by quaternization of the tertiary extra nuclear amino group.

7. Hair dye compositions which contain a hair coloring amount of the composition of claim 1.

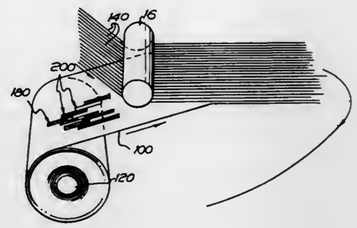
9. The process of dyeing live human hair with the composition of claim 7.

## 4,018,557
## METHOD FOR TRANSFER COLOR PRINTING

**Richard Donovan Glover, Ings Mills, Dale St., Ossett, Yorkshire, England**

**Division of Ser. No. 422,093, Dec. 5, 1973, abandoned. This application July 2, 1975, Ser. No. 592,552**
**Claims priority, application United Kingdom, Dec. 6, 1972, 56189/72; Dec. 12, 1972, 57304/72; Dec. 12, 1972, 57306/72**
**Int. Cl.² D06P** *7/00;* **B41M** *5/26*
**U.S. Cl. 8—1 XB** **3 Claims**

1. A method of making a patterned pile fabric from yarns having an affinity for sublimatic dyestuffs, comprising the steps of
   1. depositing the sublimatic dyestuffs in parallel strips on a transfer sheet whereby each deposited strip is located in relation to the other strips on the transfer sheet in accordance with the pattern to be produced in the pile fabric and has a length equal to or a whole number of times a modular length corresponding to the height of the pile of the fabric,
   2. disposing the yarns in parallel relation at a dyeing station to cause the yarns to register with the parallel strips on the transfer sheet,
   3. heating the transfer sheet to cause the dyestuffs to sublimate at the dyeing station, and



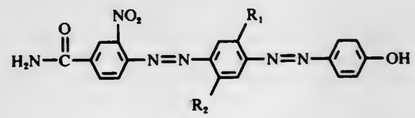
   4. producing a differential pressure to draw the sublimated dyestuffs into and around the yarns to effect an even dyeing of the yarns.

## 4,018,558
## EXHAUST PROCESS FOR THE DYEING OF SYNTHETIC ORGANIC TEXTILE MATERIAL IN NAVY BLUE TO BLACK SHADES

**Hans Wilhelm Liechti, Oberwil, and Raymond Défago, Riehen, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

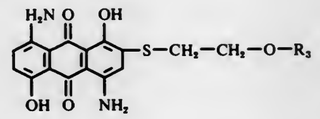
**Division of Ser. No. 467,044, May 6, 1974, Pat. No. 3,972,676. This application Apr. 9, 1976, Ser. No. 675,386**
**Claims priority, application Switzerland, May 9, 1973, 6539/73; Mar. 23, 1974, 4360/74**
**Int. Cl.² C09B** *27/00, 45/48*
**U.S. Cl. 8—26** **12 Claims**

1. A process for dyeing synthetic organic textile material in navy blue to black shades, by the exhaust process, from halogenated hydrocarbons, which process comprises the use of at least one diazo dyestuff of formula Ib



(Ib)

wherein
   $R_1$ is hydrogen, or an alkyl or alkoxy radical having 1 to 4 carbon atoms, and
   $R_2$ is hydrogen, or an alkyl or alkoxy radical having 1 to 4 carbon atoms or trifluoromethyl,
in admixture with the anthraquinone dyestuff mixture of formula III



(III)

wherein $R_3$ represents a mixture of H and $-CH_2-CH_2-S-CH_2-CH_2-OH$.

## 4,018,559
## NON-REWET LEATHER AND METHOD OF PRODUCING SAME

**Clinton E. Retzsch, Morris Township, N.J., assignor to Diamond Shamrock Corporation, Cleveland, Ohio**

**Continuation-in-part of Ser. No. 479,131, June 14, 1974, abandoned. This application May 5, 1975, Ser. No. 574,634**
**Int. Cl.² C14C** *5/00, 3/18*
**U.S. Cl. 8—94.2** **8 Claims**

1. In a method of treating chrome tanned leather stock

which includes the step of treating said leather stock with a polymeric phosphate ester wherein said polymeric phosphate ester is a composition comprising an alkyl phenol polyphenol condensate which has been alkoxylated and phosphated, and in which

A. The alkyl moiety of the alkyl phenol is selected from amongst saturated $C_6$ to $C_{18}$ alkyls which are either linear or branched chain,

B. the phenol moiety of the alkyl phenol is selected from at least one of the group consisting of phenols and substituted phenols,

C. the polyphenol is selected from at least one of a group consisting of polyphenols and substituted polyphenols, having from 2 to 15 benzene rings per molecule,

D. the alkyl phenol and polyphenol are joined by an aldehyde, substituted aldehyde, or aldehyde liberating composition selected from at least one of the group consisting of aldehydes, substituted aldehydes, and aldehyde liberating compounds,

E. the alkoxylating agent is selected from at least one of the group consisting of ethylene oxide, propylene oxide, butylene oxide and isobutylene oxide, and

F. the phosphating agent is selected from at least one of a group consisting of polyphosphoric acid, phosphoric acid, phosphorous pentoxide, pyrophosphoric acid, phosphorous acid, phospholeum and phosphorous oxychloride, further characterized in that the total number of benzene rings contained in one molecule of the condensate is between 3 and 16 wherein said solvent treatment procedure comprises immersing said leather stock in a solvent selected from the group consisting of chloroform, perchlorethylene, n-Hexane, Ethyl alcohol, Ethylether, Acetone, Methyl ethyl ketone, Stoddard Solvent, Petroleum ether.

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**4,018,560**

## DIALKYL ALKYL AND CYCLIC PHOSPHORAMIDOMETHYL PHOSPHONATES

**Peter Golborn, Skelmersdale, England, and James J. Duffy, Buffalo, N.Y., assignors to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.**

**Continuation of Ser. No. 438,481, Jan. 31, 1974, abandoned, which is a continuation-in-part of Ser. No. 239,799, March 30, 1972, Pat. No. 3,812,218. This application Oct. 1, 1975, Ser. No. 618,720**

**Int. Cl.² D06M *13/34***

**U.S. Cl. 8—190** **19 Claims**

1. A process for rendering textiles flame retardant which comprises applying to said textile a flame retardant amount of a compound of the formula

$$(R)_m\ PNHCH_2P(OR')_2$$

wherein R' is phenyl, lower alkenyl and halogen substituted and unsubstituted lower alkyl of 1–6 carbon atoms, *m* is an integer from 1–2 wherein when *m* is 2, R is alkoxy of 1–8 carbon atoms and when *m* is 1, R is alkylene dioxy of 2–8 carbon atoms.

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**4,018,561**

## APPARATUS FOR EXTRACTION OF POLONIUM - 210 FROM IRRADIATED BISMUTH USING MOLTEN CAUSTIC

**Dan H. Siemens, Jr., and Earl J. Wheelwright, both of Richland, Wash., assignors to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.**

**Filed Feb. 26, 1975, Ser. No. 553,241**

**Int. Cl.² B01D *11/04*; C01G *57/00***

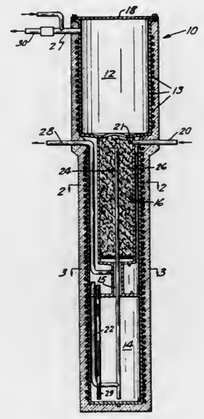
**U.S. Cl. 23—267 R** **3 Claims**

1. An extraction apparatus for removing polonium-210 from irradiated bismuth by extraction into molten caustic consisting of a self-supporting unitary hollow body containing vertically superimposed compartments comprising:

an upper melting chamber suitable for melting solid irradiated bismuth;

an intermediate extraction chamber suitable for containing molten caustic communicating with said melting chamber at its upper end, the lower end of said extraction chamber having an outlet of restricted cross-section facilitate separation of molten bismuth from molten caustic;

a lower reservoir chamber connected at its upper end to the outlet of said intermediate extraction chamber for containing molten bismuth;



heating elements surrounding said body to heat said compartments to temperatures sufficient to maintain said caustic and bismuth in molten condition;

pump means and associated distribution means contained within said hollow body for moving said molten bismuth from said reservoir chamber to a discharge point at the upper end of said extraction chamber and to permit molten bismuth to pass downwardly through molten caustic in said extraction chamber in drop-wise form;

means for excluding oxygen from and producing an inert atmosphere within said apparatus; and

means for removing the polonium-carrying molten caustic from said extraction chamber.

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**4,018,562**

## CHEMILUMINESCENT NITROGEN DETECTION APPARATUS AND METHOD

**Robert E. Parks, Houston, and Robert L. Marietta, Richmond, both of Tex., assignors to Antek Instruments, Inc., Houston, Tex.**

**Filed Oct. 24, 1975, Ser. No. 625,510**

**Int. Cl.² G01N *21/24, 31/12, 31/08***

**U.S. Cl. 23—230 PC** **10 Claims**

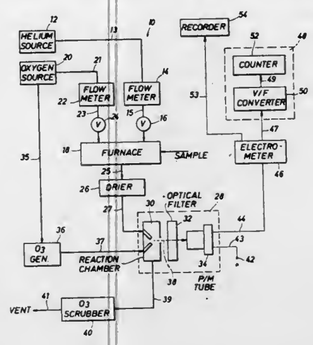
1. The method for determining the total chemically combined nitrogen content of a sample comprising the steps:

a. decomposing said sample in one step in the presence of an oxygen-rich atmosphere of oxygen and an inert gas and at a temperature sufficiently above 700° C. that substantially all of the chemically bound nitrogen is recovered as nitric oxide (NO), such decomposition being conducted in the absence of a catalyst,

b. causing the nitric oxide produced by such decomposition to undergo a chemiluminescent reaction with ozone, and



c. determining the magnitude of the chemiluminescent




reaction to indicate the quantity of chemically combined nitrogen in said sample.

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**4,018,563**

## ANALYSIS OF LOW ION CONTENTS

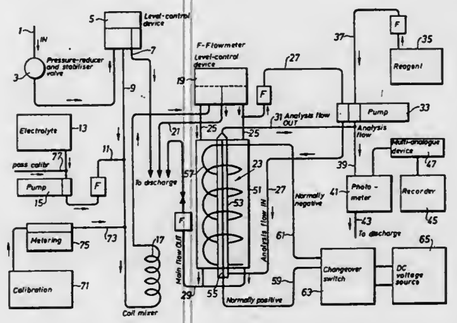
**Nils Rune Lundqwist, and Gustav Lennart Dahl, both of Nykoping, Sweden, assignors to Aktiebolaget Atomenergi, Stockholm, Sweden**

**Filed Aug. 15, 1975, Ser. No. 605,003**

**Claims priority, application Sweden, Aug. 21, 1974, 74106535**

**Int. Cl.² G01N *31/22, 33/18*; C25B *1/24***

**U.S. Cl. 23—230 R** **21 Claims**




1. A method of analyzing a solution having low contents of halogenide ions selected from the group consisting of chloride, bromide, and iodide ions to determine the halogenide ion content thereof which comprises (a) extracting a constant test solution flow from the solution to be analyzed; (b) dividing said test solution flow into an analysis flow and a main flow; (c) passing said analysis flow and said main flow over respective sides of an electrodialysis diaphragm; (d) electrolyzing said analysis flow and said main flow to obtain an analysis flow with a halogenide ion concentration higher than that prior to electrodialysis and to convert said halogenide ions in said electrodialyzed analysis flow into elementary halogen, and to obtain a main flow with a halogenide ion concentration lower than that prior to electrodialysis; and then (e) photometrically analyzing the electrodialyzed analysis flow thus obtained to determine its elementary halogen content.

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**4,018,564**

## SILICONE COMPOSITION FOR ANALYZING BLOOD SAMPLES

**John H. Wright, Clifton Park, N.Y., assignor to General Electric Company, Waterford, N.Y.**

**Filed Nov. 24, 1975, Ser. No. 634,563**

**Int. Cl.² C07F *7/18*; G01N *33/16***

**U.S. Cl. 23—230 B** **14 Claims**

8. A method for analyzing a blood sample composed of blood serum and blood clots in part comprising adding to said blood sample a small but effective amount of blood-separating composition having controlled rheological properties and a specific gravity that varies from 1.035 to 1.06 wherein said composition comprises (a) 100 parts by weight of a diorganopolysiloxane and blends of such diorganopolysiloxanes which are compatible with each other of a viscosity varying from 10,000 to 500,000 centipoise at 25° C where the organo groups are selected from the group consisting of methyl, phenyl, chlorophenyl and mixtures thereof; (b) from 3 to 50 parts by weight of a filler selected from the group consisting of a fumed silica and fumed silica treated with a silicone compound wherein the amount of treated fumed silica varies from 0 to 100% by weight of the total silica present; and (c) from 0.05 to 3 parts by weight of a stablizing compound of the formula,

$$R'O\ (C_aH_{2a}O)_x(C_bH_{2b}O)_yH$$

where R' is a member selected from the group consisting of hydrogen and lower alkyl radicals having from 1 to 7 carbon atoms, *a* and *b* are integers equal to from 1 to 4 inclusive, *x* is an integer equal to from about 4 to 5 or more and *y* is a whole number equal to from 0 to 50; and centrifuging the blood sample and said blood-separating composition to separate said blood serum from said blood clots with said blood-separating composition forming an integral barrier between said blood clots and said blood serum.

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**4,018,565**

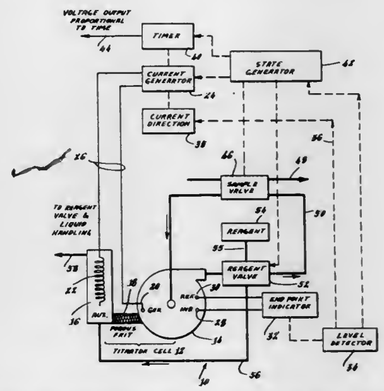
## AUTOMATIC PROCESS TITRATION SYSTEM

**Kenneth S. Fletcher, III, Norfolk; William E. Earle, North Easton, and Jay M. Weiner, Foxboro, all of Mass., assignors to The Foxboro Company, Foxboro, Mass.**

**Filed Oct. 17, 1975, Ser. No. 623,381**

**Int. Cl.² G01N *31/16, 27/44***

**U.S. Cl. 23—253 R** **27 Claims**




1. An automatic process titration system for measuring the concentration of a process stream comprising:

a titration cell having two compartments separated by a porous membrane,

one of the titration cell compartments being a working compartment including an electrode means for generating titrant electrolytically,

means for detecting a titration endpoint operatively associated with the working compartment,

the other of the compartments being an auxiliary compartment including an electrode coupled to the generating electrode means for enabling the electrogeneration of titrant,

positionable sample valve means for obtaining a sample of the process stream,

the sample valve means having at least two operative positions and being located in relation to the process stream so as to permit process stream flow therethrough in one position and injection of a predetermined amount of sample from the process stream into the titration cell in its other position,

positionable reagent valve means for introducing reagent for generating titrant to the titration cell,

the reagent valve means having at least two operative positions and being located in relation to the titration cell so as to permit working compartment contents flow therethrough in one position and introduction of reagent to the titration cell in its other position,

the sample valve means, reagent valve means and titration cell being interconnected to form a cell loop means for the flow of titration constituents therethrough,

current source means for providing current to the titrant generating electrodes,

fluid circulating means for circulating titration constituents,

valve operating means for positioning the sample and reagent valve means, and

state generator means operatively connected to the current source means, and to the valve operating means for actuating them in a preset sequence for achieving a titration cycle.

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**4,018,566**

## LIGHT RESPONSIVE MEASURING DEVICE FOR HEATER CONTROL

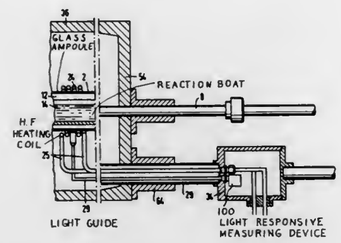
**Klaus Zeuch, Eckental, and Josef Stadter, Erlangen, both of Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany**

**Filed Mar. 17, 1975, Ser. No. 559,016**

**Claims priority, application Germany, Mar. 27, 1974, 2414856**

**Int. Cl.² B01J** *17/08, 17/06*

**U.S. Cl. 23—273 SP** **6 Claims**




1. In an apparatus for the preparation of a semiconductor compound, in particular gallium phosphide, said apparatus including an elongated reaction tube having a longitudinal axis containing a reaction boat, in which reaction tube the components of the compound are arranged, with said reaction tube disposed with its longitudinal axis horizontal in a horizontal system along with a heating device including an oven surrounding said tube and an inductive high frequency heater, the reaction tube and heating device arranged within an enclosed pressurized vessel, with the heating device and reaction vessel movable relative to each other, the improvement comprising:

a. means for maintaining the reaction tube stationary;

b. means supporting the heating device for horizontal movement with respect to the stationary tube in the direction of the longitudinal axis of said tube;

c. means for moving said heating device; and

d. means for measuring the temperature at said reaction boat comprising a light guide having its free end arranged near said reaction tube below the reaction boat said light guide being mounted to said heating device for movement therewith.

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**4,018,567**

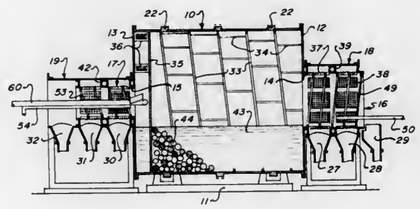
## APPARATUS FOR SEPARATING THE CONSTITUENTS OF LEAD-ACID STORAGE BATTERIES

**Albert E. La Point, Socorro, N. Mex., assignor to James P. La Point, Jr., Torrance, Calif.**

**Division of Ser. No. 359,732, May 14, 1973, Pat. No. 3,892,563. This application Mar. 31, 1975, Ser. No. 563,648**

**Int. Cl.² H01M** *6/52*; **B02C** *15/00*; **B01J** *2/12*

**U.S. Cl. 23—285** **9 Claims**



1. Apparatus for separating the constituents of lead-acid storage batteries of the type having at least grid plates of antimonial lead, active material consisting of lead, lead oxide, and lead sulfate, and battery case and separators of organic material comprising:

a. a rotatable cylindrical drum having first and second end plates each provided with a circular opening therein;

b. a quantity of grinding balls within said drum;

c. means for feeding the batteries, together with a predetermined quantity of sodium carbonate and water into the drum through the opening in said first end plate;

d. means for rotating the drum, thereby:

1. fragmentizing the batteries by impact with said grinding balls;

2. agitating the water to form with the finer particles of active material a heavy medium suspension of sufficient density to float the organic material and to permit the remaining battery fragments including grid plates to sink; and

3. transposing the finer particles of lead sulfate into lead carbonate;

e. means for removing said organic material and a fraction of said suspension through the opening in said first end plate;

f. first screen means fixed externally to the drum in cooperative engagement with the opening in said first end plate for receiving said organic material and suspension fraction, said first screen means being adapted to retain said organic material and pass the suspension fraction therethrough;

g. means for segregating said sinkable fragments toward the second end plate;

h. means for segregating said sinkable fragments into smaller and larger fragments comprising a baffle fixed adjacent said second end of said drum;

i. means for discharging said smaller sinkable fragments through the opening in said second end plate; and

j. second screen means fixed externally to the drum in cooperative engagement with the opening in said second end plate for receiving said smaller sinkable fragments, said second screen means being adapted to retain said smaller sinkable fragments and pass any fine particles of active material therethrough.



**4,018,568**

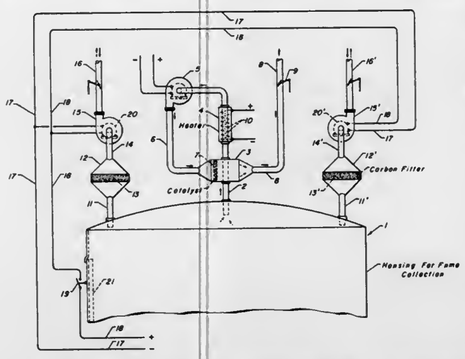
## FUME ABSORBING-TREATING SYSTEM

**Gerald L. Brewer, Rowayton, Conn., assignor to UOP Inc., Des Plaines, Ill.**

**Filed Feb. 9, 1976, Ser. No. 656,673**

**Int. Cl.² B01J** *8/02*; **F23G** *7/06*

**U.S. Cl. 23—288 F** **4 Claims**




1. A fume elimination and venting system for enclosures generating burnable and absorbable noxious fumes which will provide for additional venting for controlled periods of time, which comprises in combination:

a. at least one blower operated first venting means from the fume generating enclosure connecting with a fume incinerating means to provide for the withdrawal and passage of vented fumes into contact with fume oxidizing means and the subsequent discharge of treated fumes and gases from the system,

b. additional vent means from said enclosure in interconnection with at least one fume absorption section containing a gas pervious absorptive media and opening to external ambient air,

c. auxiliary blower means in interconnection with said additional vent means and the absorption section providing for powered operated fume flow outwardly through the absorptive media and the resulting maintenance of a low level of residual noxious fumes within said enclosure for controlled periods of time, and

d. switch control means to cut on and off the auxiliary blower means for said additional vent means and for effecting the stoppage of the outward flow through the absorptive media and the auxiliary blower means whereby with a continuing venting through said first venting means and fume oxidizing means there is an inward flow of ambient air and a resulting desorption of fumes from the absorptive media.

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**4,018,569**

## METAL OF IMPROVED ENVIRONMENTAL RESISTANCE

**David R. Chang, Cincinnati, Ohio, assignor to General Electric Company, Cincinnati, Ohio**

**Division of Ser. No. 549,769, Feb. 13, 1975, Pat. No. 3,976,436. This application Feb. 18, 1976, Ser. No. 659,045**

**Int. Cl.² B32B** *15/00, 15/18*; **C22C** *19/00, 38/06*

**U.S. Cl. 428—678** **5 Claims**

1. An alloy of improved environmental resistance consisting essentially of, by weight, 8–30% Al, 0.1–10% Hf, 0.5–20% of an element selected from the group consisting of Pt, Rh and Pd, up to 3% Y and the balance an element selected from the group consisting of Fe, Co and Ni.

**4,018,570**

## COMPOSITE OF A METALLIC MATERIAL AND VULCANIZED RUBBER

**Yuzuru Nakamoto, Kodaira; Eishi Kubota, Kokubunji, and Fukushi Suzuki, Kodaira, all of Japan, assignors to Bridgestone Tire Company Limited, Tokyo, Japan**

**Division of Ser. No. 447,631, March 4, 1974, Pat. No. 3,961,740. This application Jan. 30, 1976, Ser. No. 653,775**

**Claims priority, application Japan, Mar. 12, 1973, 48-27925**

**Int. Cl.² B32B** *15/06*

**U.S. Cl. 152—359** **4 Claims**

1. A composite product which is a metallic base and a vulcanized rubber with an intermediate adhesive layer which is a tertiary alloy containing from 59 to 73% by weight copper, 23 to 34% by weight zinc, and 2 to 13% by weight tin.

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**4,018,571**

## TREATMENT OF SOLID FUELS

**Edward L. Cole, Fishkill, and Howard V. Hess, Glenham, both of N.Y., assignors to Texaco Inc., New York, N.Y.**

**Filed Feb. 20, 1975, Ser. No. 551,486**

**Int. Cl.² C10L** *9/00, 5/14*

**U.S. Cl. 44—1 R** **11 Claims**

1. A process for upgrading a low rank solid fuel which comprises forming a slurry of said fuel with water, heating the slurry under super atmospheric pressure to a temperature between about 300° F. and the critical temperature of water, cooling the heated slurry, mixing with the slurry a hydrocarbon liquid in an amount between about 4 and 5 parts by weight fuel per part liquid thereby forming solid fuel-hydrocarbon agglomerates and separating said agglomerates from said water.

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**4,018,572**

## DESULFURIZATION OF FOSSIL FUELS

**Rollan Swanson, 220 California Ave., Santa Monica, Calif. 90403**

**Filed June 23, 1975, Ser. No. 589,412**

**Int. Cl.² C10L** *9/10*; **C10G** *19/00*

**U.S. Cl. 44—1 R** **11 Claims**

1. A process for desulfurizing a fuel of the group of coal, tar sands, (flue gases produced by the combustion thereof) and natural gases, which comprises reacting said fuel prior to combustion thereof with at least one non-volatile, unsaturated sulfur compound of an alkali metal of the group of sodium, potassium, rubidium and cesium or with a hydrogen polysulfide at a temperature sufficient to form a corresponding polysulfide to higher sulfur content than said unsaturated compound, and separating a fuel of reduced sulfur content from said polysulfide.

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**4,018,573**

## REACTOR FOR THE CATALYTIC CONVERSION OF HYDROCARBONS WITH A GAS CONTAINING OXYGEN TO FORM A FUEL GAS

**Hellmuth Mentschel, Erlangen, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany**

**Filed June 23, 1975, Ser. No. 589,001**

**Claims priority, application Germany, June 28, 1974, 2431207; May 15, 1975, 2521730**

**Int. Cl.² B01J** *8/02*; **C01B** *2/16*; **F02B** *43/08*

**U.S. Cl. 48—107** **5 Claims**

1. In a reactor for the generation of a gas by the catalytic conversion of hydrocarbons with a gas containing oxygen at elevated temperatures, said reactor having a reaction chamber filled with a catalyst charge with an inlet for raw materials and an outlet for the product gas, the improvement comprising:

a. a closed housing for said reactor;

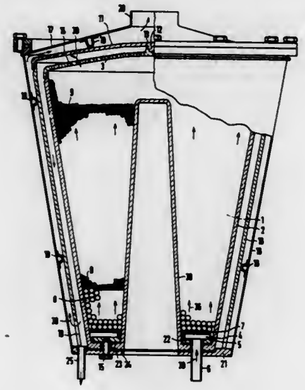
b. an enclosed intermediate wall disposed within said housing and spaced therefrom so as to form a first space between itself and said housing, said intermediate wall

being made of a non-metallic, heat resistant material which will not catalyze the formation of undesired reaction products;

c. an enclosed inner wall disposed within said intermediate wall and spaced therefrom with a second space formed between said intermediate wall and said inner wall, said inner wall defining the reaction chamber, said inner wall also being of a non-metallic, heat resistant material which will not catalyze the formation of undesired reaction products;

d. means for coupling the inlet for raw materials directly into one end of said reaction chamber and;

e. at least one first opening in said intermediate wall at the portion thereof closest to said one end of said reaction chamber so as to permit said first and second spaces on opposite sides thereof to be in communication with each other;



f. means for coupling the outlet for the gas to said first space;

g. at least one second opening in said inner wall permitting communication between said reaction chamber and said second space at the other end of said reaction chamber, whereby raw materials will flow through said reaction chamber and product gas will flow out of said second opening into said second space, through said second space to said first opening and then to said first space, after which it will flow to said outlet for the product gas whereby the flow of said product gas exiting said reaction chamber along said inner wall will be in a heat exchanging relationship with the raw material gas flowing through said chamber to aid in the reaction, with said product gas being cooled at the same time.

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**4,018,574**

**PROCESS FOR THE MANUFACTURE OF ENDLESS COATED ABRASIVE ARTICLES**

**Hugh N. Dyer, Loundonville, N.Y., assignor to Norton Compay, Worcester, Mass.**

**Filed Dec. 16, 1970, Ser. No. 98,796**
**Int. Cl.² B24D** *11/02, 11/06*
**U.S. Cl. 51—295** **4 Claims**

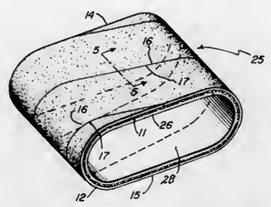
1. Process for the manufacture of an endless coated abrasive article comprising the following steps:

a. cutting a coated abrasive material at a first location along the longitudinal edge at an angle to the length direction thereof such that the length of the cut edge is equal to the circumference of the article to be fabricated.

b. cutting said material at a second location along said longitudinal edge and at a predetermined distance from said first location so as to provide a second cut edge parallel to said first cut edge thereby forming a strip of abrasive material having the shape of a parallelogram;

c. winding said strip of abrasive into a spiral comprising a plurality of coils having the abrasive surface on the outside of said coils whereby said longitudinal edge is in abutting engagement with the other longitudinal edge of the parallelogram, said spiralled abrasive strip having an inner and outer periphery;

d. rotating said spiralled abrasive strip about its own axis while said strip is rotating



e. applying to said inner periphery smooth, uniformly thick, a resinous composition whereby said composition forms a continuous layer on the inner periphery of the coiled strip of abrasive material; and

f. curing said resinous composition thereby providing an endless coated abrasive article of unitary construction and of greater width than said strip of abrasive material.

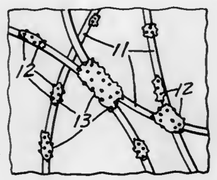
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**4,018,575**

**LOW DENSITY ABRASIVE ARTICLE**

**John E. Davis, Maplewood, and Thomas R. McAvoy, Stillwater, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

**Filed Mar. 18, 1974, Ser. No. 451,995**
**Int. Cl.² B24D** *11/02*
**U.S. Cl. 51—295** **9 Claims**



1. A low-density abrasive article, especially suited for scouring steel griddle surfaces without causing undesirable surface roughness thereto, comprising in combination:

1. a lofty, open, low-density, fibrous web having a void volume of 92 to 98% and being formed of a multitude of curved substantially continuous filament bundles disposed in substantially parallel planes one on another to form a web on the order of 2 to 10 mm thick, said filament bundles being about 150–250 denier and being comprised of a plurality of minute flexible glass filaments;

2. a relatively soft resinous prebonding composition having a Knoop hardness value no greater than about 4 thoroughly impregnating the glass filament bundles sufficient to bond them together at their points of intersection and form a prebonding interface between a hard thermoset resin and said glass filament bundles;

3. dispersed throughout said web and securely adhered to the exposed surface of said filament bundles, abrasive particles having an average particle size in the range of 40 to 250 microns;

4. a hard thermoset resin having a Knoop hardness value of at least 15 dispersed throughout and adhered to the filaments and abrasive particles.

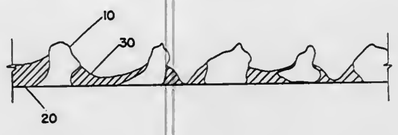


**4,018,576**

**DIAMOND ABRASIVE TOOL**

**James T. Lowder, and Edwin M. Tausch, both of Worthington, Ohio, assignors to Abrasive Technology, Inc., Columbus, Ohio**

**Division of Ser. No. 388,131, Aug. 14, 1973, Pat. No. 3,894,673, which is a continuation-in-part of Ser. No. 195,705, Nov. 4, 1971, abandoned, and Ser. No. 387,943, Aug. 13, 1973, abandoned, which is a division of Ser. No. 195,705,.**
**This application May 8, 1975, Ser. No. 575,715**
**Int. Cl.² B24D** *3/06;* **C04B** *31/16*
**U.S. Cl. 51—309 R** **4 Claims**



1. A diamond abrasive tool comprising, in combination, a metal substrate and a monolayer of diamond crystals bonded on said substrate by a braze alloy comprising approximately 60 to 92 percent by weight of one of the metals selected from the group consisting of nickel and cobalt or mixtures thereof and no more than approximately 12 percent of one or more of the elements selected from the group consisting of boron, silicon and phosphorous and a chromium content between at least approximately 2 to approximately 30 percent by weight, said tool characterized by a configuration wherein the braze alloy bond has its minimum depth at a point intermediate adjacent crystals.

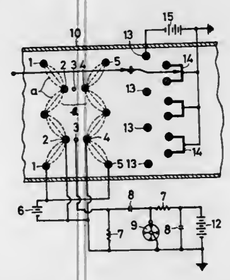
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**4,018,577**

**PARTICLE CHARGING DEVICE FOR USE IN AN ELECTRIC DUST COLLECTING APPARATUS**

**Akira Shibuya, Koganei, and Yoshifumi Nitta, Yokohama, both of Japan, assignors to Ishikawajima-Harima Jukogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Apr. 15, 1974, Ser. No. 460,762**
**Claims priority, application Japan, Apr. 23, 1973, 48-45065**
**Int. Cl.² B03C** *3/38*
**U.S. Cl. 55—137** **2 Claims**



1. An electrical dust collecting apparatus comprising:

a housing including a gas inlet at one end for receiving a dust containing gas, and a gas outlet at an end of said housing remote from said inlet;

a charging section positioned in said housing adjacent said one end for electrically charging dust particles entering said inlet, said charging section comprising a plurality of spaced ion generating electrodes positioned in said housing to extend across the flow path of gas through said housing, a plurality of pairs of opposite electrodes positioned in said housing to extend across the flow path of gas through said housing such that each ion generating electrode is positioned intermediate a pair of said opposite electrodes, said opposite electrodes spaced from said ion generating electrodes, a plurality of transfer electrodes positioned in said housing to extend across the flow path of gas through said housing in alternately spaced relationship to said opposite and ion generating electrodes with a first row of transfer electrodes positioned in spaced relationship on the inlet side of said opposite electrodes and a second row of transfer electrodes positioned in spaced relationship on the outlet side of said opposite electrodes, power supply means coupled to said ion generating electrodes to ionize gas between said ion generating electrodes and said opposite electrodes, and additional power supply means coupled between said opposite electrodes and said transfer electrodes for establishing an electric field between said opposite electrodes and said transfer electrodes to attract ions toward said transfer electrodes; and

a collecting section positioned in said housing for collecting dust particles electrically charged in said charging section, said collecting section positioned between said charging section and said outlet and including a plurality of spaced field forming electrodes positioned in said housing to extend across the flow path of gas through said housing, a plurality of spaced collector electrodes positioned in said housing on a side of said field forming electrodes spaced toward said outlet, and further power supply means coupled between said field forming electrodes and said collector electrodes for establishing an electrical field therebetween for applying a force to electrically charged dust particles to cause said charged particles to be collected by said collector electrodes.

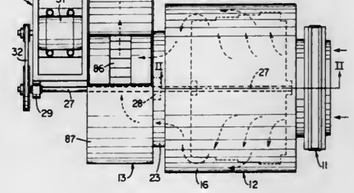
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**4,018,578**

**ELECTROSTATIC PRECIPITATOR**

**Willard K. Ahlrich, 321 N. Pine Lake Road, Stuart, Fla. 33484**

**Filed May 1, 1975, Ser. No. 573,570**
**Int. Cl.² B03C** *3/00*
**U.S. Cl. 55—138** **9 Claims**



1. In an electrostatic precipitator apparatus including housing means having inlet and outlet opening means, a precipitator member disposed in the housing means and positioned in the flow path between said inlet and outlet opening means, the precipitator member having a plurality of annular, axially spaced apart, parallel collector plates, said collector plates each having a central opening therethrough, the central openings of said collector plates being aligned to define an axially elongated gas receiving space surrounded by said plurality of collector plates, said inlet opening means being disposed adjacent one end of said plurality of collector plates and in communication with the gas receiving space whereby a particle-laden gaseous stream can be supplied into said gas receiving space and then flow outwardly through channels defined between the collector plates for discharge through said outlet opening means, an end member disposed adjacent the other end of said plurality of plates for closing the other end of said space, ionizing means disposed within said inlet opening means for ionizing the particles in the gaseous stream flowing therethrough, means for electrically insulatedly supporting alternate ones of said collector plates from the others of said collector plates, and electrical connection means for supply-

ing voltage to said alternate collector plates and said ionizing means, comprising the improvement wherein all of said collector plates have substantially equal surface areas and are substantially uniformly axially spaced apart so that electrostatic fields of substantially equal intensity are created between each adjacent pair of collector plates for removing the ionized particles from the gaseous stream as it flows outwardly through the channels defined between the collector plates, and wherein the central openings of said collector plates are of decreasing diameter as the plates extend from said one end thereof to the other end thereof so that said axially elongated gas receiving space decreases in cross-sectional area as it extends from said inlet opening means to said end member so that substantially uniform quantities of the gaseous stream flow outwardly through all of the channels.

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**4,018,579**

## APPARATUS FOR PRODUCING DRY COMPRESSED AIR

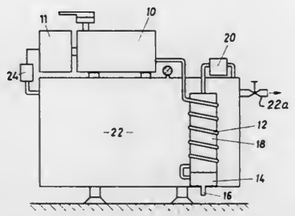
**Hans-Joachim Hofmann, Geradstetten, Germany, assignor to Durr - Dental KG, Germany**

**Filed Apr. 18, 1975, Ser. No. 569,450**

**Claims priority, application Germany, Apr. 20, 1974, 2419178; Switzerland, Apr. 10, 1975, 4548/75**

**Int. Cl.² B01D** *50/00*

**U.S. Cl. 55—213** **20 Claims**




1. Apparatus for producing dry compressed air comprising a dry compressed air storage container, means for delivering dry compressed air from said storage container to a point of use, a source of compressed air for supplying compressed air to said storage container, flow connection means connecting said source to said storage container to supply compressed air from said source to said storage container, filter means including an adsorption filter disposed in said connection means between said source and said storage container for filtering and drying the compressed air supplied from said source to said storage container, means responsive to pressure in said storage container for discontinuing the supply of compressed air from said source to said storage container when the pressure in said storage container reaches a predetermined value, a valved controlled discharge outlet in said flow connection means between said adsorption filter and said source, and control means for effecting reverse flow of air from said storage container back through said adsorption filter and said discharge outlet to the atmosphere when the supply of compressed air from said source is discontinued to regenerate said adsorption filter, said control means comprising valve means responsive to the moisture content of compressed air in said storage container to effect said reverse flow only when the moisture content of said air is also a predetermined value.

**4,018,580**

## SEPARATOR FOR SEPARATING LIQUID DROPLETS FROM A STREAM OF GAS

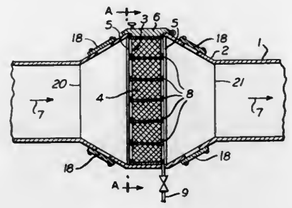
**Armin Bürkholz, Cologne, and Wolfgang Dieter Müller, Leverkusen, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany**

**Continuation-in-part of Ser. No. 341,439, March 15, 1973, abandoned. This application Sept. 16, 1974, Ser. No. 506,625**

**Claims priority, application Germany, Mar. 20, 1972, 2215679; Netherlands, Mar. 27, 1973, 7304266; Belgium, Mar. 29, 1973, 129414; France, Mar. 30, 1973, 73.11677; Japan, Mar. 27, 1973, 48-34201; United Kingdom, Mar. 28, 1973, 14861/73; Canada, Mar. 28, 1973, 167416**

**Int. Cl.² B01D** *50/00*

**U.S. Cl. 55—321** **13 Claims**




1. A separator for separating liquid droplets from a gas stream comprising:

a. a horizontally extending pipe section having a pipe inlet and a pipe outlet for passage of said gas stream therethrough, having a gauze packet disposed in the pipe section substantially vertically across the flow path through the pipe for separating of liquid from gas passing through the pipe,

b. at least one discharge channel extending across the gauze packet disposed at an intermediate level in the gauze packet for receiving the liquid separated by the gauze above the discharge channel and conveying the liquid transverse to the direction of gas flow to the side of the gauze packet, said discharge channel being inclined at an angle to the horizontal for facilitating said conveyance,

c. and a second outlet from the pipe section, said second outlet communicating with the lowermost part of the gauze packet, and being for receiving separated liquid conveyed to said side of the gauze packet and discharge of the separated liquid from the separator.

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**4,018,581**

## SOLAR HEATING SYSTEM

**John Denis Ruff, 206 Birch St., and Phillip Rood Wheeler, 209 Pine St., both of Alexandria, Va. 22305**

**Continuation-in-part of Ser. No. 533,630, Dec. 17, 1974, Pat. No. 3,960,322. This application Jan. 22, 1976, Ser. No. 651,275**

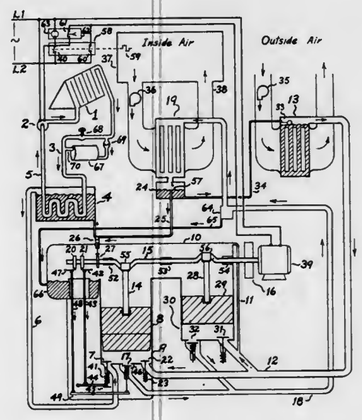
**Int. Cl.² F25B** *27/00*

**U.S. Cl. 62—2** **1 Claim**

1. In combination, means of circulating a flow of circulating liquid, and means of heating the said flow of circulating liquid by solar radiation to a sensible temperature greater than the sensible temperature of the outside heat sink, and a boiler means of causing liquid refrigerant to boil to a vapor, and means of causing the said flow of circulating liquid to heat the said boiler means, and means of introducing the said vapor into a cylinder, and the said means of introducing including a primary inlet valve, and a piston which is moved in the said cylinder by pressure from the said vapor when the said pressure is adequate to cause this movement, and means of connecting the said piston to a crankshaft so that the movement of the said piston under the influence of the said pressure causes rotation of the said crankshaft in the function of a heat engine, and means of controlling the operation of the said primary



inlet valve, and the said means of controlling being influenced by the said rotation of the said crankshaft, and the inside of a building maintained at a sensible temperature higher than the sensible temperature of the outside heat sink, and a condenser in which condensing of refrigerant vapor occurs at a sensible temperature higher than the sensible temperature of the said inside of a building, and means of exhausting the said vapor from the said cylinder to the said condenser, and means of injecting liquid refrigerant from the said condenser into the said boiler means, and an evaporator in which refrigerant liquid evaporates at a sensible temperature lower than the sensible temperature of the outside heat sink, and means of transferring heat from the outside heat sink to the said evaporator to provide latent heat of vaporization, and means of introducing liquid refrigerant into the said evaporator from the said condenser, and means of coupling the said crankshaft to drive a positive displacement compressor means of drawing refrigerant vapor from the said evaporator, and means of discharging the vapor compressed by the said positive displacement compressor means into the said condenser, and means of circulating a fluid medium to contact the said condenser so that the said fluid medium receives a heating effect from the said condenser, and means of circulating the said fluid medium to heat the said inside of a building, and an




electric motor means of driving the said crankshaft, and means of automatically controlling the said electric motor means to provide motive power to start the motion of the said function of a heat engine, and means of automatically controlling the said electric motor means to provide motive power to drive the said positive displacement compressor means when the said heating effect is required to cause heating of the said inside of a building during times when the sensible temperature in the said boiler means is too low for the said function of a heat engine to provide sufficient power to drive the said compressor means fast enough to provide the said heating effect in sufficient quantity to keep the said inside of a building heated to a pre-determined sensible temperature, and a secondary inlet valve means of conducting vapor flow from the said evaporator into the said cylinder during times when the sensible temperature of the said flow of circulating liquid is lower than the sensible temperature of the outside heat sink, and means of causing the said motor means to drive the said crankshaft during the said times when the sensible temperature in the said boiler is too low, and means of employing the said crankshaft to drive the said piston in the said cylinder in the alternate function of a compressor which assists the said positive displacement compressor means when the said motor means is driving the said crankshaft.

**4,018,582**

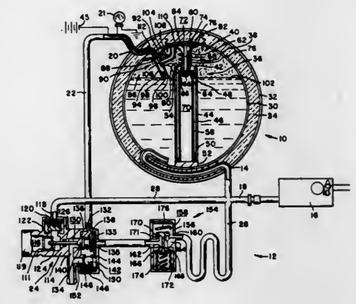
## VENT TUBE MEANS FOR A CRYOGENIC CONTAINER

**Duane E. Hinds, and Richard C. Ankney, both of Davenport, Iowa, assignors to The Bendix Corporation, South Bend, Ind.**

**Filed Mar. 29, 1976, Ser. No. 671,196**

**Int. Cl.² F17C** *7/02*

**U.S. Cl. 62—50** **11 Claims**



1. In a container means for storing a cryogenic fluid, said cryogenic fluid initially possessing a uniform temperature and density in a first stage of storage, said cryogenic fluid separating into stratified layers of cryogenic fluid each of which has a different density and temperature resulting from thermal expansion of the initial cryogenic fluid in a second stage of storage, the layer of cryogenic fluid adjacent a gravitational top of the container means having the lowest density and the highest temperature, relief means for communicating the container means to the atmosphere to minimize the loss of cryogenic fluid during said second stage of storage, said relief means comprising:

vent tube means having a first branch and a second branch for communicating cryogenic fluid through a vent port to the atmosphere, said first branch contacting said cryogenic fluid in said first stage of storage to allow communication of cryogenic fluid to the atmosphere to inform an operator of the presence of a predetermined quantity of cryogenic fluid in the container means, said layers of cryogenic fluid thermally expanding during said second stage of storage to submerge said first branch in the cryogenic fluid, said second branch extending to a position adjacent the apex of the container means to allow the layer of cryogenic fluid having the lowest density and the highest temperature to be the first communicated to the atmosphere during said thermal expansion.

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**4,018,583**

## REFRIGERATION HEAT RECOVERY SYSTEM

**Marvin M. Patnode, Georgetown, and Louis H. Leonard, Dewitt, both of N.Y., assignors to Carrier Corporation, Syracuse, N.Y.**

**Division of Ser. No. 599,518, July 28, 1975, which is a continuation-in-part of Ser. No. 523,625, Nov. 14, 1974, abandoned. This application May 24, 1976, Ser. No. 689,012**

**Int. Cl.² F25B** *15/00*, *1/00*

**U.S. Cl. 62—101** **11 Claims**

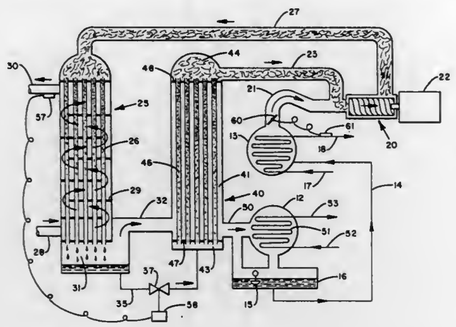
1. The method of developing a high temperature lift within the working fluid employed in a vapor compression refrigeration system wherein the suction side of the compressor is operatively connected to an evaporator including the steps of

exposing refrigerant moving from the evaporator through the compressor to a concentrated absorbent solution whereby a mixture of refrigerant vapor and solution is discharged from the compressor,

delivering the mixture discharged from the compressor into a heat exchanger, and

bringing a heat reclaiming substance into heat transfer

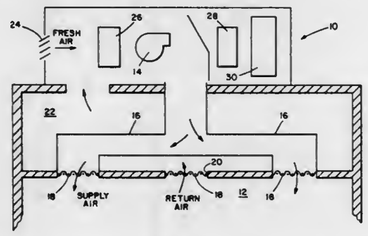
relationship with the mixture within the exchanger whereby high temperature energy developed in the mix-



ture as the concentrated solution absorbs the refrigerant vapors is transferred to the reclaiming substance.

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**4,018,584**
**AIR CONDITIONING SYSTEM HAVING LATENT AND SENSIBLE COOLING CAPABILITY**
**James Mullen, Marshalltown, Iowa, assignor to Lennox Industries, Inc., Marshalltown, Iowa**
**Filed Aug. 19, 1975, Ser. No. 605,833**
**Int. Cl.² F25B** *31/00*
**U.S. Cl. 62—175** **10 Claims**




**1.** In an air conditioning system for an enclosure of the type having evaporator means, condenser means and multiple compressor means, said enclosure defining an enclosure air temperature, an enclosure air humidity and a cooling load, said multiple compressor means having a low flow rate and at least one high flow rate, the improvement comprising, in combination:

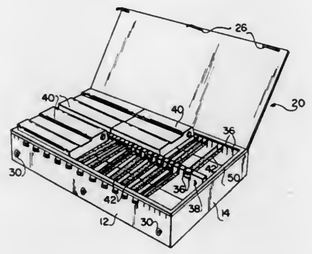
temperature means for sensing said enclosure air temperature, said temperature means defining at least one temperature threshold;

humidity means for sensing said enclosure air humidity, said humidity means defining a humidity threshold; and

control means for operatively controlling said multiple compressor means in response to said temperature means and said humidity means, said control means being operable in a first state whenever said temperature threshold exceeds said enclosure air temperature to deactivate said multiple compressor means, said control means being operable in a second state whenever said enclosure air temperature exceeds said temperature threshold and said humidity threshold exceeds said enclosure air humidity to operate said multiple compressor means at said low flow rate, whereby said evaporator means operates at a predetermined high temperature to substantially sensibly cool said enclosure, said control means being operable in at least a third state whenever said enclosure air temperature exceeds said threshold temperature and said enclosure air humidity exceeds said humidity threshold to operate said multiple compressor means at said high flow rate, whereby said evaporator means operates at a predetermined low temperature to latently cool said enclosure.

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**4,018,585**
**COOLED OR HEATED ENCLOSURE**
**Robert J. Loratto, 7331 Piney Branch Road, Takoma Park, Md. 20012**
**Filed Sept. 4, 1975, Ser. No. 610,231**
**Int. Cl.² F25D** *3/08*; **F24C** *15/10*
**U.S. Cl. 62—372** **11 Claims**



1. A cooled enclosure comprising:

a. side and end walls and a bottom wall which define an enclosure, said side walls being formed with spaced generally vertical extending slots,

b. a vertical divider positioned in said enclosure generally intermediate the side walls, with said divider being generally intermediate the side walls and formed with slots generally aligned with the slots in said side walls;

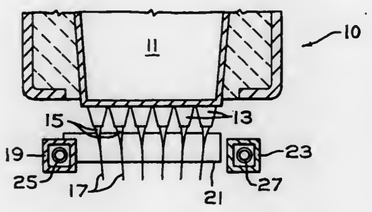
c. a cover associated with said enclosure and covering the same, said cover being formed of a heat conductive material on a least its bottom surface,

d. refrigerant means positioned in the enclosure, and

e. means mounted in said enclosure for supporting said refrigerant means and biasing the same into intimate contact with the bottom surface of said cover whereby the cooling effect of said refrigerant means is transferred to said cover; said means for supporting and biasing said refrigerant means comprising a plurality of rubber bands each of which extends between said divider and one of said side walls for resiliently supporting said refrigerant means.

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**4,018,586**
**ENVIRONMENTAL CONTROL OF BUSHING**
**Raymond H. Cates, Jr.; Walter L. Martin, Jr., and Sumpter D. Smith, all of Lexington, N.C., assignors to PPG Industries, Inc., Pittsburgh, Pa.**
**Filed Dec. 29, 1975, Ser. No. 644,709**
**Int. Cl.² C03B** *37/02*
**U.S. Cl. 65—2** **35 Claims**



**1.** In a method of forming glass filaments comprising drawing glass filaments from cones of molten glass below bushing tips in a bushing, said bushing having a bushing frame and having below said bushing tips means for removing heat in-



cluding a base cooling bar having a heat transfer fluid flowing therethrough and having connected thereto cooling fins positioned between rows of said bushing tips and being in heat transfer relationship to said base cooling bar whereby heat is removed from said bushing tips, the improvement comprising preventing short term yardage variation in the filaments by positioning and adjusting a second cooling bar, vertically spaced from said bushing frame and horizontally spaced from said bushing tips and said fins, flowing a heat transfer fluid through said second cooling bar whereby said second cooling bar removes heat from said bushing tips, said vertical and horizontal spacings being sufficiently adjusted to provide an airstream over said cooling bar and in contact with said bushing tips to therby prevent said short term yardage variation.

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**4,018,587**
**METHOD FOR PRODUCING A CURVED GLASS DIE HAVING AN ASPHERICAL POLISHED CONCAVE FACE**
**Bernard Maitenaz, La Varenne Saint Hilaire, France, assignor to Essilor International (Compagnie Generale d'Optique), Joinville-le-Pont, France**
**Filed Mar. 25, 1975, Ser. No. 562,038**
**Claims priority, application France, Mar. 29, 1974, 74.11177**
**Int. Cl.² C03B** *9/14, 21/00*; **G02B** *1/00*; **B29D** *11/00*
**U.S. Cl. 65—17** **6 Claims**



**1.** A method of producing a curved glass die having an aspherical polished concave face, comprising the steps of:

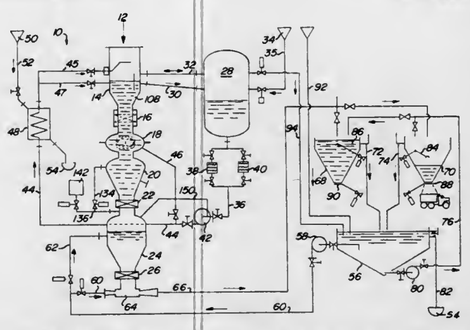
providing a curved die blank having a polished spherical concave face and an at least rough ground aspherical convex face which is complementary to the desired concave face of the blank;

placing the convex face of the blank of a shaping block of refractory material having a spherical concave support surface; and

heating the blank and the shaping block at a sufficient temperature to enable the glass of the blank to deform without flowing until the convex face of the blank rests on said concave support surface and conforms to the spherical shape of said concave support surface, thereby transferring to the polished concave face of the blank the curve that was initially on the convex face of the blank.

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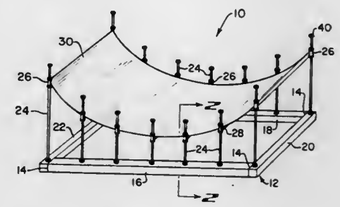
**4,018,588**
**METHOD AND APPARATUS FOR HANDLING SLAG HANDLING**
**Charles R. Hardy, Jr., Norristown, Pa., assignor to Ecolaire Incorporated, Philadelphia, Pa.**
**Filed May 10, 1976, Ser. No. 684,608**
**Int. Cl.² C03B** *18/00, 37/00*
**U.S. Cl. 65—19** **10 Claims**



**1.** Slag handling apparatus comprising an upright refractory lined quenching tank for continously receiving slag at its upper end, means for fracturing slag by use of a high pressure jet of water in said tank, a grinder below and communicating with said tank for continuously receiving and grinding the fractured slag, a first vessel below and communicating with said grinder for receiving ground slag, a second vessel located below and communicting with said first vessel, valve means between said vessels for controlling flow of slag therebetween, another valve means controlling the outlet from the lower end of said second vessel, valved conduit means for selectively venting one of said vessels and for selectively equalizing the pressure in said vessels, and an overflow tank communicating with said quenching tank for receiving overflow of water therefrom.

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**4,018,589**
**GLASS SHAPING FORM MOLD**
**William D. Egbert, and Wilson C. McDonald, both of Phoenix, Ariz., assignors to Goodyear Aerospace Corporation, Akron, Ohio**
**Filed Jan. 22, 1976, Ser. No. 651,313**
**Int. Cl.² C03B** *23/02*
**U.S. Cl. 65—287** **5 Claims**



**1.** A form for shaping planar sheets of glass into curvate configurations, comprising:

a base having opposed spaced apart sides;

a first plurality of horizontal support members having a trunnion affixed to each of two ends thereof;

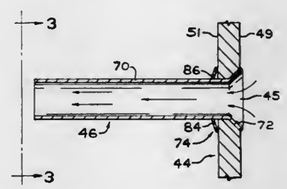
a second plurality of threaded rods, rotatable within and extending upwardly from said spaced apart sides of said base and having a trunnion fitting threaded thereon, said support members extending between pairs of said rods on opposite sides of said base and wherein the trunnions of each of said support members engage the trunnion fittings of the associated rods;

clamps affixed to each of the two ends of said support members; and

a full contact flexible mold plate maintained upon said support members and secured about its periphery by said clamps.

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**4,018,590**
**FLUID SPRAYING APPARATUS FOR TEMPERING GLASS SHEETS**
**Vaughn R. Imler, Valencia, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.**
**Filed Mar. 26, 1976, Ser. No. 670,595**
**Int. Cl.² C03B** *27/00*
**U.S. Cl. 65—348** **4 Claims**



**1.** Apparatus for tempering glass sheets comprising a pair of spaced, opposed plenum chambers, each having an apertured wall with a front surface facing a glass sheet occupying position and a rear surface facing the interior of said plenum

chamber and a plurality of replaceable nozzles extending through each of said apertures forward toward said glass sheet occupying position, means for supplying fluid under pressure to said plenum chamber for discharge through said nozzles toward the surface of a hot glass sheet at a rate sufficient to impart at least a partial temper to said glass sheet when the latter occupies said position, each said nozzle having a first portion extending from said apertured wall toward said position and a second portion within said apertured wall, said second portion being flared, each of said apertures having a flared inner portion constructed and arranged to receive said flared second portion of its associated nozzle in abutting relation with said flared inner portion of said apertured wall, the application of fluid under pressure into said plenum chamber forcing said flared second portion of said nozzles against the respective flared inner portions of said apertured wall, and resilient clip means friction-fitted around said first portion of each nozzle and engaging said front surface of the apertured wall so as to maintain said abutting relationship between the flared second portion of the nozzle and the respective flared aperture and to secure the first portion of said nozzles in an orientation extending normal to said apertured wall.

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**4,018,591**

## PRODUCT FOR ACTIVATING AND POTENTIATING VEGETABLE METABOLISM AND FOR CONDITIONING AGRICULTURAL SOIL AND METHOD FOR THE PREPARATION THEREOF

**Luigi Buttarelli, Milan, Italy, assignor to Prodotti Gianni S.r.l., Milan, Italy**

**Continuation-in-part of Ser. No. 154,194, June 17, 1971, abandoned, which is a continuation-in-part of Ser. No. 780,913, Dec. 3, 1968, abandoned. This application Dec. 11, 1974, Ser. No. 531,703**

**Int. Cl.² C05F** *11/00*

**U.S. Cl. 71—23** **11 Claims**

1. A viscous oily product for conditioning and potentiating vegetation and for fertilizing soils obtained by combining under stirring an organic substance, selected from the group consisting of lignin, obtained by the alkaline processing of wood into wood pulp, and of lignin derivatives, with a lower aliphatic alkanolamine selected from the group consisting of mono-; di-, and tri-ethanolamine, and mono-, di-, and tri-isopropanolamine, and their mixtures, to get a uniform distribution of the components, the weight ratio between the two reagents being between 1 to 10 and 1 to 1, the reaction being effected at a temperature between room temperature and 55° C, until a total solution is obtained, the product having alkaline reaction, and having the characteristic of being capable of absorbing oxygen and evolving ammonia, when exposed to air, and dissolving a metal selected from the group consisting of copper, zinc, cadmium, manganese, bismuth, cobalt, iron, vanadium, nickel and tin, in the reaction product.

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**4,018,592**

## METHOD OF CONTROLLING THE GROWTH OF ALGAE

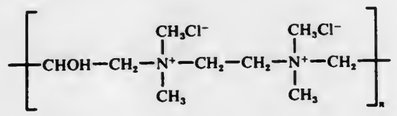
**Stanley J. Buckman, and Gerald D. Mercer, both of Memphis, Tenn., assignors to Buckman Laboratories, Inc., Memphis, Tenn.**

**Filed July 21, 1975, Ser. No. 597,602**

**Int. Cl.² A01N** *9/20*

**U.S. Cl. 71—67** **5 Claims**

1. A method of inhibiting the growth of algae in an aqueous system which comprises contacting said algae with a polymer having the formula and name:



(Poly [2-hydroxyethylene(dimethyliminio)ethylene(dimethyliminio)methylene dichloride])-prepared by reacting epichlorohydrin and hydrochloric acid with N,N,N′,N′- tetramethylethylenediamine in an aqueous medium wherein *n* is an integer varying from 4 to 40 in an amount sufficient to inhibit the growth of said algae.

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**4,018,593**

## PROCESS FOR RECOVERING USEFUL SUBSTANCES FROM CULTURE MEDIA

**Hans Müller, Im Allmendli, 8703 Erlenbach, Switzerland**

**Continuation-in-part of Ser. No. 584,020, June 4, 1975. This application June 19, 1975, Ser. No. 588,472**

**Claims priority, application Switzerland, June 7, 1974, 7469/74; Apr. 9, 1975, 4600/75; June 21, 1974, 8653/74**

**Int. Cl.² A01N** *5/00*

**U.S. Cl. 71—76** **12 Claims**

1. A process for recovering at least one member of the group consisting of proteins, enzymes, growth inhibitors, growth factors and other substances which are usable in the cultivations of microorganisms from culture media, comprising cultivating a microorganism in a liquid-containing culture medium so as to obtain a protein-containing cellular product; recovering said product from said culture medium; treating the liquid portion of said culture medium so as to obtain a first protein-containing fraction and a second fraction which is substantially free of protein and contains a growth inhibitor for said microorganism which is useful in the cultivation of green plants; and recovering said growth inhibitor from said second fraction.

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**4,018,594**

## SUSTAINED RELEASE POLYMERS

**Izhak Blank, Haifa, Israel, assignor to Hydrophilics International, Inc., New York, N.Y.**

**Continuation-in-part of Ser. No. 279,888, Aug. 11, 1972, Pat. No. 3,959,237. This application Feb. 6, 1975, Ser. No. 547,488**

**Claims priority, application United Kingdom, Aug. 12, 1971, 37936/71**

**Int. Cl.² A01N** *9/00*

**U.S. Cl. 71—97** **5 Claims**

1. In an agricultural fine chemical composition, the improvement which comprises employing as the copolymeric carrier from a film of which an effective amount of the agricultural fine chemical is releasable:

a copolymer derived from a monomer mixture selected from the class consisting of acrylic acid, from 20 to 70 parts of at least one member selected from the class consisting of lower alkyl acrylates and lower alkyl methacrylates, and from 5 to 20 parts of a long chain ester of acrylic acid or methacrylic acid, where the chain length is from 8 to 18 carbon atoms in the ester portion, said copolymer having a molecular weight of more than one million as determined by its intrinsic viscosity in methylethyl ketone at 25° C, in which at least some of the acid groups have been neutralized by multivalent inorganic cations selected from the class consisting of zinc and copper.

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**4,018,595**

## PRODUCTION OF COPPER BY GASEOUS REDUCTION

**Roman Michael Genik-Sas-Berezowsky, Edmonton, Canada, assignor to Sherritt Gordon Mines Limited, Ontario, Canada**

**Filed Nov. 28, 1975, Ser. No. 636,327**

**Int. Cl.² C22C** *1/04*; **C22B** *1/10, 15/00*

**U.S. Cl. 75—.5 A** **6 Claims**

1. In combination with the process of producing substantially oxide free copper in powder form from copper salts by reacting an acidic aqueous solution which contains said copper salts with a reducing gas at elevated temperature and pressure to precipitate metallic copper, the improvement, which comprises providing in said aqueous solution a finite amount of an addition agent selected from the group consisting of polymeric polyamine compounds having amino group linked by alkyl groups having 2 to 4 carbon atoms.



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**4,018,596**

## HIGH SHRINKAGE POWDER BODY

**David Myers Llewelyn, Swansea, Wales, assignor to The International Nickel Company, Inc., New York, N.Y.**

**Division of Ser. No. 467,127, May 6, 1974, Pat. No. 3,918,955. This application July 16, 1975, Ser. No. 596,570**

**Claims priority, application United Kingdom, May 15, 1973, 22961/73**

**Int. Cl.² B22F** *9/00*

**U.S. Cl. 75—.5 AA** **3 Claims**

1. As a new article of manufacture, a body of carbonyl nickel particles characterized by a carbon content up to 0.03%, a Fisher particle size up to about 1.9 microns and a shrinkage on sintering 20 minutes at 900° C typically about 25%.

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**4,018,597**

## RARE EARTH METAL SILICIDE ALLOYS

**John O. Staggers, Downington, Pa., assignor to Foote Mineral Company, Exton, Pa.**

**Filed Aug. 5, 1975, Ser. No. 602,081**

**Int. Cl.² C21C** *7/00*; **C22C** *33/04, 38/00*

**U.S. Cl. 75—58** **8 Claims**

1. A rare earth metal silicide alloy comprising about 25 to about 40% rare earth metals, about 35 to about 50% Si, about 5 to about 25% Fe, about 2 to about 8% Ca, about 2 to about 4% Ba and about 1 to about 3% Sr, the proportions based on the weight of the alloy.

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**4,018,598**

## METHOD FOR LIQUID MIXING

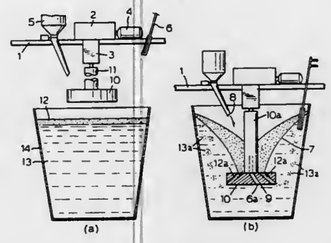
**Frank Markus, Burlington, Canada, assignor to The Steel Company of Canada, Limited, Hamilton, Canada**

**Division of Ser. No. 527,026, Nov. 25, 1974, Pat. No. 3,961,775. This application Aug. 21, 1975, Ser. No. 606,534**

**Claims priority, application United Kingdom, Nov. 28, 1973, 55297/73**

**Int. Cl.² C21C** *7/00*

**U.S. Cl. 75—61** **5 Claims**



1. A method of reducing the content of a particular substance in molten steel, comprising the steps:

placing the molten steel and a quantity of slag in a refractory container to form an interface between the two with the slag above the interface and the molten steel below the interface,

providing a refractory rotor of substantially circular outline having generally an upper face and a lower face, the rotor having a diameter of at least about one-third of the container internal diameter, the rotor having at least one internal passageway which opens at one end through the upper face at a first location adjacent the rotor axis, the other end of the passageway opening at a second location on the rotor, the second location being further from the rotor axis than is the first location,

inserting said rotor into the container sufficiently far to bring the upper face of the rotor to a location beneath the slag steel interface when the steel and slag are at rest, the axis of the rotor being generally vertical,

rotating the rotor about its axis at a speed sufficient to draw part of the interface down to the upper face of the rotor whereby slag passes into said one end of said passageway and is pumped through said passageway into said molten steel whereby the total interface area between the slag and the molten steel is increased,

and treating the slag from above with a material which preferentially reacts with said particular substance to remove same form the molten steel, whereby said material becomes a part of the slag and is brought into contact with the molten steel by virtue of the slag being pumped through the molten steel and by virtue of the total interface being in motion and of increased area, thereby to promote a reduction in the content of said particular substance in molten steel.

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**4,018,599**

## ELECTRICAL CONTACTS OF DISPERSION STRENGTHENED GOLD

**James S. Hill, Cranford; Emil L. Carbone, Paramus; Victor G. Mooradian, Summit, and Walter G. Keyes, Spotswood, all of N.J., assignors to Engelhard Minerals & Chemicals Corporation, Murray Hill, N.J.**

**Filed Sept. 5, 1975, Ser. No. 610,526**

**Int. Cl.² C22C** *5/02*

**U.S. Cl. 75—165** **4 Claims**

1. An electrical contact made from material comprising a mixture of substantially pure gold and $CeO_2$, wherein said $CeO_2$ comprises from 0.1 to 4.0 percent by volume of said mixture.

3. The electrical contact of claim 1 further comprising less than 1 percent by volume of one or more oxides characterized by high melting points and a high negative free energy of formation greater than — 80K cal/mole; the specific amount of said one or more oxides being dependent on the amount of percentage by weight of $CeO_2$ to gold, whereby any anode gain of the electrical contact of only $CeO_2$ and gold is substantially reduced to zero.

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**4,018,600**

## METHOD FOR ELIMINATING GAMMA$_2$ PHASE FROM DENTAL AMALGAM AND IMPROVED DENTAL AMALGAM COMPOSITION

**Richard M. Waterstrat, Gaithersburg, Md., assignor to American Dental Association Health Foundation, Chicago, Ill.**

**Filed Sept. 29, 1975, Ser. No. 617,594**

**Int. Cl.² C22C** *5/06, 7/00*

**U.S. Cl. 75—169** **5 Claims**

1. An improved alloy for dental amalgam consisting essentially of about 62% by weight silver, about 12% by weight manganese and the balance tin.

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**4,018,601**

## ELECTROSTATOGRAPHIC MAGNETIC BRUSH IMAGING PROCESS EMPLOYING CARRIER BEADS COMPRISING HIGH PURITY NICKEL

**Robert J. Hagenbach, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

**Division of Ser. No. 834,863, June 19, 1969, abandoned. This application Nov. 18, 1971, Ser. No. 200,186**

**Int. Cl.² G03G** *13/09, 9/14*

**U.S. Cl. 96—1 SD** **2 Claims**

1. An electrostatographic magnetic brush imaging process comprising the steps of forming an electrostatic latent image on a recording surface and developing said electrostatic latent image by contacting said electrostatic latent image with an electrostatographic developer mixture comprising finely-divided toner particles having an average particle diameter between about 1 micron and about 30 microns, said toner particles comprising tetra-(hexyl-sulfonamido) phthalocyanine, and carrier beads comprising uncoated, substantially spherical, magnetic particles consisting of at least about 98.0

percent by weight purity of nickel having an average particle diameter between about 50 microns and about 1000 microns, whereby at least a portion of said finely-divided toner particles are attracted to and held on said recording surface in conformance to said electrostatic latent image.

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**4,018,602**

## METHOD FOR IN SITU FABRICATION OF PHOTOCONDUCTIVE COMPOSITE

**Joseph Y. C. Chu, Fairport, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

**Filed Apr. 17, 1975, Ser. No. 569,131**
**Int. Cl.² G03G** *5/04*
**U.S. Cl. 96—1.5** **5 Claims**

**1.** A method for in situ preparation of a photoconductive composite comprising:

a initially forming an electronically active polymeric film on a supportive substrate, said polymeric film being substantially non-photoresponsive to visible light and capable of rapid and efficient transport of only one species of charge carrier due to the presence of either an electron donor or an electron acceptor within said polymeric film;

b allowing said polymeric film to set; and

c forming a second electronically active polymeric film on said previously formed polymeric film by solvent coating the components thereof directly on the surface of the previously formed polymeric film, the electronically active component of said second polymeric film being substantially non-photoresponsive to visible light and capable of rapid and efficient transport of the species of charge carrier not transported by the previously formed polymeric film,

whereupon the solvent of the coating solution causes sufficient softening of the previously formed film thereby permitting charge transfer interaction of the electronically active components of each layer with the electronically active components of the other layer, the extent of such charge transfer interaction being sufficient to enable formation of a charge transfer complex having an optical density of greater than about 0.3 and yet insufficient to create a charge transfer complex zone thicker than about 2 microns.

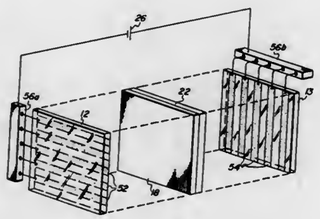
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**4,018,603**

## DEFORMATION IMAGING SYSTEM USING THERMOPLASTIC AND ELASTOMERIC LAYERS

**Nicholas K. Sheridon, Saratoga, Calif.; Dorian Kermisch, Penfield, and Richard F. Bergen, Ontario, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.**

**Filed Apr. 24, 1975, Ser. No. 571,198**
**Int. Cl.² G03G** *5/022*
**U.S. Cl. 96—1.5** **10 Claims**




**1.** An imaging member comprising (i) a series of contiguous layers including a layer of thermoplastic material capable of permanent surface deformation and having a volume resistivity above about $10^4$ ohm-cm, a layer of elastomer material having a volume resistivity above about $10^4$ ohm-cm and and a flexible conductive metallic layer sandwiched therebetween, and (ii) means in contact with the free surfaces of said contiguous layers for establishing an imagewise electric field across at least one of said thermoplastic and said elastomer layers.

**8.** An imaging member comprising (i) a series of contiguous layers including a layer of thermoplastic material capable of permanent surface deformation and having a volume resistivity above about $10^4$ ohm-cm a flexible conductive metallic layer, and a layer of elastomer material having a volume resistivity above about $10^4$ ohm-cm sandwiched therebetween and (ii) means in contact with free surfaces of said contiguous layers for establishing an imagewise electric field across at least one of said thermoplastic or elastomer layers.

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**4,018,604**

## FREE RADICAL PHOTOSENSITIVE COMPOSITIONS WITH IMPROVED SENSITIVITY AND SHELF LIFE STABILITY

**Paul L. Bachman, Cleveland Heights, Ohio, assignor to Horizons Incorporated, a division of Horizons Research Incorporated, Cleveland, Ohio**

**Filed Jan. 14, 1976, Ser. No. 648,973**
**Int. Cl.² G03C** *5/24, 1/52*
**U.S. Cl. 96—48 R** **7 Claims**

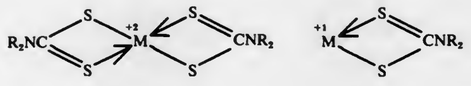
**1.** In a photosensitive composition consisting essentially of:

1. at least one leuco diaryl or triaryl methane dye forming compound;
2. at lease one dye base selected from the group consisting of styryl dye bases, cyanine dye bases and merocyanine dye bases;
3. at least one organic halogen compound which provides free radicals when exposed to a suitable dose of radiation; and

a film forming polymer in which constituents (1), (2) and (3) are supported;

the improvement which comprises including in said composition an organic sulfur compound selected from the group consisting of

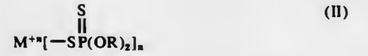
a. metal disubstituted dithiocarbamates represented by one of the following formula:



(Ia) (Ib)

wherein R is selected from the group consisting of alkyl, aryl, aralkyl and alicyclic and both R's are not required to be the same and M is a metal selected from the group consisting of $Na^+$, $K^+$, $Zn^{+2}$, $Cd^{+2}$, $Hg^{+2}$, $Fe^{+2}$, $Ni^{+2}$, $Co^{+2}$, $Cu^{+2}$, and $[BiR']^{+2}$ where R' is alkyl or aryl; and

b. metal disubstituted dithiophosphinates represented by the formula:



(II)

wherein n is 1 or 2 and wherein M is a metal selected from the group consisting of $Na^+$, $K^+$, $Zn^{+2}$, $Cd^{+2}$, $Fe^{+2}$, $Ni^{+2}$, $Co^{+2}$, $Cu^{+2}$, and $[BiR']^{+2}$ where R' is alkyl or aryl and each R is selected from the group consisting of lower alkyl, aryl, aralkyl, or alicyclic the amount of metal disubstituted dithiocarbamate and metal disubstituted dithiophosphinate being effective to both inhibit fog formation in said composition and to provide aging stability for amplification by optical development of said composition.



**4,018,605**

## METAL LITHOGRAPHIC PLATE MADE IMAGEABLE BY DIFFUSION TRANSFER BY TREATMENT WITH GROUP IV-B METAL FLUORIDE

**David B. Olsen, Lake Elmo, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

**Filed Apr. 21, 1975, Ser. No. 569,873**
**Int. Cl.² G03C** *5/54;* **G03F** *7/02;* **B44D** *1/34;* **B41M** ~~*3/00*~~
**U.S. Cl. 96—29 L** **8 Claims**

**5.** A process for preparing a lithographic plate comprising:

a. treating a hydrophilic-surfaced metallic support with an aqueous solution containing from about 0.01 to about 1.0 percent by weight of a water soluble Group IV-B metal fluoride compound of the formula:

$$X_1X_2F_6$$

wherein $X_1$ is hydrogen, an alkali metal, an alkaline earth metal or an ammonium cation and $X_2$ is a titanium, zirconium or hafnium cation at a temperature of from about 18° C to 24° C for about 5 to about 50 seconds; and

b. imaging the treated support by the silver salt diffusion transfer process.

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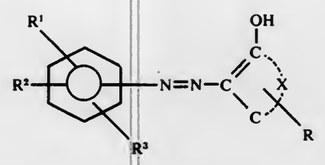
**4,018,606**

## ORGANIC AZO PIGMENT SENSITIZERS FOR PHOTOCONDUCTIVE LAYERS

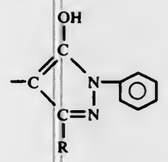
**Lawrence E. Contois; Joseph Y. Kaukeinen; Stephen Michel, and Thomas M. Plutchak, all of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed May 3, 1974, Ser. No. 466,658**
**Int. Cl.² G03G** *5/09*
**U.S. Cl. 96—1.7** **23 Claims**

**1.** A photoconductive composition comprising a photoconductor and a sensitizing amount of a sensitizer for the photoconductor comprising an organic pigment having the formula

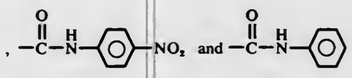


wherein X consists of the atoms necessary to complete a naphthalene, anthracene, or

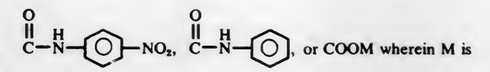


ring;

$R^1$, $R^2$, and $R^3$ are independently selected from the group consisting of hydrogen, halogen, alkoxy, $NO_2$, alkyl, $SO_3H$ or alkali metal salts thereof, and COOH or alkali metal salts thereof;



and wherein $R^2$ and $R^3$ can comprise the atoms necessary to complete a phenyl, naphthyl or anthryl ring; and R is selected from the group consisting of



or COOM wherein M is alkyl or an alkali or alkaline earth metal.

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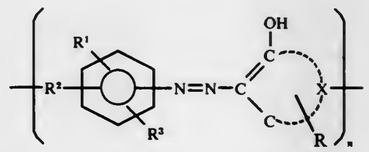
**4,018,607**

## CRYSTALLINE ORGANIC PIGMENT SENSITIZERS FOR PHOTOCONDUCTIVE LAYERS

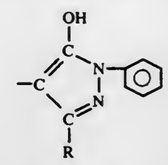
**Lawrence E. Contois, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.**

**Filed May 3, 1974, Ser. No. 466,659**
**Int. Cl.² G03G** *5/09*
**U.S. Cl. 96—1.7** **27 Claims**

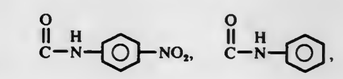
**1.** A photoconductive composition comprising a photoconductor and a sensitizing amount of a sensitizer for the photoconductor comprising crystallized organic pigments having the formula:



wherein *n* is 1 or 2; X consists of the atoms necessary to complete a naphthalene, anthracene, or



$R^1$,$R^2$, and $R^3$ are independently selected from the group consisting of hydrogen, halogen, alkoxy, $NO_2$, alkyl, $SO_3H$ or alkali metal salts thereof, and COOH or alkali metal salts thereof; and wherein $R^2$ and $R^3$ can comprise the atoms necessary to complete a phenyl, naphthyl or anthryl ring; and R is selected from the group consisting of



or COOM wherein M is alkyl or an alkali or alkaline earth metal.

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**4,018,608**

## INFRA RED PHOTOGRAPHY WITH SILVER HALIDE FILMS USING INFRARED AND VISIBLE LIGHT EXPOSURES

**Gene F. Frazier, Washington, D.C., assignor to Versar, Inc., Springfield, Va.**

**Filed Oct. 10, 1975, Ser. No. 621,311**
**Int. Cl.² G03C** *5/04, 5/32*
**U.S. Cl. 96—27 E** **10 Claims**

**1.** The method of photographing an infra red event to provide a lasting developable latent image upon a film which is of a visible-light sensitive type having a silver halide grain suspended in an emulsion, comprising the steps of:

impinging an image of the infra red event on the film which is initially unexposed to visible light, the infra red exposure being made with sufficient intensity and for an exposure interval sufficient to excite areas of the film which are the most intensely exposed to the infra red beyond the degree of excitation which increases its sensitivity to visible light by merely warming it, to a greater degree of excitation which reduces the sensitivity of the film upon exposure to visible light by reducing the ability of the grain to form a stable latent image in the presence of the excited emulsion; and

exposing said film after it has been excited by the infra red and while still excited to a field of visible light whose intensity and duration is such as to produce a developable latent image having, when developed, graduated contrast wherein the densities are functions of the degree of excitation of said areas by the infra red exposure.

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**4,018,609**

## COLOR PHOTOGRAPHIC MULTILAYERED MATERIAL WITH LAYERS OF ACID ASHED GELATINE

**Karl Lohmer, Leverkusen; Hermann Seiz, Heilbronn, and Karl Zietan, Cologne, all of Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Germany**

**Filed May 27, 1975, Ser. No. 580,905**

**Claims priority, application Germany, June 8, 1974, 2427700**

**Int. Cl.² G03C** *3/00, 5/26, 1/02*

**U.S. Cl. 96—74** **3 Claims**

1. The light sensitive multi-layer photographic material having in combination sensitized layers comprising

a red sensitive silver halide gelatine emulsion layer which contains alkaline-treated gelatine and a cyan coupler,

a green sensitive silver halide gelatine emulsion layer which contains alkaline-treated gelatine and a magenta coupler and a blue sensitive silver halide gelatine emulsion layer containing alkaline-treated gelatine and a yellow coupler,

and at least one intermediate light insensitive layer positioned between said sensitized layers and containing a gelatine binder, and protective covering layer overlying said sensitized layers containing a gelatine binder,

wherein the improvement comprises the gelatine binder of said intermediate and protective covering layer consists essentially of inert acid-ashed gelatine having an isoelectric point of between 6.5 and 9.5.

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**4,018,610**

## SUPERSENSITIZED SILVER HALIDE PHOTOGRAPHIC EMULSION

**Masanao Hinata; Haruo Takei; Akira Sato, and Tadashi Ikeda, all of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan**

**Filed July 28, 1975, Ser. No. 599,517**

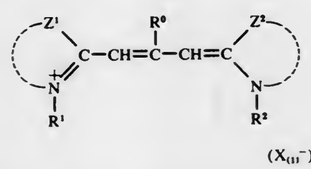
**Claims priority, application Japan, July 26, 1974, 49-86201**

**Int. Cl.² G03C** *1/14*

**U.S. Cl. 96—124** **20 Claims**

1. A spectrally sensitized silver halide photographic emulsion containing, in combination, supersensitizing amounts of at least one sensitizing dye represented by the following general formula (I)

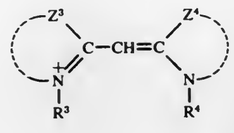
(I)



$(X_{(1)}^-)_{m-1}$

wherein $Z^1$ and $Z^2$ each represents an atomic group necessary for completing a benzimidazole nucleus, an oxazole nucleus, a benzoxazole nucleus, a naphthoxazole nucleus, a benzothiazole nucleus, a naphthothiazole nucleus, a benzoselenazole nucleus or a naphthoselenazole nucleus excepting that both of $Z^1$ and $Z^2$ do not simultaneously represent an oxazole nucleus, a benzoxazole nucleus or a naphthoxazole nucleus; $R^1$ and $R^2$ each represents an aliphatic group one of which is a sulfoalkyl group, a hydroxyalkyl group or a carboxyalkyl group and the carbon chain of which may be interrupted with an oxygen atom or a sulfur atom; $R^0$ represents a hydrogen atom, an alkyl group or an aralkyl group; $X_{(1)}^-$ represents an anion; and m is 1 or 2, with m being 1 when the dye forms an intramolecular salt; and at least one sensitizing dye represented by the following general formula (II)

(II)



$(X_{(2)}^-)_{n-1}$

wherein $Z^3$ and $Z^4$ each represents an atomic group necessary for completing a pyrroline nucleus, a pyridine nucleus, an indolenine nucleus, a benzimidazole nucleus, an oxazole nucleus, a benzoxazole nucleus, a naphthoxazole nucleus, a thiazoline nucleus, a thiazole nucleus, a benzothiazole nucleus, a naphthothiazole nucleus, a selenazole nucleus, a benzoselenazole nucleus or a naphthoselenazole nucleus; $R^3$ and $R^4$ each represents an aliphatic group and the carbon chain of which may be interrupted with an oxygen atom or a sulfur atom, and at least one of $R^3$ and $R^4$ represents an aliphatic group containing a hydroxy group, a carboxy group or a sulfo group; $X_{(2)}^-$ represents an anion; and n is 1 or 2, with n being 1 when the dye forms an intramolecular salt.

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**4,018,611**

## NON-YELLOWING ANTIMICROBIAL COMPOSITIONS COMPRISING DIIODOMETHYL SULFONES

**Charles Robert Cramer, Vaduz, Liechtenstein; Gerrit Dirk vanLenthe, and Dietmar Maier, both of Grabs, Switzerland, assignors to Metalorgana Etablissement, Vaduz, Liechtenstein**

**Filed Sept. 15, 1975, Ser. No. 613,564**

**Claims priority, application Switzerland, Sept. 17, 1974, 12588/74**

**Int. Cl.² C09D** *5/14*

**U.S. Cl. 106—15 R** **37 Claims**

1. In a method for protecting a host material against attack by micro-organisms comprising coating said host material with a diiodomethyl sulfone of the formula $R(CH_2)_nSO_2CHI_2$, wherein *n* is an integer from 0 to 4 and R is selected from the group alkyl, cycloalkyl, phenyl, naphthyl, monoloweralkylphenyl, polyloweralkylphenyl, loweralkoxyphenyl, monohalophenyl, polyhalophenyl, haloloweralkylphenyl, halonitrophenyl, nitrophenyl, nitroloweralkylphenyl, anilino, anilinophenyl and anilamidophenyl, the improvement comprising admixing with said sulfone a sufficient amount of a compound containing a reactive sulfide or sulfhydryl group to prevent the changing in color of the diiodomethyl sulfone.

13. In an antimicrobial composition adapted to protect a host material against attack by micro-organisms, said composition comprising a diiodomethyl sulfone of the formula $R(CH_2)_nSO_2CHI_2$, wherein *n* is an integer from 0 to 4 and R is selected from the group alkyl, cycloalkyl, phenyl, naphthyl, monoloweralkylphenyl, polyloweralkylphenyl, loweralkoxyphenyl, monohalophenyl, polyhalophenyl, haloloweralkylphenyl, halonitrophenyl, nitrophenyl, nitroloweralkylphenyl, anilino, anilinophenyl and anilamidophenyl, the improvement comprising a sufficient amount of a compound containing a reactive sulfide or sulfhydryl group to prevent the changing in color of the diiodomethyl sulfone.



**4,018,612**

## TRANSPARENT BETA-QUARTZ GLASS-CERAMICS

**Kenneth Chyung, Elmira, N.Y., assignor to Corning Glass Works, Corning, N.Y.**

**Filed Mar. 25, 1976, Ser. No. 670,529**

**Int. Cl.² C03C** *3/22, 3/04*

**U.S. Cl. 106—39.7** **1 Claim**

1. A transparent glass-ceramic article exhibiting a coefficient of thermal expansion (R.T.—600° C.) less than about $10 \times 10^{-7}$/° C., excellent chemical durability and resistance to detergent attack, an infra-red transmittance at a wave length of 2.5 microns through a polished plate of about 3 mm. thickness of in excess of 75%, and wherein beta-quartz solid solution constitutes the predominant crystal phase, said glass-ceramic article being crystallized in situ from a parent glass having a viscosity at the liquidus of at least 10,000 poises and consisting essentially, by weight on the oxide basis, of 2.5–3.5% $Li_2O$, 1.5–2.5% MgO, 1–2% ZnO, 17.75–20% $Al_2O_3$, 67–70% $SiO_2$, 2–4.5% $TiO_2$, 0-2% BaO, and 1–2% $ZrO_2$, and wherein alkali metal oxides other than $Li_2O$, alkaline earth metal oxides other than MgO and BaO, and $B_2O_3$ are essentially absent therefrom.

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**4,018,613**

## DIODE ENCAPSULATION GLASS

**Francis W. Martin, Painted Post, N.Y., assignor to Corning Glass Works, Corning, N.Y.**

**Filed Feb. 6, 1976, Ser. No. 655,871**

**Int. Cl.² C03C** *3/10*

**U.S. Cl. 106—53** **1 Claim**

1. A glass suitable for the manufacture of glass tubing for diode encapsulation consisting, in weight percent, of about 65% PbO, 27% $SiO_2$, 4% $K_2O$, 2% $Al_2O_3$, and 2% $B_2O_3$, said glass having a softening point of about 530° C., and an average linear coefficient of thermal expansion (25°–300° C.) of about $90 \times 10^{-7}$° C.

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**4,018,614**

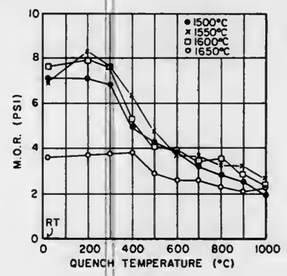
## CELSIAN-ZIRCONIA COMPOSITIONS

**Lawrence A. Nordlie, Corning, N.Y., assignor to Corning Glass Works, Corning, N.Y.**

**Filed Apr. 1, 1976, Ser. No. 672,632**

**Int. Cl.² C04B** *35/48*

**U.S. Cl. 106—57** **5 Claims**




1. A refractory, thermal shock resistant, sintered ceramic composition consisting essentially of 30–90% celsian and 10–70% zirconia by weight.

4. A microcracked, sintered ceramic composition having a melting temperature above about 1650° C and consisting essentially of, on the oxide basis by weight, 12.3–36.8% BaO, 8.1–24.5% $Al_2O_3$, 9.6–28.8% $SiO_2$, and 10–70% $ZrO_2$ and having celsian and zirconia as the predominant phases.

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**4,018,615**

## REFRACTORY MATERIAL CONTAINING FUSED SILICA AND CRYSTALLINE PHASE SILICA

**David Mills, Bristol, England, assignor to Rolls-Royce (1971) Limited, England**

**Filed Nov. 3, 1975, Ser. No. 628,404**

**Claims priority, application United Kingdom, Nov. 20, 1974, 50216/74**

**Int. Cl.² C04B** *35/14*

**U.S. Cl. 106—69** **7 Claims**

1. A method of manufacturing a refractory article comprising fused silica and crystalline phase silica comprising the steps of intimately mixing finely divided particles of fused silica and crystalline phase silica wherein said mixture contains about 36.3% to 70% by weight of crystalline phase silica based on the total silica, molding the intimate mixture to the required shape and heating the molded intimate mixture at a temperature sufficiently high enough to sinter the particles of fused silica and crystalline phase silica, but not high enough to cause rapid crystallization of the fused silica.

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**4,018,616**

## WATER GLASS COMPOSITION

**Yujiro Sugahara, Tokyo; Yoshibumi Noshi, Tsuruoka; Niroyuki Naito, Tsuruoka, and Takashi Maruya, Tsuruoka, all of Japan, assignors to Mizusawa Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan**

**Filed Sept. 11, 1975, Ser. No. 612,448**

**Claims priority, application Japan, Sept. 13, 1974, 49-104893; Sept. 13, 1974, 49-104894**

**Int. Cl.² C04B** *35/16*

**U.S. Cl. 106—74** **22 Claims**

1. A water glass composition comprising a water-soluble or water-dispersible silicate binder and an inorganic phosphate curing agent, wherein said inorganic phosphate curing agent is composed of an inorganic solid fine powder comprising as the main ingredient a silicon poylphosphate or its metal salt and said curing agent has an initial dissolution amount (B) of up to 200 mg and an average hydrolysis rate constant (A) of at least 0.2, said initial dissolution amount (B) and average hydrolysis rate constant (A) being defined by the following formula:

$$Y = AX + B$$

wherein *X* stands for the lapse of time (minutes) of up to 120 minutes after 1 g of the curing agent has been added to 100 ml of a 4N sodium hydroxide aqueous solution, and *Y* stands for the integrated amount (mg/100 ml) of phosphoric acid dissolved out of the curing agent into said aqueous solution during the time *X*.

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**4,018,617**

## MIXTURE FOR PAVEMENT BASES AND THE LIKE

**J. Patrick Nicholson, Toledo, Ohio, assignor to Nicholson Realty Ltd., Sylvania, Ohio**

**Filed Feb. 2, 1976, Ser. No. 654,211**

**Int. Cl.² C04B** *7/26*

**U.S. Cl. 106—85** **8 Claims**

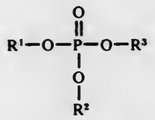
1. A mixture consisting essentially of fly ash in an amount between about 6 and 24% by dry weight, cement kiln dust in an amount between about 4 and 16% by dry weight, and aggregate in an amount between about 60 and 90% by dry weight, which through reactions produces a hard, strong, durable mass capable of supporting surfacing.

## 4,018,618
## MONO- AND/OR DI-ALKYL PHOSPHATES AS ADDITIVES FOR HYDRAULIC BINDERS

Rolf Petri, Frankenthal; Harry Distler, Ludwigshafen, and Bertold Bechert, Hessheim, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

Filed Oct. 29, 1974, Ser. No. 518,628
Claims priority, application Germany, Nov. 2, 1973, 2354714
Int. Cl.² C04B 7/02
U.S. Cl. 106—90 3 Claims

1. Hydraulic binders containing mono- or di-alkyl phosphates of the formula



in which $R^1$ denotes alkyl of from 14–18 carbon atoms, $R^2$ denotes $R^1$ or hydrogen, alkali metal, ammonium or ammonium substituted by alkyl or alkanol of from 2 to 4 carbon atoms per alkyl or alkanol group and $R^3$ denotes hydrogen, alkali metal, ammonium or ammonium substituted by alkyl or alkanol of from 2 to 4 carbon atoms per alkyl or alkanol group, as antifoaming and hydrophobizing agents, the amount of said phosphates being from about 0.2 to 6% by weight based on the weight of the hydraulic binder.

## 4,018,619
## HIGHLY ACTIVATED MIXTURES FOR CONSTRUCTING LOAD BEARING SURFACES AND METHOD OF MAKING THE SAME

William C. Webster, Norristown, and Charles L. Smith, Conshohocken, both of Pa., assignors to IU Technology Corporation, Miami, Fla.

Continuation of Ser. No. 508,221, Sept. 23, 1974, abandoned, which is a division of Ser. No. 285,257, Aug. 31, 1972, Pat. No. 3,385,084, which is a continuation-in-part of Ser. No. 23,887, March 30, 1970. This application Jan. 22, 1976, Ser. No. 651,457
Int. Cl.² C04B 7/34
U.S. Cl. 106—118 5 Claims

1. A method of producing a more reactive lime-fly ash cementitious composition, said method comprising mechanically treating a hydrated lime and fly ash pre-mixture, consisting of 4–90 weight % hydrated lime in the presence of glassy fly ash particles occurring therein, said mechanical treating comprising a process wherein said glassy fly ash particles are caused to interact mechanically with said hydrated lime to reduce the particle size of and to deagglomerate said hydrated lime, then adding to said pre-mix unactivated fly ash in an amount such that the proportion of the pre-mix in the total mix does not exceed 35% by weight.

## 4,018,620
## METHOD OF HYDROLYZING CELLULOSE TO MONOSACCHARIDES

Ronald A. Penque, Glen Ridge, N.J., assignor to Biocel Corporation, New York, N.Y.

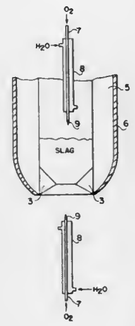
Filed May 19, 1975, Ser. No. 578,462
Int. Cl.² C13K 1/02
U.S. Cl. 127—37 10 Claims

1. A method of hydrolyzing cellulose to monosaccharides comprised of admixing cellulose, water, at least about 5% $CaCl_2$ and about 0.01% to about 2% HCl, the larger the quantity of $CaCl_2$ the lesser the quantity of HCl and heating the reaction mixture to solubilize the cellulose and until reducing sugars are formed from the solubilized cellulose.

## 4,018,621
## METHOD FOR REMOVING SLAG CAKES FROM SYNTHESIZING GAS REACTORS

Walter Jahnentz; Friedhard Klatt, and Karl Gaupp, all of Marl, Germany, assignors to Chemische Werke Huls Aktiengesellschaft, Marl, Germany

Filed Apr. 11, 1975, Ser. No. 567,118
Claims priority, application Germany, Apr. 13, 1974, 2418033
Int. Cl.² B08B 7/00
U.S. Cl. 134—5 5 Claims




1. A method for removing a slag cake formed in the bottom of a synthesizing gas reactor having a reactor cover located on the bottom of the reactor, comprising:
a. removing said reactor cover;
b. melting an orifice through said slag cake and the bottom of the reactor with said reactor cover removed by means of a flame from an oxygen core lance to form liquefied slag;
c. draining said liquefied slag through said orifice;
d. liquefying residual parts of said slag cake by means of an oxygen excess powered gas flame; and
e. draining said liquefied residual parts through said orifice.

## 4,018,622
## FLUXING AGENT FOR REMOVING INORGANIC DEPOSITS FROM SMELTERS AND FURNACES

Roy E. Wright, Oakland, and Howard C. Ross, City of Commerce, both of Calif., assignors to Philadelphia Quartz Company, Valley Forge, Pa.

Filed Oct. 19, 1973, Ser. No. 408,027
Int. Cl.² C11D 7/12, 7/14, 7/20; C23G 1/28
U.S. Cl. 134—19 10 Claims

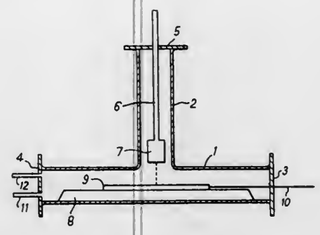
1. In the process for the removal of inorganic dusts, ash, dirt, slag and other impurities deposited on the walls and uptakes of copper smelters, by contacting said impurities with fluxing agents at the operating temperatures of said smelters and equipment, the improvement comprising the use of a fluxing agent consisting essentially of 10 to 100% alkali metal silicate selected from the group consisting of
a. crystalline hydrates of sodium metasilicate;
b. crystalline hydrates of sodium sesquisilicate;
c. hydrated amorphous sodium, potassium or mixed sodium-potassium silicate powders containing 10–30% water by weight and having a mole ratio of 1.1 to 3.9 parts of $SiO_2$ per part of $M_2O$, and
d. liquid sodium, potassium or mixed sodium-potassium silicates having a mole ratio of 0.75 to 3.9 parts of $SiO_2$ per part of $M_2O$ and 0 to 90% of a chemical selected from the group consisting of soda ash, ferrosilicon, silica, calcium carbide, lime and iron pyrites.



## 4,018,623
## METHOD OF CUTTING USING A HIGH PRESSURE WATER JET

Michael John Walker, Letchworth, England, assignor to Imperial Chemical Industries Limited, London, England

Filed Feb. 10, 1975, Ser. No. 548,808
Claims priority, application United Kingdom, Feb. 20, 1974, 7769/74
Int. Cl.² B08B 3/02
U.S. Cl. 134—21 7 Claims

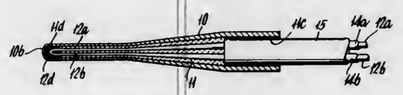



1. A method of cleaning the interior of a polymerisation reactor having polymeric build-up adhering to the inside wall thereof which method comprises delivering a jet of water with hydraulic pressure of at least 70 atmospheres ($68.6 \times 10^5$ $N/m_2$) inside the reactor onto said build-up while maintaining the entire interior of the reactor at sub-atmospheric pressure whereby the jet exerts a cutting action to remove or loosen said polymeric build-up.

## 4,018,624
## THERMOCOUPLE STRUCTURE AND METHOD OF MANUFACTURING SAME

Silvio J. Rizzolo, Nutley, N.J., assignor to Engelhard Minerals & Chemicals Corporation, Murray Hill, N.J.

Division of Ser. No. 390,548, Aug. 22, 1973, Pat. No. 3,942,242. This application Nov. 17, 1975, Ser. No. 632,462
Int. Cl.² H01V 1/02
U.S. Cl. 136—233 19 Claims

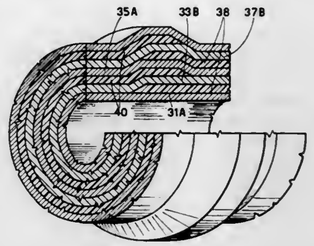



1. A thermocouple structure comprising a pair of thermocouple wires, the wires being joined together at one end to form a thermocouple, a metallic sheath closed at one end surrounding said wires and enclosing at said one end the thermocouple of said wires, the other ends of said wires being positioned outside the open other end of said sheath, the diameter of said sheath and the separation of said sheath from said wires being smaller at said one end than at said other end, crushed compacted mineral oxide contained within said metallic sheath, said mineral oxide serving to insulate said wires from said sheath and serving to insulate one of said thermocouple wires from the other, and ceramic cement provided at the other end of said sheath from which the thermocouple wires extend, said ceramic cement serving to seal said wires within said sheath and to contain the crushed compacted mineral oxide therein.

## 4,018,625
## THERMO-ELECTRIC ASSEMBLIES

Pietro Tinti, Via Unione Sovietica 9, Florence, Italy (I-50126)

Filed Mar. 25, 1975, Ser. No. 561,846
Int. Cl.² H01L 21/02
U.S. Cl. 136—225 2 Claims




1. A method of producing a thermo-electric assembly comprising the steps of depositing a first type of metal by vapor-phase deposition onto a rotating surface in a vacuum to form a cylindrical first metal layer,
depositing a first dielectric layer by vapor phase deposition in a vacuum onto a part of the surface of said first metal layer, said first dielectric layer extending axially from one end of said first metal layer, thereby to leave exposed a portion of said surface of said first metal surface at the opposite end thereof,
depositing a second cylindrical metal layer, of a different type than said first metal layer, by vapor-phase deposition in a vacuum, onto the surface of said first dielectric layer and said exposed portion of said surface of said first metal layer, so as to form with said exposed portion of said first metal layer a first metal-metal junction where said second metal layer contacts said exposed portion of said first metal layer,
depositing a second dielectric layer by vapor-phase deposition in a vacuum onto a part of the surface of said second metal layer, said second dielectric layer extending axially from one end of said second metal layer over a portion of said second metal layer leaving the remaining portion of said second metal layer exposed, and
depositing a cylindrical third metal layer by vapor-phase deposition in a vacuum onto said second dielectric layer and the exposed surface of said second metal layer to form a metal-metal junction where said third metal layer contacts the exposed portion of said second metal layer, the metal of the third metal layer being of the same type as the metal of the first metal layer,
said first and second metal-metal junctions being formed at alternating opposite axial ends of said cylindrical metal layers, whereby a temperature difference can be created between said junctions to generate a thermo-electric e.m.f. between said first and third metal layers.

2. A cylindrical thermo-electric assembly, comprising:
a plurality of cylindrical metal layers each extending along the axial length of said assembly and overlying each other with the metal of one of said metal layers being different than the metal of the one of said metal layers between which it is situated,
and a plurality of dielectric layers arranged between and separating the remaining parts of the surfaces of said metal layers,
said metal and dielectric layers being cylindrical in configuration, each successive dielectric layer extending axially from alternating ends of said assembly along a respective but alternately different one of said metal layers so as to terminate short of the opposite ends of said metal layers, thereby to leave exposed a portion of the underlying one of said metal layers, whereby said metal-metal junctions are formed between the exposed portion of one of said metal layers and that portion of the overlying one of said

metal layers covered by an overlying one of said dielectric layers, said metal-metal junctions thus being formed at alternate axial ends of said cylindrical assembly, whereby a temperature difference may be applied between said axially spaced junctions to generate a thermo-electric e.m.f. between the outermost ones of said metal layers.

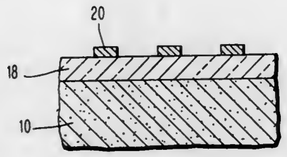
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**4,018,626**

## IMPACT SOUND STRESSING FOR SEMICONDUCTOR DEVICES

**Guenter H. Schwuttke, Poughkeepsie, and Kuei-Hsiung Yang, Wappingers Falls, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Sept. 10, 1975, Ser. No. 612,164**
**Int. Cl.² H01L** *21/304, 21/322*
**U.S. Cl. 148—1.5** **11 Claims**




1. In the process of making semiconductor devices, the improvement comprising the steps of, placing a plurality of loose spherical shaped objects on one face of a semiconductor wafer and acoustically vibrating said wafer whereby said face is damaged in a controlled and uniform manner.

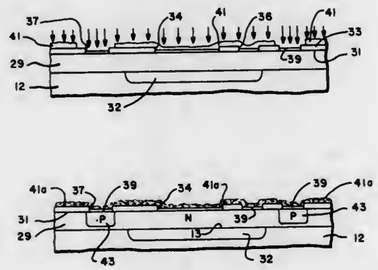
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**4,018,627**

## METHOD FOR FABRICATING SEMICONDUCTOR DEVICES UTILIZING OXIDE PROTECTIVE LAYER

**Bohumil Polata, Los Altos, Calif, assignor to Signetics Corporation, Sunnyvale, Calif.**

**Filed Sept. 22, 1975, Ser. No. 615,483**
**Int. Cl.² H01L** *21/265, 21/31*
**U.S. Cl. 148—1.5** **2 Claims**




1. A method for fabricating semiconductor devices from a semiconductor body having a planar surface comprising the steps of forming a layer of material to be utilized as a mask on said surface, forming a plurality of openings in the layer of material to expose areas of said surface, thereafter forming a thin protective layer, relative to said mask, over each of said exposed areas and maintaining said thin protective layer throughout the fabrication steps, and thereafter selectively doping the areas defined by said openings by ion implantation and selectively covering said openings so that areas exposed are not doped until the proper time in said sequence, said thin protective layer protecting nonselected areas from residual impurity products formed during removal of said selective covering.

**4,018,628**

## PROCESS FOR COLORING ALUMINIUM

**Jean Francois Paulet, Siblingen, Switzerland, assignor to Swiss Aluminium Ltd., Neuhausen am Rheinfall, Switzerland**

**Filed Oct. 17, 1975, Ser. No. 623,480**
**Claims priority, application Switzerland, Oct. 18, 1974, 13993/74; Oct. 7, 1975, 12997/75**
**Int. Cl.² C23F** *7/00, 5/02*
**U.S. Cl. 148—6.27** **13 Claims**

1. In a process for producing a strongly adherent, dark grey to black coating on the surface of aluminum and aluminum alloys,
the steps comprising,
pretreating said surface in an aqueous solution containing at least one salt of a metal selected from the group consisting of iron, copper, nickel, manganese, zinc, tin and chromium; and
forming the coating on the pretreated surface by treating it until the required coloring is obtained, in an aqueous solution stabilized at a pH of from about 6 to about 7.5 with an alkaline amine or amine derivative and containing from about 1% to about 10% molybdate ions and a total of from about 0.2% to about 10% by weight of a salt containing fluoride and/or at least one chloride of a metal selected from the group consisting of nickel, chromium, iron, tin, zinc, copper and manganese and/or an organic chloride compound with active chlorine atoms.

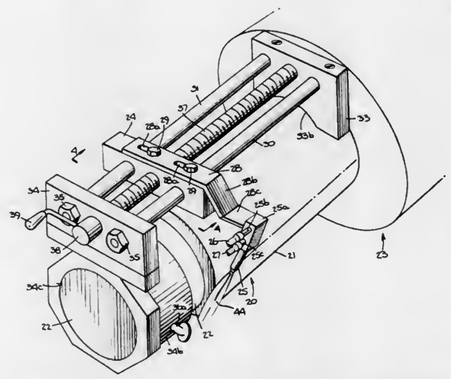
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**4,018,629**

## APPARATUS AND METHOD FOR GUIDING A CUTTING TORCH

**Buel Earl Dickey, Memphis, Tenn., and David Earl Johnson, Nesbit, Miss., assignors to Alco-Gravure, Inc., New York, N.Y.**

**Filed Jan. 9, 1976, Ser. No. 647,885**
**Int. Cl.² B23K** *7/04*
**U.S. Cl. 148—9 R** **13 Claims**



1. Apparatus for guiding a cutting torch to enable the flame thereof to cut a controlled thickness of metal material from a length of the outer surface of a hollow elongated cylindrical workpiece with the interior portion thereof disposed upon a shaft extending beyond one end portion of the workpiece to enable the wall of the workpiece to be severed along the cut comprising:
a. a carriage for holding a cutting torch at a predetermined position with respect thereto;
b. means for slidably supporting the carriage for movement along a path of travel of predetermined length;
c. a pair of means for mounting the supporting means adjacent to the workpiece with the path of travel of the carriage being substantially parallel to the longitudinal axis of the workpiece, each mounting means being spaced apart from the other by a distance substantially equal to the predetermined length of the path of the travel of the carriage and adapted to be disposed adjacent to a different opposite end of the workpiece, one of the pair of mounting means being adapted to engage the outer surface of the workpiece, the other of the pair of mounting means being adapted to engage the outer surface of the portion of the shaft extending beyond one end portion of the shaft extending beyond one end portion of the workpiece, the pair of mounting means enabling a cutting torch when supported by the carriage to have its flame directed toward the outer surface of the workpiece; and
d. means for advancing the carriage along the supporting means at a controlled rate to move the carriage and thereby a cutting torch when attached thereto along the length of and adjacent the outer surface of the workpiece to cut away a major portion of the thickness of the workpiece along its length.



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**4,018,630**

## METHOD OF PREPARATION OF DISPERSION STRENGTHENED SILVER ELECTRICAL CONTACTS

**James S. Hill, Cranford; Emil L. Carbone, Paramus; Victor G. Mooradian, Summit, and Walter G. Keyes, Spotswood, all of N.J., assignors to Engelhard Minerals & Chemicals Corporation, Murray Hill, N.J.**

**Filed Sept. 5, 1975, Ser. No. 610,525**
**Int. Cl.² H01B** *1/02;* **C22C** *1/05, 5/10*
**U.S. Cl. 148—11.5 P** **12 Claims**

1. The method of preparing a composition of Ag and $CeO_2$ comprising the steps of
preparing a powder mixture of Ag and from about 1¼ to about 2½ percent by weight of $CeO_2$,
consolidating said powder mixture into a solid billet, and
mechanically reducing said solid billet into an electrical contact body.

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**4,018,631**

## COATED CEMENTED CARBIDE PRODUCT

**Thomas E. Hale, Warren, Mich., assignor to General Electric Company, Schenectady, N.Y.**

**Filed June 12, 1975, Ser. No. 586,479**
**Int. Cl. C22c** *14/00, 16/00, 27/02, 27/04*
**U.S. Cl. 148—31.5** **7 Claims**

1. The process of pretreating cemented carbide substrate containing tungsten and cobalt for the reception of wear resistant oxide coatings which comprises
a. treating the substrate in a first atmosphere selected from carbide, nitride and carbonitride forming atmospheres to form the corresponding coating of metal selected from titanium, tantalum, hafnium, zirconium, niobium and mixtures thereof on the substrate,
b. firing the coated substrate in a second, nonreactive, atmosphere at a temperature greater than the melting point of the cobalt phase to diffuse tungsten and cobalt into said coating, and
c. heating the product of (b) in a third, oxidizing, atmosphere to oxidize said coating.

5. The product of claim 1.

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**4,018,632**

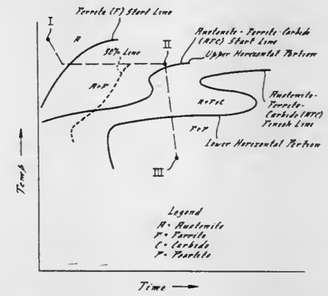
## MACHINABLE POWDER METAL PARTS

**Howard Schmidt, Pontiac, Mich., assignor to Chrysler Corporation, Highland Park, Mich.**

**Filed Mar. 12, 1976, Ser. No. 666,519**
**Int. Cl.² B22F** *3/24;* **C21D** *1/00*
**U.S. Cl. 148—126** **30 Claims**

1. A method of producing machinable steel parts comprising about 0.3 to 0.5% Mo, less than about 0.45% C, less than about 0.9% Mn, balance essentrally iron from powder metal, comprising the steps:
providing a powder metal steel part,
heating the part for a time at a temperature which insures the presence of a substantially austenitic structure in the part,
cooling the part to a first temperature range below the heating temperature, the range being within that at which the part may be held for a period of time to partially transform some of the austenite formed during heating to ferrite without forming any substantial amount of carbides,
holding the part within the first temperature range for a period of time sufficient to effect the partial transformation of the austenite, the remaining austenite becoming carbon enriched as a result thereof,
rapidly cooling the part, at a rate which avoids substantially any transformation during the cooling, to a second temperature range below the first temperature range, within which second temperature range the part may be held for a period of time to substantially transform the remaining austenite to ferrite and pearlite without any other type of substantial carbide formation, and
holding the part within the second temperature range for a period of time sufficient to effect the substantial transformation.

14. A method of preparing powder metal steel parts comprising about 0.3 to 0.5% Mo, less than about 0.45% C, less than about 0.9% Mn, balance essentrally iron which exhibit improved machinability, comprising the steps:
preparing a steel forming powder mixture,
compacting and sintering the mixture,




hot forming the sintered compact to a desired part shape, the hot forming temperature being high enough to insure the presence of a substantially austenitic structure in the part,
cooling the part to a first temperature range below the hot forming temperature, within which temperature range the part may be held for a period of time to partially transform the austenite to ferrite without forming any substantial amount of carbides,
holding the part within the first temperature range for a period of time sufficient to effect the partial transformation of the austenite, the remaining austenite becoming carbon enriched as a result thereof,
rapidly cooling the part, at a rate which avoids substantially any transformation during the cooling, to a second temperature range below the first temperature range, within which second temperature range the part may be held for a period of time to substantially transform the remaining austenite to ferrite and pearlite without any other type of substantial carbide formation, and
holding the part within the second temperature range for a period of time sufficient to effect the substantial transformation.

29. A method of producing steel parts comprising about 0.3 to 0.5% Mo, less than about 0.45% C, less than about 0.9% Mn, balance essentrally iron, comprising the steps:
providing a steel part,
heating the part to an austenitizing temperature,
cooling the part to a first temperature range below the

austenitizing temperature and above the upper horizontal portion of the austenite-ferrite-carbide start line on a time-temperature-transformation graph for the particular steel composition of the part and of the general type shown in the drawing Figure,

maintaining the part within that temperature range for a period of time short of the AFC start line and sufficient to partially transform some of the austenite to ferrite without any accompanying substantial formation of carbides,

rapidly cooling the part to a second temperature range below the first temperature range and below the lower horizontal portion of the AFC finish line on the time-temperature-transformation graph for the alloy, and

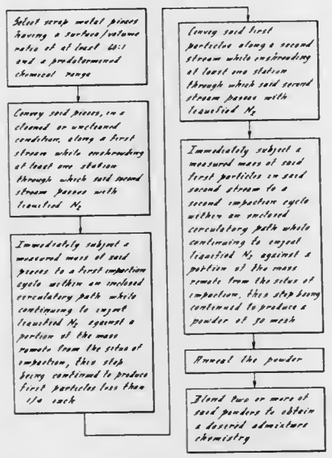
maintaining the part within that temperature range for a period of time sufficient to substantially transform any remaining austenite to a mixture consisting essentially of ferrite and pearlite.

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## 4,018,633
## CRYOGENIC METAL CHIP RECLAMATION

**Maxwell S. Holland, Troy, Mich., assignor to Ford Motor Company, Dearborn, Mich.**

**Filed Nov. 19, 1975, Ser. No. 633,519**
**Int. Cl.² B22F 1/00**
**U.S. Cl. 148—126** **18 Claims**




1. A method of making a metal powder suitable for use as a sinterable powder, the method comprising:

a. selecting and conveying a charge of metal pieces along a continuous stream, said pieces having a transverse dimension no greater than ½ inch,

b. injecting and directing a liquified cryogenic cooling medium, said medium being normally gaseous at ambient temperature conditions, against at least one section of said stream in sufficient amount to reduce the temperature of all the scrap pieces passing through said section to a temperature below the ductile-brittle transition temperature of the metal pieces,

c. immediately conveying the super cooled metal pieces into a circulatory path and repetitively bringing a series of impacting elements against said super cooled pieces causing said pieces to fragment into particles and

d. during said impaction of step (c) injecting a liquid cryogenic cooling medium into said path to insure said pieces and fragmented particles remain below said ductile-brittle transition temperature during any number of circulations in said path.

7. A method of making a metal powder suitable for use as a sinterable powder, the method comprising:

a. selecting scrap metal pieces having a surface/volume ratio of at least 60:1 and a predetermined chemical range,

b. conveying said pieces, in a cleaned or uncleaned condition, along a first stream while shrouding at least one station through which said first stream passes with a liquid cryogenic medium,

c. conveying said cryogenically cooled pieces along a first circulatory path in a slurry formed with additional liquid cryogenic medium,

d. repeatedly impacting said pieces in said slurry with a sufficient force and frequency to fragment and comminute said pieces into a supply of particles having a first predetermined size,

e. separating said supply of particles from said slurry and thence conveying said supply of particles along a second stream while shrouding at least one station through which said second stream passes with a liquid cryogenic medium,

f. conveying said second stream particles along the second circulatory path in the form of a slurry provided by additional introduction of liquid cryogenic medium, and

g. repeatedly impacting said pieces in said second circulatory slurry with sufficient force and frequency to fragment and comminute said pieces into a powder supply having a second predetermined size no greater than 10% of said first predetermined size, said second predetermined size being achieved by at least 90% of the pieces exiting from said second circulatory slurry.

16. A method of producing powder metal, comprising:

a. selecting a charge of metal scrap pieces each carrying machining oil resulting from cutting operations and conveying said scrap pieces along a stream,

b. injecting a liquified cooling medium against a section of said stream so as to contact the pieces at a substantial number of points whereby substantially all of the scrap pieces will be reduced in temperature below their ductile-brittle transition temperature,

c. immediately conveying the super cooled scrap pieces into a circulatory path within a chamber and wherein a series of impacting elements are repetitively brought against said scrap metal pieces and frozen oil to produce a composite homogeneous mixture of metal powder particles and fragmented frozen oil particles, during said impacting step a liquid cryogenic cooling medium is injected against said scrap pieces at a point of said circulatory path remote from said impacting elements to insure that the metal scrap and frozen oil retain their super cooled condition throughout repetitive impacting, and

d. permitting said composite mixture to be elevated to ambient temperature conditions whereby each comminuted frozen oil particle forms a liquid coating along each of the several adjacent metal particles.

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## 4,018,634
## METHOD OF PRODUCING HIGH STRENGTH STEEL PIPE

**Vernon Fencl, Northbrook, Ill., assignor to Grotnes Machine Works, Inc., Chicago, Ill.**

**Filed Dec. 22, 1975, Ser. No. 642,722**
**Int. Cl.² C21D 1/78; B21B 3/00; B23K 31/06**
**U.S. Cl. 148—131** **9 Claims**

1. A method of treating steel pipe made by forming and welding a mother plate, said method comprising the steps of

shrinking the pipe in the radial direction by applying compressive radial pressure to the outside surface of the pipe to reduce the pipe diameter by at least about 1.5% and thereby increase the circumferential compressive yield strength of the pipe,

and then heating the pipe to a temperature below the transformation temperature of the steel but high enough to increase the circumferential tensile yield strength of the pipeabove the tensile yield strength of the mother plate.



## 4,018,635
## PHOSPHOR COMBINATION, PARTICULARLY ADAPTED FOR USE WITH EXPLOSIVES, FOR PROVIDING A DISTINCTIVE INFORMATION LABEL

**Frederick M. Ryan, New Alexandria, and Robert C. Miller, Pittsburgh, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Division of Ser. No. 143,772, May 17, 1971, Pat. No. 3,772,099. This application Mar. 27, 1973, Ser. No. 345,375**
**Int. Cl.² C06B 45/00, 45/02, 39/00; C09K 3/00**
**U.S. Cl. 149—2** **9 Claims**




1. In combination, conglomerated small particles useful for providing an individualistic and readily identifiable indicia, said combination comprising:

a. finely divided inorganic phosphor material which is excited by predetermined energy in order to produce readily detectable radiations;

b. at least one finely divided stable other material which provides an individualistic characteristic that is readily identified once said other material has been located; and

c. inorganic binder material intimately holding together said phosphor material and said other material as a plurality of small particles each comprising conglomerates of said finely divided phosphor material and said finely divided other material.

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## 4,018,636
## SOLUBLE BINDER FOR PLASTIC BONDED EXPLOSIVES AND PROPELLANTS

**Paul L. O'Neill, China Lake, Calif., and Juan L. Hooper, Glenelg North, Australia, assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Apr. 20, 1976, Ser. No. 678,572**
**Int. Cl.² C06B 45/10**
**U.S. Cl. 149—19.4** **6 Claims**

1. An explosive composition consisting essentially of an explosive filler selected from the group consisting of cyclotrimethylenetrinitramine, cyclotetramethylenetetranitramine and pentaerythritol tetranitrate and a binder selected from the group consisting of an isocyanate cured mixture of (1) polyglycol adipate and the polyethylene oxide/propylene oxide glycol adduct of trimethylolpropane, (2) polyethylene glycol and trimethylolpropane, (3) polyethylene glycol and the ethylene oxide capped polypropylene glycol adduct of trimethylolpropane, and (4) ethylene oxide capped polypropylene glycol and the ethylene oxide capped polypropylene glycol adduct of trimethylolpropane.

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## 4,018,637
## NITROCELLULOSE LACQUER WITH SURFACTANT

**Earl J. Kimmel, Tallahassee, Fla., and Charles Earnest Silk, deceased, late of Alton, Ill. (by Wilma F. Silk, sole heir), assignors to Olin Corporation, New Haven, Conn.**

**Filed Feb. 20, 1975, Ser. No. 551,441**
**Int. Cl.² C06B 25/18, 25/20; C09K 3/00; C08B 5/04**
**U.S. Cl. 149—96** **9 Claims**

1. A process for forming a flowable lacquer comprising the steps of:

a. providing a supply of a major amount of nitrocellulose and a minor amount of water;

b. adding to said supply an amount of solvent sufficient to dissolve said nitrocellulose, said solvent being immiscible with said water; and

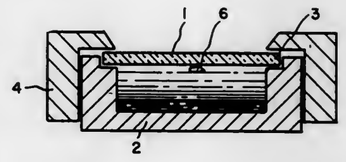
c. adding to said supply an amount of an emulsion inhibitor sufficient to prevent said water from forming discrete globules in the mixture of solvent and dissolved nitrocellulose.

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## 4,018,638
## METHOD OF REDUCING THE THICKNESS OF A WAFER OF FRAGILE MATERIAL

**Barry M. Singer, New York, and Joseph J. Lalak, Briarcliff Manor, both of N.Y., assignors to North American Philips Corporation, New York, N.Y.**

**Filed Aug. 22, 1975, Ser. No. 606,967**
**Int. Cl.² C23F 1/02**
**U.S. Cl. 156—626** **4 Claims**



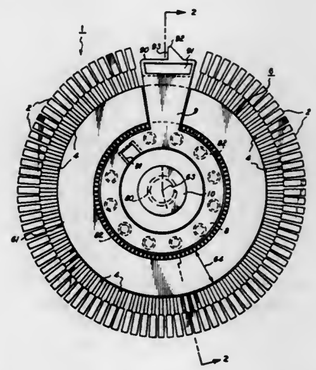

1. A method for reducing the thickness of a wafer of fragile material comprising the steps of placing the wafer supported at its rim in a holder filled with a non-corrosive liquid having a bubble in contact with one surface of the wafer, placing the holder with the exposed surface of the wafer in an etch bath to reduce the thickness of the wafer, transmitting visible radiation through the wafer which is reflected at the bubble and measuring the index of refraction of the wafer to said visible radiation without removing the wafer from the holder to determine the thickness thereof.

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## 4,018,639
## METHOD OF ASSEMBLING A COMPOSITE PRINT WHEEL

**Ernest L. Staples, Jr., Dallas, Tex., assignor to Xerox Corporation, Stamford, Conn.**

**Filed Oct. 15, 1975, Ser. No. 622,565**
**Int. Cl.² B32S 3/20**
**U.S. Cl. 156—73.1** **6 Claims**



1. A method of assembling a composite print wheel comprising the steps of:

locating a hub member in an assembly fixture in a fixed predetermined position,

locating an insert member, with character slugs attached to outer ends of beams, in the assembly fixture in a fixed predetermined position such that print characters on the character slugs align with and fit into a respective molded

likeness of a corresponding print character provided in the assembly fixture; and

fastening the hub member and the insert member together.

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**4,018,640**

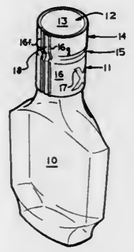
**DECORATIVE NECKBAND LABEL FOR A BOTTLE**

**Stephen W. Amberg, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio**

**Division of Ser. No. 632,333, Nov. 17, 1975, Pat. No. 3,984,005, which is a continuation-in-part of Ser. No. 514,370, Oct. 15, 1974, Pat. No. 3,951,292. This application May 14, 1976, Ser. No. 686,624**

**Int. Cl.² B24C *27/20***

**U.S. Cl. 156—86** **10 Claims**



1. The method of decoratively labelling a bottle comprising making line impressions in the surface of a sheet of cellular, organic polymeric material that is highly oriented along one dimension, by compressing the material along said line and normal to the plane of the sheet, the line impressions providing embossed patterns in the sheet in which said line impressions extend angularly with respect to said highly oriented dimension,

forming a sleeve from the sheet by overlapping the opposite ends thereof which are spaced apart in the direction of said highly oriented dimension, said dimension lying in the circumference of said sleeve, and the compressed line pattern therein being disposed in the interior surface of the sleeve,

fastening said overlapped ends together to secure said sleeve,

placing the sleeve over a bottle, and

heating the sleeve on the bottle sufficient to shrink it into annular snug fitting and surface conforming relationship about the surface of the bottle, the embossed pattern portion of the said material upon shrinking said sleeve about the outer bottle surface providing a raised, embossed pattern in the sleeve label's exterior surface.

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**4,018,641**

**BELTING AND SIMILAR ARTICLES**

**William Kenneth Donaldson, Beverley, England, assignor to J. H. Fenner & Co. Limited, Hull, England**

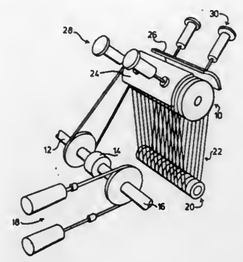
**Filed Aug. 21, 1975, Ser. No. 606,349**

**Claims priority, application United Kingdom, Aug. 21, 1974, 36695/74**

**Int. Cl.² B29H *7/22***

**U.S. Cl. 156—137** **10 Claims**

1. A method of treating by selectively heating and cooling articles in the form of conveyor and power transmission belts and the like during manufacture, said method comprising the steps of presenting limited regions of the article successively to a treatment zone of preselected length wherein the articles are subjected to pressure accompanied by simultaneous heat transfer, displacing the article through said zone between applications of pressure and heat transfer with the extent of



article displacement being short compared to the length of said zone.

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**4,018,642**

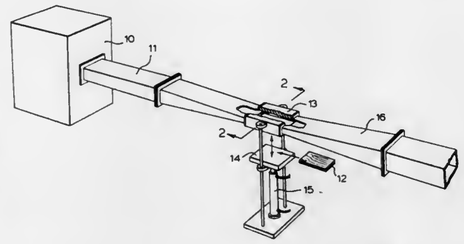
**MICROWAVE CURING OF ALKALINE PHENOLIC RESINS IN WOOD-RESIN COMPOSITIONS**

**Robert L. Pike, and Derek Barnes, both of Vancouver, Canada, assignors to MacMillan Bloedel Limited, Vancouver, Canada**

**Filed Sept. 8, 1975, Ser. No. 610,923**

**Int. Cl.² B29C *19/02***

**U.S. Cl. 156—272** **12 Claims**



1. A method for making a composite product from a composition comprising wood and a binder for said wood, said binder comprising an alkaline phenolic resin whose rate of cure is accelerated by the application of heat, said method comprising locating said composition in juxtaposition with respect to a waveguide such that microwaves propagating through said waveguide in the form of a travelling wave will propagate through said composition, propagating a microwave having a frequency of at least 100 MHz through said waveguide and said composition to heat said resin and accelerate its curing, and applying pressure to said composition before said resin has cured.

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**4,018,643**

**METHOD OF FORMING A PACKET OF SEPARATED MICROSCOPE SLIDES**

**Marshall S. Levine, Wayne, Pa., assignor to Geometric Data Corporation, Wayne, Pa.**

**Filed May 19, 1976, Ser. No. 688,005**

**Int. Cl.² B32B *31/00*; B65B *15/00***

**U.S. Cl. 156—297** **1 Claim**

1. The method of forming a packet of separated microscope slides comprising:

tilting a plurality of microscope slides which are in registration with adjacent slides in contact and parallel to each other to place one edge of each slide substantially in a common plane outside of a substantially parallel plane containing the adjacent parallel edge of the slide while retaining adjacent slides in contact,



securing a length of tape to the edges of the slides in said common plane, and



straightening the slides to separate each slide from its adjacent slides.

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**4,018,644**

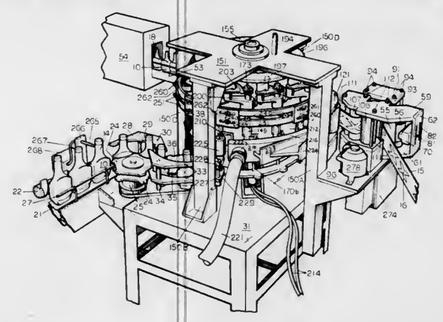
**APPARATUS FOR PRODUCING SHRUNKEN PILFER-PROOF NECK LABELS FOR CONTAINERS**

**Stephen W. Amberg, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio**

**Division of Ser. No. 526,124, Nov. 22, 1974. This application June 2, 1976, Ser. No. 692,067**

**Int. Cl.² B29D *23/10*; B29C *17/00*, *27/00***

**U.S. Cl. 156—446** **2 Claims**



1. A mandrel turret apparatus comprising

a frame,

a central shaft rotatably supported by said frame,

drive means connected to said shaft for rotating said shaft,

an annular hub connected to said shaft for rotation therewith,

a rotary manifold distributor connected to said hub for rotation therewith, a stationary manifold plate having an arcuate chamber thereon, opening toward the distributor,

plural mandrel assemblies connected on said hub in an annular array at equally spaced apart intervals, each mandrel assembly including

a rotatably mounted shaft disposed substantially parallel with said central shaft and having an axial passage,

a cylindrical mandrel sleeve fastened on one end of the shaft, the sleeve having plural apertures on the periphery thereof and encircling said passage,

passage means connecting the axial passage of the shaft and plural apertures of said sleeve,

means connecting the axial passage of the shaft remote from the sleeve apertures to the distributor and including a manifold port on the distributor facing the manifold plate and connected to said arcuate chamber during a portion of each revolution of the central shaft,

rotary drive means connected to the mandrel shaft for rotating it at least one revolution during each revolution of the central shaft,

a sleeve stripper contoured for sliding movement along the mandrel sleeve,

a crank pivotally connected on the hub and connected to said stripper for sliding it along the mandrel,

a cam follower on said crank,

a circular cam encircling the central shaft and guiding the follower for moving the strippers cyclically between retracted and stripping positions along their mandrel sleeves,

a blank loading station adjacent the mandrel path,

means feeding label blanks of flexible sheet-like material at said station for management by a mandrel,

a label blank guide member mounted on the frame adjacent said loading station and extending parallel with the rotary path of said mandrel sleevs for guiding the free portion of blanks during movement past said guide,

a source of heat,

heat applying means individual to the mandrels for applying heat to the blanks wound on the mandrels, and

means for connecting the source of heat to the individual heat applying means in response to movement of each of the mandrels along the guide member for heat sealing the ends of the blanks on the mandrels to form a sleeve thereon.

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**4,018,645**

**METHOD OF CONTROLLING SLIME DURING PAPER MANUFACTURE USING ALPHA-CHLORO-ACYLBENZALDOXIME DERIVATIVES**

**Nobuyasu Takahashi, Koshigaya; Taiichi Yamaguchi, Kasubabe; Junei Sakaguchi, Kawasaki, and Hideo Hamada, Soka, all of Japan, assignors to Somar Manufacturing Co., Ltd., Tokyo, Japan**

**Division of Ser. No. 341,651, March 15, 1973, abandoned. This application Apr. 24, 1975, Ser. No. 571,818**

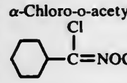
**Claims priority, application Japan, Mar. 16, 1972, 47-26748**

**Int. Cl.² D21D *3/00*; D21H *5/22***

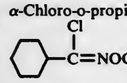
**U.S. Cl. 162—76** **4 Claims**

1. A method for controlling slime in a paper or pulp manufacturing process stream comprising adding to said stream a composition comprising at least α-chloro-acylbenzaldoxime derivative an organic solvent selected from the group consisting of diethylene glycol monomethyl ether, trimethyl benzene, dimethylformamide and xylene in an effective slime controlling amount to maintain a concentration of at least about 2.5 ppm in the process stream of said at least one α-chloro-acylbenzaldoxime derivative which is selected from the group consisting of

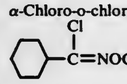
α-Chloro-o-acetylbenzaldoxime



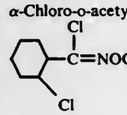
α-Chloro-o-propionylbenzaldoxime



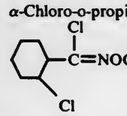
α-Chloro-o-chloroacetylbenzaldoxime



α-Chloro-o-acetyl-2-chlorobenzaldoxime

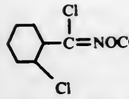


α-Chloro-o-propionyl-2-chlorobenzaldoxime

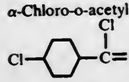


α-Chloro-o-chloroacetyl-2-chlorobenzaldoxime

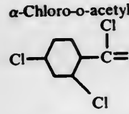
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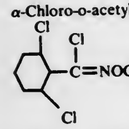
α-Chloro-o-acetyl-4-chlorobenzaldoxime



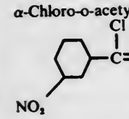
α-Chloro-o-acetyl-2,4-dichlorobenzaldoxime



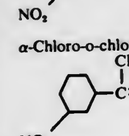
α-Chloro-o-acetyl-2,6-dichlorobenzaldoxime



α-Chloro-o-acetyl-3-nitrobenzaldoxime



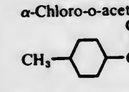
α-Chloro-o-propionyl-3-nitrobenzaldoxime



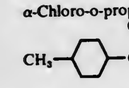
α-Chloro-o-chloroacetyl-3-nitrobenzaldoxime



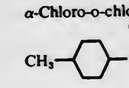
α-Chloro-o-acetyl-4-methylbenzaldoxime



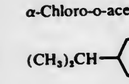
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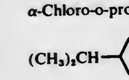
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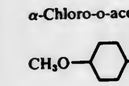
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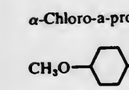
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α-Chloro-o-acetyl-4-methoxybenzaldoxime

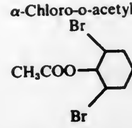


α-Chloro-a-propionyl-4-methoxybenzoldoxine

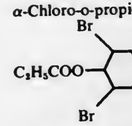


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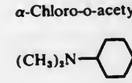
α-Chloro-o-acetyl-4-acetoxy-3,5-dibromobenzaldoxime



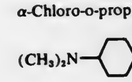
α-Chloro-o-propionyl-4-propionyloxy-3,5-dibromobenzaldoxime



α-Chloro-o-acetyl-4-dimethylaminobenzaldoxime



α-Chloro-o-propionyl-4-dimethylaminobenzaldoxime



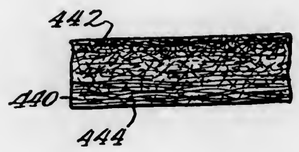
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**4,018,646**

## NONWOVEN FABRIC

Angelo P. Ruffo, Montreal, and Prashant K. Goyal, Roxboro, both of Canada, assignors to Johnson & Johnson, New Brunswick, N.J.

Continuation of Ser. No. 358,783, May 9, 1973, abandoned, which is a division of Ser. No. 108,546, Jan. 21, 1971, Pat. No. 3,768,118. This application Oct. 29, 1975, Ser. No. 626,883
Int. Cl.² D21H 5/26
U.S. Cl. 162—146 4 Claims




1. An air-laid nonwoven web having a thickness from about 1/32 inch to about 1 inch and having a pair of opposed major faces, comprised at one of said faces of a blend of a major proportion by weight of a staple length fiber having a length from about ½ inch to about 2½ inches as a first fiber type and a minor proportion by weight of short cellulose fibers having a length less than about one-fourth inch as a second fiber type interspersed therewith, and comprises at said other face of a blend of a major proportion by weight of said second fiber type and a minor proportion by weight of said first fiber type interspersed therewith, the web between said faces being comprised of a blend of fibers exhibiting a continuous uniform transition in which the proportion of said first fiber in the blend becomes progressively and continuously less with distance from said one face while the proportion of said second fiber in the blend becomes progressively and continuously less with distance from said other face, each of said fiber types being present in an amount of at least 5% at each major face.



**4,018,647**

## PROCESS FOR THE IMPREGNATION OF A WET FIBER WEB WITH A HEAT SENSITIZED FOAMED LATEX BINDER

Popke Wietsma, Velp, Netherlands, assignor to Chemische Industrie AKU-Goodrick B.V., Arnhem, Netherlands

Filed June 10, 1974, Ser. No. 477,910
Claims priority, application Netherlands, June 18, 1973, 7308406
Int. Cl.² D21D 3/00; D21F 11/02; D21H 3/40
U.S. Cl. 162—168 R 3 Claims

1. In the process of manufacturing a fiber web made by the wet method on a paper machine impregnated with a latex binder composition while passing through a screening area of a paper making type machine, the improvement which comprises

applying a foamed latex binder composition heat-sensitized to coagulate in the temperature range of from 35° to 95° C as a layer on the top surface of said web,

drawing said layer of foamed composition into said web by means of suction,

and drying the resulting web and its content of foamed binder composition to coagulate said formed binder composition.

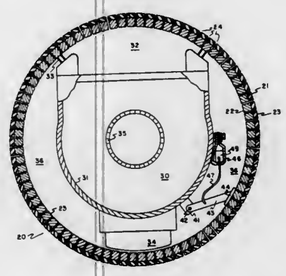
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**4,018,648**

## GALVANIC PROTECTION OF A COUCH ROLL

Harold E. Poyser, Hot Springs, Va., assignor to Westvaco Corporation, New York, N.Y.

Filed Mar. 25, 1976, Ser. No. 670,181
Int. Cl.² D21F 3/10
U.S. Cl. 162—199 8 Claims



1. A papermachine couch roll comprising:

A. Perforated cylinder couch shell means having a metal interior cylindrical surface mounted for rotation about a cylindrical axis;

B. Stationary vacuum box means disposed internally of said shell means for sealing a partial vacuum applied to an arcuate portion of said interior cylindrical surface of said shell means;

C. Electrically conductive brush means secured to said vacuum box means by electrically non-conductive mounting means, said brush means being disposed for maintaining electrical contact with said interior surface during rotation of said shell means; and,

D. Sacrificial anode means comprising a more noble metal in the electromotive series than the interior surface metal of said shell means, said anode means being electrically connected with said brush means.

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**4,018,649**

## PROCESS FOR CONTROL OF CELL DIVISION

Clarence D. Cone, Jr., 104 Harbour Drive, Yorktown, Va. 23490

Continuation of Ser. No. 314,656, Dec. 13, 1972, abandoned, which is a continuation of Ser. No. 125,235, March 17, 1971, abandoned. This application Oct. 17, 1975, Ser. No. 623,238
Int. Cl.² C12K 9/00
U.S. Cl. 195—1.8 10 Claims

1. A reversible process for controlling division of biological cells which consists essentially of

adjusting the effective cellular electrical transmembrane potential difference to a desired level between about −10mV and about −90mV by varying the relative intracellular concentrations of $Na^+$, $K^+$ and $Cl^-$ ions,

maintaining the thus imposed transmembrane potential difference at a constant level for a time sufficient to permit the cell metabolism to stabilize at the imposed level of transmembrane potential difference, and

further maintaining the imposed transmembrane potential difference at a constant level for an additional time sufficient to achieve the desired cellular effect.

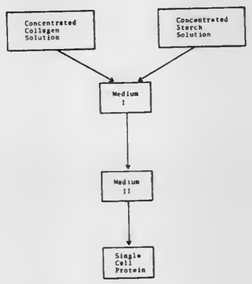
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**4,018,650**

## METHOD OF PRODUCTION AND RECOVERY OF PROTEIN FROM FOOD WASTES

Francis F. Busta, St. Paul; Bruce E. Schmidt, Golden Valley, and Larry L. McKay, St. Paul, all of Minn., assignors to The Regents of the University of Minnesota, Minneapolis, Minn.

Filed Oct. 1, 1975, Ser. No. 618,289
Int. Cl.² C12B 1/00
U.S. Cl. 195—28 R 13 Claims




1. A method of producing and recovering protein from food wastes, which method comprises:

A. preparing a mixed liquid medium from a combination of protein-containing and carbohydrate-containing food wastes,

B. inoculating said medium with a species of Bacillus,

C. maintaining the medium under conditions favorable to microbial growth for a time sufficient to produce a Bacillus-modified enriched medium,

D. inoculating the resulting modified medium with a species of Lactobacillus,

E. maintaining the resulting medium under conditions favorable for microbial growth for a time sufficient to produce Lactobacillus in the enriched medium, and

F. extracting and recovering the resulting Lactobacillus single cell protein.

**4,018,651**

## METHOD FOR REGENERATING GLUCOSE OXIDASE REAGENT

**Elio D. Canto, 425 W. 205th St., New York, N.Y. 10034, and Albert H. Padovani, Orchard Hill Road, Katonah, N.Y. 10536**

**Filed Mar. 20, 1975, Ser. No. 560,231**
**Int. Cl.² G01N *31/14***
**U.S. Cl. 195—103.5 C** **9 Claims**

1. In a method for determining the concentration of glucose in a sample of biological fluid wherein the sample containing glucose is introduced into an aerated reagent comprising glucose oxidase, catalase, and ethanol; the glucose reacts with oxygen present in the aerated reagent; the rate of oxygen consumption is measured; the concentration of glucose is calculated, said concentration being proportional to the rate of oxygen consumption; and the waste liquid comprising the sample and used reagent is collected in a waste container, the improvement which comprises adding to said waste container prior to collection of waste liquid therein, a reagent activator comprising an amount of catalase sufficient to provide a concentration of at least 2 U/ml of added catalase in the total volume of waste liquid collected, aerating the thus treated waste liquid and using said treated aerated waste liquid as the reagent for additional determinations of glucose concentration according to said method.

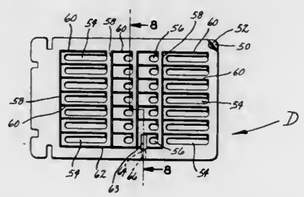
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**4,018,652**

## PROCESS AND APPARATUS FOR ASCERTAINING THE CONCENTRATION OF MICROORGANISM IN A WATER SPECIMEN

**James W. Lanham, St. Louis County; James T. Holen, Florissant, and Norman L. Fadler, St. Peters, all of Mo., assignors to McDonnell Douglas Corporation, St. Louis, Mo.**

**Filed Jan. 9, 1976, Ser. No. 647,802**
**Int. Cl.² C12K *1/04***
**U.S. Cl. 195—103.5 M** **7 Claims**




1. An apparatus for determining the concentration of microorganisms in a water specimen, said apparatus comprising a rigid body having a plurality of first wells and a plurality of second wells therein, the first wells being of equal volume and the second wells being of equal volume with the volume of the second wells being different from that of the first wells, the rigid body also having an inlet which opens outwardly from the body and forms an entry into which the water specimen may be introduced into the body, the rigid body further having filling channels leading up to and opening into the first and second wells, there being a separate filling channel for each first well and for each second well with each filling channel communicating with the inlet such that a water specimen introduced into the inlet passes into the filling channels and then into the wells, the upstream end of each filling channel being in communication with the inlet independently of the other filling channels so that the water specimen will flow into each well without passing through another well; means closing the ends of the wells and the sides of the filling channels for isolating the interiors of the wells and filling channels from the surrounding atmosphere except through the inlet, said means being transparent; and a culture medium in the wells.

5. A process for ascertaining the concentration of microorganisms in a water specimen, said process comprising: placing thewater specimen in communication with filling channels leading to sealed first cavities which are of known and equal volume; placing the water specimen in communication with additional filling channels leading to sealed second cavities which are of known and equal volume, the volume of the second cavities being less than the volume of the first cavities; placing the water specimen under a vacuum so that air is evacuated from the first and second cavities and filling channels through the water specimen; releasing the vacuum and subjecting the water specimen to atmospheric pressure so that the water specimen is forced through the filling channels and into the first and second cavities to take the place of the evacuated air; mixing the water specimen with a nutrient medium such that a mixture of water specimen and nutrient medium exists in the first and second cavities; observing the water specimen in the first and second cavities for a change in the appearance thereof to determine the number of cavities which change appearance, and comparing the number of cavities which do change appearance with tabulated results derived from statistical evaluations to determine the concentration of microorganisms.

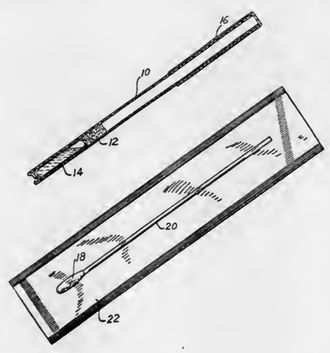
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**4,018,653**

## INSTRUMENT FOR THE DETECTION OF *NEISSERIA GONORRHOEAE* WITHOUT CULTURE

**Frederick C. Mennen, La Porte, Ind., assignor to U.S. Packaging Corporation, La Porte, Ind.**

**Division of Ser. No. 193,739, Oct. 29, 1971, Pat. No. 3,876,503. This application Dec. 30, 1974, Ser. No. 537,593**
**The portion of the term of this patent subsequent to Apr. 8, 1992, has been disclaimed.**
**Int. Cl.² C12K *1/10***
**U.S. Cl. 195—127** **4 Claims**



1. A swabbing instrument for use in the rapid detection of *Neisseria gonorrhoeae* without gram-staining and without culture by providing an initial distinctive color change on the swab of the instrument after collecting an inoculum on the swab, said instrument consisting essentially of:

a stick for the swab used to collect the inoculum;

a sterile swab mounted on said stick for obtaining a clinical specimen of said Neisseria from the penis as an exudate and the only inoculum of bacteria at the collection site from the patient;

a tube of transparent plastic having flexible side walls and a closed end into which the swab and inoculum are inserted by the stick;

A dry substantially colorless pledget disposed in said tube which is impregnated with a dilute colorless solution of N, N, N′ N′ tetramethyl-p-phenylenediamine dihydrochloride in alcohol which has been dried;

a frangible ampul containing a wetting activating agent for said tetramethyl-p-phenylenediamine compound in said tube;

said dry pledget placed above said ampul and reacting when wetted after breaking of said ampul to wet said swab without coloration but to react with *Neisseria gonorrhoeae* in the inoculum on said swab to produce a distinctive initial color change;

said wetting activating agent constituting the sole liquid agent to activate said dry pledget and said agent being selected from the group consisting of water, physiological saline, and aqueous buffer solutions at pH 6.5 to 7.2; and,

said initial distinctive color change being a purple shade produced on the inoculum on said swab at the site of collection of the bacteria, after said clinical specimen of exudate is taken from the patient and the swab is placed on the wetted pledget, wetted with said activating agent, and within two minutes to be directly indicative of *Neisseria gonorrhoeae* bacteria in said specimen.



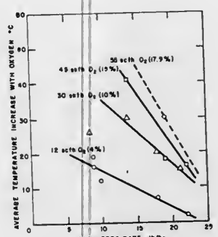
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**4,018,654**

## PRETREATMENT OF COAL DURING TRANSPORT

**Glenn E. Johnson, Pittsburgh; Harry B. Neilson, Clairton; Albert J. Forney, Coraopolis, and William P. Haynes, Pittsburgh, all of Pa., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.**

**Filed Sept. 5, 1974, Ser. No. 503,537**
**Int. Cl.² C10B *57/08*; C10L *9/00***
**U.S. Cl. 201—9** **1 Claim**




1. In a process for decaking a caking coal including a pretreatment step to reduce its agglomerating properties while it is being transported to a treating zone for subsequent treatment the improvement within said pretreatment step comprising passing the coal having a particle size of 50 to 250 microns at a rate of 5 to 100 lb/hr entrained in nitrogen gas in mixture with 4 to 15% by weight oxygen at a flow rate sufficient to provide at least 0.2 ft of oxygen per pound of coal, heating said cool entrained within said nitrogen-oxygen mixture in a passage of about ½ inch diameter to a temperature of 300° to 425° C but below the caking temperature of said coal, at a pressure of 100 psig to 600 psig for a residence time of the coal in the heated passage of 1 to 15 seconds; whereby a FSI of 2 or below is achieved.

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**4,018,655**

## PROCESS FOR FEEDING COAL INTO HORIZONTAL-CHAMBER COKE-OVENS AND CHARGING TRUCK THEREFOR

**Horst Fach, Essen, Germany, assignor to Didier Engineering GmbH, Essen, Germany**

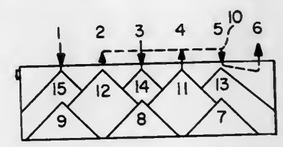
**Filed July 3, 1975, Ser. No. 593,045**
**Claims priority, application Germany, July 11, 1974, 2433346**
**Int. Cl.² C10B *57/00***
**U.S. Cl. 201—40** **5 Claims**

1. A process for feeding coal into horizontal-chamber coke-ovens of the type including a plurality of first filling openings and a plurality of second filling openings each positioned between adjacent of said first filling openings, said filling openings being substantially equally spaced and being arranged side by side in each coke-oven chamber, said process comprising:

first feeding through one of said first filling openings positioned adjacent to a riser leading from said oven chamber a partial portion of the total amount of coal to be introduced into said oven chamber through said one first filling opening, said first feeding through said one first filling opening being completed when the outer edge of the base of a resultant cone-shaped charge is situated approximately below one of said second filling openings adjacent said one first filling opening;

thereafter feeding through the remainder of said first filling openings partial portions of the respective total amounts of coal to be introduced into said oven chamber through said remainder of said first filling openings;

said partial portions being introduced through said first




filling openings until the bases of the resultant cone-shaped charges thus formed approximately contact each other;

thereafter feeding through each of said second filling openings partial portions of the respective total amounts of coal to be introduced into said oven chamber through said second filling openings, said step of feeding through said second filling openings being completed a short time before the coal would run over said cone-shaped charges formed during said steps of feeding through said first filling openings; and

subsequently alternately repeating feeding of coal through said one first filling opening, said remainder of said first filling openings and said second filling openings until said oven chamber is filled.

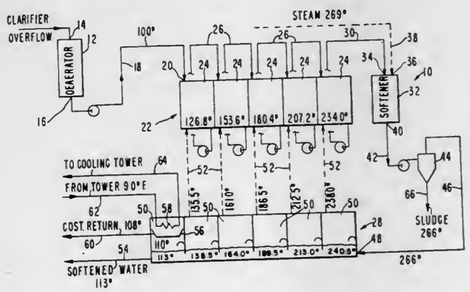
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**4,018,656**

## THERMAL SOFTENING AND DISTILLATION BY REGENERATIVE METHOD

**Alfred N. Rogers, Pleasanton; Leon Awerbuch, San Francisco, and Jack Z. Abrams, San Rafael, all of Calif., assignors to Bechtel International Corporation, San Francisco, Calif.**

**Filed Sept. 3, 1974, Ser. No. 502,465**
**Int. Cl.² B01D *3/06***
**U.S. Cl. 203—11** **21 Claims**




1. A method of treating water having dissolved impurities therein with at least certain of the impurities having solubilities which vary inversely with temperature comprising: directing a continuous flow of impure water along a first path; preheating said impure water as it flows along said first path; urging said preheated water through a region at which said water is heated to a temperature sufficient to cause at least some of said certain impurities therein to be precipitated; separating the precipitated impurities from said water to

thereby purify the latter; directing the purified water along a second path; and reducing the pressure of said purified water as it flows along said second path to cause a portion of said purified water to flash into a vapor, said preheating step including directing said vapor into said first path and into direct, admixing contact with said impure water flowing therethrough to heat the latter.

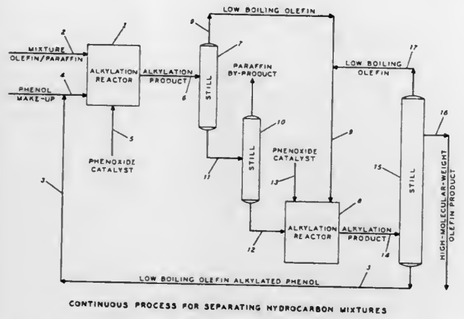
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**4,018,657**

## SEPARATION OF HYDROCARBON MIXTURES BY ALKYL DISPLACEMENT

**William A. Sweeney, Larkspur, and Milutin Simic, Novato, both of Calif., assignors to Chevron Research Company, San Francisco, Calif.**

**Filed Apr. 1, 1976, Ser. No. 672,704**
**Int. Cl.² C07C *11/02*; B01D *3/34***
**U.S. Cl. 203—38** **6 Claims**




CONTINUOUS PROCESS FOR SEPARATING HYDROCARBON MIXTURES

1. A process for separating a close-boiling mixture comprising high-molecular-weight olefins and paraffins which comprises the steps of:

1. contacting a paraffin-dilute high-molecular-weight olefin mixture with a phenolic compound in the presence of a phenoxide alkylation catalyst under conditions effective to cause olefin alkylation between the high-molecular-weight olefin and the phenol to prepare a high-molecular-weight alkyl phenol;
2. recovering the high-molecular-weight alkyl phenols;
3. contacting the high-molecular-weight alkyl phenol with an excess of low-molecular-weight olefin in the presence of a phenoxide alkylation catalyst under conditions effective to regenerate the high-molecular-weight olefin; and
4. recovering paraffin-free high-molecular-weight olefin.

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**4,018,658**

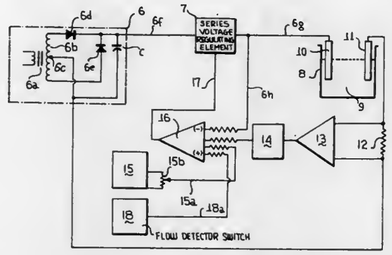
## ELECTROPLATING OF RECOVERABLE SILVER FROM PHOTOGRAPHIC SOLUTIONS AND CELL WITH CURRENT CONTROL MEANS THEREFOR

**Norman J. Alfin, Glen Arm, and Robert Scott, Westminster, both of Md., assignors to Merlin Industries, Inc., Westminster, Md.**

**Filed Dec. 26, 1974, Ser. No. 536,463**
**Int. Cl.² C25C *1/20, 7/00***
**U.S. Cl. 204—109** **20 Claims**

1. An electroplating system for removing silver from solution and for automatically closely matching the proper current density with changing silver concentrations in order to maximize silver conversion efficiency, which comprises a plating tank for said solution wherein said plating tank includes a cathode upon which said silver is to be plated and an anode, a control voltage regulatable source of DC voltage connected between said anode and said cathode, means for measuring the voltage across said cathode and said anode, and means for measuring the current flowing through said solution directly between said cathode and said anode to thereby sense the change in conductivity or resistance of the solution, said anode and said cathode act as sensing elements for measuring said voltage and said current, and analog circuit means responsive to the voltage across said anode and said cathode and the current flowing through said solution and thereby responsive to the resistance or conductivity of said solution for regulating said voltage in a predetermined voltage versus current characteristic to thereby automatically closely match the proper current density with changing silver concentration and the change of interface between the cathode and the solution in order to maximize silver conversion efficiency and minimize production of silver sulfide and production of hydrogen sulfide.

11. An electroplating process for removing silver from solution and for automatically closely matching the proper current density with changing silver concentrations in order to maximize silver conversion efficiency which comprises, introducing said solution into a plating tank which includes a cathode upon which said silver is to be plated and an anode; measuring the voltage across said cathode and said anode and measuring the current flowing through said solution directly




between said cathode and said anode by employing said cathode and said anode as sensing elements; and regulating the voltage to the plating tank in response to the voltage across said cathode and said anode and the current flowing through the solution directly between said cathode and said anode to thereby automatically closely match the proper current density with changing silver concentration in order to maximize silver conversion efficiency and at least minimize precipitation of silver sulfide and production of hydrogen sulfide.

15. A plating tank comprising a hollow cylindrical cathode being flexible and open ended and being removable from said tank and which can be flexed manually; a hollow cylindrical anode located internally of said hollow cylindrical cathode, a rotatable magnetic drive including a first magnet located interiorly of said anode, a motor coupled to rotate said first magnet and located interiorly of said anode, a second rotatable magnet located above said cylindrical anode in solely magnetically coupled relation to said first magnet, and stirring means mechanically coupled to said second magnet and extending into said tank between said anode and said cathode.

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**4,018,659**

## METHOD FOR RADIATION POLYMERIZATION AND COPOLYMERIZATION OF ISOBUTYLENE BY A CATIONIC MECHANISM

**Miroslav Marek; Ludek Toman, and Jan Pecka, all of Prague, Czechoslovakia, assignors to Ceskoslovenska akademie ved, Prague, Czechoslovakia**

**Division of Ser. No. 275,157, July 26, 1972, Pat. No. 3,897,322. This application Apr. 3, 1975, Ser. No. 564,602**
**Claims priority, application Czechoslovakia, July 29, 1971, 5555/71**
**Int. Cl.² C08D *1/00*; C08F *1/16***
**U.S. Cl. 204—159.24** **10 Claims**

1. A method for the polymerization of isobutylene, which comprises subjecting to a source of light selected from the group consisting of ultraviolet light, visible light, and infrared light at a temperature between about 0° C. and about −140° C.



an isobutylene feed selected from the group consisting of (a) essentially isobutylene and (b) essentially a mixture of isobutylene and butadiene and/or isoprene in the presence of at least one halide catalyst selected from the group consisting of tetravalent vanadium, titanium and zirconium halides and in the presence of at least one activator for said halide catalyst selected from the group consisting of magnesium aluminate, magnesium carbonate, and magnesium silicate, the molar ratio of said halide catalyst to said activator ranging from $10^3$ to $10^3$ part of halide catalyst to 1 part of activator.

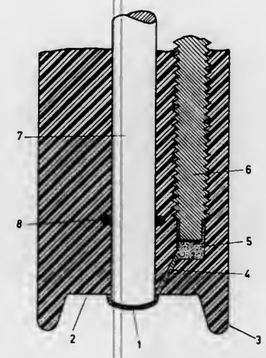
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**4,018,660**

## GAS ELECTRODE

**Elo Harald Hansen, Lyngby, and Jaromir Ruzicka, Naerum, both of Denmark, assignors to Zellweger Uster AG, Uster, Switzerland**

**Filed June 20, 1974, Ser. No. 481,047**
**Claims priority, application Denmark, July 5, 1973, 3757/73**
**Int. Cl.² G01N *27/46***
**U.S. Cl. 204—195 R** **13 Claims**



1. An electrochemical cell for measuring the gas content in a sample solution by pH measurement without immersing said electrochemical cell in said sample solution, said electrochemical cell comprising an ion-sensitive electrode and a reference electrode, an electrolyte solution for placing said ion-sensitive electrode and reference electrode in electrochemical contact with one another, said electrolyte forming a continuous, stabilized, stationary thin-film covering at least a portion of the surface of said ion-sensitive electrode, said electrolyte solution being retained in a chamber, said chamber communicating with said stationary thin-film through the agency of a porous plug, said thin-film of electrolyte solution covering said surface portion of the ion-sensitive electrode having an exposed surface which is adapted to be in direct physical contact with the gas evolved from said sample solution.

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**4,018,661**

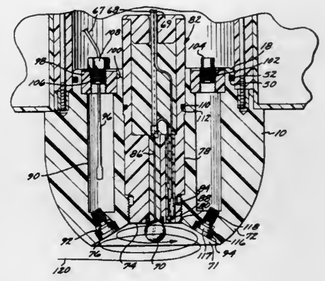
## INSTRUMENT SENSOR ASSEMBLY

**Gordon R. Brushwyler, Anaheim, and Timothy F. Scott, Brea, both of Calif., assignors to Robertshaw Controls Company, Richmond, Va.**

**Filed Sept. 4, 1975, Ser. No. 610,278**
**Int. Cl.² G01N *27/46***
**U.S. Cl. 204—195 F** **11 Claims**

1. An instrument probe assembly comprising:

a. a probe member housing having a closed end for immersion in a liquid;
b. an open-ended concave recession in the closed lower end of said housing having a centrally recessed portion with an annular sidewall thereabout, inclined to the longitudinal axis of said housing;
c. at least one through opening in the sidewall of said concave recession; and
d. a probe member mounted for exposure to said liquid



seated in said through opening and having an exposed surface generally continuous with said sidewall.

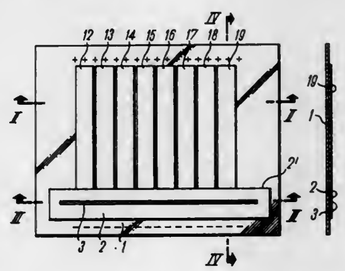
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**4,018,662**

## METHOD AND APPARATUS FOR SIMULTANEOUS QUANTITATIVE ANALYSIS OF SEVERAL CONSTITUENTS IN A SAMPLE

**Gerhard Rubenstroth-Bauer, Grafelfing, and Reiner Scherer, Munich, both of Germany, assignors to Max-Planck-Gesellschaft zur Forderung der Wissenschaften e.V., Gottingen, Germany**

**Filed Jan. 2, 1976, Ser. No. 646,391**
**Claims priority, application Germany, Jan. 3, 1975, 2500218**
**Int. Cl.² G01N *27/00, 27/26***
**U.S. Cl. 204—299 R** **8 Claims**



1. An apparatus for the simultaneous qualitative and quantitative analysis of a plurality of immuno-reactive substances in a sample, comprising:

i. a base;
ii. a first layer of a first carrier material deposited on said base to a defined extent, said first carrier material being free from antibodies capable of reacting with any substance in said sample; and including a depression for receiving said sample;
iii. a plurality of second layers of a second carrier material, deposited on said base to a defined extent adjacent the extent of said first layer, each of said plurality of second layers including a different ingredient capable of undergoing a precipitate-forming immunoreaction with a specific one of a plurality of substances to be analyzed in said sample.

## 4,018,663
## COAL LIQUEFACTION PROCESS

**Clarence Karr, Jr., Morgantown, W. Va., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.**

**Filed Jan. 5, 1976, Ser. No. 646,706**
**Int. Cl.² C10G *1/08***
**U.S. Cl. 208—10** **6 Claims**

1. An improved liquefaction process comprising passing a liquid coal slurry containing suspended materials under a pressure of hydrogen of 1000–2000 psig and at a temperature in the range 400° to 450° C. through a first reactor containing a charge of porous inert inorganic nominally non-catalytic material having a sufficiently high pore size and surface area so as to promote at least partial hydrogenation of asphaltenes, passing the partially hydrogenated hydrogen-pressurized slurry to a second reactor to contact a charge of hydrogenation catalyst at a temperature in the range 350° to 400° C. and removing a liquid fuel from said second reactor as product.

## 4,018,664
## METHOD FOR REDUCING MINERAL CONTENT OF SLUDGE

**Frederick A. Bain, Willowdale, and John O. L. Roberts, Toronto, both of Canada, assignors to Great Canadian Oil Sands Limited, Toronto, Canada**

**Filed May 27, 1975, Ser. No. 580,852**
**Int. Cl.² C10G *1/04***
**U.S. Cl. 208—11 LE** **4 Claims**

1. A method for treating the sludge layer of a retention pond associated with the hot water extraction of bitumen from tar sands said sludge layer containing 20 to 50% solids including 0.5 to 25.0% bitumen comprising:
a. withdrawing said sludge from the retention pond;
b. diluting and mixing said sludge with additional water to provide a sludge stream containing 6 to 18% solids;
c. settling said diluted sludge to form an upper layer of bituminous froth, a middle layer comprised of water having a substantially lower solids content than said sludge, and a lower layer containing a substantially higher solids content than said sludge;
d. recovering said middle layer, and
e. recovering said lower layer.

## 4,018,665
## RECYCLING AERATED SCAVENGED MIDDLINGS TO CONDITIONING STEP OF HOT WATER EXTRACTION PROCESS

**Joseph C. Anderson, Fort McMurray, Canada, assignor to Great Canadian Oil Sands Limited, Toronto, Canada**

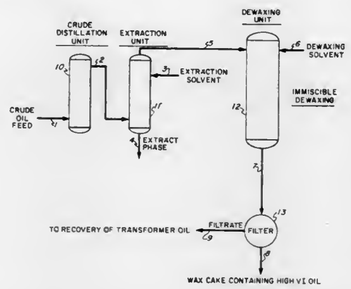
**Continuation of Ser. No. 507,823, Sept. 20, 1974, abandoned. This application July 26, 1976, Ser. No. 708,790**
**Int. Cl.² G10G *1/04***
**U.S. Cl. 208—11 LE** **5 Claims**

5. In a hot water extraction process for the recovery of bitumen from tar sands including the steps of:
a. forming a mixture of tar sands and water;
b. settling the mixture in a separation zone to form an upper bitumen froth layer, a sand tailings layer, and a middlings layer containing water, silt, clay, and bitumen;
c. separately recovering the bitumen froth layer and the sand tailings layer;
d. passing a stream of middlings to an air scavenger zone and therein aerating said middlings to provide additional bitumen froth and an aerated bitumen depleted middlings material stream; and
e. recovering the additional bitumen froth;
an improvement which comprises adding at least some of the aerated bitumen-depleted middlings material stream from step (d) in an aerated condition, to the mixture being formed in step (a).

## 4,018,666
## PROCESS FOR PRODUCING LOW POUR POINT TRANSFORMER OILS FROM PARAFFINIC CRUDES

**Lloyd E. Reid, Sarnia, and David A. Gudelis, Mississauga, both of Canada, assignors to Exxon Research and Engineering Company, Linden, N.J.**

**Filed July 28, 1975, Ser. No. 599,690**
**Int. Cl.² C10G *43/08***
**U.S. Cl. 208—36** **16 Claims**

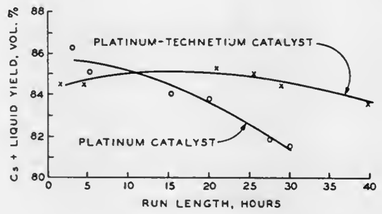



1. A process for producing a low pour point transformer oil which comprises:
a. solvent extracting a waxy distillate fraction of a paraffinic crude, said fraction having a 5 to 95% boiling range of 595° to 755° F at atmospheric pressure, to produce an extract and a raffinate;
b. solvent dewaxing said raffinate at a temperature of from about −10° to −40° F under liquid-liquid immiscible conditions to form a three-phase slurry containing a solid waxy phase, an oil-rich liquid phase and a solvent-rich liquid phase;
c. filtering said slurry at a temperature of from about −10° to about −40° F to form a filtrate substantially comprising the solvent-rich phase which contains the desired transformer oil, and a wax cake containing the oil-rich phase; and
d. recovering a low pour point transformer oil from said filtrate only by removing solvent from same.

## 4,018,667
## HYDROCARBON CONVERSION PROCESS

**Melvin M. Holm, Alameda, Calif., assignor to Chevron Research Company, San Francisco, Calif.**

**Division of Ser. No. 801,008, Feb. 20, 1969, Pat. No. 3,968,025. This application Nov. 24, 1975, Ser. No. 634,801**
**Int. Cl.² C10G *35/06***
**U.S. Cl. 208—134** **4 Claims**




1. A process for reforming a naphtha which comprises contacting said naphtha and hydrogen with a catalyst comprising a catalytic metal component consisting essentially of 0.1 to 10 weight percent technetium in association with a porous carrier at naphtha reforming conditions.



## 4,018,668
## HYDROCARBON CONVERSION WITH AN ACIDIC MULTIMETALLIC SULFUR-FREE CATALYTIC COMPOSITE

**Ernest L. Pollitzer, Skokie, and John C. Hayes, Palatine, both of Ill., assignors to Universal Oil Products Company, Des Plaines, Ill.**

**Filed Jan. 16, 1975, Ser. No. 541,674**
**Int. Cl.² C10G *35/08*; B01J *23/74*; C10G *13/02*; C07C *5/28***
**U.S. Cl. 208—139** **18 Claims**

1. A process for converting a hydrocarbon which comprises contacting the hydrocarbon at hydrocarbon conversion conditions with an acidic sulfur-free catalytic composite comprising a porous carrier material containing, on an elemental basis, about 0.01 to about 2 wt. % platinum group metal selected from the group consisting of iridium, rhodium and palladium, about 0.1 to about 3.5 wt. % halogen, lead in an atomic ratio to platinum group metal of about 0.5:1 to about 1.5:1 and cobalt in an atomic ratio to platinum group metal of at least 5:1 to about 25:1, wherein the platinum group metal, cobalt, and lead are uniformly dispersed throughout the porous carrier material, wherein substantially all of the platinum group metal is present in the elemental metallic state, wherein substantially all of the lead is present in an oxidation state above that of the elemental metal, and wherein substantially all of the cobalt is present in the elemental metallic state or in a state which is reducible to the elemental metallic state under hydrocarbon conversion conditions.

## 4,018,669
## HYDROCARBON CONVERSION WITH AN ACIDIC MULTIMETALLIC CATALYTIC COMPOSITE

**John C. Hayes, Palatine, and Ernest L. Pollitzer, Skokie, both of Ill., assignors to UOP Inc., Des Plaines, Ill.**

**Continuation-in-part of Ser. No. 522,209, Nov. 8, 1974, Pat. No. 3,960,710. This application May 17, 1976, Ser. No. 687,135**
**Int. Cl.² C10G *35/08***
**U.S. Cl. 208—139** **23 Claims**

1. A process for converting a hydrocarbon which comprises contacting the hydrocarbon at hydrocarbon conversion conditions with an acidic catalytic composite comprising a porous carrier material containing, on an elemental basis, about 0.01 to about 2 wt. % platinum or palladium, about 0.01 to about 2 wt. % rhodium, about 0.05 to about 5 wt. % cobalt and about 0.1 to about 3.5 wt. % halogen; wherein the platinum or palladium, rhodium, and catalytically available cobalt are uniformly dispersed throughout the porous carrier material; wherein substantially all of the platinum or palladium and rhodium are present in the elemental metallic state; and wherein substantially all of the catalytically available cobalt is present in the elemental metallic state or in a state which is reducible to the elemental metallic state under hydrocarbon conversion conditions or in a mixture of these states.

## 4,018,670
## HYDROCARBON CONVERSION PROCESS

**John H. Sinfelt, Berkeley Heights, and Allan E. Barnett, Westfield, both of N.J., assignors to Exxon Research and Engineering Company, Linden, N.J.**

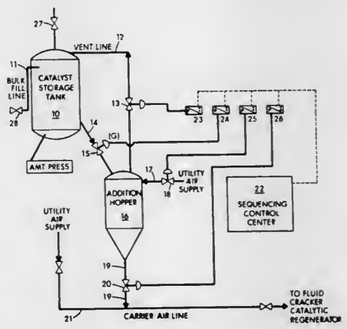
**Continuation-in-part of Ser. No. 194,461, Nov. 1, 1971, Pat. No. 3,850,747, which is a continuation-in-part of Ser. No. 883,601, Dec. 9, 1969, abandoned. This application July 30, 1974, Ser. No. 493,126**
**Int. Cl.² C10G *35/08*; B01J *11/18***
**U.S. Cl. 208—140** **17 Claims**

1. A hydrocarbon conversion process which comprises contacting a hydrocarbon feedstock, under conversion conditions, with a catalyst comprising greater than 0.1 wt. % iridium, based on total catalyst and 0.1 to 1.0 wt. % of at least one additional catalyst metal selected from the group consisting of ruthenium, rhodium, palladium, osmium, platinum, copper and silver, based on total catalyst, said iridium and additional catalyst metal being present on a refractory support and in an atomic ratio varying from 1:10 to 10:1, the surface area of said iridium and additional catalyst metal on said support being at least 200 square meters per gram of said iridium and additional catalyst metal as determined by carbon monoxide chemisorption techniques, depositing carbonaceous materials on the surface of said catalyst as a result of the hydrocarbon conversion process, and periodically regenerating said catalyst by burning substantially all of the carbonaceous materials from said catalyst in the presence of oxygen while maintaining the temperature during said burning below about 850° F. and thereby maintaining the surface area of the iridium and additional catalyst metal above about 150 square meters per gram.

## 4,018,671
## INTERMITTENT CATALYST ADDITION SYSTEM

**Nicholaki A. Andon, Westland, and Robert I. Fleece, Detroit, both of Mich., assignors to Marathon Oil Company, Findlay, Ohio**

**Filed Jan. 24, 1975, Ser. No. 543,719**
**Int. Cl.² C10G *9/32***
**U.S. Cl. 208—152** **6 Claims**




1. In the catalytic conversion of feed materials by contacting said feed materials in a converter system with catalyst in a fluidized state, some of which catalyst is lost from said catalytic cracking process through reduced activity and/or entrainment in the effluent from said process, the improvement comprising:
a. storing said catalyst in a storage tank maintained at a first internal pressure and having a conduit communicating through a storage valve with an addition hopper;
b. maintaining said addition hopper at a pressure corresponding substantially to said first pressure of said storage tank by operaton of a venting means and opening said storage valve to admit said catalyst to a predetermined level in said addition hopper, said addition hopper communicating through an addition valve to a carrier gas line leading to said converter;
c. closing said venting means and pressurizing said addition hopper to a second addition pressure;
d. thereafter opening said addition valve and permitting said addition hopper to empty into said carrier gas line;
e. after emptying of said addition hopper, closing said addition valve, opening said venting means to reduce the pressure in said addition hopper to said first pressure, and opening said storage valve to admit additional catalyst to fill said addition hopper to a predetermined level determined by the volume of said addition hopper;
f. thereafter closing said venting means, closing said storage valve and admitting additional gases to raise the pressure of said addition hopper to said addition pressure;
g. thereafter opening said addition valve to admit additional catalyst to said carrier gas line and repeating the above cycle.

4,018,672

## HYDRODESULFURIZATION CATALYST AND PROCESS UTILIZING THE SAME

William R. Moser, Wayland, Mass., assignor to Exxon Research and Engineering Company, Linden, N.J.

Filed Dec. 11, 1975, Ser. No. 639,867
Int. Cl.² C10G 23/02
U.S. Cl. 208—216 11 Claims

1. In a process for the hydrodesulfurization of a sulfur-containing hydrocarbon oil which comprises contacting said oil under hydrodesulfurization conditions with hydrogen and a catalyst comprising an alumina support composited with a hydrogenation component, said hydrogenation component being selected from the group consisting of at least one elemental metal, metal oxide and metal sulfide of a Group VIB element of the Periodic Table of Elements and at least one elemental metal, metal oxide and metal sulfide of a Group VIII element of the Periodic Table of Elements, the improvement which comprises said alumina having been prepared by hydrolyzing an aluminum alcoholate to aluminum hydroxide, and thermally decomposing said aluminum hydroxide in a solvent selected from the group consisting of C1 to C4 alcohols, acetone, methyethylketone, cyclic ethers and tetrahydrofuran, at a temperature ranging from above the critical temperature of said solvent to a temperature of about 980° C.

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4,018,673

## CENTRIFUGE PROCESSING OF HIGH-SOLIDS CLAY

Randall E. Hughes, Sandersville, and Edward P. Jordan, Thomson, both of Ga., assignors to Thiele Kaolin Company, Sandersville, Ga.

Filed Feb. 27, 1976, Ser. No. 662,135
Int. Cl.² B03B 1/04
U.S. Cl. 209—5 15 Claims

1. A method of removing coarse materials and chemical and mineral impurities from clay, which comprises forming a high solids slurry of a crude clay, water and a dispersing agent, said crude clay containing coarse material and chemical and mineral impurities, the quantity of water being sufficient to form a pumpable slurry which will not settle when subjected to static forces for 24 hours, the amount of said dispersing agent being sufficient to obtain the minimum viscosity for said slurry; subjecting said slurry to intense centrifugal forces for a short period of time; separating said coarse material and said chemical and mineral impurities; and recovering the suspended clay as a fine fraction having a reduced content of coarse material and reduced content of chemical and mineral impurities.

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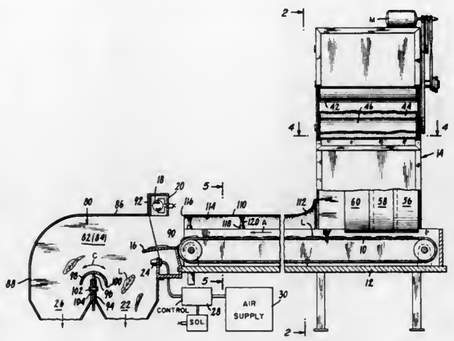
4,018,674

## APPARATUS FOR AUTOMATICALLY GRADING LEAF TOBACCO

Bennie A. Morris, 206 W. Lavender Ave., Durham, N.C. 27704

Continuation-in-part of Ser. No. 228,965, Feb. 24, 1972, abandoned. This application Nov. 26, 1974, Ser. No. 527,362
Int. Cl.² B07C 5/342
U.S. Cl. 209—73 25 Claims

1. In the system for sorting tobacco leaf wherein said leaves are carried on a horizontal endless belt conveyor past a sensing station, the method of delivering said leaves from a source to said conveyor comprising the steps of feeding within an enclosed housing vertically disposed above said conveyor a random stream of said leaves so as to fall perpendicularly to said conveyor deflecting said leaves in a plurality of selected paths, each intersecting a major portion of said perpendicularly falling stream within said housing transversely to the direction of movement of said conveyor before reaching said conveyor, each of said selected paths being inclined in a direction obliquely angular to the perpendicular direction of the said falling stream, the direction of movement of the conveyor and the plane of said conveyor to cause the leaves within said falling stream to be deflected at different times and move relative to each other sequentially downwardly at angles to the



direction of said vertical stream, the conveyor and the direction of movement of said conveyor and depositing said leaves on said conveyor in spaced orientation.

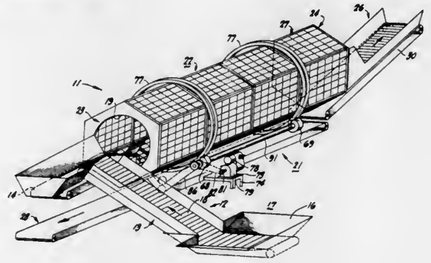
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4,018,675

## WASTE SORTING MACHINE

Ben G. Petrucci, 6781 13th St., Sacramento, Calif. 95831

Filed May 19, 1975, Ser. No. 578,611
Int. Cl.² B07C 1/10
U.S. Cl. 209—86 5 Claims



1. A waste sorting machine comprising:
a. a frame:
b. an elongated, polygonal in cross-section trommel extending from an input end to an output end, the walls of said trommel being formed of screen having a predetermined mesh size incapable of supporting waste material smaller than said mesh size,
1. each side of said polygonal in cross-section trommel including a plurality of panels covered by said screen and extending consecutively between said input end and said output end, said predetermined mesh size on at least some of said panels varying in dependence upon the distance from said input end and the side of said trommel on which said panel is located,
2. at least some of said panels adjacent said input end carrying screen of relatively large mesh size and the remaining panels adjacent said input end carrying screen of relatively small mesh size,
3. at least some of said panels adjacent said output end carrying screen of relatively large mesh size and the remaining panels adjacent said output end carrying screen of relatively small mesh size;
c. means for mounting said trommel on said frame for rotation about the longitudinal axis of said trommel, said axis being inclined downwardly from said input end toward said output end in order gravitally to advance waste material entering said input end as said trommel is rotated, and to discharge through said output end material larger than said mesh size;
d. means for rotating said trommel;
e. a plurality of rods mounted on said trommel, said rods projecting into the interior of said trommel and being capable of engaging said material larger than said mesh size in the floor portion of said trommel and elevating the same as said trommel is rotated, said rods being incapable of supporting said material larger than mesh size when said rods approach an inverted position adjacent the ceiling portion of said trommel,
1. said material larger than said relatively rigid including rectangular panels of relatively heavy and rigid corrugated board plus sheets of pliable light gauge material, and wherein said relatively large size mesh provides a plurality of openings through which a substantial portion of the corners of said rectangular panels can protrude as said material larger than said mesh size falls away from said rods when said rods approach said inverted position, said corners of said relatively rigid corrugated board panels being capable of engaging and poking subjacent ones of said pliable sheets downwardly through respective ones of said openings to a location outside said trommel while said relatiely ridgid corrugated board panels remain inside said trommel;
f. conveyor means located adjacent said output end for carrying away said material larger than said mesh size advancing through said trommel and discharging through said output end; and,
g. means below said trommel for removing said material smaller than said mesh size passing downwardly through said screen in the vicinity of said floor portion of said trommel.

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4,018,676

## REMOVAL OF EXPLOSIVE MATERIALS FROM WATER BY CHEMICAL INTERACTION ON STRONGLY BASIC ION EXCHANGE RESINS

John C. Hoffsommer; Lloyd A. Kaplan, both of Silver Spring; Donald A. Kubose, Olney, and Donald J. Glover, Columbia, all of Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jan. 15, 1976, Ser. No. 649,441
Int. Cl.² B01D 15/00
U.S. Cl. 210—24 5 Claims

1.A method for the removal of a hydrolyzable, nonaromatic, nitroso- or nitro-substituted explosive compound, or mixture of said compounds from an aqueous solution containing said compound or mixture thereof which comprises passing said aqueous solution through, and in contact with, a bed of the hydroxyl form of a strongly basic anion exchange resin, whereby said compound or mixture thereof is substantially all removed from the aqueous solution and decomposed into non-toxic products.

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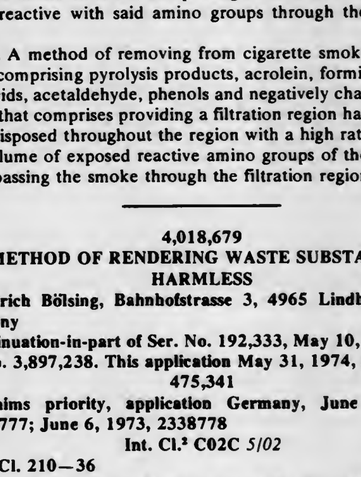
4,018,677

## METHOD OF STRIPPING SOLID PARTICLES

Alexander Himsley, Toronto, Canada, assignor to Himsley Engineering Limited, Toronto, Canada

Filed Mar. 18, 1976, Ser. No. 668,088
Int. Cl.² B01D 15/06
U.S. Cl. 210—33 10 Claims

1. A method of stripping solid particles loaded with material to be eluted therefrom, wherein the loaded particles are supplied in the form of an input slurry in a carrier liquid, comprising the steps of: establishing an upwardly-extending elution column containing a plurality of batches of the particles in vertically adjacent layers, said elution column holding an eluant liquid which contains progressively higher concentrations of the eluted material toward the bottom thereof: intermittently flowing a stripping eluant liquid downwardly through said column and concurrently therewith discharging strong eluate from the bottom of the column; isolating a batch of the input slurry; separating the carrier liquid from said isolated batch; slurrying said isolated batch after separation of




the carrier liquid therefrom into the bottom of the column with strong eluate; and discharging a batch of particles from the uppermost level of the column.

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4,018,678

## METHOD OF AND APPARATUS FOR FLUID FILTRATION AND THE LIKE WITH THE AID OF CHITOSAN

Quintin P. Peniston, Rte. 7, Box 7710, Bainbridge Island, Wash. 98110, and Edwin Lee Johnson, Rte. 5, Box 4246, Issaquah, Wash. 98027

Filed Aug. 9, 1974, Ser. No. 496,123
Int. Cl.² B01D 53/16
U.S. Cl. 210—36 12 Claims

1. A method of fluid-flow filtration that comprises providing a filtration bed having chitosan disposed throughout the bed with a high ratio surface-to-volume of exposed reactive amino groups of the chitosan, and passing fluid containing constituents reactive with said amino groups through the filtration bed.

12. A method of removing from cigarette smoke constituents comprising pyrolysis products, acrolein, formic and acetic acids, acetaldehyde, phenols and negatively charged particles, that comprises providing a filtration region having chitosan disposed throughout the region with a high ratio surface-to-volume of exposed reactive amino groups of the chitosan, and passing the smoke through the filtration region.

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4,018,679

## METHOD OF RENDERING WASTE SUBSTANCES HARMLESS

Friedrich Bölsing, Bahnhofstrasse 3, 4965 Lindhorst, Germany

Continuation-in-part of Ser. No. 192,333, May 10, 1971, Pat. No. 3,897,238. This application May 31, 1974, Ser. No. 475,341
Claims priority, application Germany, June 6, 1973, 2328777; June 6, 1973, 2338778
Int. Cl.² C02C 5/02
U.S. Cl. 210—36 12 Claims

1. A method for rendering harmless an oily waste material comprising mixing an alkaline earth metal oxide with about 0.001 to 10% its weight of a surface active agent which temporarily delays reaction between the alkaline earth metal oxide and water until after the alkaline earth metal oxide was inter-

acted with the oily waste material, combining the alkaline earth metal oxide carrying the surface active agent with said oily material, and reacting the alkaline earth metal oxide charged with the waste material with water to convert the alkaline earth metal oxide to the hydroxide.

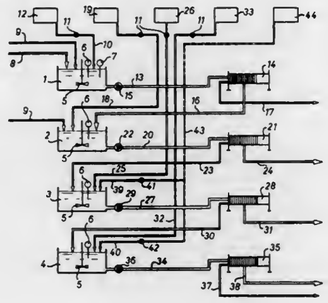
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**4,018,680**

## PROCESS FOR SEPARATING IRON, ZINC AND LEAD FROM FLUE DUST AND/OR FLUE SLUDGE

**Rudolf Kupfer, Zurich, Switzerland, assignor to Vol Roll A.G., Switzerland**

**Filed Feb. 24, 1976, Ser. No. 661,040**
**Int. Cl.² C22B** *7/02*
**U.S. Cl. 210—50** **4 Claims**



1. A process for separating iron, zinc and lead from a weakly alkaline flue dust and/or flue sludge wherein said flue dust and/or flue sludge are suspended in aqueous phase comprising the sequential steps of

treating said aqueous suspension with sufficient hydrogen peroxide so as to oxidize iron whereby said treated aqueous suspension comprises a first liquid phase and a first solid phase;

separating said first liquid phase and said first solid phase by filtration so as to produce a first filtrate and a first solid residue;

suspending said first solid residue in an aqueous phase and treating said aqueous suspension of said first solid residue with sufficient hydrochloric acid so as to change the pH of said aqueous suspension of said first solid residue to about 5 whereby said treated aqueous suspension of said first solid residue comprises a second liquid phase and a second solid phase;

separating said second liquid phase and said second solid phase by filtration so as to produce a second solid residue, consisting essentially of iron sludge and a second filtrate;

treating said second filtrate with sufficient milk of lime so as to change the pH of said second filtrate to about 8.3 whereby said treated second filtrate comprises a third liquid phase and a third solid phase;

and separating said third liquid phase and said third solid phase by filtration so as to produce a third solid residue comprising lead and zinc, and a third filtrate substantially free of dissolved heavy metals.

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**4,018,681**

## FILTRATION OF CELLULOSIC SOLUTIONS

**Edmund M. LaPolla, Parsippany; Charles F. Murphy, Morristown, and Arthur Sarkisian, Cranford, all of N.J., assignors to International Telephone and Telegraph Corporation, New York, N.Y.**

**Continuation of Ser. No. 297,406, Oct. 13, 1972, abandoned. This application Nov. 12, 1975, Ser. No. 631,370**
**Int. Cl.² B01D** *37/00*
**U.S. Cl. 210—66** **10 Claims**

1. A process for the filtration of viscose cellulosic solutions containing less than 1% of undissolved cellulosic materials comprising

filtering the cellulosic solution through a bed of particulate material inert to the cellulosic solution until the build-up of undissolved material in the bed impedes the further flow of solution through the bed,

mixing the particulate bed and build-up of undissolved material with a sodium hydroxide solvent therefor substantially free of cellulosic material to partially dissolve undissolved cellulosic material, the partial solution of said undissolved cellulosic material being highly concentrated relative to its concentration in the original cellulosic solution, the concentration being at least 25 times the concentration of the original solution,

adding carbon bisulfide substantially free of cellulosic material to said concentrated solution in an amount by weight in excess of the amount by weight of the undissolved material to complete the solution of the undissolved cellulosic material,

separating the solution from the particulate bed, and

recycling to unfiltered cellulosic solutions the reactant containing solution of cellulosic material.

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**4,018,682**

## FREEZE-THAW METHOD FOR REDUCING MINERAL CONTENT OF A CLAY-WATER MIXTURE

**Jackson S. Boyer, Wilmington, Del., assignor to Sunoco Energy Development Co., Dallas, Tex.**

**Filed Sept. 8, 1975, Ser. No. 610,953**
**Int. Cl.² B01D** *35/18*; **C02B** *1/02*
**U.S. Cl. 210—71** **7 Claims**

1. A method for reducing the clay content of a colloidal clay-water mixture which comprises:

a. combining said mixture with air at a pressure of at least 25 p.s.i.g.;

b. rapidly expanding the air-colloidal clay-water mixture by passing said mixture through a constriction into an atmosphere of sufficiently lower pressure to cause the water in the mixture to atomize, and at a temperature below 32° F to cause the atomized water to freeze into ice crystals containing said clay in a concentrated, non-colloidal form;

c. spraying said clay-containing ice crystals on the ground; and

d. melting said ice crystals containing said non-colloidal clay whereby the melted ice percolates through the ground and the clay remains behind to provide a direct separation of water and clay.

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**4,018,683**

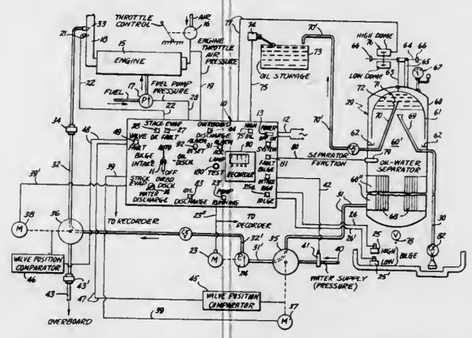
## BILGE WATER DISPOSAL SYSTEM INCLUDING OIL RECOVERY MEANS

**Chester H. Walters, St. Louis; Harold J. Barmeier, Jr., Ballwin, both of Mo., and Greig E. Sullivan, Marshalltown, Iowa, assignors to National Marine Service, Inc., St. Louis, Mo.**

**Filed Dec. 9, 1974, Ser. No. 530,539**
**Int. Cl.² B01D** *1/14*
**U.S. Cl. 210—71** **16 Claims**

1. A disposal system for bilge water mixed with another immiscible fluiid having a different specific gravity than water, comprising: a separator means for separating the bilge water from said other fluid and producing clean processed water substantially free of said other fluid; an outlet for the processed water at the separator; separator feed conduit means for carrying bilge water to the separator; means for supplying bilge water to the separator through said separator feed conduit means; an internal combustion engine; an exhaust duct for carrying exhaust gases from said engine; means for sensing the temperature of exhaust gases flowing in said duct at a predetermined area of the duct; exhaust duct feed conduit means for carrying processed water from the separator directly to the interior of the exhaust duct through a sidewall area thereof near said predetermined area; means for causing flow of processed water from said processed water outlet directly to said exhaust duct for flash vaporization therof; first means for disabling the flow causing means when the temperature of the engine exhaust gases are sensed as being below a predetermined minimum flash vaporization temperature at the predetermined area of the exhaust duct; means for sensing whether the engine is operating or not; means for sensing the





power level setting of the engine; second means for disabling the processed water flow causing means if the engine is not operating; third means for disabling the flow causing means if a predetermined power level setting is not sensed; and a control system for disabling said processed water flow causing means unless and until actual operation of the engine, a predetermined power level setting of the engine and a predetermined minimum flash vaporization temperature are sequentially sensed in the recited order by the respective sensing means.

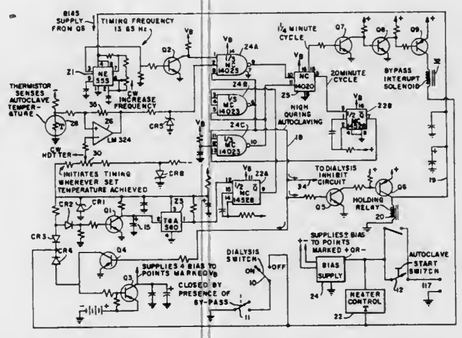
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**4,018,684**

## ELECTRONIC AUTOCLAVE TIMING CIRCUIT FOR KIDNEY DIALYSIS APPARATUS

**Michael B. Uffer, Baltimore, Md., assignor to Baxter Travenol Laboratories, Inc., Deerfield, Ill.**

**Filed July 31, 1975, Ser. No. 600,594**
**Int. Cl.² B01D** *31/00*
**U.S. Cl. 210—140** **7 Claims**



6. In a kidney dialysis machine:

electric heating means to raise the machine temperature to a desired autoclaving temperature;

control means to maintain said autoclaving temperature for a desired total elapsed interval with time out means effective during lapses in said desired autoclaving temperature; and

means for periodically shifting the flow of fluids in said kidney dialysis machine between all critical alternative fluid flow paths during said desired total elapsed interval; whereby all critical fluid flow pathways in said kidney dialysis machine are autoclaved.

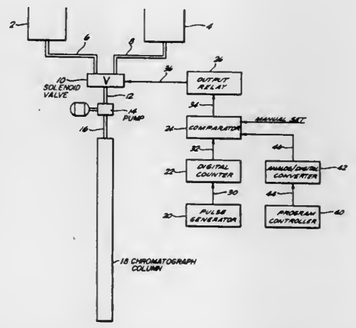
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**4,018,685**

## AUTOMATIC LIQUID MIXING DEVICE

**Dennis L. Saunders, Anaheim, and John C. Caldwell, Pomona, both of Calif., assignors to Union Oil Company of California, Brea, Calif.**

**Filed Oct. 24, 1975, Ser. No. 625,577**
**Int. Cl.² B01D** *15/08*
**U.S. Cl. 210—141** **21 Claims**



1. An apparatus for mixing a plurality of liquid components in pre-selected proportions to form a mixture of said liquid components having a desired composition, which comprises:

a plurality of liquid component storage reservoirs at least one of said reservoirs being available for each of the liquid components of said mixture;

a pump for withdrawing liquid component from said plurality of reservoirs;

switching means for successively connecting the suction of said pump to each of said plurality of liquid reservoirs;

a conduit connected to the discharge of said pump for delivering said liquid mixture to a point of use;

pulse generating means to generate a series of constant frequency electrical pulses;

a digital counter electrically connected to the output of said pulse generating means for counting the number of pulses emitted from said pulse generating means during each operating cycle, said digital counter having a binary coded decimal output;

comparator means electrically connected to the output of said digital counter for comparing the number of pulses registered on said digital counter with an adjustable, pre-selected value; and

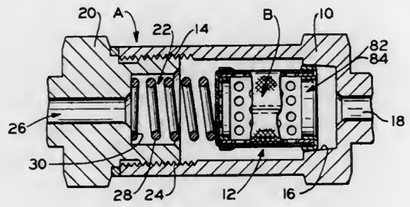
electrical output means electrically connected to the output of said comparator means responsive to a signal from said comparator means for actuating said switching means to switch the suction of said pump from one of said liquid reservoirs to another of said reservoirs when the number of pulses registered on said digital counter equals the pre-selected value set into said comparator means and to reconnect the suction of said pump to the original reservoir at the start of each operating cycle;

whereby liquid components are successively pumped from each of said reservoirs for individually controlled short time intervals and admixed to provide a mixture of said components having the desired composition.

## 4,018,686
## FLUID STRAINER ELEMENT

**Earl D. Shufflebarger, Mentor; Edward E. Kish, Kirtland; Frank M. Cunningham, Solon; John R. Boylan, Euclid, and Donald J. Murauskas, Painesville, all of Ohio, assignors to Nupro Company, Willoughby, Ohio**

**Filed July 10, 1975, Ser. No. 594,612**
**Int. Cl.² B01D** *29/14*
**U.S. Cl. 210—448** **14 Claims**




1. A generally cup-shaped fluid strainer element allowing the straining of fluid passing through the side walls and a closed end wall thereof, said strainer element comprising:

a generally cup-shaped supporting structure having an open end, a continuous side wall defined by a generally cylindrical side wall portion and a closed end wall defined by an end cap portion having an outwardly depending flange area at the terminal edge thereof adapted to closely communicate with one end of said cylindrical side wall portion, said end cap portion being rigidly affixed to said cylindrical side wall portion at said flange area with said cylindrical side wall and end cap portion both having a pattern of spaced openings over the surfaces thereof;

a generally cup-shaped straining structure having an open end, a continuous side wall defined by a generally cylindrical side wall portion and a closed end wall defined by an end cap portion having an outwardly extending flange area at the terminal edge thereof adapted to communicate with one end of said cylindrical side wall portion, said end cap portion being rigidly affixed to said cylindrical side wall portion at said flange area with said straining structure cylindrical side wall and end cap portions being constructed from a wire mesh and dimensioned to be closely received over said support structure with the open ends of said supporting and straining structures being substantially coterminous with each other; and,

a binding ring having a generally U-shaped cross-section closely received over and rigidly affixed to the substantially coterminous open ends of said supporting and straining structures with one leg of said U-shaped cross-section being received over a portion of the inner surface of said supporting structure cylindrical side wall portion and the other leg of said U-shaped cross-section being received over a portion of the outer surface of said straining structure cylindrical side wall portion.

## 4,018,687
## GLASS-ENCLOSED INTEGRAL GLASS AND CERAMIC FILTER UNIT

**Robert Theodore Zahour, Easton, Pa., assignor to J. T. Baker Chemical Company, Phillipsburg, N.J.**

**Filed July 26, 1976, Ser. No. 708,327**
**Int. Cl.² B01D** *27/00*
**U.S. Cl. 210—448** **14 Claims**

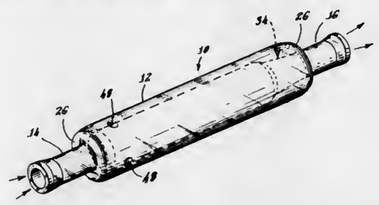
1. A totally glass-enclosed integral glass and ceramic filter unit for removal of particulate matter from sulfuric acid and from other liquid solutions which do not attack silica comprising:

a glass envelope having first and second glass ports integral therewith, said first and second ports each providing communication from the exterior of said envelope with the interior region therein,

said envelope together with its ports forming an integral glass housing enclosing said region,

a microporous ceramic filter membrane positioned within said region, said filter membrane having a border extending therearound,

a glass seal wall member having first and second borders, a first border of said wall member being fused to the border of said filter membrane, the second border of said wall member being fused to the interior of said housing for causing said glass wall member together with said filter membrane to separate said interior region into first and




second chambers with said filter membrane being positioned between said first and second chambers and with the sole communication between said chambers being through said filter membrane,

said first glass port communicating with said first chamber and said second glass port communicating with said second chamber, and

said glass seal wall member including glass material having a coefficient of thermal expansion intermediate the coefficients of thermal expansion of said ceramic filter membrane and of said glass housing for forming a transition therebetween.

## 4,018,688
## CAPSULES, PROCESS OF THEIR PREPARATION AND FABRIC CONDITIONING COMPOSITION CONTAINING SAID CAPSULES

**Hans J. Pracht, Cincinnati, and Stephen H. Iding, Sharonville, both of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio**

**Filed July 21, 1975, Ser. No. 597,867**
**Int. Cl.² B01J** *13/00;* **D06M** *13/18, 13/26, 13/34*
**U.S. Cl. 252—8.6** **29 Claims**

1. A capsule having a maximum particle dimension of less than 400 microns, especially adapted for incorporation into a liquid fabric conditioning composition, consisting essentially of an inner core of a fabric antistat/softener material and as a melting point depressant a silicone oil or a non-aromatic alkyl or alkoxy ether which is free of functional groups which react with a monomer used in forming the outer wall, is present at a level such as to be capable of lowering the melting point of said fabric antistat/softener material by at least 5° C, has a boiling point above 30° C and is present at a level less than 50% of said antistat/softener material; and an outer wall of a polycondensation product formed by interfacial polycondensation of two monomers.

8. A process for producing capsules having an outer wall of a polycondensation product formed from a first and a second monomer along an interface and containing as an inner core a fabric antistat/softener material and melting point depressant, said capsules having a maximum particle dimension of less than 400 microns, comprising the steps of:

a. melting a fabric antistat/softener material and adding to it a melting point depressant, whereby the melting point depressant is a silicone oil or a non-aromatic alkyl or alkoxy ether free of functional groups which react with the first monomer, is present at a level such as to be capable of depressing the melting point of the fabric antistat/softener material by at least 5° C, is added at a level below 50% based on the fabric antistat/softener material and has a boiling point greater than 30° C;



b. forming a solution of the melted fabric antistat/softener material and melting point depressant of step (a) with the first monomer;

c. forming an aqueous solution of the second monomer; and

d. adding under agitation the solution of step (b) to the solution of step (c) to form the capsules along the interface of the two solutions wherein a degree of stirring is employed such that the maximum particle dimension of the capsules so formed is less than 400 microns.

22. A liquid fabric conditioning composition, consisting essentially of:

a. from 0.1% to 15% of capsules having a maximum particle dimension of less than 400 microns, consisting essentially of an inner core of fabric antistat/softener material and, as a melting point depressant, a silicone oil or a non-aromatic alkyl or alkoxy ether which is free of functional groups which react with a monomer used in forming the outer wall, is present at a level such as to be capable of lowering the melting point of said fabric antistat/softener material by at least 5° C, has a boiling point above 30° C and is present at a level less than 50% of said antistat/softener material; and an outer wall of a polycondensation product formed by interfacial polymerization of two monomers; and

b. the balance water.

## 4,018,689
## COMPOSITION AND METHOD FOR REDUCING THE SURFACE TENSION OF AQUEOUS FLUIDS

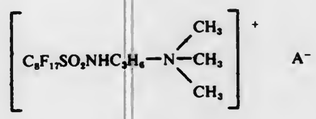
**James L. Thompson, Tulsa, Okla., assignor to The Dow Chemical Company, Midland, Mich.**

**Continuation-in-part of Ser. No. 527,576, Nov. 27, 1974, abandoned. This application Jan. 12, 1976, Ser. No. 648,596**
**Int. Cl.² E21B** *43/26, 43/27*
**U.S. Cl. 252—8.55 C** **14 Claims**

1. An aqueous composition suitable for use in treating subterranean formations comprising:

A. an aqueous liquid; and dispersed in said aqueous liquid,

B. an effective amount of a perfluorinated surfactant of the formula




wherein $A^-$ is $Cl^-$, $F^-$, $I^-$ or $Br^-$;

C. a second surfactant blend comprising as percent by weight, 57 percent polyethylene glycol monostearate; 19.2 percent sodium di(2-ethylhexyl) sulfosuccinate; 3.0 percent di-2-ethylhexyl maleate; 10.1 percent isooctyl alcohol; 4.5 percent isopropyl alcohol and 6.2 percent water; and

D. a third surfactant selected from the group consisting of an adduct of a $C_{10}$–$C_{12}$ alcohol with five moles of ethylene oxide, an adduct of trimethyl-1-heptanol with seven moles of ethylene oxide, and mixtures thereof; the total amount of said perfluorinated compound and other surfactants being present in said aqueous liquid in an amount ranging from about 0.02 to about 0.2 percent by weight of said composition.

## 4,018,690
## PROCESS FOR PREPARING SULFUR-CONTAINING FERROMAGNETIC CHROMIUM OXIDE

**Harry Robbins, Los Angeles, Calif., assignor to Eastman Kodak Company, Rochester, N.Y.**

**Continuation of Ser. No. 351,116, April 13, 1973, abandoned, which is a continuation-in-part of Ser. No. 196,715, Nov. 8, 1971, abandoned, which is a continuation-in-part of Ser. No. 84,866, Oct. 28, 1970, abandoned. This application Apr. 9, 1975, Ser. No. 566,548**
**Int. Cl.² C01G** *37/02*
**U.S. Cl. 252—62.51** **12 Claims**

1. In a process in which material comprising a compound of chromium (III) is heated at a temperature above 200° C, at a pressure of about 50–3000 atmospheres, and in the presence of about 1–300% by weight of water based on the weight of compound heated, with an oxidizing agent under conditions to prepare a ferromagnetic chromium oxide in the form of fine, acicular particles of tetragonal crystal structure of the rutile type ranging up to two microns in length and having a median axial ratio of greater than 2:1, the improvement according to which said material comprising a compound of chromium (III) is selected from a. a basic chromium sulfate corresponding to the formula $Cr_2O_x(SO_4)_{3-x}$ wherein $x$ is a value up to 2.99, and

b. a combination of a compound of chromium (III) combined with oxygen and about 0.1–25 percent by weight of said chromium compound, calculated as chromium dioxide, of a sulfate compound, calculated as sulfate ion, having the formula $R_2SO_4$ wherein R is an organic radical, H or $NH_4$.

10. In a process in which material comprising a compound of chromium (III) is heated at a temperature above 200° C, at a pressure of about 50–3000 atmospheres, and in the presence of about 1–3000% by weight of water based on the weight of compound heated, with an oxidizing agent under conditions to prepare a ferromagnetic chromium oxide in the form of fine, acicular particles to tetragonal crystal structure of the rutile type ranging up to two microns in length and having a median axial ratio of greater than 2:1, the improvement according to which said material comprising a compound of chromium (III) is selected from

a. a combination of a compound of chromium (III) combined with oxygen and about 0.1–25 percent by weight of said chromium compound, calculated as chromium dioxide, of a sulfate compound, calculated as sulfate ion, having the formula $M(H_ySO_4)_{v(y+1)/2}$ wherein M is a trivalent or tetravalent cation other than chromium, $v$ is the valence of M and $y$ is 0 or 1, and

b. a combination of a compound of chromium (III) combined with oxygen and about 0.1–25 percent by weight of said chromium compound, calculated as chromium dioxide, of a non-sulfate material calculated as chromium dioxide, of a non-sulfate material calculated as sulfate ion, which contains at least one sulfur atom and yields sulfate upon oxidation.

## 4,018,691
## ARYL SULFONATE-ALDEHYDE COMPOSITION AND PROCESS FOR ITS PREPARATION

**John A. Neal, Bellingham, Wash., assignor to Georgia-Pacific Corporation, Portland, Oreg.**

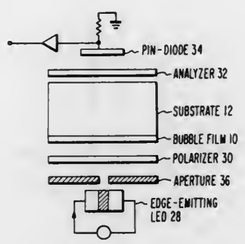
**Filed Aug. 28, 1975, Ser. No. 608,462**
**Int. Cl.² G01N** *27/82;* **H01F** *1/00*
**U.S. Cl. 252—62.54** **18 Claims**

2. A condensation product of a sulfonated phenol and aldehyde chemically combined with iron to form a ferromagnetic iron composition.

**4,018,692**
**COMPOSITION FOR MAKING GARNET FILMS FOR IMPROVED MAGNETIC BUBBLE DEVICES**

**Aline Akselrad, Princeton, and Richard Edwin Novak, East Windsor, both of N.J., assignors to RCA Corporation, New York, N.Y.**

**Continuation of Ser. No. 403,393, Oct. 4, 1973, abandoned. This application Mar. 13, 1975, Ser. No. 558,146**
**Int. Cl.² G11C** *19/08*; **C04B** *35/40*
**U.S. Cl. 252—62.57** **2 Claims**




1. A flux composition from which single crystal garnet films having growth induced uniaxial anisotropy can be epitaxially grown which comprises essentially of about 75 mol percent of lead oxide, about 15 mol percent of bismuth oxide, from about 8 – 8.5 mol percent of iron oxide, from about 0.5 – 1.0 mol percent of an oxide selected from one or more of the group consisting of yttrium oxide and trivalent rare earth oxides and from about 1 – 1.5 mol percent of gallium oxide, aluminum oxide or a mixture of gallium and aluminum oxides.

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**4,018,693**
**TRANSFORMER OILS**

**Theodore C. Mead, Port Arthur, and William B. Ashton, Nederland, both of Tex., assignors to Texaco Inc., New York, N.Y.**

**Filed Oct. 21, 1974, Ser. No. 516,556**
**Int. Cl.² H01B** *3/22*
**U.S. Cl. 252—64** **14 Claims**

1. A transformer oil comprising:
a. a naphthene or paraffin base oil ranging in viscosity about 40 to 200 SUS at 100° F and
b. a carbonyl compound chosen from the group consisting of aldehydes and ketones.

2. An oil as in claim 1 wherein the carbonyl compound is chosen from the group consisting of dialkyl ketones, aryl aldehydes, alkyl cycloalkyl ketones, dicyclo alkyl ketones and diaryl ketones.

8. A transformer oil comprising:
a. a hydrogenated naphthene or paraffin base oil ranging in viscosity from about 40 to 200 SUS at 100° F and
b. a carbonyl compound selected from the group consisting of aldehydes and ketones.

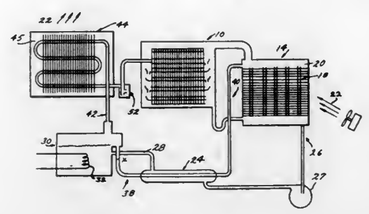
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**4,018,694**
**ABSORPTION REFRIGERANT COMPOSITION**

**Philip P. Anderson, Newburgh, Ind., assignor to Arkla Industries Inc., Evansville, Ind.**

**Filed Oct. 2, 1975, Ser. No. 619,037**
**Int. Cl.² C09K** *5/04*
**U.S. Cl. 252—69** **3 Claims**

3. In a method of operating an absorption refrigeration system of the type in which refrigerant vapor is boiled away from a liquid absorbent-refrigerant composition, condensed, evaporated and absorbed in the liquid absorbent remaining after the boiling step the improvement comprising using as the absorbent-refrigerant composition a solution containing 10%–50% by weight of a lower aliphatic alcohol which is miscible with water, 10%–50% by weight water and 40%–70%



by weight of a salt selected from the group consisting of the halides of the alkali metals and the alkaline earth metals.

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**4,018,695**
**POLYMER-MODIFIED AUTOMATIC TRANSMISSION FLUID**

**William J. Heilman, Allison Park, and Thomas J. Lynch, Pittsburgh, both of Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.**

**Continuation of Ser. No. 448,069, March 4, 1974, abandoned. This application Feb. 2, 1976, Ser. No. 654,325**
**Int. Cl.² C10M** *1/18*
**U.S. Cl. 252—73** **6 Claims**

1. A composition comprising one or more petroleum-based lubricating oil base stocks and a minor amount of a linear alpha-olefin copolymer produced by polymerization of a lower alpha-olefin monomer having from six to 10 carbon atoms or mixtures thereof admixed with from about 10 to about 25 mol percent of a higher alpha-olefin monomer having from 16 to 20 carbon atoms or mixtures thereof with substantially all of the alternate carbon atoms in each linear copolymer chain having randomly dependent therefrom an alkyl group derived from one of the alpha-olefin monomers and having two less carbon atoms than the alpha-olefin from which it is derived,

said alpha-olefin copolymer characterized by a weight average molecular weight $M_w$ between about 50,000 ($M_o$/84) and about 500,000 ($M_o$/84), a number average molecular weight $M_n$ between about 4,000 ($M_o$/84) and about 500,000 ($M_o$/84) where $M_o$ is the average molecular weight of the mixture of alpha-olefin monomers,

a distribution factor $M_w/M_n$ of between one and about 12, the upper limit of said distribution factor being about 12 when $M_w$ is about 50,000 ($M_o$/84) and the upper limit of said distribution factor being about two when $M_w$ is about 500,000 ($M_o$/84) with the upper limit of said distribution factor proportionately decreasing from about 12 to about two as $M_w$ increases from about 50,000 ($M_o$/84) to about 500,000 $M_o$/84), and

said composition comprising from about 0.2 $M_o$/84) weight percent to about five ($M_o$/84) percent of said alpha-olefine copolymer.

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**4,018,696**
**LIQUID DETERGENT COMPOSITION**

**Karl Martin Edvin Hellsten, Odsmal, and Birgit Tora Gunvor Karlsson, Stenungsund, both of Sweden, assignors to Berol Kemi AB, Stenungsund, Sweden**

**Filed Nov. 20, 1975, Ser. No. 633,899**
**Claims priority, application Sweden, Nov. 25, 1974, 7414792**
**Int. Cl.² C11D** *3/075*, *1/72*
**U.S. Cl. 252—89 R** **5 Claims**

1. A liquid aqueous detergent composition consisting essentially of an amount within the range from about 0.5 to 35% by weight of the composition of a surfactant and an amount within the range from about 10 to about 25% of a complexing agent the surfactant comprising



a. an amount within the range from about 30 to about 70% of a surface active nonionic alkylene oxide adduct having the formula

$$RO(A)_xH$$

where R represents a hydrocarbon group having from about eight to about twenty four carbon atoms, each A is an oxyalkylene group derived from an alkylene oxide having from about two to about four carbon atoms, x represents the number of A groups and is a number within the range from about 5 to 50 the number of oxyethylene groups being at least 60% of the total number of oxyalkylene groups; and

b. from about 30 to about 70% of a surface active phosphoric acid ester having the formula

$$(R'O)_yPO(OM)_{3-y}$$

where R' is alkyl having from nine to eleven carbon atoms, $y$ is an integer of 1 or 2 and M is a monovalent cation.

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**4,018,697**
**FUEL CYCLE MANAGEMENT**

**Alvin E. Smith, Arcadia, Calif., assignor to Atlantic Richfield Company, Los Angeles, Calif.**

**Filed May 2, 1975, Ser. No. 574,078**
**Int. Cl.² G21C** *19/44*
**U.S. Cl. 252—301.1 R** **5 Claims**

1. In a fuel cycle management system in which fuel particles containing a predominant amount of a uranium compound and containing fissile material within the equivalent range from about 2 percent to about 5 percent uranium-235 are employed for generating energy in a light water nuclear reactor and in which the depleted fuel is reprocessed to remove higher actinides, to remove fission products, to recover plutonium, the recover a uranium composition containing less than 2 percent but more than 0.4 percent uranium-235, said recovered uranium composition containing uranium-236, and in which fuel particles comprising such recovered uranium are employed in another cycle of energy generation in a light water nuclear reactor, the improvement which consists of:

selectively enriching a stream of recovered uranium composition derived substantially exclusively from depleted fuel, said stream being substantially free from uranium which has not been cycled through a nuclear reactor, to provide a rejected tails fraction and an upgraded fraction containing a concentration of uranium-235 greater than in said recovered uranium, such concentration being within a range from 1 percent to 3 percent of uranium-235, said upgraded fraction containing less than 70 percent but more than 40 percent of the total quantity of uranium-236 isotope in the recovered uranium, the U-236 concentration in a sample of the upgraded fraction always being greater than the U-236 concentration in the corresponding sample of the recovered uranium prior to said enrichment, said U-236 concentration in the sample of upgraded fraction being within a range from 0.05 percent to 2 percent;

admixing said upgraded fraction with plutonium compounds and employing such admixture to provide nuclear fuel comprising both uranium and plutonium and having a fuel value equivalent to that of virgin nuclear fuels containing between 2 percent and 5 percent uranium-235, the concentration of plutonium compound in said fuel being sufficient both to compensate for the presence of uranium-236 and to care for any deficiency of uranium-235 in the said upgraded fraction of uranium, such plutonium concentration being within the range from 1 percent to 7 percent by weight, said fuel being substantially free from uranium-235 derived from other than recovered uranium composition, said fuel containing at least 1.0 percent but not more than 3.0 percent uranium-235 attributable only to said upgraded fraction.

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**4,018,698**
**CERIUM STABILIZED MAGNESIUM ALUMINUM GALLATE PHOSPHORS**

**Charles F. Chenot, Towanda, Pa., assignor to GTE Sylvania Incorporated, Stamford, Conn.**

**Continuation-in-part of Ser. No. 458,077, April 5, 1974, abandoned. This application Jan. 29, 1975, Ser. No. 545,171**
**Int. Cl.² C09K** *11/46*
**U.S. Cl. 252—301.4 R** **2 Claims**

1. A luminescent composition consisting essentially of from about 99.97% to about 99.995% by weight of a manganese-activated magnesium aluminum gallate phosphor having the formula:

$$Mg_aMn_bAl_cGa_{2-c}O_{(3+a+b)}$$

wherein $a + b$ is from about 0.85 to about 1.05, $b$ is from about 0.001 to about 0.05 and $c$ is from about 0.01 to about 1.2 and from about 0.005% to about 0.03% by weight of trivalent cerium.

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**4,018,699**
**SURFACTANT COMPOSITION**

**Lowell B. Lindy, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.**

**Continuation-in-part of Ser. No. 525,135, Nov. 19, 1974, abandoned. This application Sept. 29, 1975, Ser. No. 617,897**
**Int. Cl.² B01F** *17/02*
**U.S. Cl. 252—353** **5 Claims**

1. A surfactant composition consisting essentially of an aqueous solution of (a) an alkali metal salt, or an ammonium salt, or a magnesium salt of laurylsulfate, or mixtures thereof and (b) a mono-n-butyl ether of ethylene glycol.

4. In a process for applying a back-sizing and optionally a scrim to a textile article wherein an alkali metal salt, an ammonium salt or a magnesium salt of laurylsulfate is mixed with a latex back-sizing composition, the resulting mixture is frothed, applied to the textile article, and dried, the improvement of adding a mono-n-butyl ether of ethylene glycol before said mixture is frothed.

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**4,018,700**
**CHROMATED ALKALINE EARTH SALTS OF BIS(S-DIPHENYLGUANIDINIUM BENZENEPHOSPHONATE) FOR THE CORROSION-INHIBITION OF ALUMINUM AND FERROUS ALLOYS**

**Eli Simon, 7175 Little Harbor Drive, Huntington Beach, Calif. 92648**

**Filed Mar. 17, 1976, Ser. No. 667,600**
**Int. Cl.² C23F** *11/00*
**U.S. Cl. 252—389 A** **3 Claims**

1. An inhibitor for retarding the corrosion of aluminum and ferrous alloys prepared by a three-stage sequential series of reactions conducted in aqueous solutions, the first stage comprising an addition reaction between 1-mol of s-diphenylguanidine and 1-mol of benzenephosphonic acid, the second stage the condensation reaction between 2-moles of the first stage addition-product salt and 1-mol of an a metal oxide selected from calcium, zinc, and strontium, and the third stage the chromating reaction between 1-mol of the second stage metal oxide condensation product and 2-moles of chromium trioxide.

### 4,018,701
### PHOSPHOROUS ACID AND ZINC CORROSION INHIBITING COMPOSITIONS AND METHODS FOR USING SAME

**Paul Hotchkiss Ralston, and Bennett Patsy Boffardi, both of Bethel Park, Pa., assignors to Calgon Corporation, Pittsburgh, Pa.**

**Filed July 31, 1975, Ser. No. 600,676**
**Int. Cl.² C09K** *3/00*; **C23F** *11/00*
**U.S. Cl. 252—389 A** **11 Claims**

1. A composition useful for inhibiting the corrosion of metals in a water system comprising phosphorous acid and zinc

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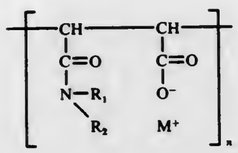
### 4,018,702
### CORROSION INHIBITION WITH AMINE ADDUCTS OF MALEIC ANHYDRIDE POLYMERS

**Bennett P. Boffardi, Bethel Park, Pa.; Michael M. Cook, Boxford, Mass., and Paul H. Ralston, Bethel Park, Pa., assignors to Calgon Corporation, Pittsburgh, Pa.**

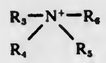
**Division of Ser. No. 450,029, March 11, 1974, Pat. No. 3,965,027. This application Feb. 12, 1976, Ser. No. 657,502**
**Int. Cl.² C23F** *11/14*, *11/18*
**U.S. Cl. 252—389 R** **19 Claims**

1. A composition useful for inhibiting the corrosion of metallic surfaces of aqueous systems, comprising zinc and a polymer, wherein the polymer and zinc components are present in a ratio of from about 1 to 5 to about 50 to 1, respectively, said polymer being selected from the group consisting of:

a. polymers having recurring units of the formula:



wherein $M^+$ may be $H^+$, alkali metal cation, or quaternary ammonium cation of the formula:

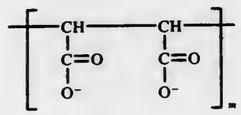


wherein for all of the above formulas, $R_1$, $R_2$, $R_3$, $R_4$, $R_5$, and $R_6$ are each independently selected from the group consisting of hydrogen, alkyl of from one to ten carbon atoms, and substituted alkyl of from one to ten carbon atoms, where the substituent is hydroxyl, carboxyl, and alkali metal and ammonium carboxylate; and

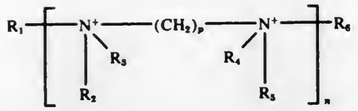
wherein $n$ is an integer of from 2 to 100 such that the polymer has a weight average molecular weight of from about 200 to about 10,000; and

wherein for the polymer component of the composition, the molecular ratio of amine to maleic anhydride is from about 0.1 to about 2.0; and

b. polymers having recurring units of the formula:



-continued



wherein $R_1$, $R_2$, $R_3$, $R_4$, $R_5$, and $R_6$ have the same meaning as above;

wherein $p$ is an integer of from 1 to 6;

wherein $m$ is an integer of from 2 to 100; and

wherein $n$ is an integer of from 2 to about 100 such that the polymer has a weight average molecular weight of from about 200 to about 10,000, provided that, for $n$ not equal to $m$, the lesser of $m$ or $n$ is multiplied by a factor such that $n=m$; and

wherein for the polymer component of the composition, the molecular ratio of amine to maleic anhydride is from about 0.1 to about 2.0.

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### 4,018,703
### CORROSION INHIBITORS

**Mervyn Edward Dennant Turner, Billingham, England, assignor to Imperial Chemical Industries Limited, London, England**

**Filed Sept. 29, 1975, Ser. No. 617,528**
**Claims priority, application United Kingdom, Oct. 14, 1974, 44394/74**
**Int. Cl.² C23F** *11/00*, *15/00*
**U.S. Cl. 252—394** **7 Claims**

1. A method of inhibiting the corrosion of steel which in use is contacted with a sulphuric acid or oleum medium which corrodes said steel which comprises maintaining in the medium contacting said steel an amount of a compound selected from the group consisting of dinitrosalicylic acid, nitrophthalic acid, monitroterephthalic acid and dinitroterephthalic acid effective to inhibit corrosion of the steel.

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### 4,018,704
### METHOD FOR DESORPTION OF METHYL BROMIDE

**Morimasa Kuragano, Yokohama, Japan, assignor to Mitsui Toatsu Chemicals, Incorporated, Tokyo, Japan**

**Filed Nov. 10, 1975, Ser. No. 630,748**
**Claims priority, application Japan, Nov. 14, 1974, 49-130499**
**Int. Cl.² B01D** *15/06*; **C07C** *21/14*
**U.S. Cl. 252—411 R** **7 Claims**

1. A method for the desorption of methyl bromide contained on active carbon adsorbent, which comprises the step of contacting an organic solvent vapor which is inert to but desorbs methyl bromide and is selected from the group consisting of lower aliphatic alcohols and chlorinated methane derivations, with the active carbon at a temperature of from about 60° C to about 130° C.

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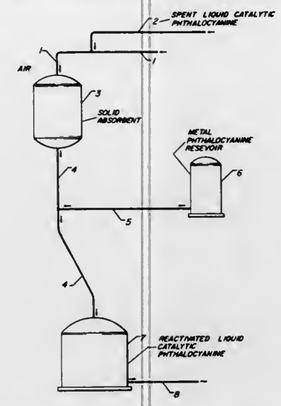
### 4,018,705
### REACTIVATION OF A SPENT LIQUID PHTHALOCYANINE CATALYTIC COMPOSITE

**David H. J. Carlson, Park Ridge, and Peter Urban, Northbrook, both of Ill., assignors to Universal Oil Products Company, Des Plaines, Ill.**

**Filed May 19, 1975, Ser. No. 578,971**
**Int. Cl.² B01J** *31/40*; **C10G** *19/02*, *19/08*
**U.S. Cl. 252—411 R** **13 Claims**

1. The method of reactivating a spent liquid phthalocyanine catalyst comprising a phthalocyanine of a metal selected from the group consisting of cobalt, vanadium, iron, copper, nickel and chromium dispersed in a liquid hydroxide of a metal selected from the group consisting of sodium, potassium, calcium, rubidium, strontium, cesium, barium, francium, lithium and beryllium, said catalyst having been deactivated during treatment of hydrocarbons wherein mercaptans are oxidized to disulfides, which process comprises percolating said liquid phthalocyanine catalyst through a bed of solid absorbent selected from the group consisting of activated charcoal and gamma alumina at a temperature of from about






0° C. to about 300° C. and a pressure of from about 1 atmosphere to about 100 atmospheres at a liquid hourly space velocity of from about 0.5 to about 10, thereafter adding to said liquid catalyst a solid phthalocyanine of a metal selected from the group consisting of cobalt, vanadium, iron, copper, nickel and chromium, and recovering the resultant reactivated phthalocyanine catalyst.

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### 4,018,706
### CATALYSTS FOR PURIFYING EXHAUST AND WASTE GASES

**Akira Inoue, Minoo; Koshi Horie, Suita; Koichi Saito, Ohyamazaki; Yukio Aoki, Suita; Tetsuji Ono, Amagasaki, and Takashi Ohara, Nishinomiya, all of Japan, assignors to Nippon Shokubai Kagaku Kogyo Co., Ltd., Osaka, Japan**

**Filed July 20, 1976, Ser. No. 707,086**
**Claims priority, application Japan, July 21, 1975, 50-88433; Mar. 1, 1976, 51-21186**
**Int. Cl.² B01J** *31/26*, *27/14*, *8/02*; **C01B** *25/26*
**U.S. Cl. 252—430** **7 Claims**

1. A catalyst for purifying exhaust and waste gases comprising

A. a support substrate comprising 2 to 100% by weight of an oxide complex of titanium and phosphorus containing titanium and phosphorus in such a proportion that the molar ratio of $TiO_2$ to $P_2O_5$ is from 5.0 to 0.5 and 98 to 0% by weight of aluminum oxide, and

B. supported on said substrate as a catalytic substance, 2 to 300 parts by weight, calculated as metal oxide per 100 parts by weight of the support substrate (A), of at least one heavy metal selected from the group consisting of Ni, Cu, Cr, Fe, Co, Mn, Bi, V, W, Mo, Sn, Zn, Zr, Pb, Sb, Ti, Ta, Cd and Nb, or 0.01 to 1.0 parts by weight, calculated as metal per 100 parts by weight of the support substrate (A), of at least one noble metal selected from the group consisting of Pt, Pd, Rh, Ir, Os and Ru.

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### 4,018,707
### TRANSITION METAL COMPOSITIONS

**Ronald John Wyatt, Runcorn, England, assignor to Imperial Chemical Industries Limited, London, England**

**Continuation of Ser. No. 62,185, Aug. 7, 1970, abandoned. This application July 16, 1974, Ser. No. 488,939**
**Claims priority, application United Kingdom, Aug. 13, 1969, 40417/69**
**Int. Cl.² C08F** *4/02*, *4/76*, *4/78*
**U.S. Cl. 252—430** **11 Claims**

1. A transition metal composition, useful as an initiator for the polymerization of olefins, which is the product obtained by mixing together under dry and oxygen-free conditions a transition metal complex of the general formula

$$R_mMX_p$$

with a substantially inert inorganic matrix material having a plurality of —OH groups attached to the surface of the matrix material, the hydrogen atoms of the —OH groups being capable of acting as proton sources, said matrix material being free from adsorbed water, wherein M is a transition metal of Groups IVA to VIA of the Periodic Table of the Elements, R is a hydrocarbon group or $—CH_2Y$ where Y is $—Z(R^1)_3$ where Z is silicon, germanium, tin or lead and $R^1$ is hydrogen or hydrocarbon, X is a halogen and $m$ and $p$ are integers, $m$ having a value from 2 to the highest valency of the metal M and $p$ having a value from 0 to 2 less than the valency of the metal M, except when M is a metal of Group VIA when $p$ is 0.

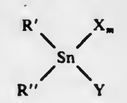
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### 4,018,708
### TIN-TITANIUM COMPLEXES AS ESTERIFICATION/TRANSESTERIFICATION CATALYSTS

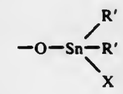
**Herwart C. Vogt, Grosse Ile; Manher Parekh, Woodhaven, and John T. Patton, Jr., Wyandotte, all of Mich., assignors to BASF Wyandotte Corporation, Wyandotte, Mich.**

**Filed Dec. 29, 1975, Ser. No. 644,358**
**Int. Cl.² B01J** *31/12*
**U.S. Cl. 252—431 C** **8 Claims**

1. The method of preparing a complex which comprises mixing a quadrivalent organotitanium compound having the formula $Ti(OR)_4$ wherein R is a radical selected from the group consisting of an aliphatic radical having from 1 to 18 carbon atoms, an alicyclic radical having between 1 and 3 rings, between 5 and 6 carbon atoms per ring and between 5 and 18 carbon atoms per molecule, and an aromatic radical having between 1 and 3 rings and between 6 and 18 carbon atoms per molecule with a quadrivalent organotin compound having the formula:



wherein R′ and R″ are individually alkyl, aryl, alicyclic groups, containing 1 to 18 carbon atoms and may be the same or different, X is an alkyl, aryl, alicyclic, heterocyclic, alkoxyl or carboxyl group having 1 to 18 carbon atoms, Y is an alkoxyl or carboxyl group each containing from 1 to 18 carbon atoms, an oxy or ether group or a group represented by the following formula:



provided that when Y is this group, X is an alkyl group, m is equal to 1 except when Y is an oxy group then $m$ is equal to

0, in a mole ratio from about 1:1 to about 1:4 titanium to tin compound and stirring the mixture until substantially all the titanium compound has reacted with the tin compound to form said complex.

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**4,018,709**
**CATALYST FOR PREPARING MALEIC ANHYDRIDE FROM $C_4$ HYDROCARBONS**
**Bruno J. Barone, and Ralph O. Kerr, both of Houston, Tex.; assignors to Petro-Tex Chemical Corporation, Houston, Tex.**
**Filed Mar. 17, 1975, Ser. No. 558,738**
**Int. Cl.² B01J** *27/14*
**U.S. Cl. 252—435** **6 Claims**

1. An improved vanadium - phosphorus-oxygen catalyst complex for the oxidation of n-$C_4$ hydrocarbons to produce maleic anhydride consisting essentially of principal active components in the atom ratios vanadium 1: phosphorus 0.90 to 1.3: Me 0.005 to 0.4 wherein Me is a mixture of B and elements selected from group consisting of Zn, Cr, U, W, Cd, Ni and Si.

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**4,018,710**
**REDUCTION CATALYSTS AND PROCESSES FOR REDUCTION OF NITROGEN OXIDES**
**Masakazu Oshimura, Ibaraki; Akira Kawakami, Takatsuki; Hiroaki Hosoda, Moriguchi; Osamu Okamoto, Ibaraki; Osamu Watanabe, Suita; Shinichi Fujii, Osaka; Satoru Yamaguchi, Suita; Noboru Odani, Ibaraki, and Yoshizo Koori, Osaka, all of Japan, assignors to Hitachi Maxell, Ltd., Osaka, Japan**
**Filed Aug. 27, 1974, Ser. No. 501,078**
**Claims priority, application Japan, Aug. 27, 1973, 48-95854**
**Int. Cl.² B01J** *27/04, 23/10*
**U.S. Cl. 252—439** **9 Claims**

1. A catalyst for reducing the oxides of nitrogen consisting essentially of a composition of nickel oxide, cerium oxide and rhodium, the molar ratio of the $CeO_2$ to the NiO being within the range of from about 0.05 to 1 to about 2.5 to 1 and the amount of the Rh being from about 7.5 to about 25 parts by weight to 100 parts by weight of the $CeO_2$ and the NiO.

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**4,018,711**
**CATALYTIC COMPOSITION**
**Ralph J. Bertolacini, Chesterton, Ind., assignor to Standard Oil Company (Indiana), Chicago, Ill.**
**Continuation-in-part of Ser. No. 167,429, July 29, 1971, abandoned, which is a division of Ser. No. 873,305, Nov. 3, 1969, Pat. No. 3,679,575. This application Nov. 9, 1973, Ser. No. 414,435**
**Int. Cl.² B01J** *29/06*
**U.S. Cl. 252—455 Z** **9 Claims**

1. An improved catalytic composition for the reforming of petroleum hydrocarbon streams, which catalytic composition consists of a Group VIII noble metal, mordenite, and an alumina, said mordenite having a silica-to-alumina ratio that is at least 19:1 but less than 45:1.

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**4,018,712**
**OXIDATION/AMMOXIDATION CATALYST**
**Tao P. Li, Chesterfield, Mo., assignor to Monsanto Company, St. Louis, Mo.**
**Continuation-in-part of Ser. No. 429,010, Dec. 27, 1973, abandoned. This application May 19, 1975, Ser. No. 578,586**
**Int. Cl.² B01J** *29/16, 29/26, 29/00*
**U.S. Cl. 252—456** **9 Claims**

1. A catalyst system suitable for operation under pressure comprising the elements antimony, uranium, iron, bismuth and molybdenum, and optionally nickel or cobalt, in an oxidized state represented by the nominal formula:

$$Sb_aU_bFe_cBi_dMo_eMe_fO_g$$

wherein Me is nickel or cobalt, $a$ is 1 to 10, $b$ is 0.1 to 5, $c$ is 0.1 to 5, $d$ is 0.001 to 0.1, $e$ is 0.001 to 0.1, $f$ is 0 to 0.1 and $g$ is a number taken to satisfy the valences of the aquantities of Sb, U, Fe, Bi and Mo, including Ni and Co if present, in the oxidation states in which they exist in the catalyst.

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**4,018,713**
**AMMOXIDATION CATALYST**
**Ronald D. Bushick, Glen Mills, and Howard P. Angstadt, Media, both of Pa., assignors to Sun Ventures, Inc., St. Davids, Pa.**
**Division of Ser. No. 568,356, April 15, 1975, Pat. No. 3,959,336, which is a continuation-in-part of Ser. No. 504,939, Sept. 11, 1974, abandoned, which is a continuation-in-part of Ser. No. 404,964, Oct. 10, 1973, abandoned. This application Jan. 27, 1976, Ser. No. 652,933**
**Int. Cl.² B01J** *21/04, 21/16, 23/22, 23/04*
**U.S. Cl. 252—464** **5 Claims**

1. A catalyst composition consisting essentially of from about 1% to 20% by weight of the total catalyst of an alkali metal vanadium bronze and from about 0.25% to about 10% by weight of a niobium oxide on a support consisting essentially of $\alpha$-alumina.

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**4,018,714**
**HYDRODESULFURIZATION CATALYST AND PROCESS FOR PRODUCING THE SAME**
**Geoffrey R. Wilson, Westlake Village, and Masami Kayamoto, Whittier, both of Calif., assignors to Filtrol Corporation, Los Angeles, Calif.**
**Filed Dec. 3, 1975, Ser. No. 637,363**
**Int. Cl.² B01J** *21/04, 21/06, 23/84, 23/88*
**U.S. Cl. 252—465** **19 Claims**

1. A catalyst consisting essentially of a substrate containing from about 5 to about 40% by weight of the total weight of Group VIII metal oxide and an oxide of a metal selected from the group consisting of molybdenum and tungsten, expressed as the metal, with the atomic weight ratio of Group VIII metal to molybdenum or tungsten being from about 1:0.3 to about 1:2.5 supported on a non-zeolitic refractory oxide carrier, and promoted with from about 1 to about 10% by weight of an oxide of a Group IV-B metal expressed as metal, all based on the weight of metal element plus the weight of said pellet substrate, said catalyst being in pellet form and having an Abrasion Index of less than about 10%.

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**4,018,715**
**GROUND ELECTRODE BACKFILL COMPOSITION**
**Joe F. Tatum, P.O. Box 1089, Hattiesburg, Miss. 39401**
**Filed June 29, 1976, Ser. No. 700,983**
**Int. Cl.² H01B** *1/06*
**U.S. Cl. 252—510** **8 Claims**

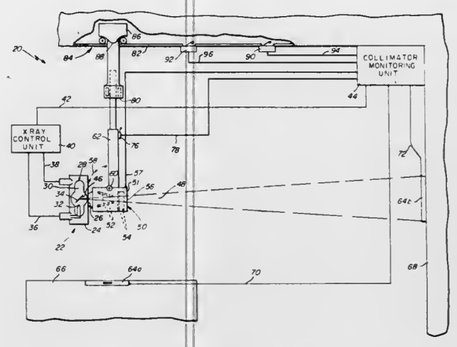
2. A backfill material for earth anode beds comprising a mixture of the following components:



| Components | Range in Per Cent by Weight |
|---|---|
| Particulate calcined fluid petroleum coke | 97.50 – 98.45 |
| Powdered graphite | 1.50 – 2.40 |
| Surfactant | .05 – .15 |

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**4,018,716**
**RADIOGRAPHIC SYSTEM**
**Thomas W. Fitzsimmons, Bethel; Vincent Berluti, Jr., West Haven; Howard G. Wagner, Stamford, and Jonathan S. Shapiro, Greenwich, all of Conn., assignors to The Machlett Laboratories, Incorporated, Stamford, Conn.**
**Filed June 16, 1975, Ser. No. 587,447**
**Int. Cl.² G21F** *5/04;* **G21K** *1/04*
**U.S. Cl. 250—511** **8 Claims**

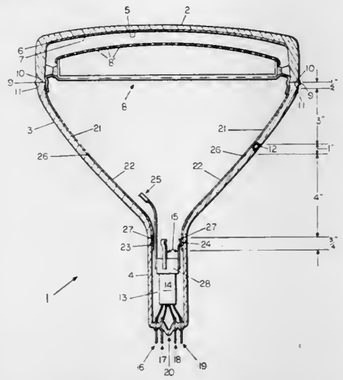



1. A radiographic system comprising:
means for directing an X-ray beam from a source through an adjustable shutter aperture in an aligned collimator and onto an image receptor located at a preselected distance from the source; and
automatic means connected to the source, the collimator, and the image receptor for ensuring that the cross-sectional size of the X-ray beam conforms to the size of the image receptor at the selected distance from the source, the automatic means including
memory means disposed to receive electrical signals indicative of operating parameters and programmed to produce a desired output signal upon receipt of a prescribed series of operating parameters;
receptor detector means disposed for engagement with the image receptor and electrically connected to the memory means for producing electrical signals indicative of the image receptor in position to receive the X-ray beam; and
orientation detector means connected to the collimator and electrically connected to the memory means for producing electrical signals indicative of the orientation of the shutter aperture with respect to the image receptor.

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**4,018,717**
**ARC SUPPRESSION IN A CATHODE RAY TUBE**
**Josef Francel, Toledo, and Galen D. Lemke, Elmore, both of Ohio, assignors to Owens-Illinois, Inc., Toledo, Ohio**
**Filed Sept. 29, 1975, Ser. No. 617,566**
**Int. Cl.² H01B** *1/08*
**U.S. Cl. 252—513** **8 Claims**

1. An electrically conductive composition for use on interior surfaces of a funnel portion and neck portion of a cathode ray tube in order to substantially suppress internal arcing during operation of said tube, said composition consisting essentially of a substantially homogeneous mixture of:
a. about 10–30 percent by weight of iron having a particle size of about 0.1–20 microns; and
b. about 90–70 percent by weight of a lead borate or lead zinc borate glass frit having a particle size such that about 100% of the glass frit particles pass a 100 mesh U.S. Sieve Series screen;

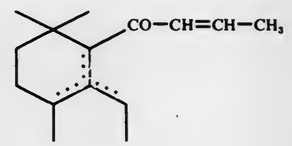


said composition being capable of being fired on said funnel and neck portions at a temperature of about 400°–450° C. to form layers each layer having a thickness of about 18–70 microns and an electrical resistivity of about 1 ohm to about 2000 ohms; said composition being capable of substantially suppressing arcing within said tube during operation of said tube at a voltage up to about 40,000 volts.

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**4,018,718**
**2-ETHYL-3,6,6-TRIMETHYL-1-CROTONYL-2-CYCLOHEXENE-TYPE COMPOUNDS AND PERFUME COMPOSITIONS**
**Paul Albert Ochsner, Geneva, and Hanspeter Schenk, Zumikon, both of Switzerland, assignors to Givaudan Corporation, Clifton, N.J.**
**Division of Ser. No. 567,891, April 14, 1975. This application Feb. 13, 1976, Ser. No. 657,815**
**Claims priority, application Switzerland, Apr. 19, 1974, 5436/74; Feb. 3, 1975, 1772/75**
**Int. Cl.² C11B** *9/00*
**U.S. Cl. 252—522** **6 Claims**

1. Compounds of the general formula



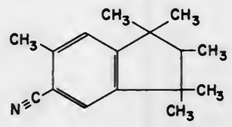

(I)

wherein one of the three lines indicated by dots represents an additional bond.

## 4,018,719
## SYNTHETIC MUSK PERFUME COMPOUND 1,1,2,3,3,5-HEXAMETHYLINDAN-6-NITRILE

**Robert S. De Simone, Middletown, N.Y., assignor to Polak's Frutal Works, Inc., Middletown, N.Y.**

**Filed Apr. 20, 1976, Ser. No. 678,782**
**Int. Cl.² C11B 9/00**
**U.S. Cl. 252—522** **3 Claims**



1. The compound 1,1,2,3,3,5-hexamethylindan-6-nitrile.

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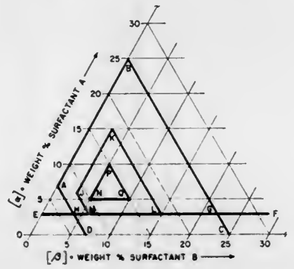
## 4,018,720
## LAUNDRY DETERGENT COMPOSITIONS IN EMULSION/SUSPENSION

**Stephen Price Lengyel, Bridgewater, N.J., and Toshiyuki Ishige, Hirakata, Japan, assignors to The Procter & Gamble Company, Cincinnati, Ohio**

**Filed July 14, 1975, Ser. No. 595,817**
**Int. Cl.² C11D 1/29, 1/37, 3/065, 17/08**
**U.S. Cl. 252—534** **28 Claims**

AMOUNTS OF SURFACTANTS

[All other components being present in amounts within the scope of the invention]




1. A liquid detergent composition which comprises:

a. surfactant in an amount from about 7% to about 25% by weight of the composition, said surfactant consisting of:

i. Surfactant A selected from the group consisting of sodium alkyl sulfate $ROSO_3Na$ and sodium alkyl ether sulfate $R(OC_2H_4)_nOSO_3Na$, where R is an alkyl chain having from about 12 to about 20 carbon atoms and where *n* has an average value from about 1 to about 12, or mixtures thereof; and

ii. Surfactant B consisting of sodium alkyl benzene sulfonate $R'\phi SO_3Na$ where R′ is a branched alkyl chain having from about 9 to about 15 carbon atoms;

wherein the amount of Surfactant A is between about 3% and about 25% by weight of the composition;

b. inorganic phosphate builder in an amount from about 6% to about 25% by weight of the composition, said builder being selected from the group consisting of sodium orthophosphate, sodium pyrophosphate, and sodium tripolyphosphate;

c. alkali metal sulfate in an amount from about 3% to about 20% by weight of the composition as stabilizing electrolyte; and

d. water in an amount from about 40% to about 75% of the composition.

## 4,018,721
## CROSS-LINKED, WATER INSOLUBLE POLY(N-GLYCIDYL-PIPERAZINE)

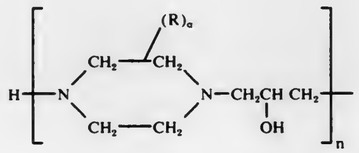
**Robert James Cotter, Bernardsville; Michael John Keogh, Somerville, and William Donald Heitz, Flagtown, all of N.J., assignors to Union Carbide Corporation, New York, N.Y.**

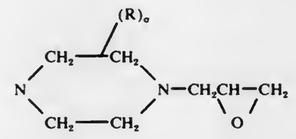
**Division of Ser. No. 531,398, Dec. 10, 1974, abandoned, which is a division of Ser. No. 489,126, July 17, 1974, Pat. No. 3,876,395, which is a continuation-in-part of Ser. No. 448,999, March 7, 1974, abandoned. This application Feb. 4, 1976, Ser. No. 655,209**
**Int. Cl.² C08G 65/22**
**U.S. Cl. 260—2 A** **6 Claims**

1. A crosslinked, water-insoluble homopolymer of N-glycidylpiperazine.

2. Method of preparing porous particles of a crosslinked, water-insoluble poly(N-glycidylpiperazine) which comprises:

a. polymerizing an aqueous solution of an oligomer having the structure:





wherein each R is a lower alkyl group having up to about 8 carbon atoms, *a* is an integer having values of 0 to 4 and *n* is an integer having values of about 2 to about 20, with about 0 to 300 parts of a water-soluble filler per 100 parts of oligomer and an azeotropic agent until polymeric beads are formed;

b. removing the water by azeotropic distillation;

c. recovering the polymeric beads; and

d. extracting the polymeric beads with water until the water extract contains no water-soluble filler.

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## 4,018,722
## RECLAIMED PLASTIC MATERIAL

**Carl Baker, Wickenburg, Ariz., assignor to Elizabeth I. Bellack, Wickenburg, Ariz., a part interest**

**Continuation-in-part of Ser. No. 556,696, March 10, 1975, abandoned. This application Aug. 18, 1976, Ser. No. 715,314**
**Int. Cl.² C08J 11/04**
**U.S. Cl. 260—2.3** **3 Claims**

1. A method of reclaiming nuisance plastic material comprising the steps of:

heating a quantity of animal fat in a container,

adding shredded thermoplastic nuisance material to said heating animal fat in sufficient quantity such that the animal fat forms a lubricant and a surface covering for the heating plastic material,

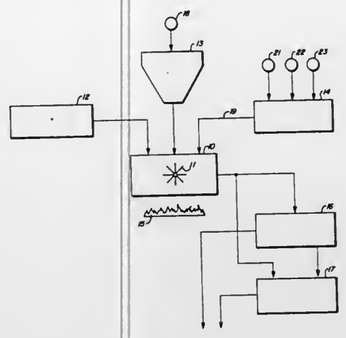
adding a sufficient quantity of silica sand containing iron and manganese as impurities and sodium chloride to provide a smooth and glossy finish to the heating plastic material,

adding a sufficient quantity of sodium hydrogen carbonate to retard flaming of the heating plastic material,

agitating the heating plastic material to cause uniform heating thereof,



heating the plastic material until the heated plastic material reaches a molten slurry condition so that it may be



poured into a mold, and pouring the molten plastic material into a mold.

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## 4,018,723
## MORPHOLINO-MODIFIED POLYSILOXANE-POLYOXYALKYLENE COPOLYMERS AND THEIR USE AS FOAM STABILIZERS IN POLYURETHANES

**Bernard Kanner, West Nyack, and Bela Prokai, Mahopac, both of N.Y., assignors to Union Carbide Corporation, New York, N.Y.**

**Filed Feb. 25, 1975, Ser. No. 552,996**
**Int. Cl.² C07D 295/04, 295/08; C08G 18/14, 77/26**
**U.S. Cl. 260—2.5 AH** **40 Claims**

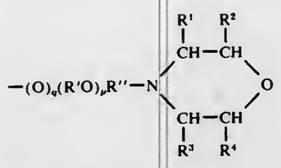
1. An organosilicone composition which comprises a polysiloxane-polyoxyalkylene copolymer containing monofunctional siloxy units and difunctional siloxy units, an average of between about 2 and about 30 silicon-bonded polyoxyalkylene blocks for every two moles of monofunctional units, and an average of from about 2 to about 100 silicon-bonded morpholino-bearing groups for every two moles of monofunctional units, wherein:

i. said polyoxyalkylene blocks have the average composition,

$$-(R^\circ)_r-(OC_nH_{2n})_b-OG$$

where *r* is zero or one, R° comprises a bivalent alkylene group a carbon atom of which is bonded to silicon, $-(OC_nH_{2n})_b-$ is a polyoxyalkylene chain where *a* has a value from 2 to 4 and *b* has an average value from about 3 to about 100, and G is an organic cap;

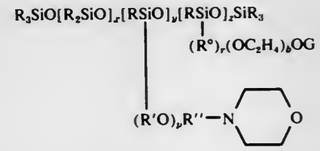
ii. said morpholino-bearing groups have the formula,



wherein *p* is zero or has an average value from about one to about four, *q* is zero or one provided *q* is one when *p* has a value of more than one, R′ is bivalent alkylene having from two to four carbon atoms, R″ is bivalent alkylene having from two to six carbon atoms, and $R^1$, $R^2$, $R^3$ and $R^4$ are independently hydrogen or alkyl of one to four carbon atoms; and

iii. the monofunctional units of the copolymer have at least two alkyls of one to ten carbon atoms bonded to the respective silicon atoms thereof and the difunctional units have at least one alkyl of one to ten carbon atoms bonded to the respective silicon atoms thereof, the remaining organic group bonded to silicon of the respective monofunctional and difunctional siloxy units being alkyl of one to ten carbon atoms, said morpholino-bearing group or said polyoxyalkylene block, provided the average number of said morpholino-bearing groups and said polyoxyalkylene blocks contained in the copolymer is as aforesaid.

40. A flame-retardant polyester-based urethane foam which comprises the product formed by simultaneously reacting and foaming a reaction mixture containing: (a) a polyester polyol reactant containing an average of at least two hydroxyl groups per molecule; (b) an organic polyisocyanate reactant containing at least two isocyanato groups per molecule; (c) water as a source of blowing action; (d) a catalyst comprising a tertiary-amine; (e) a flame-retarding agent; and (f) a foam stabilizer comprising a polysiloxane-polyoxyethylene copolymer having the average composition,



wherein: R is alkyl having from one to four carbon atoms; R′ is bivalent alkylene of 2 to 4 carbon atoms; R″ is bivalent alkylene of 2 to 6 carbon atoms; R° comprises a bivalent alkylene group of from 2 to 6 carbon atoms a carbon atom of which is bonded to silicon; G is an organic cap; *r* is zero or one; *p* is zero or one; *b* has an average value from about 3 to about 30; *x* is zero or a positive number having an average value up to about 20, *y* has an average value from about 2 to about 20, and *z* has an average value from about 2 to about 30, provided the average weight of said copolymer attributable to $-(R^\circ)_r(OC_2H_4)_bOG$ is from about 50 to about 85 weight percent.

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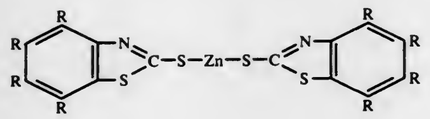
## 4,018,724
## FLAME RETARDANT FLEXIBLE URETHANE FOAMS

**David Stanley Cobbledick, Kent, Ohio, assignor to The General Tire & Rubber Company, Akron, Ohio**

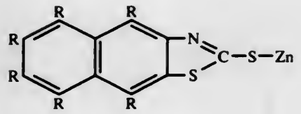
**Continuation-in-part of Ser. No. 632,940, Nov. 18, 1975, abandoned. This application Mar. 29, 1976, Ser. No. 671,641**
**Int. Cl.² C08J 9/00**
**U.S. Cl. 260—2.5 AB** **10 Claims**

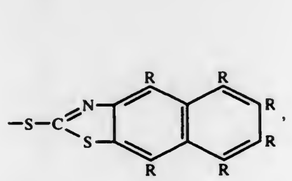
1. In the method of making a fluid or semiflexible low density, flame retardant polyurethane foam using the one-shot or prepolymer process by the reaction of (A) a polyetherpolyol having from two to four hydroxyl groups and having a molecular weight of from about 1,000 to 10,000, (B) an organic polyisocyanate and (C) a blowing agent comprising water in admixture with (D) a surfactant, (E) a catalyst, (F) from

about 1 to 50 parts by weight per 100 parts by weight of said polyol of a finely divided, solid chlorine-containing polymeric resin having an intrinsic viscosity of from about 0.25 to 2.5, (G) finely divided zinc oxide in an amount of from about 0.1 to 10 parts by weight per 100 parts by weight of said polyol, and (H) finely divided antimony trioxide in an amount of from about 0.5 to 15 parts by weight per 100 parts by weight of said polyol, the improvement comprising incorporating in said formulation prior to foaming a finely divided salt selected from the group consisting of



and



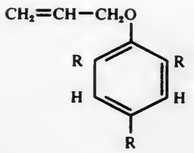


the R's being the same or different, where R is —R', —OR', —halogen, —hydrogen, or a —nitro group, R' being a $C_1$ to $C_{10}$ alkyl, cycloalkyl, aralkyl, alkaryl or aryl group, said zinc salt being used in an amount of from about 0.05 to 5.00 parts by weight per 100 parts by weight of total polyol.

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**4,018,725**
**PHENOLIC FOAM PRODUCTS AND METHOD OF MAKING THE SAME**
**John F. Hadley, Bradford Woods, Pa., assignor to H. H. Robertson Company, Pittsburgh, Pa.**
**Filed Aug. 9, 1976, Ser. No. 712,652**
**Int. Cl.² C08J 9/14**
**U.S. Cl. 260—2.5 F** **2 Claims**

1. A composition suitable for forming into a phenol-aldehyde foam product comprising:
1. phenol-aldehyde resol;
2. allyl ether of methylol-substituted phenol



;

3. halogenated alkane blowing agent having an atmospheric boiling temperature from −40° F to 200° F; and
4. a surfactant;

the amount of said allyl ether of methylol-substituted phenol ranging from 0.5 to 25 percent by weight of the said phenol-aldehyde resol.

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**4,018,726**
**[D-PHE⁶]-LH-RH AND INTERMEDIATES THEREFOR**
**Andrew Victor Schally, 2500 Whitney Place, Apt. 319, Metairie, La. 70002, and David Howard Coy, 4319 Perrier St., New Orleans, La.**
**Filed June 12, 1975, Ser. No. 586,436**
**Int. Cl.² C07C 103/52; C08H 1/00**
**U.S. Cl. 260—8** **7 Claims**

5. A compound selected from the group consisting of $R^6$-(pyro)-Glu-His-($N^{1m}$-$R^5$)-Trp-Ser($R^4$)-Tyr($R^3$)-D-Phe-Leu-Arg($N^G$-$R^2$)-Pro-Gly-A, $R^7$-His($N^{1m}$-$R^5$)-Trp-Ser($R^4$)-Tyr-($R^3$)-D-Phe-Leu-Arg($N^G$-$R^2$)-Pro-Gly-A, $R^7$-Trp-Ser($R^4$)-Tyr-($R^3$)-D-Phe-Leu-Arg($N^G$-$R^2$)-Pro-Gly-A, $R^7$-Ser($R^4$)-Tyr($R^3$)-D-Phe-Leu-Arg($N^G$-$R^2$)-Pro-Gly-A, $R^7$-Tyr($R^3$)-D-Phe-Leu-Arg-($N^G$-$R^2$)-Pro-Gly-A, and $R^7$-D-Phe-Leu-Arg($N^G$-$R^2$)-Pro-Gly-A, in which

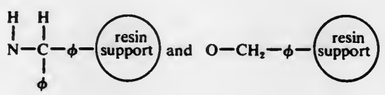
$R^2$ is a protective group for the $N^s$, $N^w$, and $N^{w1}$ nitrogen atoms of arginine selected from the group consisting of tosyl, nitro, benzyloxycarbonyl and adamantyloxycarbonyl;

$R^3$ is a protective group for the hydroxyl of tyrosine selected from the group consisting of 2-bromo-benzyloxycarbonyl, benzyl, acetyl, tosyl, benzoyl, t-butyl, tetrahydropyran-2-yl, trityl, 2,4-dichlorobenzyl and benzyloxycarbonyl;

$R^4$ is a protective group for the hydroxyl group of serine and is selected from the group defined hereinbefore for $R^3$;

$R^5$ is a protective group for the imidazole nitrogen atoms of histidine selected from the group of dinitrophenyl, tosyl, 2,2,2-trifluoro-1 -benzoyloxycarbonylaminoethyl and 2,2,2-trifluoro-t-butyloxycarbonylaminoethyl; and

$R^6$ is hydrogen or an α-amino protective group and $R^7$ is an α-amino protective group, and A is selected from the class consisting of:






**4,018,727**
**CHEMICALLY CONVERTIBLE TAPE WITH IN SITU SYNTHESIZED POLYMER**
**Lynn J. Taylor, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio**
**Continuation-in-part of Ser. No. 339,166, Mar. 8, 1973, Pat. No. 3,901,752, and Ser. No. 339,278, Mar. 8, 1973, Pat. No. 3,900,682, which is a division of Ser. No. 189,449, Oct. 14, 1971, Pat. No. 3,816,162, said Ser. No. 339,166, is a continuation-in-part of said Ser. No. 189,449. This application June 19, 1975, Ser. No. 588,546**
**Int. Cl.² C08L 1/28**
**U.S. Cl. 260—13** **10 Claims**

1. As an article of manufacture, a chemically convertible, solid tape comprising a film-forming pyrolyzable polymeric binder containing a polymerizable organic member, said polymeric binder being solid at ambient temperatures.

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**4,018,728**
**PRINTING INK**
**John Garrick Priest, London, England, assignor to Johnson Matthey & Co., Limited, London, England**
**Continuation-in-part of Ser. No. 334,718, Feb. 22, 1973, abandoned. This application Aug. 20, 1974, Ser. No. 499,043**
**Int. Cl.² C08K 5/10, 5/42; C08L 1/18, 93/04**
**U.S. Cl. 260—17 R** **16 Claims**

1. A printing ink formulation for producing a transferable layer comprising a material having pigmentary or electrical properties, which material is an element or a compound comprising a metal selected from the group consisting of transition metals and metals of the sub-groups IIIA, IVA, VA and VIA of the periodic classification, a hot melt adhesive selected from the group consisting of acrylic polymers and copolymers, a solid phase plasticiser and a solvent, the solvent being selected from the group consisting of aliphatic hydrocarbon solvents and mixtures of aliphatic and aromatic hydrocarbon solvents containing up to 40 wt.% of aromatic solvent, and the plasticiser being one which has a melting point falling within the range of 60° to 90° C and which is substantially completely insoluble in aliphatic hydrocarbon solvents and only partially soluble in aromatic hydrocarbon solvents.

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**4,018,729**
**SHAPED ARTICLE FOR CONDITIONING HAIR A BLEND OF WATER-SOLUBLE AND WATER-INSOLUBLE POLYMERS WITH INTERPENETRATING NETWORKS**
**Joseph A. Faucher, Pleasantville, and Meyer Robert Rosen, Spring Valley, both of N.Y., assignors to Union Carbide Corporation, New York, N.Y.**
**Division of Ser. No. 510,998, Oct. 1, 1974, Pat. No. 3,992,336. This application Nov. 10, 1975, Ser. No. 630,404**
**Int. Cl.² A45D 24/00; A61K 7/06; C08L 1/28**
**U.S. Cl. 260—17 R** **28 Claims**

1. Shaped hair treating article which comprises a blend of a normally solid, water soluble organic polymer selected from the group consisting of ethylene oxide resins, polyvinyl-pyrrolidone, hydroxypropyl cellulose, a cationic polyacrylic acid and polyvinyl methyl ether, in combination with a normally solid, water insoluble organic polymer, selected from the group consisting of polystyrene, poly(epsilon-caprolactone), polyvinyl chloride, a copolymer of vinyl chloride and vinyl acetate, a copolymer of vinyl chloride and ethylene, polypropylene and polybutylene, in which said polymers are present in an interpenetrating network in a ratio of 99:1 to 1:99.

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**4,018,730**
**METHOD FOR EMULSIFYING ASPHALT-RUBBER PAVING MATERIAL AND A STABLE THIXOTROPIC EMULSION OF SAID MATERIAL**
**Charles H. McDonald, 3130 W. Pierce St., Phoenix, Ariz. 85009**
**Filed June 6, 1975, Ser. No. 584,478**
**Int. Cl.² C08L 1/00, 95/00; C09D 3/24**
**U.S. Cl. 260—17.4 R** **12 Claims**

1. A method for emulsifying a asphalt-rubber pavement material into a stable, thixotropic emulsion capable of flowing as a liquid upon agitation comprising the steps of:
a. heating a mixture of about 2 to about 5 parts of paving grade asphalt with a penetration range of 10 through 300 and about 1 part of particulate non-oil resistant asphalt soluble rubber selected from the group consisting of whole tire rubber, reclaimed rubber and partially devulcanized reclaimed rubber to a temperature within the range of about 350° F to about 500° F forming a jellied reaction product,
b. admixing said jellied reaction product with a asphalt-rubber soap consisting essentially of water, an anionic water soluble emulsifying agent, a thickener, and a halide of an alkali metal or an alkaline earth metal.

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**4,018,731**
**HIGH IMPACT POLYAMIDES**
**Willard M. Sims, Leominster, Mass., assignor to Foster Grant Co., Inc., Leominster, Mass.**
**Filed June 12, 1975, Ser. No. 586,332**
**Int. Cl.² C08L 91/00**
**U.S. Cl. 260—23.7 N** **9 Claims**

1. A polyamide composition comprising the interpolymerization product of a polyamide-forming monomer or mixture of monomers selected from the group consisting of:
a. a lactam
b. an amino carboxylic acid
c. a mixture of a divalent carboxylic acid and a divalent diamine

d. a mixture of at least two of *a*, *b* and *c*, and from about 1 to 20% by weight of said polyamide composition of an approximately equi molar mixture of a diolefin polymer having an average molecular weight within the range of about 1,000 to 20,000 and a dimerized fat acid or fat acid derivative having from 16 to 48 carbon atoms, each of said diolefin polymer and fat acid or fat acid derivative having amide-forming functional groups at each terminal position in the molecular chain.

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**4,018,732**

## ADHESIVE COMPOSITION

**Pallavoor R. Lakshmanan, Allison Park, Pa., assignor to Gulf Research & Development Company, Pittsburgh, Pa.**

**Filed Jan. 2, 1976, Ser. No. 646,061**
**Int. Cl.² C08L** *93/00*
**U.S. Cl. 260—27 R** **6 Claims**

**1.** An improved adhesive composition consisting essentially of (1) an aqueous dispersion of a polymeric substance selected from the group consisting of a water-insoluble linear copolymer, and salts thereof, of about two to about four weight percent of an acid selected from the group consisting of itaconic acid, fumaric acid, and the dimer of methacrylic acid, about five to about 25 weight percent of a member selected from the group consisting of methyl methacrylate and acrylonitrile, and the balance of at least one ester of acrylic acid with an alcohol having from one to 18 carbon atoms, the copolymer having a $T_1$ between about −15° C. and +15° C. and a viscosity average molecular weight between about 50,000 to about 2,000,000, the salt being selected from the group consisting of those of ammonium, alkali metals and those formed with a water-soluble amine, the dispersion containing about 30 to about 55 weight percent of water and at least about 30 weight percent by weight of copolymer, (2) a rosin ester dispersion, and (3) a filler or fillers, said components being present in the following amounts:

| | Parts By Weight |
|---|---|
| Acrylic-Containing Polymer Dispersion | 100 |
| Rosin Ester Dispersion | 20–150 |
| Filler | 25–400 |

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**4,018,733**

## HOT MELT ADHESIVE COMPOSITION COMPRISING AN ACIDIC ETHYLENE POLYMER AND A POLYAMIDE

**Eugene Francis Lopez, Sunnyvale; Leon Conrad Glover, Jr., Los Altos, and Bernard John Lyons, Atherton, all of Calif., assignors to Raychem Corporation, Menlo Park, Calif.**

**Continuation-in-part of Ser. No. 291,542, Sept. 25, 1972, abandoned. This application July 29, 1974, Ser. No. 492,722**
**Int. Cl.² C09J** *3/14*
**U.S. Cl. 260—27 EV** **14 Claims**

**1.** A hot melt adhesive composition comprising a compatible mixture of: (a) an acidic polymer of ethylene having an acid number ranging from about 3 to about 80 selected from the group consisting of a terpolymer of ethylene, an ethylenically unsaturated mono- or dicarboxylic acid and a vinyl ester of $C_1$ to $C_6$ aliphatic carboxylic acid and a copolymer of ethylene and a $C_2$ to $C_{20}$ aliphatic ester of a mono ethylenically unsaturated mono- or dicarboxylic acid wherein a portion of the carboxylic acid moieties of said mono- or dicarboxylic acid component are not esterified, and (b) a polyamide having an amine number ranging from about 70 to about 400 with a tackifying agent wherein said tackifying agent is present in an amount ranging from about 3 to about 20 parts by weight per 100 parts of (a) and (b) together, components (a) and (b) being present in a relative proportion by weight ranging from about 40:60 to 60:40.

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**4,018,734**

## ORGANOSILICON COMPOSITIONS WHICH IMPART NON-STICK PROPERTIES TO CELLULOSIC AND SYNTHETIC MATERIALS

**Jean Dumoulin, Sainte Croix-en-Jarez, France, assignor to Rhone-Poulenc Industries, Paris, France**

**Filed June 6, 1975, Ser. No. 584,353**
**Claims priority, application France, June 10, 1974, 74.19950**
**Int. Cl.² C08K** *5/00, 5/01, 5/07, 5/10*
**U.S. Cl. 260—29.1 SB** **6 Claims**

**1.** An organosilicon coating composition which comprises, by weight:

A. 100 parts of dimethylpolysiloxane polymer selected from the group consisting of
   i. an α,ω-dihydroxydimethylpolysiloxane gum with a viscosity of at least about 1 million cPo at 25° C.,
   ii. a mixture containing at least about 75% of said gum and at most about 25% of low molecular weight linear or cyclic dimethylpolysiloxane polymer present during the preparation of said gum by polymerisation of dimethylcyclopolysiloxane by means of alkaline or acid catalyst, and
   iii. a mixture containing about 60 to 90% of α,ω-dihydroxydimethylpolysiloxane oil with a viscosity from 300 to 900,000 cPo at 25° C., and about 40 to 10% of α,ω-bis-(triorganosiloxy)-dimethylpolysiloxane gum with a viscosity of at least 1 million cPo at 25° C., blocked at its chain ends by units of the formulae: $(CH_3)_3SiO_{0.5}$ and/or $(CH_3)_2(CH_2{=}CH)SiO_{0.5}$,

B. 0 to 10 parts of a methylhydrogenopolysiloxane oil of the general formula:

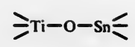
$$(CH_3)_3SiO[Si(CH_3)_2O]_x[SiH(CH_3)O]_ySi(CH_3)_3$$

in which *x* is zero or an integer or non-integral number of at most 30 and *y* represents an integral or non-integral numbers from 5 to 90,

C. 2 to 10 parts of a crosslinking system,

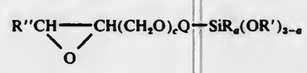
D. 0.5 to 5 parts of a catalyst selected from the group consisting of an organic tin derivative and a polymer possessing



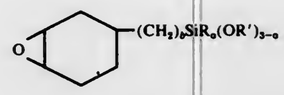


chains,

E. 0.05 to 2 parts of an epoxysilane selected from the group consisting of epoxysilanes of the formula:



and of the formula:



in which R represents an alkyl group with 1 to 4 carbon atoms or a phenyl group, R′ represents an alkyl group with 1 to 3 carbon atoms or a methoxyethyl group, R″ represents a hydrogen atom or an alkyl group with 1 to 3 carbon atoms, Q represents an alkylene radical with 1 to 10 carbon atoms, a represents 0 or 1, *b* represents 0 or 2, and *c* represents 0 or 1, and

F. 500 to 2,500 parts of organic solvent selected from the group consisting of a halogenated or non-halogenated alkane and cycloalkane, a halogenated or non-halogenated aromatic hydrocarbon, an aliphatic ketone and an alkyl ester of a monocarboxylic acid, the crosslinking system (C) comprising (1) about 70 to 95% of at least one organosilicon compound possessing at least 3 acyloxy groups bonded to one or more silicon atoms, which is a silane of the formula: $RSi(OCOR'')_3$, a disilane, a disiloxane or a disilylalkane of the formula: $(R'\lambda'COO)_{3-d}R_{d'}$ $Si(X)_fSiR_{d'}(OCOR'')_{3-d}$, in which R and R″ are as defined above, X represents an oxygen atom or the alkylene radical $-(CH_2)_h-$, each of *d* and *d*′, which may be identical or different, represents zero, 1 or 2, the sum $d + d'$ being 2 or 3, *f* represents zero or 1 and *h* represents 2 or 4, and 2) about 5 to 30% of at least one hexaalkoxymethylmelamine, the alkoxy groups each having 1 to 4 carbon atoms.

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**4,018,735**

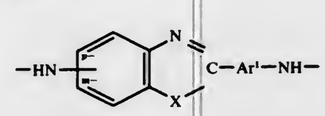
## ANISOTROPIC DOPES OF AROMATIC POLYAMIDES

**Yasuo Nakagawa, Kokubunji; Takashi Noma, and Hiroshi Mera, both of Hino, all of Japan, assignors to Teijin Limited, Osaka, Japan**

**Filed July 8, 1975, Ser. No. 594,130**
**Claims priority, application Japan, July 10, 1974, 49-78163**
**Int. Cl.² C08K** *3/16, 5/20, 5/21, 5/36*
**U.S. Cl. 260—29.1 R** **13 Claims**

**1.** An anisotropic dope of an aromatic polyamide, comprising more than 10% by weight of an aromatic polyamide and an organic polar or protonic acid solvent therefore, said aromatic polyamide consisting essentially of 100 mole% of:

A. at least 5 mole% but less than 35 mole%, based on the entire units of the polyamide, of units of formula (1) below



(1)

wherein $Ar^1$ is a divalent aromatic ring whose chain-extending bonds are coaxial or parallel and is a phenylene, biphenylene, naphthylene or pyridylene, each of which may have a substituent which is a lower alkyl, lower alkoxy, halogen, nitro, or cyano group, X is a member selected from the group consisting of O, S and NH, and the NH group bonded to the benzene ring of the above benzoxazole,, benzothiazole or benzimidazole ring is meta or para to the carbon atom to which X is bonded of said benzene ring;

B. 0 to 45 mole%, based on the entire units of the polyamide, of units of formula (2) below

$$-NH-Ar^2-NH- \quad (2)$$

wherein $Ar^2$ is the same in definition as $Ar^1$, and is identical to or different from $Ar^1$;

C. an equimolar amount, based on the total moles of the units of formulae (1) and (2) above, of a structural unit of formula (3) below

$$-CO-Ar^3-CO- \quad (3)$$

wherein $Ar^3$ is



in which the benzene ring optionally contains a substituent selected from the group consisting of halogen, lower alkyl, lower alkoxy, nitro and cyano; and

0 to 90 mole%, based on the entire units of the polyamide, of a structural unit of formula (4) below

$$-NH-Ar^4-CO- \quad (4)$$

wherein $Ar^4$ is the same in definition as $Ar^1$, and is identical to or different from $Ar^1$.

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**4,018,736**

## MANUFACTURE OF POLYESTER-IMIDE POWDERS

**Wolfgang Fabian, Wilhelmsfeld, and Jenoe Kovacs, Bobenheim-Roxheim, both of Germany, assignors to Badische Anilin- & Soda-Fabrik Aktiengesellschaft, Ludwigshafen (Rhine), Germany**

**Filed Dec. 8, 1975, Ser. No. 638,958**
**Claims priority, application Germany, Dec. 20, 1974, 2460472**
**Int. Cl.² C08G** *63/44;* **C08J** *3/12*
**U.S. Cl. 260—29.2 N** **4 Claims**

**1.** A process for the manufacture of finely divided polyesterimide powders wherein solutions, of from 5 to 60% strength by weight, of a polyester-imide, optionally together with assistants, in an organic solvent having a freezing point of from +20° to −30° C are cooled to a temperature below the freezing point of the solvent, the solvent is removed by sublimation under reduced pressure and the solid solvent-free product is pulverized.

**4.** An aqueous dispersion of a polyester-imide powder, which contains from 40 to 80% by weight of water and, if appropriate, dispersing assistants, and from 60 to 20% by weight of a polyester-imide powder obtained by the process as claimed in claim 1 and having an average particle diameter of less than 1μ.

## 4,018,737
## EMULSIONS OF ETHYLENE POLYMERS AND COPOLYMERS WITH CONTROLLED MOLECULAR WEIGHT AND PARTICLE SIZE

**Glenn E. Teer; Jerry G. Higgins; George D. Warren, all of Big Spring, Tex., and Donald C. Ewert, Lansing, Ill., assignors to Cosden Technology, Inc., Big Spring, Tex.**

**Filed Jan. 6, 1975, Ser. No. 538,919**
**Int. Cl.² C08L 23/06**
**U.S. Cl. 260—29.6 XA** **27 Claims**

1. A process for preparing translucent ethylene polymer emulsions comprising polymerizing ethylene under a pressure of from about 1,400 to about 20,000 psi by contacting gaseous ethylene with an aqueous medium having a pH of from about 8.5 to about 14.0 at a temperature of from about 60° C to about 150° C, said aqueous medium containing a water soluble salt of persulfuric acid as initiator in an amount effective to initiate polymerization, an effective amount of an emulsifier which is below about 9% by weight of said aqueous medium, which emulsifier is selected from the group consisting of anionic emulsifiers, nonionic emulsifiers and mixtures thereof, and from about 0.1 to about 1% by weight of said aqueous medium of a mercaptan selected from the group consisting of alkyl mercaptans having from about 4 to about 20 carbon atoms, dithiobis(benzothiazole), benzyl mercaptan, and p-chlorobenzyl mercaptan to thereby form said aqueous emulsion of ethylene polymer particles having molecular weights in the range of from about 3,000 to 15,000 and average particle sizes between 100 and 500 angstroms.

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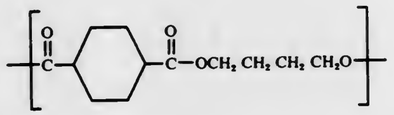
## 4,018,738
## POLY(BUTYLENETEREPHTHALATE) COMPOSITION WITH NOVACULITE

**Herbert L. Rawlings, New Martinsville, W. Va., assignor to Mobay Chemical Corporation, Pittsburgh, Pa.**

**Filed Feb. 6, 1976, Ser. No. 656,058**
**Int. Cl.² C08K 3/36, 9/06**
**U.S. Cl. 260—40 R** **12 Claims**

1. A filled synthetic resinous composition comprising 50 to 90 percent by weight of

a. poly(butyleneterephthalate) resin characterized by the repeating structural formula:



said poly(butyleneterephthalate) having an intrinsic viscosity of 0.6 to 1.5; and,

b. from 10 to 50 percent by weight novaculite having an average particle size of up to 5 microns.

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## 4,018,739
## TAR-URETHANE COMPOSITION

**Masahiro Okamoto; Morio Kimura, both of Kitakyushu; Teruo Shibuya, Kawasaki; Shinji Yamamoto, Ichihara; Shinichi Hasegawa, Settsu; Yutaka Terada, Nishinomiya, and Teruho Adachi, Toyonaka, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka and Nittetsu Chemical Industrial Co., Ltd., Tokyo, both of, Japan**

**Continuation-in-part of Ser. No. 368,376, June 8, 1973, abandoned. This application Aug. 26, 1975, Ser. No. 607,962**
**Claims priority, application Japan, June 9, 1972, 47-58053**
**Int. Cl.² C08G 2/28, 2/30**
**U.S. Cl. 260—59 R** **22 Claims**

1. A tar-urethane composition consisting essentially of (1) a non-thermosetting isocyanate-reactive tar obtained by reacting a tar produced as a by-product in the phenol synthesis via hydroperoxides with a formaldehyde in the presence of a basic catalyst selected from the group consisting of sodium hydroxide, potassium hydroxide, aqueous ammonia and amines and (2) a polyisocyanate, wherein said tar produced as a by-product in the phenol synthesis is a high boiling fraction obtained after distillation of phenols from the acid decomposition product of hydroperoxides produced in the phenol synthesis by the cumene method, the cresol synthesis by the cymene method or the resorcin and hydroquinone synthesis from diisopropylbenzene.

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## 4,018,740
## METHOD OF PRODUCING WATER-SOLUBLE AMINE-MODIFIED UREA-FORMALDEHYDE RESINS MODIFIED WITH POLYOXYALKYLENE ETHER

**Anatoly Abramovich Kruglikov, ulitsa Vyazovskaya, 9, kv. 9; Lia Ilinichna Aronova, ulitsa Karla Marxa, 87, kv. 5; Vladimir Vasilievich Kuftarev, ulitsa Tsiolkovskogo, 3, kv. 9; Zoya Sergeevna Sevrjugina, ulitsa Pervomaiskaya, 74, kv. 25, all of Nizhny Tagil Sverdlovskoi oblasti, and Vera Konstantinovna Eletskaya, poselok "Pravdy", ulitsa Zhdanova, 21, kv. 41, Moskovskaya oblast, all of U.S.S.R.**

**Filed June 28, 1976, Ser. No. 700,149**
**Int. Cl.² C08G 14/02; C08L 61/20**
**U.S. Cl. 260—70 A** **10 Claims**

1. A method of producing water-soluble urea-formaldehyde resins modified with aliphatic polyamines, residing in that interaction is performed of 1 mole of urea. 1.5–3.0 moles of formaldehyde, and branched aliphatic polyamines, with molecular weight of 200–440 and the content of tertiary nitrogen 10–15 wt.%, at 80°–100° C and pH of the alkaline medium 7.2–9.5, which is attained by proper amounts of polyamines; a sulphonic acid selected from the group consisting of aromatic and aliphatic sulphonic acids of the general formula $R—SO_3H$, where R is a radical selected from the group consisting of aryls and alkyls, is introduced into the obtained mixture until pH of an acid medium equal to 4.8–6.0 is attained; an alkaline agent is added up to pH of an alkaline medium 7.2–9.5 with the formation of oligomer; said oligomer is interacted with polyoxyethylene ether of isooctylphenol, which has 7–11 oxyethylene units, at 100°–105° C and is introduced in amounts of 0.2–2.0 wt. parts per 100 wt. parts of the initial urea.

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## 4,018,741
## PROCESS FOR THE MANUFACTURE OF HIGHLY DISPERSE SOLIDS CONSISTING OF CROSSLINKED UREA-FORMALDEHYDE POLYCONDENSATION PRODUCTS

**Alfred Renner, Muenchenstein, Switzerland, assignor to Ciba-Geigy AG, Basel, Switzerland**

**Continuation of Ser. No. 439,243, Feb. 4, 1974, abandoned, which is a continuation-in-part of Ser. No. 378,898, July 13, 1973, abandoned, which is a continuation of Ser. No. 299,479, Oct. 20, 1972, abandoned, which is a continuation of Ser. No. 65,330, Aug. 19, 1970, abandoned. This application Aug. 29, 1975, Ser. No. 609,144**
**Claims priority, application Switzerland, Sept. 12, 1969, 13829/69**
**Int. Cl.² C08G 2/28**
**U.S. Cl. 260—71** **8 Claims**

1. A process for the manufacture of highly disperse insoluble and infusible solids of crosslinked urea-formaldehyde polycondensation products consisting of primary particles having an average diameter of not greater than 1 micron which consists essentially of

A. forming an aqueous solution consisting essentially of water and a precondensate of urea and formaldehyde

B. mixing said aqueous solution with sulphamic acid at a temperature of from room temperature to 100° C to form a crosslinked gel, the pH during gel formation being from 1.0 to 1.6, and the molar ratio of formaldehyde to urea being from greater than 1.2 to 2.0 not later than at the time of gel formation, and



C. comminuting, drying and deagglomerating the resulting gel.

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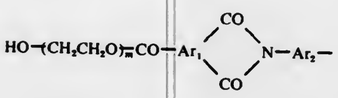
## 4,018,742
## IMIDE-RING CONTAINING POLYESTER AND WIRE ENAMEL CONTAINING SAME

**Yasuhiro Suzuki, and Katsuhiko Yamaguchi, both of Ibaraki, Japan, assignors to Nitto Electric Industrial Co., Ltd., Ibaraki, Japan**

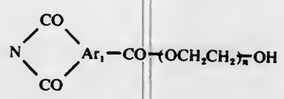
**Filed Apr. 18, 1975, Ser. No. 569,430**
**Claims priority, application Japan, May 1, 1974, 49-48279**
**Int. Cl.² C08G 73/16**
**U.S. Cl. 260—75 N** **21 Claims**

1. A polyester having imide rings in the molecule comprising the reaction product of

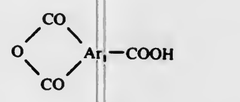
1. a polyhydric alcohol component comprising about 5 to 80% by weight of an imide ring containing diol represented by the following Formula (I)



(I)



wherein $Ar_1$ represents a trivalent aromatic group; $Ar_2$ represents a divalent aromatic group; and m and n each represents an integer of 1 to 6; with the diol being the reaction product of 2 moles of an aromatic tricarboxylic acid anhydride of the following formula (II)



(II)

wherein $Ar_1$ has the same meaning as above; with 1 mole of a diamine of the following formula (III)

$$H_2N - Ar_2 - NH_2 \qquad \text{(III)}$$

wherein $Ar_2$ has the same meaning as above, in the presence of ethylene carbonate; and;

2. a polycarboxylic acid component comprising at least one of a polycarboxylic acid and a lower alkyl ester thereof;

wherein the ratio of the polyhydric alcohol component (1) to the polycarboxylic acid component (2), as expressed by the —OH/—COOH molar ratio, is about 1.2 to 1.6.

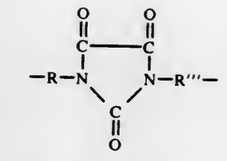
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## 4,018,743
## PROCESS FOR PREPARING TRIKETOIMIDAZOLIDINES

**Kurt Kraft, Wiesbaden-Dotzheim, and Johannes Reese, Wiesbaden-Biebrich, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt, Germany**

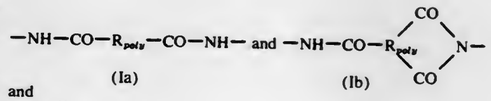
**Continuation of Ser. No. 154,634, June 18, 1971, abandoned. This application Feb. 28, 1975, Ser. No. 554,019**
**Claims priority, application Germany, June 19, 1970, 2030233**
**Int. Cl.² C08G 18/00**
**U.S. Cl. 260—77.5 CH** **23 Claims**

1. A polymer reaction product containing a plurality of units of the formula



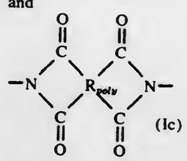
(I)

together with more than one unit selected from the group consisting of



(Ia) (Ib)

and



(Ic)

and obtained by reaction at a temperature in the range of −20° to 30 280° C at least one oxamidic ester (a) of Formula VII,

$$R—(NH—CO—CO—OR^v)_r \qquad \text{(VII)}$$

at least one isocyanate (b) of Formula VIII

$$R'''—(N=C=O)_s \qquad \text{(VIII)}$$

or compound forming an isocyanate under the aforesaid reaction conditions and at least one polycarboxylic acid or polycarboxylic acid anhydride forming a polycarboxylic acid under the aforesaid reaction conditions (c) of the formula $R_{poly}(COOH)_p$ in which formulae

R is a member selected from the group consisting of

aa. an at least mono-nuclear di- to hexavalent aromatic radical having 6 to 18 carbon atoms,

bb. an at least mono-nuclear di- to hexavalent heterocyclic radical having 5 to 12 carbon atoms,

cc. a radical as defined in (aa) being substituted by at most two substituents, referred to any one aryl group of the radical selected from the group consisting halogen, nitro, dialkylamino, diarylamino, alkylaryl-amino groups, alkyl, alkoxy, carboxyalkyl, carboxyaryl, acyl, cycloalkyl, halogenated alkyl, halogenated alkoxy, halogenated carboxyalkyl, halogenated carboxyaryl and halogenated acyl groups with up to 18 carbon atoms,

dd. a radical as defined in (bb) being substituted by a substituent selected from the group consisting of halogen, nitro, dialkylamino, diarylamino, alkylarylamino groups, alkyl, alkoxy, carboxyalkyl, carboxyaryl, acyl, cycloalkyl, halogenated alkyl, halogenated alkoxy, halogenated carboxyalkyl, halogenated carboxyaryl or halogenated acyl groups with up to 18 carbon atoms,

ee. a quinonyl radical;

$R^v$ is an aliphatic hydrocarbon group having up to 18 carbon atoms, a cycloaliphatic hydrocarbon group with up to 8 carbon atoms, an unsubstituted monomuclear aromatic hydrocarbon group or a mononuclear aromatic hydrocarbon having one or more hydrocarbon substituents, said substituents having a total of up to 14 carbon atoms,

$R'''$ is a member selected from the group consisting of

d1. an at least mono-cyclic di- to tetravalent carboxylic radical having 6 to 30 carbon atoms,

e1. an at least mono-cyclic di- to tetravalent heterocyclic radical having 6 to 40 carbon atoms,

f1. a radical d1) being substituted by at least one of the groups halogen, nitro, alkyl, alkoxy, carboxyalkyl, car-

boxyaryl, acyl, cycloalkyl, halogenated alkyl, halogenated alkoxy, halogenated carboxyalkyl, halogenated carboxyaryl and a halogenated acyl with up to 18 carbon atoms,

g1. a radical as defined in (e1) being substituted by at least one of the groups halogen, nitro, alkyl, alkoxy, carboxyalkyl, carboxaryl, acyl, cycloalkyl, halogenated alkyl, halogenated alkoxy, halogenated carboxyalkyl, halogenated carboxyaryl and halogenated acyl with up to 18 carbon atoms,

h1. an aliphatic radical with 1 to 20 carbon atoms;

$R_{poly}$ is a member selected from the group consisting of

i1. an unsubstituted di- to hexavalent at least mono-cyclic radical having 6 to 34 carbon atoms,

k1. an at least mono-nuclear carboxylic radical having 6 to 34 carbon atoms being substituted by halogen, amino or alkyl groups having a total of 1 to 8 carbon atoms,

l1. an aliphatic di- to hexavalent hydrocarbon radical having 2 to 12 carbon atoms and which may have at least one double bond,

m1. a heterocyclic radical having 4 to 69 carbon atoms

o1. an aliphatic radical (l1) being substituted by alkyl, halogen or amino groups,

p1. a heterocyclic radical (m1) being substituted by alkyl, halogen or amino groups,

*r* is an integer from 2 to 6,

*s* is an integer from 2 to 4 and

*p* is an integer from 2 to 6,

and in which polymer reaction products 1 to *r* mols of oxamidic ester have been reacted with one mol of isocyanate or 1 to *s* mols of isocyanate have been reacted with one mol of oxamidic ester with the provisions that

I. more than $1/r$ of the alcohol groups of the oxamidic ester (a) have been removed by reaction with the isocyanate groups when an excess of ester groups of the oxamidic ester, referred to the isocyanate groups, have been used as starting material and that

II. more than $1/s$ of the isocyanate groups of the isocyanate (b) has been reacted, when an excess of isocyanate groups, referred to the ester groups of the oxamidic ester, has been used as a starting material, and

III. in which reaction product at least two ester groups of the oxamidic ester have been reacted, where an excess or equimolar amount of isocyanate has been used, and at least 2 isocyanate groups have been reacted where an excess or equimolar amount of ester groups of the oxamidic ester has been used, and

IV. wherein components (a) and (c) have been reacted in a molar proportion of (A') (0.97 to 0.03) to (C') (0.03 to 0.97) wherein the total of both components is always one mol provided the oxamidic ester and the polycarboxylic acid have the same functionality and wherein the molar proportion of the reaction components is

$$a(A') + c(C') = b(B')$$

wherein

*a* is the number of oxamidic ester groups in said *A'* mols of oxamidic ester,

*b* is the number of isocyanate groups in said *B'* mols of isocyanate,

*c* is the number of the carboxylic groups in *C'* mols of polycarboxylic acid

and *a* and *b* are integers of from 2 to 4 and *c* is an integer from 2 to 6 and wherein $b(B')$ is up to three times the amount of $a(A') + c(C')$.

**4,018,744**

## STORAGE STABLE POLYESTER-POLYURETHANE-PRODUCING COMPOSITIONS

**Larry G. Wolgemuth, Cherry Hill, N.J., assignor to Atlantic Richfield Company, Los Angeles, Calif.**

**Continuation-in-part of Ser. No. 457,942, April 4, 1974, Pat. No. 3,950,285. This application Feb. 13, 1976, Ser. No. 657,680**

**Int. Cl.² C08G *18/80, 18/34***

**U.S. Cl. 260—77.5 B** **2 Claims**

1. A storage-stable composition which is thermally curable to high molecular weight polyester polyurethanes comprising

a. an organic polycarbamic acid ester having the structural formula

$$R'OCHNR(NHCOR'')_n$$

wherein *n* is 1 to 5, R is an organic radical containing 2 to about 50 carbon atoms and R' and R'' are the same or different organic radicals containing up to 12 carbon atoms,

b. an organic polycarboxylic acid ester having a molecular weight of about 118 to 462 the alcohol portion of which is a monoalcohol,

c. an organic polyhydroxy compound having a molecular weight of about 64 to 2,000, and

d. about 0.005 to 5.0%, based on the total weight of (a), (b) and (c) of a latent curing catalyst comprised of an organotin compound, said (a), (b) and (c) being free of substituents which interfere with the desired reaction, the equivalent ratio of (a) to (b) varying from 1:9 to 9:1 and the equivalent ration of total (a) and (b) to (c) varying from 0.7 to 10:1.

**4,018,745**

## POLYURETHANE WEAR-RESISTANT SURFACING

**Robert L. Peterson, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

**Continuation of Ser. No. 81,537, Oct. 16, 1970, abandoned. This application Apr. 22, 1976, Ser. No. 679,367**

**Int. Cl.² C08G *18/32***

**U.S. Cl. 260—77.5 AT** **23 Claims**

1. A tough, wear-resistant elastomer coating comprising the moisture-cured reaction product of a reaction mixture comprising

a. an aliphatic polyisocyanate-terminated prepolymer, and

b. a polymeric polyprimary amine having a molecular weight of at least 3,500, the relative amounts of said prepolymer and said polyamine in the reaction mixture being sufficient to provide about one amine group for each 10 to 200 isocyanate groups.

**4,018,746**

## TRANSPARENT COPOLYAMIDES FROM M-XYLYLENE DIAMINE, AN ALIPHATIC DIAMINE AND TEREPHTHALIC ACID

**Ludwig Brinkmann, Frankfurt am Main, and Walter Herwig, Neuenhain, Taunus, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany**

**Continuation-in-part of Ser. No. 515,658, Oct. 17, 1974, abandoned, which is a continuation-in-part of Ser. No. 347,142, April 2, 1973, abandoned. This application Mar. 26, 1976, Ser. No. 670,716**

**Claims priority, application Germany, Apr. 5, 1972, 2216261**

**Int. Cl.² C08G *69/26, 69/32***

**U.S. Cl. 260—78 R** **9 Claims**

1. A polyamide having improved form stability at elevated temperature, said polyamide being of the general formula



$$R_3\text{-}\left[HN\text{—}R_1\text{—}NH\text{—}CO\text{—}R_2\text{—}CO\right]_x R_4$$

in which

$R_1$ represents meta-xylylene units, para-xylylene units in an amount of from 0 to 50 mol % of the meta-xylylene units, and at least one, straight-chain bivalent aliphatic hydrocarbon unit containing from 4 to 20 carbon atoms, said meta-xylylene, para-xylylene and bivalent aliphatic hydrocarbon units being randomly distributed in the macromolecule and the proportion of the aliphatic hydrocarbon units being from 5 to 90 mol %, based on the sum of the xylylene and aliphatic hydrocarbon units,

$R_2$ represents phenylene units selected from the group consisting of p—$C_6H_4$—, m—$C_6H_4$—, and mixtures thereof, and at least one bivalent aliphatic saturated hydrocarbon unit containing from 3 to 18 carbon atoms; said phenylene and aliphatic hydrocarbon units being randomly distributed over the macromolecule and the proportion of aliphatic units being from 10 to 90 mol %, based on the sum of the phenylene and aliphatic units,

$R_3$ represents H or OC—$R_2$—COOH and

$R_4$ represents OH or NH—$R_1$—$NH_2$, and in which *x* indicates the degree of polymerization, measured as reduced specific viscosity within range of from 1.0 to 2.5 dl/g, determined in a solution of 1 g of the polyamide in 100 ml of a mixture of phenol/tetrachloroethane in a weight ratio of 60:40 at 25° C.

**4,018,747**

## PRODUCTION OF FIBER-FORMING POLYAMIDES BY TRANSAMIDATION OF N-ALICYCLIC DIAMIDES WITH DICARBOXYLIC ACIDS

**Russell E. Malz, Jr., Naugatuck; Robert W. Brown, Middlebury, and Harold Greenfield, Watertown, all of Conn., assignors to Uniroyal, Inc., New York, N.Y.**

**Continuation-in-part of Ser. No. 542,156, Jan. 20, 1975, abandoned. This application Apr. 20, 1976, Ser. No. 678,571**

**Int. Cl.² C08G *69/28***

**U.S. Cl. 260—78 R** **8 Claims**

1. A process for producing a fiber-forming N-alicyclic polyamide comprising mixing a dicarboxylic acid of the formula

HOOC—R—COOH

wherein R is a $-(CH_2)_z-$ group wherein *z* is an integer from 3 to 20, with an N-alicyclic diamide of the formula

$R^1$—CONH—$R^2$—NHCO—$R^3$

wherein $R^1$ and $R^3$ may be the same or different and are hydrogen, an alkyl radical having 1 to 18 carbon atoms, phenyl or benzyl, and $R^2$ is a cycloalkylene group having 6 to 12 carbon atoms or an alkanebiscycloalkylene group having 13 to 20 carbon atoms, and heating the mixture (I) under an inert atmosphere and atmospheric pressure for 2–10 hours at a temperature of from 220° to 350° C. and then (II) at a pressure of from 1 to 50 mm of Hg for ⅓ – 10 hours at a temperature of from 300° to 350° C, whereby there is produced an N-alicyclic polyamide containing repeating structural units having the formula

—CO—R—CONH—$R^2$—NH—

wherein R and $R^2$ are as defined previously, said polyamide having an inherent viscosity of at least 0.4 deciliters per gram measured at 25° C and a concentration of 0.5 gram of said polyamide in 100 milliliters of m-cresol.

**4,018,748**

## POLYAMIDES CONTAINING 1,2,5-OXADIAZOLE-3,4-DICARBONYL GROUPS

**Robert N. MacDonald, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

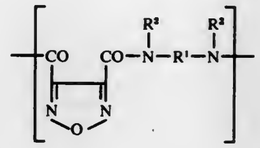
**Filed Jan. 24, 1973, Ser. No. 326,175**

**The portion of the term of this patent subsequent to May 23, 1989, has been disclaimed.**

**Int. Cl.² C08G *69/32***

**U.S. Cl. 260—78 R** **3 Claims**

1. A polyamide consisting of repeating units of the formula



wherein $R^1$ is alkylene of 2 to 12 carbon atoms or an arylene or a bis-arylene group of 6–18 carbon atoms and $R^2$ and $R^3$ are hydrogen, alkyl of up to 6 carbon atoms or when $R^1$ is an alkylene group and $R^2$ and $R^3$ jointly can be alkylene of 2 to 12 carbon atoms, said polyamide having an inherent viscosity measured at 0.1% concentration in chloroform at 25° C between 0.1 and 10.

**4,018,749**

## CURABLE COMPOSITION

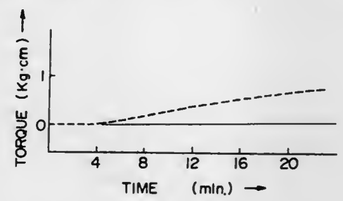
**Masao Onizawa, Ohmiya, Japan, assignor to Sanyo Trading Co., Ltd., Tokyo, Japan**

**Filed Jan. 28, 1976, Ser. No. 653,123**

**Claims priority, application Japan, Jan. 29, 1975, 50-11407; Dec. 11, 1975, 50-146889**

**Int. Cl.² C08F *8/32***

**U.S. Cl. 260—78 A** **3 Claims**




1. A curable composition comprising a liquid polybutadiene rubber having bromine bonded to at least one of its ends, and at least one amino acid selected from the group consisting of arginine, lysine, hydroxylysine and ornithine.

**4,018,750**

## CURABLE COMPOSITIONS CONTAINING CHLOROPRENE RUBBER

**Masao Onizawa, Ohmiya, Japan, assignor to Sanyo Trading Co., Ltd., Tokyo, Japan**

**Filed Jan. 29, 1976, Ser. No. 653,630**

**Claims priority, application Japan, Feb. 3, 1975, 50-13329; June 24, 1975, 50-76807**

**Int. Cl.² C08F *8/32***

**U.S. Cl. 260—78 A** **3 Claims**

1. A vulcanizable composition comprising a chloroprene rubber and at least one amino acid selected from the group consisting or arginine, lysine, hydroxylysine, ornithine, cystine, asparagine, glutamine and citrulline.

4,018,751

## CONTINUOUS PROCESS FOR AMINOAZOBENZENE

James Bryan Trecek, Somerville, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Filed Apr. 9, 1975, Ser. No. 566,594
Int. Cl.² C07C *107/06*; C09B *29/08*
U.S. Cl. 260—205 4 Claims

1. A continuous process for the preparation of a carbocyclic aromatic aminoazo compound comprising the steps of (1) intimately mixing a reactant stream containing a large excess of a carbocyclic aromatic primary amine, unsubstituted in the position para to the amino group, a mineral acid and water, with a reactant stream containing an aqueous solution of an alkali metal nitrite, each of said reactant streams having been separately heated to a temperature in the range of 10° C. to 40° C. and the combined mixed streams containing a mole ratio of primary amine to mineral acid to alkali metal nitrite in the range of 3.5—20:1.2—9:1, (2) immediately passing said premixed reactant streams directly to a tubular reactor, at a rate such as to provide a residence time in said reactor of from about 1 to 10 minutes, wherein said reactant streams react to form said aminoazo compound at a temperature in the range of 40° C. to 100° C., said temperature resulting solely from the heat of reaction, (3) neutralizing the reaction product steam, con taining said aminoazo compound as the acid salt, with an aqueous alkali metal hydroxide, (4) separating the resulting organic phase from the aqueous phase, and (5) recovering said aromatic aminoazo compound from the organic phase.

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4,018,752

## ULTRAFILTRATION PROCESS FOR THE RECOVERY OF PROTEINS FROM MILK

Marcel Bühler, Orbe; Hans-Ueli Bohren, and Théodore Hodel, both of La Tour-de-Peilz, all of Switzerland, assignors to Societe d'Assistance Technique pour Produits Nestle S.A., Lausanne, Switzerland

Filed July 25, 1974, Ser. No. 491,644
Claims priority, application Switzerland, July 31, 1973, 11117/73; June 7, 1974, 7779/74
Int. Cl.² A23J *1/20*
U.S. Cl. 260—112 R 9 Claims

1. A process for isolating a protein fraction from milk containing said fraction in admixture with other substances, which comprises subjecting said milk to ultrafiltration to obtain a first retentate and a permeate, diluting said retentate with a volume of acidic aqueous liquid having a pH between 3 and 5, said volume being equal to or greater than that of said permeate, subjecting the diluted retentate to at least one further ultrafiltration treatment and recovering a second retentate containing said protein fraction.

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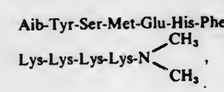
4,018,753

## POLYPEPTIDES WITH ACTH-LIKE ACTIVITIES

Ken Inouye; Masaru Shin, both of Kobe, and Kunio Watanabe, Otsu, all of Japan, assignors to Shionogi & Co., Ltd., Osaka, Japan

Filed July 16, 1975, Ser. No. 596,245
Claims priority, application Japan, July 30, 1974, 49-87759
Int. Cl.² C07C *103/52*; A61K *37/40*
U.S. Cl. 260—112.5 R 4 Claims

1. A member selected from the group consisting of



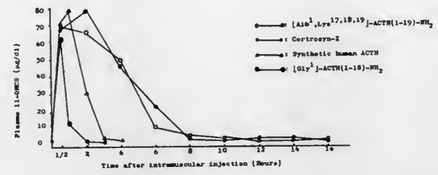

a non-toxic acid addition salt thereof, and a complex thereof.

4,018,754

## NOVEL POLYPEPTIDES HAVING ACTH-LIKE ACTION

Ken Inouye; Masaru Shin, both of Kobe, and Kunio Watanabe, Otsu, all of Japan, assignors to Shionogi & Co., Ltd., Osaka, Japan

Filed July 16, 1975, Ser. No. 596,246
Claims priority, application Japan, July 30, 1974, 49-87758
Int. Cl.² C07C *103/52*; A61K *37/40*
U.S. Cl. 260—112.5 R 5 Claims




1. A member selected from the group consisting of a compound of the formula:

Aib—Tyr—Ser—Met—Glu—His—Phe—Arg—Tr-
p—Gly—Lys—Pro—Val—Gly—(Lys)$_n$—Y

wherein $n$ is an integer of 5–6 and Y is —OH or —$HN_2$ and is bound to the carbonyl group of the C-terminal lysine residue, a non-toxic acid addition salt thereof and a complex thereof.

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4,018,755

## EXTRACTION OF PROTEINS FROM VEGETABLE SEED COMPOSITIONS

Li Chuan Wang, Peoria, Ill., assignor to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed May 12, 1975, Ser. No. 576,758
Int. Cl.² A23J *1/14*
U.S. Cl. 260—123.5 11 Claims

1. A method of extracting protein from vegetable seeds, comprising the steps of:

a. sonicating a vegetable seed composition selected from the group consisting of full-fat vegetable seed flakes, meal, grits, and flour and their defatted analogs and their toasted full-fat and defatted analogs in a suitable solvent in a solids:solvent ratio of from about 1:10 to 1:40 at a sonic frequency of about 20 KHz and at a sonic output power of from 100 to 500 watts for a time sufficient to solubilize from about 50 to 100 percent of the total protein in said vegetable seed composition;

b. separating the solids from the supernatant solution of protein resulting from step (a); and

c. recovering the protein from the supernatant solution resulting from step (b).

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4,018,756

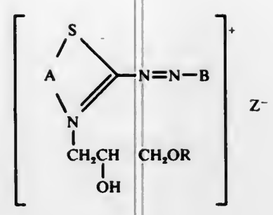
## THIAZOLE AND BENZOTHIAZOLE CATIONIC DYES

Masaaki Ohkawa, Takatsuki; Yoshio Tanaka, Osaka; Yoshiro Takeda, Takarazuka; Tadao Kinoshita, Nishinomiya, and Kazuyoshi Hirabayashi, Takarazuka, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

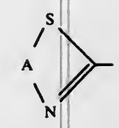
Filed June 14, 1971, Ser. No. 153,080
Claims priority, application Japan, June 12, 1970, 45-51301; June 12, 1970, 45-51302; Sept. 10, 1970, 45-79751
Int. Cl.² C09B *29/08*, *29/36*; D06P *1/08*, *3/70*
U.S. Cl. 260—146 R 13 Claims

1. A compound of the formula

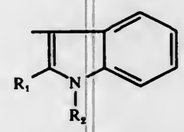




wherein the group

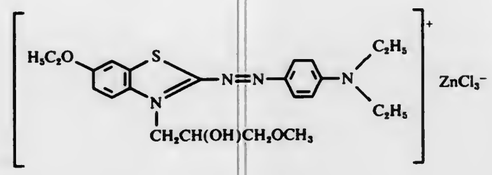


represents a group selected from the class consisting of thiazolyl or thiazolyl substituted at the 4- or 5-positions or both by methyl, ethyl, halogen, cyano or phenyl, and benzothiazolyl or benzothiazolyl substituted at the 6-position by alkyl having 1 to 3 carbon atoms, alkoxy having 1 to 2 carbon atoms, phenoxy, nitro, cyano, thiocyano, halogen, sulfamoyl or alkylsufonyl having 1 to 2 carbon atoms, B represents



wherein $R_1$ represents alkyl having 1 to 4 carbon atoms, aralkyl having 7 to 8 carbon atoms or phenyl and phenyl substituted by alkyl having 1 to 2 carbon atoms, alkoxy having 1 to 2 carbon atoms, chlorine atom, cyano or nitro, and $R_2$ represents hydrogen, alkyl having 1 to 4 carbon atoms, alkoxyalkyl having 3 to 6 carbon atoms, acetoxyethyl, $\beta$-chloroethyl, cyanoalkyl having 2 to 4 carbon atoms or carbamoylalkyl having 3 to 4 carbon atoms, and R represents alkyl having 1 to 4 carbon atoms, and $Z^-$ is an anion.

13. A compound of the formula



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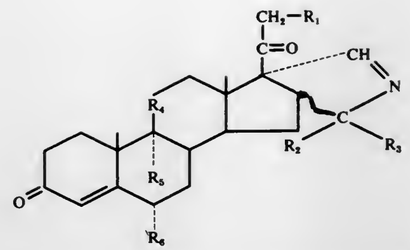
4,018,757

## STEROIDAL[16α,17-C][2H]PYRROLES

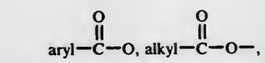
Ravi K. Varma, Belle Mead, and Christopher M. Cimarusti, Hamilton, both of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed May 20, 1976, Ser. No. 688,207
Int. Cl.² C07J *71/00*
U.S. Cl. 260—239.5 10 Claims

1. A steroid having the formula



or a 1,2-dehydro derivative thereof, wherein $R_1$ is hydrogen, hydroxy,



fluorine, chlorine or bromine; $R_2$ is alkyl or aryl; $R_3$ is aryl, cyano, alkylcarbonyl, arylcarbonyl, alkoxycarbonyl, aryloxycarbonyl, alkylsulfonyl, or arylsulfonyl; $R_4$ is carbonyl, $\beta$-hydroxymethylene, $\beta$-chloromethylene, or $\beta$-bromomethylene; $R_5$ is hydrogen, fluorine, chlorine or bromine; and $R_6$ is hydrogen, fluorine or methyl; wherein aryl is phenyl or phenyl substituted with fluorine, chlorine, bromine, nitro, cyano, alkyl or alkoxy; and alkyl and alkoxy are groups having 1 to 6 carbon atoms.

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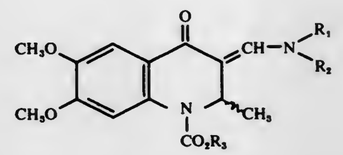
4,018,758

## 3-AMINOMETHYLENE-6,7-DIMETHOXY-2-METHYL-4-OXO-1,2,3,4-TETRAHYDRO-1-QUINOLINE CARBOXYLIC ACID ESTERS AND INTERMEDIATES LEADING THERETO

Michael R. Johnson, Gales Ferry, and Jacob J. Plattner, East Lyme, both of Conn., assignors to Pfizer Inc., New York, N.Y.

Division of Ser. No. 628,808, Nov. 4, 1975, Pat. No. 3,978,064.
This application Apr. 12, 1976, Ser. No. 676,103
Int. Cl.² C07D *401/06*, *413/06*
U.S. Cl. 260—240.3 1 Claim

1. A racemic compound selected from the group consisting of



wherein $R_1$ and $R_2$ taken together with the nitrogen to which they are attached form a heterocyclic ring selected from the group consisting of piperidino, pyrrolidino, and morpholino and $R_3$ is selected from the group consisting of alkyl having from one to five carbon atoms, phenyl, benzyl and mono-substituted benzyl and phenyl wherein said substituent is selected from the group consisting of fluoro, chloro, methyl, methoxy and trifluoromethyl.

**4,018,759**

## 3-HETEROCYCLICTHIOMETHYLCEPHALOSPORINS

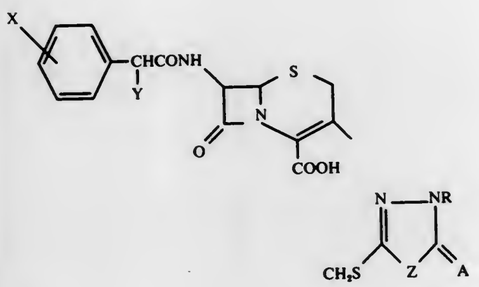
David Alan Berges, Audubon, Pa., assignor to SmithKline Corporation, Philadelphia, Pa.

Division of Ser. No. 529,141, Dec. 3, 1974, Pat. No. 3,957,768, which is a division of Ser. No. 306,507, Nov. 14, 1972, Pat. No. 3,868,369. This application Dec. 29, 1975, Ser. No. 645,105

Int. Cl.² C07D *501/20*

U.S. Cl. 260—243 C — 7 Claims

1. A compound of the formula



where

X is H, $CH_2OH$, SR, or OR;

Y is OH;

A is O or S;

Z is S; and

R is hydrogen or $C_1$-$C_4$ alkyl

or a nontoxic pharmaceutically acceptable salt thereof.

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**4,018,760**

## THIO-β-LACTAM CEPHALOSPORINS

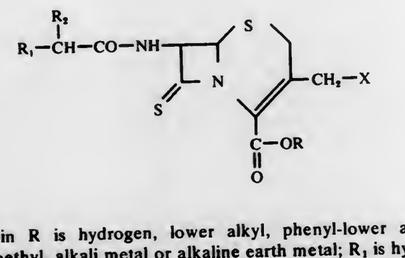
Christopher M. Cimarusti, Hamilton, N.J.; Paul Wojtkowski, Wilmington, Del., and Joseph E. Dolfini, Cincinnati, Ohio, assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Division of Ser. No. 551,222, Feb. 19, 1975, Pat. No. 3,971,780. This application Feb. 20, 1976, Ser. No. 659,863

Int. Cl.² C07D *501/20*

U.S. Cl. 260—243 C — 9 Claims

1. A compound of the formula



wherein R is hydrogen, lower alkyl, phenyl-lower alkyl, trihaloethyl, alkali metal or alkaline earth metal; $R_1$ is hydrogen, lower alkyl, saturated or unsaturated cycloalkyl of 3 to 7 carbons, phenyl, phenyl-lower alkyl, phenoxy, thienyl, furyl, oxazolyl, isoxazolyl, or thiazolyl; $R_2$ is hydrogen, amino, carboxy, hydroxy or ureido; and X is lower alkyl thiadiazolyl thio or lower alkyltetrazolyl thio.

**4,018,761**

## THIO-β-LACTAM CEPHALOSPORINS

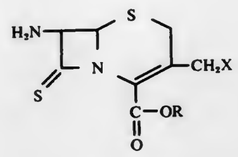
Christopher M. Cimarusti, Hamilton, N.J.; Paul Wojtkowski, Wilmington, Del., and Joseph E. Dolfini, Cincinnati, Ohio, assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Division of Ser. No. 551,222, Feb. 19, 1975, Pat. No. 3,971,780. This application Feb. 20, 1976, Ser. No. 659,864

Int. Cl.² C07D *501/20*

U.S. Cl. 260—243 C — 3 Claims

1. A compound of the formula



wherein R is hydrogen, lower alkyl, phenyl-lower alkyl, trihaloethyl, alkali metal or alkaline earth metal and X is lower alkylthiadiazolylthio or lower alkyltetrazolylthio.

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**4,018,762**

## PROCESS FOR THE PREPARATION OF 4-HYDROXY-3-(5-METHYL-3-ISOXAZOLYLCARBAMOYL)-2-METHYL-2H-1,2-BENZOTHIAZINE 1,1-DIOXIDE

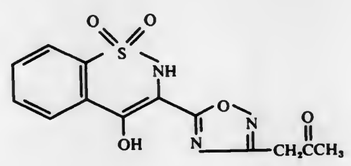
Arthur C. Fabian, Flanders; Jerome D. Genzer, Livingston; Charles Francis Kasulanis, Hopatcong; John Shavel, Jr., Mendham, and Harold Zinnes, Rockaway, all of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.

Division of Ser. No. 644,986, Dec. 29, 1975, which is a division of Ser. No. 577,568, May 21, 1975, Pat. No. 3,957,772. This application June 18, 1976, Ser. No. 697,595

Int. Cl.² C07D *279/02*

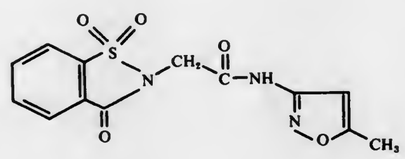
U.S. Cl. 260—243 R — 10 Claims

1. A process for preparing a compound of the formula V:



(V)

which comprises reacting a compound of the formula IV:



(IV)

with an alkali metal alkoxide of a lower alcohol in an inert solvent at a controlled temperature followed by acidification.



**4,018,763**

## PROCESS FOR THE MANUFACTURE OF BASIC OXAZINE DYES

Peter Moser, Binningen, and Alex Nicopoulos, Basel, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

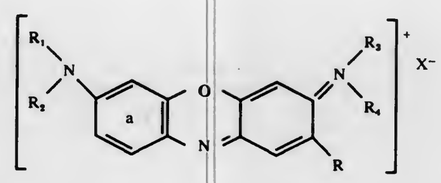
Filed Apr. 14, 1975, Ser. No. 567,795

Claims priority, application Switzerland, Apr. 29, 1974, 5873/74

Int. Cl.² C07D *265/12*

U.S. Cl. 260—245 — 8 Claims

1. A process for the preparation of a basic oxazine dye of the formula



wherein

R is lower alkoxy or lower alkyl,

$R_1$ and $R_2$ are independently lower alkyl which is unsubstituted or substituted by halo, cyano, hydroxy, methoxy, ethoxy, phenoxy or phenyl; or

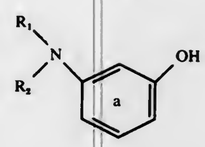
$R_1$ and $R_2$ together with the nitrogen to which they are attached represent piperidino or morpholino,

$R_3$ and $R_4$ are independently hydrogen or lower alkyl which is unsubstituted or substituted by halo, cyano, hydroxy, methoxy, ethoxy, phenoxy or phenyl,

the benzene ring *a* may be further substituted by halo, methoxy, methyl or a fused benzene ring, and

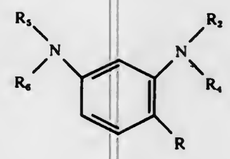
X is an anion

which comprises reacting a phenolic compound of the formula



with nitrous acid at a temperature below 50° C in the presence of a strong inorganic acid and in a polar, water-miscible solvent selected from the group consisting of lower alcohols, cyclic ethers, lower aliphatic carboxylic acids and an aprotic dipolar solvent having a dipole moment greater than 2.5 and a dielectric coefficient greater than 15, to form the corresponding nitroso compound in the reaction mixture,

adding to said reaction mixture, without isolation of said nitroso compound, a diamine of the formula



wherein

$R_5$ and $R_6$ are independently hydrogen or lower alkyl, to form said basic oxazine dye at a temperature between 20° to 120° C, and recovering said dye from the reaction mixture.

**4,018,764**

## UREYLENEBIS METHYL-PHENYLENE-CARBONYL-BIS-DIHYDRO-2-OXO-NAPHTHOXAZINE DISULTONIC ACIDS

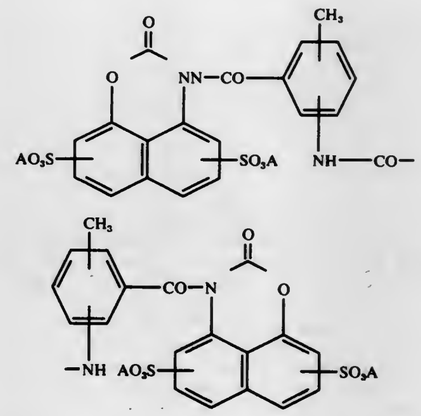
Seymour Bernstein, New City, N.Y.; Robert Herman Lenhard, Paramus, N.J., and Milton David Heller, New City, N.Y., assignors to American Cyanamid Company, Stamford, Conn.

Filed May 10, 1976, Ser. No. 684,695

Int. Cl.² C07D *265/00*, *273/00*, *295/00*

U.S. Cl. 260—246 R — 2 Claims

1. A compound selected from those of the formula:



wherein A is hydrogen, alkali metal or alkaline earth, with the proviso that A is identical in the same compound.

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**4,018,765**

## PROCESS FOR THE PREPARATION OF CERTAIN HYDROPEROXY DERIVATIVES

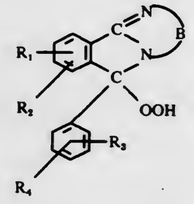
Werner Metlesics, Clifton, and Leo Henryk Sternbach, Upper Montclair, both of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 493,020, July 30, 1974, Pat. No. 3,929,766, which is a division of Ser. No. 639,315, May 18, 1967, Pat. No. 3,888,846, which is a continuation-in-part of Ser. No. 626,965, March 30, 1967, abandoned. This application Oct. 2, 1975, Ser. No. 618,864

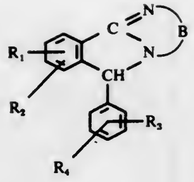
Int. Cl.² C07D *401/00*, *403/00*

U.S. Cl. 260—239 BC — 1 Claim

1. A process for the preparation of a hydroperoxy derivative of the formula



wherein B represents an alkylene chain of 2 to 4 carbon atoms in which one or more of the hydrogens can be replaced by lower alkyl; and $R_1$, $R_2$, $R_3$ and $R_4$ are each independently selected from the group consisting of hydrogen, halogen, lower alkyl, lower alkoxy, hydroxy, and trifluoromethyl, which comprises treating a compound of the formula:



wherein B, $R_1$, $R_2$, $R_3$ and $R_4$ are as described above, with hydrogen peroxide.

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**4,018,766**

**SUBSTITUTED BENZOPYRANO[3,4-C]PYRIDINE-5-ONES**

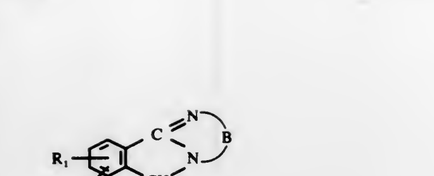
**Richard E. Brown, East Hanover; Chester Puchalski, Dover, and John Shavel, Jr., Mendham, all of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.**

**Continuation-in-part of Ser. No. 534,502, Dec. 19, 1974, Pat. No. 3,946,008, which is a continuation-in-part of Ser. No. 343,613, March 21, 1973, abandoned, which is a continuation-in-part of Ser. No. 122,498, March 9, 1971, abandoned. This application June 25, 1975, Ser. No. 590,346**

**Int. Cl.² C07D** *491/04*

**U.S. Cl. 260—247.2 B** **4 Claims**

1. A compound of the formula:



I

wherein $R_1$ and $R_2$ may be hydrogen, hydroxy, or lower alkyl of 1 to 6 carbon atoms, with the proviso that either $R_1$ or $R_2$ must be lower alkyl; and

wherein X may be oxygen, sulfur, $-CH_2CH_2-$, a valence bond, $-CHR_3$ or $NR_3$ where $R_3$ is hydrogen, a lower alkyl of 1 to 6 carbon atoms, or a lower alkanoyl group of 1 to 6 carbon atoms.

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**4,018,767**

**ANTI-ARRHYTHMIC AGENTS**

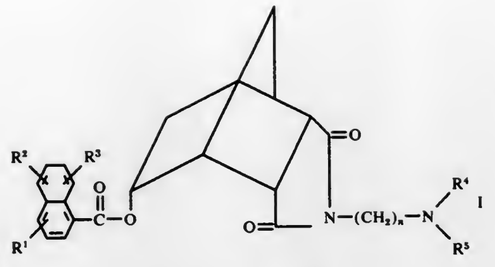
**Joseph Paul Buyniski, Syracuse, N.Y.; Alex Michael Jelenevsky, Greensboro, N.C., and Ronald Leslie Buchanan, Fayetteville, N.Y., assignors to Bristol-Myers Company, New York, N.Y.**

**Filed May 22, 1975, Ser. No. 579,763**

**Int. Cl.² C07D** *413/06, 209/94, 401/06, 403/06*

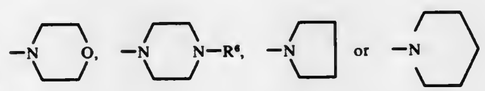
**U.S. Cl. 260—247.2 A** **15 Claims**

1. A compound having the formula



I

wherein $R^1$, $R^2$ and $R^3$ are alike or different and each is H, Cl, Br, F, (lower)alkyl, nitro, OH or (lower)alkoxy, n is an integer of 2 to 4 inclusive and $R^4$ and $R^5$ are alike or different and each is H, (lower)alkyl or when taken together with the nitrogen a radical of the formula



in which $R^6$ is (lower)alkyl; or a pharmaceutically acceptable acid addition salt thereof.

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**4,018,768**

**[1]BENZOTHIENO [3,2-d]-v-TRIAZINES AND SYNTHESIS THEREOF**

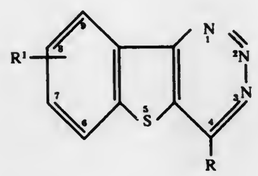
**Joseph Andrew Yahner, New Palestine, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.**

**Filed Dec. 2, 1975, Ser. No. 636,885**

**Int. Cl.² C07D** *253/08*

**U.S. Cl. 260—248 AS** **14 Claims**

1. A compound of the formula



wherein R represents
hydrogen,
chloro,
methoxy,
ethoxy,
amino,
hydrazino,
methylamino,
ethylamino,
dimethylamino or
diethylamino;

$R^1$ represents
hydrogen,
chloro,
fluoro,
bromo,
methyl or
nitro;

provided that $R^1$ represents hydrogen when R represents a group other than chloro.



**4,018,769**

**UREA CYANURATE MANUFACTURE**

**Donald C. Young, Fullerton, Calif., assignor to Union Oil Company of California, Brea, Calif.**

**Filed May 17, 1976, Ser. No. 687,363**

**Int. Cl.² C07D** *251/30*

**U.S. Cl. 260—248 NS** **8 Claims**

1. The method of producing urea cyanurate from urea including the steps of heating undissolved urea with a catalytic amount of elemental sulfur under substantially anhydrous conditions to a temperature of about 190° to about 320° C. for a period sufficient to convert said urea to a reaction product containing urea cyanurate.

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**4,018,770**

**N-(2-(PYRIDINYL)-4-PYRIMIDINYL)-AMINOMETHYLENEMALONATES AND ANALOGS**

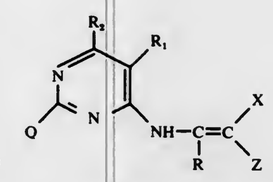
**George Y. Lesher, Rensselaer, and Baldev Singh, East Greenbush, both of N.Y., assignors to Sterling Drug Inc., New York, N.Y.**

**Filed Mar. 3, 1975, Ser. No. 555,067**

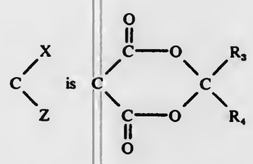
**Int. Cl.² C07D** *239/42*

**U.S. Cl. 260—256.4 N** **8 Claims**

1. A compound of the formula



where Q is 4- or 3- or 2-pyridinyl or 4- or 3- or 2-pyridinyl having one or two lower-alkyl substituents or N-oxide thereof, R is hydrogen or lower-alkyl, $R_1$ is hydrogen, lower-alkyl or cyano, $R_2$ is hydrogen, lower-alkyl, hydroxy or halo, X and Z are the same or different and are each selected from lowercarbalkoxy, lower-alkanoyl, carbamyl and cyano, or



where $r_3$ and $R_4$ are each lower-alkyl, or X is hydrogen.

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**4,018,771**

**PROCESS FOR THE PRODUCTION OF 2-ALKYL OR 2-CYCLOALKYL-4-METHYL-6-HYDROXYPYRIMIDINES**

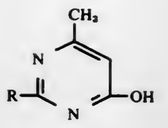
**John T. Gupton, III, Jamestown; Alex M. Jelenevsky, Nashville; Teruko U. Miyazaki, Greensboro, and Harris E. Petree, Kernersville, all of N.C., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

**Filed Aug. 23, 1976, Ser. No. 711,035**

**Int. Cl.² C07D** *239/34*

**U.S. Cl. 260—251 R** **10 Claims**

1. A process for the preparation of a 2-alkyl or 2-cycloalkyl-4-methyl-6-hydroxypyrimidine of the formula



wherein R represents alkyl of 1 to 4 carbon atoms and cycloalkyl of 3 to 6 carbon atoms, which comprises

1. reacting diketene and an acid amide of the formula

$RCONH_2$

wherein R has the same meaning as given above, in an inert organic solvent at a temperature ranging from about 40° C to 150° C and in the presence of a catalytic amount of a Lewis base or salt thereof or Lewis or Brønsted acid, to form a N-acetoacetyl acid amide of the formula

$RCONHCOCH_2COCH_3$

wherein R has the same meaning as given above and

2. reacting said N-acetoacetyl acid amide with ammonia in an inert organic solvent at a temperature ranging from about 80° to 150° C and in the presence of a Brønsted acid.

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**4,018,772**

**PROCESS FOR THE PURIFICATION OF BICYCLOMYCIN**

**Masaru Kurita, Takatsuki; Kazuyoshi Jomon, Kawanishi; Tadaaki Komori, Takatsuki, and Isami Nakatani, Ikeda, all of Japan, assignors to Fujisawa Pharmaceutical Co., Ltd., Osaka, Japan**

**Filed Jan. 17, 1975, Ser. No. 541,929**

**Claims priority, application Japan, Jan. 21, 1974, 49-9481**

**Int. Cl.² A61K** *35/66;* **C07D** *241/00*

**U.S. Cl. 260—268 BC** **6 Claims**

1. A process for the purification of bicyclomycin comprising adsorbing bicyclomycin with a macroporous nonionic styrene polymer adsorption resin crosslinked with divinylbenzene from an aqueous contaminated solution at a pH of about 2–8, and eluting said adsorbed bicyclomycin from said resin with a hydrophilic solvent.

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**4,018,773**

**PHENYLPIPERAZINOTETRAHYDRONAPHTHOLS AND DERIVATIVES**

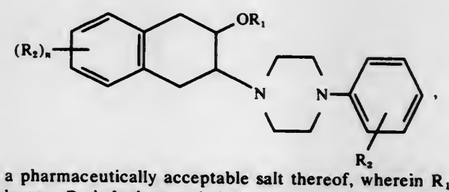
**Michael E. Condon, Lawrenceville; Frederic P. Hauck, Somerville, and Joyce Reid, Highland Park, all of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.**

**Filed Sept. 15, 1975, Ser. No. 613,721**

**Int. Cl.² C07D** *295/08*

**U.S. Cl. 260—268 PH** **30 Claims**

1. A compound having the formula



or a pharmaceutically acceptable salt thereof, wherein $R_1$ is hydrogen; $R_2$ is hydrogen, halogen, lower alkyl, hydroxy, or alkoxy; $R_3$ is hydrogen; halogen, lower alkyl, alkoxy, alkylthio, trifluoromethyl or nitro; and *n* is 1, 2 or 3; wherein the terms lower alkyl, alkoxy, and alkylthio refer to groups having 1 to 4 carbon atoms.

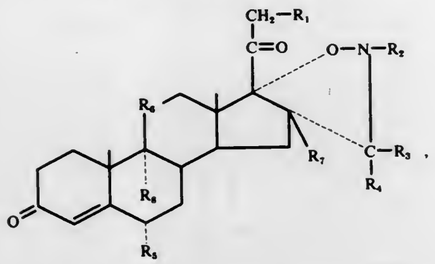
4,018,774

## STEROIDAL [16α,17-D]ISOXAZOLIDINES

Ravi K. Varma, Belle Mead, and Christopher M. Cimarusti, Hamilton, both of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Feb. 13, 1976, Ser. No. 657,791
Int. Cl.² C07J 17/00
U.S. Cl. 260—239.55 R 33 Claims

1. A steroid having the formula



or a 1,2-dehydro derivative thereof, wherein $R_1$ is hydrogen, hydroxy, alkanoyloxy, fluorne, chlorine or bromine; $R_2$ is alkyl or aryl; $R_3$ is alkyl, aryl, alkanoyl,



alkoxy-carbonyl or cyano; $R_4$ is hydrogen, alkyl or aryl; $R_5$ is hydrogen, fluorine or methyl; $R_6$ is carbonyl, β-hydroxy-methylene, or β-chloromethylene; $R_7$ is hydrogen or methyl; and $R_8$ is fluorine or chlorine; with the proviso that when $R_8$ is chlorine $R_6$ is β-chloromethylene; wherein alkyl and alkoxy refer to groups having 1 to 6 carbon atoms; wherein alkanoyl to a group having 1 to 7 carbon atoms; and wherein to a group having 1 t 7 carbon atoms; and wherein aryl refers to phenyl and phenyl substituted with halogen, nitro, cyano, or alkoxy.

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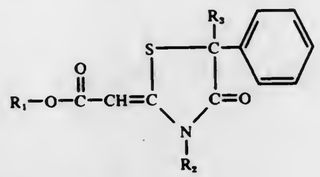
4,018,775

## 5-PHENYL-THIAZOLIDIN-4-ONE DERIVATIVES

Gerhard Satzinger, Denzlingen, and Manfred Herrmann, St. Peter, both of Germany, assignors to Warner-Lambert Company, Morris Plains, N.J.

Filed Apr. 30, 1975, Ser. No. 572,987
Claims priority, application Germany, May 16, 1974, 2423725
Int. Cl.² C07D 277/34
U.S. Cl. 260—293.68 8 Claims

1. A 5-Phenyl-thiazolidin-4-one derivative of the formula:



wherein $R_1$ is $-CH_2CH_3$; and
wherein $R_2$ is $-CH_3$, or $-CH_2CH_3$; and
wherein $R_3$ is 2-diethylamino ethyl, N-piperidino, methyl, β-hydroxyethylamino, N-pyrrolidino, or diethylamino.

3. The derivative according to claim 1 wherein $R_2$ is $-CH_2CH_3$, and $R_3$ is N-piperidino, and which is ethyl 3-ethyl-5-phenyl-5-N-piperidino-4-oxo-$\Delta^{2,}$ -thiazolidine-acetate.

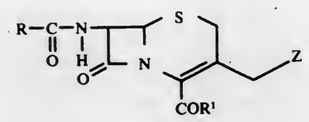
4,018,776

## PROCESS FOR THE PREPARATION OF CEPHALOSPORINS FROM THE CORRESPONDING AZETIDINONE-THIAZOLINE DERIVATIVES

Maurizio Foglio; Paolo Masi; Antonino Suarato, and Giovanni Franceschi, all of Milan, Italy, assignors to Societa' Farmaceutici Italia S.p.A., Milan, Italy

Filed Aug. 4, 1975, Ser. No. 601,586
Claims priority, application United Kingdom, Aug. 7, 1974, 34724/74
Int. Cl.² C07D 501/08
U.S. Cl. 260—243 C 2 Claims

1. A process for preparing a celphalosporin of structure:



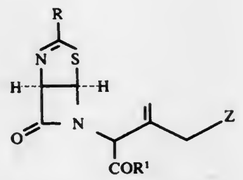
(III)

where R is selected from the class consisting of hydrogen, alkyl having from 1 to 4 carbon atoms, cyano-methyl, thienyl-methyl, furyl-methyl, naphthyl-methyl, phenyl-methyl, phenoxy-methyl, phenyl-isopropyl, phenoxy-isopropyl, pyridyl-4-thiomethyl, and tetrazolyl-1-methyl;

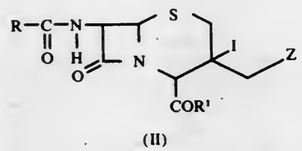
R′ is selected from the class consisting of hydroxyl, alkoxy having from 1 to 4 carbon atoms, trichloroethoxy, benzyloxy, p-methoxy-benzyloxy, p-nitrobenzyloxy, benzhydryloxy, triphenylmethoxy, phenacyloxy, and p-halophenacyloxy;

and Z is selected from the class consisting of hydrogen, hydroxyl, —O—Alkyl, —O—CO-Alkyl, —Br, —I, $—N_3$, $—O\text{-}COCH_3$, $—NH_2$, —O—CO—$NH_2$, and 2-mercapto-5-methyl-1,3,4-thiadiazole;

wherein a compound (I) of structure:



in which R, R¹ and Z have the above meanings, is reacted with iodine in an aqueous solvent at a temperature between 5° and 80° C in the presence of mercuric oxide or with azo-bis-isobutyronitrile under the influence of light or heat, to give an intermediate (II) of structure:



(II)

in which R, R¹ and Z have the above meanings,
and the said intermediate (II) is then reacted in a chloroform solution with triethylamine or pyridine to give the desired compound (III) which is then isolated and purified.



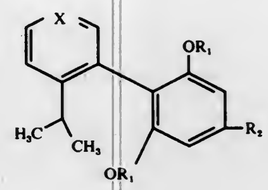
4,018,777

## 2-SUBSTITUTED-5-ALKYL RESORCINOLS

Harold Elmer Zaugg, Lake Forest; Cheuk Man Lee, Libertyville; Raymond John Michaels, Mundelein, and Nicholas Peter Plotnikoff, Lake Bluff, all of Ill., assignors to Abbott Laboratories, North Chicago, Ill.

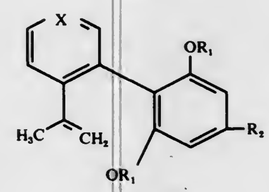
Filed Nov. 14, 1975, Ser. No. 632,126
Int. Cl.² C07D 213/55, 213/30
U.S. Cl. 260—295.5 R 13 Claims

1. A 2-substituted -5-alkyl resorcinol having one of the following formulas



I

or



II

wherein $R_1$ is hydrogen or lower-alkanoyl; $R_2$ is a straight or branched chain alkyl of 1 to 9 carbon atoms; and X is nitrogen.

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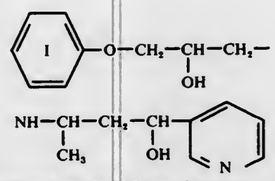
4,018,778

## DERIVATIVES OF 1-PHENOXY-3-AMINO-PROPANE-2-OL AND PROCESS FOR THEIR PRODUCTION

Thomas Raabe, Heusenstamm; Josef Scholtholt, Frankfurt am Main, and Rolf-Eberhard Nitz, Bergen-Enkheim, all of Germany, assignors to Cassella Farbwerke Mainkur Aktiengesellschaft, Frankfurt am Main-Fechenheim, Germany

Continuation-in-part of Ser. No. 362,567, May 22, 1973, abandoned. This application July 12, 1974, Ser. No. 488,194
Claims priority, application Luxembourg, May 24, 1972, 65414
The portion of the term of this patent subsequent to Aug. 20, 1991, has been disclaimed.
Int. Cl.² C07D 213/28
U.S. Cl. 260—296 AE 13 Claims

1. Derivative of 1-phenoxy-3-amino-propane-2-ol having the structural formula



in which the phenol nucleus I may be mono-, di- or tri-substituted by alkyl, alkenyl, alkinyl, cycloalkyl, cyclo-alkenyl, alkoxy, alkenyloxy, alkinyloxy, phenyl, halogen or the radical $-NR_1R_2$, in which $R_1$ stands for alkyl or acyl and $R_2$ stands for hydrogen or alkyl, their aldehyde condensation products, and their acid addition salts.

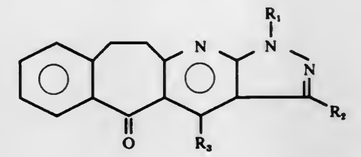
4,018,779

## DERIVATIVES OF 10,11-DIHYDROBENZO[4,5]CYCLOHEPTA[1,2-B]-PYRAZOLO[4,3-e]PYRIDINE-5(1H)ONES

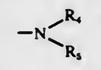
Hans Hoehn, Tegernheim, Germany; Jack Bernstein, New Brunswick, N.J., and B. Richard Vogt, Yardley, Pa., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Mar. 25, 1976, Ser. No. 670,332
Int. Cl.² C07D 471/04
U.S. Cl. 260—296 P 16 Claims

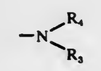
1. A compound of the formula



wherein $R_1$ is lower alkyl, phenyl or phenyl-lower alkyl; $R_2$ is hydrogen, lower alkyl or phenyl; $R_3$ is hydrogen, hydroxy, lower alkoxy, halogen, di (lower alkyl) amino (lower alkoxy) or the group



wherein $R_4$ and $R_5$ each is hydrogen, lower alkyl, phenyl, carbo-lower alkoxy or di (lower alkyl) amino (lower alkyl) or



together is one of the unsubstituted heterocyclics piperidine, piperazine, morpholine or thiamorpholine or one of said heterocyclics substituted with a lower alkyl or hydroxy lower alkyl group;
and salts thereof.

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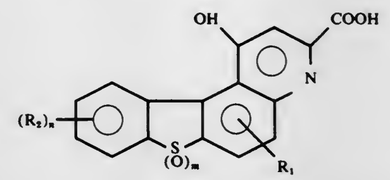
4,018,780

## [1]BENZOTHIENO[3,2-F]QUINOLINECARBOXYLIC ACIDS

Larry R. Lappi, Stillwater, and Edward H. Erickson, Woodbury, both of Minn., assignors to Riker Laboratories, Inc., Northridge, Calif.

Filed Aug. 25, 1975, Ser. No. 607,626
Int. Cl.² C07D 495/22
U.S. Cl. 260—287 C 21 Claims

1. A compound of the formula



wherein $R_1$ is hydrogen, halogen, lower alkyl or lower alkoxy, $R_2$ is halogen, lower alkyl or lower alkoxy and when n is 2, $R_2$ can represent lower alkyl and lower alkoxy, *m* is zero, one or two and *n* is zero, one or two, lower alkyl esters and pharmaceutically acceptable salts thereof.

**4,018,781**

## 2-ARYL SUBSTITUTED ISOXAZOLO(2,3-ALPHA)PYRIDINYL HALIDES

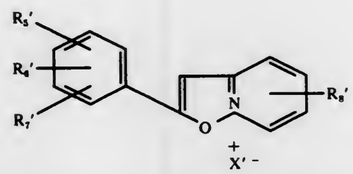
**David T. Connor, Parsippany; Patricia A. Young, Madison, and Maximilian von Strandtmann, Rockaway Township, all of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.**

**Division of Ser. No. 611,281, Sept. 8, 1975, Pat. No. 3,983,237. This application May 27, 1976, Ser. No. 690,478**

**Int. Cl.² C07D** *498/00*

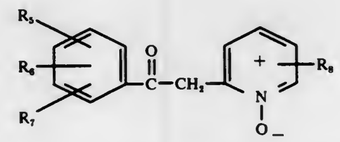
**U.S. Cl. 260—297 B** **3 Claims**

1. A process for preparing a compound having the formula II:



II

wherein $R_5'$, $R_6'$ and $R_7'$ are each hydrogen, halogen, hydroxy, lower alkyl, or lower alkoxy; $R_8'$ is hydrogen or lower alkyl and X′ is a bromide, chloride or iodide salt, which comprises treating a compound of the formula III:



III

wherein $R_5$, $R_6$ and $R_7$ are each hydrogen, halogen, hydroxy, lower alkyl or lower alkoxy; and $R_8$ is hydrogen or lower alkyl with a hyrohalide acid and a lower alkanoic acid, compound II retaining said alkoxy groups only when compound III: (a) contains a halogen substituent on the phenyl para to alkoxy group or (b) said alkoxy group is ortho to the carbonyl and $R_8$ is lower alkyl ortho to the N-oxide.

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**4,018,782**

## 2,2-DIMETHYL-3R-CARBOXY-6S-ACYLAMIDO-1-OXA-4-AZA-5R-BICYCLO[3,2,0]HEPTAN-7-ONES

**Saul Wolfe, Kingston, Canada, assignor to Queen's University, Ontario, Canada**

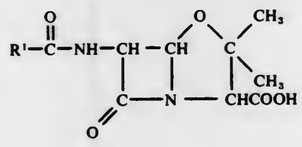
**Division of Ser. No. 242,842, April 10, 1972, abandoned. This application Aug. 26, 1974, Ser. No. 500,436**

**The portion of the term of this patent subsequent to Apr. 13, 1993, has been disclaimed.**

**Int. Cl.² C07D** *263/52*

**U.S. Cl. 260—307 F** **13 Claims**

1. A compound of the formula



wherein



is acyl other than phenylacetyl or phenoxyacetyl or a non-toxic, pharmaceutically acceptable salt thereof.

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**4,018,783**

## ESTERS OF METRIZOIC ACID

**Maurice John Soulal, Long Ditton, and Kenneth Utting, Tadworth, both of England, assignors to Beecham Group Limited, Great Britain**

**Continuation-in-part of Ser. No. 381,023, July 20, 1973, abandoned, which is a continuation-in-part of Ser. No. 178,843, Sept. 8, 1971, Pat. No. 3,795,698. This application July 26, 1974, Ser. No. 492,049**

**Claims priority, application United Kingdom, Sept. 9, 1970, 43070/70; June 28, 1973, 30875/73**

**Int. Cl.² C07C** *103/46*; **C07D** *307/77*

**U.S. Cl. 260—343.3 R** **3 Claims**

1. Phthalide ester of metrizoic acid.
2. Pivaloyloxymethyl metrizoate.
3. α-Pivaloyloxyethyl metrizoate.

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**4,018,784**

## PREPARATION OF TRICHLOROTHIAZOLE AND INTERMEDIATE

**Günther Beck, Leverkusen, and Hans Holtschmidt, Berg.Gladbach, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany**

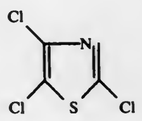
**Filed Dec. 9, 1975, Ser. No. 639,136**

**Claims priority, application Germany, Dec. 12, 1974, 2458824**

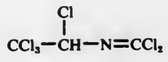
**Int. Cl.² C07D** *277/32*

**U.S. Cl. 260—302 R** **7 Claims**

1. A process for the preparation of trichlorothiazole of the formula

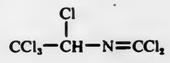


comprising reacting 1,2,2,2-tetrachloroethyl-isocyanide-dichloride of the formula



with sulfur at a temperature of about 150° to 250° C.

4. 1,2,2,2-tetrachloroethyl-isocyanide-dichloride of the formula



5. The process for making 1,2,2,2-tetrachloroethyl-isocyanide-dichloride according to claim 4, which comprises reacting chloral-formamide with chlorine and a highly active inorganic acid chloride.



**4,018,785**

## CERTAIN 2-IMINOTHIAZOLINE COMPOUNDS

**Ryozo Maeda, Osaka, and Katsumi Hirose, Kishiwada, both of Japan, assignors to Shionogi & Co., Ltd., Osaka, Japan**

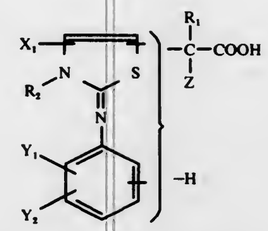
**Filed Dec. 3, 1975, Ser. No. 637,479**

**Claims priority, application Japan, Dec. 6, 1974, 49-140766**

**Int. Cl.² C07D** *277/38*, *277/42*

**U.S. Cl. 260—306.7 T** **21 Claims**

1. A member selected from the group consisting of a compound represented by the formula:



wherein $X_1$ represents hydrogen or methyl; $Y_1$ and $Y_2$ each represents hydrogen, halogen, $C_{1-3}$ alkyl, $C_{1-3}$ alkoxy or trifluoromethyl; $R_1$ represents hydrogen, methyl or ethyl; $R_2$ represents $C_{1-3}$ alkyl or $C_{3-5}$ alkenyl and Z represents hydrogen or carboxy and a pharmaceutically acceptable salt thereof.

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**4,018,786**

## 2-AMINOTHIAZOLINES AND A PROCESS FOR PREPARATION THEREOF

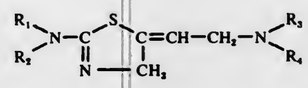
**Armand Amselem, Toulouse, France, assignor to Centre d'Etudes pour l'Industrie Pharmaceutique, Toulouse, France**

**Filed Aug. 6, 1974, Ser. No. 495,214**

**Int. Cl.² C07D** *277/42*

**U.S. Cl. 260—306.7 T** **6 Claims**

1. A thiazoline of the formula:



wherein $R_1$ and $R_2$ are each selected from hydrogen, alkenyl having 1–12 carbon atoms, alkyl having 1–12 carbon atoms, cycloalkyl having 4–12 carbon atoms, phenyl, cycloalkylphenyl wherein the cycloalkyl moiety has 4–12 carbon atoms, phenylalkyl wherein the alkyl moiety has 1–12 carbon atoms, halogencycloalkyl having 4–12 carbon atoms, halogenphenyl, halogenoalkyl having 1–12 carbon atoms and the same monosubstituted by a hydroxy, with the proviso that at least one of $R_1$ and $R_2$ is cyclic, $R_3$ and $R_4$ are each independently selected from hydrogen and alkyl having 1–12 carbon atoms, and their pharmaceutically acceptable acid addition salts.

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**4,018,787**

## 1-THIADIAZOLYL-5-ACYLIMIDAZOLIDINONES

**John Krenzer, Oak Park, Ill., assignor to Velsicol Chemical Corporation, Chicago, Ill.**

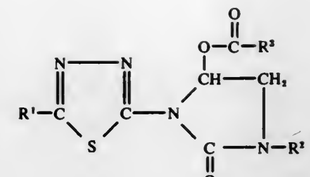
**Filed June 13, 1975, Ser. No. 587,006**

**The portion of the term of this patent subsequent to Dec. 14, 1993, has been disclaimed.**

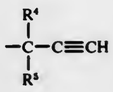
**Int. Cl.² C07D** *417/00*

**U.S. Cl. 260—306.8 D** **8 Claims**

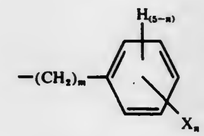
1. A compound of the formula



wherein $R^1$ is selected from the group consisting of butyl, phentyl, hexyl and trifluoromethyl; $R^2$ is selected from the group consisting of lower alkyl, lower alkenyl, lower haloalkyl and



wherein $R^4$ and $R^5$ are each selected from the group consisting of hydrogen and alkyl of up to 3 carbon atoms; and $R^3$ is selected from the group consisting of lower alkyl, lower alkenyl, lower haloalkyl, lower alkynyl, lower monoalkoxyalkyl, monocycloalkyl of from 3 to 7 carbon atoms and



wherein X is selected from the group consisting of lower alkyl, lower alkoxy, halogen, lower haloalkyl, lower alkylthio, nitro and cyano; *n* is an integer from 0 to 3 and *m* is the integer 0 or 1; provided that when $R^3$ is methyl then $R^2$ is lower haloalkyl or contains at least 2 carbon atoms.

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**4,018,788**

## 6-(O-HALOPHENYL)-1-METHYL-4H-s-TRIAZOLO[4,3-a][1,4]-BENZODIAZEPINE

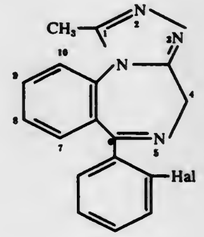
**Jackson B. Hester, Jr., Galesburg, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.**

**Continuation of Ser. No. 586,959, June 16, 1975, abandoned, which is a continuation of Ser. No. 496,219, Aug. 9, 1974, abandoned, which is a continuation of Ser. No. 361,481, May 18, 1973, abandoned, which is a continuation of Ser. No. 120,760, March 3, 1977, abandoned. This application Dec. 24, 1975, Ser. No. 644,368**

**Int. Cl.² C07D** *487/12*

**U.S. Cl. 260—308 R** **4 Claims**

1. A compound of formula:



wherein Hal is a halogen having an atomic number up to 35,

inclusive, and its pharmacologically acceptable acid addition salts.

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## 4,018,789
## 5-SUBSTITUTED-2-(2')-BENZIMIDAZOYL-FURANS

**Peter Stuart Littlewood, Menston, and Alec Victor Mercer, Bramhope, both of England, assignors to Sandoz Ltd., Basel, Switzerland**

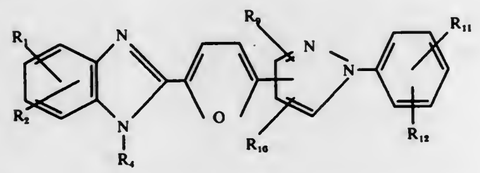
**Filed May 19, 1975, Ser. No. 578,839**

**Claims priority, application United Kingdom, May 23, 1974, 23015/74; Nov. 15, 1974, 49461/74; Dec. 17, 1974, 54386/74**

**Int. Cl.² C07D *405/14***

**U.S. Cl. 260—309.2** **30 Claims**

**1.** A compound useful as an optical brightening agent of the formula:



in which the 1-phenyl-pyrazolyl ring is bound at its 3- or 5-position to the furan ring and in which

$R_1$ $R_2$, independently, signify hydrogen, $C_{1-4}$alkyl, $C_{1-4}$alkoxy, chlorine, fluorine or $C_{1-4}$alkoxy-carbonyl,

$R_4$ signifies hydrogen; phenyl; unsubstituted $C_{1-4}$alkyl or $C_{1-4}$alkyl substituted by a substituent selected from hydroxy, cyano, amino-carbonyl, phenyl, $C_{2-4}$alkenyl, carboxy, $C_{1-4}$alkoxy-carbonyl, $C_{1-4}$alkoxy-($C_{1-4}$)-alkoxy-carbonyl, -$CONHR_{18}$ and -$CONR_{19}R_{20}$,

$R_{18}$ signifies $C_{1-4}$alkyl, unsubstituted or substituted by a di-($C_{1-4}$)-alkylamino group,

either $R_{19}$ and $R_{20}$, independently, have one of the significances of $R_{18}$, or are joined to form, with the nitrogen atom, a piperidino ring,

either $R_9$ and $R_{10}$, independently, signify hydrogen, $C_{1-4}$alkyl or phenyl, provided both do not simultaneously signify phenyl, one of $R_9$ and $R_{10}$ signifies a 4-bromo- or 4-chlorosubstituent, the other being as defined above,

$R_{11}$ and $R_{12}$, independently, signify hydrogen, $C_{1-4}$-alkyl, $C_{1-4}$alkoxy, chlorine, fluorine, cyano, $C_{1-4}$alkoxycarbonyl, -$CONR_{14}R_{15}$, -$SO_2NR_{14}R_{15}$, -$SO_2R_{16}$ or -$SO_3M$, with the proviso that $R_{11}$ and $R_{12}$ do not both simultaneously signify groups selected from cyano, $C_{1-4}$alkoxy carbonyl -$CONR_{14}R_{15}$, -$SO_2NR_{14}R_{15}$ and -$SO_2R_{16}$,

either $R_{14}$ and $R_{15}$, independently, signify hydrogen, unsubstituted $C_{1-8}$alkyl, or $C_{1-4}$alkyl substituted by a substituent selected from hydroxy, cyano and aminocarbonyl,

or $R_{14}$ and $R_{15}$, together with the nitrogen atom to which they are attached, signify a piperidino ring

$R_{16}$ signifies $C_{1-4}$alkyl, and M signifies hydrogen or a non-chromophoric cation;

in free base, acid addition or quaternary ammonium salt form.

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## 4,018,790
## SUBSTITUTED 1-SULFONYLBENZIMIDAZOLES

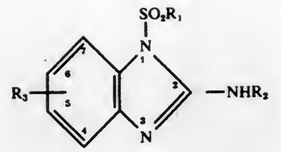
**Charles J. Paget, Indianapolis, and James H. Wikel, Greenwood, both of Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.**

**Continuation-in-part of Ser. No. 574,202, May 8, 1975, abandoned, which is a continuation-in-part of Ser. No. 484,841, July 1, 1974, abandoned. This application Nov. 24, 1975, Ser. No. 634,942**

**Int. Cl.² C07D *235/30***

**U.S. Cl. 260—309.2** **23 Claims**

**1.** A compound of the formula



wherein

$R_1$ is $R_4R_5NH$-, wherein $R_4$ and $R_5$ are independently $C_1$-$C_3$ alkyl and when taken together with the nitrogen atom to which they are attached, are pyrrolidino, piperidino or morpholino;

$R_2$ is hydrogen, formyl, acetyl or propionyl;

$R_3$ is $C_1$-$C_8$ alkoxycarbonyl, allyloxycarbonyl, propargyloxycarbonyl, ($C_3$-$C_7$ cycloalkyl)oxycarbonyl, ($C_3$-$C_7$ cycloalkyl)methyloxycarbonyl, 1-($C_3$-$C_7$ cycloalkyl) ethyloxycarbonyl, benzyloxycarbonyl, α-methylbenzyloxycarbonyl, phenoxycarbonyl, hydrazinocarbonyl, carboxy, carboxamido, N-($C_1$-$C_4$ alkyl)carboxamido, N-($C_1$-$C_4$ alkoxy)carboxamido or cyano; and $R_3$ is at the 5 or 6 position.

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## 4,018,791
## PROCESS FOR THE PREPARATION OF HIGHLY PURE HALOGENATED PHTHALOCYANINE PIGMENT

**Ernst Spietschka, Oberauroff, Taunus; Siegfried Schiessler, and Wolfgang Tronich, both of Frankfurt am Main, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt (Main), Germany**

**Filed Dec. 21, 1973, Ser. No. 427,315**

**Claims priority, application Germany, Dec. 22, 1972, 2262972**

**Int. Cl.² C09B *47/04***

**U.S. Cl. 260—314.5** **2 Claims**

1. A process for the preparaton of a highly pure, acid-stable highly halogenated copper phthalocyanine pigment which consists of the steps of: converting the crude, highly halogenated copper phthalocyanine by means of concentrated sulfuric acid or oleum into the sulfate, isolating the sulfate, hydrolizing the sulfate, isolating the highly halogenated copperphthalocyanine and grinding it in a mixture of water and an alcohol having from 4 to 6 carbon atoms.

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## 4,018,792
## 5-CYANO-THIOPHEN-2-ALDEHYDE-ISOTHIOSEMICARBAZONES AND PROCESS FOR PREPARING THEM

**Erhardt Winkelmann, and Heinrich Rolly, both of Kelkheim, Taunus, Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany**

**Filed Feb. 24, 1975, Ser. No. 552,211**

**Claims priority, application Germany, Feb. 26, 1974, 2409190**

**Int. Cl.² C07D *333/00***

**U.S. Cl. 260—329 S** **1 Claim**

1. 5-cyano-thiophen-2-aldehyde-S-methyl-isothiosemicarbazone, or a salt thereof with a physiologically tolerable acid.



## 4,018,793
## BENZO (B) THIOPHENE DERIVATIVES

**Peter Johannes Stoss, Wildtal; Manfred Franz Reinhold Herrmann, Gundelfingen, and Gerhard Satzinger, Denzlingen, all of Germany, assignors to Warner-Lambert Company, Morris Plains, N.J.**

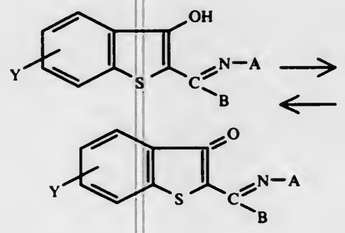
**Division of Ser. No. 566,469, April 9, 1975, Pat. No. 3,971,814, which is a division of Ser. No. 419,305, Nov. 27, 1973, Pat. No. 3,907,826. This application May 12, 1976, Ser. No. 685,600**

**Claims priority, application Germany, Nov. 27, 1972, 2258036**

**Int. Cl.² C07D *333/66***

**U.S. Cl. 260—330.5** **8 Claims**

**1.** A compound of the formula:



wherein

Y is hydrogen;

A is hydrogen;

B is a radical of the formula —O—$R_1$ wherein $R_1$ is $CH_2CH_2OC_6H_5$; $CH_2C_6H_5$; and $CH_2CH_2C_6H_5$.

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## 4,018,794
## SULFAMYLBENZOIC ACID DERIVATIVES

**Peter Werner Feit, Gentofte, and Ole Bent Tvaermose Nielsen, Vanlose, both of Denmark, assignors to Leo Pharmaceutical Products Ltd. and A/S Lovens Kemiske Fabrik Produktionsaktieselskab, both of Ballerup, Denmark**

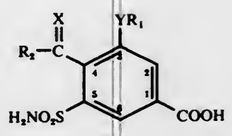
**Division of Ser. No. 349,826, April 10, 1973, Pat. No. 3,897,476. This application Feb. 19, 1975, Ser. No. 551,147**

**Claims priority, application United Kingdom, Apr. 28, 1972, 19959/72; Nov. 16, 1972, 53043/72**

**Int. Cl.³ C07D *333/24***

**U.S. Cl. 260—332.2 A** **5 Claims**

**1.** A compound selected from the group of compounds of formula I



I

in which

$R_1$ is selected from the group consisting of methyl and ethyl radicals monosubstituted with thienyl;

$R_2$ stands for a phenyl radical, optionally being substituted with a member selected from the group consisting of halogen, lower alkyl, hydroxy and lower alkoxy;

Y stands for O;

X stands for a member selected from the group consisting of O and $H_2$; and pharmaceutically acceptable, non-toxic salts of the carboxylic acid of formula I.

## 4,018,795
## SANDWICH TYPE CHEMICAL COMPOUNDS

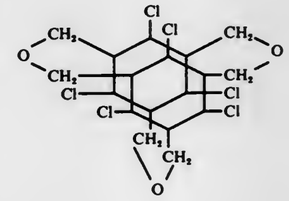
**Earl Dan Flickinger, El Dorado, and Charles Merlyn Buess, Wichita, both of Kans., assignors to Skelly Oil Company, Tulsa, Okla.**

**Division of Ser. No. 521,256, Nov. 6, 1974, Pat. No. 3,953,426, which is a division of Ser. No. 359,126, May 10, 1973, Pat. No. 3,860,610, which is a continuation of Ser. No. 68,047, Aug. 28, 1970, abandoned, which is a division of Ser. No. 706,663, Feb. 19, 1968, Pat. No. 3,577,431, which is a continuation-in-part of Ser. No. 554,651, June 2, 1966, abandoned. This application July 16, 1975, Ser. No. 596,110**

**Int. Cl.² C07D *319/08***

**U.S. Cl. 260—340.3** **1 Claim**

**1.** A new composition of matter having two ring nuclei composed of six carbon atoms essentially superimposed in fixed parallel planes with respect to each other and having the formula:



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## 4,018,796
## MONOMETHINE DYESTUFFS

**Horst Harnisch, Cologne-Buchheim, Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Germany**

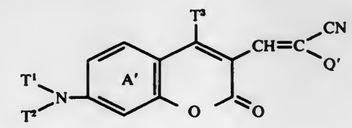
**Filed Mar. 17, 1975, Ser. No. 558,647**

**Claims priority, application Germany, Mar. 20, 1974, 2413371**

**Int. Cl.² C07D *311/06***

**U.S. Cl. 260—343.2 R** **5 Claims**

**1.** Monomethine dyestuff of the general formula



wherein

$T^1$ and $T^2$ independently of one another are unsubstituted $C_1$–$C_5$-alkyl uninterrupted or interrupted by —O—; $C_1$–$C_4$-alkyl monosubstituted or disubstituted by hydroxyl or chlorine; $C_1$–$C_4$ alkyl monosubstituted by bromine, nitrile, $C_1$–$C_4$-alkoxycarbonyl, aminocarbonyl, phenoxy, benzyloxy, cyclohexyloxy, cyclohexyl, $C_1$–$C_4$-alkoxycarbonyloxy, $C_1$–$C_4$-alkylcarbonyloxy, acetylamino, $C_1$–$C_4$-alkylsulphonylamino, aminocarbonyloxy, di-($C_1$–$C_4$-alkyl) amino, carboxyl or sulpho; cyclohexyl; phenyl-$C_1$–$C_2$-alkyl; hydrogen; or $C_1$–$C_4$-alkyl uninterrupted or interrupted by —O— and substituted by benzyloxycarbonyl, phenoxycarbonyl, phenoxy substituted by 1–5 chlorine atoms, $C_1$–$C_4$-alkylsulphonyl, benzylsulphonyl, phenylsulphonyl, benzylcarbonyloxy, benzoyloxy, $C_1$–$C_4$-alkoxycarbonyl-benzoyloxy, phenoxycarbonyloxy, tri-($C_1$–$C_4$-alkyl)ammonium, benzoylamino, phenylaminocarbonylamino, phenylsulphonylamino or toluenesulphonylamino;

$T^3$ is hydrogen or methyl;

Q′ is CN or COOR; and

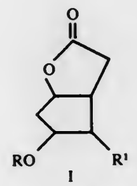
the ring A′ is unsubstituted or substituted by methoxy, methyl or chloromethyl.

## 4,018,797
## INTERMEDIATES FOR PROSTAGLANDINS

**Francis Johnson, Setauket, N.Y.; Kenneth G. Paul, West Newton, Mass., and Duccio Favara, Como, Italy, assignors to The Dow Chemical Company, Midland, Mich.**

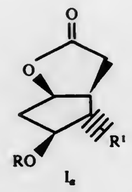
**Continuation-in-part of Ser. No. 447,103, March 1, 1974, abandoned. This application Feb. 18, 1975, Ser. No. 550,402**
**Int. Cl.² C07D *307/93***
**U.S. Cl. 260—343.3 R** **2 Claims**

1. A process for preparing a compound of the group having the formula

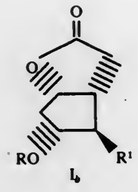


I

and its optically active forms

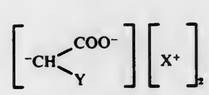


$I_a$



$I_b$

wherein:
R represents acetyl and $R^1$ represents a $CH_2OH$ group, which comprises (1) reacting at about −30° to about +30° C substantially one molar proportion of 1-2-acetoxysuccinoyl chloride with substantially five molar proportions of a salt of the formulas



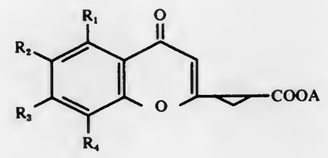
wherein Y represents a $COOR^2$ group wherein $R^2$ is lower alkyl and X is an alkali metal cation selected from $MgBr^+$, $MgCl^+$ and $MgI^+$ whereby a 3,6-dioxo-4-acetoxyoctanedioic acid ester is formed, (2) cyclizing the last named by heating it in an aqueous solution at a pH of about 5 to 11 to give a 5-acetoxy-2-carbo-(lower alkoxy)-3-oxo-1-cyclopenteneacetic acid ester, (3) (a) hydrogenating the cyclopentene ring to cyclopentane with hydrogen in the presence of a noble metal or a noble metal oxide hydrogenation catalyst, (3) (b) reducing the keto group to a hydroxy group with sodium borohydride in an aqueous solution buffered to a pH of about 3 to about 9 to give the methyl ester of 3-acetoxy-2-carbomethoxy-3-hydroxycyclopentaneacetic acid, (4) cyclizing the so-obtained acyloxycyclopentaneacetic acid derivative by alkaline hydrolysis and acylating the hydroxy group with acetyl chloride to the corresponding lactone of preceding formula I, Ia or Ib wherein $R^1$ is a carboxy group and R is acetyl, (5) converting the carboxylic group to a mixed anhydride group by reaction with a lower alkyl chlorocarbonate or to an acid chloride group by reaction with $SOCl_2$ and (6) reducing the mixed anhydride group or the acid chloride group with excess sodium borohydride to give the gamma lactone of 3-acetoxy-2-hydroxymethyl-5-hydroxycyclopentane-acetic acid.

## 4,018,798
## SUBSTITUTED (4-OXO-4H-1-BENZOPYRAN-2-YL)CYCLOPROPANE CARBOXYLIC ACIDS AND ESTERS

**Marvin P. Cohen, New Milford; John Shavel, Jr., Mendham, and Max Von Strandtmann, Rockaway Township, all of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.**

**Filed Nov. 20, 1975, Ser. No. 633,745**
**Int. Cl.² C07D *311/02***
**U.S. Cl. 260—345.2** **7 Claims**

1. A compound of the formula:



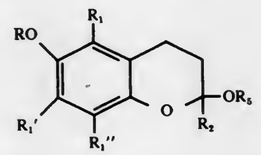
wherein $R_1$, $R_2$, $R_3$ and $R_4$ are hydrogen, lower alkyl of 1–7 carbon atoms, lower alkoxy of 1–7 carbon atoms, or phenyl, and A is hydrogen or ethyl.

## 4,018,799
## ANTIOXIDANT CHROMAN COMPOUNDS

**John William Scott, Upper Montclair; David Richard Parrish, Glen Ridge, and Gabriel Saucy, Essex Fells, all of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.**

**Division of Ser. No. 417,465, Nov. 19, 1973, Pat. No. 3,947,473, which is a continuation-in-part of Ser. No. 317,566, Dec. 22, 1972, abandoned. This application Dec. 4, 1975, Ser. No. 637,611**
**Int. Cl.² C07D *311/20***
**U.S. Cl. 260—345.5** **3 Claims**

1. A compound of the formula



wherein $R_1$, $R'_1$ and $R_1''$ are hydrogen or lower alkyl; $R_2$ is hydrogen, lower alkyl or phenyl; R is hydrogen, lower alkanoyl, benzoyl, benzyl, benzylhydryl or tetrahydropyranyl; and $R_5$ is lower alkyl.

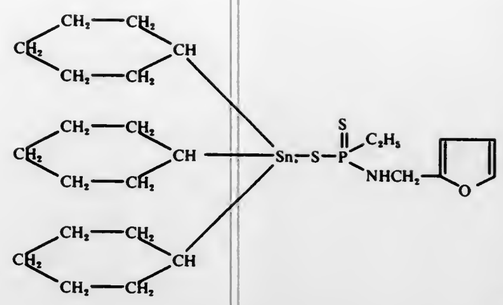
## 4,018,800
## ORGANOTIN MITICIDAL AND INSECTICIDAL COMPOUNDS

**Don R. Baker, Orinda, Calif., assignor to Stauffer Chemical Company, Westport, Conn.**

**Division of Ser. No. 466,928, May 6, 1975, Pat. No. 3,947,461, which is a division of Ser. No. 304,871, Oct. 19, 1972, Pat. No. 3,832,370. This application Jan. 5, 1976, Ser. No. 646,681**
**Int. Cl.² C07D *307/64***
**U.S. Cl. 260—347.2** **1 Claim**

1. A compound of the formula



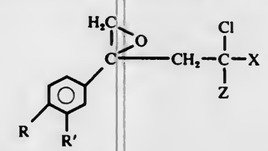


## 4,018,801
## SUBSTITUTED OXIRANE COMPOUNDS

**Thomas M. Ozretich, Vancouver, Wash., assignor to The Dow Chemical Company, Midland, Mich.**

**Continuation of Ser. No. 424,016, Dec. 12, 1973, abandoned, which is a continuation of Ser. No. 294,328, Oct. 2, 1972, abandoned, which is a continuation-in-part of Ser. No. 61,846, Aug. 6, 1970, abandoned. This application May 14, 1975, Ser. No. 577,264**
**Int. Cl.² C07D *303/08***
**U.S. Cl. 260—348 R** **15 Claims**

1. A compound having the following structure



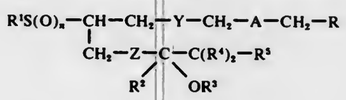
wherein X represents halogen; Z represents hydrogen, halogen, cyano or lower alkyl; R and R′ each independently represent hydrogen, halogen, cyano, nitro, lower alkoxy, trifluoromethyl, benzyloxy or lower alkyl, with the proviso that when R′ is hydrogen, R is cyano, nitro, trifluoromethyl, or benzyloxy and when R is hydrogen R′ is halogen, cyano, nitro, trifluoromethyl or benzyloxy.

## 4,018,802
## 9-THIA- AND OXOTHIA- AND 9-DIOXOTHIA-11,12-SECO-PROSTAGLANDINS AND PROCESSES

**Edward J. Cragoe, Jr.; John B. Bicking, and Robert L. Smith, all of Lansdale, Pa., assignors to Merck & Co., Inc., Rahway, N.J.**

**Continuation-in-part of Ser. No. 566,566, April 9, 1975, abandoned, which is a continuation-in-part of Ser. No. 483,178, June 25, 1974, abandoned. This application Mar. 22, 1976, Ser. No. 669,006**
**Int. Cl.² C07C *147/14*; C11D *1/28***
**U.S. Cl. 260—399** **38 Claims**

1. The compound of the formula



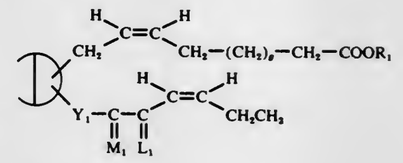
wherein
R is carboxy or a carboxy salt;
A is methylene;
Y is selected from the group consisting of ethylene, vinylene, and ethynylene;
$R^1$ is selected from the group consisting of methyl, ethyl, 2-hydroxyethyl, 2-(loweralkoxy)ethyl, and vinyl;
*n* is 0, 1, or 2;
Z is selected from the group consisting of ethylene, vinylene, and ethynylene,
$R^2$ is hydrogen or methyl;
$R^3$ is hydrogen;
$R^4$ is hydrogen or methyl;
$R^5$ is alkyl, branched chain alkyl of 3–6 carbon atoms, vinyl, or $OR^{5a}$ wherein $R^{5a}$ is alkyl or branched alkyl of 2–5 carbon atoms.

## 4,018,803
## 13,14-DIDEHYDRO-$PG_3$ COMPOUNDS

**Herman W. Smith, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.**

**Filed Feb. 13, 1976, Ser. No. 657,738**
**Int. Cl.² C07C *177/00***
**U.S. Cl. 260—408** **109 Claims**

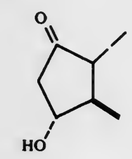
1. A prostaglandin analog of the formula



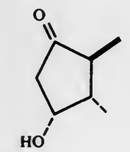
wherein



is



or



;

wherein $Y_1$ is -C ≡ C-;
wherein g is one, 2, or 3;
wherein $M_1$ is

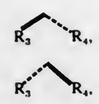


or



wherein $R_5$ and $R_6$ are hydrogen or methyl, with the proviso

that one of $R_5$ and $R_6$ is methyl only when the other is hydrogen;
wherein $L_1$ is



or a mixture of



and

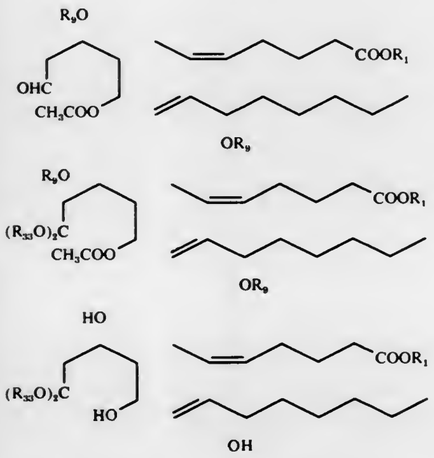


wherein $R_3$ and $R_4$ are hydrogen, methyl, or fluoro, being the same or different, with the proviso that one of $R_3$ and $R_4$ is fluoro only when the other is hydrogen or fluoro;
wherein $R_1$ is hydrogen, alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, phenyl, phenyl substituted with two or three chloro, or alkyl of one to 3 carbon atoms, inclusive, or a pharmacologically acceptable cation.

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**4,018,804**
**INTERMEDIATE FOR SYNTHESIS OF THROMBOXANE $B_2$**
**William P. Schneider, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.**
**Filed Apr. 14, 1976, Ser. No. 676,894**
**Int. Cl.² C11C *3/02*; C09F *5/00***
**U.S. Cl. 260—410.9 R** **7 Claims**

1. A thromboxane intermediate of one of the formulas




wherein $R_1$ is hydrogen, alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, or phenyl substituted with one or 2 chloro, fluoro, or alkyl of one to 4 carbon atoms, inclusive;
wherein $R_9$ is an acyl protecting group; and
wherein $R_{33}$ is alkyl of one to 5 carbon atoms, inclusive.

**4,018,805**
**METHOD FOR PREPARING FATTY ACIDS FROM THEIR CORRESPONDING SOAPS**
**Auguste Gueant, Lens, and Serge Mercier, Paris, both of France, assignors to Produits Chimiques Ugine Kuhlmann, Paris, France**
**Filed Sept. 20, 1974, Ser. No. 507,949**
**Claims priority, application France, Sept. 26, 1973, 73.34464**
**Int. Cl.² C07C *51/02***
**U.S. Cl. 260—413** **7 Claims**

1. A method for preparing fatty acids from corresponding soaps which method comprises
i. dissolving a soap in a melted state having the formula $(RCOO)_nM$, singly or in mixtures, wherein R is a $C_4$ to $C_{30}$ straight-chain or branched alkyl, M is an alkali or alkaline earth metal, and n corresponds to the valence of M in at least one $C_5$ to $C_{31}$ fatty acid in a melted state in the absence of oxygen and at a temperature of between 50° to 150° C. to form a liquid solution of soap in fatty acid, the weight ratio of soap to fatty acid being from about 2/1 to 0.2/1.
ii. contacting said solution with an aqueous solution containing an amount of strong mineral acid at least stoichiometrically equivalent to the soap and
iii. allowing the cations of soap and strong acid to exchange phases, the amount of water being sufficient to dissolve substantially all of the mineral salt thus formed.

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**4,018,806**
**PROCESS FOR RECOVERING SYMMETRICAL DIGLYCERIDES FROM GLYCERIDE MIXTURES**
**Glen Reid Wyness, Montgomery, and Richard Worthington Lodge, Springdale, both of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio**
**Filed Oct. 6, 1975, Ser. No. 619,741**
**Int. Cl.² C11B *7/00*; C07C *69/30***
**U.S. Cl. 260—428.5** **12 Claims**

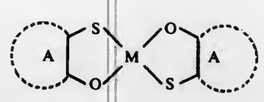
1. A process for recovering 1,3-digylceride from a glyceride mixture comprising from 5% to 60% triglyceride, from 15% to 70% 1,3-diglyceride, from 1% to 40% 1,2-diglyceride and from 8% to 50% monoglyceride which comprises: forming a solution of a glyceride mixture comprising from 5% to 60% triglyceride, from 15% to 70% 1,3-diglyceride, from 1% to 40% 1,2-diglyceride and from 8% to 50% monoglyceride, the acyl groups of said glycerides having from 12 to 22 carbon atoms and a non-polar hydrocarbon solvent and polar organic solvent, in a ratio of non-polar hydrocarbon solvent to polar organic solvent of from 2:1 to 20:1, **said polar organic solvent being sufficiently polar as to dissolve the monoglyceride content of said glyceride mixture; inducing and maintaining crystallization of solid** 1,3-diglyceride from the solution while maintaining the temperature of the solution below the saturation temperature of the 1,3-diglyceride and above the saturation temperature of the remaining components of the glyceride mixture; and recovering solid highly pure 1,3-diglyceride.

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**4,018,807**
**SYNTHESIS OF AROMATIC SULFUR-OXYGEN TRANSITION METAL COMPLEXES**
**Houston George Brooks, Jr., Somerset, N.J., assignor to American Cyanamid Company, Stamford, Conn.**
**Filed July 25, 1975, Ser. No. 599,225**
**Int. Cl.² C07F *15/04***
**U.S. Cl. 260—439 R** **9 Claims**

1. A method for the preparation of a transition metal complex of an aromatic o-hydroxymercaptan represented by the formula:



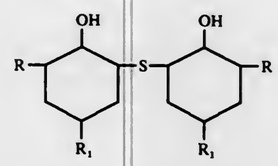


wherein M is a transition metal and A represents a mono- or polynuclear aromatic ring system, which comprises reacting an aromatic ortho-hydroxythiocyanate with an essentially stoichiometric amount of a water-soluble transition metal salt in a water-miscible organic solvent in the presence of a strong mineral acid.

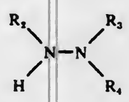
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**4,018,808**
**HYDRAZINO NICKEL THIO-BIS-PHENOLATES AND POLYOLEFINS STABILIZED THEREBY AGAINST THE EFFECTS OF HEAT AND LIGHT**
**Elmar Harry Jancis, Naugatuck, Conn., assignor to Uniroyal, Inc., New York, N.Y.**
**Division of Ser. No. 439,801, Feb. 6, 1974, Pat. No. 3,925,308. This application July 1, 1975, Ser. No. 592,142**
**Int. Cl.² C07F *15/04***
**U.S. Cl. 260—439 R** **5 Claims**

1. Hydrazino nickel thio-bis-phenolates which are the hydrazine complexes which of nickel thio-bis-phenolates, where the thio-bis-phenol is of the formula



where R is selected from the group consisting of hydrogen, normal alkyl or normal alkenyl, and $R_1$ is selected from the group consisting of normal, secondary, tertiary and cyclic alkyl groups, and the hydrazine is of the formula



where $R_2$, $R_3$ and $R_4$ are independently chosen from the group consisting of hydrogen and primary, secondary and tertiary alkyl groups consisting of 1 to 8 carbon atoms.

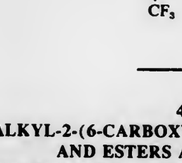
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**4,018,809**
**SOLUTIONS OF NEW ANTIMONY COMPLEXES**
**Eduard Radlmann; Heinz Schaffner; Günter Lorenz, and Günther Nischk, all of Dormagen, Germany, assignors to Plumley and Tyner, Leverkusen, Germany**
**Filed Sept. 12, 1975, Ser. No. 612,712**
**Claims priority, application Germany, Sept. 12, 1974, 2443572**
**Int. Cl.² C07F *9/90***
**U.S. Cl. 260—446** **8 Claims**

1. A process for the production of a solution of a substantially water-insoluble complex antimony compound in a polar organic solvent which comprises esterifying an α-hydroxy polycarboxylic acid with a polyol in a molar ratio of the carboxyl groups to the hydroxyl groups in the polyol of at least 2 : 1 and in the presence of an acid transesterification catalyst; reacting an excess of the esterification product with an antimony oxide in a polar organic solvent at a temperature in the range of from 100° to 200° C to form a clear solution still containing free carboxyl groups; and adding a monoisocyanate to the solution at a temperature below 100° C in such a quantity that the free carboxyl groups are converted into the corresponding amide groups the monoisocyanate corresponding to the general formula

$$R_1\text{—}N\text{=}C\text{=}O$$

in which $R_1$ is a straight-chain or branched alkyl group having from 1 to 20 carbon atoms, or

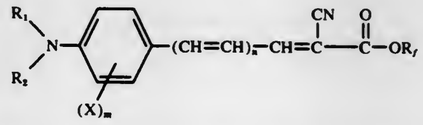


in which $R_2$, $R_3$, $R_4$, $R_5$ and $R_6$ may be the same as or different from one another and may represent a member selected from the group consisting of hydrogen, an alkyl having from 1 to 5 carbon atoms, fluorine, chlorine or bromine.

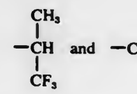
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**4,018,810**
**ORGANIC DYE HAVING FLUOROALIPHATIC SUBSTITUENT**
**Ivan H. Skoog, Lake Elmo, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**
**Filed June 11, 1975, Ser. No. 586,097**
**Int. Cl.² C07C *121/78***
**U.S. Cl. 260—465 D** **2 Claims**

1. A compound having the general formula



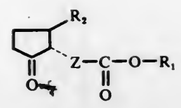
wherein $R_1$ and $R_2$ are hydrogen, alkyl, haloalkyl, aryl, or aralykl, n is the integer zero, 1 or 2, X is hydrogen, halogen, alkyl, cyano, nitro, alkoxy, $—SO_3H$, or carboxylic acid, and m is the integer 1 to 3, $R_f$ is a monovalent saturated fluoroaliphatic radical selected from the group consisting of



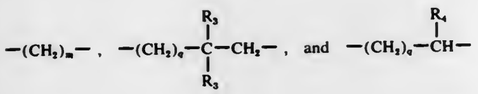
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**4,018,811**
**3-ALKYL-2-(6-CARBOXYHEXYL)CYCLOPENTANONES AND ESTERS AND SALTS THEREOF**
**Robert Eugene Schaub, Upper Saddle River, N.J.; Karel Francis Bernady, Suffern, N.Y., and Martin Joseph Weiss, Oradell, N.J., assignors to American Cyanamid Company, Stamford, Conn.**
**Continuation-in-part of Ser. No. 225,680, Feb. 11, 1972, abandoned, which is a continuation-in-part of Ser. No. 95,910, Dec. 7, 1970, abandoned. This application Apr. 3, 1972, Ser. No. 240,814**
**Int. Cl.² C07C *177/00***
**U.S. Cl. 260—468 K** **10 Claims**

1. A compound selected from the group consisting of those of the formula:



wherein $R_1$ is selected from the group consisting of hydrogen and lower alkyl; $R_2$ is a straight chain alkyl group having from 1 to 10 carbon atoms, inclusive; and Z is a divalent radical selected from the group consisting of



wherein $m$ is an integer from 4 to 8, inclusive, $q$ is an integer from 3 to 5, inclusive, $R_3$ is lower alkyl, and $R_4$ is selected from the group consisting of fluoro and lower alkyl; the stereoisomers thereof; and the cationic salts thereof when $R_1$ is hydrogen.

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**4,018,812**

**16-METHYLENE-PROSTAGLANDIN COMPOUNDS**

**Masaki Hayashi; Seiji Kori, both of Takatsuki, and Hajimu Miyake, Suita, all of Japan, assignors to Ono Pharmaceutical Co., Ltd., Osaka, Japan**

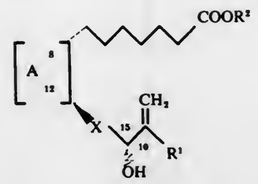
**Filed May 13, 1976, Ser. No. 685,953**

**Claims priority, application United Kingdom, June 16, 1975, 25591/75**

**Int. Cl.² C07C *177/00***

**U.S. Cl. 260—468 D** **5 Claims**

1. A compound of the formula:



IV

wherein A represents a grouping of the formula:



II

or



III

, $R^1$ represents a hydrogen atom or a straight- or branched-chain alkyl group containing from 1 to 6 carbon atoms, $R^2$ represents a hydrogen atom or a straight- or branched-chain alkyl group containing from 1 to 12 carbon atoms, X represents trans-vinylene or ethylene, and the wavy line indicates attachment of the hydroxy radical in $\alpha$- or $\beta$-configuration and cyclodextrin clathrates thereof and, when $R_2$ represents a hydrogen atom, non-toxic salts thereof.

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**4,018,813**

**N-CARBAMOYL ETHYL OXANILATES**

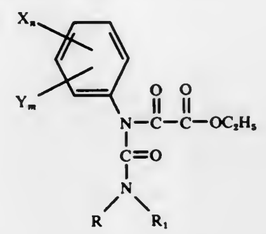
**Edmund J. Gaughan, Berkeley, Calif., assignor to Stauffer Chemical Company, Westport, Conn.**

**Continuation-in-part of Ser. No. 559,104, March 17, 1975, abandoned. This application Dec. 8, 1975, Ser. No. 638,491**

**Int. Cl.² C07C *127/19***

**U.S. Cl. 260—471 A** **10 Claims**

1. The compound having the formula



wherein X and Y are independently selected from the group consisting of chloro, bromo and trifluoromethyl; $n$ is either 0 or 1; $m$ is either 0 or 1; R and $R_1$ are independently selected from the group consisting of lower alkyl from $C_1$ to $C_3$, inclusive, and lower alkoxy from $C_1$ to $C_3$, inclusive.

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**4,018,814**

**AROMATIC AMIDES AND CARBOMATES OF PHENYLAMIDINES**

**Hartmund Wollweber, Wuppertal-Elberfeld, Germany, and Winfried Flucke, Beenleigh Qu., Australia, assignors to Bayer Aktiengesellschaft, Germany**

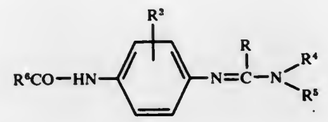
**Division of Ser. No. 398,692, Sept. 19, 1973, Pat. No. 3,911,010, which is a division of Ser. No. 151,581, June 9, 1971, Pat. No. 3,818,070. This application Apr. 18, 1975, Ser. No. 569,565**

**Claims priority, application Germany, June 13, 1970, 2029298**

**Int. Cl.² C07C *101/62*; A61K *31/27***

**U.S. Cl. 260—471 C** **10 Claims**

1. A compound selected from the group consisting of an aminophenylamidine and the physiologically acceptable acid addition salts thereof, said aminophenylamidine having the formula:



wherein

R is alkyl of 1 to 5 carbon atoms, alkenyl of 2 to 5 carbon atoms or cycloalkyl of 3 to 7 carbon atoms;

$R^3$ is hydrogen, chloro, fluoro, bromo, cyano, trifluoromethyl, alkyl of up to 4 carbon atoms, alkoxy of up to 4 carbon atoms and alkenyl of up to 4 carbon atoms;

$R^4$ is an aliphatic substituent of up to 4 carbon atoms selected from the group consisting of alkyl, alkenyl, alkynyl and alkoxy;

$R^5$ is an aliphatic substituent of up to 4 carbon atoms selected from the group consisting of alkyl or alkenyl, or cycloalkyl of 3 to 7 carbon atoms, and

$R^6$ is selected from the group consisting of phenyl, phenoxy, naphthyl, tetralyl, benzyl, phenethyl, benzyloxy, phenylethoxy, phenoxymethyl and phenoxymethoxy, unsubstituted or substituted with 1 to 3 members selected from the group consisting of nitro, trifluoromethyl, hydroxy, cyano, chloro, fluoro, bromo, methyl, methoxy, carbethoxy, methylsulfonyl, acetylamino, or acetyloxy.



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**4,018,815**

**PROCESS FOR THE PREPARATION OF POLYESTER POLYOLS**

**Herwart C. Vogt, Grosse Ile, and John T. Patton, Jr., Wyandotte, both of Mich., assignors to BASF Wyandotte Corporation, Wyandotte, Mich.**

**Filed Sept. 29, 1975, Ser. No. 617,308**

**Int. Cl.² C07C *69/34, 69/52***

**U.S. Cl. 260—485 G** **6 Claims**

1. In a process for the preparation of a polyester polyol by the esterification of a polycarboxylic acid or anhydride with a polyhydric alcohol the improvement which comprises:

a. initially charging to a reactor an amount of a polycarboxylic acid or anhydride equal to between 3 to 16 weight percent in excess of stoichiometry;

b. adding to the reactor a polyhydric alcohol and heating the charge to a temperature between 130° to 240° C.;

c. removing from the reactor between 90 to 95 weight percent of the water of esterification resulting from step (b);

d. charging to the reactor an amount of polyhydric alcohol substantially equivalent in weight to the amount of water of esterification removed from step (c); and

e. continuing the esterification reaction until a polyol having an acid number of less than two is obtained.

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**4,018,816**

**PREPARATION OF METHACRYLATES**

**Takeru Onoda, Yokohama, and Masayuki Otake, Tokyo, both of Japan, assignors to Mitsubishi Chemical Industries Ltd., Tokyo, Japan**

**Filed Dec. 17, 1975, Ser. No. 641,824**

**Claims priority, application Japan, Dec. 19, 1974, 49-146617; May 19, 1975, 50-59441**

**Int. Cl.² C07C *69/54***

**U.S. Cl. 260—486 R** **17 Claims**

1. In a process for the preparation of a methacrylate by the vapor phase reaction of methacrylic acid with an aliphatic alcohol having 1 to 4 carbon atoms and 1 to 2 hydroxyl groups in the proportion of 0.5 – 100 moles of the aliphatic alcohol per mole of methacrylic acid, at a temperature of 160° – 360° C in the presence of a catalyst, the improvement wherein the catalyst is a solid acid silica-titania catalyst which is prepared by dissolving a silicon compound and a titanium compound in an aqueous medium in such proportions that the ratio of silicon to titanium is 0.1 – 100, adjusting the pH of the resultant aqueous solution so as to coprecipitate the silicon and the titanium components and then drying and calcining the coprecipitate to form the catalyst.

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**4,018,817**

**6-HALO-5-CYCLOHEXYLINDAN-1-CARBOHYDROXAMIC ACID**

**Shunsaku Noguchi; Yoshiaki Araki, both of Osaka; Masayuki Imanishi, Hyogo, and Kiyohisa Kawai, Kyoto, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan**

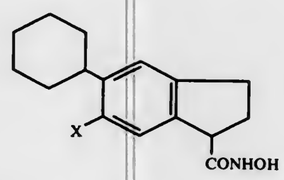
**Filed Nov. 30, 1973, Ser. No. 420,459**

**Claims priority, application Japan, Dec. 7, 1972, 47-122874**

**Int. Cl.² C07C *83/08*; A61K *31/165***

**U.S. Cl. 260—500.5 H** **2 Claims**

1. A compound of the formula



wherein X represents halogen.

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**4,018,818**

**HYDROXYL-SUBSTITUTED 2-CHLORO-α-(TERT-BUTYLAMINOMETHYL)-BENZYLALCOHOLS**

**Yuzuro Yamamoto, Kanazawa; Hideo Kato, Katsuyama Fukui; Sakae Kurata, Katsuyama Fukui, and Kazunori Nishide, Katsuyama Fukui, all of Japan, assignors to Hokuriku Pharmaceutical Co., Ltd., Fukui, Japan**

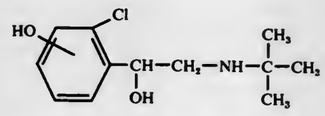
**Filed May 5, 1975, Ser. No. 575,052**

**Claims priority, application Japan, May 16, 1974, 49-53903**

**Int. Cl.² C07C *91/22***

**U.S. Cl. 260—501.17** **4 Claims**

1. A hydroxyl-substituted 2-chloro-α-(tert-butylaminomethyl)-benzylalcohol of the general formula



(I)

and salts thereof.

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**4,018,819**

**PROCESS FOR THE MANUFACTURE OF 2-CHLOROETHANE-PHOSPHONIC ACID**

**Karl Rehn, Hofheim, Taunus; Otto Schaffner, Morfelden, and Gerhard Stähler, Frankfurt am Main, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany**

**Continuation of Ser. No. 207,620, Dec. 13, 1971, abandoned. This application Aug. 19, 1975, Ser. No. 605,868**

**Claims priority, application Germany, July 9, 1971, 2134346**

**Int. Cl.² C07F *9/38***

**U.S. Cl. 260—502.4 R** **7 Claims**

1. In a process for the manufacture of 2-chloroethane-phosphonic acid by the hydrolytic cleavage of 2-chloroethane-phosphonic acid-bis(2-chloroethyl) ester by contacting said ester with hydrogen chloride in the presence of 0.1 to 31 percent of water, by weight of said ester, at a temperature above 100° C. and under an elevated pressure and maintaining an elevated pressure during the reaction by adding gaseous hydrogen chloride, the improvement which comprises distilling off during the reaction to 1,2-dichloroethane formed by the reaction.

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**4,018,820**

**CHEMICAL SYNTHESIS**

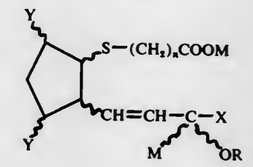
**Josef Fried, Chicago, Ill., assignor to The University of Chicago, Chicago, Ill.**

**Continuation-in-part of Ser. No. 274,365, July 24, 1972, abandoned, and Ser. No. 400,297, Sept. 24, 1973, abandoned, which is a continuation of Ser. No. 361,664, May 18, 1973, abandoned, which is a continuation of Ser. No. 53,663, July 9, 1970, abandoned. This application Sept. 5, 1974, Ser. No. 503,215**

**Int. Cl.² C07C *177/00***

**U.S. Cl. 260—514 D** **4 Claims**

1. A compound of the formula:



wherein

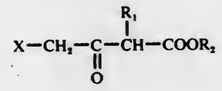
M is H, or lower alkyl;

Y is OH, acyloxy, or lower alkoxy;
X is lower alkyl;
R is H, acyl, or lower alkyl;
n is an integer from 2 to 5; and wherein the acyl radicals are derived from hydrocarbon carboxylic acids of 12 carbon atoms or less.

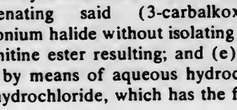
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**4,018,821**
**PROCESS FOR THE PRODUCTION OF CARNITINE**
**Leander Tenud, Visp, Switzerland, assignor to Lonza Ltd., Gampel, Switzerland**
**Filed Sept. 25, 1975, Ser. No. 616,849**
**Claims priority, application Switzerland, Sept. 25, 1974, 012971/74**
**The portion of the term of this patent subsequent to July 13, 1993, has been disclaimed.**
**Int. Cl.² C07C** *101/10, 101/12*
**U.S. Cl. 260—534 M** **14 Claims**

1. The process for the production of carnitine hydrochloride which comprises: (a) placing an ester of γ-haloacetoacetic acid having the formula:



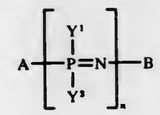
wherein $R_1$ is hydrogen, $R_2$ is a lower alkyl group having 1 to 10 carbon atoms and X is a halogen atom selected from the group consisting of chlorine or bromine, in an aqueous solution of excess trimethyl amine held at a temperature between 0° and 50° C., a reaction resulting between said ester and said amine; (b) distilling off the excess trimethyl amine; (c) adjusting the pH of the solution to between 4and 8, (3-carbalkoxy-2-oxopropyl)-trimethyl ammonium halide resulting; (d) catalytically hydrogenating said (3-carbalkoxy-2-oxopropyl)-trimethyl ammonium halide without isolating said halide from solution, a carnitine ester resulting; and (e) converting said carnitine ester by means of aqueous hydrochloric acid into said carnitine hydrochloride, which has the formula:



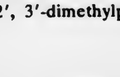
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**4,018,822**
**THIOAMINOPHOSPHAZENES**
**Vijay Ratna Sharma, and John Anthony Taylor, both of Manchester, England, assignors to Imperial Chemical Industries Limited, London, England**
**Filed July 29, 1975, Ser. No. 600,190**
**Claims priority, application United Kingdom, Sept. 9, 1974, 39264/74**
**Int. Cl.² C07F** *9/22, 9/23, 9/24*
**U.S. Cl. 260—551 P** **6 Claims**

1. A thioaminophosphazene of the formula



wherein *n* is 1 to 5,
A, if present, $Y^1$ and $Y^2$ are each selected from methoxy, ethoxy, propoxy, butoxy, hexyloxy, phenoxy, cresyl, xylyloxy, chlorophenoxy, dimethylamino, or groups of the formula $-NHR^{10}$ where $R^{10}$ is selected from phenyl, methylphenyl, methoxyphenyl, cyclohexyl, methyl or two of the groups $-NHR^{10}$ together are 1,2-phenylenediamino;
B is selected from benzenesulphonyl, toluenesulphonyl, methane sulphonyl, naphthalene sulphonyl, formyl, acetyl or benzoyl, and
at least one of the groups A, $Y^1$ and $Y^2$ are of the formula



where $R^{10}$ is defined above and $R^2$ is selected from methyl, ethyl, isopropyl, isobutyl, cyclohexyl, sec-butyl, phenyl or methoxyphenyl.

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**4,018,823**
**4',5'-DIMETHOXY-2',3-DIAMINOPROPIOPHENONE DIHYDROCHLORIDE**
**Thomas J. Schwan, Norwich, N.Y., assignor to Morton-Norwich Products, Inc., Norwich, N.Y.**
**Filed Apr. 20, 1976, Ser. No. 678,531**
**Int. Cl.² C07C** *97/10*
**U.S. Cl. 260—570.5 C** **1 Claim**

1. The compound of the formula:



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**4,018,824**
**1-ARYLOXY-3-AMINOPROPANE DERIVATIVES**
**Kunio Tsukamoto, Tokyo; Yasushi Suzuki, Yokohama; Akihiro Izumi, Kawasaki, and Yoshio Hiramatsu, Tokyo, all of Japan, assignors to Teikoku Hormone Mfg. Co., Ltd., Tokyo, Japan**
**Division of Ser. No. 92,252, Nov. 23, 1970. This application Sept. 20, 1974, Ser. No. 507,793**
**Claims priority, application Japan, Nov. 28, 1969, 44-95027; Mar. 30, 1970, 45-26548; Mar. 30, 1970, 45-26549; July 21, 1970, 45-63377; Oct. 15, 1970, 45-90429; Nov. 13, 1970, 45-99733**
**Int. Cl.² C07C** *93/06*
**U.S. Cl. 260—570.7** **1 Claim**

1. 2-Benzyloxy-1-(2', 3'-dimethylphenyloxy)-3-tert.-butylamino-propane.

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**4,018,825**
**5-HYDROXY-α-(SUBSTITUTED AMINOMETHYL)-M-XYLENE-α,α'-DIOLS**
**Charles F. Schwender, Lebanon, and John Shavel, Jr., Mendham, both of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.**
**Division of Ser. No. 275,611, July 27, 1972. This application Apr. 7, 1976, Ser. No. 674,452**
**Int. Cl.² C07C** *91/22*
**U.S. Cl. 260—570.6** **1 Claim**

1. 5-benzyloxy-α[(-butylamino)methyl]-m-xylene-α, α'-diol.



**4,018,826**
**PROCESS FOR PREPARING POLYVINYLAMINE AND SALTS THEREOF**
**Richard D. Gless, Jr., Oakland; Daniel J. Dawson, Los Altos, and Robert E. Wingard, Palo Alto, all of Calif., assignors to Dynapol Corporation, Palo Alto, Calif.**
**Filed Nov. 4, 1974, Ser. No. 520,530**
**Int. Cl.² A23L** *1/27*; **C07C** *87/24*; **C08F** *120/52, 126/02*
**U.S. Cl. 260—583 P** **6 Claims**

1. A process for preparing poly(vinylamine) salt which comprises the steps of:
A. reacting at a temperature of from 20° C to 100° C acetaldehyde with from two to four stoichiometric equivalents of acetamide in the presence of from 0.001 to 1.0 mole per mole of acetamide of an aqueous mineral acid catalyst to yield a vinylacetamide and ethylidene-bis-acetamide containing reaction product,
B. neutralizing the aqueous mineral acid catalyst and heating the vinylacetamide and ethylidene-bis-acetamide containing reaction product to 150° C to 250° C for from 0.2 to 5 hours in the presence of an inorganic nonacidic silicious oxide surface catalyst to yield a decomposition product, said catalyst having a surface area of at least about 1 $m^2/g$,
C. separating vinylacetamide from said decomposition product by vacuum volatilization,
D. contacting with vinylacetamide at a concentration of from 10% to 50% by weight in a reaction medium selected from polar hydrogen bonding liquids and nonpolar liquids with from 0.1 to 20 grams per 100 grams of vinylacetamide of a free radical initiator polymerization catalyst at a temperature of from 25° C to 125° C for from 4 to 8 hours to yield poly(vinylacetamide),
E. hydrolyzing said poly(vinylacetamide) by contacting it with from 1.05 to 3 equivalents of a mineral acid per equivalent of poly(vinylacetamide) at a temperature of from 25° C to 125° C for from 4 to 8 hours to yield the poly(vinylamine) salt of said mineral acid, and
F. precipitating and recovering said poly(vinylamine) salt.

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**4,018,827**
**PROCESS FOR THE PREPARATION OF CYCLOALKANE-1,2-DIONES**
**Durvasula V. Rao, Cheshire, and Fred A. Stuber, North Haven, both of Conn., assignors to The Upjohn Company, Kalamazoo, Mich.**
**Filed Feb. 25, 1976, Ser. No. 661,285**
**Int. Cl.² C07C** *45/00*
**U.S. Cl. 260—586 P** **12 Claims**

1. A process for the autoxidation of a cycloalkanone to the corresponding cycloalkane-1,2-dione which process comprises reacting said cycloalkanone with oxygen in the presence of (i) from 1 to 2 mole, per mole of cycloalkanone, of a base selected from the class consisting of alkali metal hydroxides and alkali metal alkoxides and (ii) an organic polar solvent at a temperature not exceeding about −20° C.

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**4,018,828**
**PROCESS FOR RECOVERING DIALKYLARYLKETONE**
**Anatoli Onopchenko, Monroeville, and Johann G. D. Schulz, Pittsburgh, both of Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.**
**Filed May 27, 1975, Ser. No. 581,288**
**Int. Cl.² C07C** *49/76*
**U.S. Cl. 260—591** **7 Claims**

1. A process for recovering a dialkylarylketone selected from the group consisting of 3,4,3',4'-tetramethylbenzophenone and 4,4'-dimethylbenzophenone from an oily mixture containing the same and a 1,1-diaryl-2-nitroethylene, said mixture having been obtained as a result of the nitric acid oxidation of 1,1-bis (3,4-dimethylphenyl)ethane and 1,1-bis(4-methylphenyl)ethane, respectively, which comprises adding a base selected from the group consisting of sodium hydroxide, potassium hydroxide, calcium hydroxide, ammonia, ammonium hydroxide, sodium amide, potassium amide and potassium t-butoxide to said mixture until solidification of said dialkylarylketone occurs, the amount of said base employed ranging from about 0.5 to about 20 weight percent based on said dialkylarylketone, and then recovering said solid dialkylarylketone by separating the latter from a solvent solution of said 1,1-diaryl-2-nitroethylene, the solvent used in said solvent solution selected from the group consisting of hydrocarbons, alcohols, ketones, esters and ethers.

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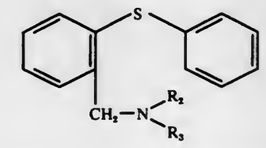
**4,018,829**
**METHOD FOR MAKING α-HYDROXY-ISOBUTYRAMIDE FROM ACETONE CYANOHYDRIN**
**Wilhelm Gruber, Darmstadt, and Guenter Schroeder, Ober-Ramstadt, both of Germany, assignors to Rohm GmbH, Darmstadt, Germany**
**Filed June 2, 1976, Ser. No. 692,109**
**Claims priority, application Germany, June 18, 1975, 2527120**
**Int. Cl.² C07C** *102/08*
**U.S. Cl. 260—561 B** **4 Claims**

1. In a method for makin α-hydroxy-isobutyramide by the hydration of acetone cyanohydrin in the presence of manganese dioxide as a catalyst, the improvement wherein acetone is added to the reaction mixture.

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**4,018,830**
**PHENYLTHIOARALKYLAMINES**
**Marcia Elizabeth Christy, Perkasie, Pa., assignor to Merck & Co., Inc., Rahway, N.J.**
**Continuation of Ser. No. 860,076, Sept. 22, 1969, abandoned. This application Nov. 25, 1974, Ser. No. 526,984**
**Int. Cl.² C07C** *97/28*
**U.S. Cl. 260—570.9** **3 Claims**

1. Compounds having the formula



wherein $R_2$ and $R_3$ are independently selected from hydrogen, $C_1$–$C_6$ alkyl, $C_1$–$C_6$ alkenyl and $C_1$–$C_6$ alkynyl.

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**4,018,831**
**PRODUCTION OF 2-ETHYL HEXANAL**
**Emmerson Bowes, Glassboro, N.J., and Robert E. Chute, Erie, Pa., assignors to Mallinckrodt, Inc., St. Louis, Mo.**
**Filed Sept. 11, 1975, Ser. No. 612,679**
**Int. Cl.² C07C** *47/02*
**U.S. Cl. 260—601 R** **2 Claims**

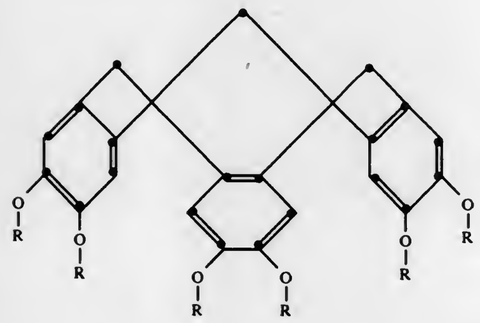
1. A process for the production of 2-ethyl hexanal without substantial simultaneous production of 2-ethyl hexanol which consists essentially of:
A. providing a bed of particulate hydrogenation catalyst consisting essentially of nickel coated on alumina, the D/A ratio of said bed being between about 1:1 and 6:1 wherein D is the depth of the bed in centimeters and A is the cross-sectional area in square centimeters,
B. passing 2-ethyl-hexene-2-al-1 (TEH) in the liquid phase upwardly through said bed at a LHSV from about 0.5 to 3,
C. injecting hydrogen into stream of TEH entering said bed at the base thereof,
D. maintaining the temperature of said bed at about 90° – 180° C,

E. maintaining the fluid in contact with said bed at a pressure between about 7 to 35 Kgm/cm²,
F. removing a liquid stream overhead from said bed, and
G. recovering 2-ethyl hexanal from said overhead effluent stream.

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**4,018,832**
**NOVEL COMPLEXING AGENTS DERIVED FROM CYCLOTRIVERATRYLENE**
**John A. Hyatt, Kingsport, Tenn., assignor to Eastman Kodak Company, Rochester, N.Y.**
**Filed July 14, 1976, Ser. No. 705,193**
**Int. Cl.² C07C** *43/26*
**U.S. Cl. 260—613 B** **5 Claims**

1. A compound having the formula

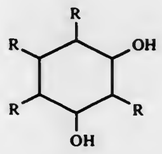


wherein R is $-(CH_2-CH_2-O)_n-R^1$, *n* is an integer of 1 to 5 and $R^1$ is alkyl having 1 to 6 carbon atoms.

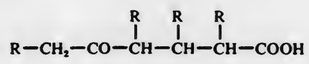
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**4,018,833**
**PREPARING RESORCINOLS FROM δ-KETOCARBOXYLIC ACIDS OR FROM THEIR LACTONES**
**Werner Heinrich Müller, Kelkheim, Taunus, and Hans Fernholz, Fischbach, Taunus, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany**
**Filed Oct. 20, 1975, Ser. No. 624,290**
**Claims priority, application Germany, Oct. 22, 1974, 2450086**
**Int. Cl.² C07C** *37/00*
**U.S. Cl. 260—621 R** **12 Claims**

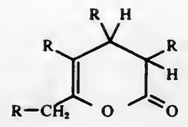
1. A process for the preparation of resorcinol of the formula



wherein each of the R substituents may be the same or different and is a member selected from the group consisting of H and alkyl, cyclo alkyl and aryl having up to 12 carbon atoms, which comprises contacting a ketocarboxylic acid of the formula



or its lactone of the formula



wherein R has the aforesaid meaning, with a dehydrogenation cayaltyst selected from the group consisting of a metal or a compound of a metal from the eighth or first subgroup of the periodic table and a carrier therefore,
said contacting being carried out in a gaseous phase and at a temperature of 150° to 500° C,
dehydrogenating said ketocarboxylic acid or said lactone to obtain said resorcinol, cooling and condensing said gas phase and recovering said resorcinol from said condensate.

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**4,018,834**
**HYDROCARBONYLATION OVER IRON ON SUPPORT HAVING SILICA ALUMINA DISPERSED IN A SEPARATE PHASE ALUMINA MATRIX**
**Jin Sun Yoo, South Holland, Ill., assignor to Atlantic Richfield Company, Los Angeles, Calif.**
**Continuation of Ser. No. 424,488, Dec. 13, 1973, abandoned, which is a continuation of Ser. No. 30,275, April 20, 1970, abandoned. This application Feb. 13, 1976, Ser. No. 657,814**
**Int. Cl.² C07C** *45/04*
**U.S. Cl. 260—632 HF** **3 Claims**

1. In the process for the hydroformylation of olefin hydrocarbons of 2 to about 8 carbon atoms at a temperature of from about 100° to 350° C. at a pressure of from about 700 to about 1800 psig in the presence of an iron catalyst, the improvement which consists essentially of conducting said hydroformylation in contact with an active catalyst formed under hydroformylation conditions, said catalyst comprising a major amount of a solid acidic calcined support comprised of about 45 to 95 weight percent amorphous silica-alumina, said support containing a separate phase of alumina constituting about 5 to 55 weight percent of said support, the total alumina content of said support being about 20 to 70 weight percent, said separate phase alumina resulting from the calcination of a mixture of amorphous hydrous alumina and alumina monohydrate, said catalyst being initially introduced in a form consisting essentially of said major amount of support and a minor amount of iron constituting from about 0.001 to about 0.1 weight percent of the catalyst.

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**4,018,835**
**METHOD OF PRODUCING POLYHYDRIC ALCOHOLS**
**Frunze Bizhanovich Bizhanov, ulitsa Dzhambula, 180, kv. 1; Dmitry Vladimirovich Sokolsky, prospekt Abaya, 31, kv. 38; Ashim Kuranbaevich Omarov, ulitsa Dzhambula, 13, kv. 37, all of Alma-Ata; Akhmed Miftakhovich Khisametdinov, prospekt Kommunisticheskiy, 95, Chimkent; Sagynbek Ongarbaev, prospekt Kosmonavtov, proezd Festivalny, 7, Chimkent, and Nikolai Ivanovich Popov, prospekt Kosmonavtov, 19, kv. 3, Chimkent, all of U.S.S.R.**
**Continuation of Ser. No. 141,426, May 7, 1971, abandoned. This application Feb. 13, 1976, Ser. No. 658,049**
**Int. Cl.² C07C** *29/00*
**U.S. Cl. 260—635 C** **11 Claims**

1. A method of producing a polyhydric alcohol comprising hydrogenating a solution of a monose in the presence of a catalyst consisting essentially of Ni and Fe in the ratio from 24:1 to 1:1 at a temperature of from 20°to 120° C. and a hydrogen pressure of 10 to 80 kg/cm², the catalyst being obtained by aqueous caustic leaching of an alloy of nickel, aluminum and iron.

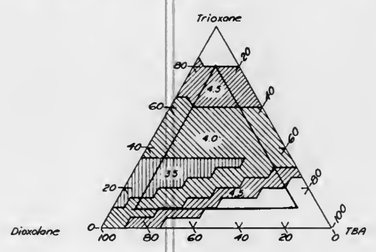


**4,018,836**
**PRODUCTION OF MONOCHLORO-SUBSTITUTED SATURATED COMPOUNDS**
**Herman S. Bloch, Skokie, and Louis Schmerling, Riverside, both of Ill., assignors to UOP Inc., Des Plaines, Ill.**
**Continuation-in-part of Ser. No. 507,086, Sept. 18, 1974, abandoned. This application June 21, 1976, Ser. No. 698,238**
**Int. Cl.² C07C** *17/26, 23/10, 23/24*
**U.S. Cl. 260—648 R** **8 Claims**

1. In a process for the production of a monochloro-substituted saturated compound which is effected by condensing a saturated cycloalkyl hydrocarbon selected from the group consisting of a cycloalkane having from 5 to about 8 carbon atoms in the ring, a bicycloalkyl having from 10 to 16 carbon atoms in the rings and a polycycloalkane having from 6 to 14 carbon atoms in the rings with a chloromonoolefin possessing not more than 4 carbon atoms and having the chlorine atom attached to one of the doubly-bonded carbon atoms in the presence of a free radical-generating peroxide catalyst at a temperature at least as high as the decomposition temperature of said catalyst and a pressure of from 1 to about 100 atmospheres, and recovering the resultant monochloro-substituted saturated compound, the improvement which comprises effecting the reaction in the presence of a promoter comprising hydrogen chloride.

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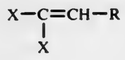
**4,018,837**
**STABILIZED METHYLCHLOROFORM**
**Wesley L. Archer, Midland; Elbert L. Simpson, Auburn, and Raymond R. Gerard, Bay City, all of Mich., assignors to The Dow Chemical Company, Midland, Mich.**
**Continuation-in-part of Ser. No. 281,242, Aug. 16, 1972, abandoned, and a continuation-in-part of Ser. No. 281,243, Aug. 16, 1972, abandoned, and a continuation-in-part of Ser. No. 281,244, Aug. 16, 1972, abandoned, and a continuation-in-part of Ser. No. 281,245, Aug. 16, 1972, abandoned. This application Nov. 25, 1974, Ser. No. 527,003**
**Int. Cl.² C07C** *17/42*
**U.S. Cl. 260—652.5 R** **11 Claims**



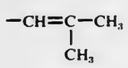

1. A 1,1,1-trichloroethane composition stable in the liquid and vapor phases in the presence of aluminum, zinc, copper, iron and their alloys which consists of 1,1,1-trichloroethane and based on the total weight of the composition (A) 3.5 to 4.5 weight percent of a mixture selected from the following:
a. dioxane, dioxolane and trioxane;
b. dioxane, dioxolane and nitromethane;
c. dioxane, trioxane and nitromethane;
d. dioxane, dioxolane and tert. butyl alcohol;
e. dioxane, trioxane and tert. butyl alcohol;
f. dioxolane, trioxane and nitromethane;
g. dioxolane, trioxane and tert. butyl alcohol;
h. dioxane, tert. butyl alcohol and nitromethane; and
i. trioxane, tert. butyl alcohol and nitromethane,
and (b) as the essential acid acceptor from about 0.25 to about 1 percent by weight of a $C_{3-8}$ monoalkylene epoxide, epichlorohydrin or cyclohexene epoxide, provided that when nitromethane is not a compound selected from the list above at least 0.25 to about 0.8 weight percent nitromethane is present, said compositions (a) through (i) being within the parameters of the inner triangle of the appropriate FIGS. 1–9.

**4,018,838**
**PROCESS OF PREPARING ALKENES**
**Peter John Vernon Cleare, Ascot, England, assignor to Imperial Chemical Industries Limited, London, England**
**Filed Apr. 9, 1976, Ser. No. 675,267**
**Claims priority, application United Kingdom, Apr. 17, 1975, 15862/75**
**Int. Cl.² C07C** *21/00*
**U.S. Cl. 260—654 R** **7 Claims**

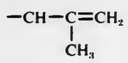
1. A process for the preparation of a compound of formula:



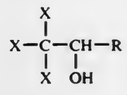
wherein X is halogeno and R is either a group of formula:



or a group of formula:



which comprises treating a haloalcohol of formula:



with powdered zinc in glacial acetic acid at a temperature within the range 25° to 110° C, wherein the zinc is used in an amount of from one to two moles per mole of haloalcohol.

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**4,018,839**
**HYDROCARBON ISOMERIZATION PROCESS**
**Richard E. Rausch, Mundelein, Ill., assignor to UOP Inc., Des Plaines, Ill.**
**Division of Ser. No. 584,438, June 6, 1975, which is a continuation-in-part of Ser. No. 480,793, June 19, 1974, Pat. No. 3,898,154, which is a continuation-in-part of Ser. No. 376,841, July 5, 1973, Pat. No. 3,846,283, which is a continuation-in-part of Ser. No. 201,576, Nov. 23, 1971, Pat. No. 3,745,112, which is a continuation-in-part of Ser. No. 807,910, March 17, 1969, Pat. No. 3,740,328. This application June 7, 1976, Ser. No. 693,662**
**Int. Cl.² C07C** *5/22, 5/28, 13/00*
**U.S. Cl. 260—666 R** **10 Claims**

1. A process for isomerizing a naphthenic hydrocarbon containing from 5 to about 20 carbon atoms which comprises contacting said hydrocarbon at isomerization conditions with a catalytic composite comprising a porous alumina carrier containing, on an elemental basis, about 0.01 to about 2 weight percent platinum or palladium, about 0.01 to about 2 weight percent rhodium, about 0.01 to about 5 percent tin and about 0.1 to about 10 weight percent halogen, wherein said platinum or palladium, rhodium and tin are uniformly dispersed throughout said alumina carrier, wherein substantially all of said platinum or palladium and rhodium are present in the corresponding elemental metallic states and wherein substantially all of said tin is present in an oxidation state above that of the elemental metal.

4,018,840

## PROCESS FOR PREPARING ALKENYLBENZENES

Kazumi Iwata; Michiyuki Tokashiki, and Takeo Shima, all of Iwakuni, Japan, assignors to Teijin Limited, Osaka, Japan

Filed Dec. 24, 1974, Ser. No. 536,128
Int. Cl.² C07C *15/09*
U.S. Cl. 260—668 B 4 Claims

1. In a process for the production of alkenylbenzene by the reaction of alkylbenzene with 1,3-butadiene in the presence of an alkali-metal catalyst in a reaction zone to form a reaction product containing alkenylbenzene, butadiene dimer, and alkali-metal catalyst, and separating this mixture in additional zones to provide said alkenylbenzene, the improvement which comprises first contacting fresh alkylbenzene feed stock with said reaction product of said reaction zone after it has left said zone to remove essentially all water and oxygen present in said alkylbenzene, separating said water-free and oxygen-free alkylbenzene from said reaction product, butadiene dimers, and said alkali-metal catalyst, and passing said water-free, dimer-free, and catalyst-free alkylbenzene to said reaction zone.

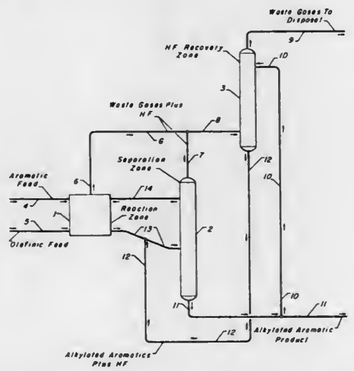
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4,018,841

## PROCESS FOR ALKYLATION OF AROMATICS

Michael Z. Mikulicz, Palatine; William G. Boney, Rolling Meadows, and Bipin V. Vora, Wheeling, all of Ill., assignors to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 520,811, Nov. 4, 1974, Pat. No. 3,957,902. This application Nov. 13, 1975, Ser. No. 631,564
The portion of the term of this patent subsequent to May 18, 1993, has been disclaimed.
Int. Cl.² C07C *15/00*
U.S. Cl. 260—671 R 1 Claim




1. An alkylation process which comprises the steps of:
a. reacting olefins with aromatic compounds in contact with hydrogen fluoride catalyst in a reaction zone;
b. separating from the resultant reaction mixture, in a separation zone, an alkylated aromatic product and a stream of unreacted aromatic compounds and hydrogen fluoride;
c. removing from the reaction zone a gaseous stream containing hydrogen fluoride;
d. removing from the separation zone a gaseous stream containing hydrogen fluoride;
e. returning said stream of unreacted aromatic compounds and hydrogen fluoride to said reaction zone;
f. combining said gaseous streams from step (c) and step (d) and contacting said combined gaseous streams with a portion of said alklated aromatic product to absorb hydrogen fluoride from said combined gaseous streams into said portion of the alkylated aromatic product; and
g. passing said portion of the alkylated aromatic product, containing absorbed hydrogen fluoride from contacting step (f) to the separation zone of step (b).

4,018,842

## SELECTIVE HYDROGENATION OF α-PINENE TO cis-PINANE

Levy A. Canova, Orange Park, Fla., assignor to SCM Corporation, New York, N.Y.

Filed May 27, 1976, Ser. No. 690,558
Int. Cl.² C07C *5/14*, *13/32*
U.S. Cl. 260—675.5 5 Claims

1. In the stereoselective hydrogenation of α-pinene to cis-pinane which comprises hydrogenating α-pinene under hydrogenation conditions at hydrogenation pressures and temperatures with a nickel hydrogenation catalyst, the improvement to achieve increased stereoselectivity which comprises carrying out said hydrogenation in the presence of a nickel catalyst which has an effective fraction of its reactive surfaces inactivated.

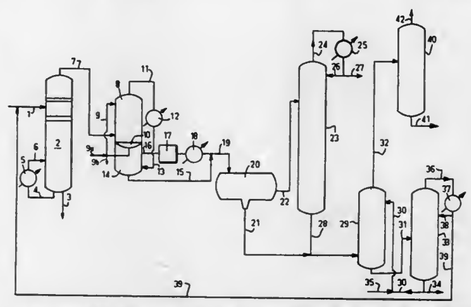
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4,018,843

## PROCESS FOR THE OBTAINING OF ISOBUTYLENE OF HIGH PURITY

Jean-Pierre Michaux, Chatou, and Guy Arnaud, Le Havre, both of France, assignors to Compagnie Francaise de Raffinage, Paris, France

Filed May 4, 1976, Ser. No. 683,178
Claims priority, application France, May 9, 1975, 75.14589
Int. Cl.² C07C *7/04*, *11/08*
U.S. Cl. 260—677 A 8 Claims



1. A process for obtaining isobutylene of a purity greater than 99.5% with good yield and efficiency from an initial feed comprising a major quantity of isobutylene and a minor quantity of tertiary butyl alcohol, water, polymers of isobutylene, and cis- and trans-2-butenes, said process comprising the following stages:
A. separating by distillation, on the one hand, isobutylene of a purity equal to or greater than 99.5%, and on the other hand, a mixture containing tertiary butyl alcohol, water, polymers of isobtylene, cis- and trans-2-butenes and isobutylene in such amount that it represents from 0 to 15% by weight of the isobutylene contained in the initial feed;
B. washing the mixture obtained in the stage (A) with water to obtain, on the one hand, an aqueous phase containing tertiary butyl alcohol and, on the other hand, an organic phase containing the isobutylene polymers, the cis- and trans-2-butenes, the isobutylene not separated in stage (A), and the tertiary butyl alcohol not dissolved in the wash water;
C. distilling the organic phase from stage (B), to separate the polymers of isobutylene from a mixture containing isobutylene and the cis- and trans-2-butenes, whereby the isobutylene contained in said resulting mixture is capable of recovery by extraction;
D. distilling the aqueous phase from stage (B), to separate water from an azeotrope of tertiary butyl alcohol and water, whereby the tertiary butyl alcohol in the azeptrope is capable of being dehydrated to isobutylene.



4,018,844

## LONG CHAIN INTERNALLY UNSATURATED ALKENES

Otto Meresz, 8 Wallingford Road, and Cecilia Mozsgai, 10 Sunny Glenway No. 103, both of Don Mills, Ontario, Canada

Division of Ser. No. 368,960, June 11, 1973, Pat. No. 3,932,616. This application Sept. 22, 1975, Ser. No. 615,739
Claims priority, application United Kingdom, June 26, 1972, 29835/72
Int. Cl.² C07C *11/02*, *11/12*
U.S. Cl. 260—677 R 2 Claims

1. A long chain internal alkene selected from the group consisting of cis-9-docosene, cis-9-tetracosene, 2-methyl-cis-14-tricosene, 2-methyl-cis-15-tetracosene, cis-9-heneicosene, 2-methyl-cis-11-eicosene.

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4,018,845

## HYDROCARBON ISOMERIZATION PROCESS

Richard E. Rausch, Mundelein, Ill., assignor to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 584,438, June 6, 1975, which is a continuation-in-part of Ser. No. 480,793, June 19, 1974, Pat. No. 3,898,154, which is a continuation-in-part of Ser. No. 376,841, July 5, 1973, Pat. No. 3,846,283, which is a continuation-in-part of Ser. No. 201,576, Nov. 23, 1971, Pat. No. 3,745,112, which is a continuation-in-part of Ser. No. 807,910, March 17, 1969, Pat. No. 3,740,328. This application June 7, 1976, Ser. No. 693,661
Int. Cl.² C07C *5/22*, *5/28*
U.S. Cl. 260—683.2 10 Claims

1. A process for isomerizing an olefinic hydrocarbon which comprises contacting said hydrocarbon at isomerization conditions with a catalytic composite comprising a porous alumina carrier containing, on an elemental basis, about 0.01 to about 2 weight percent platinum or palladium, about 0.01 to about 2 weight percent rhodium, about 0.01 to about 5 weight percent tin and about 0.1 to about 10 weight percent halogen, wherein said platinum or palladium, rhodium and tin are uniformly dispersed throughout said alumina carrier, wherein substantially all of said platinum or palladium and rhodium are present in the corresponding elemental metallic states and wherein substantially all of said tin is present in an oxidation state above that of the elemental metal.

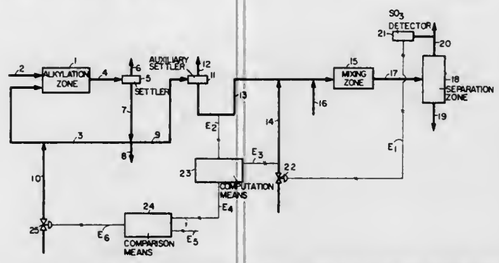
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4,018,846

## METHOD FOR CONTINUOUSLY CONTROLLING THE WATER CONTENT OF SULFURIC ACID ALKYLATION CATALYST

Ivan Mayer, Summit, N.J., assignor to Exxon Research and Engineering Company, Linden, N.J.

Filed Dec. 29, 1975, Ser. No. 645,270
Int. Cl.² C07C *3/54*
U.S. Cl. 260—683.59 7 Claims




1. In an alkylation process wherein an isoparaffin is reacted with olefins in the presence of an acid catalyst to provide an acid catalyst-hydrocarbon mixture to a settling zone wherein a hydrocarbon product is separated from the acid catalyst, a major portion of the acid catalyst from said settling zone is being recycled to the alkylation zone, and wherein fresh acid is being added to said alkylation process, the improvement which comprises continuously controlling the water content of the acid catalyst by continuously controlling the addition rate of fresh acid to said alkylation process, said catalyst comprising sulfuric acid including water according to the steps of:
1. withdrawing a sample of the acid catalyst from said settling zone,
2. intimately contacting said sample with a stream of fuming sulfuric acid in an amount sufficient to ensure substantially complete reaction of the water present in said sample with the $SO_3$ present in said fuming sulfuric acid and thereby forming concentrated acid having substantially no free water present therein;
3. sensing the presence of $SO_3$ evolved in step (2) after said complete reaction of the water present in said sample said sensed presence of $SO_3$;
4. controlling the rate of fuming sulfuric acid addition in step (2) in response to the control signal of step (3) such that said concentrated acid in step (2) is at the point of incipient fuming;
5. sensing the flow rate of the sample being withdrawn in step (1) and the flow rate of said fuming sulfuric acid stream being added in step (2);
6. providing a signal corresponding to the water content of the sample of step (1) in accordance with the sensed flow rate of said sample and the flow rate of said fuming sulfuric acid of step (5);
7. providing a reference signal in a computation means corresponding to a desired water content in said acid catalyst;
8. comparing the signals from steps (6) and (7) to provide a control signal;
9. controlling the addition rate of fresh acid catalyst to said process in accordance with the control signal from step (8) and thereby controlling the water content of the acid catalyst during the alkylation process.

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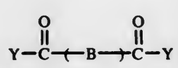
4,018,847

## FLEXIBLE COATING COMPOSITIONS

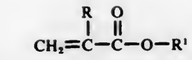
James William Messerly, Stow, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

Filed Oct. 1, 1975, Ser. No. 618,631
Int. Cl.² C08L *63/00*
U.S. Cl. 260—831 12 Claims

1. A composition comprising
A. 100 parts by weight of at least one amine-terminated liquid polymer containing an average from about 1.7 to about 3 amine groups per molecule, said groups being primary, secondary or a mixture thereof, and said polymer having the formula



wherein Y is a univalent radical obtained by removing hydrogen from an amine group of an aliphatic, alicyclic, heterocyclic or aromatic amine containing from 2 to 20 carbon atoms and at least two amine groups, at least two of said amine groups being primary, secondary or a mixture thereof, and B is a polymeric backbone comprising carbon-carbon linkages and containing polymerized units of at least one vinylidene monomer having at least one terminal $CH_2{=}C<$ group, said monomer being selected from the group consisting of (a) monoolefins containing 2 to 14 carbon atoms, (b) dienes containing 4 to 10 carbon atoms, (c) vinyl and allyl esters of carboxylic acids containing 2 to 8 carbon atoms, (d) vinyl and allyl ethers of alkyl radicals containing 1 to 8 carbon atoms, and (e) acrylic acids and acrylates having the formula



said R being hydrogen or an alkyl radical containing 1 to 3 carbon atoms and said $R^1$ being hydrogen, an alkyl radical containing 1 to 18 carbon atoms, or an alkoxyalkyl, alkythioalkyl or cyanoalkyl radical containing 2 to 12 carbon atoms,

B. from about 10 to about 50 parts by weight of at least one non-cycloaliphatic epoxy resin containing at least an average of about 1.7 epoxy groups per molecule, said resin having an epoxy equivalent weight from about 70 to about 6,000, and

C. from about 20 to about 100 parts by weight of at least one phenol-aldehyde resin, said phenolaldehyde resin being a resole or novolac, and said novolac being cured with hexamethylentetramine.

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**4,018,848**

## HIGH SOLIDS CAN COATING COMPOSITIONS BASED ON EPOXY RESIN, CROSSLINKING AGENT, FLEXIBILIZING POLYOL, CO-REACTIVE ACID CATALYST, AND SURFACE MODIFIER

**Ram Tirth Khanna, Linden Heath, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Division of Ser. No. 536,323, Dec. 24, 1974, Pat. No. 3,960,979. This application Mar. 12, 1976, Ser. No. 666,497**

**Int. Cl.² C08L** *63/00*

**U.S. Cl. 260—834** **14 Claims**

1. A high solids coating composition consisting essentially of

A. 30–65 parts by weight, based on the components (A), (B), (C),(D), and (E), of an epoxy resin containing at least two epoxy groups per molecule and having a molecular weight not exceeding 2,500;

B. 10–35 parts by weight, based on components (A), (B), (C), (D), and (E), of a nitrogen resin crosslinking agent;

C. 20–40 parts by weight, based on the components (A), (B), (C), (D), and (E), of a polyol, selected from the group consisting of: polyester polyol and polyether polyol, having a minimun of two hydroxyl groups per molecule, a molecular weight range of 100 to 4000, and a hydroxyl number range of 15 to 560;

D. 0.5–10 parts by weight, based on the components (A), (B), (C), (D), and (E), of at least one acid catalyst capable of co-reacting with and becoming permanently bound to components (A) and/or (C) of said coating composition selection from the group consisting of

E. 0-2 parts by weight, based on the components (A), (B), (C), (D), and (E), of a surface modifier wherein said surace modified is an acrylic polymer containing 0.5–10% by weight, based on the weight of the polymer, of acrylic acid, metacrylic acid or itaconic acid,

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**4,018,849**

## POLYURETHANE POLYOL COMPOSITIONS MODIFIED WITH AN ALKYLENIMINE

**Wen-Hsuan Chang, Gibsonia; Roger L. Scriven, Penn Hills, and Paul J. Prucnal, Monroeville, all of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.**

**Division of Ser. No. 361,015, May 16, 1973, Pat. No. 3,917,570. This application Aug. 7, 1975, Ser. No. 602,856**

**Int. Cl.² C08L** *61/24, 61/28*

**U.S. Cl. 260—849** **11 Claims**

1. A coating composition comprising:

A. the reaction product of:

1. an ungelled, carboxyl-hydroxyl-containing urethane reaction product having an acid value of at least 1, and having an intrinsic viscosity of 1.0 deciliter per gram or less; and

2. an alkylenimine, wherein said alkylenimine was 2 or 3 carbon atoms per alkylenimine ring;

whereby at least about 0.03 percent by weight of acidic groups based on total weight of the urethane reaction product are reacted with the alkylenimine; and

B. an aminoplast resin.

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**4,018,850**

## BLOCK POLYMER, SYNTHETIC LEATHER PREPARED THEREFROM AND A METHOD FOR PREPARING THE SAME

**Shoji Yoshida, Kobe, Japan, assignor to Honny Chemicals Company, Ltd., Kobe, Japan**

**Continuation-in-part of Ser. No. 507,796, Sept. 20, 1974, abandoned, which is a continuation-in-part of Ser. No. 286,908, Sept. 7, 1972, abandoned. This application Jan. 16, 1975, Ser. No. 541,397**

**Int. Cl.² C08L** *75/06, 75/08*

**U.S. Cl. 428—425** **16 Claims**

1. A method for making a block copolymer which comprises mixing together in an organic solvent therefor, a polyglutamic ester having terminal carboxyl and amino groups and a molecular weight of at least about 1550, a reactive hydrogen containing polyether or polyester having a molecular weight of at least about 500, and an organic diisocyanate in proportions which provide from 0.88 to 10 NCO groups per reactive hydrogen atom in the resulting mixture and provide from 10% to 50% by weight based on the weight of block copolymer of polyester or polyether units in the block copolymer and in such a manner that prereaction of the organic diisocyanate with one of the polyglutamic ester and the polyether or polyester to the exclusion of the other is avoided, and heating the solution so formed to achieve reaction between the polyglutamic ester, polyether or polyester and organic diisocyanate.

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**4,018,851**

## CURABLE POLY(ALKYLENE) ETHER POLYOL-BASED GRAFTED RESINS HAVING IMPROVED PROPERTIES

**Louis J. Baccei, Newington, Conn., assignor to Loctite Corporation, Newington, Conn.**

**Filed Mar. 12, 1975, Ser. No. 557,564**

**Int. Cl.² C08L** *75/08*

**U.S. Cl. 260—859 R** **56 Claims**

1. A curable adhesive and sealant composition comprising:

I. a polymerizable product corresponding in structure to a reaction product of:

*a.* a poly(alkylene)ether polyol to which a vinyl radical has been grafted, with either of:

*b.* (*i*) a molar excess of a reaction product of: a molar excess of an aromatic or cycloaliphatic polyisocyanate with a compound selected from the group consisting of an aromatic or cycloaliphatic polyol or polyamine, or (*ii*) a molar excess of an aromatic or cycloaliphatic polyisocyanate,

the product of (*a*) and (*b*)(*i*) or (*a*) and (*b*)(*ii*) subsequently being reacted with at least a molar equivalence of a hydroxyalkyl acrylate, a hydroxyalkyl methacrylate, an aminoalkyl acrylate, or an aminoalkyl methacrylate; and

II. a free radical initiator.

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**4,018,852**

## COMPOSITION WITH TRIALLYL COMPOUNDS AND PROCESS FOR AVOIDING SCORCHING OF ETHYLENE POLYMER COMPOSITION

**Donald Lincoln Schober, Belle Mead, N.J., assignor to Union Carbide Corporation, New York, N.Y.**

**Continuation-in-part of Ser. No. 527,854, Nov. 27, 1974, abandoned. This application Jan. 29, 1976, Ser. No. 653,378**

**Int. Cl.² C08F** *8/06;* **C08J** *3/24*

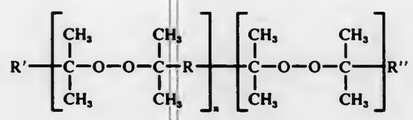
**U.S. Cl. 260—878 R** **65 Claims**

1. A scorch resistant vulcanizable composition comprising, in weight ratio,



100 parts by weight of ethylene polymer,

about 0.1 to 5.0 parts by weight of at least one first peroxide compound which has a decomposition half-life of about 0.5 to 4.5 minutes at 160° to 200° C. and has the structure



wherein

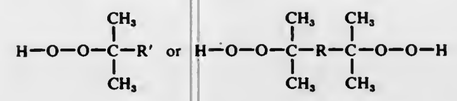
R is a $C_2$ to $C_{12}$ divalent hydrocarbon radical,

R′ and R″ are the same or different $C_1$ to $C_{12}$ monovalent hydrocarbon radicals, and

*n* is a whole number of 0 or 1,

about 0.1 to 2.0 parts by weight of at least one second peroxide which has a decomposition rate which is at least about 20 to 100 times slower than that of said first peroxide compound,

said second peroxide having the structure



and about 0.1 to 5.0 parts by weight of at least one organic compound containing at least three allyl groups.

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**4,018,853**

## CROSSLINKED, HYDROPHILIC RODS OF PYRROLIDONE-METHACRYLATE GRAFT COPOLYMERS

**Albert R. Le Boeuf, Sturbridge, and William R. Grovesteen, West Dudley, both of Mass., assignors to Warner-Lambert Company, Morris Plains, N.J.**

**Division of Ser. No. 526,022, Nov. 21, 1974, Pat. No. 3,978,164. This application Mar. 8, 1976, Ser. No. 664,442**

**Int. Cl.² C08L** *31/02;* **G02B** *5/14*

**U.S. Cl. 260—885** **4 Claims**

1. A cast, substantially strain-free, dimensionally stable, sparingly crosslinked, hydrophilic, substantially cylindrical polymeric rod consisting essentially of polymerized random graft copolymers containing:

1. from about 67.2% to about 79.3% hydroxyethyl methacrylate;

2. from about 14.25% to about 35% poly-N-vinyl pyrrolidone.

3. from about 0.1% to about 4.04% ethylene glycol dimethacrylate;

4. from about 0.1% to about 2.5% methacrylic acid;

5. from about 0.1% to about 5.0% water;

6. from about 0 to about 4.0 ppm, based on the weight of hydroxyethyl methacrylate monomer, of hydroquinone inhibitor; and

7. from about 50 to 250 ppm, based on the weight of hydroxyethyl methacrylate monomer, of the methyl ether of hydroquinone, as an inhibitor;

said polymeric rod having been polymerized in a three stage polymerization process comprising:

a. a first stage, using only a low temperature polymerization inhibitor, with substantially all the oxygen having been removed from the polymerization mix prior to and during the polymerization reaction; the initial polymerization reaction being conducted at from about 23° to about 30° C for from about 16 to about 36 hours, with the heat of the reaction continuously absorbed to control the reaction exotherm; followed by

b. a second stage wherein the product of (a) is heated to a temperature of from about 40° to about 80° C in the absence of any additional polymerization initiator, without control of the reaction exotherm, for from two to six hours; followed by

c. a third stage polymerization, wherein the product of (b) is heated to a temperature of from about 105° to about 125° C, in the absence of any additional polymerization initiator, for from 24 to 36 hours.

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**4,018,854**

## CARBOXYPHOSPHONATES

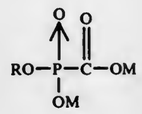
**Colin Leslie McIntosh, Newark, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Division of Ser. No. 474,537, May 30, 1974, abandoned, which is a continuation-in-part of Ser. No. 381,619, July 23, 1973, abandoned. This application June 25, 1975, Ser. No. 590,374**

**Int. Cl.² C07C** *9/32;* **A01N** *9/36*

**U.S. Cl. 260—941** **2 Claims**

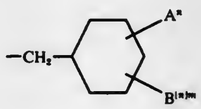
1. A compound of the formula:



wherein

M is sodium, lithium, potassium, calcium, magnesium, or barium

R is alkyl of 1 to 8 carbons, optionally substituted with a chlorine, a bromine, a fluorine, or an iodine atom; alkenyl of 3 to 8 carbon atoms, or



where

A is chlorine or methyl,

B is chlorine or methyl,

*n* is 0 or 1,

*m* is 0 or 1.

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**4,018,855**

## VULCANIZATION INHIBITING COMPOUNDS

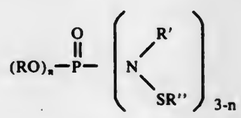
**Robert J. Arnold, Evanston, and Marion J. Gattuso, Hoffman Estates, both of Ill., assignors to UOP Inc., Des Plaines, Ill.**

**Continuation-in-part of Ser. No. 533,573, Dec. 17, 1974, abandoned. This application Dec. 15, 1975, Ser. No. 641,121**

**Int. Cl.² C07F** *9/24*

**U.S. Cl. 260—947** **6 Claims**

1. A compound having the generic formula:



in which R is an alkyl radical of from 1 to 6 carbon atoms, R′ and R″ are phenyl or cycloalkyl radicals containing from 4 to about 8 carbon atoms and *n* is an integer of from 1 to 2.

**4,018,856**

## FUEL INCREASE SYSTEM FOR ENGINE

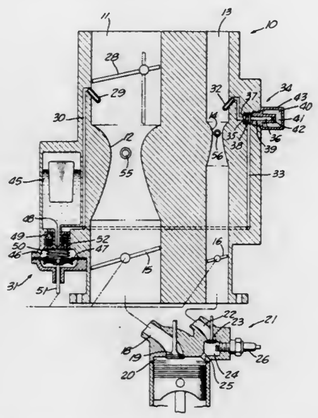
**Genjiro Hamakawa, Tokorozawa, and Kenji Naito, Kawasaki, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Sept. 10, 1975, Ser. No. 612,228**

**Claims priority, application Japan, Sept. 13, 1974, 49-105828**

**Int. Cl.² F02M *7/08***

**U.S. Cl. 261—23 A** **6 Claims**



1. For use with an internal combustion engine having an auxiliary combustion chamber in communication with each main combustion chamber, respectively, and having a main carburetor intake passage for supplying a lean mixture to each main combustion chamber and an auxiliary carburetor intake passage for supplying a rich mixture to each auxiliary combustion chamber, the improvement comprising, in combination: an acceleration pump, acceleration nozzles, one opening into each carburetor intake passage, respectively, passageways connecting the pump to each nozzle, a control valve in the passageway connecting the pump to the nozzle in the auxiliary carburetor intake passage, the other passageway being open and unrestricted, and means for opening said control valve when the ambient temperature is low and for closing said control valve when the ambient temperature is high.

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**4,018,857**

## METHOD AND A DEVICE FOR THE PRODUCTION OF CERAMIC MOULDINGS, AND MORE ESPECIALLY OF MAGNETIZED FERRITE MOULDINGS

**Rolf Schubart, Kochel am See, Germany, assignor to Dorst-Keramikmaschinen-Bau Inh. Otto Dorst u. Dipl.-Ing. Walter Schlegel, Kochel am See, Germany**

**Division of Ser. No. 472,680, May 23, 1974, Pat. No. 3,958,908. This application Sept. 24, 1975, Ser. No. 616,325**

**Int. Cl.² B28B *1/26***

**U.S. Cl. 264—24** **4 Claims**

1. A method for producing ceramic mouldings from a source of mouldable composition suspended in a liquid, comprising the steps of:

providing a first cavity having a liquid permeable wall;

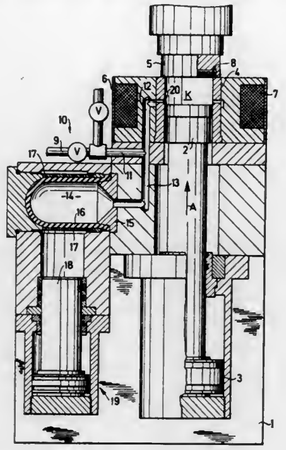
providing a second cavity interconnected with said first cavity by a duct;

filling, simultaneously said first cavity and said second cavity from said source of molding composition through said duct at a pressure sufficient merely to fill said cavities;

isolating said first and second cavities from said source;

decreasing the volume of said second cavity to force said molding composition in said second cavity through said duct to thereby increase the pressure of said molding composition in said first cavity such that a portion of the liquid of said composition is discharged through said permeable wall;

decreasing the volume of said first cavity to reduce the



contents thereof to a shaped object of a predetermined density and liquid content; and

isolating said second cavity from said first cavity as the decrease in volume of said first cavity is initiated.

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**4,018,858**

## METHOD OF MANUFACTURING REFRACTORY ARTICLES

**Ian Richard Walters, Huddersfield, and Harold Garton Emblem, Mirfield, both of England, assignors to Zirconal Processes Limited, Bromley, England**

**Filed Mar. 24, 1975, Ser. No. 561,245**

**Claims priority, application United Kingdom, Mar. 28, 1974, 13834/74; Aug. 13, 1974, 35610/74**

**Int. Cl.² C04B *35/04*, *35/48***

**U.S. Cl. 106—57** **7 Claims**

1. A method of manufacturing refractory articles comprising the steps of:

a. preparing a gellable, liquid binder for a refractory powder by mixing an aqueous solution of a zirconium salt and a dispersion of calcined magnesia powder in a mixture of from 20 to 90% water and from 80 to 10% of a polyhydric alcohol;

b. mixing a refractory powder with the liquid binder to form a liquid, flowable slurry thereof, the amounts of zirconium salt, magnesium powder and refractory powder being such that the slurry will set to a coherent state upon standing;

c. pouring the slurry while liquid and flowable into a mold;

d. allowing the slurry in the mold to set to form a coherent green shape; and

e. removing the green shape from the mold, drying the green shape, and firing the dried green shape to form a sintered refractory mass.

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**4,018,859**

## ARRANGEMENT FOR AERATING OF LIQUIDS

**Hans Müller, Alte Landstr. 415, 8707 Mannendorf, Switzerland**

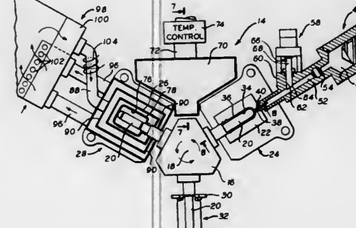
**Continuation of Ser. No. 419,726, Nov. 28, 1973, abandoned. This application Sept. 15, 1975, Ser. No. 613,305**

**Claims priority, application Germany, Dec. 1, 1972, 017630; Switzerland, June 8, 1973, 008428/73**

**Int. Cl.² B01F *3/04***

**U.S. Cl. 261—87** **13 Claims**

1. In an arrangement for aerating fluids, a combination comprising a vessel for a fluid; centrifugal aerating means, including a hollow substantially disc-shaped rotor having two axially-spaced end walls mounted for rotation in said vessel and having a hub, a periphery of said rotor being formed with a plurality of outlet openings communicating with the interior of said rotor, said rotor and hub bounding a Venturi-shaped passage of hourglass configuration having an inlet opening formed in an axial end of said rotor which communicates with said interior having an upstream converging portion, a downstream diverging portion, and a throat portion intermediate said upstream and downstream portions and having a transverse section of cross-sectional area smaller than any cross-sectional area of said upstream and downstream portions; a first and a second set of elongated blades, each set being mounted on a respective end wall and extending generally in direction radially outwardly of said rotor; means for mounting



said first set in surface contact with said second set so that respective ones of said blades of said first set are in sliding abutting engagement with and at least partially overlap respective ones of said blades of said second set in axial direction of said rotor; passage means extending in part through said hub and communicating said interior with a source of gas; said passage means having one open end in communication with a source of gas, and another open end at said transverse section of said throat portion for admitting the gas directly into the fluid flowing through said passage so as to obtain a thorough intermixing of the fluid and the gas; and means for generating a suction Venturi-type effect by rotating said rotor in said vessel so that centrifugally created suction will aspirate fluid through said inlet opening and gas through said passage means into said interior, wherein the gas and fluid become mixed prior to centrifugal ejection of the thus-aerated fluid through said outlet openings.

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**4,018,860**

## INJECTION BLOW MOLDING WITH IMPROVED COOLING

**John J. Farrell, Greenbrook, N.J., assignor to Farrell Patent Company, Greenbrook, N.J.**

**Division of Ser. No. 433,578, Jan. 15, 1974, Pat. No. 3,930,779. This application July 7, 1975, Ser. No. 593,207**

**Int. Cl.² B29C *17/07***

**U.S. Cl. 264—39** **19 Claims**



1. A method of blow molding a plastic parison comprising blowing the parison to form a blown article, cooling a blow mold to cool the article blown in the blow mold, opening the blow mold to remove the article therefrom, and preventing sweating of the confronting cooled surfaces of the blow mold sections that move toward and away from one another by circulating dry air around the space between the open sections of the mold, said air having a dew point lower than the temperature of the confronting surfaces of the blow mold sections including the surface of the wall forming the blow mold cavity, characterized by projecting the dried air as a curtain surrounding the periphery of the mold sections to prevent any air, except air from the curtain, from entering the space between the mold sections during opening of the mold and while the mold is open, wherein said curtain is formed as a continuous curtain around the entire periphery of the space between the blow mold sections and is transversely disposed to the blow mold sections.

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**4,018,861**

## METHOD FOR PREPARING CONSUMABLE ELECTROSLAG GUIDE NOZZLE

**Stanton F. Bierwith, San Leandro, Calif., assignor to Great Canadian Oil Sands Limited, Toronto, Canada**

**Division of Ser. No. 239,072, March 29, 1972, Pat. No. 3,761,674. This application Apr. 13, 1973, Ser. No. 350,864**

**Int. Cl.² B29G *1/00***

**U.S. Cl. 264—61** **4 Claims**



1. A method for preparing consumable guide nozzles for use in electroslag welding comprising:

a. blending together fine metal particles and a liquid heat hardening adhesive;

b. coating the outer surface of a hollow metal guide tube open at both ends with a quantity of said blend at least equal in weight to the weight of the guide tube;

c. compressing said coated guide tube;

d. heating said compressed coated guide tube until said adhesive hardens, and

e. recovering a consumable guide nozzle suitable for use in electroslag welding comprising a hollow metal guide tube having a coating of fine metal particles adhered to the outer surface thereof.

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**4,018,862**

## METHOD FOR PRODUCING NON-WOVEN FABRIC

**Satoru Saito, Nagaokakyo, Japan, assignor to Dynic Corporation, Kyoto, Japan**

**Filed Oct. 4, 1974, Ser. No. 512,293**

**Claims priority, application Japan, Oct. 6, 1973, 48-111949**

**Int. Cl.² B29G *5/00***

**U.S. Cl. 264—137** **5 Claims**

1. A method of making a bulky non-woven fabric, comprising:

a. Prewetting with water a web comprising:

i. a hydrophilic non-shrinkable fiber, 100 parts by weight, and

ii. a fiber which is heat shrinkable when wet, 10 to 50 parts by weight;

b. applying to portions of said wet web or in a pattern thereon, a curable binder in a liquid or pasty condition;

c. heating and shrinking said wet web while maintaining said binder in an uncured state to give a bulky non-woven fabric; and

d. drying said wet web to cure said binder, resulting in a finished bulky non-woven fabric.

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**4,018,863**

**PROCESS FOR FLANGING POLYTETRAFLUOROETHYLENE PIPES**

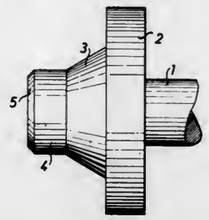
**Ernst Schneiders, Erftstadt Kierdorf, and Wilhelm Klocker, Bruhl, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany**

**Filed Sept. 30, 1974, Ser. No. 510,465**

**Claims priority, application Germany, Oct. 4, 1973, 2349818**

**Int. Cl.² B29C *27/16*; B29D *3/00***

**U.S. Cl. 264—249** **7 Claims**




1. In a process for flanging a pipe consisting of a thermoformable plastic material, wherein said pipe is placed in a metal conduit having a diameter slightly larger than the diameter of said pipe and terminating at one end thereof in a solid flange which is rigidly secured thereto, and wherein said pipe is so placed in said conduit that one end extends outwardly from the solid flange, and wherein an expandable supporting mandrel is positioned within said pipe which is expandable from the outside so as to bring said pipe into close contact with said conduit around it, and wherein the one end of said pipe extending outwardly from the solid flange of said conduit is at first cone-shaped flared and thereafter formed to a flange and the resulting flange is chilled by spraying a coolant thereonto, the improvement according to which the thermoformable plastic material consists of polytetrafluoroethylene (PTFE); a first metal implement is heated to temperatures within the range of about 180° to 210° C prior to flaring the end of said pipe; the end of said pipe and the first implement being forced against each other for flaring the end of said pipe under an area pressure within the range 5 to 20 kg/cm²and under a uniform sliding movement of the end of said pipe and the first implement, relatively to each other, within the range 5 to 15 rpm; and the end of said pipe being flared in a first step within the range of about 0.5 to 3 minutes; a second metal implement is heated to temperatures within the range of about 180° to 210° C prior to forming of a flange on the flared end of said pipe; the flared end of said pipe and the second implement being forced against each other for forming the end of said pipe to a flange under an area pressure within the range 5 to 20 kg/cm² and under a uniform sliding movement of the end of said pipe and the second implement, relative to each other, within the range 5 to 15 rpm; and the flared end of said pipe being formed to a flange in a second step within the range of about 1 to 3 minutes whereby a PTFE pipe is flanged while maintaining the pipe below a temperature at which toxic gases are released.

**4,018,864**

**METHOD FOR MAKING FUSED REFRACTORY PRODUCTS**

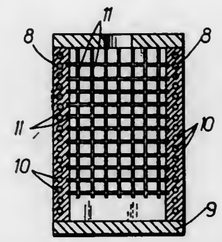
**Bernard Minssen, Avignon, and Georges Parigot, Le Pontet, both of France, assignors to L'Electro-Refractaire, France**

**Division of Ser. No. 83,706, Oct. 26, 1970, abandoned. This application Oct. 25, 1972, Ser. No. 300,493**

**Claims priority, application France, Oct. 27, 1969, 69.36769**

**Int. Cl.² B28B *1/14*; B29C *5/00***

**U.S. Cl. 264—299** **5 Claims**




1. In a process for casting molten oxide-based refractory materials in a mold, the step of preventing the formation of casting side voids during said casting by holding solidified crusts formed on the inner surfaces of the side walls of the mold against said inner surfaces through the use of a mold having a plurality of discontinuities provided on the inner surfaces of its walls, said discontinuities each having a width of about 0.5 to 1.0 millimeters and being laterally spaced about 5 to 80 millimeters from discontinuities extending in the same general direction.

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**4,018,865**

**SOLVENT-EXTRACTION PROCESS FOR RECOVERY AND SEPARATION OF METAL VALUES**

**Lawrence V. Gallacher, East Norwalk, Conn., assignor to King Industries, Inc., Norwalk, Conn.**

**Filed Mar. 29, 1976, Ser. No. 671,346**

**Int. Cl.² B01D *15/04*; C22B *15/00, 23/04, 19/26***

**U.S. Cl. 423—24** **28 Claims**

1. A process for recovering a first metal value from an aqueous solution comprising a pair of said first metal value and a second metal value, said pair being selected from the group consisting of copper and iron, nickel and iron, nickel and cobalt, copper and cobalt, copper and nickel, copper and zinc, zinc and nickel, nickel and zinc, zinc and iron, and cobalt and zinc, said process comprising contacting said aqueous solution at a pH of below about 3 with a solvent-extractant consisting of (i) an aliphatic α-hydroxy oxime, (ii) an alkylaromatic sulfonic acid having a molecular weight of at least about 400 and (ii) a water-immiscible solvent for (i) and (ii) and metal complexes thereof to provide a solution of said first metal value in said solvent-extractant, the mole % of (ii) in the combined (i) and (ii) being in the range of 10 to 80; separating the solution thus formed from the aqueous raffinate depleted in said first metal value; and recovering said first metal value from said separated solution.



**4,018,866**

**METAL CARBONATE RECYCLE TO REDUCTION CIRCUIT IN THE CUPRION PROCESS**

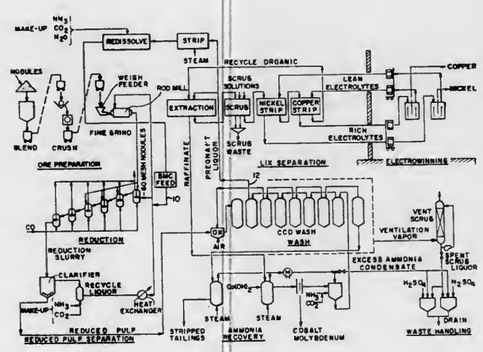
**Lester J. Szabo, Prince Edward Island, Canada, assignor to Kennecott Copper Corporation, New York, N.Y.**

**Continuation of Ser. No. 475,991, June 3, 1974, abandoned, and a continuation-in-part of Ser. No. 311,063, Dec. 1, 1972, abandoned. This application Nov. 3, 1975, Ser. No. 628,354**

**The portion of the term of this patent subsequent to Sept. 28, 1993, has been disclaimed.**

**Int. Cl.² C01G *3/14, 51/12, 53/12***

**U.S. Cl. 423—32** **6 Claims**




2. In a process in which metal values selected from the group consisting of copper, nickel, cobalt and molybdenum are recovered from a manganese containing ore by introducing the ore into a reduction reaction vessel in which the ore is reduced, said reduction reaction vessel containing an aqueous ammoniacal ammonium carbonate leach solution of cuprous ions to allow the cuprous ions to reduce the manganese oxides in the ore to enable the metal values to be solubilized in the aqueous ammoniacal ammonium carbonate leach solution and in which cuprous ions are continuously regenerated in the leach solution by a reducing gas wherein the improvement comprises leaching metal values from said manganese containing ore with said leach solution, recovering a portion of the metal values solubilized in the leach solution, after the solubilized metal values leave the reduction reaction vessel, as a mixed metal carbonate precipitate and recycling a sufficient amount of the mixed metal carbonate back to the reduction reaction vessel so as to maintain the soluble copper content of the reduction reaction vessel at a level of at least 10 grams per liter.

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**4,018,867**

**PROCESS FOR THE DISPOSAL OF ALUMINUM CONTAINING WASTE MATERIALS**

**Thomas E. Lee, Baton Rouge, La., assignor to Ethyl Corporation, Richmond, Va.**

**Continuation-in-part of Ser. No. 554,601, March 3, 1975, abandoned. This application June 30, 1975, Ser. No. 591,526**

**Int. Cl.² C01F *7/00***

**U.S. Cl. 423—115** **25 Claims**

1. A process for the disposal of an aluminum containing waste material having high reactivity with water and having an aluminum compound of the formula

$R^1R^2R^3Al$

wherein each of $R^1$, $R^2$ and $R^3$ is a hydrocarbyl radical, a hydrocarbyloxy radical, hydrogen or halogen, at least one of $R^1$, $R^2$ and $R^3$ being a hydrocarbyl radical, which process comprises reacting said compound under substantially anhydrous conditions with an anhydrous hydrolysis agent which is a hydroxide or carbonate of a Group II-A element.

13. A process for the disposal of a mixed system waste material containing an aluminum compound having the formula $R^1R^2R^3Al$ and a compound $R_nM$, wherein each of $R^1$, $R^2$, $R^3$ and $R_n$ is a hydrocarbyl radical, a hydrocarbyloxy radical, hydrogen or halogen, at least one of $R^1$, $R^2$ and $R^3$ being a hydrocarbyl radical, M is a Group IV-B, V-B, VI-B, VII-B or VIII element and $n$ is an integer equal to the valence of M, which process comprises, reacting said system under substantially anhydrous conditions with an anhydrous hydrolysis agent which is a hydroxide or carbonate of a Group II-A element.

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**4,018,868**

**THERMAL CRUSHING OF ALKALI COMPOUNDS IN THE REMOVAL OF SULFUR DIOXIDES FROM A FLUE GAS**

**John H. Knight, Aurora, Colo., assignor to The Superior Oil Company, Houston, Tex.**

**Filed Mar. 19, 1975, Ser. No. 559,930**

**Int. Cl.² B01J *8/00*; C01B *17/00***

**U.S. Cl. 423—244** **9 Claims**

1. A method of reducing the sulfur dioxide content of a flue gas which comprises:

a. introducing particulate nahcolite into a first zone heated to a temperature of from about 2,000° to about 4,000° F to produce thermally crushed nahcolite of a predominant particle size within the range of from about 0.1 to about 100 microns and a mean particle size of 1–20 microns;

b. transporting said thermally crushed nahcolite to a second zone containing a flue gas having sulfur dioxide impurities, said flue gas being at a temperature up to 1,500° F;

c. allowing said thermally crushed nahcolite and flue gas to remain in contact for a period of time sufficient to allow said thermally crushed nahcolite to combine with the sulfur dioxide impurities in said flue gas; and

d. removing from said flue gas said thermally crushed nahcolite containing combined sulfur dioxide.

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**4,018,869**

**PROCESS FOR THE EXTRACTIVE PURIFICATION OF PHOSPHORIC ACID CONTAINING CATIONIC IMPURITIES**

**Klaus Beltz, Budenheim (Rhine); Klaus Frankenfeld, Kirberg, Taunus, and Karl Gotzmann, Budenheim (Rhine), all of Germany, assignors to Chemische Fabrik Budenheim Rudolf A. Oetker, Budenheim (Rhine), Germany**

**Continuation of Ser. No. 367,319, June 6, 1973, abandoned. This application May 8, 1975, Ser. No. 575,639**

**Int. Cl.² C01B *25/16***

**U.S. Cl. 423—321 S** **5 Claims**

1. A process for purifying an aqueous phosphoric acid containing cationic impurities using extraction techniques which comprises:

a. adding to said aqueous phosphoric acid an organic solvent miscible in all proportions with phosphoric acid and water selected from the group consisting of an aliphatic alcohol and ketone, the weight ratio of said organic solvent to the weight ratio of $P_2O_5$ in said aqueous phosphoric acid being in the range of from 1:1 to 20:1

b. removing any solids residue;

c. countercurrently contacting the resulting mixture of step (a) with a concentrated solution of an inorganic multivalent cationic salt selected from the group consisting of aluminum, calcium, magnesium and zinc cationic salts, said inorganic multivalent cationic salt being soluble in water and not tending to form insoluble precipitates during such introduction, the volumetric ratio of said concentrated solution to the volume of said mixture being in the range of from 10:1 to 1:250 thereby forming a liquid aqueous inorganic salt phase including said cationic impurities and a liquid phosphoric acid-organic solvent phase;

d. separating said organic solvent phase from said inorganic salt phase;

e. repeating steps (c) and (d); and

f. recovering phosphoric acid from the organic solvent phase by distillation.

## 4,018,870
## PREPARATION OF SYNTHETIC ZEOLITE MOLECULAR SIEVES

**Thomas Vincent Whittam, Stockton-on-Tees, England, assignor to Imperial Chemical Industries Limited, London, England**

**Filed Jan. 27, 1975, Ser. No. 544,671**
**Claims priority, application United Kingdom, Jan. 30, 1974, 4274/74**
**Int. Cl.² C01B** *33/28*
**U.S. Cl. 423—329** **8 Claims**

1. In a process for the manufacture of synthetic zeolites, comprising crystallizing the zeolite from a reaction mixture, the improvement comprising altering the reaction mixture by the addition thereto of an additive selected from the group consisting of crystal violet, methyl violet, nuclear fast red, methylene blue, toluidene blue, malachite green, magenta, acriflavine, and mixtures, salts and esters thereof.

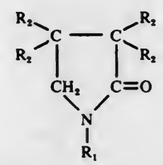
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## 4,018,871
## DISMUTATION OF TRICHLOROSILANE

**Gilbert Marin, Sante-Foy-Les-Lyon, and Marcel Lefort, Caluire, both of France, assignors to Rhone-Poulenc Industries, Paris, France**

**Filed Nov. 4, 1975, Ser. No. 628,667**
**Claims priority, application France, Nov. 7, 1974, 74.36960**
**Int. Cl.² C01B** *33/08*
**U.S. Cl. 423—342** **5 Claims**

1. In a process for the preparation of dichlorosilane by treating trichlorosilane in the presence of a catalyst, the improvement wherein an α-pyrrolidone of the formula:



in which $R_1$ represents a straight or branched alkyl or alkenyl radical having at most 6 carbon atoms, a cyclohexyl radical or a phenyl radical and each $R_2$ radical, which may be identical or different, represents a hydrogen atom or a methyl radical is used as the catalyst in an amount of from 1 to 50% by weight based on the weight of the trichlorosilane and wherein the treating is carried out at a temperature of from 30° C to 120° C.

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## 4,018,872
## PROCESS FOR THE PRODUCTION OF CONCENTRATED NITRIC ACID

**Diego Barba; Fabrizio Battistoni; Candido D'Agostini, and Giorgio Macchi, all of Rome, Italy, assignors to Societa' Italiana Resine S.I.R. S.p.A., Milan, Italy**

**Filed Dec. 9, 1975, Ser. No. 639,192**
**Claims priority, application Italy, Dec. 20, 1974, 30824/74**
**Int. Cl.² C01B** *21/40*
**U.S. Cl. 423—394** **9 Claims**

1. A method for the preparation of nitric acid having a concentration of at least 98 wt.% from nitrogen peroxide obtained by catalytic oxidation of ammonia, separation of nitrogen oxide from the resulting gaseous flow and transformation of said nitrogen oxide into nitrogen peroxide, wherein said peroxide is chemically absorbed in diluted nitric acid to produce superazeotropic acid and wherein said superazeotropic acid is distilled, which comprises:

a. bringing into contact a gaseous flow containing said nitrogen peroxide, free or substantially free from water and nitrogen oxide, with nitric acid having a concentration of from 80 to 98 wt.% thus to form a solution of said peroxide in said acid;

b. bringing into contact nitric acid having a concentration of from 68 to 75 wt.% in a first stage of chemical absorption, with the gaseous products containing nitrogen peroxide and oxygen coming from a second stage of chemical absorption, thus to produce nitric acid having an increased concentration of from 70 to 80 wt.%, according to the equations

$$3\ NO_2 + H_2O \leftrightarrows 2\ HNO_3 + NO$$

$$2\ NO + O_2 \rightarrow 2\ NO_2$$

c. bringing into contact the liquid products discharged from said stage (b) in said second stage of chemical absorption with air and liquid peroxide, thus to produce superazeotropic nitric acid having a concentration of up to 90 wt.%, according to the equation:

$$2\ N_2O_4 + 2\ H_2O + O_2 + 4\ N_2 \leftrightarrows 4\ HNO_3 + 4\ N_2$$

d. delivering said solution of peroxide in nitric acid discharged from (a) and the liquid products discharged from (c) at intermediate level of a distillation column; recovering gaseous peroxide at the top of said column, liquefying the latter and recycling a part of said liquefied peroxide as reflux to the column, the remaining part being delivered to said second stage of (c); extracting nitric acid having a concentration of at least 98 wt.% at an intermediate level of the column, but above the feeding level of said solution of (a) and liquid products of (c); extracting a first flow of nitric acid having a concentration of from 80 to 98 wt.% and a second flow of nitric acid having a concentration of from 68 to 80 wt.% from the column and delivering the latter to stage (a) and to stage (b), respectively.

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## 4,018,873
## PROCESSES FOR THE PREPARATION OF CONCENTRATED NITRIC ACID

**Diego Barba; Fabrizio Battistoni; Candido D'Agostini, and Giorgio Macchi, all of Rome, Italy, assignors to Societa' Italiana Resine S.I.R. S.p.A., Milan, Italy**

**Filed Dec. 9, 1975, Ser. No. 639,194**
**Claims priority, application Italy, Dec. 20, 1974, 30823/74**
**Int. Cl.² C01B** *21/40*
**U.S. Cl. 423—394** **7 Claims**

1. A method for the preparation of nitric acid having a concentration of at least 98 wt.% from nitrogen peroxide obtained by catalytic oxidation of ammonia, separation of nitrogen oxide from the resulting gaseous flow and transformation of said nitrogen oxide into nitrogen peroxide, wherein said peroxide is chemically absorbed in nitric acid to produce superazeotropic acid and wherein said superazeotropic acid is distilled, which comprises:

a. bringing into contact a gaseous flow containing said nitrogen peroxide with nitric acid having a concentration of at least 80 wt.%, thus obtaining a solution of said peroxide in said acid; heating said solution so as to remove gaseous peroxide and liquefying said gaseous peroxide by cooling;

b. bringing into contact superazeotropic nitric acid and water or a weak aqueous solution of nitric acid in a first chemical absorption stage to provide an overall nitric acid concentration of 68 to 75%, with the gaseous products containing nitrogen peroxide and oxygen coming from a second chemical absorption stage, to produce nitric acid having an increased concentration of from 70 to 80 wt.%, according to the equations:

$$3\ NO_2 + H_2O \leftrightarrows 2\ HNO_3 + NO$$

$$2\ NO + O_2 \leftrightarrows 2\ NO_2$$

c. bringing into contact the liquid products discharged from stage (b) in said second chemical absorption stage, with air and with a fraction of said liquefied peroxide of stage (a) to produce superazeotropic nitric acid having a concentration up to 90 wt.%, according to the equation:

$$2\ N_2O_4 + 2\ H_2) + O_2 + 4\ N_2 \leftrightarrows 4\ HNO_3 + 4\ N_2$$

d. delivering the remaining fraction of said liquefied peroxide of stage (a) to a distillation column at a point near to the top, and delivering said superazoetropic acid discharged from stage (c) to said distillation column at an intermediate point between the top and the bottom; extracting a lateral flow of nitric acid having a concentration of at least 98 wt.% at an intermediate point between said point of introduction of liquefied peroxide and said point of introduction of superazeotropic acid, extracting superazeotropic nitric acid from said distillation column and recycling the latter to said absorption stage (b), while discharging gaseous peroxide at the top and combining the latter with said gaseous peroxide of stage (a) so as to liquefy it together with the latter.

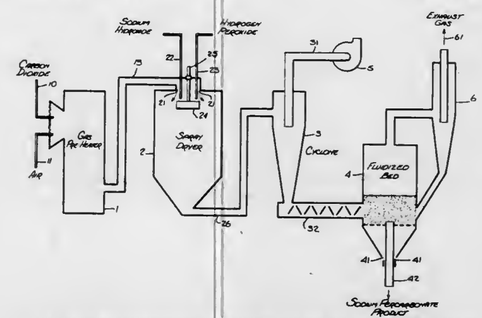


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## 4,018,874
## PROCESS FOR THE PRODUCTION OF SODIUM PERCARBONATE BY ATOMIZATION

**Paul Mollard, Sainte Foy Les Lyon, France, assignor to Produits Chimiques Ugine Kuhlmann, Paris, France**

**Filed Aug. 15, 1974, Ser. No. 497,537**
**Claims priority, application France, Aug. 28, 1973, 73.31041**
**Int. Cl.² C01B** *15/10*
**U.S. Cl. 423—415 P** **10 Claims**




1. A process for the production of alkali metal percarbonates which comprises concurrently spraying separate aqueous solutions of sodium or potassium hydroxide and hydrogen peroxide into a reaction vessel and simultaneously introducing into the vessel a hot gas containing air and carbon dioxide to form particles, respectively, of sodium or potassium percarbonate, and recovering the particles.

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## 4,018,875
## AMMONIUM OXALATE PROCESS

**Robert Kenneth Jordan, The Carlton House, Suite 1431, 550 Grant St., Pittsburgh, Pa. 15219**

**Filed Mar. 4, 1975, Ser. No. 555,151**
**Int. Cl.² C07C** *55/06;* **C01F** *5/24;* **C01B** *31/24*
**U.S. Cl. 423—419 R** **5 Claims**

1. A process for the production of ammonium oxalate and metal carbonates which are stable under the conditions of the process comprising reacting a metal oxalate with an adduct of carbon dioxide with ammonia or aqueous ammonium hydroxide in a liquid media selected from water, ammonia, methanol, acetone or mixtures thereof at temperatures in the range of −50° C to 300° C under conditions sufficient to retain the liquid media in the liquid state. To form an ammonium oxalate and the corresponding metal carbonate.

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## 4,018,876
## PROCESS FOR THE PRODUCTION OF METAL OXALATES AND SODA ASH

**Robert Kenneth Jordan, The Carlton House, Suite 1431, 550 Grant St., Pittsburgh, Pa. 15219**

**Filed Mar. 4, 1975, Ser. No. 555,189**
**Int. Cl.² C07C** *55/06;* **C01B** *31/24*
**U.S. Cl. 423—421** **3 Claims**

1. A process for the production of alkali metal carbonates and metal oxalates wherein the metal is other than an alkali metal, which comprises reacting an alkali metal oxalate with a metal carbonate in a liquid media selected from water, methanol, water-methanol mixtures and water acetone mixtures, at a temperature in the range of −30° C to 300° C under conditions sufficient to maintain said liquid media in the liquid state to produce alkali metal carbonate and metal oxalate.

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## 4,018,877
## PRODUCTION OF CALCIUM CARBONATE

**Richard Derek Anthony Woode, Runcorn, England, assignor to Imperial Chemical Industries Limited, London, England**

**Filed Feb. 10, 1975, Ser. No. 548,807**
**Claims priority, application United Kingdom, Feb. 14, 1974, 6686/74**
**Int. Cl.² C01F** *11/18*
**U.S. Cl. 423—432** **9 Claims**

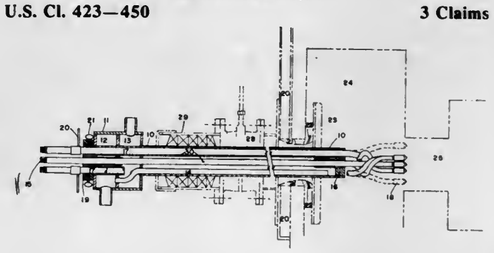
1. In a process for the manufacture of calcium carbonate by carbonating an aqueous suspension of calcium hydroxide to produce calcium carbonate and separating the thus formed calcium carbonate, the improvement which comprises adding to the suspension, subsequently to a calcium carbonate primary nucleation stage of the carbonation step and before completion of the carbonation step, a complex-forming agent for calcium ions.

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## 4,018,878
## PROCESS FOR PRODUCING CARBON BLACK

**Richard H. Reynolds, Westerville, Ohio, assignor to Ashland Oil, Inc., Ashland, Ky.**

**Filed Dec. 29, 1975, Ser. No. 644,546**
**Int. Cl.² C09C** *1/50*
**U.S. Cl. 423—450** **3 Claims**



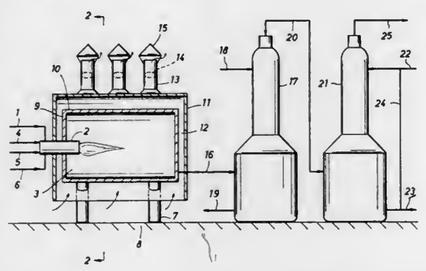
1. In the furnace process for the production of high tint, tread-grade rubber reinforcing carbon black wherein a fuel gas is essentially completely combusted in tubular chamber having a diameter substantially larger than length thereof and whereupon the resultant combustion gases enveloping a centrally confined spray of a normally liquid hydrocarbon feedstock are introduced into a tubular reaction zone to effect therein the thermal decomposition of the feedstock into carbon black under highly turbulent flow conditions, said tubular reaction zone being centrally aligned with said chamber and in open communication therewith and having a diameter substantially smaller than that of the chamber; the improvement comprising introducing a plurality of laterally disposed individual sprays of the feedstock into said reaction zone whereby the situs of injection are contiguous to said communicating opening of the reaction zone.

4,018,879

## COMBUSTION OF HALOGENATED HYDROCARBON

Denis F. Winnen, Rotterdam, Netherlands, assignor to Shell Oil Company, Houstn, Tex.

Division of Ser. No. 467,532, May 6, 1974, Pat. No. 3,984,206.
This application June 21, 1976, Ser. No. 698,395
Claims priority, application United Kingdom, May 4, 1973, 21309/73
Int. Cl.² C01B 7/00
U.S. Cl. 423—481 6 Claims



1. In the process for the combustion of halogenated organic materials wherein such materials are combusted at a temperature of at least 600° C in a metal-cased refractory-lined furnace, the combustion gases formed are cooled and at least one acid constituent thereof removed by contact with an aqueous liquid, an aqueous acid solution is recovered and cooled acid-free gases are discharged to the atmosphere, the improvement which comprises flowing air through an air jacket formed by the metal casing of the furnace and a cover surrounding the furnace with the air entering the air jacket through at least one air inlet on the bottom of said cover and exiting the top of the air jacket through at least one stack on the top of said cover, the distance between the metal casing of the furnace and said cover and the number and size of the inlets and stacks being such that the temperature of the metal casing of the furnace is maintained by the flow of air between about 140° and about 375° C.

4,018,880

## METHOD OF PURIFYING HYDROGEN CHLORIDE GAS

Yves Correia, Saint-Auban, and Jean Lesparre, Volonne, both of France, assignors to Rhone-Progil, Courbevoie, France

Filed Nov. 25, 1974, Ser. No. 526,747
Claims priority, application France, Nov. 27, 1973, 73.42141
Int. Cl.² C01B 7/08
U.S. Cl. 423—488 7 Claims

1. A method of purifying hydrogen chloride gas containing small quantities of free chlorine, without removal of hydrogen chloride, consisting essentially of adding at least one olefin to the impure hydrogen chloride in an amount to provide a molar ratio of olefin to free chlorine within the range of 10-1 moles of olefin to 1 mole of free chlorine, and passing the mixture in a gaseous state over activated carbon at a temperature within the range of 30° to 200° C.

4,018,881

## HIGH SURFACE AREA ALUMINA AND METHOD FOR THE PREPARATION THEREOF

William J. Mattox, Baton Rouge, La., assignor to Exxon Research and Engineering Company, Linden, N.J.

Division of Ser. No. 163,045, July 15, 1971, abandoned. This application Jan. 15, 1975, Ser. No. 541,278
Int. Cl.² C01F 7/02
U.S. Cl. 423—631 5 Claims

1. Process for preparing high surface area aluminas comprising reacting substantially anhydrous aluminum chloride with ammonia at temperatures ranging from about 100° to about 900° F. to form an aluminum chloride-ammonia complex comprising aluminum chloride polyammoniates having a composition corresponding to 3–6 moles $NH_3$/mole $AlCl_3$, and hydrolyzing said polyammoniates to obtain high surface area alumina.

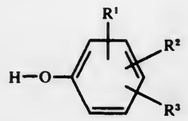
4,018,882

## MANUFACTURE OF GAMMA-IRON (III) OXIDE

Eberhard Koester, Frankenthal; Gerd Wunsch, Speyer; Eduard Schoenafinger, Ludwigshafen; Hans Henning Schneehage, Mutterstadt, and Helmut Jakusch, Ludwigshafen, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

Filed Sept. 25, 1975, Ser. No. 616,863
Claims priority, application Germany, Oct. 4, 1974, 2447386
Int. Cl.² C01G 49/02
U.S. Cl. 423—634 5 Claims

1. A process for producing acicular magnetic gamma-iron-(III) oxide comprising the steps of:
a. suspending an acicular non-magnetic iron(III) oxide in water to form a slurry,
b. adding to said slurry a solution of a water-soluble inorganic alkaline earth metal compound, said alkaline earth metal selected from the group consisting of magnesium, calcium, barium and strontium, in an amount of from 1 to 5 percent by weight of the alkaline earth metal compound based on the iron(III) oxide,
c. adding to said slurry an alkylphenol of the formula



wherein $R^1$, $R^2$ and $R^3$ are hydrogen or alkyl of 4 to 24 carbon atoms, with the proviso that at least one of $R^1$, $R^2$ and $R^3$ is alkyl, in a molar ratio of alkylphenol to alkaline earth metal compound of 0.2 to 2.0:1,
d. filtering the slurry,
e. drying the residue,
f. reducing the residue consisting essentially of non-magnetic iron(III) oxide with a gaseous reducing agent at from 300° to 500° C, to magnetite; and subsequently
g. oxidizing the magnetite with an oxygen-containing gas, at from 200° to 400° C, to gamma-iron(III) oxide.

4,018,883

## THYROXINE ($T_4$) RADIOIMMUNOASSAY

Margaret E. Parslow, Rancho Palos Verdes, Calif., assignor to Nichols Institute for Endocrinology, San Pedro, Calif.

Filed Mar. 10, 1975, Ser. No. 556,930
Int. Cl.² G01N 33/00; A61K 43/00
U.S. Cl. 424—1 24 Claims

1. A composite reagent for a radioimmunoassay to measure the concentration of thyroxine ($T_4$) in a measured quantity of human serum, the reagent comprising in the absence of non-radioactive $T_4$:
a blocking agent in sufficient quantity to displace essentially all of the $T_4$ in the measured quantity of serum bound to thyroxine-binding globulin (TBG);
an antibody in sufficient quantity to bind a significant quantity of the $T_4$ in the measured quantity of serum;
polyethylene glycol (PEG) in sufficient quantity to precipitate essentially all the antibody; and
a buffering agent in sufficient quantity to inhibit binding the $T_4$ in the measured quantity of serum to thyroxine-binding prealbumin.
14. A method of measuring the concentration of thyroxine



($T_4$) in a measured quantity of human serum, the method comprising the steps of:
combining the following to form a mixture:
a blocking agent in a quantity sufficient to displace essentially all the $T_4$ in the measured amount of human serum from thyroxine binding globulin (TBG);
an antibody in sufficient quantity to bind a significant quantity of the $T_4$ in the measured quantity of serum;
polyethylene glycol (PEG) in sufficient quantity to precipitate essentially all the antibody; and
a buffering agent in sufficient quantity to inhibit binding the $T_4$ in the measured quantity of serum to thyroxinebinding prealbumin;
adding the mixture to the measured quantity of human serum and radioactive $T_4$ in sufficient quantity to give a measurable counting rate;
incubating the serum and radioactive $T_4$ with the mixture added to allow reaction of the $T_4$ in the serum and the radioactive $T_4$ with the antibody to proceed substantially to equilibrium, thereby producing antibody bound $T_4$, a percentage of which is radioactive;
removing the antibody precipitated by the PEG including the antibody bound $T_4$ from the supernatant; and
measuring the quantity of radioactive $T_4$ in the removed precipitate or the supernatant.

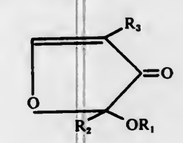
4,018,884

## FLUOROGENIC MATERIALS AND LABELING TECHNIQUES

Roy Cleeland, Jr., Short Hills; Emanuel Grunberg, North Caldwell; Willy Leimgruber, Montclair, and Manfred Weigele, North Caldwell, all of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 590,655, June 26, 1975, Pat. No. 3,969,373, which is a continuation-in-part of Ser. No. 338,019, March 5, 1973, abandoned. This application Mar. 18, 1976, Ser. No. 668,180
Int. Cl.² C07G 7/00; G01N 31/00, 31/22, 33/16
U.S. Cl. 424—7 10 Claims

1. A method for fluorescently labeling a material containing a primary amino group which comprises treating said material with a compound of the formula



wherein $R_1$ is lower alkyl or phenyl lower-alkyl, $R_2$ is phenyl, lower-alkoxyphenyl, di-lower-alkoxyphenyl, carboxyphenyl or carboxy-lower-alkyphenyl, and $R_3$ is phenyl or nitrophenyl;
in an aqueous medium at a pH between about 8.0 and 10.5.

4,018,885

## STEROID-BINDING GLOBULIN AND PROCESS FOR PREPARING IT AND ANTIBODIES THERETO

Hans Bohn, Marbach near Marburg an der Lahn, and Wilhelm Winckler, Wenkbach, both of Germany, assignors to Behringwerke Aktiengesellschaft, Marburg an der Lahn, Germany

Filed Oct. 24, 1974, Ser. No. 517,764
Claims priority, application Germany, Oct. 27, 1973, 2353973
Int. Cl.² A61K 37/04, 39/00; C12B 1/00; G01N 31/00
U.S. Cl. 424—12 5 Claims

1. A method for making a modified steroid-binding globulin which comprises treating a steroid-binding β-globulin starting material having the following properties:
a. a specific affinity to steroid hormones,
b. a content of carbohydrates of 12.5 ± 3%, of which are 5.7 ± 1.2% hexoses, 3.9 ± 0.8% hexoseamine, calculated as N-acetyl-hexoseamine, 2.9 ± 0.9% of neuraminic acid, calculated as N-acetyl-neuraminic acid, and 0.1 ± 0.1% fucose,
c. the capacity of being precipitated by specific anti-sera,
d. an electrophoretic mobility corresponding to that of $\beta_1$-globulins,
e. a sedimentation constant of 4.1 ± 1.0 S, measured in a phosphate buffer of pH 6.8,
f. a sedimentation constant of 1.1 ± 0.3 S, measured in a 1% sodium dodecylsulfate solution, and
g. a molecular weight of 65,000 ± 5,000, with neuraminidase, at a pH within the optimum reaction range of the enzyme, until the neuraminic acid content of the steroid-binding β-globulin starting material is reduced to 0.5 ± 0.5%.

4. A modified steroid-binding globulin made by the method of claim, said modified steroid-binding globulin having the following properties:
a. a specific affinity to steroid hormones,
b. a content of carbohydrates of 10.4 ± 2.6%, of which are 5.8 ± 1.2% hexoses, 4.0 ± 0.8% hexoseamine, calculated as N-acetyl-hexoseamine, 0.5 ± 0.5% neuraminic acid, calculated as N-acetyl-neuramanic acid, and 0.1 ± 0.1% fucose,
c. the capacity of being precipitated by anti-sera which are directed against steroid-binding β-globulin,
d. an electrophoretic mobility corresponding to that of gamma-globulin,
e. a sedimentation constant of 4.1 ± 1.0 S, measured in a phosphate buffer at pH 6.8,
f. a sedimentation constant of 1.1 ± 0.3 S, measured in a 1% sodium dodecylsulfate solution, and
g. a molecular weight of 65,000 ± 5,000.

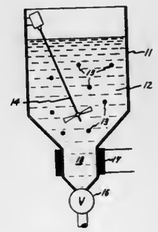
5. In the method for making an anti-serum specific to steroid-binding globulin by immunizing animals with said steroid-binding globulin, the improvement wherein the steroid-binding globulin is the modified steroid-binding globulin of claim 4.

4,018,886

## DIAGNOSTIC METHOD AND DEVICE EMPLOYING PROTEIN-COATED MAGNETIC PARTICLES

Ivar Giaever, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed July 1, 1975, Ser. No. 592,196
Int. Cl.² G01N 21/46, 27/00, 31/06, 33/16
U.S. Cl. 424—12 15 Claims



1. A diagnostic method for determining the presence or absence of select protein in a liquid sample comprising the steps of:
dispersing a plurality of finely-divided magnetic particles each of which is coated with a layer directly bonded thereto of first protein molecules specific to said select protein in the sample liquid to facilitate contact between said coated particles and said sample liquid;
magnetically retrieving and separating said coated particles from said sample liquid;
washing said coated particles;

introducing said coated particles into a volume of cleaving agent solution in direct contact with a metallized surface to permit select protein, if present, to detach from the first protein-coated particles and

examining said metallized surface for the presence of protein adsorbed thereon.

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**4,018,887**

## AMIDE-STABILIZED DRY POWDER AEROSOL ANTIPERSPIRANT COMPOSITIONS AND METHOD OF PREPARATION

**Douglas L. Danneman, Forest Park, and Jerry J. Yetter, Green Township, Hamilton County, both of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio**

**Continuation-in-part of Ser. No. 888,958, Dec. 29, 1969, abandoned. This application July 27, 1971, Ser. No. 166,584**

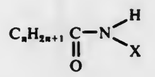
**Int. Cl.² A61K** *7/34, 7/36, 7/38*

**U.S. Cl. 424—47** **4 Claims**

1. A powder aerosol antiperspirant composition comprising:

A. from about 2% to about 12% by weight of a finely divided dry antiperspirant powder selected from the group consisting of aluminum chlorhydroxide, and complexes of aluminum chlorhydroxide and zirconyl hydroxychloride;

B. from about 0.2% to about 1% by weight of a suspending agent for the antiperspirant comprising an amide having the formula



wherein *n* is from about 12 to about 20 and wherein X is selected from the group consisting of $-C_2H_4OH$, and $-C_3H_6OH$;

C. from about 3% to about 15% by weight of a non-toxic, non-aqueous carrier liquid of low volatility having emollient properties selected from the group consisting of lanolin, polysiloxanes of the formmula $(-R_2{}^5Si\ O-)_n$ wherein $R^5$ is $C_1$–$C_4$ alkyl or phenyl and wherein said polysiloxanes have a viscosity at 25° C. of from 5 to about 2,000 centistokes, polyalkylene glycols containing a fatty acid or fatty alcohol group containing from about 2 to about 20 carbon atoms, fatty alcohols containing from about 12 to about 18 carbon atoms, fatty acid esters of aliphatic alcohols wherein said esters contain from about 12 to about 26 carbon atoms, mineral oil having a specific gravity of from about 0.8 to about 0.9 at 60° F., aliphatic hydrocarbons containing from about 12 to about 26 carbon atoms, multiple ester organic compounds of from about 12 to about 16 carbon atoms having a ratio of ester groups to carbon atoms of from about 0.125 to about 0.214 and having a solubility in water of from about 0.0005% to about 0.1% at 30° C., and mixtures thereof; and

D. from about 70.7% to about 93.9% by weight of an anhydrous, non-toxic liquefiable propellant gas, under pressure.

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**4,018,888**

## AMINE-STABILIZED DRY POWDER AEROSOL ANTIPERSPIRANT COMPOSITIONS AND METHOD OF PREPARATION

**Charles L. Scripps, Springfield Township, Hamilton County, and Jerry J. Yetter, Green Township, Hamilton County, both of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio**

**Continuation-in-part of Ser. No. 888,959, Dec. 29, 1969, abandoned. This application Aug. 11, 1971, Ser. No. 170,970**

**Int. Cl.² A61K** *7/34, 7/38*

**U.S. Cl. 424—47** **4 Claims**

1. A powder aerosol antiperspirant composition comprising:

A. from about 2% to about 12% by weight of a finely divided dry antiperspirant powder selected from the group consisting of aluminum chlorhydroxide and complexes of aluminum chlorhydroxide and zirconyl hydroxychloride;

B. from about 0.2% to about 1% by weight of a suspending agent for the antiperspirant powder comprising a primary aliphatic amine having from about 12 to about 20 carbon atoms;

C. from about 3% to about 15% by weight of a non-toxic, non-aqueous carrier liquid of low volatility having emollient properties, said liquid being selected from the group consisting of lanolin, polysiloxanes of the formula $(-R_2{}^5Si\ O-)_n$ wherein $R^5$ is $C_1$–$C_4$ alkyl or phenyl and wherein said polysiloxanes have a viscosity at 25° C. of from 5 to about 2,000 centistokes, polyalkylene glycols containing a fatty acid or fatty alcohol group containing from about 2 to about 20 carbon atoms, fatty alcohols containing from about 12 to about 18 carbon atoms, fatty acid esters of aliphatic alcohols wherein said esters contain from about 12 to about 26 carbon atoms, mineral oil having a specific gravity of from about 0.8 to about 0.9 at 60° F., aliphatic hydrocarbons containing from about 12 to about 26 carbon atoms, multiple ester organic compounds of from about 12 to about 16 carbon atoms having a ratio of ester groups to carbon atoms of from about 0.125 to about 0.214 and having a solubility in water of from about 0.0005% to about 0.1% at 30° C., and mixtures thereof; and

D. from about 70.7% to about 93.9% by weight of an anhydrous, non-toxic, liquefiable propellant gas, under pressure.

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**4,018,889**

## OXYTETRACYCLINE COMPOSITIONS

**William W. Armstrong, Mill Neck, N.Y., assignor to Pfizer Inc., New York, N.Y.**

**Filed Jan. 2, 1976, Ser. No. 646,295**

**Int. Cl.² A61K** *31/79, 31/65*

**U.S. Cl. 424—80** **8 Claims**

1. An oxytetracycline composition comprising a solution in water of from about 1 to 40% by weight of an antibiotic compound selected from the group consisting of oxytetracycline and the pharmaceutically acceptable acid addition salts thereof, from about 0.8 to 1.3 molar proportion of a pharmaceutically acceptable magnesium compound soluble in said solution, and from about 10 to 50% by weight of 2-pyrrolidone, said composition having a pH value in the range of from about 7.5 to 9.5.

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**4,018,890**

## PYRAZOL-5-ONE PHARMACEUTICAL COMPOSITIONS AND METHODS FOR EFFECTING DIURESIS, SALURESIS AND FOR TREATING HYPERTENSION

**Eike Möller; Karl Meng, both of Wuppertal; Egbert Wehinger, Neviges, and Harald Horstmann, Wuppertal, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany**

**Filed Apr. 9, 1974, Ser. No. 459,408**

*Disclosure was also published under Trial Voluntary Protest Program on Mar. 23, 1976.*

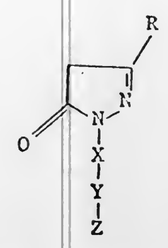
**Claims priority, application Germany, Apr. 17, 1973, 2319278**

**Int. Cl.² A61K** *31/415*

**U.S. Cl. 424—273** **68 Claims**

1. A pharmaceutical composition useful for effecting diuresis and saluresis and for treating hypertension in humans and animals which comprises a diuretic, saluretic or antihypertensive amount of a pyrazol-5-one of the formula:





or a pharmaceutically acceptable nontoxic salt thereof wherein

R is amino;

X is methylene wherein 1 hydrogen atom is substituted by lower alkyl, ethylene or ethylene wherein 1 hydrogen atom is substituted by lower alkyl or 1 hydrogen atom on each of the two carbon atoms is substituted by lower alkyl;

Y is a direct bond;

Z is aryl of 6 to 10 carbon atoms unsubstituted or substituted by:

a. 1 or 2 of the same or different substituents selected from the group consisting of halogen, trifluoromethyl, alkyl of 1 to 4 carbon atoms, alkenyl of 2 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms, and alkenoxy of 2 to 4 carbon atoms;

b. cycloalkyl of 5, 6 or 7 carbon atoms, or cycloalkenyl of 5, 6 or 7 carbon atoms;

c. nitro; or

d. nitro and 1 or 2 substituents selected from the group consisting of alkyl of 1 to 4 carbon atoms, alkenyl of 2 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms, alkenoxy of 2 to 4 carbon atoms, halogen and trifluoromethyl;

in combination with a pharmaceutically acceptable nontoxic inert diluent or carrier.

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**4,018,891**

## PHARMACEUTICAL COMPOSITIONS AND METHODS OF TREATMENT WITH 1-OXO-1H-2-BENZOTHIO PYRAN-3-CARBOXYLIC ACID DERIVATIVES

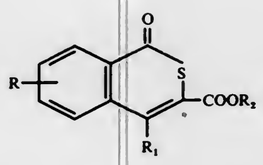
**Thomas M. Bare, Milwaukee, and John T. Suh, Mequon, both of Wis., assignors to Richardson-Merrell Inc., Wilton, Conn.**

**Division of Ser. No. 485,378, July 3, 1974, Pat. No. 3,960,892. This application Nov. 17, 1975, Ser. No. 632,241**

**Int. Cl.² A61K** *31/35*

**U.S. Cl. 424—275** **8 Claims**

1. The method of inhibiting the release of spasmogens from antigen- antibody reactions in an animal susceptible to extrinsic asthma, hay fever, urticaria, eczema or atopic dermatitis which comprises administering to said animal a safe and effective anti-allergy amount of a compound of Formula I:



I

in which R is hydrogen or lower alkoxy of 1 to 4 carbon atoms, $R_1$ is hydrogen or a lower alkyl of 1 to 4 carbon atoms, and $R_2$ is hydrogen or sodium.

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**4,018,892**

## BONE DEPOSITION BY 16-ARYL-13,14-DIHYDRO-PGE₂ P-BIPHENYL ESTERS

**Alexander H. Walsh, Old Saybrook, Conn., assignor to Pfizer Inc., New York, N.Y.**

**Division of Ser. No. 602,478, Aug. 6, 1975, Pat. No. 3,982,016. This application Mar. 31, 1976, Ser. No. 672,449**

**Int. Cl.² A61K** *31/34*

**U.S. Cl. 424—285** **1 Claim**

1. A method for increasing bone deposition for the treatment of osteopenia which comprises administering to a subject afflicted with bone loss a bone deposition increasing amount of a 16-aryl-13,14-dihydro-$PGE_2$ p-biphenyl ester wherein the aryl group of said 13,14-dihydro-$PGE_2$ p-biphenyl ester is $\alpha$- or $\beta$-furyl.

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**4,018,893**

## METHODS FOR TREATING MICROBIAL INFECTIONS

**Martin Steinman, Livingston, N.J., assignor to Schering Corporation, Kenilworth, N.J.**

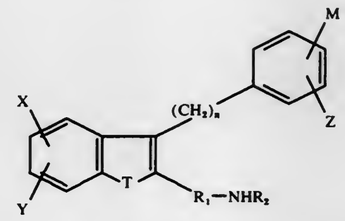
**Continuation-in-part of Ser. No. 473,625, May 28, 1974, Pat. No. 3,944,672. This application Dec. 12, 1975, Ser. No. 640,291**

**Claims priority, application United Kingdom, May 22, 1975, 22371/75**

**Int. Cl.² A61K** *31/34*

**U.S. Cl. 424—285** **9 Claims**

1. A method for treating susceptible microbial infections, selected from the group consisting of bacterial, fungal and protozoal infections, which comprises administering to an animal species so infected an antimicrobially effective quantity of a compound represented by the formula:



wherein *n* is 0 or 1; $R_2$ is hydrogen, or amino lower alkylene having 1 to 3 carbon atoms; $R_1$ is carbonyl or lower alkylene having 1 to 3 carbon atoms with the proviso that when $R_2$ is hydrogen, $R_1$ is lower alkylene; T is 0; X is halogen, nitro, or trifluoromethyl; Y is hydrogen, halogen, methyl or trifluoromethyl; M is hydrogen, halogen or methyl with the proviso that when X is nitro, M is halogen; Z is hydrogen, halogen, nitro or methyl; or the acid addition salts thereof.

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**4,018,894**

## OXIME CARBONETES AS FUNGICIDAL OR BACTERICIDAL AGENTS

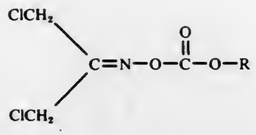
**Don Robert Baker, Orinda, Calif., assignor to Stauffer Chemical Company, Westport, Conn.**

**Division of Ser. No. 542,159, Jan. 20, 1975, Pat. No. 3,988,357. This application July 14, 1976, Ser. No. 705,224**

**Int. Cl.² A01N** *9/24*

**U.S. Cl. 424—301** **5 Claims**

1. A method of inhibiting the growth of bacteria which comprises applying thereto a bactericidally effective amount of a compound of the formula



in which R is alkyl having 1 to 6 carbon atoms.

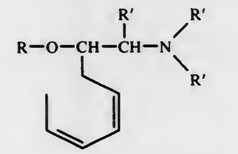
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**4,018,895**
**ARYLOXYPHENYLPROPYLAMINES IN TREATING DEPRESSION**

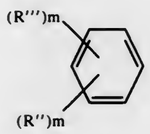
**Bryan B. Molloy, and Klaus K. Schmiegel, both of Indianapolis, Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.**

**Division of Ser. No. 432,379, Jan. 19, 1974. This application Sept. 17, 1975, Ser. No. 614,094**
**Int. Cl.² A61K** *31/135*
**U.S. Cl. 424—330** **2 Claims**

1. A method of treating human suffering from depression which comprises administering to said human an effective antidepressant dose of a compound of the formula:



wherein each R′ is independently hydrogen or methyl; wherein R is naphthyl or



wherein R′′ and R′′′ are halo, trifluoromethyl, $C_1$–$C_4$ alkyl, $C_1$–$C_3$ alkyloxy or $C_3$–$C_4$ alkenyl; and
wherein *n* and *m* are 0, 1 or 2; and acid addition salts thereof formed with a pharmaceutically-acceptable acid.

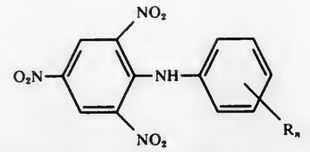
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**4,018,896**
**HALO-SUBSTITUTED -2,4,6-TRINITRODIPHENYLAMINES FOR CONTROL OF FOLIAR PHYTOPATHOGENS**

**Reuben G. Jones, Cedar City, Utah, assignor to Eli Lilly and Company, Indianapolis, Ind.**

**Filed Dec. 13, 1974, Ser. No. 533,042**
**Int. Cl.² A01N** *9/20, 9/24*
**U.S. Cl. 424—330** **9 Claims**

1. A method of inhibiting fungal pathogens on the foliage of plants which comprises applying to the pathogen or the foliage to be protected an effective fungus-inhibiting amount of a compound of the formula



wherein R represents chloro, bromo, fluoro or iodo, and *n* represents 1–3.

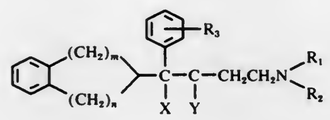
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**4,018,897**
**ANTIARRHYTHMIC AGENTS**

**Bryan B. Molloy, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.**

**Division of Ser. No. 485,488, July 3, 1974, Pat. No. 3,972,935. This application Mar. 15, 1976, Ser. No. 667,224**
**Int. Cl.² A61K** *31/135*
**U.S. Cl. 424—330** **4 Claims**

1. A method of treating cardiac arrhythmias comprising administering to a human subject suffering from an arrhythmia and in need of treatment a compound of the formula



wherein:
*m* is 0, 1, or 2; *n* is 0, 1, or 2; *m* + *n* is 2 or 3;
$R_1$ and $R_2$ independently are hydrogen, $C_1$-$C_4$ alkyl, lower alkenyl of the formula $CH_2R_4$, wherein $R_4$ is $C_2$-$C_5$ alkenyl,
$R_3$ is hydrogen, methyl, methoxy, trifluoromethyl, or halogen;
X and Y are both hydrogen, or taken together form a double bond; or
the pharmaceutically acceptable acid addition salts thereof; in the amount of about 0.005 to about 2.0 g. at intervals of about 4 to about 10 hours, either orally or parenterally.

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**4,018,898**
**METHOD OF USING POTATO SUPPLEMENT IN COMMERCIAL BREAD MAKING PROCESSES**

**Charles I. Tollefson, Rochester, N.Y.; Simon S. Jackel, Westport, Conn., and Jack K. Krum, Leawood, Kans., assignors to R. T. French Company, Rochester, N.Y.**

**Continuation of Ser. No. 430,180, Jan. 2, 1974, abandoned. This application Aug. 4, 1975, Ser. No. 601,357**
**Int. Cl.² A21D** *8/04*
**U.S. Cl. 426—21** **6 Claims**

1. A method of extending the shelf-life of bread produced commercially by a continuous process of the type in which a broth is prepared from a mixture including yeast, nutrients, sugar and water and is fermented for a period of time before being mixed by the impeller of a high speed blender with wheat flour and additives to form a developed dough ready for extrusion into pans, proofing and baking, comprising
adding to the broth, before adding the wheat flour, a quantity of potato granules ranging from 1 to 3% by weight of the overall quantity of the wheat flour that is to be added to the mixture, said granules being of the type produced by the conventional "add-back" process,
adding to the broth containing the flour a quantity of water ranging in the ratios of from 2 to 1 to 5 to 1 by weight of the potato granules added to the broth, and
during the mixing of the flour and broth, operating the blender at a speed which is less, than the speed at which the blender operates when the broth does not contain said potato granules,
proofing and baking the dough product.

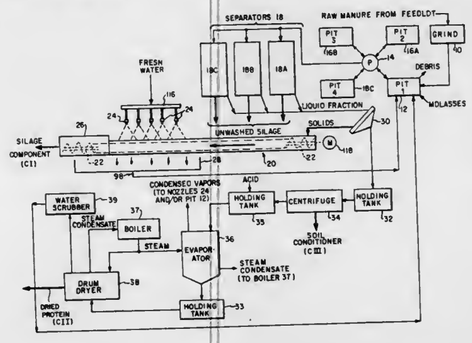


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**4,018,899**
**PROCESS FOR RECOVERING FEED PRODUCTS FROM ANIMAL MANURE**

**David W. Seckler; Judson M. Harper, both of Fort Collins, and William Wayne Gaynor, Atwood, all of Colo., assignors to Ceres Ecology Corporation, Denver, Colo.**

**Continuation-in-part of Ser. No. 388,902, Aug. 16, 1973, Pat. No. 3,875,319. This application Jan. 22, 1975, Ser. No. 542,968**
**Int. Cl.² A23K** *1/00*
**U.S. Cl. 426—55** **32 Claims**




1. A process for extracting feed products from animal manure, comprising:
forming a manure-water slurry in a first pit and permitting said slurry to ferment;
separating said slurry into solid and liquid fractions, said solid fraction comprising a silage-like component of undigested fibers and grains, said liquid fraction comprising high protein nutrients and relatively dense indigestible minerals and fiber particles;
separating said relatively dense indigestible minerals and fiber particles from said high protein nutrients in the liquid fraction; and
processing said liquid fraction for use as a feed supplement which contains relatively low amounts of indigestible minerals and fiber particles.

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**4,018,900**
**FOOD BARS HAVING FORTIFIED MARSHMALLOW BASE**

**James R. Hayward, McHenry; William L. Keyser, East Dundee, and Walter J. Zielinski, Ingleside, all of Ill., assignors to The Quaker Oats Company, Chicago, Ill.**

**Filed Aug. 2, 1976, Ser. No. 711,102**
**Int. Cl.² A23J** *3/02*; **A23G** *3/00*
**U.S. Cl. 426—72** **16 Claims**

1. Marshmallow, low in reducing sugars and containing from 1 percent to 20 percent by weight fat coated casein or caseinate salts.

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**4,018,901**
**STABILIZED HIGH PROTEIN FOOD BAR**

**James R. Hayward, McHenry; William L. Keyser, East Dundee, and Walter J. Zielinski, Ingleside, all of Ill., assignors to The Quaker Oats Company, Chicago, Ill.**

**Filed Aug. 2, 1976, Ser. No. 710,452**
**Int. Cl.² A23J** *3/02*; **A23G** *3/00*
**U.S. Cl. 426—72** **8 Claims**

1. A marshmallow base product comprising marshmallow having a density of from 30 to 74 ounces per gallon non reducing sugar, and a high protein ingredient of reduced water binding capability said high protein ingredient including a heat treated protein or a fat coated protein or a combination of heat treated protein and fat coated protein; said heat treated protein being selected from the group consisting of animal protein, vegetable protein, casein caseinate salts and combinations thereof; said fat coated protein being selected from the group consisting of animal protein, vegetable protein, casein, caseinate salts and combinations thereof; said marshmallow base product having a water activity, $A_w$, less the 0.85 and a final density of from 111 to 119 ounces per gallon.

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**4,018,902**
**COMBINATION CONFECTION AND HOLDER**

**Edward Dee, 45 Georgian Court, Elizabeth, N.J. 07200**

**Filed June 30, 1976, Ser. No. 701,207**
**Int. Cl.² A23G** *9/26*; **A44B** *17/00*
**U.S. Cl. 426—75** **1 Claim**




1. A combination confection and holder comprising
a. a confectionary slab,
b. flat, depressed areas on the opposite sides of the slab, and in general registration with each other at one end of the slab defining a seat on both sides of the slab, for a handle,
c. a handle,
d. a resilient, bifurcated end on the handle, the bifurcated portions of which are deflectable and normally generally parallel; the bifurcated end defining a confection holder portion of the handle,
e. the bifurcated portions of the handle spaced apart a distance coequal to the thickness of the slab at the depressed areas of the slab, so that they may resiliently grip the slab and seat themselves on opposite sides of the slab,
f. each bifurcated portion shaped in correspondence to the shape of the depressed areas on the slab,
g. the bifurcated portions seated in the depressed areas, on opposite sides of the slab,
h. a raised, opposed area on the inner surface of each of the bifurcated portions of the handle,
i. a passage through the flat depressed areas of the slab, and shaped to receive the raised, opposed areas on the inner surfaces of the bifurcated portions of the handle, when the bifurcated portions of the handle are seated in the depressed areas, thereby forming an interlock between the handle and slab so that the bifurcated portions cannot be slid out of the depressed areas without deflecting and spreading the portions,
j. a channel through the depressed areas communicating between the edge of the slab and the passage,
k. the channel being narrower than the passage, to permit the insertion of the raised areas into the passage.

## 4,018,903
## PROTEIN FIBERS

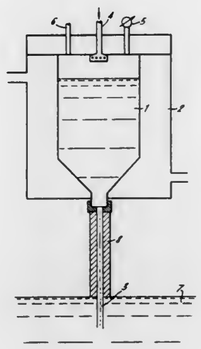
**Antonius Johannes Maria Segeren, Rhoon, and Jelles Vincent Boskamp, Vlaardingen, both of Netherlands, assignors to Thomas J. Lipton, Inc., Englewood Cliffs, N.J.**

**Filed Dec. 10, 1975, Ser. No. 639,281**

**Claims priority, application United Kingdom, Dec. 23, 1974, 55553/74**

**Int. Cl.² A23J** *3/00*

**U.S. Cl. 426—104** **13 Claims**



1. A process for preparing soy protein fibers by spinning an aqueous soy protein solution comprising:

a subjecting the solution to heat pre-treatment at a temperature between 60° C. and 85° C. for a time sufficient to partially pregel but not completely gel the protein such that the 7S fraction of the soy protein is gelled; and

b extending the partially pre-gelled soy protein solution into a coagulating fluid medium which is not enough to gel the extrudate completely for a time sufficient to gel the extrudate completely such that the 11S fraction of the soy protein is gelled.

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## 4,018,904
## CONTAINER FOR AN INSTANT FOOD

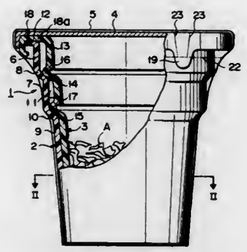
**Keiji Muraoka, Nishinomiya, Japan, assignor to Acecook Co., Ltd., Osaka, Japan**

**Filed Nov. 26, 1975, Ser. No. 635,626**

**Claims priority, application Japan, Jan. 21, 1975, 50-10493[U]**

**Int. Cl.² B65B** *29/06, 3/22*

**U.S. Cl. 426—115** **7 Claims**



1. A double-walled container for instant food comprising:

an outer receptacle of synthetic resin including a smooth peripheral side wall and having an open top and a closed bottom with two cylindrical portions near the open top of the outer receptacle; said cylindrical portions merging with each other through a tapered portion and the lower of the cylindrical portions merging with the remaining part of the receptacle by a second tapered portion;

said lower cylindrical portion having a plurality of inward projections formed circumferentially at intervals on the peripheral side wall of the outer receptacle, adjacent but spaced from said open top of the outer receptacle;

an inner receptacle of synthetic resin containing therein instant food, the inner receptacle including a lower corrugated peripheral side wall and having a closed bottom and a brim substantially flush with the open top of the outer receptacle, the apex of each corrugation being in contact with the peripheral side wall of the outer receptacle below said second tapered portion and forming an air space between the outer and inner receptacles;

two parallel annular ribs formed on the inner receptacle above the corrugated peripheral side wall, adjacent but spaced from said brim of the inner receptacle and defining therebetween an annular groove receiving said inward projections of the outer receptacle, thereby holding the inner receptacle within the outer receptacle; said ribs engaging said tapered portions;

a flange formed on and around said brim of the inner receptacle and extending outwards beyond the open top of the outer receptacle in a plane including the brim of the inner receptacle, the free end of the flange being curled downward and spaced from the outer surface of the outer receptacle; and

a covering of a pliable material bonded to said flange, thereby sealing said instant food within said inner receptacle.

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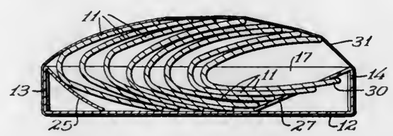
## 4,018,905
## TACO PACKAGE

**David J. Adamek, and John A. Anderson, both of Minneapolis, Minn., assignors to Hoerner Waldorf Corporation, St. Paul, Minn.**

**Filed Mar. 12, 1976, Ser. No. 666,434**

**Int. Cl.² B65B** *23/00*

**U.S. Cl. 426—124** **1 Claim**



1. A package of folded taco shells, comprising:

an open top tray with a substantially rectangular bottom and vertical side and end walls, said end walls each having attached thereto an inwardly foldable flap positioned diagonally and downwardly from the top edge of said end wall panels to the top surface of said bottom panel;

a nested array of a plurality of said shells located within said tray, said shells folded approximately about a central axis allowing adjacent shells to be nested together with each shell having a rounded, closed end and an opposite open end thereby forming an array having a rounded closed end and an open end;

a first of said inwardly foldable flaps adjacent the open end of said array opposite said rounded end having formed therein a die cut opening with an upper edge;

at least the lower edge of the first of said taco shells in said array at the open end being inserted into said die cut opening and in contact with said upper edge to therefore restrict movement of the nested array;

the opposite round end of said array being positioned against said inwardly folded flap opposite said flap with said die cut opening; and

a plastic film heat shrunk into close conformity with said array of shells and tray to firmly hold the package together and to center the array in the tray by forcing it down against the flaps and away from the end walls.



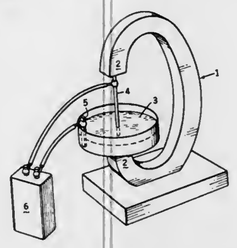
## 4,018,906
## METHOD OF ALIGNING A PROTEIN SLURRY WITH A MAGNETIC FIELD TO PRODUCE A PROTEIN FOOD PRODUCT

**James John Ostendorf, Affton, Mo., assignor to Ralston Purina Company, St. Louis, Mo.**

**Filed Apr. 21, 1976, Ser. No. 678,798**

**Int. Cl.² A23J** *3/00*

**U.S. Cl. 426—237** **15 Claims**



1. A method of preparing a structured protein food product comprising the steps of

a. freezing an aqueous slurry of a protein material having a solids content of at least about 5% by weight while said slurry is subjected to a magnetic field to form ice crystal layers which would mold the protein material of the slurry into layers corresponding generally to the lines of force of the magnetic field, and

b. heat setting the protein layers into a substantially insoluble form by heating the frozen slurry to a temperature sufficiently high to allow the protein layers to set and lower than a temperature at which the protein will degrade, thereby melting the ice crystal layers to form a structured protein food product.

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## 4,018,907
## COLORING FOOD WITH IRON-COMPLEXES

**Richard J. Scarpellino, Ramsey, N.J., assignor to General Foods Corporation, White Plains, N.Y.**

**Filed Aug. 25, 1975, Ser. No. 607,409**

**Int. Cl.² A23L** *1/27*

**U.S. Cl. 426—250** **12 Claims**

1. A method of imparting a red-hue color to edible materials which comprises adding to said edible materials a coloring composition consisting of at least one ferric salt complexed in situ or not with at least an equal weight amount of at least one 3 or 5-hydroxy, 4-pyrone-structured compound, in an amount effective to impart red color to said edible materials.

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## 4,018,908
## VACUUM TREATMENT TO REMOVE VAPORIZED LIQUID FROM UNFROZEN CELLULAR SUBSTANCES WHILE KEEPING THE CELL WALLS THEREOF INTACT

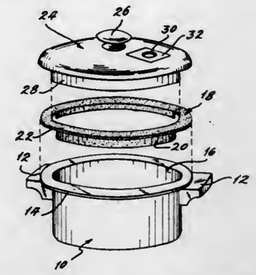
**George E. Gross, 16601 Jean Lane, Tinley Park, Ill. 60477**

**Continuation of Ser. No. 221,503, Jan. 28, 1972, abandoned. This application Apr. 18, 1974, Ser. No. 461,839**

**Int. Cl.² A23L** *1/31*

**U.S. Cl. 426—281** **3 Claims**

1. A method of processing an unfrozen cellular substance having rupturable but unruptured cell walls containing cellular liquid, comprising the steps of vaporizing at least some of the cellular liquid in said unfrozen cellular substance by a combination of reduced pressure and temperature control at a rate which is not greater than the vapor transmission rate of said rupturable cell walls of the cellular substance in order to remove vaporized cellular liquid while keeping the cell walls intact, providing a pulsating reduced pressure of gradually increasing intensity during the vaporization by terminating without releasing the reduced pressure for a predetermined time interval, and then increasing the level of reduced pressure a predetermined number of times and thereafter introducing another liquid different from the cellular liquid in the cellular substance in place of the cellular liquid replaced therefrom.



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## 4,018,909
## SEMI-MOIST PET FOOD CONTAINING CORN MOLASSES

**Peter H. Foulkes, Fox River Grove, Ill., assignor to The Quaker Oats Company, Chicago, Ill.**

**Filed Nov. 20, 1975, Ser. No. 633,803**

**Int. Cl.² A23K** *1/02*

**U.S. Cl. 426—532** **9 Claims**

1. In a semi-moist pet food containing sugar, the improvement wherein the pet food further comprises about 3 percent to about 18 percent corn molasses as a replacement for at least part of the sugar and about 6 percent to about 30 percent sugar by weight of the pet food, provided however, that the weight percent of the sugar is greater than the weight percent of the corn molasses to thereby provide a pet food having improved palatability upon storage.

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## 4,018,910
## FLAVORING AGENT

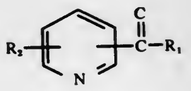
**Max Winter, Petit-Lancy; Fritz Gautschi, Commugny; Ivon Flament, and Max Stoll, both of Petit-Lancy, all of Switzerland, assignors to Firmenich & Cie, Geneva, Switzerland**

**Division of Ser. No. 243,866, April 13, 1972, abandoned, which is a division of Ser. No. 70,560, Sept. 8, 1970, Pat. No. 3,702,253, which is a continuation of Ser. No. 543,069, April 18, 1966, abandoned, which is a continuation-in-part of Ser. No. 452,342, April 30, 1965, abandoned. This application June 24, 1974, Ser. No. 482,689**

**Int. Cl.² A23L** *1/234*

**U.S. Cl. 426—537** **56 Claims**

1. As a new composition of matter, a soluble coffee material having added thereto a minor, but flavor-modifying amount of a compound selected from the group of compounds having the general formula:



wherein $R_1$ is hydrogen, methyl, or phenyl and $R_2$ is hydrogen, methyl or acetyl.

### 4,018,911
## METHOD FOR LARGE VOLUME FREEZING AND THAWING OF PACKED ERYTHROCYTES

**Fabian J. Lionetti, Milton, and Stephen M. Hunt, Allston, both of Mass., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Nov. 10, 1975, Ser. No. 630,558**
**Int. Cl.² A61K** *35/18;* **F25C** *1/18;* **C12K** *9/00*
**U.S. Cl. 424—101** **4 Claims**

1. A method of freezing and thawing large volumes on the order of 400 ml or more of human red blood cells which thereafter may be transferred without hazard to the recipient comprising:

centrifuging a selected volume of whole blood to separate platelets and buffy coats;

removing platelets rich plasma and buffy coats by forcing topmost fluid and cell layers under pressure out of the blood container;

transferring the remaining cells to a freezing bag susceptible of being spread substantially flat to a desired area and spacing of the major surfaces;

adding hydroxyethyl starch to the platelet-free plasma in a proportion substantially of 142 ml of hydroxyethyl starch, 40% weight/volume, plus 263 ml of packed cells plus plasma;

mixing the hydroxyethyl starch and the plasma in a satellite container;

forcing the hydroxyethyl starch-plasma solution into the freezing bag containing the packed cells and mixing the constituents by repeated inversion;

forcing air bubbles back into the satellite bag and sealing the freezing bag; and

placing the bag in a cryoholder adapted for rapid heat transfer and immersing the cryoholder in a liquid nitrogen bath for an interval on the order of from 1 to 1⅓ minutes while shaking at a rate of substantially 160 cpm.

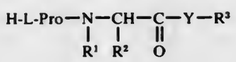
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### 4,018,912
## TRIPEPTIDE DERIVATIVES WITH CENTRAL NERVOUS SYSTEM ACTIVITY AND PREPARATION THEREOF

**Amedeo Failli, Montreal; Hans U. Immer, Mount Royal, and Manfred Gotz, Hudson, all of Canada, assignors to Ayerst McKenna and Harrison Ltd., Montreal, Canada**

**Filed July 28, 1975, Ser. No. 599,450**
**Int. Cl.² A61K** *37/00;* **C07C** *103/52*
**U.S. Cl. 424—177** **21 Claims**

1. A compound of formula 1



I

in which $R^1$ is hydrogen, lower alkyl or $NR^4R^5$ wherein $R^4$ and $R^5$ each are lower alkyl; $R^2$ is hydrogen or lower alkyl; $R^3$ is amino, lower alkylamino, di(lower)alkylamino or amino(-lower)alkylamino, and Y is one of the amino acid residues Gly or D—Ala with the proviso that when $R^1$ is $NR^4$ $R^5$ is lower alkylamino, di(lower)alkylamino or amino(lower)alkylamino and with the further proviso that when $R^1$ is hydrogen, $R^2$ is $CH_2CH(CH_3)_2$, $R^3$ is amino then Y is D—Ala.

19. A method of treating mental depression in warm-blooded animals comprising the oral administration thereto of 0.25–100 mg/kg of a compound of formula 1 as claimed in claim 1 or a pharmaceutically acceptable acid addition salt thereof.

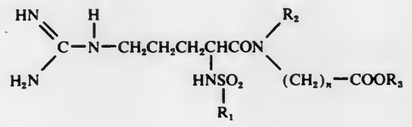
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### 4,018,913
## N²-ALKOXYNAPHTHALENESULFONYL-L-ARGININAMIDES AND THE PHARMACEUTICALLY ACCEPTABLE SALTS THEREOF

**Shosuke Okamoto, Kobe; Ryoji Kikumoto; Kazuo Ohkubo, both of Tokyo; Tohru Tezuka, Yokohama; Shinji Tonomura, Tokyo; Yoshikuni Tamao, Yokohama, and Akiko Hijikata, Kobe, all of Japan, assignors to Mitsubishi Chemical Industries Ltd., Tokyo and Shosuke Okamoto, both of, Japan**

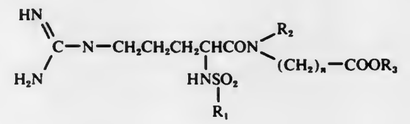
**Filed Jan. 14, 1976, Ser. No. 649,219**
**Int. Cl.² A61K** *31/195*
**U.S. Cl. 424—177** **5 Claims**

1. N²-alkoxynaphthalenesulfonyl-L-argininamides having the formula:



and the pharmaceutically acceptable salts thereof, wherein $R_1$ is naphthyl substituted with at least one $C_1$–$C_5$ alkoxy; $R_2$ is $C_2$–$C_{10}$ alkylthioalkyl; $R_3$ is hydrogen, and n is an integer of 1, 2 or 3.

5. A method for inhibiting activity and suppressing activation of thrombin in vivo which comprises introducing into a living body a pharmaceutically effective amount of an N²-alkoxynaphthalenesulfonyl-L-argininamide having the formula:



or the pharmaceutically acceptable salts thereof, wherein $R_1$ is naphthyl substituted with at least one $C_1$–$C_5$ alkoxy; $R_2$ is $C_2$–$C_{10}$ alkylthioalkyl; $R_3$ is hydrogen, and n is an integer of 1, 2 or 3.

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### 4,018,914
## PARTURITION INDUCEMENT

**Edwin Samuel Johnson, Antioch, Ill., assignor to Abbott Laboratories, North Chicago, Ill.**

**Filed Nov. 13, 1975, Ser. No. 631,773**
**Int. Cl.² A61K** *37/02*
**U.S. Cl. 424—177** **4 Claims**

1. The process of inducing parturition essentially consisting in administering to a warm-blooded animal within the last 10% of its gestation period, an effective amount of a compound of the formula L-pGlu-L-His-L-Trp-L-Ser-L-Tyr-D-X-L-Leu-D-X-L-Leu-L-Arg-L-Pro-NH-alkyl wherein X stands for an aminoacid moiety of the formula —NH—CHR′—CO— and R′ stands for a linear or branched alkyl of 1–4 carbons.

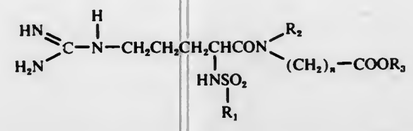


### 4,018,915
## N²-ALKOXYNAPHTHALENESULFONYL-L-ARGININAMIDES AND THE PHARMACEUTICALLY ACCEPTABLE SALTS THEREOF

**Shosuke Okamoto, Kobe; Ryoji Kikumoto; Kazuo Ohkubo, both of Tokyo; Tohru Tezuka, Yokohama; Shinji Tonomura, Tokyo; Yoshikuni Tamao, Yokohama, and Akiko Hijikata, Kobe, all of Japan, assignors to Mitsubishi Chemical Industries Ltd., Tokyo and Shosuke Okamoto, both of, Japan**

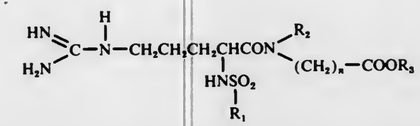
**Filed Jan. 5, 1976, Ser. No. 646,522**
**Int. Cl.² A61K** *31/195;* **C07C** *101/72*
**U.S. Cl. 424—177** **4 Claims**

1. N²-alkoxynaphthalenesulfonyl-L-argininamides having the formula:



and the pharmaceutically acceptable salts thereof, wherein $R_1$ is naphthyl substituted with at least one $C_1$–$C_5$ alkoxy; $R_2$ is $C_7$–$C_{15}$ phenylalkyl; $R_3$ is hydrogen, $C_1$–$C_{10}$ alkyl, and *n* is an integer of 1, 2 or 3.

4. A method for inhibiting activity and suppressing activation of thrombin in vivo, which comprises introducing into a living body a pharmaceutically effective amount of an N²-alkoxynaphthalenesulfonyl-L-argininamide having the formula:



or the pharmaceutically acceptable salts thereof, wherein $R_1$ is naphthyl substituted with at least one $C_1$–$C_5$ alkoxy; $R_2$ is $C_7$–$C_{15}$ phenylalkyl; $R_3$ is hydrogen; and *n* is an integer of 1, 2 or 3.

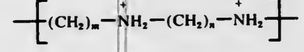
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### 4,018,916
## ANTIVIRAL IONIC COMPLEXES OF DOUBLE-STANDARD RNA

**Richard Anthony Vere Hodge, Dorking, England, assignor to Beecham Group Limited, United Kingdom**

**Division of Ser. No. 544,211, Jan. 12, 1975. This application June 25, 1975, Ser. No. 590,033**
**Int. Cl.² A61K** *31/70*
**U.S. Cl. 424—180** **8 Claims**

1. A pharmaceutical composition useful for treating susceptible DNA and RNA viral infections which comprises an antiviral amount of an antiviral substance which is a principally ionic complex in which the cations are organic polymer polycations which contains a repeat unit of formula (1):



wherein *m* and *n* are the same or different and each is an integer from 3 to 5 and the anions are either (a) double-stranded ribonucleic acid polyanions, said double-stranded ribonucleic acid being of natural origin or (b) polyanions of a double-stranded N-oxide or alkali modified derivative of a double-stranded ribonucleic acid of natural origin, in combination with a pharmaceutically acceptable non-toxic diluent or carrier.

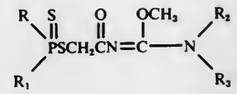
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### 4,018,917
## ISOUREA ACETYLPHOSPHATE INSECTICIDES

**Arnold D. Gutman, Berkeley, Calif., assignor to Stauffer Chemical Company, Westport, Conn.**

**Division of Ser. No. 639,318, Dec. 10, 1975, Pat. No. 3,984,410. This application May 13, 1976, Ser. No. 686,182**
**Int. Cl.² A01N** *9/36*
**U.S. Cl. 424—200** **21 Claims**

1. A method of controlling insects comprising applying to the habitat thereof an insecticidally effective amount of a compound having the formula



wherein R is lower alkoxy, $R_1$ is lower alkyl or lower alkoxy, $R_2$ is allyl or lower alkyl, and $R_3$ is selected from the group consisting of allyl, lower alkyl, phenyl, benzyl, and 3-methylphenyl; or $R_2$ and $R_3$ taken together are $—CH_2(CH_2)_3CH_2—$ or $—CH_2CH_2OCH_2CH_2—$.

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### 4,018,918
## TOPICAL CLINDAMYCIN PREPARATIONS

**Donald E. Ayer; Carl A. Schlagel, both of Kalamazoo, and Gordon L. Flynn, Ann Arbor, all of Mich., assignors to The Upjohn Company, Kalamazoo, Mich.**

**Continuation-in-part of Ser. No. 579,177, May 20, 1975, Pat. No. 3,980,778, which is a continuation of Ser. No. 409,427, Oct. 25, 1973, abandoned, which is a continuation-in-part of Ser. No. 316,973, Dec. 20, 1972, abandoned, which is a continuation-in-part of Ser. No. 233,337, March 9, 1972, abandoned. This application Mar. 19, 1976, Ser. No. 668,389**
**Int. Cl.² A61K** *31/56*
**U.S. Cl. 424—240** **10 Claims**

1. A therapeutic composition for topical or local application for treatment of affected dermatosis comprising an anti-inflammatory therapeutic amount of 6α,9α-difluoro-11β, 17α,21-trihydroxy-16β-methylpregna-1,4-diene-3,20-dione 17,21-diacetate, an antibacterial therapeutic amount of clindamycin or pharmaceutically acceptable salt or ester thereof and an antifungal therapeutic amount of chloroxine in association with a pharmaceutical carrier.

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### 4,018,919
## SEQUENTIAL CONTRACEPTIVE METHOD USING TWO TYPES OF PROGESTATIONAL AGENTS

**Larry J. Black, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.**

**Filed July 16, 1975, Ser. No. 596,542**
**Int. Cl.² A61K** *31/565*
**U.S. Cl. 424—242** **7 Claims**

1. A method of contraception for female mammals which comprises the administration to a female mammal of a Type B progestin during the follicular phase of the sexual cycle and a Type A progestin during the luteal phase fo the sexual cycle, at dose levels sufficient to prevent conception.

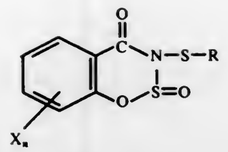
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### 4,018,920
## 3-HALOHYDROCARBYLTHIO-1,2,3-BENZOXATHIAZIN-4-(3H)-ONE 2-OXIDES

**David Cheong King Chan, San Francisco, Calif., assignor to Chevron Research Company, San Francisco, Calif.**

**Filed Apr. 1, 1976, Ser. No. 672,683**
**Int. Cl.² C07D** *291/08;* **A01N** *9/14, 15/00*
**U.S. Cl. 424—246** **7 Claims**

1. A compound of the formula



wherein R is an alkyl group of 1 to 3 carbon atoms substituted with 1 to 5 halogen atoms of atomic number 9 to 35 or an alkenyl group of 2 to 3 carbon atoms substituted with 1 to 5 halogen atoms of atomic number 9 to 35; X is halogen of atomic number 9 to 35, nitro, cyano, alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms or trifluoromethyl and *n* is 0 or an integer from 1 to 3.

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**4,018,921**

**SUBSTITUTED PHENYLGLYCYLCEPHALOSPORINS**

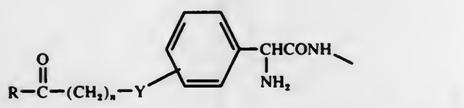
**John Gerald Gleason, Cornwells Heights, Pa., assignor to SmithKline Corporation, Philadelphia, Pa.**

**Division of Ser. No. 384,771, Aug. 1, 1973, Pat. No. 3,953,439. This application Dec. 15, 1975, Ser. No. 641,065**

**Int. Cl.² C07D** *501/22, 501/32*

**U.S. Cl. 424—246** **20 Claims**

1. A compound of the formula:





in which:

Y is O, NH or S;

*n* is one to five;

R is $NH_2$ or OR′, where R′ is hydrogen or lower alkyl of from one to four carbon atoms;

M is hydrogen or an alkali metal or ammonium cation; and

A is hydrogen, acetoxy or pyridyl.

11. A pharmaceutical composition comprising an antibacterially effective amount of a compound as claimed in claim 1 and a pharmaceutically acceptable carrier therefor.

16. A method of treating bacterial infections comprising administering by injection to a warm-blooded animal a pharmaceutical composition comprising an effective but nontoxic dose of a compound as claimed in claim 1 and a pharmaceutical carrier therefor.

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**4,018,922**

**10-(PIPERIDIN O-ALKYL)-PHENOTHIAZINES**

**Pierre Henri Deribie, Le Perreux, and Jean-Paul Lavaux, Paris, both of France, assignors to Roussel-UCLAF, Paris, France**

**Division of Ser. No. 497,995, Oct. 19, 1973, Pat. No. 3,891,636, which is a continuation-in-part of Ser. No. 252,461, May 11, 1972, abandoned. This application Mar. 25, 1975, Ser. No. 561,925**

**Claims priority, application France, Nov. 9, 1972, 72.39673; Sept. 3, 1973, 73.31698; May 14, 1971, 71.17509; May 14, 1971, 71.17510**

**Int. Cl.² A61K** *31/445, 31/54*

**U.S. Cl. 424—247** **8 Claims**

1. A compound of the formula



wherein R is selected from the group consisting of hydrogen and alkyl of 1 to 4 carbon atoms, Z′ is selected from the group consisting of hydrogen and alkyl of 1 to 10 carbon atoms, *n* is 0, 1 or 2 and A is selected from the group consisting of hydrogen, $-COOR_2$ and $-COR_1$, $R_2$ is linear alkyl of 1 to 15 carbon atoms and $R_1$ is selected from the group consisting of alkyl of 1 to 18 carbon atoms optionally substituted with a double bond or —O— and polymethoxyphenyl.

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**4,018,923**

**5,6-DIARYL-1,2,4-TRIAZINES AS TOPICALLY-ACTIVE ANTI-INFLAMMATORY AGENTS**

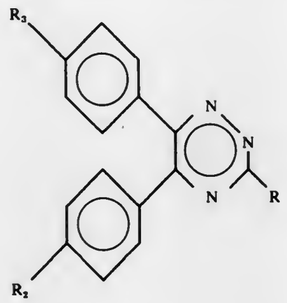
**William B. Lacefield, Indianapolis, and Peter P. K. Ho, Carmel, both of Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.**

**Filed Mar. 10, 1976, Ser. No. 665,589**

**Int. Cl.² A61K** *31/53*

**U.S. Cl. 424—249** **9 Claims**

1. A method of treating inflammation in a warm-blooded mammal which comprises topically administering to such mammal an effective amount of a compound of the formula,



wherein R is hydrogen or $-(X)_nR_1$, in which X is either O or S, *n* is an integer which is either 0 or 1, and $R_1$ is $C_1$-$C_8$ alkyl, $C_7$-$C_8$ aralkyl, $C_3$-$C_8$ cycloalkyl, or $C_4$-$C_8$ (cycloalkyl)alkyl; and $R_2$ and $R_3$ independently are halo, $C_1$-$C_3$ alkyl, $C_1$-$C_3$ alkoxy, or di($C_1$-$C_3$ alkyl)amino, with the proviso that at least one of $R_2$ and $R_3$ is halo or $C_1$-$C_3$ alkyl; and a pharmaceutically-acceptable acid addition salt of basic members thereof.

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**4,018,924**

**PHENYL-IMIDAZOLYL-ACETAMIDE DERIVATIVES**

**Karl Heinz Buchel; Werner Meiser; Manfred Plempel, all of Wuppertal-Elberfeld, and Carl Metzger, Dormagen, all of Germany, assignors to Bayer Aktiengesellschaft, Germany**

**Continuation of Ser. No. 336,025, Feb. 26, 1973, abandoned, which is a continuation-in-part of Ser. No. 38,531, May 18, 1970, Pat. No. 3,732,242. This application Jan. 9, 1975, Ser. No. 539,871**

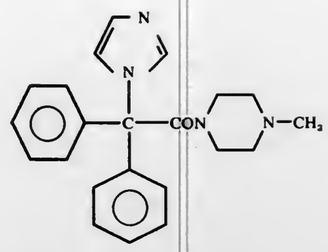
**Claims priority, application Germany, May 21, 1969, 1925994**

**Int. Cl.² C07D** *401/02*

**U.S. Cl. 424—250** **3 Claims**

1. The compound of the formula:





or a pharmaceutically acceptable nontoxic salt thereof.

2. A pharmaceutical composition useful for treating mycotic infections in humans and animals which comprises an antimycotically effective amount of the compound of claim 1 or a pharmaceutically acceptable nontoxic salt thereof in combination with a pharmaceutically acceptable nontoxic inert diluent or carrier.

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**4,018,925**

**METHOD OF ARRESTING BACTERIAL GROWTH WITH CERTAIN SELECTED DICHLORO-2,2,5,5-TETRASUBSTITUTED-3-6-PIPERAZINEDIONES**

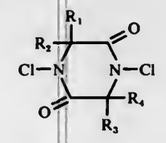
**Nicolae S. Bodor, and James J. Kaminski, both of Lawrence, Kans., assignors to Interx Research Corporation, Lawrence, Kans.**

**Division of Ser. No. 456,743, April 1, 1974, Pat. No. 3,891,649. This application Apr. 10, 1975, Ser. No. 566,743**

**Int. Cl.² A01N** *9/22*

**U.S. Cl. 424—250** **6 Claims**

1. A method of arresting bacterial growth which comprises applying to the same, an effective antibacterial amount of a compound of the formula:



wherein $R_1$, $R_2$, $R_3$, and $R_4$ are the same or different, and represent a member selected from the group consisting of an alkyl group of from 1 to 20 carbon atoms, a phenyl group, and a naphthyl group.

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**4,018,926**

**ALKYL 4-[O-(SUBSTITUTED METHYLENEAMINO)-PHENYL]-3-THIOALLOPHANATE MITICIDES AND FUNGICIDES**

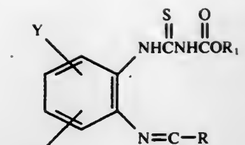
**Joel Benjamin Wommack, Jr., Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Division of Ser. No. 473,156, May 24, 1974, Pat. No. 3,958,007, and a continuation-in-part of Ser. No. 865,947, Oct. 13, 1969, Pat. No. 3,836,569. This application Jan. 13, 1976, Ser. No. 648,760**

**Int. Cl.² A01N** *9/22*

**U.S. Cl. 424—258** **14 Claims**

1. A method of preventing injury due to mites or fungi comprising applying to the locus to be protected from fungi and mites a pesticidally effective amount of a compound of the formula:



wherein

X is hydrogen, fluorine, chlorine, or bromine;

Y is hydrogen or alkyl of 1 to 4 carbon atoms;

$R_1$ is alkyl of 1 to 12 carbon atoms;

R is thienyl; furyl; naphthyl; pyridyl; quinolyl; alkyl of 1 to 12 carbon atoms; alkoxy of 1 to 3 carbon atoms or



$R_2$ is hydrogen or alkyl of 1 to 4 carbon atoms;

$R_3$ is alkyl of 1 to 4 carbon atoms, provided that $R_2$ and $R_3$ can be taken together and be $-CH_2CH_2OCH_2CH_2-$ or $-(CH_2)_m-$; when Y is alkyl, *n* is O; when Y is hydrogen, *n* is 1, 2 or 3; *m* is 4 to 6; and the sodium, potassium, lithium, calcium, barium, copper, zinc and manganese salts of these compounds.

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**4,018,927**

**TREATMENT OF PROLIFERATING SKIN DISEASES WITH PAPAVERINE ALKALOIDS**

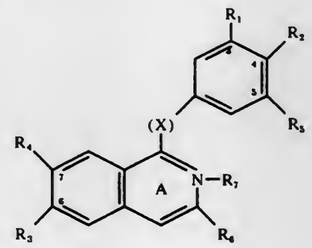
**John J. Voorhees, Ann Arbor, Mich., assignor to The Regents of the University of Michigan, Ann Arbor, Mich.**

**Continuation of Ser. No. 425,339, Dec. 17, 1973, abandoned, which is a continuation-in-part of Ser. No. 324,012, Jan. 16, 1973, abandoned. This application Nov. 20, 1975, Ser. No. 633,646**

**Int. Cl.² A61K** *31/485*

**U.S. Cl. 424—260** **4 Claims**

1. A process for treating proliferating skin diseases comprising the administration of an effective amount of a compound of the formula:



wherein X is carbonyl or $(CH_2)_n$ and *n* is zero or one; $R_1$ is hydroxy, methoxy, ethoxy or ethyl; $R_2$, $R_3$, and $R_4$ are hydrogen, hydroxy, methoxy or ethoxy; $R_5$ is hydrogen or ethoxy; $R_6$ is hydrogen or methyl; and $R_7$ is nothin, hydrogen or methyl and provided that when $R_7$ is hydrogen or methyl, the double bonds indicated in the A ring are saturated, in association with a pharmaceutical carrier to a human or animal having a proliferating skin disease.

## 4,018,928
## PYRIDYL SUBSTITUTED AMINOALKYL-THIOUREAS AND UREAS

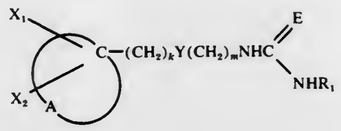
**Graham John Durant, Welwyn Garden City; John Colin Emmett, Codicote, and Charon Robin Ganellin, Welwyn Garden City, all of England, assignors to Smith Kline & French Laboratories Limited, Welwyn Garden City, England**

**Division of Ser. No. 450,931, March 13, 1974, Pat. No. 3,932,427, which is a continuation-in-part of Ser. No. 290,584, Sept. 20, 1972, abandoned, which is a continuation-in-part of Ser. No. 230,451, Feb. 29, 1972, abandoned. This application Oct. 29, 1975, Ser. No. 626,682**

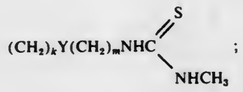
**Int. Cl.² A61K** *31/44*

**U.S. Cl. 424—263** **11 Claims**

1. A pharmaceutical composition to inhibit H-2 histamine receptors, said composition being suitable for oral or parenteral administration, comprising a pharmaceutical carrier and in an effective amount to inhibit said receptors a pyridyl compound of the formula:



wherein A is such that there is formed together with the carbon atom shown a pyridine ring; $X_1$ is hydrogen, lower alkyl, hydroxyl, trifluoromethyl, halogen, amino or



$X_2$ is hydrogen or when $X_1$ is lower alkyl, lower alkyl or halogen; $k$ is 1 or 2 and $m$ is 2 or 3, provided that the sum of $k$ and $m$ is 3 or 4; Y is NH; E is oxygen or sulphur; $R_1$ is hydrogen, lower alkyl, or dimethylaminoethyl or a pharmaceutically acceptable addition salt thereof.

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## 4,018,929
## 3-LOWERALKYLCARBAMYLSULFONAMIDO-4-PHENYLAMINOPYRIDINE-N-OXIDES, DERIVATIVES THEREOF AND PHARMACEUTICAL COMPOSITIONS CONTAINING SAME

**Jacques E. Delarge, Dolembreux; Charles L. Lapiére, Tongeren, and Andre' H. Georges, Ottignies, all of Belgium, assignors to A. Christiaens Societe Anonyme, Brussels, Belgium**

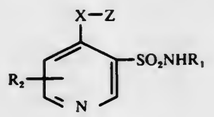
**Filed Apr. 16, 1975, Ser. No. 568,759**

**Claims priority, application United Kingdom, Apr. 17, 1974, 16836/74**

**Int. Cl.² A61K** *31/44*; **C07D** *213/71*

**U.S. Cl. 424—263** **8 Claims**

1. A compound of the following formula:



(I),

in which

X represents an amino or $C_1$-$C_4$-alkylamino group;

$R_1$ represents a group of the formula:

$R_3NHCA$ (II),

where A represents oxygen or sulfur and $R_3$ represents a $C_1$-$C_4$-alkyl, allyl, cyclohexyl, unsubstituted phenyl group or a phenyl group substituted by chloro, or a group of the formula $R_4CO$(III), wherein $R_4$ represents an unsubstituted phenyl group or a phenyl group substituted by chloro; $R_2$ represents hydrogen or a $C_1$-$C_4$-alkyl group, and Z represents a $C_1$-$C_4$-alkyl, methylfuryl, pyridyl or unsubstituted phenyl group, or a phenyl group substituted by one or two halogen atoms or by a $C_1$-$C_4$-alkyl, alkoxy, trifluoromethyl or nitro group, or by a trifluoromethyl group and a halogen atom with the provisos that:

1. when X represents an amino group, Z, $R_1$, $R_2$, $R_3$ and $R_4$ have all the above indicated meanings;
2. when X represents an alkylamino group, Z may only represent a $C_1$-$C_4$-alkyl group or a phenyl group as defined hereabove and $R_1$ may further represent a group of the formula:

$R_5CO$ (IV)

in which $R_5$ represents hydrogen or a $C_1$-$C_4$-alkyl group;

3. when X represents an amino group and Z is other than a phenyl group, $R_1$ may further represent hydrogen or a group of the formula (IV) as above defined,

as well as a pyridine N-oxide of the compound of formula I and the pharmaceutically acceptable base and acid addition salts of said compounds.

8. A pharmaceutical composition containing an anti-inflammatory or diuretic effective amount of a compound of claim 1 and a pharmaceutical carrier or vehicle.

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## 4,018,930
## SUBSTITUTED INDOLOBENZAZEPINES

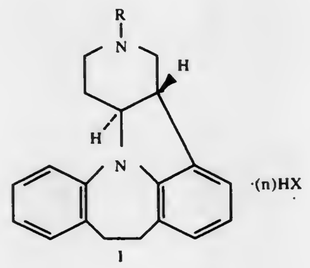
**Joel G. Berger, Freeport, N.Y., assignor to Endo Laboratories, Inc., Garden City, N.Y.**

**Continuation-in-part of Ser. No. 422,615, Dec. 6, 1973, abandoned. This application July 17, 1975, Ser. No. 596,851**

**Int. Cl.² C07D** *471/16*

**U.S. Cl. 424—267** **16 Claims**

1. Compounds of the formula



I

wherein

*n* is zero or one;

X is the anion of a pharmaceutically suitable acid; and

R is 3-chloro-2-butenyl: $C_3$-$C_8$ oxoalkyl side chain; phenacyl; 3-oxo-3-phenylpropyl; $C_3$-$C_5$ alkenyl; $C_3$-$C_5$ alkynyl; or $C_6$-$C_8$ cycloalkenylmethyl; and

the hydrogens in the 4*a* and 14*a* positions are in trans relationship to each other.



## 4,018,931
## PHARMACOLOGICALLY ACTIVE THIOUREA AND UREA COMPOUNDS

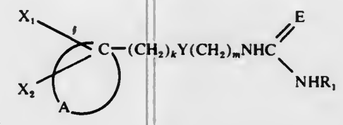
**Graham John Durant, Welwyn Garden City; John Colin Emmett, Codicote, and Charon Robin Ganellin, Welwyn Garden City, all of England, assignors to Smith Kline & French Laboratories Limited, Welwyn Garden City, England**

**Division of Ser. No. 451,333, March 14, 1974, Pat. No. 3,950,353, which is a continuation-in-part of Ser. No. 290,584, Sept. 20, 1972, abandoned, which is a continuation-in-part of Ser. No. 230,451, Feb. 29, 1972, abandoned. This application Dec. 4, 1975, Ser. No. 637,494**

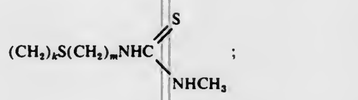
**Int. Cl.² A61K** *31/41*, *31/415*

**U.S. Cl. 424—269** **10 Claims**

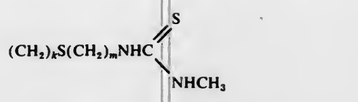
1. A pharmaceutical composition to inhibit H-2 histamine receptors comprising a pharmaceutical carrier and in an effective amount to inhibit said receptors a heterocyclic compound of the formula:



wherein A is such that there is formed together with the carbon atom shown an unsaturated heterocyclic nucleus, said unsaturated heterocyclic nucleus being an imidazole or pyrazole ring; $X_1$ is hydrogen, lower alkyl, hydroxyl, trifluoromethyl, benzyl, halogen, amino or



$X_2$ is hydrogen or when $X_1$ is lower alkyl, lower alkyl or halogen; $k$ is 0 to 2 and $m$ is 2 or 3, provided that the sum of $k$ and $m$ is 3 or 4; Y is oxygen, sulphur or NH; E is oxygen or sulphur; and $R_1$ is hydrogen, lower alkyl, benzoyl or di-lower alkylamino-lower alkyl or a pharmaceutically acceptable addition salt thereof with the proviso that $X_1$ is



only when Y and E are sulphur and $R_1$ is methyl and with the proviso that when $X_1$ is other than hydrogen or lower alkyl and $X_2$ is other than hydrogen, $X_1$ and $X_2$ are attached at carbon atoms.

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## 4,018,932
## ANTHELMINTIC POUR-ON FORMULATIONS FOR TOPICAL USE ON DOMESTIC AND FARM ANIMALS

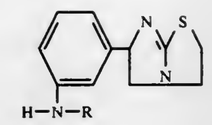
**Larry Dean Spicer, Princeton; James Michael Quinlan, Trenton, and Harold Berger, Lawrenceville, all of N.J., assignors to American Cyanamid Company, Stamford, Conn.**

**Filed Nov. 3, 1975, Ser. No. 628,458**

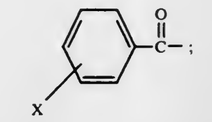
**Int. Cl.² A61K** *31/425*

**U.S. Cl. 424—270** **13 Claims**

1. A method for the control of helminths infecting homothermic domestic and farm animals comprising, directly contacting the skin of said animals with a solution containing an anthelmintically effective amount of (a) a compound of the formula:



wherein R is selected from the group consisting of lower alkanoyl and



X is selected from the group consisting of hydrogen and halogen, or (b) the racemic (dl) mixtures or (c) an optically active levorotatory isomer thereof; and wherein said compound is the free base or an acid addition salt thereof.

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## 4,018,933
## ACYLAMINOPENICILLANIC ACIDS AND PROCESS FOR PREPARING THEM

**Manfred Schorr, Frankfurt am Main; Elmar Schrinner, Wiesbaden, and Wilfried Schmitt, Kelkheim, Taunus, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany**

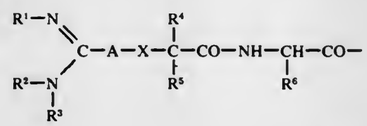
**Filed Dec. 11, 1975, Ser. No. 639,807**

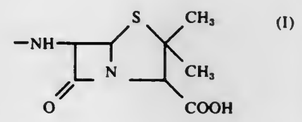
**Claims priority, application Germany, Dec. 13, 1974, 2458973**

**Int. Cl.² C07D** *499/68*, *499/70*; **A61K** *31/43*

**U.S. Cl. 424—271** **16 Claims**

1. Acylaminopenicillanic acids of the general formula I





(I)

in which $R^1$, $R^2$ and $R^3$ represent hydrogen or lower alkyl radicals which may be substituted by lower alkoxy and in which the radicals $R^1$ and $R^2$ or $R^2$ and $R^3$ may form together an alkylene radical of 2 to 4 carbon atoms which may be interrupted by oxygen or nitrogen and which may be substituted by lower alkyl radicals which may be interrupted by oxygen and wherein these substituents of the alkylene ring may further be closed to form a ring which may be interrupted by oxygen;

$R^4$ and $R^5$ represent hydrogen or lower alkyl,

$R^6$ represents phenyl which may be substituted by hydroxyl, lower alkyl, lower alkoxy or halogen; dihydrophenyl; or thienyl, furyl or pyridyl which may be substituted by lower alkyl or lower alkoxy;

A represents a benzene or thiophene ring which may be substituted by lower alkoxy, haogen or lower alkyl, and

X represents oxygen or a single bond.

4,018,934

## STABILIZATION OF IRON - COMPLEX COLORS

Thomas Holden Parliment, New City, N.Y., assignor to General Foods Corporation, White Plains, N.Y.

Filed Aug. 25, 1975, Ser. No. 607,321
Int. Cl.² A23L *1/27*
U.S. Cl. 426—540 13 Claims

1. An improved method of preparing iron-complex colors comprised of a ferric ion component and a non-ferric component selected from the group consisting of those phenols, α-hydroxy carboxylic acids, esters of α-hydroxy carboxylic acids, ethers of α-hydroxy carboxylic acids, 3-hydroxy-4-pyrone-structured compounds, and 5-hydroxy-4-pyrone-structured compounds effective to complex with said ferric ion to produce an iron-complex color, wherein the improvement comprises:

a. forming one ferric ion component by preparing a solution comprising the ferric ion component and at least an equal weight amount of an edible inert diluent; and

b. co-drying the solution.

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4,018,935

## COMMINUTED MEAT PRODUCT AND METHOD OF PREPARING SAME

Benjamin John Catlin, Rushden, and Tegwyn Pierce Williams, Great Doddington near Wellingborough, both of England, assignors to Thomas J. Lipton, Inc., Englewood Cliffs, N.J.

Continuation of Ser. No. 465,576, April 30, 1974, abandoned. This application Nov. 13, 1975, Ser. No. 631,450
Claims priority, application United Kingdom, May 4, 1973, 21232/73
Int. Cl.² A23L *1/31*
U.S. Cl. 426—646 7 Claims

5. A method for reducing shrinkage of comminuted meat products during heating comprising mixing, prior to heating, comminuted meat and 1–10% by weight dried potato pulp based on the wet weight of meat, wherein said potato pulp has had 75–100% of its starch removed.

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4,018,936

## GLUTEN TREATMENT

John T. Garbutt; Ronald C. Malzahn, and Alpha L. Morehouse, all of Muscatine, Iowa, assignors to Grain Processing Corporation, Muscatine, Iowa

Filed Oct. 16, 1975, Ser. No. 622,874
Int. Cl.² A23J *3/00*
U.S. Cl. 426—656 5 Claims

1. A method of treating gluten which comprises heating gluten to a temperature above about 255° F. under pressure for a period of not more than 420 seconds, filtering the gluten and then extracting the gluten with a water-containing, water-miscible organic solvent selected from the group consisting of ethanol, propanol, isopropanol and acetone, separating the solvent and recovering purified gluten.

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4,018,937

## ELECTRON BEAM RECORDING COMPRISING POLYMER OF 1-METHYLVINYL METHYL KETONE

Aaron William Levine, Kendall Park, and Michael Kaplan, Franklin Township, both of N.J., assignors to RCA Corporation, New York, N.Y.

Division of Ser. No. 314,975, Dec. 14, 1972, abandoned. This application Aug. 14, 1975, Ser. No. 604,707
Int. Cl.² B05C *5/00*; G03C *1/68*
U.S. Cl. 427—43 7 Claims

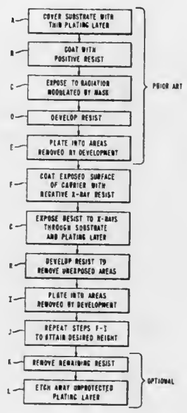
1. In a method of recording information whereby a modulated beam of electrons is scanned across a surface of a resist material which becomes more soluble in a developer solvent when impinged upon by the beam of electrons and the resist material is developed with the developer solvent so as to remove the solubilized portions thereof, the improvement which comprises employing as the resist material a polymer of 1-methylvinyl methyl ketone.

4,018,938

## FABRICATION OF HIGH ASPECT RATIO MASKS

Ralph Feder, Hyde Park, and Eberhard A. Spiller, Mount Kisco, both of N.Y., assignors to International Business Machines Corporation, Yorktown Heights, N.Y.

Filed June 30, 1975, Ser. No. 591,986
Int. Cl.² B05D *3/06*
U.S. Cl. 427—43 18 Claims




1. A method of manufacturing a mask characterized by an aspect ratio > 1 comprising the steps of:

a. providing a mask of aspect ratio ≤ 1 on a substrate transparent to radiation, said mask defined by selective areas absorbent of said radiation and,

b. coating said mask with material which becomes insoluble in a developer in response to said radiation,

c. exposing said mask and said material to said radiation with said substrate located between said mask and a source of said radiation,

d. developing said material, and

e. plating masking material absorbent to said radiation in areas in which said radiation responsive material was removed by said developing whereby the height of said radiation absorbent masking material is increased to thereby increase the aspect ratio of said mask.

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4,018,939

## METHOD OF RENDERING SURFACES NONFOGGING

Richard E. Merrill, Wakefield, and Arthur A. Massucco, Natick, both of Mass., assignors to Arthur D. Little, Inc., Cambridge, Mass.

Continuation-in-part of Ser. No. 309,332, Nov. 24, 1972, Pat. No. 3,935,367. This application May 15, 1975, Ser. No. 577,701
Int. Cl.² B05D *3/06*
U.S. Cl. 427—54 18 Claims

1. A method for improving adhesion of urethane-acrylic block copolymer nonfogging film coatings to polymeric substrate surfaces, comprising the step of subjecting said substrate to exposure to UV light in an amount of at least about 20 watts per square inch.



4,018,940

## PROCESS FOR FORMING SOLDER RESISTANT PHOTORESIST COATINGS

Charles R. Morgan, Silver Spring, Md., assignor to W. R. Grace & Co., New York, N.Y.

Division of Ser. No. 330,818, Feb. 8, 1973, Pat. No. 3,925,320, which is a continuation-in-part of Ser. No. 250,554, May 5, 1972, abandoned. This application Nov. 24, 1975, Ser. No. 634,719
Int. Cl.² B05D *3/06*
U.S. Cl. 427—54 8 Claims

1. A process of forming a solder resistant photoresist on a printed circuit board which comprises:

A. applying to the electrically conductive surface of a printed circuit board having holes therethrough a solid layer of a solder resistant photocurable composition consisting essentially of

1. a solid polyene which is a reaction product of a styrene-allyl alcohol copolymer and a member selected from the group consisting of at least one reactive unsaturated monoisocyanate and at least one reactive unsaturated monocarboxylic acid, said polyene containing at least 2 reactive carbon to carbon bonds per molecule; and

2. a liquid polythiol containing at least 2 thiol groups per molecule, the total combined functionality of (a) the reactive unsaturated carbon to carbon bonds per molecule in the polyene and (b) the thiol groups per molecule in the polythiol being greater than 4;

B. imagewise exposing selected areas of said composition to actinic radiation, thereby curing the exposed areas of said composition;

C. removing the unexposed uncured areas of the curable composition, thereby exposing the surface of said printed circuit board beneath the removed uncured areas of the composition

D. inserting the leads of electrical components where desired through the holes in the bared areas of the printed circuit board;

E. passing the printed circuit board over a flux bath, and thereafter over a solder bath maintained at a temperature in the range of 400° to 600° F, thereby soldering said electrical components to said board; and

F. removing the cured solder resistant composition from said board.

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4,018,941

## PROCESS FOR COATING POLYMERIC SUBSTRATES WITH MAR-RESISTANT COATING

Robert Jerome Tucker, Hackettstown, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Filed May 18, 1976, Ser. No. 687,576
Int. Cl.² B05D *3/06*; C08K *5/13*
U.S. Cl. 427—55 10 Claims

1. A process for coating a polymeric substrate comprising,

A. continuously contacting a clean, dust-free polymeric substrate with a mar-resistant coating composition having a viscosity of from about 50 to about 95 centipoises at room temperature, for from about 2 to about 7 minutes,

B. continuously removing the resultant coated substrate from said coating composition,

C. allowing said coating on said substrate to level, with evaporation of solvent, for from about 30 seconds to about 3 minutes, and

D. curing the resultant leveled coating by subjecting it to radiant heat at a temperature of from about 50° C. to about 130° C. for from about 1 to about 20 minutes, said mar-resistant coating composition consisting essentially of a mixture of (1), (2), (3) and (4), in which

1. is a saturated urethane prepolymer having terminal hydroxy groups which is the reaction product of materials consisting essentially of a mixture of (a) and (b), at a molar ratio of 1:2 respectively in which,

a. is an isocyanate-terminated urethane which is the reaction product of a mixture consisting essentially of (I) and (II), at a molar ratio of 1:2 respectively in which

I. is a saturated diol having a molecular weight of from about 200 to about 3,000, and

II. is a saturated organic isocyanate, (b) is a monomeric, sterically bulky, polyhydric alcohol containing 2–6 hydroxyl groups and being free of oxyalkylene units,

2. is a polyalkyl ether of a polymethylol melamine,

3. is an acid catalyst and

4. is from about 0.0% to about 5.0%, by weight, based on the total weight of solids in said composition, of an ultraviolet light absorber.

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4,018,942

## METHOD FOR THE MANUFACTURE OF A SUPERCONDUCTOR WITH A LAYER OF THE A-15 PHASE OF THE SYSTEM NB-AL OR NB-AL-GE

Alfred Müller, and Arno Fink, both of Erlangen, Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Filed Oct. 31, 1974, Ser. No. 519,676
Claims priority, application Germany, Nov. 2, 1973, 2355008
Int. Cl.² B05D *5/12*; C21D *1/00*; C22F *1/18*
U.S. Cl. 427—62 28 Claims

1. A method for the manufacture of a superconductor having a layer of the A-15 phase of the system Nb—Al comprising:

a. coating a niobium carrier with a coat having a thickness between 0.5 and 5μm by placing the carrier in an aluminum melt at a temperature between 800° and 1400° C, said aluminum melt containing sufficient niobium to saturate the aluminum melt therewith; and

b. then immediately annealing the coated niobium carrier in an inert atmosphere for 0.5 to 5 seconds at a temperature of 1700°–1960° C to thereby form a layer of $Nb—Al_3$.

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4,018,943

## METHOD OF FORMING A CONDUCTING MATERIAL FOR A CONDUCTING DEVICE

Karl J. Youtsey, Chicago; William C. Holt, Jr., Arlington Heights; Robert D. Carnahan, Barrington, and David H. Spielberg, Schaumburg, all of Ill., assignors to Universal Oil Products Company, Des Plaines, Ill.

Continuation-in-part of Ser. No. 66,521, Aug. 24, 1970, Pat. No. 3,651,386. This application Feb. 14, 1972, Ser. No. 226,035
Int. Cl.² H01L *21/64*
U.S. Cl. 427—87 12 Claims

1. A method of making a conductive composition for use in a conducting device and comprising carbonaceous pyropolymer on a refractory oxide which comprises, contacting a pyrolyzable hydrocarbon, in the vapor phase and in a nonoxidizing atmosphere, with a refractory oxide selected from the group consisting of alumina and silica-alumina and having a surface area of from about 1 to about 500 square meters per gram, at a temperature of at least 400° C and for a time sufficient to form at least a monolayer of carbonaceous pyropolymer on said refractory oxide, said temperature and time of contacting being correlated to result in said conductive composition having a conductivity of at least about $10^{-8}$ inverse ohm-centimeters and within the semiconducting range, and recovering the resulting conductive composition.

5. The method of claim 1 wherein said pyrolyzable hydrocarbon is an aromatic hydrocarbon.

6. The method of claim 5 wherein said aromatic hydrocarbon is selected from the group consisting of benzene, toluene, naphthalene and anthracene.

**4,018,944**

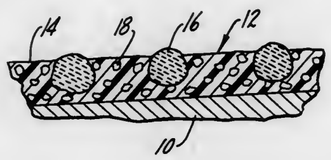
## METHOD OF APPLYING A WEARING SURFACE

**James R. Hallstrom, Brookfield; Raymond J. Hoffman, Fox Point, and Ronald L. Walling, Sussex, all of Wis., assignors to Rexnord Inc., Milwaukee, Wis.**

**Continuation of Ser. No. 414,874, Nov. 12, 1973, abandoned. This application Apr. 21, 1975, Ser. No. 570,194**

**Int. Cl.² B32B** *35/00;* **B05D** *5/00*

**U.S. Cl. 427—140** **7 Claims**




1. A method of making a surface substantially more wear resistant where the surface is subject to wear caused by impact, abrasion, erosion or corrosion, including the steps of supplying (a) an uncured curable crosslinkable thermosetting resin and (b) a curing agent for the resin, separately, in about a 2 to 1 ratio, and a thixotropic agent in an amount sufficient to prevent settling, intermixing independently in (a) and (b) both large abrasion resistant ceramic particles and much smaller coabrasion resistant filler particles of a hardness on the order of that of the material causing wear with the smaller particles dispersed in random fashion among the larger particles, mixing all the ingredients and applying the resultant mixture to the surface subject to wear and allowing it to cure and firmly adhere to the surface.

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**4,018,945**

## METHOD OF MAKING A METALLIZED VIDEO DISC HAVING AN INSULATING LAYER THEREON

**Robert Michael Mehalso, Trenton, N.J., assignor to RCA Corporation, New York, N.Y.**

**Filed June 19, 1975, Ser. No. 588,387**

**Int. Cl.² B05D** *3/06;* **G11B** *3/70, 25/04*

**U.S. Cl. 427—41** **4 Claims**

1. In the method of making an information record comprising a disc having a spiral groove in a surface thereof, said groove containing an information track constituted by geometric variations within said groove coated with a first layer of a conductive metal and a second layer of a dielectric material which is applied by glow discharging said metal coated disc in the presence of a polymeric precursor, the improvement which comprises glow discharging said applied dielectric layer in the presence of an oxygen-containing gas.

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**4,018,946**

## PRODUCTION OF HEAT-EXPANDABLE STYRENE-POLYMER BIT-PIECES

**Max Klein, New Shrewsbury, N.J., assignor to Sealed Air Corporation, Fair Lawn, N.J.**

**Continuation-in-part of Ser. No. 106,915, Jan. 15, 1971, abandoned, which is a continuation-in-part of Ser. No. 889,332, Dec. 31, 1969, abandoned, which is a continuation-in-part of Ser. No. 515,445, Dec. 21, 1965, abandoned. This application Nov. 28, 1975, Ser. No. 636,103**

**Int. Cl.² B05D** *1/18, 7/02*

**U.S. Cl. 427—222** **5 Claims**

1. A method of producing expandable discrete styrene-polymer bit-pieces impregnated with a liquid aliphatic impregnant, which aliphatic impregnant volatilizes below said polymer's softening point, said aliphatic impregant being selected from the group consisting of hydrocarbons, halogenated hydrocarbons and mixtures thereof, said polymer being insoluble in said aliphatic impregnant, said method comprising mixing a quantity of said styrene-polymer bit-pieces to be impregnated with a quantity of said aliphatic impregnant sufficient to provide the planned extend of impregnation in an aqueous solution, in an impregnator chamber which is free of moving parts, hermetically sealing said impregnator after filling it with said aqueous solution, rotating said sealed impregnator around an axis of rotation intersecting and perpendicular to the central axis of cylinder at a speed sufficient to maintain said polymer bit-pieces in agitation while heating the aqueous solution by indirect heat exchange to a temperature between at least about 104°F. and below the second order transition point of said polymer, until the planned extent of impregnation is reached, and separating the impregnated bit-pieces from the liquid phase.

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**4,018,947**

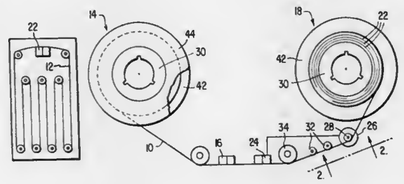
## METHOD FOR EDGE MARKING RECORDABLE WEBS

**Wayne B. Stone, Jr., 7307 Nevis Road, Bethesda, Md. 20034**

**Continuation of Ser. No. 405,904, Oct. 12, 1973, abandoned. This application Feb. 19, 1976, Ser. No. 659,565**

**Int. Cl.² B05D** *5/00*

**U.S. Cl. 427—284** **14 Claims**




1. A method of edge marking a recordable tape, comprising; establishing a tape path run onto a take-up reel; winding said tape on said reel to produce a plurality of wound tape wraps thereon; steps for offsetting the side edges of at least segments of radially spaced ones of said wraps relative to the remainder of said wraps during the winding thereof; and marking the offset side edges to contrast the remainder of the wound reel.

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**4,018,948**

## METHOD OF COMPOUNDING RUBBER

**Jeffrey W. Saracsan, Akron, and Paul H. Sandstrom, Tallmadge, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio**

**Filed Sept. 4, 1975, Ser. No. 610,212**

**Int. Cl.² B05D** *7/02;* **B32B** *25/08*

**U.S. Cl. 427—316** **2 Claims**

1. A method of adhering a polyurethane to a cured rubber stock selected from the class of natural and synthetic hydrocarbon rubbers comprising compounding a hundred parts of rubber with a sulfur curative and at least one part of a polyol of less than 7000 molecular weight selected from the class of polyester polyol, polyether polyol and hydrocarbon polyol, curing the compounded rubber adhering a coating of a polyurethane to the compounded rubber by reacting free NCO of the polyurethane with the polyol to adhere the polyurethane to the cured rubber.

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**4,018,949**

## SELECTIVE TIN DEPOSITION ONTO ALUMINUM PISTON SKIRT AREAS

**William A. Donakowski, and John R. Morgan, both of Dearborn Heights, Mich., assignors to Ford Motor Company, Dearborn, Mich.**

**Filed Jan. 12, 1976, Ser. No. 648,341**

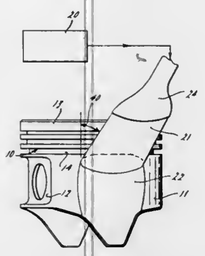
**Int. Cl.² C23F** *7/00*

**U.S. Cl. 427—327** **5 Claims**

1. A method of providing an element with operational protection against galling and corrosion at selected zones, comprising:

a. defining an aluminum piston for use in an internal combustion engine, said piston having skirts connecting side walls of said piston and each skirt having at least one selected zone thereof to be protected, said zone extending from the upper central extremity to the lower central extremity of said skirt, said selected zone for deposition occupying less than 10% of the total exterior surface of said piston,

b. cleaning said piston zone so as to be free of dirt and organic matter as well as oxides of aluminum, and




c. directing a stream of an aqueous solution containing a protective metal agent consisting essentially of potassium stannate and characterized by its ability to plate out upon momentary contact with metal substrate, said stream being maintained at a temperature of about 140° F and being directed to contact the central upper extremity of said zone and follow the surface in said zone as a laminar flow along the remainder of the zone to the central lower extremity where flow leaves the surface.

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**4,018,950**

## DURABLE PRESS FINISHING WITH CATALYSIS BY TRIAZAPHOSPHAADAMANTANE DERIVATIVES

**Robert M. Reinhardt; Donald J. Daigle, both of New Orleans, and Russell M. H. Kullman, Metairie, all of La., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.**

**Filed Sept. 19, 1975, Ser. No. 614,994**

**Int. Cl.² B05D** *3/02*

**U.S. Cl. 427—381** **2 Claims**

1. In a method of preparing wrinkle resistant textile fabrics that are composed of at least 35 weight percent of a cellulosic fiber wherein said textile materials are:

a. impregnated with an aqueous solution comprised of 5 to 20% by weight of a methylol amide crosslinking agent and a catalyst; and

b. dried and cured, the improvement wherein the catalyst is contained in said aqueous solution in amounts equal to 0.2% to 6% by weight and is selected from the group consisting of salts of 1,3,5-triaza-7-phosphaadamantane and inorganic, organic, and sulfonic acids, salts of 1,3,5-triaza-7-phosphaadamantane-7-oxide and inorganic, organic, and sulfonic acids, and mixed salt complexes of 1,3,5-triaza-7-phosphaadamantane, an organic acid, and an inorganic salt.

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**4,018,951**

## ABSORBENT ARTICLES AND METHODS FOR THEIR PREPARATION

**James R. Gross, Lake Jackson, Tex., assignor to The Dow Chemical Company, Midland, Mich.**

**Division of Ser. No. 468,794, May 9, 1974, Pat. No. 3,980,663, which is a continuation-in-part of Ser. No. 371,909, June 20, 1973, abandoned. This application May 9, 1975, Ser. No. 575,919**

**Int. Cl.² B05D** *3/00, 3/02;* **C08L** *31/02, 33/02*

**U.S. Cl. 427—401** **5 Claims**

1. A method of preparing a substantially dry, water swellable polyelectrolyte film which comprises the steps of

A. applying a coating on an impervious substrate wherein the coating comprises

1. a solution of a carboxylic synthetic polyelectrolyte wherein the solution consists of water, lower alcohols, or mixtures thereof and about 5 to about 60% by weight of a carboxylic polyelectrolyte, and

2. at least about 0.1% by weight based on the polyelectrolyte of a crosslinking agent reactive with carboxylate groups

B. heating said coated substrate to a temperature greater than about 30° C. to crosslink said polyelectrolyte to form a film, and

C. separating said crosslinked polyelectrolyte film from said substrate.

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**4,018,952**

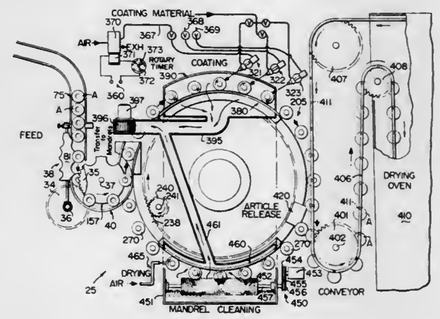
## SPRAY-COATING METHOD

**Roger S. Brigham, deceased, late of Crete, Ill., and by Loraine M. Brigham, heir, Harwood Heights, Ill., assignors to Continental Can Company, Inc., New York, N.Y.**

**Division of Ser. No. 116,673, Feb. 18, 1971, Pat. No. 3,989,001, which is a continuation of Ser. No. 603,709, Dec. 16, 1966, abandoned. This application May 24, 1976, Ser. No. 689,246**

**Int. Cl.² B05D** *1/02*

**U.S. Cl. 427—425** **1 Claim**




1. A method of spray-coating container bodies comprising the steps of conveying a plurality of conveyor bodies along a predetermined path, disposing a plurality of spray nozzles adjacent a portion of the path for directing coating material against the container bodies, rotating the container bodies during travel thereof along said path portion, providing a source of coating material, placing the spray nozzles in fluid communication with the source of coating material, and sequentially actuating the spray nozzles to direct coating material from a first spray nozzle against a first circumferential portion of a container body and the entire axial length thereof but not completely about the entire circumference thereof, and thereafter directing coating material from a second spray nozzle against a portion of the first circumferential portion and a second circumferential portion of said container body and the entire length thereof thereby circumferentially overlapping the coating materials in the absence of a complete overlapping of the entire circumference of the container body.

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**4,018,953**

## COATING METHOD

**Arthur C. Martellock, Pittsford, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

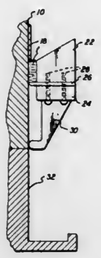
**Filed Aug. 12, 1976, Ser. No. 713,764**

**Int. Cl.² B05D** *1/00;* **B05C** *3/02*

**U.S. Cl. 427—430 R** **7 Claims**

1. A method for applying a thin coating of a hardenable liquid material to the surface of a cylindrical substrate which comprises:

a. mounting the cylindrical substrate in vertical disposition, on a vertically elongated pedestal having the same diameter as that of the cylinders;
b. providing an applicator collar comprising a ring having an inside diameter larger than the outside diameter of the cylinder; said ring having along its inside surface a resilient ring-shaped gasket attached to the ring in such a manner that a leakproof trough is formed when the collar is slideably mounted on the cylinder by sliding it over an end thereof and providing guide fingers depending from



said ring whereby to maintain said collar in a perpendicular relationship with the cylinder axis;
c. mounting the coating collar on the outside of the cylinder by sliding it over an end thereof;
d. adding the hardenable liquid to the trough formed by the ring, gasket and cylinder while the cylinder is in a vertical position; and
e. sliding the applicator collar down the full length of the cylinder and onto the pedestal to leave a thin coating of the liquid on the outer surface of the cylinder.

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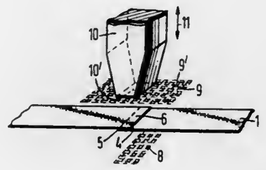
**4,018,954**
**SHEET MATERIAL**
**Osamu Fukushima; Kazuo Nagoshi, and Toshiaki Iwamoto, all of Kurashiki, Japan, assignors to Kuraray Co., Ltd., Kurashiki, Japan**
**Continuation-in-part of Ser. No. 64,721, Aug. 18, 1970, abandoned. This application Oct. 29, 1974, Ser. No. 518,829**
**Int. Cl.² B32B** *5/24*
**U.S. Cl. 428—86** **10 Claims**



1. A sheet material having leather-like grain, excellent scuffing and abrasion resistance and superior dyeability comprising in combination a fibrous substrate, an intermediate layer consisting of a finely napped porous polymeric layer bonded to said substrate and an upper layer consisting of a non-porous laminar polymeric layer completely covering and bonded to said finely napped porous polymeric layer,
said finely napped porous polymeric layer having a thickness of about 0.05 to 2.5 mm., a density of about 0.25 to 0.5 g/cc, a nap length of about 0.03 to 0.5 mm., and minute pores of about 0.1 to 100 microns in diameter, and
said non-porous polymeric layer having a thickness of 1–100 microns and consisting of a laminar structure of at least two polymeric laminae exhibiting different physical properties, of which the lamina thereof bonded to said finely napped porous polymeric layer consists of a cross-linked polyurethane elastomer.

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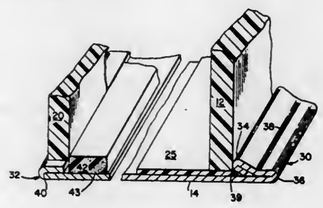
**4,018,955**
**PROCESS FOR PRODUCING A RING-SHAPED ONE-COLOR OR MULTI-COLOR RIBBON AND A RIBBON PRODUCED IN ACCORDANCE WITH THIS PROCESS**
**Guenter Klaüke, Munich, and Anton Wimmer, Bad Toelz, both of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany**
**Filed July 29, 1975, Ser. No. 600,059**
**Claims priority, application Germany, July 31, 1974, 2436928**
**Int. Cl.² B32B** *31/20*
**U.S. Cl. 428—57** **6 Claims**



1. In a ring-shaped ribbon made of thermoplastic material having at least one color track and formed from a strip of the ribbon of finite length, the end portions of which are overlapped and fused to form a continuous ribbon, the improvement wherein the overlapped end portions of the ribbon strip are welded in grid form to provide a series of spaced welded line joints having ink-bearing cells therebetween.
3. In the method of making a ring-shaped thermoplastic ribbon having at least one color track, by overlapping the end portions of a strip of the ribbon of finite length and fusing said end portions to form a continuous ribbon, the improvement wherein said end portions are fused by welding same under conditions of pressure and temperature in a grid form to retain ink-saturated cells within said end portions.

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**4,018,956**
**METHOD OF MAKING A DIFFERENTIALLY SHRUNK FLOCKED FABRIC, AND FLOCKED FABRIC PRODUCT**
**James P. Casey, Seekonk, Mass., assignor to Microfibres, Inc., Pawtucket, R.I.**
**Filed Oct. 3, 1975, Ser. No. 619,212**
**Int. Cl.² D03D** *27/00;* **D04H** *11/00*
**U.S. Cl. 428—86** **29 Claims**



29. A differentially shrunk fabric having a novel three-dimensional design, said fabric comprising a differentially shrunken substrate having adhesive and a plurality of upstanding flock fibres affixed thereto,
said substrate being composed of a design area and a background area adjacent thereto,
said background area being shrunken more tightly than said design area,
wherein said flock fibres are applied only to said design area and other flock fibres are applied to said background area,
said other fibres also being overflocked on top of said flocked fibres applied to said design area.



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**4,018,957**
**COATED FABRIC SHEET-TYPE MATERIAL HAVING RESILIENT BACKING AND PROCESS FOR MAKING SAME**
**Jesse Werner, New York, N.Y., and Gordon R. Rugg, Allentown, Pa., assignors to GAF Corporation, New York, N.Y.**
**Filed Apr. 1, 1975, Ser. No. 564,155**
**Int. Cl.² B32B** *3/00, 3/30*
**U.S. Cl. 428—141** **14 Claims**




1. A flexible, decorative sheet-type covering material comprising:
a. a decorative textured fabric base, said fabric having a height variation between about 4 and about 16 mils;
b. a transparent, flexible polyurethane or PVC wear layer at least about 4 mils thick adhered to the face of the fabric and having a surface height variation of at least about 4 mils due to the texture of the fabric; and
c. a resilient backing layer of foamed material between about 50 and about 250 mils thick and having a density between about 10 and about 40 lbs/ft³ adhered to the back of the fabric.

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**4,018,958**
**HIGH-FREQUENCY RASTER WITH IRREGULAR STRUCTURE OF RASTER ELEMENTS**
**Viktoria Ivanovna Andreeva, 3 Rybinskaya ulitsa, 21, korpus 2, kv. 249; Alexandra Ljudovikovna Popova, ulitsa Usievicha, 3, kv. 88, and Veniamin Semenovich Lapatukhin, Teply Stan, ulitsa Ostrovityanova, mikroraion 1a, korpus 16, kv. 16, all of Moscow, U.S.S.R.**
**Division of Ser. No. 451,599, March 15, 1974, Pat. No. 3,976,523. This application Dec. 24, 1975, Ser. No. 644,175**
**Int. Cl.² B32B** *3/00;* **C03C** *15/00, 25/06*
**U.S. Cl. 428—141** **1 Claim**

1. An optical high-frequency raster with an irregular structure of raster elements, the raster comprising a substantially plane-parallel glass plate mechanically ground on both sides to obtain a uniform surface structure and having transparent microroughnesses on both surfaces, the microroughnesses having a value Ra equal to 0.2 to 0.26 mμ, washed with water and subjected to multiple etching, at least three times, to obtain the transparent microroughnesses, whereby the resulting raster has a high resolving power of at least 25 $mm^{-1}$, and is capable of transmitting an interval of optical densities between approximately 1.0 and 1.2.

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**4,018,959**
**CORRUGATING ADHESIVE COMPOSITIONS CONTAINING THERMOPLASTIC POLYMER, THERMOSETTING RESIN, AND STARCH**
**Paul R. Demko, Edison; Frank J. Washabaugh, Titusville, and Robert H. Williams, Piscataway, all of N.J., assignors to National Starch and Chemical Corporation, Bridgewater, N.J.**
**Continuation-in-part of Ser. No. 537,174, Dec. 30, 1974, abandoned. This application Dec. 10, 1975, Ser. No. 639,273**
**Int. Cl.² B32B** *3/28;* **C08L** *3/02*
**U.S. Cl. 428—182** **12 Claims**

1. A corrugating adhesive composition capable of yielding dry films which are characterized by their outstanding water resistance and thermal stability; said adhesive composition comprising a mixture of (a) a crosslinkable polymer in aqueous emulsion form selected from the group consisting of vinyl acetate homopolymers, copolymers of vinyl acetate with one or more ethylenically unsaturated copolymerizable comonomers, and copolymers of $C_1$–$C_8$ alkyl esters of acrylic and methacrylic acids with one or more ethylenically unsaturated copolymerizable comonomers; (b) an ungelatinized starch which is present in amount ranging from 0.5 to 6.0 times the amount of the resinous content of said polymer, (c) a thermosetting resin selected from the group consisting of dimethylol ethylene urea, dimethylol methoxy ethyl carbamate, dimethylol isobutyl carbamate, dimethylol hydroxyethyl triazone, methylated methylol melamine, melamineformaldehyde, and urea-formaldehyde; said thermosetting resin being present in an amount ranging from about 0.1 to about 5.0% by weight, of the total composition, (d) an acidic metal salt curing agent selected from the group consisting of chromium nitrate, chromium perchlorate, zirconium nitrate, aluminum chloride, zirconium oxychloride, aluminum sulfate and aluminum nitrate; said acidic metal salt curing agent being present in an amount ranging from about 0.1 to about 2.0%, by weight, of the total composition, and (e) water; said composition having a viscosity of from about 100 to 2500 cps.

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**4,018,960**
**BELTING FOR SAFETY BELTS**
**Johann Berger, Gutenbergstr. 48/1, and Josef Berger, Karl-Lullig-Str. 59, both of 707 Schwabisch Gmund, Germany**
**Filed Sept. 24, 1975, Ser. No. 616,304**
**Claims priority, application Germany, Oct. 1, 1974, 2446837; Feb. 28, 1975, 2508732; May 13, 1975, 2521124**
**Int. Cl.² B32B** *3/02*
**U.S. Cl. 428—193** **15 Claims**




1. Woven belting for safety belts including:
a longitudinally extending, single layer woven belt portion of textile material having warp and weft threads and having opposite longitudinal side margins, and
at least one protective profiled element extending along one of said side margins,
said protective profiled element being in the form of a woven tube of textile material having warp and weft threads and a weave in which 3/1 alternates with 1/3,
said protective element being integral with said belt portion with said woven tube and belt portion having common weft threads,
wherein the coefficients of elongation at break of the warp threads of the said element are higher by a percentage *a* than the coefficients of elongation at break of the warp threads of the belt portion and the percentage *a* is at least substantially equal to a percentage *b* by which in a predetermined length of belting the actual lengths of the warp threads of the belt portion are greater than the actual lengths of the warp threads of the said element.

**4,018,961**

## LAMINAR ROLLER RINK SURFACE HAVING HIGH SOLIDS CONTENT PRIMER LAYER

**Barton B. Noll, Blue Springs, Mo., assignor to R. C. Sports, Inc., Olathe, Kans.**

**Continuation-in-part of Ser. No. 664,449, March 8, 1975, Pat. No. 3,993,823. This application Oct. 15, 1976, Ser. No. 732,886**

**Int. Cl.² B32B** *3/28*

**U.S. Cl. 428—213** **17 Claims**

1. A laminar floor construction, comprising: a porous substrate;
   - a cured primer layer applied over said substrate and including the dried residue of a first synthetic resin mixture which includes an epoxy resin and a curing agent therefor and has a solids content ranging from about 85 to 100%;
   - a cured resiliency layer applied over and bonded to said primer layer, said resiliency layer having a thickness of from about 0.030 to 0.500 inches and comprising the dried residue of a second synthetic resin mixture which includes an epoxy resin and a curing agent therefor; and
   - a finishing layer applied over and bonded to said resiliency layer and including the dried residue of a third synthetic resin mixture which presents a floor surface.

9. The laminar floor construction of claim 1 wherein said primer layer is from about 0.030 to 0.500 inches in thickness.

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**4,018,962**

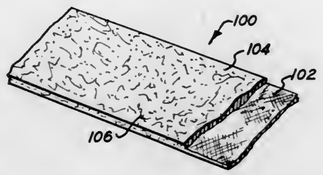
## ARC AND FIREPROOFING TAPE

**J. Watson Pedlow, 2500 Pine Oak Drive, Media, Pa. 19063**

**Filed Apr. 9, 1975, Ser. No. 566,170**

**Int. Cl.² C09K** *3/28*

**U.S. Cl. 428—245** **9 Claims**




1. An electrical arc and fire protective tape for disposition about electrical equipment, cables, cable splices, appurtenant equipment or the like, comprising a resinous mixture coated as a heat fused film of thermoplastic resinous particles in a plasticizer upon a fabric base, said resinous film having evenly distributed therein a heat resistant fiber, heat stable over the melting point of said thermoplastic film, and fire-retardant and intumescing substances, said fiber adapted to hold the heat moltent thermoplastic from flowing, said resinous coating mixture containing no water other than chemically combined water, said fire-retardant and intumescing substances in coated position upon the fabric base protectively mounted about said electrical equipment being heat activated at high arcing and flaming temperatures to release fire protective gases to convert said protective coating into a heat insulating foam upon said electrical equipment.

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**4,018,963**

## LARGE LIGHTWEIGHT GYPSUM ARTICLE AND A PROCESS FOR THE PRODUCTION THEREOF

**Masanobu Fuji, Sagamihara, and Kuniomi Suzuki, Tokyo, both of Japan, assignors to Taisei Kensetsu Kabushiki Kaisha, Japan**

**Filed May 20, 1975, Ser. No. 579,325**

**Claims priority, application Japan, May 21, 1974, 49-56134**

**Int. Cl.² D04H** *13/00*

**U.S. Cl. 428—294** **22 Claims**

1. A large lightweight fire-resistant gypsum article which comprises anhydrous or hemihydrous gypsum, ettringite and reinforcing members, the weight ratio of said ettringite to the gypsum being 10 to 100%.

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**4,018,964**

## METHOD FOR PREPARING GLASSY FIBER HAVING PROTUBERANCES STUDDED ON THE SURFACE USEFUL FOR REINFORCEMENT AND RESULTING PRODUCT

**Takashi Otouma; Susumu Aoki, both of Yokohama; Toshiaki Minaki, Yamato-kooriyama; Kenichi Shibata, Nara, and Kentaro Mori, Tokyo, all of Japan, assignors to Nippon Asbestos Company, Ltd., Tokyo, Japan**

**Filed July 23, 1974, Ser. No. 491,499**

**Claims priority, application Japan, July 27, 1973, 48-83984; July 27, 1973, 48-83985**

**Int. Cl.² C03B** *37/04*

**U.S. Cl. 428—372** **9 Claims**

1. A method of preparing glass fiber having protuberances studded in the fiber for use as a reinforcing material, which comprises
   - mixing 100 parts by weight of glass fiber components with 5–25 parts by weight of a protuberance-forming substance selected from the group consisting of zirconia, zircon-sand, disapore and fused alumina,
   - heating the mixture in a cupola furnace at a temperature of 1320°–1450° C, and
   - fiberizing the resultant melt, containing both unmelted and melted portions of the protuberance-forming substance, by a spinner of blowing technique to form glass fiber having protuberances studded in the fiber in a volume of 0.1–3.0% based on the volume of the body of the fiber.

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**4,018,965**

## PHOTOCHROMIC SHEET GLASS COMPOSITIONS AND ARTICLES

**David J. Kerko, and Thomas P. Seward, III, both of Corning, N.Y., assignors to Corning Glass Works, Corning, N.Y.**

**Filed Apr. 14, 1975, Ser. No. 567,925**

**Int. Cl.² B32B** *17/00;* **C03C** *21/00, 3/26;* **G02C** *7/02*

**U.S. Cl. 428—410** **9 Claims**

1. A chemically-strengthened photochromic drawn sheet glass article formed of a glass having a composition consisting essentially, in weight percent as calculated from the batch, of about 54–66% $SiO_2$, 7–15% $Al_2O_3$, 10–25% $B_2O_3$, 0.5–4.0% $Li_2O$, 3.5–15% $Na_2O$, 0–10% $K_2O$, 6–16% total of $Li_2O + Na_2O + K_2O$, 0–3.0% PbO, 0.1–1.0% Ag, 0.1–1.0% Cl, 0–3.0% Br, 0–2.5% F, 0.008–0.16% CuO, 0–1.0% total of transition metal oxide colorants, and 0–5.0% total of rare earth metal oxide colorants, said composition providing a glass having a viscosity at the liquidus temperature thereof of at least about $10^4$ poises, said article having excellent chemical durability, an unabraded modulus of rupture strength of at least about 45,000 psi, and a compressively-stressed surface layer at least about 3.5 mils in thickness, and said glass being haze-free and having, in a thickness not exceeding 1.7 millimeters, a darkened luminous transmittance not exceeding about 25%, a clear luminous transmittance of at least about 60%, and a fading rate such that the glass exhibits a faded luminous transmittance at least about 1.5 times the darkened luminous transmittance after a 5-minute fading interval from the darkened state.



**4,018,966**

## COMPOSITIONS CONTAINING A REACTIVE HYDROXYL-CONTAINING VINYL CHLORIDE POLYMER

**George J. Antlfinger, Avon Lake, and Richard F. Reinhart, Elyria, both of Ohio, assignors to The B. F. Goodrich Company, Akron, Ohio**

**Continuation of Ser. No. 313,603, Dec. 8, 1972, abandoned. This application May 27, 1975, Ser. No. 581,169**

**Int. Cl.² C08K** *5/07;* **C08L** *27/06*

**U.S. Cl. 428—423** **17 Claims**

1. A coating composition comprising an organic solvent having dissolved therein a hydroxyl-containing terpolymer comprised of in copolymerized form (a) from about 40% to about 90% by weight of vinyl chloride, (b) from about 10% to about 60% by weight of vinylidene chloride or vinyl acetate, and (c) from about 2% to about 20% by weight of hydroxypropyl acrylate or hydroxypropyl methacrylate, and a reactive thermosetting resin selected from the group consisting of urea-formaldehyde resins, melamine resins, and isocyanate resins.

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**4,018,967**

## MAGNETIC RECORDING TAPE

**Hermann Roller, Ludwigshafen; Werner Senkpiel, Laudenbach; Gerd Wunsch, Speyer; Job-Werner Hartmann, Ludwigshafen; Friedrich Fuchs, Kirchheim; Joachim Hack, Ludwigshafen; Volker Kiener, Ludwigshafen; Herbert Motz, Ludwigshafen, and Werner Ostertag, Willstaett, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany**

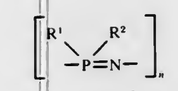
**Filed Sept. 19, 1974, Ser. No. 507,466**

**Claims priority, application Germany, Oct. 5, 1973, 2350062**

**Int. Cl.² H01F** *10/02*

**U.S. Cl. 428—425** **6 Claims**

1. In a magnetic recording tape of the type comprising
   1. a base; and
   2. a magnetic coating carried on said base, said coating consisting essentially of a dispersion of a finely divided magnetic pigment and at least one lubricant in an organic binder, the improvement which comprises: using as a lubricant in said coating at least one compound of the formula (1)



in which $n$ is an integer of from 3 to 8, R′ and R² are identical or different and are alkoxy or aralkoxy of 3 to 18 carbon atoms, alkoxy and aralkoxy substituted with bromine or chlorine or R′ and R² conjointly are a —O—R³—O— radical in which R³ is a divalent aliphatic radical of 3 to 18 carbon atoms, wherein said compound of the Formula I constitutes from about 20 to about 100% by weight of the lubricant in the coating.

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**4,018,968**

## COATED MAGNETIC RECORDING MEDIA

**Ute Neumann, Frankenthal; Hermann Roller, Ludwigshafen; Job-Werner Hartmann, Ludwigshafen; Joachim Hack, Ludwigshafen; Herbert Motz, Ludwigshafen, and Werner Ostertag, Willstaett, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany**

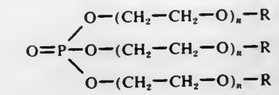
**Filed Sept. 19, 1974, Ser. No. 507,457**

**Claims priority, application Germany, Oct. 5, 1973, 2350063**

**Int. Cl.² H01F** *10/02*

**U.S. Cl. 428—539** **5 Claims**

1. A coated magnetic recording medium comprising a base carrying a magnetic coating which consists essentially of a dispersion of a finely divided magnetic pigment and a lubricant in an organic binder, wherein the said lubricant contains 20 to 100% by weight of a compound of the formula (1)



wherein $n$ is an integer of from 1 to 30 and R is alkyl, alkoxyalkyl or aralkyl, each of 3 to 18 carbon atoms.

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**4,018,969**

## ELECTROCHEMICAL STORAGE CELL

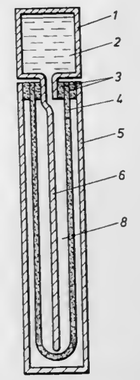
**Wilfried Fischer, Neckargemund; Herbert Kleinschmager, Eppelheim; Wilheim Haar, Sandhausen; Gert Weddigen, Hd-Neuenheim, and Franz-Josef Rohr, Absteinach, all of Germany, assignors to Brown, Boveri & Cie. A.G., Mannheim, Germany**

**Filed Mar. 26, 1976, Ser. No. 670,864**

**Claims priority, application Germany, Mar. 27, 1975, 2513651**

**Int. Cl.² H01M** *10/00*

**U.S. Cl. 429—104** **12 Claims**




1. In an electrochemical storage cell or battery based on alkali metal and sulfur with at least one anode chamber containing alkali metal and one cathode chamber containing alkali sulfide compounds which are separated from each other by an ion-conducting solid electrolyte, the improvement comprising at least partially dissolved alkali sulfide compounds in the cathode chamber, in an organic liquid solvent with a boiling point above the operating temperature of the electrochemical storage cell, said operating temperature of the cell being in the range of about 100° to 200° C.

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**4,018,970**

## ELECTRIC CELL

**Yves Jumel, and Jean-Paul Gabano, both of Poitiers, France, assignors to Saft-Societe des Accumulateurs Fixes et de Traction, Romainville, France**

**Filed Oct. 10, 1975, Ser. No. 621,383**

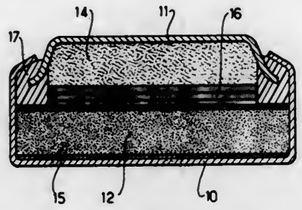
**Claims priority, application France, Oct. 17, 1974, 74.34867; June 30, 1975, 75.20497**

**Int. Cl.² H01M** *6/14*

**U.S. Cl. 429—162** **25 Claims**

1. Electric cell powering delicate equipment such as watches, said cell having a positive electrode comprising a positive active mterial and an electronic conductor in intimate mixture with it, a negative electrode and an electrolyte whose solvent is a non-aqueous liquid, characterized in that the said

electronic conductor and the reduction product of the positive active material resulting from the discharge of the cell having a decomposition overvoltage with respect to the said solvent such that the decomposition of the said solvent takes place at




a voltage lower than the reduction voltage of the positive active material during the discharge of the cell, thereby reducing the voltage peak at the beginning of cell discharge to close the desired discharge voltage level during use of the cell.

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**4,018,971**

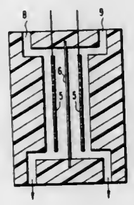
**GELS AS BATTERY SEPARATORS FOR SOLUBLE ELECTRODE CELLS**

**Dean W. Sheibley, Sandusky, and Randall F. Gahn, Columbia Station, both of Ohio, assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.**

**Filed July 20, 1976, Ser. No. 707,124**

**Int. Cl.² H01M** *6/00*

**U.S. Cl. 429—105** **27 Claims**




**8.** An ionic transport membrane comprising a microporous substrate which contains an ion transport medium comprising a gel of hydrochloric acid and powdered silica.

**18.** An electrical storage device comprising an anode, an anodic fluid, a cathode, a cathodic fluid and between said anodic and cathodic fluid, an ionic transport membrane comprising a microporous substrate which contains an ion transport medium comprising a gel of hydrochloric acid and powdered silica.

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**4,018,972**

**ANTIBACTERIAL AGENTS CIS-BM123$\gamma_1$ AND CIS-BM123$\gamma_2$**

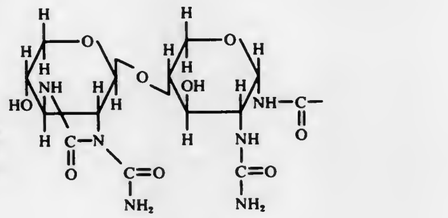
**Joseph John Hlavka, Tuxedo Park, N.Y., assignor to American Cyanamid Company, Stamford, Conn.**

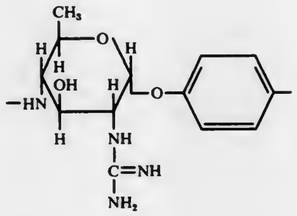
**Filed Mar. 8, 1976, Ser. No. 664,321**

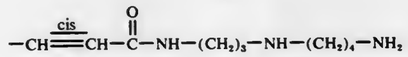
**Int. Cl.² C07H** *15/22*

**U.S. Cl. 536—17** **2 Claims**

**1.** A compound selected from the group consisting of antibacterial cis-BM123$\gamma_1$ of the formula:







and the pharmacologically acceptable acid-addition salts thereof.



**4,018,973**

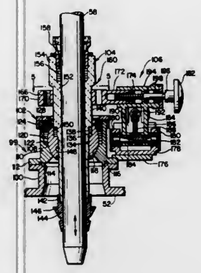
**FURNACE CONSTRUCTION FOR PLASMA ARC REMELTING OF METAL**

**Boris Evgenievich Paton, Apt. 21, 11/13, Kotsubinskogo Str.; Victor Iosifovich Lakomsky, Bastionoja, ul. 10; Gary Alexandrovich Melnik, ul. Prazhskaya 3, kv. 169; Anatoli Ivanovich Chvertko, Blvd. Lesiga, Ukrainka 2, and Alfred Iosifovich Bukalo, Apt. 69, 8/2, Zaporozhtsa Str., all of Kiev, U.S.S.R.**

**Division of Ser. No. 498,937, Aug. 20, 1974, which is a division of Ser. No. 409,329, Oct. 24, 1973, Pat. No. 3,849,584. This application Feb. 20, 1976, Ser. No. 659,908**

**Int. Cl.² H05H** *1/26*

**U.S. Cl. 13—9 ES** **33 Claims**



**1.** A plasma arc remelting installation for producing ingots comprising: a hermetically sealable chamber; an ingot- forming mold contained in said chamber; a plurality of plasma arc torch means positioned above said mold; an electric power supply source, said torch means connectable so as to supply plasma to melt metal; and means enabling a metal charge to be arranged for melting in the plasma arcs and the molten metal therefrom to be solidified in said mold to form an ingot, at least one of said plasma arc torch means including a plasma arc torch, a ball and socket assembly providing a sealed mounting for enabling projection of said torch from exterior to interior of said chamber so the torch nozzle is disposed within said chamber and enabling adjustment of said torch and an adjustment control mechanism mounted on said furnace adjacent to said ball and socket assembly coacting with said torch to provide and enable infinitely variable universal inclination adjustment of said torch during remelting and including at least two independently operable control members to accomplish the variable universal inclination.

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**4,018,974**

**DIRECT CURRENT ARC FURNACE**

**Conny Andersson, Viken, and Sven-Einar Stenkvist, Vasteras, both of Sweden, assignors to ASEA Aktiebolag, Vasteras, Sweden**

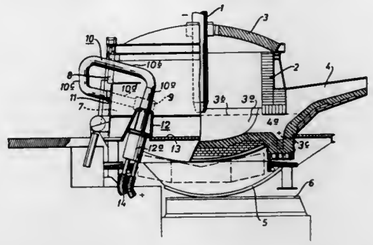
**Filed Dec. 11, 1975, Ser. No. 639,916**

**Claims priority, application Sweden, Dec. 12, 1974, 7415575**

**Int. Cl.² H05B** *7/00*

**U.S. Cl. 13—9 R** **2 Claims**

**1.** A DC arc furnace comprising a hearth through which electric power can be transmitted to a melt when formed on the hearth, an enclosure for the hearth, at least one arcing electrode extending through said enclosure for initially melting a charge of solid metal on said hearth and thereafter heating the resulting melt, said enclosure having at least one permanent opening required for normal operation of the furnace, a starting electrode through which electric power is transmitted to a charge of solid metal on said hearth until the charge is melted down to a melt on the hearth, and means on the outside of said enclosure for mounting said starting electrode movably so it can be inserted into said enclosure through said permanent opening and into contact with a charge of solid metal on said hearth for initially melting down the charge and for thereafter removing the starting electrode from the enclosure through the permanent opening, said means being provided by a pivotal mounting offset laterally from said enclosure and said starting electrode being made with a portion



mounted by said pivotal mounting and formed so as to extend therefrom via a lever arm to a curved portion which can pass through said permanent opening by swinging via said lever arm, arcuately about said pivotal mounting.

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**4,018,975**

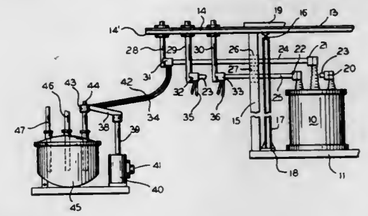
**SUSPENSION MEANS FOR ELECTRIC FURNACE TRANSFORMER SECONDARY BUSES**

**Girish H. Kothari, Pittsburgh, Pa., assignor to Pennsylvania Engineering Corporation, Pittsburgh, Pa.**

**Filed Mar. 21, 1975, Ser. No. 560,330**

**Int. Cl.² H05B** *7/10*

**U.S. Cl. 13—12** **22 Claims**



**12.** A transformer vault having walls, an electric furnace and an electric transformer, said furnace being outside of said vault and said transformer being inside of said vault, at least one of said walls having one or more openings, a plurality of bus bars extending from said transformer through selected openings outwardly of said vault, structural members generally defining said vault and:

a. cantilever beam means mounted on selected ones of said structural members and extending generally away from said vault and outside thereof at a level above said outwardly extending bus bars,

b. support means mounted on said cantilever beam means outside of said vault, and

c. means for mounting bus bars on said support means

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**4,018,976**

**KICKLESS RESISTANCE WELDING CABLE AND METHOD OF MAKING THE SAME**

**Earl I. Grove, 7220 Muerdale, West Bloomfield, Mich. 48033**

**Filed Apr. 15, 1976, Ser. No. 670,186**

**Int. Cl.² H01B** *7/34*

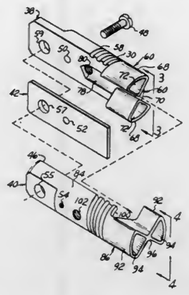
**U.S. Cl. 174—19** **10 Claims**

**1.** A water-cooled resistance welding cable with an uninterrupted copper welding current path, said cable comprising

an elongated welding cable conductor assembly including a plurality of laterally-spaced flexible elongated stranded copper wire conductors of intended opposite electric polarities with an elongated separator of insulating material disposed therebetween and a flexible elongated tubular insulating casing surrounding said conductors,

a terminal connected to each of the opposite ends of said conductor assembly,

said terminal comprising a pair of copper terminal components disposed adjacent one another in laterally-spaced relationship and adapted to carry electric current of opposite polarities and connected to said con-



ductors of the same intended electric polarities, and an insulator disposed in the space between said components,

and copper-welded electrical connections disposed between the opposite end portions of said conductors and their respective terminal components.

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**4,018,977**

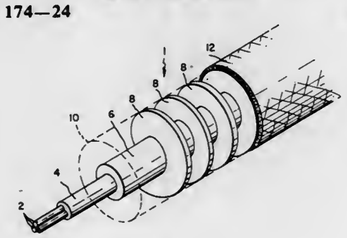
**HIGH VOLTAGE CABLE WITH AIR DIELECTRIC**

**Henry Otto Herrmann, Jr., Mount Joy, and Douglas Wade Glover, Harrisburg, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.**

**Continuation-in-part of Ser. No. 601,700, Aug. 4, 1975, abandoned. This application July 2, 1976, Ser. No. 702,266**

**Int. Cl.² H01B** *7/02*

**U.S. Cl. 174—24** **8 Claims**



1. A high voltage cable, comprising:

a center conductor,

a layer of solid insulation encircling said conductor,

a cover of air permeable flexible material enclosing said layer of solid insulation, said cover being impervious to dust particles and defining a dust free unpressurized air space around said solid insulation, and

spacer means between said solid insulation and said cover defining the outer radial extent of said air space.

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**4,018,978**

**ORBITAL DISC INSULATOR FOR $SF_6$ GAS-INSULATED BUS**

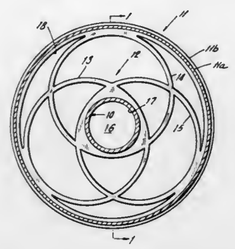
**Dosio C. Bacvarov, Greensburg, and Nicholas G. Gomarac, West Newton, both of Pa., assignors to I-T-E Imperial Corporation, Spring House, Pa.**

**Filed Feb. 25, 1976, Ser. No. 661,174**

**Int. Cl.² H01B** *9/04, 17/58*

**U.S. Cl. 174—28** **24 Claims**

1. A support insulator for a high-voltage gas-insulated power transmission system having a central conductor supported within a gas-filled housing; said support insulator comprising at least first, second and third rings of insulation material which mutually intersect one another and which define a central opening bound by each of said rings and outer periphery regions; whereby the central conductor of said power



transmission system can be supported within said central opening, and whereby said outer periphery regions of said rings can engage the interior surface of said gas-filled housing to support said central conductor within said housing.

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**4,018,979**

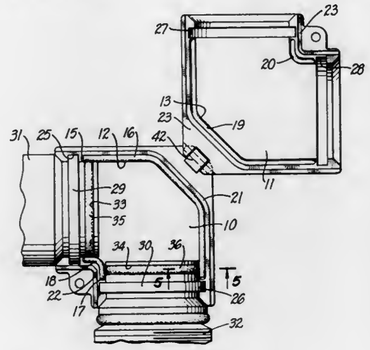
**SPLIT SHELL CONNECTOR ACCESSORY FOR ELECTRICAL CABLES**

**Thomas F. Young, Burbank, Calif., assignor to Sunbank Electronics, Inc., Burbank, Calif.**

**Filed Dec. 22, 1975, Ser. No. 643,523**

**Int. Cl.² H05K** *9/00*

**U.S. Cl. 174—35 C** **5 Claims**



1. A split shell connector accessory for electrical cables comprising a pair of complementarily formed shell halves having a passage extending therethrough for receiving and holding a cable, one of said shell halves having an elastomeric sealing member extending continously along each side of said cable holding passage, an adapter mounted at each end of said passage, each of said adapters having an annular resilient member extending therearound, said resilient members extending in a plane transverse to the plane of said elastomeric sealing members, said shell halves having complementarily formed ridges and grooves extending continuously along each side of said passage adjacent and in the same plane as said sealing members, and said adapters and shell halves having complementarily formed annular flanges and channels extending therearound adjacent to and in the same plane as said resilient members, and means for tightening said shell halves into engagement with each other, whereby the adjacent portions of said elastomeric members and resilient members are compressed into engagement with each other and said elastomeric members are compressed into engagement with the other of said shell halves to form an environmental seal and said ridges and grooves and said flanges and channels are respectively simultaneously engaged with each other to form a RFI/EMI shield, said environmental seal and said shield ex-



tending completely around the periphery of said passage and the cable portion disposed within said passage.

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**4,018,980**

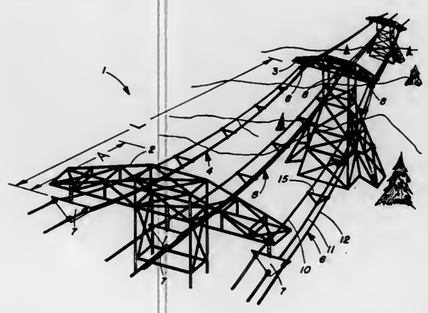
**TRANSMISSION LINE SYSTEM HAVING IMPROVED STABILITY CHARACTERISTICS FROM WAKE-INDUCED SUBSPAN OSCILLATIONS**

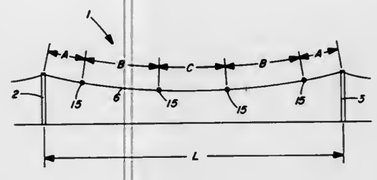
**Mahmood Mohajery, Potsdam, and Charles B. Rawlins, Massena, both of N.Y., assignors to Aluminum Company of America, Alcoa Center, Pa.**

**Filed July 21, 1975, Ser. No. 597,665**

**Int. Cl.² H02G** *7/14*

**U.S. Cl. 174—42** **14 Claims**





1. A transmission line system having improved stability characteristics from wake induced subspan oscillations, such system comprising,

a plurality of transmission line towers spaced apart and supporting at least one conductor bundle extending therebetween,

each of said bundles including at least two subconductors with each bundle length defining a span between adjacent pairs of said towers,

a plurality of spacer members disposed in longitudinally spaced relation along said bundle and connecting said subconductors together and defining subspans therebetween,

each span having at least two such subspans and each of said subspans having a predetermined length different from the length of an adjacent subspan, and

at least one of said spans having a structure so as to provide a plurality of longitudinally spaced nodes of the harmonics of the rigid body modes of wake induced oscillations of said span upon wind of a given velocity being applied to said span,

said spacer members being attached at locations along the length of an associated bundle and being disposed longitudinally away from the nodes of a selected number of the said harmonics of such rigid body modes produced from the wake-induced oscillations of the subconductors within said bundle which are present in said span in response to said given wind velocity in the attached condition of said spacer members.

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**4,018,981**

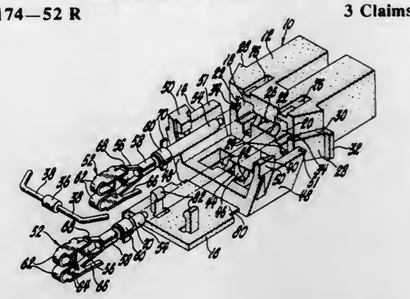
**ELECTRICAL COMPONENT PACKAGE**

**Harold G. Hawkins, Bristolville, Ohio, assignor to General Motors Corporation, Detroit, Mich.**

**Filed May 17, 1976, Ser. No. 686,694**

**Int. Cl.² H05K** *5/00*

**U.S. Cl. 174—52 R** **3 Claims**



1. A once piece housing for packaging an electrical component body and connecting the component leads to terminals after packaging comprising, in combination, a housing of insulating material having a pair of open ended terminal receiving passages, a cavity intermediate the passages for receiving the body of the component, a groove in the housing outwardly of each passage for receiving a respective lead of the component when the component body is in the body receiving cavity, a cover integrally hinged to the housing and including a pair of flanges, each covering a groove and component lead therein when the cover is in closed position, cooperating means on the cover and housing for latching the cover in closed position, a flap integrally hinged to the cover, and means on the flap extending transversely into the terminal receiving passages of the housing when the flap is in closed position and engageable with terminals in the passages to lock the terminals against withdrawal and maintain the flap in closed position relative to the housing.

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**4,018,982**

**HOUSING STRUCTURE FOR ELECTRICAL APPARATUS**

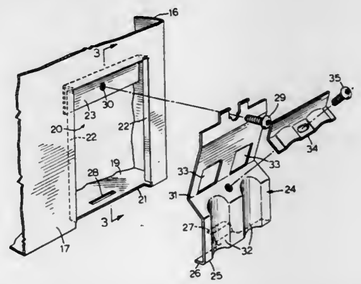
**Imants J. Svekis, Mississauga, Canada, assignor to The Canadian Chromalox Company, Limited, Rexdale, Canada**

**Filed Mar. 8, 1976, Ser. No. 664,586**

**Claims priority, application Canada, June 24, 1975, 230022**

**Int. Cl.² F24H** *9/02*

**U.S. Cl. 174—65 R** **11 Claims**



1. For an electrical apparatus, a box-like housing which provides a terminal box section, the housing having a generally flat rear wall including an aperture positioned to provide manual access to the terminal box section, a removable cover plate for the aperture and means for securing the cover plate to the rear wall to cover the aperture, the cover plate including an opening to receive a pass-through cable, a clamping plate mounted on the cover plate, and means for securing the

clamping plate to the cover plate in position to clamp the cable against an outer surface of said cover plate adjacent said opening, said clamping plate also overlying and covering said opening.

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**4,018,983**

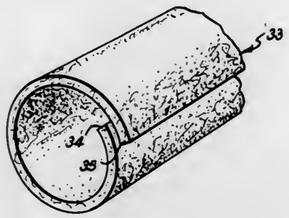
## ELECTRICAL ARC AND FIRE PROTECTIVE SHEATH, BOOT OR THE LIKE

**J. Watson Pedlow, 2500 Pine Oak Drive, Media, Pa. 19063**

**Filed Apr. 9, 1975, Ser. No. 566,199**

**Int. Cl.² C09K** *3/28*; **H02G** *3/04*; **H01R** *13/52*; **B65D** *25/16*

**U.S. Cl. 174—135** **17 Claims**




1. A precast electrical arc and fire protective sheath, boot or the like in the form of a separately manually mountable protective unit for disposition about electrical equipment, cables, cable splices, appurtenant equipment or the like, said unit comprising a heat fused, and molded thermoplastic base having evenly distributed therein a heat resistant fiber, heat stable above the melting point of said thermoplastic base, and fire-retardant substances, said fiber adapted to hold heat molten thermoplastic from flowing, said unit being molded from a suspension containing no water other than chemically bound water, said fire-retardant substances being heat activatable at high arcing and flaming temperatures to release fire protective gases to convert said protective unit into a foamed heat insulating coating when mounted about electrical equipment, such as cables, cable splices, appurtenant equipment and the like.

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**4,018,984**

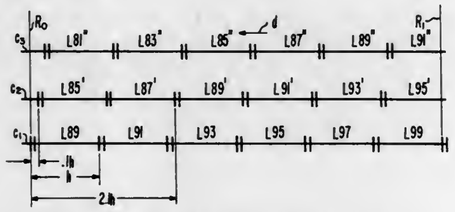
## VIDEO DISC RECORD HAVING SPIRALLY ALIGNED SYNC STORAGE LOCATIONS

**Eugene Orville Keizer, Princeton, N.J., assignor to RCA Corporation, New York, N.Y.**

**Filed Nov. 12, 1974, Ser. No. 522,820**

**Int. Cl.² H04N** *5/76*

**U.S. Cl. 358—128** **6 Claims**




1. A composite video signal record comprising:

a disc having a surface bearing a spiral information track;

said information track containing recorded representations of successive frames of interlaced fields of composite video signals inclusive of horizontal sync signals recurring at a given line repetition rate, with each of said frames containing an odd integral number of line intervals;

said signal representations being distributed along the convolutions of said spiral information track in such manner that each convolution of said spiral information track contains composite video signals occupying an even integral number of frame intervals less the sum of a small integral number of line intervals and a predetermined fraction of a line interval, several times smaller than a half-line interval.

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**4,018,985**

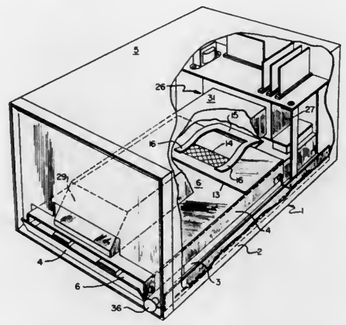
## FACSIMILE APPARATUS FOR SCANNING A SELECTED PORTION OF A GRAPHIC RECORD

**John M. Alden, Needham, and George C. Williams, South Easton, both of Mass., assignors to Alden Research Foundation, Westboro, Mass.**

**Filed Apr. 7, 1975, Ser. No. 565,865**

**Int. Cl.² H04N** *3/02*

**U.S. Cl. 358—285** **10 Claims**




1. Facsimile apparatus for transmitting an electrical signal representative of a selected face portion of a graphic record comprising:

a frame member,

means on the frame member for scanning the graphic record,

a carriage member moveable linearly between inner and outer positions on the frame member, the carriage member having framing means for locating the graphic record flatwise on a planar path passing the scanning means, the carriage member being below the scanning means and the whole framing means being exposed when the carriage is in outer position so that the graphic record is visible face up when located in the framing means by the operator, and means to limit the movement of the carriage on its path such that a selected length of the record in the direction of carriage movement is scanned.

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**4,018,986**

## CIRCUIT ARRANGEMENT FOR THE TRANSMISSION AND PRESENTATION OF AN ANALOG SIGNAL WITH A VIDEO SIGNAL

**Klaus Wilk, Kersbach, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany**

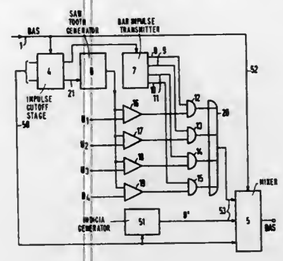
**Filed July 29, 1975, Ser. No. 600,095**

**Claims priority, application Germany, July 30, 1974, 2436674**

**Int. Cl.² H04N** *7/02*; **A61B** *5/04*; **H01R** *13/50*

**U.S. Cl. 358—142** **5 Claims**

1. A circuit for the transmission and presentation of an analog signal with a video signal on the video picture screen of a television picture tube, comprising a bar impulse transmitter synchronized by synchronizing impulses from said video signal, said bar impulse transmitter generating bar impulses for producing at least one bar of constant brightness on said video picture screen; a mixer stage for receiving said bar impulses from said bar impulse transmitter, said bar impulses being superimposed on said video signal in said mixer stage; modulating circuit means being connected intermediate said bar impulse transmitter and said mixer stage for receiving said analog signal and modulating said bar impulses dependent thereon whereby the length of the bar on said picture screen




corresponds to said analog signal; al least one integrator for integrating the bar impulse superimposed on said video signal for each video picture.



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**4,018,987**

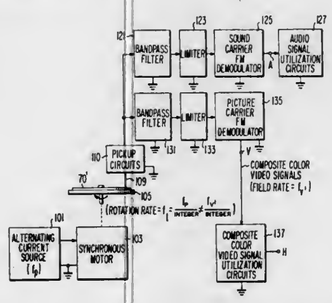
## VIDEO DISC PLAYBACK APPARATUS

**Eugene Orville Keizer, Princeton, N.J., assignor to RCA Corporation, New York, N.Y.**

**Filed July 14, 1975, Ser. No. 595,758**

**Int. Cl.² H04N** *5/76*

**U.S. Cl. 358—128** **4 Claims**




1. Playback apparatus for use with a video disc record having a spiral information track containing representations of recorded composite video signals comprising successive frames of picture information and inclusive of regularly recurring deflection sync signals; said apparatus comprising the combination of:

means, subject to energization with alternating current, for causing rotation of said video disc record at a substantially constant rotation frequency bearing a subharmonic relationship to the frequency of said alternating current; and

signal recovery means, including signal pickup means normally traversing successive convolutions of said spiral information track in a regualr progression toward one extremity of said spiral track, for developing composite video signals corresponding to the composite video signal information content of said video disc record and having a frame frequency not bearing a subharmonic relationship to said alternating current frequency.

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**4,018,988**

## NEGATIVE GAMMA CIRCUIT

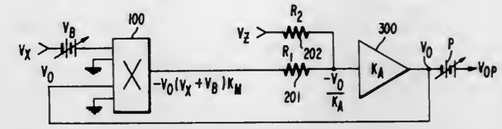
**Harold George Seer, Jr., Woodbury, N.J., assignor to RCA Corporation, New York, N.Y.**

**Filed Feb. 26, 1976, Ser. No. 661,616**

**Claims priority, application United Kingdom, Aug. 6, 1975, 32842/75**

**Int. Cl.² H04N** *3/16*, *9/53*

**U.S. Cl. 358—164** **4 Claims**




1. A gamma circuit for developing a video output signal having a positive gamma coefficient from an input signal having a negative gamma coefficient, comprising:

an input terminal for receiving a first signal ($V_X$), having a negative gamma coefficient;

a first reference source ($V_B$);

first combining means coupled to said first signal and to said first reference source for providing a first additive combination ($V_X + V_B$) of said first signal and said first reference source;

a second reference source ($V_Z$);

divider means responsive to said first additive combination signal and said second reference source for developing an output signal equal to said second reference source divided by said first additive combination signal;

a third reference source (P);

second combining means coupled to said divider output signal and said third reference source for additively combining said divider output signal and said third reference source.

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**4,018,989**

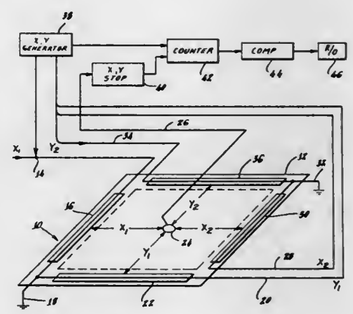
## POSITION COORDINATE DETERMINATION DEVICE

**Edward J. Snyder, Trumbull, and Stephen L. Domyan, Norwalk, both of Conn., assignors to Summagraphics Corporation, Fairfield, Conn.**

**Filed Dec. 24, 1975, Ser. No. 644,035**

**Int. Cl.² G08C** *21/00*

**U.S. Cl. 178—18** **10 Claims**



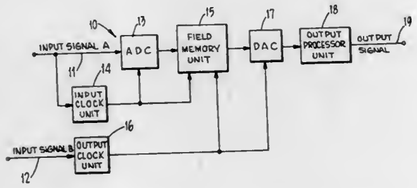

6. A self-correcting position determination device comprising a data surface and means for generating a corrected position coordinate corresponding to first and second orthogonal coordinates along respective axes for determining the location of said position, said means including first means for generating a first datum representing said position with respect to a first reference, second means for generating a second datum representing said position with respect to a second reference axially aligned with said first reference along one of said orthogonal axes, means for calculating a first true axial coordi-

nate position from a ratiometric proportionality of said first and second datum, means for storing said first true axial coordinate position, third means for generating a third datum representing said position with respect to a third reference, fourth means for generating a fourth datum representing said position with respect to a fourth reference axially aligned with said third reference along the other of said orthogonal axes, means for calculating a second true axial coordinate position from a ratiometric proportionality of said third and fourth datum, means for storing said second true axial coordinate position, and means responsive to the storing of said first and second true axial coordinate positions for reading out said first and second true axial coordinate positions as the said corrected position coordinate.

## 4,018,990
## DIGITAL VIDEO SYNCHRONIZER

**Ronald D. Long, San Jose; Allan L. Swain, Palo Alto, and Thomas C. Lyon, San Jose, all of Calif., assignors to Consolidated Video Systems, Inc., Sunnyvale, Calif.**

**Filed Feb. 13, 1975, Ser. No. 549,571**
**Int. Cl.² H04L** *7/00*
**U.S. Cl. 358—149** **18 Claims**




1. The method for synchronizing first and second input video type signals each of which comprises horizontal sync portions, said method comprising:

a. successively sampling said first video input signal at a first clock rate derived from said first video input signal;

b. storing the signals sampled in step (a) in a memory;

c. delaying said signals in said memory for a predetermined delay interval determined by the difference in phase between predetermined portions of said first video input signal and said second video input signal;

d. reading the signals stored in said memory at a second clock rate synchronously related to said second video input signal; and

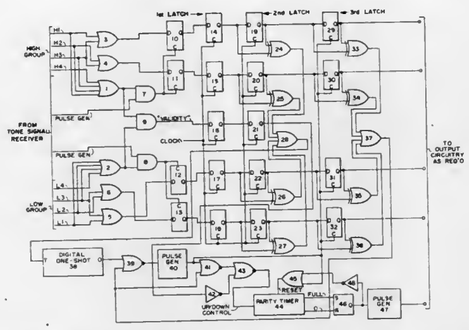
e. periodically changing said predetermined delay interval when said phase difference varies.

## 4,018,991
## MULTIFREQUENCY SIGNAL PARITY DETECTOR

**Robert H. Beeman, Berkeley, Ill., assignor to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.**

**Filed Dec. 29, 1975, Ser. No. 644,668**
**Int. Cl.² H04M** *1/50*
**U.S. Cl. 179—84 VF** **10 Claims**

1. A parity checking circuit, connected to a source of clock pulses, and to first and second groups of tone detector circuits, for detecting the concurrent detection of a tone signal by one of said tone detector in each of said first and second tone detector groups, comprising: latching means including a plurality of first circuit inputs connected to said tone detector first group and a plurality of second circuit inputs connected to said tone detector second group and an enablement circuit input connected to said clock pulse source; parity timing means including a plurality of input circuits and an output operable to generate an output signal in response to detection of a tone by one of said tone detectors in said first group coincidental with detection of a tone by one of said tone detectors in said second group, said parity timing means output signal generated a predetermined time after said tone detections; code change timing means including an input circuit, and an output circuit connected to said parity timing means and to said latching means; and code change detection means including an input circuit from said latching means and a first output circuit connected to said code change timing means input circuit and a second output circuit connected to the input of said parity timing means; said latching means initially operated in response to a first clock pulse from said clock pulse source to register the detection of tones by said tone detector groups; said code change detection means initially operated in response to said registration by said latching means and said code change timing means conditioned in response to the operation of said code change detection




means; said latching means further operated in response to a second clock pulse from said source to further register said detection of a tone by each of said first and second tone detector groups; said code change detection means further operated in response to said further registration; said parity timing means conditioned in response to said code change detection means further operation; said code change timing means operated a predetermined period of time after said conditioning to further condition said parity timing means; said latching means additionally operated in response to operation of said code change timing means to additionally register said detection of a tone in each of said tone detector groups; and said parity timing means operated a predetermined period of time after said initial and said further conditioning to generate said output signals.

## 4,018,992
## DECODER FOR QUADRAPHONIC PLAYBACK

**Lynn T. Olson, Portland, Oreg., assignor to Clifford H. Moulton and Charles D. Wood, both of Portland, Oreg.**

**Filed Sept. 25, 1975, Ser. No. 616,555**
**Int. Cl.² H04R** *5/00*
**U.S. Cl. 179—1 GQ** **8 Claims**

1. A decoder for reproducing on at least four separate loudspeakers adapted to be disposed at left front, right front, left back and right back positions relative to a listener at least four separate audio intelligence signals encoded into a pair of input channel signals having preselected amplitude and phase relationships, the decoder comprising:

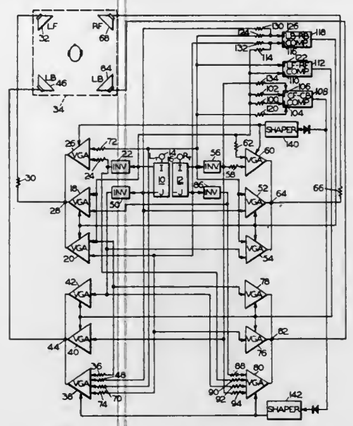
a. a pair of independently controlled variable gain amplifier units for each loudspeaker for providing two independently variable decoding coefficients per loudspeaker,

b. phase shifting means for each of the pair of input channel signals each having an input adapted for connection to the corresponding channel and each having a plurality of outputs providing output signals of different phases which are connected to inputs of the variable gain amplifier units, and

c. three independent signal comparing means one of which is responsive to the ratio between left front and right front signals, the second of which is responsive to the ratio between left back and right back signals, and the third of which is responsive to the ratio between center front and center back signals, the comparing means having inputs



connected to selected derived outputs of the phase shifting means and having control signal outputs connected to the pairs of variable gain amplifier units for selectively

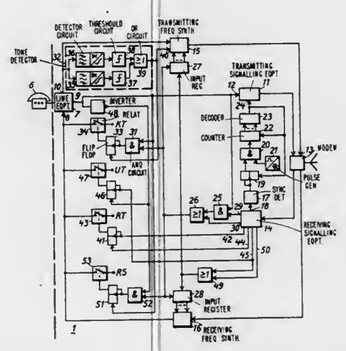


controlling operation of each unit, whereby to achieve full separation at any point on a 360° circle about a listener by varying two decoding coefficients simultaneously for each loudspeaker.

## 4,018,993
## TELEPHONE SYSTEM COMPRISING A SATELLITE

**Nils Herbert Edström, Bromma, Sweden, assignor to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden**

**Filed Apr. 3, 1975, Ser. No. 564,649**
**Claims priority, application Sweden, Apr. 19, 1974, 7405276; Apr. 19, 1974, 7405277; Apr. 19, 1974, 7405280**
**Int. Cl.² H04B** *7/19*
**U.S. Cl. 179—15 BY** **3 Claims**

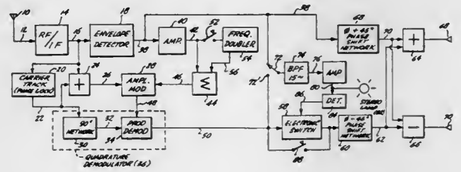



1. Telephone system comprising: a satellite arranged to relay a plurality of one-way signalling channels and one-way speech transmission channels, the latter being paired into two-way speed transmission channels assignable as calling and calling subscriber's channels; a plurality of earth stations comprising a plurality of line units each of which having a subscriber terminal connected to a subscriber, an input for receiving incoming speech signals, a first output for transmitting signals indicating the on-hook/off-hook condition of the subscriber and a second output for transmitting outgoing speech signals and call signalling data from the subscriber, signalling equipment connected to said first output of said line units for receiving signals indicating the on-hook/off-hook conditions of the subscribers, and including means for transmitting over said signalling channels signal indications about said conditions, and means for receiving over said signalling channels commands about assigned two-way speech transmission channels for calling and called subscribers, and a frequency synthesizer means connected to said input and second output of said line unit and to said signalling equipment for connecting the calling and called subscribers to assigned two-way speech transmission channels under control of said commands in response to signal indications and commands received from said signalling equipment; and a central control station comprising central signalling equipment arranged to receive said signal indications and transmit said commands, control equipment connected to said central signalling equipment and arranged to generate said commands assigning two-way speech transmission channels in accordance with the availability of said channels and address said commands to said earth stations, a call signalling data decoding means connected to a data input of said control equipment, and a central frequency synthesizer means connected to said control equipment for connecting said call signalling data decoding means to the speech transmission channels in accordance with the commands being generated by said control equipment.

## 4,018,994
## COMPATIBLE AM STEREOPHONIC RECEIVERS

**Leonard R. Kahn, 70 N. Grove St., Freeport, N.Y. 11520**

**Continuation-in-part of Ser. No. 487,155, July 10, 1974, Pat. No. 3,908,090, and a continuation-in-part of Ser. No. 487,154, July 10, 1974, Pat. No. 3,944,749, each is a continuation-in-part of Ser. No. 251,947, May 10, 1972, abandoned. This application May 2, 1975, Ser. No. 573,905**
**Int. Cl.² H04H** *5/00*
**U.S. Cl. 179—15 BT** **54 Claims**




1. A receiver for receiving a compatible single sideband type radio frequency (RF) carrier wave with stereo related (L and R) intelligence appearing as upper and lower sideband modulation of the carrier wave, the said carrier being amplitude modulated with stereo summation (L+R) intelligence and being phase modulated with stereo difference (L—R) intelligence, said receiver comprising:

a. superheterodyne means developing from the received RF signal an intermediate frequency (IF) signal;

b. detection means deriving the fundamental of the L+R intelligence from a portion of the IF signal;

c. means for exalting the carrier of a portion of the IF signal;

d. means inversely amplitude modulating a portion of the exalted carrier IF signal with at least the fundamental of the L+R intelligence;

e. demodulator means deriving from the exalted carrier IF signal and the additionally amplitude modulated IF signal an audio output essentially comprising the fundamental of the L—R intelligence;

f. separate phase shift means essentially placing the fundamental L+R and L—R signals in phase;

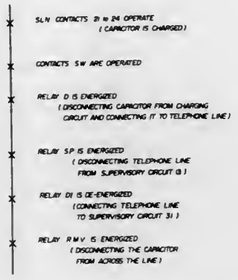
g. combining means for the L+R and L—R signals and deriving L and R stereo signals therefrom; and

h. respective acoustic output means for the L and R signals.

## 4,018,995
## NOISE SUPPRESSION CIRCUIT FOR SWITCHED TELEPHONE LINES

Harold Grant McClelland, Manotick, Canada, assignor to Northern Electric Company Limited, Montreal, Canada

Filed Jan. 29, 1976, Ser. No. 653,294
Int. Cl.² H04B 3/02
U.S. Cl. 179—79 12 Claims



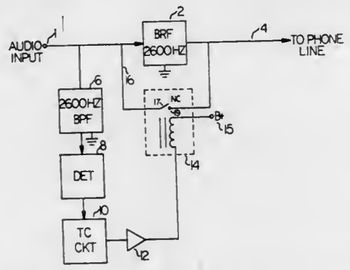

1. In a telephone system comprising a first supervisory circuit and a subscriber telephone line connected thereto, a second supervisory circuit, and means for transferring said telephone line from said first circuit to said second circuit, circuit means for suppressing noise pulses generated upon said transfer comprising, a capacitor, and switch means for connecting the capacitor across said telephone line before it is disconnected from said first circuit, said switch means including means for disconnecting said capacitor from said line a predetermined interval of time subsequent to the transfer.

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## 4,018,996
## COMMUNICATION NETWORK PROTECTION SYSTEM

Leonard R. Kahn, 70 N. Grove St., Freeport, N.Y. 11520

Filed Feb. 13, 1976, Ser. No. 657,718
Int. Cl.² H04M 1/50
U.S. Cl. 179—84 VF 7 Claims

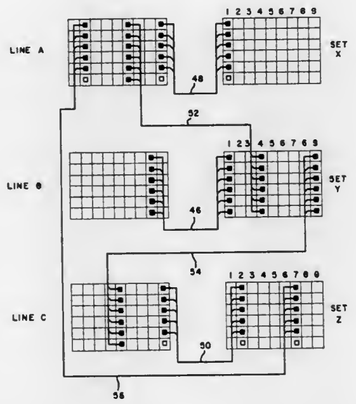



1. A method of protecting a communications channel equipped with in-band signaling from false operation by main signal components which imitate signaling tones comprising:
- a. sensing the presence of said components in the main signal which imitate the in-band signaling tone,
- b. determining whether the sensed tone components are present for a period of time exceeding a predetermined value which may falsely operate the in-band signaling equipment, and
- c. switching into the communication channel means for attenuating the signal components which imitate the in-band signaling tone when it is determined in Step (b) that the sensed tone components are present for a period exceeding the predetermined value.

## 4,018,997
## PLUGGABLE KEY SET TELEPHONE CROSS CONNECT DEVICE

Charles Donald Hoover, Harrisburg, and Jared Nathan Worman, Camp Hill, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Continuation-in-part of Ser. No. 468,773, May 10, 1974, abandoned. This application Oct. 1, 1975, Ser. No. 618,666
Int. Cl.² H04Q 1/02
U.S. Cl. 179—98 12 Claims



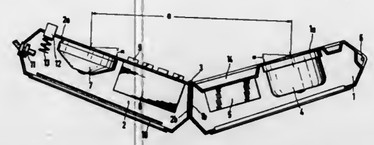

1. A telephone substation cross connect device for selectively cross connecting a plurality of incoming telephone lines with a plurality of key set telephones, said device comprising:
- a line input connector connected with said plurality of incoming telephone lines;
- a plurality of first receptacle units;
- a plurality of second receptacle units;
- each said first and second receptacle unit comprising a closely spaced, high density cluster of female receptacles arranged in at least six horizontal rows and at least five vertical rows, each said receptacle having an electrical contact fixedly mounted therein and a key profiled entrance configuration,
- a plurality of key set connectors each connected to a respective one of said plurality of key set telephones;
- circuit board means including a rigid base member having said line input connector, said pluralities of said first and second receptacle units, and said key set connectors fixedly mounted thereon and fixed conductor means forming a plurality of first circuits interconnecting said line input connector with each of said first receptacle units and a plurality of second circuits each interconnecting one of said second receptacle units with a respective one of said key set connectors; and
- a plurality of jumper cables each having both ends terminated by identical key profiled plugs, said jumper cables having one plug engaged in one of said first receptacle units and the other plug engaged in one of said second receptacle units to selectively connect each said key set to at least one incoming telephone line,
- at least some of said jumper cables having six conductors and terminated by six cavity plugs, and
- at least some of said jumper cables having five conductors and terminated by six cavity plugs, one cavity being vacant, thereby assuring proper connection of the conductors with contacts in said receptacles.



## 4,018,998
## COMMUNICATION HAND-SET FOLDABLE FOR PROTECTION

Siegfried Wegner, Peine-Vohrum, Germany, assignor to Elmeg Elektro-Mechanik GmbH, Peine, Germany

Filed Feb. 3, 1976, Ser. No. 654,849
Claims priority, application Germany, Feb. 3, 1975, 2504314
Int. Cl.² H04M 1/03
U.S. Cl. 179—103 5 Claims



1. A handset apparatus for use as a piece of peripheral equipment in a communication system or network, and including a speaker, a microphone and a dial facility in a casing, comprising, the casing being constructed to have an upper casing part, containing the microphone with audio-access thereto being located in a particular surface of the upper casing part, and a lower casing part containing the speaker with audio-access thereto being in a particular surface of the lower casing part, one of the particular surfaces containing also the dial facilities, all of the particular surfaces containing all other manual access facilities, the lower part being hinged to the upper casing part for a first superimposing position, in which the particular surfaces of the casing parts mutually cover each other so that the manual operation facilities and audio-access to the microphone and the speaker are covered accordingly, and for a second folded up position in which the parts have a particular angle for uncovering the said audio-access as well as for access to the dial facility.

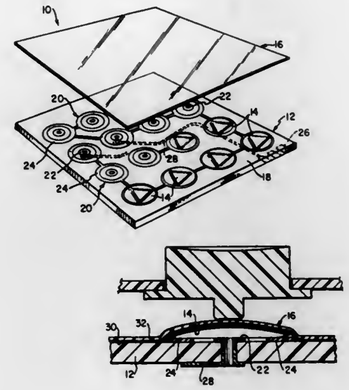
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## 4,018,999
## KEYBOARD SWITCH ASSEMBLY HAVING ADHESIVE POSITION RETAINER ELEMENT

Max S. Robinson, Richland, Wash., and Thomas J. Studebaker, Boulder, Colo., assignors to Mohawk Data Sciences Corporation, Herkimer, N.Y.

Filed Sept. 12, 1974, Ser. No. 505,389
Int. Cl.² H01H 1/34, 13/06
U.S. Cl. 200—5 A 8 Claims

1. A contact switch assembly for a keyboard having at least one normally open contact switch, said assembly comprising:
- a circuit board having at least one first electrical contact provided on one side thereof, each of said first contacts being coupled to a respective conductor on said circuit board and at least one second electrical contact provided on said one side of said circuit board, each of said second contacts being proximate to a first contact and coupled to a respective conductor on said circuit board;
- at least one curved resilient plate formed of electrically conductive material, each of said plates having a periphery at least a portion of which is in continuous electrical communication with a respective one of said second contacts and each plate normally spaced from and overlying a proximate first contact, each said plate being deflectable from said normally open position to a closed position wherein said plate electrically communicates with said proximate first contact; and
- a retaining element covering said one side of said circuit board, said first and second electrical contacts and said curved resilient plates, said retaining element being bonded to said resilient plates and to said one circuit board side thereby maintaining said resilient plates in position continuously communicating with said second contacts and overlying said first contacts.

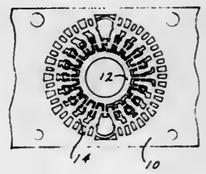


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## 4,019,000
## ELECTRICAL SWITCH WITH CHEMICALLY MILLED CONTACTS

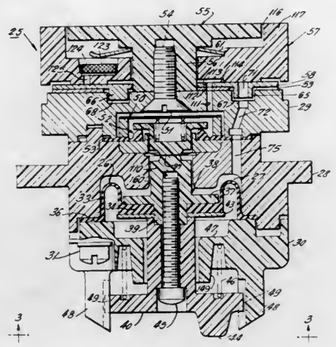
James H. Robinson, Elkhart, Ind., assignor to CTS Corporation, Elkhart, Ind.

Filed Dec. 16, 1974, Ser. No. 532,744
Int. Cl.² H01H 19/58, 1/42
U.S. Cl. 200—11 D 5 Claims



1. An electrical switch comprising a stator body of dielectric material, a movable contactor body being movable with predetermined relative motion with respect to the stator body, a plurality of electrical contacts each being fixedly attached to the stator body, the stator body being molded to the electrical contacts, each of the contacts having a planar contact surface in planar alignment with the planar contact surfaces of the other of the electrical contacts, and each of the contacts having a chemically milled leading edge surface that is disposed substantially orthogonal to the direction of motion of the contactor body with respect to the planar surface and that is at an obtuse angle to the planar contact surface thereof, an electrical contactor constrained to move with the contactor body for selectively and slideably engaging the planar contact surfaces, and resilient means urging the electrical contactor into electrical conducting engagement with selective ones of the planar contact surfaces.

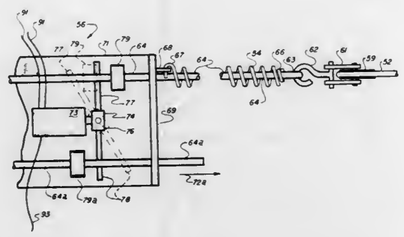
**4,019,001**
**PNEUMATIC TIMER**
**Keith T. Krueger, Bellefontaine, Ohio, assignor to I-T-E Imperial Corporation, Spring House, Pa.**
**Filed May 5, 1975, Ser. No. 574,597**
**Int. Cl.² H01H** *7/03*; **F16F** *15/00*
**U.S. Cl. 200—34** **10 Claims**



1. A timing device comprising a filter capsule subassembly including a housing means defining a cavity, check valve means disposed within said cavity, said device also comprising means defining a timing chamber, a plunger operatively connected in said chamber and mounted for movement in opposite directions in a timing and a reset stroke, a main spring urging said plunger to move in said timing stroke, means defining a reset passage, including said check valve means when open, connecting said timing chamber to ambient and proportioned to permit free movement of said plunger in said reset stroke, means defining a restricted timing passage bypassing said check valve means when closed and connecting said timing chamber to ambient thereby retarding movement of said plunger in a controlled manner during said timing stroke, said housing means including unsealed opening means communicating with said cavity, and said subassembly also including filter means covering all of said unsealed opening means.

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**4,019,002**
**POSITIVE CABLE DERAILMENT SENSING APPARATUS**
**Jan K. Kunczynski, Glenbrook, Nev., assignor to Lift Engineering & Mfg., Inc., Carson City, Nev.**
**Filed June 18, 1975, Ser. No. 588,123**
**Int. Cl.² B61B** *12/00*
**U.S. Cl. 200—61.18** **13 Claims**

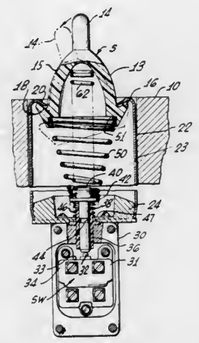


12. In a cable derailment sensing apparatus for use with a pair of proximate pulley means having cable sections carried thereby, said pulley means each being movably mounted to a support arm, said apparatus including a pair of tendon means each secured proximate an end thereof to said pair of pulley means for movement therewith, a pair of spring biasing means operatively connected to said pair of tendon means and formed to bias said pair of pulley means to a moved position upon derailment of said sections of cable therefrom, the improvement comprising:

a sensing means connected to said pair of tendon means and formed to sense the movement of both of said pair of tendon means, said sensing means including a switch having at least two switch arms extending outwardly thereof, said switch arms both being connected to said switch for operation of said switch upon displacement of either of said switch arms, and said switch arms being formed and positioned for displacement of the same by actuating means mounted for movement with said pair of tendon means.

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**4,019,003**
**MULTI-DIRECTIONAL SENSOR SWITCH WITH AUXILIARY ACTUATING STRUCTURE**
**Arnold Duerksen, deceased, late of Salinas, Calif. (by Mildred Eva Judge Duerksen, executrix), assignor to Cochran Western Corporation, Salinas, Calif.**
**Filed Nov. 21, 1975, Ser. No. 634,159**
**Int. Cl.² H01H** *3/16*
**U.S. Cl. 200—61.42** **8 Claims**



1. A sensor adapted for mounting at a signal station in a conveyor system for actuation by transport of an object to said station along a predetermined path of travel, comprising:

a sensor housing set into said system floor,

said housing including a top portion with a wide upwardly facing, annular opening therein defined by an inwardly extending lip,

a sensor body in the external form of an upwardly convergent figure of revolution about a normally vertical axis, said body being receivable into said housing and being configured for engagement under said lip, and for projection and convergence thereabove, and said body including a stem extending upward from its convergent upper end,

a spring abutment positioned below said sensor body and quided by means on said housing for substantially vertical travel relative to said housing,

a coil compression spring acting between said sensor body and said spring abutment to hold said sensor body normally yieldingly up against said lip,

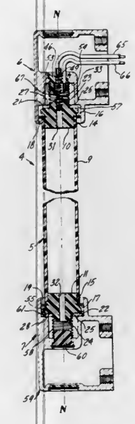
a switch actuating element on said spring abutment,

a microswitch having an operating element engaged and deflected by said actuating element, and

said sensor body being responsive to external forces to cause lateral and downward deflection thereof to move said switch operating member so as to actuate said microswitch.



**4,019,004**
**BUS DOOR SWITCH APPARATUS**
**Robert M. Gute, Corunna, Mich., assignor to Midland-Ross Corporation, Cleveland, Ohio**
**Filed Sept. 5, 1975, Ser. No. 610,573**
**Int. Cl.² H01H** *3/16*; **E05G** *15/00*
**U.S. Cl. 200—61.43** **8 Claims**



1. Manually operable normally open-circuit switch apparatus comprising a touch bar and first and second spaced assemblies to which opposite end portions of the bar are attached, said bar having at least one end portion comprising an electrically non-conductive material defining the end surface of the bar; said first assembly being adapted to receive two electrical conductors and comprising:

a housing providing a recess for receiving said end portion, said recess defined by an interior circular side wall surface having a radial clearance with said end portion;

a mount plug of electrically non-conductive material supported by said housing in axially spaced relation with said end portion; said plug and said end portion having central apertures and at inoperative position being aligned generally along a switch axis coaxial or parallel with the longitudinal axis of said bar;

an elongate laterally-flexible normally-rectilinear spring extending at least partly through said apertures with its exterior surface in tightly fitting relation with surfaces defining the apertures;

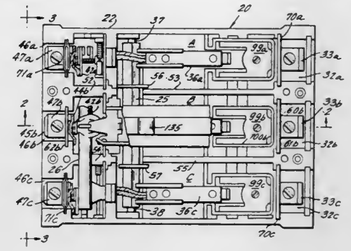
an electrically conductive sleeve supported in fixed position with said housing coaxially of said switch axis at a position between, and in spaced relation with, said end portion and the end of said mount plug further away from said end portion, said sleeve having an inner surface in normally radially spaced relation with said spring, and the length of said spring between said plug and said end portion being free to warp sidewise into contact with said sleeve;

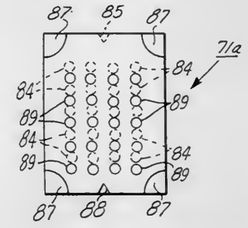
said spring and said sleeve being adapted for separate connection with two conductors of an electrical circuit;

said second assembly adapted for mounting in fixed axially spaced relation with the first assembly and comprising means cooperating with means in the first assembly for maintaining said bar in a desired longitudinal or axial relation with said first assembly; and

centering means urging said bar and said spring into coaxial relation with said sleeve.

**4,019,005**
**MULTI-POLE CIRCUIT BREAKER WITH BAFFLE SHIELD VENTING**
**Anthony B. Michetti, Warminster, Pa., assignor to I-T-E Imperial Corporation, Spring House, Pa.**
**Filed Dec. 30, 1974, Ser. No. 537,261**
**Int. Cl.² H01H** *9/30*, *33/02*
**U.S. Cl. 200—144 R** **10 Claims**





1. A circuit breaker including a housing, separable cooperating contacts disposed within said housing, said housing having an opening for venting of expanding gases developed during interruption of arcs drawn between said contacts upon separation thereof, a baffle assembly substantially closing said opening, said assembly including first and second generally platelike elements having integrally formed protrusions which maintain perforated main portions of said elements stacked in face-to-face closely spaced relationship.

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**4,019,006**
**OVERCURRENT AND SHORT CIRCUIT PROTECTION DEVICE**
**Manfred Strössner, Erlangen, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany**
**Continuation-in-part of Ser. No. 438,438, Jan. 31, 1974, Pat. No. 3,282,147. This application Jan. 2, 1975, Ser. No. 538,199**
**Claims priority, application Germany, Feb. 5, 1973, 2305533; Nov. 12, 1973, 2356410**
**Int. Cl.² H01H** *33/08*, *33/18*
**U.S. Cl. 200—144 R** **13 Claims**

1. Improved apparatus for electrical overcurrent and short circuit protection of the type in which a fusible wire is arranged in an arc-quenching chamber between first and second electrodes which, after the fusible wire is melted through, forms with the arc a current loop generating magnetic forces which act to elongate the arc, comprising:

a. a pair of horn electrodes coupled to the first and second electrodes;

b. an inner arc chamber comprising:

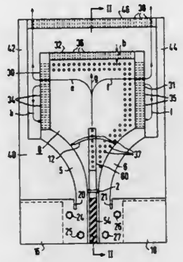
1. first and second sidewalls comprising extensions of said pair of horn electrodes;

2. an end wall abutting said first and second sidewall;

3. a bottom wall covering one side of said horn electrodes and said side walls and endwalls;

4. a top wall covering the other side of said horn electrodes, side walls and end wall;

5. said top and bottom walls being disposed parallel to each other and forming a gap which is of a sufficiently small thickness such that the voltage current characteristic of the arc has a descending portion to a minimum value with increasing current, after which it then rises for large currents and, wherein,
6. said top, bottom side walls and end walls each contain



a plurality of mutually parallel holes having a diameter in the range of 0.8 to 2.5 mm and having a total cross section which is 30 to 50% of the inside area of said arc-quenching chamber; and

c. an outer arc-quenching chamber surrounding said inner arc-quenching chamber, said outer arc-quenching chamber having at least one wall provided with mutually parallel holes.

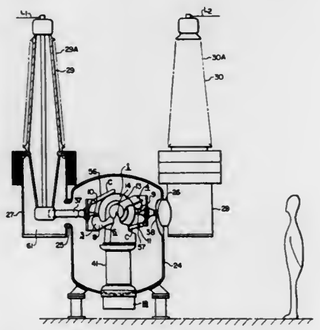
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**4,019,007**

## GROUNDED-TANK HIGH-POWER COMPRESSED-GAS CIRCUIT-INTERRUPTER

**Robert E. Friedrich, Upper St. Clair, and Robert L. Hess, N. Versailles, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed Sept. 25, 1975, Ser. No. 616,713**
**Int. Cl.² H01H** *33/82*
**U.S. Cl. 200—148 B** **9 Claims**



1. A high-voltage, high-power compressed-gas circuit-interrupter including a vertically-extending generally-cylindrical grounded metallic tank (24), a two-break rotatable-contact-arm type of arc-extinguishing assembly having its axis of rotation generally horizontally arranged and disposed within said vertically-extending grounded metallic tank structure, a pair of off-jutting metallic terminal-bushing housings, a pair of laterally-spaced vertically-extending terminal-bushings extending upwardly one from each of said metallic terminal-bushing housings so that the line-connections assume a generally U-shaped arrangement, an insulating stationary tubular support (41), extending downwardly from said two-break rotatable-contact-arm type of arc-extinguishing assemblage to the bottom of said cylindrical vertically-extending metallic tank structure, an operating rod extending upwardly through said tubular insulating support, a high-pressure gas-reservoir chamber disposed generally upon the axis of said arc-extinguishing assemblage, gas conduit means extending through the hollow rotatable arms of said arc-extinguishing assemblage, whereby gas may flow generally horizontally along the axis of said assemblage and radially outwardly through the two hollow rotatable arms of said rotatable assemblage, and a high-pressure gas-conduit extending up through said vertically-extending tubular stationary insulating support (41) to said high-pressure gas-reservoir chamber.

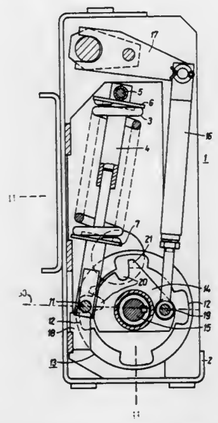
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**4,019,008**

## ACTUATING MECHANISM FOR SNAP-ACTUATING AN ELECTRIC SWITCHING APPARATUS

**Werner Kohler, Bentfeld, Holstein, and Norbert Steinemer, Berlin, both of Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany**

**Filed Aug. 14, 1975, Ser. No. 604,834**
**Claims priority, application Germany, Aug. 16, 1974, 2439837**
**Int. Cl.² H01H** *3/00*
**U.S. Cl. 200—153 SC** **2 Claims**



1. An actuator mechanism for snap-actuating electric switching apparaus such as vacuum switching apparatus comprising: spring means for receiving the energy needed to snap-actuate the vacuum switching apparatus, said spring means including a spring for receiving said energy and a holder assembly having two holding parts movable relative to each other for stressing said spring therebetween, one of said parts including a take-along bolt; cocking means movable for stressing said spring means for imparting thereto said energy for actuating the vacuum switching apparatus, said cocking means comprising mutually adjacent rotatable cocking parts having respective openings formed therein for engaging said take-along bolt and moving the same so as to cause said holding parts to impart said energy to said spring thereby loading said bolt with the energy of said spring; and transmission means for receiving said energy of said spring means and for transmitting the same to the vacuum switching apparatus in a movement independent of said cocking means, said transmission means including mutually adjacent rotatable transmission parts mounted concentrically with said cocking parts so as to be movable independently of the latter, said transmission parts having openings for receiving said take-along bolt therein after said spring has been stressed by said cocking means whereby said bolt applies the energy of said spring to said transmission parts.

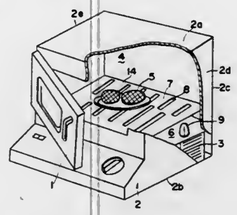


**4,019,009**

## MICROWAVE HEATING APPARATUS

**Shigeru Kusunoki, Yamatokoriyama; Teruhisa Takano, Osaka, and Noboru Kurata, Yamatokoriyama, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Filed Feb. 6, 1975, Ser. No. 547,746**
**Claims priority, application Japan, Feb. 8, 1974, 49-16623**
**Int. Cl.² H05B** *9/06*
**U.S. Cl. 219—10.55 F** **12 Claims**



1. A microwave heating apparatus comprising:

a casing formed of electrically conductive metallic material and having an opening therein, a door closing said opening, said door and casing defining an enclosed chamber;

a surface wave transmission line positioned within said chamber and dividing said chamber into a heating space for receipt of an object to be heated and a transmission space, said transmission space extending continuously along the entire area of one side of said surface wave transmission line; and

a source of microwave power for generating microwaves, at least a portion of tbe energy from said microwave power source being coupled to said transmission space, said transmission space comprising means for transmitting microwaves to said surface wave transmission line over the entire area of said one side thereof, such that said surface wave transmission line forms a surface wave transmission mode which propagates within said heating space at a wave length less than the free-space operating wave length.

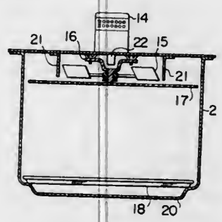
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**4,019,010**

## MICROWAVE OVEN WITH UNIFORM ELECTRIC FIELD DISTRIBUTION

**Junzo Tanaka, Fujiidera; Haruo Matsushima, and Yukio Abe, both of Yamatokoriyama, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Filed Mar. 27, 1975, Ser. No. 562,412**
**Claims priority, application Japan, Apr. 17, 1974, 49-43607**
**Int. Cl.² H05B** *9/06*
**U.S. Cl. 219—10.55 F** **6 Claims**



1. A microwave oven comprising a main oven body, a heating cavity of substantially parallelepiped structure having top and rear walls, a door releasably closing an opening of said heating cavity, and a high frequency feeder section for supplying microwave energy into said heating cavity, wherein the improvement comprises:

means for mounting said high frequency feeder section on the top wall of said heating cavity, said feeder section being positioned substantially symmetrically, both depthwise and lengthwise, with respect to said heating cavity for producing a main mode excitation having a plurality of strong vertical electric-field components distributed parallel to the depth of said heating cavity, and

a pair of parallel conductor plates mounted on the top wall of said heating cavity on both sides of said high frequency feeder section, said pair of conductor plates protruding substantially vertically inside said heating cavity and being aligned respectively with a pair of strong electric-field components distributed on both sides of said high frequency feeder, whereby said main mode of excitation is changed to another having strong vertical electric-field components parallel to the width of said cavity thereby providing sufficient heat at the center portion of an article placed within said heating cavity.

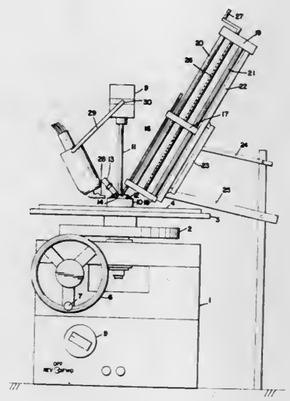
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**4,019,011**

## METHOD OF AND APPARATUS FOR HARD FACING POPPET VALVES

**Arthur T. Cape, Monterey, Calif., assignor to Coast Metals, Inc., Little Ferry, N.J.**

**Filed Jan. 27, 1975, Ser. No. 544,054**
**Int. Cl.² B23K** *9/04, 9/08*
**U.S. Cl. 219—76** **12 Claims**



1. In a method of coating the working surface of a poppet valve with hard facing material, the steps of supporting the valve with its working surface facing upwardly, striking an arc between a non-consumable tungsten electrode and the end of a rod of said hard facing material, whereby to cause metal from said rod to melt and be deposited on said working surface, rotating said valve about its axis during said melting, and electromagnetically controlling the distribution of said molten metal on said working surface.

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**4,019,012**

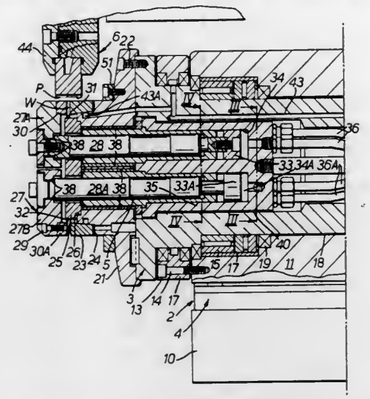
## WELDING APPARATUS

**Alois Raffauf, Koblenz-Kesselheim, and Eduard Wolfle, Mulheim-Karlich, both of Germany, assignors to Girling Limited, Birmingham, England**

**Filed Apr. 8, 1975, Ser. No. 566,074**
**Claims priority, application United Kingdom, Apr. 9, 1974, 15724/74; Nov. 22, 1974, 50675/74**
**Int. Cl.² B23K** *11/06;* **B23Q** *3/00*
**U.S. Cl. 219—79** **13 Claims**

1. A welding apparatus for welding together a platform and an arcuate web, comprising rotatable web clamping means including an axially fixed first clamp part and a second clamp part defining a recess therebetween, said second clamp part being axially movable to clamp a web in said recess between

said parts, means for passing an electrical current to said web through one of said parts, and clamp actuating means rotatable with said web clamping means for axially moving said

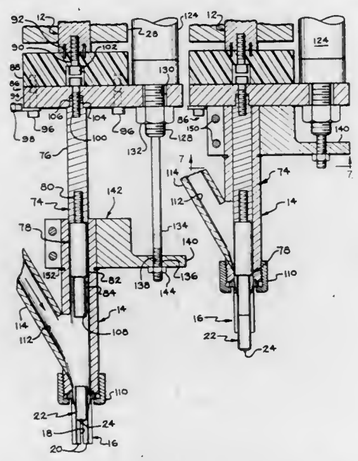


second clamp part, said actuating means being located on the same side of said recess as said first clamp part and extending there through, said actuating means comprising one or more fluid pressure operable devices rotatable with said web clamping means, each said device including a cylinder, a piston working in said cylinder, and a piston rod secured to said piston and to said second clamp part.

## 4,019,013
## APPARATUS FOR WELDING STUDS

**Steve Spisak, Elyria, Ohio, assignor to TRW Inc., Cleveland, Ohio**

**Filed Apr. 7, 1975, Ser. No. 565,535**
**Int. Cl.² B23K** *9/20*
**U.S. Cl. 219—98** **19 Claims**

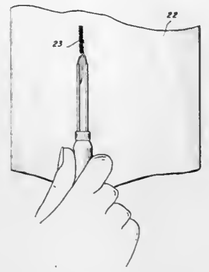


**13.** Stud welding apparatus comprising a back-up plunger, means affixed to said back-up plunger for moving said back-up plunger between a retracted position spaced from a workpiece and a forward position toward the workpiece, said back-up plunger being rigidly supported by said moving means at all times during a welding cycle, means forming a loading passage into which said plunger extends, said loading passage means having means at one end thereof for holding a stud, and means for moving said loading passage means between a position in which said plunger is spaced from said stud-holding means and a position in which said plunger is near said stud-holding means to back up and rigidly support a stud held thereby.

## 4,019,014
## METHOD FOR HEAT WELDING SELENIUM

**John Frank Byrne, Worthington, Ohio, assignor to Xerox Corporation, Stamford, Conn.**

**Filed Apr. 23, 1975, Ser. No. 570,677**
**Int. Cl.² B23K** *11/16*
**U.S. Cl. 219—118** **8 Claims**



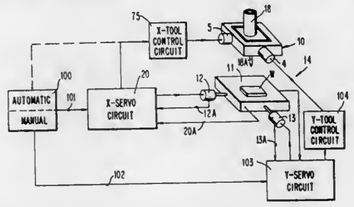
**1.** A method for repairing damaged selenium photoconductors comprising:

applying a concentrated source of heat to a minute region of the photoconductor including a damaged area of selenium, in an oscillating motion traverse to the damage for such period of time that a weld healing of the damaged photoconductor material occurs.

## 4,019,015
## PRECISION TOOL AND WORKPIECE POSITIONING APPARATUS WITH RINGOUT DETECTION

**Javathu K. Hassan, Hopewell Junction; Carl V. Rabstejnek, Wappingers Falls, and Anthony D. Wutka, Fishkill, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Division of Ser. No. 395,502, Sept. 10, 1973, Pat. No. 3,886,421. This application Feb. 26, 1975, Ser. No. 553,385**
**Int. Cl.² B23K** *15/00*
**U.S. Cl. 219—121 EB** **2 Claims**



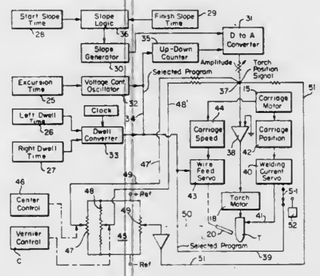
**1.** Apparatus for positioning a semiconductor wafer and an electron beam means in a precise location relative to each other by positioning in a predetermined site said semiconductor wafer then positioning the electron beam means in a precise predetermined position relative to said site, said apparatus comprising: a stage, and a semiconductor wafer mounted on said stage, at least one closed loop servo system connected to said stage, positioning means including a motor for positioning said semiconductor wafer in a predeterming site, position indicator means for determining the actual position of said semiconductor wafer relative to a fixed reference, and a signal output from said position indicator means indicative of said actual position of said semiconductor wafer at any one time; an error generator, and means for providing to said error generator the desired position of said semiconductor wafer relative to said reference; and means for inputting said error generator with said signal output from said position indicator means, and means in said error generator to produce a difference signal therefrom indicative of the difference between the actual position of said semiconductor wafter and the desired position of said semiconductor wafer; and means responsive to said difference signal to actuate said positioning means until said difference signal is such that said semiconductor wafer is in said predetermined site; and first means responsive to said difference signal, when said semiconductor wafer is in said predetermined site to stop said positioning means, an electron beam means including electrostatic deflection means to deflect an electron beam, and electrostatic deflection amplifier and means coupling said electrostatic deflection means to said electrostatic deflection amplifier, said amplifier being responsive to said difference signal to effect movement of said beam; ring out detection means responsive to the rate of change of position of said semiconductor wafer, and means for enabling said electrostatic deflection amplifier responsive to an output signal from said ring out detection means indicating that said rate of change of said actual position has reached a predetermined lower value, said electrostatic deflection amplifier effecting beam movement until said difference reaches a predetermined second lower value of thereby effect precise positioning of said beam relative to said semiconductor wafer.



## 4,019,016
## WELDING CONTROL SYSTEMS

**Robert Friedman, and Howard D. Lesher, both of Saugus, Calif., assignors to Dimetrics, Inc., Sepulveda, Calif.**

**Continuation-in-part of Ser. No. 421,397, Dec. 3, 1973, abandoned. This application Apr. 7, 1975, Ser. No. 565,517**
**Int. Cl.² B23K** *9/10*
**U.S. Cl. 219—125 R** **5 Claims**




**1.** An automatic arc are welding system comprising, in combination:

a. a track positionable adjacent to a weld path on a member to be welded;

b. a carriage coupled to said track;

c. a carriage motor on the carriage for moving it along the track at a given speed so that the carriage follows along the path;

d. a welding torch coupled to said carriage;

e. a torch motor on the carriage which when energized causes excursion movement of the torch in a direction perpendicular to the direction of motion of the carriage;

f. amplitude control signal generating means for said torch motor to provide a desired amplitude of excursion of said torch;

g. excursion time control signal generating means for said torch motor to provide a desired excursion time for the torch to travel between the limits of the desired amplitude;

h. left and right dwell time control signal generating means for said torch for individually providing desired left and right dwell times of the torch at the left and right limits of the torch excursion on the left and right sides of the weld path respectively, whereby the selected amplitude, excursion time, and left and right dwell times may be automatically controlled;

i. welding current servo means for supplying welding current to said torch;

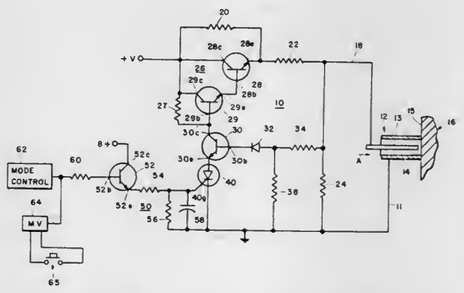
j. welding current control means connected to and controlling said welding current servo means to provide current to the torch, said welding current control means including means for providing low frequency current pulses alternating between adjustable high and low current levels, the frequency and duty cycle of the high current level being independently adjustable, said means comprising in combination a high level current source; a low level current source; a switch logic means connecting said high level current source and low level current source to said welding current servo so that when said switch logic means is switched back and forth the high level current source and low level current source are alternately applied to the welding current servo; means for generating a series of pulses at a frequency proportional to the carriage speed in inches per second divided by a given number of pulses per inch as set into said system; first and second counters connected to receive said pulses at their inputs; and a flip-flop circuit having set and reset terminals connected respectively to the outputs of said first and second counters, said first counter automatically resetting itself and providing an output pulse to said flip-flop when a given number of pulses have been counted, and said second counter providing an output after a given count is achieved less than said first mentioned count to reset said flip-flop, said duty cycle being set into said second counter, said flip-flop connecting to said switch logic means to alternately pass said high level current source and low level current source in accord with the selected counts for said first and second counters; and,

k. means automatically responsive to the torch position connected to said means for generating welding current so that the high level current occurs during the left and right dwell times and the low level current occurs during the excursion times of said torch.

## 4,019,017
## ARC CONTROL CIRCUIT

**George J. Sitek, Stevensville, and Charles W. Berk, St. Joseph, both of Mich., assignors to Leco Corporation, St. Joseph, Mich.**

**Filed Apr. 14, 1975, Ser. No. 567,930**
**Int. Cl.² H02H** *9/00*
**U.S. Cl. 219—135** **2 Claims**




**1.** An electrical circuit for providing a low voltage to an electrode used for striking an arc against a conductive member and for providing a higher arc sustaining voltage to said electrode only when said electrode is in an arcing position in conductive relationship with a conductive work piece, said circuit comprising:

a pair of output conductors for supplying electrical power to an electrode and a work piece;

a source of direct voltage;

voltage dividing means including first and second serially coupled resistors wherein said first resistor has an end remote from said second resistor coupled to said source and said second resistor is coupled between said output

conductors for providing an output voltage between said conductors lower than the voltage of said source;

solid state switching means for selectively bypassing at least a portion of said voltage dividing means to increase the voltage applied to said output conductors;

detection means coupled to said output conductors and to said solid state switching means for actuating said solid state switching means to bypass said voltage dividing means when said output conductors are momentarily shorted by an electrode engaging a work piece, said solid state switching means comprising a first transistor having base, collector and emitter terminals wherein said base terminal is coupled to said detecting means and said first resistor is coupled between said collector and emitter terminals such that said first resistor is bypassed when said transistor is conductive and said detection means comprising a second transistor having base, collector and emitter terminals wherein said base terminal is coupled to one of said output conductors and one of said collector or emitter terminals is coupled to said base terminal of said first transistor, and means for coupling the remaining one of said collector or emitter terminals to the other of said output conductors such that voltage between said output conductors from said source forward biases said second transistor, and wherein said coupling means comprises an SCR having an anode-to-cathode current path coupled between said second transistor and said other output conductor and a gate terminal coupled to means for providing a control signal to trigger said SCR.

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**4,019,018**

## PROCESS FOR NARROW GAP WELDING OF ALUMINUM ALLOY THICK PLATES

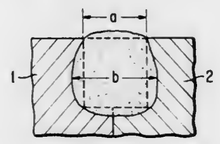
**Minoru Oishi, Fujisawa; Masaharu Rokujo, Kobe; Hisaaki Yokota, Chigasaki; Naoki Okuda, Kamakura; Makoto Tomita, Yokohama, and Toshihiko Endo, Kamakura, all of Japan, assignors to Kobe Steel Ltd., Kobe, Japan**

**Filed Jan. 29, 1975, Ser. No. 545,026**

**Claims priority, application Japan, Sept. 30, 1974, 49-111476; Sept. 30, 1974, 49-111477**

**Int. Cl.² B23K** *9/02*

**U.S. Cl. 219—137 R** **27 Claims**




1. A process for the narrow gap welding of aluminum and aluminum alloy plates greater than 20 mm in thickness with a non-consumable electrode, which comprises the steps of:

first inserting the filling material into the welding groove, and then applying a direct current of more than 300 A between said non-consumable electrode which is characterized by a flat welding end configuration and a current density of 10–50 A/mm² and said plates to be welded with straight polarity,

maintaining arc length from 0.5 to 5 mm during said welding; and

shielding the welding groove with an inert gas comprising at least 50% helium.

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**4,019,019**

## METHOD OF PRODUCING TUBE RODS AND ARTICLES PRODUCED THEREFROM

**James Arlen Cole, El Monte, Calif., assignor to Cabot Corporation, Kokomo, Ind.**

**Filed Mar. 20, 1975, Ser. No. 560,305**

**Int. Cl.² B23K** *35/36*

**U.S. Cl. 219—146** **8 Claims**

1. The method of closing the ends of hollow weld rods filled with particulate solids comprising the steps of mechanically reducing the diameter of the hollow rod ends to restrain the solids from falling out the end while leaving an opening into the interior, dipping one end in a fluid material having sufficient capillarity to enter between the particles of filler within the hollow tube adjacent each end and solidify to form a film over the tube end and within the particulate solids filler adjacent the end, permitting said fluid material to become sufficiently viscous to retain its position within the particulate solids prior to dipping the other end, dipping the other end of said weld rod in said fluid material and solidifying the fluid material in both ends.

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**4,019,020**

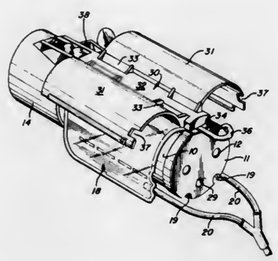
## CONTROLLED TEMPERATURE FLUID HEATER

**Larry T. Bilbee, and Thomas L. Clabaugh, both of Bellville, Ohio, assignors to The Gorman-Rupp Company, Mansfield, Ohio**

**Filed Aug. 13, 1975, Ser. No. 604,339**

**Int. Cl.² A61M** *5/14*; **F24H** *1/12*; **B67D** *5/62*; **F28F** *7/00*

**U.S. Cl. 219—302** **4 Claims**




1. Apparatus for maintaining a flow of fluid at optimum temperature comprising an inner mandrel having high thermal conductivity, means for maintaining said inner mandrel at constant optimum temperature, a substantially flat plastic bag wrapped around said inner mandrel and having sealed linear areas forming a labyrinth of passageways through the bag, said sealed linear areas being interrupted by gaps adapted to inhibit the accumulation of air bubbles along the sealed linear areas, and an outer housing havng hinged wings for holding said bag in wrapped-around contact with said inner mandrel when their free edges are secured in abutment with each other.

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**4,019,021**

## ELECTRIC RESISTANCE FLUID HEATING APPARATUS

**Hermann J. Schladitz, Munich, Germany, assignor to Schladitz-Whiskers, A.G., Zug, Switzerland**

**Division of Ser. No. 23,090, April 6, 1970, Pat. No. 3,833,791, which is a continuation of Ser. No. 474,797, July 26, 1965, abandoned. This application June 6, 1974, Ser. No. 476,946**

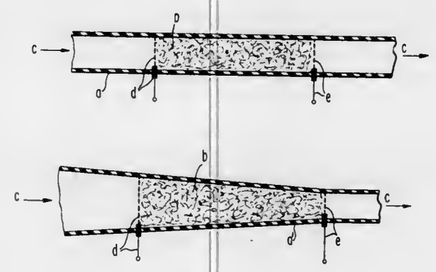
**Claims priority, application Switzerland, July 28, 1964, 9872/64**

**Int. Cl.² H05B** *3/12*; **F24H** *1/10, 3/04*

**U.S. Cl. 219—381** **15 Claims**

1. A resistance heater for rapidly heating a fluid to a desired temperature, comprising an electric resistance element including a porous mat of fine, electrically-conductive, elongated elements connected together so as to be electrically conductive, said elongated elements being selected from the group consisting of metalcoated non-metal whiskers and polycrystalline metal whiskers, power means for supplying electric energy to said resistance element, and a non-conductive tubular structure accommodating the resistance element therein so that substantially all of the fluid flows through said porous






mat, said porous mat being disposed so as to substantially fill a portion of the length of said tubular structure, said tubular structure having at one end an opening for admission of the fluid to be heated and at the opposite end an opening for discharge of the heated fluid, wherein said elongated elements are connected at the contact points thereof by metalization from the gaseous phase.

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**4,019,022**

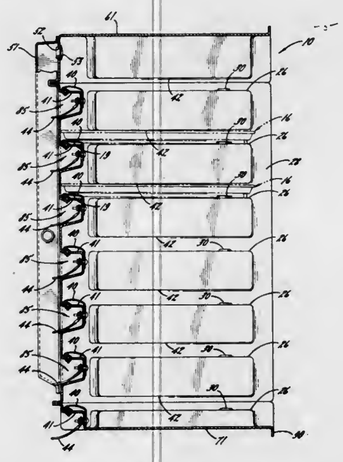
## STORAGE SYSTEM FOR HOT FOOD TRAYS

**Gene J. Seider, Bloomington; Michael C. Freund, Mendota Heights, and James R. Duffy, West St. Paul, all of Minn., assignors to Gould Inc., Chicago, Ill.**

**Filed Apr. 30, 1975, Ser. No. 573,078**

**Int. Cl.² F27D** *11/02*

**U.S. Cl. 219—386** **3 Claims**



1. A storage system for hot food trays containing electrical heaters connected to electrical contacts on the rear portions of the trays, said system comprising the combination of

a. a storage compartment having a plurality of vertically spaced tray support means including vertical shoulders adapted to cooperate with complementary shoulders on the front portion of the trays to latch the trays in the storage compartment when the trays are fully inserted therein,

b. a plurality of spring contacts within the storage compartment for providing electrical connections with the contacts on the trays while urging the rear portions of the trays carrying the contacts away from said support means,

c. and guide means for the trays forming a fulcrum located forwardly of said spring contacts toward said latching shoulders rearwardly of said latching shoulders, on the opposite side of the tray from the spring contacts, so that said spring contacts urge the rear portions of the trays upwardly about said fulcrum thereby urging said complementary shoulders on the front portions of the trays downwardly against said latching shoulders on the tray support means.

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**4,019,023**

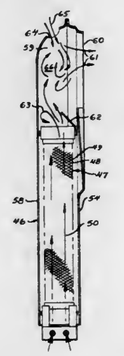
## ELECTRICALLY HEATED DRYER

**James M. Marzonie, Hancock, and Karl Jautakis, Sawyer, both of Mich., assignors to Whirlpool Corporation, Benton Harbor, Mich.**

**Filed June 16, 1975, Ser. No. 587,437**

**Int. Cl.² F26B** *11/00*; **H05B** *3/12*; **F24H** *3/04*

**U.S. Cl. 219—400** **11 Claims**



1. A dryer for articles, comprising: a drying container for the articles; an air duct leading to said container having an air entrance opening to said container, a front wall facing said container and a rear wall; means for directing an air stream through said duct; heating means in said duct spaced from said entrance for heating said air stream; an air mixing baffle means in said duct upstream of said air entrance opening and downstream of said heating means and adjacent said front wall and extending at an angle in the direction of said air stream and inwardly of said duct and toward said rear wall and said entrance for creating an even temperature turbulence in said air stream thereby tending to eliminate any hot air stratification; an ambient air inlet opening means to said duct between said baffle and said air entrance opening and downstream of said heating means, and said baffle means said baffle means being located downstream of said heating means and upstream of said ambient air inlet.

### 4,019,024
### ROLLER FOR FIXING ELECTROPHOTOGRAPHIC TONER IMAGES AND METHOD OF PRODUCING THE SAME

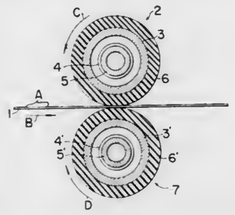
**Ryoichi Namiki, Hino, Japan, assignor to Ricoh Co., Ltd., Tokyo, Japan**

**Continuation-in-part of Ser. No. 440,341, Feb. 7, 1974, abandoned, which is a continuation-in-part of Ser. No. 339,979, March 12, 1973, abandoned. This application Mar. 7, 1975, Ser. No. 556,289**

**Claims priority, application Japan, Mar. 29, 1972, 47-31411**

**Int. Cl.² B21B** *27/06*; **H05B** *3/02*

**U.S. Cl. 219—469** **7 Claims**



1. An image fixing roller for electrophotography comprising a core, a roll layer disposed around the core and made of silicon rubber whose outer surface is ground, said roll layer being impregnated with silicon oil and being adapted to be heated for melting toner particles forming toner images, and the outer peripheral surface of the roll layer tending to wear off when exposed to heat and friction.

### 4,019,025
### CARD CONVEYOR DEVICE

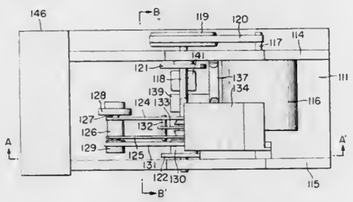
**Tadasu Taniguchi, Tokyo; Iwao Hosaka, and Shigehiro Kato, both of Chichibu, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo and Canon Denshi Kabushiki Kaisha, Saitama, both of, Japan**

**Filed Sept. 5, 1975, Ser. No. 610,875**

**Claims priority, application Japan, Sept. 9, 1974, 49-103701**

**Int. Cl.² G06K** *13/02*, *7/10*

**U.S. Cl. 235—61.11 R** **55 Claims**



1. A card conveyor device comprising:
a card guide path along which a card for reading or writing information therein is guided in a predetermined direction;
an inlet-outlet port for inserting therethrough said card into said card guide path and for discharging therethrough said card from said card guide path;
first and second card transport means disposed successively along said card guide path in the direction from said inlet-outlet port;
first detector means for detecting that said card has been inserted into said card guide path through said inlet-outlet port and that said card has been discharged from said card guide path;
second detector means for detecting that said card, after its forward movement from said inlet-outlet port toward said card guide path, has reached a predetermined position on said card guide path;
third detector means for detecting the position of said card on said card guide path between said first and said second detector means;
control means for bringing said first card transport means into or out of engagement with said card in accordance with an output from said third detector means; and
drive means for driving said first and second card transport means forwarly in response to a signal from said first detector means and for reversing the forward drive of said first and second card transport means in response to a signal from said second detector means.

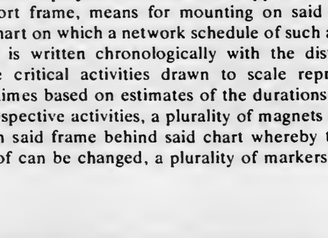
### 4,019,026
### LASER BEAM LABEL READER HEAD

**Sadao Nakanishi, and Nobufumi Tokura, both of Ise, Japan, assignors to Shinko Electric Co., Ltd., Tokyo, Japan**

**Filed Sept. 23, 1975, Ser. No. 616,057**

**Int. Cl.² G06K** *7/14*; **G02B** *5/08*; **G06K** *9/10*

**U.S. Cl. 235—61.11 E** **2 Claims**




1. A laser beam label reader head for reading code information on a label by irradiation of a laser beam, comprising in combination:
a laser tube for radiation of a laser beam;
a polyhedral rotating mirror located in position to reflect the laser beam from said laser tube toward a label to scan code information on the label;
an apertured mirror positioned between said laser tube and said polyhedral rotating mirror and having a center aperture to allow passage therethrough of said laser beam from said laser tube, said apertured mirror being held in a slanting position to divert a portion of the light reflections which comes from said label along the axis of the scanning laser beam; and
an photoelectric converter located in position to receive the diverted light portion and adapted to pick up light signals therefrom for conversion into corresponding electric signals.

### 4,019,027
### APPARATUS AND METHOD FOR SCHEDULE MONITORING AND CONTROL

**William L. Kelley, 45 Ashbrook Place, Moraga, Calif. 94556**

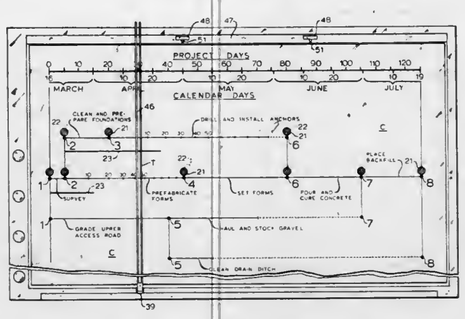
**Filed May 9, 1975, Ser. No. 576,221**

**Int. Cl.² G09B** *19/18*; **G09F** *3/18*; **G06C** *3/00*

**U.S. Cl. 235—89 R** **11 Claims**

1. Schedule control and monitoring apparatus for use in network type scheduling of a project having a plurality of interrelated activities with events at the start and termination thereof and wherein a succession of activities of the longest time path for the project are critical, said apparatus comprising a support frame, means for mounting on said frame a prepared chart on which a network schedule of such activities and events is written chronologically with the distance of consecutive critical activities drawn to scale representing scheduled times based on estimates of the durations to complete the respective activities, a plurality of magnets movably disposed on said frame behind said chart whereby the positions thereof can be changed, a plurality of markers of magnetic material adapted for disposition on the front face of said chart at said event points and supported by said magnets, an indicator bar mounted on said frame over said chart, and means for moving said indicator bar at a constant rate past said markers from a position indicating the commencement of the project to provide a comparison between the actual progress of any given activity and the scheduled progress thereof.





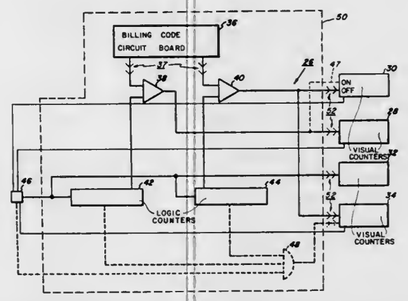

### 4,019,028
### PRINTING MACHINE WITH VARIABLE COUNTER CONTROL SYSTEM

**Demetrios Polyzoes, Pittsford, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

**Continuation of Ser. No. 343,067, March 20, 1973. This application Nov. 25, 1974, Ser. No. 526,652**

**Int. Cl.² H03K** *21/30*

**U.S. Cl. 235—92 SB** **2 Claims**




1. In a reproduction machine of the type which produces and delivers a number of copies of an original to a receiving means during a run of a job, the improvement which comprises:
a. first means for counting the total number of copies of an original delivered to the receiving means, second means for counting each copy of an original up to a first predetermined number which is delivered to the receiving means, and third means for counting the number of runs that exceed a predetermined length, the first, second, and third counting means including a plurality of counters for presenting visual indications of the events counted, and
b. means for enabling at least some of the counters in accordance with a predetermined program, a billing circuit board detachably connected to the enabling means by mating connectors for defining the predetermined program, and means for detecting when a copy has been deposited in the receiving means and for sending an input to the counters in accordance with the predetermined program.

### 4,019,029
### MONITORING APPARATUS FOR CHECKING THE REGULARITY OF THE OPERATION OF LOGIC SYSTEMS

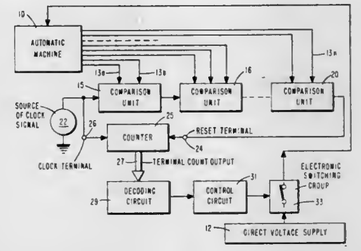
**Mario Pozzetti, Bologna, Italy, assignor to Finike Italiana Marposs-Soc. In Accomandita Semplice di Mario Possati & C., Bentivogliio-S. Marino, Italy**

**Filed Nov. 14, 1975, Ser. No. 631,945**

**Claims priority, application Italy, Nov. 22, 1974, 3524/74**

**Int. Cl.² G06M** *3/02*

**U.S. Cl. 235—92 PD** **12 Claims**




1. A monitoring apparatus for checking the regularity of the operation of a logic system, comprising a source of a clock signal, a series of comparison units connected to said source adapted to compare the signals of determined pairs or groups of logic signals; a detecting device adapted to check the presence of the clock signal at the output of said seris; alarm means connected to the output of the detecting device, said detecting device comprising counting means having a first input, of clock, connected to the source of the clock signal, a second input, of reset, connected to said output of the series, and an output of terminal count connected to decoding means adapted to control said alarm means when the counting on said terminal count output reaches a predetermined value, first switching and consent means adapted to stop the operation of the logic system; checking means adapted to simulate an alarm state and second consent means connected to the first switching and consent means and to the checking means for making the continuation of the operation of the logic system depend on the working conditions of the monitoring apparatus.

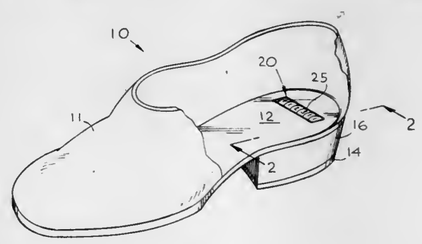
### 4,019,030
### STEP-COUNTING SHOE

**Farouq M. Tamiz, 530 Howard St., Alhambra, Calif. 91801**

**Filed Nov. 3, 1975, Ser. No. 627,897**

**Int. Cl.² G01C** *22/00*; **A43B** *19/00*

**U.S. Cl. 235—105** **7 Claims**



1. A step-counting shoe comprising:
a shoe member provided with heel means;
said heel means having hollowed portion means;
step-counting means disposed within the hollowed portion means and secured to said heel means;
operating means, reciprocally displaceable between non-

counting and counting positions, for actuating said step-counting means;

said operating means being disposed within said hollowed portion means and including pin means extending through an aperture in the base of said heel means in the non-counting position; and

means for biasing said operating means to the non-counting position.

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**4,019,031**

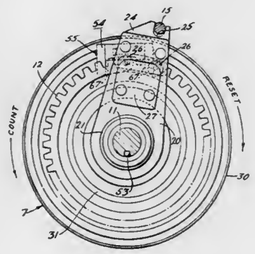
## REGISTER PRICE WHEEL STRUCTURE

**Einar T. Young, Newtown Square, Pa., assignor to Sun Oil Company of Pennsylvania, Philadelphia, Pa.**

**Division of Ser. No. 489,275, July 17, 1974, Pat. No. 3,920,964. This application July 10, 1975, Ser. No. 594,935**

**Int. Cl.² G06C** *15/42, 25/00*

**U.S. Cl. 235—131 FD** **4 Claims**




1. In a counter, a supporting shaft, a number wheel rotatably mounted on the shaft, a driven gear for rotating the number wheel during a counting operation, and means for applying a frictional force against said gear and including an arm mounted on and supported by said shaft adjacent to said driven gear, and a leaf spring secured to said arm and being biased against said driven gear to exert a substantially constant drag upon said gear as the latter rotates.

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**4,019,032**

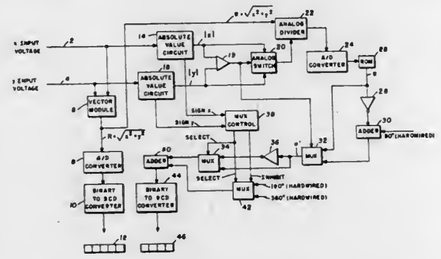
## X-Y TO RANGE-BEARING CONVERTER

**Edward J. McDevitt, Laurel, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Jan. 14, 1976, Ser. No. 648,984**

**Int. Cl.² G06J** *1/00*

**U.S. Cl. 235—150.5** **9 Claims**



1. A method for converting two rectangular coordinate analog inputs into range and bearing digital outputs, comprising the steps of:

producing an analog range output from said analog inputs and digitizing the analog range output in an analog-to-digital circuit,

producing by circuit means a digital trigonometric value calculated with said two analog inputs,

feeding the digital trigonometric value into a read-only memory and producing a first angle output, corresponding to said trigonometric value,

comparing the signs of the rectangular coordinate analog inputs to determine into which quadrant the first angle output belongs, and

sending the sign comparison output and the first angle output into bearing multiplexer circuitry, and

changing the value of the first angle output into a bearing output positioned in the proper quadrant as determined by the inputs sent into the bearing multiplexer circuitry.

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**4,019,033**

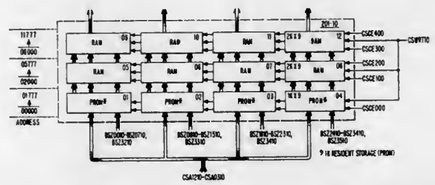
## CONTROL STORE CHECKING SYSTEM AND METHOD

**Arthur A. Parmet, Waltham, Mass., assignor to Honeywell Information Systems, Inc., Waltham, Mass.**

**Filed Dec. 29, 1975, Ser. No. 644,678**

**Int. Cl.² G11C** *29/00*; **G06F** *11/10*

**U.S. Cl. 235—153 AM** **22 Claims**



1. A system for checking the operation of the circuits and transfer paths of a microprogrammed processing unit, said system comprising:

a cycled addressable control store including a plurality of storage locations for storing a corresponding number of microinstruction words, each microinstruction word coded to include at least one previously calculated check bit whose state indicates a predetermined characteristic of the plurality of bits of an address of the storage location in said store previously calculated to be next in sequence;

first address register means coupled to said store for storing said address for referencing said plurality of storage locations and operatively coupled to receive a signal corresponding to said check bit during the read out of each microinstruction word;

second register means coupled to said store for storing at least a portion of the microinstruction word read out from an addressed location during an operative cycle of said control store;

decoding means coupled to said second register means for generating a plurality of control signals;

increment circuit means coupled to said first register means for incrementing said address by one; and,

first checking means coupled to said address register means, said checking means being operative to perform continuously a checking operation upon said address and said check bit stored in said first register means in response to at least a first one of said control signals for verifying when any one of said number of circuits is not operating properly.



**4,019,034**

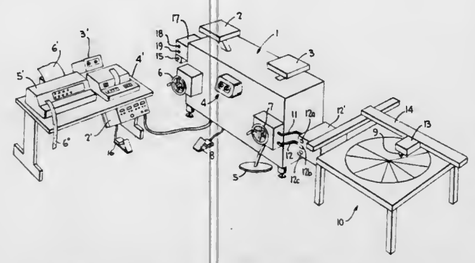
## METHOD FOR DETERMINING THE INTERIOR SHAPE OF SPHERICAL TANKS FOR THE COMPUTATION OF THE LIQUID VOLUME OF THE TANKS, AND DEVICE FOR CARRYING OUT THE METHOD

**Ole H. Blom, Stabekk, and Rolf Bakken, Oslo, both of Norway, assignors to Bloms Oppmaling A/S, Oslo, Norway**

**Continuation-in-part of Ser. No. 498,731, Aug. 19, 1974, abandoned. This application Oct. 23, 1975, Ser. No. 624,448**

**Int. Cl.² G06F** *15/36*; **G01F** *17/00*

**U.S. Cl. 235—151.3** **10 Claims**



1. A method for determining the interior shape of a spherical tank for the computation of the liquid volume of the tank, comprising the steps of:

establishing a predetermined number of measuring stations within the tank;

establishing an arbitrary system of coordinates, the location of said measuring stations being identified with reference to said system of coordinates;

placing a series of markers evenly distributed on the inner surface of the tank to form reference points which are measured by measuring instruments at said measuring stations in accordance with said system of coordinates;

photographing all said reference points to obtain double coverage of all the inner surface areas of the tank;

plotting the measured reference points onto a drawing table of a coordinatograph to establish a horizontal great circle plane of the sphere together with a first interim center of the sphere;

feeding the coordinate values of all reference points and said first interim center of the sphere to a computer for the determination of the coordinate values of a second interim center of the sphere;

plotting said calculated second interim center of the sphere onto said drawing table;

generating a plurality of vertical planes evenly angularly spaced through said second interim center and generating intersecting horizontal circle planes on the drawing table to form selected other points;

forming in an autograph stereoscopic models of the inner surface of said tank using the double coverage photographs, said autograph being associated with said coordinatograph with the drawing table;

obtaining a series of three-dimensional readings from said stereoscopic models in a predetermined system of coordinates, said readings including the identification of said reference points and said selected other points on the inner surface of said tank;

transferring all said three-dimensional readings to an interface unit wherein said readings are registered and converted into field coordinates;

calculating on the basis of all three-dimensional readings the final mean radius of the sphere, the coordinate values of the final center of the sphere and the deviation from the mean radius for every point of reading;

calculating on the basis of said three-dimensional readings the mean radius of said small circles; and

calculating the volume of each of the areas between adjacent small circles to determine the total volume of said tank.

**4,019,035**

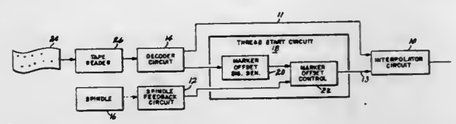
## METHOD AND APPARATUS FOR CONTROLLING THE INITIATION OF MULTIPLE START THREADING CUTS

**Randall Curtis Tanner, Cincinnati, Ohio, assignor to Cincinnati Milacron, Inc., Cincinnati, Ohio**

**Filed Jan. 23, 1976, Ser. No. 651,938**

**Int. Cl.² B23G** *3/04*

**U.S. Cl. 235—151.11** **10 Claims**




1. An apparatus for controlling the initiation of threading spans for multiple start threads for use in a numerical control comprised in part of an interpolator circuit responsive to a spindle feedback circuit connected to a machine spindle, said spindle feedback circuit producing a marker pulse and a first predetermined number of spindle pulses during each revolution of the spindle, wherein the improvement comprises:

a. means for providing input signals representing a particular thread start number relative to the total number of threading starts;

b. means responsive to the input signals and a reference signal representing the first predetermined number of spindle pulses for producing a control signal representing a second number of spindle pulses as a function of the ratio of the particular thread start number to the total number of threading starts; and

c. means having inputs responsive to the marker and spindle pulses and the control signal and an output connected to the interpolator circuit for inhibiting the transfer of spindle pulses to the interpolator circuit as a function of the control signal.

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**4,019,036**

## METHOD FOR THE RATIONAL APPLICATION OF PATTERNING SIGNALS TO A PATTERNING DEVICE, TOOLS ADAPTED TO PRODUCE A PATTERN AND AN APPARATUS FOR CARRYING OUT THE SAME

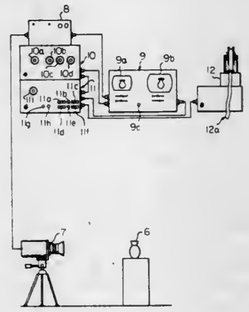
**Takashi Hiramatsu; Akihiko Oe; Atsushi Fukuda; Masaki Fuse, and Tatsujiro Mori, all of Nagoya, Japan, assignors to Mitsubishi Rayon Co., Ltd., Tokyo, Japan**

**Filed Dec. 11, 1974, Ser. No. 531,701**

**Claims priority, application Japan, Aug. 30, 1974, 49-99615**

**Int. Cl.² D04B** *15/78*

**U.S. Cl. 235—151.1** **11 Claims**



1. A method for applying a pattern, corresponding to at least a portion of an object, to an article, said method forming basic pattern information which controls a machine for applying said pattern onto said article in accordance with a pattern information signal, comprising the steps of:

a. generating a television signal corresponding to said object;
b. generating a first electrical signal as a function of variations in said television signal resulting from at least one of the gradations, colors or irregularities in said object;
c. displaying said first signal on a display device;
d. generating a second electrical signal which can be displayed on said display device as at least one of a group of points or a group of boundary lines wherein the dimensions of the display of said second signal, horizontal to vertical ratio, the number of points and the position of the display of said second signal are independently variable;
e. displaying said first and second signals on said display device in a superimposed relationship;
f. varying said first signal and thus the display thereof, such that said first signal corresponds to at least a portion of said object;
g. monitoring the variations of said first signal with said second signal superimposed thereon on said display device;
h. generating a third electrical signal corresponding to said varied first signal at the points at which said second signal is superimposed thereon;
i. applying said third signal to said machine for applying said pattern to said article for controlling said machine.

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**4,019,037**

## ELECTRONIC WRISTWATCH INCORPORATING CALCULATOR

**Takashi Monna, Suwa, Japan, assignor to Kabushiki Kaisha Suwa Seikosha, Tokyo, Japan**

**Filed Dec. 27, 1972, Ser. No. 319,070**
**Claims priority, application Japan, Dec. 27, 1971, 46-2875; Dec. 27, 1971, 46-2876**
**Int. Cl.² G06F** *7/48, 3/02;* **G04B** *19/30*
**U.S. Cl. 235—156** **4 Claims**




1. An input device for an electronic wristwatch incorporating calculating means comprising a ring member rotatably mounted on said wristwatch, fixed contact means operatively coupled to said calculating means, displaceable contact means mounted for rotation with said ring member, and mark means on said wristwatch, said ring member having numerical characters representative of each digit from 0 to 9 and at least one function character applied thereto at discrete circumferentially spaced positions; at least one of said fixed and movable contact means including a plurality of contact elements respectively associated with said numerical and function characters and positioned for electrical engagement between the contact element associated with the character aligned with said mark means and the other of said fixed and movable contacts.

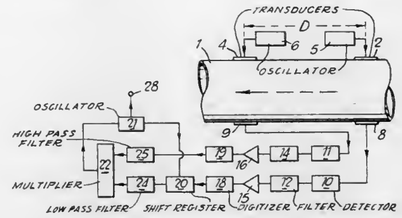
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**4,019,038**

## CORRELATORS

**Donald Louis Critten, and Peter Alan Johnson, both of Luton, England, assignors to Kent Instruments Limited, Luton, England**

**Continuation of Ser. No. 261,327, June 9, 1972, abandoned.**
**This application Mar. 4, 1975, Ser. No. 555,250**
**Claims priority, application United Kingdom, June 10, 1971, 27366/71; Feb. 3, 1972, 5184/72**
**Int. Cl.² G06F** *15/34*
**U.S. Cl. 235—181** **11 Claims**




1. A method of cross-correlating two detected noise signals representative of respective random variations in a moving medium and having a net time delay between similar characteristics thereof, the method including the steps of deriving a pair of noise signals in the form of pulse trains representative of respective random variations, imposing a time delay on the noise signal derived from a leading one of the random variations, effecting a relative phase shift substantially equal to an odd number multiple of 90° between the pair of noise signals, obtaining the product of the noise signal derived from a trailing one of the random variations and the delayed signal derived from the leading one of the random variations, after effecting the said phase shift, and adjusting the time delay imposed on the noise signal derived from the leading one of the random variations to reduce the said product to zero.

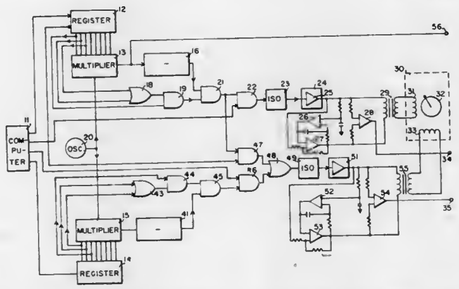
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**4,019,039**

## SYNCHROSCOPE SIMULATOR

**Robert Richard Fontaine, Riverdale, Md., assignor to The Singer Company, Binghamton, N.Y.**

**Filed Nov. 28, 1975, Ser. No. 635,577**
**Int. Cl.² G06G** *7/48;* **G01R** *25/00*
**U.S. Cl. 235—184** **10 Claims**




1. Apparatus for simulating a synchroscope system, said apparatus comprising:
a first register and a second register;
a first rate multiplier connected to receive the contents of said first register;
a second rate multiplier connected to receive the contents of said second register;
an oscillator connected to said first and second rate multipliers to supply the rate by which the contents of said first and second registers are multiplied;



at least one source of digital information connected to the inputs of said first and second registers to supply individual digital words representing a frequency to said first and second registers;
a first filter means coupled to the output of said first multiplier to convert the first multiplier output into a first sinusoidal wave having a frequency equal to the digital word stored in said first register;
a second filter means coupled to the output of the second multiplier to convert the output of the second multiplier into a second sinusoidal wave having a frequency equal to the digital word stored in said second register;
means for controlling the output of at least one of said sources of digital words to change the contents of one of said first or second registers as the system operates to bring the values of the contents of said first and second registers closer together; and
means for transmitting the first and second sinusoidal waves to the two windings of a synchroscope.

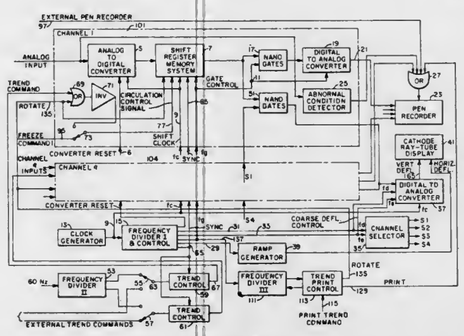
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**4,019,040**

## CRT DISPLAY AND RECORD SYSTEM

**Francis T. Thompson, Murrysville, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Continuation of Ser. No. 402,686, Oct. 2, 1973, abandoned, which is a continuation of Ser. No. 197,469, Nov. 10, 1971, abandoned. This application Mar. 27, 1975, Ser. No. 562,618**
**Int. Cl.² G06F** *3/14*
**U.S. Cl. 235—92 SH** **2 Claims**




1. Apparatus for processing digital input signals, comprising, a shift register memory means adapted to sequentially receive input signals and store a predetermined number of said input signals as input signal information, clock means connected to said shift register memory means to advance said input signals through said shift register memory means causing the oldest stored input signal to be discarded in response to each new input signal received by said shift register memory means, logic control means, including means for selecting a first and second mode of operation, operatively connected to said shift register memory means to selectively gate said input signals to said shift register means at a first and second rate, and visual display means operatively connected to said shift register memory means to display the input signal information stored in said shift register memory means, the rate of introducing input signals to said shift register memory means in said first mode of operation producing a slowly moving display, said rate of introducing input signals to said shift register memory means in said second mode of operation being less than the rate corresponding to said first mode of operation and producing an essentially stationary display.

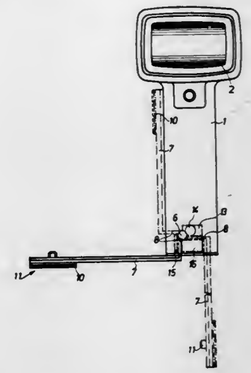
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**4,019,041**

## FLASH APPARATUS WITH CABLE STORAGE SPACE

**Claus Prochnow, Braunschweig, Germany, assignor to Rollei-Werke Franke & Heidecke, Braunschweig, Germany**

**Filed Sept. 16, 1975, Ser. No. 613,760**
**Claims priority, application Germany, Sept. 28, 1974, 2446411**
**Int. Cl.² G03B** *15/02;* **F21V** *7/00*
**U.S. Cl. 240—1.3** **10 Claims**




1. Photographic flash apparatus comprising a body portion, a synchronous connection cable for electrical connection with a camera with which the flash apparatus is used, and a mounting arm pivotally attached to said body portion for supporting said body portion from said camera, characterized by the fact that:
a. said body portion has a cavity serving as a storage compartment for said cable when not in use;
b. one end of said cable is connected to said body portion within said cavity;
c. said mounting arm is arranged for swinging movement to a plurality of positions of orientation relative to said body portion; and
d. in one of said positions, said mounting arm overlies and serves as a closure for said storage cavity.

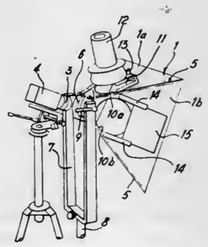
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**4,019,042**

## LIGHTING DEVICE FOR PHOTOGRAPH OR MOTION-PICTURE PHOTOGRAPHY

**Mardick Baliozian, Feucherolles, France, assignor to Tolec, Neuilly-Plaisance, France**

**Filed Sept. 19, 1975, Ser. No. 614,782**
**Claims priority, application France, Sept. 26, 1974, 74.32418**
**Int. Cl.² G03B** *15/02*
**U.S. Cl. 240—1.3** **8 Claims**




1. In combination with a light source and with a camera having a lens, a lighting device comprising: an opaque reflector of truncated shape having a base wall formed with an opening and a side wall flaring outwardly from said base wall

and formed with a pair of offset lightpassing windows; said reflector with said opening aligned with said lens, whereby said camera can take a picture through said opening; means for securing said light source outside said reflector at one of said windows in a position wherein light emitted by said source is reflected by the interior of said reflector at an object viewable by said camera through said opening, said light source being out of line with said lens in said position; and means including a guide on said reflector and an opaque slide displaceable along said guide across a one of said windows for varying the amount of light passing through the thus equipped window.

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**4,019,043**

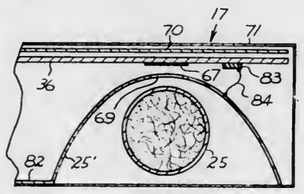
## PHOTOFLASH LAMP ARRAY HAVING SHIELDED SWITCHING CIRCUIT

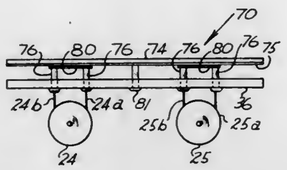
**Richard Blount, South Euclid, Ohio, assignor to General Electric Company, Schenectady, N.Y.**

**Continuation-in-part of Ser. No. 574,752, May 5, 1975, abandoned, Continuation-in-part of Ser. No. 520,451, Nov. 4, 1974, abandoned. This application Dec. 8, 1975, Ser. No. 638,364**

**Int. Cl.² G03B** *15/02*; **H05K** *1/00*

**U.S. Cl. 240—1.3** **22 Claims**




1. A multiple flash lamp array comprising a plurality of flash lamps of the electrically fired type, a circuit board having circuitry on one side thereof for sequentially firing said lamps, and means electrically connecting said lamps to said circuitry, wherein the improvement in said array comprises an electrically conductive shield in the form of a conductive sheet member connected electrically to said sequential firing circuitry and positioned substantially parallel to and spaced from at least part of the opposite side of said circuit board to reduce the likelihood of said lamps being fired by electrostatic charges applied to said array and to reduce capacitive coupling between said shield and said firing circuitry.

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**4,019,044**

## LIGHTING FIXTURE WITH REMOVABLE ELECTRICAL COMPONENT MOUNTING ARRANGEMENT

**James P. Kelly, Cudahy, and Donald Wandler, South Milwaukee, both of Wis., assignors to McGraw-Edison Company, Elgin, Ill.**

**Filed Oct. 10, 1975, Ser. No. 621,419**

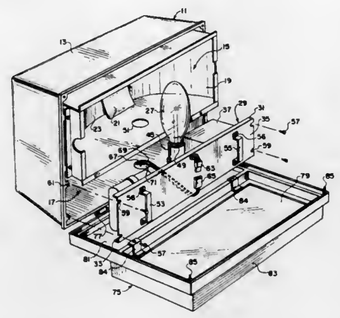
**Int. Cl.² F21S** *13/10*; **F21V** *23/02*

**U.S. Cl. 240—25** **19 Claims**

1. A lighting fixture comprising:

a housing having an energization compartment therein;

electrical component mounting means on which electrical components for controlling energization of a lamp are mounted, said electrical component mounting means adapted to be removably inserted into said energization compartment;



lamp supporting means affixed to said electrical component mounting means to hold the lamp and convey electrical power thereto; and

electrical connector means for selectively conveying electrical power to said electrical components and said lamp supporting means.

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**4,019,045**

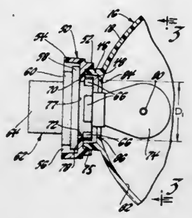
## SOCKET MOUNTING CAP

**Norman W. Bassett, Anderson, Ind., assignor to General Motors Corporation, Detroit, Mich.**

**Filed Aug. 25, 1975, Ser. No. 607,254**

**Int. Cl.² F21M** *7/00*

**U.S. Cl. 240—41 BM** **3 Claims**



2. A bulb and socket support for use in a lamp housing having an integrally molded parabolic mirror including a bulb access opening therein and an outwardly extending socket collar the improvement comprising: a radially inwardly directed mirror segment on the integrally formed support collar to define an access opening into the parabolic mirror having an inside diameter less than 10 percent greater than the outside diameter of the bulb inserted therethrough and to define an annular light interception surface for reducing light reflection loss at the access opening into the parbolic mirror, a bulb socket and bulb with sealing gasket having a reference surface, a socket mounting cap supported on the outer end of the support collar including an outboard flange formed continuously around said gasket to define a socket sealing gasket shield at the socket sealing gasket reference surface, the inside diameter of the outboard flange being greater than the outside diameter of the sealing gasket to cover the socket reference surface to prevent ingress of foreign material into the interior of the mirror housing, said mounting cap including a support wall to supportingly receive the socket and an outboard surface to sealingly engage the sealing gasket, the support collar and socket mounting cap support wall maintaining said bulb at a position to locate its filament at a focal length wherein a cone of generated light therefrom will be intercepted by the light interception surface for reflection therefrom to minimize excessive loss of reflector efficiency at the socket support.



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**4,019,046**

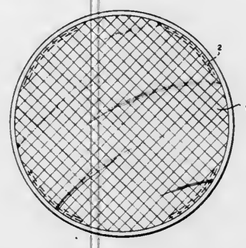
## HEADLIGHT SAFETY COVER

**Lawrence Edwin Reynolds, Colony St., Meriden, Conn. 06450**

**Filed July 16, 1975, Ser. No. 567,408**

**Int. Cl.² F21J** *9/08*

**U.S. Cl. 240—46.59** **2 Claims**



1. A headlight safety cover to be fitted over the headlight of a motorcycle or the like to improve visibility of the motorcycle when the headlight is illuminated during daylight hours comprising: a colored lens having a size and shape adapted to overlie substantially the entire headlight lens; an attachment sleeve connected to the periphery of the colored lens and having clamp-like springs for holding the colored lens on the headlight; and resilient bumpers within the attachment sleeve positioned for engagement with the exterior of the headlight and having a resiliency permitted vibrating movement of the colored lens relative to the headlight upon movement of the motorcycle or the like.

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**4,019,047**

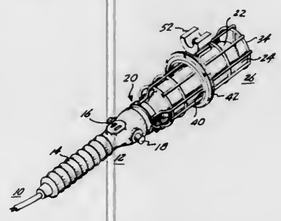
## TROUBLE LAMP FOR MECHANICS

**Oscar J. Frey, 8660 - 46th SW., Seattle, Wash. 98136**

**Filed Nov. 17, 1975, Ser. No. 632,640**

**Int. Cl.² F21V** *15/00*; **F16B** *47/00*

**U.S. Cl. 240—54 A** **6 Claims**



1. In a trouble-lamp of the type wherein a light bulb is mounted in a socket at an end of an extension cord and a protective openwork cage, non-rotatably attached to the socket, surrounds said light bulb, and light shield means is provided within said cage to preclude light emanations along one side of said light bulb, the improvement comprising:

an open-centered discoidal member;

an annular member, channel-shaped in cross-section rotatably interfitted to an edge of said discoidal member to permit relative rotation about a common axis of one member with respect to the other member;

one of said members being fixedly secured intermediate of the length of said protective cage; and

the other of said members being fixedly secured to a magnet for mounting on magnetically attractive means proximate to a work area to be illuminated.

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**4,019,048**

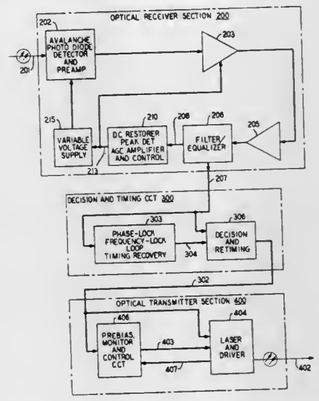
## REGENERATOR FOR AN OPTICAL TRANSMISSION SYSTEM

**Theodore Lincoln Maione, Little Silver; Frederick Enyeart Radcliffe, Lavallette; Darrell Dean Sell, Holmdel, and Dan Holden Wolaver, Edison, all of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed Mar. 22, 1976, Ser. No. 668,851**

**Int. Cl.² H04B** *9/00*

**U.S. Cl. 250—199** **34 Claims**




1. An optical pulse stream regenerator comprising

means for receiving an optical data pulse stream and converting it to an electrical data pulse stream representing the received optical data pulse stream;

means responsive to the electrical data pulse stream from the receiving means for recovering a clock pulse stream synchronized with the received optical data pulse stream;

means responsive to the clock pulse stream and to the electrical data pulse stream from the receiving means for regenerating an electrical data pulse stream representing the received optical data pulse stream; and

an optical transmitter including an injection laser responsive to the regenerated electrical data pulse stream and to a prebias signal, which is established in response to the difference between a signal representing the optical output of the laser and a signal representing the regenerated electrical data pulse stream, for regenerating an optical output data pulse stream representing the received optical data pulse stream.

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**4,019,049**

## PHOTOELECTRIC TRANSDUCING UNIT AND SYSTEM FOR DETECTING THE SHARPNESS OF THE IMAGE OF OBJECT BY MEANS OF THE UNIT

**Hansrichard Schulz, Obere Walstrasse 2a, D-773 Villingen, Black Forest, Germany**

**Filed Jan. 30, 1975, Ser. No. 545,473**

**Claims priority, application Germany, Feb. 8, 1974, 2406045**

**Int. Cl.² H01J** *39/12*

**U.S. Cl. 250—211 R** **65 Claims**

1. A light-to electrical signal conversion unit, comprising;

electrical insulation means permitting the passage of light therethrough,

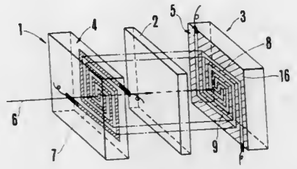
first photoelectric transucing means including;

a pair of strip-shaped electrode members each having two long edges and two short edges smaller than the long edges, each of said electrode members being disposed over an area of said insulating means so that the member never crosses itself, one of the short edges of each member being disposed near the center of the area, said members being bifilar wound relative to each other over the

area, the other short edge on each member being disposed at the outside of the area,

a first photosensitive element disposed between said bifilar wound members,

second photoelectric transducing means disposed on said insulating means over a second area opposing the first photoelectric transducing means, said second photoelectric transducing means including;




a belt-shaped second photosensitive element having two long edges and two short edges smaller than the long edges, said long edges having central portions, said element being folded so that the central portions are situated nearly at the center of the second area and being wound bifilarly over the second area similarly to said first photoelectic transducing means, the shorted edges being situated outside of the second area,

a pair of electrode pieces, each of said pieces being connected to each of said shorter edges.

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**4,019,050**

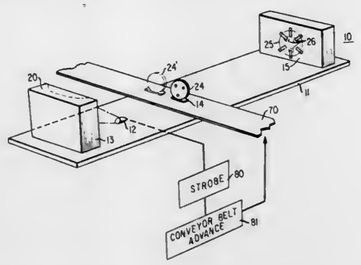
**OPTICAL INSPECTION SYSTEM**

**Norman N. Axelrod, 445 E. 86th St., New York, N.Y. 10028**

**Filed June 17, 1975, Ser. No. 587,543**

**Int. Cl.² G01B** *11/24*

**U.S. Cl. 250—222 R** **2 Claims**




1. Apparatus for inspecting an image of one or more objects having identical significant features (object), said apparatus including means for producing an image of (an object) said one or more objects in an image plane, means comprising a plurality of detectors placed in (different) identical positions (of like geometry) with respect to said significant features (image), and means coupled to detectors situated alike with respect to different identical features in pairs and responsive to outputs therefrom for producing a signal only when said outputs are different.

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**4,019,051**

**DIRECTIONAL OPTICAL WAVEGUIDE COUPLERS**

**Stewart Edward Miller, Locust, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed Dec. 24, 1975, Ser. No. 644,139**

**Int. Cl.² G02B** *5/14*; **H01J** *5/16*, *39/12*

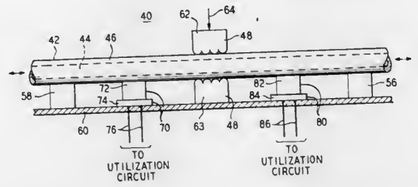
**U.S. Cl. 250—227** **11 Claims**

1. A directional optical waveguide coupler comprising:

a main optical waveguide comprising a core capable of transmitting light energy in at least a first direction surrounded by a layer of cladding material having an index of refraction which is less than the index of refraction of said core material;

mode coupling means disposed at a first intermediate longitudinal position along said main optical waveguide capable of enhancing mode coupling from core-guided modes to cladding modes in said main optical waveguide;

means for transferring out of said cladding layer the cladding modes generated by said mode coupling means and propagating in said first direction for subsequent conversion to a representative electrical signal, said transferring means being disposed at a second intermediate longitudinal position along said main optical waveguide downstream of said first intermediate longitudinal position in said first direction and having an index of refraction which is equal to or greater than the index of refraction of said cladding material of said main optical waveguide;




a first stripper-absorber means comprising both a body of dielectric material disposed in coupling relationship with the cladding of said main optical waveguide and a light absorbing means and disposed along said main optical waveguide at a third intermediate longitudinal position upstream of said first intermediate position in said first direction for removing and absorbing cladding modes propagating therebeneath in said main optical waveguide; and

a second stripper-absorber means comprising both a body of dielectric material disposed in coupling relationship with the cladding of said main optical waveguide and a light absorbing means and disposed along said main optical waveguide at a fourth intermediate longitudinal position downstream of said second intermediate position in said first direction for removing and absorbing cladding modes propagating therebeneath in said main optical waveguide.

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**4,019,052**

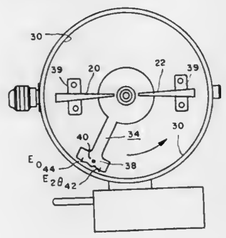
**ELECTROPHOTOGRAPHIC X-RAY DEVICE**

**David J. Haas, Stanford, Conn., assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Oct. 30, 1975, Ser. No. 627,110**

**Int. Cl.² G01N** *23/20*; **G21K** *1/00*

**U.S. Cl. 250—274** **13 Claims**




1. An electrophotographic diffractometer apparatus comprising

a. a photoconductive storage member;

b. means for uniformly charging said storage member;



c. means for holding a diffraction specimen;

d. means for directing a collimated beam of electromagnetic radiation to said specimen, whereby diffracted rays of said beam are directed to said charge storage member and produce discharged local areas thereon in accordance with the diffraction characteristics of said specimen; and

e. scanning means for electrically measuring the charge pattern at said storage member, said scanning means comprising said charging means and said measuring means.

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**4,019,053**

**LETHAL WEAPON DETECTION PROCESS**

**Jeffrey C. Levine, 6235 Springhill Drive, Greenbelt, Md. 20770**

**Filed Oct. 14, 1975, Ser. No. 622,388**

**Int. Cl.² G21H** *5/02*

**U.S. Cl. 250—303** **10 Claims**

1. A method of identifying and detecting a weapon that is concealed from view comprising the steps of:

incorporating a radioactive marking material in the form of a coding in the weapon in a concealed manner that produces a non-visible code of radiation of sufficient intensity as to be detectable at a distance from the concealed weapon,

detecting such code of radiations at each location where it is desired to detect such weapon, such a detector being provided at locations including one of entranceways into rooms, vehicles, places of entertainment, windows, and other entrances and exits.

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**4,019,054**

**APPARATUS FOR FIXING TONER IMAGES**

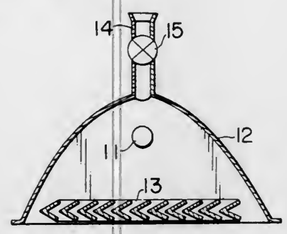
**Kinzi Saito, Kawasaki, and Sadao Takahashi, Tokyo, both of Japan, assignors to Ricoh Company, Ltd., Japan**

**Filed July 21, 1975, Ser. No. 597,692**

**Claims priority, application Japan, July 19, 1974, 49-82940; May 7, 1975, 50-54827**

**Int. Cl.² G03C** *5/16*

**U.S. Cl. 250—319** **6 Claims**




1. An apparatus for fixing toner images on a sheet bearing such images, comprising means for feeding the image-bearing sheets along a feed path, a housing overlying such feed path, an infrared light source in said housing; and light ray directing means between said light source and said feed path for directing the light from said source in a path to produce a first high temperature region along an initial portion of said feed path and a second high temperature region having temperature higher than said first high temperature region along the remaining portion of said path, said light ray directing means including a solid portion of said housing defined along the length of said feed path to produce the first high temperature region and a perforated portion extending along the remainder of the feed path defining the second high temperature region.

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**4,019,055**

**CORONA CLEANING ASSEMBLY**

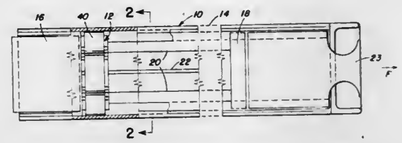
**James L. Derleth, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

**Continuation of Ser. No. 245,306, April 19, 1972, abandoned.**

**This application June 6, 1973, Ser. No. 367,607**

**Int. Cl.² G03G** *15/00*

**U.S. Cl. 250—324** **1 Claim**




1. A corona discharge device having at least one corona discharge electrode, a conductive shield partially surrounding the discharge electrode, the shield having a plurality of guide channels formed therein, resilient wiper means positioned within the shield and in contact with both the discharge electrode and the shield, means for moving the wiper means along the discharge electrode and the shield so as to clean both, the moving means including a plurality of rods and at least two support plates affixed to the rods in a spaced relationship for supporting the wiper means between the plates, the rods being disposed within the channels, the wiper means being disposed between the plates, and the distance between the plates being less than the thickness of the wiper means so as to compress the wiper means between the plates.

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**4,019,056**

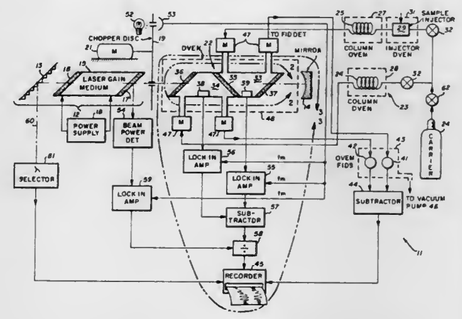
**INFRARED LASER DETECTOR EMPLOYING A PRESSURE CONTROLLED DIFFERENTIAL OPTOACOUSTIC DETECTOR**

**Barry Block, Los Altos Hills, and Harry E. Aine, Mountain View, both of Calif., assignors to Diax Corporation, Sunnyvale, Calif.**

**Filed Apr. 28, 1975, Ser. No. 572,013**

**Int. Cl.² G01J** *3/42*

**U.S. Cl. 250—344** **19 Claims**




1. In an infrared laser absorption detection apparatus:

means for producing a laser beam of coherent radiation;

means for providing first and second sample regions partitioned from each other;

means for disposing first and second fluid samples in said respective first and second sample regions;

means for directing at least a portion of the laser beam into at least one of said sample regions for irradiating said sample and for absorbing coherent radiation from the laser beam and for converting the absorbed coherent radiation into a second form of energy, wherein said second form of energy may be a pressure or acoustic wave;

means for modulating the laser beam at a modulation frequency to produce modulation of the infrared absorption and thus a modulation of the second form of energy;

absorption detector means coupled in energy exchanging relation with at least said irradiated sample region for detecting the modulated second form of energy resulting from the absorption of energy from the coherent infrared beam by said irradiated sample; and

pressure controller means responsive to the pressure difference between the sample fluid pressure in said first and second sample regions at a frequency different than the beam modulation frequency for controlling such pressure differential to a predetermined value including zero.

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**4,019,057**

## DEVICE FOR DETERMINING THE SPATIAL DISTRIBUTION OF RADIOACTIVITY WITHIN AN OBJECT

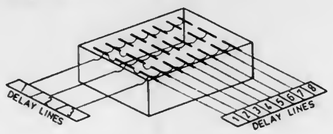
**Stanley Bram, Paris, France, assignor to Institut Pasteur, France**

**Filed Feb. 26, 1975, Ser. No. 553,109**

**Claims priority, application France, Apr. 25, 1974, 74.14453**

**Int. Cl.² G01T *1/18***

**U.S. Cl. 250—375** **14 Claims**




1. A method for determination of the spatial distribution of radioactivity in an object, comprising the steps of

a. placing said object inside the chamber of a position-sensitive radioactivity detector;

b. sealing said chamber;

c. introducing a gas into said chamber under pressure significantly higher than atmosphereic pressure;

d. sensing the location within said chamber of a particle emitted by said object; and

e. counting and displaying the number of such particles sensed at a plurality of locations within said detector.

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**4,019,058**

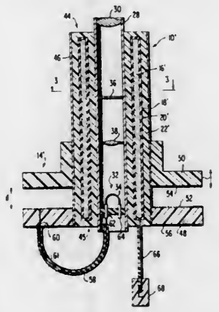
## CHARGE TRANSPORT TACTICAL DOSIMETER

**Stanley Kronenberg, Hollow Road, Skillman, N.J. 08558, and Robert A. Lux, 891 Knight St., Toms River, N.J. 08753**

**Filed Oct. 23, 1975, Ser. No. 625,341**

**Int. Cl.² G01T *1/18***

**U.S. Cl. 250—376** **16 Claims**



1. A dosimeter comprising in combination:

electroscope means and indicator means therefor providing an indication of the charged state of the electroscope;

a variable capacitor electrically coupled in parallel with said electroscope;

a radiation detection capacitor formed of material of a relatively large atomic number surrounded by a material of less atomic number whereby exposure of radiation causes an electrical charge to be built up on said material of relatively large atomic number; and

means for transferring the charge from said detection capacitor to said electroscope and said variable capacitor, wherein said electroscope is charged thereby and said variable capacitor is reduced in capacitance value thereafter to raise the voltage on said electroscope to a predetermined value with the dose being determined by the reduction in capacitance of said variable capacitor necessary to raise the electroscope to said predetermined voltage.

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**4,019,059**

## PATIENT'S SUPPORT ARRANGEMENT FOR AN X-RAY APPARATUS

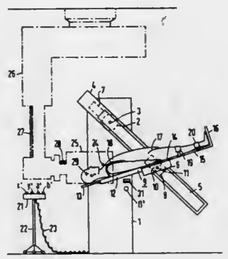
**Bengt Brundin, Sundbyberg, and Wulf Trepte, Sollentuna, both of Sweden, assignors to Siemens Aktiengesellschaft, Erlangen, Germany**

**Filed Nov. 18, 1975, Ser. No. 633,161**

**Claims priority, application Germany, Nov. 22, 1974, 2455447**

**Int. Cl.² G21K *5/08***

**U.S. Cl. 250—451** **6 Claims**



1. In a patient's support arrangement for an x-ray apparatus, including a support pallet for supporting a patient thereon; drive means for effecting circular movement of said pallet about a horizontal rotational axis; and means for adjusting said pallet relative to said rotational axis, the improvement comprising: said drive means comprising two servomotors for rotating said pallet about said horizontal axis in the region of a patient resting thereon; control means for controlling said servomotors, said control means including means for setting of reference values of the coordinates in space of the desired position of said rotational axis, sensing means in said control means for sensing of actual values of the coordinates of the acutal position of said rotational axis, follow-up contro means for actuating said servomotors when a difference prevails between said desired position and said actual position, said servo motors being acutated in directions for reducing said difference; said means for setting said reference values transmitting the desired position of said rotational axis in terms of coordinates of said support pallet, the coordinates of said support pallet corresponding to the coordinates of the patient, said reference values being in a coordinate system separate from the coordinate system of the position of said patient.



**4,019,060**

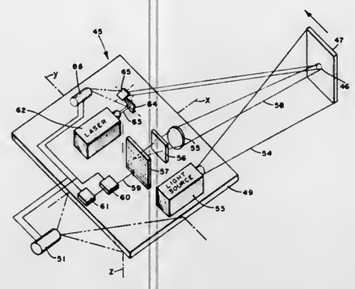
## FLUORESCENCE LOCATING SYSTEM AND METHOD

**Douglas P. Woodman, Menlo Park, Calif., assignor to GTE Sylvania Incorporated, Mountain View, Calif.**

**Filed Oct. 3, 1975, Ser. No. 619,388**

**Int. Cl.² G01N *21/38***

**U.S. Cl. 250—461 R** **4 Claims**




1. An automatic tracking system for an object having a trackable surface composed of first and second substances at different locations on the object comprising

optical transmitter means having an output beam with a first wavelength directed toward said object whereby to illuminate all of said trackable surface with said light and cause said first and second substances to emit light at second and third wavelengths, respectively,

a receiver responsive to light at said second wavelength and unresponsive to light at said third wavelength, said receiver having an optical transducer array capable of producing an electrical output signal corresponding to the position of incidence of said second wavelength light on said array,

logic circuit means receiving the output of said array and deriving an error signal proportional to the deviation of said position of incidence of said first wavelength light from a reference position on said array,

a laser adapted to produce an output beam and

a steering mechanism for said laser beam,

said beam steering mechanism being connected to said logic circuit means and being responsive to said error signal for steering said laser beam for incidence on said first substance on said object.

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**4,019,061**

## X-RAY EXAMINING APPARATUS FOR EXAMINATION OF STANDING PATIENTS

**Johann Finkenzeller, Erlangen-Tennenlohe; Fritz Bronnert, and Karl Weiss, both of Erlangen, all of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany**

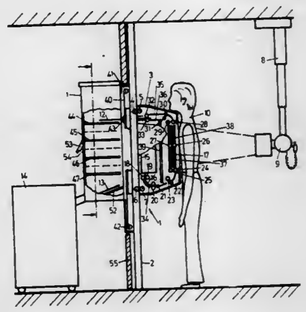
**Continuation-in-part of Ser. No. 501,071, Aug. 27, 1974, abandoned. This application May 20, 1976, Ser. No. 688,724**

**Claims priority, application Germany, Sept. 12, 1973, 2346024**

**Int. Cl.² G11B *1/00***

**U.S. Cl. 250—470** **7 Claims**

1. In an X-ray examining apparatus for the examination of standing patients, including support means supporting an X-ray tube; an exposure installation; a rack mounting said exposure installation for vertical adjustment thereof; a supply magazine for film sheets having first conveying means for conveying unexposed film sheets from said magazine into an exposure position in said exposure installation; and second conveying means for conveying exposed film sheets from said exposure position into an automatic developing arrangement, the improvement comprising X-ray protective screen means positioned rearwardly of said exposure position, said supply magazine for unexposed film sheets being located, in the direction of the incoming X-radiation, rearwardly of said exposure position and of said X-ray protective screen means for reducing the width of the exposure installation to a maximum of twice the width of the maximum exposure format and to a maximum width of 80 centimeters, said first and second conveying means for conveying unexposed film sheets into the exposure position and exposed film sheets from said exposure position being conducted through the region of said X-ray protective screen means, said first conveying means conveying said unexposed film sheets from below upwardly into the exposure position, and said second conveying means conveying said exposed film sheets from upwardly out of the exposure position.



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**4,019,062**

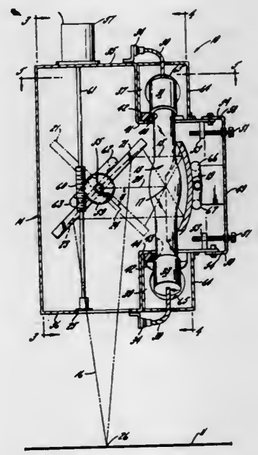
## UNIT FOR TREATMENT OF SUBSTRATE WITH ULTRAVIOLET RADIATION

**Eric H. Rongren, 22 W 750 Elmwood Ave., Glen Ellyn, Ill. 60137**

**Filed Sept. 11, 1975, Ser. No. 612,301**

**Int. Cl.² F26B *3/30***

**U.S. Cl. 250—492 R** **14 Claims**



1. A unit for treating a substrate with ultraviolet radiation, said unit comprising:

a housing spaced from the substrate;

at least one radiation producing source carried by said housing;

a paraboloidal reflector carried by said housing adjacent each of said sources, with said source being located substantially at the focus of said paraboloidal reflector so that the reflector produces a generally collimated beam of radiation oriented generally parallel to the substrate;

a concave, spherical reflector carried by said housing for each of said paraboloidal reflectors, said spherical reflector being spaced away from said source and said paraboloidal reflector and intercepting said collimated beam and reflecting the same so that the rays of said beam converge toward each other upon progressing toward said substrate to thereby concentrate the radiation intensity of said beam which strikes said substrate, said spherical reflector having a focal length substantially greater than the focal length of said paraboloidal reflector.

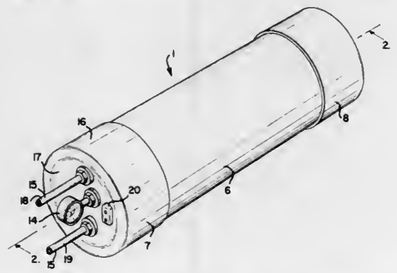
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**4,019,063**

## RADIOGRAPHIC EXAMINATION APPARATUS

**Leonard O. Curry, P.O. Box 152, Nevada, Mo. 64772**

**Filed Mar. 17, 1976, Ser. No. 667,509**
**Int. Cl.² H01J** *7/44*
**U.S. Cl. 250—523** **10 Claims**



1. A radiographic examination apparatus comprising:
a. an elongated tubular housing having a side wall and opposite end portions;
b. first and second cap members each mounted on a respective one of the end portions of said housing to close same and define an interior chamber;
c. seal means for and in engagement with each of the opposite end portions of said housing and with said respective first and second cap members;
d. radiation emission means for exposure of photographic film including means for retaining said emission means in a desired relative position within the interior chamber of said housing;
e. electrical transformer means operatively coupled to said radiation emission means and including means for retaining said transformer means in a desired position within said chamber; and
f. an insulating medium within said housing and gauge means mounted on one of said housing and cap members for measuring pressure within said housing.

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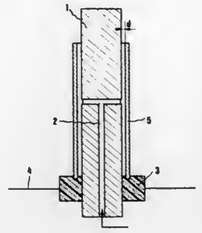
**4,019,064**

## HIGH INTENSITY IONIC BOMBARDMENT REACTOR FOR THERMOCHEMICAL TREATMENT PROCESSES

**Henri Michel, 10 impasse des Acacias, Jarville (Meurthe & Moselle), and Michel Gantois, 63 rue Charles Gounod, Vandoeuvre (Meurthe & Moselle), both of France**

**Filed Mar. 17, 1975, Ser. No. 558,896**
**Claims priority, application France, Mar. 19, 1974, 74.09227**
**Int. Cl.² B01K** *1/00;* **C21D** *1/00*
**U.S. Cl. 250—543** **3 Claims**

1. In a high intensity ionic bombardment reactor for submitting an object to thermochemical treatment with a reactive treatment gas in which the interior surface of said reactor is at anodic potential with a cylindrical metal rod at cathodic potential insulatedly disposed on the surface of the reactor, said rod being operative to support said object, the improvement comprising a cylindrical tube insulatedly disposed on said reactor surface coaxially with and surrounding a portion of said rod, the interior of said tube being spaced from said rod at a constant distance which is as small as possible and less than the dark field dimension δ, said rod including at least one gas circulating duct communicating with the exterior of the



reactor and the space between said rod and said tube and operable to convey said gas to or from said reactor so as to maintain a dynamic pressure in the space between said rod and said tube, which pressure is higher or lower, respectively, then the average pressure in said reactor.

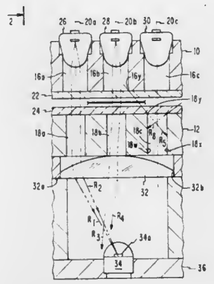
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**4,019,065**

## MULTIPLEXING DOCUMENT CARD READER WITH CONVEX LENS

**Ralph Emil Beastrom; Arlen John Bowen; Ronald James Keller, all of Rochester, and David George Nutt, Dodge Center, all of Minn., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Dec. 24, 1975, Ser. No. 644,240**
**Int. Cl.² H05B** *33/00;* **G06K** *7/10;* **H01J** *39/12*
**U.S. Cl. 250—553** **6 Claims**



1. A reader for a document card having data representative openings therethrough disposed in a plurality of columns, said reader comprising:
a plurality of light sources disposed in a row and producing parallel output light rays,
means providing a path of travel for the document card so that it may cut said light rays and so that its said openings in one of its said columns respectively line up with the light rays from said light sources to allow the light rays to pass therethrough,
a light detector positioned directly in line with the light ray from a middle one of said light sources but being of such restricted size that it is not in line with the light rays from the other ones of said light sources, and
a convex lens positioned to have the light rays from said light sources impinge on a convex surface of the lens so that the lens converges the light rays from said light sources to cause all of the light rays to impinge on said light detector.

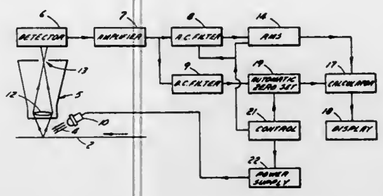


**4,019,066**

## MEASURING THE SURFACE ROUGHNESS OF A MOVING SHEET MATERIAL

**John M. Lucas, Montreal, and Serge Gracovetsky, St. Lambert, both of Canada, assignors to Domtar Limited, Montreal, Canada**

**Filed Mar. 25, 1975, Ser. No. 561,900**
**Claims priority, application Canada, Apr. 16, 1974, 197731**
**Int. Cl.² G01N** *21/32;* **G01B** *11/30;* **G01N** *21/48*
**U.S. Cl. 250—562** **12 Claims**




1. An apparatus for the on-line measuring of the surface roughness of a moving web which comprises;
illuminating means for projecting a beam of light obliquely onto the surface of said web;
collector means disposed to collect scattered light reflected at a non-specular angle from a small area of said surface;
a support structure adapted to be placed adjacent said surface, said illuminating means and said collector means being fixedly set in said support;
means providing relative movement between said web and said support thereby to collect reflected light from a multiplicity of small areas sequentially appearing in front of said collector means;
photoelectric means for converting the light collected from the said small areas into electrical signals;
and analyzer means for converting said electrical signals into an index of roughness, said analyzer means comprising means for dividing said electrical signals into a direct component and on alternating component and for computing the ratio of said alternating to said direct component, said ratio providing said index of roughness.

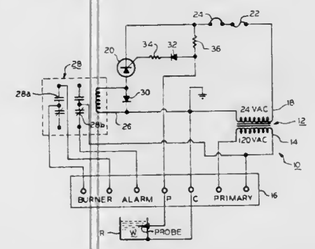
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**4,019,067**

## CONDUCTIVE PROBE LEVEL CONTROL

**Roland Aaron Gladstone, Morton Grove, Ill., assignor to International Telephone and Telegraph Corporation, New York, N.Y.**

**Filed Nov. 17, 1975, Ser. No. 632,380**
**Int. Cl.² G01F** *23/00*
**U.S. Cl. 307—118** **5 Claims**




1. A fusable control system for use with a conductive probe level control device said probe having first and second electrically separated portions wherein the impedance of said probe is determined by the conductivity of a media in contact with said probe between said first and second portions, said system comprising, in combination:
a transformer having a primary winding for coupling to a primary source of alternating current and a secondary winding for providing a source of alternating current operating potential, and wherein said operating potential is substantially less than the potential of said primary source;
a fuse serially coupled with one of said windings and being operative to interrupt said source of operating potential when the current in said one of said windings exceeds a predetermined level;
a relay having a coil and being responsive to alternating current to activate said relay, said relay having at least one set of contacts for controlling an external circuit;
means for coupling one end of said relay coil and said secondary winding to a point of reference potential with respect to said operating potential;
a unidirectional controlled rectifier having first and second main electrodes coupled between the other ends of said relay coil and said secondary winding, and said controlled rectifier having a control electrode for varying the impedance of said controlled rectifier between relatively conducting and non-conducting states;
a diode coupled in parallel with said coil of said relay and poled in back-to-back relationship to said controlled rectifier; and,
means for coupling said probe between said control electrode and said point of reference potential wherein said controlled rectifier becomes conductive when the impedance of said probe is less than a given level and a rectified, unidirectional altenating current is applied to said relay coil, whereby said diode is normally non-conductive and wherein said diode becomes conductive if said controlled rectifier becomes conductive in the opposite direction thereof whereby said current in said one of said windings exceeds said predetermined level.

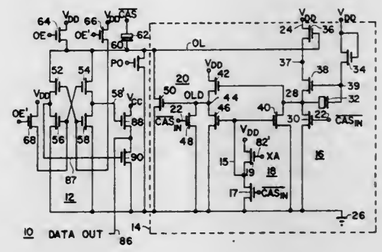
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**4,019,068**

## LOW POWER OUTPUT DISABLE CIRCUIT FOR RANDOM ACCESS MEMORY

**Alan Richard Bormann, Tempe, Ariz., assignor to Motorola, Inc., Chicago, Ill.**

**Filed Sept. 2, 1975, Ser. No. 609,457**
**Int. Cl.² H03K** *19/08, 19/34, 3/353;* **G11C** *7/00*
**U.S. Cl. 307—205** **3 Claims**

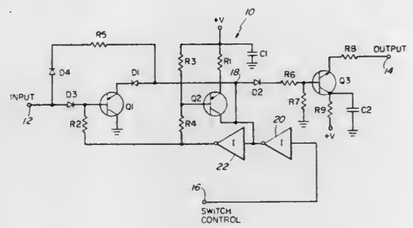



1. An electronic circuit comprising:
a bootstrap inverting circuit including a switching MOSFET and a load MOSFET coupled in series, and a bootstrap capacitor charging MOSFET coupled to the gate of said load MOSFET;
a series MOSFET coupled in series between a first voltage supply conductor and a drain of said load MOSFET;
feedback circuit means coupled between an output of said bootstrap inverting circuit and a gate of said series MOSFET for controllably turning said series MOSFET off in response to a signal applied to a gate of said switching MOSFET to reduce power dissipation of said bootstrap inverter circuit; and
said feedback means including inverting means responsive to said signal and having an input coupled to said output

of said bootstrap inverting circuit and having an output coupled to said gate of said series MOSFET.

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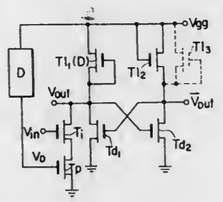
**4,019,069**
**BASEBAND VIDEO SWITCH**
**Domenic A. Zambuto, Norwell, Mass., and Gordon Champion, Deep River, Conn., assignors to GTE Laboratories Incorporated, Waltham, Mass.**
**Filed Apr. 2, 1976, Ser. No. 673,023**
**Int. Cl.² H03K 17/74**
**U.S. Cl. 307—256** **6 Claims**




1. A baseband video switch including:
a. first and second oppositely poled diodes connected in series, the junction between the diodes forming a control point for the switch,
b. a third diode and a switchable, high impedance buffer means connected in series between an input terminal for the baseband video signal and the side of the first diode opposite to the control point.
c. a switchable driver means connected between the side of the second diode opposite to the control point and an output terminal for the baseband video signal,
d. a switchable, transistorized constant current source means for supplying a constant level of current to the control point where the diodes are in a conductive state, and
e. means responsive to a control signal having first and second voltage levels for biasing the diodes, and the buffer means, the driver means and current source means into conduction when the control signal is of the first level and for biasing the diodes, the buffer means, the driver means and current source means into non-conduction when the control signal is of the second level.

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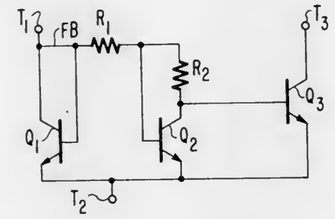
**4,019,070**
**CIRCUIT FOR SETTING AN INITIAL STATE AFTER CONNECTION OF A POWER SUPPLY**
**Jiroh Sakaguchi, Kokubunji, and Hiroto Kawagoe, Kodaira, both of Japan, assignors to Hitachi, Ltd., Japan**
**Filed Dec. 30, 1975, Ser. No. 645,342**
**Claims priority, application Japan, Jan. 6, 1975, 50-109**
**Int. Cl.² H03K 17/22, 3/286, 3/353**
**U.S. Cl. 307—279** **10 Claims**




1. A circuit comprising:
a first terminal to which a power supply voltage is to be applied;
a second terminal to which a reference voltage is applied;
first and second inverter circuits connected between said first and second terminals and including a first transistor and a second transistor, respectively, the respective outputs of said first and second transistors being connected to the respective inputs of the second and first transistors, thereby forming a flip-forming a flip-flop circuit;
third and fourth transistors connected in series between the input of said second inverter circuit and said second terminal, and an input voltage being applied to said third transistor; and
a delay circuit, connected between said first terminal and the input of said fourth transistor, for preventing said fourth transistor from being rendered conductive until a preselected period of time after the application of said power supply voltage to said first terminal.

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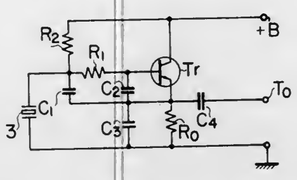
**4,019,071**
**BIASING CURRENT ATTENUATOR**
**Adel Abdel Aziz Ahmed, Annandale, N.J., assignor to RCA Corporation, New York, N.Y.**
**Filed Apr. 12, 1976, Ser. No. 676,008**
**Int. Cl.² H03K 17/00**
**U.S. Cl. 307—296 R** **9 Claims**




1. A biasing current attenuator comprising:
first, second and third terminals, said first and second terminals for accepting applied input current, said first and third terminals for suppling output current;
first, second and third transistors of the same conductivity type, each having base and emitter electrodes with a base-emitter junction therebetween and having a collector electrode, the emitter and collector electrodes of said first transistor being connected to said first and said second terminals, respectively, the collector electrode of said third transistor being connected to said third terminal;
a direct coupled collector-to-base feedback connection for said first transistor, whereby the emitter-to-base potential of said first transistor is regulated to condition said first transistor for conducting most of said input current between its collector and emitter electrodes;
a first resistive element connected to the base-emitter junction of said second transistor to form a serial combination therewith;
means for applying the base-emitter potential of said first transistor to said serial combination in a sense to forward-bias the base-emitter junction of said second transistor;
a second resistive element connected at one end to the base electrode of said second transistor and at the other end to the collector electrode of said second transistor and the base electrode of said third transistor; and
means connecting the emitter electrode of said third transistor to the emitter electrode of at least one of said first and said second transistors.



**4,019,072**
**PIEZOELECTRIC PRESSURE SENSOR**
**Hideo Mifune, Hirakata; Kenroku Tani, Katano, and Tomohiko Niikawa, Hirakata, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**
**Filed Mar. 17, 1975, Ser. No. 558,627**
**Claims priority, application Japan, May 20, 1974, 49-57170**
**Int. Cl.² H01L 41/04**
**U.S. Cl. 310—8.1** **3 Claims**

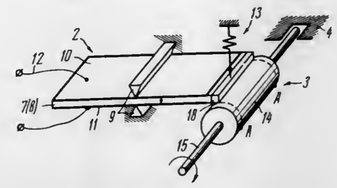



1. A piezoelectric pressure sensor for detecting the level of a liquid in a vessel, comprising:
an elongated tubular member having a closed end, an open end and a substantially hollow interior, a portion of said tubular member including said closed end extending into said vessel;
a piezoelectric transducer bonded to the interior surface of said closed end of said tubular member;
a cover member sealing the open end of said tubular member;
A.C. signal generating means electrically coupled through said cover member to said piezoelectric transducer for exciting said transducer to cause the closed end of said tubular member to vibrate;
detecting circuit means coupled to said transducer to detect changes in the impedance of said transducer as a function of changes in the environment in which said closed end of said tubular member is located between a substantially liquid and a substantially gaseous environment; and
a temperature dependent impedance element located in said tubular member and electrically connected in series between said piezoelectric transducer and said A.C. signal generating means to prevent excitation of said transducer when the ambient temperature is below a predetermined value and to permit excitation of said transducer when the ambient temperature is above said predetermined value.

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**4,019,073**
**PIEZOELECTRIC MOTOR STRUCTURES**
**Vladimir Sergeevich Vishnevsky, ulitsa Ovruchskaya, 19, kv. 1; Vladimir Leonidovich Kavertsev, prospekt Voroshilova, 17a, kv. 24; Igor Alexandrovich Kartashev, pereulok Ivana Maryanenko, 7, kv. 22; Vyacheslav Vasilievich Lavrinenko, ulitsa A. Malyshko, 13, kv. 125; Mikhail Makarovich Nekrasov, prospekt Brest-Litovsky, 2, kv. 16a, and Alexei Alexeevich Prez, ulitsa Bolshaya Podvalnaya, 28, kv. 15, all of Kiev, U.S.S.R.**
**Filed Aug. 12, 1975, Ser. No. 604,064**
**Int. Cl.² H01L 41/04**
**U.S. Cl. 310—8.2** **61 Claims**

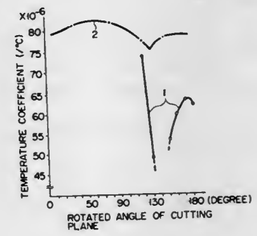
1. An electric motor comprising a stator and a rotor; at least one of them including at least one vibrator having acoustically resonant elements incorporating a piezoelectric device; said piezoelectric device including electrodes having outgoing leads connected to an external voltage source, and means urging said stator and said rotor yieldably against each other at least at one point on the surface of said vibrator for transmission of the driving torque during one direction of oscillation




while providing space separation between the vibrator and the rotor during the other direction of oscillation.

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**4,019,074**
**$LiNbO_3$ SAW DEVICE**
**Kimio Shibayama, and Kazuhiko Yamanouchi, both of Sendai, Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan**
**Filed Oct. 1, 1975, Ser. No. 618,339**
**Claims priority, application Japan, Oct. 7, 1974, 49-114689**
**Int. Cl.² H01L 41/04**
**U.S. Cl. 310—9.5** **4 Claims**



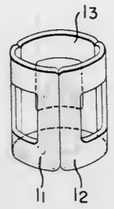

1. An electro-mechanical transducer comprising a $LiNbO_3$-piezoelectric substrate containing at least one impurity selected from the group consisting of Ta, $Ta_2O_5$, Pd, $SiO_2$, $TiO_2$, $V_2O_5$, V and a mixture of at least two of these impurities, and at least one electrode device for electro-mechanical conversion, provided on said $LiNbO_3$-piezoelectric substrate.

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**4,019,075**
**IRONLESS ROTOR WINDINGS OF ROTARY COILS IN MINIATURE ELECTRIC MACHINES**
**Isao Kagami, Kawasaki, Japan, assignor to Canon Kabushiki Kaisha and Canon Seiki Kabushiki Kaisha, both of Tokyo, Japan**
**Continuation of Ser. No. 379,832, July 16, 1973, abandoned, which is a continuation of Ser. No. 182,696, Sept. 22, 1971.**
**This application Feb. 1[illegible], 1975, Ser. No. 548,760**
**Claims priority, application Japan, Sept. 26, 1970, 45-84455**
**Int. Cl.² H02K 23/30**
**U.S. Cl. 310—206** **5 Claims**

1. In a miniature electric machine having an ironless rotor, the rotor comprising:
a. a rotary shaft;
b. a commutator fixed on said rotary shaft; and
c. a coil body,
said rotary shaft, commutator, and coil body being molded with a synthetic resin into an integral body,
said coil body being composed of a plurality of windings of individual conductors, each said winding being formed in a hexagonal shape,
the center axis of each of said plurality of individual hexagonal windings being disposed in parallel with the

axis of said rotary shaft so that a pair of opposing sides of said each individual hexagonal winding is parallel with said rotary shaft, one of said opposing sides of each winding being disposed in overlapping but offset relation to at least one of said opposing sides of another of said windings and each winding being of a radial




thickness no greater than the thickness of the conductor so that the thickness of said coil body is about twice the thickness of said individual winding, and the remaining four sides thereof being curved in conformity to the curvature of the cylindrical surface around the periphery of said rotary shaft.

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**4,019,076**

**ELECTRICAL COMMUTATORS AND SLIP-RINGS**

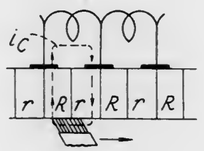
**James John Bates, Shrivenham, England, assignor to National Research Development Corporation, London, England**

**Filed Jan. 8, 1975, Ser. No. 539,387**

**Claims priority, application United Kingdom, Jan. 11, 1974, 1328/74**

**Int. Cl.² H02K** *13/04*

**U.S. Cl. 310—233** **12 Claims**




1. An electrical machine including a commutator and electrical contact brushes bearing thereon, said commutator being movable with respect to the brushes and comprising a plurality of pairs of interconnected segments, said pairs being separated from one another by electrical insulation and individual segments of a pair having alternately low contact resistance and high contact resistance, said segments being positioned to enable the brush to contact the individual segments of a pair in sequence whereby the brush first contacts a low resistance segment and then a high resistance segment.

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**4,019,077**

**FIELD EMISSION ELECTRON GUN**

**Yoshio Sakitani, Ohimachi, Japan, assignor to Hitachi, Ltd., Japan**

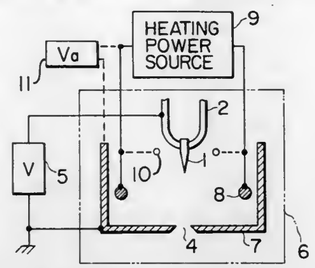
**Filed Dec. 19, 1975, Ser. No. 642,611**

**Claims priority, application Japan, Dec. 20, 1974, 49-145576**

**Int. Cl.² H01J** *19/70*

**U.S. Cl. 313—178** **13 Claims**

1. In a field emission electron gun including:
a cathode for emitting electrons,
an anode for attracting said electrons and toward which said electrons are accelerated, and
a high D.C. voltage source connected between said cathode and said anode,
the improvement wherein at least a portion of a surface of said anode upon which said electrons impinge is made of getter material, and




said gun further includes means for heating said anode at a high temperature.

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**4,019,078**

**METHOD OF ELECTRODE MOUNTING IN HIGH-PRESSURE SODIUM DISCHARGE LAMP**

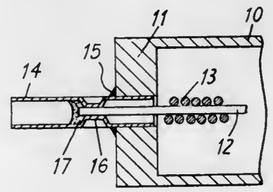
**Norman Burgess, London, England, assignor to Thorn Electrical Industries Limited, London, England**

**Filed Oct. 29, 1975, Ser. No. 626,655**

**Claims priority, application United Kingdom, Oct. 30, 1974, 47037/74**

**Int. Cl.² H01J** *61/06*

**U.S. Cl. 313—217** **6 Claims**




1. In a high-pressure sodium discharge lamp having a discharge envelope comprising a ceramic tube with ceramic end discs and having at each end of the envelope an electrode supported by a metal tube which is sealed to the end disc, the improvement which comprises for each electrode a stem carrying said electrode, said tube having an inner portion through which said stem extends with clearance and having a portion outside of but close to the end disc, which outer portion is pressed into engagement with and sealed to the said stem.

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**4,019,079**

**GAS INJECTED VACUUM SWITCH**

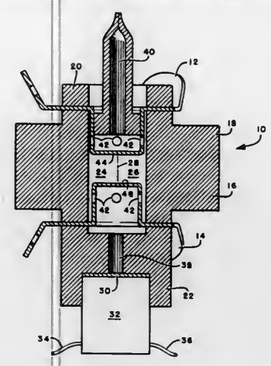
**K. Dan Hardin, Albuquerque, N. Mex., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.**

**Filed May 7, 1976, Ser. No. 684,420**

**Int. Cl.² H01J** *17/26, 19/68, 21/00*

**U.S. Cl. 313—231.4** **6 Claims**

1. A gas injected vacuum switch comprising;
a housing having a generally cylindrical interior chamber; first conduit means operably connected to said chamber for evacuating said chamber;
an anode disposed within said chamber;
a cathode, spaced from said anode, disposed within said chamber;
second conduit means for providing a passageway into said chamber;
means for sealing said chamber from said second conduit means; and
means for producing electrically conductive gaseous material, for breaching said seal, and for injecting said material through said second conduit means into said chamber to




provide a conductive path for electric current between said anode and said cathode.



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**4,019,080**

**VACUUM-TIGHT SEALS BETWEEN CERAMIC AND ALUMINIUM COMPONENTS, EVACUATED ENVELOPES INCORPORATING THE COMPONENTS SEALED BY SAID METHOD, AND VACUUM TUBES INCORPORATING SAID ENVELOPES**

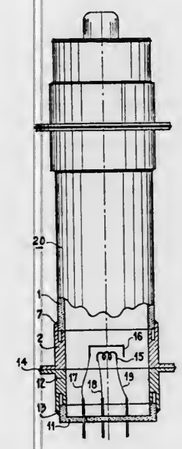
**Andre Besson, Paris, France, assignor to Thomson-CSF, Paris, France**

**Division of Ser. No. 302,416, Oct. 31, 1972, Pat. No. 3,893,224. This application Apr. 29, 1974, Ser. No. 465,189**

**Claims priority, application France, Nov. 5, 1971, 71.39796**

**Int. Cl.² H01J** *5/00*

**U.S. Cl. 313—317** **2 Claims**




1. An evacuated envelope, comprising at least one ceramic component and one aluminium component, sealed to one another along a common interface, a metallized layer on said ceramic component along said interface, and a fused solder having a Al-Si eutectic structure with 89% aluminium and 11% silicon along said interface.

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**4,019,081**

**REACTION CATHODE**

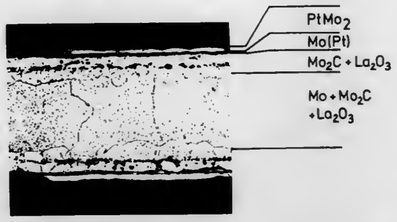
**Charley Buxbaum, Baden, and Gernot Gessinger, Bublikon, both of Switzerland, assignors to BBC Brown Boveri & Company Limited, Baden, Switzerland**

**Filed Oct. 6, 1975, Ser. No. 620,175**

**Claims priority, application Sweden, Oct. 25, 1974, 7414295**

**Int. Cl.² H01J** *1/14, 19/06*

**U.S. Cl. 313—346 R** **10 Claims**




1. In a reaction cathode with high thermic emission, which is especially suited for vacuum tube application, and which comprises a carrier body consisting of crystallite grains and a compound of a monolayer-forming element, which compound is liberated by a continuous supply reaction and transported to the emitting surface of the cathode by diffusion through the volume, the grain boundaries or in both the volume and the grain boundaries of said carrier body during the operation of the cathode, the improvement wherein the monolayer-forming element is at least one of the elements selected from the group consisting of yttrium and lathanum and wherein said cathode further contains at least one metal selected from the group consisting of palladium, platinum, rhodium and ruthenium, as a solid state diffusion-enhancing dispersed in the volume, in the grain boundaries or in both the volume and the grain boundaries of said carrier body together with said compound of the monolayer-forming element.

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**4,019,082**

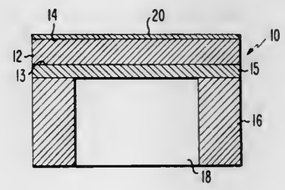
**ELECTRON EMITTING DEVICE AND METHOD OF MAKING THE SAME**

**Gregory Hammond Olsen, Cranbury; Ramon Ubaldo Martinelli, Hightstown, and Michael Ettenberg, Freehold, all of N.J., assignors to RCA Corporation, New York, N.Y.**

**Filed Mar. 24, 1975, Ser. No. 561,353**

**Int. Cl.² H01J** *1/14, 19/06*

**U.S. Cl. 313—346 R** **11 Claims**




1. An electron emitting device comprising
a first body of single crystalline gallium arsenide having opposed, substantially flat surfaces,
a second body of single crystalline indium gallium phosphide on one of the surfaces of said first body, said second body being thinner than said first body, and
a layer of an electropositive work function reducing material on the other of said surfaces of said first body.

## 4,019,083
## TELEVISION CAMERA TUBE

**Nicolaas Hendrik Limper, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.**

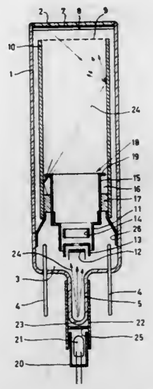
**Filed Sept. 17, 1975, Ser. No. 614,254**

**Claims priority, application Netherlands, Sept. 19, 1974, 7412382**

**The portion of the term of this patent subsequent to Aug. 31, 1993, has been disclaimed.**

**Int. Cl.² H01J** *31/26, 31/38*

**U.S. Cl. 313—372** **10 Claims**



1. A television camera tube having, in an evacuated envelope, a photosensitive target, an electron gun assembly, an anode sleeve extending between the target and the gun assembly, and means for the auxiliary illumination of the target, said auxiliary illuminating means comprising a light source, a hollow light shielding cylinder located within said anode sleeve to define an annular space between its outer wall and an inner wall portion of said sleeve, an annular light distributor disposed within said annular space, said shielding cylinder coaxially extending within said anode sleeve in a direction toward said target a distance which produces a substantially uniform illumination of said target and a television signal is obtained which is uniform within narrow limits across said target, and means for conducting light from said light source to the distributor in the annular space section remote from said target.

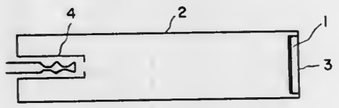
## 4,019,084
## PYROELECTRIC VIDICON HAVING A PROTECTIVE COVERING ON THE PYROELECTRIC TARGET

**Thomas H. Conklin, Ridgefield, Conn., and Barry M. Singer, New York, N.Y., assignors to North American Philips Corporation, New York, N.Y.**

**Filed Oct. 2, 1975, Ser. No. 618,768**

**Int. Cl.² H01J** *31/00*

**U.S. Cl. 313—388** **2 Claims**



1. In a pyroelectric vidicon including an evacuated envelope having a pyroelectric target at one end and an electron gun at the other end for scanning a surface of the target, said target consisting of a material which is unstable in a vacuum and decomposes upon heating and selected from the group consisting of tri-glycine sulfate, tri-glycine fluoberylliate and alanine tri-glycine sulfate, the improvement wherein the surface of said target exposed to the vacuum is covered with a protective coating of a vacuum compatible material having a relatively high secondary emission coefficient, a low first crossover and a low conductivity, said latter material being selected from the group consisting of $Al_2O_3$, $Si_3N_4$ and $Si\,O_x$, $x$ being between 1 and 2.

## 4,019,085
## INTERNAL MAGNETIC SHIELD FOR CATHODE RAY TUBE

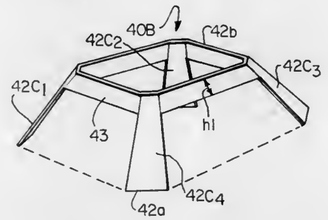
**Shigeki Sakata, Nagaokakyo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Continuation-in-part of Ser. No. 465,670, April 30, 1974, abandoned. This application Sept. 10, 1975, Ser. No. 611,872**

**Claims priority, application Japan, May 2, 1973, 48-52556**

**Int. Cl.² H01J** *29/06, 29/07*

**U.S. Cl. 313—402** **5 Claims**




1. A color cathode ray tube for use in a color television receiver and comprising:

a. an enclosed envelope including a face plate, a funnel portion and a neck portion, said face plate being of a substantially rectangular shape including four sides and four corners;

b. a phosphor screen disposed on the internal surface of said plate and including blue, green and red phosphors;

c. electron gun means disposed within said neck portion of said envelope to generate a beam of electrons toward said screen;

d. shadow mask means, disposed in said envelope opposite to said phosphor screen, for determining the landing positions of said beam of electrons on said phosphor screen;

e. magnetic shield means, positioned within the funnel portion of said envelope, for reducing the effects of terrestrial magnetism and undesirable magnetic fields on said beam of electrons, said magnetic shield means comprising a magnetic shield body formed of sheet magnetic metal material, said magnetic shield body including four non-apertured, laterally spaced corner walls corresponding to said four corners of said faceplate, each of said corner walls being secured at a first end thereof to said shadow mask means, said magnetic shield body further comprising non-apertured bridge sections located within said funnel portion and integrally joined with and connecting second ends of at least a portion of adjacent of said corner walls;

f. said magnetic shield means being positioned within a funnel region within said envelope surrounding a path along which said beam of electrons from said electron gun means travels to said phosphor screen, said funnel region including four side portions corresponding to said four sides of said face plate and four corner portions corresponding to said four corners of said face plate, said funnel region extending from a first end thereof adjacent said shadow mask means to a second end thereof spaced from said shadow mask means, said four corner walls of said magnetic shield body being positioned within said four side portions of said funnel region, said bridge sections of said magnetic shield body being positioned within said side positions of said funnel region;



g. the peripheral area of said funnel region between said corner walls and not occupied by said magnetic shield body comprising apertures extending through said funnel region, the total area of said apertures being equal to from 20 to 70% of the total area of the peripheral surface of said funnel region.

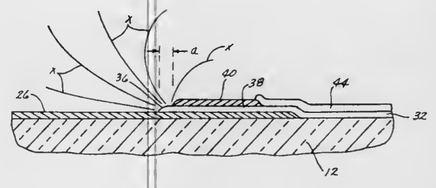
## 4,019,086
## ELECTRICAL INDICIA DISPLAY DEVICE AND METHOD FOR MAKING SAME

**Herman R. Person, and Lawrence E. Gilg, both of Columbus, Nebr., assignors to Dale Electronics, Inc., Columbus, Nebr.**

**Filed Sept. 16, 1975, Ser. No. 613,815**

**Int. Cl.² H01J** *61/00*

**U.S. Cl. 313—518** **10 Claims**




1. A method for making an indicia display device comprising:

printing a plurality of electrical conductors and at least one anode on the upper surface of a dielectric substrate,

printing a first dielectric layer over said conductors and anode, said first dielectric layer having an anode opening therein;

positioning said first dielectric layer during printing thereof so that said anode opening exposes a first portion of said anode, and the marginal edges of said anode opening overlie a second portion of said anode,

printing a plurality of cathode segments over said first dielectric layer adjacent said marginal edges of said anode opening so that said cathode segments are overlying said second portion of said anode and said dielectric material separates and insulates said cathode segments from said anode;

printing a second dielectric layer over said cathode segments, said second dielectric layer having an indicia opening registered with said cathodes and exposing said cathodes adjacent said marginal edges of said anode opening in said first dielectric layer;

sealing said upper surface of said substrate in a compartment having a viewing window therein;

introducing an ionizable gas capable of cathode glow into said compartment and into communication with said exposed portions of said cathode segments.

## 4,019,087
## COUPLED-CAVITY TYPE TRAVELING-WAVE TUBE WITH SEVER TERMINATION ATTENUATORS

**Sadanori Hamada; Kunio Tsutaki, and Hiroyuki Hashimoto, all of Tokyo, Japan, assignors to Nippon Electric Company, Ltd., Tokyo, Japan**

**Filed Mar. 16, 1976, Ser. No. 667,464**

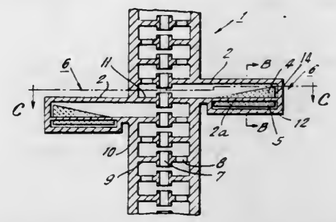
**Claims priority, application Japan, Mar. 20, 1975, 50-34692**

**Int. Cl.² H01J** *25/34*

**U.S. Cl. 315—3.5** **6 Claims**

1. In a traveling-wave tube equipped with a coupled-cavity type slow-wave circuit having a housing for vacuum sealing the slow-wave structure, comprising a vacuum sealed waveguide extending outwardly from said housing and having its interior communicating with the interior of said slow-wave structure housing, sever termination means having an attenuator body which is essentially comprised of a ceramic material containing an electromagnetic energy absorbing substance and is brazed to the inner surface of one wall of said waveguide and which is electromagnetically coupled to the slow-wave circuit element;

said coupled-cavity type traveling-wave tube being characterized in that the waveguide wall where the attenuator




body of the sever terminations means is brazed is made sufficiently thin to allow the waveguide wall to be readily plastically deformed as the ceramic material attenuator body is thermally deformed, a ceramic plate for balancing thermal stress is brazed to the outer side of the thin waveguide wall opposite that of the attenuator body, and the ceramic plate is hermetically enclosed within an outer structure joined to said waveguide and enclosing said thin waveguide wall and said ceramic plate which maintains a vacuum condition within its interior.

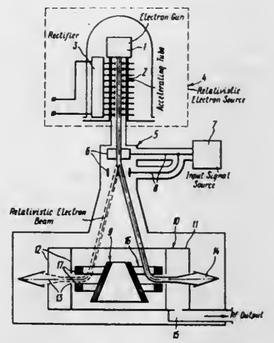
## 4,019,088
## ELECTROVACUUM SHF APPARATUS

**Gersh Itskovich Budker, ulitsa Maltseva, 6; Sergei Nikolaevich Morozov, ulitsa Tereshkovoi, 42, kv. 3; Oleg Alexandrovich Nezhevenko, ulitsa Tereshkovoi, 7, kv. 1; Gennady Nikolaevich Ostreiko, Morskoi prospekt, 60, kv. 24, and Isai Abramovich Shekhtman, ulitsa Ilicha, 15, kv. 68, all of Novosibirsk, U.S.S.R.**

**Filed Apr. 8, 1975, Ser. No. 566,049**

**Int. Cl.² H01J** *25/22*

**U.S. Cl. 315—5.24** **5 Claims**




1. A vacuum SHF apparatus comprising: means for forming a charged-particle beam to be directed along the longitudinal axis of the apparatus; an accelerating tube arranged at the output of said beam forming means, for imparting a velocity close to that of light to the charged particles of the beam; a first deflection yoke for circular scanning of the beam at an input signal frequency, said first yoke being arranged behind said tube, along the beam path, and coaxially with said beam forming means; an additional magnetic deflection yoke ar-

ranged successively along the beam path behind said first yoke and coaxially therewith, for deflecting the scanned beam outwardly from the longitudinal axis; a hollow annular resonator arranged successively behind said additional yoke and coaxially therewith along the beam path; said resonator having broader walls that are parallel with the longitudinal axis; annular slots being provided in said resonator walls for the beam, that has been deflected by said additional yoke, to pass through said slots; circular windings through which current flows from said additional yoke, positioned in planes perpendicular to the longitudinal axis, the radius pitch of said windings being chosen to ensure that the particle beam passes through said slots at a velocity close to zero in the axial direction and with a specific ratio between azimuth and radial components; the internal dimensions and shape of said resonator being such that it can maintain an electromagnetic wave traveling along said resonator at a frequency equal to the standing frequency of the beam or its multiple, the electromagnetic wave having an electric field substantially parallel to the path of the beam particles; a collector arranged successively behind said resonator, along the beam path for receiving the charged-particle beam as it leaves said resonator; and means for deriving SHF power from said resonator.

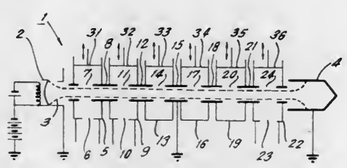
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**4,019,089**

## WIDEBAND MULTI-CAVITY VELOCITY MODULATION TUBE

**Takao Kageyama, and Hiroshi Kato, both of Tokyo, Japan, assignors to Nippon Electric Company, Ltd., Tokyo, Japan**

**Filed Mar. 23, 1976, Ser. No. 669,648**
**Claims priority, application Japan, Apr. 3, 1975, 50-40627**
**Int. Cl.² H01J** *25/10*
**U.S. Cl. 315—5.43** **6 Claims**



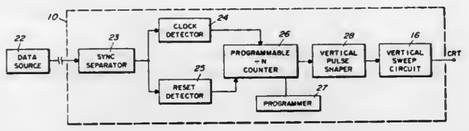
1. A multi-cavity velocity modulation tube having a collector electrode and an electron gun assembly for directing an electron beam towards said collector, said tube having an operating pass band of a predetermined frequency bandwidth, characterized in that said tube further comprises an input cavity tuned to a frequency higher than the upper band edge frequency of said operating pass band, a first prebuncher cavity disposed downstream of the input cavity along the electron beam path and tuned to a frequency lower than the resonant frequency of the input cavity and in the vicinity of said upper band pass edge frequency of the operating pass band, a second prebuncher cavity tuned to a frequency in the vicinity of the lower band pass edge frequency of said operating pass band, at least one buncher cavity disposed downstream of said second prebuncher cavity along the electron beam path and tuned to a frequency higher than the resonant frequency of said input cavity, an output cavity disposed downstream of said buncher cavity along the electron beam path and tuned to a frequency within said operating pass band for extracting output wave energy from a density-modulated electron beam, and drift tubes intervening between every adjacent pair of said cavities; the Q-value of said input cavity being lower than the Q-value of the first prebuncher cavity; and the second prebuncher cavity and all the buncher cavities are unloaded.

**4,019,090**

## SELF-STEPPING VERTICAL SCAN SYSTEM

**David Allen Wolff, Schaumburg, and Walter Kowalski, Franklin Park, both of Ill., assignors to Motorola, Inc., Schaumburg, Ill.**

**Filed Dec. 5, 1975, Ser. No. 638,123**
**Int. Cl.² H01J** *29/70*
**U.S. Cl. 315—8.5** **10 Claims**




1. In a CRT display device having horizontal and vertical sweep circuits for providing a raster and using both horizontal and vertical synchronizing pulses, a self-stepping circuit arrangement for the vertical sweep circuit comprising:

programmable counter means for counting the horizontal sync pulses and for providing an output pulse when a predetermined, set count is reached;

means for coupling the vertical synchronizing pulses to the counter means for resetting and restarting the counter means at the same time relative to each raster;

pulse shaping means for receiving output pulses from the counter means and providing stepped vertical sweep signals to the vertical sweep output circuit; and

means for controlling the pulse shaping means for adjusting the raster height.

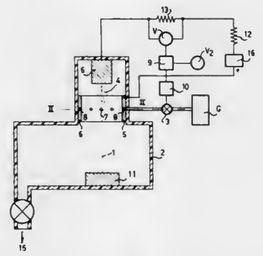
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**4,019,091**

## GAS DISCHARGE ELECTRON GUN FOR GENERATING AN ELECTRON BEAM BY MEANS OF A GLOW DISCHARGE

**Theodorus Maria Berendina Schoenmakers, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.**

**Continuation of Ser. No. 575,490, May 8, 1975, abandoned. This application Apr. 9, 1976, Ser. No. 675,498**
**Claims priority, application Netherlands, May 30, 1974, 7407253**
**Int. Cl.² B23K** *15/00*; **H01J** *17/26*
**U.S. Cl. 315—111.8** **5 Claims**



1. A gas discharge electron gun for generating an electron beam by means of a glow discharge, comprising an envelope and, within said envelope, and electrode assbley including a cathode and at least one tubular positive electrode, means for supplying a gaseous ionizable medium into said envelope to produce the glow discharge within said electrode assembly when a voltage is applied thereto, means for measuring voltage on the electrode assembly and means for measuring pressure of the gaseous medium during the discharge, flow control means provided in said medium supplying means and coupled to said pressure measuring means and to said voltage measuring means to control the flow of the gaseous medium in response to predetermined voltage variations, the tubular electrode in said assembly including an inner duct which communicates with said supplying means and has at least one aperture interconnecting said duct with the space where the glow discharge takes place.



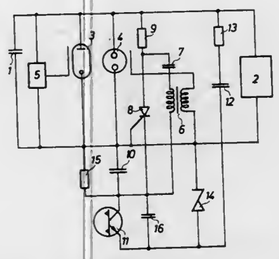
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**4,019,092**

## PHOTOGRAPHIC FLASH APPARATUS

**Armin Stiller, Braunschweig, Germany, assignor to Rollei-Werke Franke & Heidecke, Braunschweig, Germany**

**Filed Apr. 18, 1975, Ser. No. 569,582**
**Claims priority, application Germany, May 15, 1974, 2423527**
**Int. Cl.² H05B** *41/32*, *37/02*, *37/00*
**U.S. Cl. 315—159** **4 Claims**



1. Photographic flash apparatus having an electronic flash tube, means for initiating a flash in said tube, means for terminating a flash in progress in said tube, and exposure-measuring and flash-terminating circuitry for operating said flash terminating means, said circuitry including a light-sensitive element and an integrating capacitor having terminals connected together so said light-sensitive element and said integrating capacitor are in series with each other, a voltage source for said exposure-measuring and flash-terminating circuitry, said voltage source including means for supplying a higher voltage point and a lower voltage point for energizing said exposure-measuring and flash-terminating circuitry, and a thyristor having an anode, a cathode, and a control electrode, said thyristor being effective when conductive to cause said terminating means to terminate a flash, said flash apparatus being characterized by the facts that:

a. a terminal of said integrating capacitor opposite from said terminal connected to said light-sensitive element is connected directly to said higher voltage point;

b. a terminal of said light-sensitive element opposite from said terminal connected to said integrating capacitor is connected directly to said lower voltage point;

c. the control electrode to cathode path of said thyristor is connected in parallel with said integrating capacitor;

d. a resistor is connected in parallel with said integrating capacitor and arranged for discharging said integrating capacitor after each flash and

e. means connected between said higher and lower voltage points for maintaining the constancy of the voltage between said points.

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**4,019,093**

## HORIZONTAL DYNAMIC DAMPER CIRCUITRY

**Arthur H. Klein, Oakfield, N.Y., assignor to GTE Sylvania Incorporated, Stamford, Conn.**

**Filed Oct. 9, 1975, Ser. No. 620,869**
**Int. Cl.² H01J** *29/56*
**U.S. Cl. 315—370** **6 Claims**

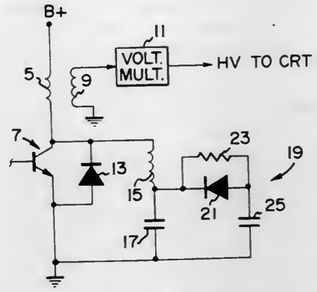
1. In color cathode ray tube display apparatus having a horizontal deflection system, a dynamic damper circuit comprising:

a potential source;

a horizontal deflection signal source;

a horizontal deflection yoke winding coupled to said potential source and horizontal deflection signal source;

"S" curve correction means series connected to said horizontal deflection yoke winding, said series connected horizontal deflection yoke winding and "S" curve correction means shunting said horizontal deflection signal source; and




dynamic damper means in the form of a series connected charge storage means and a diode shunted by an impedance shunt connected across said "S" curve correction means with said impedance providing a charge path and said diode providing a discharge path for said charge storage means form said potential source whereby undesired ringing signals in the horizontal deflection system due to large intermittent video signal changes are damped.

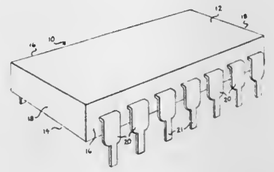
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**4,019,094**

## STATIC CONTROL SHORTING CLIP FOR SEMICONDUCTOR PACKAGE

**Edward H. Dinger; David G. Saben, and John R. VanPatten, all of Waynesboro, Va., assignors to General Electric Company, Salem, Va.**

**Filed Dec. 19, 1975, Ser. No. 642,349**
**Int. Cl.² H05F** *3/02*
**U.S. Cl. 361—220** **12 Claims**



1. A shorting clip for use with a semiconductor package including a substantially flat body defining top, bottom, side and end surfaces and including at least one electrical lead extending from each side surface at an angle with respect to the planes of said top and bottom surfaces, said clip comprising:

a. a top portion dimensioned to overlay the top surface of said body;

b. a pair of electrically interconnected leg portions attached to said top portion and adapted to resiliently engage and electrically contact, respectively, the electrical leads extending from said side surfaces;

c. a retaining member resiliently secured to each end of said top portion, each of said retaining members extending across a respective end surface of said body and adapted for engagement with said bottom surface; and,

d. resilient means intermediate said top portion and said top surface to bias said portion and said body apart and

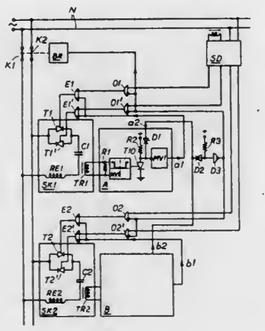
thereby enhance engagement of said retaining members with said bottom surface.

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**4,019,095**
**CAPACITOR EQUIPMENT**

**Harry Frank, and Kjell Rehnman, both of Vasteras, Sweden, assignors to ASEA Aktiebolag, Vasteras, Sweden**

**Filed June 5, 1975, Ser. No. 584,003**
**Claims priority, application Sweden, June 25, 1974, 74083114**
**Int. Cl.² H02H** *7/20*
**U.S. Cl. 361—79** **6 Claims**



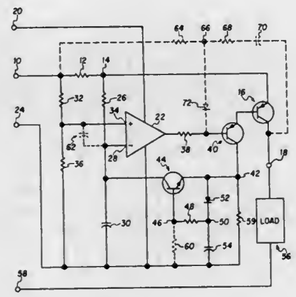
1. Shunt capacitor equipment which comprises a series-connection, connected to an alternating voltage network, of
a. two antiparallel-connected thyristors,
b. one capacitor,
c. one reactor,
in which a control device is connected to the control electrodes of the thyristors and arranged alternately to ignite the thyristors at times in the vicinity of th peak value of the alternating voltage, the improvement which comprises a sensing member for sensing an operating magnitude in said series-connection and a level-sensing member connected to the sensing member and to the control device including means to influence the control device to produce ignition of both thyristors in response to one instantaneous value of the operating magnitude outside a predetermined interval.

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**4,019,096**
**CURRENT LIMITING APPARATUS**

**Johannes Bullinga, Cedar Rapids, Iowa, assignor to Rockwell International Corporation, El Segundo, Calif.**

**Filed June 7, 1976, Ser. No. 693,452**
**Int. Cl.² H02H** *3/08*
**U.S. Cl. 361—86** **4 Claims**



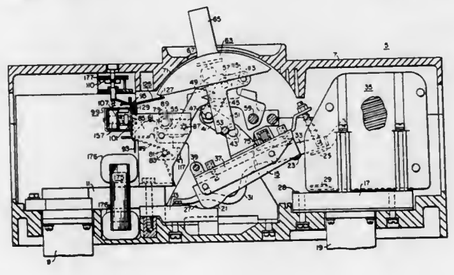
2. Apparatus for minimizing power dissipation in series circuit current limiting means comprising, in combination:

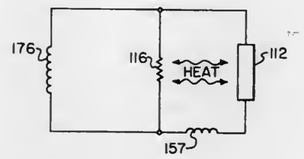
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**4,019,097**
**CIRCUIT BREAKER WITH SOLID STATE PASSIVE OVERCURRENT SENSING DEVICE**

**Robert C. Miller; George T. Mallick, Jr., and Peter R. Emtage, all of Pittsburgh, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed Dec. 10, 1974, Ser. No. 531,428**
**Int. Cl.² H02H** *5/04*; **H01H** *39/00*
**U.S. Cl. 361—93** **11 Claims**






1. A circuit breaker, comprising:
separable contacts;
a flux transfer trip mechanism comprising a permanent magnet, two magnetic circuits, and a trip coil, said trip coil being operable upon energization to switch magnetic flux produced by said permanent magnet from one of said magnetic circuits to the other to actuate said flux transfer trip mechanism and effect separation of said contacts;
an overcurrent sensing device comprising a temperature-dependent switching resistor connected to said trip coil and switchable between first and second resistance levels, said resistor operable upon switching to said second resistance level to energize said trip coil and actuate said flux transfer trip mechanism; and
current coupling means connected to said contacts, said trip coil, and said temperature dependent switching resistor;
an overcurrent condition through said contacts causing said temperature-dependent switching resistor to switch to said second resistance level and actuate said flux transfer trip mechanism, thereby affecting separation of said contacts.

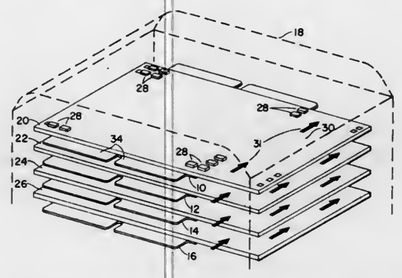


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**4,019,098**
**HEAT PIPE COOLING SYSTEM FOR ELECTRONIC DEVICES**

**Raymond George McCready, South Bend, Ind., and Philip Eugene Eggers, Worthington, Ohio, assignors to Sundstrand Corporation, Rockford, Ill.**

**Division of Ser. No. 526,643, Nov. 25, 1974. This application June 6, 1975, Ser. No. 584,313**
**Int. Cl.² H05K** *7/20*
**U.S. Cl. 361—385** **11 Claims**



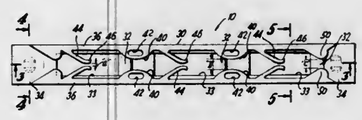
1. A heat pipe structure for cooling electronic components comprising:
a first planar sheet configured with grooves on the inner surface that form a first group of capillary channels;
a second planar sheet configured with grooves on the inner surface that form a second group of capillary tubes;
at least three spacer members interposed between said first and said second sheet effective to form at least two vapor channels parallel to each of said groups of capillary channels;
a condenser region at one end of the heat pipe for transferring heat from the heat pipe to a cooling medium;
a working fluid contained in a liquid state in said capillary channels and a vapor state in said vapor channels for transferring heat from the electronic components to said condenser region;
a plurality of electronic components secured to the outer surface of said first sheet;
a circuit board secured to the outer surface of said second sheet;
a plurality of terminal pins extending through the heat pipe connecting said electronic components to said circuit board.

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**4,019,099**
**CIRCUIT BOARD MOUNTING DEVICE**

**Anthony D. Calabro, 8738 West Chester Pike, Upper Darby, Pa. 19082**

**Filed Jan. 15, 1976, Ser. No. 649,453**
**Int. Cl.² H02B** *1/02*
**U.S. Cl. 361—399** **12 Claims**



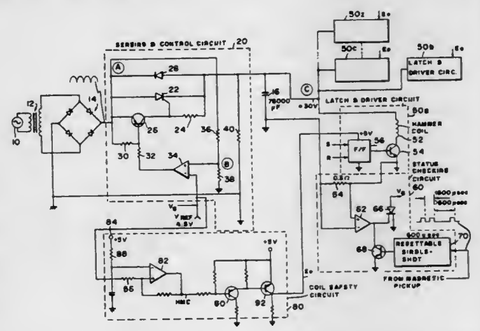
1. A track mounting device for slidably receiving and frictionally holding a circuit board comprising an elongated channel member of generally U-shaped cross-section including two parallel side walls and an intermediate slide bearing base portion, opposed resilient grip means projecting from said side walls intermediate the length thereof to form a laterally expansible track in frictional contact with the circuit board supported on the slide bearing base, said side walls including opposed thickened portions projecting into the space between the parallel side walls intermediate the length thereof, and opposed protrusions disposed at opposite ends of the side walls and projecting into the space between said side walls, with the spacing between said opposed protrusions being less than the spacing between said opposed thickened portions but greater than the spacing between said opposed resilient grip means.

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**4,019,100**
**PRINT HAMMER ENERGIZING AND CONTROL CIRCUIT**

**Gordon Brent Barrus, El Segundo, Calif., assignor to Printronix, Inc., Irvine, Calif.**

**Filed May 16, 1975, Ser. No. 578,179**
**Int. Cl.² B41J** *9/38*
**U.S. Cl. 361—186** **10 Claims**



1. An arrangement for energizing a plurality of print element circuits in a printer system comprising:
an AC source;
full wave rectifier means coupled to the AC source;
storage capacitor means coupled to energize a plurality of print element circuits;
gating means coupling the full wave rectifier means to the storage capacitor means, said gating means being operative to conduct when fired and to continue conducting for a selected period of time thereafter;
means for summing signals at the output of the full wave rectifier means and the storage capacitor means to provide a combined signal;
means for providing a reference signal; and
means coupled to compare the combined signal and the reference signal, the means coupled to compare being operative to fire the gating means each time the combined signal and the reference signal assume a predetermined relationship.

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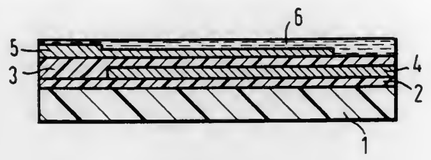
**4,019,101**
**CORROSION-RESISTANT REGENERABLE ELECTRICAL CAPACITOR**

**Karl-Heinz Preissinger, Taufkirchen; Walter Voelkl; Willi Weber, both of Munich, and Ulrich Wehnelt, Starnberg, all of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany**

**Filed June 26, 1975, Ser. No. 590,719**
**Claims priority, application Germany, June 27, 1974, 2431013**
**Int. Cl.² H01G** *4/24*
**U.S. Cl. 361—313** **4 Claims**

1. A corrosion-resistant regenerable electrical capacitor comprising: a first metallized electrode hermetically connected to and sandwiched between two solid plastic dielectric layers, one of said dielectric layers being of weak regenerating characteristics, one of said dielectrics in contact with a carrier

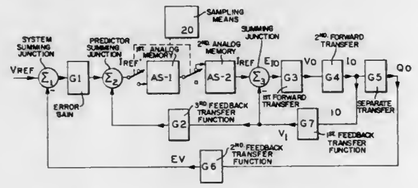
foil, the other dielectric having a second metallized electrode in capacitive relationship to said first metallized electrode, a




major surface of said second metallized electrode being free of solid plastic and being coated with a liquid insulating oil.

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**4,019,102**
**SUCCESSIVE APPROXIMATION FEEDBACK CONTROL SYSTEM**
**George P. Wallot, Fort Wayne, Ind., assignor to General Electric Company, Carmel, Ind.**
**Filed Oct. 16, 1975, Ser. No. 622,960**
**Int. Cl.² G03G** *13/02*
**U.S. Cl. 361—225** **21 Claims**

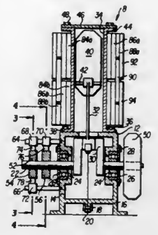



1. A feedback control system comprising:
a first feedback loop including an input reference, a summing junction, a forward transfer function, an output yielding a controlled variable, and a first feedback transfer function for sampling the controlled variable and feeding an output signal proportional to the controlled variable to the summing junction;
a separate transfer function having an input connected to the output of the first feedback loop and producing a system output controlled variable;
a system input reference having as a value the ideal for the system output controlled variable;
a predictor means for sampling the system output controlled variable, the system input reference, and the first feedback loop controlled variable to produce a corrected input reference for the first feedback loop to result in a shift in the first feedback loop output and a corresponding shift in system output controlled variable that will by successive approximation approach a value which is in correct proportion to the system input reference thereby resulting in a near zero system error.

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**4,019,103**
**ELECTROMAGNETIC MOTOR AND GENERATOR**
**Oliver Thurston Davis; Norman Ray Jones, both of Rte. 1, P.O. Box 33, Dunlap, Tenn. 37327, and Elmer Carl Eddy, Rte. 1, P.O. Box 258, Whitwell, Tenn. 37397**
**Filed Mar. 5, 1976, Ser. No. 664,089**
**Int. Cl.² H02K** *33/12*
**U.S. Cl. 318—37** **11 Claims**

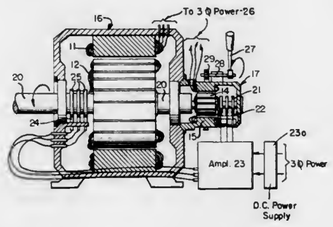
1. A motor-generator comprising:
a. a cylinder having a pair of solenoid means disposed one around each end thereof and a magnetizable piston reciprocally mounted in said cylinder, said piston being swingably connected by link means to a rotatably mounted crankshaft means;
b. switch means operatively connected to said crankshaft means and interposed in an electric circuit for selectively energizing said solenoids to cause rotary motion of said crankshaft means; and



c. additional circuit means connected to each of said solenoids for recapturing electrical energy generated in each of said solenoids, upon deenergization of said solenoids by said switch means.

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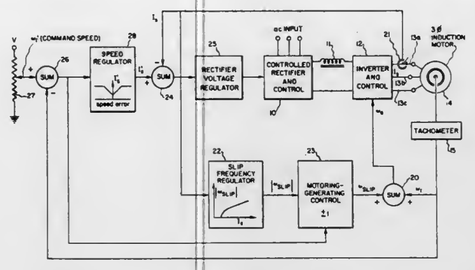
**4,019,104**
**VARIABLE SPEED INDUCTION MOTOR**
**Louis W. Parker, 2408 Sunrise Key Highway, Fort Lauderdale, Fla. 33304**
**Continuation-in-part of Ser. No. 454,991, March 26, 1974, abandoned. This application May 12, 1975, Ser. No. 576,934**
**Int. Cl.² H02P** *7/36;* **H02K** *17/24*
**U.S. Cl. 318—195** **22 Claims**




1. A motor system comprising a polyphase induction motor having a first wound stator and a first wound rotor mounted on a rotatable shaft for rotation adjacent said first stator, a polyphase generator having the same number of poles as said motor, said generator comprising a second wound stator and a second wound rotor mounted for rotation adjacent said second stator, the horsepower rating of said generator being less than that of said motor, means mechanically coupling said second rotor to said rotatable shaft to cause rotation of said first rotor to rotate said second rotor at the same rotational speed, a polyphase power source connected in parallel to both of said wound stators for energizing said stators in phase with one another with sinewave shaped voltages of like magnitude, a polyphase linear amplifier, rectifier power supply means disposed between said polyphase power source and said amplifier for energizing said amplifier with substantially D.C. power, said amplifier having its inputs connected to the windings of said second rotor, the outputs of said linear amplifier being connected to the windings of said first rotor whereby the polyphase sinewave shaped output voltages generated across the windings of said second rotor are amplified by said linear amplifier and supplied as amplified sinewave shaped voltages respectively to the windings of said first rotor to control the current flow in the windings of said first rotor.



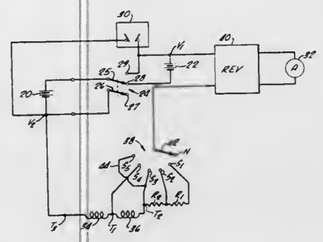
**4,019,105**
**CONTROLLED CURRENT INDUCTION MOTOR DRIVE**
**Edward P. Cornell, and Thomas A. Lipo, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.**
**Filed Sept. 26, 1975, Ser. No. 617,187**
**Int. Cl.² H02R** *5/40*
**U.S. Cl. 318—227** **11 Claims**




1. A motor control circuit for a current controlled induction motor having a stator winding on a stator which is separated from a rotor by an air gap comprising
a constant current source converter for producing variable amplitude and frequency stator line current to be supplied to the stator winding,
current sensing means for sensing the peak stator current amplitude and speed sensing means for effectively sensing the speed and frequency of said rotor and generating sensor signals respectively representative thereof,
first feedback control means for deriving a slip frequency signal as a predetermined function of said stator current sensor signal to maintain constant rated air gap magnetic flux,
second feedback control means for summing said slip frequency and rotor frequency sensor signals to generate an electrical frequency control signal which is fed to said converter to determine the frequency of the stator line current produced by said converter, and
third feedback control means for summing a stator current amplitude command signal representative of desired torque and said stator current sensor signal to generate an error signal which is fed to said converter to determine the amplitude of the stator line current produced by said converter.

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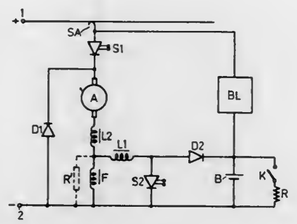
**4,019,106**
**MOTOR SPEED CONTROL**
**Robert L. Van Doren, Garden Grove, Calif., assignor to Taylor-Dunn Manufacturing Company, Anaheim, Calif.**
**Filed Mar. 18, 1974, Ser. No. 452,384**
**Int. Cl.² H02P** *7/00*
**U.S. Cl. 318—252** **7 Claims**



**4,019,108**
**DRIVE EQUIPMENT SUPPLIED WITH DIRECT CURRENT**

**Sten Elvin, Vasteras, Sweden, assignor to ASEA Aktiebolag, Vasteras, Sweden**

**Filed Jan. 8, 1976, Ser. No. 647,501**
**Claims priority, application Sweden, Jan. 20, 1975, 7500545**
**Int. Cl.² H02P 7/10**
**U.S. Cl. 318—353** **6 Claims**



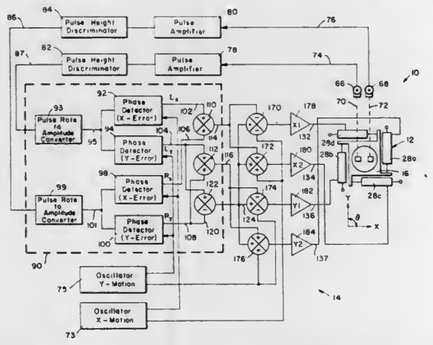

1. Drive equipment supplied with direct current, having a DC motor with a series field winding and means connecting a controllable semi-conductor rectifier working in pulse operation and a reactor in series with each other and in parallel with the field winding, for variable shunting of the field winding, means connecting a load object in parallel to the semi-conductor rectifier.

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**4,019,109**
**ALIGNMENT SYSTEM AND METHOD WITH MICROMOVEMENT STAGE**

**John H. McCoy, Newbury Park, and Paul A. Sullivan, Santa Monica, both of Calif., assignors to Hughes Aircraft Company, Culver City, Calif.**

**Continuation of Ser. No. 469,154, May 13, 1974, abandoned. This application Apr. 5, 1976, Ser. No. 673,553**
**Int. Cl.² G05B 19/18**
**U.S. Cl. 318—640** **16 Claims**



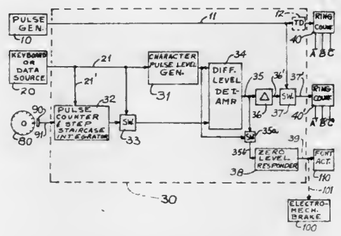

1. In an alignment system for processing of semiconductor wafers, a device for producing micron movement in planar orthogonal and angular directions singly and in combination of a mask with respect to a semiconductor wafer, comprising:
a carrier having means for supporting one of the mask and the wafer, being substantially rectangular in configuration to define four orthogonally disposed sides, and including four ears orthogonally positioned with one another and respectively secured to and extending from said sides for forming outwardly projecting extensions from said carrier, said extensions respectively having a first face contiguous with one of said sides and a second face substantially at right angles with a second of said sides orthogonal to said one side;
a support including four anchor blocks rigidly affixed to said support, each of said anchor blocks including a face substantially parallel with and spaced from said second face of each of said ears;
four transducers, each of said transducers having means for providing at least an elongation therein and being positioned between each of said respective facing ones of said anchor block faces and said second faces of said ears;
flat springs affixed respectively to each of said transducers and to each of said anchor block faces and said second faces of said ears, each of said flat springs having a pair of large parallel flat sides and a pair of short parallel flat sides of lesser width than said large parallel flat sides, and said large parallel flat sides being substantially parallel with said sides of said carrier; and
means coupled to each of said transducers and intercoupling said transducer for actuating said transducer means for elongating each of said transducers singly and in combination.

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**4,019,110**
**STEPPING MOTOR HAVING ROTATIONAL AND COUNTER ROTATIONAL MAGNETIC FIELD CONTROL**

**Martin E. Gerry, 13452 Winthrope St., Santa Ana, Calif. 92705**

**Filed May 19, 1975, Ser. No. 579,028**
**Int. Cl.² H02K 37/00**
**U.S. Cl. 318—696** **14 Claims**



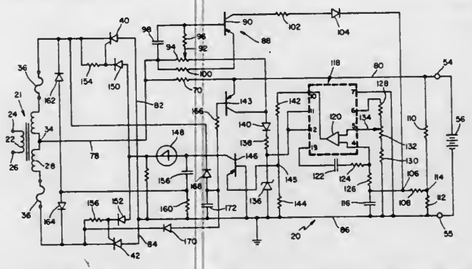

1. A stepping motor, comprising in combination:
a rotor;
a stator structure, magnetically coupled to the rotor, having a first plurality of windings and a second plurality of windings, each one of the first plurality of windings being in space coincidence with only one of the second plurality of windings; and
a plurality of pole pieces integral with the stator structure and disposed at regular intervals therewithin, each one of the pole pieces having one each of the first and second plurality of windings thereon, the windings of said first plurality of windings on such of the pole pieces which are oppositely disposed being serially interconnected, the windings of said second plurality of windings on such of the pole pieces which are oppositely disposed being serially interconnected, said first plurality of windings when energized by phased pulse power producing magnetic flux in a first direction and a rotational torque upon the rotor, and said second plurality of windings when energized by phased pulse power producing magnetic flux in opposition to the first direction and a counter rotational torque upon said rotor substantially equal in magnitude to the rotational torque.



**4,019,111**
**BATTERY CHARGER WITH AUTOMATIC CHANGE FROM CURRENT TO VOLTAGE MODE CONTROL**

**David H. Bennefeld, Anoka, Minn., assignor to Introl Corporation, Minneapolis, Minn.**

**Filed May 14, 1975, Ser. No. 577,175**
**Int. Cl.² H02J 7/04**
**U.S. Cl. 320—23** **3 Claims**



1. A battery charger for connection to a source of AC power comprising:
a rectifier means for supplying charging current to a battery to be charged;
a resistor in series with said rectifier means for providing a voltage drop thereacross caused by the flow of charging current through said resistor;
a first potentiometer connected in parallel with said resistor and having an adjustable contact;
a first transistor having a base connected to said adjustable contact so as to vary the conduction of said transistor in relation to the voltage drop across said resistor, said transistor providing an output voltage signal representative of the charging current;
a voltage divider in parallel with said battery providing a voltage signal representative of said battery voltage;
summing point means for algebraically summing said output voltage signal of said transistor and said voltage representative of said battery voltage;
an error amplifier having a pair of inputs and an output, one of said inputs connected to said summing point and the other of said inputs connected to a reference voltage, said amplifier producing an output signal representative of the difference between said voltages applied to said inputs;
means for controlling said rectifier means in accordance with said amplifier output signal to increase the flow of charging current when said battery voltage is below a threshold value and to decrease the flow of charging current when said battery voltage reaches said threshold value;
a second potentiometer having an adjustable contact connected to said other of said inputs of said error amplifier to provide a variable reference voltage; and
means for changing the voltage applied to said one input of said error amplifier in a direction generating an error amplifier output signal controlling said rectifier means to reduce the charging current when the charger is initially connected to a source of AC power.

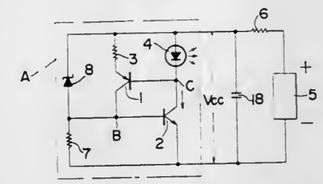
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**4,019,112**
**BATTERY CHECKER CIRCUIT**

**Ken Satoh, Hachioji, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan**

**Filed June 25, 1975, Ser. No. 590,288**
**Claims priority, application Japan, June 28, 1974, 49-74065; July 5, 1974, 49-79415; July 9, 1974, 49-80776**
**Int. Cl.² H02J 7/02**
**U.S. Cl. 320—48** **6 Claims**

1. A battery checker circuit comprising a voltage divider connected across a storage battery, said voltage divider including a first voltage detection resistor, a pair of complementary transistors, a second resistor connecting the emitter of a first one of the pair of transistors with one terminal of the battery; the collector of said first transistor being connected to the voltage detection resistor, and a light emitting display element connected in series with the other one of the pair of transistors across the battery, the base of the first transistor being connected to the junction between the display element and the other transistor, and the base of the other transistor being connected with the collector of the first transistor; a current limiting resistor connected intermediate the battery and the voltage divider and the transistors, and a capacitor connected across the series combination of said current limiting resistor and the battery, said capacitor repeatedly discharging through the series combination of the display element and the other transistor and charging through the current limiting resistor for operating the display element in a flashing manner wherein the rate of flashing is reduced to correspond to a reduction in the battery voltage level.

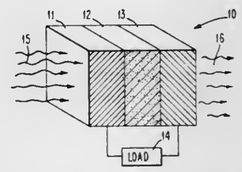



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**4,019,113**
**ENERGY CONVERSION DEVICE**

**James Keith Hartman, 664 South St., East Aurora, N.Y. 14052**

**Filed Nov. 20, 1974, Ser. No. 525,509**
**Int. Cl.² H02M 7/00**
**U.S. Cl. 321—1.5** **14 Claims**




1. An energy conversion device for conversion between thermal energy and electrical energy comprising:
A first element having a partially filled conduction band;
A second element joined to said first element along a first common surface thereof said second element having a conduction band separated from a valance band by an energy gap;
There being a first voltage barrier at said first common surface between said first element and said second element; and
A third element joined to said second element along a second common surface, said third element having a partially filled conduction band, there being a second voltage barrier at said second common surface between said second element and said third element;
Said first voltage barrier being greater than said second voltage barrier.

**4,019,114**

## CIRCUIT ARRANGEMENT FOR THE UNGROUNDED TRANSMISSION OF SIGNALS THROUGH TESTING POINTS IN COMMUNICATION FACILITIES

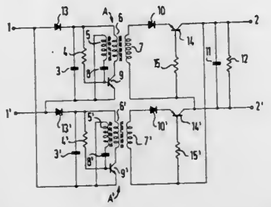
**Josef Huellwegen, Altenbeken, Germany, assignor to Nixdorf Computer AG, Paderborn, Germany**

**Filed Mar. 7, 1975, Ser. No. 556,410**

**Claims priority, application Germany, Mar. 12, 1974, 2411871**

**Int. Cl.² H02M** *3/335*

**U.S. Cl. 321—2** **3 Claims**



1. A circuit arrangement for the ungrounded transmission of signals through testing points in communication facilities, said circuit arrangement comprising input terminal means and output terminal means and high-frequency oscillator means having an input thereto and an output therefrom and control means connected in circuit with said input to said high-frequency oscillator means and being responsive to one polarity of an input signal to said input terminal means for controlling the duration and magnitude of oscillations produced by said high-frequency oscillator means at said output therefrom and rectifier means and resistive load means connected in circuit with said output from said high-frequency oscillator means, said output terminal means being connected across said resistive load means, said oscillations at said output from said high-frequency oscillator means being rectified by said rectifier means and the rectified signal applied to said resistive load means for effecting the production of an output signal at said output terminal means which has a shape that corresponds to the shape of said input signal applied to said input terminal means, said circuit arrangement being free of power sources therein and utilizing only said input signal for an operation of said circuit arrangement, said high-frequency oscillator means including two high-frequency oscillators, said control means including two control circuits, one being responsive to one polarity of said input signal and the other being responsive to the opposite polarity of said input signal, said rectifier means including two rectifier circuits, one rectifying said oscillations at said output from one of said high-frequency oscillators and the other rectifying and oscillations at said output from the other of said high-frequency oscillators, and said rectified signals from said rectifier circuits occurring at spaced intervals of time and are each applied to said resistive load means which is common to both of said rectifier circuits so that the shape of said two polarity input signals is reproduced at said output terminal means.

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**4,019,115**

## ENERGY TRANSMISSION SYSTEM WITH A COMMON MAIN FOR DIRECT CURRENT

**Hans-Peter Lips, Schriesheim, Germany, assignor to BBC Brown Boveri & Company Limited, Baden, Switzerland**

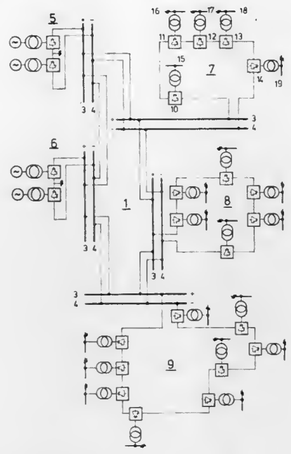
**Filed July 14, 1975, Ser. No. 595,877**

**Claims priority, application Germany, July 25, 1974, 2435755**

**Int. Cl.² H02M** *7/00*

**U.S. Cl. 321—27 R** **4 Claims**

1. In an energy transmission system provided with a common main which conducts direct-current at high voltage and is fed from at least one three-phase network or power station through rectifiers, the improvement characterized in that connected to a plurality of points in the common main, between the poles are output groups connected in parallel, each of which consists of a plurality of partial inverters connected



in series between the poles of the common main, associated with each of which partial inverters is an alternating-current network or partial network to be supplied, and that a regulating device is provided to monitor the electrical quantities.

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**4,019,116**

## COMMUTATION CIRCUIT FOR A CONVERTER

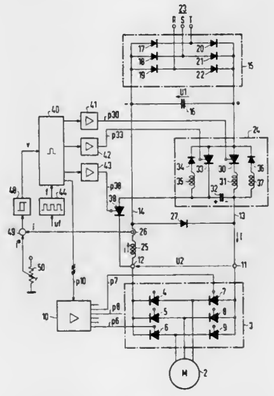
**Herwig Klautschek, Furth, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany**

**Filed Nov. 25, 1975, Ser. No. 635,149**

**Claims priority, application Germany, Dec. 3, 1974, 2457109**

**Int. Cl.² H02M** *7/515*

**U.S. Cl. 321—45 C** **6 Claims**



1. A commutation circuit for a frequency converter comprising:

a p-pulse converter including controllable valves, first and second inputs, and an output adapted to be connected to a load;

a DC voltage source for supplying a constant DC voltage, said voltage source having first and second output terminals;

an intermediate DC link connected between said DC voltage source and said p-pulse converter, said link comprising:



a smoothing choke connecting the first output terminal of said DC voltage source to said first input of said p-pulse converter;

a DC control means for controlling the DC current in said link and connecting the second output terminal of said DC voltage source to said second input of said p-pulse converter, said DC control means comprising:

a controllable main valve, and a quenching arrangement for quenching said main valve, said arrangement being shunted across said main valve and including a quenching capacitor connected in series with a controllable quenching valve, said quenching capacitor having one electrode connected to said second input of said p-pulse converter,

and a bypass valve connected in series with said smoothing choke, said series connection of said bypass valve and smoothing choke being connected between said first and second inputs of said p-pulse converter and said bypass valve being poled in the direction of said second input,

and a controllable auxiliary valve connected between the other electrode of said quenching capacitor and said first input of said p-pulse converter such that when said auxiliary valve is fired the voltage of said quenching capacitor is present as a cut-off voltage at said controllable valves of said p-pulse converter, said quenching capacitor thereby acting additionally as a quenching capacitor for the sum-quenching of said controllable valves.

c. wherein the diode recovery bridge is coupled across the d.c. input terminals ahead of the electronic switches.

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**4,019,117**

## CIRCUIT ARRANGEMENT FOR AN INVERTER

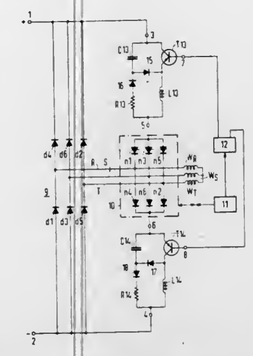
**Horst Gehm, Rottenbach; Werner Gratzke, Erlangen, and Wilhelm Linden, Erlangen-Buchenbach, all of Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany**

**Filed Sept. 3, 1975, Ser. No. 610,053**

**Claims priority, application Germany, Sept. 9, 1974, 2443025**

**Int. Cl.² H02M** *7/155*

**U.S. Cl. 321—45 R** **5 Claims**



1. In an inverter having controlled rectifiers in a bridge circuit with recovery diodes also in a bridge circuit with the junction points of the recovery diode bridge circuit coupled to the corresponding junction points of the inverter bridge circuit, both the inverter bridge circuit and diode bridge circuit being coupled across positive and negative d.c. voltage inputs, an improved circuit arrangement comprising:

a. symmetrically arranged electronic switches coupling the positive and negative d.c. voltage inputs to the inverter bridge circuit;

b. an auxiliary circuit having an inductance coupled in series with the load path of each electronic switch and a series circuit comprising a capacitor, a resistor and a diode coupled in parallel across the series circuit made up of said inductance and said load path, for limiting the current rate of rise and voltage rise across said load paths; and

**4,019,118**

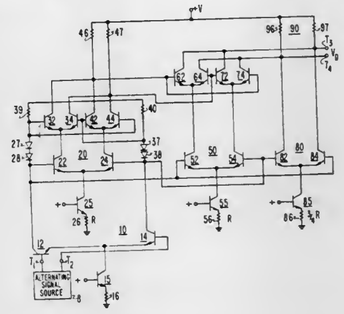
## THIRD HARMONIC SIGNAL GENERATOR

**Leopold Albert Harwood, Somerville, N.J., assignor to RCA Corporation, New York, N.Y.**

**Filed Mar. 29, 1976, Ser. No. 671,563**

**Int. Cl.² H02M** *5/16*

**U.S. Cl. 321—65** **16 Claims**



9. A third harmonic signal generator circuit comprising:

a source of alternating input signals proportional to sin $\theta$;

a first signal multiplier comprising a first amplifier having input and common electrodes coupled to said source, and an output electrode, for providing a first output signal proportional to $\sin^2 \theta$;

a second signal multiplier comprising a second amplifier having an input electrode coupled to said output electrode of said first amplifier, a common electrode coupled to said source, and an output electrode, for providing a second output signal proportional to $\sin^3 \theta$ having a first harmonic component proportional to sin $\theta$ and a third harmonic component proportional to sin $3\theta$;

a third amplifier having an input electrode coupled to said source, a common electrode and an output electrode, for providing a third output signal in predetermined magnitude and polarity relation with said first harmonic component sin $\theta$; and

a combining network coupled to said outputs of said second and third amplifiers, for combining said second and third output signals to cancel said first harmonic component of said second signal and thereby provide an output signal proportional to said third harmonic component sin $3\theta$ and substantially devoid of said first harmonic component.

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**4,019,119**

## DC TO AC VOLTAGE CONVERTER WITH AUTOMATIC START-STOP CONTROL OF MOTOR-GENERATOR SET

**Joseph S. Naber, Marengo, Ill., assignor to Applied Motors, Inc., Rockford, Ill.**

**Continuation-in-part of Ser. No. 568,868, April 17, 1975, abandoned. This application Apr. 1, 1976, Ser. No. 672,792**

**Int. Cl.² H02P** *9/06*; **H02M** *7/64*

**U.S. Cl. 322—8** **29 Claims**

1. In a control system for starting and stopping a motor-alternator set, the motor being rotationally driven when energized from a dc. battery and the alternator being connected to supply ac. current to a load unit having a series on-off switch, the combination comprising:

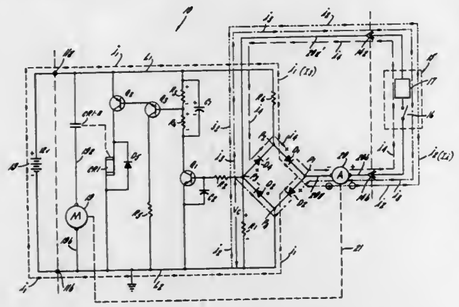
a. means including a current limiting resistor and a forwardly poled semiconductor junction adapted for connection across said battery to draw a standby dc. trickle current,

b. means connecting said alternator, load unit and on-off switch to said semiconductor junction so that closure of

said switch results in initial dc. current flow through the alternator, load unit and switch,

c. means responsive to said initial dc. current flow for connecting said motor across said battery to energize and start the motor,

d. permanently connected means for conducting ac. current, generated by said alternator, through said load unit



and on-off switch, when closed, including at least two semiconductor diodes for respectively forwardly conducting the alternate half cycles of such current, and

e. means responsive to the pulsating forward voltage drop across at least one of said diodes for maintaining said motor connected across said battery,

whereby said motor is started or stopped automatically when said on-off switch is respectively closed or opened.

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**4,019,120**

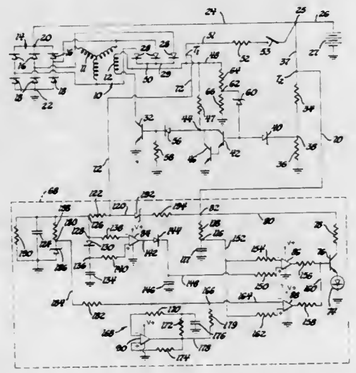
## FAULT INDICATOR FOR MOTOR VEHICLE BATTERY CHARGING SYSTEMS

**Gerald T. Fattic, Anderson, Ind., assignor to General Motors Corporation, Detroit, Mich.**

**Filed Apr. 2, 1976, Ser. No. 672,872**

**Int. Cl.² H02J 7/24; G08B 21/00; G01R 31/02**

**U.S. Cl. 322—28** **5 Claims**



1. A malfunction indicator for a motor vehicle battery charging system comprising, an alternating current generator having a polyphase output winding and a field winding, a first fullwave bridge rectifier connected to said output winding, a battery connected across the direct current output terminals of said first bridge rectifier to be charged thereby, second rectifier means connected with said output winding, said second rectifier means and certain of the rectifiers of said bridge rectifier providing a field energizing rectifier circuit having direct current field energizing terminals, voltage regulating means including a field current control means, means connecting said field winding and said field current control means across said field energizing terminals of said field energizing rectifier circuit to provide regulated field excitation for said generator, an amplifier having first and second inputs operative to provide an output signal when the input currents to said amplifier inputs differ by a predetermined amount, means connecting the inputs of said amplifier to said field energizing terminals including a diode connected across said amplifier input terminals and a capacitor connected between one amplifier input terminal and one field energizing terminal, said diode and capacitor operative to cause a differential input current to be supplied to said amplifier inputs of sufficient magnitude as to cause said amplifier to develop a first output fault signal in response to the occurrence of sudden voltage transitions across said field energizing terminals indicative of certain faults in said system, means connected to said battery and to one of said field energizing terminals for providing a second fault signal when a predetermined voltage difference exists therebetween indicative of faulty field excitation, and fault signal indicating means operative to respond to said first and second fault signals.

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**4,019,121**

## CIRCUIT ARRANGEMENT FOR PRODUCING A COMPENSATED CURRENT

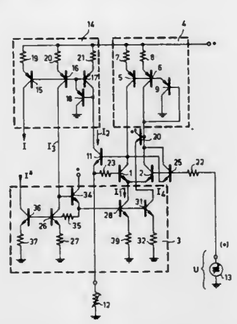
**Hans Heinrich Feindt, Pinneberg, Germany, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Nov. 21, 1975, Ser. No. 634,256**

**Claims priority, application Germany, Dec. 14, 1974, 2459271**

**Int. Cl.² G05F 1/56**

**U.S. Cl. 323—4** **6 Claims**



1. A transistor circuit arrangement for producing a current which is proportional to an adjustable reference voltage and/or the admittance of a variable resistor, and which is compensated for temperature variations and supply voltage variations, comprising: a differential amplifier including a first transistor to the base of which the reference voltage is applied, and a second transistor; a third transistor the emitter circuit of which is connected to the base of the second transistor and includes the variable resistor while the base of which is connected to the collector of the second transistor; a first current mirror circuit supplied by the supply voltage and connected between the collector circuits of the first and the second transistor; a second current mirror circuit supplied by the supply voltage and connected to the collector circuit of the third transistor to supply a control current $I_2$ thereto, said second current mirror circuit further supplying an input current $I_3$ and an output current I; and a third current mirror circuit supplied by said input current $I_3$ and connected to the emitter circuits of the first and the second transistor to determine a common emitter current $I_1$ thereof.



**4,019,122**

## STABILIZED POWER SUPPLIES

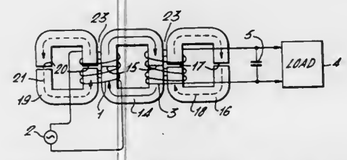
**Kenneth Augustine Ryan, Wishaw, Scotland, assignor to Telcon-Magnetic Cores Limited, England**

**Filed Aug. 7, 1975, Ser. No. 602,511**

**Claims priority, application United Kingdom, Aug. 14, 1974, 35766/74; Feb. 20, 1975, 7176/75**

**Int. Cl.² G05F 3/06**

**U.S. Cl. 323—60** **10 Claims**



1. A constant-voltage transformer comprising a primary coil, a secondary coil, a tuning capacitor connected across said secondary coil, a magnetically continuous magnetic core linking both said primary coil and said secondary coil, a magnetically discontinuous magnetic core linking said secondary coil but not said primary coil and another discontinuous magnetic core linking said primary coil but not said secondary coil.

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**4,019,123**

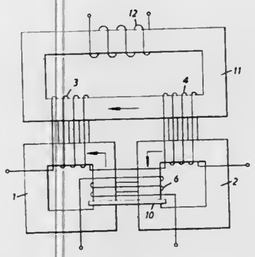
## MAGNETIC AMPLIFIER ARRANGEMENTS

**Arthur Maskery, London, England, assignor to Westinghouse Brake and Signal Co. Ltd., England**

**Filed Sept. 18, 1973, Ser. No. 398,430**

**Int. Cl.² G05F 1/32**

**U.S. Cl. 323—85** **2 Claims**



1. Electropneumatic braking control apparatus comprising a magnetic amplifier arrangement including a first magnetizable core, a second magnetizable core and a third magnetizable core, a first full-wave a.c. input winding wound about the first core and the third core, a second full-wave a.c. winding equivalent to the first winding and wound about the second core and the third core, common d.c. control winding means wound about the first and second cores with the sense thereof relative to the first and second windings being such that fluxes normally linked with the d.c. winding means, due to alternating current in the a.c. windings, mutually cancel, and a secondary winding being provided on the third core for producing an output from the magnetic amplifier arrangement, means for applying a signal to said d.c. control winding means which is the resultant of a demand signal and an opposed regenerative braking signal, and means connected to the output of said secondary winding on said third core for producing a control signal for controlling an electropneumatic brake, said arrangement including a common short circuited winding about the first and second cores.

**4,019,124**

## APPARATUS FOR COMPENSATING REACTIVE POWER IN A THREE-PHASE NETWORK

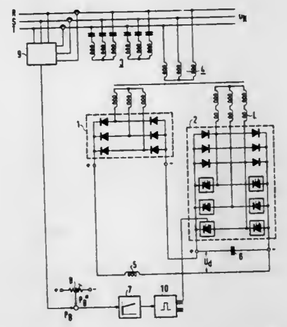
**Gottfried Möltgen, Erlangen, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany**

**Filed Mar. 11, 1976, Ser. No. 665,876**

**Claims priority, application Germany, Mar. 25, 1975, 2513168**

**Int. Cl.² H02J 3/18**

**U.S. Cl. 323—102** **3 Claims**



1. A cycloconverter apparatus for compensating for the reactive power in a three-phase network comprising:

an uncontrolled converter adapted to be connected to said network for generating an impressed DC voltage;

a self-commutating inverter for producing an output signal;

inductance means for coupling said output signal to said network;

an intermediate DC link for coupling said impressed voltage to said inverter;

and means for controlling said inverter such that said output signal is a pulse width modulation signal having a pulse width angle which can be varied, said pulse width modulation signal comprising a fundamental frequency component which when coupled by said inductances is in phase opposition to the network voltage and which has an amplitude which varies with variations in said pulse width angle.

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**4,019,125**

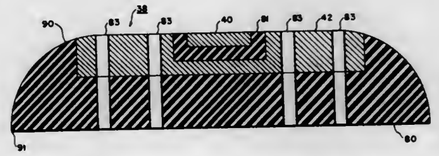
## WELL LOGGING PAD DEVICES HAVING SELECTIVE DIFFERENTIAL RELIEF

**Wilbur Lee Daniel, Houston, Tex., assignor to Dresser Industries, Inc., Dallas, Tex.**

**Filed Oct. 17, 1975, Ser. No. 623,868**

**Int. Cl.² G01V 3/18; E21B 49/00**

**U.S. Cl. 324—1** **6 Claims**



6. An apparatus for investigating earth formations traversed by a borehole, comprising:

an elongated support member adapted for movement through a borehole; and

an auxilliary pad member connected to said support member and adapted to be urged against the borehole wall, said pad member having first and second surfaces, said first surface having at least one electrode and being

adapted to engage the borehole wall, and said pad member having at least one fluid channel between said first and second surfaces and means within said at least one channel responsive to differential pressure between said first and second surfaces for providing pressure relief between said first and second surfaces.

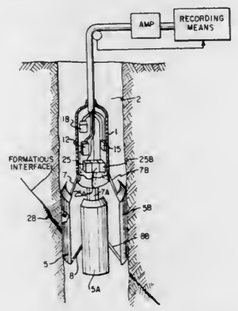
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**4,019,126**

## DIPMETER MEANS UTILIZING GENERATED EDDY CURRENTS AND LINES OF FLUX IN AN EARTH FORMATION

**Richard A. Meador, Houston, Tex., assignor to Texaco Inc., New York, N.Y.**

**Filed Apr. 10, 1974, Ser. No. 459,742**
**Int. Cl.² G01V** *3/08, 3/18*
**U.S. Cl. 324—5** **1 Claim**



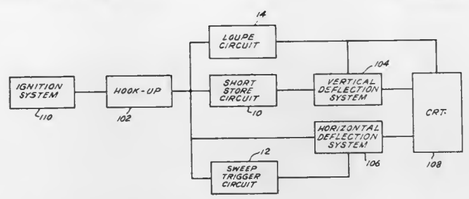

1. A dipmeter comprising a logging tool adapted to be passed through a borehole traversing an earth formation which includes means for sensing an angle of inclination of the borehole and providing an inclination signal corresponding thereto, means for sensing an azimuth angle for the logging tool and providing a corresponding azimuth signal, means for sensing the diameter of the borehole and providing a signal corresponding thereto, and at least three circuit means for generating lines of flux and eddy currents in the earth formation, said circuit means being in a predetermined spatial relationship to each other, and each circuit means includes a radio frequency oscillator comprising a coil urged in substantially close proximity to the side of the borehole, means connected to the coil for providing an alternating current, having a frequency within a preferred range of frequencies of **50** to **200** megahertz, to the coil so as to energize the coil, thereby creating lines of flux and eddy currents, said alternating current means includes a vacuum tube having a grid current corresponding to the alternating current in the coil, and means connected to the vacuum tube for providing a dip signal corresponding to said lines of flux and eddy currents in accordance with the grid current; surface apparatus comprising means for providing a signal corresponding to the depth of the logging tool in the borehole, and means for recording signals; and transmission means connecting the recording means to the sensing means and to all the dip signal means for providing the signals from the sensing means and the dip signal means to the recording means so that the signals are recorded by the recording means.

**4,019,127**

## ANALOG OSCILLOSCOPE

**Gary F. Comiskey, Evanston; Gregory N. Hesse, Lombard, both of Ill., and Johannes Peter Bovenlander, Kormmenie, Netherlands, assignors to Sun Electric Corporation, Chicago, Ill.**

**Filed Dec. 12, 1975, Ser. No. 640,220**
**Int. Cl.² F02P** *17/00*
**U.S. Cl. 324—16 S** **14 Claims**




1. In a device for displaying an ignition signal of an engine having a variable speed, said device including sweep means for varying sweep time, and improved means for correlating said variable speed and said sweep time comprising, in combination:
generator means for generating a sample pulse and a dump pulse in response to said ignition signal, said dump pulse sequentially following said sample pulse;
first voltage storage means;
integrator means for producing a ramp voltage;
first controllably conductive means for discharging said integrator means in response to said dump pulse;
first switch means for selectively interconnecting said first voltage storage means and said integrator means in response to said sample pulse, whereby said first voltage storage means is charged to a sample sweep voltage substantially inversely proportional to said variable speed;
reciprocal means for producing an output voltage substantially proportional to said variable engine speed in response to said sample sweep voltage; and
means for interconnecting said reciprocal means and said sweep means.

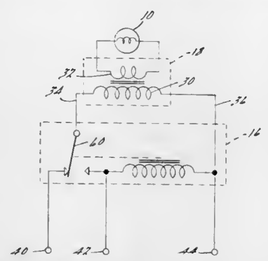
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**4,019,128**

## INDICATOR LIGHT AND TESTING CIRCUIT

**Jerome E. Chebowski, Detroit, Mich., assignor to Rees, Inc., Fremont, Ind.**

**Filed May 8, 1975, Ser. No. 575,593**
**Int. Cl.² G01R** *31/02, 31/22;* **G08B** *29/00*
**U.S. Cl. 324—21** **6 Claims**



6. A pilot light unit comprising,
a pilot light,
a transformer connected to said pilot light,
relay means connected in circuit to said transformer, said relay means having a relay coil, switching means, a signal line terminal, a test line terminal and a main line terminal,
said signal line and main line terminals adapted to be connected to and energized by a control circuit,
said test line and main line terminals adapted to be connected to and energized by a test circuit, and
said switching means normally biased to connect in circuit said signal line terminal with said transformer whereby said pilot light is energized by said control circuit, and movable subject to energization of said relay coil by said test circuit to connect in circuit said test line terminal with said transformer, whereby said pilot light is energized by said test circuit and isolated from said control circuit.



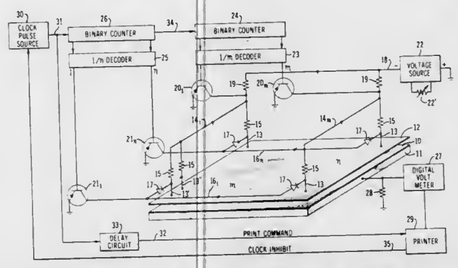
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**4,019,129**

## METALLIC PLATING TESTING APPARATUS

**Thomas George Grau, Westerville, Ohio, assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed June 2, 1975, Ser. No. 582,722**
**Int. Cl.² G01N** *27/46, 31/02*
**U.S. Cl. 324—30 R** **12 Claims**




1. Apparatus for testing the surface conditions of a metallic plating comprising an electrolytic medium in electrical contact with said plating, an array of cathode elements in electrical contact with said medium, means for applying a test potential individually to said cathode elements in a predetermined sequence, means electrically connected to said plating for measuring currents generated in said medium by said potential between said cathode elements and said plating and for generating output data representative of the magnitude of said currents, and presentation means controlled responsive to said data for presenting said data in a sequence corresponding to said predetermined sequence.

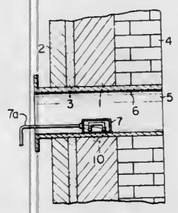
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**4,019,130**

## METHOD FOR MEASURING WEAR OF COOLING CELL ASSEMBLY

**Yoshiyasu Sakamoto, Osaka; Tatsuo Hiroshima, Nishinomiya; Toshihiko Sakai, and Tetuo Asano, both of Osaka, all of Japan, assignors to Sumitomo Metal Industries, Ltd., Osaka, Japan**

**Filed Aug. 26, 1975, Ser. No. 607,905**
**Claims priority, application Japan, Sept. 3, 1974, 49-101024**
**Int. Cl.² G01R** *33/12*
**U.S. Cl. 324—34 R** **4 Claims**



1. A method for measuring the amount of wear of a high-temperature furnace cooling cell assembly of a ferromagnetic material, comprising the steps of:
providing an inspection hole through a portion of the furnace wall into the inside of the furnace;
moving a sensor consisting of an iron core having primary and secondary windings wound thereabout along the surface of the wall which defines said inspection hole while supplying an alternating current to the primary winding of said sensor;
measuring the variation in output voltage of the secondary winding of said sensor and when the output voltage drops abruptly, measuring the length of the sensor inserted into the hole to thereby determine the thickness of the cooling cell assembly; and
comparing the thickness of the cooling cell assembly at the time of the measurement with the initial thickness of the cooling cell assembly for determining the amount of wear of the cooling cell assembly.

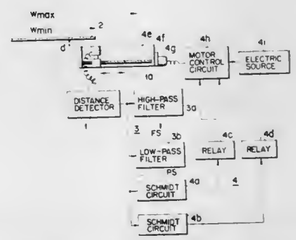
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**4,019,131**

## METHOD AND APPARATUS FOR MEASURING THE SHAPE OF THE WAVY EDGES OF METAL STRIPS USING A DETECTION COIL CONTROLLED TO TRACK THE STRIP EDGE

**Takeo Yamada, Yokohama; Katsujiro Watanabe, Tokyo, and Seigo Ando, Yokohama, all of Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan**

**Filed Oct. 30, 1975, Ser. No. 627,137**
**Claims priority, application Japan, Oct. 31, 1974, 49-125816**
**Int. Cl.² G01R** *33/12*
**U.S. Cl. 324—34 R** **10 Claims**




1. In a method of measuring the contour of the wavy edge of a metal strip wherein a single detection coil means of an electromagnetic type non-contacting distance measuring device is disposed near the edge of a running metal strip, offset therefrom in the direction of the strip thickness with the center line of the coil positioned a predetermined lateral distance from the edge of said strip, for measuring the distance in the direction of the strip thickness between said single detection coil means and the surface of said metal strip near said edge, the improvement which comprises the steps of
separately deriving out a high frequency component and a low frequency component from the output of said single detection coil means,
maintaining the lateral distance between the center line of said single detection coil means and the strip edge at said predetermined value by using said low frequency component to control the lateral position of said coil relative to said strip edge, and
measuring the contour of the wavy edge of the metal strip by using said high frequency component, which high frequency component varies as a function of the distance of said coil from said surface in the direction of the strip thickness, while said lateral distance is maintained at said predetermined value.

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**4,019,132**

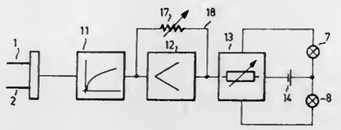
## METHOD AND APPARATUS FOR DETERMINING THE MOISTURE CONTENT OF DIFFERENT KINDS OF MATERIALS

**Ernst Loch, Uster, Switzerland, assignor to Zellweger, Ltd., Switzerland**

**Filed May 22, 1975, Ser. No. 579,950**
**Claims priority, application Switzerland, May 22, 1974, 7008/74**
**Int. Cl.² G01R** *27/02*
**U.S. Cl. 324—65 R** **24 Claims**

1. A method for determining the moisture content of different kinds of materials by measuring their conductivity com-

prising the steps of passing an electrical measuring current through the material whose moisture content is to be measured, detecting said measuring current which is indicative of the conductivity of the material, directly coverting the measuring current into a measuring voltage corresponding to the



logarithm of said current, applying the measuring voltage to an amplifier having a low-valued input resistance, and determining the moisture content of the material by adjusting a scale graduated in moisture values in accordance with the output of the amplifier.

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**4,019,133**

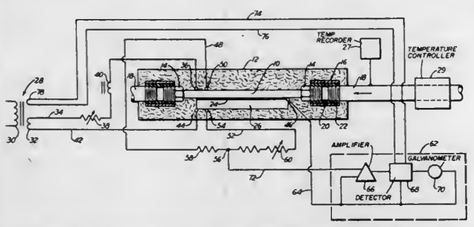
## CORROSION DETECTING AND MONITORING APPARATUS

**Robert E. Manley, Lower Burrell, and John D. McCoy, Gibsonia, both of Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.**

**Filed Dec. 29, 1975, Ser. No. 644,968**

**Int. Cl.² G01R** *27/02*

**U.S. Cl. 324—65 CR** **10 Claims**




**1.** Apparatus for measuring the rate of corrosion of a ferromagnetic metal by a flowing fluid comprising a tubular test specimen of the ferromagnetic metal, means for flowing the fluid through the test specimen, a tubular reference specimen of the ferromagnetic metal adjacent to the test specimen, said reference specimen being of substantially the same length, diameter and wall thickness as the test specimen, electrical insulation separating the test specimen and the reference specimen, a housing enclosing the test specimen and the reference specimen, thermal insulation within the housing around the test specimen and the reference specimen adapted to maintain the temperature of the specimens within 1° F. of one another, an alternating current source connected to the test specimen and the reference specimen to pass a current therethrough, and electrical leads attached to the outer surface of the test specimen and to the reference specimen connecting the specimens in a Wheatstone bridge circuit for measuring the resistance of the test specimen relative to the reference specimen to indicate the extent of corrosion of the test specimen.

**4,019,134**

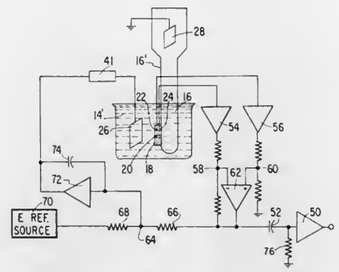
## PARTICLE DETECTOR INDEPENDENT OF ERRORS CAUSED BY CHANGES OF ELECTROLYTE CONDUCTIVITY AND ELECTRODE POLARIZATION

**Walter R. Hogg, Miami Lakes, Fla., assignor to Coulter Electronics, Inc., Hialeah, Fla.**

**Continuation-in-part of Ser. No. 387,548, Aug. 13, 1973, Pat. No. 3,944,917. This application Mar. 11, 1976, Ser. No. 666,060**

**Int. Cl.² G01N** *27/00*

**U.S. Cl. 324—71 CP** **18 Claims**




**1.** A particle detector for use with a particle analyzer having a microscopic particle sensing zone which separates two bodies of fluid, the particles being caused to pass from one body to the other via the sensing zone and thereupon enabling the generation of a discrete signal pulse related to each so passed particle, said detector comprising: a pair of power electrodes and a pair of particle sensing electrodes positioned in the bodies of fluid relative to the sensing zone such that a sensing electrode and a power electrode both are disposed in each of the bodies of fluid, voltage means for establishing a voltage between said particle sensing electrodes, such voltage having a D.C. component which is substantially constant, said voltage establishing means including feedback means coupling said sensing electrodes to said power electrodes for causing said particle detector to be substantially independent of power electrode polarization, and an output circuit including a high input impedance voltage sensitive detecting means coupled to said particle sensing electrodes for detecting the particle passing sensed by said sensing electrode and providing a pulse related to each passed particle in a manner such that said particle detector operates substantially independent of slow changes of conductivity in the bodies of fluid.

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**4,019,135**

## RECORDING DEVICE FOR ENERGY METERS

**Christer Edvin Löfdahl, Danderyd, Sweden, assignor to AB Samefa, Stockholm, Sweden**

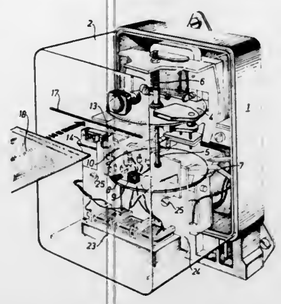
**Filed Dec. 10, 1974, Ser. No. 531,372**

**Claims priority, application Sweden, Dec. 11, 1973, 7316727; Nov. 29, 1974, 7415023**

**Int. Cl.² G01R** *13/04*

**U.S. Cl. 324—113** **9 Claims**

**1.** A device for periodic, automatic, readable recording of a meter value from a consumption measuring meter comprising: a casing attachable to an otherwise conventional meter and provided with a slot; a printing unit disposed within said casing and located out of the plane of said slot in order to be tamperproof, said printing unit being composed of an identification data printer and a consumption value printer and being adapted upon insertion of a record card in the slot of the casing to apply to the record card a visually readable marking of the identification data and meter consumption value; and a push button connected to said printing unit and manually actuable for causing said marking to be applied to the record



card by shifting said printing unit towards the record card inserted into the casing through said slot.

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**4,019,136**

## PROCESS AND APPARATUS FOR DIGITAL INDICATION OF ELECTRIC MEASURING AND/OR TEST VALUES

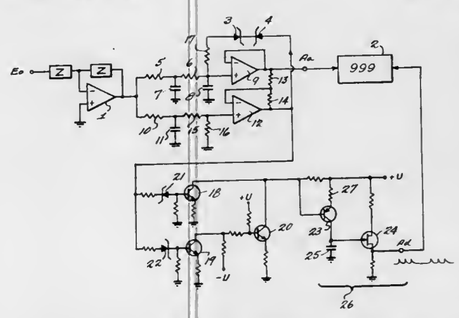
**Friedrich Wenz, Seehelm, Germany, assignor to Gebr. Hofmann KG, Darmstadt, Germany**

**Filed Dec. 29, 1975, Ser. No. 645,303**

**Claims priority, application Germany, Jan. 3, 1975, 2500154**

**Int. Cl.² G01R** *1/20, 17/06*

**U.S. Cl. 324—128** **6 Claims**




**1.** An electrical circuit for digitally displaying an input electrical signal comprising:

a first low pass filter for receiving said signal and removing fluctuations therefrom, including an operational amplifier functioning as an impedance transformer,

means for connecting the output of said first filter to digital display means,

a second low pass filter for receiving said signal and removing fluctuations therefrom, said second filter having an adjusting time in response to changes in the value of said signal less than the adjusting time of said first filter,

means for comparing the outputs of said first and second filters and producing an electrical signal indicating the difference including a differential amplifier with one input connected to the output of said operational amplifier and a second input connected to the output of said second filter,

means for varying the output of said first filter in accordance with said difference so as to reduce said difference including first and second serially and oppositely connected Zener diodes connecting the output of said differential amplifier to the input to said operational amplifier.



**4,019,137**

## MOVING COIL TYPE INSTRUMENT

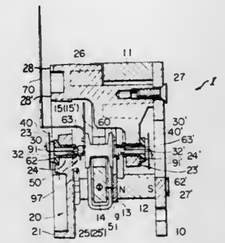
**Shoji Takeda, and Yutaka Sugawara, both of Musashino, Japan, assignors to Yokogawa Electric Works, Ltd., Tokyo, Japan**

**Filed Dec. 19, 1975, Ser. No. 642,657**

**Claims priority, application Japan, Dec. 26, 1974, 50-2600[U]**

**Int. Cl.² G01R** *5/08, 1/02*

**U.S. Cl. 324—150** **1 Claim**



**1.** A moving coil type instrument comprising: an annular magnetic path plate; a frame attached to said magnetic path plate, the frame having two arms each having a through-hole; a pair of boss-stoppers made of an elastic, electrically insulating material, each having an approximately T-shaped cross-section and a through-hole along the axis and equipped with a tension spring at the head thereof, each boss-stopper being fitted in the through-hole of each arm of said frame; a mounting member made of an elastic, electrically insulating material, mounting a pointer and a moving coil mounting frame and having a pair of integral bosses of said electrically insulating material with each boss having diametrally small and large portions, each boss being attached to an end of a tension band, the moving coil and the pointer being diametrically opposite to each other with respect to the axis of the two bosses; an annular permanent magnet with part cut out, attached to said magnetic path plate; and a core installed opposite said permanent magnet across a gap, thus forming a magnetic path with said magnetic path plate, the core being surrounded with said moving coil; the other ends of said tension bands being connected to said tension springs so that the diametrally small portions of said bosses sit in said boss-stoppers respectively.

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**4,019,138**

## FREQUENCY SYNCHRONIZING SYSTEM FOR SATELLITE COMMUNICATION

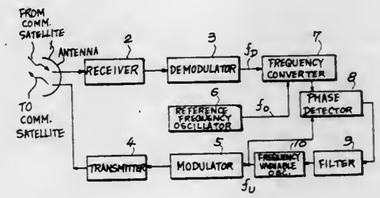
**Tatsuo Watanabe, Mitaka, and Hideki Saito, Tachikawa, both of Japan, assignors to Kokusai Denshin Denwa Kabushiki Kaisha, Japan**

**Filed Feb. 19, 1976, Ser. No. 659,362**

**Claims priority, application Japan, Feb. 24, 1975, 50-21867**

**Int. Cl.² H04B** *7/14*

**U.S. Cl. 325—4** **2 Claims**




**2.** A frequency synchronizing circuit for satellite communication, comprising:

a variable frequency oscillator for generating a reference transmission signal of a frequency approximate to the reference frequency;

a receiving circuit for receiving the reference transmission signal through the communications satellite;

a reference oscillator for generating a signal of a constant frequency substantially twice as high as the reference frequency;

a frequency converter for producing a signal of a frequency of the difference between the outputs from the reference oscillator and the receiving circuit; and

a phase detector for obtaining the phase difference between the outputs from the frequency converter and the variable frequency oscillator and applying the phase difference to the variable frequency oscillator to control it to decrease the phase difference.

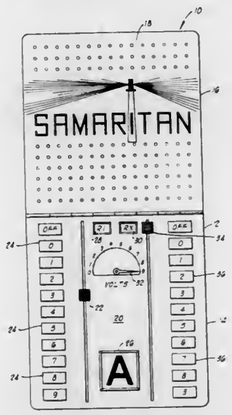
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**4,019,139**

## INTERACTION MULTI-STATION ALARM SYSTEM

**Jose I. Ortega, 212 W. Cammack, Shawnee, Okla. 74801**

**Filed Apr. 28, 1975, Ser. No. 572,386**
**Int. Cl.² H01B** *1/38*
**U.S. Cl. 325—16** **7 Claims**




1. Combination apparatus for transmitting and receiving alarm indication as used in plurality to consititue a vigilance alarm network, comprising:

transmitter means which is energizable for selectively generating a preselected tone modulated output transmission signal of selected frequency, said tone modulation being a selected one of a plurality of tone frequencies;

receiver means tuned to receive and demodulate an output transmission signal at said selected frequency and to produce output of a tone signal at a selected one of the plurality of tone frequencies;

resonant switch means receiving input of said tone signal and providing an output indication at one of plural outputs each responsive to a different predetermined one of said plurality of tone frequencies;

plural gate means each receiving input from a respective one of said resonant switch means plural outputs to generate a characteristic gate output in response to switch means output indication; and

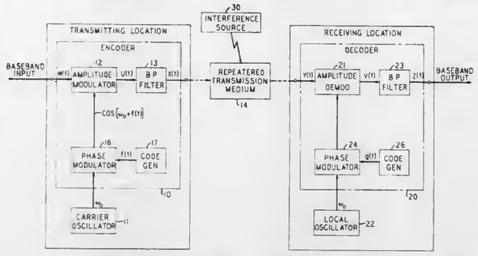
plural indicators each connected for energization by a respective one of said gate outputs.

**4,019,140**

## METHODS AND APPARATUS FOR REDUCING INTELLIGIBLE CROSSTALK IN SINGLE SIDEBAND RADIO SYSTEMS

**Richard Barry Swerdlow, Haverhill, Mass., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed Oct. 24, 1975, Ser. No. 625,491**
**Int. Cl.² H03B** *23/00;* **H04B** *1/62*
**U.S. Cl. 325—65** **46 Claims**




11. In a transmission system of the type wherein a coded, amplitude-modulated signal is transmitted from a first to a second location, said system including, at said second location:

means for generating a local carrier wave; and

means, connected to said local carrier wave generating means, for demodulating said amplitude-modulated signal, the improvement which comprises:

means for generating a local coding signal which corresponds to the signal priorly employed at said first location to encode said amplitude-modulated signal; and

means for phase-modulating said local carrier wave with said local coding signal, thereby to cause said demodulating means to decode said coded amplitude-modulated signal.

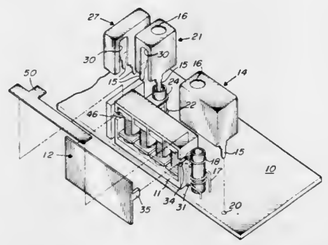
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**4,019,141**

## PRESELECTOR CAVITY ARRANGEMENT AND RF SELECTIVITY ASSEMBLY

**Daniel Orange Numan, Tamarac, and Richard Dean Williamson, Fort Lauderdale, both of Fla., assignors to Motorola, Inc., Schaumburg, Ill.**

**Filed Mar. 22, 1976, Ser. No. 668,761**
**Int. Cl.² H04B** *1/08*
**U.S. Cl. 325—357** **8 Claims**



1. An improved preselector cavity and RF selectivity shielding arrangement for the RF circuitry of a radio receiver, the arrangement comprising:

a cast preselector cavity having a plurality of apertures, each aperture being substantially surrounded by a boss;

a plurality of adjoining housings, each having a slot in at least one side, each slot dimensioned to receive one of the bosses of said cavity;

a plurality of interconnections between portions of the RF circuitry, said portions being contained within the cavity and the several housings, and said interconnections being made through said apertures, at least one of said interconnections comprising a loop from one circuitry portion which to substantially encircles a coil form in another of said circuitry portions; and

a printed circuit board for mounting the housings.



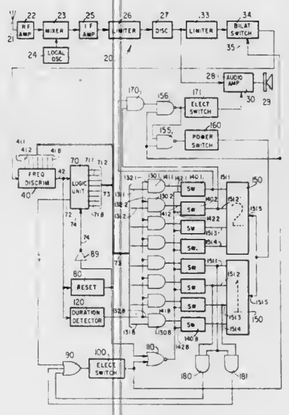
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**4,019,142**

## SELECTIVELY CALLABLE RECEIVER OPERATED IN ACCORDANCE WITH TONE CHARACTERISTICS

**Keith H. Wycoff, 1205 N. Tyler St., Lexington, Nebr. 68850**

**Filed Aug. 16, 1974, Ser. No. 498,172**
**Int. Cl.² H04J** *3/12*
**U.S. Cl. 325—392** **47 Claims**




45. In a selectively callable receiver having means to furnish a plurality of tones, the combination comprising decoding means responsive to tones respectively of predetermined frequencies for producing a decoded signal indicative of the durations respectively of the tones, and duration-detecting means coupled to said decoding means and having a plurality of outputs, said detecting means being responsive to said decoded signal for providing signals on said outputs in accordance with the durations of the tones.

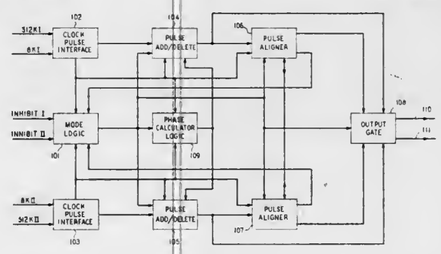
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**4,019,143**

## STANDBY APPARATUS FOR CLOCK SIGNAL GENERATORS

**Joseph Michael Fallon, Old Bridge Township, Middlesex County, and Nathan Harold Stochel, Edison, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed May 10, 1976, Ser. No. 684,717**
**Int. Cl.² H03K** *1/17*
**U.S. Cl. 328—71** **10 Claims**




1. A clock control circuit having first and second states and an intermediate correction state and including means for producing pulse signals, first and second sources of timing signals, means for aligning the phase of the producing means to coincide with the phase of signals applied thereto, means effective during the first state for applying signals derived from the first source timing signals to the producing means and means effective during the second state for applying signals derived from the second source timing signals to the producing means;

characterized by

means effective during the intermediate correction state for precluding the application signals to the producing means and for modifying the phase of the producing means incremental quantities to compensate for phase differences between the second source timing signals and the first source timing signals.

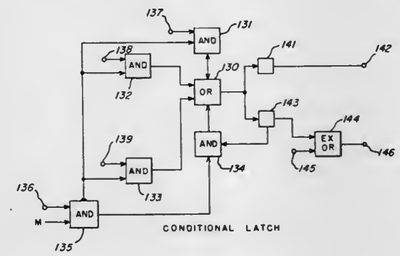
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**4,019,144**

## CONDITIONAL LATCH CIRCUIT

**Neil R. Lincoln, St. Paul, and David R. Resnick, Arden Hills, both of Minn., assignors to Control Data Corporation**

**Division of Ser. No. 612,837, Sept. 12, 1975. This application Aug. 2, 1976, Ser. No. 710,940**
**Int. Cl.² H03K** *19/04, 3/12*
**U.S. Cl. 328—92** **3 Claims**




1. A logic circuit comprising, in combination:

OR gate means having first, second and third inputs and an output;

first AND gate means having fourth and fifth inputs and an output;

second AND gate means having sixth and seventh inputs and an output;

third AND gate means having eighth and ninth inputs and an output;

fourth AND gate means having tenth and eleventh inputs and an inverted output and a non-inverted output;

means connecting the outputs of said first, second and third AND gate means to respective ones of said first, second and third inputs;

means connecting said inverted output of said fourth AND gate means to said fourth and sixth inputs;

means connecting said non-inverted output of said fourth AND gate means to said eighth input;

means connecting said output of said OR gate means to said ninth input; and

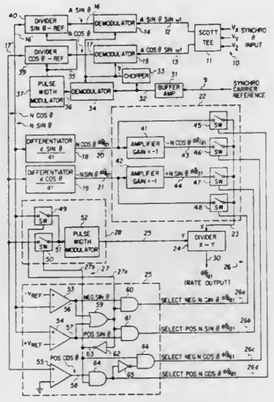
means connecting a binary clock pulse signal having a first binary value to said tenth input,

whereby upon application of a signal having said first binary value to said eleventh input, said circuit operates as an OR gate to signals of a second binary value appearing at either of said fifth and seventh inputs, and whereby upon application of a signal having said second binary value to said eleventh input, said circuit operates as a storage means to store signals of a second binary value appearing at either of said fifth and seventh inputs; said second binary value being different from said first binary value; and said output of said OR gate means providing the output of said circuit.

## 4,019,145
## SYNCHRO RATE GENERATOR

**John C. Rathe, Cedar Rapids, Iowa, assignor to Rockwell International Corporation, El Segundo, Calif.**

**Filed June 24, 1976, Ser. No. 699,282**
**Int. Cl.² H03D *3/18*; H03K *1/16***
**U.S. Cl. 328—133** **8 Claims**



1. Means for developing a signal proportional to the rate of change of angular information conveyed by respective quadrature sinusoidally amplitude modulated carrier signals comprising; means for demodulating each of said quadrature signals and said carrier signal against said carrier signal as reference, means for dividing each of said demodulated quadrature signals by a carrier signal amplitude reference as obtained from demodulating said carrier reference signal, means for differentiating each of the output signals from said means for dividing, and means for selectively dividing selected outputs from said means for differentiating by selected ones of the outputs of said means for dividing as a function of the angular information conveyed by said quadrature amplitude modulated carrier signals, the output from said means for selectively dividing comprising an output signal proportional to said rate of change of angular information.

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## 4,019,146
## CIRCUIT ARRANGEMENT FOR STORING AN ELECTRICAL ANALOG SIGNAL

**Wolfgang Lesche, Berlin, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany**

**Filed Feb. 19, 1976, Ser. No. 659,522**
**Claims priority, application Germany, Feb. 20, 1975, 2507655**
**Int. Cl.² H03K *5/00*; G11C *27/02***
**U.S. Cl. 328—151** **8 Claims**

1. A circuit arrangement for storing electrical analog signals comprising:

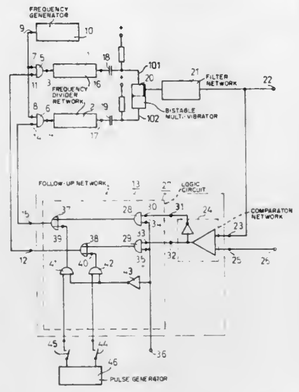
a. a frequency generator having at least one output;

b. first and second logic gate means connected in circuit to said generator;

c. first and second frequency dividing networks connected to respective outputs of said first and second logic means;

d. means for comparing the phase difference between the output signals of each of said dividing networks with the magnitude of the analog signal to be stored, said comparison means having two logic outputs connected to respective second inputs of said first and second logic gate means,

whereby the logic levels appearing on each of the outputs of said comparison means is a function of the comparison between said phase difference and the analog signal to be stored, said logic levels altering the number of pulses from said frequency generator flowing through each of said first and second logic gate means and into said frequency dividing networks such that said phase difference is made proportional to the analog signal to be stored; and



e. means responsive to a signal to store said analog signal connected in circuit with said means for comparing, such that in response to said signal to store, the operation of said means for comparing is interrupted,

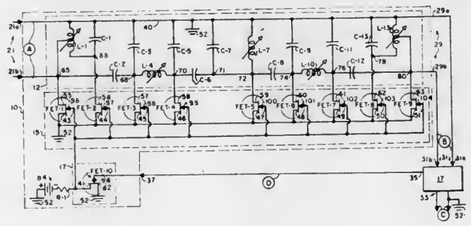
whereby said logic levels thereafter permit pulses to continuously flow through each of said first and second logic gate means such that said phase difference remains constant during the period said signal to store is present.

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## 4,019,147
## BAND PASS FILTER FOR IMPULSE OPERATION

**Robert W. Blomenkamp, Palo Alto, Calif., assignor to Physics International Company, San Leandro, Calif.**

**Filed Dec. 1, 1975, Ser. No. 636,447**
**Int. Cl.² H04M *1/00*; H03H *7/14***
**U.S. Cl. 328—167** **12 Claims**



1. A filter comprising

means defining a filter circuit for passing an oscillating wave pulse of a predetermined band width frequency, the shape of said pulse being defined by an amplitude envelope, said filter circuit having a pair of input terminals and a pair of output terminals,

means defining a demodulator connected to said output terminals of said filter circuit for detecting increases in said amplitude envelope of said oscillating wave pulse, and

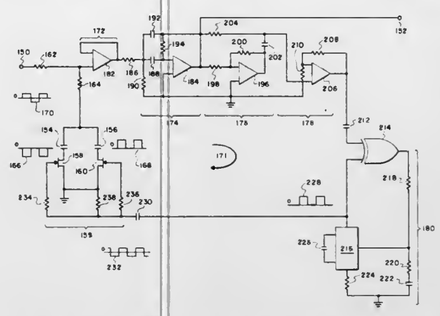
means for short circuiting the terminals of said filter circuit upon detection of a predetermined decrease in amplitude of said amplitude envelope at the end of said pulse.



## 4,019,148
## LOCK-IN NOISE REJECTION CIRCUIT

**Elbert N. Shawhan, West Chester, Pa., assignor to Sperry-Sun, Inc., Sugar Land, Tex.**

**Filed Dec. 29, 1975, Ser. No. 644,686**
**Int. Cl.² H04B *1/12***
**U.S. Cl. 328—167** **14 Claims**



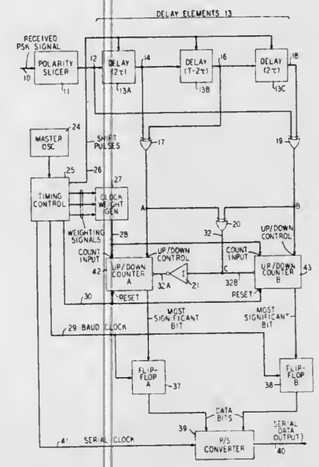
1. Circuit for locking in on an alternating current signal comprising: means receptive of the alternative current signal; a pair of storage capacitors; resistor isolation means between the receptive means and the capacitors; and feedback means connected between the isolation means and said capacitors responsive to signals from the capacitors for connecting one of the capacitors to the alternating current signal during positive half cycles of said alternating current signal and connecting the other of said capacitors to said alternating current signal during the negative half of the cycles of said signal.

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## 4,019,149
## CORRELATIVE DATA DEMODULATOR

**George John Kustka, Matawan, and Kurt Hugh Mueller, Holmdel, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed Jan. 16, 1976, Ser. No. 649,716**
**Int. Cl.² H03K *9/04***
**U.S. Cl. 329—107** **8 Claims**



1. A demodulator for a four-phase differentially coherent phase-shift-keyed data signal modulating a carrier wave of frequency $f_c$ and having a synchronous baud interval T comprising

means for delaying received data signals by the baud interval T respectively increased and decreased by the reciprocal of $8f_c$;

first and second means for correlating in pairs signals obtained from said delaying means respectively delayed by the baud interval T minus, and the baud interval T plus, the reciprocal of $8f_c$ to form first and second correlation signals A and B;

third means for correlating signals A and B from said first and second correlating means to form a third correlation signal C;

first and second reversible counting means individually responsive to said first and second signals A and B with respect to counting direction and alternatively to said third signal C with respect to counting inhibition or enablement;

first and second bistable circuit means responsive to the sign of the accumulated counts of said first and second counting means at the end of each baud interval T; and

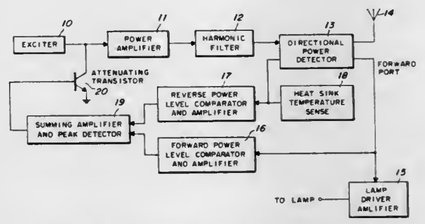
means for resetting each of said first and second counting means to a reference condition at the end of each baud interval T.

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## 4,019,150
## PA PROTECTION CIRCUIT FOR A SINGLE SIDEBAND RADIO

**Daniel Morris Lurey, Hoffman Estates, and David Michael Drury, Mundelein, both of Israel, assignors to Motorola, Inc., Schaumburg, Ill.**

**Filed Nov. 17, 1975, Ser. No. 632,542**
**Int. Cl.² H03G *3/20***
**U.S. Cl. 330—2** **8 Claims**



1. A protection circuit for a power amplifier used in a single sideband transmitter to supply RF power modulated with an audio signal to an antenna and wherein said power varies with the power of the audio signal, said protection circuit comprising:

a. directional power detector means coupled between the power amplifier and the antenna and having a first output for providing thereon a first audio frequency signal varying in accordance with the modulating audio signal and indicative of forward power supplied to the antenna and a second output for providing thereon a second audio frequency signal varying in accordance with the modulating audio signal and indicative of reflected power from the antenna;

b. first level comparator means coupled to the first output of said directional power detector means and providing an output signal varying in accordance with the first audio frequency signal applied thereto about a predetermined level;

c. second level comparator means coupled to the second output of said directional power detector means and providing an output signal varying in accordance with the second audio frequency signal applied thereto about a predetermined level;

d. summing means coupled to said first and second level comparator means for receiving the output signals therefrom and providing an output signal indicative of the sum thereof;

e. peak detector means coupled to said summing means for receiving the output signal therefrom and providing a DC potential at an output thereof which is proportional to the

magnitude of the output signal from said summing means; and

f. attenuating means having a control input coupled to said peak detector means and an output coupled to the power amplifier for reducing the amplitude of signals supplied to the power amplifier in accordance with the DC potential at the output of said peak detector to control peak envelope power at the antenna.

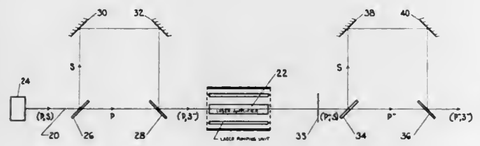
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**4,019,151**

## MULTIPLE PASS LASER AMPLIFIER SYSTEM

**Keith A. Brueckner; Siebe Jorna, both of La Jolla, Calif., and N. Kent Moncur, Ann Arbor, Mich., assignors to KMS Fusion, Inc., Ann Arbor, Mich.**

**Filed Apr. 26, 1974, Ser. No. 468,176**
**Int. Cl.² H01S 3/00**
**U.S. Cl. 330—4.3** **20 Claims**




1. An optical system for use in a lasing system which comprises:

a. a laser amplifier on a defined optical axis,

b. a pair of polarizer plates on said axis on each side of said amplifier,

c. means for forming an extended optical path between the first and second of the polarizer plates in each pair, and

d. a rotator on said axis between said amplifier and said second pair to rotate the plane of polarization of a beam on said axis,

whereby a linearly polarized light beam on said axis will be decomposed into two beam components out of phase in time, passed through said amplifier and brought together in phase in time to merge as a single amplified beam of linearly polarized light.

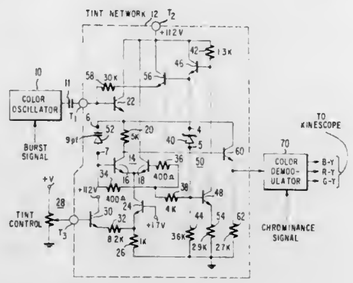
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**4,019,152**

## BIAS CIRCUIT FOR JUNCTION DIODES

**Leopold Albert Harwood, Somerville, and Erwin Johann Wittmann, North Plainfield, both of N.J., assignors to RCA Corporation, New York, N.Y.**

**Filed Aug. 25, 1975, Ser. No. 607,491**
**Int. Cl.² H03G 3/30**
**U.S. Cl. 330—29** **10 Claims**




6. A variable phase control circuit comprising:

a source of signals;

a phase shift network having an input coupled to said source and an output, and including a semiconductor device having a PN junction exhibiting a capacitance thereacross when reverse biased;

an amplifier having an input terminal coupled to said phase shift network output and an output terminal coupled to said source of signals;

variable control means coupled to said amplifier, for varying the amplifier gain and for thereby varying the amplitude of phase shifted signals provided at said output terminal;

a load impedance coupled to said output terminal for combining signals from said source and said varying amplitude phase shifted signals to produce combined signals;

a bias network providing a substantially constant reference voltage having a magnitude less than the reverse conduction breakdown voltage of said PN junction; and

coupling means for applying said reference voltage to said device to reverse bias said junction, thereby determining said capacitance and inhibiting operation of said device beyond said reverse breakdown voltage in the presence of applied voltages having a magnitude tending to cause said operation.

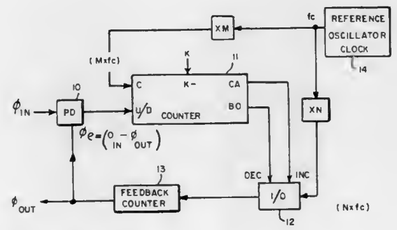
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**4,019,153**

## DIGITAL PHASE-LOCKED LOOP FILTER

**Duncan B. Cox, Jr., Manchester, and William H. Lee, Boston, both of Mass., assignors to The Charles Stark Draper Laboratory, Inc., Cambridge, Mass.**

**Filed Oct. 7, 1974, Ser. No. 512,733**
**Int. Cl.² H03B 3/04**
**U.S. Cl. 331—1 A** **45 Claims**




36. A device comprising

phase detector means responsive to a first signal having a first phase and to a second signal having a second phase for producing a phase detected output signal representing the magnitude of the phase difference between said first and second phases;

digital integrating means responsive to a first clock signal and to said phase detected output signal for digitally integrating said phase detected output signal to generate a first control signal whenever the digitally integrated magnitude of said phase difference reaches a first preselected level and to generate a second control signal whenever the digitally integrated magnitude of said phase difference reaches a second preselected level; and

means responsive to a second clock signal and to said first and second control signals for producing a controlled clock output signal, the number of pulses of said clock output signal being controlled in accordance with the generation of said first and said second control signals.

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**4,019,154**

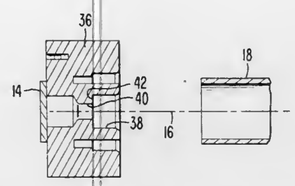
## LIGHTNING ROD MIRROR PROTECTION

**Gerald C. Barker, Palo Alto, Calif., assignor to Coherent Radiation, Palo Alto, Calif.**

**Filed Oct. 31, 1975, Ser. No. 627,714**
**Int. Cl.² H01S 3/02**
**U.S. Cl. 331—94.5 T** **7 Claims**

1. An improved laser device of the type having resonator mirrors defining an optic path and spaced apart cathode and anode electrodes intermediate the mirrors and aligned along the optic path, wherein the improvement comprises electrically conductive means extending adjacent the optic path from the mirror closest to the cathode towards the cathode for






conveying electrical discharges from the cathode to the closest mirror, whereby electrical discharges between the cathode and the closest mirror are nondestructively conducted thereto.

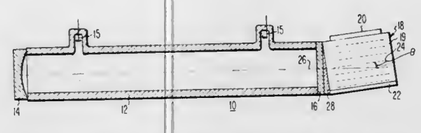
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**4,019,155**

## ACOUSTO-OPTIC MODULATED LASER

**Istvan Gorog, and Joseph Dale Knox, both of Princeton, N.J., assignors to RCA Corporation, New York, N.Y.**

**Filed Nov. 5, 1975, Ser. No. 629,087**
**Int. Cl.² H01S 3/10**
**U.S. Cl. 331—94.5 M** **9 Claims**




1. A gas discharge device for generating a modulated laser beam comprising:

a tube containing an active lasing gas and having means for creating a population inversion in the lasing gas, a spherical mirror and a partially reflective flat mirror at opposite ends of the tube for generating a laser beam; and

an acousto-optic modulator having a transducer for transmitting an acoustic wave through the modulator, the modulator being attached to the flat mirror so that the flat mirror is between the modulator and the tube.

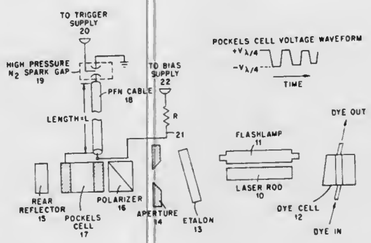
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**4,019,156**

## ACTIVE/PASSIVE MODE-LOCKED LASER OSCILLATOR

**William D. Fountain, Fremont, and Bertram C. Johnson, Palo Alto, both of Calif., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.**

**Filed Dec. 2, 1975, Ser. No. 636,864**
**Int. Cl.² H01S 3/098**
**U.S. Cl. 331—94.5 ML** **3 Claims**




1. A Q-switched/mode-locked laser oscillator including an optical resonant cavity employing simultaneous active and passive loss modulation within the optical cavity comprising: a lasing medium positioned intermediate and in axial alignment with a rear reflector and a flowing dye cell/output reflector assembly, means for pumping said lasing medium positioned adjacent thereto, a Pockels cell and a linear polarizer positioned intermediate said lasing medium and said rear reflector and axially aligned therewith, means for controlling said Pockels cell operatively connected therewith, and an aperture forming member and an etalon positioned intermediate and aligned with said polarizer and said lasing medium.

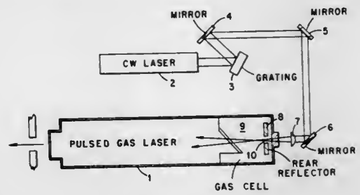
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**4,019,157**

## METHOD AND APPARATUS FOR TUNING HIGH POWER LASERS

**Donald P. Hutchinson, Knoxville, and Kenneth L. Vandersluis, Oak Ridge, both of Tenn., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.**

**Filed Apr. 6, 1976, Ser. No. 674,262**
**Int. Cl.² H01S 3/10**
**U.S. Cl. 331—94.5 C** **6 Claims**




1. In a high power pulsed gas laser of the type having an optically resonant cavity filled with a first gas capable of lasing at natural frequencies characteristic of said first gas, the cavity being bounded at one end by a rear reflector, the improvement comprising means for tuning said laser to a desired frequency, said tuning means including a gas cell mounted within said cavity adjacent to said rear reflector, said gas cell containing a second gas at a desired pressure and capable of reducing the gain of the natural lasing frequencies of said first gas; a second low power laser adapted to be operated at said desired frequency; a focusing lens; said rear reflector provided with a small centrally positioned hole with a desired diameter; and means for directing the output of said second laser through said focusing lens and through said rear reflector hole into said gas cell and cavity, whereby said second laser acting in conjunction with said gas cell in said high power laser effects the tuning of said high power laser to said desired frequency of said second laser without the loss of power in the output of said high power laser.

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**4,019,158**

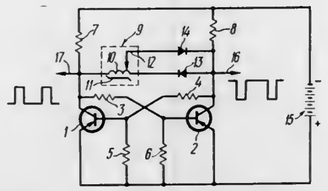
## ASYMMETRICAL TRANSISTORIZED MULTIVIBRATOR WITH INDUCTIVE TIMING CIRCUITS

**Sergei Nikolaevich Bazhenov, ulitsa Pushkinskaya, 32, kv.4, and Efim Mordukhovich Belyavsky, ulitsa Tonkopiya, 8b, kv. 115, both of Kharkov, U.S.S.R.**

**Filed May 22, 1975, Ser. No. 579,819**
**Int. Cl.² H03K 3/282**
**U.S. Cl. 331—113 R** **3 Claims**

1. An asymetrical transistorized multivibrator comprising: inductive timing circuits; a flip-flop; a first transistor of said flip-flop; a second transistor of said flip-flop; resistors of said flip-flop connected to said first and second transistors; a power source; a first load resistor whose first lead is connected to the collector of said first transistor, its second lead being connected to a respective pole of said power source; a second load resistor whose first lead is connected to the collector of said second transistor, its second lead being connected to a respective pole of said power source; a saturable reactor of

said timing circuit; a winding of said saturable reactor having two leads and a tap from a portion of turns of said winding, said first lead of said winding being connected to the collector of said first transistor; a first diode connected between said



second lead of said winding and the collector of said second transistor; a second diode connected in opposition to said first diode, between the collector of said second transistor and said tap of said winding of said saturable reactor.

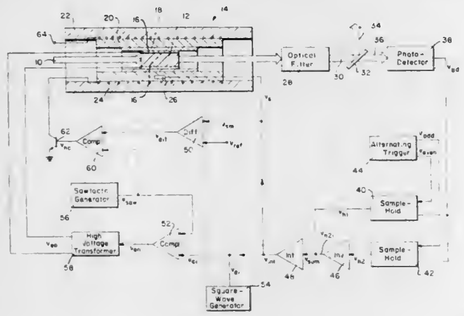
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**4,019,159**

**OPTICAL FREQUENCY DOUBLER USING ELECTRO-OPTIC CRYSTAL WITH IMPROVED FEEDBACK CONTROL OF CRYSTAL PHASE MATCH**

**David T. Hon, Los Angeles, and Richard W. Wyeth, Agoura, both of Calif., assignors to Hughes Aircraft Company, Culver City, Calif.**

**Filed Oct. 14, 1975, Ser. No. 621,883**
**Int. Cl.² H01S** *3/13*; **H04B** *9/00*
**U.S. Cl. 332—7.51** **9 Claims**




1. An optical frequency doubling arrangement comprising:
an oven including a heater element;
a crystal of electro-optic material mounted in said oven and positioned to receive an input beam of light at a predetermined frequency, said crystal being oriented to convert said input light beam into an output light beam having a component at twice said predetermined frequency; and
feedback control means responsive to the magnitude of said component at twice said predetermined frequency and to the temperature within said oven for controlling the indices of refraction of light in said electro-optic crystal to provide maximum conversion of light to said component at twice said predetermined frequency, said feedback control means including:
means for providing a first electrical signal indicative of the magnitude of said component at twice said fundamental frequency;
means for deriving from said first electrical signal a second electrical signal indicative of a continuing change in the magnitude of said component at twice said fundamental frequency;
means responsive to said second electrical signal for applying an electric field across said crystal of a magnitude determined by said second electrical signal;
means for providing a third electrical signal indicative of the temperature within said oven; and
means responsive to the sum of said second and third electrical signals for controlling said heater element.

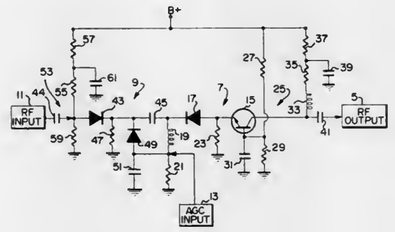
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**4,019,160**

**SIGNAL ATTENUATOR CIRCUIT FOR TV TUNER**

**George H. Kam, Tonawanda, N.Y., assignor to GTE Sylvania Incorporated, Stamford, Conn.**

**Filed Dec. 5, 1975, Ser. No. 638,144**
**Int. Cl.² H03H** *7/24*; **H03G** *3/00*; **H04N** *5/52*
**U.S. Cl. 333—81 R** **7 Claims**




1. TV tuner attenuator circuit comprising:
signal input and output network means;
signal amplifier stage coupled to a bias network and to said signal output network means;
controllable impedance means in the form of a PIN diode AC coupled to said signal input network means and DC coupled to said signal amplifier stage and to a potential reference level; and
control signal means DC coupled to said controllable impedance means for altering current flow through said signal amplifier stage and controllable impedance means in a direction opposite to the direction of change of said applied signal whereby gain reduction of said signal amplifier stage and increased impedance of said controllable impedance means are combined to non-linearly attenuate an increase in applied signals.

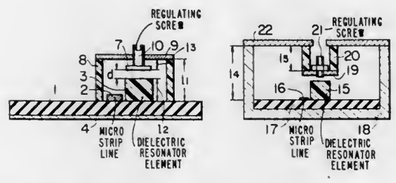
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**4,019,161**

**TEMPERATURE COMPENSATED DIELECTRIC RESONATOR DEVICE**

**Katsuhiro Kimura, Tokyo, and Yoichi Kaneko, Tokorozawa, both of Japan, assignors to Hitachi, Ltd., Japan**

**Filed Sept. 2, 1975, Ser. No. 609,603**
**Claims priority, application Japan, Sept. 2, 1974, 49-99949**
**Int. Cl.² H01P** *7/04*
**U.S. Cl. 333—82 B** **3 Claims**




1. A dielectric resonator device comprising:
a micro-integrated plane base member;
a dielectric resonator element mounted on said micro-integrated plane base member;
a vertical support member extending vertically from said micro-integrated plane base member;
a frequency regulating screw for manually regulating the resonant frequency of said device, rotatably attached to said vertical support member adjacent said dielectric element; and
a metallic plate, mounted on said screw and having a planar surface facing an upper surface of said dielectric resonator element, the size of the planar surface of said metallic plate being larger than the cross-sectional area of the screw perpendicular to the axis of the screw; and wherein
said vertical support member comprises
a first support member extending vertically from said base member, and
a second support member supported by said first support member above said base member, and wherein
said frequency regulating screw is rotatably attached to said second support member with said metallic plate being affixed to the lower end of said screw, and
said first support member is made from Teflon pipe and said second support member is made from a metallic disc.



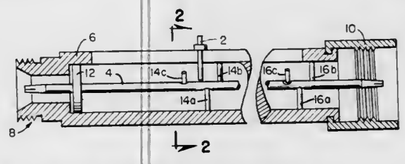
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**4,019,162**

**COAXIAL TRANSMISSION LINE WITH REFLECTION COMPENSATION**

**Harmon W. Banning, Derwood, Md., assignor to Weinschel Engineering Company, Gaithersburg, Md.**

**Filed Aug. 11, 1975, Ser. No. 603,703**
**Int. Cl.² H01P** *3/06*, *5/04*; **G01R** *25/02*
**U.S. Cl. 333—96** **17 Claims**



1. a. A coaxial transmission line comprising
b. a rigid hollow outer conductor,
c. a rigid inner conductor centrally located within the hollow outer conductor, said inner conductor having an outer surface,
d. support means for rigidly supporting the inner conductor within the outer conductor comprising spaced dielectric pins extending radially between said conductors and which separately engage said inner conductor, and
e. means for reducing wave reflections of at least one of said pins comprising a depressed area, in said outer surface, of said inner conductor, said depressed area being located in the same lateral plane of the inner conductor as said one pin and constituting a shallow depression in the outer surface of the inner conductor and extending longitudinally along said inner conductor, said depressed area extending laterally away from the pin for a distance which is small as compared to the periphery of the inner conductor and being dimensioned to produce an inductive effect tending to compensate for the capacitive effect of the dielectric pin.

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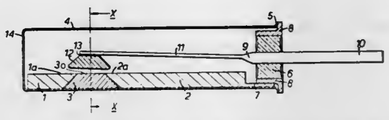
**4,019,163**

**REED CONTACT UNIT**

**Alan R. Beavitt, Towcester, England, assignor to Square D Company, Park Ridge, Ill.**

**Continuation of Ser. No. 557,210, March 10, 1975, abandoned. This application Feb. 5, 1976, Ser. No. 655,589**
**Int. Cl.² H01H** *51/28*
**U.S. Cl. 335—154** **7 Claims**

1. A reed contact unit comprising a pair of aligned members of magnetizable and electrically conductive materials spaced apart endwise from each other;
a fillet of a non-magnetic electrically conductive material inserted between the spaced ends of the members with a surface of the fillet and of each of the members co-planar to thereby provide a continuous contact surface;
a resilient cantilever mounted to be electrically independent of the members;
a magnetizable armature secured to the free end of the cantilever and positioned to move and make contact with the contact surface and complete an electrical circuit



through the cantilever to the members upon magnetization of the members;
a non-magnetic stop member positioned to limit movement of the armature upon breaking of the electrical circuit to thereby minimize oscillation with the stop member electrically insulated from the members.

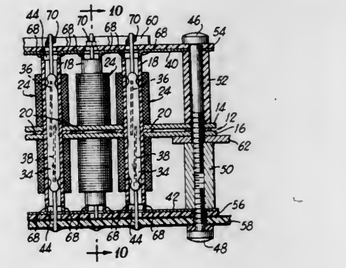
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**4,019,164**

**MEMORY MATRIX**

**Wyman L. Deeg, Vernon Hills, Ill., assignor to C. P. Clare & Company, Chicago, Ill.**

**Filed Dec. 3, 1975, Ser. No. 637,389**
**Int. Cl.² H01H** *67/14*
**U.S. Cl. 335—112** **18 Claims**



1. A cross point switching matrix comprising:
a magnetic shunt plate having a plurality of apertures defined therein;
a plurality of reed switches disposed in said apertures and extending through said shunt plate; and
a pair of magnetic coupling plates disposed on opposite sides of said shunt plate, said magnetic coupling plate having a plurality of apertures defined therein and flanges extending from said apertures, said flanges being disposed in close proximity to the ends of said reed switches for magnetically coupling said reed switches together.

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**4,019,165**

**MINIATURE RELAY DEVICE**

**William W. Wright, Wheaton, Ill., assignor to Guardian Electric Manufacturing Company, Chicago, Ill.**

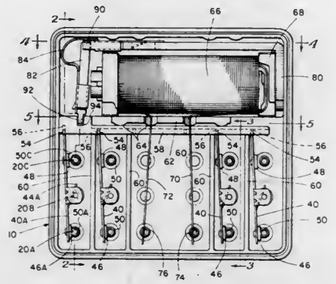
**Filed Sept. 8, 1975, Ser. No. 611,180**
**Int. Cl.² H01H** *45/04*
**U.S. Cl. 335—126** **11 Claims**

1. An improved miniature relay construction comprising, in combination:
a housing with a base, said base including a plurality of contact pins encapsulated therein and projecting in opposite directions to the exterior and to the interior of the housing;
a coil assembly mounted in the housing, said assembly including a coil with a longitudinal axis, a fixed core in the coil, a field piece having an armature attached thereto by an attached armature spring, said armature pivoted at one

end to the field piece and biased by said spring away from said core;

a movable lifter in the housing generally adjacent to and parallel to the axis of the coil and translatable freely in said parallel direction, said lifter retained against substantial movement in other directions, the opposite end of said armature being drivingly connected to the lifter to translate the lifter in response to pivotal movement of the armature with respect to the field piece;

a plurality of moving blades, each blade being pivotally



mounted on a separate pin for rotation in either direction and having a contact affixed to at least one end thereof, each end being cooperative with another separate associated contact pin; and

means connecting said lifter and said moving blades to effect pivotal movement in both directions of each of the blades on the pin on which each is mounted, said lifter being translated in response to pivotal movement of the armature, said armature being pivoted away from the core by the spring and toward said core when sufficient current is passed through the coil.

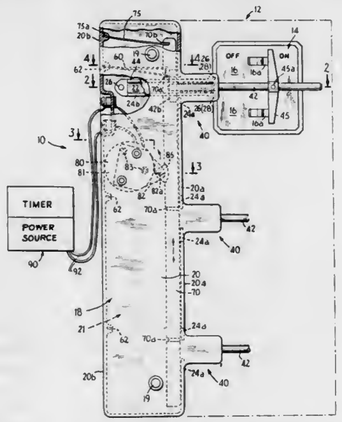
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**4,019,166**

**TIMER CONTROLLED ELECTROMAGNETIC TRIPPING APPARATUS FOR SIMULTANEOUSLY CLOSING PLURAL SWITCHES MOUNTED TO PANELBOARD**

**Robert J. Lawrence, Dix Hills; John Devaney, Massapequa Park, and Dominick Tramontano, East Islip, all of N.Y., assignors to Grumman Aerospace Corporation, Bethpage, N.Y.**

**Filed Mar. 10, 1975, Ser. No. 557,034**
**Int. Cl.² H01H** *9/00, 3/00*
**U.S. Cl. 335—172** **10 Claims**




1. A switching device for use with a switch panel having a plurality of lever type switches therein comprising:

housing means adapted to be mounted on the panel adjacent the switches; a plurality of trip assemblies, each assembly including a trip rod slidably mounted in said housing and extending outwardly therefrom parallel to the throw path of the associated panel switches; switch lever engaging means coupled to said trip rod, said trip rod being movable through a throw distance corresponding to the ON-OFF throw of said switch lever; spring means mounted in said housing for biasing said trip rod to the OFF position; flexible detent means located within said housing having one portion normally engaging the trip rod and blocking the movement thereof in the OFF direction, and said one portion being movable to a non-blocking position, whereby said trip rod may move in the OFF direction under the influence of said spring means, each trip rod and engaging means being movable conjointly with their associated switch lever, when the switch lever is manually moved to the ON position; and an elongate actuator rod slidably mounted in said housing and traversing each detent means, said actuator rod including a detent engaging member for each flexible detent; and means for moving said actuator rod longitudinally to cause said detent engaging member means to flex each detent means whereby said one portion of the detent means is moved to a non-blocking position and each rod is biased to the OFF position.

8. The device of claim 1, wherein said actuator rod moving means includes a rotary solenoid, and linkage means for transforming the rotary motion of the solenoid into linear motion for moving said actuator rod.

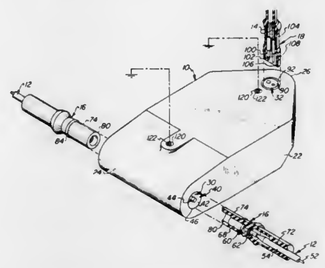
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**4,019,167**

**ENCAPSULATED TRANSFORMER**

**Kenneth L. Barker, Flanders, N.J., assignor to Amerace Corporation, New York, N.Y.**

**Filed May 19, 1975, Ser. No. 579,117**
**Int. Cl.² H01F** *15/10, 27/04*
**U.S. Cl. 336—96** **13 Claims**



1. An encapsulated transformer having a core and coil assembly with primary and secondary windings, and having a watertight construction suitable for burial, immersion in water, an for use under a relatively wide range of temperature variations, wherein the improvement comprises:

a. a unitary jacket surrounding the core and coil assembly, for resisting rough handling, accommodating the temperature variations without fracture, and for providing the watertight encapsulation of the transformer; and

b. a plurality of recesses in said jacket defining a corresponding plurality of separable external circuit connections, at least one of said external circuit connections comprising a first electrical contact member and a second complementary electrical contact member, said first contact member and said second complementary contact member each having means engageable with one another, one of said engageable means comprising a detent element adapted for engagement with the other of said engageable means, said one engageable means further including resilient means, which resilient means biases



the detent element at an acute angle to the longitudinal axis of its corresponding contact member, whereby said acute angle is of sufficient magnitude to capture said other engageable means against release by a force greater than the force necessary to cause mutual engagement of said one and said other engageable means, and wherein said first contact member comprises a pin member, and said other engageable means comprises a groove on said pin member, said groove adapted to receivably engage said detent element, and said second complementary contact member comprises an electrical socket including said one engageable means, said electrical socket adapted to receivably engage said pin member.

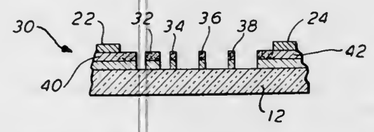
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**4,019,168**

**BILAYER THIN FILM RESISTOR AND METHOD FOR MANUFACTURE**

**Franklyn M. Collins, Lewiston, N.Y., assignor to Airco, Inc., Montvale, N.J.**

**Filed Aug. 21, 1975, Ser. No. 606,399**
**Int. Cl.² H01C** *1/012*
**U.S. Cl. 338—309** **15 Claims**



1. An electrical resistor comprising a non-conductive substrate, a conductive thin film of a chromium containing alloy selected from the group consisting of nickel-chromium and cobalt-chromium supported thereby and a protective layer of tantalum oxide directly thereover and contiguous therewith.

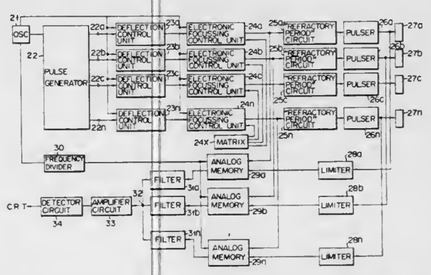
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**4,019,169**

**ULTRASONIC WAVE TRANSMITTING AND RECEIVING APPARATUS**

**Kinya Takamizawa, Yokohama, Japan, assignor to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan**

**Filed Sept. 24, 1975, Ser. No. 616,390**
**Claims priority, application Japan, Sept. 30, 1974, 49-111626**
**Int. Cl.² G01S** *9/66*
**U.S. Cl. 340—1 R** **10 Claims**




1. An ultrasonic transmitting and receiving apparatus comprising

a plurality of electro-acoustic conversion elements arranged in line;

a plurality of driving pulsers for supplying high voltage driving pulses to the electro-acoustic conversion elements to permit them to generate ultrasonic beams;

a plurality of electronic focussing control units for energizing the driving pulsers in a predetermined time relation in order to focus the ultrasonic beams;

a clock pulse generator for generating fundamental clock pulses;

a control pulse generator having a plurality of output terminals for sequentially generating control output pulses through the output terminals with equal delay times which are cyclically varied in a digital format;

a plurality of deflection control units for deflecting the ultrasonic beams which are generated to correspond with the output terminals of the control pulse generator to generate output pulses in response to the control pulses from the control pulse generator which have a delay function in order to simultaneously generate output pulses in response to the control output pulses seqentially generated from the control pulse generator with a desired delay time which may be cyclically varied in order to determine a deflection center, the output pulses from the deflection control units being supplied to the electronic focussing control units, respectively; and

a plurality of memory units corresponding to the electro-acoustic conversion elements adapted to receive, as write-in signals, signals obtained from the electro-acoustic conversion elements when the ultrasonic beams are reflected from an object and to read out the write-in signals at the same intervals as the output pulses generated by the electronic focussing control units.

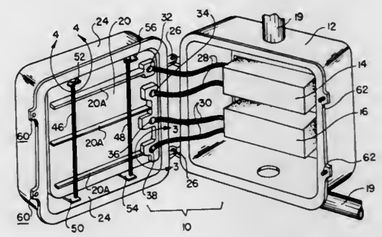
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**4,019,170**

**ADAPTER UNIT FOR PEDESTRIAN TRAFFIC CONTROL SIGNAL**

**James S. Gould, Los Alamitos, and Samuel Gould, Los Angeles, both of Calif., assignors to Indicator Controls Corporation, Gardena, Calif.**

**Filed Dec. 10, 1975, Ser. No. 639,267**
**Int. Cl.² E01F** *9/00*
**U.S. Cl. 340—119** **6 Claims**



1. In combination: a pedestrian traffic control signal including a casing and a frame-like cover hinged to the casing, and at least one transformer mounted in said casing; a signal illuminating capsule having a tray-like configuration mounted in said cover, said capsule having a planar lens member enclosing the front face thereof, and having electrodes mounted on the rear face thereof; electrical leads connected to said electrodes and to the transformer to establish electrical connection with the transformer; a plurality of brackets affixed to said cover at the edges thereof; and the ends of at least one bar releasably clipped into said brackets extending across and bearing against the rear face of the capsule to retain the capsule in said cover.

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**4,019,171**

**SAFETY LIGHTING SYSTEM**

**Ronald G. Martelet, River Forest, Ill., assignor to Sears, Roebuck and Co., Chicago, Ill.**

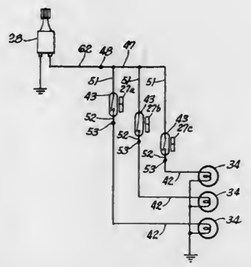
**Filed Dec. 16, 1974, Ser. No. 532,917**
**Int. Cl.² B62J** *5/00*
**U.S. Cl. 340—134** **1 Claim**

1. An improved speed responsive lighting system for a cycle having a spoked wheel rotatable at a velocity relative to the

speed of the cycle, said wheel being journalled for rotation in a supporting member of said cycle which is disposed in a plane adjacent to the spokes of the wheel and which extends substantially radially from the center of the wheel, said system comprising:

a. a plurality of warning light means mounted in a unitary bracket mounted on said cycle with the light means being rearwardly directed,

b. a plurality of magnetically responsive switch means mounted in aligned relationship in an integral housing with said housing being mounted on said cycle in parallel relation to said supporting member adjacent a plurality of spokes of said wheel and being operatively coupled to said warning light means,




c. and a plurality of magnetic field generating means mounted on equiangularly spaced spokes of said wheel,

d. each of said magnetic field generating means being spaced radially from the center of the wheel a distance corresponding to the distance of a respective one of each of the magnetically responsive switch means from the center of the wheel whereby upon rotation of the wheel each of the magnetic field generating means passes within magnetic field responsive proximity of one of said magnetically responsive switch means to cause the latter to be actuated and thereby to cause each of said light means to be periodically energized in sequence for an interval determined by the velocity of rotation of said wheel.

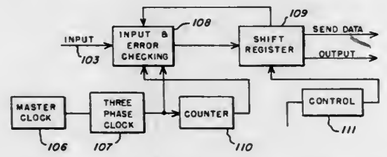
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**4,019,172**

## CENTRAL SUPERVISORY AND CONTROL SYSTEM GENERATING 16-BIT OUTPUT

**Paul G. Srodes, Arlington Heights, Ill., assignor to Honeywell Inc., Minneapolis, Minn.**

**Filed Jan. 19, 1976, Ser. No. 650,229**
**Int. Cl.² G08B 29/00**
**U.S. Cl. 340—146.1 C** **20 Claims**




1. A communication system wherein a central processing means and a plurality of remote stations transmit and receive messages to and from each other over a common transmission channel, said messages constructed of a plurality of bits, said system comprising:

central processing means having processing means and universal asynchronous receiver transmitter means comprising,

bit means for generating a plurality of bit signals each corresponding to a bit of a message received from said plurality of remote stations,

error means for generating an error signal having a state dependent upon whether there is an error in the transmission of messages from said plurality of remote stations, and

busy means for generating a busy signal having a state dependent upon whether the universal asynchronous receiver transmitter means is busy;

said central processing means further comprising,

bit output means connected to receive such bit signals for generating bit outputs,

error output means connected to receive said error signal for generating an error output,

busy output means connected to receive said busy signal for generating a busy output, and

no response means responsive to said messages from said remote states for generating a no response signal having a state dependent upon whether or not a message is received from a remote station within a predetermined time;

said processing means for receiving substantially simultaneously said bit outputs, error output, busy output and no response output for reading said outputs in one operation;

transmission channel means connected to said central processing means; and

a plurality of remote stations each connected to said transmission channel means for receiving and transmitting messages.

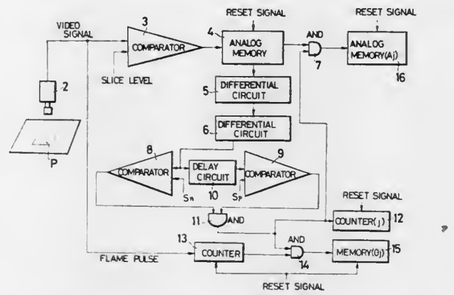
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**4,019,173**

## SYSTEM FOR RECOGNITION OF SHAPE PATTERNS

**Hidehiko Kono, Akishima, Japan, assignor to Agency of Industrial Science & Technology, Tokyo, Japan**

**Continuation-in-part of Ser. No. 594,040, July 8, 1975, abandoned. This application June 9, 1976, Ser. No. 694,382**
**Claims priority, application Japan, July 8, 1974, 49-78003**
**Int. Cl.² G06K 9/00**
**U.S. Cl. 340—146.3 AE** **3 Claims**




1. A system for recognition of a shape pattern, which comprises

a. causing a pattern input device to read the projection on a reference line of the shape pattern of an article subjected to pattern recognition and set in position at a given postural angle with reference to said reference line,

b. converting the resultant output from the pattern input device into corresponding projection values,

c. subjecting said projection values to differentiation twice in two stages of differential circuits,

d. continuing the whole procedure described in steps (a), (b) and (c) until the rotation thereof covers one complete circle,

e. detecting the fact that each side of the polygon of the shape pattern has fallen exactly into the direction of projection in accordance with the change in the initial value of the output from said differential circuits,

f. putting to memory the rotary postural angle of the shape pattern and the projection value existing at the time of said detection and



g. accomplishing the recognition of shape pattern on the basis of the rotated postural angle and the projection value obtained as described above.

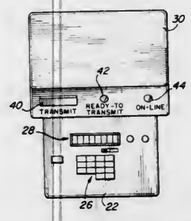
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**4,019,174**

## DATA COLLECTING AND TRANSMITTING SYSTEM

**James L. Vanderpool, Centerville, and Dennis J. Hoertt, Dayton, both of Ohio, assignors to Monarch Marking Systems, Inc., Dayton, Ohio**

**Continuation of Ser. No. 205,810, Dec. 8, 1971. This application Sept. 17, 1973, Ser. No. 397,945**
**Int. Cl.² G06F 3/14**
**U.S. Cl. 340—172.5** **15 Claims**




1. An apparatus for collecting and supplying data entries comprising

a dynamic circulating data storage means providing time slots in a repetitive time frame for storing data entries, each of said time slots defining a time at which a data entry may be stored and withdrawn from the data storage means,

input means for supplying data entries to the storage means,

output means for withdrawing data entries from the storage means,

a pair of counters each operable synchronously with the circulating data storage means, one of said counters providing a load signal representing a first time slot when said one counter reaches a predetermined count value and the other of said counters providing an output signal representing a second time slot when said other counter reaches a predetermined count value,

a pair of control circuits, one control circuit being controlled by the load signal and coupled to the input means for initiating the storage of a data entry into the storage means during the first time slot and the other control circuit being controlled by the output signal and coupled to the output means for initiating the withdrawal of a data entry from the storage means during the second time slot.

means responsive to the input means for altering by a fixed amount the count within said one counter as each data entry is stored in the storage means, thereby altering the time during which a data entry may be stored after each storage of a data entry, and

mens responsive to the output means for altering by a fixed amount the count in said other counter as each data entry is withdrawn from the storage means, thereby altering the time during which a data entry may be withdrawn after each withdrawl of a data entry.

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**4,019,175**

## PROGRAM CHANGEABLE SEQUENCE CONTROLLER

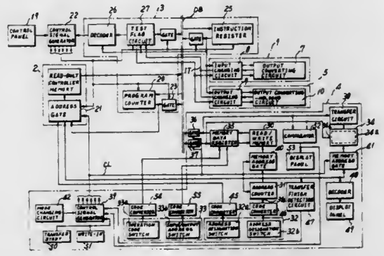
**Hisaji Nakao, Toyota; Yasufumi Tokura, Kariya; Kazuo Matsuno, Okusa, and Toshihiko Yomogida, Kariya, all of Japan, assignors to Toyoda Koki Kabushiki Kaisha and Toyota Jidosha Kogyo Kabushiki Kaisha, both of, Japan**

**Filed Apr. 15, 1975, Ser. No. 568,249**
**Claims priority, application Japan, Apr. 18, 1974, 49-43652**
**Int. Cl.² G05B 19/18**
**U.S. Cl. 340—172.5** **16 Claims**

1. A program input device for a programmable sequence controller having controller memory means capable of removably containing at least one read-only memory for storing a sequence program comprising a series of instructions, input means for selecting external inputs connected thereto in accordance with the instructions, operation control means for examining the selected external inputs in accordance with the instructions, and output means for selectively operating external outputs connected thereto in accordance with the instructions and with the results of the examinations, the program input device comprising:

a read-write memory capable of storing the sequence program,

connecting means connectible to the read-only memory removed from the controller memory means,



program transfer means coupled to the read-write memory and the connecting means for transferring the sequence program from the read-only memory to the read-write memory in a first transfer mode and from the read-write memory to the read-only memory in a second transfer mode,

program changing means for changing the sequence program loaded into the read-write memory, and

switchable mode changing means for causing the program transfer means to operate selectively in the first and second transfer modes.

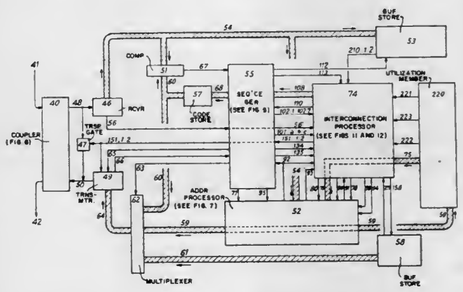
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**4,019,176**

## SYSTEM AND METHOD FOR RELIABLE COMMUNICATION OF STORED MESSAGES AMONG STATIONS OVER A SINGLE COMMON CHANNEL WITH A MINIMIZATION OF SERVICE MESSAGE TIME

**Jean M. Cour, and Jean F. Suchard, both of Paris, France, assignors to Centre d'Etude et de Realisation en Informatique Appliquee - C.E.R.I.A., Paris, France**

**Filed June 19, 1975, Ser. No. 588,497**
**Claims priority, application France, June 21, 1974, 74.21717**
**Int. Cl.² G06F 3/04; H04J 3/04, 3/08, 3/06**
**U.S. Cl. 340—172.5** **11 Claims**



1. A method of communicating data among a plurality of mutually remote stations equipped for transmitting and receiving data signals at a rate within a predetermined tolerance

of a predetermined transmission rate on a common transmission channel through which a message transmitted by one station is made available for reception at all other stations of said plurality of stations without message storage delays at any intermediate station distinct from the sending station, comprising the steps of:

providing at all stations a looped list of all said stations, by address codes respectively individual to the several stations, in the same predetermined order;

locally storing data originating at any station and ready for transmission to any other station together with the identification of the latter addressee station;

observing the condition of the transmission channel at each station during desired periods of activity of the respective stations and receiving messages detected by observing said channel condition as specified in the receiving step set forth below;

sending messages, within a predetermined period after said transmission channel has become silent, in one of at least two formats, messages of all formats being preceded by the transmission of a synchronization signal that identifies the beginning of a message, followed by a source address code identifying the sending station and thereafter followed by a destination address code identifying another of said stations as the station intended to send the next message within a period of a predetermined length following the end of the current message, said first two formats including a first format in which said destination address code is followed by a data field corresponding to the data awaiting transmission at the sending station and a second format in which the message ends with the transmission of the destination address code;

determining the destination address code in messages of said first format in accordance with an addressee station identification supplied with data awaiting transmission, and

determining the destination address code in messages of said second format by selecting the next station on said looped list,

said step of sending a message being performed only within a period of said predetermined length following reception of a preceding message in which the destination code received was recognized as the station's own address code, except when the transmission channel has been silent for a period of a second predetermined length much longer than said first predetermined length,

receiving at least the control codes, source address codes and destination address codes included in messages detected when the station is not sending,

detecting destination address codes identifying the receiving station and as a preliminary to sending steps set forth above, and

receiving data fields of messages of the first format at least in the cases of messages of which the destination address code has been detected to be that of the receiving station.

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**4,019,177**

## MAGNETIC BUBBLE DETECTOR

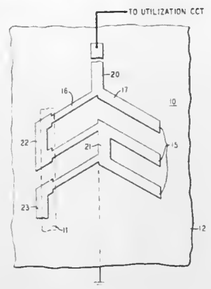
**Terence John Nelson, New Providence, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed Mar. 10, 1976, Ser. No. 665,422**

**Int. Cl.² G11C** *19/08*

**U.S. Cl. 340—174 TF** **4 Claims**

1. A magnetic bubble memory comprising a layer of material in which magnetic bubbles can be moved, a magnetoresistive detector and means for moving said bubbles to said detector, said detector comprising a plurality of chevron elements each having first and second legs, said elements being aligned along an axis transverse to the path of bubble movement, said chevron elements being interconnected by interlinking elements at an end and at about the apex of each into a single magnetoresistive element including said first leg therebe-




tween, said first leg having a cross section reduced from that of said second leg.

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**4,019,178**

## CMOS DRIVE SYSTEM FOR LIQUID CRYSTAL DISPLAY UNITS

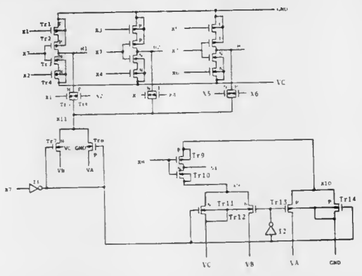
**Shintaro Hashimoto, Nara, and Hirohide Nakagawa, Sakurai, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan**

**Filed Apr. 4, 1975, Ser. No. 565,269**

**Claims priority, application Japan, Apr. 5, 1974, 49-39336**

**Int. Cl.² G06F** *3/14*

**U.S. Cl. 340—324 M** **3 Claims**



1. In a drive system for driving a liquid crystal unit including a common electrode, a plurality of segment electrodes, the combinations of which define display patterns, as well as liquid crystal composition between said common and said segment electrodes having a given threshold voltage value which initiates a change in the optical characteristics of said liquid crystal unit, said drive system being adapted to apply an alternating voltage higher than the threshold value to the liquid crystal unit when it is desired to be on, and to apply an alternating voltage higher than a reference potential but lower than the threshold value to the same when it it is desired to be off, an improvement comprising;

means for establishing first, second and third potential levels other than the reference potential, the potential difference between the third level and the reference level being selected higher than the threshold value and the potential differences of the first and second potential levels with respect to the reference level being lower than the threshold value;

means for applying to the common electrode an alternating voltage alternating between the reference level and the third level and for applying to the segment electrodes an alternating voltage which alternates between the reference level and the third level in a phase opposite to the alternating polarity voltage applied to the common electrode, when the liquid crystal unit is desired to be on; and



means for applying to at least one of the common electrode and the segment electrodes an alternating voltage which alternates between the first level and the second level, when the liquid crystal unit is desired to be off.

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**4,019,179**

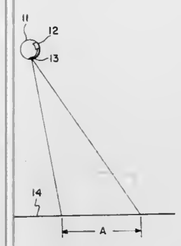
## METHOD OF LOCATING PERSONS IN DISTRESS

**Wilford Eugene Sivertson, Jr., Yorktown, Va., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.**

**Filed Feb. 27, 1976, Ser. No. 662,176**

**Int. Cl.² G01S** *7/04, 9/02*

**U.S. Cl. 343—5 MM** **4 Claims**




1. A method for locating any person in distress on a part of the surface of the earth who has deployed passive RF reflectors in a predetermined arrangement to indicate his distress situation comprising the steps of:

making a first transparency in the spatial frequency domain of an image of said RF reflectors in said predetermined arrangement;

scanning said part of the surface of the earth with a side-looking radar to produce images of said part of the surface of the earth;

making second transparencies in the conventional image domain of said images produced by said radar; and

determining, from said first and second transparencies by complex spatial filtering, if said RF reflectors in said predetermined arrangement were deployed on said part of the surface of the earth when scanned by said radar.

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**4,019,180**

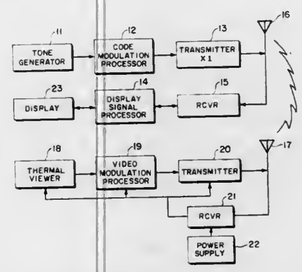
## REMOTE INFRARED SIGNAL COMMUNICATOR

**Howard T. Graves, Alexandria, Va., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Continuation of Ser. No. 304,710, Nov. 8, 1972, abandoned. This application Nov. 17, 1975, Ser. No. 632,594**

**Int. Cl.² G01S** *9/02, 9/64*

**U.S. Cl. 343—6 ND** **2 Claims**




1. A surveillance system comprising:

a passive infrared viewer including at least one detector element supplying a video signal;

a first wireless transmitter means for transmission of a first carrier wave;

a first modulation circuit means coupling said viewer and said transmitter means for impressing the video image information from said detector means on the modulation envope of said first carrier wave;

a power supply;

a first receiver directly coupled to said power supply and tuned to a frequency band different from that of said first carrier wave to receive a second carrier wave and further including,

a demodulator circuit means to generate a gating pulse in response to a preselected frequency shift in said second carrier, and

a rachet type relay means activated by said gating pulse to connect and interrupt said power supply to said viewer, said first transmitter means and said first modulation means.

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**4,019,181**

## TRANSPONDER SYSTEM

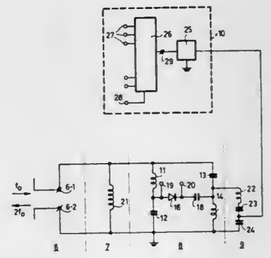
**Kjell Olow Ingemar Olsson, Jarfalla, and Bengt Georg Loggert, Solna, both of Sweden, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed July 9, 1975, Ser. No. 594,206**

**Claims priority, application Sweden, July 19, 1974, 7409425**

**Int. Cl.² G01S** *9/56*

**U.S. Cl. 343—6.5 SS** **7 Claims**

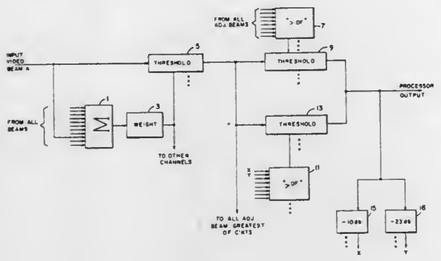



1. A transponder system including an interrogator station which is provided with a transmitter and a receiver, said transmitter being arranged for wireless transmission of an interrogation signal in the form of a pulse train having a given carrier frequency, and a responder station comprising a common transmitting and receiving antenna connected to two terminals, a first resonator connected between said terminals and tuned to the incoming carrier frequency, a second resonator connected between said terminals and tuned to a harmonic of the incoming frequency, a rectifier element with a non-linear characteristic coupled between the first and second resonators to produce d.c. trigger pulses from the incoming signal and to excite said second resonator for retransmitting a reply signal at the harmonic frequency, a modulator triggered by said d.c. pulses from the rectifier element an including control means for eliminating and restoring the resonant condition in said second resonantor in response to a binary information signal which is fed into the modulator.

## 4,019,182
## RADAR SIGNAL PROCESSOR

**Joseph DeLorenzo, Sudbury, Mass.; Julius V. DiFranco, Dix Hills, and Frank J. Scire, Huntington Staton, both of N.Y., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Mar. 14, 1973, Ser. No. 342,906**
**Int. Cl.² G01S 7/34**
**U.S. Cl. 343—7 A** **3 Claims**

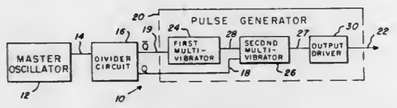



1. A processor in a multiple beam radar system having a plurality of beam signals physically located to each other in a rank and file pattern comprising a first threshold circuit having an input and an output; a first beam signal being fed to the input of the threshold circuit; a first means connected to said threshold circuit for setting the threshold level in accordance with a weighted amount of the average of all the beam signals; a second threshold circuit having an input and an output; the input of said second threshold circuit being connected to the output of said first threshold circuit; a first greater of circuit having a plurality of inputs and an output; each beam signal physically adjacent to said first beam signal being connected to individual ones of the inputs to said greater of circuit; and said first greater of circuit being connected to said second threshold circuit so as to set the threshold level thereof.

## 4,019,183
## APPARATUS FOR LORAN SIMULATION

**James R. Haynes, Lake City, S.C., assignor to Kayot, Inc., Mankato, Minn.**

**Filed Sept. 17, 1975, Ser. No. 613,992**
**Int. Cl.² G01S 1/24**
**U.S. Cl. 343—103** **5 Claims**

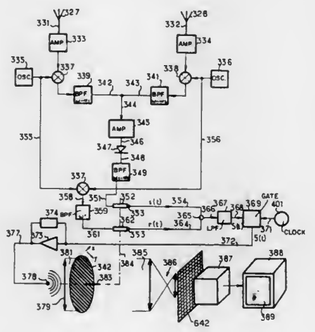



1. Solid state electronic apparatus for generating a simulated LORAN output signal for actuating and testing LORAN receivers, said apparatus comprising:
- oscillator means for generating a primary signal having a predetermined frequency;
- divider means for generating a Q trigger signal and a complementary Q trigger signal in response to said primary signal;
- generator means for producing a simulated LORAN pulse slave signal in response to said Q trigger signal and a simulated LORAN pulse master signal in response to said Q trigger signal, said generator means comprising:
  - first multi-vibrator means responsive to said Q trigger signal for producing said simulated LORAN slave signal; and
  - second multivibrator means responsive to said Q trigger signal for producing said simulated LORAN master signal; and
  - means for coupling said first multivibrator means to said second multivibrator means thereby combining said simulated pulse slave signal and said simulated pulse master signal thereby providing said simulated LORAN output signal.

## 4,019,184
## DIRECTION-FINDING METHOD AND SYSTEM

**Jacques A. Dorey, Combs-la-ville, France, assignor to Office National d'Etudes et de Recherches Aerospatiales (O.N.E.R.A.), Chatillon, France**

**Filed Feb. 18, 1975, Ser. No. 550,481**
**Claims priority, application France, Feb. 20, 1974, 74.05808; Feb. 20, 1974, 74.05809; Feb. 20, 1974, 74.05810; Feb. 20, 1974, 74.05811; Feb. 20, 1974, 74.05812**
**Int. Cl.² G01S 5/02**
**U.S. Cl. 343—113 DE** **42 Claims**



1. A method of obtaining information on the position of a first station relative to a second station, comprising the steps of:
- sending out wave energy from a transmitting device at said first station;
- intercepting said wave energy by a receiving device at a second station;
- subjecting one of said devices to a continuous periodic motion;
- deriving from the intercepted wave energy a periodic signal component dependent on two spatial coordinates determined by said relative position;
- modulating a luminous flux with said signal component;
- directing the modulated flux onto an optical filter with a two-dimensional transmissivity pattern varying periodically in one dimension; and
- displacing said pattern with reference to the path of said modulated flux with a periodicity related to the period of said continuous motion whereby the intensity of the flux downstream of said pattern reaches an extreme value at a location determined by said spatial coordinates.

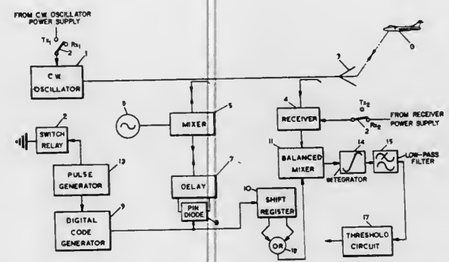
## 4,019,185
## PHASE MODULATION APPARATUS

**Arthur Picton Morgan, Farnborough, England, assignor to The Secretary of State for Defence in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, England**

**Filed May 23, 1973, Ser. No. 365,090**
**Claims priority, application United Kingdom, May 30, 1972, 25344/72**
**Int. Cl.² G01S 7/28, 9/38**
**U.S. Cl. 343—17.2 R** **7 Claims**

1. Phase modultion apparatus for an interrupted carrier-wave coherent radar comprising; carrier-wave generator means for generating a carrier-wave signal of a predetermined frequency during transmit periods and having signal output means for connection to an aerial; transmit/receive switch means connected to a power supply control input of the carrier-wave generator means; pulse generator means connected to a control input of the transmit/receive switch means for producing alternately transmit pulses and receive pulses of predetermined and non-overlapping periods, each of said transmit pulses being operative to cause the transmit/receive switch means to switch on a power supply to the carrier-wave generator means for a transmit period and each of said receive pulses being operative to cause the transmit/receive switch means to switch off the power supply to the carrier-wave generator means for a receive period; a delay line coupled at one end to the signal output means of the carrier-wave generator means; reflector means at the other end of the delay line for reflecting



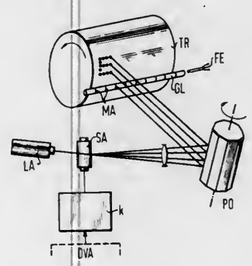



signals produced by the carrier-wave generator means during a transmit period and travelling in the delay line; and, modulation signal generator means connected to the reflector means and synchronously connected to the pulse generator means for controlling the reflecting actions of the reflector means so that signals travelling in the delay line are reflected with a phase-shift dependent on a modulation signal produced by the modulation signal generator means and arrive back at the signal output means substantially at but not after the commencement of the next transmit period, the phase of the reflected signal determining by injection phase-locking the phase of the carrier-wave signal produced by the carrier-wave generator means during a transmit period as compared with the phase of the carrier-wave signal produced during the preceding transmit period.

## 4,019,186
## MOTION PICK-UP APPARATUS IN A NON-MECHANICAL PRINTER

**Anton Dressen, Dachau, and Klaus Menzel, Ebersberg, both of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany**

**Filed Mar. 18, 1976, Ser. No. 668,125**
**Claims priority, application Germany, Mar. 20, 1975, 2512349**
**Int. Cl.² G01D 9/42, 15/10; G02B 5/14**
**U.S. Cl. 346—108** **5 Claims**

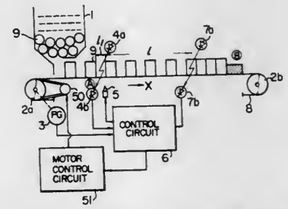



1. Motion pick-up apparatus for producing electronic timing signals in a non-mechanical character printer, comprising:
- a light source operable to produce a laser beam;
- beam deflection apparatus including an acousto-optical beam deflector for splitting the laser beam into a plurality of sub-beams in accordance with each of the characters to be pritned;
- a data carrier;
- a polygonal reflector for deflecting the sub-beams onto the data carrier at spaced locations for each character along a line of the data carrier;
- a light transmissive rod disposed parallel to the line of print of the data carrier;
- light scattering locations along said rod in the path of a predetermined sub-beam for scattering incident light for transmission through said rod; and
- a light detector at one end of said rod for generating timing signals in response to the light reflected through said rod.

## 4,019,187
## INK JET RECORDING APPARATUS

**Hideyuki Ōmori, Hitachi; Yoshio Ouchi, Mito; Takatoshi Ikeda, and Toshio Tsubaki, both of Hitachi, all of Japan, assignors to Hitachi, Ltd., Japan**

**Filed Mar. 17, 1976, Ser. No. 667,469**
**Claims priority, application Japan, Mar. 19, 1975, 50-32356**
**Int. Cl.² G01D 15/18; B41F 17/16**
**U.S. Cl. 346—75** **4 Claims**




1. An ink jet recording apparatus wherein information patterns are recorded on articles in the form of dot matrix by a recording head which ejects ink droplets in a direction toward recording surface of each of said articles conveyed by a conveyer as changing the direction of the ink droplets to apply the droplets to a predetermined area of the each article, said apparatus comprising:
- drive means for driving said conveyer,
- recording control means for controlling the operation of said recording head,
- trouble detection means for detecting the movement of the recorded articles conveyed by said conveyer,
- record completion detection means for detecting the completion of record for each of the articles, and
- means for stopping the operation of said driving means and said recording control means under the presence of the output signals of said trouble detection means and said record completion detection means.

## 4,019,188
## MICROMIST JET PRINTER

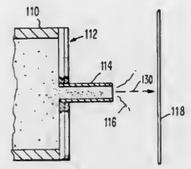
**Frederick Hochberg, Yorktown Heights; William B. Pennebaker, Carmel, and Keith S. Pennington, Somers, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed May 12, 1975, Ser. No. 576,407**
**Int. Cl.² G01D 15/18**
**U.S. Cl. 346—75** **3 Claims**

1. A micromist ink printing device comprising:
- nozzle means having an aerosol chamber with an output port, said output port having an opening size in the order of up to about one millimeter;
- nebulizer means for introducing a micromist of ink particles having a size of about 1 to 25 microns into said chamber;

pressure means for forcing said micromist of ink particles out through said output port in the form of an aerosol jet with a velocity that causes the micromist ink particles to be entrained in and focused around the axis of said aerosol jet and thereby print on a print medium a narrow width region which is substantially narrower in size than the opening size of said output port; and

particle velocity control means mounted on or forming part




of an aerosol chamber wall for selectively introducing turbulence into said aerosol jet such that said aerosol particle velocity is insufficient to wet with said print medium, said particle velocity control means being activated during non-print cycles, said particle velocity control means comprising a piezoelectric transducer mounted on said aerosol chamber wall adjacent said output port, and said output port is formed by a tubular jet nozzle.

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**4,019,189**

## DIGITAL EXPOSURE TIME CONTROL CIRCUIT WITH SELF-TIMER

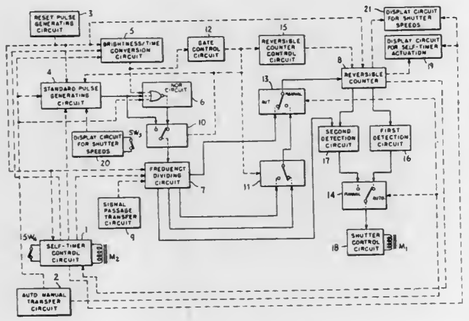
**Kiyoshi Kitai, Tokyo; Takeo Saito, Dainichi Yotsukaido, and Youichi Seki, Chiba, all of Japan, assignors to Seiko Koki Kabushiki Kaisha, Japan**

**Filed Feb. 14, 1975, Ser. No. 550,030**

**Claims priority, application Japan, Feb. 18, 1974, 49-19272**

**Int. Cl.² G03B** *7/08, 9/64*

**U.S. Cl. 354—23 D** **1 Claim**




1. A digital exposure time control circuit comprising: a pulse generating circuit for generating standard pulses at a substantially constant rate; a dividing circuit for developing output pulses having a lower repetition rate than standard pulses applied thereto; brightness-time conversion circuit means connecting said pulse generating circuit to said dividing circuit and operable for applying to said dividing circuit a number of standard pulses inversely proportional to the brightness of a scene to be photographed, whereby the number of standard pulses are proportional to an exposure time; a reversible counter operable in a counting mode for counting pulses applied thereto and operable in a read-out mode for reading out the counted pulses to control an exposure time; means for applying dividing circuit output pulses to said reversible counter to count the dividing circuit output pulses when said reversible counter is operated in the counting mode; second means operable for applying standard pulses to said dividing circuit thereby to effect counting of dividing circuit output pulses by sid reversible counter when said reversible counter is operated in the counting mode; a self-timer control circuit responsive to the number of counted pulses for clearing said reversible counter, for disabling said second means for applying standard pulses to said dividing circuit, and for enabling said brightness-time conversion circuit means when the number of counted pulses exceeds a predetermined number which corresponds to a predetermined delay time, whereby said reversible counter counts the number of pulses proportional to an exposure time to control an exposure time after a delay determined by the time required to count the predetermined number of pulses to which self-timer control is responsive.

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**4,019,190**

## ACCESSORY FOOT FOR CAMERA ACCESSORIES

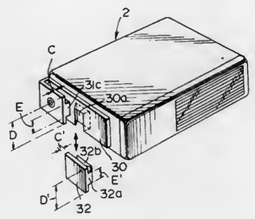
**Hiroshi Ohmura, Tokyo, Japan, assignor to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan**

**Filed Aug. 5, 1975, Ser. No. 602,073**

**Claims priority, application Japan, Aug. 21, 1974, 49-99688[U]**

**Int. Cl.² G03B** *15/05*

**U.S. Cl. 354—145** **5 Claims**




1. An accessory foot fixed to an accessory for cameras to be engaged with an accessory shoe fixed to the body of cameras comprising a base fixed to the accessory, said base extending along the bottom face of the accessory, a standardized foot part fixed to said base and having a main portion spaced from and extending in a direction parallel to said base, said standardized foot part having an electric synchronizing contact to be put into contact with an electric contact provided on the accessory shoe on the camera body, and a demountable foot member removably mounted to said base, said demountable foot member being so positioned on said base and of such a shape as to elongate the main portion of the standardized foot part in said direction parallel to said base to make the foot longer.

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**4,019,191**

## PHOTOMETRIC DEVICE FOR USE IN A SINGLE LENS REFLEX CAMERA

**Katsuhiko Miyata, Saitama, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Mar. 5, 1975, Ser. No. 555,704**

**Claims priority, application Japan, Mar. 23, 1974, 49-33269[U]**

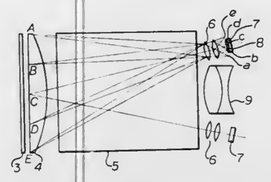
**Int. Cl.² G03B** *19/12, 13/02*

**U.S. Cl. 354—155** **2 Claims**

1. In a single lens reflex camera wherein light from a subject is imaged by a camera lens on a focusing means for viewing by an eyepiece through a pentaprism, the improvement comprising a photometric device located beside said eyepiece, said photometric device comprising:

a first photometric lens mounted on one side of said eyepiece in a position such that said first photometric lens receives light through said pentaprism from substantially the entire area encompassed by the subject imaged by the camera lens of said single lens reflex camera on said focusing means for viewing by said eyepiece; and,

a first light receiving element having a photosensitive surface, said first light receiving element mounted at the focal plane of said first photometric lens such that light received by said first photometric lens impinges on the entire photosensitive surface of said first light receiving element, said photosensitive surface being sized such that




said impinging light is only a portion of the light received by said first photometric lens through said pentaprism from the area encompassed by the subject imaged by the photographic lens of the single lens reflex camera on said focusing means for viewing by said eyepiece, said first light receiving element producing an electrical output related to the intensity of the light impinging on said photosensitive surface of said first light receiving element.

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**4,019,192**

## PHOTOGRAPHIC CAMERA OF THE RETRACTABLE LENS TUBE TYPE WITH A MOVABLE LENS COVER

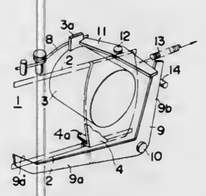
**Fumihiro Miyagawa, Yokohama, Japan, assignor to Ricoh Co., Ltd., Japan**

**Filed May 20, 1975, Ser. No. 579,060**

**Claims priority, application Japan, May 20, 1974, 49-55591; May 20, 1974, 49-56451[U]**

**Int. Cl.² G03B** *17/04*

**U.S. Cl. 354—187** **5 Claims**




1. A photographic camera of the retractable objective lens tube type comprising, in combination,

a. an objective lens tube movable between a retracted position, in which the lens tube is disposed within the camera, and a picture-taking position, in which the lens tube projects outwardly of the camera from a front surface of the camera;

b. means biasing said lens tube to move forwardly from its retracted position;

c. means locking said lens tube in its retracted position against the bias of said biasing means;

d. protective cover means movable along a guide path parallel to said front surface of the camera between an operative position, in which it covers said lens tube in its retracted position, and an inoperative position, in which it is retracted from the path of movement of said lens tube; and

e. means operative, in conjunction with the movement of said cover means to its inoperative position, to release said locking means thereby to permit said lens tube to move forwardly from its retracted position, said cover means consisting of a pair of halves movable in respective opposite directions along said guide path.

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**4,019,193**

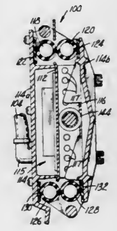
## DEVELOPER APPARATUS

**Willard J. Holman, Barrington, and Morris Tolliver, Streamwood, both of Ill., assignors to Addressograph Multigraph Corporation, Cleveland, Ohio**

**Filed July 3, 1974, Ser. No. 485,347**

**Int. Cl.² G03D** *7/00*

**U.S. Cl. 354—300** **14 Claims**




1. Apparatus for developing a diazo photographic medium in the presence of heat and in an ammonia vapor atmosphere comprising:

a chamber containing said ammonia vapor atmosphere;

a heat transfer plate disposed within said chamber, said heat transfer plate having a heated working surface applying heat to said diazo photographic medium upon contact therewith;

first and second pairs of rollers disposed on opposite ends of said working surface in parallel relationship thereto for passing the diazo photographic medium through said chamber and across said working surface;

a source of ammonia vapor;

a conduit connected to said ammonia vapor source and to said chamber and passing ammonia vapor from said source to said chamber to be heated by said heat transfer plate; and

means for urging a portion of the photographic medium into intimate contact with a portion of said working surface to increase the heat transfer between said portion of said working surface and said portion of said photographic medium, said urging means including a pressure roller disposed adjacent to said portion of said working surface between said first and second pairs of rollers, said pressure roller and said heat transfer plate cooperating to receive said diazo photographic medium between said pressure roller and said portion of said working surface as the diazo photographic medium passes between said first and second pairs of rollers to thereby apply pressure to said portion of said diazo photographic medium locally to increase the developing rate of said portion of said diazo photographic medium between said pressure roller and said portion of said working surface.

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**4,019,194**

## PHOTOGRAPHIC APPARATUS FOR PROCESSING LARGE FORMAT, SELF-DEVELOPING FILM UNIT

**Norman W. Cutler, Jr., Braintree, and Duncan C. Sorli, Chelmsford, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.**

**Filed Dec. 8, 1975, Ser. No. 638,352**

**Int. Cl.² G03D** *9/02*

**U.S. Cl. 354—312** **22 Claims**

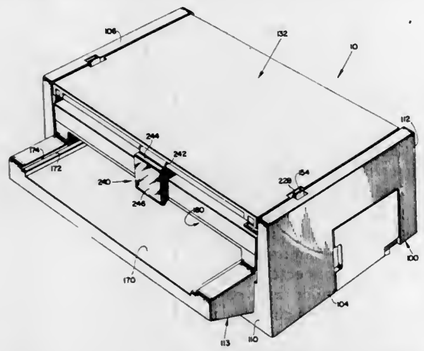
1. A processor for receiving and supporting a lighttight cassette holding a self-developing film unit of a given total length and for advancing the film unit from the cassette, dis-

tributing a fluid processing composition within the film unit and providing a light-free enviornment for the film unit, the film unit being of the type having a plurality of layers including photosensitive and image- receiving layers, a rupturable container holding a fluid processing composition adapted to be distributed between a predetermined pair of such layers, and a film unit manipulation tab extending forwardly of a leading end of the film unit, the cassette being of the type included a light sealed opening at one end thereof through which the tab may protrude and also through which the film unit may be withdrawn from the cassette by pulling on the tab, said processor comprising:

a housing having a film entry slot therein through which such a film unit may be advanced in said housing;

means on said housing for receiving and supporting such a cassette holding a film unit such that the opening at one end of the cassette faces and is in alignment with said film entry slot;

processing means, including a pair of rotatably mounted pressure-applying rollers located within said housing with a film entry side of said rollers adjacent said film entry slot for engaging a film unit manipulation tab, extending through said film entry slot, and for advancing the film unit from the cassette, into said housing, and between said pair of rollers to an exit side thereof and for progressively applying a compressive pressure along the length of the film unit to distribute the fluid processing composi-



tion between the predetermined pair of layers of the film unit, said processing means also including means for rotatably driving at least one of said pair of rollers in a direction to cause the film unit to be advanced therebetween from the entry side of the rollers to the exit side thereof;

means defining a dark chamber on said exit side of said rollers for receiving and supporting a film unit in a substantially light-free environment, said dark chamber defining means including first and second dark chamber sections, each being of a length that is less than the given total length of such a film unit, said first section being located on said housing and having a film entry opening at one end thereof located in alignment with the path of travel of a film unit emerging from the exit side of said rollers, said second section being coupled to said housing for movement, without being uncoupled from said housing, between an operative position wherein at least a major portion of said second section extends outwardly beyond said housing and said second section is in alignment and communication with an opposite open end of said first section to form a dark chamber, in cooperation with said first section, of sufficient length to receive and support a film unit of such a given total length, and a storage position wherein said second section is located in superposed relation to at least said first section; and

means providing access to said dark chamber, defined by said first and second sections located in said operative position, for removing a processed film unit therefrom.

**4,019,195**

## SEMI-CONDUCTOR DEVICE CAPABLE OF SUPPORTING HIGH AMPERAGES OF INVERSE CURRENT

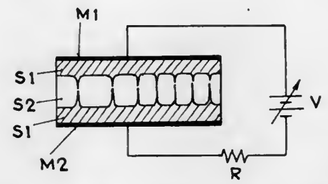
**Elias Munoz Merino, Madrid, Spain, assignor to Fabrica Espanola Magnetos, S.A., Madrid, Spain**

**Filed July 3, 1975, Ser. No. 592,873**

**Claims priority, application Spain, Dec. 21, 1972, 409921**

**Int. Cl.² H01L** *29/90, 29/04*

**U.S. Cl. 357—13** **4 Claims**




1. A solid-state surge arrester device comprising a quasimonocrystalline semiconductor made up of a plurality of grains, said semiconductor containing a background dopant of one of the two types, n and p, of doping materials, and a layer of diffused dopant of the other type, wherein:

said semiconductor contains grain boundries in sufficient number and of sufficiently low angle to cause an etch pit density in excess of $10^6/cm^2$;

said grain boundries contain higher concentrations of said dopants than said grains; and

said grain boundries form a plurality of $p^+n^+$ junctions.

**4,019,196**

## INDICATING ELEMENT AND METHOD OF MANUFACTURING SAME

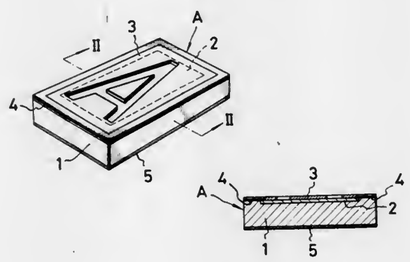
**Toru Teshima, Hatano; Hoichiro Kashiwabara, Hino, and Yoshinori Uchiyama, Machida, all of Japan, assignors to Stanley Electric Co., Ltd., Tokyo, Japan**

**Filed Oct. 24, 1975, Ser. No. 625,685**

**Claims priority, application Japan, Nov. 22, 1974, 49-134971; Feb. 25, 1975, 50-25852[U]; Feb. 25, 1975, 50-25853[U]; Feb. 25, 1975, 50-25854[U]**

**Int. Cl.² H01L** *33/00*

**U.S. Cl. 357—17** **20 Claims**




1. An indicating element comprising:

a semiconductor base plate (1) of epitaxial crystals of a first conductivity type;

a first electrode (5) on a surface of said base plate;

a planar semiconductor layer (2) of a second conductivity type opposite to that of said first conductivity type embedded in an opposite surface of said base plate (1), an exposed junction being defined therebetween, said base plate (1) and said planar layer (2) forming a luminescent diode;

a protective layer (4) over the exposed junction between said base plate (1) and planar (2); and

an electrode mask layer (3) provided on said planar layer (2), base plate (1) and protective layer (4) and defining a predetermined indicating pattern, said electrode mask layer having light blocking portions over a substantial surface portion of said planar layer (2) and void portions, said void portions defining said predetermined pattern;

whereby when electric power is applied across said first electrode (5) and electrode mask layer (3) light is emitted from said luminescent diode and is blocked by said light blocking portions of said electrode mask layer (3) and is passed through said void portion to display said predetermined pattern.



**4,019,197**

## SEMICONDUCTOR FLOATING GATE STORAGE DEVICE WITH LATERAL ELECTRODE SYSTEM

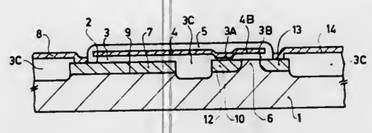
**Jan Lohstroh, and Roelof Herman Willem Salters, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed Dec. 4, 1975, Ser. No. 637,705**

**Claims priority, application Netherlands, Jan. 17, 1975, 7500550**

**Int. Cl.² H01L** *29/78, 29/88, 29/34, 29/04*

**U.S. Cl. 357—23** **9 Claims**




1. A floating gate solid state storage device comprising a body having a semiconductor region of first type conductivity and first and second surface zones of second type conductivity, a first insulator portion through which charge carriers can tunnel on the surface of the second zone, a second insulator portion through which charge carriers cannot tunnel covering entirely the surface of the first zone, an isolated floating gate electrode on the first and second insulator portions and overlying the first and second zones and capacitively coupled thereto, means for applying a potential between the first and second zones sufficient to cause transfer of charge carriers to and from the floating gate through the first insulator portion by tunneling for storing a charge condition, and means connected to the device for sensing the charge condition of the floating gate.

**4,019,198**

## NON-VOLATILE SEMICONDUCTOR MEMORY DEVICE

**Norio Endo, and Yoshio Nishi, both of Yokohama, Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan**

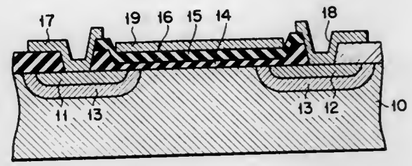
**Filed July 3, 1974, Ser. No. 485,703**

**Claims priority, application Japan, July 5, 1973, 48-75283**

**Int. Cl.² H01L** *29/78, 29/34;* **G11B** *13/00, 9/02*

**U.S. Cl. 357—23** **7 Claims**

1. A non-volatile semiconductor memory device comprising a semiconductor substrate of one conductivity type having an impurity concentration of below $10^{15}$ atoms per $cm^3$; source and drain regions formed in a spaced-apart relationship on one side of the semiconductor substrate to define p-n junctions with the substrate; a gate having first and second insulating films; said first insulating film being formed at that portion of the semiconductor substrate situated on said one side of the semiconductor substrate and between the source and drain regions and having a thickness to permit incoming electric charges to be moved to its upper surface; said second insulating film being formed on the first insulating film to trap incoming electric charges therein; and an impurity diffusion layer formed to surround at least one of the junctions defined by the source and drain regions with the substrate, and having the




same conductivity type as the semiconductor substrate, an impurity concentration above $10^{17}$ atoms per $cm^3$ at the portion of the maximum impurity concentration and a width of below 1 $\mu$m.

**4,019,199**

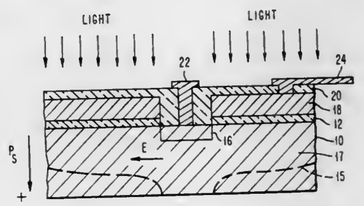
## HIGHLY SENSITIVE CHARGE-COUPLED PHOTODETECTOR INCLUDING AN ELECTRICALLY ISOLATED REVERSED BIASED DIFFUSION REGION FOR ELIMINATING AN INVERSION LAYER

**Savvas Georgiou Chamberlain, Waterloo, Canada, and Lawrence Griffith Heller, Brewster, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Dec. 22, 1975, Ser. No. 642,862**

**Int. Cl.² H01L** *29/78, 27/14, 31/00, 29/34*

**U.S. Cl. 357—24** **4 Claims**




1. A low capacitance charge-coupled semiconductor photodiode structure comprising,

a semiconductor substrate layer of one conductivity type,

a diffusion region of opposite conductivity type disposed in the surface of said substrate, the area of said diffusion region being substantially smaller than the area of said substrate surface,

a first insulating layer disposed on said substrate surface exclusive of said area of said diffusion region,

a layer of gate material disposed on the surface of said first insulating layer which in combination with said substrate layer forms a photodiode,

a second insulating layer disposed on the surface of said gate layer and the surface of said diffusion region,

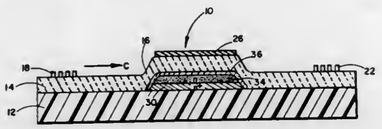
a first electrically conductive contact extending through said second insulating layer to connect an output device to a portion of the surface of said diffusion region,

a second electrically conductive contact for connecting a controllable bias voltage means to said layer of gate material for biasing said diffusion region positive to eliminate any inversion layer at the interface of said first insulating layer and said substrate and electrically isolating said diffusion region from said photodiode formed by said gate material and said first insulating layer, said photodiode being responsive to light radiation directed on said surface of said second insulating layer to generate charge carriers proportional to said light, said charge carriers being collected by said diffusion region to produce an electrical output signal on said first contact representative of said light radiation.

## 4,019,200
## MONOLITHIC SURFACE ACOUSTIC WAVE SIGNAL STORAGE DEVICE

**Larry R. Adkins, Tustin, and James L. Gates, Costa Mesa, both of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.**

**Filed June 11, 1975, Ser. No. 586,107**
**Int. Cl.² H01L** *29/84, 29/96, 29/78;* **H04N** *3/00*
**U.S. Cl. 357—26** **10 Claims**




1. A monolithic signal storage and processing device comprising:

a. a storage structure including:

1. a layer of relatively high resistivity semiconductor material;
2. a first film of dielectric material disposed on said layer of relatively high resistivity semiconductor material;
3. a second film of dielectric material having piezoelectric properties disposed on said first film; and
4. electrode means for applying and sensing voltages across said storage structure;

b. substrate means for supporting said storage structure, said substrate means having an upper surface, said second film extending further along said substrate upper surface then said layer, said first film and said electrode means and being disposed on said upper surface outside said storage region; and

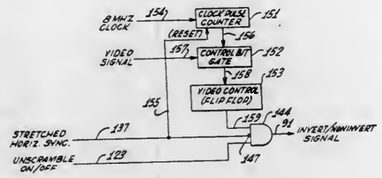
c. transducer means disposed on said second film outside said storage region, where said second film is disposed on said upper surface of said substrate means for launching surface acoustic waves along a propagation path from said transducer means into said storage structure.

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## 4,019,201
## METHOD AND APPARATUS FOR SCRAMBLING AND UNSCRAMBLING COMMUNICATION SIGNALS

**Albert F. Hartung, Woodland Hills; Frank W. Lehan, Santa Barbara; Charles T. Barooshian, Pacific Palisades, and Edward J. Zacharski, Malibu, all of Calif., assignors to System Development Corporation, Santa Monica, Calif.**

**Division of Ser. No. 388,439, Aug. 15, 1973, Pat. No. 3,919,462. This application Sept. 2, 1975, Ser. No. 609,573**
**Int. Cl.² H04N** *1/44*
**U.S. Cl. 358—124** **6 Claims**




1. For use with receivers in a subscription television system, a method of unscrambling composite television video and synchronization signals scrambled by the inversion of video portions corresponding to preselected lines in a television picture, comprising the steps of:

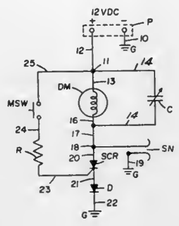
receiving and decoding inversion indicator signals transmitted one with each line of the television picture; and

selectively inverting the video signals only when a decoded inversion indicator signal is in a particular state.

## 4,019,202
## AUTOMATIC SHUT-OFF CIRCUIT FOR EIGHT-TRACK TAPE PLAYERS AND THE LIKE

**John P. Arvesen, c/o Universal Sound, Inc., 110 S. Court, Fairfield, Iowa 52556**

**Filed Sept. 24, 1975, Ser. No. 616,441**
**Int. Cl.² G11B** *15/06, 15/52, 19/20*
**U.S. Cl. 360—74** **4 Claims**



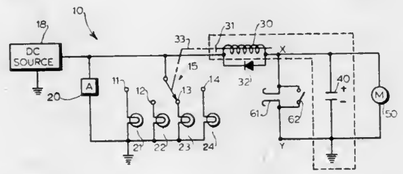

1. In an eight-track tape player or the like having a tape drive motor of the direct current type with first and second power inputs, the first and second motor power inputs being respectively connectible in series to the first and second sides of a source for direct current power, the improvement comprising: an electric circuit for automatically shutting off the drive motor upon the completion of a taped program, the circuit consisting of a silicon controlled rectifier disposed between the second motor power input and the second side of the source for direct current power, the anode of the rectifier being connected in series with the second motor power input and its cathode being connected in series with the second side of the source for direct current power; a normally open motor start switch of the momentary contact type and a voltage dropping resistor connected in series with each other and disposed between the first side of the source for direct current power and the gate of the rectifier; a stabilizing diode disposed between the silicon controlled rectifier and the second side of the source for direct power, the anode of the diode being connected in series with the cathode of the rectifier and the cathode of the diode being connected in series with the second side of the source for direct current power; and a tape sensor having a pair of circuit making contacts connected in shunt relation with the rectifier, the sensor being adapted to contact the tape and to have the circuit closed through its contacts by means carried by the tape.

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## 4,019,203
## FILTERS FOR TAPE RECORDING SYSTEMS

**Bill Soichro Yamanashi, Durham, N.C., and Tadashi Fujita, Ishikawa, Japan, assignors to Electromechanics Research, Durham, N.C.**

**Filed Oct. 31, 1975, Ser. No. 627,798**
**Int. Cl.² H01H** *7/14;* **G11B** *21/08, 5/02, 15/00*
**U.S. Cl. 360—78** **7 Claims**




1. In a tape player-recorder of the type having a load in the nature of a drive motor, amplifier, or the like, a DC power source, normally open momentary switch means and circuitry electrically connecting said load and switch means to said power source, said switch means being adapted for momentarily closing in response to the sensing of a selected tape position or the operation of a manual control, an improved filter circuitry comprising in combination:

a. solenoid actuator means including a solenoid coil and means responsive to sufficient level of energization of said coil for actuating an electromechanical operator associated with a switch, ejector, channel shifter, or the like, within said player-recorder;

b. electrical connector means for connecting said switch means and said load in parallel and further connecting said solenoid coil in series with said power source and between said power source and one side of the parallel circuitry which includes the load and the momentary switch means thereby providing a fixed current path from said source to said load through said coil and a selectively operable shorting path parallel to said load through said switch means; and

c. capacitor means electrically connected to said solenoid coil of said actuator means in an operative position to form a filter circuit in combination with said solenoid coil;

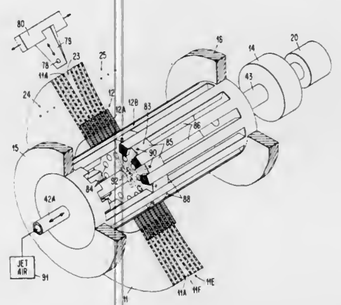
whereby during normal operation of said player-recorder said momentary switch means is open and a normal operating current flows through the solenoid coil for powering said load while said solenoid coil in conjunction with said capacitor means simultaneously provides a filtering action associated with said load and in correspondence with momentary closing of said switch means said solenoid coil is energized in a manner to cause said actuator means to actuate said electromechanical operator.

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## 4,019,204
## FLUIDIC TRANSDUCER ACCESS OPENING IN A STACK OF FLEXIBLE RECORD DISKS

**Donald Eric Griffiths, Longmont, and David Gibbons Norton, Boulder, both of Colo., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Nov. 19, 1975, Ser. No. 633,320**
**Int. Cl.² G11B** *5/016, 5/76, 15/64*
**U.S. Cl. 360—99** **42 Claims**




1. Record storage apparatus having a coaxial stack of flexible record disks mounted for rotation with a rotatable spindle, a frame mounting said spindle for rotation, means for supplying fluid for radial outward movement between adjacent ones of said record storage disks in said stack,

the improvement including in combination:

said fluid supply means supplying said fluid to establish a given rotational stability state in said stack of disks;

means coaxial with and having a lesser axial extent than said spindle and being movable axially with respect thereto and having a predetermined fluid communicative relationship to a plurality of said disks axially aligned therewith;

said communicative relationship altering said radial outward fluid flow between said axially aligned disks such that rotational stability state other than said given state occurs in said disks axially aligned with said coaxial means;

a first of said rotational states being a fully spaced apart stable rotational state, and a second of said rotational states being less than said fully stable rotational state; and

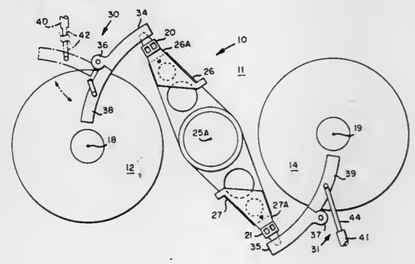
means at the interface between said disks in said first state and said second state to activate partial axial movement of a radially outward portion of predetermined ones of said disks in said second state away from disks adjacent said interface in said first state, whereby a radial outwardly opening access opening occurs in said stack for accessing a given one of said record storage disks in said first state and which faces said disks adjacent said interface and are in said second state.

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## 4,019,205
## DISC DRIVE WITH ROTARY ACCESS MECHANISM

**Kent A. Salmond, Los Gatos, and Ivan Pejcha, Santa Clara, both of Calif., assignors to Information Storage Systems, Inc., Cupertino, Calif.**

**Filed Sept. 16, 1974, Ser. No. 506,122**
**Int. Cl.² G11B** *5/54, 21/22, 5/55, 5/56*
**U.S. Cl. 360—105** **4 Claims**




1. A disc drive apparatus, comprising a baseplate, means for supporting a plurality of recording discs arrayed in packs on the baseplate for rotation about respective vertically extended axes of rotation spaced from and extending parallel to each other, with each respective recording disc including a surface thereon for the recording of data thereon,

drive means for rotating each said disc about said respective axis,

a read/write head associated with each disc surface for reading or writing data thereon,

a plurality of elongated support arms having first and second ends with each having the first end thereof fixed to a respective one of the read/write heads,

a rotary actuator supported on the baseplate at a position between the recording disc supporting means and selectively rotatable about a central axis extending parallel to the disc axes of rotation,

means connecting each support arm second end to the actuator whereby with rotation of the actuator, said read/write heads are moved across the respective disc surface in unison,

means to detect the relative position of the heads and respective disc surfaces thereby to enable the positioning of the heads at preselected locations on the disc surface,

means to load the read/write heads toward the respective disc surface for the efficient transduction of data therebetween, and

said last mentioned means including means for resiliently biasing each read/write head into a loaded position adjacent its associated disc surface, camming means for directing each read/write head away from its associated disc surface into an unloaded position, cam riding means secured to each of said first ends of said elongated support arms for engaging said camming means, and pivot-

ting means for selectively rotating said camming means into and out of engagement with said cam riding means.

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**4,019,206**

**METHOD AND APPARATUS FOR MAGNETIC RECORDING OF DATA WITH A RECORDING HEAD HAVING A PLURALITY OF PHYSICALLY PARALLEL, SERIALLY CONNECTABLE CONDUCTORS**

**Peter Haas, 113 Richmond Ave., Ridgewood, N.J. 07450**

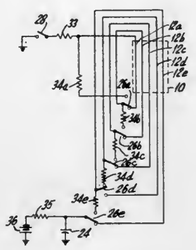
**Continuation of Ser. No. 178,694, Sept. 8, 1971, abandoned.**
**This application June 7, 1973, Ser. No. 367,738**
**Int. Cl.² G11B** *5/20*
**U.S. Cl. 360—123** **11 Claims**

1. Apparatus for recording data on a cooperating magnetic recording medium comprising:

a plurality of electrical conductors with a single segment of each of the conductors mounted in parallel positional relationship to corresponding segments of the other conductors with each segment in proximity to the magnetic recording medium;

switching means for connecting selected conductors in a single series circuit; and

means for energizing the segments of the selected conductors and thereby recording data on the magnetic medium by passing current in the form of a single short duration,



high peak current pulse through the selected conductors in series;

said energizing means comprises a capacitor and means for rapidly discharging said capacitor.

# DESIGN PATENTS

## GRANTED APRIL 19, 1977

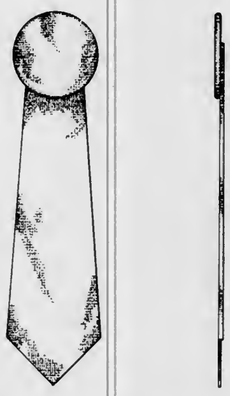
### ERRATA

| For CLASS | See PATENT NO. |
|---|---|
| 007–015 | 244,063 |
| 007–023 | 244,064 |
| 007–023 | 244,065 |
| 013–021 | 244,095 |
| 014–086 | 244,096 |
| 014–093 | 244,097 |
| 014–005 | 244,102 |

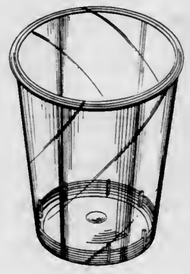
244,061
NECKWEAR
Walter W. Haines, Sr., 1511 Oakdale St., Philadelphia, Pa. 19132
Filed Jan. 20, 1975, Ser. No. 542,567
Term of patent 14 years
Int. Cl. D2—*05*
U.S. Cl. D2—351



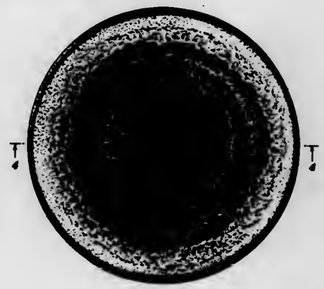
244,062
NECKWEAR
Walter W. Haines, Sr., 1511 Oakdale St., Philadelphia, Pa. 19132
Filed Jan. 20, 1975, Ser. No. 542,568
Term of patent 14 years
Int. Cl. D2—*05*
U.S. Cl. D2—351



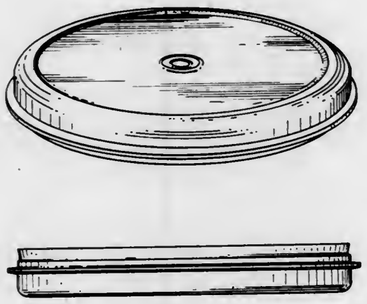
244,063
CUP
Hubert E. Christian, Phoenix, Ariz., assignor to Dart Industries Inc., Los Angeles, Calif.
Filed Dec. 27, 1974, Ser. No. 536,758
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—15



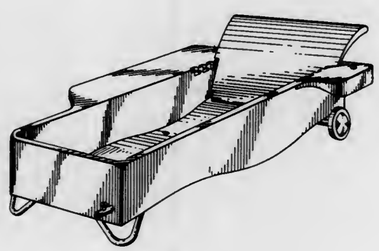
244,064
PLATE
Tapio Wirkkala, Helsinki, Finland, assignor to A. Ahlstrom Osakeyhtio, Iittala, Finland
Filed May 27, 1975, Ser. No. 581,412
Claims priority, application Finland, Nov. 28, 1974, 74623
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—23



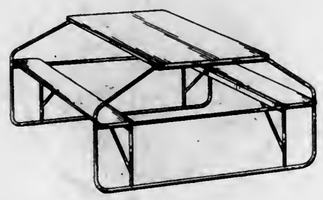
244,065
SERVING BOWL OR THE LIKE
Robert H. C. M. Daenen, Aalst, Belgium, assignor to Dart Industries Inc., Los Angeles, Calif.
Filed Sept. 10, 1975, Ser. No. 612,153
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—23



244,066
WATER LOUNGE
Robert Gildea, 2213 Ogletown Road, Newark, Del. 19711
Filed July 31, 1975, Ser. No. 600,630
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—37



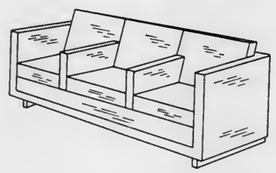
244,067
COLLAPSIBLE PICNIC TABLE
Philip E. Uhl, Luna Pier, Mich., assignor to Toledo Metal Furniture Company, Toledo, Ohio
Filed Nov. 13, 1975, Ser. No. 631,614
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D6—45



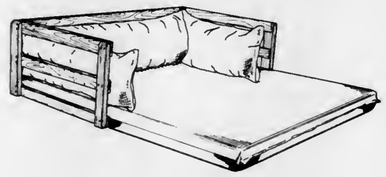
244,068
HANGING CHAIR
Woodland McAdoo Styron, Jr., 102 Stokley Drive, Wilmington, N.C. 28401
Filed July 21, 1975, Ser. No. 597,849
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—47



244,069
CONVERTIBLE SEAT OR SIMILAR ARTICLE
Leon Summer, 8105 Howard St., Omaha, Nebr. 68114
Filed May 9, 1975, Ser. No. 576,146
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—63

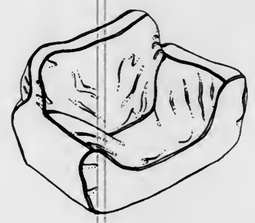


244,070
CONVERTIBLE SOFA
Robert J. Marks, 9350 SW. 106th St., Miami, Fla. 33157
Filed Aug. 15, 1975, Ser. No. 605,188
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—63

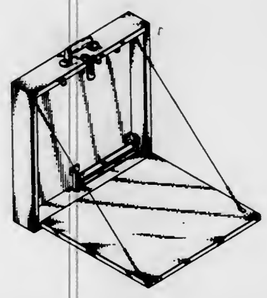




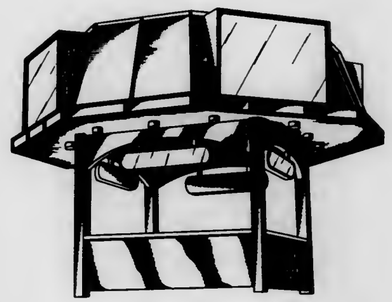
244,071
ARM CHAIR
Rodney R. Haynes, Sr., Richmond, Va., assignor to Dart Industries Inc., Los Angeles, Calif.
Filed Jan. 7, 1976, Ser. No. 647,225
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—71



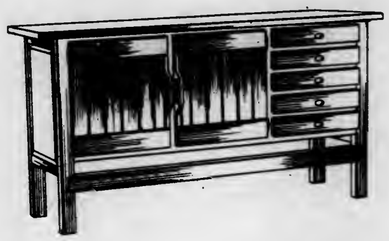
244,072
BARBECUE TOOL CABINET
John J. Schaecher, 3351 W. Grand Ave., Englewood, Colo. 80110
Filed May 24, 1976, Ser. No. 689,100
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—128



244,073
AUDIO AND VISUAL DISPLAY BOOTH
Donald M. Urbaniec, 21 W 041 Monticello, Lombard, Ill. 60148; Jerry L. Stanbrough, 600 W. Surf, Chicago, Ill. 60657, and Alois A. Masters, 612 Park, Saugatuck, Mich. 49453
Filed July 28, 1975, Ser. No. 600,104
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D6—157



244,074
BUFFET
Colman Zola, 58 Tamarack Way, Pleasantville, N.Y. 10570
Filed Oct. 20, 1975, Ser. No. 624,041
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—164



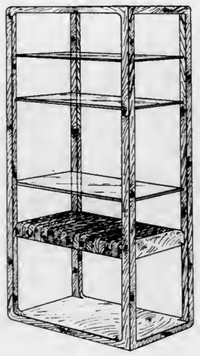
244,075
TABLE
Marion Imber, Stamford, Conn., and Seymour Wezenter, Fair Lawn, N.J., assignors to Ray Control Corporation, New York, N.Y.
Filed Apr. 14, 1976, Ser. No. 676,778
Term of patent 14 years
Int. Cl. D6—*03*
U.S. Cl. D6—179



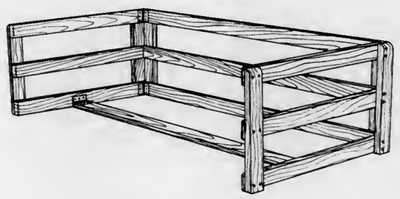
244,076
TABLE
Richard B. Saltz, Huntington Harbor, Calif., assignor to Charlton Co., Inc., Leominster, Mass.
Filed Jan. 21, 1976, Ser. No. 651,055
Term of patent 14 years
Int. Cl. D6—*03*
U.S. Cl. D6—177



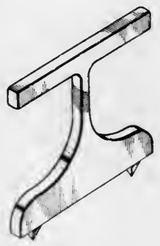
244,077
SHELF UNIT OR SIMILAR ARTICLE
Richard B. Saltz, Huntington Harbor, Calif., assignor to Charlton Co., Inc., Leominster, Mass.
Filed Jan. 21, 1976, Ser. No. 651,056
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—186



244,078
FURNITURE FRAME
Robert J. Marks, 9350 SW. 106th St., Miami, Fla. 33157
Filed Aug. 15, 1975, Ser. No. 605,189
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D6—191



244,079
CAN LID PUNCH
Robert H. Heckroth, 7631 Commodore Circle, Huntington Beach, Calif. 92646
Filed June 30, 1975, Ser. No. 591,769
Term of patent 14 years
Int. Cl. D8—*03*
U.S. Cl. D8—41

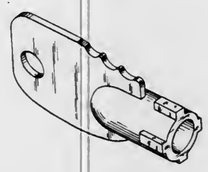




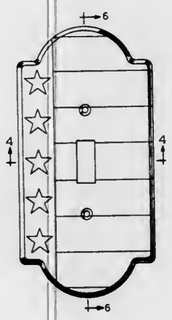
244,080
HINGED LOCK FOR LUGGAGE OR THE LIKE
Alain D. Perrin, Boulogne, France, assignor to Les Must de Cartier, Paris, France
Filed May 2, 1975, Ser. No. 573,945
Claims priority, application France, Nov. 4, 1974, 74.30658
Term of patent 14 years
Int. Cl. D8—*07*
U.S. Cl. D8—338



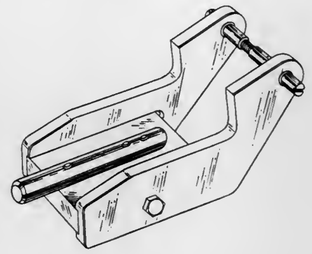
244,081
KEY BLANK FOR AN AXIAL TUMBLER-TYPE LOCK
Robert L. Steinbach, Chicago, Ill., assignor to Chicago Lock Co.
Filed Oct. 5, 1976, Ser. No. 729,793
Term of patent 14 years
Int. Cl. D8—*07*
U.S. Cl. D8—347



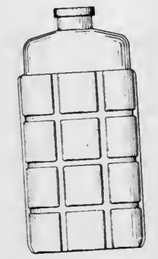
244,082
WALL PLATE
Joan Klatil Creamer, Warwick, R.I., assignor to General Electric Company
Filed Dec. 23, 1974, Ser. No. 536,272
Term of patent 14 years
Int. Cl. D8—*09*
U.S. Cl. D8—351



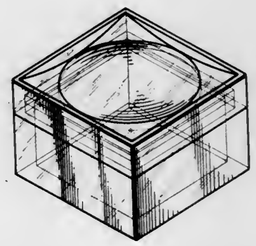

244,083
SAIL BOAT MAST SETTING BRACKET
Joachim A. Pfeiffer, 4373 Faraday Drive, San Jose, Calif. 95124
Filed Mar. 20, 1975, Ser. No. 560,537
Term of patent 14 years
Int. Cl. D8—*08*; D12—*06*
U.S. Cl. D8—354



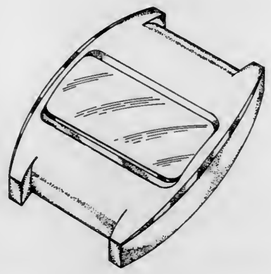
244,084
FRAGRANCE BOTTLE
Bernard A. Mitchell, 1000 N. Lake Shore Drive, Chicago, Ill. 60611
Filed Aug. 20, 1975, Ser. No. 606,015
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—157



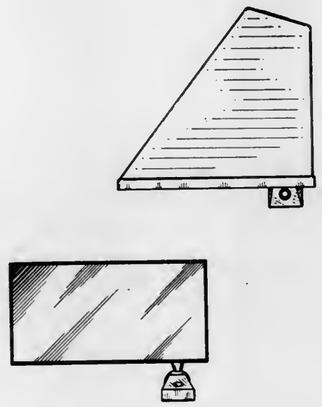
244,085
CONTAINER FOR MINERAL SPECIMENS
Daniel S. Giddings, 33 Wedgewood Lane, Lawrence, N.Y. 11559, and Julian Fabian, 140 S. Middleneck Road, Great Neck, N.Y. 11201
Filed Dec. 11, 1974, Ser. No. 531,551
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—193



244,086
DIGITAL WATCH CASING
William James Lawrence, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.
Continuation-in-part of Ser. No. 535,265, Dec. 23, 1974. This application June 16, 1975, Ser. No. 587,529
Term of patent 14 years
Int. Cl. D10—*02*
U.S. Cl. D10—38



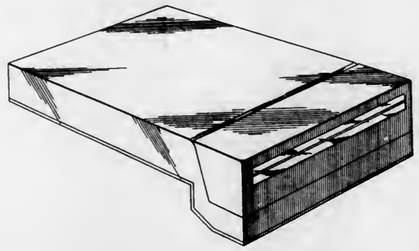
244,088
REAR-VIEW MIRROR
Raymond A. McCarroll, 1725 Newcastle, Grosse Pointe Woods, Mich. 48236
Division of Ser. No. 614,520, Sept. 18, 1975. This application July 26, 1976, Ser. No. 708,420
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—187



244,087
FIGURINE
Gerald Thomas Patton, 11 Club Drive, West, Pittsburgh, Pa. 15236
Filed Nov. 24, 1975, Ser. No. 634,473
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D11—160



244,089
PHOTOGRAPHIC CAMERA BACK OR SIMILAR ARTICLE
Rolf M. Augustin, Jr., Wellesley, and Norman W. Cutler, Jr., Braintree, both of Mass., assignors to Polaroid Corporation
Filed Nov. 4, 1975, Ser. No. 628,461
Term of patent 14 years
Int. Cl. D16—*99*
U.S. Cl. D16—10

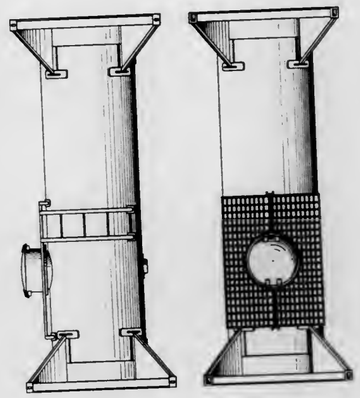




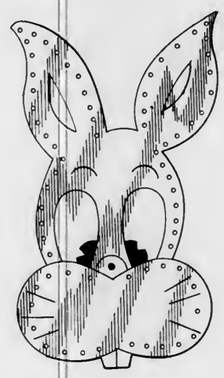
244,090
RULER
John Brownridge West, 4 Quail Valley Drive, Thornhill, Ontario, Canada (L3T 4R2)
Filed Sept. 2, 1975, Ser. No. 609,198
Term of patent 14 years
Int. Cl. D19—*06*
U.S. Cl. D19—35



244,092
INTERMODAL CONTAINER
Erling Mowatt-Larssen, Warren, Ohio, and Thomas S. Lapikas, Sharon, Pa., assignors to General American Transportation Corporation, Chicago, Ill.
Filed Oct. 14, 1975, Ser. No. 622,252
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—2



244,091
CHILD'S COMPASS
William J. Bryant, 2251 Washington Ave., San Leandro, Calif. 94577
Filed June 30, 1975, Ser. No. 591,828
Term of patent 14 years
Int. Cl. D19—*06*
U.S. Cl. D19—38



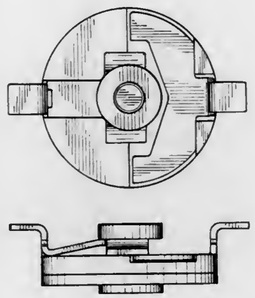
244,093
SWIMMING POOL SAFETY LADDER
Peter F. Gannon, Troy, Mich., assignor to Vinyl-Fab Industries, Ferndale, Mich.
Filed Aug. 15, 1973, Ser. No. 388,584
Term of patent 14 years
Int. Cl. D25—*99*
U.S. Cl. D25—64



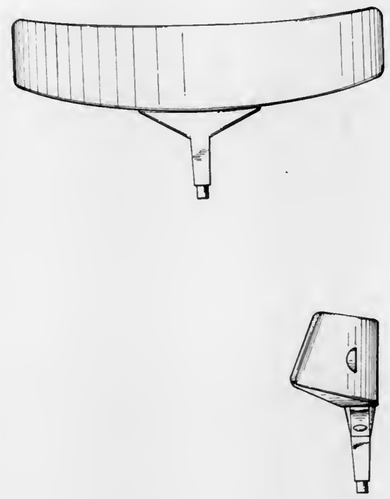
244,094
**DEEP TEXTURED DECORATIVE LAMINATE SHEET**
Jack August Willard, Hamilton, Ohio, assignor to Formica Corporation, Cincinnati, Ohio
Filed Sept. 12, 1974, Ser. No. 505,410
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—84



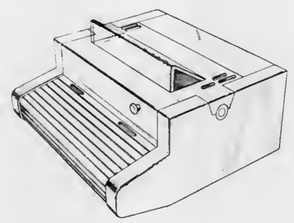
244,095
**CAPACITOR**
Chander M. Wahi, and Robert J. Baumler, both c/o E. F. Johnson Company, 299 Tenth Ave. SW., Waseca, Minn. 56093
Filed July 28, 1975, Ser. No. 599,725
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D13—21



244,096
**PLATE-TYPE ANTENNA**
Ernest Pizon, Saint Cloud, France, assignor to Mecaniplast, Clichy, France
Filed July 2, 1976, Ser. No. 702,487
Claims priority, application France, Jan. 7, 1976, 76.74457
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—86

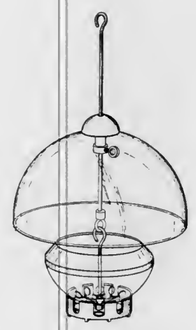


244,097
**HOUSING FOR TELEPRINTERS AND THE LIKE**
Berndt Ebbe Frick, Herrgardsvagen 9, 135 00 Tyreso, Sweden
Filed July 3, 1975, Ser. No. 592,749
Claims priority, application Sweden, Jan. 16, 1975, 7599
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—93

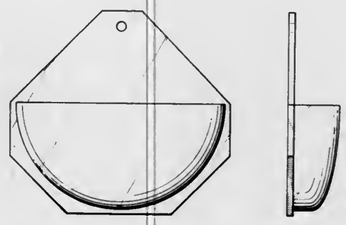




244,098
**BIRD FEEDER**
Peter Kilham, Box 98, Foster, R.I. 02825
Filed Apr. 26, 1976, Ser. No. 680,375
Term of patent 14 years
Int. Cl. D30—*03*
U.S. Cl. D30—14



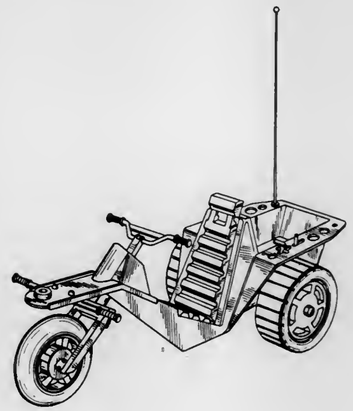
244,099
**WALL MOUNTABLE AQUARIUM OR SIMILAR ARTICLE**
Tony Robert, 5701 SW. Freeway, Houston, Tex. 77057
Filed Mar. 10, 1975, Ser. No. 557,037
Term of patent 14 years
Int. Cl. D30—*02*
U.S. Cl. D30—7



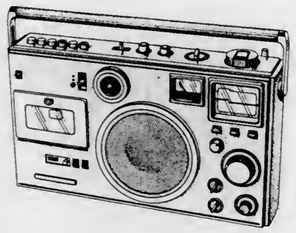
244,100
**GOLF CLUB GRIP**
Clifford A. Spencer, Akron, Ohio, assignor to Eaton Corporation
Filed June 3, 1975, Ser. No. 583,302
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 GS



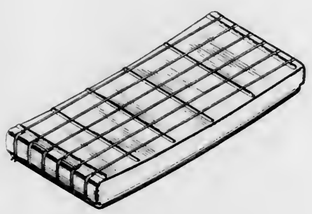
244,101
**TOY VEHICLE**
Dale I. Goldberg, Cincinnati, Ohio, assignor to General Mills Fun Group, Inc., Minneapolis, Minn.
Filed June 2, 1975, Ser. No. 582,947
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 AJ



244,102
**COMBINED PORTABLE RADIO AND TAPE RECORDER**
Kazumasa Takenaka, Moriguchi, and Kikuo Ohta, Katano, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan
Filed June 2, 1975, Ser. No. 583,138
Claims priority, application Japan, Dec. 6, 1974, 49-43065
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D14—5



244,103
**POCKET FINGER EXERCISE BOARD**
Michael M. Greer, Box 22, McGrath, Alaska 99627
Filed July 21, 1975, Ser. No. 597,786
Term of patent 14 years
Int. Cl. D17—*99*
U.S. Cl. D56—1 R



244,104
**HARP**
Walter Krasicki, 5810 W. Schubert, Chicago, Ill. 60639
Filed July 25, 1975, Ser. No. 598,860
Term of patent 14 years
Int. Cl. D17—*03*
U.S. Cl. D56—1 A



244,105
**HEADLIGHTS REMINDER AND COIN HOLDER**
John L. Piekarski, Janesville, Wis., assignor to Ozburn-Janesville Corporation, Janesville, Wis.
Filed Sept. 12, 1975, Ser. No. 612,950
Term of patent 14 years
Int. Cl. D3—*02*
U.S. Cl. D87—3 B



# LIST OF PATENTEES

## TO WHOM

## PATENTS WERE ISSUED ON THE 19TH DAY OF APRIL, 1977

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A. B. Dick Company: *See—*
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A. Christiaens Societe Anonyme: *See—*
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A/S Lovens Kemiske Fabrik Produktionsaktieselskab: *See—*
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AB Volvo: *See—*
Perhed, Per-Gunnar Arthur, 4,018,343.
Abbott, Jerry Joe; and Caudill, Allison Holland, to International Business Machines Corporation. Grooved magnetic brush roll. 4,018,187, Cl. 118-658.000.
Abbott Laboratories: *See—*
Johnson, Edwin Samuel, 4,018,914.
Zaugg, Harold Elmer; Lee, Cheuk Man; Michaels, Raymond John; and Plotnikoff, Nicholas Peter, 4,018,777.
Abe, Michio, to Tokai Cold Forming Co., Ltd. Connecting-rod bolt. 4,018,132, Cl. 85-1.00L.
Abe, Yukio: *See—*
Tanaka, Junzo; Matsushima, Haruo; and Abe, Yukio, 4,019,010.
Aber, Arthur B., to Stanbel, Incorporated. Kite. 4,018,407, Cl. 244-153.00R.
Abrams, Jack Z.: *See—*
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Abrasive Technology, Inc.: *See—*
Lowder, James T.; and Tausch, Edwin M., 4,018,576.
Acda, Petrus Marinus; and Guitoneau, Hans Edward, to Polva-Nederland B.V. Tapping tee. 4,018,464, Cl. 285-197.000.
Acecook Co., Ltd.: *See—*
Muraoka, Keiji, 4,018,904.
ACF Industries, Incorporated: *See—*
Dugge, Richard H.; and Van Dyke, Ronald D., 4,018,484.
Acme Highway Products Corporation: *See—*
Puccio, Guy S., 4,018,539.
ACS Industries, Inc.: *See—*
Botvin, George B., 4,017,949.
Acton, Hugh Collier, to Boyertown Burial Casket Company. Casket and casket support. 4,017,947, Cl. 27-27.000.
Adachi, Teruho: *See—*
Okamoto, Masahiro; Kimura, Morio; Shibuya, Teruo; Yamamoto, Shinji; Hasegawa, Shinichi; Terada, Yutaka; and Adachi, Teruho, 4,018,739.
Adamek, David J.; and Anderson, John A., to Hoerner Waldorf Corporation. Taco package. 4,018,905, Cl. 426-124.000.
Addressograph Multigraph Corporation: *See—*
Holman, Willard J.; and Tolliver, Morris, 4,019,193.
Adkins, Larry R.; and Gates, James L., to Rockwell International Corporation. Monolithic surface acoustic wave signal storage device. 4,019,200, Cl. 357-26.000.
Aerosol Inventions & Development S.A. AIDSA: *See—*
Butcher, Roger Anthony, 4,018,365.
Agence Nationale de Valorisation de la Recherche (ANVAR): *See—*
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Bartel, Siegfried; Payrhammer, Bernd; and Wurf, Johann, 4,018,527.
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Ungnadner, Peter; and Geisslinger, Wolfgang, 4,018,517.
Ahlrich, Willard K. Electrostatic precipitator. 4,018,578, Cl. 55-138.000.
Ahmed, Adel Abdel Aziz, to RCA Corporation. Biasing current attenuator. 4,019,071, Cl. 307-296.00R.
Aine, Harry E.: *See—*
Block, Barry; and Aine, Harry E., 4,019,056.
Airco, Inc.: *See—*
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Aja, Raymond A.; and Dufault, Alphonse C. Typeball cleaning apparatus. 4,017,933, Cl. 15-21.00A.
Akselrad, Aline; and Novak, Richard Edwin, to RCA Corporation. Composition for making garnet films for improved magnetic bubble devices. 4,018,692, Cl. 252-62.570.
Aktiebolaget Alga: *See—*
Krumlinde, Jockum, 4,018,000.
Aktiebolaget Atomenergi: *See—*
Lundqwist, Nils Rune; and Dahl, Gustav Lennart, 4,018,563.
Aktiebolaget Imo-Industri: *See—*
Segerstrom, Lars, 4,018,549.
Alafuzov, Jury Pavlovich; and Itin, Artur Markovich. Vertical multiple-spindle machine. 4,018,429, Cl. 269-20.000.
Albertson, Clarence E., to Borg-Warner Corporation. Boiling heat transfer surface and method. 4,018,264, Cl. 165-1.000.
Albrecht, Albert B.: *See—*
Heaton, James W.; Warren, Donald W.; and Albrecht, Albert B., 4,018,112.
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Dickey, Buel Earl; and Johnson, David Earl, 4,018,629.
Alden, John M.; and Williams, George C., to Alden Research Foundation. Facsimile apparatus for scanning a selected portion of a graphic record. 4,018,985, Cl. 358-285.000.
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Alden, John M.; and Williams, George C., 4,018,985.
Alfin, Norman J.; and Scott, Robert, to Merlin Industries, Inc. Electroplating of recoverable silver from photographic solutions and cell with current control means therefor. 4,018,658, Cl. 204-109.000.
Allen, John Graham: *See—*
McDermott, Michael John; Allen, John Graham; Jones, Keith; and Wright, Peter Gordon, 4,018,508.
Alley, Vernon L., Jr.; and McHatton, Austin D., to United States of America, National Aeronautics and Space Administration. Amplifying ribbon extensometer. 4,018,085, Cl. 73-88.00R.
Allied Chemical Corporation: *See—*
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Amberg, Stephen W., to Owens-Illinois, Inc. Decorative neckband label for a bottle. 4,018,640, Cl. 156-86.000.
Amberg, Stephen W., to Owens-Illinois, Inc. Apparatus for producing shrunken pilfer-proof neck labels for containers. 4,018,644, Cl. 156-446.000.
Amerace Corporation: *See—*
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Bernstein, Seymour; Lenhard, Robert Herman; and Heller, Milton David, 4,018,764.
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American Micro-Systems, Inc.: *See—*
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American Polarizers, Inc.: *See—*
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American Safety Equipment Corporation: *See—*
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American Stamping Company: *See—*
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AMF Incorporated: *See—*
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Grubb, Daniel Baker, 4,017,954.
Herrmann, Henry Otto, Jr.; and Glover, Douglas Wade, 4,018,977.
Hoover, Charles Donald; and Worman, Jared Nathan, 4,018,997.
Rickards, David William, 4,018,499.
Scheingold, William Samuel; and Youngfleish, Frank Christian, 4,018,494.
Amselem, Armand, to Centre d'Etudes pour l'Industrie Pharmaceutique. 2-Aminothiazolines and a process for preparation thereof. 4,018,786, Cl. 260-306.70T.
Anania, James A., Sr. Educational puzzle game. 4,018,445, Cl. 273-135.00B.
Anderson, Anders, to Suo, Patrick; and Concors, Arthur, part interest to each. Automatic braking device for nesting cart. 4,018,449, Cl. 280-33.99C.
Anderson, Jack, to Allied Steel & Tractor Products, Incorporated. Pneumatic hammer. 4,018,291, Cl. 173-135.000.
Anderson, John A.: *See—*
Adamek, David J.; and Anderson, John A., 4,018,905.
Anderson, Joseph C., to Great Canadian Oil Sands Limited. Recycling aerated scavenged middlings to conditioning step of hot water extraction process. 4,018,665, Cl. 208-11.0LE.
Anderson, Philip P., to Arkla Industries Inc. Absorption refrigerant composition. 4,018,694, Cl. 252-69.000.
Anderson, Ralph A., to Carborundum Company, The. Ceramic elements and insulation assembly including such elements. 4,018,023, Cl. 52-410.000.
Anderson, Richard B.: *See—*
McQuinn, Ted M.; and Anderson, Richard B., 4,018,316.
Andersson, Conny; and Stenkvist, Sven-Einar, to ASEA Aktiebolag. Direct current arc furnace. 4,018,974, Cl. 13-9.00R.
Ando, Koki, to Nissin Shokuhin Kaisha, Ltd. Inner lid of a receptacle for instant-cooking foods. 4,018,355, Cl. 220-23.000.
Ando, Seigo: *See—*
Yamada, Takeo; Watanabe, Katsujiro; and Ando, Seigo, 4,019,131.
Andon, Nicholaki A.; and Fleece, Robert I., to Marathon Oil Company. Intermittent catalyst addition system. 4,018,671, Cl. 208-152.000.
Andreeva, Viktoria Ivanovna; Popova, Alexandra Ljudovikovna; and Lapatukhin, Veniamin Semenovich. High-frequency raster with irregular structure of raster elements. 4,018,958, Cl. 428-141.000.
Andreoli, Bruno; Fiebig, Trauterose; and Maurer, Gustav, to Von Roll AG. Incinerator feed. 4,018,168, Cl. 110-38.000.
Andrews, Norwood H. Jet-type axial pulverizer. 4,018,388, Cl. 241-39.000.
Andros Incorporated: *See—*
Ethington, Gayle M., 4,018,223.
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Bushick, Ronald D.; and Angstadt, Howard P., 4,018,713.
Ankney, Richard C.: *See—*
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Brenner, Arthur Walter, 4,018,536.
Antek Instruments, Inc.: *See—*
Parks, Robert E.; and Marietta, Robert L., 4,018,562.
Antlfinger, George J.; and Reinhart, Richard F., to B. F. Goodrich Company, The. Compositions containing a reactive hydroxyl-containing vinyl chloride polymer. 4,018,966, Cl. 428-423.000.
Aoki, Susumu: *See—*
Otouma, Takashi; Aoki, Susumu; Minaki, Toshiaki; Shibata, Kenichi; and Mori, Kentaro, 4,018,964.
Aoki, Yukio: *See—*
Inoue, Akira; Horie, Koshi; Saito, Koichi; Aoki, Yukio; Ono, Tetsuji; and Ohara, Takashi, 4,018,706.
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Archer, Wesley L.; Simpson, Elbert L.; and Gerard, Raymond R., to Dow Chemical Company, The. Stabilized methylchloroform. 4,018,837, Cl. 260-652.50R.
Ariyama, Kenzo: *See—*
Tani formerly Nishikawa, Tatsuo; and Ariyama, Kenzo, 4,018,524.
Arkla Industries Inc.: *See—*
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Armco Steel Corporation: *See—*
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Armstrong Store Fixture Corporation: *See—*
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Armstrong, William W., to Pfizer Inc. Oxytetracycline compositions. 4,018,889, Cl. 424-80.000.
Arnaud, Guy: *See—*
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Arnold, Robert J.; and Gattuso, Marion J., to UOP Inc. Vulcanization inhibiting compounds. 4,018,855, Cl. 260-947.000.
Aromando, Nick A., to Hillside Metal Products, Inc. Method for manufacturing ball bearings having a sintered metal powder outer race. 4,017,951, Cl. 29-149.5PM.
Aronova, Lia Ilinichna: *See—*
Kruglikov, Anatoly Abramovich; Aronova, Lia Ilinichna; Kuftarev, Vladimir Vasilievich; Sevrjugina, Zoya Sergeevna; and Eletskaya, Vera Konstantinovna, 4,018,740.
Arthur D. Little, Inc.: *See—*
Merrill, Richard E.; and Massucco, Arthur A., 4,018,939.
Arvesen, John P. Automatic shut-off circuit for eight-track tape players and the like. 4,019,202, Cl. 360-74.000.
Asahi Kogaku Kogyo Kabushiki Kaisha: *See—*
Miyata, Katsuhiko, 4,019,191.
Takahashi, Yasuo, 4,018,511.
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Aste, Fortunato, to GAF Corporation. Projector focusing mechanism. 4,018,520, Cl. 353-101.000.
Atlantic Richfield Company: *See—*
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Awerbuch, Leon: *See—*
Rogers, Alfred N.; Awerbuch, Leon; and Abrams, Jack Z., 4,018,656.
Axelrod, Norman N. Optical inspection system. 4,019,050, Cl. 250-222.00R.
Aya, Norimoto: *See—*
Kajio, Yoshihiro; and Aya, Norimoto, 4,018,474.
Ayer, Donald E.; Schlagel, Carl A.; and Flynn, Gordon L., to Upjohn Company, The. Topical clindamycin preparations. 4,018,918, Cl. 424-240.000.
Ayerst McKenna and Harrison Ltd.: *See—*
Failli, Amedeo; Immer, Hans U.; and Gotz, Manfred, 4,018,912.
Aylott, Eric V., to Eylure Limited. Packaging of artificial eyelashes. 4,018,336, Cl. 206-460.000.
B. F. Goodrich Company, The: *See—*
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Fisher, John Melvin, 4,018,321.
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Baccei, Louis J., to Loctite Corporation. Curable poly(alkylene) ether polyol-based grafted resins having improved properties. 4,018,851, Cl. 260-859.00R.
Bachman, Paul L., to Horizons Incorporated, a division of Horizons Research Incorporated. Free radical photosensitive compositions with improved sensitivity and shelf life stability. 4,018,604, Cl. 96-48.00R.
Bacvarov, Dosio C.; and Gomarac, Nicholas G., to I-T-E Imperial Corporation. Orbital disc insulator for $SF_6$ gas-insulated bus. 4,018,978, Cl. 174-28.000.
Badalov, Vladimir Vachaganovich: *See—*
Denikin, Ernst Ivanovich; Khazkhuta, Nikolai Yakovlevich; Shestopalov, Alexandr Andreevich; Badalov, Vladimir Vachaganovich; Vasiliev, Alexandr Alexandrovich; Okunev, Vyacheslav Ivanovich; Kaplan, David Abramovich; Deinego, Jury Borisovich; Kazakov, Alexandr Danilovich; Gienko, Vladimir Ivanovich; Marchenko, Alexei Alexeevich; and Laevsky, Mikhail Avramovich, 4,018,541.
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Baier, Kurt, to Daimler-Benz Aktiengesellschaft. Heater for vehicles. 4,018,380, Cl. 237-12.30C.
Bain, Frederick A.; and Roberts, John O. L., to Great Canadian Oil Sands Limited. Method for reducing mineral content of sludge. 4,018,664, Cl. 208-11.0LE.
Baker, Carl, to Bellack, Elizabeth I., a part interest. Reclaimed plastic material. 4,018,722, Cl. 260-2.300.
Baker, Don R., to Stauffer Chemical Company. Organotin miticidal and insecticidal compounds. 4,018,800, Cl. 260-347.200.
Baker, Don Robert, to Stauffer Chemical Company. Oxime carbonetes as fungicidal or bactericidal agents. 4,018,894, Cl. 424-301.000.



Baker, Nathaniel R.; and Lynch, Frank E., to Mountain Fuel Supply Company. Catalytic flame-type gas burner assembly and method of burning gas. 4,018,553, Cl. 431-7.000.
Baker, William Gene, to Northrop Corporation. Vehicle guidance control link utilizing light beam. 4,018,405, Cl. 244-3.140.
Bakken, Rolf: *See—*
Blom, Ole H.; and Bakken, Rolf, 4,019,034.
Bales, Robert F.: *See—*
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Baliozian, Mardick, to Tolec. Lighting device for photograph or motion-picture photography. 4,019,042, Cl. 240-1.300.
Ball, Douglas C., to Sunar Limited. Office chair. 4,018,479, Cl. 297-455.000.
Bandrowski, Michael, Jr., to General Motors Corporation. Insulated, high efficiency, low heat rejection, engine cylinder head. 4,018,195, Cl. 123-41.760.
Banning, Harmon W., to Weinschel Engineering Company. Coaxial transmission line with reflection compensation. 4,019,162, Cl. 333-96.000.
Barba, Diego; Battistoni, Fabrizio; D'Agostini, Candido; and Macchi, Giorgio, to Societa' Italiana Resine S.I.R. S.p.A. Process for the production of concentrated nitric acid. 4,018,872, Cl. 423-394.000.
Barba, Diego; Battistoni, Fabrizio; D'Agostini, Candido; and Macchi, Giorgio, to Societa' Italiana Resine S.I.R. S.p.A. Processes for the preparation of concentrated nitric acid. 4,018,873, Cl. 423-394.000.
Bare, Thomas M.; and Suh, John T., to Richardson-Merrell Inc. Pharmaceutical compositions and methods of treatment with 1-oxo-1H-2-benzothio pyran-3-carboxylic acid derivatives. 4,018,891, Cl. 424-275.000.
Barichello, Gary Douglas, to Michener Associates, Inc. Resilient sprinkler riser. 4,018,386, Cl. 239-200.000.
Barker, Gerald C., to Coherent Radiation. Lightning rod mirror protection. 4,019,154, Cl. 331-94.50T.
Barker, Kenneth L., to Amerace Corporation. Encapsulated transformer. 4,019,167, Cl. 336-96.000.
Barmeier, Harold J., Jr.: *See—*
Walters, Chester H.; Barmeier, Harold J., Jr.; and Sullivan, Greig E., 4,018,683.
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Barnett, Allan E.: *See—*
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Barnett, Karl F., to Cadillac Products, Inc. Heat shrink packaging. 4,018,337, Cl. 206-484.000.
Barone, Bruno J.; and Kerr, Ralph O., to Petro-Tex Chemical Corporation. Catalyst for preparing maleic anhydride from $C_4$ hydrocarbons. 4,018,709, Cl. 252-435.000.
Barooshian, Charles T.: *See—*
Hartung, Albert F.; Lehan, Frank W.; Barooshian, Charles T.; and Zacharski, Edward J., 4,019,201.
Barr, Anthony J.; and Mullin, Alexander G. Apparatus and method for maximum utilization of elongated stock. 4,017,976, Cl. 33-1.00S.
Barr, Irwin R., to AAI Corporation. Solar energy collection and transfer arrangement and method, and method of assembly. 4,018,211, Cl. 126-270.000.
Barrett, Joseph J., to Allied Chemical Corporation. Spectroscopic temperature measurement. 4,018,529, Cl. 356-45.000.
Barrus, Gordon Brent, to Printronix, Inc. Print hammer energizing and control circuit. 4,019,100, Cl. 361-186.000.
Bartel, Siegfried; Payrhammer, Bernd; and Wurf, Johann, to AGFA-Gevaert, A.G. Apparatus for controlling the movements of printing filters. 4,018,527, Cl. 355-71.000.
Bartholomew, Donald D.: *See—*
Kochte, Werner W. F. K.; and Bartholomew, Donald D., 4,017,961.
Bartram, Ronald D.; and Runkle, Charles J., to Monsanto Company. Apparatus for shaping wire and ribbon structures obtained by slitting metallic coil stock. 4,018,073, Cl. 72-199.000.
BASF Aktiengesellschaft: *See—*
Burdorf, Donald L., 4,018,402.
Koester, Eberhard; Wunsch, Gerd; Schoenafinger, Eduard; Schneehage, Hans Henning; and Jakusch, Helmut, 4,018,882.
Neumann, Ute; Roller, Hermann; Hartmann, Job-Werner; Hack, Joachim; Motz, Herbert; and Ostertag, Werner, 4,018,968.
Petri, Rolf; Distler, Harry; and Bechert, Bertold, 4,018,618.
Roller, Hermann; Senkpiel, Werner; Wunsch, Gerd; Hartmann, Job-Werner; Fuchs, Friedrich; Hack, Joachim; Kiener, Volker; Motz, Herbert; and Ostertag, Werner, 4,018,967.
BASF Wyandotte Corporation: *See—*
Vogt, Herwart C.; Parekh, Manher; and Patton, John T., Jr., 4,018,708.
Vogt, Herwart C.; and Patton, John T., Jr., 4,018,815.
Baslow, Floyd M. Fabric wall coverings. 4,018,260, Cl. 160-327.000.
Bassett, Norman W., to General Motors Corporation. Socket mounting cap. 4,019,045, Cl. 240-41.0BM.
Bates, James John, to National Research Development Corporation. Electrical commutators and slip-rings. 4,019,076, Cl. 310-233.000.
Battistoni, Fabrizio: *See—*
Barba, Diego; Battistoni, Fabrizio; D'Agostini, Candido; and Macchi, Giorgio, 4,018,872.
Barba, Diego; Battistoni, Fabrizio; D'Agostini, Candido; and Macchi, Giorgio, 4,018,873.
Bauer, Andreas: *See—*
Fiala, Ernst; and Bauer, Andreas, 4,018,478.
Bauer, Johann, to Siemens Aktiengesellschaft. Electrical equipment mounting apparatus including a movable mounting member. 4,018,413, Cl. 248-214.000.
Baumann, Hans D. Perforated valve trim and method for producing the same. 4,018,245, Cl. 137-270.000.
Bausch & Lomb Incorporated: *See—*
Peck, Theodore H., 4,018,505.
Baxter Travenol Laboratories, Inc.: *See—*
Lolachi, Houshang; and Goldsmith, Herbert, 4,018,304.
Uffer, Michael B., 4,018,684.
Bayer Aktiengesellschaft: *See—*
Beck, Gunther; and Holtschmidt, Hans, 4,018,784.
Buchel, Karl Heinz; Meiser, Werner; Plempel, Manfred; and Metzger, Carl, 4,018,924.
Burkholz, Armin; and Muller, Wolfgang Dieter, 4,018,580.
Harnisch, Horst, 4,018,796.
Jaschinski, Klemens; Fuhr, Werner; and Brandle, Karl, 4,018,262.
Moller, Eike; Meng, Karl; Wehinger, Egbert; and Horstmann, Harald, 4,018,890.
Wollweber, Hartmund; and Flucke, Winfried, 4,018,814.
Bazhenov, Sergei Nikolaevich; and Belyavsky, Efim Mordukhovich. Asymmetrical transistorized multivibrator with inductive timing circuits. 4,019,158, Cl. 331-113.00R.
BBC Brown Boveri & Company Limited: *See—*
Buxbaum, Charley; and Gessinger, Gernot, 4,019,081.
Lips, Hans-Peter, 4,019,115.
Beastrom, Ralph Emil; Bowen, Arlen John; Keller, Ronald James; and Nutt, David George, to International Business Machines Corporation. Multiplexing document card reader with convex lens. 4,019,065, Cl. 250-553.000.
Beavitt, Alan R., to Square D Company. Reed contact unit. 4,019,163, Cl. 335-154.000.
Bechert, Bertold: *See—*
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Bechtel International Corporation: *See—*
Rogers, Alfred N.; Awerbuch, Leon; and Abrams, Jack Z., 4,018,656.
Shoemaker, Robert S.; Moyer, Donald H.; and Newman, Joseph J., 4,018,396.
Beck, Gunther; and Holtschmidt, Hans, to Bayer Aktiengesellschaft. Preparation of trichlorothiazole and intermediate. 4,018,784, Cl. 260-302.00R.
Beckman Instruments, Inc.: *See—*
Dzula, Gregory; Levine, Melvin; and Sperry, Elmer Ambrose, III, 4,018,089.
Beecham Group Limited: *See—*
Hodge, Richard Anthony Vere, 4,018,916.
Soulal, Maurice John; and Utting, Kenneth, 4,018,783.
Beeman, Robert H., to GTE Automatic Electric Laboratories Incorporated. Multifrequency signal parity detector. 4,018,991, Cl. 179-84.0VF.
Beerwerth, Wolfgang; Geppert, Albrecht; Gesing, Horst; and Schimmer, Rigobert, to Licentia Patent-Verwaltungs-G.m.b.H. Device for bonding electrodes to semiconductor devices. 4,018,373, Cl. 228-44.10A.
Behr, Michael Isaac: *See—*
Brutsch, Werner; Behr, Michael Isaac; and Gyi, Ko Ko, 4,017,965.
Behringwerke Aktiengesellschaft: *See—*
Bohn, Hans; and Winckler, Wilhelm, 4,018,885.
Beier, Alfred, to Volkswagenwerk Aktiengesellschaft. Exhaust gas return valve actuating rod. 4,018,098, Cl. 74-470.000.
Belanger, Inc.: *See—*
Belanger, James A., 4,018,014.
Belanger, James A., to Belanger, Inc. Hub structure for rotary finishing wheels. 4,018,014, Cl. 51-337.000.
Belew, Robert R., to United States of America, National Aeronautics and Space Administration. Emergency descent device. 4,018,423, Cl. 254-158.000.
Belknap, Donald J. Apparatus for making incandescent lamps and the like. 4,017,956, Cl. 29-810.000.
Bell & Howell Company: *See—*
Broderick, Milan A.; Porazinski, Robert F.; and Mateja, Eugene V., 4,018,525.
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Bell Telephone Laboratories, Incorporated: *See—*
Fallon, Joseph Michael; and Stochel, Nathan Harold, 4,019,143.
Grau, Thomas George, 4,019,129.
Kustka, George John; and Mueller, Kurt Hugh, 4,019,149.
Maione, Theodore Lincoln; Radcliffe, Frederick Enyeart; Sell, Darrell Dean; and Wolaver, Dan Holden, 4,019,048.
Miller, Stewart Edward, 4,019,051.
Nelson, Terence John, 4,019,177.
Swerdlow, Richard Barry, 4,019,140.
Bellack, Elizabeth I.: *See—*
Baker, Carl, 4,018,722.
Beltz, Klaus; Frankenfeld, Klaus; and Gotzmann, Karl, to Chemische Fabrik Budenheim Rudolf A. Oetker. Process for the extractive purification of phosphoric acid containing cationic impurities. 4,018,869, Cl. 423-321.00S.
Belyavsky, Efim Mordukhovich: *See—*
Bazhenov, Sergei Nikolaevich; and Belyavsky, Efim Mordukhovich, 4,019,158.
Benda, George, to Lawrence Peska Associates, Inc., a part interest. Kit for renovating a planar surface. 4,018,332, Cl. 206-223.000.
Bendix Corporation, The: *See—*
Dunbar, Jack E., 4,018,243.
Fannin, Richard C., 4,018,485.

Hinds, Duane E.; and Ankney, Richard C., 4,018,582.
Ritsema, Irving R.; and Colpaert, James J., 4,018,310.

Bennefeld, David H., to Introl Corporation. Battery charger with automatic change from current to voltage mode control. 4,019,111, Cl. 320-23.000.

Bennett, George Thomas, to General Motors Corporation. Air flow guide mechanism. 4,018,159, Cl. 98-40.0VM.

Bente, Alfred, to Messrs. adidas Sportschuhfabriken Adi Dassler K.G. Trousers for combined training and leisure suit. 4,017,910, Cl. 2-232.000.

Bergen, Richard F.: *See—*
Sheridon, Nicholas K.; Kermisch, Dorian; and Bergen, Richard F., 4,018,603.

Berger, Harold: *See—*
Spicer, Larry Dean; Quinlan, James Michael; and Berger, Harold, 4,018,932.

Berger, Joel G., to Endo Laboratories, Inc. Substituted indolobenzazepines. 4,018,930, Cl. 424-267.000.

Berger, Johann; and Berger, Josef. Belting for safety belts. 4,018,960, Cl. 428-193.000.

Berger, Josef: *See—*
Berger, Johann; and Berger, Josef, 4,018,960.

Berger Maschinenfabriken G.m.b.H. & Co.: *See—*
Moelders, Johann, 4,018,006.

Berger, Sol J. Display clip for point of purchase displays. 4,017,991, Cl. 40-128.000.

Berges, David Alan, to SmithKline Corporation. 3-Heterocyclicthiomethylcephalosporins. 4,018,759, Cl. 260-243.00C.

Berk, Charles W.: *See—*
Sitek, George J.; and Berk, Charles W., 4,019,017.

Berkenblit, Melvin; Lussow, Robert O.; Park, Kyu Chang; and Reisman, Arnold, to International Business Machines Corporation. Gas discharge display panel fabrication. 4,018,490, Cl. 316-21.000.

Berkowitz, Murray, to Curtiss-Wright Corporation. Rotary trochoidal compressor. 4,018,548, Cl. 418-61.00A.

Berluti, Vincent, Jr.: *See—*
Fitzsimmons, Thomas W.; Berluti, Vincent, Jr.; Wagner, Howard G.; and Shapiro, Jonathan S., 4,018,716.

Bernady, Karel Francis: *See—*
Schaub, Robert Eugene; Bernady, Karel Francis; and Weiss, Martin Joseph, 4,018,811.

Bernard-Moteurs: *See—*
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Bernstein, Jack: *See—*
Hoehn, Hans; Bernstein, Jack; and Vogt, B. Richard, 4,018,779.

Bernstein, Seymour; Lenhard, Robert Herman; and Heller, Milton David, to American Cyanamid Company. Ureylenebis methyl-phenylene-carbonyl-bis-dihydro-2-oxo-naphthoxazine disultonic acids. 4,018,764, Cl. 260-246.00R.

Berol Kemi AB: *See—*
Hellsten, Karl Martin Edvin; and Karlsson, Birgit Tora Gunvor, 4,018,696.

Berry, Robert Frank, to Dresser Industries, Inc. Mandrel locking sleeve. 4,018,273, Cl. 166-120.000.

Berry, William: *See—*
Garrett, Wayne O., 4,018,207.

Bertele, Jurgen: *See—*
Bertele, Ludwig, 4,018,510.

Bertele, Ludwig, to Bertele, Ludwig; and Bertele, Jurgen, part interest to each. Varifocal objective containing movable lens component of positive refractivity. 4,018,510, Cl. 350-184.000.

Bertenburg, Joachim: *See—*
Heiermann, Klaus; Pohler, Carl-Ludwig; and Bertenburg, Joachim, 4,018,114.

Bertolacini, Ralph J., to Standard Oil Company (Indiana). Catalytic composition. 4,018,711, Cl. 252-455.00Z.

Bertoldi, Attilio. Apparatus having oscillating permeable walls for fabric treatment. 4,018,068, Cl. 68-175.000.

Besson, Andre, to Thomson-CSF. Vacuum-tight seals between ceramic and aluminium components, evacuated envelopes incorporating the components sealed by said method, and vacuum tubes incorporating said envelopes. 4,019,080, Cl. 313-317.000.

Beyerlein, Fritz W., to Signetics Corporation. Semiconductor assembly and method. 4,017,963, Cl. 29-577.000.

BICC Limited: *See—*
Proud, Stanley Harold Russell, 4,018,315.

Bicking, John B.: *See—*
Cragoe, Edward J., Jr.; Bicking, John B.; and Smith, Robert L., 4,018,802.

Bidwell, Robert E.: *See—*
Kurtz, Leonard D.; and Bidwell, Robert E., 4,018,224.

Bieler, Hans. Braking device for skis. 4,018,455, Cl. 280-605.000.

Bierwith, Stanton F., to Great Canadian Oil Sands Limited. Method for preparing consumable electroslag guide nozzle. 4,018,861, Cl. 264-61.000.

Bigelow, Leon J. Quick release locking device. 4,018,453, Cl. 280-512.000.

Bilbee, Larry T.; and Clabaugh, Thomas L., to Gorman-Rupp Company, The. Controlled temperature fluid heater. 4,019,020, Cl. 219-302.000.

Bilsback, Malvin S., to International Business Machines Corporation. Interconnection for conductor assemblies having closely spaced conductive lines. 4,018,496, Cl. 339-17.00F.

Biocel Corporation: *See—*
Penque, Ronald A., 4,018,620.

Bird, David M. Simulated hockey game goal units. 4,018,443, Cl. 273-85.00R.

Biro, David W. Electronic musical instrument. 4,018,127, Cl. 84-1.280.

Bisegna, Frank A., to Red Top Fuel Company. Apparatus for increasing the efficiency of heating systems for buildings. 4,018,381, Cl. 237-55.000.

Bizhanov, Frunze Bizhanovich; Sokolsky, Dmitry Vladimirovich; Omarov, Ashim Kuranbaevich; Khisametdinov, Akhmed Miftakhovich; Ongarbaev, Sagynbek; and Popov, Nikolai Ivanovich. Method of producing polyhydric alcohols. 4,018,835, Cl. 260-635.00C.

Black Body Corporation: *See—*
Wells, Harold D.; Hughes, E. Warner; and Bales, Robert F., 4,017,967.

Black and Decker Manufacturing Company, The: *See—*
Weber, Edwin Joseph, 4,018,037.

Black, Larry J., to Eli Lilly and Company. Sequential contraceptive method using two types of progestational agents. 4,018,919, Cl. 424-242.000.

Blackwood, John C., to Stepan Chemical Company. Metal fastener sticks and process of preparing same by curing polymeric binder for said under conditions of U.V. irradiation. 4,018,333, Cl. 206-343.000.

Bland, James R.; and Brunka, Rueben R., to Caterpillar Tractor Co. Frictionally held control linkage for engine throttle controls and the like. 4,018,104, Cl. 74-531.000.

Blank, Izhak, to Hydrophilics International, Inc. Sustained release polymers. 4,018,594, Cl. 71-97.000.

Blazenin, Miroslav; Rohs, Hans-Gunter; and Zeller, Bruno, to Gebr. Boehringer G.m.b.H. Apparatus for adjusting the cutting edge of a tool in a machine tool. 4,018,113, Cl. 82-2.00B.

Bloch, Herman S.; and Schmerling, Louis, to UOP Inc. Production of monochloro-substituted saturated compounds. 4,018,836, Cl. 260-648.00R.

Block, Barry; and Aine, Harry E., to Diax Corporation. Infrared laser detector employing a pressure controlled differential optoacoustic detector. 4,019,056, Cl. 250-344.000.

Block Engineering, Inc.: *See—*
Hirschfeld, Tomas, 4,018,530.

Blom, Ole H.; and Bakken, Rolf, to Bloms Oppmaling A/S. Method for determining the interior shape of spherical tanks for the computation of the liquid volume of the tanks, and device for carrying out the method. 4,019,034, Cl. 235-151.300.

Blomenkamp, Robert W., to Physics International Company. Band pass filter for impulse operation. 4,019,147, Cl. 328-167.000.

Bloms Oppmaling A/S: *See—*
Blom, Ole H.; and Bakken, Rolf, 4,019,034.

Blount, Richard, to General Electric Company. Photoflash lamp array having shielded switching circuit. 4,019,043, Cl. 240-1.300.

Bochynsky, Frank J.; and Przybylek, George J., to Byke Co., The. Protective garment for the face. 4,017,906, Cl. 2-10.000.

Bode, Robert Euland, to Continental Oil Company. Blowout preventer testing apparatus. 4,018,276, Cl. 166-183.000.

Bodor, Nicolae S.; and Kaminski, James J., to Interx Research Corporation. Method of arresting bacterial growth with certain selected dichloro-2,2,5,5-tetrasubstituted-3-6-piperazinediones. 4,018,925, Cl. 424-250.000.

Boeke, Jan. Optical window used in device for monitoring clarity of a fluid. 4,018,513, Cl. 350-319.000.

Boffardi, Bennett P.; Cook, Michael M.; and Ralston, Paul H., to Calgon Corporation. Corrosion inhibition with amine adducts of maleic anhydride polymers. 4,018,702, Cl. 252-389.00R.

Boffardi, Bennett Patsy: *See—*
Ralston, Paul Hotchkiss; and Boffardi, Bennett Patsy, 4,018,701.

Bohn, Hans; and Winckler, Wilhelm, to Behringwerke Aktiengesellschaft. Steroid-binding globulin and process for preparing it and antibodies thereto. 4,018,885, Cl. 424-12.000.

Bohren, Hans-Ueli: *See—*
Buhler, Marcel; Bohren, Hans-Ueli; and Hodel, Theodore, 4,018,752.

Bolsing, Friedrich. Method of rendering waste substances harmless. 4,018,679, Cl. 210-36.000.

Bom, Cornelis Johannes Gerardus: *See—*
van der Lely, Ary; and Bom, Cornelis Johannes Gerardus, 4,018,170.
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Boney, William G.: *See—*
Mikulicz, Michael Z.; Boney, William G.; and Vora, Bipin V., 4,018,841.

Bonfigli, Daniel J. Shoe tying instructional device. 4,017,984, Cl. 35-8.00R.

Bonkowski, Teofil L.: *See—*
Curry, Byron V.; and Bonkowski, Teofil L., 4,018,027.

Bonner, Alvin Truit, Sr.: *See—*
Stone, William David; and Bonner, Alvin Truit, Sr., 4,018,171.

Bonpei, Gotoh: *See—*
Hideaki, Tohyama; and Bonpei, Gotoh, 4,018,516.

Bonvicini, Gene Ferruccio. Air heater. 4,018,209, Cl. 126-121.000.

Borg-Warner Corporation: *See—*
Albertson, Clarence E., 4,018,264.
Lemon, Robert William, 4,018,317.

Borg-Warner, GmbH: *See—*
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Bormann, Alan Richard, to Motorola, Inc. Low power output disable circuit for random access memory. 4,019,068, Cl. 307-205.000.



Borneman, Lawrence A., to A. B. Dick Company. Universal master cylinder for offset presses. 4,018,158, Cl. 101-132.500.

Boskamp, Jelles Vincent: *See—*
Segeren, Antonius Johannes Maria; and Boskamp, Jelles Vincent, 4,018,903.

Bosshard, Ernst, to Sulzer Brothers Limited. Apparatus for irradiating goods conveyed in receptacles. 4,018,348, Cl. 214-17.00B.

Boswell, Donald D.; Grinberg, Jan; Jacobson, Alexander D.; and Myer, Gary D., to Hughes Aircraft Company. Optical data processing system with reflective liquid crystal light valve. 4,018,509, Cl. 350-160.0LC.

Botvin, George B., to ACS Industries, Inc. Method of making a scouring pad or the like. 4,017,949, Cl. 28-77.000.

Bovenlander, Johannes Peter: *See—*
Comiskey, Gary F.; Hesse, Gregory N.; and Bovenlander, Johannes Peter, 4,019,127.

Bowen, Arlen John: *See—*
Beastrom, Ralph Emil; Bowen, Arlen John; Keller, Ronald James; and Nutt, David George, 4,019,065.

Bowes, Emmerson; and Chute, Robert E., to Mallinckrodt, Inc. Production of 2-ethyl hexanal. 4,018,831, Cl. 260-601.00R.

Boyer, Jackson S., to Sunoco Energy Development Co. Freeze-thaw method for reducing mineral content of a clay-water mixture. 4,018,682, Cl. 210-71.000.

Boyertown Burial Casket Company: *See—*
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Boylan, John R.: *See—*
Shufflebarger, Earl D.; Kish, Edward E.; Cunningham, Frank M.; Boylan, John R.; and Murauskas, Donald J., 4,018,686.

Bozeman, Hoyt W., Jr., to Lindsey Manufacturing Company. Bundle conductor stringing block with rotary threading gate. 4,018,422, Cl. 254-134.3PA.

Braetsch, Norbert: *See—*
Rudert, Wolfgang; Schulmeister, Robert; Schlaupitz, Manfred; and Braetsch, Norbert, 4,018,053.

Bram, Georges Eugene, to Everitube. Sealed joint having a socket. 4,018,461, Cl. 285-110.000.

Bram, Stanley, to Institut Pasteur. Device for determining the spatial distribution of radioactivity within an object. 4,019,057, Cl. 250-375.000.

Brandle, Karl: *See—*
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Brandriff, Robert. Disposable operating room gown. 4,017,909, Cl. 2-114.000.

Brawner, William Howard: *See—*
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Breed Corporation: *See—*
Breed, David S.; Thuen, Torbjorn; and Breed, Allen K., 4,018,164.

Breed, David S.; Thuen, Torbjorn; and Breed, Allen K., to Breed Corporation. Projectile fuze containing a floating body. 4,018,164, Cl. 102-78.000.

Brems, John Henry. Rotary and linear reversible indexing mechanism. 4,018,090, Cl. 74-52.000.

Brenner, Arthur Walter, to Anson Incorporated. Writing instrument top. 4,018,536, Cl. 401-292.000.

Brewer, Gerald L., to UOP Inc. Fume absorbing-treating system. 4,018,568, Cl. 23-288.00F.

Bridgestone Tire Company Limited: *See—*
Nakamoto, Yuzuru; Kubota, Eishi; and Suzuki, Fukushi, 4,018,570.

Brigham, Loraine M., heir: *See—*
Brigham, Roger S., deceased; and Brigham, Loraine M., heir, 4,018,952.

Brigham, Roger S., deceased; and by Brigham, Loraine M., heir, to Continental Can Company, Inc. Spray-coating method. 4,018,952, Cl. 427-425.000.

Brinkmann, Ludwig; and Herwig, Walter, to Hoechst Aktiengesellschaft. Transparent copolyamides from m-xylylene diamine, an aliphatic diamine and terephthalic acid. 4,018,746, Cl. 260-78.00R.

Bristol-Myers Company: *See—*
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Brix, Jochim, to Schottel-Werft Josef Becker KG. Lateral thrust control unit for watercrafts. 4,018,181, Cl. 114-151.000.

Broan Manufacturing Co., Inc.: *See—*
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Broderick, Milan A.; Porazinski, Robert F.; and Mateja, Eugene V., to Bell & Howell Company. Instant image film camera with inspection station. 4,018,525, Cl. 355-27.000.

Bronnert, Fritz: *See—*
Finkenzeller, Johann; Bronnert, Fritz; and Weiss, Karl, 4,019,061.

Brooks, Houston George, Jr., to American Cyanamid Company. Synthesis of aromatic sulfur-oxygen transition metal complexes. 4,018,807, Cl. 260-439.00R.

Brouwer, Gerardus J., to Brouwer Turf Equipment Limited. Sod cutting knife with separate side blades. 4,018,287, Cl. 172-19.000.

Brouwer Turf Equipment Limited: *See—*
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Brown, Albert R.: *See—*
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Brown, Boveri & Cie. A.G.: *See—*
Fischer, Wilfried; Kleinschmager, Herbert; Haar, Wilheim; Weddigen, Gert; and Rohr, Franz-Josef, 4,018,969.

Brown, Claude H., to Jet Research Center, Inc. Placement method for Q.D. charges using minimum diving time. 4,018,163, Cl. 102-23.000.

Brown, Elwood B.; and Kropp, Helmut H., to Rexnord Inc. Gimbaled conveyor balls. 4,018,322, Cl. 193-37.000.

Brown, Joe R.; Lindsey, William C.; and Manderscheid, Phillip H., to Brown Oil Tools, Inc. Well packer apparatus. 4,018,272, Cl. 166-119.000.

Brown, Murray Hunter, to Puckett, John R., a part interest. Cover. 4,017,917, Cl. 5-60.000.

Brown Oil Tools, Inc.: *See—*
Brown, Joe R.; Lindsey, William C.; and Manderscheid, Phillip H., 4,018,272.
Cochran, Chudleigh B., 4,018,274.

Brown, Richard E.; Puchalski, Chester; and Shavel, John, Jr., to Warner-Lambert Company. Substituted benzopyrano[3,4-c]pyridine-5-ones. 4,018,766, Cl. 260-247.20B.

Brown, Richard P., to Mount Hope Machinery Company, Incorporated. Liquid-lubricated roll with anti-flooding barriers. 4,018,302, Cl. 184-6.260.

Brown, Robert W.: *See—*
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Brown, Wilburn Kelly, to Pettibone Corporation. Hydraulic cyliner systems with safeguarded float action. 4,018,350, Cl. 214-140.000.

Brueckner, Keith A.; Jorna, Siebe; and Moncur, N. Kent, to KMS Fusion, Inc. Multiple pass laser amplifier system. 4,019,151, Cl. 330-4.300.

Brundin, Bengt; and Trepte, Wulf, to Siemens Aktiengesellschaft. Patient's support arrangement for an X-ray apparatus. 4,019,059, Cl. 250-451.000.

Brunka, Rueben R.: *See—*
Bland, James R.; and Brunka, Rueben R., 4,018,104.

Bruno, Leonard. Oscillating spray head. 4,018,385, Cl. 239-102.000.

Brushwyler, Gordon R.; and Scott, Timothy F., to Robertshaw Controls Company. Instrument sensor assembly. 4,018,661, Cl. 204-195.00F.

Brutsch, Werner; Behr, Michael Isaac; and Gyi, Ko Ko, to Burroughs Corporation. Method of making a transducer head with narrow core structure. 4,017,965, Cl. 29-603.000.

Bruun, Bjorn Adler Zeuthen. Press for production of a dry fodder. 4,018,149, Cl. 100-160.000.

Bryan, John F., Jr. Tie replacing system. 4,018,165, Cl. 104-9.000.

Buchanan, Ronald Leslie: *See—*
Buyniski, Joseph Paul; Jelenevsky, Alex Michael; and Buchanan, Ronald Leslie, 4,018,767.

Buchel, Karl Heinz; Meiser, Werner; Plempel, Manfred; and Metzger, Carl, to Bayer Aktiengesellschaft. Phenyl-imidazolyl-acetamide derivatives. 4,018,924, Cl. 424-250.000.

Buck, Alfred. Apparatus and method for producing meshware. 4,018,063, Cl. 66-90.000.

Buckman Laboratories, Inc.: *See—*
Buckman, Stanley J.; and Mercer, Gerald D., 4,018,592.

Buckman, Stanley J.; and Mercer, Gerald D., to Buckman Laboratories, Inc. Method of controlling the growth of algae. 4,018,592, Cl. 71-67.000.

Budd, James Michael: *See—*
Rastogi, Vijay; Budd, James Michael; and Koehler, Daniel Lynn, 4,018,482.

Budker, Gersh Itskovich; Morozov, Sergei Nikolaevich; Nezhevenko, Oleg Alexandrovich; Ostreiko, Gennady Nikolaevich; and Shekhtman, Isai Abramovich. Electrovacuum SHF apparatus. 4,019,088, Cl. 315-5.240.

Buess, Charles Merlyn: *See—*
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Bugaut, Andree: *See—*
Kalopissis, Gregoire; and Bugaut, Andree, 4,018,556.

Buhler, Marcel; Bohren, Hans-Ueli; and Hodel, Theodore, to Societe d'Assistance Technique pour Produits Nestle S.A. Ultrafiltration process for the recovery of proteins from milk. 4,018,752, Cl. 260-112.00R.

Bukalo, Alfred Iosifovich: *See—*
Paton, Boris Evgenievich; Lakomsky, Victor Iosifovich; Melnik, Gary Alexandrovich; Chvertko, Anatoli Ivanovich; and Bukalo, Alfred Iosifovich, 4,018,973.

Bulanchuk, William J., to Midland-Ross Corporation. Joint for electrical conductors. 4,018,497, Cl. 339-22.00B.

Bullinga, Johannes, to Rockwell International Corporation. Current limiting apparatus. 4,019,096, Cl. 361-86.000.

Bulliot, Georges Leon Marcel, to Societe Alsacienne de Constructions Mecaniques de Mulhouse. Devices for connecting two co-axial shafts for rotation and in the axial direction. 4,018,062, Cl. 64-7.000.

Bulten-Kanthal Aktiebolag: *See—*
Lejdegard, Sixten H., 4,018,334.

Burch, John L.; and Johnston, James D., to United States of America, National Aeronautics and Space Administration. Combined docking and grasping device. 4,018,409, Cl. 244-161.000.

Burdette, James Reuben. Reinforced concrete slat floor. 4,018,188, Cl. 119-28.000.

Burdorf, Donald L., to BASF Aktiengesellschaft. Tape transport apparatus. 4,018,402, Cl. 242-192.000.

Burgess, Norman, to Thorn Electrical Industries Limited. Method of electrode mounting in high-pressure sodium discharge lamp. 4,019,078, Cl. 313-217.000.

Burkart, Oskar, to Marker, Hannes. Device for damping vibration of a ski. 4,018,454, Cl. 280-602.000.

Burkholz, Armin; and Muller, Wolfgang Dieter, to Bayer Aktiengesell-

schaft. Separator for separating liquid droplets from a stream of gas. 4,018,580, Cl. 55-321.000.
Burns, James A., to Airco, Inc. Automatic switchover valve and system utilizing same. 4,018,244, Cl. 137-113.000.
Burroughs Corporation: *See—*
Brutsch, Werner; Behr, Michael Isaac; and Gyi, Ko Ko, 4,017,965.
Burtis, Wilson A.; and Babcock, William C. Anti-pollution nozzle assembly. 4,018,252, Cl. 141-45.000.
Bushick, Ronald D.; and Angstadt, Howard P., to Sun Ventures, Inc. Ammoxidation catalyst. 4,018,713, Cl. 252-464.000.
Busta, Francis F.; Schmidt, Bruce E.; and McKay, Larry L., to University of Minnesota, The Regents of the. Method of production and recovery of protein from food wastes. 4,018,650, Cl. 195-28.00R.
Butcher, Roger Anthony, to Aerosol Inventions & Development S.A. AIDSA. Valve actuators for pressurized dispensers. 4,018,365, Cl. 222-402.110.
Buttarelli, Luigi, to Prodotti Gianni S.r.l. Product for activating and potentiating vegetable metabolism and for conditioning agricultural soil and method for the preparation thereof. 4,018,591, Cl. 71-23.000.
Buxbaum, Charley; and Gessinger, Gernot, to BBC Brown Boveri & Company Limited. Reaction cathode. 4,019,081, Cl. 313-346.00R.
Buyniski, Joseph Paul; Jelenevsky, Alex Michael; and Buchanan, Ronald Leslie, to Bristol-Myers Company. Anti-arrhythmic agents. 4,018,767, Cl. 260-247.20A.
B.V. "Eminent" Fabriek van Electronische Orgels: *See—*
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C.A.V. Limited: *See—*
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Cal Crown Corporation: *See—*
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Calabro, Anthony D. Circuit board mounting device. 4,019,099, Cl. 361-399.000.
Caldwell, Frank J.; and Heckman, Thomas B., to Hobart Corporation. Tray washer apparatus. 4,018,239, Cl. 134-143.000.
Caldwell, John C.: *See—*
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Boffardi, Bennett P.; Cook, Michael M.; and Ralston, Paul H., 4,018,702.
Ralston, Paul Hotchkiss; and Boffardi, Bennett Patsy, 4,018,701.
Callahan, Harold E. Mounting for power toothbrush. 4,017,934, Cl. 15-176.000.
Camco, Incorporated: *See—*
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Campbell, Joseph K. Pipe stress/strain neutralizer. 4,018,463, Cl. 285-166.000.
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Canno, Leonard E., to Equitable Bag Co., Inc. Box-bag with permanently secured handle. 4,018,142, Cl. 93-35.00H.
Cannon, Robert L. Electronic metronome. 4,018,131, Cl. 84-484.000.
Canon Denshi Kabushiki Kaisha: *See—*
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Canon Kabushiki Kaisha: *See—*
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Taniguchi, Tadasu; Hosaka, Iwao; and Kato, Shigehiro, 4,019,025.
Canon Seiki Kabushiki Kaisha: *See—*
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Canova, Levy A., to SCM Corporation. Selective hydrogenation of α-pinene to cis-pinane. 4,018,842, Cl. 260-675.500.
Canto, Elio D.; and Padovani, Albert H. Method for regenerating glucose oxidase reagent. 4,018,651, Cl. 195-103.50C.
Cape, Arthur T., to Coast Metals, Inc. Method of and apparatus for hard facing poppet valves. 4,019,011, Cl. 219-76.000.
Capetti, Raffaele, to A. Tonolli & C. S.p.A. Process for obtaining skeins of wire rod of a weight which is a multiple of that of a wirebar. 4,018,376, Cl. 228-158.000.
Capuano, Antonio, to SIGMA S.p.A. Device for pressing Louis shoe heels. 4,017,929, Cl. 12-16.400.
Capuano, Antonio, to Sigma S.p.A. Universal device for pressing soles on shoes. 4,017,930, Cl. 12-33.000.
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Cargill, N. Allen, to Mohawk Data Sciences Corporation. Ballistic print hammer assembly. 4,018,155, Cl. 101-93.330.
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Carlson, David H. J.; and Urban, Peter, to Universal Oil Products Company. Reactivation of a spent liquid phthalocyanine catalytic composite. 4,018,705, Cl. 252-411.00R.
Carlson, James E.; and Urmston, Robert E. Method and apparatus for sleep induction. 4,018,218, Cl. 128-1.00C.
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Carr, Charles E. Valve. 4,018,248, Cl. 137-514.300.
Carr, Clifford H. Springless ball valve for high speed compressors. 4,018,247, Cl. 137-512.100.
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Carson, Earl L.; and Carson, Donald W., to Raymond Lee Organization, Inc., The, a part interest. Whirlwind power system. 4,018,543, Cl. 415-2.000.
Carter, Lewis D. Mailbox signal device. 4,018,379, Cl. 232-35.000.
Casey, James P., to Microfibres, Inc. Method of making a differentially shrunk flocked fabric, and flocked fabric product. 4,018,956, Cl. 428-86.000.
Cason, Charles M., III, to United States of America, Army. Device for measuring energy transfer rates during lasing. 4,018,535, Cl. 356-218.000.
Cassella Farbwerke Mainkur Aktiengesellschaft: *See—*
Raabe, Thomas; Scholtholt, Josef; and Nitz, Rolf-Eberhard, 4,018,778.
Cassia, Antonio Macchi, to Steiner American Corporation. Soap dispenser. 4,018,363, Cl. 222-80.000.
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Hasselbacher, Roland E., 4,018,295.
Latimer, Robert M., 4,018,424.
Cates, Raymond H., Jr.; Martin, Walter L., Jr.; and Smith, Sumpter D., to PPG Industries, Inc. Environmental control of bushing. 4,018,586, Cl. 65-2.000.
Catlin, Benjamin John; and Williams, Tegwyn Pierce, to Thomas J. Lipton, Inc. Comminuted meat product and method of preparing same. 4,018,935, Cl. 426-646.000.
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Chaivre, Joseph W.; and Jadach, Albert A., to Towne Robinson Fastener Company. Capped wheel nut. 4,018,133, Cl. 85-35.000.
Chalupsky, Paul A., to FMC Corporation. Material handling equipment operator's cab mounting. 4,018,473, Cl. 296-28.00C.
Chamberlain, Richard W., to Caterpillar Tractor Co. Control linkage mechanism. 4,018,103, Cl. 74-519.000.
Chamberlain, Savvas Georgiou; and Heller, Lawrence Griffith, to International Business Machines Corporation. Highly sensitive charge-coupled photodetector including an electrically isolated reversed biased diffusion region for eliminating an inversion layer. 4,019,199, Cl. 357-24.000.
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Chan, David Cheong King, to Chevron Research Company. 3-Halohydrocarbylthio-1,2,3-benzoxathiazin-4-(3H)-one 2-oxides. 4,018,920, Cl. 424-246.000.
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Chang, David R., to General Electric Company. Metal of improved environmental resistance. 4,018,569, Cl. 428-678.000.
Chang, Harry L., to Mobil Oil Corporation. Oil recovery by waterflooding with improved mobility control. 4,018,281, Cl. 166-273.000.
Chang, Wen-Hsuan; Scriven, Roger L.; and Prucnal, Paul J., to PPG Industries, Inc. Polyurethane polyol compositions modified with an alkylenimine. 4,018,849, Cl. 260-849.000.
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Sweeney, William A.; and Simic, Milutin, 4,018,657.
Chew, Otto F., Jr.; and Hinshaw, Louis W. Ring whirling device. 4,018,444, Cl. 273-109.000.
Chowning, John M., to Leland Stanford Junior University, The Board of Trustees of. Method of synthesizing a musical sound. 4,018,121, Cl. 84-1.010.
Christensson, Od Wikar, to Christenssons Maskiner & Patenter AB. Arrangement for vacuum packing of foodstuffs and the like. 4,018,030, Cl. 53-124.00B.
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Christophel, Reuben L., to Shenandoah Manufacturing Company, Inc. Forced air convector/heater fireplace grate structure. 4,018,210, Cl. 126-164.000.
Christy, Marcia Elizabeth, to Merck & Co., Inc. Phenylthioaralkylamines. 4,018,830, Cl. 260-570.900.
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Chu, Joseph Y. C., to Xerox Corporation. Method for in situ fabrication of photoconductive composite. 4,018,602, Cl. 96-1.500.
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Moser, Peter; and Nicopoulos, Alex, 4,018,763.
Cicci, George B.; and Tufts, Guy O., to International Harvester Company. Method for harvesting crops using a tractor-pulled crop harvester. 4,018,036, Cl. 56-1.000.
Cimarusti, Christopher M.; Wojtkowski, Paul; and Dolfini, Joseph E., to E. R. Squibb & Sons, Inc. Thio-β-lactam cephalosporins. 4,018,760, Cl. 260-243.00C.
Cimarusti, Christopher M.; Wojtkowski, Paul; and Dolfini, Joseph E., to E. R. Squibb & Sons, Inc. Thio-β-lactam cephalosporins. 4,018,761, Cl. 260-243.00C.
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Clapp, Roy A. Composite photography apparatus and method utilizing a polarizing beam splitting unit. 4,018,519, Cl. 352-89.000.
Clark Equipment Company: *See—*
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Clayton, Malcolm; and Grimshaw, Keith, to English Card Clothing Company Limited, The. Textile carding. 4,017,942, Cl. 19-106.00R.
Cleare, Peter John Vernon, to Imperial Chemical Industries Limited. Process of preparing alkenes. 4,018,838, Cl. 260-654.00R.
Cleeland, Roy, Jr.; Grunberg, Emanuel; Leimgruber, Willy; and Weigele, Manfred, to Hoffmann-La Roche Inc. Fluorogenic materials and labeling techniques. 4,018,884, Cl. 424-7.000.
Clemmens, William B., to Avco Corporation. Gas turbine engines with toroidal combustors. 4,018,043, Cl. 60-39.270.
Coast Metals, Inc.: *See—*
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Cobbledick, David Stanley, to General Tire & Rubber Company, The. Flame retardant flexible urethane foams. 4,018,724, Cl. 260-2.5AB.
Cochran, Chudleigh B., to Brown Oil Tools, Inc. Well packer. 4,018,274, Cl. 166-129.000.
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Coggiola, James P., to General Electric Company. Self-cleaning steam iron. 4,017,988, Cl. 38-77.830.
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Cohen, Marvin P.; Shavel, John, Jr.; and Von Strandtmann, Max, to Warner-Lambert Company. Substituted (4-oxo-4H-1-benzopyran-2-yl)cyclopropane carboxylic acids and esters. 4,018,798, Cl. 260-345.200.
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Cole, Edward L.; and Hess, Howard V., to Texaco Inc. Treatment of solid fuels. 4,018,571, Cl. 44-1.00R.
Cole, James Arlen, to Cabot Corporation. Method of producing tube rods and articles produced therefrom. 4,019,019, Cl. 219-146.000.
Collette, Roderick E., to Pawling Rubber Corporation. Ventilated interlocking floor tile. 4,018,025, Cl. 52-590.000.
Collins, Franklyn M., to Airco, Inc. Bilayer thin film resistor and method for manufacture. 4,019,168, Cl. 338-309.000.
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Comiskey, Gary F.; Hesse, Gregory N.; and Bovenlander, Johannes Peter, to Sun Electric Corporation. Analog oscilloscope. 4,019,127, Cl. 324-16.00S.
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Michaux, Jean-Pierre; and Arnaud, Guy, 4,018,843.
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Condon, Michael E.; Hauck, Frederic P.; and Reid, Joyce, to E. R. Squibb & Sons, Inc. Phenylpiperazinotetrahydronaphthols and derivatives. 4,018,773, Cl. 260-268.0PH.
Cone, Clarence D., Jr. Process for control of cell division. 4,018,649, Cl. 195-1.800.
Conklin, Thomas H.; and Singer, Barry M., to North American Philips Corporation. Pyroelectric vidicon having a protective covering on the pyroelectric target. 4,019,084, Cl. 313-388.000.
Connor, David T.; Young, Patricia A.; and von Strandtmann, Maximilian, to Warner-Lambert Company. 2-Aryl substituted isoxazolo(2,3-alpha)pyridinyl halides. 4,018,781, Cl. 260-297.00B.
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Contois, Lawrence E.; Kaukeinen, Joseph Y.; Michel, Stephen; and Plutchak, Thomas M., to Eastman Kodak Company. Organic azo pigment sensitizers for photoconductive layers. 4,018,606, Cl. 96-1.700.
Contois, Lawrence E., to Eastman Kodak Company. Crystalline organic pigment sensitizers for photoconductive layers. 4,018,607, Cl. 96-1.700.
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Cotter, Robert James; Keogh, Michael John; and Heitz, William Donald, to Union Carbide Corporation. Cross-linked, water insoluble poly(N-glycidyl-piperazine). 4,018,721, Cl. 260-2.00A.
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Cour, Jean M.; and Suchard, Jean F., to Centre d'Etude et de Realisation en Informatique Appliquee - C.E.R.I.A. System and method for reliable communication of stored messages among stations over a single common channel with a minimization of service message time. 4,019,176, Cl. 340-172.500.
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Cramer, Charles Robert; vanLenthe, Gerrit Dirk; and Maier, Dietmar, to Metalorgana Etablissement. Non-yellowing antimicrobial compositions comprising diiodomethyl sulfones. 4,018,611, Cl. 106-15.00R.
Creighton, Gordon Robert, to Ciba-Geigy Corporation. Heat exchangers. 4,017,953, Cl. 29-157.30V.
Crise, W. Paul. Cleaner using intermittent jets of fluid supplied at above ambient pressure. 4,017,938, Cl. 15-346.000.
Critten, Donald Louis; and Johnson, Peter Alan, to Kent Instruments Limited. Correlators. 4,019,038, Cl. 235-181.000.
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Danneman, Douglas L.; and Yetter, Jerry J., to Procter & Gamble Company, The. Amide-stabilized dry powder aerosol antiperspirant compositions and method of preparation. 4,018,887, Cl. 424-47.000.
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Davis, John E.; and McAvoy, Thomas R., to Minnesota Mining and Manufacturing Company. Low density abrasive article. 4,018,575, Cl. 51-295.000.
Davis, Oliver Thurston; Jones, Norman Ray; and Eddy, Elmer Carl. Electromagnetic motor and generator. 4,019,103, Cl. 318-37.000.
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DeCaro, Charles J., to Textron, Inc. Installation tool apparatus. 4,018,254, Cl. 144-32.00R.
Dee, Edward. Combination confection and holder. 4,018,902, Cl. 426-75.000.
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DeLorenzo, Joseph; DiFranco, Julius V.; and Scire, Frank J., to United States of America, Army. Radar signal processor. 4,019,182, Cl. 343-7.00A.
Demko, Paul R.; Washabaugh, Frank J.; and Williams, Robert H., to National Starch and Chemical Corporation. Corrugating adhesive compositions containing thermoplastic polymer, thermosetting resin, and starch. 4,018,959, Cl. 428-182.000.
Dempsey, John E.; and Meinke, Russell F., to General Motors Corporation. Conveyor mechanism. 4,018,032, Cl. 53-247.000.
Denikin, Ernst Ivanovich; Khazkhuta, Nikolai Yakovlevich; Shestopalov, Alexandr Andreevich; Badalov, Vladimir Vachaganovich; Vasiliev, Alexandr Alexandrovich; Okunev, Vyacheslav Ivanovich; Kaplan, David Abramovich; Deinego, Jury Borisovich; Kazakov, Alexandr Danilovich; Gienko, Vladimir Ivanovich; Marchenko, Alexei Alexeevich; and Laevsky, Mikhail Avramovich. Road roller for compacting pavements. 4,018,541, Cl. 404-130.000.
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De Simone, Robert S., to Polak's Frutal Works, Inc. Synthetic musk perfume compound 1,1,2,3,3,5-hexamethylindan-6-nitrile. 4,018,719, Cl. 252-522.000.
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Dickey, Buel Earl; and Johnson, David Earl, to Alco-Gravure, Inc. Apparatus and method for guiding a cutting torch. 4,018,629, Cl. 148-9.00R.
DiCuya, Patsy. Glove form. 4,018,382, Cl. 223-78.000.
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Diggs, Richard E. Irrigation apparatus. 4,017,958, Cl. 29-268.000.
Diggs, Richard E. Tree saw. 4,018,255, Cl. 144-34.00R.
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Dorey, Jacques A., to Office National d'Etudes et de Recherches Aerospatiales (O.N.E.R.A.). Direction-finding method and system. 4,019,184, Cl. 343-113.0DE.
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Dumler, Donald C. Fishing rod holder. 4,017,998, Cl. 43-21.200.
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Eberhardt, H. Alfred, to Hale Fire Pump Company. Centrifugal pump. 4,018,544, Cl. 415-170.00A.
Eckart, George R., to Daniel Woodhead, Inc. Advance grounding system for electrical connectors. 4,018,492, Cl. 339-14.00P.
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Eft, Sheldon E. Water injection system for I.C. engines. 4,018,192, Cl. 123-25.00C.
Egbert, William D.; and McDonald, Wilson C., to Goodyear Aerospace Corporation. Glass shaping form mold. 4,018,589, Cl. 65-287.000.
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Eichenseher, Heinrich; and Eichenseher, Wolfgang. Method of recovering non-ferrous metal conductors from a telecommunication cable laid in the earth. 4,018,058, Cl. 61-105.000.
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Elmi, Stelio Jack, to Gillette Company, The. Catamenial tampon. 4,018,225, Cl. 128-285.000.

Elvin, Sten, to ASEA Aktiebolag. Drive equipment supplied with direct current. 4,019,108, Cl. 318-353.000.

Emblem, Harold Garton: *See—*
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Endo, Norio; and Nishi, Yoshio, to Tokyo Shibaura Electric Co., Ltd. Non-volatile semiconductor memory device. 4,019,198, Cl. 357-23.000.

Endo, Toshihiko: *See—*
Oishi, Minoru; Rokujo, Masaharu; Yokota, Hisaaki; Okuda, Naoki; Tomita, Makoto; and Endo, Toshihiko, 4,019,018.

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Evans, Daniel R. Arm and hand rest device for microsurgery. 4,018,217, Cl. 128-1.00R.

Evans, Elferd L. Strap snubber horn. 4,018,146, Cl. 100-26.000.

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Fabian, Wolfgang; and Kovacs, Jenoe, to Badische Anilin- & Soda-Fabrik Aktiengesellschaft. Manufacture of polyester-imide powders. 4,018,736, Cl. 260-29.20N.

Fabrica Espanola Magnetos, S.A.: *See—*
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Fach, Horst, to Didier Engineering GmbH. Process for feeding coal into horizontal-chamber coke-ovens and charging truck therefor. 4,018,655, Cl. 201-40.000.

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Fallon, Joseph Michael; and Stochel, Nathan Harold, to Bell Telephone Laboratories, Incorporated. Standby apparatus for clock signal generators. 4,019,143, Cl. 328-71.000.

Fannin, Richard C., to Bendix Corporation, The. Fluid pressure braking system with parking brake-service brake interlock. 4,018,485, Cl. 303-13.000.

Farallon Industries, Inc.: *See—*
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Farrell, John J., to Farrell Patent Company. Injection blow molding with improved cooling. 4,018,860, Cl. 264-39.000.

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Fattic, Gerald T., to General Motors Corporation. Fault indicator for motor vehicle battery charging systems. 4,019,120, Cl. 322-28.000.

Faucher, Joseph A.; and Rosen, Meyer Robert, to Union Carbide Corporation. Shaped article for conditioning hair a blend of water-soluble and water-insoluble polymers with interpenetrating networks. 4,018,729, Cl. 260-17.00R.

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Fegley, Charles R. Fluid dispensing anti-burglar device. 4,018,361, Cl. 222-5.000.

Feindt, Hans Heinrich, to U.S. Philips Corporation. Circuit arrangement for producing a compensated current. 4,019,121, Cl. 323-4.000.

Feit, Peter Werner; and Nielsen, Ole Bent Tvaermose, to Leo Pharmaceutical Products Ltd.; and A/S Lovens Kemiske Fabrik Produktionsaktieselskab. Sulfamylbenzoic acid derivatives. 4,018,794, Cl. 260-332.20A.

Fencl, Vernon, to Grotnes Machine Works, Inc. Method of producing high strength steel pipe. 4,018,634, Cl. 148-131.000.

Fennekels, Peter; and Schutze, Herbert, to Girmes-Werke A.G. Machine for printing pile fabrics. 4,018,066, Cl. 68-5.00D.

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Fiala, Ernst; and Bauer, Andreas, to Volkswagenwerk Aktiengesellschaft. Safety belt. 4,018,478, Cl. 297-385.000.

Ficken, Leonard A.; and Podgorny, Gerald J., to UMC Industries, Inc. Nozzle having a lateral chute outlet. 4,018,366, Cl. 222-412.000.

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Finkenzeller, Johann; Bronnert, Fritz; and Weiss, Karl, to Siemens Aktiengesellschaft. X-ray examining apparatus for examination of standing patients. 4,019,061, Cl. 250-470.000.

Fiore, Joseph V., to AMF Incorporated. Mechanical lipid removal from tobacco leaves. 4,018,234, Cl. 131-140.00B.

Firmenich & Cie: *See—*
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Fischer, Wilfried; Kleinschmager, Herbert; Haar, Wilheim; Weddigen, Gert; and Rohr, Franz-Josef, to Brown, Boveri & Cie. A.G. Electrochemical storage cell. 4,018,969, Cl. 429-104.000.

Fisher, John Melvin, to B. F. Goodrich Company, The. Escape slide and platform assembly. 4,018,321, Cl. 193-25.00B.

Fitzgerald, Robert Edward; and Kampe, Robert Frederick, to Chandler Evans Inc. Flow attachment device for thrust vector control. 4,018,384, Cl. 239-265.190.

Fitzsimmons, Thomas W.; Berluti, Vincent, Jr.; Wagner, Howard G.; and Shapiro, Jonathan S., to Machlett Laboratories, Incorporated, The. Radiographic system. 4,018,716, Cl. 250-511.000.

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Foglio, Maurizio; Masi, Paolo; Suarato, Antonino; and Franceschi, Giovanni, to Societa' Farmaceutici Italia S.p.A. Process for the preparation of cephalosporins from the corresponding azetidinone-thiazoline derivatives. 4,018,776, Cl. 260-243.00C.

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Foster Grant Co., Inc.: *See—*
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Fountain, William D.; and Johnson, Bertram C., to United States of America, Energy Research and Development Administration. Active/passive mode-locked laser oscillator. 4,019,156, Cl. 331-94.5ML.

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Francel, Josef; and Lemke, Galen D., to Owens-Illinois, Inc. Arc suppression in a cathode ray tube. 4,018,717, Cl. 252-513.000.

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Fraser, Andrew S. Signature protection system. 4,017,994, Cl. 40-2.200.

Fraser, Douglas S., to FTS Systems Inc. Freeze dryer. 4,017,983, Cl. 34-92.000.

Frazee, Ray D., to Carlisle Corporation. Wheel assembly with slip clutch. 4,018,298, Cl. 180-76.000.

Frazier, Gene F., to Versar, Inc. Infra red photography with silver halide films using infrared and visible light exposures. 4,018,608, Cl. 96-27.00E.

Freeman, Gerald C., to Pitney-Bowes, Inc. Tape handling apparatus utilizing tangential web contact for postage meter. 4,018,153, Cl. 101-93.000.

Freitag, Walter O., to Sperry Rand Corporation. Connector device. 4,018,495, Cl. 339-17.00L.

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Frick, Richard H., to Kimberly-Clark Corporation. Diaper folder and stacker mechanism. 4,018,432, Cl. 270-61.00R.

Fricke, Hans-Jurgen; Nonnenmacher, Gerhard; Robeller, Walter; and Kersten, Gunter, to Robert Bosch G.m.b.H. Piston machine construction. 4,018,137, Cl. 91-488.000.

Fried, Josef, to University of Chicago, The. Chemical synthesis. 4,018,820, Cl. 260-514.00D.

Friedman, Robert; and Lesher, Howard D., to Dimetrics, Inc. Welding control systems. 4,019,016, Cl. 219-125.00R.

Friedrich, Robert E.; and Hess, Robert L., to Westinghouse Electric Corporation. Grounded-tank high-power compressed-gas circuit-interrupter. 4,019,007, Cl. 200-148.00B.

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Fuji Photo Film Co., Ltd.: *See—*
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Funakubo, Shinnosuke. Sleeve for use in a meat chopper. 4,018,390, Cl. 241-82.500.

Furucz, Istvan. Carburation system for an internal combustion. 4,018,199, Cl. 123-127.000.

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Gall, James W.; and Johnston, Everett L., to Phillips Petroleum Company. Controlled well plugging with dilute polymer solutions. 4,018,286, Cl. 166-295.000.

Gallacher, Lawrence V., to King Industries, Inc. Solvent-extraction process for recovery and separation of metal values. 4,018,865, Cl. 423-24.000.

Galler, William J. Safety frame for weight lifting. 4,018,442, Cl. 272-123.000.

Gallwitz, Gerhard: *See—*
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Garbutt, John T.; Malzahn, Ronald C.; and Morehouse, Alpha L., to Grain Processing Corporation. Gluten treatment. 4,018,936, Cl. 426-656.000.

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Garrett Corporation, The: *See—*
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Garrison, Judd F., to John Thomas Batts, Inc. Accessory for article display tally. 4,017,990, Cl. 40-322.000.

Gartner, Todd Henry, to Motorola, Inc. High energy adaptive ignition via digital control. 4,018,202, Cl. 123-148.00E.
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Gaut, Robert T. Anchoring device for well tools. 4,018,275, Cl. 166-137.000.
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Gay, David. Omnidirectional air driven power generating system. 4,018,051, Cl. 60-398.000.
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Gebelius, Sven Runo Vilhelm. Pump device for flow rate control of liquid in a piping system. 4,018,546, Cl. 417-313.000.
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General Tire & Rubber Company, The: *See—*
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Genik-Sas-Berezowsky, Roman Michael, to Sherritt Gordon Mines Limited. Production of copper by gaseous reduction. 4,018,595, Cl. 75-.50A.
Genzer, Jerome D.: *See—*
Fabian, Arthur C.; Genzer, Jerome D.; Kasulanis, Charles Francis; Shavel, John, Jr.; and Zinnes, Harold, 4,018,762.
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George Kent Limited: *See—*
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George, Stanley Ross. Beverage belt. 4,018,371, Cl. 224-26.00R.
Georges, Andre H.: *See—*
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Gerard, Raymond R.: *See—*
Archer, Wesley L.; Simpson, Elbert L.; and Gerard, Raymond R., 4,018,837.
Gerry, Martin E. Stepping motor having rotational and counter rotational magnetic field control. 4,019,110, Cl. 318-696.000.
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Gertsch, Ulrich, to Gertsch AG. Ski binding with release plate. 4,018,456, Cl. 280-618.000.
Gesing, Horst: *See—*
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Gessinger, Gernot: *See—*
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Giaever, Ivar, to General Electric Company. Diagnostic method and device employing protein-coated magnetic particles. 4,018,886, Cl. 424-12.000.
Gienko, Vladimir Ivanovich: *See—*
Denikin, Ernst Ivanovich; Khazkhuta, Nikolai Yakovlevich; Shestopalov, Alexandr Andreevich; Badalov, Vladimir Vachaganovich; Vasiliev, Alexandr Alexandrovich; Okunev, Vyacheslav Ivanovich; Kaplan, David Abramovich; Deinego, Jury Borisovich; Kazakov, Alexandr Danilovich; Gienko, Vladimir Ivanovich; Marchenko, Alexei Alexeevich; and Laevsky, Mikhail Avramovich, 4,018,541.
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Gladstone, Roland Aaron, to International Telephone and Telegraph Corporation. Conductive probe level control. 4,019,067, Cl. 307-118.000.
Glaesel, Gottfried, to Hego Electric G.m.b.H. Terminal block retaining member. 4,018,502, Cl. 339-198.0GA.
Glaser, Heinz: *See—*
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Gleason, John Gerald, to SmithKline Corporation. Substituted phenylglycylcephalosporins. 4,018,921, Cl. 424-246.000.
Glenn, Coy F.: *See—*
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Glenn, Edward C. Dowel pin positioner. 4,017,972, Cl. 32-11.000.
Gless, Richard D., Jr.; Dawson, Daniel J.; and Wingard, Robert E., to Dynapol Corporation. Process for preparing polyvinylamine and salts thereof. 4,018,826, Cl. 260-583.00P.
Glover, Donald J.: *See—*
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Glover, Douglas Wade: *See—*
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Glover, Leon Conrad, Jr.: *See—*
Lopez, Eugene Francis; Glover, Leon Conrad, Jr.; and Lyons, Bernard John, 4,018,733.
Glover, Richard Donovan. Method for transfer color printing. 4,018,557, Cl. 8-1.0XB.
Gnyp, Andrew; and Elert, Karl, to Jos. Schlitz Brewing Company. Apparatus for spin flanging containers. 4,018,176, Cl. 113-1.00G.
Goff, Edward W. High speed precision metal cutting saw assembly. 4,018,118, Cl. 83-167.000.
Goffredo, Daniel L., to Chemcut Corporation. Drying apparatus. 4,017,982, Cl. 34-31.000.
Golborn, Peter; and Duffy, James J., to Hooker Chemicals & Plastics Corporation. Dialkyl alkyl and cyclic phosphoramidomethyl phosphonates. 4,018,560, Cl. 8-190.000.
Gold, Joseph. Adjustable display unit. 4,018,340, Cl. 211-44.000.
Golden, Preston L., to Jonathan-Alan Corporation, The. Liquid filled insoles. 4,017,931, Cl. 12-146.00B.
Golden, William R.: *See—*
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Goosen, Carl C. Surgical punch apparatus. 4,018,228, Cl. 128-305.000.
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Gorman-Rupp Company, The: *See—*
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Gorog, Istvan; and Knox, Joseph Dale, to RCA Corporation. Acousto-optic modulated laser. 4,019,155, Cl. 331-94.50M.
Gotz, Manfred: *See—*
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Gould, James S.; and Gould, Samuel, to Indicator Controls Corporation. Adapter unit for pedestrian traffic control signal. 4,019,170, Cl. 340-119.000.
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Graham, John W.: *See—*
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Gratzke, Werner: *See—*
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Grau, Thomas George, to Bell Telephone Laboratories, Incorporated. Metallic plating testing apparatus. 4,019,129, Cl. 324-30.00R.
Graves, Howard T., to United States of America, Army. Remote infrared signal communicator. 4,019,180, Cl. 343-6.0ND.
Great Canadian Oil Sands Limited: *See—*
Anderson, Joseph C., 4,018,665.
Bain, Frederick A.; and Roberts, John O. L., 4,018,664.
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Greenfield, Harold: *See—*
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Greune, Christian; Herrmann, Bruno; and Steuer, Siegfried, to Motoren- und Turbinen-Union Munchen GmbH. Regulating device for a prime mover, more particularly for a single-spool gas turbine. 4,018,045, Cl. 60-39.28R.
Griffiths, Donald Eric; and Norton, David Gibbons, to International Business Machines Corporation. Fluidic transducer access opening in a stack of flexible record disks. 4,019,204, Cl. 360-99.000.
Grimshaw, Keith: *See—*
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Grinberg, Jan: *See—*
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Vogelbacher, Erich, 4,017,948.
Gross, George E. Vacuum treatment to remove vaporized liquid from unfrozen cellular substances while keeping the cell walls thereof intact. 4,018,908, Cl. 426-281.000.
Gross, James R., to Dow Chemical Company, The. Absorbent articles and methods for their preparation. 4,018,951, Cl. 427-401.000.
Grotnes Machine Works, Inc.: *See—*
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Grove, Earl I. Kickless resistance welding cable and method of making the same. 4,018,976, Cl. 174-19.000.
Grovesteen, William R.: *See—*
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Grubb, Daniel Baker, to AMP Incorporated. Tool for gang crimping ribbon coaxial cable. 4,017,954, Cl. 29-749.000.
Gruber, Wilhelm; and Schroeder, Guenter, to Rohm GmbH. Method for making α-hydroxy-isobutyramide from acetone cyanohydrin. 4,018,829, Cl. 260-561.00B.
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Grumman Aerospace Corporation: *See—*
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GTE Sylvania Incorporated: *See—*
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Gudelis, David A.: *See—*
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Gueant, Auguste; and Mercier, Serge, to Produits Chimiques Ugine Kuhlmann. Method for preparing fatty acids from their corresponding soaps. 4,018,805, Cl. 260-413.000.
Guichesseux, Gerard Pierre: *See—*
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Gulf Research & Development Company: *See—*
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Gupton, John T., III; Jelenevsky, Alex M.; Miyazaki, Teruko U.; and Petree, Harris E., to Ciba-Geigy Corporation. Process for the production of 2-alkyl or 2-cycloalkyl-4-methyl-6-hydroxypyrimidines. 4,018,771, Cl. 260-251.00R.
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Gute, Robert M., to Midland-Ross Corporation. Bus door switch apparatus. 4,019,004, Cl. 200-61.430.
Gutman, Arnold D., to Stauffer Chemical Company. Isourea acetylphosphate insecticides. 4,018,917, Cl. 424-200.000.
Gutridge, Jack E.; and Marulic, Walter J., to Pullman Incorporated. Combination seat and berth. 4,018,166, Cl. 105-316.000.
Gyi, Ko Ko: *See—*
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Gym-Dandy, Inc.: *See—*
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Haas, David J., to U.S. Philips Corporation. Electrophotographic x-ray device. 4,019,052, Cl. 250-274.000.
Haas, Peter. Method and apparatus for magnetic recording of data with a recording head having a plurality of physically parallel, serially connectable conductors. 4,019,206, Cl. 360-123.000.
Haber, Terry M. Calibration system for magnetic switches used in wrist instruments. 4,018,078, Cl. 73-1.00D.
Hack, Joachim: *See—*
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Hadley, John F., to H. H. Robertson Company. Phenolic foam products and method of making the same. 4,018,725, Cl. 260-2.50F.
Haga, Toshikatu: *See—*
Kawabe, Naoshi; Haga, Toshikatu; Nakajima, Taiitu; Takahashi, Takeshi; Shinoda, Hiroshi; and Hayakawa, Shuji, 4,017,960.
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Hagenbach, Robert J., to Xerox Corporation. Electrostatographic magnetic brush imaging process employing carrier beads comprising high purity nickel. 4,018,601, Cl. 96-1.0SD.
Haines, Richard F., to United States of America, National Aeronautics and Space Administration. Optical instrument employing reticle having preselected visual response pattern formed thereon. 4,018,533, Cl. 356-171.000.
Halberthal S.A.: *See—*
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Haldi, Bernhard A., to Raymond Lee Organization, Inc., The, a part interest. Device for folding sheets and the like. 4,018,368, Cl. 223-37.000.
Hale Fire Pump Company: *See—*
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Hale, Thomas E., to General Electric Company. Coated cemented carbide product. 4,018,631, Cl. 148-31.500.
Hallerberg, Karl J., to Borg-Warner, GmbH. Wedging free-wheel clutch. 4,018,318, Cl. 192-41.00A.
Hallstrom, James R.; Hoffman, Raymond J.; and Walling, Ronald L., to Rexnord Inc. Method of applying a wearing surface. 4,018,944, Cl. 427-140.000.
Hamacher, Martin. Junction piece for electrical leads. 4,018,500, Cl. 339-103.00R.
Hamada, Hideo: *See—*
Takahashi, Nobuyasu; Yamaguchi, Taiichi; Sakaguchi, Junei; and Hamada, Hideo, 4,018,645.
Hamada, Sadanori; Tsutaki, Kunio; and Hashimoto, Hiroyuki, to Nippon Electric Company, Ltd. Coupled-cavity type traveling-wave tube with sever termination attenuators. 4,019,087, Cl. 315-3.500.

Hamakawa, Genjiro; and Naito, Kenji, to Honda Giken Kogyo Kabushiki Kaisha. Fuel increase system for engine. 4,018,856, Cl. 261-23.00A.
Hamilton, David, to Tom Lauderdale Machine Shop, Inc., a part interest. Hot air andiron. 4,018,208, Cl. 126-121.000.
Hammer, Jacob Meyer, to RCA Corporation. Fiber-optic to planar-waveguide optical coupler. 4,018,506, Cl. 350-96.00C.
Hanold, William E., to National Union Electric Corporation. Hose coupling for a suction cleaner. 4,017,937, Cl. 15-327.00R.
Hansen, Barton G.: *See—*
Sauer, Gale E.; and Hansen, Barton G., 4,018,020.
Hansen, Elo Harald; and Ruzicka, Jaromir, to Zellweger Uster AG. Gas electrode. 4,018,660, Cl. 204-195.00R.
Hanson, Herbert G., to Vapor Corporation. Valve and seal assembly therefor. 4,018,417, Cl. 251-63.500.
Hardin, K. Dan, to United States of America, Energy Research and Development Administration. Gas injected vacuum switch. 4,019,079, Cl. 313-231.400.
Hardy, Charles R., Jr., to Ecolaire Incorporated. Method and apparatus for handling slag handling. 4,018,588, Cl. 65-19.000.
Hardy, Peter D., to Metal Box Company Limited, The. Variable length reciprocating conveyor system for spacing articles. 4,018,326, Cl. 198-461.000.
Harnisch, Horst, to Bayer Aktiengesellschaft. Monomethine dyestuffs. 4,018,796, Cl. 260-343.20R.
Harper, Judson M.: *See—*
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Harris, Donald S., to Overhead Door Corporation. Drawbar arm for door operator. 4,018,005, Cl. 49-199.000.
Harris, George M., to Harris-Hub Co., Inc. Metal crib structure. 4,017,918, Cl. 5-100.000.
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Hart, John; and Pride, Clifford John, to Girling Limited. Vehicle brake wedge actuator assemblies. 4,018,313, Cl. 188-343.000.
Hartl, Carroll P.: *See—*
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Hartman, James Keith. Energy conversion device. 4,019,113, Cl. 321-1.500.
Hartmann, Job-Werner: *See—*
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Hartung, Albert F.; Lehan, Frank W.; Barooshian, Charles T.; and Zacharski, Edward J., to System Development Corporation. Method and apparatus for scrambling and unscrambling communication signals. 4,019,201, Cl. 358-124.000.
Harwood, Leopold Albert, to RCA Corporation. Third harmonic signal generator. 4,019,118, Cl. 321-65.000.
Harwood, Leopold Albert; and Wittmann, Erwin Johann, to RCA Corporation. Bias circuit for junction diodes. 4,019,152, Cl. 330-29.000.
Hasbro Development Corporation: *See—*
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Hasegawa, Shinichi: *See—*
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Hashimoto, Shintaro; and Nakagawa, Hirohide, to Sharp Kabushiki Kaisha. CMOS drive system for liquid crystal display units. 4,019,178, Cl. 340-324.00M.
Hashimoto, Yoshio: *See—*
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Hassan, Javathu K.; Rabstejnek, Carl V.; and Wutka, Anthony D., to International Business Machines Corporation. Precision tool and workpiece positioning apparatus with ringout detection. 4,019,015, Cl. 219-121.0EB.
Hasselbacher, Roland E., to Caterpillar Tractor Co. Vehicle equalizer bar mounting means. 4,018,295, Cl. 180-9.500.
Hatch, Burton D., to General Electric Company. Cryogenic fluid transfer joint employing gaseous seals. 4,018,059, Cl. 62-55.000.
Hauck, Frederic P.: *See—*
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Haupt, Robert C., to Allis-Chalmers Corporation. Four-piece fan shroud. 4,018,297, Cl. 180-54.00A.
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Hawkins, Harold G., to General Motors Corporation. Electrical component package. 4,018,981, Cl. 174-52.00R.
Hayakawa, Shuji: *See—*
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Hayashi, Masaki; Kori, Seiji; and Miyake, Hajimu, to Ono Pharmaceutical Co., Ltd. 16-methylene-prostaglandin compounds. 4,018,812, Cl. 260-468.00D.
Hayashibara Biochemical Laboratories, Incorporated: *See—*
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Hayes, John C.; and Pollitzer, Ernest L., to UOP Inc. Hydrocarbon conversion with an acidic multimetallic catalytic composite. 4,018,669, Cl. 208-139.000.
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Haynes, James R., to Kayot, Inc. Apparatus for Loran simulation. 4,019,183, Cl. 343-103.000.
Haynes, William P.: *See—*
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Hayssen Manufacturing Co.: *See—*
Safranski, Richard W.; and Kovacs, Lloyd, 4,018,029.
Hayward, James R.; Keyser, William L.; and Zielinski, Walter J., to Quaker Oats Company, The. Food bars having fortified marshmallow base. 4,018,900, Cl. 426-72.000.
Hayward, James R.; Keyser, William L.; and Zielinski, Walter J., to Quaker Oats Company, The. Stabilized high protein food bar. 4,018,901, Cl. 426-72.000.
Hazar, Mitchell M., to American Denture Corporation. Modular prosthetic dentures. 4,017,971, Cl. 32-2.000.
Heartz, Robert A., to General Electric Company. Multisensor digital image generator. 4,017,985, Cl. 35-10.400.
Heaton, James W.; Warren, Donald W.; and Albrecht, Albert B., to Kennametal Inc. Machine tool having a special indexable turret and method of operation. 4,018,112, Cl. 82-1.00C.
Heckman, Thomas B.: *See—*
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Hego Electric G.m.b.H.: *See—*
Glaesel, Gottfried, 4,018,502.
Heidrich, Gunter, to AGFA-Gevaert, A.G. Apparatus for applying indica on photographic paper or the like. 4,018,152, Cl. 101-45.000.
Heiermann, Klaus; Pohler, Carl-Ludwig; and Bertenburg, Joachim, to Th. Kieserling & Albrecht. Device on peeling machine. 4,018,114, Cl. 82-20.000.
Heilman, William J.; and Lynch, Thomas J., to Gulf Research & Development Company. Polymer-modified automatic transmission fluid. 4,018,695, Cl. 252-73.000.
Hein, Leopold A.; and Myers, William N. Solar heating and cooking apparatus. 4,018,212, Cl. 126-270.000.
Heitz, William Donald: *See—*
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Hellsten, Karl Martin Edvin; and Karlsson, Birgit Tora Gunvor, to Berol Kemi AB. Liquid detergent composition. 4,018,696, Cl. 252-89.00R.
Hemmeter, John H. Mattress guard. 4,017,919, Cl. 5-317.00R.
Henault, Claude, to Regie Nationale des Usines Renault; and Automobiles Peugeot. Method of and apparatus for feeding hydrogen fuel to engines. 4,018,190, Cl. 123-3.000.
Henderson, Cyril, to American Safety Equipment Corporation. Vehicle inertia sensors. 4,018,400, Cl. 242-107.40A.
Hennig, Kurt. Power feed chain. 4,018,411, Cl. 248-49.000.
Hensel, Otis O. Apparatus for draining whey from cheese. 4,018,145, Cl. 99-458.000.
Herb, Carl C.: *See—*
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Heretoiu, Silviu: *See—*
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Hijikata, Akiko: *See—*
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Hofmann, Hans-Joachim, to Durr - Dental KG. Apparatus for producing dry compressed air. 4,018,579, Cl. 55-213.000.
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Johne, Hans; Jentzsch, Arndt; and Rudolph, Otfried, 4,018,161.
Jerobee Industries, Inc.: *See—*
Weglin, Walter, 4,017,968.
Jet Research Center, Inc.: *See—*
Brown, Claude H., 4,018,163.
Jimenez, Antonio, to Mefina S.A. Device comprising two pieces held together in spaced apart relation by joining elements. 4,018,173, Cl. 112-231.000.
Joby, Michael John; and Maker, Paul Manwaring, to Lucas Industries Limited. Electronic fuel control for a gas turbine engine. 4,018,044, Cl. 60-39.16R.
John Dennis (Graphics) Limited: *See—*
Dennis, Richard John, 4,018,528.
John Thomas Batts, Inc.: *See—*
Garrison, Judd F., 4,017,990.
John Thurley Limited: *See—*
Thurley, John, 4,018,216.
Johne, Hans; Jentzsch, Arndt; and Rudolph, Otfried, to VEB Polygraph Leipzig Kombinat fur Polygraphische Maschinen und Ausrustungen. Printing machine with sheet-transfer arrangement. 4,018,161, Cl. 101-231.000.
Johnson, Bertram C.: *See—*
Fountain, William D.; and Johnson, Bertram C., 4,019,156.
Johnson, Charles H.; and Hartl, Carroll P., to Oscar Mayer & Co. Inc. Method and apparatus for stuffing loaf molds. 4,017,940, Cl. 17-32.000.
Johnson, David Earl: *See—*
Dickey, Buel Earl; and Johnson, David Earl, 4,018,629.
Johnson, David F.: *See—*
Galarowic, Lawrence A.; Waineo, Glenn B.; and Johnson, David F., 4,018,328.
Johnson, Edwin Lee: *See—*
Peniston, Quintin P.; and Johnson, Edwin Lee, 4,018,678.
Johnson, Edwin Samuel, to Abbott Laboratories. Parturition inducement. 4,018,914, Cl. 424-177.000.
Johnson, Everett A.: *See—*
Silverman, Daniel; and Johnson, Everett A., 4,018,503.
Johnson, Francis; Paul, Kenneth G.; and Favara, Duccio, to Dow Chemical Company, The. Intermediates for prostaglandins. 4,018,797, Cl. 260-343.30R.
Johnson, Glenn E.; Neilson, Harry B.; Forney, Albert J.; and Haynes, William P., to United States of America, Energy Research and Development Administration. Pretreatment of coal during transport. 4,018,654, Cl. 201-9.000.
Johnson & Johnson: *See—*
Ruffo, Angelo P.; and Goyal, Prashant K., 4,018,646.
Johnson Matthey & Co., Limited: *See—*
Priest, John Garrick, 4,018,728.
Johnson, Michael R.; and Plattner, Jacob J., to Pfizer Inc. 3-Aminomethylene-6,7-dimethoxy-2-methyl-4-oxo-1,2,3,4-tetrahydro-1-quinoline carboxylic acid esters and intermediates leading thereto. 4,018,758, Cl. 260-240.300.
Johnson, Peter Alan: *See—*
Critten, Donald Louis; and Johnson, Peter Alan, 4,019,038.
Johnson, Robert D.; Havener, John W.; Reyner, Franklin W., Jr.; Whitver, Loren K.; Kilburn, Norman W.; and Hoglan, Jack M., to Pharmaceutical Innovators, Ltd. Cassette pill storing, dispensing and counting machine. 4,018,358, Cl. 221-7.000.
Johnson, Wesley Grant. Saliva ejector and chin holder therefor. 4,017,975, Cl. 32-33.000.
Johnston, Everett L.: *See—*
Gall, James W.; and Johnston, Everett L., 4,018,286.
Johnston, James D.: *See—*
Burch, John L.; and Johnston, James D., 4,018,409.
Jomon, Kazuyoshi: *See—*
Kurita, Masaru; Jomon, Kazuyoshi; Komori, Tadaaki; and Nakatani, Isami, 4,018,772.
Jonathan-Alan Corporation, The: *See—*
Golden, Preston L., 4,017,931.
Jones, Christopher Robin: *See—*
Williams, Malcolm; and Jones, Christopher Robin, 4,018,201.
Jones, Keith: *See—*
McDermott, Michael John; Allen, John Graham; Jones, Keith; and Wright, Peter Gordon, 4,018,508.
Jones, Norman Ray: *See—*
Davis, Oliver Thurston; Jones, Norman Ray; and Eddy, Elmer Carl, 4,019,103.
Jones, Reuben G., to Eli Lilly and Company. Halo-substituted -2,4,6-trinitrodiphenylamines for control of foliar phytopathogens. 4,018,896, Cl. 424-330.000.
Jones, Robert S.; Jones, Wesley E.; and Smathers, Harry W. Flooring system. 4,018,271, Cl. 165-175.000.
Jones, Wesley E.: *See—*
Jones, Robert S.; Jones, Wesley E.; and Smathers, Harry W., 4,018,271.
Jordan, Edward P.: *See—*
Hughes, Randall E.; and Jordan, Edward P., 4,018,673.
Jordan, Robert Kenneth. Ammonium oxalate process. 4,018,875, Cl. 423-419.00R.
Jordan, Robert Kenneth. Process for the production of metal oxalates and soda ash. 4,018,876, Cl. 423-421.000.
Jorna, Siebe: *See—*
Brueckner, Keith A.; Jorna, Siebe; and Moncur, N. Kent, 4,019,151.
Jorwa, Mildred M. Matchbook with safety panel. 4,018,330, Cl. 206-106.000.
Jos. Schlitz Brewing Company: *See—*
Gnyp, Andrew; and Elert, Karl, 4,018,176.
Judd, Ronald Iliff, to McDonnell Douglas Corporation. Self-aligning valve assembly. 4,017,913, Cl. 4-52.000.
Jumel, Yves; and Gabano, Jean-Paul, to Saft-Societe des Accumulateurs Fixes et de Traction. Electric cell. 4,018,970, Cl. 429-162.000.
Kabushiki Kaisha Komatsu Seisakusho: *See—*
Wagatsuma, Toshiaki; Suketomo, Toshitaka; Yoshida, Kouki; and Suga, Michio, 4,018,452.
Kabushiki Kaisha Sato Kenkyusho: *See—*
Sato, Yo, 4,018,157.
Kabushiki Kaisha Suwa Seikosha: *See—*
Monna, Takashi, 4,019,037.
Kaetterhenry, Lorell D. Hydraulic apparatus for controlling movement of a member under loading. 4,018,136, Cl. 91-420.000.
Kafesjian, Ralph R.; Masse, Norman G.; and Keller, David P., to American Hospital Supply Corporation. Heart valve with a sintered porous surface. 4,017,911, Cl. 3-1.500.
Kagami, Isao, to Canon Kabushiki Kaisha; and Canon Seiki Kabushiki Kaisha. Ironless rotor windings of rotary coils in miniature electric machines. 4,019,075, Cl. 310-206.000.
Kagerhuber, Franz: *See—*
Scheinecker, Alois; and Kagerhuber, Franz, 4,018,261.
Kageyama, Takao; and Kato, Hiroshi, to Nippon Electric Company, Ltd. Wideband multi-cavity velocity modulation tube. 4,019,089, Cl. 315-5.430.

Kahn, Leonard R. Compatible AM stereophonic receivers. 4,018,994, Cl. 179-15.0BT.
Kahn, Leonard R. Communication network protection system. 4,018,996, Cl. 179-84.0VF.
Kajan Specialty Company, Inc.: *See—*
Perkins, Lee E., 4,018,284.
Kajio, Yoshihiro; and Aya, Norimoto, to Nissan Motor Co., Ltd. Vehicle body construction with slimly shaped front pillar. 4,018,474, Cl. 296-28.00R.
Kajitani, Akira, to Toshikiyo Shiraki. Decorative sheet. 4,017,992, Cl. 40-138.000.
Kajiware, Takao: *See—*
Kimura, Kenji; and Kajiware, Takao, 4,018,047.
Kallies, Henrik. Induction air-conditioning apparatus. 4,018,268, Cl. 165-86.000.
Kalopissis, Gregoire; and Bugaut, Andree, to Societe Anonyme dite: L'Oreal. Hair dye compounds. 4,018,556, Cl. 8-10.100.
Kam, George H., to GTE Sylvania Incorporated. Signal attenuator circuit for TV tuner. 4,019,160, Cl. 333-81.00R.
Kaminski, James J.: *See—*
Bodor, Nicolae S.; and Kaminski, James J., 4,018,925.
Kamisaka, Makoto; Kojima, Kanji; Negoro, Tatsuya; Uchikubo, Toshichika; Okamoto, Yusho; and Minato, Sadao, to Mitsubishi Jukogyo Kabushiki Kaisha. Automatic continuous barrel filling method. 4,018,026, Cl. 53-37.000.
Kampe, Robert Frederick: *See—*
Fitzgerald, Robert Edward; and Kampe, Robert Frederick, 4,018,384.
Kamphues, Hermann, to C. Keller & Co. Process and apparatus for arranging bricks in setting layers of rectangular configuration. 4,018,324, Cl. 198-347.000.
Kanamaru, Hisanobu: *See—*
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Kaneko, Yoichi: *See—*
Kimura, Katsuhiro; and Kaneko, Yoichi, 4,019,161.
Kanner, Bernard; and Prokai, Bela, to Union Carbide Corporation. Morpholino-modified polysiloxane-polyoxyalkylene copolymers and their use as foam stabilizers in polyurethanes. 4,018,723, Cl. 260-2.5AH.
Kaplan, David Abramovich: *See—*
Denikin, Ernst Ivanovich; Khazkhuta, Nikolai Yakovlevich; Shestopalov, Alexandr Andreevich; Badalov, Vladimir Vachaganovich; Vasiliev, Alexandr Alexandrovich; Okunev, Vyacheslav Ivanovich; Kaplan, David Abramovich; Deinego, Jury Borisovich; Kazakov, Alexandr Danilovich; Gienko, Vladimir Ivanovich; Marchenko, Alexei Alexeevich; and Laevsky, Mikhail Avramovich, 4,018,541.
Kaplan, Lloyd A.: *See—*
Hoffsommer, John C.; Kaplan, Lloyd A.; Kubose, Donald A.; and Glover, Donald J., 4,018,676.
Kaplan, Michael: *See—*
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Karlsson, Birgit Tora Gunvor: *See—*
Hellsten, Karl Martin Edvin; and Karlsson, Birgit Tora Gunvor, 4,018,696.
Karr, Clarence, Jr., to United States of America, Energy Research and Development Administration. Coal liquefaction process. 4,018,663, Cl. 208-10.000.
Kartashev, Igor Alexandrovich: *See—*
Vishnevsky, Vladimir Sergeevich; Kavertsev, Vladimir Leonidovich; Kartashev, Igor Alexandrovich; Lavrinenko, Vyacheslav Vasilievich; Nekrasov, Mikhail Makarovich; and Prez, Alexei Alexeevich, 4,019,073.
Kasahara, Nobuo, to Ricoh Co., Ltd. Color electrophotographic copying machine. 4,018,522, Cl. 355-4.000.
Kashiwabara, Hoichiro: *See—*
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Kasulanis, Charles Francis: *See—*
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Kato, Hideo: *See—*
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Kato, Hiroshi: *See—*
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Kato, Shigehiro: *See—*
Taniguchi, Tadasu; Hosaka, Iwao; and Kato, Shigehiro, 4,019,025.
Kaufman, Seth Ian. Home vacuum apparatus for freezer bags. 4,018,253, Cl. 141-65.000.
Kauk, Reinhold J. Training device for ice skaters. 4,018,439, Cl. 272-70.300.
Kaukeinen, Joseph Y.: *See—*
Contois, Lawrence E.; Kaukeinen, Joseph Y.; Michel, Stephen; and Plutchak, Thomas M., 4,018,606.
Kavertsev, Vladimir Leonidovich: *See—*
Vishnevsky, Vladimir Sergeevich; Kavertsev, Vladimir Leonidovich; Kartashev, Igor Alexandrovich; Lavrinenko, Vyacheslav Vasilievich; Nekrasov, Mikhail Makarovich; and Prez, Alexei Alexeevich, 4,019,073.
Kawabe, Naoshi; Haga, Toshikatu; Nakajima, Taiitu; Takahashi, Takeshi; Shinoda, Hiroshi; and Hayakawa, Shuji, to Kureha Kagaku Kogyo Kabushiki Kaisha; and NGK Insulators, Ltd. Method of repairing injured portion of refractory furnace-lining. 4,017,960, Cl. 29-401.00E.
Kawagoe, Hiroto: *See—*
Sakaguchi, Jiroh; and Kawagoe, Hiroto, 4,019,070.
Kawai, Kiyohisa: *See—*
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Kawakami, Akira: *See—*
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Kawasaki Jukogyo Kabushiki Kaisha: *See—*
Yoshida, Toshio, 4,018,180.
Kawawa, Hiroyuki; Ohuchi, Yasushi; and Kanamaru, Hisanobu, to Hitachi, Ltd. Plastic working dies for cylindrical parts. 4,018,075, Cl. 72-467.000.
Kay, Herbert M., to Command-Aire Corporation. Building fresh air ventilator system. 4,018,266, Cl. 165-12.000.
Kayamoto, Masami: *See—*
Wilson, Geoffrey R.; and Kayamoto, Masami, 4,018,714.
Kayot, Inc.: *See—*
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Keegan, Thomas E. Board game. 4,018,446, Cl. 273-136.00F.
Kees, George, Jr.; and Hickmann, Horst R., to Kees Surgical Specialty Company. Bracket for an operating table. 4,018,412, Cl. 248-214.000.
Kees Surgical Specialty Company: *See—*
Kees, George, Jr.; and Hickmann, Horst R., 4,018,412.
Keizer, Eugene Orville, to RCA Corporation. Video disc record having spirally aligned sync storage locations. 4,018,984, Cl. 358-128.000.
Keizer, Eugene Orville, to RCA Corporation. Video disc playback apparatus. 4,018,987, Cl. 358-128.000.
Keller Corporation, The: *See—*
Keller, Leonard J., 4,018,293.
Keller, David P.: *See—*
Kafesjian, Ralph R.; Masse, Norman G.; and Keller, David P., 4,017,911.
Keller, Leonard J., to Keller Corporation, The. Method and apparatus for controlled fracturing of subterranean formations. 4,018,293, Cl. 175-4.500.
Keller, Ronald James: *See—*
Beastrom, Ralph Emil; Bowen, Arlen John; Keller, Ronald James; and Nutt, David George, 4,019,065.
Kelley, William L. Apparatus and method for schedule monitoring and control. 4,019,027, Cl. 235-89.00R.
Kelly, Gordon D.: *See—*
Norris, H. Coleman; and Kelly, Gordon D., 4,017,993.
Kelly, James P.; and Wandler, Donald, to McGraw-Edison Company. Lighting fixture with removable electrical component mounting arrangement. 4,019,044, Cl. 240-25.000.
Kennametal Inc.: *See—*
Heaton, James W.; Warren, Donald W.; and Albrecht, Albert B., 4,018,112.
Kennecott Copper Corporation: *See—*
Szabo, Lester J., 4,018,866.
Kent Instruments Limited: *See—*
Critten, Donald Louis; and Johnson, Peter Alan, 4,019,038.
Kent, Ronald I.; and Brown, Albert R., to Continental Can Company, Inc. Compartmented tray having improved divider means. 4,018,377, Cl. 229-27.000.
Keogh, Michael John: *See—*
Cotter, Robert James; Keogh, Michael John; and Heitz, William Donald, 4,018,721.
Keren, Eitan, to Sealed Air Corporation. Packaging apparatus. 4,018,034, Cl. 53-390.000.
Kerko, David J.; and Seward, Thomas P., III, to Corning Glass Works. Photochromic sheet glass compositions and articles. 4,018,965, Cl. 428-410.000.
Kermisch, Dorian: *See—*
Sheridon, Nicholas K.; Kermisch, Dorian; and Bergen, Richard F., 4,018,603.
Kerr, Ralph O.: *See—*
Barone, Bruno J.; and Kerr, Ralph O., 4,018,709.
Kersten, Gunter: *See—*
Fricke, Hans-Jurgen; Nonnenmacher, Gerhard; Robeller, Walter; and Kersten, Gunter, 4,018,137.
Ketterer, Stanley Joseph, to Singer Company, The. Feed regulator clamping device. 4,018,172, Cl. 112-215.000.
Keyes, Walter G.: *See—*
Hill, James S.; Carbone, Emil L.; Mooradian, Victor G.; and Keyes, Walter G., 4,018,599.
Hill, James S.; Carbone, Emil L.; Mooradian, Victor G.; and Keyes, Walter G., 4,018,630.
Keyser, William L.: *See—*
Hayward, James R.; Keyser, William L.; and Zielinski, Walter J., 4,018,900.
Hayward, James R.; Keyser, William L.; and Zielinski, Walter J., 4,018,901.
Keystone Consolidated Industries, Inc.: *See—*
Orr, John L.; and Sewell, Robert A., 4,018,487.



Khanna, Ram Tirth, to Du Pont de Nemours, E. I., and Company. High solids can coating compositions based on epoxy resin, crosslinking agent, flexibilizing polyol, co-reactive acid catalyst, and surface modifier. 4,018,848, Cl. 260-834.000.
Khazkhuta, Nikolai Yakovlevich: *See—*
Denikin, Ernst Ivanovich; Khazkhuta, Nikolai Yakovlevich; Shestopalov, Alexandr Andreevich; Badalov, Vladimir Vachaganovich; Vasiliev, Alexandr Alexandrovich; Okunev, Vyacheslav Ivanovich; Kaplan, David Abramovich; Deinego, Jury Borisovich; Kazakov, Alexandr Danilovich; Gienko, Vladimir Ivanovich; Marchenko, Alexei Alexeevich; and Laevsky, Mikhail Avramovich, 4,018,541.
Khisametdinov, Akhmed Miftakhovich: *See—*
Bizhanov, Frunze Bizhanovich; Sokolsky, Dmitry Vladimirovich; Omarov, Ashim Kuranbaevich; Khisametdinov, Akhmed Miftakhovich; Ongarbaev, Sagynbek; and Popov, Nikolai Ivanovich, 4,018,835.
Kiener, Volker: *See—*
Roller, Hermann; Senkpiel, Werner; Wunsch, Gerd; Hartmann, Job-Werner; Fuchs, Friedrich; Hack, Joachim; Kiener, Volker; Motz, Herbert; and Ostertag, Werner, 4,018,967.
Kijima, Koichi: *See—*
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Kikumoto, Ryoji: *See—*
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Okamoto, Shosuke; Kikumoto, Ryoji; Ohkubo, Kazuo; Tezuka, Tohru; Tonomura, Shinji; Tamao, Yoshikuni; and Hijikata, Akiko, 4,018,915.
Kilburn, Norman W.: *See—*
Johnson, Robert D.; Havener, John W.; Reyner, Franklin W., Jr.; Whitver, Loren K.; Kilburn, Norman W.; and Hoglan, Jack M., 4,018,358.
Kimberly-Clark Corporation: *See—*
Frick, Richard H., 4,018,432.
Kimmel, Earl J.; and Silk, Charles Earnest, deceased (by Silk, Wilma F., sole heir), to Olin Corporation. Nitrocellulose lacquer with surfactant. 4,018,637, Cl. 149-96.000.
Kimura, Katsuhiro; and Kaneko, Yoichi, to Hitachi, Ltd. Temperature compensated dielectric resonator device. 4,019,161, Cl. 333-82.00B.
Kimura, Kenji; and Kajiware, Takao, to Honda Giken Kogyo Kabushiki Kaisha. Exhaust reaction apparatus for internal combustion engine having in-line cylinders. 4,018,047, Cl. 60-282.000.
Kimura, Kenji: *See—*
Matsuoka, Saburo; and Kimura, Kenji, 4,018,048.
Kimura, Morio: *See—*
Okamoto, Masahiro; Kimura, Morio; Shibuya, Teruo; Yamamoto, Shinji; Hasegawa, Shinichi; Terada, Yutaka; and Adachi, Teruho, 4,018,739.
King Industries, Inc.: *See—*
Gallacher, Lawrence V., 4,018,865.
King-Wilkinson, Limited: *See—*
Erzen, Cevdet; Tillyer, Robert; and Williams, Norman Elliott, 4,018,057.
Kinoshita, Tadao: *See—*
Ohkawa, Masaaki; Tanaka, Yoshio; Takeda, Yoshiro; Kinoshita, Tadao; and Hirabayashi, Kazuyoshi, 4,018,756.
Kinsell, Robert C.; Noe, James C.; and Campbell, Carl D., to Garrett Corporation, The. Air conditioning system for aircraft. 4,018,060, Cl. 62-91.000.
Kish, Edward E.: *See—*
Shufflebarger, Earl D.; Kish, Edward E.; Cunningham, Frank M.; Boylan, John R.; and Murauskas, Donald J., 4,018,686.
Kita, Hideki: *See—*
Muramoto, Ikuo; and Kita, Hideki, 4,018,312.
Kitai, Kiyoshi; Saito, Takeo; and Seki, Youichi, to Seiko Koki Kabushiki Kaisha. Digital exposure time control circuit with self-timer. 4,019,189, Cl. 354-23.00D.
Klatt, Friedhard: *See—*
Jahnentz, Walter; Klatt, Friedhard; and Gaupp, Karl, 4,018,621.
Klauke, Guenter; and Wimmer, Anton, to Siemens Aktiengesellschaft. Process for producing a ring-shaped one-color or multi-color ribbon and a ribbon produced in accordance with this process. 4,018,955, Cl. 428-57.000.
Klautschek, Herwig, to Siemens Aktiengesellschaft. Commutation circuit for a converter. 4,019,116, Cl. 321-45.00C.
Klein, Arthur H., to GTE Sylvania Incorporated. Horizontal dynamic damper circuitry. 4,019,093, Cl. 315-370.000.
Klein, Gerald B.; and Lowe, Frank C., to Klein, Gerald B. Method of manufacture of a gated can lid with score at upper surface. 4,018,178, Cl. 113-121.00C.
Klein, Max, to Sealed Air Corporation. Production of heat-expandable styrene-polymer bit-pieces. 4,018,946, Cl. 427-222.000.
Kleinguenther, Robert A. Apparatus and process for treating wood and fibrous materials. 4,017,980, Cl. 34-13.400.
Kleinschmager, Herbert: *See—*
Fischer, Wilfried; Kleinschmager, Herbert; Haar, Wilheim; Weddigen, Gert; and Rohr, Franz-Josef, 4,018,969.
Klocker, Wilhelm: *See—*
Schneiders, Ernst; and Klocker, Wilhelm, 4,018,863.
Klomp, Edward D., to General Motors Corporation. Vortex chamber stratified charge engine. 4,018,193, Cl. 123-30.00C.
Klygis, Mindaugas Julius, to Illinois Tool Works Inc. Multipackaging devices. 4,018,331, Cl. 206-199.000.
KMS Fusion, Inc.: *See—*
Brueckner, Keith A.; Jorna, Siebe; and Moncur, N. Kent, 4,019,151.
Knaack, Carl W., to Morris Associates, Inc. Golf flag assembly. 4,018,182, Cl. 116-173.000.
Knedlik, Omar. Mix blending pump. 4,018,545, Cl. 417-262.000.
Knight, John H., to Superior Oil Company, The. Thermal crushing of alkali compounds in the removal of sulfur dioxides from a flue gas. 4,018,868, Cl. 423-244.000.
Knox, Joseph Dale: *See—*
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Knudson, Jerome Leslie. Four wheel tractor. 4,018,296, Cl. 180-41.000.
Kobe Steel Ltd.: *See—*
Oishi, Minoru; Rokujo, Masaharu; Yokota, Hisaaki; Okuda, Naoki; Tomita, Makoto; and Endo, Toshihiko, 4,019,018.
Koch, Ulrich H.; Matousek, Stephen; and DiGennaro, Richard S., to Whitey Research Tool Co. Operating handle. 4,018,537, Cl. 403-240.000.
Kochte, Werner W. F. K.; and Bartholomew, Donald D., to Merit Plastics, Inc. Method of producing drag on an operating rod. 4,017,961, Cl. 29-450.000.
Koehler, Daniel Lynn: *See—*
Rastogi, Vijay; Budd, James Michael; and Koehler, Daniel Lynn, 4,018,482.
Koester, Eberhard; Wunsch, Gerd; Schoenafinger, Eduard; Schneehage, Hans Henning; and Jakusch, Helmut, to BASF Aktiengesellschaft. Manufacture of gamma-iron (III) oxide. 4,018,882, Cl. 423-634.000.
Kohler, Werner; and Steinemer, Norbert, to Siemens Aktiengesellschaft. Actuating mechanism for snap-actuating an electric switching apparatus. 4,019,008, Cl. 200-153.0SC.
Kojima, Kanji: *See—*
Kamisaka, Makoto; Kojima, Kanji; Negoro, Tatsuya; Uchikubo, Toshichika; Okamoto, Yusho; and Minato, Sadao, 4,018,026.
Kokusai Denshin Denwa Kabushiki Kaisha: *See—*
Watanabe, Tatsuo; and Saito, Hideki, 4,019,138.
Kolinger, Kenneth J.; Williams, Norman E.; Earley, Donald M.; and Golden, William R., to International Harvester Company. Automotive fan shroud for screening debris. 4,018,270, Cl. 165-119.000.
Komiya, Osamu, to Olympus Optical Co., Ltd. Apparatus for ligation of affected part in coeloma. 4,018,229, Cl. 128-326.000.
Komori, Tadaaki: *See—*
Kurita, Masaru; Jomon, Kazuyoshi; Komori, Tadaaki; and Nakatani, Isami, 4,018,772.
Konishi, Masami; and Futamura, Kazumasa, to Toyota Jidosha Kogyo Kabushiki Kaisha. Exhaust manifold reactor assembly. 4,018,049, Cl. 60-282.000.
Kono, Hidehiko, to Agency of Industrial Science & Technology. System for recognition of shape patterns. 4,019,173, Cl. 340-146.3AE.
Koori, Yoshizo: *See—*
Oshimura, Masakazu; Kawakami, Akira; Hosoda, Hiroaki; Okamoto, Osamu; Watanabe, Osamu; Fujii, Shinichi; Yamaguchi, Satoru; Odani, Noboru; and Koori, Yoshizo, 4,018,710.
Korgemets, Dorothy. Adult undergarment. 4,018,226, Cl. 128-287.000.
Kori, Seiji: *See—*
Hayashi, Masaki; Kori, Seiji; and Miyake, Hajimu, 4,018,812.
Kosuge, Momotoshi. Architectural block and the structure composed thereof. 4,018,018, Cl. 52-127.000.
Kothari, Girish H., to Pennsylvania Engineering Corporation. Suspension means for electric furnace transformer secondary buses. 4,018,975, Cl. 13-12.000.
Kovacs, Jenoe: *See—*
Fabian, Wolfgang; and Kovacs, Jenoe, 4,018,736.
Kovacs, Lloyd: *See—*
Safranski, Richard W.; and Kovacs, Lloyd, 4,018,029.
Kowalski, Walter: *See—*
Wolff, David Allen; and Kowalski, Walter, 4,019,090.
Kraft, Kurt; and Reese, Johannes, to Hoechst Aktiengesellschaft. Process for preparing triketoimidazolidines. 4,018,743, Cl. 260-77.5CH.
Krenzer, John, to Velsicol Chemical Corporation. 1-Thiadiazolyl-5-acylimidazolidinones. 4,018,787, Cl. 260-306.80D.
Kronenberg, Stanley; and Lux, Robert A. Charge transport tactical dosimeter. 4,019,058, Cl. 250-376.000.
Kropp, Helmut H.: *See—*
Brown, Elwood B.; and Kropp, Helmut H., 4,018,322.
Krueger, Keith T., to I-T-E Imperial Corporation. Pneumatic timer. 4,019,001, Cl. 200-34.000.
Kruglikov, Anatoly Abramovich; Aronova, Lia Ilinichna; Kuftarev, Vladimir Vasilievich; Sevrjugina, Zoya Sergeevna; and Eletskaya, Vera Konstantinovna. Method of producing water-soluble amine-modified urea-formaldehyde resins modified with polyoxyalkylene ether. 4,018,740, Cl. 260-70.00A.
Krum, Jack K.: *See—*
Tollefson, Charles I.; Jackel, Simon S.; and Krum, Jack K., 4,018,898.
Krumlinde, Jockum, to Aktiebolaget Alga. Burner unit especially for toy steam engines. 4,018,000, Cl. 46-1.00R.
Kubose, Donald A.: *See—*
Hoffsommer, John C.; Kaplan, Lloyd A.; Kubose, Donald A.; and Glover, Donald J., 4,018,676.
Kubota, Eishi: *See—*
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Kuftarev, Vladimir Vasilievich: *See—*
Kruglikov, Anatoly Abramovich; Aronova, Lia Ilinichna; Kuftarev, Vladimir Vasilievich; Sevrjugina, Zoya Sergeevna; and Eletskaya, Vera Konstantinovna, 4,018,740.
Kugelfischer Georg Schafer & Co.: *See—*
Weigert, Hans; and Patel, Kirit, 4,018,041.
Kullman, Russell M. H.: *See—*
Reinhardt, Robert M.; Daigle, Donald J.; and Kullman, Russell M. H., 4,018,950.
Kunczynski, Jan K., to Lift Engineering & Mfg., Inc. Positive cable derailment sensing apparatus. 4,019,002, Cl. 200-61.180.
Kupfer, Rudolf, to Vol Roll A.G. Process for separating iron, zinc and lead from flue dust and/or flue sludge. 4,018,680, Cl. 210-50.000.
Kuragano, Morimasa, to Mitsui Toatsu Chemicals, Incorporated. Method for desorption of methyl bromide. 4,018,704, Cl. 252-411.00R.
Kuraray Co., Ltd.: *See—*
Fukushima, Osamu; Nagoshi, Kazuo; and Iwamoto, Toshiaki, 4,018,954.
Kurata, Noboru: *See—*
Kusunoki, Shigeru; Takano, Teruhisa; and Kurata, Noboru, 4,019,009.
Kurata, Sakae: *See—*
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Kureha Kagaku Kogyo Kabushiki Kaisha: *See—*
Kawabe, Naoshi; Haga, Toshikatu; Nakajima, Taiitu; Takahashi, Takeshi; Shinoda, Hiroshi; and Hayakawa, Shuji, 4,017,960.
Kurita, Masaru; Jomon, Kazuyoshi; Komori, Tadaaki; and Nakatani, Isami, to Fujisawa Pharmaceutical Co., Ltd. Process for the purification of bicyclomycin. 4,018,772, Cl. 260-268.0BC.
Kurtz, Leonard D.; and Bidwell, Robert E., to Deknatel, Inc. Underwater drainage device with dual collection chambers. 4,018,224, Cl. 128-276.000.
Kustka, George John; and Mueller, Kurt Hugh, to Bell Telephone Laboratories, Incorporated. Correlative data demodulator. 4,019,149, Cl. 329-107.000.
Kusunoki, Shigeru; Takano, Teruhisa; and Kurata, Noboru, to Matsushita Electric Industrial Co., Ltd. Microwave heating apparatus. 4,019,009, Cl. 219-10.55F.
La Telemecanique Electrique: *See—*
Lameyre, Felix, 4,018,249.
Lascarrou, Alain, 4,018,498.
Lacefield, William B.; and Ho, Peter P. K., to Eli Lilly and Company. 5,6-Diaryl-1,2,4-triazines as topically-active anti-inflammatory agents. 4,018,923, Cl. 424-249.000.
Laevsky, Mikhail Avramovich: *See—*
Denikin, Ernst Ivanovich; Khazkhuta, Nikolai Yakovlevich; Shestopalov, Alexandr Andreevich; Badalov, Vladimir Vachaganovich; Vasiliev, Alexandr Alexandrovich; Okunev, Vyacheslav Ivanovich; Kaplan, David Abramovich; Deinego, Jury Borisovich; Kazakov, Alexandr Danilovich; Gienko, Vladimir Ivanovich; Marchenko, Alexei Alexeevich; and Laevsky, Mikhail Avramovich, 4,018,541.
Lakomsky, Victor Iosifovich: *See—*
Paton, Boris Evgenievich; Lakomsky, Victor Iosifovich; Melnik, Gary Alexandrovich; Chvertko, Anatoli Ivanovich; and Bukalo, Alfred Iosifovich, 4,018,973.
Lakshmanan, Pallavoor R., to Gulf Research & Development Company. Adhesive composition. 4,018,732, Cl. 260-27.00R.
Lalak, Joseph J.: *See—*
Singer, Barry M.; and Lalak, Joseph J., 4,018,638.
Lambert, James T. Live bait vending apparatus. 4,018,359, Cl. 221-14.000.
Lameyre, Felix, to La Telemecanique Electrique. Timing device for pneumatic control. 4,018,249, Cl. 137-624.110.
Lampietti, Bernard Pierre, to Torin Corporation. Spring winding machine with improved pitch mechanism. 4,018,071, Cl. 72-23.000.
Lampietti, Bernard Pierre: *See—*
Yagusic, George Joseph; and Lampietti, Bernard Pierre, 4,018,070.
Lance, Raymond E.; and James, Ronald N., to Construction Technology, Inc. Hydraulically powered impact device. 4,018,135, Cl. 91-321.000.
Landreau, Jean Florent Francois Marcel Robert, to Societe Anonyme Francaise du Ferodo. Rotary hydraulic machine. 4,018,139, Cl. 91-490.000.
Landrigan Corporation: *See—*
Landrigan, George E., 4,018,079.
Landrigan, George E., to Landrigan Corporation. Method and apparatus for testing hydraulic releases. 4,018,079, Cl. 73-4.00R.
Langstroth, Hall, to Watsco, Inc. Line tap valve. 4,018,246, Cl. 137-318.000.
Lanham, James W.; Holen, James T.; and Fadler, Norman L., to McDonnell Douglas Corporation. Process and apparatus for ascertaining the concentration of microorganism in a water specimen. 4,018,652, Cl. 195-103.50M.
Lapatukhin, Veniamin Semenovich: *See—*
Andreeva, Viktoria Ivanovna; Popova, Alexandra Ljudovikovna; and Lapatukhin, Veniamin Semenovich, 4,018,958.
Lapiere, Charles L.: *See—*
Delarge, Jacques E.; Lapiere, Charles L.; and Georges, Andre H., 4,018,929.
La Point, Albert E., to La Point, James P., Jr. Apparatus for separating the constituents of lead-acid storage batteries. 4,018,567, Cl. 23-285.000.
La Point, James P., Jr.: *See—*
La Point, Albert E., 4,018,567.
LaPolla, Edmund M.; Murphy, Charles F.; and Sarkisian, Arthur, to International Telephone and Telegraph Corporation. Filtration of cellulosic solutions. 4,018,681, Cl. 210-66.000.
Lappi, Larry R.; and Erickson, Edward H., to Riker Laboratories, Inc. [1]Benzothieno[3,2-f]quinolinecarboxylic acids. 4,018,780, Cl. 260-287.00C.
Larsen, Darrell R., to Minneapolis Electric Steel Casting Company. Mounting for grinder liners. 4,018,393, Cl. 241-182.000.
Lascarrou, Alain, to La Telemecanique Electrique. Contact clamp. 4,018,498, Cl. 339-65.000.
Latimer, Robert M., to Caterpillar Tractor Co. Winch disconnect control arrangement. 4,018,424, Cl. 254-187.100.
Laussermair, Friedrich. Accumulator to store and release braking energy. 4,018,052, Cl. 60-414.000.
Lavaux, Jean-Paul: *See—*
Derible, Pierre Henri; and Lavaux, Jean-Paul, 4,018,922.
Lavrinenko, Vyacheslav Vasilievich: *See—*
Vishnevsky, Vladimir Sergeevich; Kavertsev, Vladimir Leonidovich; Kartashev, Igor Alexandrovich; Lavrinenko, Vyacheslav Vasilievich; Nekrasov, Mikhail Makarovich; and Prez, Alexei Alexeevich, 4,019,073.
Lawler, James H. Tank shell with integral walkway. 4,018,354, Cl. 220-20.000.
Lawrence Peska Associates, Inc.: *See—*
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Williams, Ann, 4,017,970.
Lawrence, Robert J.; Devaney, John; and Tramontano, Dominick, to Grumman Aerospace Corporation. Timer controlled electromagnetic tripping apparatus for simultaneously closing plural switches mounted to panelboard. 4,019,166, Cl. 335-172.000.
Leach, Robert J., to George Kent Limited. Apparatus for providing a controlled concentration of a substance in a flow of liquid. 4,018,077, Cl. 73-1.00R.
Le Boeuf, Albert R.; and Grovesteen, William R., to Warner-Lambert Company. Crosslinked, hydrophilic rods of pyrrolidone-methacrylate graft copolymers. 4,018,853, Cl. 260-885.000.
Le Clercq, Pierre Alphonse Leon Marie Ghislain. Steel caissons. 4,018,055, Cl. 61-53.000.
Leco Corporation: *See—*
Sitek, George J.; and Berk, Charles W., 4,019,017.
Lee, Cheuk Man: *See—*
Zaugg, Harold Elmer; Lee, Cheuk Man; Michaels, Raymond John; and Plotnikoff, Nicholas Peter, 4,018,777.
Lee, Stuart M.; and Stafford, Jerrett D., to Ford Aerospace & Communications Corporation. Method for forming a bond between sapphire and glass. 4,018,374, Cl. 228-121.000.
Lee, Thomas E., to Ethyl Corporation. Process for the disposal of aluminum containing waste materials. 4,018,867, Cl. 423-115.000.
Lee, William H.: *See—*
Cox, Duncan B., Jr.; and Lee, William H., 4,019,153.
Lee, Yuan Ho. Blank turn-over device for high speed nut formers. 4,017,928, Cl. 10-76.00T.
Leendertz, Jack Albert, to National Research Development Corporation. Speckle pattern interferometer. 4,018,531, Cl. 356-109.000.
Leeper, Ralph S. Device for splicing rope. 4,018,039, Cl. 57-23.000.
Lefort, Marcel: *See—*
Marin, Gilbert; and Lefort, Marcel, 4,018,871.
Legros, Andre, to Bernard-Moteurs. Decompressing device. 4,018,203, Cl. 123-182.000.
Lehan, Frank W.: *See—*
Hartung, Albert F.; Lehan, Frank W.; Barooshian, Charles T.; and Zacharski, Edward J., 4,019,201.
Leigh, John U., to Raymond Lee Organization, Inc., The, a part interest. Golf practice device. 4,018,436, Cl. 273-35.00B.
Leimgruber, Willy: *See—*
Cleeland, Roy, Jr.; Grunberg, Emanuel; Leimgruber, Willy; and Weigele, Manfred, 4,018,884.
Lejdegard, Sixten H., to Bulten-Kanthal Aktiebolag. Fastener package. 4,018,334, Cl. 206-346.000.
Leland Stanford Junior University, The Board of Trustees of: *See—*
Chowning, John M., 4,018,121.
L'Electro-Refractaire: *See—*
Minssen, Bernard; and Parigot, Georges, 4,018,864.
Leliaert, Raymond M., to Wheelabrator-Frye, Inc. Vibratory finishing device. 4,018,009, Cl. 51-163.200.
Lemke, Galen D.: *See—*
Francel, Josef; and Lemke, Galen D., 4,018,717.
Lemkin, Jack L., to Midland-Ross Corporation. Box and lid therefor. 4,018,338, Cl. 206-505.000.
Lemon, Robert William, to Borg-Warner Corporation. Spin proof tandem axle drive mechanism. 4,018,317, Cl. 192-36.000.
Lengyel, Stephen Price; and Ishige, Toshiyuki, to Procter & Gamble Company, The. Laundry detergent compositions in emulsion/suspension. 4,018,720, Cl. 252-534.000.
Lenhard, Robert Herman: *See—*
Bernstein, Seymour; Lenhard, Robert Herman; and Heller, Milton David, 4,018,764.
Lennox, Forrest R., to Dow Chemical Company, The. Film slitting apparatus. 4,018,119, Cl. 83-425.300.
Lennox Industries, Inc.: *See—*
Mullen, James, 4,018,584.
Lenz, Herman N., to Teledyne Industries, Inc. Bevel gear shimming gage. 4,017,979, Cl. 33-174.00R.



Leo Pharmaceutical Products Ltd.: *See—*
Feit, Peter Werner; and Nielsen, Ole Bent Tvaermose, 4,018,794.
Leonard, Louis H.: *See—*
Patnode, Marvin M.; and Leonard, Louis H., 4,018,583.
Lerner, Harold S.: *See—*
DiBenedetto, Ernest A.; and Lerner, Harold S., 4,018,174.
Lesche, Wolfgang, to Siemens Aktiengesellschaft. Circuit arrangement for storing an electrical analog signal. 4,019,146, Cl. 328-151.000.
Leshem, Adam, to Combustion Engineering, Inc. Three-position actuator and apparatus incorporating same. 4,018,344, Cl. 214-1.0BB.
Leshem, Adam; Marugg, Martin Lewis; and Savor, Dennis Edward, to Combustion Engineering, Inc. Mounting arrangement for anchor fingers on a surface traversing apparatus. 4,018,346, Cl. 214-1.0BB.
Leshem, Adam: *See—*
Formanek, Frank Joseph; and Leshem, Adam, 4,018,345.
Lesher, George Y.; and Singh, Baldev, to Sterling Drug Inc. N-(2-(pyridinyl)-4-pyrimidinyl)-aminomethylenemalonates and analogs. 4,018,770, Cl. 260-256.40N.
Lesher, Howard D.: *See—*
Friedman, Robert; and Lesher, Howard D., 4,019,016.
Lesparre, Jean: *See—*
Correia, Yves; and Lesparre, Jean, 4,018,880.
Levine, Aaron William; and Kaplan, Michael, to RCA Corporation. Electron beam recording comprising polymer of 1-methylvinyl methyl ketone. 4,018,937, Cl. 427-43.000.
Levine, Jeffrey C. Lethal weapon detection process. 4,019,053, Cl. 250-303.000.
Levine, Marshall S., to Geometric Data Corporation. Method of forming a packet of separated microscope slides. 4,018,643, Cl. 156-297.000.
Levine, Melvin: *See—*
Dzula, Gregory; Levine, Melvin; and Sperry, Elmer Ambrose, III, 4,018,089.
Lewis, David W.: *See—*
Daviduk, Nicholas; Lewis, David W.; and Siuta, Michael T., 4,018,280.
Li, Tao P., to Monsanto Company. Oxidation/ammoxidation catalyst. 4,018,712, Cl. 252-456.000.
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Beerwerth, Wolfgang; Geppert, Albrecht; Gesing, Horst; and Schimmer, Rigobert, 4,018,373.
Rusch, Dieter; Glaser, Heinz; and Lubcke, Otto, 4,018,397.
Liebrandt, Gunnar; Hagel, Adolf; and Gallwitz, Gerhard. Driving apparatus for the knitting implement bars of warp knitting machines. 4,018,065, Cl. 66-208.000.
Liechti, Hans Wilhelm; and Defago, Raymond, to Ciba-Geigy Corporation. Exhaust process for the dyeing of synthetic organic textile material in navy blue to black shades. 4,018,558, Cl. 8-26.000.
Liedke, Carl F., to O. F. Mossberg & Sons, Inc. Sear-disconnector for firearms. 4,017,996, Cl. 42-69.00B.
Lift Engineering & Mfg., Inc.: *See—*
Kunczynski, Jan K., 4,019,002.
Light, Glenn M.; and Richardi, Michael V. Trailer hitch alignment device. 4,017,977, Cl. 33-1.0LE.
Limper, Nicolaas Hendrik, to U.S. Philips Corporation. Television camera tube. 4,019,083, Cl. 313-372.000.
Lincoln, Neil R.; and Resnick, David R., to Control Data Corporation. Conditional latch circuit. 4,019,144, Cl. 328-92.000.
Linden, Wilhelm: *See—*
Gehm, Horst; Gratzke, Werner; and Linden, Wilhelm, 4,019,117.
Linder, Ernst; and Dettling, Hubert, to Robert Bosch G.m.b.H. Internal combustion engine. 4,018,196, Cl. 123-75.00B.
Lindsay, Harold W. Adjustable tool holder for boring bar. 4,018,542, Cl. 408-153.000.
Lindsey Manufacturing Company: *See—*
Bozeman, Hoyt W., Jr., 4,018,422.
Lindsey, William C.: *See—*
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Lindstrom, Edgar K., to J. I. Case Company. Anti-rollback mechanism for material handling implement. 4,018,352, Cl. 214-761.000.
Lindy, Lowell B., to Dow Chemical Company, The. Surfactant composition. 4,018,699, Cl. 252-353.000.
Linsinger, Ernst. Apparatus for trimming and edge-cutting a plate-like metallic workpiece. 4,018,134, Cl. 90-15.00R.
Lionetti, Fabian J.; and Hunt, Stephen M., to United States of America, Navy. Method for large volume freezing and thawing of packed erythrocytes. 4,018,911, Cl. 424-101.000.
Lipo, Thomas A.: *See—*
Cornell, Edward P.; and Lipo, Thomas A., 4,019,105.
Lips, Hans-Peter, to BBC Brown Boveri & Company Limited. Energy transmission system with a common main for direct current. 4,019,115, Cl. 321-27.00R.
Lipschutz, Paul, to Neiman, S.A. Key-actuated barrel-type locks. 4,018,069, Cl. 70-395.000.
Lissant, Kenneth J.: *See—*
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Littlewood, Peter Stuart; and Mercer, Alec Victor, to Sandoz Ltd. 5-Substituted-2-(2')-benzimidazoyl-furans. 4,018,789, Cl. 260-309.200.
Litton Business Systems, Inc.: *See—*
Giordano, Benjamin B., 4,018,156.
Llewelyn, David Myers, to International Nickel Company, Inc., The. High shrinkage powder body. 4,018,596, Cl. 75-.5AA.
Lloyd, L. Babcock. Rotary internal combustion engine. 4,018,191, Cl. 123-8.450.
Lobdell, Harry R.: *See—*
Dice, S. Virgil, Jr.; and Lobdell, Harry R., 4,018,143.
Loch, Ernst, to Zellweger, Ltd. Method and apparatus for determining the moisture content of different kinds of materials. 4,019,132, Cl. 324-65.00R.
Lockheed Aircraft Corporation: *See—*
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Lodge, Richard Worthington: *See—*
Wyness, Glen Reid; and Lodge, Richard Worthington, 4,018,806.
Lofdahl, Christer Edvin, to AB Samefa. Recording device for energy meters. 4,019,135, Cl. 324-113.000.
Logan, Francis D., to Camco, Incorporated. Self-centering steady rest for a machine tool. 4,018,115, Cl. 82-39.000.
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Lohmer, Karl; Seiz, Hermann; and Zietan, Karl, to AGFA-Gevaert, A.G. Color photographic multilayered material with layers of acid ashed gelatine. 4,018,609, Cl. 96-74.000.
Lohstroh, Jan; and Salters, Roelof Herman Willem, to U.S. Philips Corporation. Semiconductor floating gate storage device with lateral electrode system. 4,019,197, Cl. 357-23.000.
Lolachi, Houshang; and Goldsmith, Herbert, to Baxter Travenol Laboratories, Inc. Lubrication system for a centrifugal liquid processing system. 4,018,304, Cl. 184-7.00R.
Long, Ronald D.; Swain, Allan L.; and Lyon, Thomas C., to Consolidated Video Systems, Inc. Digital video synchronizer. 4,018,990, Cl. 358-149.000.
Lonza Ltd.: *See—*
Tenud, Leander, 4,018,821.
Lopez, Eugene Francis; Glover, Leon Conrad, Jr.; and Lyons, Bernard John, to Raychem Corporation. Hot melt adhesive composition comprising an acidic ethylene polymer and a polyamide. 4,018,733, Cl. 260-27.0EV.
LoPresti, Roy F., to Peskin, Samuel. Multipositionable portable and collapsible rectangular frame exercising apparatus with detachable support means. 4,018,437, Cl. 272-62.000.
Loratto, Robert J. Cooled or heated enclosure. 4,018,585, Cl. 62-372.000.
Lorenz, Gunter: *See—*
Radlmann, Eduard; Schaffner, Heinz; Lorenz, Gunter; and Nischk, Gunther, 4,018,809.
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Louzil, Friedrich, to U.S. Philips Corporation. Winding hub for a record carrier in the form of a tape. 4,018,398, Cl. 242-74.100.
Lowder, James T.; and Tausch, Edwin M., to Abrasive Technology, Inc. Diamond abrasive tool. 4,018,576, Cl. 51-309.00R.
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Lucas Industries Limited: *See—*
Joby, Michael John; and Maker, Paul Manwaring, 4,018,044.
Lucas, John M.; and Gracovetsky, Serge, to Domtar Limited. Measuring the surface roughness of a moving sheet material. 4,019,066, Cl. 250-562.000.
Lundquist, Merlin L. Lifting ring for plastic drums. 4,018,468, Cl. 294-67.0BA.
Lundqwist, Nils Rune; and Dahl, Gustav Lennart, to Aktiebolaget Atomenergi. Analysis of low ion contents. 4,018,563, Cl. 23-230.00R.
Lurey, Daniel Morris; and Drury, David Michael, to Motorola, Inc. PA protection circuit for a single sideband radio. 4,019,150, Cl. 330-2.000.
Lussow, Robert O.: *See—*
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Manoliu, Victor; Lutescu, Andrei; Ionescu, Gheorghe; Heretoiu, Silviu; Frangopol, Victor; and Petru, Lucuta, 4,018,082.
Lutz, Alfons; and Jardin, Hans, to Webasto-Werk W. Baier KG. Automobile sliding roof with transparent panel and shutter. 4,018,476, Cl. 296-137.00F.
Lux, Robert A.: *See—*
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Lynch, Thomas J.: *See—*
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Lyon, Thomas C.: *See—*
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Lyons, Bernard John: *See—*
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Lyons, Merlyn E. Emergency building access apparatus. 4,018,306, Cl. 187-6.000.

Maag, Fritjof; and Unger, Friedrich, to Hoechst Aktiengesellschaft. Wrapped yarn. 4,018,042, Cl. 57-144.000.

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Barba, Diego; Battistoni, Fabrizio; D'Agostini, Candido; and Macchi, Giorgio, 4,018,873.

MacDonald, Robert N., to Du Pont de Nemours, E. I., and Company. Polyamides containing 1,2,5-Oxadiazole-3,4-dicarbonyl groups. 4,018,748, Cl. 260-78.00R.

Machlett Laboratories, Incorporated, The: *See—*
Fitzsimmons, Thomas W.; Berluti, Vincent, Jr.; Wagner, Howard G.; and Shapiro, Jonathan S., 4,018,716.

MacMillan Bloedel Limited: *See—*
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Maeda, Ryozo; and Hirose, Katsumi, to Shionogi & Co., Ltd. Certain 2-iminothiazoline compounds. 4,018,785, Cl. 260-306.70T.

Maier, Dietmar: *See—*
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Maione, Theodore Lincoln; Radcliffe, Frederick Enyeart; Sell, Darrell Dean; and Wolaver, Dan Holden, to Bell Telephone Laboratories, Incorporated. Regenerator for an optical transmission system. 4,019,048, Cl. 250-199.000.

Maitenaz, Bernard, to Essilor International (Compagnie Generale d'Optique). Method for producing a curved glass die having an aspherical polished concave face. 4,018,587, Cl. 65-17.000.

Maker, Paul Manwaring: *See—*
Joby, Michael John; and Maker, Paul Manwaring, 4,018,044.

Malkin, Vasily Berkovich: *See—*
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Mallick, George T., Jr.: *See—*
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Mallinckrodt, Inc.: *See—*
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Maloof, Robert Edward, to Victor Electric Wire & Cable Corporation. Multiple terminal connector plug. 4,018,501, Cl. 339-183.000.

Malz, Russell E., Jr.; Brown, Robert W.; and Greenfield, Harold, to Uniroyal, Inc. Production of fiber-forming polyamides by transamidation of N-alicyclic diamides with dicarboxylic acids. 4,018,747, Cl. 260-78.00R.

Malzahn, Ronald C.: *See—*
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Manderscheid, Phillip H.: *See—*
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Manley, Robert E.; and McCoy, John D., to Gulf Research & Development Company. Corrosion detecting and monitoring apparatus. 4,019,133, Cl. 324-65.0CR.

Mann, Harold J., Jr. Solar heating structure. 4,018,213, Cl. 126-271.000.

Manoliu, Victor; Lutescu, Andrei; Ionescu, Gheorghe; Heretoiu, Silviu; Frangopol, Victor; and Petru, Lucuta, to Institutul Pentru Creatie Stintifica si Tehnica-Increst. Device for nondestructive ultrasonic testing of cylindrical parts. 4,018,082, Cl. 73-67.50R.

Manson, Morris, to Corax Corporation. Slide brackets. 4,018,488, Cl. 312-348.000.

Marathon Oil Company: *See—*
Andon, Nicholaki A.; and Fleece, Robert I., 4,018,671.

Marcade, Roque Denis; and Gurubatham, Vincent Paulraj, to Whirlpool Corporation. Refuse compactor with automatic drawer opener. 4,018,147, Cl. 100-45.000.

Marcal Paper Mills, Inc.: *See—*
Smaw, Jesse B., 4,018,031.

Marchenko, Alexei Alexeevich: *See—*
Denikin, Ernst Ivanovich; Khazkhuta, Nikolai Yakovlevich; Shestopalov, Alexandr Andreevich; Badalov, Vladimir Vachaganovich; Vasiliev, Alexandr Alexandrovich; Okunev, Vyacheslav Ivanovich; Kaplan, David Abramovich; Deinego, Jury Borisovich; Kazakov, Alexandr Danilovich; Gienko, Vladimir Ivanovich; Marchenko, Alexei Alexeevich; and Laevsky, Mikhail Avramovich, 4,018,541.

Marek, Miroslav; Toman, Ludek; and Pecka, Jan, to Ceskoslovenska akademie ved. Method for radiation polymerization and copolymerization of isobutylene by a cationic mechanism. 4,018,659, Cl. 204-159.240.

Margolis, Hyman J. Sanitary hand covering with shaping fasteners. 4,017,907, Cl. 2-158.000.

Marietta, Robert L.: *See—*
Parks, Robert E.; and Marietta, Robert L., 4,018,562.

Marin, Gilbert; and Lefort, Marcel, to Rhone-Poulenc Industries. Dismutation of trichlorosilane. 4,018,871, Cl. 423-342.000.

Marker, Hannes: *See—*
Burkart, Oskar, 4,018,454.

Marklein, Heinz, to Fa. Schmalbach-Lubeca GmbH. Vacuum closure for containers. 4,018,353, Cl. 215-253.000.

Markus, Frank, to Steel Company of Canada, Limited, The. Method for liquid mixing. 4,018,598, Cl. 75-61.000.

Marlow, Darrell W., to Olin Corporation. Inflating device for use with vehicle safety systems. 4,018,457, Cl. 280-735.000.

Martelet, Ronald G., to Sears, Roebuck and Co. Safety lighting system. 4,019,171, Cl. 340-134.000.

Martellock, Arthur C., to Xerox Corporation. Coating method. 4,018,953, Cl. 427-430.00R.

Martin, Francis W., to Corning Glass Works. Diode encapsulation glass. 4,018,613, Cl. 106-53.000.

Martin, Walter L., Jr.: *See—*
Cates, Raymond H., Jr.; Martin, Walter L., Jr.; and Smith, Sumpter D., 4,018,586.

Martinelli, Ramon Ubaldo: *See—*
Olsen, Gregory Hammond; Martinelli, Ramon Ubaldo; and Ettenberg, Michael, 4,019,082.

Marugg, Martin Lewis: *See—*
Leshem, Adam; Marugg, Martin Lewis; and Savor, Dennis Edward, 4,018,346.

Marulic, Walter J.: *See—*
Gutridge, Jack E.; and Marulic, Walter J., 4,018,166.

Marulli, Alfred N., to National Plastics & Plating Supply Co., Inc. Electroplating barrel sidewall construction. 4,018,427, Cl. 259-81.00R.

Maruya, Takashi: *See—*
Sugahara, Yujiro; Noshi, Yoshibumi; Naito, Niroyuki; and Maruya, Takashi, 4,018,616.

Marzonie, James M.; and Jautakis, Karl, to Whirlpool Corporation. Electrically heated dryer. 4,019,023, Cl. 219-400.000.

Masi, Paolo: *See—*
Foglio, Maurizio; Masi, Paolo; Suarato, Antonino; and Franceschi, Giovanni, 4,018,776.

Maskery, Arthur, to Westinghouse Brake and Signal Co. Ltd. Magnetic amplifier arrangements. 4,019,123, Cl. 323-85.000.

Mason, William T., Jr., to General Motors Corporation. Tractor-trailer aerodynamic drag reducer. 4,018,472, Cl. 296-1.00S.

Masse, Norman G.: *See—*
Kafesjian, Ralph R.; Masse, Norman G.; and Keller, David P., 4,017,911.

Massey, David H. Ring buoy. 4,017,927, Cl. 9-340.000.

Masson Scott Thrissell Engineering Limited: *See—*
Stutt, Colin; Noble, Anthony John; and Ford, Reginald Arthur, 4,018,144.

Massucco, Arthur A.: *See—*
Merrill, Richard E.; and Massucco, Arthur A., 4,018,939.

Mateja, Eugene V.: *See—*
Broderick, Milan A.; Porazinski, Robert F.; and Mateja, Eugene V., 4,018,525.

Matousek, Stephen: *See—*
Koch, Ulrich H.; Matousek, Stephen; and DiGennaro, Richard S., 4,018,537.

Matsumoto, Jyusei; Itoh, Minoru; Ishikawa, Chuzi; and Hashimoto, Yoshio, to Ricoh Co., Ltd. Printing apparatus for cash register. 4,018,154, Cl. 101-93.020.

Matsuno, Kazuo: *See—*
Nakao, Hisaji; Tokura, Yasufumi; Matsuno, Kazuo; and Yomogida, Toshihiko, 4,019,175.

Matsuoka, Saburo; and Kimura, Kenji, to Honda Giken Kogyo Kabushiki Kaisha. Exhaust reaction chamber assembly for internal combustion engine. 4,018,048, Cl. 60-282.000.

Matsushima, Haruo: *See—*
Tanaka, Junzo; Matsushima, Haruo; and Abe, Yukio, 4,019,010.

Matsushita Electric Industrial Co., Ltd.: *See—*
Kusunoki, Shigeru; Takano, Teruhisa; and Kurata, Noboru, 4,019,009.
Mifune, Hideo; Tani, Kenroku; and Niikawa, Tomohiko, 4,019,072.
Tanaka, Junzo; Matsushima, Haruo; and Abe, Yukio, 4,019,010.

Matthews, Dean A.: *See—*
Ehrhardt, Benonie C.; Matthews, Dean A.; and Pivarunas, Walter A., 4,018,307.

Mattox, William J., to Exxon Research and Engineering Company. High surface area alumina and method for the preparation thereof. 4,018,881, Cl. 423-631.000.

Maurer, Gustav: *See—*
Andreoli, Bruno; Fiebig, Trauterose; and Maurer, Gustav, 4,018,168.

Max-Planck-Gesellschaft zur Forderung der Wissenschaften e.V.: *See—*
Ruhenstroth-Bauer, Gerhard; and Scherer, Reiner, 4,018,662.

Mayer, Ivan, to Exxon Research and Engineering Company. Method for continuously controlling the water content of sulfuric acid alkylation catalyst. 4,018,846, Cl. 260-683.590.

McAleer, William J.; and Hilleman, Maurice R., to Merck & Co., Inc. Syringe containing frozen vaccine. 4,018,222, Cl. 128-216.000.

McArthur, Billy Walton, to Sperry-Sun Well Surveying Company. Borehole pressure measurement apparatus having a high pressure float valve. 4,018,088, Cl. 73-151.000.

McAvoy, Thomas R.: *See—*
Davis, John E.; and McAvoy, Thomas R., 4,018,575.

McClelland, Harold Grant, to Northern Electric Company Limited. Noise suppression circuit for switched telephone lines. 4,018,995, Cl. 179-79.000.





McCoy, John D.: *See—*
Manley, Robert E.; and McCoy, John D., 4,019,133.

McCoy, John H.; and Sullivan, Paul A., to Hughes Aircraft Company. Alignment system and method with micromovement stage. 4,019,109, Cl. 318-640.000.

McCready, Raymond George; and Eggers, Philip Eugene, to Sundstrand Corporation. Heat pipe cooling system for electronic devices. 4,019,098, Cl. 361-385.000.

McDermott, Michael John; Allen, John Graham; Jones, Keith; and Wright, Peter Gordon, to Imperial Chemical Industries Limited. Electrochromic device and medium therefor. 4,018,508, Cl. 350-160.00R.

McDevitt, Edward J., to United States of America, Navy. X-Y to range-bearing converter. 4,019,032, Cl. 235-150.500.

McDonald, Charles H. Method for emulsifying asphalt-rubber paving material and a stable thixotropic emulsion of said material. 4,018,730, Cl. 260-17.40R.

McDonald, Wilson C.: *See—*
Egbert, William D.; and McDonald, Wilson C., 4,018,589.

McDonnell Douglas Corporation: *See—*
Judd, Ronald Iliff, 4,017,913.
Lanham, James W.; Holen, James T.; and Fadler, Norman L., 4,018,652.

McGraw-Edison Company: *See—*
Kelly, James P.; and Wandler, Donald, 4,019,044.

McHatton, Austin D.: *See—*
Alley, Vernon L., Jr.; and McHatton, Austin D., 4,018,085.

McIntosh, Colin Leslie, to Du Pont de Nemours, E. I., and Company. Carboxyphosphonates. 4,018,854, Cl. 260-941.000.

McKay, Larry L.: *See—*
Busta, Francis F.; Schmidt, Bruce E.; and McKay, Larry L., 4,018,650.

McKee, William H.; and Schubert, Anthony E., to TRW Inc. Terminal connectors and method of making the same. 4,018,177, Cl. 113-119.000.

McQuinn, Ted M.; and Anderson, Richard B., to General Motors Corporation. Engine and transmission power train. 4,018,316, Cl. 192-3.300.

Mead, Theodore C.; and Ashton, William B., to Texaco Inc. Transformer oils. 4,018,693, Cl. 252-64.000.

Meador, Richard A., to Texaco Inc. Dipmeter means utilizing generated eddy currents and lines of flux in an earth formation. 4,019,126, Cl. 324-5.000.

Mefina S.A.: *See—*
Jimenez, Antonio, 4,018,173.

Megee, Robert Luther. Pedal operator for piano and the like. 4,018,128, Cl. 84-231.000.

Mehalso, Robert Michael, to RCA Corporation. Method of making a metallized video disc having an insulating layer thereon. 4,018,945, Cl. 427-41.000.

Meinke, Russell F.: *See—*
Dempsey, John E.; and Meinke, Russell F., 4,018,032.

Meiser, Werner: *See—*
Buchel, Karl Heinz; Meiser, Werner; Plempel, Manfred; and Metzger, Carl, 4,018,924.

Melnik, Gary Alexandrovich: *See—*
Paton, Boris Evgenievich; Lakomsky, Victor Iosifovich; Melnik, Gary Alexandrovich; Chvertko, Anatoli Ivanovich; and Bukalo, Alfred Iosifovich, 4,018,973.

Meng, Karl: *See—*
Moller, Eike; Meng, Karl; Wehinger, Egbert; and Horstmann, Harald, 4,018,890.

Mennen, Frederick C., to U.S. Packaging Corporation. Instruments for the detection of *Neisseria gonorrhoeae* without culture. 4,018,653, Cl. 195-127.000.

Mentschel, Hellmuth, to Siemens Aktiengesellschaft. Reactor for the catalytic conversion of hydrocarbons with a gas containing oxygen to form a fuel gas. 4,018,573, Cl. 48-107.000.

Menuiserie du Val de Rhins R. Boucher S.A.: *See—*
Geay, Gilbert Louis, 4,018,300.

Menzel, Klaus: *See—*
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Mera, Hiroshi: *See—*
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Mercer, Alec Victor: *See—*
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Mercer, Gerald D.: *See—*
Buckman, Stanley J.; and Mercer, Gerald D., 4,018,592.

Mercier, Serge: *See—*
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Merck & Co., Inc.: *See—*
Christy, Marcia Elizabeth, 4,018,830.
Cragoe, Edward J., Jr.; Bicking, John B.; and Smith, Robert L., 4,018,802.
McAleer, William J.; and Hilleman, Maurice R., 4,018,222.

Meresz, Otto; and Mozsgai, Cecilia. Long chain internally unsaturated alkenes. 4,018,844, Cl. 260-677.00R.

Merino, Elias Munoz, to Fabrica Espanola Magnetos, S.A. Semi-conductor device capable of supporting high amperages of inverse current. 4,019,195, Cl. 357-13.000.

Merlt Plastics, Inc.: *See—*
Kochte, Werner W. F. K.; and Bartholomew, Donald D., 4,017,961.

Merlin Industries, Inc.: *See—*
Alfin, Norman J.; and Scott, Robert, 4,018,658.

Merrill, Richard E.; and Massucco, Arthur A., to Arthur D. Little, Inc. Method of rendering surfaces nonfogging. 4,018,939, Cl. 427-54.000.

Mertz, Richard E.; and Lissant, Kenneth J., to Petrolite Corporation. System for producing emulsions. 4,018,426, Cl. 259-7.000.

Mery, Jean-Claude, to Societe Anonyme D.B.A. Disc brake and locking means therefor. 4,018,309, Cl. 188-72.400.

Messerly, James William, to B. F. Goodrich Company, The. Flexible coating compositions. 4,018,847, Cl. 260-831.000.

Messrs. adidas Sportschuhfabriken Adi Dassler K.G.: *See—*
Bente, Alfred, 4,017,910.

Metal Box Company Limited, The: *See—*
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Metalorgana Etablissement: *See—*
Cramer, Charles Robert; vanLenthe, Gerrit Dirk; and Maier, Dietmar, 4,018,611.

Metlesics, Werner; and Sternbach, Leo Henryk, to Hoffmann-La Roche Inc. Process for the preparation of certain hydroperoxy derivatives. 4,018,765, Cl. 260-239.0BC.

Metzger, Carl: *See—*
Buchel, Karl Heinz; Meiser, Werner; Plempel, Manfred; and Metzger, Carl, 4,018,924.

Meuleman, Johannes, to U.S. Philips Corporation. Apparatus for treating a plurality of semiconductor slices to a reacting gas current. 4,018,183, Cl. 118-49.000.

Meyer, Leonard S. Archery bow with arcuate limb attachments. 4,018,205, Cl. 124-24.00R.

Micco, Alexander J.: *See—*
Sodal, Ingvar E.; Hoivik, Lars; Micco, Alexander J.; Weil, John V.; and Baer, Norman W., 4,018,241.

Michaels, Raymond John: *See—*
Zaugg, Harold Elmer; Lee, Cheuk Man; Michaels, Raymond John; and Plotnikoff, Nicholas Peter, 4,018,777.

Michaux, Jean-Pierre; and Arnaud, Guy; to Compagnie Francaise de Raffinage. Process for the obtaining of isobutylene of high purity. 4,018,843, Cl. 260-677.00A.

Michel, Henri; and Gantois, Michel. High intensity ionic bombardment reactor for thermochemical treatment processes. 4,019,064, Cl. 250-543.000.

Michel, Stephen: *See—*
Contois, Lawrence E.; Kaukeinen, Joseph Y.; Michel, Stephen; and Plutchak, Thomas M., 4,018,606.

Michener Associates, Inc.: *See—*
Barichello, Gary Douglas, 4,018,386.

Michetti, Anthony B., to I-T-E Imperial Corporation. Multi-pole circuit breaker with baffle shield venting. 4,019,005, Cl. 200-144.00R.

Microfibres, Inc.: *See—*
Casey, James P., 4,018,956.

Midland-Ross Corporation: *See—*
Bulanchuk, William J., 4,018,497.
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Mifune, Hideo; Tani, Kenroku; and Niikawa, Tomohiko, to Matsushita Electric Industrial Co., Ltd. Piezoelectric pressure sensor. 4,019,072, Cl. 310-8.100.

Mihalic, William T., to Eaton Corporation. Positioning device for adjustable steering columns. 4,018,101, Cl. 74-493.000.

Mijnheer, Andries: *See—*
Prast, Gijsbert; Mijnheer, Andries; and Mulder, Jan, 4,018,552.

Mika, Anton Leroy: *See—*
Raudys, Vytas Andrew; and Mika, Anton Leroy, 4,017,941.

Mikulicz, Michael Z.; Boney, William G.; and Vora, Bipin V., to UOP Inc. Process for alkylation of aromatics. 4,018,841, Cl. 260-671.00R.

Miller, Art J.: *See—*
Clark, Gary E.; and Miller, Art J., 4,018,086.

Miller, Charles. Room planning kit. 4,017,986, Cl. 35-16.000.

Miller, Louis Donald; and Popp, Hans, to RCA Corporation. Method for extending cathode life in vidicon tubes. 4,018,489, Cl. 316-5.000.

Miller, Robert C.; Mallick, George T., Jr.; and Emtage, Peter R., to Westinghouse Electric Corporation. Circuit breaker with solid state passive overcurrent sensing device. 4,019,097, Cl. 361-93.000.

Miller, Robert C.: *See—*
Ryan, Frederick M.; and Miller, Robert C., 4,018,635.

Miller, Stewart Edward, to Bell Telephone Laboratories, Incorporated. Directional optical waveguide couplers. 4,019,051, Cl. 250-227.000.

Mills, David, to Rolls-Royce (1971) Limited. Refractory material containing fused silica and crystalline phase silica. 4,018,615, Cl. 106-69.000.

Minaki, Toshiaki: *See—*
Otouma, Takashi; Aoki, Susumu; Minaki, Toshiaki; Shibata, Kenichi; and Mori, Kentaro, 4,018,964.

Minato, Sadao: *See—*
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Minnesota Mining and Manufacturing Company: *See—*
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Olsen, David B., 4,018,605.
Peterson, Robert L., 4,018,745.
Siemens, Dan H., Jr.; and Wheelwright, Earl J., 4,018,561.
Skoog, Ivan H., 4,018,810.

Minssen, Bernard; and Parigot, Georges, to L'Electro-Refractaire. Method for making fused refractory products. 4,018,864, Cl. 264-299.000.

Mirecki, Walter. Hot cap. 4,018,003, Cl. 47-26.000.
Mischenko, Nicholas, to Bell & Howell Company. Mixed slide separator. 4,018,521, Cl. 353-104.000.
Mitchell, Edward; and Cobb, John M., to Texaco Inc. Engine piston with insulated combustion chamber. 4,018,194, Cl. 123-32.00C.
Mitchell, Thomas J.; and Pengue, Leonard M., to Pitney-Bowes, Inc. Pneumatic feed device. 4,018,434, Cl. 271-96.000.
Mitsubishi Chemical Industries Ltd.: *See*—
Okamoto, Shosuke; Kikumoto, Ryoji; Ohkubo, Kazuo; Tezuka, Tohru; Tonomura, Shinji; Tamao, Yoshikuni; and Hijikata, Akiko, 4,018,913.
Okamoto, Shosuke; Kikumoto, Ryoji; Ohkubo, Kazuo; Tezuka, Tohru; Tonomura, Shinji; Tamao, Yoshikuni; and Hijikata, Akiko, 4,018,915.
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Mitsubishi Denki Kabushiki Kaisha: *See*—
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Mitsubishi Jukogyo Kabushiki Kaisha: *See*—
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Mitsubishi Rayon Co., Ltd.: *See*—
Hiramatsu, Takashi; Oe, Akihiko; Fukuda, Atsushi; Fuse, Masaki; and Mori, Tatsujiro, 4,019,036.
Mitsui Toatsu Chemicals, Incorporated: *See*—
Kuragano, Morimasa, 4,018,704.
Miyagawa, Fumihiro, to Ricoh Co., Ltd. Photographic camera of the retractable lens tube type with a movable lens cover. 4,019,192, Cl. 354-187.000.
Miyake, Hajimu: *See*—
Hayashi, Masaki; Kori, Seiji; and Miyake, Hajimu, 4,018,812.
Miyake, Toshio, to Sumitomo Chemical Company Limited; and Hayashibara Biochemical Laboratories, Incorporated. Shaped matters of tobaccos and process for producing the same. 4,018,233, Cl. 131-17.0AC.
Miyata, Katsuhiko, to Asahi Kogaku Kogyo Kabushiki Kaisha. Photometric device for use in a single lens reflex camera. 4,019,191, Cl. 354-155.000.
Miyazaki, Teruko U.: *See*—
Gupton, John T., III; Jelenevsky, Alex M.; Miyazaki, Teruko U.; and Petree, Harris E., 4,018,771.
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Mobil Oil Corporation: *See*—
Chang, Harry L., 4,018,281.
Daviduk, Nicholas; Lewis, David W.; and Siuta, Michael T., 4,018,280.
Moe, James A. Selection console and locking mechanism for vending machine. 4,018,100, Cl. 74-483.0PB.
Moelders, Johann, to Berger Maschinenfabriken G.m.b.H. & Co. Spinning jet blasting plant for cleaning shaped workpieces. 4,018,006, Cl. 51-9.00R.
Mohajery, Mahmood; and Rawlins, Charles B., to Aluminum Company of America. Transmission line system having improved stability characteristics from wake-induced subspan oscillations. 4,018,980, Cl. 174-42.000.
Mohawk Data Sciences Corporation: *See*—
Cargill, N. Allen, 4,018,155.
Robinson, Max S.; and Studebaker, Thomas J., 4,018,999.
Molins Limited: *See*—
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Mollard, Paul, to Produits Chimiques Ugine Kuhlmann. Process for the production of sodium percarbonate by atomization. 4,018,874, Cl. 423-415.00P.
Moller, Eike; Meng, Karl; Wehinger, Egbert; and Horstmann, Harald, to Bayer Aktiengesellschaft. Pyrazol-5-one pharmaceutical compositions and methods for effecting diuresis, saluresis and for treating hypertension. 4,018,890, Cl. 424-273.000.
Molloy, Bryan B.; and Schmiegel, Klaus K., to Eli Lilly and Company. Aryloxyphenylpropylamines in treating depression. 4,018,895, Cl. 424-330.000.
Molloy, Bryan B., to Eli Lilly and Company. Antiarrhythmic agents. 4,018,897, Cl. 424-330.000.
Moltgen, Gottfried, to Siemens Aktiengesellschaft. Apparatus for compensating reactive power in a three-phase network. 4,019,124, Cl. 323-102.000.
Mominee, David E.; and Vance, Gilbert W., to Reed Irrigation Systems. Submain connector. 4,018,459, Cl. 285-5.000.
Monarch Marking Systems, Inc.: *See*—
Vanderpool, James L.; and Hoertt, Dennis J., 4,019,174.
Moncur, N. Kent: *See*—
Brueckner, Keith A.; Jorna, Siebe; and Moncur, N. Kent, 4,019,151.
Monna, Takashi, to Kabushiki Kaisha Suwa Seikosha. Electronic wristwatch incorporating calculator. 4,019,037, Cl. 235-156.000.
Monpetit, Louis, to Societe Anonyme D.B.A. Miniature solenoid valve. 4,018,419, Cl. 251-65.000.
Monsanto Company: *See*—
Bartram, Ronald D.; and Runkle, Charles J., 4,018,073.
Li, Tao P., 4,018,712.
Mooradian, Victor G.: *See*—
Hill, James S.; Carbone, Emil L.; Mooradian, Victor G.; and Keyes, Walter G., 4,018,599.
Hill, James S.; Carbone, Emil L.; Mooradian, Victor G.; and Keyes, Walter G., 4,018,630.
Moore, David M., to Armstrong Store Fixture Corporation. Bracket and clip for mounting a cross-bar to a bracket. 4,017,943, Cl. 24-84.00R.
Morehouse, Alpha L.: *See*—
Garbutt, John T.; Malzahn, Ronald C.; and Morehouse, Alpha L., 4,018,936.
Morell, Antoinette; and Nicolas, Jean, to Thomson-CSF. Method of manufacturing a magnetic head having a relatively large air-gap and a good resistance to mechanical wear. 4,017,966, Cl. 29-603.000.
Morgan, Arthur Picton, to United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in Her Britannic Majesty's Government of the. Phase modulation apparatus. 4,019,185, Cl. 343-17.20R.
Morgan, Charles R., to W. R. Grace & Co. Process for forming solder resistant photoresist coatings. 4,018,940, Cl. 427-54.000.
Morgan, John R.: *See*—
Donakowski, William A.; and Morgan, John R., 4,018,949.
Mori, Kentaro: *See*—
Otouma, Takashi; Aoki, Susumu; Minaki, Toshiaki; Shibata, Kenichi; and Mori, Kentaro, 4,018,964.
Mori, Tatsujiro: *See*—
Hiramatsu, Takashi; Oe, Akihiko; Fukuda, Atsushi; Fuse, Masaki; and Mori, Tatsujiro, 4,019,036.
Morine, Richard L.; and Hokes, James J., to Fedco Inc. Manifold dispensing apparatus having releasable subassembly. 4,018,367, Cl. 222-485.000.
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Budker, Gersh Itskovich; Morozov, Sergei Nikolaevich; Nezhevenko, Oleg Alexandrovich; Ostreiko, Gennady Nikolaevich; and Shekhtman, Isai Abramovich, 4,019,088.
Morris Associates, Inc.: *See*—
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Morris, Bennie A. Apparatus for automatically grading leaf tobacco. 4,018,674, Cl. 209-73.000.
Morris, Roy H.; Turner, George L.; and Hixon, Walter L., to American Stamping Company. Hose coupling. 4,018,460, Cl. 285-39.000.
Morrison, Neolan V. Cinch winch for saddling a horse. 4,018,035, Cl. 54-23.000.
Morton-Norwich Products, Inc.: *See*—
Schwan, Thomas J., 4,018,823.
Moser, Peter; and Nicopoulos, Alex, to Ciba-Geigy Corporation. Process for the manufacture of basic oxazine dyes. 4,018,763, Cl. 260-245.000.
Moser, William R., to Exxon Research and Engineering Company. Hydrodesulfurization catalyst and process utilizing the same. 4,018,672, Cl. 208-216.000.
Motoren- und Turbinen-Union Munchen GmbH: *See*—
Greune, Christian; Herrmann, Bruno; and Steuer, Siegfried, 4,018,045.
Motoren- und Turolnen-union Friedrichshafen GmbH: *See*—
Rudert, Wolfgang; Schulmeister, Robert; Schlaupitz, Manfred; and Braetsch, Norbert, 4,018,053.
Motorola, Inc.: *See*—
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Gartner, Todd Henry, 4,018,202.
Lurey, Daniel Morris; and Drury, David Michael, 4,019,150.
Numan, Daniel Orange; and Williamson, Richard Dean, 4,019,141.
Wolff, David Allen; and Kowalski, Walter, 4,019,090.
Motz, Herbert: *See*—
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Moyer, Donald H.: *See*—
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Kustka, George John; and Mueller, Kurt Hugh, 4,019,149.
Muko, Sakae. Fish-feeder. 4,017,999, Cl. 43-44.990.
Mulder, Jan: *See*—
Prast, Gijsbert; Mijnheer, Andries; and Mulder, Jan, 4,018,552.
Mullen, James, to Lennox Industries, Inc. Air conditioning system having latent and sensible cooling capability. 4,018,584, Cl. 62-175.000.
Muller, Alfred; and Fink, Arno, to Siemens Aktiengesellschaft. Method for the manufacture of a superconductor with a layer of the A-15 phase of the system Nb-Al or Nb-Al-Ge. 4,018,942, Cl. 427-62.000.



Muller, Hans. Process for recovering useful substances from culture media. 4,018,593, Cl. 71-76.000.
Muller, Hans. Arrangement for aerating of liquids. 4,018,859, Cl. 261-87.000.
Muller, Rudolf; and Stolberg, Hermann Josef, to Hermann Rappold & Co. GmbH. Slide valve for closing a large pressurized gas conveying pipe. 4,018,420, Cl. 251-172.000.
Muller, Werner Heinrich; and Fernholz, Hans, to Hoechst Aktiengesellschaft. Preparing resorcinols from δ-ketocarboxylic acids or from their lactones. 4,018,833, Cl. 260-621.00R.
Muller, Wolfgang Dieter: *See*—
Burkholz, Armin; and Muller, Wolfgang Dieter, 4,018,580.
Mullin, Alexander G.: *See*—
Barr, Anthony J.; and Mullin, Alexander G., 4,017,976.
Mundel, Gunter; and Grampp, Friedrich, to Ed. Zublin Aktiengesellschaft. Machine for making reinforcing baskets for steel concrete posts, masts, pipes and the like. 4,018,251, Cl. 140-112.000.
Muramoto, Ikuo; and Kita, Hideki, to Toyo Kogyo Co., Ltd. Duo-servo parking brake. 4,018,312, Cl. 188-333.000.
Muraoka, Keiji, to Acecook Co., Ltd. Container for an instant food. 4,018,904, Cl. 426-115.000.
Murauskas, Donald J.: *See*—
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Murnane, Edward L. Rescue garment. 4,017,908, Cl. 2-84.000.
Murphy, Charles F.: *See*—
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Murphy, John R., to Glenn, Coy F., a part interest. Compressed air-operated motor employing dual lobe cams. 4,018,050, Cl. 60-370.000.
Murray, Douglas J., to Dimensional Industries, Inc. Wall frames with interlocking clips. 4,017,989, Cl. 40-152.000.
MWA Company: *See*—
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Myer, Gary D.: *See*—
Boswell, Donald D.; Grinberg, Jan; Jacobson, Alexander D.; and Myer, Gary D., 4,018,509.
Myers, James Lewis, to Coors Container Company. Powder feeder pick-up tube. 4,018,185, Cl. 118-308.000.
Myers, William N.: *See*—
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Naber, Joseph S., to Applied Motors, Inc. DC to AC voltage converter with automatic start-stop control of motor-generator set. 4,019,119, Cl. 322-8.000.
Nagasawa, Koichi; and Kijima, Koichi, to Mitsubishi Denki Kabushiki Kaisha. Apparatus for treatment of semiconductor wafer. 4,018,184, Cl. 118-49.100.
Nagin, Tony, Jr.; and Nagin, Tony, Sr. Decelerating safety bumper for vehicles and the like. 4,018,299, Cl. 180-91.000.
Nagin, Tony, Sr.: *See*—
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Nagoshi, Kazuo: *See*—
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Nakagawa, Hirohide: *See*—
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Nakagawa, Yasuo; Noma, Takashi; and Mera, Hiroshi, to Teijin Limited. Anisotropic dopes of aromatic polyamides. 4,018,735, Cl. 260-29.10R.
Nakajima, Taiitu: *See*—
Kawabe, Naoshi; Haga, Toshikatu; Nakajima, Taiitu; Takahashi, Takeshi; Shinoda, Hiroshi; and Hayakawa, Shuji, 4,017,960.
Nakamoto, Yuzuru; Kubota, Eishi; and Suzuki, Fukushi, to Bridgestone Tire Company Limited. Composite of a metallic material and vulcanized rubber. 4,018,570, Cl. 152-359.000.
Nakanishi, Sadao; and Tokura, Nobufumi, to Shinko Electric Co., Ltd. Laser beam label reader head. 4,019,026, Cl. 235-61.11E.
Nakao, Hisaji; Tokura, Yasufumi; Matsuno, Kazuo; and Yomogida, Toshihiko, to Toyoda Koki Kabushiki Kaisha; and Toyota Jidosha Kogyo Kabushiki Kaisha. Program changeable sequence controller. 4,019,175, Cl. 340-172.500.
Nakatani, Isami: *See*—
Kurita, Masaru; Jomon, Kazuyoshi; Komori, Tadaaki; and Nakatani, Isami, 4,018,772.
Nameche, Alfred E. Clamp type ladder wall engaging bracket. 4,018,301, Cl. 182-206.000.
Namiki, Ryoichi, to Ricoh Co., Ltd. Roller for fixing electrophotographic toner images and method of producing the same. 4,019,024, Cl. 219-469.000.
Nash, John E.: *See*—
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National Hydro-Hoist Company: *See*—
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National Marine Service, Inc.: *See*—
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National Research Development Corporation: *See*—
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Neal, John A., to Georgia-Pacific Corporation. Aryl sulfonate-aldehyde composition and process for its preparation. 4,018,691, Cl. 252-62.540.
Neal, Vay F. Anti-skid device for vehicle wheel. 4,018,258, Cl. 152-208.000.
Negoro, Tatsuya: *See*—
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Nelson, John E., to HMW Industries, Inc. Magnetic tooth straightener. 4,017,973, Cl. 32-14.00A.
Nelson, Terence John, to Bell Telephone Laboratories, Incorporated. Magnetic bubble detector. 4,019,177, Cl. 340-174.0TF.
Nemoto, Kiyomitsu; Naito, Kesahiro; Urata, Megumu; and Sagawa, Norihiko, to Hitachi, Ltd. Method for disassembling and repairing a sodium-handling apparatus. 4,017,952, Cl. 29-157.30R.
Neumann, Ute; Roller, Hermann; Hartmann, Job-Werner; Hack, Joachim; Motz, Herbert; and Ostertag, Werner, to BASF Aktiengesellschaft. Coated magnetic recording media. 4,018,968, Cl. 428-539.000.
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Newman, Joseph J.: *See*—
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NGK Insulators, Ltd.: *See*—
Kawabe, Naoshi; Haga, Toshikatu; Nakajima, Taiitu; Takahashi, Takeshi; Shinoda, Hiroshi; and Hayakawa, Shuji, 4,017,960.
Nichols Institute for Endocrinology: *See*—
Parslow, Margaret E., 4,018,883.
Nicholson, J. Patrick, to Nicholson Realty Ltd. Mixture for pavement bases and the like. 4,018,617, Cl. 106-85.000.
Nicholson Realty Ltd.: *See*—
Nicholson, J. Patrick, 4,018,617.
Nicolas, Jean: *See*—
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Nicopoulos, Alex: *See*—
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Niedzwiecke, Andrew J.; and Shaheen, Joseph M., to Rockwell International Corporation. Carrier for devices. 4,018,491, Cl. 339-4.000.
Niehaus, Edward J.; and Hosack, James R., to Rockwell International Corporation. Adjustable dado head. 4,018,256, Cl. 144-238.000.
Nielsen, Ole Bent Tvaermose: *See*—
Feit, Peter Werner; and Nielsen, Ole Bent Tvaermose, 4,018,794.
Niikawa, Tomohiko: *See*—
Mifune, Hideo; Tani, Kenroku; and Niikawa, Tomohiko, 4,019,072.
Nilsson, Sven Walter, to SKF Nova A.B. Device for transforming reciprocating motions into turning motions. 4,018,093, Cl. 74-126.000.
Nippon Asbestos Company, Ltd.: *See*—
Otouma, Takashi; Aoki, Susumu; Minaki, Toshiaki; Shibata, Kenichi; and Mori, Kentaro, 4,018,964.
Nippon Electric Company, Ltd.: *See*—
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Nippon Gakki Seizo Kabushiki Kaisha: *See*—
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Nippon Shokubai Kagaku Kogyo Co., Ltd.: *See*—
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Nippon Toki Kabushiki Kaisha: *See*—
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Nishide, Kazunori: *See—*
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Nishimoto, Tetsuo, to Nippon Gakki Seizo Kabushiki Kaisha. Electronic musical instrument. 4,018,125, Cl. 84-1.190.

Nissan Motor Co., Ltd.: *See—*
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Nissin Shokuhin Kaisha, Ltd.: *See—*
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Nitta, Yoshifumi: *See—*
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Nittetsu Chemical Industrial Co., Ltd.: *See—*
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Nitto Electric Industrial Co., Ltd.: *See—*
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Nitz, Rolf-Eberhard: *See—*
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Noguchi, Shunsaku; Araki, Yoshiaki; Imanishi, Masayuki; and Kawai, Kiyohisa, to Takeda Chemical Industries, Ltd. 6-Halo-5-cyclohexylindan-1-carbohydroxamic acid. 4,018,817, Cl. 260-500.50H.

Noll, Barton B., to R. C. Sports, Inc. Laminar roller rink surface having high solids content primer layer. 4,018,961, Cl. 428-213.000.

Noma, Takashi: *See—*
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Nonnenmacher, Gerhard: *See—*
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Nordlie, Lawrence A., to Corning Glass Works. Celsian-zirconia compositions. 4,018,614, Cl. 106-57.000.

Norlin, Stig Ivar, to Saab-Scania Aktiebolag. Vehicle bumper assembly. 4,018,466, Cl. 293-71.00R.

Norris, H. Coleman; and Kelly, Gordon D., to Columbian Art Works, Inc. Rotary file. 4,017,993, Cl. 40-68.000.

North American Philips Corporation: *See—*
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Northern Electric Company Limited: *See—*
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Norton Compay: *See—*
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Novak, Richard Edwin: *See—*
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Numan, Daniel Orange; and Williamson, Richard Dean, to Motorola, Inc. Preselector cavity arrangement and RF selectivity assembly. 4,019,141, Cl. 325-357.000.

Nupro Company: *See—*
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O. F. Mossberg & Sons, Inc.: *See—*
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O'Brien, Patrick H.; and Zabritski, William J., to General Motors Corporation. Multispeed shift linkage control. 4,018,099, Cl. 74-473.00R.

Ochiai, Kazuo; and Mizutani, Masayasu. Cervical dilator. 4,018,230, Cl. 128-344.000.

Ochsner, Paul Albert; and Schenk, Hanspeter, to Givaudan Corporation. 2-Ethyl-3,6,6-trimethyl-1-crotonyl-2-cyclohexene-type compounds and perfume compositions. 4,018,718, Cl. 252-522.000.

Odani, Noboru: *See—*
Oshimura, Masakazu; Kawakami, Akira; Hosoda, Hiroaki; Okamoto, Osamu; Watanabe, Osamu; Fujii, Shinichi; Yamaguchi, Satoru; Odani, Noboru; and Koori, Yoshizo, 4,018,710.

Odetics, Inc.: *See—*
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Oe, Akihiko: *See—*
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Office National d'Etudes et de Recherches Aerospatiales (O.N.E.R.A.): *See—*
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Ohkawa, Masaaki; Tanaka, Yoshio; Takeda, Yoshiro; Kinoshita, Tadao; and Hirabayashi, Kazuyoshi, to Sumitomo Chemical Company, Limited. Thiazole and benzothiazole cationic dyes. 4,018,756, Cl. 260-146.00R.

Ohkubo, Kazuo: *See—*
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Ohmura, Hiroshi, to Fuji Photo Film Co., Ltd. Accessory foot for camera accessories. 4,019,190, Cl. 354-145.000.

Ohuchi, Yasushi: *See—*
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Oishi, Minoru; Rokujo, Masaharu; Yokota, Hisaaki; Okuda, Naoki; Tomita, Makoto; and Endo, Toshihiko, to Kobe Steel Ltd. Process for narrow gap welding of aluminum alloy thick plates. 4,019,018, Cl. 219-137.00R.

Okamoto, Masahiro; Kimura, Morio; Shibuya, Teruo; Yamamoto, Shinji; Hasegawa, Shinichi; Terada, Yutaka; and Adachi, Teruho, to Sumitomo Chemical Company, Limited; and Nittetsu Chemical Industrial Co., Ltd. Tar-urethane composition. 4,018,739, Cl. 260-59.00R.

Okamoto, Osamu: *See—*
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Okamoto, Shosuke; Kikumoto, Ryoji; Ohkubo, Kazuo; Tezuka, Tohru; Tonomura, Shinji; Tamao, Yoshikuni; and Hijikata, Akiko, to Mitsubishi Chemical Industries Ltd.; and Okamoto, Shosuke. N²-alkoxynaphthalenesulfonyl-L-argininamides and the pharmaceutically acceptable salts thereof. 4,018,913, Cl. 424-177.000.

Okamoto, Shosuke; Kikumoto, Ryoji; Ohkubo, Kazuo; Tezuka, Tohru; Tonomura, Shinji; Tamao, Yoshikuni; and Hijikata, Akiko, to Mitsubishi Chemical Industries Ltd.; and Okamoto, Shosuke. N²-alkoxynaphthalenesulfonyl-L-argininamides and the pharmaceutically acceptable salts thereof. 4,018,915, Cl. 424-177.000.

Okamoto, Yusho: *See—*
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Denikin, Ernst Ivanovich; Khazkhuta, Nikolai Yakovlevich; Shestopalov, Alexandr Andreevich; Badalov, Vladimir Vachaganovich; Vasiliev, Alexandr Alexandrovich; Okunev, Vyacheslav Ivanovich; Kaplan, David Abramovich; Deinego, Jury Borisovich; Kazakov, Alexandr Danilovich; Gienko, Vladimir Ivanovich; Marchenko, Alexei Alexeevich; and Laevsky, Mikhail Avramovich, 4,018,541.

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Olsen, David B., to Minnesota Mining and Manufacturing Company. Metal lithographic plate made imageable by diffusion transfer by treatment with Group IV-B metal fluoride. 4,018,605, Cl. 96-29.00L.

Olsen, Gregory Hammond; Martinelli, Ramon Ubaldo; and Ettenberg, Michael, to RCA Corporation. Electron emitting device and method of making the same. 4,019,082, Cl. 313-346.00R.

Olson, Lynn T., to Moulton, Clifford H.; and Wood, Charles D. Decoder for quadraphonic playback. 4,018,992, Cl. 179-1.0GQ.

Olsson, Kjell Olow Ingemar; and Loggert, Bengt Georg, to U.S. Philips Corporation. Transponder system. 4,019,181, Cl. 343-6.5SS.

Olympus Optical Co., Ltd.: *See—*
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Omarov, Ashim Kuranbaevich: *See—*
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Omori, Hideyuki; Ouchi, Yoshio; Ikeda, Takatoshi; and Tsubaki, Toshio, to Hitachi, Ltd. Ink jet recording apparatus. 4,019,187, Cl. 346-75.000.

O'Neill, Paul L.; and Hooper, Juan L., to United States of America, Navy. Soluble binder for plastic bonded explosives and propellants. 4,018,636, Cl. 149-19.400.

Ongarbaev, Sagynbek: *See—*
Bizhanov, Frunze Bizhanovich; Sokolsky, Dmitry Vladimirovich; Omarov, Ashim Kuranbaevich; Khisametdinov, Akhmed Miftakhovich; Ongarbaev, Sagynbek; and Popov, Nikolai Ivanovich, 4,018,835.

Onizawa, Masao, to Sanyo Trading Co., Ltd. Curable composition. 4,018,749, Cl. 260-78.00A.

Onizawa, Masao, to Sanyo Trading Co., Ltd. Curable compositions containing chloroprene rubber. 4,018,750, Cl. 260-78.00A.





Ono Pharmaceutical Co., Ltd.: *See—*
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Ono, Tetsuji: *See—*
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Onoda, Takeru; and Otake, Masayuki, to Mitsubishi Chemical Industries Ltd. Preparation of methacrylates. 4,018,816, Cl. 260-486.00R.

Onopchenko, Anatoli; and Schulz, Johann G. D., to Gulf Research & Development Company. Process for recovering dialkylarylketone. 4,018,828, Cl. 260-591.000.

Onuki, Yoshio: *See—*
Honda, Ichiro; Takasu, Shigetoshi; and Onuki, Yoshio, 4,018,269.

Orr, John L.; and Sewell, Robert A., to Keystone Consolidated Industries, Inc. Cam adjustment for tension spring of sewing machine head lifter mechanism. 4,018,487, Cl. 312-27.000.

Ortega, Jose I. Interaction multi-station alarm system. 4,019,139, Cl. 325-16.000.

Oscar Mayer & Co. Inc.: *See—*
Johnson, Charles H.; and Hartl, Carroll P., 4,017,940.

Oshimi, Tetsuro, to Nippon Toki Kabushiki Kaisha. Apparatus for grinding surface portions of thick plates. 4,018,007, Cl. 51-33.00R.

Oshimi, Tetsuro, to Nippon Toki Kabushiki Kaisha. Method for grinding surface portions of thick plates. 4,018,013, Cl. 51-281.00R.

Oshimura, Masakazu; Kawakami, Akira; Hosoda, Hiroaki; Okamoto, Osamu; Watanabe, Osamu; Fujii, Shinichi; Yamaguchi, Satoru; Odani, Noboru; and Koori, Yoshizo, to Hitachi Maxell, Ltd. Reduction catalysts and processes for reduction of nitrogen oxides. 4,018,710, Cl. 252-439.000.

Osintsev, Vladislav Grigorievich; Naumov, Jury Grigorievich; Esibyan, Eduard Migranovich; Danchenko, Mikhail Evgenievich; and Malkin, Vasily Berkovich. Method of manufacturing a nonconsumable copper-zirconium electrode. 4,018,375, Cl. 228-131.000.

Ostendorf, James John, to Ralston Purina Company. Method of aligning a protein slurry with a magnetic field to produce a protein food product. 4,018,906, Cl. 426-237.000.

Ostertag, Werner: *See—*
Neumann, Ute; Roller, Hermann; Hartmann, Job-Werner; Hack, Joachim; Motz, Herbert; and Ostertag, Werner, 4,018,968.
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Ostreiko, Gennady Nikolaevich: *See—*
Budker, Gersh Itskovich; Morozov, Sergei Nikolaevich; Nezhevenko, Oleg Alexandrovich; Ostreiko, Gennady Nikolaevich; and Shekhtman, Isai Abramovich, 4,019,088.

Ostrem, Obert M., to Continental Group, Inc., The. Pour opening for liquid containers. 4,018,357, Cl. 220-268.000.

Otake, Masayuki: *See—*
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Otis Engineering Corporation: *See—*
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Otouma, Takashi; Aoki, Susumu; Minaki, Toshiaki; Shibata, Kenichi; and Mori, Kentaro, to Nippon Asbestos Company, Ltd. Method for preparing glassy fiber having protuberances studded on the surface useful for reinforcement and resulting product. 4,018,964, Cl. 428-372.000.

Ouchi, Yoshio: *See—*
Omori, Hideyuki; Ouchi, Yoshio; Ikeda, Takatoshi; and Tsubaki, Toshio, 4,019,187.

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Owens-Illinois, Inc.: *See—*
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Amberg, Stephen W., 4,018,644.
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Francel, Josef; and Lemke, Galen D., 4,018,717.
Pei, Yu K., 4,018,215.
Taylor, Lynn J., 4,018,727.

Ozretich, Thomas M., to Dow Chemical Company, The. Substituted oxirane compounds. 4,018,801, Cl. 260-348.00R.

Pace, George D., Jr.: *See—*
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Pacific Roller Die Co., Inc.: *See—*
Davis, Paul K., 4,018,072.

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Canto, Elio D.; and Padovani, Albert H., 4,018,651.

Paget, Charles J.; and Wikel, James H., to Eli Lilly and Company. Substituted 1-sulfonylbenzimidazoles. 4,018,790, Cl. 260-309.200.

Palmer, John P., to General Dynamics Corporation. Integrated array of optical fibers and thin film optical detectors, and method for fabricating the same. 4,017,962, Cl. 29-572.000.

Palthe, John W. Brush cleaning device. 4,018,240, Cl. 134-196.000.

Paoli, Stephen A. High production mechanical separator machine. 4,018,389, Cl. 241-67.000.

Parekh, Manher: *See—*
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Parigot, Georges: *See—*
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Park, Kyu Chang: *See—*
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Parker, Louis W. Variable speed induction motor. 4,019,104, Cl. 318-195.000.

Parks, Robert E.; and Marietta, Robert L., to Antek Instruments, Inc. Chemiluminescent nitrogen detection apparatus and method. 4,018,562, Cl. 23-230.0PC.

Parliment, Thomas Holden, to General Foods Corporation. Stabilization of iron - complex colors. 4,018,934, Cl. 426-540.000.

Parmer, Edward: *See—*
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Parmer, Edward G., Jr.: *See—*
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Parmet, Arthur A., to Honeywell Information Systems, Inc. Control store checking system and method. 4,019,033, Cl. 235-153.0AM.

Parrish, David Richard: *See—*
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Parslow, Margaret E., to Nichols Institute for Endocrinology. Thyroxine ($T_4$) radioimmunoassay. 4,018,883, Cl. 424-1.000.

Parsons, Roger R., to Raven Industries, Inc. Redundant blower drive for pressurized hot air airship. 4,018,406, Cl. 244-98.000.

Pastore, John B. Stop attachment for mat cutting device. 4,018,120, Cl. 83-529.000.

Patel, Kirit: *See—*
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Patnode, Marvin M.; and Leonard, Louis H., to Carrier Corporation. Refrigeration heat recovery system. 4,018,583, Cl. 62-101.000.

Paton, Anthony David; and Rowland, Roger John, to Imperial Chemical Industries Limited. Process for production of drop streams. 4,018,383, Cl. 239-4.000.

Paton, Boris Evgenievich; Lakomsky, Victor Iosifovich; Melnik, Gary Alexandrovich; Chvertko, Anatoli Ivanovich; and Bukalo, Alfred Iosifovich. Furnace construction for plasma arc remelting of metal. 4,018,973, Cl. 13-9.0ES.

Patterson, Jan J. Cutting method and machine employing heated reciprocating wire. 4,018,117, Cl. 83-16.000.

Patton, John T., Jr.: *See—*
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Vogt, Herwart C.; and Patton, John T., Jr., 4,018,815.

Paul, Kenneth G.: *See—*
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Paulet, Jean Francois, to Swiss Aluminium Ltd. Process for coloring aluminium. 4,018,628, Cl. 148-6.270.

Pawling Rubber Corporation: *See—*
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Payrhammer, Bernd: *See—*
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Pearce, Peter J.; and Cowan, Toby J., to Synestructics, Inc. Concave parabolic arch kite. 4,018,408, Cl. 244-153.00R.

Pearson, Raymond H. Toilet ventilator including motion-responsive electrical transducer. 4,017,916, Cl. 4-213.000.

Peck, Theodore H., to Bausch & Lomb Incorporated. Objective centering nosepiece. 4,018,505, Cl. 350-39.000.

Pecka, Jan: *See—*
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Pedlow, J. Watson. Arc and fireproofing tape. 4,018,962, Cl. 428-245.000.

Pedlow, J. Watson. Electrical arc and fire protective sheath, boot or the like. 4,018,983, Cl. 174-135.000.

Pei, Yu K., to Owens-Illinois, Inc. Liquid operated solar energy collector. 4,018,215, Cl. 126-271.000.

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Pengue, Leonard M.: *See—*
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Peniston, Quintin P.; and Johnson, Edwin Lee. Method of and apparatus for fluid filtration and the like with the aid of chitosan. 4,018,678, Cl. 210-36.000.

Pennebaker, William B.: *See—*
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Pennington, Keith S.: *See—*
Hochberg, Frederick; Pennebaker, William B.; and Pennington, Keith S., 4,019,188.

Pennsylvania Engineering Corporation: *See—*
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Penque, Ronald A., to Biocel Corporation. Method of hydrolyzing cellulose to monosaccharides. 4,018,620, Cl. 127-37.000.

Perez, Louis A., Jr.; and Tatarenko, Galina. Pedicure sandal. 4,017,987, Cl. 36-11.500.

Perhed, Per-Gunnar Arthur, to AB Volvo. Remote-controlled, motor-propelled transport car for the transport of motors during assembly and testing, and a test station for use together with the transport car. 4,018,343, Cl. 214-1.00Q.

Perkins, Lee E., to Kajan Specialty Company, Inc. Apparatus and method for gravel packing a well. 4,018,284, Cl. 166-278.000.

Person, Herman R.; and Gilg, Lawrence E., to Dale Electronics, Inc. Electrical indicia display device and method for making same. 4,019,086, Cl. 313-518.000.

Persson, Karl Rune, to Sprinter Pack AB. Carton tray with cover. 4,018,378, Cl. 229-31.00R.

Peruchon, Edouard; and Rabischong, Pierre, to Societe Nationale Elf Aquitaine (Production). Device for taking an impression and visualizing said impression. 4,017,978, Cl. 33-174.00L.

Peskin, Samuel: *See—*
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Peterson, Donald C.; and Snyder, Jack C., to Peterson, Donald C. Portable gun support. 4,017,997, Cl. 42-94.000.
Peterson, Robert L., to Minnesota Mining and Manufacturing Company. Polyurethane wear-resistant surfacing. 4,018,745, Cl. 260-77.5AT.
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Petri, Rolf; Distler, Harry; and Bechert, Bertold, to BASF Aktiengesellschaft. Mono- and/or di-alkyl phosphates as additives for hydraulic binders. 4,018,618, Cl. 106-90.000.
Petro-Tex Chemical Corporation: *See—*
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Pike, Robert L.; and Barnes, Derek, to MacMillan Bloedel Limited. Microwave curing of alkaline phenolic resins in wood-resin compositions. 4,018,642, Cl. 156-272.000.
Pillsbury Company, The: *See—*
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Pinsenschaum, Edwin C.: *See—*
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Plummer, William T., to Polaroid Corporation. Apparatus for retinal photography. 4,018,514, Cl. 351-7.000.
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Podgorny, Gerald J.: *See—*
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Pollitzer, Ernest L.; and Hayes, John C., to Universal Oil Products Company. Hydrocarbon conversion with an acidic multimetallic sulfur-free catalytic composite. 4,018,668, Cl. 208-139.000.
Pollitzer, Ernest L.: *See—*
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Pozzato, Mariano: *See—*
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Pozzato, Tarcisio; Pozzato, Mariano; and Pozzato, Alberto. Plate mill for pebbles, gravel or like materials. 4,018,395, Cl. 241-252.000.
Pozzetti, Mario; and Rossi, Roberto, to Finike Italiana Marposs-Soc. In Accomandita Semplice di Marlo Possati & C. Method and relative apparatus for controlling and regulating the working cycles of a machine tool. 4,018,010, Cl. 51-165.710.
Pozzetti, Mario, to Finike Italiana Marposs-Soc. In Accomandita Semplice di Mario Possati & C. Monitoring apparatus for checking the regularity of the operation of logic systems. 4,019,029, Cl. 235-92.0PD.
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Prast, Gijsbert; Mijnheer, Andries; and Mulder, Jan, to U.S. Philips Corporation. Pressing block for die pressing thermoplastic material. 4,018,552, Cl. 425-407.000.
Preissinger, Karl-Heinz; Voelkl, Walter; Weber, Willi; and Wehnelt, Ulrich, to Siemens Aktiengesellschaft. Corrosion-resistant regenerable electrical capacitor. 4,019,101, Cl. 361-313.000.
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Rankins, Everett V.; and Foster, Raymond Keith. Draft attachment for wheeled implements. 4,018,294, Cl. 180-13.000.
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Rastogi, Vijay; Budd, James Michael; and Koehler, Daniel Lynn, to B. F. Goodrich Company, The. Rim construction for wheels having brake torque drives. 4,018,482, Cl. 301-6.00E.
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Reid, Lloyd E.; and Gudelis, David A., to Exxon Research and Engineering Company. Process for producing low pour point transformer oils from paraffinic crudes. 4,018,666, Cl. 208-36.000.
Reinhardt, Robert M.; Daigle, Donald J.; and Kullman, Russell M. H., to United States of America, Agriculture. Durable press finishing with catalysis by triazaphosphaadamantane derivatives. 4,018,950, Cl. 427-381.000.
Reinhart, Richard F.: *See—*
Antlfinger, George J.; and Reinhart, Richard F., 4,018,966.
Reisman, Arnold: *See—*
Berkenblit, Melvin; Lussow, Robert O.; Park, Kyu Chang; and Reisman, Arnold, 4,018,490.
Rejsa, Jack J., to Pillsbury Company, The. Automatic package accumulator. 4,018,325, Cl. 198-347.000.
Reliance Electric Company: *See—*
Dixon, George Scott; Gilbert, Edward O.; Oliver, Theodore A.; and Wilson, James W. A., 4,019,107.
Renaux, Charley, to Halberthal S.A. Method for the optimized transportation of passengers or objects. 4,018,410, Cl. 246-5.000.
Renner, Alfred, to Ciba-Geigy AG. Process for the manufacture of highly disperse solids consisting of crosslinked urea-formaldehyde polycondensation products. 4,018,741, Cl. 260-71.000.
Rennie, Thomas. Support for anesthetic gas delivery hoses and endotracheal tubes. 4,018,221, Cl. 128-185.000.
Resch, Darrel R.: *See—*
Erb, Elisha W.; and Resch, Darrel R., 4,018,387.
Resnick, David R.: *See—*
Lincoln, Neil R.; and Resnick, David R., 4,019,144.
Retzsch, Clinton E., to Diamond Shamrock Corporation. Non-rewet leather and method of producing same. 4,018,559, Cl. 8-94.200.
Rex, Gert Ingmar. Automatic locking device for a vehicle safety belt. 4,018,399, Cl. 242-107.40A.
Rexnord Inc.: *See—*
Brown, Elwood B.; and Kropp, Helmut H., 4,018,322.
Hallstrom, James R.; Hoffman, Raymond J.; and Walling, Ronald L., 4,018,944.
Reyner, Franklin W., Jr.: *See—*
Johnson, Robert D.; Havener, John W.; Reyner, Franklin W., Jr.; Whitver, Loren K.; Kilburn, Norman W.; and Hoglan, Jack M., 4,018,358.
Reynolds, Lawrence Edwin. Headlight safety cover. 4,019,046, Cl. 240-46.590.
Reynolds, Merrill J.; and Disney, Ralph W. In situ coal combustion heat recovery method. 4,018,279, Cl. 166-258.000.
Reynolds, Richard H., to Ashland Oil, Inc. Process for producing carbon black. 4,018,878, Cl. 423-450.000.
Rhone-Poulenc Industries: *See—*
Dumoulin, Jean, 4,018,734.
Marin, Gilbert; and Lefort, Marcel, 4,018,871.
Rhone-Progil: *See—*
Correia, Yves; and Lesparre, Jean, 4,018,880.
Richardi, Michael V.: *See—*
Light, Glenn M.; and Richardi, Michael V., 4,017,977.
Richardson-Merrell Inc.: *See—*
Bare, Thomas M.; and Suh, John T., 4,018,891.
Richmond, Raymond; Parmer, Edward; and Parmer, Edward G., Jr. Anti-theft vehicle brake-supervising device. 4,018,314, Cl. 188-353.000.
Richtermeier, Heinrich, to Volkswagenwerk Aktiengesellschaft. Door system for vehicles. 4,018,475, Cl. 296-28.00R.
Rickards, David William, to AMP Incorporated. Contact for insulated wire. 4,018,499, Cl. 339-97.00C.
Rickel, David Murray: *See—*
Hermanson, Gerald Peter; Rickel, David Murray; and Carr, Robert Joseph, 4,017,955.
Ricoh Co., Ltd.: *See—*
Kasahara, Nobuo, 4,018,522.
Matsumoto, Jyusei; Itoh, Minoru; Ishikawa, Chuzi; and Hashimoto, Yoshio, 4,018,154.
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Riker Laboratories, Inc.: *See—*
Lappi, Larry R.; and Erickson, Edward H., 4,018,780.

Ritsema, Irving R.; and Colpaert, James J., to Bendix Corporation, The. Disc brake. 4,018,310, Cl. 188-73.300.

Rizzolo, Silvio J., to Engelhard Minerals & Chemicals Corporation. Thermocouple structure and method of manufacturing same. 4,018,624, Cl. 136-233.000.

Robbins, Harry, to Eastman Kodak Company. Process for preparing sulfur-containing ferromagnetic chromium oxide. 4,018,690, Cl. 252-62.510.

Robeller, Walter: *See—*
Fricke, Hans-Jurgen; Nonnenmacher, Gerhard; Robeller, Walter; and Kersten, Gunter, 4,018,137.

Robert Bosch G.m.b.H.: *See—*
Fricke, Hans-Jurgen; Nonnenmacher, Gerhard; Robeller, Walter; and Kersten, Gunter, 4,018,137.
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Roberts, John O. L.: *See—*
Bain, Frederick A.; and Roberts, John O. L., 4,018,664.

Robertshaw Controls Company: *See—*
Brushwyler, Gordon R.; and Scott, Timothy F., 4,018,661.

Robinson, James H., to CTS Corporation. Electrical switch with chemically milled contacts. 4,019,000, Cl. 200-11.00D.

Robinson, Max S.; and Studebaker, Thomas J., to Mohawk Data Sciences Corporation. Keyboard switch assembly having adhesive position retainer element. 4,018,999, Cl. 200-5.00A.

Roblin Industries, Inc.: *See—*
Sauer, Gale E.; and Hansen, Barton G., 4,018,020.

Rockwell International Corporation: *See—*
Adkins, Larry R.; and Gates, James L., 4,019,200.
Bullinga, Johannes, 4,019,096.
Niedzwiecke, Andrew J.; and Shaheen, Joseph M., 4,018,491.
Niehaus, Edward J.; and Hosack, James R., 4,018,256.
Rathe, John C., 4,019,145.
Williams, Elmer A., 4,018,198.

Rogen, Neil E. Elevating by shape memory induction. 4,018,308, Cl. 187-17.000.

Rogen, Neil E. Pumping by wire elongation. 4,018,547, Cl. 417-321.000.

Rogers, Alfred N.; Awerbuch, Leon; and Abrams, Jack Z., to Bechtel International Corporation. Thermal softening and distillation by regenerative method. 4,018,656, Cl. 203-11.000.

Rohm GmbH: *See—*
Gruber, Wilhelm; and Schroeder, Guenter, 4,018,829.

Rohr, Franz-Josef: *See—*
Fischer, Wilfried; Kleinschmager, Herbert; Haar, Wilheim; Weddigen, Gert; and Rohr, Franz-Josef, 4,018,969.

Rohs, Hans-Gunter: *See—*
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Rokujo, Masaharu: *See—*
Oishi, Minoru; Rokujo, Masaharu; Yokota, Hisaaki; Okuda, Naoki; Tomita, Makoto; and Endo, Toshihiko, 4,019,018.

Roll, Karl; and Fritschi, Klaus-Peter, to Robert Bosch G.m.b.H. Power tool with device for preventing unintentional turn-on of drive motor. 4,018,292, Cl. 173-170.000.

Rollei-Werke Franke & Heidecke: *See—*
Prochnow, Claus, 4,019,041.
Stiller, Armin, 4,019,092.

Roller, Hermann; Senkpiel, Werner; Wunsch, Gerd; Hartmann, Job-Werner; Fuchs, Friedrich; Hack, Joachim; Kiener, Volker; Motz, Herbert; and Ostertag, Werner, to BASF Aktiengesellschaft. Magnetic recording tape. 4,018,967, Cl. 428-425.000.

Roller, Hermann: *See—*
Neumann, Ute; Roller, Hermann; Hartmann, Job-Werner; Hack, Joachim; Motz, Herbert; and Ostertag, Werner, 4,018,968.

Rolls-Royce (1971) Limited: *See—*
Mills, David, 4,018,615.

Rolly, Heinrich: *See—*
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Rongren, Eric H. Unit for treatment of substrate with ultraviolet radiation. 4,019,062, Cl. 250-492.00R.

Rosado, Ruperto L. Automatic guitar tuner for electric guitars. 4,018,124, Cl. 84-1.160.

Rose, Jack: *See—*
White, James Richard; Dodge, George Herbert; and Rose, Jack, 4,018,303.

Rosen, Meyer Robert: *See—*
Faucher, Joseph A.; and Rosen, Meyer Robert, 4,018,729.

Ross, Alan R., to Eaton Corporation. Axle lubrication system. 4,018,097, Cl. 74-467.000.

Ross, Howard C.: *See—*
Wright, Roy E.; and Ross, Howard C., 4,018,622.

Rossi, Roberto: *See—*
Pozzetti, Mario; and Rossi, Roberto, 4,018,010.

Rote, Everett Arthur, to Xerox Corporation. Holding fixture. 4,018,414, Cl. 248-317.000.

Roussel-UCLAF: *See—*
Derible, Pierre Henri; and Lavaux, Jean-Paul, 4,018,922.

Rowland-Hill, Edward W.; and Todd, Robert R., to Sperry Rand Corporation. Material distribution means for concave of rotary combine. 4,018,232, Cl. 130-27.00T.

Rowland, Roger John: *See—*
Paton, Anthony David; and Rowland, Roger John, 4,018,383.

Rudert, Wolfgang; Schulmeister, Robert; Schlaupitz, Manfred; and Braetsch, Norbert, to Motoren- und Turolnen-union Friedrichshafen GmbH. Method and apparatus for operating an internal combustion engine with an exhaust gas turbo-charger and a combustion chamber. 4,018,053, Cl. 60-606.000.

Rudolph, Otfried: *See—*
Johne, Hans; Jentzsch, Arndt; and Rudolph, Otfried, 4,018,161.

Ruff, John Denis; and Wheeler, Phillip Rood. Solar heating system. 4,018,581, Cl. 62-2.000.

Ruffo, Angelo P.; and Goyal, Prashant K., to Johnson & Johnson. Nonwoven fabric. 4,018,646, Cl. 162-146.000.

Rugg, Gordon R.: *See—*
Werner, Jesse; and Rugg, Gordon R., 4,018,957.

Ruhenstroth-Bauer, Gerhard; and Scherer, Reiner, to Max-Planck-Gesellschaft zur Forderung der Wissenschaften e.V. Method and apparatus for simultaneous quantitative analysis of several constituents in a sample. 4,018,662, Cl. 204-299.00R.

Rumsey, Rollin Douglas. Radial piston pump/motors. 4,018,138, Cl. 91-488.000.

Runkle, Charles J.: *See—*
Bartram, Ronald D.; and Runkle, Charles J., 4,018,073.

Rusch, Dieter; Glaser, Heinz; and Lubcke, Otto, to Licentia Patent-Verwaltungs-G.m.b.H. Unfurling device for tubular extendible structures. 4,018,397, Cl. 242-54.00A.

Rutledge, James T. Bicycle-mounted noise maker. 4,018,450, Cl. 280-289.00R.

Rutter, Henry A., to National Hydro-Hoist Company. Pontoon system for supporting watercraft on a body of water. 4,018,179, Cl. 114-45.000.

Ruzicka, Jaromir: *See—*
Hansen, Elo Harald; and Ruzicka, Jaromir, 4,018,660.

Ryan, Frederick M.; and Miller, Robert C., to Westinghouse Electric Corporation. Phosphor combination, particularly adapted for use with explosives, for providing a distinctive information label. 4,018,635, Cl. 149-2.000.

Ryan, Kenneth Augustine, to Telcon-Magnetic Cores Limited. Stabilized power supplies. 4,019,122, Cl. 323-60.000.

Saab-Scania Aktiebolag: *See—*
Norlin, Stig Ivar, 4,018,466.

Saben, David G.: *See—*
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Safety Steel Service, Inc.: *See—*
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Safranski, Richard W.; and Kovacs, Lloyd, to Hayssen Manufacturing Co. Packaging apparatus. 4,018,029, Cl. 53-59.00W.

Saft-Societe des Accumulateurs Fixes et de Traction: *See—*
Jumel, Yves; and Gabano, Jean-Paul, 4,018,970.

Sagawa, Norihiko: *See—*
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Saggin, Francesco: *See—*
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Saito, Hideki: *See—*
Watanabe, Tatsuo; and Saito, Hideki, 4,019,138.

Saito, Kinzi; and Takahashi, Sadao, to Ricoh Company, Ltd. Apparatus for fixing toner images. 4,019,054, Cl. 250-319.000.

Saito, Koichi: *See—*
Inoue, Akira; Horie, Koshi; Saito, Koichi; Aoki, Yukio; Ono, Tetsuji; and Ohara, Takashi, 4,018,706.

Saito, Satoru, to Dynic Corporation. Method for producing non-woven fabric. 4,018,862, Cl. 264-137.000.

Saito, Takeo: *See—*
Kitai, Kiyoshi; Saito, Takeo; and Seki, Youichi, 4,019,189.

Saka, Yoshimi, to Hitachi Metals, Ltd. Pipe fitting. 4,018,462, Cl. 285-111.000.

Sakaguchi, Jiroh; and Kawagoe, Hiroto, to Hitachi, Ltd. Circuit for setting an initial state after connection of a power supply. 4,019,070, Cl. 307-279.000.

Sakaguchi, Junei: *See—*
Takahashi, Nobuyasu; Yamaguchi, Taiichi; Sakaguchi, Junei; and Hamada, Hideo, 4,018,645.

Sakai, Toshihiko: *See—*
Sakamoto, Yoshiyasu; Hiroshima, Tatsuo; Sakai, Toshihiko; and Asano, Tetuo, 4,019,130.

Sakai, Yutaka, to Fuji Photo Optical Co., Ltd. Retrofocus type lens. 4,018,512, Cl. 350-215.000.

Sakamoto, Yoshiyasu; Hiroshima, Tatsuo; Sakai, Toshihiko; and Asano, Tetuo, to Sumitomo Metal Industries, Ltd. Method for measuring wear of cooling cell assembly. 4,019,130, Cl. 324-34.00R.

Sakata, Shigeki, to Mitsubishi Denki Kabushiki Kaisha. Internal magnetic shield for cathode ray tube. 4,019,085, Cl. 313-402.000.

Sakitani, Yoshio, to Hitachi, Ltd. Field emission electron gun. 4,019,077, Cl. 313-178.000.

Salathiel, William M.: *See—*
Graham, John W.; Salathiel, William M.; Gruesbeck, Clay; and Muecke, Thomas W., 4,018,282.
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Salmond, Kent A.; and Pejcha, Ivan, to Information Storage Systems, Inc. Disc drive with rotary access mechanism. 4,019,205, Cl. 360-105.000.





Salters, Roelof Herman Willem: *See—*
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Salvesen, Harold L. Carton carrier. 4,018,467, Cl. 294-31.200.

Salway, Peter Hugh, to Lucas Electrical Company Limited, The. Spark ignition systems for internal combustion engines. 4,018,197, Cl. 123-117.00D.

Sami, Yasuo, to Sanyo Electric Co., Ltd. Automatic tape stopping detective device in a magnetic recording and reproducing apparatus. 4,018,404, Cl. 242-200.000.

Sandborn, Edmund B.: *See—*
Szasz, I. Emery; and Sandborn, Edmund B., 4,018,356.

Sandoz Ltd.: *See—*
Littlewood, Peter Stuart; and Mercer, Alec Victor, 4,018,789.

Sandstrom, Paul H.: *See—*
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Sanyo Electric Co., Ltd.: *See—*
Sami, Yasuo, 4,018,404.

Sanyo Trading Co., Ltd.: *See—*
Onizawa, Masao, 4,018,749.
Onizawa, Masao, 4,018,750.

Saracsan, Jeffrey W.; and Sandstrom, Paul H., to Goodyear Tire & Rubber Company, The. Method of compounding rubber. 4,018,948, Cl. 427-316.000.

Sarkisian, Arthur: *See—*
LaPolla, Edmund M.; Murphy, Charles F.; and Sarkisian, Arthur, 4,018,681.

Sasena, John J., to Eaton Corporation. Fastener for fence construction and fencing system utilizing same. 4,018,425, Cl. 256-54.000.

Sato, Akira: *See—*
Hinata, Masanao; Takei, Haruo; Sato, Akira; and Ikeda, Tadashi, 4,018,610.

Sato, Yo, to Kabushiki Kaisha Sato Kenkyusho. Printing head for printing bar code characters. 4,018,157, Cl. 101-110.000.

Satoh, Ken, to Olympus Optical Co., Ltd. Battery checker circuit. 4,019,112, Cl. 320-48.000.

Satzinger, Gerhard; and Herrmann, Manfred, to Warner-Lambert Company. 5-Phenyl-thiazolidin-4-one derivatives. 4,018,775, Cl. 260-293.680.

Satzinger, Gerhard: *See—*
Stoss, Peter Johannes; Herrmann, Manfred Franz Reinhold; and Satzinger, Gerhard, 4,018,793.

Saucy, Gabriel: *See—*
Scott, John William; Parrish, David Richard; and Saucy, Gabriel, 4,018,799.

Sauer, Gale E.; and Hansen, Barton G., to Roblin Industries, Inc. Modular wall construction. 4,018,020, Cl. 52-241.000.

Saunders, Dennis L.; and Caldwell, John C., to Union Oil Company of California. Automatic liquid mixing device. 4,018,685, Cl. 210-141.000.

Saunders, Norman B. Heating and ventilation system. 4,018,214, Cl. 126-271.000.

Sautter, Wilfried: *See—*
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Savor, Dennis Edward: *See—*
Leshem, Adam; Marugg, Martin Lewis; and Savor, Dennis Edward, 4,018,346.

Scarpellino, Richard J., to General Foods Corporation. Coloring food with iron-complexes. 4,018,907, Cl. 426-250.000.

Schaeffer-Homberg GmbH, Firma: *See—*
Stanik, Raimund; Appelt, Horst Gustav; and Ramspott, Walter, 4,017,945.

Schaffner, Heinz: *See—*
Radlmann, Eduard; Schaffner, Heinz; Lorenz, Gunter; and Nischk, Gunther, 4,018,809.

Schaffner, Otto: *See—*
Rehn, Karl; Schaffner, Otto; and Stahler, Gerhard, 4,018,819.

Schally, Andrew Victor; and Coy, David Howard. [D-Phe$^6$]-LH-RH and intermediates therefor. 4,018,726, Cl. 260-8.000.

Schantz, John S., to Shantz, Raymond G.; and Schantz, Socrates J., part interest to each. Finger nail retainer and tweezer. 4,017,923, Cl. 7-1.00C.

Schantz, Socrates J.: *See—*
Schantz, John S., 4,017,923.

Schaub, Robert Eugene; Bernady, Karel Francis; and Weiss, Martin Joseph, to American Cyanamid Company. 3-Alkyl-2-(6-carboxyhexyl)cyclopentanones and esters and salts thereof. 4,018,811, Cl. 260-468.00K.

Scheinecker, Alois; and Kagerhuber, Franz, to Vereinigte Osterreichlsche Eisen- und Stahlwerke-Alpine Montan Aktiengesellschaft. Continuous casting plant strand guiding means. 4,018,261, Cl. 164-282.000.

Scheingold, William Samuel; and Youngfleish, Frank Christian, to AMP Incorporated. Interconnection for electrically connecting two vertically stacked electronic packages. 4,018,494, Cl. 339-17.0CF.

Schenk, Hanspeter: *See—*
Ochsner, Paul Albert; and Schenk, Hanspeter, 4,018,718.

Scherer, Reiner: *See—*
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Schering Corporation: *See—*
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Schiessler, Siegfried: *See—*
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Schimmer, Rigobert: *See—*
Beerwerth, Wolfgang; Geppert, Albrecht; Gesing, Horst; and Schimmer, Rigobert, 4,018,373.

Schladitz, Hermann J., to Schladitz-Whiskers, A.G. Electric resistance fluid heating apparatus. 4,019,021, Cl. 219-381.000.

Schladitz-Whiskers, A.G.: *See—*
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Schlagel, Carl A.: *See—*
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Schlaupitz, Manfred: *See—*
Rudert, Wolfgang; Schulmeister, Robert; Schlaupitz, Manfred; and Braetsch, Norbert, 4,018,053.

Schlegel, Herold M. Fire hose cabinet. 4,018,242, Cl. 137-355.180.

Schluter, Siegfried Hans-Dietmar, to Apparatebau Rothemuhle Brandt & Kritzler. Regenerative air preheater. 4,018,265, Cl. 165-7.000.

Schmalz, Roman, to Logemann Brothers Company. Method and apparatus for processing metal material into bales. 4,018,169, Cl. 100-39.000.

Schmerling, Louis: *See—*
Bloch, Herman S.; and Schmerling, Louis, 4,018,836.

Schmidt, Bruce E.: *See—*
Busta, Francis F.; Schmidt, Bruce E.; and McKay, Larry L., 4,018,650.

Schmidt, Gunter, to Cubic Productron Inc. Daylight film handling system. 4,018,033, Cl. 53-381.00R.

Schmidt, Horst, to Sulzer Turbomaschinen AG. Apparatus for intermittently turning a turbine shaft. 4,018,094, Cl. 74-128.000.

Schmidt, Howard, to Chrysler Corporation. Machinable powder metal parts. 4,018,632, Cl. 148-126.000.

Schmidt, Louis F.: *See—*
United States of America, National Aeronautics and Space Administration; Schmidt, Louis F.; and Pace, George D., Jr., 4,018,532.

Schmidt, Paul, to Tracto-Technik Paul Schmidt. Hydraulically driven vibrator. 4,018,290, Cl. 173-49.000.

Schmiegel, Klaus K.: *See—*
Molloy, Bryan B.; and Schmiegel, Klaus K., 4,018,895.

Schmitt, Wilfried: *See—*
Schorr, Manfred; Schrinner, Elmar; and Schmitt, Wilfried, 4,018,933.

Schmitt, Wilheim: *See—*
Schulte, Siegfried; and Schmitt, Wilheim, 4,017,964.

Schneehage, Hans Henning: *See—*
Koester, Eberhard; Wunsch, Gerd; Schoenafinger, Eduard; Schneehage, Hans Henning; and Jakusch, Helmut, 4,018,882.

Schneider, William P., to Upjohn Company, The. Intermediate for synthesis of Thromboxane $B_3$. 4,018,804, Cl. 260-410.90R.

Schneiders, Ernst; and Klocker, Wilhelm, to Hoechst Aktiengesellschaft. Process for flanging polytetrafluoroethylene pipes. 4,018,863, Cl. 264-249.000.

Schober, Donald Lincoln, to Union Carbide Corporation. Composition with triallyl compounds and process for avoiding scorching of ethylene polymer composition. 4,018,852, Cl. 260-878.00R.

Schoenafinger, Eduard: *See—*
Koester, Eberhard; Wunsch, Gerd; Schoenafinger, Eduard; Schneehage, Hans Henning; and Jakusch, Helmut, 4,018,882.

Schoenmakers, Theodorus Maria Berendina, to U.S. Philips Corporation. Gas discharge electron gun for generating an electron beam by means of a glow discharge. 4,019,091, Cl. 315-111.800.

Schofield, Minnie, to Raymond Lee Organization, Inc., The, a part interest. Door stop. 4,017,939, Cl. 16-82.000.

Scholtholt, Josef: *See—*
Raabe, Thomas; Scholtholt, Josef; and Nitz, Rolf-Eberhard, 4,018,778.

Schoop, Traugott K. Expansion joint means. 4,018,017, Cl. 52-58.000.

Schorr, Manfred; Schrinner, Elmar; and Schmitt, Wilfried, to Hoechst Aktiengesellschaft. Acylaminopenicillanic acids and process for preparing them. 4,018,933, Cl. 424-271.000.

Schottel-Werft Josef Becker KG: *See—*
Brix, Jochim, 4,018,181.

Schrader, Charles E. Gauze impregnator. 4,018,186, Cl. 118-405.000.

Schrape, Peter; and Worner, Gunter, to Daimler-Benz Aktiengesellschaft. Clutch disk for motor vehicle main clutches. 4,018,320, Cl. 192-106.200.

Schrinner, Elmar: *See—*
Schorr, Manfred; Schrinner, Elmar; and Schmitt, Wilfried, 4,018,933.

Schroeder, Guenter: *See—*
Gruber, Wilhelm; and Schroeder, Guenter, 4,018,829.

Schroter, Herbert, to Hoechst Aktiengesellschaft. Method of and apparatus for controlling the exposure time in an apparatus for the re-enlargement of microfilms. 4,018,526, Cl. 355-68.000.

Schubart, Rolf, to Dorst-Keramikmaschinen-Bau Inh. Otto Dorst u. Dipl.-Ing. Walter Schlegel. Method and a device for the production of ceramic mouldings, and more especially of magnetized ferrite mouldings. 4,018,857, Cl. 264-24.000.

Schubert, Anthony E.: *See—*
McKee, William H.; and Schubert, Anthony E., 4,018,177.

Schueler, Marlin Alios, to American/Durein Company. Separator for handling multi-folded paper. 4,018,431, Cl. 270-52.500.

Schulmeister, Robert: *See—*
Rudert, Wolfgang; Schulmeister, Robert; Schlaupitz, Manfred; and Braetsch, Norbert, 4,018,053.

Schulte Elektrotechnik KG, Firma: *See—*
Schulte, Siegfried; and Schmitt, Wilheim, 4,017,964.

Schulte, Siegfried; and Schmitt, Wilheim, to Schulte Elektrotechnik KG, Firma. Method of manufacturing electrical machinery having a rotor. 4,017,964, Cl. 29-596.000.

Schultz, Edward D. Backstacking apparatus. 4,018,323, Cl. 198-508.000.

Schultz, William J., to General Electric Company. Method for making a gas sensor assembly. 4,017,950, Cl. 29-25.150.

Schulz, Gordon, to Odetics, Inc. Cassette loader for video recorder/reproducer. 4,018,403, Cl. 242-198.000.

Schulz, Hansrichard. Photoelectric transducing unit and system for detecting the sharpness of the image of object by means of the unit. 4,019,049, Cl. 250-211.00R.

Schulz, Johann G. D.: *See*—
Onopchenko, Anatoli; and Schulz, Johann G. D., 4,018,828.

Schutze, Herbert: *See*—
Fennekels, Peter; and Schutze, Herbert, 4,018,066.

Schwan, Thomas J., to Morton-Norwich Products, Inc. 4',5'-Dimethoxy-2',3-diaminopropiophenone dihydrochloride. 4,018,823, Cl. 260-570.50C.

Schweikert, Karl, to Robert Bosch G.m.b.H. Windshield wiper arrangement. 4,017,936, Cl. 15-250.320.

Schwender, Charles F.; and Shavel, John, Jr., to Warner-Lambert Company. 5-Hydroxy-α-(substituted aminomethyl)-m-xylene-α,α'-diols. 4,018,825, Cl. 260-570.600.

Schwuttke, Guenter H.; and Yang, Kuei-Hsiung, to International Business Machines Corporation. Impact sound stressing for semiconductor devices. 4,018,626, Cl. 148-1.500.

Scire, Frank J.: *See*—
DeLorenzo, Joseph; DiFranco, Julius V.; and Scire, Frank J., 4,019,182.

SCM Corporation: *See*—
Canova, Levy A., 4,018,842.

Scott, John William; Parrish, David Richard; and Saucy, Gabriel, to Hoffmann-La Roche Inc. Antioxidant chroman compounds. 4,018,799, Cl. 260-345.500.

Scott, Robert: *See*—
Alfin, Norman J.; and Scott, Robert, 4,018,658.

Scott, Timothy F.: *See*—
Brushwyler, Gordon R.; and Scott, Timothy F., 4,018,661.

Scripps, Charles L.; and Yetter, Jerry J., to Procter & Gamble Company, The. Amine-stabilized dry powder aerosol antiperspirant compositions and method of preparation. 4,018,888, Cl. 424-47.000.

Scriven, Roger L.: *See*—
Chang, Wen-Hsuan; Scriven, Roger L.; and Prucnal, Paul J., 4,018,849.

Sealed Air Corporation: *See*—
Keren, Eitan, 4,018,034.
Klein, Max, 4,018,946.

Sears, Roebuck and Co.: *See*—
Martelet, Ronald G., 4,019,171.

Seckler, David W.; Harper, Judson M.; and Gaynor, William Wayne, to Ceres Ecology Corporation. Process for recovering feed products from animal manure. 4,018,899, Cl. 426-55.000.

Seer, Harold George, Jr., to RCA Corporation. Negative gamma circuit. 4,018,988, Cl. 358-164.000.

Segeren, Antonius Johannes Maria; and Boskamp, Jelles Vincent, to Thomas J. Lipton, Inc. Protein fibers. 4,018,903, Cl. 426-104.000.

Segerstrom, Lars, to Aktiebolaget Imo-Industri. Screw pump. 4,018,549, Cl. 418-197.000.

Seider, Gene J.; Freund, Michael C.; and Duffy, James R., to Gould Inc. Storage system for hot food trays. 4,019,022, Cl. 219-386.000.

Seiko Koki Kabushiki Kaisha: *See*—
Kitai, Kiyoshi; Saito, Takeo; and Seki, Youichi, 4,019,189.

Seiz, Hermann: *See*—
Lohmer, Karl; Seiz, Hermann; and Zietan, Karl, 4,018,609.

Seki, Youichi: *See*—
Kitai, Kiyoshi; Saito, Takeo; and Seki, Youichi, 4,019,189.

Sell, Darrell Dean: *See*—
Maione, Theodore Lincoln; Radcliffe, Frederick Enyeart; Sell, Darrell Dean; and Wolaver, Dan Holden, 4,019,048.

Senkpiel, Werner: *See*—
Roller, Hermann; Senkpiel, Werner; Wunsch, Gerd; Hartmann, Job-Werner; Fuchs, Friedrich; Hack, Joachim; Kiener, Volker; Motz, Herbert; and Ostertag, Werner, 4,018,967.

Sevrjugina, Zoya Sergeevna: *See*—
Kruglikov, Anatoly Abramovich; Aronova, Lia Ilinichna; Kuftarev, Vladimir Vasilievich; Sevrjugina, Zoya Sergeevna; and Eletskaya, Vera Konstantinovna, 4,018,740.

Seward, Thomas P., III: *See*—
Kerko, David J.; and Seward, Thomas P., III, 4,018,965.

Sewell, Robert A.: *See*—
Orr, John L.; and Sewell, Robert A., 4,018,487.

Shady, Dan L.: *See*—
United States of America, National Aeronautics and Space Administration; Evans, Page K.; and Shady, Dan L., 4,018,080.

Shaheen, Joseph M.: *See*—
Niedzwiecke, Andrew J.; and Shaheen, Joseph M., 4,018,491.

Shamlian, Ralph B., to Farallon Industries, Inc. Swim fin including means for restricting ankle movement. 4,017,925, Cl. 9-309.000.

Shantz, Raymond G.: *See*—
Schantz, John S., 4,017,923.

Shapiro, Jonathan S.: *See*—
Fitzsimmons, Thomas W.; Berluti, Vincent, Jr.; Wagner, Howard G.; and Shapiro, Jonathan S., 4,018,716.

Sharkey, Melvin; and Newman, Douglas A. Continuous duplicating sheets. 4,018,162, Cl. 101-473.000.

Sharma, Vijay Ratna; and Taylor, John Anthony, to Imperial Chemical Industries Limited. Thioaminophosphazenes. 4,018,822, Cl. 260-551.00P.

Sharp Kabushiki Kaisha: *See*—
Hashimoto, Shintaro; and Nakagawa, Hirohide, 4,019,178.

Shavel, John, Jr.: *See*—
Brown, Richard E.; Puchalski, Chester; and Shavel, John, Jr., 4,018,766.
Cohen, Marvin P.; Shavel, John, Jr.; and Von Strandtmann, Max, 4,018,798.
Fabian, Arthur C.; Genzer, Jerome D.; Kasulanis, Charles Francis; Shavel, John, Jr.; and Zinnes, Harold, 4,018,762.
Schwender, Charles F.; and Shavel, John, Jr., 4,018,825.

Shawhan, Elbert N., to Sperry-Sun, Inc. Lock-in noise rejection circuit. 4,019,148, Cl. 328-167.000.

Sheibley, Dean W.; and Gahn, Randall F., to United States of America, National Aeronautics and Space Administration. Gels as battery separators for soluble electrode cells. 4,018,971, Cl. 429-105.000.

Shekhtman, Isai Abramovich: *See*—
Budker, Gersh Itskovich; Morozov, Sergei Nikolaevich; Nezhevenko, Oleg Alexandrovich; Ostreiko, Gennady Nikolaevich; and Shekhtman, Isai Abramovich, 4,019,088.

Shell Oil Company: *See*—
Winnen, Denis F., 4,018,879.

Shenandoah Manufacturing Company, Inc.: *See*—
Christophel, Reuben L., 4,018,210.

Sheridon, Nicholas K.; Kermisch, Dorian; and Bergen, Richard F., to Xerox Corporation. Deformation imaging system using thermoplastic and elastomeric layers. 4,018,603, Cl. 96-1.500.

Sherritt Gordon Mines Limited: *See*—
Genik-Sas-Berezowsky, Roman Michael, 4,018,595.

Shestopalov, Alexandr Andreevich: *See*—
Denikin, Ernst Ivanovich; Khazkhuta, Nikolai Yakovlevich; Shestopalov, Alexandr Andreevich; Badalov, Vladimir Vachaganovich; Vasiliev, Alexandr Alexandrovich; Okunev, Vyacheslav Ivanovich; Kaplan, David Abramovich; Deinego, Jury Borisovich; Kazakov, Alexandr Danilovich; Gienko, Vladimir Ivanovich; Marchenko, Alexei Alexeevich; and Laevsky, Mikhail Avramovich, 4,018,541.

Shibata, Kenichi: *See*—
Otouma, Takashi; Aoki, Susumu; Minaki, Toshiaki; Shibata, Kenichi; and Mori, Kentaro, 4,018,964.

Shibayama, Kimio; and Yamanouchi, Kazuhiko, to Tokyo Shibaura Electric Co., Ltd. $LiNbO_3$ saw device. 4,019,074, Cl. 310-9.500.

Shibuya, Akira; and Nitta, Yoshifumi, to Ishikawajima-Harima Jukogyo Kabushiki Kaisha. Particle charging device for use in an electric dust collecting apparatus. 4,018,577, Cl. 55-137.000.

Shibuya, Teruo: *See*—
Okamoto, Masahiro; Kimura, Morio; Shibuya, Teruo; Yamamoto, Shinji; Hasegawa, Shinichi; Terada, Yutaka; and Adachi, Teruho, 4,018,739.

Shima, Takeo: *See*—
Iwata, Kazumi; Tokashiki, Michiyuki; and Shima, Takeo, 4,018,840.

Shimano Industrial Company Limited: *See*—
Shimano, Keizo, 4,018,095.

Shimano, Keizo, to Shimano Industrial Company Limited. Driving device for bicycle. 4,018,095, Cl. 74-217.00B.

Shin, Masaru: *See*—
Inouye, Ken; Shin, Masaru; and Watanabe, Kunio, 4,018,753.
Inouye, Ken; Shin, Masaru; and Watanabe, Kunio, 4,018,754.

Shinko Electric Co., Ltd.: *See*—
Nakanishi, Sadao; and Tokura, Nobufumi, 4,019,026.

Shinoda, Hiroshi: *See*—
Kawabe, Naoshi; Haga, Toshikatu; Nakajima, Taiitu; Takahashi, Takeshi; Shinoda, Hiroshi; and Hayakawa, Shuji, 4,017,960.

Shiokawa, Seiji. Open-sided press. 4,018,150, Cl. 100-231.000.

Shionogi & Co., Ltd.: *See*—
Inouye, Ken; Shin, Masaru; and Watanabe, Kunio, 4,018,753.
Inouye, Ken; Shin, Masaru; and Watanabe, Kunio, 4,018,754.
Maeda, Ryozo; and Hirose, Katsumi, 4,018,785.

Shockey, Clyde J. Rotating head. 4,018,471, Cl. 294-90.000.

Shoemaker, Robert S.; Moyer, Donald H.; and Newman, Joseph J., to Bechtel International Corporation. Embedded housing for ore crusher. 4,018,396, Cl. 241-301.000.

Shoger, James. Recreational jouncing apparatus with vertical supports and removable board travel stops. 4,018,438, Cl. 272-65.000.

Short, Bruce H. Phonograph turntable. 4,018,447, Cl. 274-10.00R.

Shufflebarger, Earl D.; Kish, Edward E.; Cunningham, Frank M.; Boylan, John R.; and Murauskas, Donald J., to Nupro Company. Fluid strainer element. 4,018,686, Cl. 210-448.000.

Shumaker, John F., to J. I. Case Company. Vehicle stabilizer with adjustable foot. 4,018,458, Cl. 280-766.000.

Shuman, Jack N. Table for plastic forming apparatus. 4,018,551, Cl. 425-388.000.

Shupe, Russell D., to Texaco Inc. Surfactant oil recovery process usable in high temperature formations. 4,018,278, Cl. 166-252.000.

Sieg, Robert C., to Raymond Lee Organization, Inc., The, a part interest. Bed desk. 4,017,920, Cl. 5-317.00R.

Siemens Aktiengesellschaft: *See*—
Bauer, Johann, 4,018,413.
Brundin, Bengt; and Trepte, Wulf, 4,019,059.
Dressen, Anton; and Menzel, Klaus, 4,019,186.
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Gehm, Horst; Gratzke, Werner; and Linden, Wilhelm, 4,019,117.
Klauke, Guenter; and Wimmer, Anton, 4,018,955.
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Mentschel, Hellmuth, 4,018,573.
Moltgen, Gottfried, 4,019,124.
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Preissinger, Karl-Heinz; Voelkl, Walter; Weber, Willi; and Wehnelt, Ulrich, 4,019,101.
Strossner, Manfred, 4,019,006.
Wilk, Klaus, 4,018,986.
Zeuch, Klaus; and Stadter, Josef, 4,018,566.

Siemens, Dan H., Jr.; and Wheelwright, Earl J., to Minnesota Mining and Manufacturing Company. Apparatus for extraction of polonium - 210 from irradiated bismuth using molten caustic. 4,018,561, Cl. 23-267.00R.

SIGMA S.p.A.: *See*—
Capuano, Antonio, 4,017,929.
Capuano, Antonio, 4,017,930.

Signetics Corporation: *See*—
Beyerlein, Fritz W., 4,017,963.
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Silk, Charles Earnest, deceased: *See*—
Kimmel, Earl J.; and Silk, Charles Earnest, deceased, 4,018,637.

Silk, Wilma F., sole heir: *See*—
Kimmel, Earl J.; and Silk, Charles Earnest, deceased, 4,018,637.

Silverman, Daniel; and Johnson, Everett A. Holographic systems having reference beam coded holograms. 4,018,503, Cl. 350-3.500.

Simic, Milutin: *See*—
Sweeney, William A.; and Simic, Milutin, 4,018,657.

Simon, Eli. Chromated alkaline earth salts of bis(s-diphenylguanidinium benzenephosphonate) for the corrosion-inhibition of aluminum and ferrous alloys. 4,018,700, Cl. 252-389.00A.

Simon, Herbert: *See*—
Jaeger, Knut, 4,018,369.

Simpson, Elbert L.: *See*—
Archer, Wesley L.; Simpson, Elbert L.; and Gerard, Raymond R., 4,018,837.

Sims, Willard M., to Foster Grant Co., Inc. High impact polyamides. 4,018,731, Cl. 260-23.70N.

Sinfelt, John H.; and Barnett, Allan E., to Exxon Research and Engineering Company. Hydrocarbon conversion process. 4,018,670, Cl. 208-140.000.

Singer, Barry M.; and Lalak, Joseph J., to North American Philips Corporation. Method of reducing the thickness of a wafer of fragile material. 4,018,638, Cl. 156-626.000.

Singer, Barry M.: *See*—
Conklin, Thomas H.; and Singer, Barry M., 4,019,084.

Singer Company, The: *See*—
Fontaine, Robert Richard, 4,019,039.
Ketterer, Stanley Joseph, 4,018,172.
Stone, William David; and Bonner, Alvin Truit, Sr., 4,018,171.

Singh, Baldev: *See*—
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Sipe, Charles B. Hand rake with grasping tines. 4,018,038, Cl. 56-400.120.

Sisson, Kenneth O.: *See*—
Vona, Nick, Jr.; and Sisson, Kenneth O., 4,018,067.

Sitek, George J.; and Berk, Charles W., to Leco Corporation. Arc control circuit. 4,019,017, Cl. 219-135.000.

Siuta, Michael T.: *See*—
Daviduk, Nicholas; Lewis, David W.; and Siuta, Michael T., 4,018,280.

Sivertson, Wilford Eugene, Jr., to United States of America, National Aeronautics and Space Administration. Method of locating persons in distress. 4,019,179, Cl. 343-5.0MM.

Skelly Oil Company: *See*—
Flickinger, Earl Dan; and Buess, Charles Merlyn, 4,018,795.

SKF Nova A.B.: *See*—
Nilsson, Sven Walter, 4,018,093.

Skoog, Ivan H., to Minnesota Mining and Manufacturing Company. Organic dye having fluoroaliphatic substituent. 4,018,810, Cl. 260-465.00D.

Smathers, Harry W.: *See*—
Jones, Robert S.; Jones, Wesley E.; and Smathers, Harry W., 4,018,271.

Smaw, Jesse B., to Marcal Paper Mills, Inc. Article packaging machine. 4,018,031, Cl. 53-159.000.

Smith, Alvin E., to Atlantic Richfield Company. Fuel cycle management. 4,018,697, Cl. 252-301.10R.

Smith, April A. Ash tray. 4,018,235, Cl. 131-236.000.

Smith, Charles L.: *See*—
Webster, William C.; and Smith, Charles L., 4,018,619.

Smith, D. Kermit. Process and apparatus for dislodging and conveying material from a surface with a positive pressure fluid stream. 4,018,483, Cl. 302-25.000.

Smith, Herman W., to Upjohn Company, The. 13,14-Didehydro-$PG_2$ compounds. 4,018,803, Cl. 260-408.000.

Smith Kline & French Laboratories Limited: *See*—
Durant, Graham John; Emmett, John Colin; and Ganellin, Charon Robin, 4,018,928.
Durant, Graham John; Emmett, John Colin; and Ganellin, Charon Robin, 4,018,931.

Smith, Robert L.: *See*—
Cragoe, Edward J., Jr.; Bicking, John B.; and Smith, Robert L., 4,018,802.

Smith, Sumpter D.: *See*—
Cates, Raymond H., Jr.; Martin, Walter L., Jr.; and Smith, Sumpter D., 4,018,586.

SmithKline Corporation: *See*—
Berges, David Alan, 4,018,759.
Gleason, John Gerald, 4,018,921.

Smyrni, Emanuel S.; and White, Bobbie L., to Gym-Dandy, Inc. Cross arm hanger support. 4,018,538, Cl. 403-346.000.

Snyder, Edward J.; and Domyan, Stephen L., to Summagraphics Corporation. Position coordinate determination device. 4,018,989, Cl. 178-18.000.

Snyder, Jack C.: *See*—
Peterson, Donald C.; and Snyder, Jack C., 4,017,997.

Snyder, Michael D., to Universal Instruments Corporation. Belted axial lead electronic component splicing clip crimping tool. 4,018,074, Cl. 72-410.000.

Societa' Farmaceutici Italia S.p.A.: *See*—
Foglio, Maurizio; Masi, Paolo; Suarato, Antonino; and Franceschi, Giovanni, 4,018,776.

Societa' Italiana Resine S.I.R. S.p.A.: *See*—
Barba, Diego; Battistoni, Fabrizio; D'Agostini, Candido; and Macchi, Giorgio, 4,018,872.
Barba, Diego; Battistoni, Fabrizio; D'Agostini, Candido; and Macchi, Giorgio, 4,018,873.

Societe Alsacienne de Constructions Mecaniques de Mulhouse: *See*—
Bulliot, Georges Leon Marcel, 4,018,062.

Societe Anonyme D.B.A.: *See*—
Mery, Jean-Claude, 4,018,309.
Monpetit, Louis, 4,018,419.

Societe Anonyme dite: L'Oreal: *See*—
Kalopissis, Gregoire; and Bugaut, Andree, 4,018,556.

Societe Anonyme Francaise du Perodo: *See*—
Landreau, Jean Florent Francois Marcel Robert, 4,018,139.

Societe Anonyme pour l'Equipement Electrique des Venicules S. E. V. Marchal: *See*—
Jacob, Pascal Marie Henri; and Guichesseux, Gerard Pierre, 4,018,335.

Societe d'Application Plastique Mecanique et Electronique, Plastimecanique S.A.: *See*—
Donnet, Henry, 4,018,028.

Societe d'Assistance Technique pour Produits Nestle S.A.: *See*—
Buhler, Marcel; Bohren, Hans-Ueli; and Hodel, Theodore, 4,018,752.

Societe Industrielles des Establissements Piel: *See*—
Piel, Michel, 4,017,926.

Societe Nationale Elf Aquitaine (Production): *See*—
Peruchon, Edouard; and Rabischong, Pierre, 4,017,978.

Sodal, Ingvar E.; Hoivik, Lars; Micco, Alexander J.; Weil, John V.; and Baer, Norman W., to University of Colorado, The Regents of the. Method and inlet control system for controlling a gas flow sample to an evacuated chamber. 4,018,241, Cl. 137-14.000.

Soffer, Anita. Humidifying plant table. 4,018,004, Cl. 47-39.000.

Soja, Frank John, to Alta Engineering, Inc. Lock screw for rigging connector or the like. 4,017,946, Cl. 24-265.0AL.

Sokolsky, Dmitry Vladimirovich: *See*—
Bizhanov, Frunze Bizhanovich; Sokolsky, Dmitry Vladimirovich; Omarov, Ashim Kuranbaevich; Khisametdinov, Akhmed Miftakhovich; Ongarbaev, Sagynbek; and Popov, Nikolai Ivanovich, 4,018,835.

Somar Manufacturing Co., Ltd.: *See*—
Takahashi, Nobuyasu; Yamaguchi, Taiichi; Sakaguchi, Junei; and Hamada, Hideo, 4,018,645.

Sonoco Products Company: *See*—
Cunningham, McCleery B., 4,018,401.

Sorbier, Pierre, to Agence Nationale de Valorisation de la Recherche (ANVAR). Shredding machine for fibrous materials. 4,018,394, Cl. 241-200.000.

Sorli, Duncan C.: *See*—
Cutler, Norman W., Jr.; and Sorli, Duncan C., 4,019,194.

Sotman, Kurt; and Nash, John E., to Star Dental Manufacturing Co., Inc. Handpiece with adjustable water spray. 4,017,974, Cl. 32-28.000.

Soulal, Maurice John; and Utting, Kenneth, to Beecham Group Limited. Esters of metrizoic acid. 4,018,783, Cl. 260-343.30R.

Spangler, Morris H., to Reflector Hardware Corporation. Preassembled bracket and shelf assembly. 4,018,167, Cl. 108-152.000.

Sperry, Elmer Ambrose, III: *See*—
Dzula, Gregory; Levine, Melvin; and Sperry, Elmer Ambrose, III, 4,018,089.

Sperry Rand Corporation: *See*—
Freitag, Walter O., 4,018,495.
Rowland-Hill, Edward W.; and Todd, Robert R., 4,018,232.

Sperry-Sun, Inc.: *See*—
Shawhan, Elbert N., 4,019,148.

Sperry-Sun Well Surveying Company: *See*—
McArthur, Billy Walton, 4,018,088.

Spicer, Larry Dean; Quinlan, James Michael; and Berger, Harold, to American Cyanamid Company. Anthelmintic pour-on formulations for topical use on domestic and farm animals. 4,018,932, Cl. 424-270.000.

Spielberg, David H.: *See*—
Youtsey, Karl J.; Holt, William C., Jr.; Carnahan, Robert D.; and Spielberg, David H., 4,018,943.

Spietschka, Ernst; Schiessler, Siegfried; and Tronich, Wolfgang, to Hoechst Aktiengesellschaft. Process for the preparation of highly pure halogenated phthalocyanine pigment. 4,018,791, Cl. 260-314.500.
Spiller, Eberhard A.: *See—*
Feder, Ralph; and Spiller, Eberhard A., 4,018,938.
Spisak, Steve, to TRW Inc. Apparatus for welding studs. 4,019,013, Cl. 219-98.000.
Spriggs, Samuel C. Stopper remover. 4,018,110, Cl. 81-3.10B.
Sprinter Pack AB: *See—*
Persson, Karl Rune, 4,018,378.
Square D Company: *See—*
Beavitt, Alan R., 4,019,163.
Srodes, Paul G., to Honeywell Inc. Central supervisory and control system generating 16-bit output. 4,019,172, Cl. 340-146.10C.
Stadter, Josef: *See—*
Zeuch, Klaus; and Stadter, Josef, 4,018,566.
Stafford, Jerrett D.: *See—*
Lee, Stuart M.; and Stafford, Jerrett D., 4,018,374.
Staggers, John O., to Foote Mineral Company. Rare earth metal silicide alloys. 4,018,597, Cl. 75-58.000.
Stahler, Gerhard: *See—*
Rehn, Karl; Schaffner, Otto; and Stahler, Gerhard, 4,018,819.
Stanbel, Incorporated: *See—*
Aber, Arthur B., 4,018,407.
Standard Oil Company (Indiana): *See—*
Bertolacini, Ralph J., 4,018,711.
Standley, Robert S., to Armco Steel Corporation. Yieldable joint. 4,018,054, Cl. 61-45.00R.
Stanik, Raimund; Appelt, Horst Gustav; and Ramspott, Walter, to Schaeffer-Homberg GmbH, Firma. Fastener for pockets, cases or the like. 4,017,945, Cl. 24-208.00R.
Stanley Electric Co., Ltd.: *See—*
Teshima, Toru; Kashiwabara, Hoichiro; and Uchiyama, Yoshinori, 4,019,196.
Staples, Ernest L., Jr., to Xerox Corporation. Method of assembling a composite print wheel. 4,018,639, Cl. 156-73.100.
Star Dental Manufacturing Co., Inc.: *See—*
Sotman, Kurt; and Nash, John E., 4,017,974.
Stauffer Chemical Company: *See—*
Baker, Don R., 4,018,800.
Baker, Don Robert, 4,018,894.
Gaughan, Edmund J., 4,018,813.
Gutman, Arnold D., 4,018,917.
Steel Company of Canada, Limited, The: *See—*
Markus, Frank, 4,018,598.
Steelcase, Inc.: *See—*
Faiks, Frederick S., 4,018,102.
Steiman, Wolf. Booklet type cosmetic compact. 4,018,237, Cl. 132-83.00R.
Stein, Volkhard: *See—*
Stumpp, Gerhard; Wessel, Wolf; Stein, Volkhard; and Sautter, Wilfried, 4,018,200.
Steinemer, Norbert: *See—*
Kohler, Werner; and Steinemer, Norbert, 4,019,008.
Steiner American Corporation: *See—*
Cassia, Antonio Macchi, 4,018,363.
Steinman, Martin, to Schering Corporation. Methods for treating microbial infections. 4,018,893, Cl. 424-285.000.
Stelzer, William. Louvered windows comprising insulating pairs of superimposed panes. 4,018,024, Cl. 52-473.000.
Stenkvist, Sven-Einar: *See—*
Andersson, Conny; and Stenkvist, Sven-Einar, 4,018,974.
Stepan Chemical Company: *See—*
Blackwood, John C., 4,018,333.
Sterling Drug Inc.: *See—*
Lesher, George Y.; and Singh, Baldev, 4,018,770.
Sternbach, Leo Henryk: *See—*
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Steuer, Siegfried: *See—*
Greune, Christian; Herrmann, Bruno; and Steuer, Siegfried, 4,018,045.
Stewart, Bruce Edmund: *See—*
Lyman, John Bartholomew; and Stewart, Bruce Edmund, 4,018,493.
Stier, Otto, to Vollmer Werke Maschinenfabrik GmbH. Saw sharpening machine. 4,018,107, Cl. 76-41.000.
Stier, Otto, to Vollmer Werke Maschinenfabrik GmbH. Feed device for saw machining apparatus. 4,018,109, Cl. 76-77.000.
Stiller, Armin, to Rollei-Werke Franke & Heidecke. Photographic flash apparatus. 4,019,092, Cl. 315-159.000.
Stobb, Inc.: *See—*
Stobb, Walter John, 4,018,351.
Stobb, Walter John, to Stobb, Inc. Apparatus for handling bundles of sheets. 4,018,351, Cl. 214-314.000.
Stochel, Nathan Harold: *See—*
Fallon, Joseph Michael; and Stochel, Nathan Harold, 4,019,143.
Stockhausen, Paul E.: *See—*
Hopkins, Richard G.; and Stockhausen, Paul E., 4,018,012.
Stolberg, Hermann Josef: *See—*
Muller, Rudolf; and Stolberg, Hermann Josef, 4,018,420.
Stoll, Max: *See—*
Winter, Max; Gautschi, Fritz; Flament, Ivon; and Stoll, Max, 4,018,910.
Stone, Jack C. Granular-floor supported cargo hauling trailer apparatus construction. 4,018,480, Cl. 298-27.000.
Stone, Wayne B., Jr. Method for edge marking recordable webs. 4,018,947, Cl. 427-284.000.
Stone, William David; and Bonner, Alvin Truit, Sr., to Singer Company, The. Yarn tensioning means for tufting machines. 4,018,171, Cl. 112-79.00R.
Stonebraker, Robert E. Cutting instrument. 4,017,969, Cl. 30-156.000.
Stoops, Bobby G., to Don R. Hinderliter, Inc. Gate latching mechanism for hoist hook. 4,018,469, Cl. 294-82.00R.
Stoss, Peter Johannes; Herrmann, Manfred Franz Reinhold; and Satzinger, Gerhard, to Warner-Lambert Company. Benzo (b) thiophene derivatives. 4,018,793, Cl. 260-330.500.
Strauss, Friedrich, to Amann & Sohne. Cassette for dispensing yarn reels. 4,018,360, Cl. 221-310.000.
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Stumpp, Gerhard; Wessel, Wolf; Stein, Volkhard; and Sautter, Wilfried, to Robert Bosch G.m.b.H. Fuel injection system with fuel pressure control valve. 4,018,200, Cl. 123-139.0AW.
Stutt, Colin; Noble, Anthony John; and Ford, Reginald Arthur, to Masson Scott Thrissell Engineering Limited. Flap folding mechanism for carton making machines. 4,018,144, Cl. 93-52.000.
Suarato, Antonino: *See—*
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Sunbank Electronics, Inc.: *See—*
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Suzuki, Yasuhiro; and Yamaguchi, Katsuhiko, to Nitto Electric Industrial Co., Ltd. Imide-ring containing polyester and wire enamel containing same. 4,018,742, Cl. 260-75.00N.
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Swanson, Gladys B. Trailer anchoring device. 4,018,015, Cl. 52-23.000.
Swanson, Rollan. Desulfurization of fossil fuels. 4,018,572, Cl. 44-1.00R.
Sweda International, Inc.: *See—*
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Sweeney, William A.; and Simic, Milutin, to Chevron Research Company. Separation of hydrocarbon mixtures by alkyl displacement. 4,018,657, Cl. 203-38.000.
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Szasz, I. Emery; and Sandborn, Edmund B. Floating deck for liquid storage tank. 4,018,356, Cl. 220-220.000.
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Takahashi, Yasuo, to Asahi Kogaku Kogyo Kabushiki Kaisha. Photographic wide angle lens. 4,018,511, Cl. 350-214.000.
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Tanaka, Junzo; Matsushima, Haruo; and Abe, Yukio, to Matsushita Electric Industrial Co., Ltd. Microwave oven with uniform electric field distribution. 4,019,010, Cl. 219-10.55F.
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Tanner, Randall Curtis, to Cincinnati Milacron, Inc. Method and apparatus for controlling the initiation of multiple start threading cuts. 4,019,035, Cl. 235-151.110.
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Teer, Glenn E.; Higgins, Jerry G.; Warren, George D.; and Ewert, Donald C., to Cosden Technology, Inc. Emulsions of ethylene polymers and copolymers with controlled molecular weight and particle size. 4,018,737, Cl. 260-29.6XA.
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Watkins, Larry A.; Graham, John W.; and Salathiel, William M., to Exxon Production Research Company. Method for controlling fines migrations. 4,018,285, Cl. 166-295.000.
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Wenz, Friedrich, to Gebr. Hofmann KG. Process and apparatus for digital indication of electric measuring and/or test values. 4,019,136, Cl. 324-128.000.
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Bartel, Siegfried; Payrhammer, Bernd; and Wurf, Johann, 4,018,527.
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Hagenbach, Robert J., 4,018,601.
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Oshimura, Masakazu; Kawakami, Akira; Hosoda, Hiroaki; Okamoto, Osamu; Watanabe, Osamu; Fujii, Shinichi; Yamaguchi, Satoru; Odani, Noboru; and Koori, Yoshizo, 4,018,710.
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Yokota, Hisaaki: *See—*
Oishi, Minoru; Rokujo, Masaharu; Yokota, Hisaaki; Okuda, Naoki; Tomita, Makoto; and Endo, Toshihiko, 4,019,018.
Yomogida, Toshihiko: *See—*
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Scheingold, William Samuel; and Youngfleish, Frank Christian, 4,018,494.

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Blazenin, Miroslav; Rohs, Hans-Gunter; and Zeller, Bruno, 4,018,113.

Zellweger, Ltd.: *See—*
Loch, Ernst, 4,019,132.

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Zietan, Karl: *See—*
Lohmer, Karl; Seiz, Hermann; and Zietan, Karl, 4,018,609.

Zinnes, Harold: *See—*
Fabian, Arthur C.; Genzer, Jerome D.; Kasulanis, Charles Francis; Shavel, John, Jr.; and Zinnes, Harold, 4,018,762.

Zirconal Processes Limited: *See—*
Walters, Ian Richard; and Emblem, Harold Garton, 4,018,858.

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| DOCUMENT NUMBER | PATENT NUMBER | PUB. DATE | ISSUE DATE |
|---|---|---|---|
| B 48,560 | 4,002,772 | Mar. 30, 1976 | Jan. 11, 1977 |
| B 54,859 | 4,000,101 | Feb. 17, 1976 | Dec. 28, 1976 |
| B 59,512 | 3,999,216 | Mar. 16, 1976 | Dec. 21, 1976 |
| B 66,272 | 4,014,978 | Feb. 24, 1976 | Mar. 29, 1977 |
| B 71,613 | 4,008,393 | Mar. 16, 1976 | Feb. 15, 1977 |
| B 73,017 | 4,001,879 | Mar. 9, 1976 | Jan. 4, 1977 |
| B 78,315 | 3,982,192 | Feb. 10, 1976 | Sep. 21, 1976 |
| B 79,099 | 3,982,177 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 97,259 | 3,999,614 | Mar. 9, 1976 | Dec. 28, 1976 |
| B 105,006 | 4,007,074 | Mar. 23, 1976 | Feb. 8, 1977 |
| B 111,130 | 4,001,380 | Mar. 16, 1976 | Jan. 4, 1977 |
| B 141,968 | 4,013,442 | Mar. 30, 1976 | Mar. 22, 1977 |
| B 150,142 | 3,981,767 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 160,045 | 3,983,446 | Jan. 13, 1976 | Sep. 28, 1976 |
| B 160,099 | 3,987,221 | Jan. 13, 1976 | Oct. 19, 1976 |
| B 163,463 | 3,981,659 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 167,470 | 4,001,101 | Mar. 2, 1976 | Jan. 4, 1977 |
| B 181,208 | 4,001,391 | Mar. 9, 1976 | Jan. 4, 1977 |
| B 200,759 | 3,986,872 | Feb. 3, 1976 | Oct. 19, 1976 |
| B 208,916 | 3,987,106 | Jan. 13, 1976 | Oct. 19, 1976 |
| B 214,925 | 3,997,648 | Mar. 9, 1976 | Dec. 14, 1976 |
| B 223,678 | 3,989,159 | Mar. 9, 1976 | Nov. 2, 1976 |
| B 231,416 | 4,000,054 | Mar. 30, 1976 | Dec. 28, 1976 |
| B 236,266 | 4,013,624 | Mar. 23, 1976 | Mar. 22, 1977 |
| B 236,342 | 4,001,182 | Feb. 10, 1976 | Jan. 4, 1977 |
| B 248,240 | 3,983,556 | Jan. 13, 1976 | Sep. 28, 1976 |
| B 257,143 | 4,000,111 | Mar. 16, 1976 | Dec. 28, 1976 |
| B 270,274 | 3,982,223 | Feb. 17, 1976 | Sep. 21, 1976 |
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| B 271,743 | 4,001,195 | Mar. 16, 1976 | Jan. 4, 1977 |
| B 276,026 | 3,992,405 | Feb. 3, 1976 | Nov. 16, 1976 |
| B 279,415 | 4,000,697 | Mar. 16, 1976 | Jan. 4, 1977 |
| B 279,969 | 3,986,073 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 281,162 | 4,009,481 | Mar. 23, 1976 | Feb. 22, 1977 |
| B 283,941 | 3,995,313 | Feb. 3, 1976 | Nov. 30, 1976 |
| B 288,757 | 4,001,072 | Mar. 30, 1976 | Jan. 4, 1977 |
| B 301,143 | 3,991,107 | Jan. 27, 1976 | Nov. 9, 1976 |
| B 302,160 | 3,985,774 | Feb. 3, 1976 | Oct. 12, 1976 |
| B 306,668 | 3,985,713 | Feb. 3, 1976 | Oct. 12, 1976 |
| B 307,698 | 3,993,763 | Feb. 3, 1976 | Nov. 23, 1976 |
| B 308,659 | 3,981,947 | Jan. 27, 1976 | Sep. 21, 1976 |
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| B 311,779 | 4,013,481 | Feb. 10, 1976 | Mar. 22, 1977 |
| B 313,280 | 4,003,591 | Apr. 6, 1976 | Jan. 18, 1977 |
| B 326,211 | 3,988,272 | Mar. 23, 1976 | Oct. 26, 1976 |
| B 328,065 | 4,014,752 | Mar. 30, 1976 | Mar. 29, 1977 |
| B 328,077 | 4,014,860 | Apr. 13, 1976 | Mar. 29, 1977 |
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| B 336,754 | 3,989,805 | Mar. 16, 1976 | Nov. 2, 1976 |
| B 337,023 | 4,013,188 | Mar. 30, 1976 | Mar. 22, 1977 |
| B 337,823 | 4,002,746 | Mar. 23, 1976 | Jan. 11, 1977 |
| B 339,194 | 3,982,215 | Feb. 3, 1976 | Sep. 21, 1976 |
| B 339,446 | 4,001,067 | Feb. 24, 1976 | Jan. 4, 1977 |
| B 340,170 | 4,000,444 | Mar. 30, 1976 | Dec. 28, 1976 |
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| B 348,433 | 3,984,405 | Feb. 3, 1976 | Oct. 5, 1976 |
| B 349,370 | 3,989,684 | Jan. 27, 1976 | Nov. 2, 1976 |
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| B 385,024 | 3,994,911 | Feb. 10, 1976 | Nov. 30, 1976 |
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| B 385,631 | 3,982,924 | Jan. 27, 1976 | Sep. 28, 1976 |
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| B 386,673 | 3,993,717 | Feb. 3, 1976 | Nov. 23, 1976 |
| B 386,828 | 3,992,440 | Feb. 3, 1976 | Nov. 16, 1976 |
| B 387,337 | D 243,157 | Mar. 16, 1976 | Jan. 25, 1977 |
| B 388,675 | 4,012,459 | Mar. 30, 1976 | Mar. 15, 1977 |
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| B 390,031 | 3,985,799 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 390,408 | 3,992,426 | Feb. 3, 1976 | Nov. 16, 1976 |
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| B 395,975 | 4,001,085 | Mar. 2, 1976 | Jan. 4, 1977 |
| B 396,164 | 3,989,590 | Feb. 3, 1976 | Nov. 2, 1976 |
| B 396,377 | D 243,148 | Apr. 6, 1976 | Jan. 25, 1977 |
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| B 398,220 | 3,990,834 | Feb. 3, 1976 | Nov. 9, 1976 |
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| B 411,624 | 4,001,205 | Mar. 16, 1976 | Jan. 4, 1977 |
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| B 412,068 | 3,981,244 | Jan. 13, 1976 | Sep. 21, 1976 |
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| B 414,266 | 3,993,614 | Feb. 10, 1976 | Nov. 23, 1976 |
| B 414,481 | 3,982,979 | Jan. 20, 1976 | Sep. 28, 1976 |
| B 414,971 | D 242,208 | Feb. 10, 1976 | Nov. 9, 1976 |
| B 415,021 | 3,994,173 | Mar. 2, 1976 | Nov. 30, 1976 |

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| DOCUMENT NUMBER | PATENT NUMBER | PUB. DATE | ISSUE DATE | DOCUMENT NUMBER | PATENT NUMBER | PUB. DATE | ISSUE DATE |
|---|---|---|---|---|---|---|---|
| B 415,122 | 3,997,503 | Feb. 10, 1976 | Dec. 14, 1976 | B 440,632 | 4,014,955 | Apr. 13, 1976 | Mar. 29, 1977 |
| B 415,590 | 4,009,317 | Mar. 23, 1976 | Feb. 22, 1977 | B 440,633 | 4,000,116 | Feb. 10, 1976 | Dec. 28, 1976 |
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| B 416,589 | 3,990,363 | Jan. 27, 1976 | Nov. 9, 1976 | B 441,543 | 4,014,755 | Mar. 23, 1976 | Mar. 29, 1977 |
| B 417,014 | 3,981,851 | Jan. 13, 1976 | Sep. 21, 1976 | B 441,723 | 3,988,249 | Mar. 16, 1976 | Oct. 26, 1976 |
| B 417,164 | 4,001,360 | Mar. 2, 1976 | Jan. 4, 1977 | B 441,789 | 4,001,449 | Mar. 30, 1976 | Jan. 4, 1977 |
| B 417,349 | 3,985,076 | Mar. 9, 1976 | Oct. 12, 1976 | B 442,163 | D 242,192 | Mar. 16, 1976 | Nov. 9, 1976 |
| B 417,498 | 4,013,471 | Mar. 23, 1976 | Mar. 22, 1977 | B 442,295 | 4,000,477 | Mar. 16, 1976 | Dec. 28, 1976 |
| B 418,489 | 3,989,592 | Jan. 13, 1976 | Nov. 2, 1976 | B 442,431 | 4,011,260 | Mar. 23, 1976 | Mar. 8, 1977 |
| B 419,173 | 3,999,728 | Mar. 9, 1976 | Dec. 28, 1976 | B 442,810 | 3,997,533 | Feb. 24, 1976 | Dec. 14, 1976 |
| B 419,582 | 3,989,681 | Mar. 2, 1976 | Nov. 2, 1976 | B 442,866 | 3,982,351 | Feb. 24, 1976 | Sep. 28, 1976 |
| B 420,176 | 4,001,017 | Mar. 16, 1976 | Jan. 4, 1977 | B 442,953 | 4,002,657 | Mar. 23, 1976 | Jan. 11, 1977 |
| B 420,321 | 3,990,645 | Mar. 30, 1976 | Nov. 9, 1976 | B 442,970 | 3,989,890 | Feb. 3, 1976 | Nov. 2, 1976 |
| B 420,472 | 3,993,934 | Feb. 24, 1976 | Nov. 23, 1976 | B 443,163 | 3,981,242 | Feb. 3, 1976 | Sep. 21, 1976 |
| B 421,373 | 4,001,326 | Mar. 23, 1976 | Jan. 4, 1977 | B 443,446 | D 242,494 | Apr. 6, 1976 | Nov. 23, 1976 |
| B 421,608 | 4,013,806 | Mar. 23, 1976 | Mar. 22, 1977 | B 443,563 | 3,996,204 | Feb. 24, 1976 | Dec. 7, 1976 |
| B 421,975 | 3,994,693 | Mar. 2, 1976 | Nov. 30, 1976 | B 443,647 | 3,990,737 | Feb. 17, 1976 | Nov. 9, 1976 |
| B 422,063 | 3,994,835 | Feb. 3, 1976 | Nov. 30, 1976 | B 443,712 | 3,982,233 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 422,156 | 4,010,401 | Mar. 23, 1976 | Mar. 1, 1977 | B 444,078 | 4,014,854 | Mar. 23, 1976 | Mar. 29, 1977 |
| B 423,365 | 3,996,186 | Feb. 17, 1976 | Dec. 7, 1976 | B 444,294 | 4,013,634 | Mar. 30, 1976 | Mar. 22, 1977 |
| B 423,404 | 3,990,958 | Mar. 2, 1976 | Nov. 9, 1976 | B 444,437 | 3,995,171 | Mar. 9, 1976 | Nov. 30, 1976 |
| B 423,441 | 3,997,137 | Feb. 17, 1976 | Dec. 14, 1976 | B 445,166 | 4,001,252 | Mar. 2, 1976 | Jan. 4, 1977 |
| B 423,867 | 3,990,844 | Feb. 3, 1976 | Nov. 9, 1976 | B 445,459 | 3,988,889 | Feb. 3, 1976 | Nov. 2, 1976 |
| B 423,883 | 3,986,871 | Jan. 27, 1976 | Oct. 19, 1976 | B 445,493 | 3,994,903 | Mar. 2, 1976 | Nov. 30, 1976 |
| B 424,354 | D 242,416 | Feb. 10, 1976 | Nov. 23, 1976 | B 445,690 | 3,999,584 | Feb. 3, 1976 | Dec. 28, 1976 |
| B 424,989 | 3,990,569 | Feb. 3, 1976 | Nov. 9, 1976 | B 446,107 | 4,001,276 | Mar. 9, 1976 | Jan. 4, 1977 |
| B 425,193 | 4,002,107 | Mar. 23, 1976 | Jan. 11, 1977 | B 446,956 | 4,014,765 | Apr. 13, 1976 | Mar. 29, 1977 |
| B 425,285 | 4,014,676 | Apr. 13, 1976 | Mar. 29, 1977 | B 447,000 | 3,984,419 | Feb. 3, 1976 | Oct. 5, 1976 |
| B 425,462 | 3,998,396 | Mar. 9, 1976 | Dec. 21, 1976 | B 447,440 | 3,991,724 | Feb. 17, 1976 | Nov. 16, 1976 |
| B 425,588 | 3,985,111 | Jan. 13, 1976 | Oct. 12, 1976 | B 449,892 | 3,997,919 | Mar. 23, 1976 | Dec. 14, 1976 |
| B 426,157 | 4,013,714 | Mar. 23, 1976 | Mar. 22, 1977 | B 449,988 | 4,014,794 | Mar. 30, 1976 | Mar. 29, 1977 |
| B 426,227 | 3,999,028 | Mar. 2, 1976 | Dec. 21, 1976 | B 450,196 | 3,997,701 | Feb. 10, 1976 | Dec. 14, 1976 |
| B 426,266 | 3,998,839 | Mar. 2, 1976 | Dec. 21, 1976 | B 450,413 | 4,007,463 | Mar. 23, 1976 | Feb. 8, 1977 |
| B 426,274 | 4,014,949 | Jan. 20, 1976 | Mar. 29, 1977 | B 450,521 | 3,982,838 | Feb. 17, 1976 | Sep. 28, 1976 |
| B 426,424 | 3,993,742 | Feb. 3, 1976 | Nov. 23, 1976 | B 450,701 | 3,991,084 | Mar. 16, 1976 | Nov. 9, 1976 |
| B 426,639 | 3,992,539 | Feb. 3, 1976 | Nov. 16, 1976 | B 450,708 | 3,989,724 | Mar. 9, 1976 | Nov. 2, 1976 |
| B 426,819 | 3,995,868 | Feb. 17, 1976 | Dec. 7, 1976 | B 450,870 | 3,998,951 | Mar. 16, 1976 | Dec. 21, 1976 |
| B 427,883 | 3,982,277 | Jan. 20, 1976 | Sep. 21, 1976 | B 450,967 | 3,983,055 | Jan. 13, 1976 | Sep. 28, 1976 |
| B 427,946 | 4,006,161 | Mar. 23, 1976 | Feb. 1, 1977 | B 451,248 | 3,997,758 | Mar. 2, 1976 | Dec. 14, 1976 |
| B 428,103 | 4,000,211 | Feb. 10, 1976 | Dec. 28, 1976 | B 451,308 | 3,991,037 | Feb. 17, 1976 | Nov. 9, 1976 |
| B 428,271 | 3,987,415 | Mar. 23, 1976 | Oct. 19, 1976 | B 451,396 | 4,000,450 | Apr. 13, 1976 | Dec. 28, 1976 |
| B 428,408 | 3,995,252 | Mar. 2, 1976 | Nov. 30, 1976 | B 451,438 | Re. 29,066 | Mar. 2, 1976 | Dec. 7, 1976 |
| B 428,877 | 3,984,649 | Jan. 27, 1976 | Oct. 5, 1976 | B 451,534 | 3,986,033 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 429,018 | 3,990,061 | Feb. 10, 1976 | Nov. 2, 1976 | B 452,034 | 4,002,367 | Mar. 23, 1976 | Jan. 11, 1977 |
| B 429,027 | 4,001,260 | Mar. 23, 1976 | Jan. 4, 1977 | B 452,138 | 4,004,278 | Mar. 23, 1976 | Jan. 18, 1977 |
| B 429,157 | 3,990,628 | Jan. 27, 1976 | Nov. 9, 1976 | B 452,293 | 4,014,726 | Mar. 30, 1976 | Mar. 29, 1977 |
| B 429,434 | 3,989,223 | Feb. 17, 1976 | Nov. 2, 1976 | B 452,501 | 4,001,111 | Mar. 16, 1976 | Jan. 4, 1977 |
| B 430,157 | 3,992,465 | Feb. 17, 1976 | Nov. 16, 1976 | B 452,672 | 3,981,602 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 430,172 | 3,982,563 | Jan. 13, 1976 | Sep. 28, 1976 | B 452,879 | 4,001,089 | Mar. 16, 1976 | Jan. 4, 1977 |
| B 430,213 | 4,013,514 | Mar. 30, 1976 | Mar. 22, 1977 | B 452,883 | 3,981,735 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 430,276 | 3,982,171 | Jan. 20, 1976 | Sep. 21, 1976 | B 452,915 | 4,013,933 | Mar. 30, 1976 | Mar. 22, 1977 |
| B 430,287 | D 242,489 | Feb. 10, 1976 | Nov. 23, 1976 | B 452,938 | 3,994,719 | Feb. 17, 1976 | Nov. 30, 1976 |
| B 430,326 | 4,003,581 | Mar. 23, 1976 | Jan. 18, 1977 | B 452,944 | 4,009,773 | Mar. 30, 1976 | Mar. 1, 1977 |
| B 430,334 | 3,981,677 | Jan. 27, 1976 | Sep. 21, 1976 | B 453,031 | 3,998,678 | Mar. 16, 1976 | Dec. 21, 1976 |
| B 431,072 | 3,985,610 | Jan. 20, 1976 | Oct. 12, 1976 | B 453,067 | 4,005,394 | Mar. 23, 1976 | Jan. 25, 1977 |
| B 431,334 | 3,988,095 | Mar. 16, 1976 | Oct. 26, 1976 | B 453,238 | 3,997,063 | Mar. 2, 1976 | Dec. 14, 1976 |
| B 431,713 | 4,000,167 | Feb. 10, 1976 | Dec. 28, 1976 | B 453,432 | 4,000,514 | Mar. 16, 1976 | Dec. 28, 1976 |
| B 431,785 | 3,999,950 | Feb. 24, 1976 | Dec. 28, 1976 | B 453,533 | 3,997,744 | Feb. 17, 1976 | Dec. 14, 1976 |
| B 431,797 | 4,007,290 | Mar. 30, 1976 | Feb. 8, 1977 | B 453,616 | 3,987,376 | Jan. 27, 1976 | Oct. 19, 1976 |
| B 432,049 | 3,995,123 | Mar. 23, 1976 | Nov. 30, 1976 | B 453,759 | 3,989,790 | Jan. 27, 1976 | Nov. 2, 1976 |
| B 432,140 | 3,999,163 | Mar. 23, 1976 | Dec. 21, 1976 | B 453,960 | 4,014,701 | Apr. 13, 1976 | Mar. 29, 1977 |
| B 432,265 | 4,013,480 | Mar. 23, 1976 | Mar. 22, 1977 | B 454,283 | 3,995,153 | Feb. 3, 1976 | Nov. 30, 1976 |
| B 432,594 | 4,003,404 | Mar. 30, 1976 | Jan. 18, 1977 | B 454,833 | 4,008,733 | Mar. 30, 1976 | Feb. 22, 1977 |
| B 432,969 | 3,997,017 | Mar. 2, 1976 | Dec. 14, 1976 | B 455,425 | 3,990,060 | Feb. 3, 1976 | Nov. 2, 1976 |
| B 432,991 | 3,991,669 | Mar. 2, 1976 | Nov. 16, 1976 | B 455,481 | 3,991,092 | Feb. 24, 1976 | Nov. 9, 1976 |
| B 433,094 | 3,987,768 | Jan. 27, 1976 | Oct. 26, 1976 | B 455,486 | 4,001,353 | Mar. 16, 1976 | Jan. 4, 1977 |
| B 433,707 | 4,013,594 | Mar. 23, 1976 | Mar. 22, 1977 | B 455,686 | 4,001,156 | Mar. 2, 1976 | Jan. 4, 1977 |
| B 433,892 | 4,016,061 | Apr. 6, 1976 | Apr. 5, 1977 | B 455,759 | 3,984,242 | Feb. 24, 1976 | Oct. 5, 1976 |
| B 433,930 | 4,012,324 | Mar. 23, 1976 | Mar. 15, 1977 | B 455,806 | 3,998,919 | Mar. 23, 1976 | Dec. 21, 1976 |
| B 434,206 | 3,994,610 | Feb. 3, 1976 | Nov. 30, 1976 | B 456,069 | 3,998,991 | Mar. 9, 1976 | Dec. 21, 1976 |
| B 434,441 | D 242,849 | Mar. 16, 1976 | Dec. 28, 1976 | B 456,148 | 3,984,269 | Jan. 13, 1976 | Oct. 5, 1976 |
| B 435,481 | 4,000,892 | Mar. 9, 1976 | Jan. 4, 1977 | B 456,153 | 3,997,992 | Mar. 9, 1976 | Dec. 21, 1976 |
| B 435,570 | 4,000,908 | Mar. 16, 1976 | Jan. 4, 1977 | B 456,384 | 4,014,859 | Apr. 6, 1976 | Mar. 29, 1977 |
| B 435,617 | 4,001,234 | Mar. 16, 1976 | Jan. 4, 1977 | B 456,579 | 3,993,715 | Feb. 10, 1976 | Nov. 23, 1976 |
| B 436,724 | 3,991,856 | Feb. 24, 1976 | Nov. 16, 1976 | B 456,869 | 4,001,277 | Mar. 9, 1976 | Jan. 4, 1977 |
| B 437,209 | 4,001,193 | Feb. 3, 1976 | Jan. 4, 1977 | B 456,900 | 3,996,262 | Feb. 3, 1976 | Dec. 7, 1976 |
| B 437,559 | 3,993,287 | Feb. 3, 1976 | Nov. 23, 1976 | B 456,905 | 4,013,431 | Mar. 23, 1976 | Mar. 22, 1977 |
| B 437,596 | 3,985,638 | Jan. 27, 1976 | Oct. 12, 1976 | B 457,547 | 3,996,397 | Feb. 17, 1976 | Dec. 7, 1976 |
| B 437,894 | 4,001,015 | Mar. 2, 1976 | Jan. 4, 1977 | B 457,850 | 3,993,586 | Feb. 10, 1976 | Nov. 23, 1976 |
| B 437,986 | 4,011,399 | Apr. 20, 1976 | Mar. 8, 1977 | B 457,862 | 3,987,195 | Jan. 27, 1976 | Oct. 19, 1976 |
| B 438,048 | 4,001,394 | Mar. 23, 1976 | Jan. 4, 1977 | B 457,886 | 3,988,498 | Jan. 13, 1976 | Oct. 26, 1976 |
| B 438,484 | 3,992,451 | Feb. 17, 1976 | Nov. 16, 1976 | B 457,931 | 4,001,229 | Mar. 16, 1976 | Jan. 4, 1977 |
| B 438,882 | 3,983,719 | Feb. 24, 1976 | Oct. 5, 1976 | B 458,500 | 3,997,805 | Feb. 24, 1976 | Dec. 14, 1976 |
| B 438,916 | 3,983,050 | Jan. 13, 1976 | Sep. 28, 1976 | B 458,617 | 3,984,422 | Feb. 3, 1976 | Oct. 5, 1976 |
| B 439,542 | 3,982,199 | Jan. 27, 1976 | Sep. 21, 1976 | B 458,964 | 3,996,615 | Mar. 2, 1976 | Dec. 7, 1976 |
| B 439,778 | 4,001,455 | Feb. 3, 1976 | Jan. 4, 1977 | B 459,190 | 4,010,786 | Mar. 30, 1976 | Mar. 8, 1977 |
| B 440,548 | 4,001,271 | Mar. 16, 1976 | Jan. 4, 1977 | B 459,381 | 4,000,017 | Mar. 9, 1976 | Dec. 28, 1976 |



CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

| DOCUMENT NUMBER | PATENT NUMBER | PUB. DATE | ISSUE DATE | DOCUMENT NUMBER | PATENT NUMBER | PUB. DATE | ISSUE DATE |
|---|---|---|---|---|---|---|---|
| B 459,408 | 4,018,890 | Mar. 23, 1976 | Apr. 19, 1977 | B 475,681 | 3,983,332 | Jan. 20, 1976 | Sep. 28, 1976 |
| B 459,597 | 3,996,711 | Feb. 17, 1976 | Dec. 14, 1976 | B 476,267 | 4,005,068 | Apr. 6, 1976 | Jan. 25, 1977 |
| B 459,811 | 3,982,173 | Jan. 20, 1976 | Sep. 21, 1976 | B 476,372 | 3,985,771 | Feb. 24, 1976 | Oct. 12, 1976 |
| B 459,821 | 4,005,954 | Mar. 30, 1976 | Feb. 1, 1977 | B 476,542 | 4,013,549 | Mar. 30, 1976 | Mar. 22, 1977 |
| B 460,388 | 3,989,448 | Jan. 27, 1976 | Nov. 2, 1976 | B 476,568 | 3,999,456 | Mar. 16, 1976 | Dec. 28, 1976 |
| B 460,441 | 3,981,828 | Jan. 13, 1976 | Sep. 21, 1976 | B 476,577 | 3,982,070 | Jan. 20, 1976 | Sep. 21, 1976 |
| B 460,846 | 3,985,817 | Feb. 24, 1976 | Oct. 12, 1976 | B 476,681 | 3,986,181 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 461,184 | 3,992,482 | Feb. 17, 1976 | Nov. 16, 1976 | B 476,776 | 3,998,715 | Mar. 23, 1976 | Dec. 21, 1976 |
| B 461,250 | 4,000,768 | Mar. 16, 1976 | Jan. 4, 1977 | B 476,967 | 3,995,206 | Mar. 9, 1976 | Nov. 30, 1976 |
| B 461,336 | 3,982,231 | Feb. 3, 1976 | Sep. 21, 1976 | B 477,252 | 3,985,759 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 461,352 | 3,981,681 | Jan. 13, 1976 | Sep. 21, 1976 | B 477,481 | 3,991,076 | Feb. 3, 1976 | Nov. 9, 1976 |
| B 461,685 | 4,013,661 | Mar. 30, 1976 | Mar. 22, 1977 | B 477,584 | D 242,855 | Apr. 6, 1976 | Dec. 28, 1976 |
| B 461,752 | 4,016,541 | Apr. 20, 1976 | Apr. 5, 1977 | B 477,597 | 3,993,912 | Feb. 17, 1976 | Nov. 23, 1976 |
| B 461,874 | 3,982,276 | Jan. 27, 1976 | Sep. 21, 1976 | B 477,892 | 4,010,355 | Mar. 30, 1976 | Mar. 1, 1977 |
| B 462,030 | 4,009,342 | Mar. 23, 1976 | Feb. 22, 1977 | B 478,234 | 4,010,421 | Mar. 30, 1976 | Mar. 1, 1977 |
| B 462,386 | 3,988,188 | Jan. 13, 1976 | Oct. 26, 1976 | B 478,739 | 3,992,253 | Feb. 17, 1976 | Nov. 16, 1976 |
| B 462,424 | 3,989,602 | Feb. 24, 1976 | Nov. 2, 1976 | B 479,175 | 3,985,700 | Feb. 17, 1976 | Oct. 12, 1976 |
| B 462,828 | 3,998,395 | Mar. 9, 1976 | Dec. 21, 1976 | B 479,242 | 3,983,074 | Feb. 17, 1976 | Sep. 28, 1976 |
| B 462,893 | 3,984,253 | Feb. 24, 1976 | Oct. 5, 1976 | B 479,502 | 3,999,030 | Mar. 16, 1976 | Dec. 21, 1976 |
| B 463,322 | 3,989,982 | Jan. 20, 1976 | Nov. 2, 1976 | B 479,681 | D 242,672 | Mar. 16, 1976 | Dec. 14, 1976 |
| B 463,388 | 3,992,605 | Feb. 10, 1976 | Nov. 16, 1976 | B 479,969 | 4,001,132 | Mar. 9, 1976 | Jan. 4, 1977 |
| B 463,473 | 4,002,068 | Mar. 23, 1976 | Jan. 11, 1977 | B 480,114 | 4,001,327 | Mar. 2, 1976 | Jan. 4, 1977 |
| B 463,591 | 4,015,051 | Mar. 30, 1976 | Mar. 29, 1977 | B 480,251 | 4,008,700 | Mar. 23, 1976 | Feb. 22, 1977 |
| B 463,671 | 3,985,385 | Jan. 13, 1976 | Oct. 12, 1976 | B 480,287 | 4,006,029 | Mar. 30, 1976 | Feb. 1, 1977 |
| B 464,027 | 3,999,390 | Mar. 16, 1976 | Dec. 28, 1976 | B 480,292 | 3,994,011 | Mar. 16, 1976 | Nov. 23, 1976 |
| B 464,290 | 3,990,307 | Feb. 3, 1976 | Nov. 9, 1976 | B 480,350 | 3,994,164 | Feb. 10, 1976 | Nov. 30, 1976 |
| B 464,491 | 4,015,612 | Mar. 30, 1976 | Apr. 5, 1977 | B 480,384 | 3,999,737 | Mar. 23, 1976 | Dec. 28, 1976 |
| B 464,587 | 3,991,091 | Feb. 3, 1976 | Nov. 9, 1976 | B 480,452 | 3,994,923 | Feb. 10, 1976 | Nov. 30, 1976 |
| B 464,593 | 3,997,659 | Mar. 9, 1976 | Dec. 14, 1976 | B 480,473 | 3,995,608 | Mar. 2, 1976 | Dec. 7, 1976 |
| B 465,145 | 3,981,148 | Jan. 27, 1976 | Sep. 21, 1976 | B 480,604 | 3,985,251 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 465,202 | 3,989,757 | Feb. 24, 1976 | Nov. 2, 1976 | B 480,625 | 3,996,227 | Feb. 24, 1976 | Dec. 7, 1976 |
| B 465,393 | 3,987,390 | Jan. 27, 1976 | Oct. 19, 1976 | B 480,662 | 3,988,382 | Mar. 2, 1976 | Oct. 26, 1976 |
| B 465,688 | 3,989,770 | Jan. 27, 1976 | Nov. 2, 1976 | B 480,740 | 3,996,431 | Mar. 2, 1976 | Dec. 7, 1976 |
| B 465,955 | 3,997,502 | Feb. 3, 1976 | Dec. 14, 1976 | B 480,749 | 3,999,207 | Mar. 9, 1976 | Dec. 21, 1976 |
| B 466,304 | 4,007,095 | Mar. 23, 1976 | Feb. 8, 1977 | B 480,987 | 4,001,459 | Mar. 30, 1976 | Jan. 4, 1977 |
| B 466,318 | 3,999,115 | Mar. 9, 1976 | Dec. 21, 1976 | B 481,048 | 3,998,542 | Mar. 16, 1976 | Dec. 21, 1976 |
| B 466,390 | 3,983,349 | Feb. 24, 1976 | Sep. 28, 1976 | B 481,190 | 4,013,468 | Mar. 30, 1976 | Mar. 22, 1977 |
| B 466,419 | 4,011,087 | Mar. 23, 1976 | Mar. 8, 1977 | B 481,600 | 3,981,235 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 466,444 | 3,986,039 | Jan. 20, 1976 | Oct. 12, 1976 | B 481,737 | 3,982,057 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 466,906 | 3,993,037 | Mar. 16, 1976 | Nov. 23, 1976 | B 481,778 | 4,001,385 | Mar. 30, 1976 | Jan. 4, 1977 |
| B 466,929 | 3,991,195 | Jan. 27, 1976 | Nov. 9, 1976 | B 481,930 | 3,992,717 | Feb. 24, 1976 | Nov. 16, 1976 |
| B 467,250 | 3,997,428 | Feb. 3, 1976 | Dec. 14, 1976 | B 481,989 | 4,008,337 | Mar. 23, 1976 | Feb. 15, 1977 |
| B 467,328 | 3,997,599 | Mar. 9, 1976 | Dec. 14, 1976 | B 482,058 | 4,001,398 | Mar. 2, 1976 | Jan. 4, 1977 |
| B 467,412 | 3,981,265 | Jan. 13, 1976 | Sep. 21, 1976 | B 482,660 | 3,995,026 | Feb. 10, 1976 | Nov. 30, 1976 |
| B 467,486 | 3,991,725 | Mar. 16, 1976 | Nov. 16, 1976 | B 482,709 | 3,985,733 | Feb. 24, 1976 | Oct. 12, 1976 |
| B 467,971 | 3,983,453 | Jan. 13, 1976 | Sep. 28, 1976 | B 482,907 | 3,984,811 | Jan. 20, 1976 | Oct. 5, 1976 |
| B 468,052 | 3,988,335 | Feb. 10, 1976 | Oct. 26, 1976 | B 483,247 | 4,001,889 | Apr. 13, 1976 | Jan. 4, 1977 |
| B 468,100 | 3,995,107 | Mar. 9, 1976 | Nov. 30, 1976 | B 483,256 | 3,981,723 | Feb. 10, 1976 | Sep. 21, 1976 |
| B 468,330 | 4,001,475 | Mar. 16, 1976 | Jan. 4, 1977 | B 483,268 | 3,995,215 | Mar. 9, 1976 | Nov. 30, 1976 |
| B 468,350 | 3,981,922 | Jan. 13, 1976 | Sep. 21, 1976 | B 483,606 | 3,986,990 | Jan. 27, 1976 | Oct. 19, 1976 |
| B 468,421 | 4,014,739 | Mar. 30, 1976 | Mar. 29, 1977 | B 483,615 | 3,988,637 | Jan. 27, 1976 | Oct. 26, 1976 |
| B 468,603 | 4,003,839 | Mar. 23, 1976 | Jan. 18, 1977 | B 483,746 | 4,014,923 | Mar. 23, 1976 | Mar. 29, 1977 |
| B 469,036 | 4,005,926 | Mar. 16, 1976 | Feb. 1, 1977 | B 483,762 | 3,993,608 | Feb. 10, 1976 | Nov. 23, 1976 |
| B 469,468 | 4,000,220 | Mar. 16, 1976 | Dec. 28, 1976 | B 483,865 | 3,985,693 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 469,947 | 3,984,153 | Jan. 20, 1976 | Oct. 5, 1976 | B 484,029 | 3,983,558 | Feb. 10, 1976 | Sep. 28, 1976 |
| B 470,170 | 3,986,410 | Jan. 13, 1976 | Oct. 19, 1976 | B 484,067 | 3,992,374 | Feb. 17, 1976 | Nov. 16, 1976 |
| B 470,305 | 4,014,043 | Apr. 6, 1976 | Mar. 22, 1977 | B 484,068 | 3,994,937 | Mar. 2, 1976 | Nov. 30, 1976 |
| B 470,348 | 3,981,929 | Jan. 13, 1976 | Sep. 21, 1976 | B 484,121 | 3,997,770 | Mar. 16, 1976 | Dec. 14, 1976 |
| B 470,576 | 3,997,507 | Feb. 24, 1976 | Dec. 14, 1976 | B 484,269 | 4,000,159 | Feb. 10, 1976 | Dec. 28, 1976 |
| B 470,601 | 3,985,655 | Mar. 9, 1976 | Oct. 12, 1976 | B 484,332 | 3,986,540 | Mar. 2, 1976 | Oct. 19, 1976 |
| B 470,798 | 3,987,480 | Jan. 20, 1976 | Oct. 19, 1976 | B 484,365 | 3,983,578 | Jan. 27, 1976 | Sep. 28, 1976 |
| B 470,853 | 4,002,101 | Mar. 23, 1976 | Jan. 11, 1977 | B 484,419 | 4,001,292 | Mar. 9, 1976 | Jan. 4, 1977 |
| B 470,899 | 3,996,441 | Mar. 2, 1976 | Dec. 7, 1976 | B 484,437 | 4,013,740 | Mar. 30, 1976 | Mar. 22, 1977 |
| B 470,900 | 4,001,213 | Mar. 2, 1976 | Jan. 4, 1977 | B 484,482 | 3,994,017 | Mar. 23, 1976 | Nov. 23, 1976 |
| B 470,945 | 4,014,848 | Apr. 13, 1976 | Mar. 29, 1977 | B 484,769 | 3,999,498 | Mar. 16, 1976 | Dec. 28, 1976 |
| B 471,116 | 4,001,318 | Feb. 17, 1976 | Jan. 4, 1977 | B 485,051 | 3,992,418 | Feb. 17, 1976 | Nov. 16, 1976 |
| B 471,221 | 3,981,974 | Jan. 13, 1976 | Sep. 21, 1976 | B 485,060 | 3,983,067 | Feb. 17, 1976 | Sep. 28, 1976 |
| B 471,405 | 3,993,576 | Feb. 10, 1976 | Nov. 23, 1976 | B 485,169 | 3,989,791 | Mar. 16, 1976 | Nov. 2, 1976 |
| B 471,494 | 3,993,660 | Mar. 16, 1976 | Nov. 23, 1976 | B 485,188 | 4,001,170 | Mar. 16, 1976 | Jan. 4, 1977 |
| B 471,579 | 3,985,689 | Jan. 13, 1976 | Oct. 12, 1976 | B 485,401 | 3,985,859 | Jan. 27, 1976 | Oct. 12, 1976 |
| B 471,617 | 3,994,871 | Feb. 10, 1976 | Nov. 30, 1976 | B 485,575 | 3,996,565 | Feb. 24, 1976 | Dec. 7, 1976 |
| B 471,681 | 4,012,844 | Apr. 13, 1976 | Mar. 22, 1977 | B 485,926 | 4,006,357 | Mar. 23, 1976 | Feb. 1, 1977 |
| B 471,735 | 3,989,408 | Feb. 3, 1976 | Nov. 2, 1976 | B 485,972 | 4,017,472 | Mar. 23, 1976 | Apr. 12, 1977 |
| B 471,836 | 4,000,150 | Feb. 24, 1976 | Dec. 28, 1976 | B 486,280 | 3,983,130 | Feb. 3, 1976 | Sep. 28, 1976 |
| B 472,241 | 3,992,453 | Feb. 17, 1976 | Nov. 16, 1976 | B 486,614 | 3,995,835 | Feb. 17, 1976 | Dec. 7, 1976 |
| B 472,256 | 3,985,789 | Jan. 13, 1976 | Oct. 12, 1976 | B 486,678 | 4,001,273 | Mar. 2, 1976 | Jan. 4, 1977 |
| B 472,284 | 3,982,078 | Jan. 13, 1976 | Sep. 21, 1976 | B 486,828 | 3,989,651 | Mar. 2, 1976 | Nov. 2, 1976 |
| B 472,591 | 4,013,029 | Apr. 6, 1976 | Mar. 22, 1977 | B 487,062 | D 241,256 | Feb. 10, 1976 | Nov. 9, 1976 |
| B 472,760 | 4,001,330 | Apr. 13, 1976 | Jan. 4, 1977 | B 487,078 | 4,012,895 | Mar. 30, 1976 | Mar. 22, 1977 |
| B 473,039 | 3,985,747 | Feb. 10, 1976 | Oct. 12, 1976 | B 487,133 | 3,989,826 | Jan. 27, 1976 | Nov. 2, 1976 |
| B 473,040 | 3,985,738 | Feb. 10, 1976 | Oct. 12, 1976 | B 487,260 | 3,990,610 | Jan. 27, 1976 | Nov. 9, 1976 |
| B 473,813 | 3,989,071 | Mar. 9, 1976 | Nov. 2, 1976 | B 487,411 | 3,983,579 | Feb. 24, 1976 | Sep. 28, 1976 |
| B 473,972 | 3,984,043 | Jan. 13, 1976 | Oct. 5, 1976 | B 487,423 | 3,998,810 | Mar. 2, 1976 | Dec. 21, 1976 |
| B 474,573 | 3,988,375 | Jan. 20, 1976 | Oct. 26, 1976 | B 487,427 | 3,995,788 | Mar. 2, 1976 | Dec. 7, 1976 |
| B 474,747 | 3,997,704 | Feb. 24, 1976 | Dec. 14, 1976 | B 487,467 | 4,014,847 | Apr. 13, 1976 | Mar. 29, 1977 |
| B 475,236 | 3,989,990 | Feb. 3, 1976 | Nov. 2, 1976 | B 488,111 | 3,985,765 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 475,385 | 4,001,071 | Mar. 9, 1976 | Jan. 4, 1977 | B 488,395 | 3,982,245 | Jan. 27, 1976 | Sep. 21, 1976 |

# CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

| DOCUMENT NUMBER | PATENT NUMBER | PUB. DATE | ISSUE DATE |
|---|---|---|---|
| B 488,634 | 3,982,158 | Jan. 20, 1976 | Sep. 21, 1976 |
| B 488,756 | 3,991,810 | Mar. 16, 1976 | Nov. 16, 1976 |
| B 488,836 | 4,013,121 | Mar. 30, 1976 | Mar. 22, 1977 |
| B 489,290 | 3,998,081 | Feb. 17, 1976 | Dec. 21, 1976 |
| B 489,328 | 3,990,088 | Jan. 20, 1976 | Nov. 2, 1976 |
| B 489,331 | 3,996,175 | Feb. 17, 1976 | Dec. 7, 1976 |
| B 489,485 | D 243,266 | Apr. 13, 1976 | Feb. 1, 1977 |
| B 489,550 | 4,000,710 | Mar. 16, 1976 | Jan. 4, 1977 |
| B 489,685 | 3,984,085 | Feb. 24, 1976 | Oct. 5, 1976 |
| B 490,067 | 3,986,600 | Jan. 27, 1976 | Oct. 19, 1976 |
| B 490,547 | 3,999,439 | Feb. 24, 1976 | Dec. 28, 1976 |
| B 490,551 | D 243,168 | Apr. 6, 1976 | Jan. 25, 1977 |
| B 490,589 | 3,990,680 | Feb. 3, 1976 | Nov. 9, 1976 |
| B 490,623 | 3,996,964 | Mar. 2, 1976 | Dec. 14, 1976 |
| B 490,647 | 3,985,196 | Feb. 24, 1976 | Oct. 12, 1976 |
| B 490,806 | 3,989,486 | Feb. 3, 1976 | Nov. 2, 1976 |
| B 490,812 | 3,998,842 | Mar. 30, 1976 | Dec. 21, 1976 |
| B 490,946 | 3,993,652 | Feb. 17, 1976 | Nov. 23, 1976 |
| B 490,995 | 3,995,031 | Feb. 3, 1976 | Nov. 30, 1976 |
| B 491,032 | 3,981,892 | Feb. 10, 1976 | Sep. 21, 1976 |
| B 491,052 | 3,985,790 | Mar. 2, 1976 | Oct. 12, 1976 |
| B 491,111 | 3,997,916 | Feb. 17, 1976 | Dec. 14, 1976 |
| B 491,455 | 3,991,167 | Feb. 3, 1976 | Nov. 9, 1976 |
| B 491,501 | 3,984,914 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 491,618 | 4,007,950 | Mar. 16, 1976 | Feb. 15, 1977 |
| B 491,650 | 3,999,044 | Mar. 9, 1976 | Dec. 21, 1976 |
| B 491,673 | 3,994,770 | Feb. 17, 1976 | Nov. 30, 1976 |
| B 491,776 | 3,986,298 | Mar. 16, 1976 | Oct. 19, 1976 |
| B 491,883 | 3,984,412 | Feb. 3, 1976 | Oct. 5, 1976 |
| B 491,906 | D 242,223 | Feb. 10, 1976 | Nov. 9, 1976 |
| B 492,039 | 3,997,541 | Feb. 24, 1976 | Dec. 14, 1976 |
| B 492,093 | 4,003,658 | Mar. 23, 1976 | Jan. 18, 1977 |
| B 492,120 | 3,995,692 | Feb. 24, 1976 | Dec. 7, 1976 |
| B 492,301 | 3,981,073 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 492,373 | 4,010,908 | Mar. 30, 1976 | Mar. 8, 1977 |
| B 492,688 | 3,983,415 | Jan. 20, 1976 | Sep. 28, 1976 |
| B 492,716 | 3,998,739 | Mar. 2, 1976 | Dec. 21, 1976 |
| B 492,774 | 4,001,843 | Mar. 9, 1976 | Jan. 4, 1977 |
| B 492,902 | 3,993,859 | Feb. 24, 1976 | Nov. 23, 1976 |
| B 492,946 | 3,991,303 | Jan. 27, 1976 | Nov. 9, 1976 |
| B 493,254 | D 243,267 | Apr. 13, 1976 | Feb. 1, 1977 |
| B 493,370 | 3,984,792 | Mar. 16, 1976 | Oct. 5, 1976 |
| B 493,463 | 4,013,510 | Mar. 23, 1976 | Mar. 22, 1977 |
| B 493,474 | 4,013,565 | Mar. 23, 1976 | Mar. 22, 1977 |
| B 493,501 | 3,988,061 | Feb. 3, 1976 | Oct. 26, 1976 |
| B 493,686 | 4,008,338 | Mar. 23, 1976 | Feb. 15, 1977 |
| B 493,955 | 3,989,830 | Mar. 9, 1976 | Nov. 2, 1976 |
| B 493,981 | 3,990,165 | Mar. 9, 1976 | Nov. 9, 1976 |
| B 494,234 | 3,983,808 | Feb. 10, 1976 | Oct. 5, 1976 |
| B 494,339 | 4,001,255 | Mar. 16, 1976 | Jan. 4, 1977 |
| B 494,383 | 3,991,289 | Feb. 3, 1976 | Nov. 9, 1976 |
| B 494,669 | 3,991,104 | Feb. 3, 1976 | Nov. 9, 1976 |
| B 494,691 | 3,987,457 | Mar. 16, 1976 | Oct. 19, 1976 |
| B 494,806 | 3,989,210 | Feb. 3, 1976 | Nov. 2, 1976 |
| B 494,944 | 3,992,469 | Feb. 17, 1976 | Nov. 16, 1976 |
| B 495,185 | 3,999,166 | Mar. 9, 1976 | Dec. 21, 1976 |
| B 495,331 | 4,000,456 | Mar. 16, 1976 | Dec. 28, 1976 |
| B 495,402 | 3,983,988 | Feb. 17, 1976 | Oct. 5, 1976 |
| B 495,408 | 4,000,222 | Feb. 3, 1976 | Dec. 28, 1976 |
| B 495,489 | 3,984,571 | Feb. 3, 1976 | Oct. 5, 1976 |
| B 495,550 | 3,993,666 | Feb. 3, 1976 | Nov. 23, 1976 |
| B 495,554 | 3,993,665 | Feb. 3, 1976 | Nov. 23, 1976 |
| B 495,759 | 3,989,998 | Feb. 3, 1976 | Nov. 2, 1976 |
| B 495,781 | 4,013,699 | Mar. 23, 1976 | Mar. 22, 1977 |
| B 495,903 | 3,995,997 | Feb. 17, 1976 | Dec. 7, 1976 |
| B 496,430 | 3,991,140 | Feb. 10, 1976 | Nov. 9, 1976 |
| B 496,431 | 3,985,894 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 496,487 | 3,982,261 | Jan. 20, 1976 | Sep. 21, 1976 |
| B 496,500 | 3,985,962 | Feb. 3, 1976 | Oct. 12, 1976 |
| B 496,502 | 3,987,444 | Jan. 20, 1976 | Oct. 19, 1976 |
| B 496,792 | 3,999,959 | Feb. 17, 1976 | Dec. 28, 1976 |
| B 496,964 | 3,999,219 | Apr. 20, 1976 | Dec. 21, 1976 |
| B 496,999 | 3,983,804 | Jan. 27, 1976 | Oct. 5, 1976 |
| B 497,021 | 3,985,039 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 497,194 | 3,988,267 | Feb. 3, 1976 | Oct. 26, 1976 |
| B 497,292 | 3,994,052 | Feb. 3, 1976 | Nov. 30, 1976 |
| B 497,293 | 4,011,412 | Mar. 30, 1976 | Mar. 8, 1977 |
| B 497,473 | 3,990,839 | Feb. 3, 1976 | Nov. 9, 1976 |
| B 497,571 | 4,009,997 | Mar. 23, 1976 | Mar. 1, 1977 |
| B 497,584 | 3,988,184 | Feb. 24, 1976 | Oct. 26, 1976 |
| B 497,702 | 3,996,589 | Mar. 2, 1976 | Dec. 7, 1976 |
| B 497,780 | 3,997,500 | Feb. 24, 1976 | Dec. 14, 1976 |
| B 497,853 | 3,987,934 | Feb. 17, 1976 | Oct. 26, 1976 |
| B 497,896 | D 243,091 | Apr. 6, 1976 | Jan. 18, 1977 |
| B 497,960 | 3,991,325 | Jan. 20, 1976 | Nov. 9, 1976 |
| B 498,208 | 4,001,480 | Apr. 13, 1976 | Jan. 4, 1977 |
| B 498,288 | 4,013,657 | Mar. 23, 1976 | Mar. 22, 1977 |
| B 498,775 | 3,993,868 | Mar. 2, 1976 | Nov. 23, 1976 |
| B 498,205 | 3,989,611 | Feb. 10, 1976 | Nov. 2, 1976 |
| B 498,500 | 3,982,241 | Jan. 20, 1976 | Sep. 21, 1976 |
| B 498,775 | 3,993,868 | Mar. 2, 1976 | Nov. 23, 1976 |
| B 498,820 | 3,996,670 | Mar. 9, 1976 | Dec. 14, 1976 |
| B 498,951 | 3,996,907 | Mar. 2, 1976 | Dec. 14, 1976 |
| B 499,171 | 3,985,192 | Jan. 27, 1976 | Oct. 12, 1976 |
| B 499,209 | 3,995,907 | Feb. 24, 1976 | Dec. 7, 1976 |
| B 499,227 | 3,981,344 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 499,324 | 4,001,375 | Mar. 16, 1976 | Jan. 4, 1977 |
| B 499,352 | 3,981,391 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 499,370 | 4,013,544 | Mar. 30, 1976 | Mar. 22, 1977 |
| B 499,718 | 3,990,058 | Jan. 27, 1976 | Nov. 2, 1976 |
| B 499,786 | 4,000,663 | Mar. 16, 1976 | Jan. 4, 1977 |
| B 500,171 | 3,997,262 | Mar. 30, 1976 | Dec. 14, 1976 |
| B 500,176 | 3,995,316 | Feb. 3, 1976 | Nov. 30, 1976 |
| B 500,408 | D 242,721 | Mar. 16, 1976 | Dec. 14, 1976 |
| B 500,945 | 3,996,817 | Feb. 24, 1976 | Dec. 14, 1976 |
| B 500,959 | 4,014,853 | Apr. 13, 1976 | Mar. 29, 1977 |
| B 500,981 | 3,984,681 | Jan. 27, 1976 | Oct. 5, 1976 |
| B 501,122 | 3,981,385 | Feb. 17, 1976 | Sep. 21, 1976 |
| B 501,181 | 3,984,761 | Feb. 10, 1976 | Oct. 5, 1976 |
| B 501,253 | 3,994,015 | Feb. 3, 1976 | Nov. 23, 1976 |
| B 501,317 | 3,985,643 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 501,379 | 4,013,696 | Mar. 30, 1976 | Mar. 22, 1977 |
| B 501,415 | 3,982,051 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 501,482 | 4,012,650 | Jan. 13, 1976 | Mar. 15, 1977 |
| B 501,503 | 4,001,640 | Mar. 2, 1976 | Jan. 4, 1977 |
| B 501,540 | 3,985,694 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 501,975 | 3,998,466 | Mar. 2, 1976 | Dec. 21, 1976 |
| B 501,993 | 3,981,606 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 502,151 | 3,998,614 | Mar. 23, 1976 | Dec. 21, 1976 |
| B 502,161 | 4,000,500 | Mar. 2, 1976 | Dec. 28, 1976 |
| B 502,289 | 3,982,274 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 502,381 | D 242,231 | Mar. 16, 1976 | Nov. 9, 1976 |
| B 502,540 | 3,983,698 | Jan. 13, 1976 | Oct. 5, 1976 |
| B 502,571 | D 242,433 | Apr. 6, 1976 | Nov. 23, 1976 |
| B 502,589 | 3,989,652 | Jan. 27, 1976 | Nov. 2, 1976 |
| B 502,652 | 3,989,186 | Feb. 24, 1976 | Nov. 2, 1976 |
| B 502,667 | 3,991,431 | Feb. 24, 1976 | Nov. 16, 1976 |
| B 502,973 | 3,982,161 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 502,993 | 3,992,489 | Feb. 17, 1976 | Nov. 16, 1976 |
| B 503,029 | 3,986,879 | Jan. 27, 1976 | Oct. 19, 1976 |
| B 503,345 | 4,001,235 | Feb. 24, 1976 | Jan. 4, 1977 |
| B 503,371 | 4,009,401 | Mar. 30, 1976 | Feb. 22, 1977 |
| B 503,436 | 3,988,819 | Feb. 24, 1976 | Nov. 2, 1976 |
| B 503,456 | 4,007,702 | Mar. 23, 1976 | Feb. 15, 1977 |
| B 503,521 | 3,999,646 | Mar. 16, 1976 | Dec. 28, 1976 |
| B 503,579 | 3,989,680 | Feb. 10, 1976 | Nov. 2, 1976 |
| B 503,618 | 3,997,782 | Mar. 9, 1976 | Dec. 14, 1976 |
| B 503,742 | 3,989,756 | Feb. 17, 1976 | Nov. 2, 1976 |
| B 503,776 | 4,016,000 | Mar. 23, 1976 | Apr. 5, 1977 |
| B 503,780 | 3,990,055 | Mar. 16, 1976 | Nov. 2, 1976 |
| B 503,817 | 3,988,307 | Jan. 13, 1976 | Oct. 26, 1976 |
| B 504,056 | 3,993,923 | Feb. 24, 1976 | Nov. 23, 1976 |
| B 504,061 | 3,987,534 | Mar. 16, 1976 | Oct. 26, 1976 |
| B 504,156 | 3,999,048 | Mar. 23, 1976 | Dec. 21, 1976 |
| B 504,169 | 3,981,219 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 504,404 | 3,996,499 | Feb. 24, 1976 | Dec. 7, 1976 |
| B 504,405 | 4,007,401 | Apr. 13, 1976 | Feb. 8, 1977 |
| B 504,439 | 3,999,398 | Mar. 16, 1976 | Dec. 28, 1976 |
| B 504,503 | 3,999,210 | Mar. 9, 1976 | Dec. 21, 1976 |
| B 504,582 | 4,005,138 | Mar. 30, 1976 | Jan. 25, 1977 |
| B 504,778 | 3,986,650 | Feb. 24, 1976 | Oct. 19, 1976 |
| B 504,877 | 3,997,564 | Feb. 24, 1976 | Dec. 14, 1976 |
| B 504,899 | 3,991,273 | Mar. 9, 1976 | Nov. 9, 1976 |
| B 505,126 | 3,981,745 | Feb. 10, 1976 | Sep. 21, 1976 |
| B 505,221 | 4,013,627 | Mar. 30, 1976 | Mar. 22, 1977 |
| B 505,582 | 4,001,659 | Mar. 23, 1976 | Jan. 4, 1977 |
| B 505,689 | 3,987,631 | Mar. 2, 1976 | Oct. 26, 1976 |
| B 505,813 | 3,985,175 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 506,144 | 3,991,147 | Feb. 10, 1976 | Nov. 9, 1976 |
| B 506,148 | 3,988,319 | Feb. 3, 1976 | Oct. 26, 1976 |
| B 506,167 | 3,990,652 | Feb. 10, 1976 | Nov. 9, 1976 |
| B 506,286 | 3,982,085 | Jan. 20, 1976 | Sep. 21, 1976 |
| B 506,461 | 3,987,348 | Jan. 20, 1976 | Oct. 19, 1976 |
| B 506,566 | 3,985,402 | Jan. 20, 1976 | Oct. 12, 1976 |
| B 506,624 | 3,999,695 | Mar. 9, 1976 | Dec. 28, 1976 |
| B 506,648 | 3,994,857 | Feb. 3, 1976 | Nov. 30, 1976 |
| B 506,744 | 3,981,176 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 506,760 | 4,012,835 | Apr. 13, 1976 | Mar. 22, 1977 |
| B 506,839 | 4,005,389 | Mar. 23, 1976 | Jan. 25, 1977 |
| B 506,840 | 4,002,928 | Mar. 23, 1976 | Jan. 11, 1977 |
| B 506,916 | 3,986,140 | Feb. 3, 1976 | Oct. 12, 1976 |
| B 506,926 | 3,993,232 | Feb. 17, 1976 | Nov. 23, 1976 |
| B 507,087 | 3,991,389 | Feb. 17, 1976 | Nov. 9, 1976 |
| B 507,131 | 4,000,499 | Mar. 2, 1976 | Dec. 28, 1976 |



CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

| DOCUMENT NUMBER | PATENT NUMBER | PUB. DATE | ISSUE DATE |
|---|---|---|---|
| B 507,166 | 4,014,738 | Apr. 13, 1976 | Mar. 29, 1977 |
| B 507,396 | 3,995,167 | Feb. 10, 1976 | Nov. 30, 1976 |
| B 507,476 | 3,994,680 | Feb. 10, 1976 | Nov. 30, 1976 |
| B 507,647 | 3,982,240 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 508,118 | 3,992,283 | Feb. 17, 1976 | Nov. 16, 1976 |
| B 508,119 | 3,992,285 | Feb. 17, 1976 | Nov. 16, 1976 |
| B 508,369 | 3,985,847 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 508,639 | 4,004,194 | Mar. 23, 1976 | Jan. 18, 1977 |
| B 508,817 | 3,989,891 | Feb. 3, 1976 | Nov. 2, 1976 |
| B 508,878 | 3,994,117 | Feb. 3, 1976 | Nov. 30, 1976 |
| B 508,940 | 3,981,321 | Feb. 17, 1976 | Sep. 21, 1976 |
| B 508,961 | 3,987,477 | Feb. 3, 1976 | Oct. 19, 1976 |
| B 509,043 | 3,996,767 | Feb. 24, 1976 | Dec. 14, 1976 |
| B 509,165 | 3,999,155 | Mar. 2, 1976 | Dec. 21, 1976 |
| B 509,185 | 3,989,996 | Feb. 3, 1976 | Nov. 2, 1976 |
| B 509,238 | 3,982,399 | Feb. 24, 1976 | Sep. 28, 1976 |
| B 509,474 | 3,997,260 | Feb. 17, 1976 | Dec. 14, 1976 |
| B 509,586 | 4,006,645 | Feb. 3, 1976 | Feb. 8, 1977 |
| B 509,606 | 3,989,986 | Feb. 3, 1976 | Nov. 2, 1976 |
| B 509,772 | 3,999,004 | Mar. 16, 1976 | Dec. 21, 1976 |
| B 509,819 | 4,014,712 | Apr. 13, 1976 | Mar. 29, 1977 |
| B 510,026 | 4,016,763 | Apr. 13, 1976 | Apr. 12, 1977 |
| B 510,184 | D 242,784 | Apr. 6, 1976 | Dec. 21, 1976 |
| B 510,278 | 4,008,972 | Mar. 30, 1976 | Feb. 22, 1977 |
| B 510,281 | 3,993,215 | Mar. 9, 1976 | Nov. 23, 1976 |
| B 510,346 | D 242,207 | Feb. 10, 1976 | Nov. 9, 1976 |
| B 510,458 | 4,000,221 | Feb. 10, 1976 | Dec. 28, 1976 |
| B 510,521 | 3,990,656 | Mar. 2, 1976 | Nov. 9, 1976 |
| B 510,588 | 3,981,539 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 510,677 | 3,989,541 | Feb. 24, 1976 | Nov. 2, 1976 |
| B 510,682 | 4,000,978 | Mar. 30, 1976 | Jan. 4, 1977 |
| B 510,836 | 4,013,795 | Mar. 23, 1976 | Mar. 22, 1977 |
| B 510,850 | 3,989,841 | Feb. 3, 1976 | Nov. 2, 1976 |
| B 510,855 | 3,981,059 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 511,907 | 3,999,622 | Mar. 30, 1976 | Dec. 28, 1976 |
| B 510,998 | 3,992,336 | Feb. 10, 1976 | Nov. 16, 1976 |
| B 511,002 | 3,998,717 | Mar. 2, 1976 | Dec. 21, 1976 |
| B 511,099 | 3,990,162 | Feb. 3, 1976 | Nov. 9, 1976 |
| B 511,156 | 3,981,364 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 511,346 | 3,984,072 | Jan. 27, 1976 | Oct. 5, 1976 |
| B 511,407 | 3,981,485 | Feb. 10, 1976 | Sep. 21, 1976 |
| B 511,454 | 3,982,333 | Feb. 24, 1976 | Sep. 28, 1976 |
| B 511,665 | 4,001,037 | Mar. 2, 1976 | Jan. 4, 1977 |
| B 511,885 | 3,981,346 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 511,886 | 3,989,991 | Feb. 3, 1976 | Nov. 2, 1976 |
| B 511,909 | 3,981,183 | Feb. 17, 1976 | Sep. 21, 1976 |
| B 512,324 | 3,985,084 | Feb. 17, 1976 | Oct. 12, 1976 |
| B 512,547 | 3,984,193 | Jan. 13, 1976 | Oct. 5, 1976 |
| B 512,745 | 3,981,294 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 512,779 | 4,014,897 | Apr. 13, 1976 | Mar. 29, 1977 |
| B 512,818 | 3,997,363 | Apr. 6, 1976 | Dec. 14, 1976 |
| B 512,849 | 3,982,141 | Feb. 3, 1976 | Sep. 21, 1976 |
| B 512,964 | 3,995,279 | Feb. 10, 1976 | Nov. 30, 1976 |
| B 513,014 | 3,991,113 | Feb. 10, 1976 | Nov. 9, 1976 |
| B 513,027 | 3,995,143 | Feb. 17, 1976 | Nov. 30, 1976 |
| B 513,134 | 4,006,764 | Mar. 23, 1976 | Feb. 8, 1977 |
| B 513,280 | 3,988,211 | Jan. 20, 1976 | Oct. 26, 1976 |
| B 513,368 | 3,982,138 | Feb. 3, 1976 | Sep. 21, 1976 |
| B 513,706 | 3,986,064 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 513,756 | 3,993,869 | Feb. 3, 1976 | Nov. 23, 1976 |
| B 513,781 | 4,001,324 | Feb. 24, 1976 | Jan. 4, 1977 |
| B 513,789 | 3,981,599 | Feb. 3, 1976 | Sep. 21, 1976 |
| B 513,791 | 4,008,608 | Mar. 30, 1976 | Feb. 22, 1977 |
| B 514,259 | 4,013,649 | Mar. 23, 1976 | Mar. 22, 1977 |
| B 514,687 | 3,986,522 | Jan. 27, 1976 | Oct. 19, 1976 |
| B 515,135 | 3,990,085 | Feb. 17, 1976 | Nov. 2, 1976 |
| B 515,303 | 3,987,939 | Jan. 20, 1976 | Oct. 26, 1976 |
| B 515,368 | 4,014,733 | Apr. 6, 1976 | Mar. 29, 1977 |
| B 515,452 | 3,995,243 | Feb. 10, 1976 | Nov. 30, 1976 |
| B 515,455 | 3,982,149 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 515,642 | 4,001,258 | Feb. 24, 1976 | Jan. 4, 1977 |
| B 515,908 | 3,984,676 | Jan. 20, 1976 | Oct. 5, 1976 |
| B 516,002 | 3,988,638 | Jan. 13, 1976 | Oct. 26, 1976 |
| B 516,032 | 3,986,634 | Jan. 27, 1976 | Oct. 19, 1976 |
| B 516,047 | 3,985,741 | Feb. 10, 1976 | Oct. 12, 1976 |
| B 516,060 | 3,983,572 | Feb. 17, 1976 | Sep. 28, 1976 |
| B 516,069 | 3,986,208 | Mar. 16, 1976 | Oct. 12, 1976 |
| B 516,296 | 3,984,404 | Feb. 3, 1976 | Oct. 5, 1976 |
| B 516,537 | 3,996,784 | Feb. 17, 1976 | Dec. 14, 1976 |
| B 516,564 | 3,993,931 | Feb. 17, 1976 | Nov. 23, 1976 |
| B 516,609 | 3,994,486 | Feb. 24, 1976 | Nov. 30, 1976 |
| B 516,625 | 4,013,542 | Mar. 30, 1976 | Mar. 22, 1977 |
| B 516,804 | 3,991,209 | Mar. 23, 1976 | Nov. 9, 1976 |
| B 516,825 | 3,988,885 | Feb. 3, 1976 | Nov. 2, 1976 |
| B 517,273 | D 242,798 | Mar. 16, 1976 | Dec. 21, 1976 |
| B 517,504 | 3,999,855 | Mar. 9, 1976 | Dec. 28, 1976 |
| B 517,668 | 4,013,423 | Apr. 6, 1976 | Mar. 22, 1977 |
| B 517,762 | 3,986,065 | Mar. 16, 1976 | Oct. 12, 1976 |
| B 517,858 | 4,000,999 | Feb. 17, 1976 | Jan. 4, 1977 |
| B 517,956 | D 243,088 | Apr. 6, 1976 | Jan. 18, 1977 |
| B 517,957 | D 243,089 | Apr. 6, 1976 | Jan. 18, 1977 |
| B 518,076 | 4,014,914 | Mar. 30, 1976 | Mar. 29, 1977 |
| B 518,226 | 3,993,509 | Feb. 10, 1976 | Nov. 23, 1976 |
| B 518,326 | 4,008,282 | Mar. 23, 1976 | Feb. 15, 1977 |
| B 518,656 | 3,989,732 | Feb. 17, 1976 | Nov. 2, 1976 |
| B 518,859 | 3,989,971 | Feb. 3, 1976 | Nov. 2, 1976 |
| B 518,999 | 3,990,323 | Feb. 3, 1976 | Nov. 9, 1976 |
| B 519,095 | 3,993,621 | Feb. 24, 1976 | Nov. 23, 1976 |
| B 519,355 | 4,014,829 | Apr. 13, 1976 | Mar. 29, 1977 |
| B 519,377 | 3,987,223 | Jan. 27, 1976 | Oct. 19, 1976 |
| B 519,446 | 3,985,815 | Feb. 24, 1976 | Oct. 12, 1976 |
| B 519,485 | 3,991,134 | Feb. 10, 1976 | Nov. 9, 1976 |
| B 519,486 | 3,992,481 | Feb. 17, 1976 | Nov. 16, 1976 |
| B 519,487 | 3,992,337 | Feb. 17, 1976 | Nov. 16, 1976 |
| B 519,599 | 3,995,350 | Feb. 17, 1976 | Dec. 7, 1976 |
| B 519,623 | 4,012,049 | Apr. 6, 1976 | Mar. 15, 1977 |
| B 519,680 | 4,014,660 | Mar. 30, 1976 | Mar. 29, 1977 |
| B 519,932 | 3,988,618 | Feb. 3, 1976 | Oct. 26, 1976 |
| B 519,979 | 3,982,067 | Feb. 3, 1976 | Sep. 21, 1976 |
| B 520,063 | 3,989,934 | Mar. 2, 1976 | Nov. 2, 1976 |
| B 520,075 | 3,989,935 | Feb. 24, 1976 | Nov. 2, 1976 |
| B 520,076 | 3,989,936 | Mar. 2, 1976 | Nov. 2, 1976 |
| B 520,082 | 3,989,937 | Mar. 23, 1976 | Nov. 2, 1976 |
| B 520,115 | 4,003,072 | Mar. 23, 1976 | Jan. 11, 1977 |
| B 520,227 | 4,002,823 | Mar. 30, 1976 | Jan. 11, 1977 |
| B 520,256 | 3,985,730 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 520,277 | 3,995,635 | Feb. 17, 1976 | Dec. 7, 1976 |
| B 520,341 | 3,992,028 | Mar. 16, 1976 | Nov. 16, 1976 |
| B 520,384 | 3,986,592 | Jan. 27, 1976 | Oct. 19, 1976 |
| B 520,514 | 3,988,308 | Mar. 9, 1976 | Oct. 26, 1976 |
| B 520,534 | 3,997,119 | Feb. 17, 1976 | Dec. 14, 1976 |
| B 520,543 | 3,986,768 | Jan. 27, 1976 | Oct. 19, 1976 |
| B 520,546 | 4,001,133 | Mar. 2, 1976 | Jan. 4, 1977 |
| B 520,613 | 3,991,341 | Mar. 16, 1976 | Nov. 9, 1976 |
| B 520,658 | 3,998,778 | Mar. 9, 1976 | Dec. 21, 1976 |
| B 520,878 | 4,014,849 | Apr. 6, 1976 | Mar. 29, 1977 |
| B 520,884 | 4,000,433 | Mar. 16, 1976 | Dec. 28, 1976 |
| B 520,924 | 3,982,113 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 520,928 | 3,983,617 | Jan. 13, 1976 | Oct. 5, 1976 |
| B 520,952 | 4,000,876 | Mar. 16, 1976 | Jan. 4, 1977 |
| B 520,995 | 4,009,996 | Mar. 23, 1976 | Mar. 1, 1977 |
| B 521,025 | 3,998,838 | Mar. 23, 1976 | Dec. 21, 1976 |
| B 521,044 | 3,983,435 | Feb. 24, 1976 | Sep. 28, 1976 |
| B 521,045 | 3,983,433 | Feb. 24, 1976 | Sep. 28, 1976 |
| B 521,046 | 3,983,434 | Feb. 24, 1976 | Sep. 28, 1976 |
| B 521,125 | 3,994,865 | Feb. 10, 1976 | Nov. 30, 1976 |
| B 521,126 | 3,997,510 | Feb. 10, 1976 | Dec. 14, 1976 |
| B 521,127 | 3,996,201 | Feb. 17, 1976 | Dec. 7, 1976 |
| B 521,128 | 3,997,511 | Feb. 10, 1976 | Dec. 14, 1976 |
| B 521,324 | 3,983,143 | Jan. 27, 1976 | Sep. 28, 1976 |
| B 521,480 | 3,982,665 | Jan. 13, 1976 | Sep. 28, 1976 |
| B 521,600 | 3,981,458 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 521,612 | 4,000,251 | Mar. 9, 1976 | Dec. 28, 1976 |
| B 521,620 | 3,983,749 | Jan. 27, 1976 | Oct. 5, 1976 |
| B 521,643 | 3,997,567 | Mar. 2, 1976 | Dec. 14, 1976 |
| B 521,711 | 3,989,835 | Feb. 10, 1976 | Nov. 2, 1976 |
| B 521,793 | 3,996,981 | Feb. 24, 1976 | Dec. 14, 1976 |
| B 521,984 | 3,983,220 | Feb. 17, 1976 | Sep. 28, 1976 |
| B 521,985 | 4,012,404 | Mar. 23, 1976 | Mar. 15, 1977 |
| B 521,986 | 3,981,607 | Feb. 3, 1976 | Sep. 21, 1976 |
| B 522,009 | 3,995,444 | Feb. 17, 1976 | Dec. 7, 1976 |
| B 522,038 | 3,993,119 | Feb. 3, 1976 | Nov. 23, 1976 |
| B 522,227 | 3,992,904 | Mar. 30, 1976 | Nov. 23, 1976 |
| B 522,309 | 3,991,603 | Feb. 3, 1976 | Nov. 16, 1976 |
| B 522,354 | 3,984,959 | Jan. 20, 1976 | Oct. 12, 1976 |
| B 522,446 | 4,001,194 | Mar. 30, 1976 | Jan. 4, 1977 |
| B 522,537 | 3,999,587 | Mar. 30, 1976 | Dec. 28, 1976 |
| B 522,567 | 3,996,238 | Feb. 17, 1976 | Dec. 7, 1976 |
| B 522,568 | D 242,785 | Apr. 6, 1976 | Dec. 21, 1976 |
| B 522,577 | 3,982,123 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 522,629 | 4,001,155 | Mar. 16, 1976 | Jan. 4, 1977 |
| B 523,226 | 4,006,367 | Mar. 23, 1976 | Feb. 1, 1977 |
| B 523,696 | 3,986,071 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 523,885 | 3,981,040 | Feb. 17, 1976 | Sep. 21, 1976 |
| B 523,952 | 3,988,707 | Mar. 23, 1976 | Oct. 26, 1976 |
| B 524,026 | 3,992,206 | Feb. 10, 1976 | Nov. 16, 1976 |
| B 524,121 | 3,982,536 | Feb. 3, 1976 | Sep. 28, 1976 |
| B 524,179 | 3,985,872 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 524,464 | 3,985,580 | Feb. 10, 1976 | Oct. 12, 1976 |
| B 524,806 | 4,000,065 | Mar. 2, 1976 | Dec. 28, 1976 |
| B 524,849 | 4,014,938 | Mar. 23, 1976 | Mar. 29, 1977 |
| B 525,133 | 3,996,481 | Mar. 23, 1976 | Dec. 7, 1976 |
| B 525,204 | 4,001,109 | Mar. 16, 1976 | Jan. 4, 1977 |
| B 525,809 | 3,985,040 | Feb. 24, 1976 | Oct. 12, 1976 |

# CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

| DOCUMENT NUMBER | PATENT NUMBER | PUB. DATE | ISSUE DATE |
|---|---|---|---|
| B 525,961 | 3,985,557 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 526,106 | 3,990,073 | Jan. 27, 1976 | Nov. 2, 1976 |
| B 526,190 | 3,982,129 | Feb. 17, 1976 | Sep. 21, 1976 |
| B 526,279 | 4,013,138 | Apr. 13, 1976 | Mar. 22, 1977 |
| B 526,289 | 3,992,641 | Feb. 24, 1976 | Nov. 16, 1976 |
| B 526,388 | 3,992,017 | Feb. 3, 1976 | Nov. 16, 1976 |
| B 526,445 | 3,984,978 | Jan. 20, 1976 | Oct. 12, 1976 |
| B 526,447 | 4,000,052 | Feb. 24, 1976 | Dec. 28, 1976 |
| B 526,510 | 3,989,708 | Jan. 20, 1976 | Nov. 2, 1976 |
| B 526,654 | 4,011,534 | Mar. 23, 1976 | Mar. 8, 1977 |
| B 526,942 | 4,013,700 | Mar. 30, 1976 | Mar. 22, 1977 |
| B 526,997 | 3,985,695 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 527,040 | 4,013,515 | Mar. 23, 1976 | Mar. 22, 1977 |
| B 527,054 | 3,981,559 | Feb. 17, 1976 | Sep. 21, 1976 |
| B 527,171 | 3,998,248 | Mar. 9, 1976 | Dec. 21, 1976 |
| B 527,187 | 3,995,202 | Feb. 17, 1976 | Nov. 30, 1976 |
| B 527,333 | 3,999,732 | Mar. 23, 1976 | Dec. 28, 1976 |
| B 527,669 | 3,982,206 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 527,693 | 3,995,233 | Feb. 3, 1976 | Nov. 30, 1976 |
| B 527,788 | D 242,337 | Feb. 10, 1976 | Nov. 16, 1976 |
| B 527,972 | 4,000,016 | Mar. 9, 1976 | Dec. 28, 1976 |
| B 527,999 | 3,981,682 | Feb. 3, 1976 | Sep. 21, 1976 |
| B 528,297 | 4,001,138 | Mar. 16, 1976 | Jan. 4, 1977 |
| B 528,303 | 3,991,023 | Feb. 10, 1976 | Nov. 9, 1976 |
| B 528,401 | 3,991,619 | Feb. 3, 1976 | Nov. 16, 1976 |
| B 528,756 | 3,990,476 | Feb. 3, 1976 | Nov. 9, 1976 |
| B 528,761 | 3,982,221 | Feb. 10, 1976 | Sep. 21, 1976 |
| B 528,962 | 3,989,666 | Feb. 24, 1976 | Nov. 2, 1976 |
| B 528,966 | 3,989,667 | Feb. 24, 1976 | Nov. 2, 1976 |
| B 529,156 | 3,989,158 | Jan. 13, 1976 | Nov. 2, 1976 |
| B 529,194 | 4,000,776 | Mar. 23, 1976 | Jan. 4, 1977 |
| B 529,214 | 4,013,004 | Apr. 20, 1976 | Mar. 22, 1977 |
| B 529,659 | 3,996,875 | Feb. 24, 1976 | Dec. 14, 1976 |
| B 529,836 | 3,994,345 | Feb. 3, 1976 | Nov. 30, 1976 |
| B 529,925 | 4,014,003 | Mar. 30, 1976 | Mar. 22, 1977 |
| B 529,974 | 3,987,098 | Feb. 17, 1976 | Oct. 19, 1976 |
| B 530,174 | 3,993,635 | Feb. 24, 1976 | Nov. 23, 1976 |
| B 530,255 | 3,996,103 | Mar. 2, 1976 | Dec. 7, 1976 |
| B 530,263 | 4,009,736 | Mar. 30, 1976 | Mar. 1, 1977 |
| B 530,285 | 4,013,903 | Apr. 6, 1976 | Mar. 22, 1977 |
| B 530,303 | 4,006,029 | Mar. 23, 1976 | Feb. 1, 1977 |
| B 530,318 | 3,985,752 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 530,437 | 4,014,857 | Apr. 13, 1976 | Mar. 29, 1977 |
| B 530,569 | 3,999,865 | Mar. 16, 1976 | Dec. 28, 1976 |
| B 530,580 | 4,001,151 | Mar. 2, 1976 | Jan. 4, 1977 |
| B 530,605 | 3,989,064 | Feb. 3, 1976 | Nov. 2, 1976 |
| B 530,709 | 4,012,944 | Apr. 6, 1976 | Mar. 22, 1977 |
| B 530,813 | 3,986,131 | Feb. 17, 1976 | Oct. 12, 1976 |
| B 530,873 | 4,001,016 | Feb. 17, 1976 | Jan. 4, 1977 |
| B 530,925 | 3,983,161 | Feb. 24, 1976 | Sep. 28, 1976 |
| B 531,096 | 3,984,415 | Feb. 10, 1976 | Oct. 5, 1976 |
| B 531,267 | 3,997,040 | Feb. 24, 1976 | Dec. 14, 1976 |
| B 531,425 | 3,992,595 | Feb. 3, 1976 | Nov. 16, 1976 |
| B 531,566 | 3,997,820 | Mar. 16, 1976 | Dec. 14, 1976 |
| B 531,686 | 3,990,017 | Mar. 23, 1976 | Nov. 2, 1976 |
| B 531,753 | 3,988,843 | Mar. 2, 1976 | Nov. 2, 1976 |
| B 531,929 | 3,986,067 | Jan. 20, 1976 | Oct. 12, 1976 |
| B 532,005 | 3,992,397 | Feb. 24, 1976 | Nov. 16, 1976 |
| B 532,140 | 4,001,299 | Mar. 2, 1976 | Jan. 4, 1977 |
| B 532,319 | 3,990,292 | Feb. 3, 1976 | Nov. 9, 1976 |
| B 532,326 | 3,993,959 | Mar. 23, 1976 | Nov. 23, 1976 |
| B 532,424 | D 242,292 | Feb. 10, 1976 | Nov. 9, 1976 |
| B 532,476 | 3,992,756 | Feb. 3, 1976 | Nov. 23, 1976 |
| B 532,477 | 4,014,895 | Apr. 13, 1976 | Mar. 29, 1977 |
| B 532,679 | 4,010,706 | Apr. 6, 1976 | Mar. 8, 1977 |
| B 532,901 | 3,984,318 | Jan. 13, 1976 | Oct. 5, 1976 |
| B 532,969 | 3,981,706 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 532,976 | 4,000,837 | Mar. 23, 1976 | Jan. 4, 1977 |
| B 533,056 | 3,983,969 | Jan. 13, 1976 | Oct. 5, 1976 |
| B 533,259 | 3,999,556 | Feb. 24, 1976 | Dec. 28, 1976 |
| B 533,454 | 3,996,566 | Mar. 2, 1976 | Dec. 7, 1976 |
| B 533,580 | 3,982,255 | Feb. 3, 1976 | Sep. 21, 1976 |
| B 533,652 | 4,000,196 | Mar. 23, 1976 | Dec. 28, 1976 |
| B 533,734 | 3,984,799 | Jan. 27, 1976 | Oct. 5, 1976 |
| B 533,968 | 3,986,576 | Jan. 27, 1976 | Oct. 19, 1976 |
| B 534,016 | 3,983,381 | Feb. 3, 1976 | Sep. 28, 1976 |
| B 534,313 | 3,981,675 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 534,314 | 3,981,786 | Feb. 10, 1976 | Sep. 21, 1976 |
| B 534,333 | 3,981,480 | Feb. 17, 1976 | Sep. 21, 1976 |
| B 534,334 | D 242,722 | Mar. 16, 1976 | Dec. 14, 1976 |
| B 534,443 | 3,989,970 | Jan. 27, 1976 | Nov. 2, 1976 |
| B 534,574 | 3,995,624 | Feb. 24, 1976 | Dec. 7, 1976 |
| B 534,591 | 3,991,141 | Feb. 17, 1976 | Nov. 9, 1976 |
| B 534,680 | 4,014,904 | Apr. 20, 1976 | Mar. 29, 1977 |
| B 534,767 | 3,982,180 | Feb. 3, 1976 | Sep. 21, 1976 |
| B 534,915 | 4,012,668 | Mar. 23, 1976 | Mar. 15, 1977 |
| B 534,991 | 3,983,517 | Jan. 27, 1976 | Sep. 28, 1976 |
| B 535,076 | 3,981,718 | Jan. 20, 1976 | Sep. 21, 1976 |
| B 535,209 | 4,001,873 | Mar. 16, 1976 | Jan. 4, 1977 |
| B 535,256 | 3,999,150 | Mar. 23, 1976 | Dec. 21, 1976 |
| B 535,268 | 3,999,045 | Mar. 30, 1976 | Dec. 21, 1976 |
| B 535,386 | 3,981,150 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 535,391 | 3,981,386 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 535,411 | 3,990,543 | Feb. 24, 1976 | Nov. 9, 1976 |
| B 535,437 | 3,997,555 | Feb. 24, 1976 | Dec. 14, 1976 |
| B 535,448 | 3,997,123 | Mar. 16, 1976 | Dec. 14, 1976 |
| B 535,466 | 3,981,309 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 535,813 | 3,981,819 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 535,928 | 3,981,466 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 536,009 | 3,982,112 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 536,082 | 3,997,783 | Mar. 16, 1976 | Dec. 14, 1976 |
| B 536,322 | 4,001,272 | Mar. 23, 1976 | Jan. 4, 1977 |
| B 536,403 | 3,998,341 | Mar. 23, 1976 | Dec. 21, 1976 |
| B 536,511 | 3,995,989 | Mar. 9, 1976 | Dec. 7, 1976 |
| B 536,675 | 3,985,773 | Jan. 20, 1976 | Oct. 12, 1976 |
| B 536,923 | 4,007,828 | Mar. 30, 1976 | Feb. 15, 1977 |
| B 536,935 | 3,985,729 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 537,058 | 4,000,969 | Mar. 23, 1976 | Jan. 4, 1977 |
| B 537,102 | 3,981,829 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 537,709 | 3,981,368 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 537,711 | 3,985,748 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 537,722 | 3,985,423 | Feb. 3, 1976 | Oct. 12, 1976 |
| B 537,903 | 3,986,492 | Jan. 20, 1976 | Oct. 19, 1976 |
| B 538,472 | 3,992,884 | Feb. 3, 1976 | Nov. 23, 1976 |
| B 538,491 | 3,982,928 | Feb. 17, 1976 | Sep. 28, 1976 |
| B 538,686 | 3,982,199 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 538,753 | 3,993,642 | Feb. 10, 1976 | Nov. 23, 1976 |
| B 539,374 | 3,996,229 | Mar. 9, 1976 | Dec. 7, 1976 |
| B 539,746 | 3,983,423 | Feb. 17, 1976 | Sep. 28, 1976 |
| B 540,078 | 3,984,701 | Jan. 13, 1976 | Oct. 5, 1976 |
| B 540,218 | 3,986,108 | Feb. 10, 1976 | Oct. 12, 1976 |
| B 540,632 | 3,981,600 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 540,703 | 4,013,206 | Apr. 13, 1976 | Mar. 22, 1977 |
| B 540,767 | 3,986,010 | Mar. 16, 1976 | Oct. 12, 1976 |
| B 540,872 | 3,982,135 | Jan. 20, 1976 | Sep. 21, 1976 |
| B 540,888 | 4,005,528 | Mar. 30, 1976 | Feb. 1, 1977 |
| B 541,015 | 3,993,208 | Jan. 27, 1976 | Nov. 23, 1976 |
| B 541,376 | 3,981,690 | Feb. 17, 1976 | Sep. 21, 1976 |
| B 541,415 | 3,982,080 | Feb. 3, 1976 | Sep. 21, 1976 |
| B 541,464 | 3,995,424 | Feb. 17, 1976 | Dec. 7, 1976 |
| B 541,496 | 3,982,232 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 541,501 | 4,005,826 | Apr. 13, 1976 | Feb. 1, 1977 |
| B 541,517 | 3,986,156 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 541,710 | 3,994,472 | Feb. 24, 1976 | Nov. 30, 1976 |
| B 542,135 | 3,986,939 | Feb. 10, 1976 | Oct. 19, 1976 |
| B 542,158 | 3,981,886 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 542,226 | 3,993,748 | Feb. 24, 1976 | Nov. 23, 1976 |
| B 542,258 | 4,013,536 | Mar. 23, 1976 | Mar. 22, 1977 |
| B 543,078 | 3,995,687 | Feb. 17, 1976 | Dec. 7, 1976 |
| B 543,941 | 3,985,528 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 544,034 | 3,997,175 | Feb. 17, 1976 | Dec. 14, 1976 |
| B 544,476 | 3,993,585 | Feb. 24, 1976 | Nov. 23, 1976 |
| B 544,899 | 3,994,962 | Feb. 17, 1976 | Nov. 30, 1976 |
| B 544,961 | 3,983,492 | Jan. 13, 1976 | Sep. 28, 1976 |
| B 545,050 | 3,982,073 | Jan. 20, 1976 | Sep. 21, 1976 |
| B 545,265 | D 243,090 | Apr. 13, 1976 | Jan. 18, 1977 |
| B 545,299 | 4,001,259 | Feb. 24, 1976 | Jan. 4, 1977 |
| B 545,344 | 4,012,746 | Mar. 30, 1976 | Mar. 15, 1977 |
| B 545,464 | 3,992,387 | Feb. 10, 1976 | Nov. 16, 1976 |
| B 545,630 | 3,981,337 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 545,777 | 4,004,906 | Jan. 27, 1976 | Jan. 25, 1977 |
| B 545,856 | 4,006,939 | Mar. 30, 1976 | Feb. 8, 1977 |
| B 545,935 | 3,990,337 | Jan. 27, 1976 | Nov. 9, 1976 |
| B 545,945 | 3,995,260 | Jan. 27, 1976 | Nov. 30, 1976 |
| B 546,097 | 3,999,309 | Mar. 23, 1976 | Dec. 28, 1976 |
| B 546,295 | 3,987,070 | Jan. 20, 1976 | Oct. 19, 1976 |
| B 546,426 | 3,982,063 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 546,631 | 3,983,729 | Feb. 3, 1976 | Oct. 5, 1976 |
| B 546,665 | 3,990,062 | Jan. 20, 1976 | Nov. 2, 1976 |
| B 546,677 | 4,015,654 | Apr. 6, 1976 | Apr. 5, 1977 |
| B 546,911 | 3,981,058 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 546,922 | 3,987,742 | Mar. 16, 1976 | Oct. 26, 1976 |
| B 547,016 | 3,999,741 | Mar. 23, 1976 | Dec. 28, 1976 |
| B 547,208 | 4,001,218 | Feb. 24, 1976 | Jan. 4, 1977 |
| B 547,547 | 3,997,670 | Feb. 24, 1976 | Dec. 14, 1976 |
| B 547,994 | 3,990,081 | Jan. 20, 1976 | Nov. 2, 1976 |
| B 548,028 | 3,991,517 | Feb. 3, 1976 | Nov. 16, 1976 |
| B 548,058 | 3,983,050 | Feb. 17, 1976 | Sep. 28, 1976 |
| B 548,155 | 3,981,477 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 548,440 | 3,993,401 | Feb. 3, 1976 | Nov. 23, 1976 |
| B 548,302 | 3,983,414 | Feb. 17, 1976 | Sep. 28, 1976 |
| B 548,440 | 3,993,401 | Feb. 3, 1976 | Nov. 23, 1976 |
| B 548,462 | D 242,283 | Feb. 10, 1976 | Nov. 9, 1976 |
| B 548,688 | 3,995,984 | Mar. 9, 1976 | Dec. 7, 1976 |



CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

| DOCUMENT NUMBER | PATENT NUMBER | PUB. DATE | ISSUE DATE |
|---|---|---|---|
| B 548,719 | 3,990,553 | Feb. 17, 1976 | Nov. 9, 1976 |
| B 548,978 | 3,998,139 | Mar. 9, 1976 | Dec. 21, 1976 |
| B 549,198 | 3,981,975 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 549,244 | 3,981,125 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 549,394 | 3,981,611 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 549,931 | 3,986,141 | Jan. 20, 1976 | Oct. 12, 1976 |
| B 549,964 | 3,995,899 | Feb. 24, 1976 | Dec. 7, 1976 |
| B 550,693 | 3,982,194 | Jan. 20, 1976 | Sep. 21, 1976 |
| B 550,744 | 3,993,550 | Feb. 17, 1976 | Nov. 23, 1976 |
| B 550,810 | 4,000,910 | Mar. 23, 1976 | Jan. 4, 1977 |
| B 551,133 | 3,996,740 | Mar. 2, 1976 | Dec. 14, 1976 |
| B 551,463 | 3,996,254 | Feb. 17, 1976 | Dec. 7, 1976 |
| B 551,527 | 3,982,599 | Jan. 13, 1976 | Sep. 28, 1976 |
| B 551,809 | 3,996,743 | Feb. 24, 1976 | Dec. 14, 1976 |
| B 551,952 | Re. 29,059 | Mar. 2, 1976 | Dec. 7, 1976 |
| B 552,006 | 3,992,129 | Feb. 3, 1976 | Nov. 16, 1976 |
| B 552,489 | 3,994,864 | Feb. 10, 1976 | Nov. 30, 1976 |
| B 552,498 | 3,983,139 | Jan. 13, 1976 | Sep. 28, 1976 |
| B 552,508 | 4,001,250 | Mar. 16, 1976 | Jan. 4, 1977 |
| B 552,629 | 3,994,773 | Mar. 23, 1976 | Nov. 30, 1976 |
| B 552,709 | 4,001,467 | Mar. 23, 1976 | Jan. 4, 1977 |
| B 552,932 | 3,989,292 | Feb. 3, 1976 | Nov. 2, 1976 |
| B 553,421 | 4,001,146 | Mar. 23, 1976 | Jan. 4, 1977 |
| B 553,460 | 3,990,019 | Feb. 3, 1976 | Nov. 2, 1976 |
| B 553,584 | 3,992,456 | Feb. 17, 1976 | Nov. 16, 1976 |
| B 553,629 | 3,999,242 | Feb. 24, 1976 | Dec. 28, 1976 |
| B 554,039 | 3,999,944 | Feb. 24, 1976 | Dec. 28, 1976 |
| B 554,164 | 4,001,465 | Mar. 9, 1976 | Jan. 4, 1977 |
| B 554,283 | 3,981,152 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 554,291 | 4,001,209 | Mar. 9, 1976 | Jan. 4, 1977 |
| B 554,380 | 4,001,147 | Mar. 9, 1976 | Jan. 4, 1977 |
| B 554,594 | 3,985,960 | Jan. 20, 1976 | Oct. 12, 1976 |
| B 554,655 | 4,015,048 | Feb. 24, 1976 | Mar. 29, 1977 |
| B 554,848 | 4,001,265 | Feb. 24, 1976 | Jan. 4, 1977 |
| B 554,939 | 3,994,013 | Feb. 10, 1976 | Nov. 23, 1976 |
| B 555,146 | 4,007,636 | Apr. 20, 1976 | Feb. 15, 1977 |
| B 555,437 | 3,991,152 | Feb. 3, 1976 | Nov. 9, 1976 |
| B 555,456 | 3,993,423 | Mar. 30, 1976 | Nov. 23, 1976 |
| B 555,772 | 3,982,641 | Jan. 13, 1976 | Sep. 28, 1976 |
| B 556,057 | 3,985,349 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 556,496 | 3,990,244 | Mar. 16, 1976 | Nov. 9, 1976 |
| B 556,897 | 3,992,972 | Feb. 3, 1976 | Nov. 23, 1976 |
| B 557,153 | 3,991,603 | Feb. 3, 1976 | Nov. 16, 1976 |
| B 557,274 | 4,016,375 | Mar. 23, 1976 | Apr. 5, 1977 |
| B 557,299 | 3,990,357 | Feb. 3, 1976 | Nov. 9, 1976 |
| B 557,621 | 3,990,800 | Feb. 3, 1976 | Nov. 9, 1976 |
| B 557,721 | 4,013,435 | Mar. 23, 1976 | Mar. 22, 1977 |
| B 557,856 | 3,991,019 | Feb. 10, 1976 | Nov. 9, 1976 |
| B 558,220 | 3,990,009 | Jan. 27, 1976 | Nov. 2, 1976 |
| B 558,251 | 3,981,289 | Jan. 13, 1976 | Sep. 21, 1976 |
| B 558,813 | 3,989,188 | Feb. 3, 1976 | Nov. 2, 1976 |
| B 558,818 | 3,983,762 | Jan. 13, 1976 | Oct. 5, 1976 |
| B 558,819 | 3,990,160 | Feb. 3, 1976 | Nov. 9, 1976 |
| B 558,973 | 3,981,126 | Feb. 10, 1976 | Sep. 21, 1976 |
| B 559,111 | 3,984,854 | Feb. 24, 1976 | Oct. 5, 1976 |
| B 559,142 | 4,001,124 | Mar. 2, 1976 | Jan. 4, 1977 |
| B 559,394 | 4,016,094 | Apr. 20, 1976 | Apr. 5, 1977 |
| B 559,441 | 4,013,609 | Mar. 23, 1976 | Mar. 22, 1977 |
| B 559,631 | 4,011,406 | Mar. 23, 1976 | Mar. 8, 1977 |
| B 559,697 | 3,995,770 | Mar. 16, 1976 | Dec. 7, 1976 |
| B 559,700 | 4,001,189 | Mar. 23, 1976 | Jan. 4, 1977 |
| B 559,701 | 4,001,190 | Mar. 23, 1976 | Jan. 4, 1977 |
| B 559,737 | 3,984,668 | Jan. 20, 1976 | Oct. 5, 1976 |
| B 559,954 | 3,982,673 | Feb. 3, 1976 | Sep. 28, 1976 |
| B 560,261 | 3,987,493 | Mar. 16, 1976 | Oct. 19, 1976 |
| B 560,488 | 3,989,940 | Mar. 16, 1976 | Nov. 2, 1976 |
| B 560,717 | 3,982,034 | Feb. 10, 1976 | Sep. 21, 1976 |
| B 560,765 | 3,983,389 | Feb. 3, 1976 | Sep. 28, 1976 |
| B 561,062 | D 242,248 | Feb. 10, 1976 | Nov. 9, 1976 |
| B 561,165 | 4,013,002 | Mar. 30, 1976 | Mar. 22, 1977 |
| B 561,166 | 4,011,809 | Mar. 30, 1976 | Mar. 15, 1977 |
| B 561,365 | 4,005,078 | Apr. 13, 1976 | Jan. 25, 1977 |
| B 561,387 | 3,985,706 | Feb. 10, 1976 | Oct. 12, 1976 |
| B 561,405 | 4,003,770 | Mar. 30, 1976 | Jan. 18, 1977 |
| B 561,712 | 3,992,126 | Feb. 17, 1976 | Nov. 16, 1976 |
| B 561,732 | 3,991,460 | Feb. 3, 1976 | Nov. 16, 1976 |
| B 561,764 | 3,984,634 | Jan. 27, 1976 | Oct. 5, 1976 |
| B 561,770 | 4,000,366 | Mar. 16, 1976 | Dec. 28, 1976 |
| B 561,784 | 3,984,710 | Jan. 27, 1976 | Oct. 5, 1976 |
| B 562,413 | 4,000,930 | Mar. 16, 1976 | Jan. 4, 1977 |
| B 562,462 | 3,985,836 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 562,519 | 4,013,125 | Mar. 30, 1976 | Mar. 22, 1977 |
| B 562,601 | 3,998,360 | Mar. 16, 1976 | Dec. 21, 1976 |
| B 562,698 | 3,983,972 | Jan. 13, 1976 | Oct. 5, 1976 |
| B 562,813 | 3,985,491 | Feb. 3, 1976 | Oct. 12, 1976 |
| B 563,070 | 3,996,230 | Mar. 9, 1976 | Dec. 7, 1976 |
| B 563,165 | 4,000,977 | Mar. 9, 1976 | Jan. 4, 1977 |
| B 563,244 | 3,983,562 | Jan. 27, 1976 | Sep. 28, 1976 |
| B 563,301 | 3,995,589 | Feb. 17, 1976 | Dec. 7, 1976 |
| B 563,412 | 3,992,127 | Feb. 24, 1976 | Nov. 16, 1976 |
| B 563,419 | 3,999,051 | Mar. 23, 1976 | Dec. 21, 1976 |
| B 563,722 | 3,990,925 | Jan. 13, 1976 | Nov. 9, 1976 |
| B 563,780 | 3,987,769 | Feb. 3, 1976 | Oct. 26, 1976 |
| B 563,932 | 4,000,638 | Mar. 23, 1976 | Jan. 4, 1977 |
| B 564,252 | 4,001,293 | Mar. 2, 1976 | Jan. 4, 1977 |
| B 564,255 | 4,015,996 | Mar. 30, 1976 | Apr. 5, 1977 |
| B 564,314 | 3,984,996 | Jan. 20, 1976 | Oct. 12, 1976 |
| B 564,902 | 4,001,351 | Mar. 23, 1976 | Jan. 4, 1977 |
| B 565,180 | 3,981,685 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 565,275 | 3,990,299 | Apr. 6, 1976 | Nov. 9, 1976 |
| B 565,717 | 3,999,138 | Apr. 13, 1976 | Dec. 21, 1976 |
| B 565,754 | 4,011,626 | Mar. 30, 1976 | Mar. 15, 1977 |
| B 566,464 | 3,996,367 | Feb. 3, 1976 | Dec. 7, 1976 |
| B 566,556 | 3,998,511 | Mar. 23, 1976 | Dec. 21, 1976 |
| B 566,572 | 3,988,590 | Mar. 16, 1976 | Oct. 26, 1976 |
| B 566,585 | 4,001,083 | Mar. 2, 1976 | Jan. 4, 1977 |
| B 567,058 | 3,985,188 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 567,076 | 4,011,187 | Mar. 23, 1976 | Mar. 8, 1977 |
| B 567,158 | 3,988,073 | Mar. 23, 1976 | Oct. 26, 1976 |
| B 567,207 | 3,991,689 | Apr. 13, 1976 | Nov. 16, 1976 |
| B 567,435 | 3,995,724 | Feb. 3, 1976 | Dec. 7, 1976 |
| B 567,854 | 3,985,038 | Feb. 3, 1976 | Oct. 12, 1976 |
| B 567,892 | 4,000,855 | Mar. 16, 1976 | Jan. 4, 1977 |
| B 568,226 | 3,992,698 | Feb. 24, 1976 | Nov. 16, 1976 |
| B 568,770 | 3,982,213 | Feb. 10, 1976 | Sep. 21, 1976 |
| B 569,125 | 3,986,980 | Feb. 24, 1976 | Oct. 19, 1976 |
| B 569,293 | 4,004,149 | Mar. 30, 1976 | Jan. 18, 1977 |
| B 569,501 | 3,999,250 | Mar. 9, 1976 | Dec. 28, 1976 |
| B 569,519 | 3,993,133 | Feb. 3, 1976 | Nov. 23, 1976 |
| B 569,646 | 3,985,222 | Jan. 13, 1976 | Oct. 12, 1976 |
| B 569,859 | 3,994,160 | Mar. 9, 1976 | Nov. 30, 1976 |
| B 570,172 | 3,987,763 | Feb. 3, 1976 | Oct. 26, 1976 |
| B 570,615 | 3,998,570 | Mar. 23, 1976 | Dec. 21, 1976 |
| B 570,862 | 3,991,639 | Feb. 24, 1976 | Nov. 16, 1976 |
| B 571,219 | 3,991,388 | Feb. 24, 1976 | Nov. 9, 1976 |
| B 571,638 | 4,001,244 | Mar. 9, 1976 | Jan. 4, 1977 |
| B 571,659 | 3,995,186 | Apr. 13, 1976 | Nov. 30, 1976 |
| B 572,642 | 3,990,715 | Feb. 10, 1976 | Nov. 9, 1976 |
| B 572,726 | 4,015,020 | Feb. 24, 1976 | Mar. 29, 1977 |
| B 573,033 | 3,995,224 | Mar. 23, 1976 | Nov. 30, 1976 |
| B 573,114 | 4,014,843 | Apr. 6, 1976 | Mar. 29, 1977 |
| B 573,991 | 4,013,704 | Mar. 30, 1976 | Mar. 22, 1977 |
| B 573,994 | 4,000,641 | Mar. 23, 1976 | Jan. 4, 1977 |
| B 574,128 | 3,982,961 | Feb. 17, 1976 | Sep. 28, 1976 |
| B 574,616 | 4,000,424 | Mar. 2, 1976 | Dec. 28, 1976 |
| B 574,996 | 3,989,718 | Feb. 17, 1976 | Nov. 2, 1976 |
| B 575,583 | 4,000,928 | Mar. 16, 1976 | Jan. 4, 1977 |
| B 575,757 | 3,981,170 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 575,761 | 4,013,123 | Apr. 13, 1976 | Mar. 22, 1977 |
| B 575,776 | 4,013,124 | Apr. 20, 1976 | Mar. 22, 1977 |
| B 575,851 | 3,985,826 | Feb. 10, 1976 | Oct. 12, 1976 |
| B 576,385 | 4,009,498 | Mar. 30, 1976 | Mar. 1, 1977 |
| B 576,859 | 3,991,526 | Feb. 24, 1976 | Nov. 16, 1976 |
| B 576,903 | 3,995,032 | Feb. 3, 1976 | Nov. 30, 1976 |
| B 578,447 | 3,982,658 | Jan. 20, 1976 | Sep. 28, 1976 |
| B 579,104 | 3,982,081 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 579,116 | 3,986,227 | Feb. 3, 1976 | Oct. 19, 1976 |
| B 579,153 | 4,013,745 | Mar. 30, 1976 | Mar. 22, 1977 |
| B 579,806 | 3,995,318 | Feb. 3, 1976 | Nov. 30, 1976 |
| B 580,379 | 4,000,796 | Apr. 6, 1976 | Jan. 4, 1977 |
| B 580,826 | 3,988,391 | Feb. 17, 1976 | Oct. 26, 1976 |
| B 580,921 | 3,984,054 | Jan. 13, 1976 | Oct. 5, 1976 |
| B 581,843 | 4,000,562 | Mar. 16, 1976 | Jan. 4, 1977 |
| B 583,051 | 3,990,714 | Feb. 3, 1976 | Nov. 9, 1976 |
| B 583,089 | 3,982,174 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 583,712 | 3,995,064 | Feb. 10, 1976 | Nov. 30, 1976 |
| B 584,520 | 3,981,149 | Jan. 27, 1976 | Sep. 21, 1976 |
| B 584,997 | 4,000,030 | Mar. 9, 1976 | Dec. 28, 1976 |
| B 585,247 | 3,989,914 | Feb. 3, 1976 | Nov. 2, 1976 |
| B 585,731 | 3,993,603 | Feb. 3, 1976 | Nov. 23, 1976 |
| B 586,215 | 3,985,302 | Jan. 20, 1976 | Oct. 12, 1976 |
| B 586,380 | 3,983,885 | Mar. 2, 1976 | Oct. 5, 1976 |
| B 586,387 | 3,981,311 | Feb. 3, 1976 | Sep. 21, 1976 |
| B 586,663 | 3,992,080 | Feb. 3, 1976 | Nov. 16, 1976 |
| B 587,118 | Re. 29,067 | Mar. 2, 1976 | Dec. 7, 1976 |
| B 587,786 | 3,991,204 | Feb. 17, 1976 | Nov. 9, 1976 |
| B 587,936 | 3,999,052 | Mar. 23, 1976 | Dec. 21, 1976 |
| B 589,179 | 4,001,102 | Mar. 23, 1976 | Jan. 4, 1977 |
| B 589,687 | 3,995,349 | Mar. 23, 1976 | Dec. 7, 1976 |
| B 589,966 | 3,985,828 | Feb. 17, 1976 | Oct. 12, 1976 |
| B 590,158 | 3,985,163 | Feb. 10, 1976 | Oct. 12, 1976 |
| B 590,159 | 3,985,164 | Feb. 3, 1976 | Oct. 12, 1976 |
| B 590,502 | 4,001,171 | Mar. 23, 1976 | Jan. 4, 1977 |
| B 591,141 | 4,013,631 | Mar. 23, 1976 | Mar. 22, 1977 |

# CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

| DOCUMENT NUMBER | PATENT NUMBER | PUB. DATE | ISSUE DATE | DOCUMENT NUMBER | PATENT NUMBER | PUB. DATE | ISSUE DATE |
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| B 592,143 | 3,984,713 | Jan. 27, 1976 | Oct. 5, 1976 | B 657,438 | 3,985,701 | Jan. 20, 1976 | Oct. 12, 1976 |
| B 592,146 | 4,001,084 | Mar. 2, 1976 | Jan. 4, 1977 | B 747,785 | 3,981,899 | Feb. 10, 1976 | Sep. 21, 1976 |
| B 592,658 | 4,001,164 | Mar. 23, 1976 | Jan. 4, 1977 | B 750,679 | 4,007,049 | Mar. 23, 1976 | Feb. 8, 1977 |
| B 593,781 | 4,015,953 | Mar. 16, 1976 | Apr. 5, 1977 | B 843,038 | 3,981,785 | Feb. 3, 1976 | Sep. 21, 1976 |
| B 594,871 | 3,999,245 | Mar. 16, 1976 | Dec. 28, 1976 | B 845,044 | 4,001,338 | Mar. 30, 1976 | Jan. 4, 1977 |
| B 596,692 | 3,992,349 | Feb. 17, 1976 | Nov. 16, 1976 | B 848,336 | 3,993,752 | Mar. 30, 1976 | Nov. 23, 1976 |
| B 597,410 | 4,000,925 | Mar. 30, 1976 | Jan. 4, 1977 | | | | |

# LIST OF REISSUE PATENTEES

## TO WHOM

## PATENTS WERE ISSUED ON THE 19TH DAY OF APRIL, 1977

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Bell Telephone Laboratories, Incorporated: *See*—
Harrigan, Thomas George, Re. 29,191.

Braucht, Theodore C., to Mark K Industries. Automatic dredge pump rebuilder. Re. 29,190, Cl. 219-76.000.

Canon Kabushiki Kaisha: *See*—
Knechtel, Wilhelm; Petersdorf, Gerhard; and Sandner, Winfried, Re. 29,187.
Komori, Shigehiro; Sato, Juro; and Hattori, Hiroyuki, Re. 29,186.

Croughwell, William J., to Emhart Industries, Inc. Computer control for glassware forming machine. Re. 29,188, Cl. 65-163.000.

DEC International, Inc.: *See*—
Petranyi, John F., Re. 29,184.

Emhart Industries, Inc.: *See*—
Croughwell, William J., Re. 29,188.

Fischer, Russell C., to GTE Automatic Electric Laboratories Incorporated. Self-balancing hybrid circuit. Re. 29,189, Cl. 179-170.00D.

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Hattori, Hiroyuki: *See*—
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Knechtel, Wilhelm; Petersdorf, Gerhard; and Sandner, Winfried, to Canon Kabushiki Kaisha. Copying apparatus. Re. 29,187, Cl. 355-51.000.

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Petersdorf, Gerhard: *See*—
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Petranyi, John F., to DEC International, Inc. Apparatus for dispensing liquid from a liquid supply manifold. Re. 29,184, Cl. 222-373.000.

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Sato, Juro: *See*—
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Baumler, Robert J.: *See*—
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Bryant, William J. Child's compass. 244,091, 4-19-77, Cl. D19-38.000.

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Chicago Lock Co.: *See*—
Steinbach, Robert L., 244,081.

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Creamer, Joan Klatil, to General Electric Company. Wall plate. 244,082, 4-19-77, Cl. D8-351.000.

Cutler, Norman W., Jr.: *See*—
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Eaton Corporation: *See*—
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Willard, Jack August, 244,094.

Frick, Berndt Ebbe. Housing for teleprinters and the like. 244,097, 4-19-77, Cl. D14-93.000.

Gannon, Peter F., to Vinyl-Fab Industries. Swimming pool safety ladder. 244,093, 4-19-77, Cl. D25-64.000.

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General Electric Company: *See*—
Creamer, Joan Klatil, 244,082.

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Goldberg, Dale I., 244,101.

Giddings, Daniel S.; and Fabian, Julian. Display package for mineral specimens. 244,085, 4-19-77, Cl. D9-193.000.

Gildea, Robert. Water lounge. 244,066, 4-19-77, Cl. D6-37.000.

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Greer, Michael M. Pocket finger exercise board. 244,103, 4-19-77, Cl. D56-1.00R.

Haines, Walter W., Sr. Neckwear. 244,061, 4-19-77, Cl. D2-351.000.

Haines, Walter W., Sr. Neckwear. 244,062, 4-19-77, Cl. D2-351.000.

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Imber, Marion; and Wezenter, Seymour, to Ray Control Corporation. Table. 244,075, 4-19-77, Cl. D6-179.000.

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Krasicki, Walter. Harp. 244,104, 4-19-77, Cl. D56-1.00A.

Lapikas, Thomas S.: *See*—
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Lawrence, William James. Digital watch casing. 244,086, 4-19-77, Cl. D10-38.000.

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Marks, Robert J. Convertible sofa. 244,070, 4-19-77, Cl. D6-63.000.

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Masters, Alois A.: *See*—
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Matsushita Electric Industrial Co., Ltd.: *See*—
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McCarroll, Raymond A. Rear-view mirror. 244,088, 4-19-77, Cl. D12-187.000.

Mecaniplast: *See*—
Pizon, Ernest, 244,096.

Mitchell, Bernard A. Fragrance bottle. 244,084, 4-19-77, Cl. D9-157.000.
Mowatt-Larssen, Erling; and Lapikas, Thomas S., to General American Transportation Corporation. Intermodal container. 244,092, 4-19-77, Cl. D23-2.000.
Ohta, Kikuo: *See*—
Takenaka, Kazumasa; and Ohta, Kikuo, 244,102.
Ozburn-Janesville Corporation: *See*—
Piekarski, John L., 244,105.
Patton, Gerald Thomas. Figurine. 244,087, 4-19-77, Cl. D11-160.000.
Perrin, Alain D., to Les Must de Cartier. Hinged lock for luggage or the like. 244,080, 4-19-77, Cl. D8-338.000.
Pfeiffer, Joachim A. Sail boat mast setting bracket. 244,083, 4-19-77, Cl. D8-354.000.
Piekarski, John L., to Ozburn-Janesville Corporation. Headlights reminder and coin holder. 244,105, 4-19-77, Cl. D87-3.00B.
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Polaroid Corporation: *See*—
Augustin, Rolf M., Jr.; and Cutler, Norman W., Jr., 244,089.
Ray Control Corporation: *See*—
Imber, Marion; and Wezenter, Seymour, 244,075.
Robert, Tony. Wall mountable aquarium or similar article. 244,099, 4-19-77, Cl. D30-7.000.
Saltz, Richard B., to Charlton Co., Inc. Table. 244,076, 4-19-77, Cl. D6-177.000.
Saltz, Richard B., to Charlton Co., Inc. Shelf unit or similar article. 244,077, 4-19-77, Cl. D6-186.000.
Schaecher, John J. Barbecue tool cabinet. 244,072, 4-19-77, Cl. D6-128.000.
Spencer, Clifford A., to Eaton Corporation. Golf club grip. 244,100, 4-19-77, Cl. D34-5.0GS.
Stanbrough, Jerry L.: *See*—
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Steinbach, Robert L., to Chicago Lock Co. Key blank for an axial tumbler-type lock. 244,081, 4-19-77, Cl. D8-347.000.
Styron, Woodland McAdoo, Jr. Hanging chair. 244,068, 4-19-77, Cl. D6-47.000.
Summer, Leon. Convertible seat or similar article. 244,069, 4-19-77, Cl. D6-63.000.
Takenaka, Kazumasa; and Ohta, Kikuo, to Matsushita Electric Industrial Co., Ltd. Combined portable radio and tape recorder. 244,102, 4-19-77, Cl. D14-5.000.
Toledo Metal Furniture Company: *See*—
Uhl, Philip E., 244,067.
Uhl, Philip E., to Toledo Metal Furniture Company. Collapsible picnic table. 244,067, 4-19-77, Cl. D6-45.000.
Urbaniec, Donald M.; Stanbrough, Jerry L.; and Masters, Alois A. Audio and visual display booth. 244,073, 4-19-77, Cl. D6-157.000.
Vinyl-Fab Industries: *See*—
Gannon, Peter F., 244,093.
Wahi, Chander M.; and Baumler, Robert J. Capacitor. 244,095, 4-19-77, Cl. D13-21.000.
West, John Brownridge. Ruler. 244,090, 4-19-77, Cl. D19-35.000.
Wezenter, Seymour: *See*—
Imber, Marion; and Wezenter, Seymour, 244,075.
Willard, Jack August, to Formica Corporation. Deep textured decorative laminate sheet. 244,094, 4-19-77, Cl. D25-84.000.
Wirkkala, Tapio, to A. Ahlstrom Osakeyhtio. Plate. 244,064, 4-19-77, Cl. D7-23.000.
Zola, Colman. Buffet. 244,074, 4-19-77, Cl. D6-164.000.

# CLASSIFICATION OF PATENTS

## ISSUED APRIL 19, 1977

NOTE.—First number, class; second number, subclass; third number, patent number

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2 4,018,581
50 4,018,582
55 4,018,059
91 4,018,060
101 4,018,583
125 4,018,061
175 4,018,584
372 4,018,585

**CLASS 64**
7 4,018,062

**CLASS 65**
2 4,018,586
17 4,018,587
19 4,018,588
163 Re.29,188
287 4,018,589
348 4,018,590

**CLASS 66**
90 4,018,063
154 A 4,018,064
208 4,018,065

**CLASS 68**
5 D 4,018,066
134 4,018,067
175 4,018,068

**CLASS 70**
395 4,018,069

**CLASS 71**
23 4,018,591
67 4,018,592
76 4,018,593
97 4,018,594

**CLASS 72**
19 4,018,070
23 4,018,071
106 4,018,072
199 4,018,073
410 4,018,074
467 4,018,075
481 4,018,076

**CLASS 73**
1 D 4,018,078
1 R 4,018,077
4 R 4,018,079
15.6 4,018,080
41 4,018,081
67.5 R 4,018,082
70 4,018,083
71.5 R 4,018,084
88 R 4,018,085
119 A 4,018,086
146 4,018,087
151 4,018,088
422 R 4,018,089

**CLASS 74**
52 4,018,090
89.15 4,018,091
96 4,018,092
126 4,018,093
128 4,018,094
217 B 4,018,095
230.01 4,018,096
467 4,018,097
470 4,018,098
473 R 4,018,099
483 PB 4,018,100
493 4,018,101
501 R 4,018,102
519 4,018,103
531 4,018,104
665 GE 4,018,105
688 4,018,106

**CLASS 75**
.5 A 4,018,595
.5 AA 4,018,596
58 4,018,597
61 4,018,598
165 4,018,599
169 4,018,600

**CLASS 76**
41 4,018,107
63 4,018,108
77 4,018,109

**CLASS 81**
3.1 B 4,018,110
71 4,018,111

**CLASS 82**
1 C 4,018,112
2 B 4,018,113
20 4,018,114
39 4,018,115

**CLASS 83**
4 4,018,116
16 4,018,117
167 4,018,118
425.3 4,018,119
529 4,018,120

**CLASS 84**
1.01 4,018,121
1.03 4,018,122
4,018,123
1.16 4,018,124
1.19 4,018,125
1.24 4,018,126
1.28 4,018,127
231 4,018,128
294 4,018,129
415 4,018,130
484 4,018,131

**CLASS 85**
1 L 4,018,132
35 4,018,133

**CLASS 90**
15 R 4,018,134

**CLASS 91**
321 4,018,135
420 4,018,136
488 4,018,137
4,018,138
490 4,018,139

**CLASS 92**
31 4,018,140
85 A 4,018,141

**CLASS 93**
35 H 4,018,142
36.3 4,018,143
52 4,018,144

**CLASS 96**
1 SD 4,018,601
1.5 4,018,602
4,018,603
1.7 4,018,606
4,018,607
27 E 4,018,608
29 L 4,018,605
48 R 4,018,604
74 4,018,609
124 4,018,610

**CLASS 98**
40 D 4,018,160
40 VM 4,018,159

**CLASS 99**
458 4,018,145

**CLASS 100**
26 4,018,146
39 4,018,169
45 4,018,147
53 4,018,148
160 4,018,149
231 4,018,150

**CLASS 101**
40 4,018,151
45 4,018,152
93 4,018,153
93.02 4,018,154
93.33 4,018,155
106 4,018,156
110 4,018,157
132.5 4,018,158
231 4,018,161
473 4,018,162

**CLASS 102**
23 4,018,163
78 4,018,164

**CLASS 104**
9 4,018,165

**CLASS 105**
316 4,018,166

**CLASS 106**
15 R 4,018,611
39.7 4,018,612
53 4,018,613
57 4,018,614
4,018,858
69 4,018,615
74 4,018,616
85 4,018,617
90 4,018,618
118 4,018,619

**CLASS 108**
152 4,018,167

**CLASS 110**
38 4,018,168

**CLASS 111**
7 4,018,170

**CLASS 112**
79 R 4,018,171
215 4,018,172
231 4,018,173
235 4,018,174
254 4,018,175

**CLASS 113**
1 G 4,018,176
119 4,018,177
121 C 4,018,178

**CLASS 114**
45 4,018,179
65 R 4,018,180
151 4,018,181

**CLASS 116**
173 4,018,182

**CLASS 118**
49 4,018,183
49.1 4,018,184
308 4,018,185
405 4,018,186
658 4,018,187

**CLASS 119**
28 4,018,188
109 4,018,189

**CLASS 123**
3 4,018,190
8.45 4,018,191
25 C 4,018,192
30 C 4,018,193
32 C 4,018,194
41.76 4,018,195
75 B 4,018,196
117 D 4,018,197
119 A 4,018,198
127 4,018,199
139 AW 4,018,200
139 E 4,018,201
148 E 4,018,202
182 4,018,203
198 F 4,018,204

**CLASS 124**
24 R 4,018,205

**CLASS 125**
11 B 4,018,207
11 CD 4,018,206

**CLASS 126**
121 4,018,208
4,018,209
164 4,018,210
270 4,018,211
4,018,212
271 4,018,213
4,018,214
4,018,215
360 R 4,018,216

**CLASS 127**
37 4,018,620

**CLASS 128**
1 C 4,018,218
1 R 4,018,217
2.06 A 4,018,219
130 4,018,220
185 4,018,221
216 4,018,222
218 C 4,018,223
276 4,018,224
285 4,018,225
287 4,018,226
303.1 4,018,227
305 4,018,228
326 4,018,229

344 4,018,230
351 4,018,231

**CLASS 130**

27 T 4,018,232

**CLASS 131**

17 AC 4,018,233
140 B 4,018,234
236 4,018,235
240 R 4,018,236

**CLASS 132**

83 R 4,018,237
143 4,018,238

**CLASS 134**

5 4,018,621
19 4,018,622
21 4,018,623
143 4,018,239
196 4,018,240

**CLASS 136**

225 4,018,625
233 4,018,624

**CLASS 137**

14 4,018,241
81 4,018,243
113 4,018,244
270 4,018,245
318 4,018,246
355.18 4,018,242
512.1 4,018,247
514.3 4,018,248
624.11 4,018,249

**CLASS 138**

140 4,018,250

**CLASS 140**

112 4,018,251

**CLASS 141**

45 4,018,252
65 4,018,253

**CLASS 144**

32 R 4,018,254
34 R 4,018,255
238 4,018,256

**CLASS 148**

1.5 4,018,626
4,018,627
6.27 4,018,628
9 R 4,018,629
11.5 P 4,018,630
31.5 4,018,631
126 4,018,632
4,018,633
131 4,018,634

**CLASS 149**

2 4,018,635
19.4 4,018,636
96 4,018,637

**CLASS 151**

41.72 4,018,257

**CLASS 152**

208 4,018,258
359 4,018,570

**CLASS 156**

73.1 4,018,639
86 4,018,640
137 4,018,641
272 4,018,642
297 4,018,643
446 4,018,644
626 4,018,638

**CLASS 160**

26 4,018,259
327 4,018,260

**CLASS 162**

76 4,018,645
146 4,018,646
168 R 4,018,647
199 4,018,648

**CLASS 164**

282 4,018,261

**CLASS 165**

1 4,018,262
4,018,263
4,018,264
7 4,018,265
12 4,018,266
84 4,018,267
86 4,018,268
105 4,018,269
119 4,018,270
175 4,018,271

**CLASS 166**

119 4,018,272
120 4,018,273
129 4,018,274
137 4,018,275
183 4,018,276
214 4,018,277
252 4,018,278
258 4,018,279
266 4,018,280
273 4,018,281
278 4,018,282
4,018,283
295 4,018,284
4,018,285
4,018,286

**CLASS 172**

19 4,018,287
395 4,018,288
713 4,018,289

**CLASS 173**

49 4,018,290
135 4,018,291
170 4,018,292

**CLASS 174**

19 4,018,976
24 4,018,977
28 4,018,978
35 C 4,018,979
42 4,018,980
52 R 4,018,981
65 R 4,018,982
135 4,018,983

**CLASS 175**

4.5 4,018,293

**CLASS 178**

18 4,018,989

**CLASS 179**

1 GQ 4,018,992
15 BT 4,018,994
15 BY 4,018,993
79 4,018,995
84 VF 4,018,991
4,018,996
98 4,018,997
103 4,018,998
170 D Re.29,189

**CLASS 180**

9.5 4,018,295
13 4,018,294
41 4,018,296
54 A 4,018,297
76 4,018,298
91 4,018,299

**CLASS 182**

178 4,018,300
206 4,018,301

**CLASS 184**

6.26 4,018,302
4,018,303
7 R 4,018,304
45 R 4,018,305

**CLASS 187**

6 4,018,306
9 E 4,018,307
17 4,018,308

**CLASS 188**

72.4 4,018,309
73.3 4,018,310
218 XL 4,018,311
333 4,018,312
343 4,018,313
353 4,018,314

**CLASS 191**

39 4,018,315

**CLASS 192**

3.3 4,018,316
36 4,018,317
41 A 4,018,318
53 E 4,018,319
106.2 4,018,320

**CLASS 193**

25 B 4,018,321
37 4,018,322

**CLASS 195**

1.8 4,018,649
28 R 4,018,650
103.5 C 4,018,651
103.5 M 4,018,652
127 4,018,653

**CLASS 198**

347 4,018,324
4,018,325
461 4,018,326
508 4,018,323
723 4,018,327
741 4,018,328
743 4,018,329

**CLASS 200**

5 A 4,018,999
11 D 4,019,000
34 4,019,001
61.18 4,019,002
61.42 4,019,003
61.43 4,019,004
144 R 4,019,005
4,019,006
148 B 4,019,007
153 SC 4,019,008

**CLASS 201**

9 4,018,654
40 4,018,655

**CLASS 203**

11 4,018,656
38 4,018,657

**CLASS 204**

109 4,018,658
159.24 4,018,659
195 F 4,018,661
195 R 4,018,660
299 R 4,018,662

**CLASS 206**

106 4,018,330
199 4,018,331
223 4,018,332
343 4,018,333
346 4,018,334
422 4,018,335
460 4,018,336
484 4,018,337
505 4,018,338

**CLASS 208**

10 4,018,663
11 LE 4,018,664
4,018,665
36 4,018,666
134 4,018,667
139 4,018,668
4,018,669
140 4,018,670
152 4,018,671
216 4,018,672

**CLASS 209**

5 4,018,673
73 4,018,674
86 4,018,675

**CLASS 210**

24 4,018,676
33 4,018,677
36 4,018,678
4,018,679
4,018,680
66 4,018,681
71 4,018,682
4,018,683
140 4,018,684
141 4,018,685
448 4,018,686
4,018,687

**CLASS 211**

8 4,018,339
44 4,018,340
59.1 4,018,341

**CLASS 214**

1 BB 4,018,344
4,018,345
4,018,346
1 BT 4,018,342
1 Q 4,018,343
16 B 4,018,347
17 B 4,018,348
87 4,018,349
140 4,018,350
314 4,018,351
761 4,018,352

**CLASS 215**

253 4,018,353

**CLASS 219**

10.55 F 4,019,009
4,019,010
76 Re.29,190
4,019,011
79 4,019,012
98 4,019,013
118 4,019,014
121 EB 4,019,015
125 R 4,019,016
135 4,019,017
137 R 4,019,018
146 4,019,019
302 4,019,020
381 4,019,021
386 4,019,022
400 4,019,023
469 4,019,024

**CLASS 220**

20 4,018,354
23 4,018,355
220 4,018,356
268 4,018,357

**CLASS 221**

7 4,018,358
14 4,018,359
310 4,018,360

**CLASS 222**

5 4,018,361
55 4,018,362
80 4,018,363
190 4,018,364
373 Re.29,184
402.11 4,018,365
412 4,018,366
485 4,018,367

**CLASS 223**

37 4,018,368
78 4,018,382

**CLASS 224**

9 4,018,369
25 A 4,018,370
26 R 4,018,371

**CLASS 225**

2 4,018,372

**CLASS 228**

44.1 A 4,018,373
121 4,018,374
131 4,018,375
158 4,018,376

**CLASS 229**

22 Re.29,185
27 4,018,377
31 R 4,018,378

**CLASS 232**

35 4,018,379

**CLASS 235**

61.11 E 4,019,026
61.11 R 4,019,025
89 R 4,019,027
92 PD 4,019,029
92 SB 4,019,028
92 SH 4,019,040
105 4,019,030
131 FD 4,019,031
150.5 4,019,032
151.1 4,019,036
151.11 4,019,035
151.3 4,019,034
153 AM 4,019,033
156 4,019,037
181 4,019,038
184 4,019,039

**CLASS 237**

12.3 C 4,018,380
55 4,018,381

**CLASS 239**

4 4,018,383
102 4,018,385
200 4,018,386
265.19 4,018,384
405 4,018,387

**CLASS 240**

1.3 4,019,041
4,019,042
4,019,043
25 4,019,044
41 BM 4,019,045
46.59 4,019,046
54 A 4,019,047

**CLASS 241**

39 4,018,388
67 4,018,389
82.5 4,018,390
152 A 4,018,391
167 4,018,392
182 4,018,393
200 4,018,394
252 4,018,395
301 4,018,396

**CLASS 242**

54 A 4,018,397
74.1 4,018,398
107.4 A 4,018,399
4,018,400
118.3 4,018,401
192 4,018,402
198 4,018,403
200 4,018,404

**CLASS 244**

3.14 4,018,405
98 4,018,406
153 R 4,018,407
4,018,408
161 4,018,409

**CLASS 246**

5 4,018,410

**CLASS 248**

4,018,411
214 4,018,412
4,018,413
317 4,018,414
381 4,018,415

**CLASS 249**

62 4,018,416

**CLASS 250**

199 4,019,048
211 R 4,019,049
222 R 4,019,050
227 4,019,051
274 4,019,052
303 4,019,053
319 4,019,054
324 4,019,055
344 4,019,056
375 4,019,057
376 4,019,058
451 4,019,059
461 R 4,019,060
470 4,019,061
492 R 4,019,062
511 4,018,716
523 4,019,063
543 4,019,064
553 4,019,065
562 4,019,066

**CLASS 251**

63.5 4,018,417
63.6 4,018,418
65 4,018,419
172 4,018,420

**CLASS 252**

8.55 C 4,018,689
8.6 4,018,688
62.51 4,018,690
62.54 4,018,691
62.57 4,018,692
64 4,018,693
69 4,018,694
73 4,018,695
89 R 4,018,696
301.1 R 4,018,697
301.4 R 4,018,698
353 4,018,699
389 A 4,018,700
4,018,701
389 R 4,018,702
394 4,018,703
411 R 4,018,704
4,018,705
430 4,018,706
4,018,707
431 C 4,018,708
435 4,018,709
439 4,018,710
455 Z 4,018,711
456 4,018,712
464 4,018,713
465 4,018,714
510 4,018,715
513 4,018,717
522 4,018,718
4,018,719
534 4,018,720

**CLASS 254**

8 B 4,018,421
134.3 PA 4,018,422
158 4,018,423
187.1 4,018,424

**CLASS 256**

54 4,018,425

**CLASS 259**

7 4,018,426
81 R 4,018,427

**CLASS 260**

2 A 4,018,721
2.3 4,018,722
2.5 AB 4,018,724
2.5 AH 4,018,723
2.5 F 4,018,725
8 4,018,726
13 4,018,727
17 R 4,018,728
4,018,729
17.4 R 4,018,730
23.7 N 4,018,731
27 EV 4,018,733
27 R 4,018,732
29.1 R 4,018,735
29.1 SB 4,018,734
29.2 N 4,018,736
29.6 XA 4,018,737
40 R 4,018,738
59 R 4,018,739
70 A 4,018,740
71 4,018,741
75 N 4,018,742
77.5 AT 4,018,745
77.5 B 4,018,744
77.5 CH 4,018,743
78 A 4,018,749
78 R 4,018,750
4,018,746
4,018,747
4,018,748
112 R 4,018,752
112.5 R 4,018,753
4,018,754
123.5 4,018,755
146 R 4,018,756
205 4,018,751
239 BC 4,018,765
239.5 4,018,757
239.55 R 4,018,774
240.3 4,018,758
243 C 4,018,759
4,018,760
4,018,761
4,018,776
243 R 4,018,762
245 4,018,763
246 R 4,018,764
247.2 A 4,018,767
247.2 B 4,018,766
248 AS 4,018,768
248 NS 4,018,769
251 R 4,018,771
256.4 N 4,018,770
268 BC 4,018,772
268 PH 4,018,773
287 C 4,018,780
293.68 4,018,775
295.5 R 4,018,777
296 AE 4,018,778
296 P 4,018,779
297 B 4,018,781
302 R 4,018,784
306.7 T 4,018,785
4,018,786
306.8 D 4,018,787
307 F 4,018,782
308 R 4,018,788
309.2 4,018,789
4,018,790
314.5 4,018,791
329 S 4,018,792
330.5 4,018,793
332.2 A 4,018,794
340.3 4,018,795
343.2 R 4,018,796
343.3 R 4,018,783
4,018,797
345.2 4,018,798
345.5 4,018,799
347.2 4,018,800
348 R 4,018,801
399 4,018,802
408 4,018,803
410.9 R 4,018,804
413 4,018,805
428.5 4,018,806
439 R 4,018,807
4,018,808
446 4,018,809
465 D 4,018,810
468 D 4,018,812
468 K 4,018,811
471 A 4,018,813
471 C 4,018,814
485 G 4,018,815
486 R 4,018,816
500.5 H 4,018,817
501.17 4,018,818
502.4 R 4,018,819
514 D 4,018,820
534 M 4,018,821
551 P 4,018,822
561 B 4,018,829
570.5 C 4,018,823
570.6 4,018,825
570.7 4,018,824
570.9 4,018,830
583 P 4,018,826
586 P 4,018,827
591 4,018,828
601 R 4,018,831
613 B 4,018,832



621 R 4,018,833
632 HF 4,018,834
635 C 4,018,835
648 R 4,018,836
652.5 R 4,018,837
654 R 4,018,838
666 R 4,018,839
668 B 4,018,840
671 R 4,018,841
675.5 4,018,842
677 A 4,018,843
677 R 4,018,844
683.2 4,018,845
683.59 4,018,846
831 4,018,847
834 4,018,848
849 4,018,849
859 R 4,018,851
878 R 4,018,852
885 4,018,853
941 4,018,854
947 4,018,855

**CLASS 261**

23 A 4,018,856
87 4,018,859

**CLASS 264**

24 4,018,857
39 4,018,860
61 4,018,861
137 4,018,862
249 4,018,863
299 4,018,864

**CLASS 267**

65 R 4,018,428

**CLASS 269**

20 4,018,429
156 4,018,430

**CLASS 270**

52.5 4,018,431
61 R 4,018,432

**CLASS 271**

80 4,018,433
96 4,018,434

**CLASS 272**

33 R 4,018,435
62 4,018,437
65 4,018,438
70.3 4,018,439
4,018,440
75 4,018,441
123 4,018,442

**CLASS 273**

35 B 4,018,436
85 R 4,018,443
109 4,018,444
135 B 4,018,445
136 F 4,018,446

**CLASS 274**

10 R 4,018,447
42 R 4,018,448

**CLASS 280**

33.99 C 4,018,449
289 R 4,018,450
461 A 4,018,451
481 4,018,452
512 4,018,453
602 4,018,454
605 4,018,455
618 4,018,456
735 4,018,457
766 4,018,458

**CLASS 285**

5 4,018,459
39 4,018,460
110 4,018,461
111 4,018,462
166 4,018,463
197 4,018,464

**CLASS 292**

336.3 4,018,465

**CLASS 293**

71 R 4,018,466

**CLASS 294**

31.2 4,018,467
67 BA 4,018,468
82 R 4,018,469
89 4,018,470
90 4,018,471

**CLASS 296**

1 S 4,018,472
28 C 4,018,473
28 R 4,018,474
4,018,475
137 F 4,018,476

**CLASS 297**

284 4,018,477
385 4,018,478
455 4,018,479

**CLASS 298**

27 4,018,480

**CLASS 299**

4 4,018,481

**CLASS 301**

6 E 4,018,482

**CLASS 302**

25 4,018,483
52 4,018,484

**CLASS 303**

13 4,018,485
97 4,018,486

**CLASS 307**

118 4,019,067
205 4,019,068
256 4,019,069
279 4,019,070
296 R 4,019,071

**CLASS 310**

8.1 4,019,072
8.2 4,019,073
9.5 4,019,074
206 4,019,075
233 4,019,076

**CLASS 312**

27 4,018,487
348 4,018,488

**CLASS 313**

178 4,019,077
217 4,019,078
231.4 4,019,079
317 4,019,080
346 R 4,019,081
4,019,082
372 4,019,083
388 4,019,084
402 4,019,085
518 4,019,086

**CLASS 315**

3.5 4,019,087
5.24 4,019,088
5.43 4,019,089
8.5 4,019,090
111.8 4,019,091
159 4,019,092
370 4,019,093

**CLASS 316**

5 4,018,489
21 4,018,490

**CLASS 318**

37 4,019,103
195 4,019,104
227 4,019,105
252 4,019,106
338 4,019,107
353 4,019,108
640 4,019,109
696 4,019,110

**CLASS 320**

23 4,019,111
48 4,019,112

**CLASS 321**

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## CLASSIFICATION OF DESIGNS

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| D2— | 351 | 244,061 | | 128 | 244,072 | | 23 | 244,064 | | 193 | 244,085 | | 93 | 244,097 | D30— | 7 | 244,099 |
| | | 244,062 | | 157 | 244,073 | | | 244,065 | D10— | 38 | 244,086 | D16— | 10 | 244,089 | | 14 | 244,098 |
| D6— | 37 | 244,066 | | 164 | 244,074 | D8— | 41 | 244,079 | D11— | 160 | 244,087 | D19— | 35 | 244,090 | D34— | 5 GS | 244,100 |
| | 45 | 244,067 | | 177 | 244,076 | | 338 | 244,080 | D12— | 187 | 244,088 | | 38 | 244,091 | | 15 AJ | 244,101 |
| | 47 | 244,068 | | 179 | 244,075 | | 347 | 244,081 | D13— | 21 | 244,095 | D23— | 2 | 244,092 | D56— | 1 A | 244,104 |
| | 63 | 244,069 | | 186 | 244,077 | | 351 | 244,082 | D14— | 5 | 244,102 | D25— | 64 | 244,093 | | 1 R | 244,103 |
| | | 244,070 | | 191 | 244,078 | | 354 | 244,083 | | 86 | 244,096 | | 84 | 244,094 | D87— | 3 B | 244,105 |
| | 71 | 244,071 | D7— | 15 | 244,063 | D9— | 157 | 244,084 | | | | | | | | | |

## CLASSIFICATION OF PLANTS

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| P.— | 41 | 4,042 | | | | | | | | | |

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## PLANT PATENTS

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U. S. GOVERNMENT PRINTING OFFICE : O - 1977

# OFFICIAL GAZETTE of the
# UNITED STATES PATENT and TRADEMARK OFFICE

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# PATENT AND TRADEMARK OFFICE NOTICES

## Official Seal

The Patent and Trademark Office announces a change in the Official Seal of the Office, pursuant to P.L. 93–596, which changed the name of the Office to the Patent and Trademark Office.

Beginning with Letters Patent issued on March 22, 1977, Trademark Registrations issued on March 8, 1977, and Certificates of Correction issued on March 1, 1977, the seal embossed on the document shows the name "Patent and Trademark Office" in lieu of "Patent Office." The emblem portion of the Official Seal has not been changed.

Date: 4–1–77. RICHARD J. SHAKMAN,
*Assistant Commissioner for Administration.*

## Patent Suits

**Notices under 35 U.S.C. 290; Patent Act of 1952**

**3,371,455,** G. C. Fox, SWIMMING POOL STRUCTURE, **filed** July 22, 1976, D.C.N.J. (Trenton), Doc. C–76–1421, *Fox Pool Corporation* v. *Blue Wtaer Pools and Construction Co. Inc.* **Same, filed** Nov. 23, 1976, D.C., N.D.N.Y. (Utica), Doc. 76–CV–494, *Fox Pool Corporation* v. *Imperial Pools Inc.*

**3,413,171,** D. F. Hannon, PROCESS OF MAKING IDENTIFICATION CARDS; **3,417,497,** same, IDENTIFICATION CARD, **filed** June 15, 1973, D.C., N.D. Ill. (Chicago), Doc. 73c1554, *Laminex Inc.* v. *Ronald C. Fritz et al.* Decision, none of the claims have been infringed and patents are invalid, Aug. 13, 1974.

**3,417,497.** (See 3,413,171.)

**3,495,668,** P. W. Schumacher, DRILL BIT, **filed** Dec. 1, 1976, D.C., S.D. Tex. (Houston), Doc. CA–76–H–1969, *Reed Tool Company* v. *Hughes Tool Company.* **Same, filed** Dec. 1, 1976, D.C., S.D. Tex. (Houston), Doc. CA–76–H–1968, *Reed Tool Company* v. *Smith International Inc.*

**3,575,678,** W. F. Barton, REED SWITCH ASSEMBLY, **filed** Aug. 9, 1973, D.C., N.D. Ill. (Chicago), Doc. 73c2034, *Grigsby Barton Inc.* v. *Lincoln, Hodges & Associates Inc.* Pursuant to stipulation between the parties, ordered that this cause be and the same is hereby dismissed, Nov. 4, 1974.

**3,599,921,** W. J. Cumber, INDEPENDENT SUPPORT CLIPS; **3,993,735,** M. R. Irani, CLEANUP OF WET PROCESS PHOSPRORIC ACID, **filed** Aug. 30, 1974, D.C., N.D. Ill. (Chicago), Doc. 74c2504. *Erico Products Inc.* v. *Minerallac Electric Company.* Cause dismissed without prejudice and without costs, pursuant to stipulation of the parties, Mar. 31, 1976.

**3,611,910,** J. S. Hughes, CORN POPPER, **filed** Jan. 24, 1974, D.C., N.D. Ill. (Chicago), Doc. 74c204, *Ropat Corporation* v. *Mirron Aluminum Company.* The plaintiff is collaterally estopped and permanently barred from asserting U.S. patent and any claim thereof against the defendants, and that judgment is entered in favor of defendants, Sept. 28, 1976.

**3,619,381,** G. R. Fitterer, DETERMINING OXYGEN CONTENT OF MATERIALS. **filed** Dec. 6, 1976, D.C., W.D. Pa. (Pittsburgh), Doc. C.A.76–1520, *Fitterer Engineering Assoc. Inc. and Dr. George R. Fitterer* v. *Electro Nite Company.*

**3,621,143,** C. W. Chambers, CURRENT CONTROLLED VOLTAGE BOOSTER FOR TELEPHONE SYSTEMS; **3,639,696,** same, MULTISTAGE VOLTAGE BOOSTER CIRCUIT FOR TELEPHONE SYSTEMS, **filed** Dec. 27, 1973, D.C., N.D. Ill. (Chicago), Doc. 73c3234, *Lorain Products Corporation* v. *Telephone and Data Products Inc.* Enter stipulation of dismissal as to Loraine Products Corp. and Telephone and Data Products Inc., Jan. 16, 1975.

**3,639,690.** (See 3,621,143.)

**3,646,748,** F. A. Lang, TENDONS FOR PRESTRESSED CONCRETE AND PROCESS FOR MAKING SUCH TENDONS, **filed** Dec. 7, 1976, D.C. Del. (Wilmington), Doc. 76–432, *PIC Incorporated* v. *The Prescon Corporation.*

**3,651,813,** M. D. Bryne, CRYOSURGICAL DELIVERY AND APPLICATION OF LIQUEFIED GAS COOLANT, **filed** Nov. 29, 1976, D.C., C.D. Calif. (Los Angeles), Doc. CV–76–3684–MML, *Brymill Corporation* v. *Gilmore Liquid Air Company.*

**3,669,499,** Semplonius and Kolk, CHAIR, **filed** May 2, 1975, D.C., N.D. Ill. (Chicago), Doc. 75c1414, *Steelcase Inc.* v. *Emeco Industries Inc. and Al Treiber.* Motion of the defendants to dismiss the complaint is granted, and the complaint is dismissed for lack of venue. Mar. 24, 1976.

**3,681,084,** J. C. Kanzelberger, CONTAINER, **filed** Sept. 20, 1972, D.C., N.D. Ill. (Chicago), Doc. 72c2334, *Contemporary Inc.* v. *Ronald T. Jedlinski, doing business as Roman's Religious Goods and Roman's Art & Goods.* Enter final judgment on consent. Mar. 29, 1976.

**3,722,399,** J. E. Cole, POPCORN POPPER HAVING AUTOMATIC BUTTERING MEANS; **Re. 27,920,** same, **filed** Mar. 21, 1974, D.C., N.D. Ill. (Chicago), Doc. 74c794, *Scovill Manufacturing Co.* v. *K Mart Enterprises of Illinois Inc.* Pursuant to stipulation between the parties, ordered cause dismissed with prejudice, Jan. 21, 1975.

**3,746,608,** M. Takahashi, SHAPED ARTICLE OF SYNTHETIC RESIN HAVING MECHANICALLY DISORDERED ORIENTATION, **filed** Dec. 9, 1974, D.C., N.D. Ill. (Chicago), Doc. 74c3554, *Weld-Loc Systems Inc.* v. *B. H. Bunn Company.* Cause dismissed without prejudice and pursuant to stipulation of the parties, Mar. 31, 1975. **Same, filed** Dec. 3, 1976, D.C., N.D. Ill. (Chicago), Doc. 76c4461, *Weld-Loc Systems* v. *Interlake Inc.*

**3,774,785,** A. J. Gasseling, KILN LAYING APPARATUS, **filed** Nov. 19. 1976, D.C. Wash. (Spokane), Doc. C–76–295, *Allen J. Gasseling* v. *Ronald McDonald, Jane Doe McDonald and L & R Building Sales Inc.*

**3,775,951,** Elchholz and McCambridge, VACUUM CLEANER, **filed** Jan. 9, 1974, D.C., N.D. Ill. (Chicago), Doc. 74c64, *Central Quality Industries Inc.* v. *Shelton Products Inc. et al.* By agreement cause dismissed without prejudice and without costs, May 30, 1974.

**3,799,433,** Bauer, Cairo and Holkeboer, SPACE THERMOSTAT WITH AUTOMATIC SOLID STATE ANTICIPATOR; **3,948,441,** Perkins, Nurnberg and Goodhouse, TIME VARIABLE THERMOSTAT, **filed** Sept. 8, 1976, D.C., E.D. Mich. (DETROIT). Doc. 76–71848, *Robertshaw Controls Company* v. *Emerson Electric Co.*

**3,826,271,** Sattler and Phillips, AWNING CONSTRUCTION, **filed** Dec. 2, 1976, D.C., E.D. Tenn. (Chattanooga), Doc. 1–76–294, *Wildwood Products Inc.* v. *A & E Plasik Pak Co. Inc.*

**3,948,441.** (See 3,799,433.)

**3,993,735.** (See 3,599,921.)

**Re. 27,126,** W. P. Gingery, DUAL SPLINED SHAFT ASSEMBLY FOR A CLUTCH. **filed** Jan. 31, 1972, D.C., N.D. Ill. (Chicago), Doc. 72c264, *Super-Drive Products Inc.* v. *Illinois Auto Truck Co. Inc.* Order cause dismissed with leave to reinstate, Feb. 2, 1973. Filed stipulation of dismissal, Mar. 21, 1973.

**Re. 27,920.** (See 3,722,399.)





## REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b)).

**3,316,574,** Re. S.N. 773,249, Filed Mar. 1, 1977, Cl. 14/16, ROAD EXPANSION JOINT, Robert Lee Pare, Owner of Record: *The General Tire & Rubber Company, Akron, Ohio,* Attorney or Agent: Frank C. Rote, Jr., et al., Ex. Gp.: 352

**3,375,763,** Re. S.N. 773,250, Filed Mar. 1, 1977, Cl. 94/18, ELASTOMERIC EXPANSION JOINT, John A. Welch, Owner of Record: *The General Tire & Rubber Company, Akron, Ohio,* Attorney or Agent: Frank C. Rote, Jr., et al., Ex. Gp.: 352

**3,428,735, Re.** S.N. 776,464, Filed Mar. 10, 1977, Cl. 424/330, METHOD OF TREATING DEPRESSION WITH 5-(3-DIMETHYLAMINOPROPYLIDENE) DIBENZO [a,d][1,4] CYCLOHEPTADIENE OR ITS NON-TOXIC SALTS THEREOF, Edward L. Engelhardt, Owner of Record: *Merck & Co., Inc., Rahway, N.J.,* Attorney or Agent: Harry E. Westlake, Jr., et al., Ex. Gp.: 125

**3,828,864,** Re. S.N. 773,301, Filed Mar. 1, 1977, Cl. 173/49, PILE DRIVER AND EXTRACTOR, Edwin Haverkamp, et al., Owner of Record: *Assors. to H & M Vibro, Inc., Grandville, Mich.,* Attorney or Agent: Price, Heneveld, Huizenga & Cooper, Ex. Gp.: 355

**3,869,380,** Re. S.N. 773,304, Filed Mar. 1, 1977, Cl. 210/17, TREATMENT OF WASTEWATER, Wilbur N. Torpey, Owner of Record: *Autotrol Corporation, Milwaukee, Wis.,* Attorney or Agent: Thomas W. Ehrmann, et al., Ex. Gp.: 176

**3,870,695,** Re. S.N. 775,665, Filed Mar. 8, 1977, Cl. 260/146 R, HEAVY METAL COMPLEXES OF AZO DYESTUFFS CONTAINING A 2-AMINO-3-HYDROXYPYRIDINE AS COUPLING COMPONENT, Gerhard Back, et al., Owner of Record: *Ciba-Geigy AG, Basel, Switzerland,* Attorney or Agent: Karl F. Jorda, et al., Ex. Gp.: 117

**3,872,498,** Re. S.N. 775,865, Filed Mar. 9, 1977, Cl. 358/21, COLOR INFORMATION TRANSLATING SYSTEMS, Dalton Harold Pritchard, Owner of Record: *RCA Corporation, New York, N.Y.,* Attorney or Agent: Eugene M. Whitacre, et al., Ex. Gp.: 358

**3,873,382,** Re. S.N. 775,069, Filed Mar. 7, 1977, Cl. 148/171, PROCESS FOR THE PREPARATION OF SEMICONDUCTOR MATERIALS AND DEVICES, Warren O. Groves, et al., Owner of Record: *Monsanto Company, St. Louis, Mo.,* Attorney or Agent: Peter S. Gilster, Ex. Gp.: 111

**3,900,937,** Re. S.N. 774,851, Filed Mar. 7, 1977, Cl. 29/200, SPOT CLINCH MEANS AND METHOD, Louis C. Schleicher, Owner of Record: *Inventor,* Attorney or Agent: William L. Fisher, Ex. Gp.: 321

**3,912,545,** Re. S.N. 775,004, Filed Mar. 7, 1977, Cl. 148/1.5, PROCESS AND PRODUCT FOR MAKING A SINGLE SUPPLY N-CHANNEL SILICON GATE DEVICE, William E. Armstrong, Owner of Record: *Motorola, Inc., Chicago, Ill.,* Attorney or Agent: Vincent J. Rauner, Ex. Gp.: 111

**3,933,052,** Re. S.N. 774,590, Filed Mar. 7, 1977, Cl. 74/18.1, PRESSURE COMPENSATED HERMETICALLY SEALED TRANSMISSION SYSTEM, Carl R. Coles, Owner of Record: *Inventor,* Attorney or Agent: Howard H. Darbo, et al., Ex. Gp.: 345

**3,937,811,** Re. S.N. 776,935, Filed Mar. 11, 1977, Cl. 424/64, FATTY COMPOSITIONS FOR USE IN COSMETIC MAKEUP COMPOSITIONS AND SAID COSMETIC MAKEUP COMPOSITIONS, Christos Papantoniou, et. al., Owner of Record: *Societe Anonyme Diete: L'Oreal, Paris, France,* Attorney or Agent: John W. Malley, et. al., Ex. Gp.: 125

**3,942,224,** Re. S.N. 776,449, Filed Mar. 10, 1977, Cl. 24/90 B, BUTTONING MEANS, Peter David Benmax, Owner of Record: *Inventor,* Attorney or Agent: Edwin E. Greigg, Ex. Gp.: 351

**3,953,162,** Re. S.N. 775,516, Filed Mar. 8, 1977, Cl. 8/39 B, DYEING PROCESS, Colin William Greenhalgh, et al., Owner of Record: *Imperial Chemical Industries Limited, London, England,* Attorney or Agent: John W. Malley, et al., Ex. Gp.: 144

**3,958,969,** Re. S.N. 776,471, Filed Mar. 10, 1977, Cl. 65/30 E, MANUFACTURE OF GLASS, David Gordon Loukes, et al., Owner of Record: *Pilkington Brothers Limited, St. Helens, England,* Attorney or Agent: Peter H. Smolka, et al., Ex. Gp.: 173

**3,988,519,** Re. S.N. 773,728, Filed Mar. 2, 1977, Cl. 428/15, LAMINATES OF A POLYMERIC FILM AND A NONWOVEN FABRIC, Frederick L. Stoller, Owner of Record: *Phillips Petroleum Company, Bartlesville, Okla.,* Attorney or Agent of Record: Donald J. Quigg, et al., Ex. Gp.: 164

**3,997,775,** Re. S.N. 776,022, Filed Mar. 9, 1977, Cl. 240/1.3, ELECTRONIC FLASH UNIT HAVING AN ADJUSTABLE MOUNTING MECHANISM AND MOVABLE ELECTRICAL PLUG, Jeffrey R. Stoneham, Owner of Record: *Eastman Kodak Company, Rochester, N.Y.,* Attorney or Agent: Robert W. Hampton, et al., Ex. Gp.: 211

**4,006,780,** Re. S.N. 774,375, Filed Mar. 4, 1977, Cl. 169/26, RUPTURING HEAD FOR FIRE EXTINGUISHERS, William J. Zehr, Owner of Record: *The Protectoseal Company, Bensenville, Ill.,* Attorney or Agent: Charles W. Rummler, et al., Ex. Gp.: 313

# PATENT NOTICES

## Certificates of Correction for the Week of Apr. 26, 1977

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| Re. 29,009 | 3,981,417 | 3,995,521 | 4,003,750 |
| Re. 29,136 | 3,982,232 | 3,995,734 | 4,003,780 |
| D. 243,009 | 3,982,341 | 3,995,906 | 4,003,811 |
| 3,449,620 | 3,982,670 | 3,996,425 | 4,003,816 |
| 3,485,261 | 3,982,683 | 3,996,457 | 4,003,903 |
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| 3,920,098 | 3,987,793 | 3,999,118 | 4,006,767 |
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| 3,956,255 | 3,991,480 | 4,000,998 | 4,008,434 |
| 3,957,823 | 3,991,824 | 4,001,243 | 4,008,499 |
| 3,957,898 | 3,992,458 | 4,001,265 | 4,008,695 |
| 3,960,954 | 3,992,676 | 4,001,535 | 4,008,792 |
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| 3,963,825 | 3,993,399 | 4,001,909 | 4,008,933 |
| 3,965,904 | 3,993,669 | 4,002,289 | 4,008,934 |
| 3,967,885 | 3,993,721 | 4,002,425 | 4,008,981 |
| 3,968,269 | 3,993,806 | 4,002,433 | 4,008,989 |
| 3,970,912 | 3,993,922 | 4,002,451 | 4,009,271 |
| 3,971,023 | 3,994,428 | 4,002,512 | 4,009,302 |
| 3,972,174 | 3,994,462 | 4,002,749 | 4,009,441 |
| 3,972,779 | 3,943,599 | 4,002,815 | 4,009,600 |
| 3,975,167 | 3,994,647 | 4,002,972 | 4,009,910 |
| 3,975,221 | 3,994,708 | 4,003,041 | 4,010,012 |
| 3,976,429 | 3,994,737 | 4,003,044 | 4,010,479 |
| 3,977,568 | 3,994,967 | 4,003,362 | |
| 3,980,742 | 3,995,211 | 4,003,379 | |
| 3,981,315 | 3,995,473 | 4,003,534 | |



## PATENT EXAMINING CORPS

**RENE D. TEGTMEYER, Assistant Commissioner**
**WILLIAM FELDMAN, Deputy Assistant Commissioner**

## CONDITION OF PATENT APPLICATIONS AS OF MARCH 26, 1977

| PATENT EXAMINING GROUPS | Actual Filing Date of Oldest New Case Awaiting Action |
|---|---|
| **CHEMICAL EXAMINING GROUPS** | |
| GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices. | 7-22-76 |
| GENERAL ORGANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director. Heterocyclic, Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides. | 7-13-76 |
| HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes. | 3-18-76 |
| COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—R. FRIEDMAN, Director. Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography. | 6-23-76 |
| SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—H. S. VINCENT, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes. | 4-8-76 |
| **ELECTRICAL EXAMINING GROUPS** | |
| INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Illumination; Horology; Acoustics; Recorders; Weighing Scales. | 10-15-75 |
| SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director. Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material. | 1-15-76 |
| INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts. | 6-1-76 |
| RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—N. ANSHER, Director. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating. | 10-5-76 |
| ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring. | 4-27-76 |
| DESIGNS, GROUP 290—C. D. QUARFORTH, Director. Industrial Arts; Household, Personal and Fine Arts. | 10-2-75 |
| **MECHANICAL EXAMINING GROUPS** | |
| HANDLING AND TRANSPORTING MEDIA, GROUP 310—D. J. STOCKING, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment. | 5-24-76 |
| MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus: Plastics Working Apparatus; Plastic Block and Earthenware Apparatus; Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks. | 9-10-76 |
| AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—G. M. FORLENZA, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination. | 6-1-76 |
| HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—B. R. GAY, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication. | 4-19-76 |
| GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—M. M. NEWMAN, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors: Miscellaneous Hardware; Locks; Building Structures: Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Coating; Textiles; Apparel and Shoes; Sewing Machines. | 9-13-76 |

**Expiration of patents:** The patents within the range of numbers indicated below expire during April 1977, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 2,931,038 to 2,934,765, inclusive
Plant Patents..... Numbers 1,926 to 1,948, inclusive

# REISSUES

APRIL 26, 1977

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

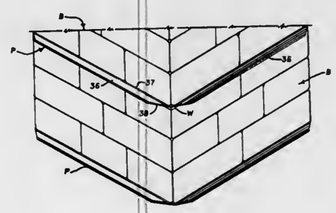
## Re. 29,192
## SLIP PALLET

**Raymond F. Anderson, Arvada; Ronald C. Mackes, Northglenn; Richard Edwin Andrews, Arvada, and Patrick Maurice Mawe, Wheat Ridge, all of Colo., assignors to BQP Industries, Inc., Denver, Colo.**

**Original No. 3,776,145, dated Dec. 4, 1973, Ser. No. 243,507, Mar. 27, 1972. Application for reissue Apr. 22, 1975, Ser. No. 570,381**

**Int. Cl.² B65D** *19/00*

**U.S. Cl. 108—51.3** **8 Claims**



*11. A reuseable slip pallet adapted to hold a load of cardboard boxes or the like, and to be carried upon a platen which slides underneath the loaded slip pallet to move the slip pallet onto and off of the platen, the platen including a pull-push means to grip an edge of the pallet and to pull and slide the loaded pallet onto the platen and to push and slide the loaded pallet off of the platen;*

*said pallet having a central area whereon the box load is placed;*

*a tab along the side of at least one edge of said central area, partially folded upwardly along the edge of said central area to be gripped and held by the aforesaid gripping means;*

*said pallet being comparatively thin and flexible and thus being yieldable whereby it is subject to rippling and buckling effects when the platen is sliding under the loaded pallet, but is capable of preventing excessive folding or tearing due to such rippling and buckling effects, said pallet being formed of a tough, pliable sheet of single thickness of polyolefin resin having a thickness in the range of approximately 20 to 125 mils, a tensile strength in the range of 2,500 to 4,500 p.s.i. and a vicat softening point temperature in excess of 250° F.;*

*with the aforesaid tab fold being a compression-formed crease in at least one surface of the sheet at the boundary between said central area and said tab and constituting a shallow groove which does not impair the strength of the pallet between said central area and said tab; and*

*a modified upper surface at said central area adapted to increase the static frictional resistance between the box load and the pallet to a degree which exceeds the sliding frictional resistance between the pallet and the platen and wherein the difference in the coefficient of friction between the upper and lower surfaces exceeds 0.15, whereby said pallet will hold the box load without significant slipping between the box load and pallet when the platen is sliding under the pallet.*

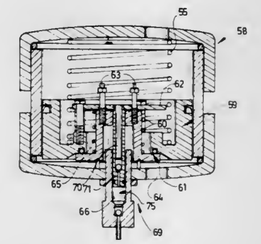
## Re. 29,193
## FLUID METERING DEVICE

**Lance John Carlyle, Cambridge, New Zealand, assignor to Economics Laboratory, Inc., St. Paul, Minn.**

**Original No. 3,818,924, dated June 25, 1974, Ser. No. 294,984, Oct. 4, 1972. Application for reissue Oct. 6, 1975, Ser. No. 619,951**

**Int. Cl.² G05D** *11/00*

**U.S. Cl. 137—99** **19 Claims**



*18. A fluid metering device having a housing with a hollow interior and inlet and outlet openings respectively into and out of said hollow interior, first pumping means within said hollow interior and displaceable under fluid pressure between said inlet and outlet openings from an 'inlet' position to an 'outlet' position to pump fluid through said fluid outlet opening, biasing means tending to retain or restore said first pumping means to said 'inlet' position in use, and said first pumping means defining a passage communicating between said fluid inlet and outlet openings; characterized by: closure means adapted to close said passage at said 'inlet' position and also during displacement of said first pumping means, under fluid pressure, from said 'inlet' position to said 'outlet' position and to open said passage at said 'outlet' position and also during movement of said first pumping means from said 'outlet' position to said 'inlet' position; and second pumping means actuated on movement of said first pumping means to meter a predetermined quantity of other fluid into said first mentioned fluid on each cycle of said first pumping means.*

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## Re. 29,194
## METHOD AND APPARATUS FOR TRANSFERRING DATA

**Walter R. Ambrose, Naples; Robert T. Shone, Pittsford, both of N.Y., and Brian H. Welham, Cincinnati, Ohio, assignors to Bausch & Lomb Incorporated, Rochester, N.Y.**

**Original No. 3,770,347, dated Nov. 6, 1973, Ser. No. 207,818, Dec. 14, 1971. Application for reissue Oct. 30, 1975, Ser. No. 627,411**

**Int. Cl.² G03B** *27/52, 27/70*

**U.S. Cl. 355—43** **43 Claims**

1. An instrument for use by a human operator in transferring graphical information from an input record to an output record, comprising:

a. a first compound microscope having a first optical axis and objective and eyepiece means disposed at cooperative optical conjugates along said first optical axis;

b. a second compound microscope having a second optical axis and objective and eyepiece means disposed at cooperative optical conjugates along said second optical axis; said eyepiece means being in common with the eyepiece means of said first compound microscope;

c. semireflective beam combiner means disposed across said first and second optical axes for transmitting and reflecting portions of rays directed along said axes by said first

and second compound microscopes toward said common eyepiece means;

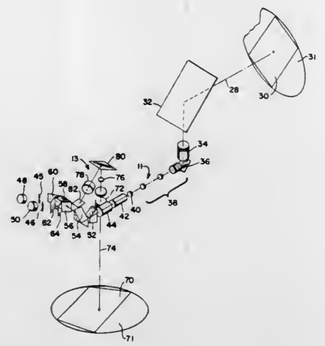
d. means for mounting an input record in an object plane conjugated to said objective of said first compound microscope;

e. means for focusing said first compound microscope on said object plane;

f. output record receiving means including means defining a substantially planar surface adjacent a human operator station;

g. lens means disposed in said first compound microscope between said beam combiner means and said objective, and conjugated to an eyepiece focal plane of said common eyepiece means for focusing rays emanating from said input record to form an image of said input record in said eyepiece focal plane;

h. lens means disposed in said second compound microscope between said beam combiner means and said objective and conjugated to an eyepiece focal plane of said common eyepiece means for focusing rays emanating



from said output record to form an image of said output record in said eyepiece focal plane superimposed over said image of said input record;

i. means for mounting said second compound microscope at a fixed object conjugate above said planar surface;

j. means including means for disposing said common eyepiece means adjacent said human operator station in position to receive at least one of said human operator's eyes in correspondence with an exit pupil of said eyepiece means while simultaneously having said planar surface in position to receive manual transfer of data by said human operator from said input record to said output record; and

k. means in said first compound microscope between said objective and said beam combining means, including at least a variable magnification system which is continuously variable over a range of magnifications without variance of the object conjugate, for modifying an image of said input record to correspond with an image of said output record.

**Re. 29,195**

## 3-(3-CHLORO-2-PROPENYL)-1,3,5,7-TETRAAZABICYCLO(3.3.1)NONANE AND ITS PREPARATION

**Thomas P. Brady, Natick, Mass., assignor to The Dow Chemical Company, Midland, Mich.**

**Original No. 3,862,939, dated Jan. 28, 1975, Ser. No. 408,889, Oct. 23, 1973. Application for reissue Dec. 8, 1975, Ser. No. 638,790**

**Int. Cl.² C07D** *251/72*

**U.S. Cl. 260—248 NS** **4 Claims**

1. A member of the group consisting of [7-] *3*-cis-(3-chloro-2-propenyl)-1,3,5,7-tetraazabicyclo(3.3.1)-nonane -[3-methanol] and [7-] *3*-cis-trans-(3-chloro-2-propenyl)-1,3,5,7-tetraazabicyclo(3.3.1)nonane [-3-methanol].

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**Re. 29,196**

## ALKYLPHENYL BENZOPYRANOPYRIDINES

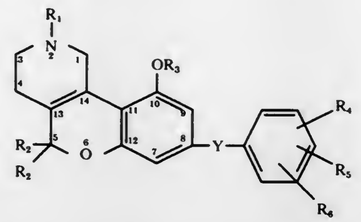
**Martin Winn, Deerfield, Ill., assignor to Abbott Laboratories, North Chicago, Ill.**

**Original No. 3,932,432, dated Jan. 13, 1976, Ser. No. 442,032, Feb. 13, 1974. Continuation-in-part of Ser. No. 345,942, April 2, 1973, abandoned. Application for reissue June 25, 1976, Ser. No. 699,831**

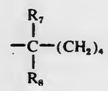
**Int. Cl.² A61K** *31/44*; **C07D** *491/04*

**U.S. Cl. 424—256** **16 Claims**

1. A compound of the formula



where $R_1$ is hydrogen, loweralkyl, 3-methyl-2-butenyl, *propargyl*, 3-chloro-2-propenyl, cyclopropylmethyl, phenylloweralkyl, or 3(3,4,5-trimethoxyphenyl)-2-propenyl; $R_2$ is methyl; $R_3$ is hydrogen; [Y is a radical of the formula



where n is a linear chain of 1–9 carbon atoms and $R_7$ is H or $CH_3$;]

*Y is a straight or branched chain alkylene group having 4 to 7 carbon atoms and having no branch larger than a methyl group;* and each $R_4$ and $R_5$ and $R_6$ are the same or different members of the group consisting of hydrogen, halo, trifluoromethyl or loweralkyl; and the pharmaceutically acceptable salts thereof.

*16. A pharmaceutical composition in unit dosage form comprising an analgesic effective amount of a compound of claim 1 and a pharmaceutically acceptable carrier or diluent.*

# PLANT PATENTS

## GRANTED APRIL 26, 1977

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

**4,043**

### ROSE PLANT

**William A. Warriner, Tustin, Calif., assignor to Jackson & Perkins Co., Medford, Oreg.**

**Filed Oct. 16, 1975, Ser. No. 622,844**

**Int. Cl.² A01H** *5/00*

**U.S. Cl. Plt.—20** **1 Claim**

1. A new and distinct cultivar of rose plant of the hybrid tea class, substantially as herein shown and described, characterized particularly as to novelty by the unique combination of its vigorous, upright habit of growth, Cardinal Red flower color, pronounced fragrance, and large downward pointed thorns.

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**4,044**

### ROSE PLANT

**Reimer Kordes, Sparrieshoop, Holstein, Germany, assignor to Jackson & Perkins Co., Medford, Oreg.**

**Filed Mar. 29, 1976, Ser. No. 671,171**

**Int. Cl.² A01H** *5/00*

**U.S. Cl. Plt.—24** **1 Claim**

1. A new and distinct cultivar of rose plant of the floribunda class, substantially as herein shown and described, characterized particularly as to novelty by the unique combination of a bushy, heavily branched plant, high greenhouse production of buds of a clear Buttercup Yellow (W), whose shape is oval but with a blunt or flat tip; Spinach Green (W) glossy foliage and a strong fragrance.

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**4,045**

### DIEFFENBACHIA NAMED ULERYII

**Dale W. Ulery, Springfield, Ohio, assignor to Ulery Greenhouse Company, Springfield, Ohio**

**Filed June 18, 1976, Ser. No. 697,329**

**Int. Cl. A01H** *5/12*

**U.S. Cl. Plt.—88** **1 Claim**

1. A new and distinct variety of dieffenbachia plant substantially as herein shown and described, characterized by the broad substantially unbroken white central area of its leaves interrupted only by its prominent veins and a very light green midrib, the margin of the leaves being of a solid dark green color which flows irregularly inward of the white central area.

# PATENTS

## GRANTED APRIL 26, 1977

### ERRATA

| For CLASS | See PATENT NO. |
|---|---|
| 280–214 | 4,019,230 |
| 048–055 | 4,019,274 |
| 081–052.4 R | 4,019,412 |
| 010–013 | 4,019,432 |
| 124–061 | 4,019,480 |
| 192–048.91 | 4,019,586 |
| 227–119 | 4,019,666 |
| 242–131.1 | 4,019,700 |
| 242–152.1 | 4,019,701 |
| 267–160 | 4,019,750 |
| 428–217 | 4,019,873 |
| 428–570 | 4,019,875 |
| 428–621 | 4,019,876 |
| 428–626 | 4,019,877 |
| 075–241 | 4,019,874 |
| 250–396 ML | 4,019,989 |
| 240–46.59 | 4,020,047 |
| 260–327 P | 4,020,168 |
| 260–328 | 4,020,169 |
| 260–329 S | 4,020,170 |
| 260–340.5 | 4,020,171 |
| 260–343.2 R | 4,020,172 |
| 260–343.6 | 4,020,173 |
| 260–346.8 A | 4,020,174 |
| 260–347.2 | 4,020,175 |
| 260–349 | 4,020,176 |
| 260–399 | 4,020,177 |
| 428–325 | 4,020,261 |
| 428–276 | 4,020,262 |
| 358–128 | 4,020,278 |
| 258–160 | 4,020,279 |
| 358–242 | 4,020,280 |
| 260–078 UA | 4,020,303 |
| 235–146 | 4,020,328 |
| 361–227 | 4,020,393 |
| 361–045 | 4,020,394 |
| 361–059 | 4,020,395 |
| 361–064 | 4,020,396 |
| 361–024 | 4,020,397 |
| 361–060 | 4,020,398 |
| 361–331 | 4,020,399 |
| 361–353 | 4,020,400 |
| 361–433 | 4,020,401 |

# PATENTS

## GRANTED APRIL 26, 1977

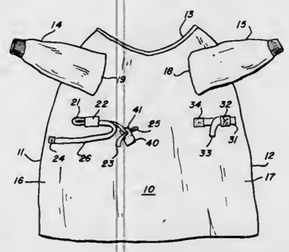
## GENERAL AND MECHANICAL

**4,019,207**

### SURGICAL GOWN BELTING MEANS

**John W. Newman, Whitefish Bay, Wis., and Frank D. Schoonover, Douglas, Ariz., assignors to Will Ross, Inc., Milwaukee, Wis.**

**Filed May 28, 1976, Ser. No. 691,070**
**Int. Cl.² A41D *13/00***
**U.S. Cl. 2—51** **6 Claims**



1. A belting system for use on a back-closure surgical gown having a front panel and two rear panels integral therewith which comprises:

a first tie having a first end, a second end and an intermediate segment between said first and second ends, said first of said rear panels at about waist level;

a belt transfer means releasably attached to the second end of said first tie;

a belt retention means adapted to be affixed to said gown at or above waist level and proximate to a juncture of the first of said rear panels and said front panel, said retention means releasably retaining the intermediate segment of said first tie at a fixed position with respect to said gown; and

a second tie having a first end, a second end and an intermediate segment between said first and second ends, said first end adapted to be affixed to said gown at or above waist level proximate to a juncture of the second of said rear panels and said front panel, and said intermediate segment adapted to be releasably retained on said gown so as to retain said second end of said second tie at or above waist level.

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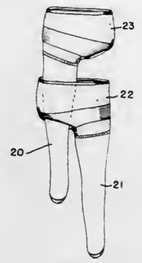
**4,019,208**

### PANTY STOCKING AND COMBINATION PANTY HOSE GARMENT

**Joseph G. Walser, Jr., P.O. Box 49, High Point, N.C. 27261, and John O. Ferrell, Rte. 5, Box 122, High Point, N.C. 27263**

**Filed Apr. 7, 1975, Ser. No. 565,433**
**Int. Cl.² A41B *11/00***
**U.S. Cl. 2—240** **8 Claims**

7. A combination pantyhose garment comprising two separate seamless panty stockings, each panty stocking having, toe, foot, leg and panty-welt portions knit of textured yarns, each panty stocking also having an elastic top band, the panty portion of each stocking having a leg opening in said welt portion intermediate the length thereof, a series of courses in said panty portion having elastomeric yarn forming a supporting intermediate band whereby upon placing the panty stocking on the wearer, the panty portions substantially overlap each other and the supporting bands cross over each other, front and back, to provide increased control or support in the panty portion.



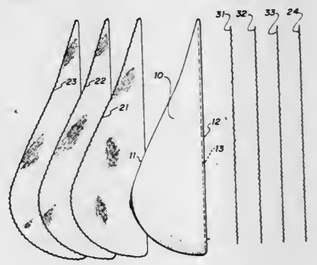
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**4,019,209**

### ARTIFICIAL BREAST FORM AND METHOD OF FORMING

**Wayman R. Spence, Waco, Tex., assignor to Spenco Medical Corporation, Waco, Tex.**

**Filed Apr. 22, 1976, Ser. No. 679,176**
**Int. Cl.² A61F *1/24*; A41C *3/10***
**U.S. Cl. 3—36** **12 Claims**



1. An artificial breast form comprising:

a. a preformed self-contained stabilized gel structure of breast size and shape, and

b. a porous elastic fabric cover which yields in response to pressures exerted thereon by said gel.

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**4,019,210**

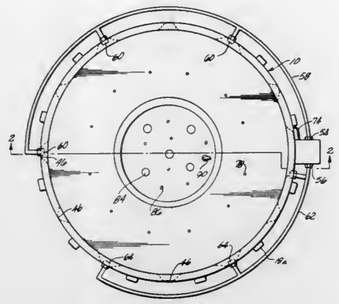
### WATER-INFLATED PORTABLE SPA

**Richard G. Patterson, Rialto, and Thaddeus W. Fuller, Pomona, both of Calif., assignors to Muskin Corporation, Colton, Calif.**

**Filed Apr. 12, 1976, Ser. No. 676,303**
**Int. Cl.² E04H *3/16, 3/18*; F16L *22/02***
**U.S. Cl. 4—172** **14 Claims**

1. A portable pool unit comprising a confining outer wall, a double-wall liner extending around the inside of the outer wall, the liner having an outer sheet of thin flexible material forming the bottom and sides of the pool and an inner sheet of thin flexible material attached and sealed around the margins to the outer sheet to form a confined space between the two sheets, pump means having an inlet and outlet, fluid conduit means coupling the pump means to the pool for recirculating

water in the pool when the pool is filled, and conduit means connecting the outlet from the pump means to the confined



space between the inner and outer sheets to inflate the confined space with water from the pump.

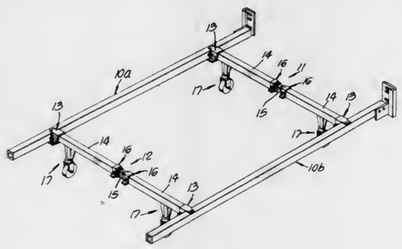
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**4,019,211**

## BEDFRAME WITH UNITIZED ADJUSTABLE CROSSBAR

**Melvin P. Spitz, 619 N. Elm Drive, Beverly Hills, Calif. 90210**

**Filed Dec. 16, 1975, Ser. No. 641,254**
**Int. Cl.² A47C** *19/04*
**U.S. Cl. 5—181** **10 Claims**



1. A adjustable bedframe crossbar unit assembly adapted to be connected transversely between a pair of bedframe side rails, comprising:

a. a pair of axially aligned sections having adjacent ends in telescoped relation;

b. the innermost of said sections having an outwardly opening longitudinally extending side channel;

c. a plurality of slots extending from the bottom of said channel, said slots being spaced apart longitudinally of the channel;

d. an inverted U-shaped latch member straddling the adjacent end of the outermost of said sections, and being supported for selective guided manual movements between a lowered seated position and a raised position;

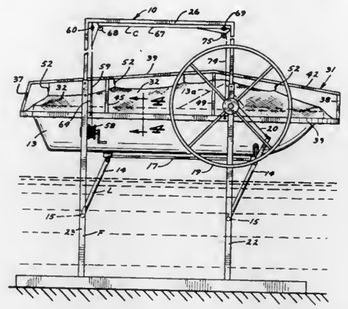
e. an inwardly extending projection on the leg portion of said latch member on the side adjacent said channel adapted in said raised position to be disposed in said channel so as to permit longitudinal telescopic adjustment of the sections, and in the lowered seated position to enter one of said slots to retain the sections against relative longitudinal movements.

**4,019,212**

## BOAT COVER APPARATUS

**Jason K. Downer, Box No. 522, Alexandria, Minn. 56308**

**Filed Dec. 29, 1975, Ser. No. 644,466**
**Int. Cl.² B63B** *17/02*
**U.S. Cl. 9—1.5** **9 Claims**



6. For covering the top portion of a boat having an upper, outer peripheral edge portion that extends generally horizontally around the boat while the boat is supported above the level of the water by boat lift mechanism on a main frame, cover apparatus comprising a collapsible cover of perimetric dimensions substantially greater than the maximum perimetric dimensions of the boat in plan view, a subframe for at least nearly surrounding the boat at an elevation between the boat bottom and the upper, outer peripheral edge portion and vertically movable above the boat out of engagement therewith, means for securing the cover peripheral edge portion to the subframe, means for mounting the subframe on the main frame for vertical movement between an elevation vertically between the level of the water and the boat upper, outer peripheral edge portions, and means mounted on the subframe for resiliently supporting the cover to have the cover abuttingly engage substantially the entire boat upper, outer peripheral edge portion.

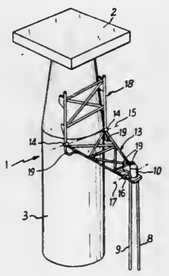
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**4,019,213**

## PIPING APPARATUS FOR A FLOATING OR SEMI-SUBMERSIBLE PLATFORM

**Isaac Behar, Paris, and Maurice Genini, Creteil, both of France, assignors to Coflexip, Rueil-Malmaison, France**

**Continuation of Ser. No. 414,197, Nov. 9, 1973, abandoned. This application Sept. 16, 1975, Ser. No. 613,914**
**Claims priority, application France, Nov. 9, 1972, 72.39657**
**The portion of the term of this patent subsequent to Oct. 14, 1992, has been disclaimed.**
**Int. Cl.² B63B** *35/02*
**U.S. Cl. 9—8 P** **3 Claims**



1. Apparatus for the collection of oil from wells in a deep body of water, said apparatus comprising:



a sinker including container means having a volume sufficient to support said sinker at the surface of the water when said container means is full of air and to hold said sinker at the bottom of said body of water when said container means is full of water,

a float of adjustable buoyancy,

first flexible pipe means located between said float and said sinker,

means supported by said sinker for connecting said first flexible pipe means to second flexible pipe means leading to a submarine well, said first flexible pipe means being of a length such as to hold said float only so far beneath the surface of said body of water as to protect said float from the influence of the surface swell when said sinker is on said bottom and to be kept in tension while doing so,

a floating platform comprising a body including oil storage means immersed vertically beneath the surface of said body of water, and an upper part located on top of said body, said upper part being provided with an upper deck emerging above the surface of said body of water, and

conduit means between said platform and float connecting said storage means to said first flexible pipe means, said conduit means comprising an arm pivotally connected at one end to said float and at its other end to said body and additional flexible pipe means extending the length of said arm and connected to said first flexible pipe means.

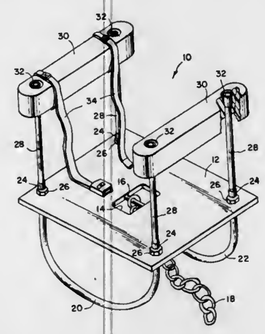
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**4,019,214**

## FLOATING PLATFORM

**Stewart Shaw, 1000 Pleasant St., Stoughton, Mass. 02072**

**Filed Jan. 19, 1976, Ser. No. 649,982**
**Int. Cl.² B63C** *9/00*
**U.S. Cl. 9—14** **4 Claims**



1. A lifesaving device comprising:

a substantially planar deck adapted to be submerged in a body of water,

a pair of spaced, substantially U-shaped handles secured to the deck and extending downwardly from the bottom surface of said deck,

an upright support connected to the ends of each of said U-shaped handles extending upwardly from the top surfce of said deck,

a pair of buoyant floats secured between adjacent upright supports,

said deck including a centrally located opening,

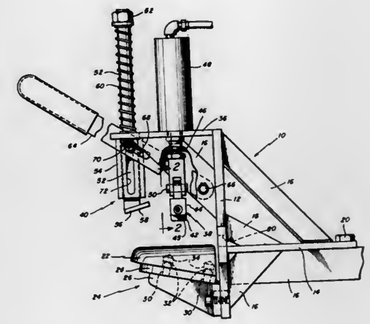
a spindle transversing said opening, and an anchor chain secured to said spindle.

**4,019,215**

## METHOD AND APPARATUS FOR LINING SAFETY BOX TOES

**Jules N. Allard, Tyngsboro, and Victor J. Gagnon, Salem, both of Mass., assignors to Bush Universal, Inc., Woburn, Mass.**

**Filed Apr. 19, 1976, Ser. No. 678,244**
**Int. Cl.² A43D** *7/00, 65/00;* **A43C** *13/14*
**U.S. Cl. 12—146 D** **28 Claims**



1. A method for lining the inner surface of a rigid box toepiece comprising:

providing a mold having a toe end shaped to substantially conform to the inner surface of the box toepiece;

locating a sheet of lining material on the mold to overlie at least the toe end of the mold;

placing the box toepiece over the toe end of the mold and liner;

sandwiching the liner between the mold and box toe piece to conform the liner to the shape of the inner surface of the box toepiece and to press the liner into substantially continuous contact with the inner surface of the box toepiece; and

attaching the liner to the box by an adhesive coating between the box toe piece and the liner.

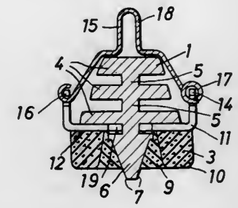
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**4,019,216**

## WINDSHIELD WIPER

**Wolfgang Priesemuth, Postkamp 13, 221 Itzehoe-Nordoe, Germany**

**Filed Apr. 1, 1974, Ser. No. 456,976**
**Claims priority, application Germany, Mar. 30, 1973, 2315891**
**Int. Cl.² B60S** *1/46*
**U.S. Cl. 15—250.03** **8 Claims**



1. A windshield wiper which includes in combination: spring bow means, a wiper blade having wiping edge means and being on upper flange connected to said spring bow means, a flat wiping body pad extending substantially along the length of said wiper blade and being held against at least one side of said wiping edge means and being movable therewith, said pad being adapted to receive and store a cleaning fluid and to substantially evenly release the same onto the windshield to be

wiped, an elongated stabilizer backing strip having an elongated opening extending therethrough corresponding in length and width to said wiping edge means so that said wiping edge means can pass through said opening to contact the windshield, said stabilizer backing strip means provided with fastening means projecting toward said spring bow means and juxtaposed to face each other on opposite sides of said backing strip means in paired relationship therewith, said pad being connected to said stabilizer backing strip means and being movable freely only in limited range relative to said stabilizer backing strip means to assure flat wiping engagement, and spring clip means straddling the width of said wiper blade and being disengageably connected to each pair of said fastening means.

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**4,019,217**

## CLEANING APPARATUS FOR ROLLERS

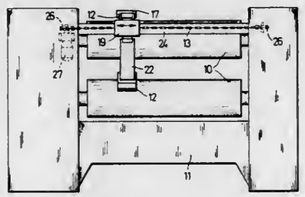
**Otto Schinke, Bruchmuehlen-Roedinghausen, Germany, assignor to Theodor Hymmen KG, Bielefeld, Germany**

**Filed Dec. 1, 1975, Ser. No. 636,574**

**Claims priority, application Germany, Nov. 29, 1974, 2456401**

**Int. Cl.² D21G** *3/02*

**U.S. Cl. 15—256.53** **8 Claims**



1. In a machine for application of viscous liquid compositions by means of a plurality of longitudinally extending applicator rollers, the improvement comprising apparatus on said machine for cleaning said rollers, said apparatus comprising a resilient nonrigid cleaning element for each roller, linkage means interconnecting each element to said machine to permit said element to be selectively brought from a storage position to a cleaning position adjacent its roller, and displacement means for moving said elements longitudinally along said rollers.

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**4,019,218**

## CARPET SOIL EXTRACTOR

**Gilbert G. Cyphert, Glendale, Ariz., assignor to Chemko Industries, Inc., Phoenix, Ariz.**

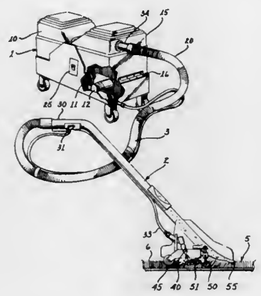
**Filed Apr. 15, 1976, Ser. No. 677,264**

**Int. Cl.² A47L** *7/00*

**U.S. Cl. 15—321** **11 Claims**

1. A self contained carpet soil extractor for cleaning carpets, said soil extractor including a carrier, a wand and a hose assembly for interconnecting said carrier with said wand, said carrier having: (i) a first tank for storing a cleaning solution; (ii) a hinged cover extending across an upper opening of the first tank; (iii) a second tank for receiving waste water; (iv) a hinged sealable cover extending across an upper opening of the second tank; (v) a pump assembly for pumping the cleaning solution from the first tank under pressure; (vi) a vacuum pump assembly for creating a vacuum within the second tank; (vii) a power cord for transmitting electrical power to the pump assembly and the vacuum pump assembly from a source of electrical power; and (viii) wheels for transporting said carrier across a surface, said soil extractor comprising in combination:

a. said wand including a one piece head for supporting:
   1. means for dispensing the cleaning solution into the carpet;
   2. vertically reciprocable brush means for agitating the pile of the carpet;
   3. mouth means for drawing a mixture of the cleaning solution and dirt from the pile of the carpet; and
   4. support means for aiding in the transport of said wand across the pile of the carpet;
b. said hose assembly including:
   1. a first hose for conveying the cleaning solution from the pump assembly to said dispensing means within said wand; and
2. a second hose for interconnecting the second tank with said mouth means within said wand;
c. said carrier including:
   1. switch means for energizing the pump assembly to



convey the cleaning solution under pressure from the first tank through said hose assembly to said dispensing means and for energizing the vacuum pump assembly to establish a vacuum within the second tank and draw the mixture of cleaning solution and dirt into said mouth means within said wand, through said second hose and into the waste tank; and
   2. hinge means for pivotally securing the waste tank to said carrier and accommodating tipping of the second tank to empty it; and
d. normally closed valve means disposed within said wand for regulating the flow of cleaning solution from said first hose assembly through said dispensing means without affecting the continuing recovery of the mixture of cleaning solution and dirt to dry the carpet.

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**4,019,219**

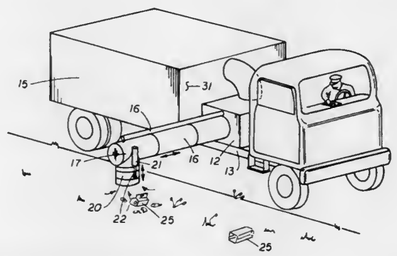
## TRASH COMPACTOR APPARATUS

**Robert A. Willenborg, Dyersville, Iowa, assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest**

**Filed Oct. 3, 1975, Ser. No. 619,483**

**Int. Cl.² A47L** *5/12*

**U.S. Cl. 15—339** **1 Claim**



1. Apparatus mountable on the flat bed of a truck for picking up roadside debris, comprising,

a housing for containment of debris,



a suction fan unit externally mounted to said housing with the outlet tube of the suction fan unit led into the housing,

an inlet tube fitted to said suction fan unit which extends, in the mounted position of the unit, in a generally horizontal plane from a lateral side of the suction fan unit,

a pick-up tube fitted to the external end of said inlet tube which extends vertically downwards from said unit in said mounted position,

said inlet tube and said pick-up tube each being formed of telescopic members and each fitted with an individually associated fluid-operated cylinder and piston, the axis of which extends parallel to the axis of the tube to which it is mounted, so that each tube may be independently extended or retracted along its axis by the associated cylinder and piston unit,

said housing fitted with means to compact the debris blown into the housing by the suction fan unit.

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**4,019,220**

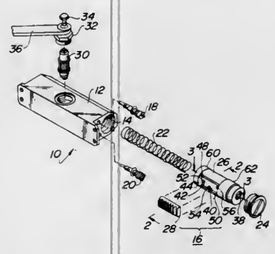
## PISTON ASSEMBLY FOR DOOR CLOSER

**Sidney Lieberman, Lancaster, Pa., assignor to Reading Door Closer Corporation, Reamstown, Pa.**

**Filed Jan. 13, 1976, Ser. No. 648,627**

**Int. Cl.² E05F** *3/04*; **F16H** *1/04*

**U.S. Cl. 16—59** **6 Claims**



1. For use in hydraulic door closer apparauts, a piston comprising a body portion and a rack coupled to said body portion transmitting forces to and from said piston, said rack being made of relatively hard, wear and impact-resistant material, and said body portion being made of relatively easily machinable material, and means on said piston for removably supporting and positioning said rack in operative association with said piston, said last-mentioned means comprising a recess portion in said piston extending longitudinally with respect to said piston and having a bottom wall, side wall portions and spaced end walls, the length of said recess portion being slightly greater than the length of said rack so as to constrain said rack from longitudinal movement with respect to the piston, and said side wall portions being spaced apart by a distance slightly greater than the width of said rack so as to constrain said rack from lateral movement with respect to the longitudinal axis of said piston, and means associated with said bottom wall and adapted to engage a rear face of said rack to maintain said rack in spaced relation with respect to said bottom wall and in a desired position with respect to the periphery of said piston, said means associated with said bottom wall comprising a plurality of spaced bosses projecting from said bottom wall into engagement with said rear face of said rack.

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**4,019,221**

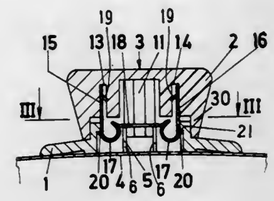
## PAN HANDLE

**Gerd D. Baumgarten, Wilnsdorf, Wilden, Germany, assignor to Heinrich Baumgarten, Eisen- und Blechwarenfabrik, Neunkirchen, Germany**

**Filed Mar. 15, 1976, Ser. No. 666,947**

**Int. Cl.² A47J** *36/00*

**U.S. Cl. 16—114 A** **9 Claims**



1. In a handle for a utensil comprising a handle body of plastics material, a cross-piece for connection to said utensil, at least one spring held in said handle body for the purpose of fastening said handle body to said cross-piece, the improvement comprising wherein said handle body has means defining a groove therein and means defining a shoulder thereon, said spring is a leaf spring accommodated in said groove in said handle body, said leaf spring having a part bent over to form a hook having a curved portion, wherein said cross-piece includes for said leaf spring at least one abutment formed by an edge of said cross-piece, the arrangement being such that in the assembled condition of said handle body said leaf spring bears with the back of said hook thereof against said shoulder formed on said handle body and with a part of said curved portion of said hook against said one abutment edge of said cross-piece.

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**4,019,222**

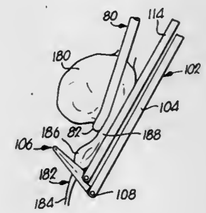
## POULTRY EVISCERATING METHOD AND APPARATUS

**Donald J. Scheier, Kansas City, and Henry E. Frederick, Parkville, both of Mo., assignors to Gordon Johnson Company, Kansas City, Mo.**

**Filed Jan. 30, 1976, Ser. No. 653,666**

**Int. Cl.² A22C** *21/00*

**U.S. Cl. 17—11** **25 Claims**



1. In an eviscerating machine for automatically removing the digestive tract from a poultry carcass through an opening at the vent of the carcass:

means for holding the carcass against substantial movement and with its opening in a predetermined position;

a pair of separate removal tools each shiftable relative to said holding means through insertion and withdrawal strokes disposed to move the same into the carcass through said opening and subsequently back out of the carcass through the opening.

each of said tools having structure enabling the same to pull on the tract and thereby remove the latter from the carcass as the tools move through their withdrawal strokes; and

mechanism for positioning said tools at spaced locations along the tract and for moving the tools through their withdrawal strokes at a rate which pulls the tract from the carcass without rupturing the tract at a point between said locations.

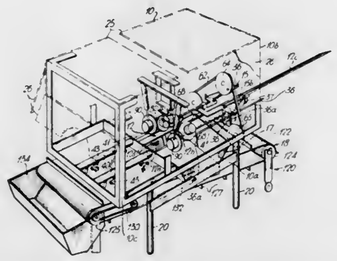
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**4,019,223**

## APPARATUS FOR CUTTING POULTRY CARCASS

**Eric Ralph Lloyd Baker, Coquitlam, Canada, assignor to Elsie Jennie Baker, Coquitlam, Canada**

**Filed Oct. 14, 1975, Ser. No. 622,168**
**Claims priority, application Canada, June 6, 1975, 228698**
**Int. Cl.² A22C *21/00***
**U.S. Cl. 17—11** **25 Claims**



**1.** Apparatus for cutting poultry carcasses into several pieces comprising frame means carrying support means including a supporting slideway and a guide bar projecting forwardly of said slideway, said slideway having side surfaces which slope downwardly from a central area ridge which forms a continuation of the top of said guide bar, said bar being suitable for insertion through the central cavity of a poultry carcass, said frame means also carrying power driven feeding apparatus arranged to grip a carcass positioned on said bar and to cause movement of the carcass through cutting blade means mounted adjacent said support means, said cutting blade means including first blade means which are positioned below said bar to cut the breast portion of a poultry fed onto said bar with its back-bone uppermost so that the side portions of the carcass are partially separated before said carcass moves onto said slideway, said side surfaces of the support member being arranged to support the side portions of the carcass and being associated with further blade means for performing subsequent cutting operations on the carcass while supported on said side surfaces.

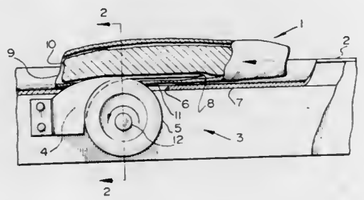
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**4,019,224**

## REMOVAL OF MEAT FROM CRUSTACEANS

**Pesi Jal Amaria; Roy A. MacLellan, and James W. Tucker, all of St. John's, Canada, assignors to Canadian Patents and Development Limited, Ottawa, Canada**

**Filed Sept. 18, 1975, Ser. No. 614,492**
**Int. Cl.² A22C *29/02***
**U.S. Cl. 17—71** **7 Claims**



**1.** An apparatus for the removal of meat from a Crustacean member having a tubular shell, comprising:

a. guide means for longitudinally guiding the Crustacean member, said guide means defining an opening;

b. a shell slitting device comprising a fixed cutting member and an eccentric rotary cutter disposed in the opening, said fixed cutting member having an elongated guide element disposed substantially parallel to the guide means and operative to be introduced between the meat and shell of the Crustacean member, said eccentric rotary cutter disposed adjacent to the fixed cutting member and operative upon rotation in association with the fixed cutting member to shear the shell longitudinally as the Crustacean member is moved along the guide means into the shell slitting device.

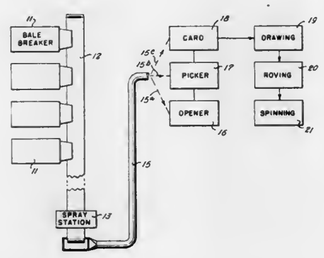
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**4,019,225**

## MILL FIBER TREATMENT APPARATUS

**James E. Nayfa, 5015 Sharp St., Dallas, Tex. 75247**

**Division of Ser. No. 327,730, Jan. 29, 1973, Pat. No. 3,894,314. This application June 6, 1975, Ser. No. 584,300**
**Int. Cl.² D01G *37/00***
**U.S. Cl. 19—66 R** **8 Claims**




**1.** Apparatus for treating fibrous material in a textile mill comprising

a conveyor;

powered apparatus for opening fibrous material and for distributing said material uniformly onto said conveyor;

spray apparatus including at least one nozzle for spraying a liquid on the fibrous material carried on said conveyor, and a pump driven by an electric motor for supplying liquid to said nozzle through a liquid supply conduit; said spray apparatus being positioned adjacent to said conveyor, at a location distant from said powered distributing apparatus;

and electric control means including an electric power circuit for said pump motor, and a time delay circuit responsive to the energization and deenergization of said powered distributing apparatus for energizing and deenergizing said power circuit after selected time intervals;

said time delay circuit comprising

a. a delay start controller;

b. a delay stop controller;

c. circuit means for energizing and deenergizing said delay start controller responsive respectively to the energization and deenergization of said distributing apparatus; and

d. circuit means for energizing and deenergizing said delay stop controller through said delay start controller;

said delay start controller being effective, when energized and after a preselected time delay, to close and energize said power circuit and to deenergize said delay stop controller; said delay stop controller being effective, when deenergized, to close said power circuit in parallel with said start controller;

said delay start controller being effective, when deenergized, to open said power circuit and to energize said delay stop controller; and said delay stop controller being effective, when energized and after a preselected time delay, to open and deenergize said spray apparatus power circuit to deenergize said spray apparatus.

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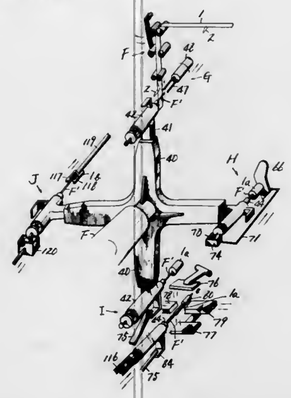


**4,019,226**

## APPARATUS FOR AUTOMATICALLY SHAPING CELLULOSE TYPE MENSTRUAL TAMPONS

**Akira Yamauchi, Hyogo; Tetsu Kakuma, Kashiwara; Hisao Yamashita, Kawanishi, and Masahiko Ariga, Takatuski, all of Japan, assignors to Jex Co., Ltd., Osaka, Japan**

**Continuation-in-part of Ser. No. 302,542, Oct. 31, 1972, abandoned. This application Jan. 15, 1975, Ser. No. 541,128**
**Claims priority, application Japan, Aug. 10, 1972, 47-80615**
**Int. Cl.² A61L *15/00***
**U.S. Cl. 19—144.5** **8 Claims**



**1.** Apparatus, as a single unit, for producing menstrual tampons from a long continuous cotton fiber band comprising feeding means for feeding a long continuous cotton fiber band to said apparatus, said fiber band having a plurality of withdrawing strings incorporated therewith at spaced intervals therealong, a breaking station associated with said cotton fiber band withdrawing and feeding means for receiving the continuous cotton fiber band, said breaking station including means for breaking said continuous cotton fiber band into individual cotton fiber articles of a length corresponding to that generally of a finished tampon with each article containing a withdrawing string affixed thereto, a turret spindle mechanism spaced from said breaking station, said spindle mechanism having four spindle elements circumferentially spaced therearound, means associated with said breaking station for feeding, one at a time, the cotton fiber articles having a withdrawing string affixed thereto produced from the breaking of the continuous cotton fiber band to a spindle element at a fixed point on said turret spindle mechanism, a cotton fiber article winding station mounted on said apparatus in operative relationship with said turret spindle mechanism to form a first station which will be in operating registry with each spindle element, one at a time, said winding station including means to wind the cotton fiber article present on the spindle element in registry therewith, a cotton fiber article withdrawing string embedding station mounted on said apparatus in circumferentially spaced relationship with respect to the cotton fiber article winding station and in operative relationship with said turret spindle mechanism to form a second station which will be in operating registry with each spindle element, one at a time, said string embedding station including means to embed the withdrawing string of the cotton fiber article present on the spindle element in registry therewith and after the cotton fiber article present thereon has first passed through the first winding station, a cotton fiber article compressing station mounted on said apparatus in circumferentially spaced relationship to said string embedding second station and in operative relationship with said turret spindle mechanism to form a third station which will be in operating registry with each spindle element, one at a time, said cotton fiber article compressing station including means to compress the cotton fiber article present on the spindle element in registry therewith and after the cotton fiber article present thereon has first passed through the first winding station and the second embedding station, a cotton fiber article discharge station mounted on apparatus in circumferentially spaced relationship to said article compressing third station and in operative relationship with said turret spindle mechanism to form a fourth station which will be in operating relationship with each spindle element, one at a time, said article discharge station including means to withdraw the cotton fiber article present on the spindle element in registry therewith as a finished tampon, and means for rotating said turret spindle mechanism to advance each of said spindle means intermittently and sequentially through said first winding station, said second embedding station, said third compressing station, and said fourth discharge station.

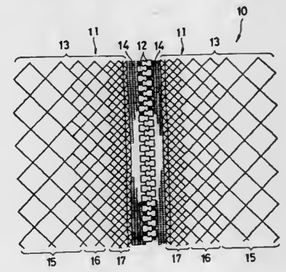
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**4,019,227**

## SLIDE FASTENER STRINGERS

**Hiroyuki Ebata, Uozu, Japan, assignor to Yoshida Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed June 25, 1976, Ser. No. 699,691**
**Claims priority, application Japan, June 30, 1975, 50-81319**
**Int. Cl.² A44G *19/34***
**U.S. Cl. 24—205.16 R** **5 Claims**



**1.** A sliding clasp fastener stringer tape supporting a row of scoops thereon, comprising a major region made of a knitted fabric with a net-like texture, said major region being longitudinally divided into a plurality of subregions of progressively finer mesh size from the one lying along one of the longitudinal edges of said major region toward the one lying along the other longitudinal edge thereof, and a relatively narrow scoop-carrying region extending along said other longitudinal edge of said major region, said scoop-carrying region being made of a fabric with a finer texture than the finest mesh subregion of said major region, said row of scoops being mounted on said scoop-carrying region.

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**4,019,228**

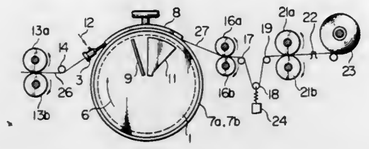
## CRIMPING APPARATUS

**Goro Ozawa; Kenzo Kosaka, both of Nagoya; Kasumi Sato, Toyohashi; Akio Ishikawa, Toyohashi; Toshiyuki Nanbu, Toyohashi; Kiyoshi Adachi, Nagoya; Tsutomu Okaya, Nagoya; Takashi Goto, Nagoya, and Hiroshi Kitagawa, Nagoya, all of Japan, assignors to Mitsubishi Rayon Co., Ltd., Japan**

**Division of Ser. No. 355,213, April 27, 1973, abandoned, which is a continuation-in-part of Ser. No. 109,885, Jan. 26, 1971, abandoned. This application Sept. 10, 1975, Ser. No. 611,886**
**Claims priority, application Japan, Mar. 5, 1970, 45-18539**
**Int. Cl.² D02G *1/20, 1/16, 1/12***
**U.S. Cl. 28—1.3** **9 Claims**

**1.** An improved crimping apparatus for crimping one or more filamentary strands of thermoplastic material, comprising in combination, a rotary cylinder having a cylindrical surface, a curved tunnel-shaped stuffing chamber defined by a portion of said cylindrical surface, spaced opposite arcuate stationary side walls disposed normal to the axis of said cylinder and having radially inner arcuate edges adjacent and conforming to said cylindrical surface and a stationary arcuate cover extending between radially outer edges of said side walls

and spaced from said cylindrical surface which constitutes the bottom of said stuffing chamber; an ejection nozzle for said filamentary strands having the ejection end of the nozzle terminating inside said stuffing chamber and directed approximately circumferentially of said cylinder in the direction of

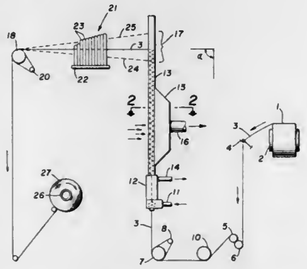


rotation of said cylinder; means for supplying a heated medium into said ejection nozzle; means for supplying said filamentary strand to said ejection nozzle for ejection at a controlled rate into said stuffing chamber by said heated medium; and means for taking up said strands delivered from a downstream outlet of said stuffing chamber.

## 4,019,229
## YARN TEXTURING APPARATUS

**Pelham D. Chastang, Bay Minette, Ala., assignor to Monsanto Company, St. Louis, Mo.**

**Filed Sept. 23, 1975, Ser. No. 615,955**
**Int. Cl.² D02G 1/12**
**U.S. Cl. 28—1.6** **1 Claim**



1. Stuffer box yarn texturing apparatus comprising:

a. an aspirating hot fluid jet for heating, tangling, and longitudinally forwarding thermoplastic yarn from a source into and upwardly through an elongated stuffing chamber wherein the yarn is crimped and moves in the form of a plug;

b. means for cooling the yarn as it moves through the chamber;

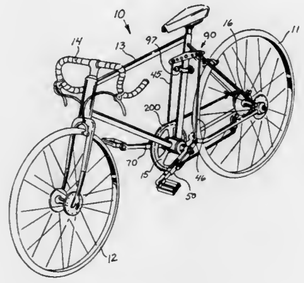
c. a driven roll for withdrawing the yarn at an abrupt angle from the leading end of the moving yarn plug and pulling the yarn from the chamber; and

d. a device in the yarn path between said chamber and said driven roll for controlling said abrupt angle at which the yarn is withdrawn from said chamber within the range of 90° ± 30° thereby controlling the distance that the yarn plug moves through the chamber whereby yarn of uniform bulk is provided, said device comprising (i) a base member; (ii) a plurality of closely spaced juxtaposed rod-like yarn guide members having different yarn engaging lengths and being slightly sequentially inclined first in one direction and then in the opposite direction; (iii) one end of each of said guide members being secured in said base; and (iv) the opposite ends of said guide members being bent in the same direction as the guide members are inclined, whereby the tension in the yarn moving in a serpentine path around said guide members is inversely related to the distance that the yarn is from the base member and whereby the crimp pattern of the yarn is rumpled by the yarn being in frictional contact with said guide members, said guide device being further characterized in that when the yarn angle is between 60° and 120° a given number of members are contacted by the yarn and when the yarn angle is less than about 60° or greater than about 120° a greater or lesser number, respectively, of members are contacted by the yarn, whereby the tangle level in the yarn is not significantly changed by changes in the yarn angle between 60° and 120°.

## 4,019,230
## RECIPROCATING POWERED BICYCLE

**Melville R. Pollard, 5995 S. Virginia, Reno, Nev. 89502**

**Filed June 30, 1975, Ser. No. 591,530**
**Int. Cl.² B62M 1/00**
**U.S. Cl. 280—214** **1 Claim**



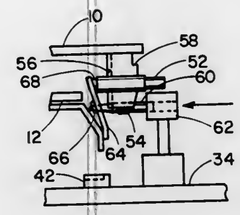
1. A drive mechanism comprising a sprocket suitable to drive a chain; a first torque imparting means attached to one side of said sprocket having the characteristics of imparting torque to said sprocket when rotated in one direction and being free spinning and imparting no torque to said sprocket when rotated in the reverse direction; a second torque imparting means attached to the other side of said sprocket and having the same characteristics of said first torque imparting means so as to impart torque to said sprocket in a like manner and in the same direction; a first hollow shaft attached to said first torque imparting means; a second shaft attached to said second torque imparting means, being concentrically positioned within said first hollow shaft and rotatable therein, the operation of said shafts being independent, a slot means provided in said second shaft; a first force arm adjustably connected to said first hollow shaft and containing insertion means which could be inserted into said slot means on said second shaft; a second force arm adjustably connected to said second shaft, the reciprocal movement of the force arms causing the motion of the said sprocket when said shafts are operating independently of one another; rotary movement of the force arms causing the motion of said sprocket if said first force arm is repositioned on said first hollow shaft so that said insertion means on said first force arm can be inserted into said means in said second shaft so as to lock the shafts together so as to operate in a dependent manner; a rocker arm with a self-centering bearing pivotally mounted on a horizontal stud, which stud is mounted on a vertical frame member; a first connecting link removably connected at one end to said first force arm and at its other end to a first end of said pivotally mounted rocker arm when said shafts are operating independently, being disconnected when said shafts are operating dependently; a second connecting link removably connected at one end to said second force arm and at its other end to a second end of said pivotally mounted rocker arm when said shafts are operating independently, being disconnected when said shafts are operating dependently and a rocker arm limiter is located beneath said rocker arm and is vertically adjustable with respect to said rocker arm, so that the rocking travel of said rocker arm; and the resultant stroke of said force arms is variable according to the vertical clearance between said rocker arm and said rocker arm limiter.



## 4,019,231
## METHOD FOR ATTACHING A SHADOW OR PHOTOGRAPHIC MASK TO A FLANGELESS, CURVED FACEPLATE OF A COLOR TELEVISION PICTURE TUBE

**Lawrence W. Dougherty, Sleepy Hollow, Ill., assignor to Zenith Radio Corporation, Glenview, Ill.**

**Filed July 6, 1976, Ser. No. 702,822**
**Int. Cl.² H01J 9/18**
**U.S. Cl. 29—25.15** **5 Claims**



1. For use in the manufacture of color television picture tubes, a method for attaching a frameless, non-self-rigid, curved shadow or photographic mask to a flangeless, curved faceplate having a concave inner surface with mask support studs extending therefrom in corner regions thereof, said method comprising:

providing on each corner of said mask a leaf-type spring having a stud-engagement provision for retentively engaging a mating provision on one of said studs, and having indexing means separate from said provision;

supporting said mask in a substantially horizontal position;

supporting said faceplate in a substantially horizontal position and with the concave surface of said faceplate facing a convex surface of said mask;

rotationally and translationally aligning said faceplate and said mask by engaging said studs on said faceplate with a stud aligning means such that said mating provisions on said studs lie in a substantially horizontal, predetermined stud reference plane, and by engaging said indexing means on said springs with a spring aligning means such that said stud engagement provisions lie in a substantially horizontal, predetermined spring reference plane, said spring reference plane being spaced a predetermined distance in a substantially vertical direction from said stud reference plane;

depressing said springs with said spring aligning means:

effecting translational relative motion over said predetermined distance between said faceplate and mask assembly such that said stud reference plane and said spring reference plane coincide; and

releasing said springs such that said stud-engagement provisions on said springs engage said mating provisions on said studs.

## 4,019,232
## RAM TYPE STEEL BAR COUPLING APPARATUS

**Seiji Hattori, Nagoya, Japan, assignor to Daido Seiko Kabushiki Kaisha, NagoyaJA**

**Filed Dec. 3, 1975, Ser. No. 637,178**
**Claims priority, application Japan, Dec. 4, 1974, 49-139288; May 12, 1975, 50-55657; May 12, 1975, 50-55658**
**Int. Cl.² B21D 39/04; B23P 19/04**
**U.S. Cl. 29—282** **1 Claim**

1. An apparatus for coupling two deformed steel bars by one sleeve, said apparatus comprising:

split dies having a bearing portion of smaller inner diameter than the outer diameter of said sleeve,

a substantially U-shaped die frame for supporting said dies,

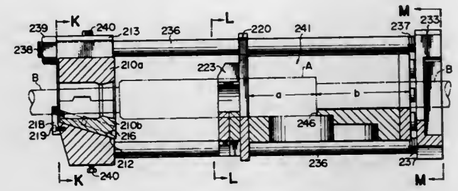
rods connected at one end thereof to said die frame,

a substantially U-shaped bottom frame attached to the other ends of said rods,

a substantially U-shaped intermediate frame supported on said rods between said die frame and said bottom frame so that the intermediate frame can freely slide along said rods and can receive at one side face thereof one end of the sleeve,

a substantially U-shaped hydraulic pressure unit including a plurality of cylinders that can be interposed between said bottom frame and said intermediate frame to slide said intermediate frame along said rods,

said dies comprising upper and lower dies split and separated from each other in a plane passing through the axial line of said dies,



the split faces of said upper and lower split dies having convex and concave portions to be engaged with each other,

said upper die having upper shoulder faces parallel to the axial line,

said lower die having an inclined bottom face slanted at an angle to the axial line,

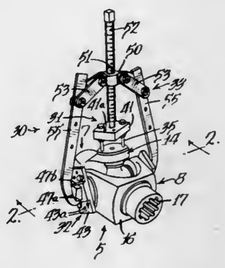
said die frame having parallel faces confronting said upper shoulder faces to support them and a further inclined face confronting said inclined bottom face to support it, and

means on said die frame for movably supporting said lower die whereby said lower die can be displaced from a support position on said further inclined face of said die frame to a removed position to one side of said die frame.

## 4,019,233
## PULLER APPARATUS AND METHOD FOR DISASSEMBLING UNIVERSAL JOINTS

**James E. Jirele, Owatoona, Minn., assignor to Owatonna Tool Company, Owatonna, Minn.**

**Filed May 7, 1975, Ser. No. 575,470**
**Int. Cl.² B23P 19/04**
**U.S. Cl. 29—261** **8 Claims**



1. A puller apparatus for disassembling a universal joint which has a cruciform spider with opposite arms, first and second bearing cups rotatably surrounding the end portions of a first two opposite arms, third and fourth bearing cups rotatably surrounding the end portions of a second two opposite arms, a first yoke which spans the spider and has first and second collars in which the first an second bearing cups are respectively mounted, a second yoke which spans the spider and has third and fourth collars in which the third and fourth bearing cups are respectively mounted, a bearing cup flange

integral with each bearing cup and overlying the associated yoke collar, and headed bolts which impale holes in each of said flanges and screw into threaded bores in the yoke collars, said puller apparatus comprising, in combination:

a bridge assembly that includes a bridge plate mounted upon studs which loosely impale the holes in the first bearing cup flange when the headed bolts are removed, said studs having distal portions seated in the threaded bores in the first collar;

a pair of side plates which are secured, respectively, to the third and fourth collars;

a puller assembly that includes a cross head having a threaded bore, a drive screw threaded through said bore and bearing on the bridge plate, and two puller arms pivotally supported on fixed pivots on said cross head and which have free ends releasably interengaged with the side plates to secure the cross head against movement away from the spider,

whereby rotation of the drive screw to apply pushing force to the bridge plate moves said bridge plate and first yoke bodily away from the cross head while the spider and the first bearing cup remain fixed relative to the cross head to separate the bearing cup from the collar; and

a pair of journal cap which are adapted to surround the end portions of the first two opposite arms of the spider after the first and second bearing cups and the first yoke have been removed, said caps being adapted to be interengaged with the free ends of the puller arms to permit the bridge assembly and the puller means to be used for removing the third and fourth bearing cups and the second yoke from the spider.

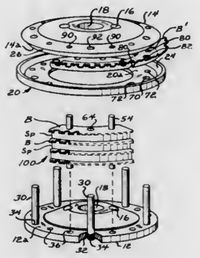
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**4,019,234**

## TIRE RASP HAVING REVERSIBLE BLADE HOLDER ASSEMBLIES

**Wayne E. Jensen, Homewood, and Charles Keith Stanfield, Matteson, both of Ill., assignors to B & J Manufacturing Company, Glenwood, Ill.**

**Filed May 3, 1976, Ser. No. 682,261**
**Int. Cl.² B23D** *71/00*
**U.S. Cl. 29—79** **22 Claims**



**19.** Rasp hub for a tire buffing machine comprising a pair of circular-shaped mounting plates adapted to support assemblies of blades and spacers therebetween with the working edge of the blades exposed about the hub periphery which blades and spacers comprise segments of a circle and each have at least three constantly located mounting holes, the hub further comprising separate holder means for each said assemblies of blades and spacers, which separate holder means embody a segment of arcuate extent no greater than that of the blades and spacers assembled thereon, each said segments having a pair of fixed, parallel spaced pin means protruding from opposite sides of the segment on which blades and spacers may be assembled utilizing two of their aligned mounting holes, said segments having a locating hole related to said pairs of pin means which center with the remaining holes of the blades and spacers assembled therewith, one of the hub mounting plates having spaced pairs of openings to receive the pin means protruding from one side of the segment, said mounting plate also having support pins related to each said pairs of openings and which are of a length to pass through the locating holes of the blades and spacers assembled on the segments when said pin means are received in the related pairs of openings, and the other of the hub mounting plates having groups of related openings located to receive the support pins of the first mentioned hub mounting plate and the pin means protruding from the opposite side of the segment as when the two hub mounting plates are closed against the assemblies of blades and spacers on their respective holder means, one of said holder means and its assembly of blades and spacers being readily separable from the hub without dismounting the other blade and spacer assemblies from the first mentioned hub mounting plate.

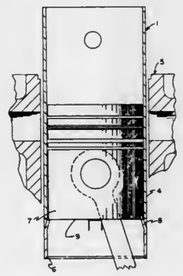
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**4,019,235**

## PISTON PULLER

**Leonard Gregg, 7 Kohlmeyer Lane, Pittsburgh, Pa. 15211**

**Filed Apr. 30, 1976, Ser. No. 681,812**
**Int. Cl.² B25B** *27/14*
**U.S. Cl. 29—280** **10 Claims**



**1.** A tool for removing a piston from a cylinder of a piston driven engine wherein the tool is adapted to be inserted into an annulus defined by the cylinder wall and the piston, said tool comprising:

A. a cylindrical sleeve member having a length greater than the length of the piston to be removed, an outside diameter less than the diameter of the cylinder and an inside diameter greater than the diameter of the piston;

B. means adjacent one end of the sleeve member for inserting the sleeve member into the cylinder; and

C. means adjacent the opposite end of the sleeve member for engaging a wall of the piston to enable it to be withdrawn from the cylinder within the sleeve member.

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**4,019,236**

## CRIMPING PRESS CLAMP FOR ELECTRICAL CONNECTORS

**Lloyd Carl Osman, Sunbury, Pa., assignor to AMP Incorporated, Harrisburg, Pa.**

**Filed Dec. 31, 1975, Ser. No. 645,723**
**Int. Cl.² H01R** *43/04*
**U.S. Cl. 29—753** **1 Claim**

**1.** A device for removably retaining a connector on an anvil assembly of an operator-actuated crimping press, comprising:

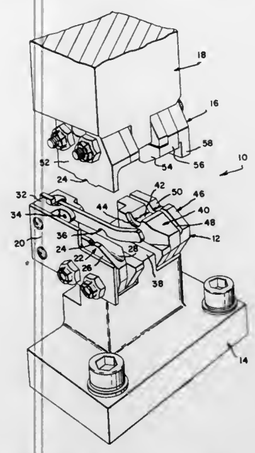
a. a plate adapted to be fastened to the anvil assembly;

b. a housing secured to the plate and having a vertical aperture therein and a slot bisecting the housing and aperture, said slot being in a direction perpendicular to the longitudinal axis of the anvil assembly;

c. an elongated arm having first and second ends and pivotally mounted in slot with the pivot point being inwardly from the first end and with the second end extending across the anvil assembly and towards an operator who may be positioned at the crimping press;



d. an indent located on the lower edge of the second end of the arm, said indent being conformable to and in registration with a connector which may be positioned on the anvil assembly; and



e. biasing means positioned in the vertical aperture and bearing against the first end of the arm and thereby biasing the second end downwardly against a connector which may be positioned on the anvil assembly to retain it thereon, said connector being releasable therefrom by the operator raising the second end of the arm.

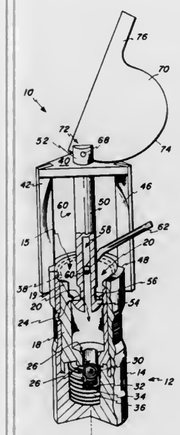
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**4,019,237**

## TOOL FOR DISASSEMBLING HYDRAULIC VALVE LIFTERS

**Alvia K. DeRee, Rte. No. 1, Umatilla, Fla. 32784**

**Filed Oct. 30, 1975, Ser. No. 627,076**
**Int. Cl.² B23P** *19/04*
**U.S. Cl. 29—213 E** **15 Claims**



**1.** A tool for disassembling hydraulic valve lifters of the type having a housing enclosing a plunger longitudinally movable through a cylindrical cavity therein, the plunger having a coaxial cavity therein with a circumferential lip or groove adjacent the open end thereof, said tool comprising in combination:

a shaft for communicating into said coaxial cavity of said plunger, said shaft having at the distended end thereof engaging means for engaging said circumferential lip adjacent said open end of said plunger;

activating means coupled to said shaft for activating said engaging means to engage said circumferential lip;

a frame for communicating with said housing for restraining the longitudinal movement thereof, said frame comprising a plurality of legs movably depending longitudinally therefrom with each of said legs being rotatable about a first pivot generally perpendicular to said shaft for movably engaging or disengaging said housing; and

first means movably coupled between said shaft and said frame for longitudinally moving said shaft relative to said frame, whereby said shaft having said plunger coupled thereto by said engaging means is extracted from said cavity within said housing by the movement of said first means.

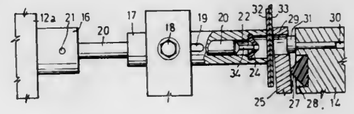
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**4,019,238**

## APPARATUS FOR RIVETING

**Ralph Fuhrmeister, Queensland, Australia, assignor to Furma Manufacturing Co. Pty. Ltd., Queensland, Australia**

**Filed Oct. 8, 1975, Ser. No. 620,764**
**Int. Cl.² B23P** *11/00*
**U.S. Cl. 29—243.53** **2 Claims**



**1.** Apparatus for riveting sheet material members including:

a frame,

a female die mounted on the frame,

an anvil mounted on the frame,

a rivet carrier having a passage therethrough,

means for conveying a rivet into said passage,

a rivet driver slidable through the passage of the rivet carrier and adaptable to advance the rivet shank-first, relative to the female die, and

a resilient rivet guide within the passage adapted to engage frictionally a rivet advanced by the rivet driver through the passage for maintaining the rivet parallel to its direction of advance,

said rivet driver being adapted to drive the rivet into the female die and towards the anvil thereby penetrating adjacent sheet material members interposed between the rivet carrier and the die, said anvil being adapted to enlarge radially the penetrating end of the rivet shank, and said female die being adapted to permit the withdrawal therefrom of the radially enlarged end of the rivet shank.

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**4,019,239**

## METHOD OF PRODUCING MAGNETITE ARTICLE

**Georg Heinrich Artur Gerhard Bockstiegel, Hoganas, Sweden, assignor to Hoganas Aktiebolag, Hoganas, Sweden**

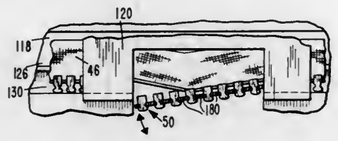
**Filed Sept. 11, 1974, Ser. No. 504,881**
**Claims priority, application Sweden, Sept. 26, 1973, 7313077**
**Int. Cl.² H01S** *4/00*
**U.S. Cl. 29—592** **4 Claims**

**1.** A method of manufacturing a magnetite article having a high electrical conductivity, comprising compacting magnetite powder to form a preform, heating said preform at 900° – 1300° C and hot compacting the heated preform at a pressure of 100 to 600 Megapascal in a compacting tool having a temperature below 500° C until a dense magnetite article is produced.

## 4,019,240
## PROCESS FOR GAPPING SLIDE FASTENER CHAIN

**Norman W. MacFee, Conneaut Lake, Pa., assignor to Textron, Inc., Providence, R.I.**

**Filed May 28, 1975, Ser. No. 581,658**
**Int. Cl.² B21D *53/50*; B29D *5/00***
**U.S. Cl. 29—408** **7 Claims**




1. A process of gapping a slide fastener stringer having a continuous row of fastening elements secured to an edge of a tape of the stringer comprising the steps of

gripping a plurality of fastening elements in a portion of the stringer to be gapped,

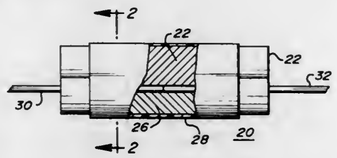
holding the tape, and

producing relative pivotal movement between the gripped plurality of fastening elements and the held tape so as to separate the gripped plurality of fastening elements from the tape seriatim.

## 4,019,241
## METHOD OF SPLICING ELONGATE MEMBERS

**Maurus C. Logan, Elizabeth, N.J., assignor to Thomas & Betts Corporation, Elizabeth, N.J.**

**Filed Nov. 10, 1975, Ser. No. 630,747**
**Int. Cl.² B23Q *17/00***
**U.S. Cl. 29—407** **7 Claims**




1. A method of maintaining selective portions of two elongate members in axial alignment with one another comprising the steps of: (a) disposing the ends of said elongate members in end-to-end facing disposition adjacent one another within the axial center of a bundle of at least three elongate cylindrical elements each having a uniform outer diameter; (b) disposing a contractable member about said bundle; (c) radially contracting said contractable member about said bundle so as to cause said cylindrical elements to be displaced inwardly in tangential contacting engagement with said elongate members; (d) transversely dividing one of said cylindrical elements into two parts spaced from one another; and (e) providing an opening in said contractable member coincident with the spacing between said two parts of said cylindrical element, for observing the disposition of said elongate members within said bundle.

## 4,019,242
## VACUUM PRESSURE FILL OF VISCOUS DAMPERS

**Donald G. Zook, Metamora; Kenneth J. Miller, and Eugene K. Patton, both of Peoria, all of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.**

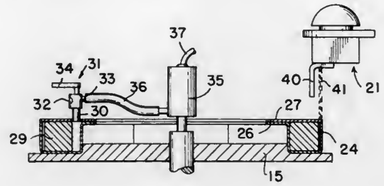
**Division of Ser. No. 477,914, June 10, 1974, Pat. No. 3,939,880. This application Oct. 8, 1975, Ser. No. 620,620**
**Int. Cl.² B23P *19/00***
**U.S. Cl. 29—434** **4 Claims**

1. A method of making a viscous damper, comprising the steps of

placing a damper assembly into a vacuum chamber, said damper assembly comprising

a housing, an inertial weight, and a housing cover, with the housing and cover having a single aperture therein, and providing a complete enclosure except for said aperture,

evacuating the chamber and the space around the inertia weight within the damper housing,



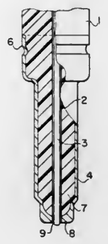

welding the cover onto the housing in said evacuated chamber,

pumping a viscous fluid through the aperture and into the evacuated space within the damper assembly to fill said space with viscous fluid, and sealingly securing a plug in said aperture.

## 4,019,243
## METHOD FOR FORMING A TUBULAR WRITING PEN

**Lasse Kuparinen, Hamburg, Germany, assignor to Koh-I-Noor Rapidograph, Inc., Bloomsbury, N.J.**

**Division of Ser. No. 535,051, Dec. 20, 1974, Pat. No. 3,977,798. This application Mar. 12, 1976, Ser. No. 666,299**
**Int. Cl.² B23P *11/02***
**U.S. Cl. 29—453** **5 Claims**




1. The method of producing a writing point for a stylographic, or tube writing pen of the type wherein the writing point comprises, in combination, a cylindrical member, traversed from end to end by a channel for the passage therethrough of ink from an ink reservoir at a rear end of the channel, and a writing tube attached to a front end of said cylindrical member, comprising the steps of:

A. forming said writing tube with a front end and a rear end wherein the forming of said writing tube comprises deep-drawing a flat blank of metal in successive stages to define an elongated cup and then cutting off the bottom of said cup to define said front end of said writing tube, and;

B. forming a flat writing surface at said front end, wherein the front end is cold formed to create, at said writing tube end, a hardened writing surface and to define said outlet orifice for ink, and;

C. forming an ink outlet orifice in said flat writing surface, and;

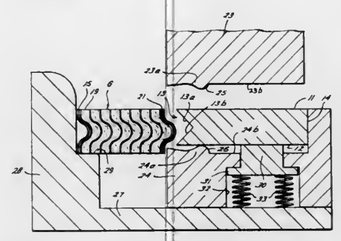
D. securing the thusly formed writing tube in a surrounding relation around said front end of said cylindrical member.



## 4,019,244
## SPIRAL WOUND GASKET ASSEMBLY METHOD

**A. B. Owen, and Bruce M. Gifford, both of Houston, Tex., assignors to Lamons Metal Gasket Company**

**Filed Feb. 17, 1976, Ser. No. 658,509**
**Int. Cl.² B21D *39/00*; B23P *11/00***
**U.S. Cl. 29—520** **6 Claims**



1. A method of forming a spiral wound gasket assembly having a gasket ring and an ouer metal gauge ring with flat guide surfaces between an inner groove and an outer peripheral edge, wherein the improvement comprising the steps of:

forming a spiral gasket ring with the exterior diameter of the ring allowing positioning of the ring in the gauge ring groove;

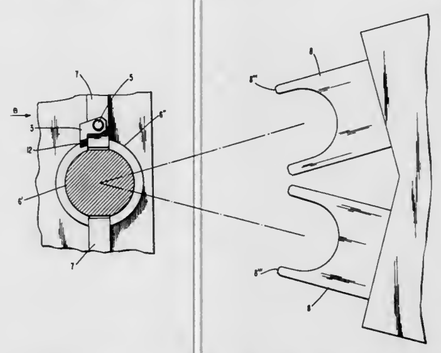
positioning the gasket ring within the gauge ring; and

deforming a portion of the gauge ring to reduce the size of the gauge ring groove to tighten and retain the gasket ring within the groove.

## 4,019,245
## DEVICE FOR CLAMPING TOOLS IN THE SEAT OF A TOOL MAGAZINE

**Nikola Dimov Stoilov, and Ivan Konstantinov Hoklar, both of Sofia, Bulgaria, assignors to Institute za Metalloobrabotvashti Machini, Sofia, Bulgaria**

**Division of Ser. No. 542,456, Jan. 20, 1975, abandoned. This application Sept. 25, 1975, Ser. No. 616,774**
**Int. Cl.² B23Q *3/155***
**U.S. Cl. 29—568** **1 Claim**

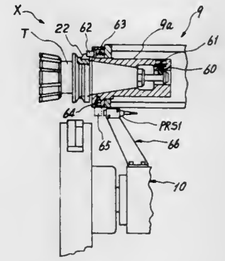


1. A device for clamping tools in the seat of a tool magazine, said seat having at least one key, comprising an axle located in the face portion of the seat of the tool magazine, a cam member pivotally mounted on said face portion adjacent to said axle, the cam being L-shaped and having a front part which is beveled, and a stop projecting from the cam adapted to engage the key of the seat of said tool magazine and a grip adapted to move in a substantially perpendicular direction relative to the axis of said axle and to remove or place a tool in said seat of the tool magazine after said stop has been displaced from said key by said grip, said cam member and axle being so arranged that only the cam's weight applies a rotary torque to the cam to rotate the cam about the axle towards the tool and abut said stop against said key.

## 4,019,246
## MACHINE TOOL WITH AUTOMATIC TOOL CHANGER

**Tamaki Tomita, Okazaki, and Manabu Hosokawa, Chiryu, both of Japan, assignors to Toyoda Koki Kabushiki Kaisha, Japan**

**Filed Oct. 23, 1975, Ser. No. 625,034**
**Claims priority, application Japan, Oct. 23, 1974, 49-122298**
**Int. Cl.² B23Q *3/157***
**U.S. Cl. 29—568** **4 Claims**




1. A machine tool comprising:

a tool storage magazine for removably storing a first group of tools and a second group of tools and capable of indexing a selected tool to a predetermined tool change position;

a key way provided upon each of said first and second group of tools;

a plurality of first key members, each of which is slidably disposed upon said tool storage magazine and engageable with one of said key ways of said tools so as to position one of said tools to a predetermined angular position;

a plurality of resilient members, each of which is disposed within said tool storage magazine for urging each of said first key members outwardly to a position for engaging said key ways of said tools;

a spindle head;

a tool spindle rotatably mounted upon said spindle head;

a second key member slidably disposed upon said spindle and engageable with said key way of a first group tool received in said spindle;

a resilient member disposed within said spindle for urging said second key member outwardly to a position for engaging said key way of said first group tool;

a tool spindle indexing device provided within said spindle head for indexing said spindle to a predetermind angular position so as to align said second key member of said spindle with on of said first key members indexed to said tool change position;

a tool change device for exchanging a tool held upon said spindle and a tool positioned at said tool change position on said tool storage magazine;

means for generating a first signal when either the tool to be used next, or the used tool, is a tool of said first group, and a second signal when the tool to be used next, or the used tool, are tools of said second group;

a first control circuit responsive to said first signal for causing said tool spindle indexing device to be actuated and for causing said tool change device to be subsequently operated; and

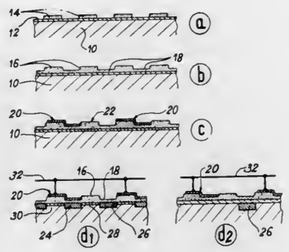
a second control circuit responsive to said second signal for causing said tool change device to be operated without operating said tool spindle indexing device.

**4,019,247**

## FABRICATION OF A CHARGE-COUPLED DEVICE

**Joseph Borel, Echirolles; Jacques Lacour, Grenoble, and Gerard Merckel, Sassenage, all of France, assignors to Commissariat a l'Energie Atomique, Paris, France**

**Filed Jan. 2, 1975, Ser. No. 538,168**
**Claims priority, application France, Jan. 4, 1974, 74.00294**
**Int. Cl.² B01J** *17/00*
**U.S. Cl. 29—578** **2 Claims**



1. A method of fabrication of a charge-coupled device having one control line the steps of froming an insulating layer of a periodic series of insulating steps successively of substantial thickness and of small thickness on a doped semiconductor substrate,

depositing a metallic layer on alternate steps of substantial thickness and on the adjacent step of small thickness thus forming a series of electrodes separated by a space of two consecutive steps not covered with a metallic layer, one of said consecutive steps being of substantial thickness and the other of said consecutive steps being of small thickness.

implanting doped regions of a doping type opposite to that of the doped substrate into the surface of the semiconductor by directing an ion beam upon said steps and electrodes, said steps and electrodes being employed as a mask in such a manner that the insulating steps of substantial thickness which are not covered with said metallic layer are opaque to the ion beam and that the insulating steps of small thickness which are not covered with said metallic layer are transparent to said ion beam, and

connecting each electrode to a control line.

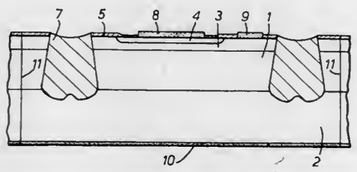
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**4,019,248**

## HIGH VOLTAGE JUNCTION SEMICONDUCTOR DEVICE FABRICATION

**Christopher Thurson Black, Bedford, England, assignor to Texas Instruments Incorporated, Dallas, Tex.**

**Filed June 16, 1975, Ser. No. 587,516**
**Claims priority, application United Kingdom, June 14, 1974, 24680/74**
**Int. Cl.² B01J** *17/00*
**U.S. Cl. 29—583** **20 Claims**



1. In a method of fabrication semiconductor devices having a junction capable of withstanding high reverse voltages, the steps of:

a. providing at a surface of a semiconductor body a first semiconductor region of one conductivity type in a second semiconductor region of opposite conductivity type to define a junction therebetween;

b. mechanically cutting a plurality of closed contour channels extending through said first semiconductor region and into said second region but only partly through the thickness of said semiconductor body to define respective plane areas of said junction each said area having a peripheral boundary defined by a wall portion of a respective said channel, wherein said wall portion of each said channel and said semiconductor body surface define a substantially constant included angle not greater than a right angle;

c. chemically etching surfaces of said channels to remove semiconductor material damaged by said mechanical cutting;

d. filling each said channel with an insulating glass for passivating said junction;

e. separating said semiconductor body into individual chips each having a peripheral boundary within which a said closed contour channel is located and spaced therefrom; and

f. encapsulating said chip in a moldable electrically insulating synthetic resin material against which said insulating glass provides a barrier to contamination of said junction by said encapsulating material thereby enabling said junction to withstand high reverse voltages.

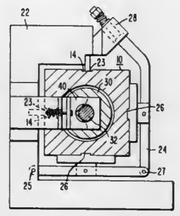
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**4,019,249**

## METHOD AND FIXTURE FOR THE ASSEMBLY OF DYNAMOELECTRIC MACHINES

**Charles F. Irvin, Sugar Creek Township, Ohio, assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed Dec. 10, 1975, Ser. No. 639,338**
**Int. Cl.² H02K** *15/00*
**U.S. Cl. 29—596** **6 Claims**



1. A method of assembly of a dynamoelectric machine with proper alignment of rotating parts in relation to stationary parts, comprising the steps of:

stacking a plurality of stator core laminations to form a core stack having a predetermined distance between a central bore and control surfaces of said stack removed from said bore;

placing said core stack in a fixture wherein said core stack is held at said control surfaces;

placing a shaft mounted rotor within said bore of said core stack and holding said rotor in fixed position by said fixture wherein said rotor is held along a shaft center line at points which are fixed relation to said control surfaces of said stack, said rotor being held in spaced relation from said stator with an air gap therebetween free of supporting elements;

placing an end bell containing a bearing over a first shaft extension of said rotor; and,

securing said end bell and said core stack together.

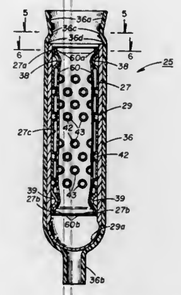


**4,019,250**

## METHODS OF FABRICATING A CONNECTOR WITH A PERFORABLE INSULATIVE LINER

**Henry C. Bassett, Addison; Charles A. From, Jr., Elmhurst, both of Ill.; John F. Parker, Dubuque, Iowa, and Ansel A. Worley, Lombard, Ill., assignors to Western Electric Company, Inc., New York, N.Y.**

**Filed July 21, 1975, Ser. No. 597,742**
**Int. Cl.² H02G** *15/00*
**U.S. Cl. 29—629** **30 Claims**



1. In a method of assembling electrical connectors of the deformable type, wherein at least one metallic sleeve is formed with a spaced array of inwardly projecting insulation-piercing tangs, and wherein an insulative, open-ended jacket surrounds said sleeve, the improvement comprising the step of:

positioning a perforable insulative liner adjacent said sleeve so as to overlie the distal ends of said tangs, and extend continuously in both the circumferential and longitudinal directions as a single-wall liner, with no overlapped regions in said sleeve, and with no discontinuities at least to the borders of the array of tangs formed in said sleeve.

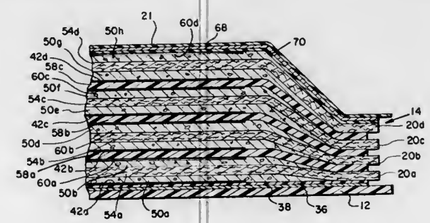
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**4,019,251**

## FLAT BATTERY AND METHOD OF MANUFACTURE

**Thomas P. McCole, South Natick, Mass., assignor to Polaroid Corporation, Cambridge, Mass.**

**Filed Jan. 8, 1976, Ser. No. 647,599**
**Int. Cl.² H01M** *6/00*
**U.S. Cl. 29—623.2** **23 Claims**



1. The method for constructing flat batteries comprising the steps of

assembling a predetermined sequence of sheettype components, electrolyte and electrode active materials to define a multicell pile, said sheet-type components including current collectors externally disposed within said assemblage, electrically conductive polymeric intercell connectors and separators, said components being associated with thermaly activatable material seals peripherally and continuously disposed about the peripheries thereof and dimensioned having peripheries extending beyond the peripheries of said intercell connectors adjacent said seals;

placing cover sheet material, dimensionally stable at temperatures whereat said seal material and said polymeric connectors are dimensionally unstable, upon one said externally disposed current collector, said cover sheet transmitting heat substantially only in a transverse direction and extending over the said peripheries of said seals; and then

thermally sealing the periphery of said multicell pile by applying heat and pressure against said cover sheet over a peripheral area including said seal material to effect thereby a peripherally disposed seal.

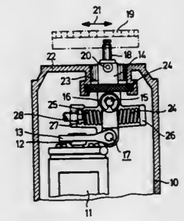
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**4,019,252**

## ELECTRIC SHAVER

**Werner Port, and Christian Schmieder, both of Schwalbach, Taunus, Germany, assignors to Braun Aktiengesellschaft, Frankfurt, Germany**

**Filed Feb. 21, 1975, Ser. No. 551,843**
**Claims priority, application Germany, Feb. 28, 1974, 2409592**
**Int. Cl.² B26B** *19/04*; **F16D** *3/00*
**U.S. Cl. 30—43.92** **11 Claims**



1. An electric shaver comprising a housing, a shear head supported by said housing and including a first cutter and a cooperating second cutter; an electric motor having a rotatable output shaft; motion-transmitting linkage means connecting said output shaft with one of said cutters for imparting oscillatory movement to said one cutter in response to rotation of said output shaft, said linkage means including a crank member connected with and oscillatable by said output shaft, a swing arm member connected with said one cutter, and a joint connecting said swing arm member with said crank member and including a joint member having a spherical surface and a pair of socket members each surrounding and in contact with a portion of said spherical surface, said members all having sufficient spacing from one another except for the contact of said socket members with said spherical surface, so that said members are free to perform relative tumbling movements about the center of said spherical surface; journalling means for journalling said crank member on said shaft member; and a universal joint connecting said journalling means to said crank member.

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**4,019,253**

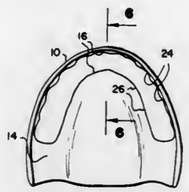
## MEANS AND METHOD FOR PRODUCING CUSTOM ARTIFICIAL DENTURES

**Mitchell M. Hazar, Phoenix, Ariz., assignor to American Denture Corporation, Scottsdale, Ariz.**

**Filed Oct. 29, 1975, Ser. No. 626,851**
**Int. Cl.² A61C** *9/00*
**U.S. Cl. 32—19** **10 Claims**

1. An impression tray for producing artificial dentures comprising: a tray member adapted generally to conform loosly with an edentulus ridge of a patient's mouth; said tray provided with a generally U-shaped recessed portion having a

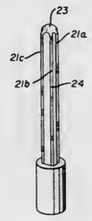
generally U-shaped opening in said U-shaped recessed portion adapted to hold a generally U-shaped stringer of artificial




teeth such that said artificial teeth of said stringer project through said U-shaped opening.

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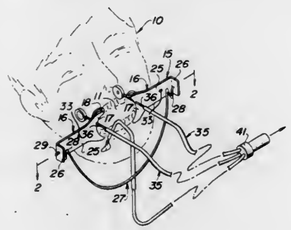
**4,019,254**
**ENDODONTIC OPERATING INSTRUMENT**
**Oscar Malmin, 127 E. Wayne Ave., Akron, Ohio 44301**
**Filed June 30, 1975, Ser. No. 591,693**
**Int. Cl.² A61C** *5/02*
**U.S. Cl. 32—57** **4 Claims**




1. An endodontic instrument for insertion into a root canal, comprising;
   A. an elongate flexible shank;
   B. grasping means carried on one end of said shank;
   C. the remaining end of said shank being blunt; and
   D. a quantity of abrasive material carried by said blunt end of said shank
      1. whereby said blunt end of said shank may form a seat in said root canal for reception of endodontic sealing material.

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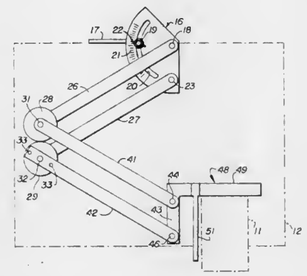
**4,019,255**
**DENTAL APPARATUS FOR CHEEK RETRACTION AND SALIVA COLLECTION**
**Morton Cohen, Suite 604, Fox Pavilion, Jenkintown, Pa. 19046, and Elliott Silverman, 4829 Atlantic Ave., Ventnor, N.J. 08406**
**Filed Oct. 16, 1975, Ser. No. 623,103**
**Int. Cl.² A61C** *17/04*
**U.S. Cl. 32—33** **14 Claims**




1. In a dental apparatus, a pair of cheek retractor elements each comprising a hook part for engaging a patient's lips at a respective side of the mouth, a shank part extending from each hook part outwardly away from each other and the patient's mouth entirely exteriorly thereof, connector means on an outer region of each shank part remote from the patient's mouth, and a resiliently contractile element extending between and connected to said connector means for yieldably urging the latter apart, said contractile element being generally curved in use to extend in spaced relation exteriorly about the patient's mouth and present no obstacle to the dental operator.

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**4,019,256**
**GUIDE FOR TOOL OR INSTRUMENT**
**Lance A. Johnson, 774 Edgewood Road, San Mateo, Calif. 94402**
**Filed Dec. 19, 1975, Ser. No. 642,456**
**Int. Cl.² B43L** *13/00*
**U.S. Cl. 33—79 A** **7 Claims**




1. A guide for a tool to be used on a work piece comprising a straight-edge element adapted to be fixed relative to said work piece, an angle-selector plate attached to said element, a first arm, a second arm of equal length to said first arm, first and second pivot means pivotally connecting the first ends of said first and second arms, respectively, to said angle-selector plate, said first and second pivot means being spaced apart a first distance, a first roller mounted in a fixed position on the second end of said first arm, a second roller mounted rotatably on the second end of said second arm, said rollers being of the same diameter, said diameter being equal to said first distance, rotation means to maintain said rollers in tangential contact and to cause said rollers to turn in opposite directions through identical angles, third and fourth arms of equal length and equal to said first and second arms, a first end of said third arm being rotatably connected to said first roller, a first end of said fourth arm being fixed for rotation about the axis of said second roller, and end-member, third and fourth pivot means spaced apart said first distance pivotally connecting the second ends of said third and fourth arms, respectively, to said end-member, and a tool locator fixed relative to said end-member and shaped to receive said tool.

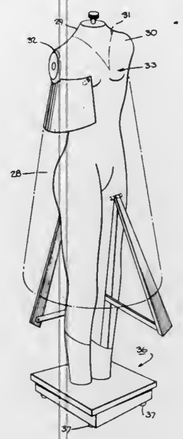
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**4,019,257**
**METHOD AND APPARATUS FOR DEVELOPING A GARMENT PATTERN**
**George Cavrich, 1285 Madison Ave., New York, N.Y. 10028**
**Continuation-in-part of Ser. No. 245,131, April 18, 1972, abandoned. This application Dec. 26, 1973, Ser. No. 427,453**
**Int. Cl.² A41H** *3/00*
**U.S. Cl. 33—17 R** **6 Claims**

1. A method of making a garment pattern comprising the steps of
   1. adjusting a mannequin characterized by at least one moveable contour element to establish a contour of said mannequin corresponding to a predetermined style of garment for which a pattern is desired;
   2. positioning a self-supporting shell over the mannequin as adjusted so that said shell is supported on the mannequin at the shoulders, bust and back thereof;



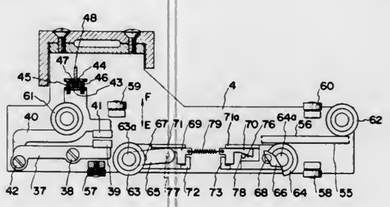
   3. cutting the shell on at least one side to remove excess material therefrom while at substantially the same time and thereafter shaping the remainder of the shell to the contour of the mannequin and securing the shell in that contour thereby imparting to it a style corresponding to said predetermined style;




   4. making markings on the shell while it is still on the mannequin to delineate patterns for the several pieces of the garment intended to be produced, and
   5. cutting the shell along said markings to generate a plurality of pattern pieces of three-dimensional configuration.

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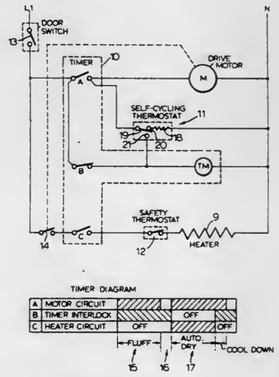
**4,019,258**
**DEVICE FOR ATTACHING ROLLERS TO A CARRIAGE ADAPTED TO MOVE ALONG A RAIL**
**Tadayoshi Iwai, Tokyo, Japan, assignor to Mutoh Industry Ltd., Tokyo, Japan**
**Continuation of Ser. No. 538,779, Jan. 6, 1975, abandoned. This application Feb. 13, 1976, Ser. No. 658,015**
**Int. Cl.² B43I** *13/02*
**U.S. Cl. 33—79 R** **3 Claims**




1. In a drawing apparatus, the combination of:
   a rail having a plurality of rail surfaces extending longitudinally thereof;
   a carriage slidably mounted on said rail for movement therealong;
   first rollers rotatably mounted on said carriage and positioned against one of the rail surfaces of said rail;
   at least one guide member on said carriage;
   presser means including at least one member engaged with said guide member on said carriage for linear movement along said guide member and having thereon a surface gently inclined with respect to the direction of said linear movement;
   abutment means positioned in the path of movement of said inclined surface on said one member of said presser means and engaged by said inclined surface during said linear movement;
   mounting means on which said abutment means is mounted for movement of said abutment means towards and away from another to said rail surfaces;
   at least one further roller mounted on said abutment means;
   resilient means engaged with said one member of said pressure means for moving said one member toward said abutment means; and
   blocking means movably mounted on said carriage for movement into and out of the path of movement of said one member of said presser means at a position to block movement of said one member toward said abutment means at a position where said further roller is out of contact with said another of said rail surfaces.

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**4,019,259**
**AUTOMATIC REGULATION OF DRYING TIME IN A CLOTHES DRYING MACHINE**
**Pierre H. Veraart, Mississauga, Canada, assignor to GSW Appliances Limited, Weston, Canada**
**Filed Oct. 15, 1974, Ser. No. 514,296**
**Int. Cl.² F26B** *19/00*
**U.S. Cl. 34—48** **6 Claims**



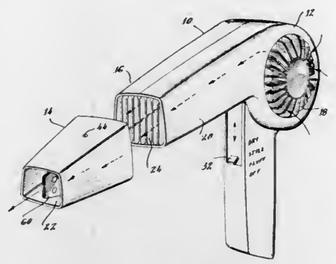

1. In a clothes dryer, a heater for drying a clothes load placed in the dryer, means for energizing said heater to initiate clothes drying, and means to regulate drying time in accordance with the size of clothes load placed in the dryer to dry the clothes to a predetermined degree of dryness and to thereafter terminate drying, said regulating means comprising signal generating means operatively responsive to the cooling effect of the clothes load during heater energization without altering heater energization and means responsive to signals generated by said signal generating means for terminating heater energization when said signal indicates that the clothes have reached the predetermined degree of dryness, said signal generating means comprising a self-cycling thermostat having an internal heater, a bi-metal element carrying at least one contact and at least one fixed contact, said contacts being closed to energize said internal heater initially upon energization of said dryer heater, the heat from said internal heater acting on said bi-metal element effecting opening of said contact and de-energization of said internal heater, and the cooling effect of the clothes load acting on said bi-metal element upon opening of said contacts and effecting closing of said contacts and energization of said internal heater, whereby the thermostat is rendered self-cycling at a rate and duty cycle corresponding to said cooling effect and said means responsive to said signal generating means comprises means responsive to the rate of cycling and duty cycle of said self-cycling thermostat.

**4,019,260**

## HAIR TREATMENT METHOD AND DEVICE

**Emanuel Edward Levy, Ridgefield, and Martin Jay Wolff, West Haven, both of Conn., assignors to Sperry Rand Corporation, Bridgeport, Conn.**

**Filed June 4, 1975, Ser. No. 583,613**
**Int. Cl.² A45D** *20/00*
**U.S. Cl. 34—97** **32 Claims**



**1.** An adaptor for attachment to a hair treatment device having a housing therefor including a conduit segment and means for establishing an air stream which flows from an aperture of said conduit segment, comprising:

a. a conduit body having an outlet, said conduit body adapted to be mounted to the conduit segment of said hair treatment device at said conduit segment aperture whereby the air stream of the hair treatment device flows through said conduit body; and,

b. flow impedance means within the air stream for automatically and periodically varying the flow rate of the air stream at said conduit body outlet whereby a continuous air stream having a pulsating flow rate is discharged from the outlet.

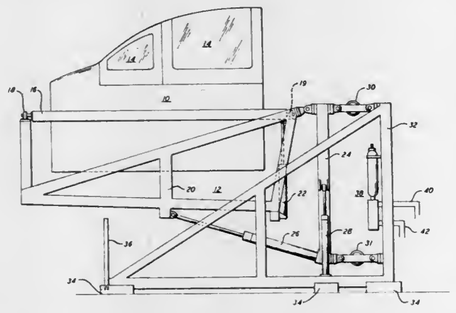
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**4,019,261**

## MOTION SYSTEM FOR A FLIGHT SIMULATOR

**Edward G. Pancoe, Chenango Forks, N.Y., assignor to The Singer Company, Binghamton, N.Y.**

**Filed May 9, 1975, Ser. No. 576,092**
**Int. Cl.² G09B** *9/08*
**U.S. Cl. 35—12 P** **17 Claims**



**1.** A system for imparting motion to a cockpit of a grounded flight trainer, comprising:

first frame means for supporting said cockpit for rotation about a longitudinal axis;

a vertically translatable frame, at least a portion of said frame being disposed behind said first frame means;

second means located between the rear of said first frame means and said frame portion for pivotally connecting the rear of said first frame means to said frame portion;

linear actuator means connected between the first frame means and said portion of the vertically translatable frame for pivoting said first frame means about said second means;

a fixed frame; and

third means for connecting said vertically translatable frame to said fixed frame in a four-bar parallelogram linkage including at least one torque tube for laterally restraining said vertically translatable frame.

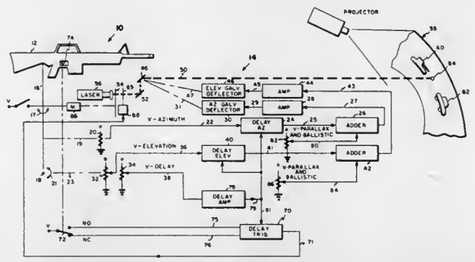
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**4,019,262**

## DIRECT FIRE WEAPON TRAINER INCORPORATING HIT AND DATA DELAY RESPONSES

**Denis R. Breglia, Altamonte Springs; Alfred H. Rodemann, Maitland, and David T. Long, Oviedo, all of Fla., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Dec. 22, 1975, Ser. No. 642,880**
**Int. Cl.² F41G** *3/26*
**U.S. Cl. 35—25** **12 Claims**




**1.** A weapon fire simulator system for training a marksman to shoot a predetermined weapon accurately at a predetermined target means, comprising in combination:

an imitation weapon having a trigger for effecting the simulated firing thereof;

means slave connected to said weapon for generating a first voltage that represents the elevation thereof with respct to a horizontal plane;

means slave connected to said weapon for generating a second voltage that represents the azimuth thereof with respect to a vertical plane;

means effectively connected to said weapon for generating a third voltage that represents the elevation of said weapon with respect to a horizontal plane;

a first adjustable delay means having a voltage signal input, a control input, and a voltage signal output, with the voltage signal input thereof connected to the output of said first voltage generating means;

a second adjustable delay means having a voltage signal input, a control input, and a voltage signal output, with the voltage signal input thereof connected to the output of said second voltage generating means;

a third delay means having an input and an output, with the input thereof connected to the output of said third voltage generating means, and with the output thereof connected to the control inputs of said first and second adjustable delay means;

a normally open trigger switch having terminals and being connected to the trigger of said weapon in such manner as to be closed upon the firing thereof;

a fourth voltage effectively connected to one of the terminals of said normally open trigger switch;

an adjustable delay trigger circuit having a voltage input, a control input, and an output, with the voltage input thereof connected to the other terminal of said normally open trigger switch, and with the control input thereof connected to the output of said third delay means;

emitter means spatially disposed from said screen for timely projecting a predetermined radiation beam along a predetermined path;



reflective means disposed between the aforesaid screen and said emitter means in the path of the radiation beam projected thereby for effecting the redirection thereof;

normally closed shutter means effectively connected to the output of said adjustable delay trigger circuit and physically disposed in the path of the radiation beam projected by the aforesaid emitter means for effecting the passing of said radiation beam toward said reflector means in response to the delayed fourth voltage from said adjustable delay trigger circuit;

means effectively connected to the outputs of the aforesaid first and second delay means and to said reflective means for indexing the aforesaid projected radiation beam redirected thereby in response to the aforesaid delayed first voltage representing the elevation of said weapon and in response to the aforesaid delayed second voltage representing the azimuth of said weapon in such manner as to position said projected radiation beam on said display screen as a hit or miss mark thereof in correspondence with the aiming of said weapon when said weapon is effectively fired as a result of the aforesaid trigger switch being closed by the pulling of the trigger thereof.

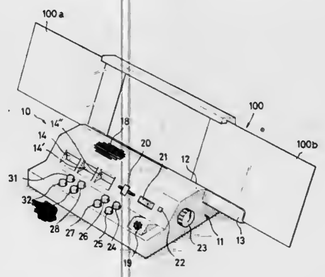
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**4,019,263**

## CARD TYPE LANGUAGE TEACHING APPARATUS

**Roku Sakuma, Tokyo, Japan, assignor to Ryobi, Ltd., Fuchu, Japan**

**Filed Sept. 17, 1975, Ser. No. 614,177**
**Int. Cl.² G09B** *19/04*
**U.S. Cl. 35—35 C** **16 Claims**




**16.** In a language teaching apparatus comprising: a body formed with an upright guide slot; card drive means including capstan means rotatable back and forth, and first pressure means movable towards said capstan means; magnetic reproduce means including at least one reproduce head for magnetically reproducing an audio information, and second pressure means movable towards said reproduce head; mechanical means actuatable for rotating said capstan means and for selectively moving the first- and second-named pressure means; electric circuit means controllable for actuating said mechanical means; and manual control means manually actuatable for controlling said electric circuit means;

a teaching card assembly sized to horizontally run in the upright guide slot of said body in the forward and backward directions, when urged by the first-named pressure means into contact with said capstan means and driven thereby, said teaching card assembly comprising:

a first sheet having a key visual information; and

a second sheet having an additional visual information, at least one of the first- and second-named sheets being made of a transparent material so that the key and additional informations may be observed as a visual information of a suspended meaning when the two sheets are placed one on the other, the second-named sheet having at least one magnetically recording horizontal medium, in which at least one question concerning the superposed visual information and also at least one answer corresponding to the question are recorded as an audio information, said second-named sheet having a plurality of image slides concerning the superposed visual information for a projecting purpose.

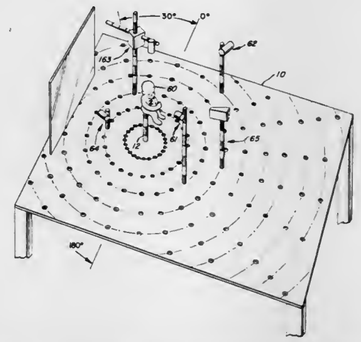
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**4,019,264**

## PHOTOGRAPHIC TEACHING APPARATUS UTILIZING A THREE-COORDINATE REFERENCE SYSTEM

**Henry Matthew Gall, 144-22 22nd Road, Whitestone, N.Y. 11357**

**Filed Apr. 23, 1975, Ser. No. 570,613**
**Int. Cl.² G09B** *25/00*
**U.S. Cl. 35—53** **1 Claim**




**1.** Apparatus for teaching portrait photography by illustrating the height, angle and distance relationship between the equipment used in portrait photography and the subject to be photographed comprising:

a horizontal surface for representing the floor of a photography studio;

said surface having a plurality of apertures forming a predetermined pattern;

said pattern having a center reference aperture and the remaining apertures forming concentric circles with said center reference aperture being the common center point for each of said concentric circles;

each of said concentric circles having a predetermined radius representing the distance

from said center aperture;

a subject model means for inserting into said center reference aperture;

said subject model means comprising:

a subject head means for representing the subject to be photographed and,

a subject support means extending from said subject head means and adapted for insertion into said center aperture;

a plurality of equipment model means for inserting into said remaining apertures forming said concentric circles;

said equipment model means comprising:

a head means for representing the equipment, and an equipment support means extending from said head means and adapted for insertion into one of said remaining apertures forming said concentric circles;

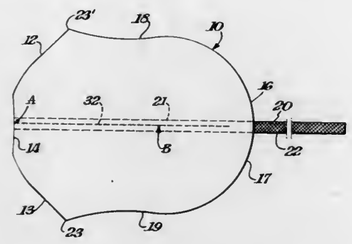
said subject support means and said equipment support means having predetermined marked graduations related to the radius of said concentric circles so that said subject model means is insertable into said center reference aperture to represent the height of the subject to be photographed and said equipment model means are insertable into said remaining apertures to represent the distance and angle from the subject to be photographed and the height of the equipment; and,

a card for recording the distance and angle from said center reference aperture and the height above said horizontal

surface of said equipment models when inserted into said plurality of apertures and the height above said horizontal surface of said subject model when inserted into said center reference aperture.

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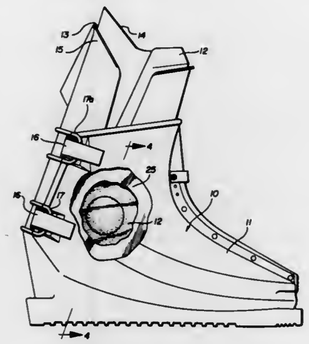
**4,019,265**
**UNIVERSAL SIZE DISPOSABLE SHOE COVER**
**Louis S. Epstein, c/o Melco, Inc. 6603 Governor Printz Blvd., Wilmington, Del. 19809**
**Continuation of Ser. No. 338,916, March 7, 1973, Pat. No. 3,898,750. This application Mar. 13, 1975, Ser. No. 558,065**
**Int. Cl.² A43B** *3/16, 23/00*
**U.S. Cl. 36—7.1 R** **8 Claims**



**1.** A shoe covering made from a blank, which blank, made from stretchable material, comprises a top section, a bottom comprising two sections and two side sections, the top section being angularly flared from the uppermost part of the top section toward the respective side section, said bottom sections being rounded toward the respective side sections and being flat, the terminal of each rounded bottom section being joined to the terminal of its respective angularly flared top through a curve comprising said side sections, the said covering being formed by a sewing together of the said two angularly flared parts at their edges that meet in a folded form of said blank, said sewing thereby forming a vamp for said shoe in the preparation of said covering.

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**4,019,266**
**ANKLE PAD FOR FOOTWEAR**
**Alden B. Hanson; Chris A. Hanson, and Donald W. Bertetto, all of Boulder, Colo., assignors to Hanson Industries Inc., Boulder, Colo.**
**Filed Mar. 4, 1976, Ser. No. 664,042**
**Int. Cl.² A43B** *5/04*
**U.S. Cl. 36—119** **9 Claims**



**1.** An ankle pad insert in a boot having a relatively stiff shell and a liner disposed within said boot shell and conforming about the foot and ankle area of an individual, said liner having an inner wall and an outer wall,

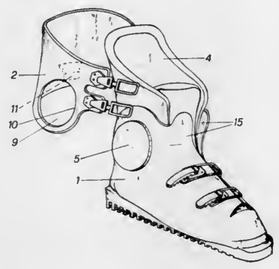
said outer wall being recessed in the area of the portion of said liner at the location where said ankle joint of a wearer of the boot would contact said liner,

said recessed area being substantially filled with said ankle pad insert,

said ankle pad insert comprising a material which is less dense than the density of said liner material whereby said ankle pad insert conforms to the ankle joint of a wearer.

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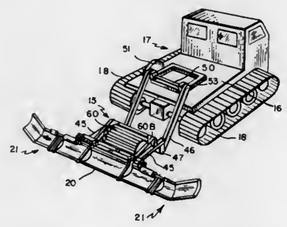
**4,019,267**
**SKI BOOT STRUCTURE**
**Marc Sadler, Paris, France, assignor to Dorofix Design Establishment, Eschen, Liechtenstein**
**Filed Jan. 7, 1976, Ser. No. 647,149**
**Int. Cl.² A43B** *5/04*
**U.S. Cl. 36—120** **3 Claims**



**1.** A ski boot comprising a boot upper and a boot leg portion articulatedly coupled with the boot upper at the natural articulation axis of the human ankle, and means forming an articulation connection between said upper and leg portion comprising rotationally engaged interfitting parts on said upper and leg portion at the interior and exterior sides of the ski boot and substantially at said natural articulation axis of the ankle, said means forming said articulation connection comprising a pair of flanged trunnions on the interior and exterior sides of said upper, and said leg portion being provided with a pair of opposite side openings receiving closely and rotatably said trunnions inwardly of the flanges of the trunnions, said upper and said trunnions being integrally formed from synthetic material and being substantially rigid, said trunnions being substantially cylindrical, and said openings of the leg portion being substantially circular.

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**4,019,268**
**APPARATUS FOR COMPACTING SNOW FOR SKIING**
**Donald Herbert Waterman, Poland Springs, Maine, assignor to Valley Engineering, Inc., Gray, Maine**
**Filed Nov. 1, 1976, Ser. No. 737,522**
**Int. Cl.² B30B** *9/00*
**U.S. Cl. 37—10** **8 Claims**



**1.** An apparatus for compacting snow for sking comprising, an elongate central section having a substantially flat bottom wall,



first elongate frame means substantially parallel to said central section when viewed from the top,

means for securing said first elongate frame means to said central section,

second elongate frame means substantially parallel to said first elongate frame means and located forwardly thereof,

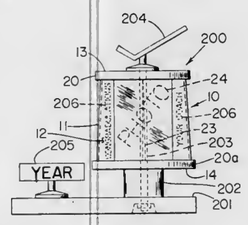
first pivot means located substantially at the centers of said first and second frame means for providing pivotal movement of said first frame means and said central section relative to said second frame means, and

third elongate frame means secured to said second frame means and extending substantially normal thereto,

whereby as the compacting apparatus is moved forwardly over uneven terrain and one end portion of said central section contacts an elevated snow surface the said one end portion of the central section moves upwardly about said first pivot means thus substantially equalizing the p.s.i. exerted by said substantially flat bottom wall against the snow being compacted.

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**4,019,269**
**GRAPHIC EXHIBITOR TROPHY**
**Lloyd J. Vix, R.R. 1, Houston, Minn. 55943**
**Filed Oct. 24, 1975, Ser. No. 625,444**
**Int. Cl.² G09F** *3/20*
**U.S. Cl. 40—19** **7 Claims**




**1.** A graphic award exhibitor for a displayable trophy, comprising in combination:

a. a transparent rigid tubular display window having an exposed outer face, an inner window surface having a tapered contour against which graphic award material may be presented, a closed end, and, an openable end for insertion and removal of graphic material in the window;

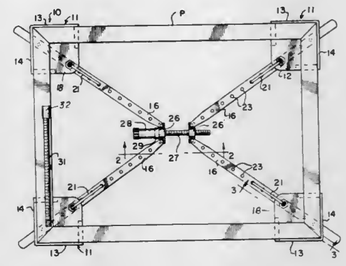
b. a flexible initially rectangular and flat window liner formable to the contour of the window tapered inner surface and sized to completely cover the inner surface, the liner being inserted within the window and pressed against the inner surface by the stress within the liner when formed to the contour of and placed within the window inner surface, the liner being removable from the window and returnable to the flat form, having a surface upon which a graphic message may be written, being re-formable and re-insertable in the window after application of the graphic message with the graphic message facing against the window inner surface, being visible through the window, and forming at least part of a graphic award, the liner having initially parallel edges which climb angularly around the tapered inside window contour and inward from each window end;

c. a peripheral rim wit an opaque annular flange about the closed end of the window, the flange having height on the window greater than the angular climb of the lines from the closed window end, for visually concealing the angular liner climb on the closed end; and

d. A removable opaque end cap having a peripheral rim with an annular flange snap-fitted to and about the open end of the window and retaining the cap to the window, the cap forming a retainer for retention of the liner within the window and being manually removable from the window by disengagement of the rim flange, for access to, removal of and re-insertion of the liner, the end cap being re-snap-fittable to the window for retention of a re-inserted liner, and the flange having a height on the window greater than the angular climb of the liner from the openable window end, for visually concealing the angular liner climb on the closed end.

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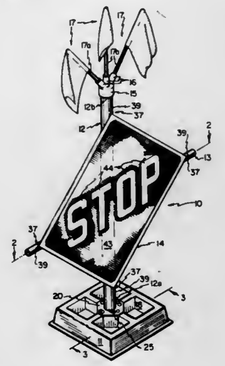
**4,019,270**
**MITRE FRAME CLAMP**
**Leonard D. Trowbridge, 16200 Woodbridge, Harvey, Ill. 60426**
**Filed Mar. 27, 1975, Ser. No. 562,571**
**Int. Cl.² G09F** *1/12*
**U.S. Cl. 40—155** **5 Claims**



**1.** A picture frame clamp comprising four corner brackets having wall means, for engaging the four corners of a picture frame so as to maintain the corners at right angles relative to each other, diagonally extending strap means attached to each of said corner brackets, space blocks connecting said straps at one end to form two pairs of strap means, an adjusting screw extending through said blocks to move said corner brackets inwardly and outwardly relative to each other, a thumb piece fixed to one end of said adjusting screw, and a thrust-bearing between said thumb piece and an adjacent block.

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**4,019,271**
**METHOD FOR MANUFACTURING A DISPLAY PORTION THEREOF**
**Kenneth James Latimer, 1088 Garnette St., Salt Lake City, Utah 84106**
**Filed Oct. 6, 1975, Ser. No. 619,796**
**Int. Cl.² G09F** *7/00*
**U.S. Cl. 40—125 H** **14 Claims**




**1.** A portable sign comprising,

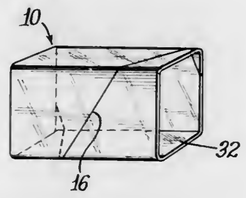
a base constructed so as to be capable of being nested with a like base;

a mast, arranged to be releasably connected at its base end to said base in a vertical attitude, extending upwardly therefrom;

means for releasably connecting said mast, at its base end, to said base;
means for releasably locking the base end of said mast to said base;
a cross arm installable to said mast to extend across said mast;
means for releasably installing said cross arm to said mast;
a sign display portion for arrangement across said mast and cross arm; and,
means for releasably connecting said sign display portion across said mast and cross arm.

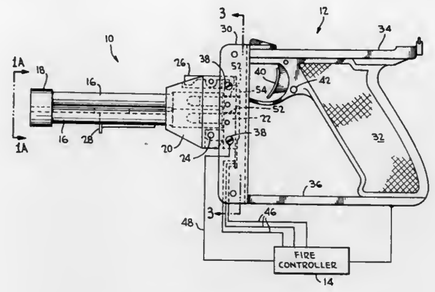
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**4,019,272**
**IDENTIFICATION MARKER**
**Phillip D. Kerz, Rte. 4, Charleston, Ill. 61920**
**Filed Dec. 1, 1975, Ser. No. 636,416**
**Int. Cl.² G09F** *3/06*
**U.S. Cl. 40—316** **1 Claim**




1. An identification marker for application to an elongated article in the form of a rod, comprising,
a tubular sleeve of polygonal cross section made of a strip of flexible pre-stressed spring material having helical turns normally in contracted condition of pre-formed shape with adjacent turns in edge-to-edge inter-engaging relation and thereby forming an axially and circumferentially continuous tube,
the turns being flexible outwardly by the fingers of the user to a relatively large-diameter condition of the sleeve, and further flexible to an open position in which the turns provide an open side extending longitudinally, to enable the sleeve to be applied to and removed from the article in transverse direction, and upon release of pressure for opening the turns, the turns return to contracted condition in surrounding relation to the rod,
the sleeve when on a rod of a first diameter no greater than the internal side-to-side dimension of the sleeve, being in fully contracted condition in which the adjacent turns inter-engage,
the sleeve including substantially more than a single turn, whereby to enable the sleeve to be flexed outwardly and spread to a substantially increased transverse size to surround a rod of substantially greater diameter than said first diameter with the turns completely surrounding the rod, and there thus being no portion of the rod circumferentially that is not surrounded by the sleeve,
the turns due to their helical positioning being each in full gripping engagement with the rod at points throughout the full circumferential extent of itself and of the rod and thereby performing its full incremental part in holding the marker on the rod, the turns being in such full gripping engagement in the case of rods of any diameter throughout a wide range including said first diameter as the smallest,
the sleeve being constituted solely by said turns whereby the marker does not include any portions extending axially beyond the ends of the marker itself and the marker is thereby held on the rod solely by the engagement of the turns with the rod,
the turns being free of all mechanical interconnection, and
the sleeve being provided with identification indicia in intaglio form on its outer surface.

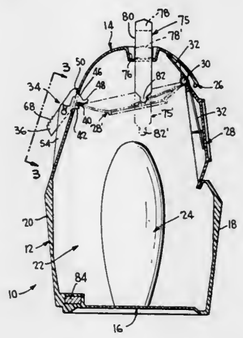
**4,019,273**
**THREE-BARREL PISTOL, ELECTRODE FIRED**
**Ralph J. Kibler, Phoenix, and Otho C. Wolfe, Darlington, both of Md., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.**
**Filed June 7, 1976, Ser. No. 693,401**
**Int. Cl.² F41C** *27/00, 19/12*
**U.S. Cl. 42—1 R** **9 Claims**




1. A pistol for determining design parameters for a hand-held weapon comprising:
1. barrel means;
2. means for loading cartridges in said barrel means;
3. cartridge firing means;
4. grip means supporting said barrel means; and
5. adjustment means for changing the position of said grip means to positions ranging from directly behind the center of said barrel means to above and below said barrel means.

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**4,019,274**
**TROLLING BUCKET WITH LOADING LATCH MEANS**
**Harper Landell, and John M. Michel, both of Downingtown, Pa., assignors to Woodstream Corporation, Lititz, Pa.**
**Filed Sept. 20, 1976, Ser. No. 724,753**
**Int. Cl.² A01K** *97/04*
**U.S. Cl. 43—55** **12 Claims**

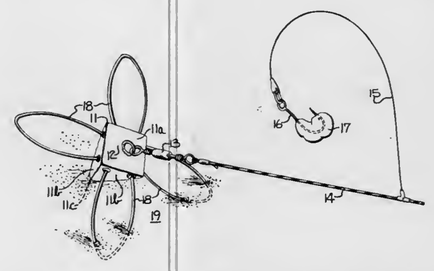


1. A trolling bucket for carrying live bait or the like comprising:
a generally closed, hollow, shell having a forward end, a rearward end, an upper wall and a lower wall together defining a chamber within said shell;
portions of said upper wall of said shell defining an opening to provide access to said chamber;
door means generally corresponding in shape to said opening;
hinge means securing said door means to said upper wall of said shell adjacent said opening for movement of said door means between a closed position in which said door means substantially blocks said opening and precludes escape of bait or the like from within said chamber, and an opened position in which said door means is spaced from said opening interiorly of said chamber to thereby unblock said opening and permit bait or the like to be placed within, or removed from, said chamber;
door biasing means normally urging said door means into said closed position;
latching means including latching portions located interiorly of said shell for engaging and releasably holding said door means against the urging of said door biasing means when said door means is moved to said opened position; and
releasing means for releasing said door means from its holding relationship with said latching means to permit said door means to be moved to said closed position by said door biasing means, said releasing means including portions located exteriorly of said shell for actuating said releasing means.



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**4,019,275**
**FISHING SINKER**
**George T. Ruppe, P.O. Box 542, Kings Mountain, N.C. 28086**
**Filed Mar. 23, 1976, Ser. No. 669,692**
**Int. Cl.² A01K** *95/00*
**U.S. Cl. 43—44.96** **7 Claims**

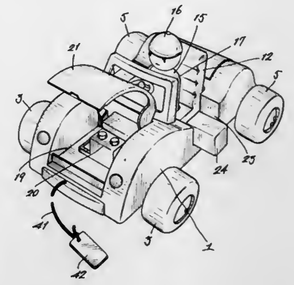


1. A fishing sinker adapted to withstand the tendency of surrounding flowing water to rapidly displace the same comprising a weighted body having a relatively large base portion and a relatively small tapered end, means carried by the base portion of said body for attaching a fishing line thereto, a plurality of relatively broad skeletal fins secured to said tapered body adjacent the base portion of said body and extending outwardly generally radially around said body, said fins being secured to said body so that the width of the fins extends generally in the same direction as the width of the body, and the radial extent of said fins being substantially greater than the widest portion of said tapered body and thereby being adapted to effectively serve to engage the floor of the fishing bed to facilitate maintenance of the sinker in its cast location, while being readily retrievable.

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**4,019,276**
**AUTOMOBILE TOY**
**Shinroku Nakao, Yokohama, Japan, assignor to Combi Co., Ltd., Tokyo, Japan**
**Filed July 1, 1975, Ser. No. 592,163**
**Claims priority, application Japan, July 4, 1974, 49-78923**[U]; July 5, 1974, 49-79602[U]
**Int. Cl.² A63H** *17/25*
**U.S. Cl. 46—99** **7 Claims**

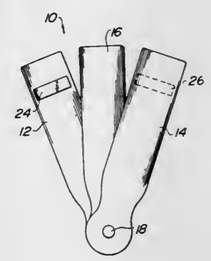
1. An automobile toy which comprises in combination a body, a front wheel axle extending across the front portion of said body and coaxially supporting front wheels at the extreme opposite ends, a rear wheel axle exending across the rear portion and eccentrically supporting rear wheels at the extreme opposite ends so as to move said body upwardly and downwardly as said rear wheels are rotated when the automobile toy is moved, said body defining a driver's compartment between said front and rear portions thereof, a driver figure doll loosely received in said driver's compartment for rocking movement back and forth as said body moves upwardly and



downwardly, in which said front wheel axle supports a sound producing wheel adjacent and inwardly of the adjacent front wheel and said front portion of the body includes a resilient metallic engaging piece adapted to intermittently engage said sound producing wheel so as to produce a sound intermittently as said automobile toy is moved upwardly and downwardly.

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**4,019,277**
**COMBINED FAN AND NOISEMAKER**
**Charles W. Kenkelen, Philadelphia, Pa., assignor to Melvin G. Rabin, El Paso, Tex.**
**Filed Jan. 12, 1976, Ser. No. 648,592**
**Int. Cl.² A63H** *5/00*
**U.S. Cl. 46—175 R** **3 Claims**



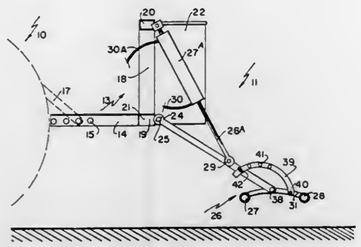
1. A combined fan and noisemaker comprising a pair of outer blades, an anvil blade disposed intermediate said outer blades, each outer blade having a protuberance adjacent one of said outer blade's ends, which protuberance is juxtaposed to a face of said anvil blade when said outer blade is juxtaposedly aligned with said anvil blade, and means for pivotably securing together said outer and anvil blades at a point remote from said protuberances about an axis perpendicular to their major faces whereby said outer blades may be selectively pivoted to an open fan-like disposition, or may be aligned in juxtaposed relationship so that said outer blades may be percussively struck on said anvil blade.

**4,019,278**

## DEVICE FOR THE APPLICATION OF CHEMICALS TO FIELD CROPS AND/OR OTHER PLANT CONCENTRATIONS

James A. McKirdy, 140 Oakdean Blvd., Winnipeg, Canada

Filed Feb. 19, 1976, Ser. No. 659,246
Claims priority, application Canada, Feb. 24, 1975, 220668
Int. Cl.² B05C 1/00
U.S. Cl. 47—1.5 12 Claims



1. A weed bar assembly for use with a liquid such as a herbicide or the like adapted to be supported upon a source of power such as a tractor, said source of power including a source of hydraulic pressure; comprising in combination supporting framework, said supporting framework adapted to be operatively connected to said source of power, a tank associated with said framework for holding a supply of liquid, at least one hollow weed bar assembly supported transversely by said supporting framework and extending upon each side thereof means to adjust the height of said week bar assembly relative to the ground, means operatively connecting said tank with the interior of said weed bar assembly, said weed bar assembly including means in the wall thereof for feeding said liquid through the wall to maintain a film of said liquid upon the outer surface of said wall, said weed bar assembly including a pair of spaced and parallel tubes, means to adjust the fore and aft relationship of said tubes relative to the ground, said means to adjust the height of said weed bar assembly relative to the ground including a pair of links pivoted by one end thereof to said supporting structure and being pivotally connected by the other ends thereof to said weed bar assembly, and a fluid operator extending between said supporting framework and said weed bar assembly and being operatively connected to said source of hydraulic pressure whereby extension and retraction of said fluid operator pivots said links around said one end thereof thereby raising and lowering said weed bar assembly relative to the ground.

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**4,019,279**

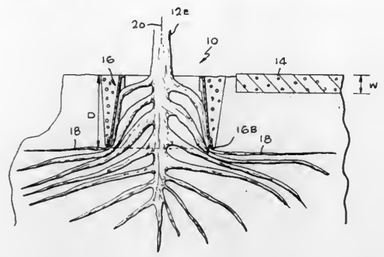
## ROOT CONTROL PLANTER

Maurice D. Moorman, 8124 Holy Cross Place, Los Angeles, Calif. 90045, and Leonard N. Albrecht, 8780 Shoreham Drive, Los Angeles, Calif. 90069

Filed June 9, 1975, Ser. No. 585,048
Int. Cl.² A01G 17/00, 9/02, 11/00
U.S. Cl. 47—25 13 Claims

1. In a tree installation which includes a planting location near a sidewalk or other structure which can be cracked by a root of a tree, and which also includes a tree centered on said location and which is of a kind whose roots can reach and crack the structure, the improvement comprising:

a root deflector disposed between said planting location and most of said structure, said deflector being made of a material which does not disintegrate with time and having root impenetrable smooth walls with a top at least within a few inches of ground level and with a bottom at least one foot below the top of the ground, said deflector being open at the bottom, whereby roots upon contacting said deflector are generally directed downwardly and can emerge only from the bottom of the deflector at a depth



that prevents them from cracking the sidewalk or other nearby structure.

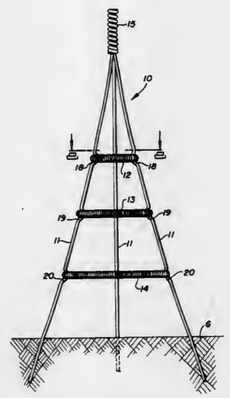
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**4,019,280**

## COLLAPSIBLE PLANT SUPPORT

James B. Summers, Lima, Ohio, assignor to NBS Incorporated, Huntsville, Ohio

Filed Oct. 6, 1975, Ser. No. 619,577
Int. Cl.² A01G 17/04
U.S. Cl. 47—45 7 Claims



1. A collapsible plant support comprising at least three elongated legs fabricated from flexible wire rod with all of said legs being interconnected at one end, said legs being displaceable between a collapsed configuration wherein said legs are disposed in substantially parallel relationship and an expanded configuration wherein said legs are mutually divergent from their interconnected ends, and at least one helically-wound wire spring of predetermined length to extend around said legs and form a closed loop at a selected axial position along side legs when said legs are flexed to said mutually divergent configuration for support of plant elements by said spring, each end of said helical spring provided with means cooperatively interengageable to secure said spring in said closed loop configuration around said legs and supported thereon when said legs are vertically disposed and flexed to said expanded configuration, each of said legs having support means formed therewith and projecting laterally outward thereof at said selected axial position and cooperatively interengageable with said helical spring for vertical support thereof when the legs are in said expanded configuration and said helical spring is formed with an internal diameter to thread axially onto one of said legs and cooperatively interfit with said support means in retained relationship on said leg.

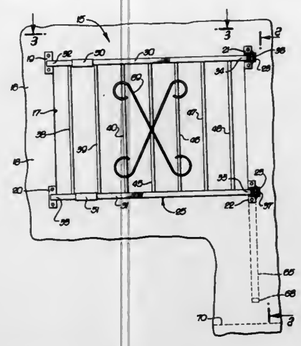


**4,019,281**

## QUICK RELEASE WINDOW GUARD

Ray C. Weiler, 17386 Vine St., Fontana, Calif. 92335

Filed Mar. 1, 1976, Ser. No. 662,377
Int. Cl.² F06B 3/68
U.S. Cl. 49—56 8 Claims



1. In combination:

a grating means divided by joint means in a vertical plane into separate but interlockable sections;

means for mounting said grating means on a wall of a building so as to overlie an opening provided in said wall for a window, by separately securing said grating sections to said wall on opposite sides of said window opening;

hidden locking means operating on said joint means for assembling said sections of said grating means as a rigid unit protectively covering said window opening and preventing illegal entry of said building through said opening; and

cable means connected to said locking means and hidden from access through said grating means from outside said building and terminating at a remote point within said building and functioning when pulled from within said building to unlock joint means and cause said grating means to separate at said joint means and yield readily from its normal position covering said opening and thus readily permit escape through said window in the event of fire.

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**4,019,282**

## APPARATUS FOR DESCALING METAL STRIPS

Ford B. Cauffiel, 1400 Hastings Ave., Toledo, Ohio 43607

Filed Mar. 14, 1975, Ser. No. 558,282
Int. Cl.² B24B 7/12
U.S. Cl. 51—75 12 Claims



1. Apparatus for removing scale from a metal strip, said apparatus comprising an abrasive roll having a hub and a multiplicity of flexible sheets extending generally radially from said hub, said sheets having lengths which are less than the width of the metal strip, and having abrasive surfaces facing in a common direction, means for rotating said hub at high speed in the common direction, means for supporting the metal strip in contact with outer edge portions of said flexible sheets, means for moving the metal strip in a given direction between said flexible sheets and said supporting means, means mounting said abrasive roll for movement in an axial direction transverse to the direction of movement of the strip, and means movable in an axial direction with said abrasive roll for maintaining common ends of said flexible sheets substantially in alignment with a longitudinal edge of the metal strip.

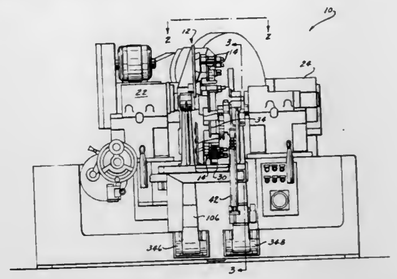
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**4,019,283**

## GRINDING MACHINE LOADER ASSEMBLY

Theodore A. Mrugala, Auburn, Mass., assignor to The Warner & Swasey Company, Cleveland, Ohio

Filed Dec. 17, 1975, Ser. No. 641,540
Int. Cl.² B24B 5/04, 41/00
U.S. Cl. 51—103 C 23 Claims



15. An apparatus for use in sequentially grinding a plurality of workpieces in a work area, said apparatus comprising a base, chuck means connected with said base for holding each workpiece in turn in the work area, grinding means for grinding each workpiece in turn while the workpiece is being held by said chuck means, and workpiece transport means for sequentially transporting workpieces to the work area, said workpiece transport means including a wheel which is rotatable relative to said base, a plurality of workpiece support means disposed on said wheel at equally spaced locations for supporting a plurality of workpieces, index motor means for effecting rotational movement of said wheel to sequentially move workpieces into the work area, and wheel support means for supporting said wheel and index motor means for movement relative to said base between an operating position in which said wheel extends into the work area and an inactive position in which said wheel is spaced apart from said work area.

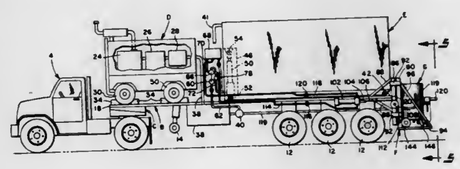
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**4,019,284**

## SELF-CONTAINED SANDBLASTING APPARATUS

Fred Lee Hilemare Jr., 7433 Columbia Road, Olmsted Falls, Ohio 44138

Filed July 7, 1975, Ser. No. 593,438
Int. Cl.² B24C 3/00
U.S. Cl. 51—9 M 6 Claims



1. Self-contained sandblasting apparatus comprising: an elevated wheeled support and transport platform having releasable coupling means for releasably coupling said platform to a powered towing vehicle for transporting said platform from one location to another, said platform including front and rear platform ends, a large generally rectangular substantially closed sand receptacle mounted on said platform and having outlet means adjacent one bottom end thereof for dispensing sand therefrom, said outlet means being located

adjacent said rear platform end, receptacle power means for tilting said receptacle to raise the other bottom end thereof higher than said one bottom end, pneumatically operated sandblasting means for projecting sand particles against a surface to be sandblasted and including a sand reservoir of substantially smaller size than said receptacle and having reservoir inlet means for filling said reservoir with sand, said sandblasting means being positioned for flow of sand from said outlet means to said inlet means, said sandblasting means reservoir being connected by elongated flexible conduit means with manipulatable nozzle means for manipulation by a workman remote from said platform, carrier means mounted on said platform adjacent said rear platform end for raising and lowering movement relative to said platform, said carrier means including generally horizontal carrier support means spaced a substantial distance downwardly from said platform, said sandblasting means including said reservoir being releasably secured to and supported on said carrier support means in upstanding relationship thereto, and a wheeled self-contained engine driven air compressor means removably mounted on said platform remote from said sandblasting means between said receptacle and said platform front end for supplying air to said sandblasting means.

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**4,019,285**

## DEVICES FOR MOUNTING LENSES FOR EDGE GRINDING

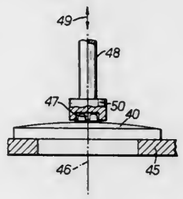
**George William Gravell, London, England, assignor to Raphael's Limited, London, England**

**Continuation of Ser. No. 523,853, Nov. 14, 1974, abandoned. This application Mar. 19, 1976, Ser. No. 668,729**

**Claims priority, application United Kingdom, Nov. 28, 1973, 55189/73**

**Int. Cl.² B24B** *41/06*

**U.S. Cl. 51—216 LP** **4 Claims**




1. A device for mounting a lens in an edge grinding machine, comprising: a key member adhesively secured to a surface of said lens in a centered and angularly oriented position, a pair of friction pad members adapted to engage said lens therebetween and to frictionally transmit rotational forces thereto; said key member comprising a lens surface conforming base and a key projecting from said base; and one of said pair of friction pad members having means defining a keyway which receives said key for aligning said one friction pad member in a centered and angularly oriented position relative to said lens, means defining a recess around said keyway which accommodates said base of said key member, and a surface surrounding said recess to engage said lens in frictional drive-transmitting relationship.

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**4,019,286**

## HONE FOR INVOLUTE KNIFE

**Robert J. Spooner, and Oscar W. Dillon, both of Essex, Conn., assignors to Cashin Systems Corporation, Williston Park, N.Y.**

**Filed Jan. 26, 1976, Ser. No. 652,230**

**Int. Cl.² B24B** *3/40*

**U.S. Cl. 51—248** **6 Claims**

1. A hone for sharpening the cutting edge of a rotary involute knife blade mounted on a shaft comprising:

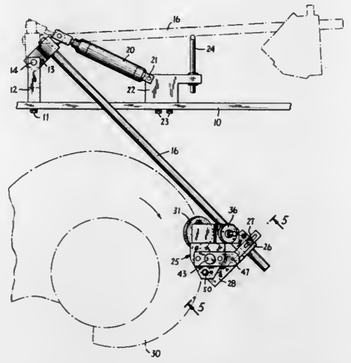
a hone arm pivotally connected at one end to a support in fixed position with respect to said shaft, the axis of the said pivot being parallel to the said shaft to permit the arm to rotate around the pivot in a plane parallel to the plane of the knife blade and through a tracking angle to compensate for changes in the radii of the cutting edge of the knife blade;

a grinding assembly affixed to the other end of the said hone arm by adjustable mounting means;

said grinding assembly comprising:

a. guide means contacting said blade adjacent the cutting edge;

b. a first grinding wheel mounted at an angle to the plane of the blade to be sharpened; and




c. means interconnecting the guide means and first grinding wheel to position said first grinding wheel with respect to said cutting edge;

said mounting means comprising adjustments to rotate the grinding assembly around the hone arm, to rotate the grinding assembly with respect to the mounting means to adjust the tracking angle, and to move the grinding assembly sideways with respect to the mounting means and the knife blade;

the pivot point of the said hone arm and the point of attachment of the grinding assembly to the said hone arm being so positioned that the first grinding wheel will make proper contact with the cutting edge at any radius of the blade and over the entire path of the cutting edge.

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**4,019,287**

## SPIRAL KNIFE SHARPENER

**Lowell J. Goering, Moundridge, and Harold William Voth, Newton, both of Kans., assignors to Hesston Corporation, Hesston, Kans.**

**Filed June 12, 1975, Ser. No. 586,420**

**Int. Cl.² B24B** *3/42*

**U.S. Cl. 51—249** **9 Claims**

1. In combination with a crop cutting cylinder rotatable about its own longitudinal axis and having at least one elongated knife extending helically about said axis, said knife having a normally leading edge, an outer surface, and a bevel between said edge and said surface, a sharpener for said knife comprising:

a grinding element;

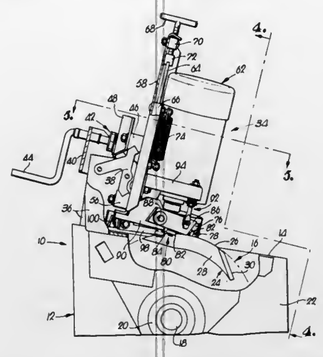
means mounting said element for reciprocation along a path of travel parallel with said axis of the cylinder and in engagement with the bevel of said knife; and

a pair of opposed guides disposed for trapping said knife between the same when the element is reciprocated;

said guides being mounted for movement with said element whereby during said reciprocation of the latter the cylinder is rotated to the extent and in the direction necessary



to maintain the bevel of the knife engaged with the element,




one of said guides being disposed for engagement with said leading edge of the knife and the other being disposed for engagement with said outer surface of the knife.

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**4,019,288**

## GRINDING METHOD AND APPARATUS

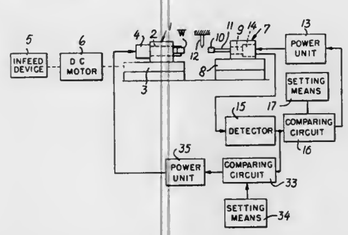
**Sadao Moritomo, Ichikawa, Japan, assignor to Seiko Seiki Kabushiki Kaisha, Japan**

**Filed May 9, 1975, Ser. No. 576,183**

**Claims priority, application Japan, May 10, 1974, 49-52082; May 16, 1974, 49-54916**

**Int. Cl.² B24B** *49/00*

**U.S. Cl. 51—327** **8 Claims**




1. A grinding method with revolution speed control of a grinding wheel, comprising the steps of: moving a grinding wheel into pressure contact with a workpiece; rotating the grinding wheel at a revolution speed effective for feed grinding and at a value different from that corresponding to a first resonance frequency of the wheel spindle as determined when the grinding wheel is in pressure contact with the workpiece to thereby feed-grind the workpiece; detecting spark-out or finish of the feed grinding and providing a corresponding signal; and then lowering the revolution speed in response to said signal to another value different from that corresponding to a second resonance frequency of the wheel spindle as determined when the grinding wheel is in spark-out operation, this resonance frequency being lower than the first, to thereby surface-grind the workpiece; whereby good grinding quality is attained in the feed grinding operation and good surface finishing in the spark-out operation.

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**4,019,289**

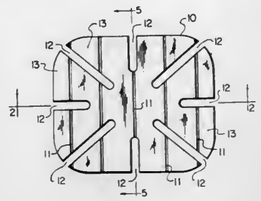
## REPLACEABLE LENS SURFACING PAD WITH INTEGRAL WEAR INDICATING PATTERN

**Clayton Paul Korver, 5739 Redwood Lane, Dallas, Tex. 75209**

**Filed Feb. 23, 1976, Ser. No. 660,339**

**Int. Cl.² B24D** *11/02*

**U.S. Cl. 51—395** **8 Claims**




1. A lens surfacing device for use between a lens to be surfaced and a smooth curved surfacing tool, comprising a replaceable homogeneous metal pad of toolable material conformable to have substantially identical curvature and configuration as said tool and having a first face for movable contact in intimate association with an abrasive slurry with the lens to be surfaced, a second face separated from and located back-to-back with said first face for removable affixation to said surfacing tool, and wear indicating means comprising depressions defining intermediate face areas of lesser surface area than said first face and located below said first face a predetermined distance beyond which wear of said pad results in imperfections being created in said lens for indicating pad wear as said first face is eroded relative to said intermediate areas during a lens fining operation.

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**4,019,290**

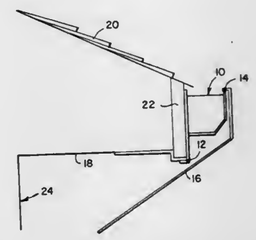
## GUTTER PROTECTOR

**Bruce R. Manty, Moose Lake, Minn., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest**

**Filed Dec. 23, 1975, Ser. No. 643,787**

**Int. Cl.² E04D** *13/00*

**U.S. Cl. 52—11** **1 Claim**

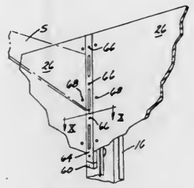



1. A rain gutter comprising a trough positionable adjacent to the edge of a roof that extends over a building to form an eave, said trough being adopted to collect water flowing over such edge of a roof, the back of said trough being mountable on a facia trim board extending downward from such edge of a roof, a hinge having one arm extending in a direction from a point below said trough upwardly and secured to the back of said trough, said hinge having a second arm extending in a direction under such eave and towards a wall of a building on which said roof is mounted, said hinge being adapted to pivot at the intersection of such facie trim board and such eave, said one arm of said hinge being of a sufficient length so that said trough may be folded under such eave and so that the front edge of said trough is pointing at least towards such wall, a rod pivotally secured to the front edge of said trough for holding said trough in a rain collecting position under such roof edge and against such facia trim board, said rod also being operable

to swing and hold said trough under such eave, said rod extending downwardly from said front edge of said trough and then at an angle towards said hinge.

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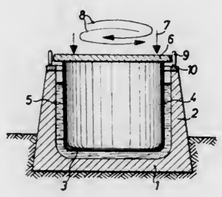
**4,019,291**
**WALL SYSTEM**
**Gerhard Ernst, Muskegon, Mich., assignor to American Store Equipment Corporation, Muskegon, Mich.**
**Filed Oct. 14, 1975, Ser. No. 622,133**
**Int. Cl.² E04B 5/55; A47B 96/14**
**U.S. Cl. 52—36** **14 Claims**



1. A prefabricated wall system comprising a wall frame section having at least a pair of spaced, vertical studs and top and bottom stringers for securing said studs in horizontally spaced positions; a covering material such as dry wall sheeting or the like secured to at least one side of said wall frame section; and generally concealed, slotted channel means for receiving cantilever-type supports for shelving or the like including an outwardly opening, elongated channel extending vertically along one of said studs at the side of one of said wall frame sections, the edges of said covering material abutting either side of said channel with the edges of said channel being generally flush with the surface of said covering material, and an inwardly opening, elongated, slotted channel received within said outwardly opening channel such that a series of aligned, vertical slots are exposed at the surface of said covering material; and means for securing said slotted channel within said outwardly opening channel and for securing said outwardly opening channel to said stud.

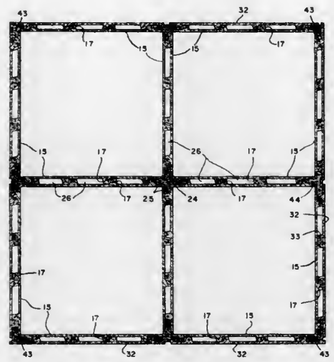
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**4,019,292**
**ROTARY STRUCTURE FOR THE SUPPORT OF LOADS**
**Enrique Pedro, 152, Via Julia, Barcelona, Spain**
**Filed June 19, 1975, Ser. No. 588,154**
**Claims priority, application Spain, June 25, 1974, 427899**
**Int. Cl.² E04B 1/346**
**U.S. Cl. 52—65** **12 Claims**



1. In combination: a fixed body having a peripheral portion, a hollow chamber, and central vertical axis, a liquid partially filling said chamber, a movable body floatingly received in the liquid in said chamber, and having a central vertical axis, and a rotary support structure for supporting loads to be rotated, said support structure including means supported on said peripheral portion for circular movement thereover about said central vertical axis.

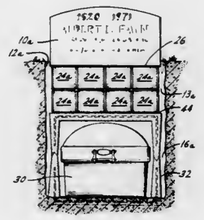
**4,019,293**
**BUILDING MODULES AND STRUCTURE EMBODYING SUCH MODULES**
**Eduardo Santana Armas, G.P.O. Box 3806, San Juan, P.R. 00936**
**Filed Jan. 27, 1975, Ser. No. 544,418**
**Int. Cl.² E04B 1/348**
**U.S. Cl. 52—79.11** **25 Claims**



1. A building module comprising four upright side walls and a roof integrally cast of concrete, the roof having a planar top surface and the side walls being joined at corners and each having a series of equally spaced upright studs of greater thickness than the wall portions between the studs and projecting from the outer surfaces of the side walls, the stud at each end of the series on each of the four side walls being spaced from the end of that wall and the stud at one end of the series for each of the four side walls being spaced from the adjacent corner of the module a distance greater than the spacing of the stud at the other end of the series from the corner of the module adjacent said other end, thereby providing for interfitting of the studs of one side wall of the module with the studs of any side wall of a similar module when such side walls are congruently positioned with relation to each other.

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**4,019,294**
**MARKER SUPPORT ARRANGEMENT**
**Joseph F. Bosico, and David F. Bosico, both of Lansdale, Pa., assignors to Bosico Precast Company, Lansdale, Pa.**
**Filed Nov. 4, 1975, Ser. No. 628,758**
**Int. Cl.² E04H 13/00**
**U.S. Cl. 52—103** **1 Claim**

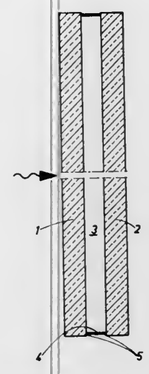


1. A combination comprising a coffin, an excavation in which said coffin is located, said excavation including a trench formed in the bottom of and at one end thereof, said trench having a length significantly less than that of said excavation, a lower generally U-shaped saddle member including a first pair of generally parallel leg members connected at one end by a generally transverse leg member, said lower saddle member being located in said excavation with said transverse leg member being in said trench and below said coffin and with said generally parallel leg members extending upwardly along the sides of said coffin, said parallel leg members terminating in free end face located below the top surface of said coffin, one of said free end faces being formed with a projection and the other free end face being formed with a notch, an upper generally U-shaped saddle member including a second pair of generally parallel leg members connected at one end by a second generally transverse leg member having a generally flat surface, said second pair of generally parallel leg members extending from said second generally transverse leg member a distance equal to the distance which said first generally pair of parallel leg members extend from said first transverse leg member, said second pair of generally parallel leg members terminating in free end faces one of which is formed with a projection and the other of which is formed with a notch, said upper saddle member being located in excavation with the free end faces of said second pair of generally parallel leg members bearing on the free end faces of said first pair of generally parallel leg members with the said projection in one pair seating in said notch in the other pair and with said generally flat surface being located closely adjacent the top surface of said coffin and below the ground surface around said excavation, and support means on said generally flat surface extending upwardly therefrom and terminating in a support base generally level with the ground surface around said excavation for supporting a marker, said support means comprising a plurality of blocks placed on top of each other.



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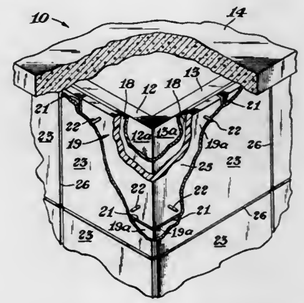
**4,019,295**
**LIGHT TRANSMITTING PANEL WITH SOUND DAMPING PROPERTIES**
**Paul Derner, Gelsenkirchen; Hans Sonntag, Gelsenkirchen-Buer, and Otto Stehl, Essen, all of Germany, assignors to BFG Glassgroup, Paris, France**
**Filed Sept. 16, 1975, Ser. No. 613,853**
**Claims priority, application Luxembourg, Apr. 4, 1975, 72200; Sept. 16, 1974, 70915; Sept. 16, 1974, 70916; Germany, Dec. 27, 1974, 2461533; Dec. 27, 1974, 2461531; Dec. 27, 1974, 2461532; Feb. 1, 1975, 2504293**
**Int. Cl.² E06B 5/20; B32B 1/04**
**U.S. Cl. 52—171** **38 Claims**



1. In a light transmitting panel composed of at least two panes, and spacer means holding the panes in spaced relation to define at least one inter-pane space therebetween, the improvement wherein, for improving the sound damping properties of said panel, said inter-pane space is more than 9mm thick and is sealed from the atmosphere, and said panel further comprises a gaseous medium at least 30% by volume of which has the composition of air, the medium further including a quantity of at least one other gas, and the composition of said medium being such that the velocity of sound propagation in said gaseous medium at a given temperature and pressure differs from that in dry air at the same pressure and temperature by a least 5%.

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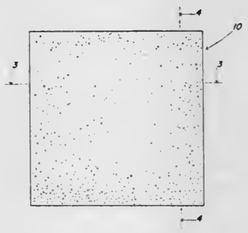
**4,019,296**
**FACADE CLAD BUILDINGS AND METHOD**
**Ludwig V. Jochmann, Wadenswil, Switzerland, assignor to The Dow Chemical Company, Midland, Mich.**
**Filed Dec. 12, 1975, Ser. No. 640,130**
**Int. Cl.² E04B 2/28**
**U.S. Cl. 52—268** **9 Claims**



1. A building structure, the building structure having a wall and a roof, the wall and roof enclosing a useful space therein, the wall having an exterior surface, the exterior surface having a generally water-impermeable layer affixed thereto, the water-impermeable layer being generally coextensive with the outer surface of the wall, a layer of thermal insulation disposed on the water-impermeable layer and affixed thereto, the layer of thermal insulation comprising a closed-cell, generally water-impermeable foam, a plurality of facade cladding panels disposed remote from the water-impermeable layer and generally adjacent the closed-cell foam thermally insulating layer and means to suspend the panels in generally spaced parallel relationship to an adjacent surface of the foam insulating layer, and at least a majority of the panels defining between adjacent edges a water-permeable passage.

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**4,019,297**
**CONSTRUCTION PANEL**
**William F. Murphy, Marshall, Ill., assignor to David V. Munnis, Champaign, Ill., a part interest**
**Continuation-in-part of Ser. No. 491,283, July 29, 1974, abandoned. This application Oct. 14, 1975, Ser. No. 621,793**
**Int. Cl.² E04B 1/26**
**U.S. Cl. 52—309.2** **5 Claims**



1. A separately transportable, masonry-faced construction panel comprising (1) a frame, wherein said frame is comprised of a plurality of parallel, spaced apart vertical studs, a transverse top plate across the upper ends of said studs, and a transverse bottom plate across the bottom ends of said studs,

said studs and plates being secured together and positioned relative to each other such that the respective adjacent side and back faces thereof are flush with each other and such that the front faces of said plates extend forwardly farther than do the front faces of said studs, said plates having a depth dimension which is greater than that of said studs, (2) an insulating fiber board panel secured to and covering the front faces of said studs within the resultant cavity formed between said plates, (3) a mesh of filament covering the faces of said fiber board opposite said studs and the front faces of said plates of said frame adjacent said fiber board, and (4) an in situ formed crack-free concrete-like facing layer on said fiber board, said facing layer containing said filament mesh imbedded therein and completely covering the front surface of said frame on the side thereof to which said mesh is attached, said facing layer being formed by applying an autogenously hardenable paste consisting essentially of concrete cement, from about 0.75 to about 2.5 parts by volume expanded mica per part said cement, from about 0.75 to about 2.5 parts by volume particulate expanded polystyrene per part said cement, and water, and allowing said applied paste to harden to form thereby one entire face of the resultant panel.

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**4,019,298**

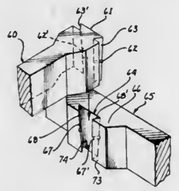
## BEAM SUSPENSION SYSTEM

**John J. Johnson, IV, 212 Dartmouth, NE., Albuquerque, N. Mex. 87106**

**Continuation-in-part of Ser. No. 380,147, July 18, 1973, abandoned. This application Nov. 4, 1974, Ser. No. 520,478**

**Int. Cl.² E04C** *1/10*; **E04B** *1/56*; **F16B** *12/58*

**U.S. Cl. 52—594** **2 Claims**



1. A beam suspension structure securing a beam to a joint in a building structure, said suspension structure comprising in combination:

a. a dual tapered dovetail mortise disposed within a planar side of the joist and extending downwardly from the top of the joist, said mortise including:

i. an end surface depending downwardly from the top of the joist and sloping forwardly toward said side of the joist, said end surface being laterally terminated by lateral edges sloping downwardly toward one another at an acute angle and defining the sides of an inverted truncated isosceles triangle;

ii. a pair of opposed lateral surfaces sloping downwardly toward one another and extending horizontally from said lateral edges of said end surface toward said side of the joist and toward one another, each said lateral surface being laterally terminated by a further lateral edge, said further lateral edges being sloped downwardly and toward one another at an acute angle within the plane of said side of the joist such that each said lateral surface defines an inverted truncated right triangle whereby a cross-section of said mortise defined by said end surface and said lateral surfaces and taken parallel to the top surface of the joist defines a trapezoid and resulting in said mortise being linearly tapered in both width and depth; and

b. a dual tapered dovetail tenon extending from a planar end of the beam, said tenon including:

i. a further end surface at the extremity of said tenon sloping downwardly and inwardly toward the beam at an angle equivalent to the sloping angle of said end surface of said mortise, said further end surface being laterally terminated by yet further lateral edges sloping downwardly toward one another at an acute angle and defining the sides of an inverted truncated isosceles triangle; and

ii. a pair of further lateral surfaces sloping downwardly toward one another and extending horizontally from said further lateral edges of said further end surface toward said end of the beam and toward one another, each said further lateral surface being laterally terminated by still further lateral edges, said still further lateral edges being disposed in the plane of said end of the beam and sloping downwardly and toward one another at an acute angle such that each said further lateral surfaces defines an inverted truncated right triangle, whereby a cross-section of said tenon defined by said further end surface and said further pair of lateral surfaces and taken parallel to the longitudinal axis of the beam defines a trapezoid and resulting in said tenon being linearly tapered in both width and depth:

c. said tenon being mated with said mortise each of the surfaces defining said mortise interferingly contact corresponding surfaces of said tenon to establish force vectors perpendicular to each of the pairs of contacting surfaces to draw and retain said planar end of the beam adjacent said planar side of the joist and frictionally interlock said planar side of the joist and frictionally interlock said mortise and said tenon.

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**4,019,299**

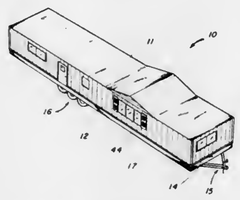
## FLOOR FRAME ASSEMBLY FOR A MOBILE BUILDING

**Frederick H. Lindsay, Rte. 1, Box 71, Darwin, Minn. 55324**

**Division of Ser. No. 560,792, March 21, 1975. This application Apr. 2, 1976, Ser. No. 673,208**

**Int. Cl.² B62D** *21/00*; **B60P** *3/32*

**U.S. Cl. 52—648** **2 Claims**



1. A floor joist comprising:

a plurality of horizontal lower beams with opposite ends;

a pluraity of vertical members mounted to and atop said lower beams;

a plurality of horizontal upper beams mounted to and atop said vertical members, said upper beams have ends located outwardly of said ends of said lower beams;

a plurality of cross braces with opposite ends attached to said vertical members, said cross braces being attached to said lower beams and extending upwardly and outwardly toward sad ends of said upper beams being attached to said upper beams;

a pair of floor runners extending perpendicular to said lower beams and being in contact with said ends of said lower beams, vertical supports extending down from said ends of said upper beams and resting atop said floor runners;

end walls extending between said upper beams and said lower beams; and,

a floor mounted atop and to said upper beams providing a support surface for receiving stacked items thereatop.



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**4,019,300**

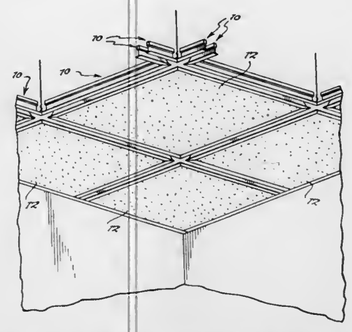
## SUSPENDED CEILING STRUCTURE

**Gale E. Sauer, Williamsville, and Barton Hansen, Cheektowaga, both of N.Y., assignors to Roblin Industries, Inc., Buffalo, N.Y.**

**Filed Aug. 4, 1975, Ser. No. 601,726**

**Int. Cl.² E04B** *5/52*

**U.S. Cl. 52—665** **21 Claims**



9. A grid system adapted to support a plurality of individual panel members in a plane and being in combination with an air handling conduit between said panel members, said grid system comprising:

at least one pair of spaced grid members being substantially parallel to one another,

at least one bridging clip means, said bridging clip means being assembled to said pair of grid members to maintain the latter in a substantially parallel, spaced disposition with respect to one another so that said pair of grid members are adapted to support panel members on the non-adjacent sides thereof and air handling conduits between the adjacent sides thereof at preselected locations along the longitudinal length thereof.

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**4,019,301**

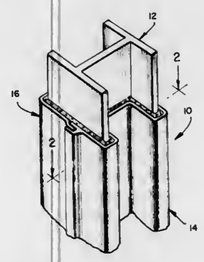
## CORROSION-RESISTANT ENCASEMENT FOR STRUCTURAL MEMBERS

**Douglas L. Fox, 3203 Northridge Drive, Pikesville, Md. 21208**

**Continuation of Ser. No. 488,539, July 15, 1974, abandoned, which is a continuation-in-part of Ser. No. 338,350, March 5, 1973, abandoned. This application Oct. 24, 1975, Ser. No. 625,871**

**Int. Cl.² E04C** *3/34*, *3/30*

**U.S. Cl. 52—725** **12 Claims**



1. A light-weight in situ-formed protective encasement for a structural member situated at least partially in water, and supporting a transverse load,

said encasement member comprising a sheet-like jacket of reinforced resin material which is chemically inert and corrosion resistant sized to receive at least a portion of said structural member therein with at least the lower end of said encasement member located beneath the water level,

said jacket having at least two separated and confronting longitudinal wall edges, and having a cross-sectional area appreciably larger than the cross sectional area of said structural member to define a continuous gap between said jacket and said structural member,

said sheet-like jacket being sufficiently flexible to enable separation of said jacket at said longitudinal edge walls by a distance greater than the width of said structural member whereby to permit said jacket to be inserted transversely about said structural member in a mounted position in which said longitudinal edge walls are in overlapping relationship,

said overlapping edge walls of said jacket in said mounted position being joined in situ by a sealing agent capable of curing in water,

and a filler of inert bonding material filling said gap and bonding said jacket to said structural member, thereby forming with said jacket a rigid unitary encasement member as a permanent part of said structural member,

said filler being made of a water insensitive resin capable of curing in water.

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**4,019,302**

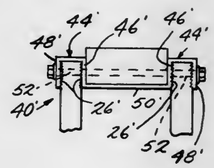
## METAL FLANGE WEB CONNECTION

**Leon J. Meyer, 142 Jefferson St., Savannah, Ga. 31401**

**Filed Apr. 3, 1973, Ser. No. 347,362**

**Int. Cl.² E04C** *3/32*, *3/07*

**U.S. Cl. 52—730** **2 Claims**



1. A metal connector member for use in constructing a plywood box beam or double walled plywood panel comprising an elongated metal member including two coextensive, spaced-apart parallel channel portions facing in the same direction and extending the length of said member, each of said channel portions defining a slot having parallel walls for engaging and clamping to the opposite faces of an edge portion of a plywood sheet, said walls having a large number of sharp projections extending inwardly for penetration into the plywood to thereby form a friction bond with both faces of the plywood along the length of said channel portion, the adjacent walls of the channel portions also defining a third channel portion which is parallel to and faces in a direction opposite the first two channel portions.

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**4,019,303**

## ADJUSTABLE SPLIT DOOR JAMB

**Owen Earl McAllister, Oshkosh, Wis., assignor to Combustion Engineering, Inc., Windsor, Conn.**

**Division of Ser. No. 462,475, April 19, 1974, Pat. No. 3,981,103. This application Nov. 19, 1975, Ser. No. 633,194**

**Int. Cl.² E04C** *2/00*; **E06B** *1/04*

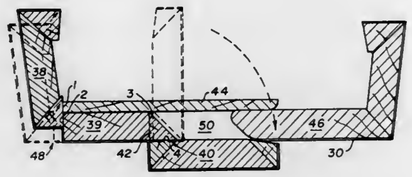
**U.S. Cl. 52—745** **3 Claims**

1. The process of manufacturing an adjustable split door frame member, the process comprising the steps of:

a. cladding the front surface of a board with a flexible cladding material;

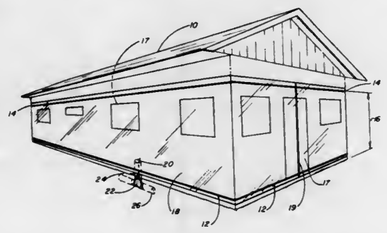
b. longitudinally grooving four parallel V-shaped grooves in the back of said board down to but not through said clad, each groove defining two adjacent surfaces respectively;

c. grooving down to but not through said clad a first and a second plowed groove in the back of said board parallel to and between the middle two V-shaped grooves, said first plowed groove defining first and second facing surfaces and said second plowed groove defining third and fourth facing surfaces, and said first and second plowed grooves forming a middle portion therebetween;
d. joining said board along said V-shaped grooves by folding said respective adjacent surfaces toward each other into abutting relationship and securing said board in said relationship, thereby forming first and second folded ends of said board adjacent to and outside of said first and second plowed grooves respectively;



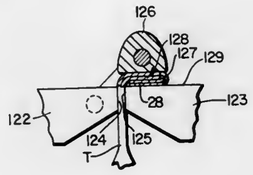

e. joining said first and second facing surfaces together in abutting relationship along a portion thereof by moving said second surface toward said first surface, offsetting said second surface by an amount equal to the width of said first plowed groove, and securing said surfaces in said offset abutting relationship;
f. rotating said third surface away from said fourth surface by an angle of substantially 90°;
g. attaching a support member between said third and fourth surfaces, thereby securing said third and fourth surfaces in substantially perpendicular positions;
h. attaching a board member to said middle portion, said board member extending beyond said middle portion to form a slot with said second folded end.

**4,019,304**
**METHOD OF TEMPORARILY WATER-PROOFING PARTS OF BUILDINGS IN ANTICIPATION OF FLOODS**
**Rolando E. Timm, 628 Aldee Lane, Gretna, La. 70053**
**Filed Oct. 29, 1975, Ser. No. 626,699**
**Int. Cl.² E04H 9/14**
**U.S. Cl. 52—746** **3 Claims**




1. Method of temporarily waterproofing parts of a building in anticipation of floods comprising the steps of:
a. Sealing a continuous strip of waterproof tape around bottom of building, said tape having both sides coated with sealing, and sealing to said building by means of one coated side;
b. sealing a similar tape exteriorly around said building spaced vertically upward from said first tape more than the expected height of flooding;
c. inserting blodders in junctions of drains opening interiorly between said tapes;
d. covering with plywood all exterior openings in in and below said building; and
e. wrapping a continuous sheet of flexible plastic around said building that extends between said tapes and seals thereto by the irrespective second sides; and
f. sealing the ends of said continuous sheet with waterproof sealing means.

**4,019,305**
**METHODS AND APPARATUS FOR FOLDABLY CLOSING THE ENDS OF LAMINATED METAL-PLASTIC TUBES**
**Russell P. McGhie, Somers; Olaf Bredholt, Brooklyn, both of N.Y., and Winston G. Rockefeller, Woodcliff Lake, N.J., assignors to Colgate-Palmolive Company, New York, N.Y.**
**Continuation of Ser. No. 557,059, March 10, 1975, abandoned, which is a continuation of Ser. No. 379,911, July 16, 1973, abandoned. This application Dec. 9, 1975, Ser. No. 639,124**
**Int. Cl.² B65B 7/14, 7/08, 51/14**
**U.S. Cl. 53—39** **2 Claims**

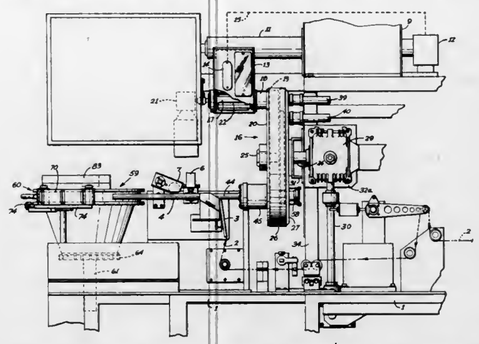



1. A method of foldably closing the end of a flexible dispensing tube having a metal-plastic laminate wall comprising a layer of a metal that will retain a dead fold shape and a coextensive external bonded layer of a heat softenable synthetic plastic on at least one side of said metal layer, said plastic being of a material which has an inherent memory characteristic tending during cooling to open a fold imparted thereto when heated, comprising flattening and folding an end section of the laminated tube wall while subjecting said section to controlled heat for a predetermined period and at a predetermined temperature appreciably above ambient temperature and within a range the lower limit of which is such that the plastic is softened and conditioned to permit a dead fold in the metal layer to be accomplished and said applied heat being such as to destroy said memory whereby a dead fold at the tube end is maintained by the folded metal layer even when said end section cools to ambient temperature, and the upper limit of which is such that the plastic is not undesirably softened or damaged.

**4,019,306**
**APPARATUS FOR FORMING TAMPON SACKS AND FILLING SAME WITH AGGREGATE**
**Stephen F. Evans, Cincinnati, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio**
**Filed Dec. 27, 1974, Ser. No. 536,832**
**Int. Cl.² B65B 1/26**
**U.S. Cl. 53—124 A** **31 Claims**

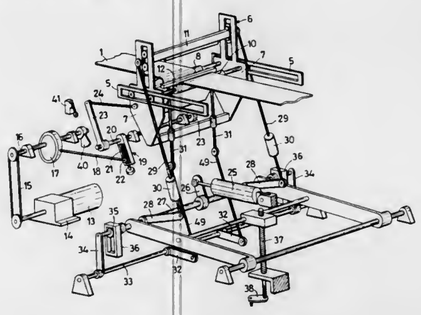
1. Apparatus for filling flexible tubing with measured charges of filling material comprising a rotary loading wheel, drive means for rotating said loading wheel, a plurality of pockets extending through said wheel at equally spaced apart intervals, each pocket having an open leading end and a trailing end closed by screening of a size to retain the filling material, a filling port positioned to sequentially communicate with the leading ends of the pockets as the loading wheel rotates, means for continuously feeding filling material to said filling port, means for drawing vacuum on said pockets from the trailing ends thereof when their leading ends are in communication with said filling port, a discharge nozzle having a leading end and a trailing end, the trailing end of said discharge nozzle being positioned to sequentially communicate with the leading ends of the pockets subsequent to their passage beyond said filling port, and means for passing a stream of air under pressure through said nozzle for discharge through the





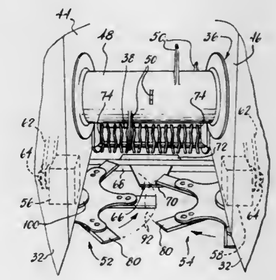
leading end thereof, said stream of air acting to purge the charges of filling material from the pockets and propel the charges through said discharge nozzle.

**4,019,307**
**WELDING AND CUTTING DEVICE FOR PACKAGING MACHINES**
**Aris Ballestrazzi; Lamberto Tassi, and Gianni Tosarelli, all of Vignola (Modena), Italy, assignors to Situno Holding SA, Luxembourg, Luxembourg**
**Filed Jan. 16, 1976, Ser. No. 649,578**
**Claims priority, application Italy, Jan. 17, 1975, 19387/75**
**Int. Cl.² B65B 51/14**
**U.S. Cl. 53—182 R** **3 Claims**



1. A device for welding and severing for packaging machines of the kind in which the products to be packaged are arranged in succession on a conveyor belt and wrapped by a continuous tubular film of a plastics material, comprising a carriage which is moved with a horizontal reciprocation in the direction of movement of the conveyor belt, a welding rod and a counter-welding rod carried by said carriage on opposite sides with respect to said tubular film and capable of approaching to each other to provide a temporary condition of engagement for welding and severing of the film inserted therebetween first actuation means adapted to impress on the counterwelding rod a reciprocal vertical motion between an at rest position immediately below the tubular film and a variable lifted position and second actuating means adapted to impress on the welding rod a vertical reciprocation of constant amplitude between a lifted at rest position and a depressed position of mutual engagement for welding and severing with said counter-welding rod when the latter is in the lifted position, whereby the vertical position of mutual engagement is adjustable, said first and second actuating means comprising respective control shafts having a rotary reciprocal motion and so coupled to each other that a rotary reciprocation of constant amplitude impressed on the control shaft of the welding rod produces a rotary reciprocation of the control shaft of the counter-welding rod having an amplitude which is varied as the distance between the axes of the shafts is varied, and means for temporarily deflecting the conveyor belt in correspondence with said carriage so that the belt does not pass through the gap between said welding and counter-welding rods.

**4,019,308**
**BASE CUTTING APPARATUS FOR SUGAR CANE HARVESTERS**
**Donald J. Quick, Bundaberg, Australia, assignor to Massey-Ferguson Services N.V., Curacao, Netherlands Antilles**
**Filed Oct. 10, 1975, Ser. No. 621,275**
**Claims priority, application United Kingdom, Dec. 27, 1974, 55890/74**
**Int. Cl.² A01D 55/26, 45/02, 45/10**
**U.S. Cl. 56—13.9** **1 Claim**



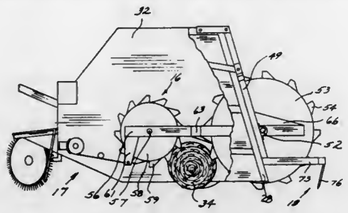
1. A sugar cane harvester including a main frame, a pair of spaced rotatable crop lifting augers mounted on the forward portion of the frame, a pair of spaced substantially parallel walls mounted on the frame to the rear of the crop lifting augers to define a main feed passage, an improved cane base cutter mounted on each of the parallel walls for severing cane at the surface of the ground or below, a butt lifter and feed rollers rotatably mounted between the parallel walls for conveying cane up and to the rear, a cane chopping apparatus mounted on the main frame for receiving cane from the butt lifter and feed rollers and chopping the cane into billets, and billet cleaning and conveying means mounted on the frame for conveying billets away from the cane chopping apparatus and for separating trash from the billets, wherein said improved base cutters each include a gear box mounted on one of said parallel side walls, a drive shaft extending generally downward from the gear box, a generally flat central blade support member supported and driven by said drive shaft, a plurality of integral generally flat blade support arms extending outwardly from and forming an integral part of the central blade support member and a generally flat blade attached to the bottom of each of the blade support arms and extending outwardly therefrom.

**4,019,309**
**ROUND BALE FORMING MACHINE**
**Vernon J. Lundell, P.O. Box 171, Cherokee, Iowa 51012**
**Filed Mar. 5, 1976, Ser. No. 664,344**
**Int. Cl.² A01D 39/00**
**U.S. Cl. 56—341** **9 Claims**

1. A round bale forming machine for picking up cut hay from a field and forming it into a cylindrical bale, said baler comprising:
portable frame means having a forward end and a rearward end;
upright spaced side walls mounted on said frame;
drum means rotatably mounted on said frame means be-

tween said side walls proximate said rearward end, said drum means having pickup means mounted on the periphery thereof for picking up the hay and for rolling the hay into a cylindrical bale and for forming the bale;

roller means disposed forwardly of and parallel to said drum means and rotatably and movably mounted between said



side walls for compacting, forming and rolling the bale; and

power means connected to said drum to rotate same such that the portion thereof adjacent the ground moves forwardly in the same direction as the baler is moving of the baler with the peripheral speed of said roller substantially equal to the forward speed of the baler.

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## 4,019,310
## APPARATUS FOR DIGITALLY MONITORING OPERATING PARAMETERS OF AN OPEN-END SPINNING MACHINE

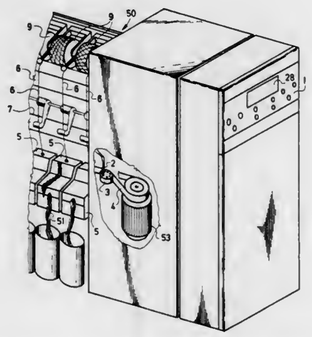
**Pavel Seidl; Josef Rod, both of Usti nad Orlici; Jiří Deutsch, Vrchlabi, and Josef Bartos, Usti nad Orlici, all of Czechoslovakia, assignors to Elitex, koncern textilniho strojirenstvi, Liberec, Czechoslovakia**

**Filed Apr. 12, 1976, Ser. No. 675,947**

**Claims priority, application Czechoslovakia, Apr. 15, 1975, 2581/75**

**Int. Cl.² D01H** *13/32, 1/12*

**U.S. Cl. 57—34 R** **10 Claims**



**1.** Apparatus for digitally mointoring selected operating parameters of an open-end spinning machine, the machine including a rotary combing cylinder for separating slivers supplied thereto into fibers, means for feeding slivers into the combing cylinder, a rotary spinning chamber coupled to the output of the combing cylinder for spinning separated fibers into yarn, and means for withdrawing spun fibers from the spinning chamber, the apparatus comprising, in combination, first detection means coupled to the spun fiber withdrawing means for generating a first sequence of pulses at a rate proportional to the rate of withdrawal of the spun fibers, second detection means coupled to the sliver-introducing means for generating a second sequence of pulses at a rate proportional to the rate of introduction of the slivers, multi-tap sequentially operable switching means having at least first and second inputs and first and second outputs, a main binary counter, an auxiliary binary counter, a memory, means for selectively coupling the output of the main and auxiliary counters to the memory, means for coupling the first output of the switching means to the count input of the main counter, means for coupling the second output of the switching means to the count input of the auxiliary counter, means for coupling the output of the first detection means to the first input of the switching means, means for coupling the output of the second detection means to the second input of the switching means, and means for operating the switching means.

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## 4,019,311
## PROCESS FOR THE PRODUCTION OF A MULTIFILAMENT TEXTURIZED YARN

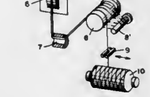
**Heinz Schippers, Remscheid, Germany, assignor to Barmag Barmer Maschinenfabrik Aktiengesellschaft, Wuppertal, Germany**

**Filed July 16, 1974, Ser. No. 488,948**

**Claims priority, application Germany, July 18, 1973, 2336509**

**Int. Cl.² D02G** *3/04;* **D01D** *5/12*

**U.S. Cl. 57—140 BY** **14 Claims**



**1.** A process for the production of a multifilament texturized yarn which comprises:

simultaneously melt-spinning at least two different thermoplastic fiber-forming linear polymers selected from the group consisting of linear fiber-forming and crimpable polyesters and polyamides into a continuous preoriented multifilament tow containing the different polymer components under substantially the same spinning conditions for all portions as the tow including a draw-off from the spinning zone at a velocity of more than 2,500 meters/minute;

and then, in a second separate stage prior to any crimping, stretching the spun and solidified multifilament tow under substantially the same stretching conditions for all portions of the tow,

said melt-spinning being carried out to achieve a preorientation which is so high that the available maximum stretching ratio of all the filamentary polymer components in the second stage amounts to not more than 1:2.5, and said stretching being carried out to exceed the elastic limit of at least one of the filamentary polymer components with the proviso that said stretching is maintained above the elastic limit but below the maximum stretching ratio of at least one of the filamentary polymer components while said stretching also extends beyond the maximum stretching ratio of at least another one of the filamentary polymer components to cause filament breakage.



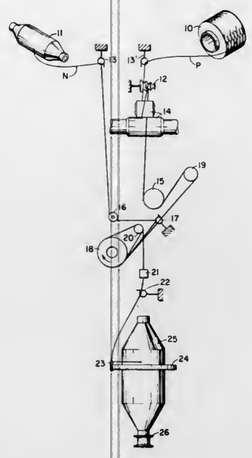
## 4,019,312
## METHOD OF COMBINING SYNTHETIC YARNS

**Ford E. Warrick, Asheville, N.C., assignor to Akzona Incorporated, Asheville, N.C.**

**Filed May 16, 1975, Ser. No. 578,065**

**Int. Cl.² D02G** *3/04, 1/18*

**U.S. Cl. 57—157 S** **6 Claims**



**5.** A method of combining undrawn polyester and drawn polyamide continuous filament yarns on a drawtwister having two creels provided for each drawing position and having means including a feed roll and a draw godet for drawing yarn, comprising having undrawn continuous filament polyester yarn on one creel position, and having drawn continuous filament polyamide yarn on a second creel position, comprising the steps of drawing said polyester yarn by use of said feed roll and said draw godet, and simultaneously introducing said polyamide yarn between said feed roll and said draw godet so the said drawn polyamide yarn is not further drawn; combining the said polyester and said polyamide yarns, and leading said combined yarns around the second draw godet; and winding said combined yarns on a yarn collecting device.

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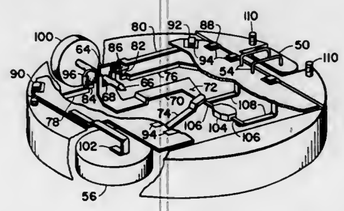
## 4,019,313
## LIQUID CRYSTAL WATCH MODULE

**Daniel W. Mason, Scottsdale, and Richard S. Walton, Tempe, both of Ariz., assignors to Motorola, Inc., Chicago, Ill.**

**Filed Oct. 17, 1975, Ser. No. 623,537**

**Int. Cl.² G04B** *19/30;* **G04C** *3/00*

**U.S. Cl. 58—23 R** **9 Claims**



**1.** In an electronic timepiece, a display element having a given number of digit positions, first circuits for causing said display element to show hours and minutes in the given number of digit positions, second circuits for causing said display element to show minutes and seconds in the given number of digit positions, and a switch operable selectively to connect said first or second circuits to said display element.

## 4,019,314
## HIGH PRESSURE GASIFICATION OF COAL USING NITROGEN DILUTION OF WASTE GAS FROM STEAM GENERATOR

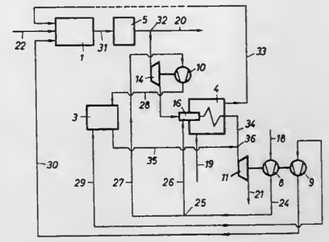
**Helmut Springmann, Geretsried, Germany, assignor to Linde Aktiengesellschaft, Wiesbaden, Germany**

**Filed Jan. 27, 1976, Ser. No. 652,772**

**Claims priority, application Germany, Jan. 27, 1975, 2503193**

**Int. Cl.² F02C** *3/22*

**U.S. Cl. 60—39.02** **12 Claims**



**1.** In a process for the production of a fuel gas by the pressure gasification of carbon-containing fuels with oxygen and steam, wherein the oxygen is manufactured in a low temperature air separation plant and the steam is formed in a gas-heated steam boiler, and the waste gases produced in the steam boiler are subsequently expanded in an expansion turbine, the improvement which comprises admixing the nitrogen produced during the air separation with the waste gases before the expansion of the latter.

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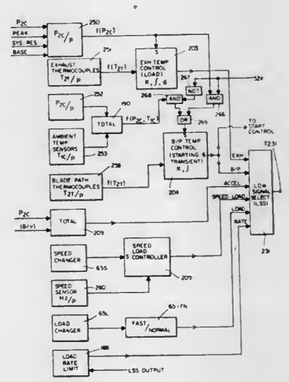
## 4,019,315
## GAS TURBINE POWER PLANT CONTROL APPARATUS INCLUDING A TEMPERATURE RESET STARTING CONTROL SYSTEM AND AN IGNITION PRESSURE CONTROL SYSTEM

**Robert A. Yannone, Aldan, and James J. Shields, Philadelphia, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed June 20, 1973, Ser. No. 371,623**

**Int. Cl.² F02C** *9/10*

**U.S. Cl. 60—39.03** **58 Claims**



**53.** A method for operating a gas turbine electric power plant having a gas turbine supplied with fuel by a fuel system

comprising a pump and a throttle valve in a main fuel flow path, means for regulating pump discharge pressure, and a bypass fuel flow path having means for determining bypass flow through the bypass flow path, the steps of said method comprising starting and driving the turbine and a mechanically coupled electric generator to ignition speed, operating the fuel system to ignite the turbine during an ignition period, operating the discharge pressure regulating means to provide primary control over the pump discharge pressure during predetermined turbine operating time periods, operating the bypass means to limit the pump discharge pressure at a given level within a first predetermined time period following initiation of ignition, sensing ignition and operating the bypass means to reduce said pump discharge pressure when ignition is sensed before the end of said first time period, operating the bypass means in a fixed state during a second time period, accelerating the turbine and generator to idle or synchronous speed after ignition, and operating the fuel system to meet load requirements after the turbine and generator reach idle speed.

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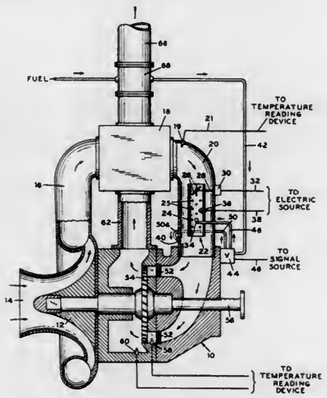
## 4,019,316
## METHOD OF STARTING A COMBUSTION SYSTEM UTILIZING A CATALYST

**William C. Pfefferle, Middletown, N.J., assignor to Engelhard Minerals & Chemicals Corporation, Murray Hill, N.J.**

**Continuation-in-part of Ser. Nos. 142,939, May 13, 1971, abandoned, and Ser. No. 164,718, July 21, 1971, abandoned, and Ser. No. 358,411, May 8, 1973, Pat. No. 3,928,961. This application Dec. 29, 1975, Ser. No. 644,873**

**Int. Cl.² F02C** *3/04*; **F02M** *27/02*

**U.S. Cl. 60—39.02** **22 Claims**




1. A method starting a combustion system utilizing a catalyst in which upon starting a carbonaceous fuel is combusted in the presence of a catalyst with at least a stoichiometric amount of air for complete oxidation of the fuel to carbon dioxide and water, in which the operating temperature of the catalyst is substantially above the instantaneous auto-ignition temperature of the fuel-air mixture, which method comprises:

a. heating said catalyst in the substantial absence of unburned fuel to bring the catalyst to at least a temperature at which it will sustain mass transfer limited operation;

b. forming an intimate admixture of carbonaceous fuel and air; and

c. no sooner than essentially concurrently with the catalyst reaching said temperature which will sustain mass transfer limited operation, feeding said admixture of fuel and air to said catalyst for combustion, said combustion being characterized by said fuel-air admixture having an adiabatic flame temperature such that upon contact with said catalyst, the operating temperature of said catalyst is substantially above the instantaneous auto-ignition temperature of said fuel-air admixture but below a temperature that would result in any substantial formation of oxides of nitrogen.

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## 4,019,317
## FLUID FLOW CONTROL VALVE FOR GAS TURBINE ENGINE FUEL CONTROL SYSTEM

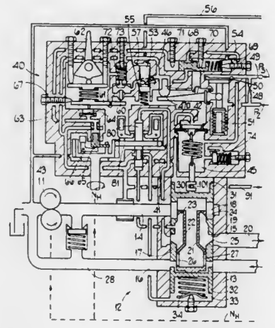
**Trevor Stanley Smith, Sutton Coldfield, England, assignor to Lucas Industries Limited, Birmingham, England**

**Filed Sept. 22, 1975, Ser. No. 615,829**

**Claims priority, application United Kingdom, Oct. 23, 1974, 45918/74**

**Int. Cl.² F02C** *9/08*, *9/10*

**U.S. Cl. 60—39.28 R** **9 Claims**



1. A fluid flow control valve for a gas turbine engine fuel control system, comprising a body having an inlet and first and second outlets, first and second control elements which are slidable relative to each other and to said body, one of said elements being slidable within the other of said elements, said first control element defining, in part, a variable metering orifice and said first and second control elements co-operating to define a throttle valve, said metering orifice and said throttle valve being in series between said inlet and said first outlet, said first and second control elements also co-operating to define a spill valve between said inlet and said second outlet, movement of said second control element to increase flow through said first outlet simultaneously acting to decrease flow through said second outlet, means responsive to a first servo pressure signal for slidably moving said first control element, and means responsive to variations in a second servo pressure signal for slidably moving said second control element.

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## 4,019,318
## FLUID FLOW CONTROL VALVES

**Trevor Stanley Smith, Sutton Coldfield, England, assignor to Lucas Industries Limited, Birmingham, England**

**Filed Jan. 16, 1976, Ser. No. 649,617**

**Claims priority, application United Kingdom, Feb. 5, 1975, 4830/75**

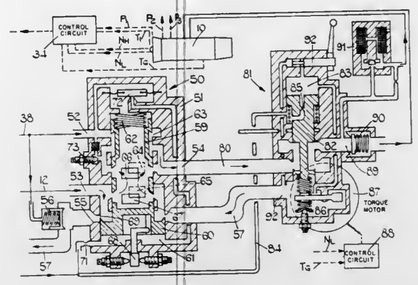
**Int. Cl.² F02C** *9/08*

**U.S. Cl. 60—39.28 R** **8 Claims**

1. A fluid flow control valve comprising a body having first and second inlets and first and second outlets, a control element movable within said body in response to variations in a servo pressure signal and combining with ports in said body to provide a first variable flow restrictor between said first inlet and said first outlet, second and third variable flow restrictors in series between said second inlet and said first outlet, and a fourth variable flow restrictor between said second inlet and said second outlet, and a pilot valve, responsive to a difference between the pressure at said first inlet and the pressure intermediate said second and third restrictors, for varying said servo pressure signal, an increase in the pressure at said first inlet resulting in an increase in flow through said first, second and third restrictors and a simultaneous decrease in flow through said fourth restrictor.



7. A fuel control system for a gas turbine engine, comprising a pump a control valve as claimed in claim 1, through said first outlet of which fuel can flow to the engine, a variable metering device responsive to engine operating parameters and connected between the outlet of said pump and said first inlet, said second inlet being connected to receive unmetered fuel from said pump outlet, and said second outlet being connected to a low pressure zone.




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## 4,019,319
## APPARATUS FOR GENERATING HIGH-PRESSURE GAS

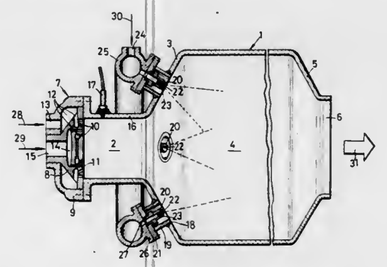
**Noriyuki Oda; Takashi Yoshida; Takeshi Nakanishi, and Kensuke Yoshikawa, all of Osaka, Japan, assignors to Hitachi Shipbuilding and Engineering Co., Ltd., Osaka, Japan**

**Filed Aug. 14, 1975, Ser. No. 604,751**

**Claims priority, application Japan, Oct. 7, 1974, 49-115795**

**Int. Cl.² F02C** *3/20*

**U.S. Cl. 60—39.46 S** **8 Claims**



1. An apparatus for generating a high temperature and high-pressure combustion gas from a three component propellant for use as a driving energy for turbines, comprising:

a primary oxidizing agent, a primary fuel and a secondary fuel, and in which a secondary oxidizing agent for the secondary fuel is formed by the interaction of said primary fuel with said primary oxidizing agent and said secondary fuel is a metal fuel, said apparatus including a gas generator body provided with a combustion chamber, said combustion chamber including a chamber portion, said gas generator body including a primary propellant injector having orifices for injecting the primary fuel into said chamber portion, and orifices for injecting the primary oxidizing agent into said chamber portion, for assuring that both said primary fuel and said primary oxidizing agent are thoroughly mixed together, both said orifices being open to the chamber portion of said combustion chamber, an igniter in communication with said chamber portion, for igniting the primary fuel forced out from said injector and thereby igniting the mixture of said primary fuel with said primary oxidizing agent which react with each other to produce in said chamber portion a high temperature combustion gas containing said secondary oxidizing agent, said secondary oxidizing agent being formed exclusively from products of the combustion of said primary fuel with said primary oxidizing agent, and valve means having a secondary fuel injecting orifice communicating with said combustion chamber for injecting a metal fuel into said combustion chamber, said metal fuel combining with said high temperature gas containing said secondary oxidizing agent formed in said chamber portion for reaction with said secondary oxidizing agent for producing the high-temperature and high-pressure combustion gas, said gas generator body including an outlet for the combustion gas.

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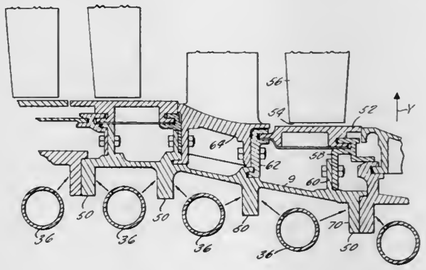
## 4,019,320
## EXTERNAL GAS TURBINE ENGINE COOLING FOR CLEARANCE CONTROL

**Ira H. Redinger, Jr., Vernon; David Sadowsky, and Philip S. Stripinis, both of South Windsor, all of Conn., assignors to United Technologies Corporation, Hartford, Conn.**

**Filed Dec. 5, 1975, Ser. No. 638,132**

**Int. Cl.² F02C** *7/18*

**U.S. Cl. 60—226 R** **8 Claims**



1. For a turbofan engine operating over a range of power having a fan discharge duct, a turbine, a casing surrounding the turbine, and turbine seal means extending inwardly from said casing means for controlling the clearance between the tip of the turbine and the turbine seal means, said means including a plurality of axially spaced flanges extending outwardly from said casing, at least one tube circumferentially mounted about said engine case adjacent to said flanges, connection means interconnecting the fan discharge duct and said tube whereby the cool fan discharge air is directed to impinge on the side wall of said flange and said flange being sufficiently structured so that the effect of cooling causes the engine case to shrink to reduce the diameter of said air seal and the clearance between the turbine tip and said air seal and means for selectively turning the flow of air on and off at a given power condition of said range of power.

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## 4,019,321
## CONTROLS FOR A HYDRAULICALLY DRIVEN VEHICLE

**Ryozo Aoyama; Yukinobu Matsuda, and Mitsuo Urushima, all of Hirakata, Japan, assignors to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan**

**Filed Oct. 8, 1975, Ser. No. 620,817**

**Claims priority, application Japan, Oct. 8, 1974, 49-120932; Feb. 26, 1975, 50-22738**

**Int. Cl.³ F15B** *11/16*

**U.S. Cl. 60—484** **5 Claims**

1. Controls for a hydraulically driven vehicle, comprising

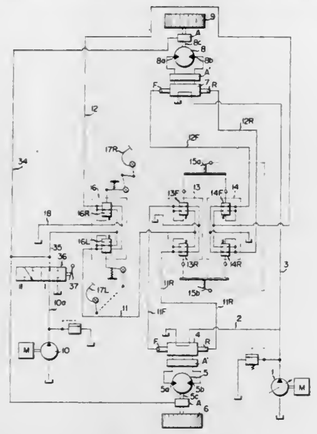
a. a hydraulic pressure source for travel,

b. a primary valve means connected in a continuous manner with said hydraulic pressure source for travel,

c. a motor connected in a continuous manner with said primary valve means,

d. a hydraulic pressure source for a pilot fluid,

e. a secondary valve means, wherein one end is connected in a continuous manner with said hydraulic pressure source for the pilot fluid, and the other end is connected in a continuous manner with said primary valve means, such that actuation of said primary valve means causes said secondary valve means to be kept energized in a position for drainage at all times,
f. a tertiary valve means is fitted in place on a pilot pipeline connected in a continuous manner with said hydraulic

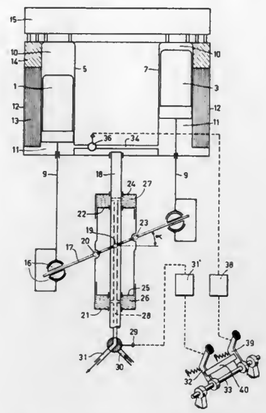


pressure source for the pilot fluid such as to be retained in an energized state at a connecting position at all times for conducting proper control of the drive of the vehicle,
g. a parking brake mounted in place on an output shaft of a motor for travel, and
h. a parking brake valve, wherein one end is connected in a continuous manner with said hydraulic pressure source for the pilot fluid, and the other end is connected in a continuous manner with said parking brake.

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**4,019,322**
**HOT-GAS RECIPROCATING ENGINE**
**Roelf Jan Meijer, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.**
**Filed Oct. 30, 1975, Ser. No. 627,107**
**Claims priority, application Netherlands, Jan. 22, 1975, 7500731**
**Int. Cl.² F02G *1/06***
**U.S. Cl. 60—525** **1 Claim**

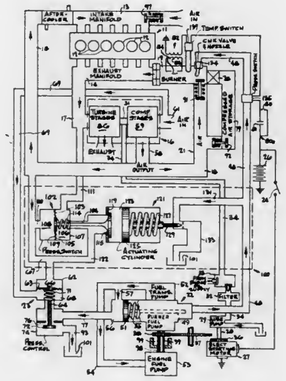
1. A hot-gas reciprocating engine comprising at least three piston-like bodies which are each movable in an associated cylinder and which each separate a hot and a cold space in the relevant cylinder, each of the hot spaces communicating, via a regenerator, with one of the cold spaces in an other cylinder, each of the piston-like bodies furthermore being provided with a drive rod which cooperates, by way of a sliding body, with a plate which is mounted on a rotatable shaft in such a manner that this plate cannot rotate with respect to the shaft but can be tilted about a tilting shaft extending transversely of the first-mentioned shaft, and means being provided for tilting the plate, characterized in that each of the cold spaces communicates, via a duct incorporating a controllable valve, with a cold space in an other cylinder, means for operating these valves being provided which are so constructed that, when the valves are opened, these means also operate the means for tilting the plate, so that the plate assumes a more inclined position with respect to the shaft, whilst the means for tilting



the plate can be operated independently of the means for operating the valves.

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**4,019,323**
**CONTROLLER FOR TURBOCHARGER SYSTEM FOR INTERNAL COMBUSTION ENGINES**
**Arthur A. Zuhn, E. Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.**
**Filed Dec. 1, 1975, Ser. No. 636,511**
**Int. Cl.² F02B *33/44***
**U.S. Cl. 60—606** **7 Claims**



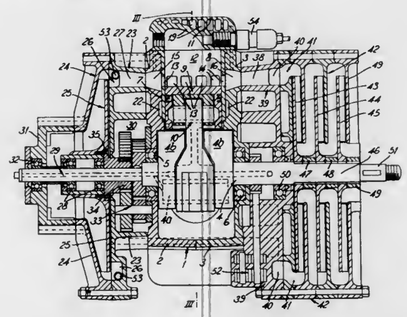
1. In a turbocharger system for an internal combustion engine having an exhaust manifold and an intake manifold adjacent to the engine, a turbine communicating with the exhaust manifold and driven by gases therefrom, a compressor driven by said turbine and having an output which communicates with said intake manifold, a fuel burner chamber having an input for receiving compressed air, a spark igniter, and an output through which expanded gases pass, means communicating the output of said compressor to the input of said fuel burner chamber, means communicating the output of said fuel burner chamber into and through the exhaust manifold, means for supplying a variable quantity of fuel from a fuel reservoir to said burner chamber and means responsive to intake manifold pressure to vary the quantity of fuel delivered to said burner, an improvement comprising:



means for preventing supply of said variable quantity of fuel to said burner unless said fuel is at a fuel pressure above the pressure in said burner; and
means responsive to said fuel being at least equal to a selectively set minimum fuel pressure value for activating said spark igniter in said burner chamber.

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**4,019,324**
**INTERNAL COMBUSTION ENGINE**
**John R. Coxon, "Penfound," Stane St., Pulborough, England**
**Filed Sept. 3, 1975, Ser. No. 609,967**
**Claims priority, application United Kingdom, Sept. 11, 1974, 39678/74**
**Int. Cl.² F02G *3/00***
**U.S. Cl. 60—624** **17 Claims**

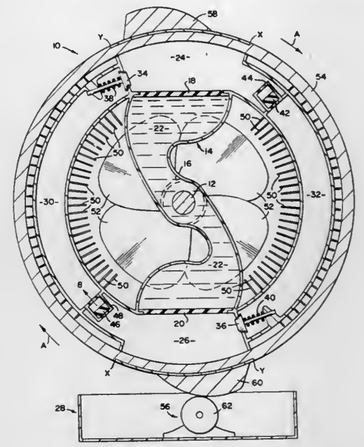


1. In an internal combustion engine including a crankshaft, a cylinder, a cylinder head, a piston reciprocably mounted in said cylinder, means drivingly connecting said piston to said crankshaft, a combustion chamber defined and bounded by said cylinder, said cylinder head, and said piston, means defining i let ports and outlet ports for said combustion chamber, air intake means, means defining an inlet duct for conducting air fro said air intake means to said inlet ports for supply to said combustion chamber for combustion with fuel to drive said piston and hence said crankshaft, and means defining an exhaust duct communicating with said exhaust ports for conducting post combustion gases away from said combustion chamber, the improvement wherein said engine further includes an air compressor between said air intake means and said inlet duct whereby said air conducted by said inlet duct is compressed, a plurality of passage means leading from said inlet duct and extending in said engine closely around said combustion chamber whereby compressed air flows through said passage means from said inlet duct to extract heat from said engine surrounding said combustion chamber, and a turbine having a power output shaft, rotor means attached to said power output shaft, and high pressure gas inlet means communicating with said exhaust duct and said passage means whereby hot compressed gases from said combustion chamber and said passage means expand through said turbine to drive said rotor means and hence said power output shaft.

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**4,019,325**
**ENERGY CONVERTER**
**Paschal H. Murphy, Jr., Rte. 2, Box 104B, Zephyrhills, Fla. 33599**
**Filed Sept. 5, 1975, Ser. No. 610,790**
**Int. Cl.² F01K *27/00***
**U.S. Cl. 60—643** **24 Claims**

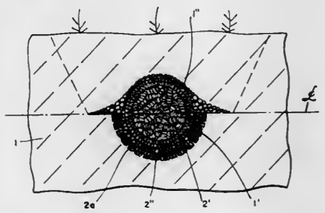
1. An energy converter of the type primarily used to convert thermal energy into mechanical energy, said energy converter comprising: support means; axle means rotatable disposed on said support means; rotor means mounted on said axle means in substantially transverse relation to the axis of rotation of said axle means; flywheel means disposed in substantially concentric relation to said axis of rotation for rotation with said rotor means; heating chamber means disposed in fluid-communicating relation to one end of said rotor means; exhaust chamber means disposed in fluid-communicating relation to said heating chamber means; an expansible fluid placed in said heating chamber means; valve means interconnecting



said heating and exhaust chamber means whereby the flow of said fluid therebetween may be regulated; and thermal supply means operatively disposed relative to said heating chamber means enabling heating of at least a portion of said rotor means causing a displacement of mass within said rotor means thereby rotating said axle.

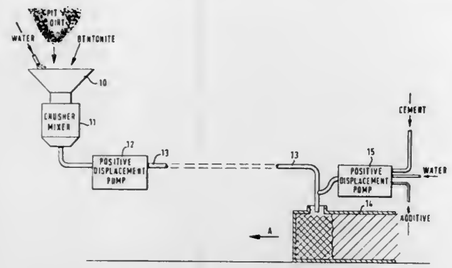
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**4,019,326**
**NONWOVEN HORIZONTAL DRAINAGE SYSTEM**
**Wilhelm Herveling, Wuppertal; Alfred Birker, Neviges-Donberg; Berthold H. Daimler, Remscheid-Lennep, all of Germany; Jan G. Vos, Dieren (Gld.), Netherlands, and Hans Stapp, Momlingen, Germany, assignors to Akzona Incorporated, Asheville, N.C.**
**Filed Dec. 4, 1972, Ser. No. 311,656**
**Int. Cl.² E02B *11/00***
**U.S. Cl. 61—11** **4 Claims**



1. A horizontal soil drainage system consisting of a nonwoven three-dimensional mat in tubular form comprising a plurality of looped, intersecting and substantially amorphous continuous filaments of melt-spun synthetic polymers self-bonded together at their intersections, said mat forming at least one central cavity throughout its length, and having an inner peripheral zone adjacent said central cavity and an outer peripheral zone and a center zone between said inner and outer peripheral zones, and wherein at least one of said peripheral zone of said mat has a lower cross-sectional porosity than the center zone of said mat.

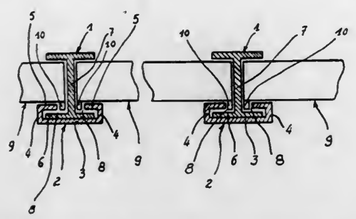
**4,019,327**
**MINING**
**Edward Kempster, Llanelly, Wales, assignor to Thyssen (Great Britain) Limited, Wales**
**Continuation of Ser. No. 271,212, July 12, 1972, abandoned. This application Feb. 7, 1975, Ser. No. 548,099**
**Claims priority, application United Kingdom, Sept. 20, 1971, 43793/71**
**Int. Cl.² E02D** *15/00*
**U.S. Cl. 61—35** **10 Claims**




1. A method of stowing waste material in mining comprising the steps of mixing the material in powdered or granular form with bentonite and water, the bentonite being between 0.05% and 4% by weight of the total solids, and the quantity of water being such that, with the bentonite, the waste material forms a flowable sludge of a suitable consistency for pumping and having a slump of two to four inches, the bentonite enabling such a sludge to be formed with substantially less water than would be required in the absence of bentonite, pumping the material through a pipe line to a point of utilization using a positive displacement pump, mixing the pumped material immediately as it arrives at that point through said pipe line with a quick setting agent comprising cement, and allowing the mixed material to solidify, the sludge, due to the presence of the bentonite, containing only a small amount of water such that it can set to form a solid without draining of water from the pumped material.

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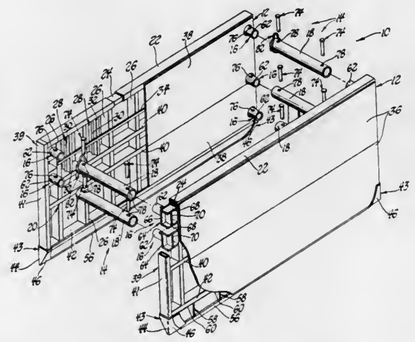
**4,019,328**
**ARRANGEMENT FOR MAKING A PREFABRICATED WALL**
**Jean Marie Gérard Koehl, 3, rue Varengue 92340, Bourg-la-Reine, France**
**Filed Dec. 8, 1975, Ser. No. 638,351**
**Int. Cl.² E02D** *5/00*
**U.S. Cl. 61—41 A** **11 Claims**



1. An arrangement for erecting a pre-fabricated wall, comprising a section having a T-shaped wing in configuration placed parallel to said wall, including an I-shaped section having a web and two wings, a C-shaped section with a plane web and two wings having respective ends comprising a portion bent parallel to the web of said C-shaped section, one of the wings of the I-shaped section being slidably engageable inside the C-shaped section in such a way that said ends constitute, with the web of the I-shaped section and the inner surface of the wing of said section when engaged in the C-shaped section, at least one groove-shaped interval, and a substantially plane element provided at least at one of the ends thereof with a guiding means angularly placed to a wall of said substantially plane element, said substantially plane element being engaged between the wings of the I-shaped section in such a way that said guiding means is engaged in said groove when a wall of said element opposite the wall provided with said guiding means is brought in contact with the wing of the I-shaped section opposite the wing engaged in the C-shaped section.

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**4,019,329**
**TRENCH SHORING ASSEMBLY**
**James L. Griswold, 513 Morningside Drive, Battle Creek, Mich. 49015**
**Filed Feb. 9, 1976, Ser. No. 656,145**
**Int. Cl.² E21D** *5/00*
**U.S. Cl. 61—41 A** **9 Claims**



1. A trench shoring assembly comprising: a pair of spaced wall means for vertical disposition within a trench, and connecting means interconnecting said wall means for allowing limited pivotal movement between said wall means, said connecting means including a plurality of support means rigidly attached to each of said wall means adjacent each end thereof and extending from said wall means in opposite directions toward one another, a plurality of spreader means extending between opposed pairs of said support means for spacing said wall means apart, said spreader means overlapping a portion of said support means and including slot means extending through the overlapping portions of said spreader means and said support means, and pin means extending through said slot means for attaching said spreader means to said support means and being at least in part larger than said pin means for allowing said limited movement between said spreader means and said support means.

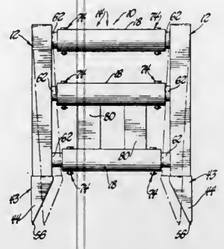
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**4,019,330**
**TRENCH SHORING ASSEMBLY WITH ABRASION PROTECTION DEVICE**
**James L. Griswold, 513 Morningside Drive, Battle Creek, Mich. 49015**
**Filed Feb. 9, 1976, Ser. No. 656,149**
**Int. Cl.² E21D** *5/00*
**U.S. Cl. 61—41 A** **3 Claims**

1. A trench shoring assembly of the type including a pair of interconnected spaced wall means, said assembly comprising: wall means having a predetermined thickness and a tapered bottom portion defining a triangularly shaped pointed lower extremity extending between the ends thereof, said triangularly shaped pointed lower extremity being defined by metal plates extending upwardly at an acute angle relative to one another away from said pointed lower extremity, and abrasion protection means disposed at said pointed lower extremity and



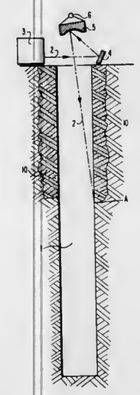
extending between said ends thereof for protecting the bottom of said wall means against abrasion, said protection means



being defined by a metal which is more abrasion resistant than said metal components and extends downwardly from said metal plates to define said lower extremity.

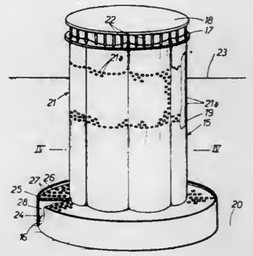
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**4,019,331**
**FORMATION OF LOAD-BEARING FOUNDATIONS BY LASER-BEAM IRRADIATION OF THE SOIL**
**Josef Rom, Haifa; Israel Alterman, Savyon, and Joseph Schwartz, Haifa, all of Israel, assignors to Technion Research and Development Foundation Ltd., Haifa and Israel Alterman, Savyon, both of, Israel, part interest to each**
**Continuation-in-part of Ser. No. 645,415, Dec. 30, 1975. This application Mar. 10, 1976, Ser. No. 665,394**
**Claims priority, application Israel, Dec. 30, 1974, 46361**
**Int. Cl.² E02D** *7/00*
**U.S. Cl. 61—53.54** **9 Claims**



1. A method of converting clayey or silty soil into a stable and solid underground column or pile suitable for supporting a building structure, which comprises
drilling into the earth to a predetermined depth a bore hole of a diameter considerably smaller than the external diameter of the column or pile to be created,
directing a focused laser beam gradually across the entire surface of said bore, in such a manner that each point of the bore surface is irradiated and heated at an intensity sufficient for converting the soil surrounding the bore into a solid mass of a predetermined thickness measured from the bore surface.

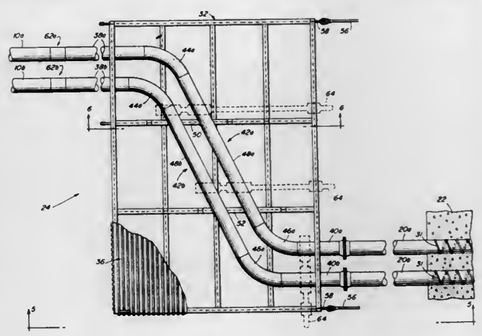
**4,019,332**
**DEVICES FOR PROTECTING THE BASES OF STRUCTURES IMMERSED IN A VOLUME OF WATER AGAINST UNDERMINING**
**Jacques Edouard Lamy, Fontenay-aux-Roses, France, assignor to C. G. Doris, Paris, France**
**Filed Dec. 24, 1975, Ser. No. 644,153**
**Claims priority, application France, Dec. 31, 1974, 74.43434**
**Int. Cl.² E02B** *3/04*
**U.S. Cl. 61—86** **10 Claims**



1. A combination for protecting the base of a structure having a base resting on the bed of a body of water with sub-aquatic currents against undermining by the effect of said currents, comprising, a continuously vertically extending member in said structure reaching a predetermined height above said bed, an imperforate wall extending without interruption substantially parallel to the vertically extending member of the structure at a distance from said vertically extending member in the direction of the body of water to thereby intercept said currents in the direction toward and away from said member, and providing a space between the top of the wall and the member free of obstacles which would prevent water from entering that space thereby to permit said sub-aquatic water currents to induce water currents reaching the bed of said body of water in that space, said imperforate wall reaching from the bed of the body of water to a height which is but a minor fraction of the depth of the body of water and said height of said member whereby the entirety of the wall is deeply immersed in the water.

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**4,019,333**
**APPARATUS AND METHOD FOR BUFFERING SUBMERGED CONDUITS**
**Demir I. Karsan, 33 Oaken Lane, London, England**
**Filed Dec. 24, 1975, Ser. No. 644,183**
**Int. Cl.² F16L** *1/00, 51/00*
**U.S. Cl. 61—110** **15 Claims**



1. A buffer unit for linking an underwater riser to an underwater pipeline, comprising
an enclosure positioned intermediate said riser and said pipeline

first and second conduit segments projecting from said enclosure for coupling to said riser and said pipeline, respectively, and

conduit means within said enclosure connecting said first and second conduit segments and comprising an expansion mechanism;

said enclosure having internal means that support, while permitting movement of, said expansion mechanism within said enclosure.

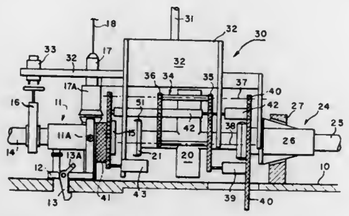
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**4,019,334**

## METHOD AND APPARATUS FOR MAKING SUBSEA PIPE CONNECTIONS

**Albert R. Sinclair; Arthur C. Daughtry, both of Houston, Tex.; Thomas W. Childers, Mandeville, and Joseph A. Burkhardt, New Orleans, both of La., assignors to Exxon Production Research Company, Houston, Tex.**

**Filed Mar. 17, 1976, Ser. No. 667,758**
**Int. Cl.² F16L 1/04**
**U.S. Cl. 61—110** **10 Claims**



1. A method for connecting a spool piece hub, connected to a subsea structure manifold, to a fixed pipeline hub aligned for connection to said spool piece hub comprising the steps of:

lowering a remotely operated connecting tool from the water's surface;

guiding said connecting tool onto said pipeline and said manifold;

latching said connecting tool to said spool piece;

moving said spool piece hub by means of said connecting tool into engagement with said pipeline hub; and

clamping said engaged hubs together by means of said connecting tool.

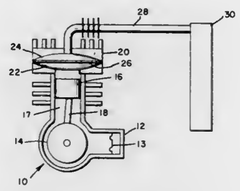
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**4,019,335**

## HYDRAULICALLY ACTUATED SPLIT STIRLING CYCLE REFRIGERATOR

**Calvin W. Browning, Torrance, Calif., assignor to The Garrett Corporation, Los Angeles, Calif.**

**Filed Jan. 12, 1976, Ser. No. 648,432**
**Int. Cl.² F25B 9/00**
**U.S. Cl. 62—6** **18 Claims**



1. A fluid handling system comprising:

pump means having first and second fluid tight chambers;

resilient wall means in said pump means for separating said chambers;

hydraulic displacing means connected to one of the chambers of said pump means and a source of hydraulic fluid for periodically deflecting said resilient wall means by displacement of said fluid;

fluid compressing means connected to the other chamber of said pump means and a second source of fluid whereby periodic deflection of said wall means by said displacing means causes periodic compression of said second fluid.

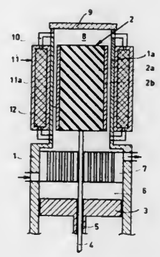
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**4,019,336**

## REFRIGERATOR

**Andries Mijnheer, and Albert Klaas De Jonge, both of Emmasingel, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.**

**Continuation of Ser. No. 527,243, Nov. 26, 1974, abandoned. This application Aug. 7, 1975, Ser. No. 602,737**
**Claims priority, application Netherlands, Sept. 11, 1973, 7312488**
**Int. Cl.² F25B 9/00**
**U.S. Cl. 62—6** **1 Claim**



1. A refrigerator comprising a compression space of variable volume and higher mean temperature during operation which communicates with an expansion space of lower mean temperature during operation, the volume of the said expansion space being variable by a displacer which is reciprocatable in a cylinder, the communication between the said spaces incorporating a regenerator through which a working medium can flow to and fro between the two spaces, characterized in that the communication between the said two spaces incorporates an auxiliary regenerator, connected parallel to the regenerator and formed by an annular gap between the displacer and the cooperating cylinder wall, at least one of the two facing surfaces of displacer and cylinder having a high thermal capacity with respect to the working medium flow through the gap during operation, the hydraulic diameter of the gap satisfying the relation:

$$0.4\,d_h \qquad d_h \qquad 1.4\,d_h$$

where

$$d_{h_o} = 2.8\sqrt[4]{\frac{s\cdot\eta^2\cdot L}{\rho\cdot\Delta\cdot P}}$$ in which

$d_h$ = hydraulic diameter of the gap
$s$ = stroke length of the displacer
$\eta$ = mean dynamic viscosity of the working medium in the gap
$L$ = length of the gap
$\rho$ = mean density of the working medium in the gap
$\Delta P$ = mean pressure drop across the regenerator.

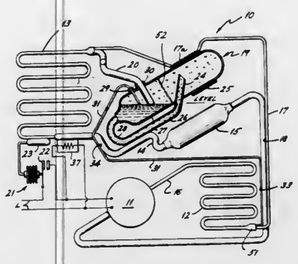


**4,019,337**

## REFRIGERATION APPARATUS AND METHOD

**Elmer W. Zearfoss, Jr., 929 Magee Ave., Philadelphia, Pa. 19111**

**Continuation-in-part of Ser. No. 517,141, Oct. 23, 1974, Pat. No. 3,955,374. This application Apr. 8, 1976, Ser. No. 674,849**
**Int. Cl.² F25B 39/04**
**U.S. Cl. 62—113** **18 Claims**



16. In a refrigeration system of the kind having a conduit including a capillary tube for expanding refrigerant flowing from a condenser to an evaporator, a method for controlling to optimize refrigerant flow in said system, comprising the steps of: sensing a superheat gain in said evaporator; applying expanded liquid refrigerant in heat exchange with said conduit in response to said gain, and subcooling refrigerant in said conduit to increase flow therethrough; sensing a superheat loss in said evaporator; and reducing activity of said heat exchange in response to said loss, thereby to decrease flow in said conduit.

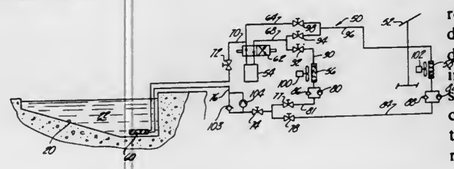
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**4,019,338**

## HEATING AND COOLING SYSTEM

**Everett E. Poteet, 275 N. Berkshire, Bloomfield Hills, Mich. 48013**

**Filed Jan. 9, 1976, Ser. No. 647,919**
**Int. Cl.² F25B 13/00**
**U.S. Cl. 62—238** **3 Claims**



1. A heating and cooling apparatus for heating water contained within a swimming pool while cooling the interior of a building, said apparatus comprising:

a compressor;

a first condenser for heating the water within said pool;

a conduit means connecting the output of said compressor to said first condenser;

an evaporator for cooling the interior of said building, said conduit means connecting the output of said condenser to the intake of said evaporator and the outlet of said evaporator to said compressor;

a first throttle valve disposed in said conduit means between said first condenser and said evaporator;

a second condenser;

first valve means for selectively communicating said second condenser to said compressor and said evaporator for selectively cooling said building while not heating said pool;

second valve means for communicating the outlet of said first condenser to said second condenser; and

second throttle means disposed between said first and second condensers whereby said second condenser functions as an evaporator and said pool water is heated while not cooling the interior of said building.

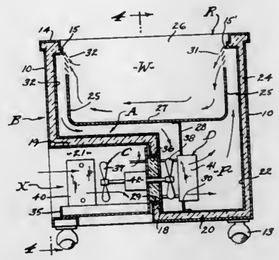
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**4,019,339**

## SYSTEM AND COLD CABINET SERVER

**William G. Anderson, 5942 Gildred Circle, Huntington Beach, Calif. 92647**

**Filed Aug. 20, 1975, Ser. No. 606,094**
**Int. Cl.² A47F 3/04**
**U.S. Cl. 62—255** **5 Claims**



1. A Cold Cabinet for conditioning prepackaged foods and the like to maintain refrigeration of the same and including; a bin type cabinet with insulated side and end and bottom panels, the bottom panel being stepped with a bulkhead disposed between the end panels dividing the cabinet into an equipment chamber exterior thereto and a recirculation chamber interior thereto and there being an opening through the bulkhead, a baffle within the cabinet and disposed between the end panels in spaced relation to the bulkhead and there being an opening through the baffle, said openings in the bulkhead and baffle being aligned, an upwardly open well complementary to and depending into the cabinet with side and end and bottom walls in spaced relation to the aforementioned body panels respectively, the bottom wall of the well being engaged with and carrying the baffle dividing the space between the cabinet panels and well walls into an air intake means vented from the well and an air recirculating means vented into the well, and a replaceable refrigeration unit comprised of closure means disengageable in the bulkhead opening and an evaporator disengageable in the baffle opening and a blower means having a motor shaft with an exterior refrigeration cooling fan in said equipment chamber and extending into said recirculation chamber with an interior recirculating fan for moving air from the intake means and through the evaporator and into the recirculating means.

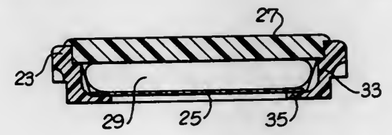
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**4,019,340**

## THERMAL ENCLOSURE AND METHOD

**Hale Conklin, Santa Ana, Calif., assignor to Divajex, Santa Ana, Calif.**

**Filed Aug. 27, 1975, Ser. No. 608,182**
**Int. Cl.² F25D 3/08**
**U.S. Cl. 62—371** **16 Claims**



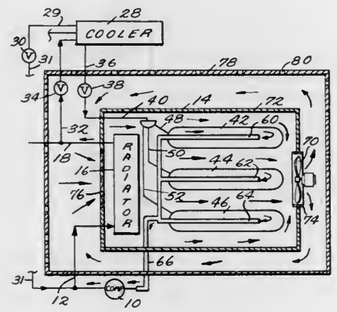
1. A wall section for a thermal enclosure comprising:

a frame having inner and outer ends and a passage extending into said frame in a generally axial direction from said outer end toward said inner end;

said frame being integrally molded from an insulating material and including a peripheral wall and a ledge exposed within the peripheral wall, said ledge being axially inwardly of said outer end;
an inner wall having an edge portion, said edge portion being supported by said ledge and being intermediate the ledge and the outer end of said frame;
an outer wall affixed to the frame and closing the passage at a location spaced axially outwardly from said inner wall;
first means in said passage at least partially between the outer wall and the inner wall for adding heat or removing heat; and
the physical characteristics of the inner wall and the outer wall being such that more heat transfer occurs across the inner wall than across the outer wall.

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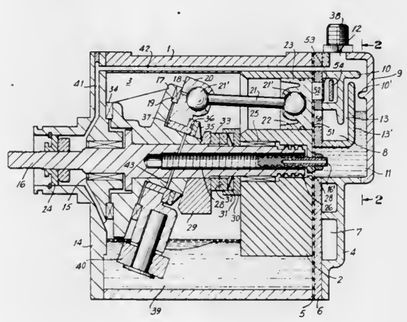
**4,019,341**
**HEAT EXCHANGING PROCESS OF REFRIGERANT GAS IN REFRIGERATOR**
**Moritaka Iwasaki, 10-1, Idogaya Nakamachi, Minami, Yokohama, Kanagawa, Japan**
**Filed Dec. 3, 1975, Ser. No. 637,411**
**Int. Cl.² F25B** *47/00*
**U.S. Cl. 62—277** **1 Claim**




**1.** In a refrigeration system having:
a. a compressor for compressing a refrigeration fluid;
b. a heat exchanger including a radiator for subtracting heat from the compressed refrigeration fluid;
c. first conduit means for supplying the compressed refrigeration fluid from the compressor to the radiator;
d. a condenser for liquefying the compressed, cooled refrigeration fluid;
e. second conduit means for supplying the compressed, cooled refrigeration fluid from the radiator to the condenser;
f. an evaporator juxtaposed with a cooler from which heat is to be subtracted by the refrigeration fluid;
g. third conduit means connected with the evaporator for forwarding the compressed, cooled, liquefied refrigeration fluid towards the evaporator;
h. an expansion valve interposed in the third conduit means, for permitting evaporation of the compressed, cooled, liquefied refrigeration fluid to supply the evaporator therewith; and
i. fourth conduit means for returning the evaporated, warmed refrigeration fluid from the evaporator to the compressor;
a defrosting system for defrosting the cooler, comprising:
the heat exchanger including :
an inner housing enclosing the radiator;
first opening means defining an air inlet to the inner housing;
second opening means defining an air outlet from the inner housing; and
forced draft means for pulling air into the inner housing through the first opening means, flowing the air over the radiator to subtract heat from the radiator, and pushing the heated air out the second opening means;
the defrosting system further including:
fifth conduit means interconnecting the radiator with the evaporator for supplying refrigeration fluid from the evaporator to the evaporator;
switching valve means between the second and fifth conduit means for determining whether the refrigeration fluid leaving the radiator will be forwarded to said condenser for refrigeration or to said evaporator for defrosting;
expansion chamber means interposed within said inner housing between the radiator and the second opening means, so that the air passing in forced draft within the inner housing passes in heat exchanging relation with the expansion chamber means after this air passes in heat exchanging relation with the radiator, to heat fully vaporized refrigeration fluid in the expansion chamber means;
sixth conduit means connecting the evaporator with the expansion chamber means;
valve means interposed in the fourth and sixth conduit means for determining that the refrigeration fluid will flow through the sixth conduit means while the cooler is being defrosted and through the fourth conduit means while the cooler is being refrigerated; and
seventh conduit means for returning heated refrigeration fluid from the expansion chamber means to the compressor.

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**4,019,342**
**COMPRESSOR FOR A REFRIGERANT GAS**
**Motomu Ohta, Sakashi, Japan, assignor to Cegedur Societe de Transformation de l'Aluminium Pechiney, Paris, France**
**Filed Jan. 30, 1976, Ser. No. 654,007**
**Claims priority, application Japan, Mar. 13, 1975, 50-30969**
**Int. Cl.² F25B** *43/02*; **F04B** *17/00, 35/00, 39/02*
**U.S. Cl. 62—469** **9 Claims**

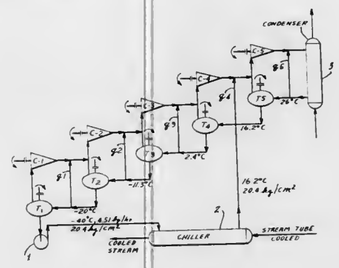


**1.** In a compressor for a refrigerant gas wherein in a casing a drive shaft is coupled to a rotor which acts on an inclined rocking plate to effect rocking thereof and reciprocation of a piston in a cylinder bore to produce suction and exhaust strokes for refrigerant gas, a lubricant in a sump in the casing being atomized and mixing with refrigerant gas leaking past the piston, an improvement wherein the compressor has an inlet for the refrigerant gas, duct means for conveying the mixture of leaked refrigerant gas and lubricant from said casing under the action of the suction stroke of the piston, said duct means communicating with the inlet for refrigerant gas to mix the leaked refrigerant gas and lubricant with incoming refrigerant gas, separator means downstream of said inlet for separating the lubricant from the refrigerant gas, and lubricant delivery means on said drive shaft for returning the separated lubricant back to the sump, said separator means including a lubricant reservoir in communication with said lubricant delivery means.



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**4,019,343**
**REFRIGERATION SYSTEM USING ENTHALPY CONVERTING LIQUID TURBINES**
**Edward S. Roberts, 214-05 33rd Ave., Bayside, Queens, N.Y. 11361**
**Continuation-in-part of Ser. No. 648,628, Jan. 13, 1976, abandoned. This application Apr. 23, 1976, Ser. No. 679,690**
**Int. Cl.² F25B** *1/10*
**U.S. Cl. 62—510** **8 Claims**

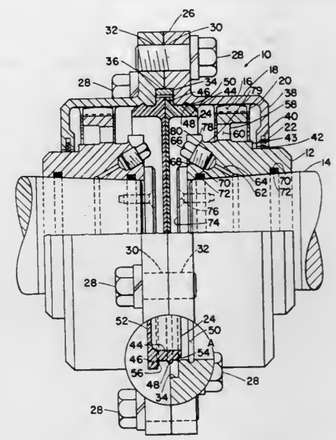



**1.** In a refrigeration system in which a refrigerant is cooled by self evaporation with compression of vapors and condensation, the improvement which comprises,
a. introducing the cold refrigerant at a preselected temperature through a chilling zone in which it is in heat exchange with the material to be cooled and passes through with or without change of phase of at least part of the liquid, and
b. flowing liquid from the refrigerant condenser through a series of enthalpy converting liquid turbines, entering one of which it is joined by any heated refrigerant liquid from the chilling zone, in each turbine the liquid decreases in pressure and temperature and vapors are separated, each turbine being paired with a vapor compressor receiving the separated vapors and each turbine passing liquid on to the next turbine in the series, the compression of vapors being to the pressure of the preceding turbine.

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**4,019,344**
**SYMETRICAL SEALED GEAR COUPLING**
**Michael Mircea Calistrat, Baltimore, Md., assignor to Koppers Company, Inc., Pittsburgh, Pa.**
**Filed Nov. 24, 1975, Ser. No. 634,766**
**Int. Cl. F16d** *3/18*
**U.S. Cl. 64—9 R** **5 Claims**

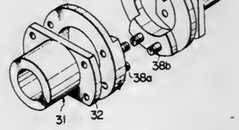
**1.** A gear type flexible coupling for connecting a pair of substantially axially aligned shafts comprising in combination:
substantially identical first and second hub means, adapted for connection to respective ones of said shafts, having a ring of external gear teeth thereon;
substantially identical, axially-connected, first and second sleeve means surrounding said hub means and having a ring of internal gear teeth therein in operative engagement with said external gear teeth;
aligning ring means seated within facing annular recesses in said sleeve means and extending axially therebetween for radially aligning said sleeve means;
substantially identical first and second flexible sealing ring means, seated in outer end portions of said sleeve means, surrounding outer end portions of said hub means and in sealing engagement therewith; and
substantially identical first and second removable sealing cup means seated within the inner periphery of said sleeve means of closing inner end portions of said sleeve means to retain lubricant within each of said sleeve means between said cups and said flexible metallic sealing ring means each said seal cup means having annular detent means around a tubular flange portion thereof and each said sleeve means having a corresponding annular recess



in the interior thereof for seating and removably retaining said cup means therein during separation of said sleeve means with one of said hub means therein.

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**4,019,345**
**FLEXIBLE COUPLING FOR ROTATING SHAFTS**
**Kazuichi Fukuda, Fujisawa, Japan, assignor to Kanto Special Steel Works, Ltd., Fujisawa, Japan**
**Filed Dec. 15, 1975, Ser. No. 641,035**
**Claims priority, application Japan, May 12, 1975, 50-56596; Oct. 8, 1975, 50-137615[U]; Oct. 8, 1975, 50-137616[U]**
**Int. Cl. F16d** *3/58*
**U.S. Cl. 64—12** **9 Claims**

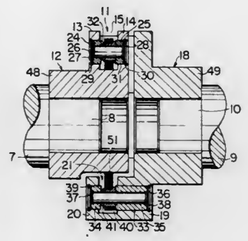


**1.** A flexible coupling for rotating shafts, which comprises a pair of hub members each having a flange and being for connection, respectively, with a drive shaft and a driven shaft, and a main set removably mounted between the flanges of the respective hub members facing each other, said main set having a pair of disks and a plurality of connecting members, each connecting member being composed of a plurality of connecting laminations of resilient thin sheet material and each having an ovaloidal shape having curves connecting a narrowed central portion with semi-circular end portions and each end portion having an opening therein for a pin to go through, each disk having a plurality of pin holes therein perpendicular to said disk and on a common pitch circle, a pin tightly mounted in each pin hole perpendicular to the surface of the disk and welded to said disk, each two adjacent pins being equally spaced in the circumferential direction, the disks of each pair facing each other with the pins therein projecting toward the opposite disk and the pins of the respective disks alternating with each other at equal distances, said connecting members connecting adjacent pins for forming a polygonal linkage along the surface of the disks in the circumferential direction thereof.

## 4,019,346
## FLEXIBLE COUPLING FOR ROTATING SHAFTS

Kazuichi Fukuda, Yokohama, Japan, assignor to Kanto Special Steel Works Ltd., Japan

Filed Feb. 11, 1975, Ser. No. 549,036
Claims priority, application Japan, Feb. 13, 1974, 49-17932; Oct. 21, 1974, 49-120285; Oct. 21, 1974, 49-120286
Int. Cl.² F16D 3/58
U.S. Cl. 64—12 14 Claims

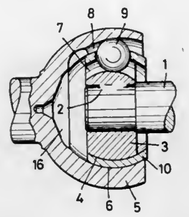


1. A flexible coupling for transmitting torque from a drive shaft to a driven shaft, said flexible coupling comprising:
a first hub member attached to said drive shaft;
a second hub member attached to said driven shaft;
each said hub member having a pair of outwardly extending flanges, the flanges of each hub member being axially spaced from each other with a space therebetween;
the pair of flanges of each said hub member having portions thereof cut away to form void spaces, each defined by and adjoined to projections forming the respective pair of flanges;
said first and second hub members being constructed such that when axially abutted end-to-end, the projections of one hub member extend and fit into respective complementary formed void spaces of the other hub member, with clearance between all facing complementary surfaces of said first and second hub members so that there is no contact therebetween;
a plurality of retaining members extending parallel to the axes of said drive and driven shafts at positions substantially equally radially spaced therefrom;
one each of said retaining members being supported by the projections forming the pair of flanges of one of said hub members, each said retaining member having one axial end thereof supported by a first flange of the respective hub member and the other axial end thereof supported by a second flange of said respective hub member, said retaining member thereby spanning the axial space between said pair of flanges of said respective hub member;
said retaining members being alternately supported by said first and second hub members, in the circumferential direction of said coupling;
a plurality of laminated connecting members, each formed by a plurality of sheet-like connecting elements;
each said connecting member being mounted at a first end thereof to one of said retaining members supported between the pair of flanges of said first hub member and at a second end thereof to the next circumferentially adjacent one of said retaining members supported between the pair of flanges of said second hub member; and
the thus connected connecting members thereby connecting said first and second hub members, and together forming a circumferential polygonal link substantially in a plane perpendicular to said axes of said drive and driven shafts.

## 4,019,347
## BALL GROOVES FOR A CONSTANT VELOCITY UNIVERSAL JOINT

Werner Krude, Neunkirchen, Germany, assignor to Lohr & Bromkamp GmbH, Offenbach am Main, Germany

Filed July 11, 1975, Ser. No. 595,089
Claims priority, application Germany, July 11, 1974, 2433349
Int. Cl.² F16D 3/30
U.S. Cl. 64—21 3 Claims

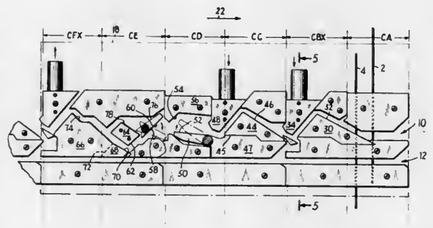


1. A constant velocity universal joint comprising an outer joint member having a hollow interior and a plurality of grooves in the interior surface thereof, an inner joint member within said outer joint member and having a corresponding plurality of grooves in its outer surface, said inner and outer joint member grooves being opposed from each other to define pairs of opposed grooves, a ball in each pair of opposed grooves contacting a surface of each of said grooves at one point under a torque load, a cage between said joint members having a plurality of radial openings to retain said balls therein, and means in each of said grooves for defining a further contact point for said balls under all bending angles of the joint and under torque load.

## 4,019,348
## METHOD AND APPARATUS FOR SELECTIVELY RENDERING NEEDLES OPERATIVE AND INOPERATIVE ON A CIRCULAR KNITTING MACHINE

Morris Philip, c/o Philip Knitting Mill, 26 Bruckner Blvd., Bronx, N.Y. 10454

Filed May 14, 1975, Ser. No. 577,237
Int. Cl.² D04B 9/22
U.S. Cl. 66—24 11 Claims



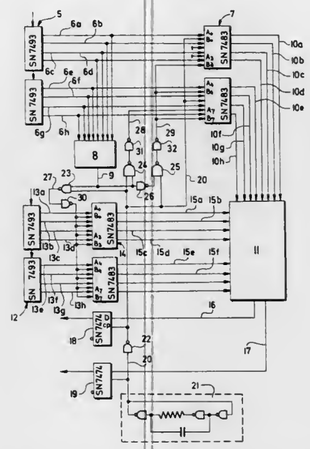
1. In a method of knitting a tubular fabric with both rib and plain portions on a dial and cylinder circular knitting machine having a plurality of needle sets thereon, the needles in each of said sets being movable, forwardly from a cast off position through a knitting cycle the steps of moving at least one of the sets of needles rearwardly of said cast off position to an inactive position and maintaining said rearwardly moved needles in said inactive position until at least one course is knitted by the remaining needle set or sets whereby said needles in said inactive position do not knit and do not have any fabric thereon.



## 4,019,349
## METHOD AND APPARATUS FOR ELECTRONIC CONTROL OF MULTIFEED CIRCULAR KNITTING MACHINES

Ivo Kouklik, Trebic, Czechoslovakia, assignor to Elitex, Zavody textilniho strojirenstvi generalni reditalstvi, Liberec, Czechoslovakia

Filed Nov. 1, 1974, Ser. No. 519,830
Claims priority, application Czechoslovakia, Nov. 2, 1973, 7532/73
Int. Cl.² D04B 15/66
U.S. Cl. 66—154 A 8 Claims



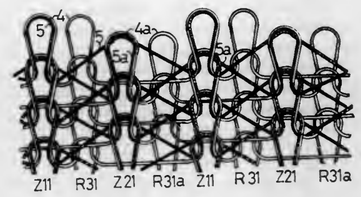
1. The method for reading the storage matrix of a circular knitting machine having a plurality of needles arranged in order with respect to a given first needle, the output of which is fed to independent means for selecting needles associated with two or more separate simultaneously operable feed systems distributed about the needle cylinder, comprising the steps of counting during each revolution the passage of said needles by a given point and simultaneously arithmetically imposing an appropriate constant on said count depending upon the position of the first needle in said cylinder with respect to each of the subsequent selecting means to determine from said counting the location of a particular needle at any given time at each of said independent selecting means, and successively feeding the several determinations to said matrix, to thereafter successively read said matrix with respect to the position of the needles in each of said separate feed systems and means for feeding the output of said matrix to said associated independent selecting means in timed relationship therewith.

## 4,019,350
## METHOD OF PRODUCING DOUBLE-KNIT FABRIC HAVING ADDITIONAL FLEECE THREADS INCORPORATED INTO ONE FACE OR BOTH FACES THEREOF

Walter Richard Schmidt, Breisach am Rhine, Germany, assignor to Burlington AG, Switzerland

Filed Mar. 18, 1974, Ser. No. 452,358
Claims priority, application Germany, Mar. 19, 1973, 2313651; Feb. 18, 1974, 2407736
Int. Cl.² D04B 9/26
U.S. Cl. 66—196 16 Claims

1. A method of producing an improved double-knit fabric comprising a backing fabric having additional threads incorporated into at least one face thereof by a first and a second set of needles, said method comprising the steps of: feeding a backing yarn to predetermined needles of said first and second set of needles for stitch formation of the backing fabric, feeding at least one additional yarn to the hooks of knitting and tucking needles of said first set of needles, wherein the backing yarn is fed only to predetermined needles within said first

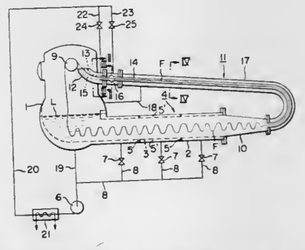



and second set of needles raised into clearing position above the needles of the first needle set which are in tuck position, and wherein the additional yarn is fed to all needles in knitting and tucking position of said first set of needles at the back side opposite to the hook openings of said second set of needles.

## 4,019,351
## APPARATUS FOR FLUID TREATMENT OF A FIBER PRODUCT

Hiroshi Mizutani, Nagashimacho, and Hitoshi Ono, Moriyama, both of Japan, assignors to Nihon Senshoku Kikai Kabushiki Kaisha and Takeni Senka Kabushiki Kaisha, both of, Japan

Filed Aug. 27, 1975, Ser. No. 608,407
Claims priority, application Japan, Sept. 9, 1974, 49-102947
Int. Cl.² D06B 3/28
U.S. Cl. 68—177 1 Claim



1. An apparatus for fluid treatment of a fiber product wherein said fiber product is smoothly circulated in a predetermined direction within said apparatus, which apparatus comprises:
a. a substantially upright cylindrical fiber treatment section having an opening at a side of the lower portion thereof and an opening at a side of the upper portion thereof;
b. a horizontal outer tube connected to said lower opening;
c. a perforated inner tube concentrically provided inside said horizontal outer tube; said perforated inner tube and said horizontal outer tube comprising a fiber residence section;
d. a tube for transferring a fiber product to the terminus of said horizontal outer tube from said opening at the side of the upper portion of said upright cylindrical section;
e. said tube for transferring said fiber product being provided with a treatment fluid jet nozzle for high speed transfer of said fiber product; and
f. a high speed reel in the upper portion of said upright cylindrical section;
the circulation of said fiber product being from:
i. the lower portion of said upright cylindrical section to
ii. the upper portion of said upright cylindrical section to
iii. said transfer tube via said reel to
iv. said fiber residence section and
v. back to said lower portion of said upright section

and wherein an annular space is formed between said horizontal outer tube and said perforated inner tube,

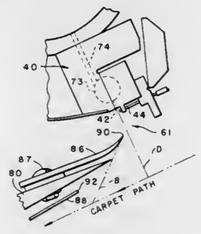
said annular space being divided into a desired number of annular chambers via partition rings provided inside said space perpendicular to the horizontal length of said outer tube, each of said annular chambers having a valved outlet connected to a pump where by opening and closing said valved outlets, the position of said fiber in said residence section can be varied to thereby transfer said fiber through said apparatus smoothly, said pump being in liquid flow communication with said treatment fluid jet nozzle.

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## 4,019,352
## APPARATUS FOR THE APPLICATION OF LIQUIDS TO MOVING MATERIALS

**John K. McCollough, Jr., and William H. Stewart, Jr., both of Spartanburg, S.C., assignors to Milliken Research Corporation, Spartanburg, S.C.**

**Filed Feb. 23, 1976, Ser. No. 660,149**
**Int. Cl.² D06B *1/02***
**U.S. Cl. 68—205 R** **4 Claims**



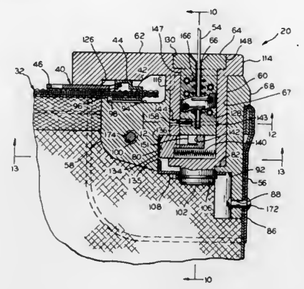

1. Apparatus for applying liquids to moving material including means for conveying the material in a predetermined path of travel, liquid applicator means having a row of outlets positioned above the path of travel of the material for continuously discharging a corresponding row of generally parallel streams of liquid downwardly toward the path of travel of the material, means positioned on one side of said row of outlets so that discharge axes of said means intersect the discharge axes of the outlets for selectively deflecting the streams of liquid from said outlets away from the path of travel of the material, and a liquid collection chamber positioned on the other side of the discharge axes of the row of outlets from said deflecting means, said liquid collection chamber having an opening extending along the row of outlets for receiving the deflected liquid streams to prevent their contact with the moving material, a first liquid collector plate supportably positioned in said opening with an outer edge of the plate extending along the opening and positioned closely adjacent the liquid discharge axes of said outlets to intercept and direct deflected liquid into the collection chamber, a second liquid collector plate positioned in spaced relation below said first collector plate and having an outer edge extending generally parallel to said first collector plate edge but positioned further from said discharge axes than said first collector plate edge for receiving liquid falling from the first plate and directing the liquid into the collection chamber, and a third liquid collector plate positioned in spaced relation below said second collector plate and having an outer edge extending generally parallel to said first and second collector plate edges but positioned further from said liquid discharge axes than said first and second collector plate edges to receive liquid falling from said second collector plate and prevent such liquid from contacting material moving on said path of travel of moving material.

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## 4,019,353
## KEEPER LOCK FOR A SLIDE FASTENER

**Walter S. Christopher, Park Ridge, Ill., assignor to Chicago Lock Co., Chicago, Ill.**

**Filed May 15, 1975, Ser. No. 577,655**
**Int. Cl.² E05B *67/38***
**U.S. Cl. 70—68** **4 Claims**



1. In a keeper lock for a zipper-type slide fastener having a lacing element, said keeper lock including a barrel having a cylindrical bore and a laterally outwardly projecting rim flange on one end thereof, an anvil fixed to and projecting radially from the barrel and adapted for supporting a fastener lacing element thereon, a cylindrical handle rotatable in the barrel, a keeper arm fixed to and projecting radially from the handle for rotation therewith and adapted to overlie the anvil and a fastener lacing element thereon for retaining the lacing element between the keeper arm and the anvil to prevent operation of the fastener, said keeper arm having a flange extending laterally outwardly from the handle and overlying said rim flange, a lock cylinder rotatable in the handle, tumbler means movable between the lock cylinder and the handle for alternately preventing and enabling rotation of the lock cylinder relative to the handle, a lock bolt mounted in the handle and movable when the keeper arm overlies the anvil between a position locking the handle to the barrel and an unlocking position freeing the handle for rotation, and means coupling the lock cylinder and the lock bolt for moving the bolt between its said positions in response to rotation of the lock cylinder, the combination with means securing said handle substantial axial movement relative to said barrel, a lug integral with the undersurface of said keeper arm flange and with the outer surface of said handle, means defining an arcuate movement path for said lug including an arcuate recess formed in the wall of said barrel bore and bounded by said rim flange, said path being bounded by lug stops for limiting the rotation of said handle, whereby said handle and said keeper arm are limitedly rotatable upon movement of said lock bolt to its unlocking position between said position of the keeper arm overlying the anvil and an out-of-the-way position wherein the lacing element is accessible for manipulation, while each remains substantially in a constant axial disposition relative to said barrel, and means for automatically restoring said lock bolt to its locking position upon rotation of said handle and said keeper arm from said out-of-the-way position of the keeper arm to said anvil-overlying position.

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## 4,019,354
## MOTORCYCLE CHAIN LOCK

**Marvin O'Dell, Fort Lauderdale, Fla., assignor to The Raymond Lee Organization, Inc., a part interest**

**Filed Feb. 9, 1976, Ser. No. 656,370**
**Int. Cl.² B62H *5/06, 5/12***
**U.S. Cl. 70—236** **3 Claims**

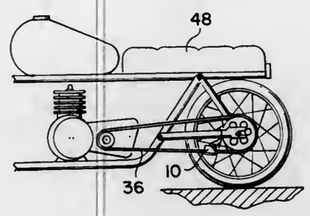
1. A lock designed to engage links of a chain, comprising:

a main body with a transversely extending groove having a square cross-section, open ends and an open bottom;

a flat rectangular plate detachably securable to the bottom of the body to close off the open bottom of the groove to form a chain receiving channel when the plate is in a closed position attached to the body and to be detached from the body in an open position when the plate is not attached to the body;

first and second like, parallel prongs spaced apart from each other and attached to the plate at their lower ends and extending perpendicularly upwardly away from the plate, the tops of the prongs being enlarged and constituting prong heads, the prongs being so located as to pass transversely through spaces in the chain when the chain is






located in the channel and the plate is in a closed position;

a key-operated tumbler cylinder rotatably secured in the body so as to be rotatable between an open position and a closed position; and

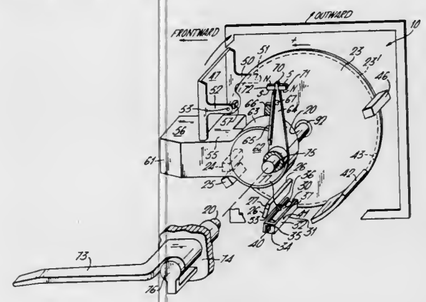
an offset locking arm fixedly secured to the cylinder in a manner that the arm will engage the heads of the prongs to secure the plate to the body when the cylinder is rotated to a closed position and the plate is in a closed position and that the arm will be disengaged from the heads of the prongs when the cylinder is rotated to an open position and the plate is in a closed position.

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## 4,019,355
## PUSHBUTTON COMBINATION LOCK

**Charles E. Germanton, 38 Mountain Ave., Summit, N.J. 07901**

**Filed Dec. 18, 1975, Ser. No. 642,007**
**Int. Cl.² E05B *49/02***
**U.S. Cl. 70—278** **14 Claims**



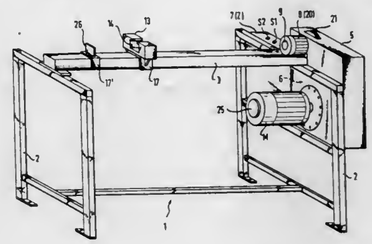

1. A combination lock comprising a housing, a bolt selectively retractable within said housing, a rotatable arm for retracting said bolt, a rotatable knob journalled in said housing, a remanent control member within said housing for selectively engaging said arm, said control member being rotatable with said knob, a coil surrounding said remanent control member, a circuit means to selectively energize said coil so as to selectively magnetize said remanent control member, a set of two-state memory elements for storing any one of all combinations of said memory elements, and said circuit means being responsive to signals that correspond to said stored combination for engaging and disengaging said remanent control member and said rotatable arm for selective movement with said remanent control member in order to retract said bolt.

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## 4,019,356
## APPARATUS FOR THE COLD WORKING OF BAR STOCK

**Hans-Erich Bohl, D-3559 Grusen No. 66, Bemunden, Wohra, Germany**

**Filed July 22, 1975, Ser. No. 598,510**
**Claims priority, application Germany, July 24, 1974, 2435534**
**Int. Cl.² B21D *11/14***
**U.S. Cl. 72—30** **42 Claims**



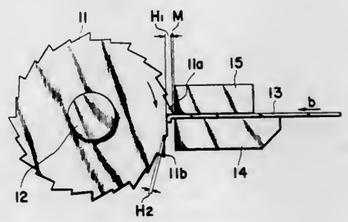
1. An apparatus for the cold working of bar stock, comprising a bed support stationary fixing means and comprising rotary fixing means motor-driven via a step-down gear, said stationary and rotary fixing means being aligned and arranged for variable spacing with respect to each other and being provided each with detachable insertion means having a profile matching that of the bar stock to be worked, control means being provided fo effecting a predetermined amount of rotation of said rotary fixing means relative to said stationary fixing means, whereby one bar portion is held stationary while an opposite bar portion is wound in predetermined degree.

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## 4,019,357
## METHOD OF MAKING REINFORCEMENTS FOR CONCRETE

**Isao Gokyu, Musashino, Japan, assignor to Nippon Concrete Industries Co. Ltd., Tokyo, Japan**

**Filed Nov. 10, 1975, Ser. No. 630,626**
**Int. Cl.² B21D *31/00***
**U.S. Cl. 72—130** **6 Claims**




1. A method of making reinforcements for concrete, said reinforcements being cut from an elongated strip of thin metal, comprising the steps of:

rotating a cutter wheel having a circular surface about its rotational axis, said cutter wheel being of finite length and diameter, said cutter wheel including a plurality of cutting teeth extended a first distance from said circular surface of said cutter wheel, and a plurality of bending teeth extended a second distance from said circular surface of said cutter wheel, said second distance being less than said first distance, and said bending teeth and said cutting teeth being aligned parallel to said rotational axis of said

cutter wheel, and said cutting teeth and said bending teeth spaced alternately around said circular surface of said cutter wheel;

supporting said metal strip relative to said cutter wheel on a supporter having a planar supporting surface parallel with said axis of rotation of said cutter wheel, and said supporter positioned apart from said cutter wheel such that the clearance between an adjacent edge of said supporter and a most extended edge of said cutting teeth causes shearing of the metal strip by said cutting teeth when said cutter wheel is rotated and said metal strip bridges said clearance;

moving said metal strip, the width of said metal strip not exceeding said finite length of said cutter wheel, against said rotating cutter wheel with said extended teeth;

bending said metal strip by contact of one of said bending teeth with said metal strip;

moving said bent metal strip against said rotating cutter wheel;

shearing said bent metal strip parallel to the bend by contact of one of said cutting teeth,

whereby said metal strip is first bent by one of said bending teeth and a portion is subsequently sheared off said strip by one of said cutting teeth, said cutting tooth next following said bending tooth.

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**4,019,358**

**ROLLING MILL**

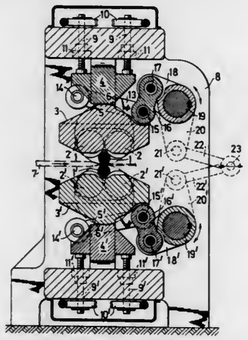
**Josef Fröhling, Olpe, Biggesee, and Karl Wiedemer, Siegen, both of Germany, assignors to Firm Josef Frohling, Olpe, Biggesee, Germany**

**Continuation of Ser. No. 468,153, May 8, 1974, abandoned. This application Sept. 30, 1975, Ser. No. 618,275**

**Claims priority, application Brazil, May 10, 1973, 3392/73**

**Int. Cl.² B21B** *13/18*

**U.S. Cl. 72—189** **31 Claims**



1. A cycloidal rolling mill for reducing the thickness of a metal workpiece, comprising:

at least one rotary work roll located to be above the workpiece and one rotary work roll located to be below the workpiece, said work rolls being adapted to be engaged on the workpiece;

a displaceable carrier associated with each of said work rolls, each displaceable carrier comprising a curved cam surface which faces away from the work roll;

means for supporting said work rolls on said displaceable carriers;

means for moving said displaceable carriers in a forward advance direction and in the opposite direction while said work rolls are simultaneously engaged on the upper and underside surfaces of the workpiece; and

backing members associated with each displaceable carrier for maintaining a predetermined separation between said displaceable carriers to maintain a corresponding predetermined spacing between said work rolls when the workpiece is fed therebetween so that said work rolls are engaged against the workpiece during said forward advance of said displaceable carriers as well as during movement of said displaceable carriers in said opposite direction to perform a rolling operation on the workpiece, each backing member including a counterface on which the cam surface of each displaceable carrier engages, said engaging cam surfaces and said counterfaces being shaped to cause said displaceable carriers with said work rolls supported thereon to follow a path including a cycloidal portion and a rectilinear portion during movement of said displaceable carriers in said forward and opposite directions.

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**4,019,359**

**METHOD OF HOT ROLLING METAL STRIP**

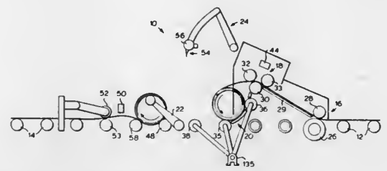
**William Smith, Burlington, Canada, assignor to The Steel Company of Canada, Limited, Hamilton, Canada**

**Division of Ser. No. 574,901, May 6, 1975, Pat. No. 4,005,830. This application Apr. 12, 1976, Ser. No. 676,139**

**Claims priority, application United Kingdom, May 6, 1974, 19917/74**

**Int. Cl.² B21B** *1/34*

**U.S. Cl. 72—231** **6 Claims**



1. In a method of rolling hot metal strip, the steps of:

a. rolling a transfer bar,

b. coiling the transfer bar at a coiling location to form a coil having an open center core,

c. substantially immediately after the coiling step is completed, initiating the uncoiling of said coil at the coiling location and passing the uncoiling transfer bar end toward a finishing operation,

d. while the uncoiling is proceeding, transferring the coil from said coiling location to an adjacent uncoiling location, by means which has contact with the coil at at least one point that continuously moves with respect to the coil,

e. and, during at least part of the uncoiling step, coiling a further transfer bar at said coiling location to form a further coil having an open center core.

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**4,019,360**

**WIRE ROD ROLLING MILL**

**Oskar Biernot, Ensheimer Str. 48, and Albert Bier, Am Klosterhang 15, both of St. Ingbert, Germany (6670)**

**Filed Sept. 22, 1975, Ser. No. 615,609**

**Claims priority, application Germany, Oct. 1, 1974, 2446905**

**Int. Cl.² B21B** *35/02*

**U.S. Cl. 72—249** **4 Claims**

1. A wire rod mill, comprising:

a plurality of serially arranged roll stands;

at least one lontitudinal main drive shaft, said main drive shaft serving as a common drive shaft for all of said roll stands;

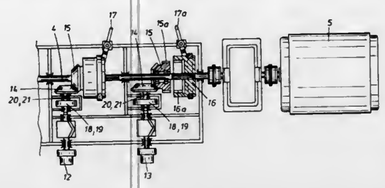
a variable speed drive motor connected to said main drive shaft;

a plurality of transverse shafts, one for each of said roll stands;

first coupling means connecting each transverse shaft with its associated roll stand for driving said roll stand at a selected speed from said transverse shaft; and

a plurality of second coupling means, one for each transverse shaft, for connecting said transverse shafts with said common main drive shaft in a fixed, predetermined transmission ratio, the second coupling means associated with





the final one of said roll stands in said series, and the second coupling means associated with at least a plurality of roll stands next preceeding said final roll stand, each including means for selectively and individually disconnecting their associated transverse shafts from said common main drive shaft.

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**4,019,361**

**MANIPULATOR FOR ROLLING MILL**

**Carl Sebardt, Stockholm, Sweden, assignor to Siftelsen for Metallurgisk Forskning, Lulea, Sweden**

**Filed Feb. 4, 1976, Ser. No. 655,067**

**Claims priority, application Sweden, Feb. 13, 1975, 7501630**

**Int. Cl.² B21B** *39/06, 39/30, 39/00*

**U.S. Cl. 72—252** **4 Claims**



1. Manipulator for feeding ingots or billets to the roll-nip of the rolls of a rolling mill, comprising support means adapted to be maintained in fixed relation on one side of a pair of cooperable rolls, a manipulator head carried by said support means for movement longitudinally and laterally thereof, said manipulator head including a rotatable head and means for rotating same, grab means adapted to releasably grasp one end of an ingot or billet rotatable with said rotatable head, and a pusher means carried pivotably for pivotal movement between an upper rest position above said grab means and in which upper rest position the grab means is movable to a forward position in which it can grasp an end of the ingot or billet and a lower working position in front of said rotatable head and in front of said grab means so as to be engageable with said one end of the ingot or billet to feed same to the roll-nip of the rolls.

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**4,019,362**

**TERMINAL CRIMPING MACHINE**

**Carl W. McKeever, Kendallville, Ind., assignor to Lyall Electric, Inc., Albion, Ind.**

**Filed Mar. 17, 1975, Ser. No. 559,336**

**Int. Cl.² B21D** *37/04, 43/04*

**U.S. Cl. 72—421** **4 Claims**

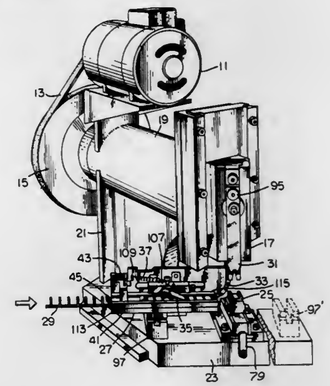
1. A crimping machine for attaching terminals to electrical conductors comprising:

an applicator having a bed and a ram relatively movable together and apart to operate on a workpiece placed therebetween;

first and second cooperating crimping dies operable by relative movement together of the ram and bed to crimp a terminal onto a conductor, the first crimping die being removably attached to the applicator ram and the second crimping die being removably attached to the applicator bed;

terminal feed means removably attached to the applicator and including a reciprocating member for supplying terminals seriatim and in synchronism with the relative movement of the ram and bed, to the region between the ram and bed and only during motion of the reciprocating member in one direction;

flexible, nonelastic tension transmitting means coupling the feed means and applicator to actuate the feed means to supply a terminal to the region between the ram and bed when the ram and bed move apart; and



biasing means opposing operation of the flexible nonelastic tension transmitting means to restore the feed means for subsequent actuation by the flexible nonelastic tension transmitting means, the biasing means including a feed means restoring spring and the flexible nonelastic tension transmitting member interconnecting the ram and the feed means reciprocating member to deform the restoring spring and deliver a terminal when the ram moves away from the bed, the distance moved by the reciprocating member being less than the extent of relative motion between the bed and ram with the flexible nonelastic tension transmitting means going slack between reciprocations of the reciprocating member.

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**4,019,363**

**CALIBRATION APPARATUS AND METHOD**

**Philip Horton Sanford, Walpole, Mass., assignor to Masonellan International, Inc., Norwood, Mass.**

**Continuation of Ser. No. 401,142, Oct. 9, 1973, abandoned. This application Feb. 5, 1976, Ser. No. 655,483**

**Int. Cl.² G01F** *25/00*

**U.S. Cl. 73—1 R** **43 Claims**

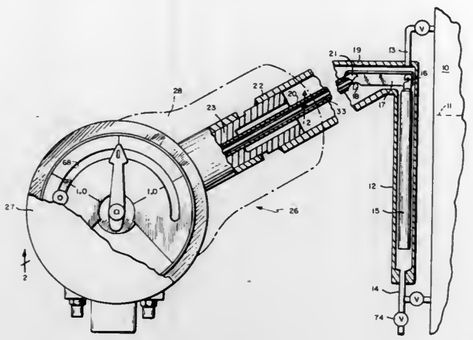
1. The method of calibrating instruments having means for measuring, and means normally loaded by said measuring means for transmitting, changes in a media or process condition across a range of said condition comprising the steps of

establishing the measured condition at the instrument at one limit of said condition range,

adjusting said transmitting means for corresponding indication by the instrument of said condition at said one limit of said condition range,

loading said transmitting means independently of and without affecting said measuring means to inferentially simulate said condition at the other limit of its said range, and

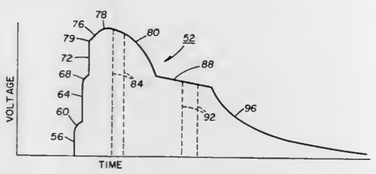
adjusting said transmitting means for corresponding indica-



tion by the instrument of said condition at said other limit of its said range.

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**4,019,364**
**METHOD AND APPARATUS FOR TESTING WELDS BETWEEN DISSIMILAR METALS BY USING THE SEEBECK EFFECT**
**Harry L. Maddox, Reynoldsburgh, Ohio, assignor to Western Electric Company, Inc., New York, N.Y.**
**Filed Sept. 8, 1975, Ser. No. 610,964**
**Int. Cl.² G01N *25/72*; G01R *31/00*; G08B *21/00***
**U.S. Cl. 73—15 FD** **6 Claims**

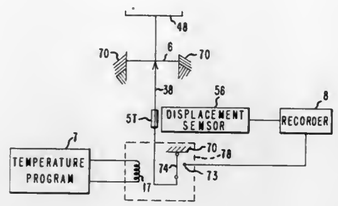



**1.** In a method of testing a weld formed between two dissimilar metals by the application of welding energy to the weld, where an emf is generated across the weld bond interface and has a value related to the temperature of the weld bond interface as a result of the Seebeck effect:
monitoring the emf across the weld as a result of the emf generated across the weld bond interface;
detecting the occurrence of a loss of the monitored emf subsequent to the application of the welding energy to the weld and during the cooling thereof, and
generating an indication of a detected loss of the monitored emf.

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**4,019,365**
**THERMOMECHANICAL ANALYZER**
**Lecon Woo, Newark, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**
**Filed Mar. 4, 1975, Ser. No. 553,453**
**Int. Cl.² G01N *3/18***
**U.S. Cl. 73—15.6** **11 Claims**

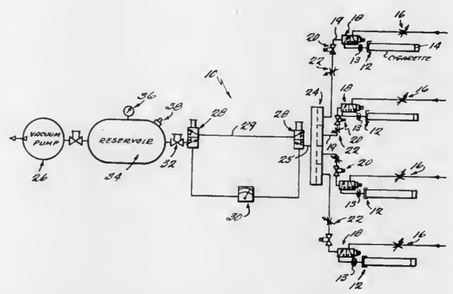
**1.** A mechanical analyzer for measuring stress or tension in a sample material having a modulus of elasticity comprising:
a flat spring having a known modulus of elasticity over the measuring range of said analyzer, said known modulus being greater than said sample modulus,
coupling means for coupling said flat spring and said sample mechanically in parallel such that each are subjected to




the same displacement, and
transducer means for sensing said displacement.

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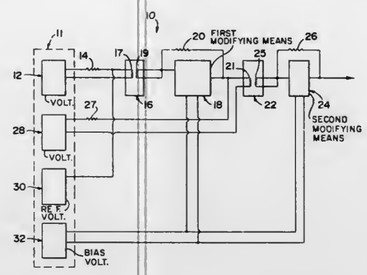
**4,019,366**
**VARIABLE PARAMETER SMOKING MACHINE**
**Warren E. Claflin, Chesterfield, and Francis M. Watson, III, Richmond, both of Va., assignors to Philip Morris Incorporated, New York, N.Y.**
**Filed Nov. 4, 1975, Ser. No. 628,776**
**Int. Cl.² G01N *1/26***
**U.S. Cl. 73—23** **9 Claims**




**1.** A smoking machine comprising
a. a plurality of means for holding a cigarette or the like for smoking,
b. a continuous source of vacuum,
c. a plurality of dummy air-flow resistance means, one corresponding to each of said holding means, the air-flow resistance of said dummy means being adjustable to be substantially the same as a cigarette or the like being held by the corresponding holding means,
d. means for operatively connecting said continuous source of vacuum to said plurality of holding means and to said plurality of dummy air-flow resistance means, and
e. a first valve means associated with each holding and disposed in said connecting means for selectively placing each of said holding means in communication with said vacuum source so that air and smoke are drawn through a cigarette in said holding means toward said vacuum source to provide a puff, said valve means in a first position thereof placing said holding means in operative communication with said vacuum source and said dummy means not being in communication with said vacuum source, and in a second position thereof placing said dummy means in operative communication with said vacuum source and said holding means not being in communication with said vacuum source.



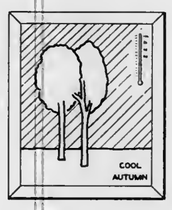
**4,019,367**
**LINEARIZED ODOR TRANSDUCER**
**Ross W. Norsworthy, Largo, Fla., assignor to CRS Industries, Inc., Tampa, Fla.**
**Filed Sept. 11, 1975, Ser. No. 612,458**
**Int. Cl.² G01N *27/04***
**U.S. Cl. 73—23** **6 Claims**




**1.** A pollutant sensing means for indicating the amount of pollutants in a gas, comprising the combination:
a first and second pollutant transducer means each providing a change in resistance as a function of the concentration of pollutant present in the gas;
a first and a second signal modifying means,
electrical power source means connected to said first and second pollutant transducer means and to said first and second signal modifying means;
reference power source means,
first means connecting said first pollutant transducer means to said reference power source means and connecting the output signal of said first pollutant transducer means to said first signal modifying means for providing a first outout signal in accordance with the change in resistance of said first pollutant transducer means relative to said reference power source means; and second means connecting said second pollutant transducer means to said first output signal of said first signal modifying means and connecting the output of said second pollutant transducer means to said second signal modifying means for providing a second output signal in accordance with the change in resistance of said second pollutant transducer means relative to said first output signal.

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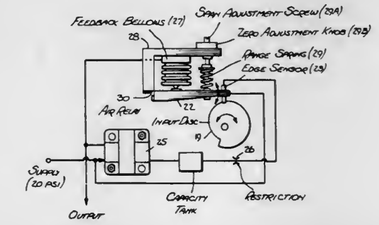
**4,019,368**
**PICTORIAL ROOM THERMOMETER**
**Jose Miguel Antonio Rosario Navato, 938 Brookvale Terrace, Manchester, Mo. 63011**
**Filed Jan. 8, 1976, Ser. No. 647,009**
**Int. Cl.² G01N *11/12***
**U.S. Cl. 73—356** **8 Claims**




**1.** A thermometer adapted to be hanged up on walls or stood up on flat surfaces to pictorially and graphically indicate the temperature of the room or environment comprising a substrate on which is painted or printed a design, a black or dark background, an overlay or painted on layer of liquid crystals over designed areas of the picture or painting or the first mentioned design, which liquid crystals change color in response to changes of room or ambient temperature in a predetermined temperature range and causing a change in the color and or shape of the original design, and a standard room thermometer incorporated in the picture or design for more precise temperature determination.

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**4,019,369**
**PNEUMATIC TRANSMITTER FOR VARIABLE AREA FLOWMETER**
**Toshio Satori, Yokohama, Japan, assignor to Fischer & Porter Co., Warminster, Pa.**
**Filed July 8, 1976, Ser. No. 703,529**
**Int. Cl.² G01B *13/16*; G01F *1/24***
**U.S. Cl. 73—37** **10 Claims**




**1.** A variable-area flowmeter system adapted to produce a transmittable pneumatic output that is linearly proportional to fluid flow rate, said system comprising:
A. a variable area tube through which the fluid to be metered is conducted;
B. a float disposed in said tube to be raised and lowered therein as a function of flow rate, and a bar magnet physically coupled to said float and axially movable therewith.
C. a shaft-mounted follower magnet magnetically coupled to the bar magnet whereby the axial movement of the bar magnet is translated into rotary motion.
D. an edge-profiled disc mounted on said shaft, said profile affording a linear relationship between rotation of said disc and the pneumatic output of said system; and
E. means including a pneumatic edge sensor associated with said disc to produce said pneumatic output signal, said edge sensor being constituted by an air jet nozzle to produce an air stream which is picked up by a collector spaced therefrom by a gap in which the edge of the disc is inserted to more or less interrupt the stream in accordance with the profile, said nozzle being cocked relative to the plane of the disc to an extent counteracting the tendency of the stream to rotate the disc.

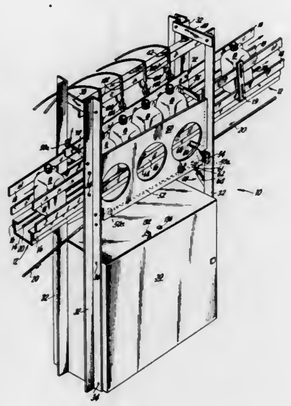
**10.** A system adapted to produce a transmittable pneumatic output that is linearly proportional to a process variable, said system comprising:
A. means to rotate a shaft to an angular degree in accordance with said variable;
B. an edge-profiled disc mounted on said shaft, said profile affording a linear relationship between rotation of said disc and the pneumatic output of said system; and
C. means including a pneumatic edge sensor associated with said disc to product said pneumatic output signal, said edge sensor being constituted by an air jet nozzle to produce an air stream which is picked up by a collector spaced therefrom by a gap in which the edge of the disc is inserted to more or less interrupt the stream in accordance with the profile, said nozzle being cocked relative to the plane of the disc to an extend counteracting the tendency of the stream to rotate the disc.

**4,019,370**

## LEAK TESTING DEVICE AND METHOD FOR PLASTIC BOTTLES

**Andrew Allocco, Jr., Miami, Fla., assignor to Farm Stores, Inc., Miami, Fla.**

**Filed Oct. 24, 1975, Ser. No. 625,772**
**Int. Cl.² G01M *3/32***
**U.S. Cl. 73—45.1** **15 Claims**



1. Apparatus for leak testing lightweight plastic bottles comprising:

a. a plurality of test stations each having a retractable head;

b. conveyor means for transporting said bottles through said test stations;

c. means at said test stations for sensing the entrance of bottles into said test stations and generating a command signal when a set of bottles have entered the test station;

d. movable means at the downstream end of said test stations for preventing the exit of said bottles until completion of testing and aligning the bottle mouths in register with said head in response to said command signal;

e. means for moving each of said heads into and out of sealing engagement with its associated bottle leak test means at each test station including:

i. reservoir means for receiving and containing a given volume of pressurized fluid from a source,

ii. control means responsive to said command signal for segregating said reservoir means from said source and placing said reservoir in communication with its associated head, whereby a test pressure-volume relationship is established between the reservoir and bottle, and

iii. means for sensing the pressure of said test pressure-volume relationship and comparing said sensed pressure to a set point value; and

f. ejector means operatively connected to said comparing means for displacing the associated bottle if said sensed pressure is below said set point value.

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**4,019,371**

## APPARATUS AND METHOD FOR EXTERNALLY TESTING CONDUIT CONNECTIONS

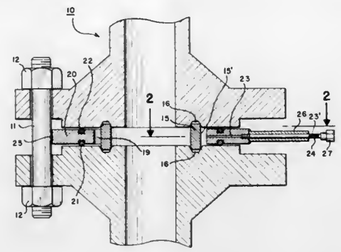
**Gervase M. Chaplin, Gretna, and Thomas W. Childers, Mandeville, both of La., assignors to Exxon Production Research Company, Houston, Tex.**

**Filed Jan. 28, 1976, Ser. No. 652,969**
**Int. Cl.² G01M *3/28***
**U.S. Cl. 73—46** **19 Claims**

1. Apparatus for testing a connection between fluid conducting conduits employing an external source of fluid pressure comprising:

ring seal means in said connection for sealing off and preventing flow of fluids into and from said conduits when said connection is made;

test ring seal means in said connection, said test ring seal



means and said ring seal means forming a space therebetween; and

passageway means connecting said space to the exterior of said connection for transmitting fluid pressure from said source of fluid pressure to said space.

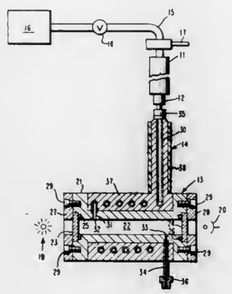
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**4,019,372**

## CHROMATOGRAPHIC DETECTOR SYSTEM

**Erwin C. Parkell, Galena, Md., and John A. Stamm, Wilmington, Del., assignors to E. I. DuPont de Nemours and Company, Wilmington, Del.**

**Continuation-in-part of Ser. No. 470,635, May 16, 1974, abandoned. This application Dec. 16, 1974, Ser. No. 534,092**
**Int. Cl.² G01N *31/08***
**U.S. Cl. 73—61.1 C** **5 Claims**



1. A detector system for use with a liquid chromatographic column comprising an optically transparent flow cell and a connecting means connecting said flow cell to the output of said column, said connecting means being a long narrow tube, partially coiled around said flow cell and encapsulated by and connected to said flow cell by a thermally conductive medium, said connecting means being in thermal contact with said flow cell for a sufficient length so that any liquid passing through said connecting means come into thermal equilibrium with said flow cell before entering the optical transparent portion of said flow cell.

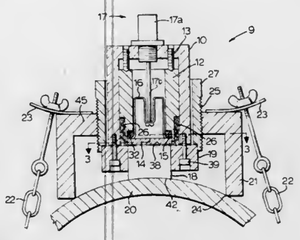


**4,019,373**

## ULTRASONIC TRANSDUCER MOUNTING AND COUPLING ASSEMBLY

**David Lewis Freeman, Bridgenorth, and Ralph Seymour Flemons, Peterborough, both of Canada, assignors to Canadian General Electric Company Limited, Toronto, Canada**

**Filed May 28, 1975, Ser. No. 581,636**
**Claims priority, application Canada, June 17, 1974, 202680**
**Int. Cl.² G01N *29/00***
**U.S. Cl. 73—71.5 US** **5 Claims**



1. A transducer coupling for providing electro-mechanical energy coupling with a pipe, comprising; adjustable mounting means for attaching said coupling to said pipe, having casing means secured thereto in spaced relation from the pipe when installed, a resilient elastomeric coupling member, securing means holding said coupling member is attached relation to the casing means, having an outer end of said coupling member projecting therefrom to contact the surface of said pipe in compressed relation therewith, a transducer having one surface thereof secured in compressed relation against the other end of said coupling member, by way of electrically insulated mounting means, first and second electrical connections to said transducer, said first connection contacting said one surface of the transducer, being held in contacting relation therewith by compressive force acting between said coupling member and said insulated mounting means, said insulated mounting means securing said second connection in resilient contacting relation to a second face of said transducer.

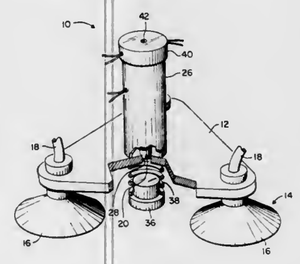
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**4,019,374**

## ELECTROMAGNETIC IMPULSER FOR DYNAMICALLY LOADING A STRUCTURE

**William S. Tierney, Palos Verdes Peninsula, and James E. Wright, Long Beach, both of Calif., assignors to TRW Inc., Redondo Beach, Calif.**

**Filed July 24, 1975, Ser. No. 598,900**
**Int. Cl.² B06B *1/04***
**U.S. Cl. 73—71.5 R** **1 Claim**



1. An impulser for percussively loading a structure comprising:

a plate;

suction cups secured to one side of said plate including means through which said cups may be evacuated to firmly attach said plate to said structure;

a solenoid mounted on the other side of said plate on a transverse axis of the plate; an anvil at said one side of said plate on the axis of said solenoid for seating against said structure;

a compression spring securing said anvil to said plate;

a plunger movable in said solenoid from a normal retracted position through a percussion stroke toward said anvil by electromagnetic action to impact one end of said plunger against said anvil and thereby deliver an impulse to said structure;

a spring for urging said plunger to its retracted position;

signal generating means including an axially adjustable timing shaft threaded axially in the other end of said plunger, a light source and a photodetector situated at diametrically opposite sides of said timing shaft in a manner such that said shaft blocks light transmission from said source to said detector in said normal retracted position of said plunger and said timing shaft moves through said percussion, stroke with said plunger and from between said light source and detector to permit light transmission to said detector, whereby the detector generates an electrical signal in timed relation to said impulse; and

said timing shaft is adjustable relative to said plunger in the axial direction of said plunger.

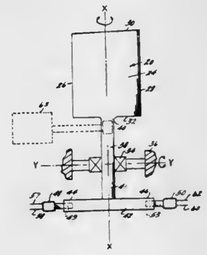
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**4,019,375**

## MEANS FOR INDUCING VIBRATION IN AN AIRFOIL

**Delmar H. Ellis, Cincinnati; John E. Baker, Loveland; Wayne M. Shaffernocker, Mason, and Ralph W. Scott, Cincinnati, all of Ohio, assignors to General Electric Company, Cincinnati, Ohio**

**Filed Dec. 22, 1975, Ser. No. 643,077**
**Int. Cl.² G01M *7/00*; G01N *3/32***
**U.S. Cl. 73—71.5 R** **16 Claims**



1. An apparatus for inducing vibrations in an airfoil blade extending longitudinally about a first axis and including a pair of generally opposed airfoil surfaces, a leadng and a trailing edge associated with said surfaces, said airfoil surfaces terminating at a pair of end portions each of said portions connecting said one of said pair of surfaces to the other of said pair of surfaces, said end portions disposed at opposite ends of longitudinally extending blade, said apparatus comprising:

an elongated stem secured at one of its ends to said airfoil blade;

bearing means receiving said stem for supporting said airfoil blade for rotation siumltaneously about said first axis and about a second axis perpendicualr to said first axis;

second means operatively connected to one of said end portions and movable about said two axes in response to variations in magnetic flux, said second means operative to pivotally rotate said blade simultaneously about said first and second axes;

third means responsive to an electrical control signal for generating a variable magnetic flux field, said second means disposed within said magnetic flux field so as to be responsive to variations in said magnetic flux field;

fourth means for providing said electrical control siganal to said third means.

**4,019,376**

## HARDNESS TESTER

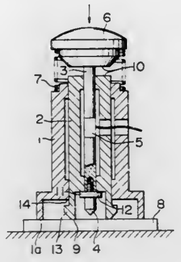
**Shozo Iwasaki, Ebina, Japan, assignor to Kabushiki Kaisha Akashi Seisakusho, Japan**

**Filed Sept. 4, 1975, Ser. No. 610,398**

**Claims priority, application Japan, Sept. 11, 1974, 49-104672**

**Int. Cl.² G01N *3/48***

**U.S. Cl. 73—81** **5 Claims**




1. A hardness tester, comprising;

a load application shaft having an indenter at a lower end thereof, and having loading means at an upper end thereof for applying variable loads to the shaft to press the indenter into a specimen;

a reference cylinder coaxially fitted around the shaft for sliding of the shaft along the cylinder, the cylinder having a datum plane at a lower end thereof for contacting the specimen at the inception of the applying of a load to the shaft;

stop means on the shaft and cylinder for limiting any sliding of the shaft, downwardly along the cylinder, to a predetermined length to limit the pressing of the indenter into the specimen to a predetermined corresponding depth;

a load detector on the shaft between the indenter and the loading means for detecting loads applied to the shaft by the pressing of the indenter into the specimen; and

means for indicating the load applied to the shaft and detected upon the pressing of the indenter into the specimen to the predetermined depth, to thereby indicate a corresponding hardness of the specimen without any need for measuring variable dimensions of an indentation.

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**4,019,377**

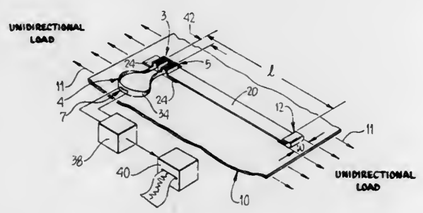
## ELASTOMER STRAIN GAGE

**Michael A. Rickards, La Jolla, Calif., assignor to Rohr Industries, Inc., Chula Vista, Calif.**

**Filed Mar. 29, 1976, Ser. No. 671,428**

**Int. Cl.² G01B *7/16***

**U.S. Cl. 73—88.5 R** **6 Claims**




1. A temperature compensating strain gage apparatus for measuring surface elongations of an elastomeric material comprising:

an elongated strap of said elastomeric material;

means for attaching one end of said strap to the surface of said elastomeric material;

a first and second strain gage holding means, said first holding means is fixedly attached to the end of said strap remote from said means for attaching and said second holding means fixedly attached to said surface adjacent and spaced from said first holding means;

a strain gage removably secured to said first and second holding means for measuring relative movement therebetween; and

a heat transferring medium positioned between said surface and said strap intermediate its ends.

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**4,019,378**

## HYDRAULIC CHUCKING HEAD

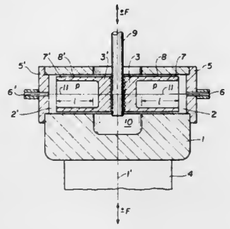
**Guenter Keller, Ernsthofen; Friedrich Klinger, Garmisch-Partenkirchen; Andreas Pohl, Darmstadt; Gerhard Schimanski, Darmstadt-Eberstadt, and Guenter Zuber, Messel, all of Germany, assignors to Carl Schenck AG, Darmstadt, Germany**

**Filed June 7, 1976, Ser. No. 693,519**

**Claims priority, application Germany, July 5, 1975, 2530132**

**Int. Cl.² G01N *3/04***

**U.S. Cl. 73—103** **7 Claims**




1. A chucking head especially for testing machines to hold a test sample therein, comprising a housing having a first axis, a recess extending coaxially in the direction of said first axis in said housing, at least one second axis in said housing extending at a right angle to said first axis, cylinder bore means in said housing extending along said second axis and having an open end facing into said recess, hollow piston means located in each of said cylinder bore means and facing toward said first axis, and pressure supply means communicating with said cylinder bore means, said hollow piston means being made of elastically yielding material whereby upon application of pressure the piston jackets are pressed against the respective cylinder bore means to eliminate play therebetween.

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**4,019,379**

## PNEUMATIC ROUGHNESS MEASURER

**Claude Wartelle, Gouvieux, and Michel Leveque, Champigny-sur-Marne, both of France, assignors to Centre Technique des Industries Mecaniques, Senlis, France**

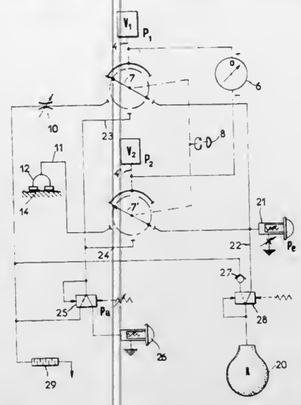
**Filed Apr. 12, 1976, Ser. No. 676,341**

**Int. Cl.² G01B *5/28***

**U.S. Cl. 73—105** **14 Claims**

1. A method for measuring the surface roughness of a workpiece, comprising filling two vessels with a compressed gas at specific pressures; disconnecting the vessels from the pressure source, applying to the rough surface of the workpiece to be studied the open end of a bell-form sensor connected to a second one of the vessels; evacuating simultaneously and individually to atmosphere the two vessels, the first through a calibrated throttle, the second through the leak existing between the edge of said sensor bell and the rough surface of the workpiece; measuring, during evacuation, the difference between the pressures in the two vessels; and deducing from this






pressure differential, by standardization with sample pieces of known roughness, the roughness of the piece studied.

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**4,019,380**

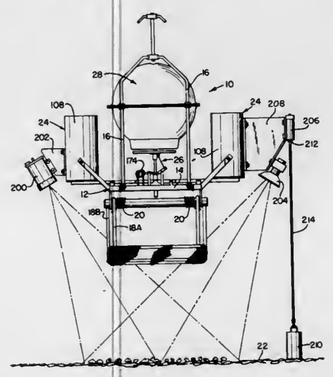
## UNDERWATER SAMPLER

**Samuel O. Raymond, Falmouth, Mass., assignor to Benthos, Inc., N. Falmouth, Mass.**

**Filed Mar. 8, 1976, Ser. No. 664,482**

**Int. Cl.² G01N *1/00***

**U.S. Cl. 73—170 A** **23 Claims**




1. A sampler for obtaining a specimen of the bottom of a body of water comprising;

a frame;

ballast supporting means mounted to said frame for releasably supporting ballast whereby said sampler is caused to sink to the bottom of a body of water;

first and second jaw members mounted on said frame for relative movement between an open position wherein said jaw members are spaced from one another and a closed position wherein said jaw members oppose each other and provide a specimen retaining pocket;

jaw moving means for moving said jaw members relative to one another from said open position to said closed position;

control means for independently initiating operation of said jaw moving means and causing said ballast supporting means to release ballast when said sampler reaches the bottom of a body of water; and

buoyant means on said frame to return the sampler to the surface of the body of water after the ballast is released.

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**4,019,381**

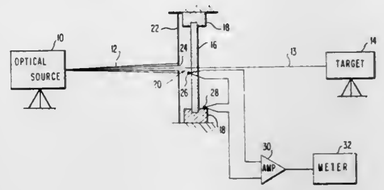
## TRANSPARENT OPTICAL POWER METER

**Frank J. Elmer, Spring Lake Heights, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Jan. 12, 1976, Ser. No. 648,350**

**Int. Cl.² G01K *17/00***

**U.S. Cl. 73—190 EW** **11 Claims**




1. Apparatus for measuring the average power in an optical beam emitted from an optical source, comprising in combination.

an extended area optical transmission means located in the path of said optical beam, said beam passing therethrough from an input face to an output face at a predetermined limited area inner region;

support means of a different material than said optical transmission means in an outer peripheral area of said optical transmission means for supporting said optical transmission means in said beam path;

first and second temperature sensitive means connected in series and being operable to measure the temperature difference existing between an area immediately adjacent said predetermined region through which the beam passes and the temperature of said support means and generating a measurement signal indicative of said temperature difference; said first means being disposed on said input face in contact with said optical transmission means in said area immediately adjacent said inner region out of the path of said beam, said second means being disposed on said support means in said outer peripheral area adjacent said optical transmission means; and

means coupled to and responsive to said temperature difference measurement signal to provide a readout of power remaining in said beam following the beam passage through said transmission means.

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**4,019,382**

## APPARATUS FOR USE IN THE MEASUREMENT OF THE FLOW RATE OF FLUID FLOW

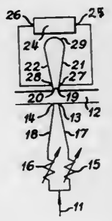
**Hussein Mokhtar El-Gammal, Hatfield, England, assignor to Ferraris Development and Engineering Company Limited, London, England**

**Filed Mar. 24, 1975, Ser. No. 561,378**

**Claims priority, application United Kingdom, Mar. 25, 1974, 13076/74**

**Int. Cl.² G01F *1/34***

**U.S. Cl. 73—194 R** **8 Claims**




1. Apparatus for use in the measurement of the flow rate of a fluid flow, the apparatus comprising:

a body which defines a duct through which the fluid flow to be measured is directed;

at least one pressure fluid supply passage formed in the body in communication with the duct, adapted for connection to a source of fluid pressure and orientated with respect to the duct so that, in use of the apparatus, it directs a jet of fluid under pressure across the duct;

a pair of receiver passages formed in the body and in communication with the duct opposite said at least one pressure fluid supply passage, said pair of receiver passages being arranged symmetrically with respect to said at least one pressure fluid supply passage, each receiver passage having a mouth which is defined within a wall of the duct; and

sensing means for sensing a non-turbulent component of fluid flow within each receiver passage for the derivation of at least one signal which is indicative of the associated non-turbulent component of fluid flow, the arrangement being such that an indication of the flow rate of fluid flow through the duct can be derived from said at least one signal;

wherein the two receiver passages are connected together so as to define a loop by which said mouths communicate one with the other, the dimensions and configuration of the part of the loop with which said sensing means communicate being such as to ensure that fluid flow therewithin is laminar.

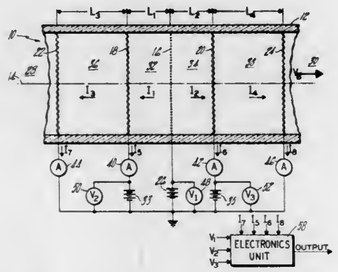
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**4,019,383**

## FOUR-COLLECTOR FLUX SENSOR

**Walter J. Wiegand, Jr., Glastonbury; Robert H. Bullis, Avon, both of Conn., and Robert J. Mongeon, East Longmeadow, Mass., assignors to United Technologies Corporation, Hartford, Conn.**

**Filed July 21, 1976, Ser. No. 707,174**
**Int. Cl.² G01F *1/64***
**U.S. Cl. 73—194 F** **14 Claims**




1. Apparatus for determining the flux of a gas comprising:

means for providing a region having an axis parallel to which the gas flows at a velocity $v_g$ in passing therethrough;

charged particle source means extending essentially perpendicular to the flow axis to provide charged particles in the gas adjacent to the source means;

first collection means separated from the charged particle source means by a distance $L_1$ and extending across the region essentially perpendicular to the flow axis to collect charged particles which drift from the charged particle source means along the flow axis in the direction opposite to the flow of the gas and form a first electric current;

second collection means separated from the charged particle source means by a distance $L_2$ and extending across the region essentially perpendicular to the flow axis to collect charged particles which drift from the charged particle source means along the flow axis in the direction of flow of the gas and form a second electric current;

third collection means separated from the first collection means by a distance $L_3$ and extending across the region essentially perpendicular to the flow axis to collect charged particles which drift from the first collection means along the flow axis in the direction opposite to the flow of the gas and form a third electric current;

fourth collection means separated from the second collection means by a distance $L_4$ and extending across the region essentially perpendicular to the flow axis to collect charged particles which drift from the second collection means along the flow axis in the direction of flow of the gas and form a fourth electric current;

means for providing an electric potential between the charged particle source means and the collection means to induce the charged particles to drift along the axis toward the collection means;

means for sensing the first electric current;

means for sensing the second electric current;

means for sensing the third electric current; and

means for sensing the fourth electric current.

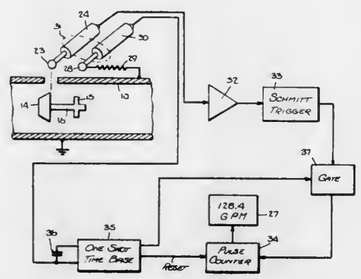
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**4,019,384**

## DIGITAL READ-OUT SYSTEM FOR EXTERNAL-SENSOR VORTEX FLOWMETER

**Peter J. Herzl, Morrisville, Pa., assignor to Fischer & Porter Co., Warminster, Pa.**

**Continuation-in-part of Ser. No. 445,869, Feb. 26, 1974, Pat. No. 3,946,608. This application Apr. 2, 1976, Ser. No. 673,096**
**Int. Cl.² G01F *1/32***
**U.S. Cl. 73—194 VS** **14 Claims**




1. A flow rate measuring arrangement for use in conjunction with fluid-conducting lines, said arrangement comprising:

A. a family of vortex-type flowmeters, each flowmeter being installed in one of said lines and including a flow tube having an obstacle assembly mounted therein to produce fluidic oscillations, the assembly being provided with a deflectable section that is set into vibration by said fluidic oscillations, a first external coupling head linked to said deflectable section whereby said vibrations are transmitted thereto, and a second external coupling head connected to an impedance element whose value is determined by the extent to which the meter factor of the flowmeter deviates from a nominal meter factor, whereby the flowmeters in said family carry impedance elements appropriate to their respective meter factors; and

B. a common read-out system for taking a reading from each flowmeter in said family, said system comprising:

a. a sensor engageable with said first head to produce a signal whose frequency corresponds to the vibratory frequency;

b. means coupled to the sensor to convert said signal to pulses having the same frequency;

c. a tip engageable with said second head to effect a connection to said impedance element;

d. means connected to said tip to generate a timing period whose duration depends on the value of said element; and

e. a pulse counter to count said pulses during said timing period to provide a count indicative of the flow rate of the flowmeter being read, which count is corrected for the meter factor of said flowmeter.



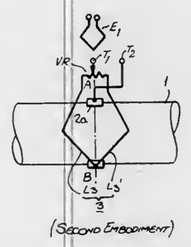
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**4,019,385**

## NOISE COMPENSATION IN ELECTROMAGNETIC FLOWMETER

**Masayasu Watanabe, Yokohama, Japan, assignor to Hokushin Electric Works, Ltd., Tokyo, Japan**

**Filed Oct. 6, 1975, Ser. No. 620,105**
**Claims priority, application Japan, Oct. 30, 1974, 49-125937**
**Int. Cl.² G01F *1/58***
**U.S. Cl. 73—194 EM** **2 Claims**




1. In an electromagnetic flowmeter provided with a flow tube through which there is conducted the fluid to be metered, the tube having a pair of electrodes mounted thereon at diametrically-opposed points along a transverse axis normal to the direction of flow, the flowing fluid intercepting a magnetic field established by diamond-shaped excitation coils, which field is somewhat asymmetrical with respect to said transverse axis, thereby inducing a voltage in the fluid which is transferred to the electrodes to produce a flow signal; a noise-compensating circuit for eliminating from the flow signal noise components resulting from magnetic coupling between the excitation magnetic fluxes and an imaginary loop formed by the signal lead wires and the conductive liquid path extending between said electrodes as well as from asymmetrical eddy currents flowing in regions on opposite sides of said transverse axis, said circuit comprising:

A. two lead wires external to the tube, each connected at one end to one of said electrodes and extending symmetrically on opposite sides of said transverse axis and formed to define a diamond-shaped loop;

B. a potentiometer connected between the other ends of said lead wires and having a slider; and

C. a pair of output terminals, one of which is connected to said slider and the other to the other electrode.

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**4,019,386**

## UNITIZED ELECTRODE ASSEMBLY FOR ELECTROMAGNETIC FLOWMETER

**Eggert Appel, Dransfeld; Gottfried Geisler, Gottingen, and Albert Seebode, Rosdorf, all of Germany, assignors to Fischer & Porter Co., Warminster, Pa.**

**Filed Jan. 20, 1976, Ser. No. 650,686**
**Claims priority, application Germany, Feb. 8, 1975, 2505427**
**Int. Cl.² G01F *1/58***
**U.S. Cl. 73—194 EM** **5 Claims**

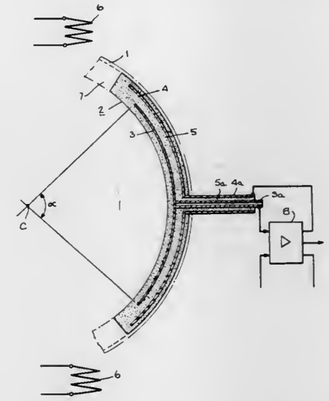
1. In an electromagnetic flowmeter having a dielectrically-lined flow tube through which is conducted the fluid to be metered, said tube having diametrically-opposed openings, the fluid intercepting a magnetic field to induce a signal in the detecting electrodes of a pair of diametrically-disposed unitized electrode assemblies, each assembly comprising:

A. a liner segment having a curvature conforming to the inner contour of the flow tube and formed of rigid homogeneous dielectric material;

B. a planar detector electrode embedded in said segment, said electrode having an arcuate form conforming to the curvature of said segment;

C. a planar shielding electrode embedded in said segment behind said detector electrode and in spaced relation thereto, said shielding electrode having an arcuate form conforming to the curvature of said segment; and

D. a coaxial line extending radially through one of said openings in said flow tube to provide separate electrical connections to said electrodes, said line having an inner conductor which terminates at and is physically and electrically attached to said detecting electrode and an outer conductor which terminates at and is physically and electrically attached to said shielding electrode, the interior space between the conductors being filled with the same dielectric material as that of said segment and being integral therewith to form a unitized rigid assembly structure which is dimensionally stable, the structure being installable within said tube by inserting the free end of said coaxial line through said one opening.



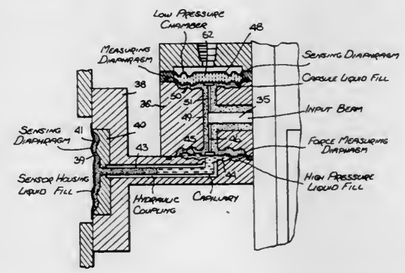
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**4,019,387**

## TEMPERATURE COMPENSATED LIQUID LEVEL TRANSMITTER

**William A. Siegel, Norristown, Pa., assignor to Fischer & Porter Co., Warminster, Pa.**

**Filed Apr. 24, 1975, Ser. No. 571,311**
**Int. Cl.² G01F *23/16***
**U.S. Cl. 73—299** **3 Claims**




1. In a transmitter for generating a signal proportional to the level of liquid in a tank or other vessel, the combination comprising:

A. a meter having a pivoted force beam and producing an output signal that depends on the force applied to the beam,

B. A sensor for detecting said liquid level and having a housing attachable to the wall of said tank, said housing having a well therein covered by a sensing diaphragm whose face is exposed to the liquid in the tank through an opening in said wall and whose periphery is bonded to the housing, and an insert seated in said well, the face of said insert being spaced from the diaphragm to define a fill chamber containing hydraulic fluid, the volume of hydraulic fluid in said fill chamber varying as a function of temperature,

C. hydraulic means coupling said fill chamber to said beam whereby the force produced by the pressure of the liquid on said diaphragm is applied by the hydraulic fluid to said beam, said hydraulic means including a high-pressure chamber formed in the body of said meter and covered by a force-measuring diaphragm mechanically linked to the lower end of said force beam, and a capillary communicating between the fill chamber and said high-pressure chamber, said capillary being disposed within a support tube extending between the housing of the sensor and the meter body, said insert being formed of a metal having a coefficient of expansion that is low relative to the material of said housing, whereby variations in temperature produce changes in the dimensions of the housing relative to that of the insert and result in changes in the volume of said fill chamber to an extent compensating for concurrent changes in the volume of the hydraulic fluid, thereby rendering the force applied to said beam independent of said variations in temperature,

D. A static pressure chamber formed in said meter body and covered by a second sensing diaphragm, said static pressure chamber and said high-pressure chamber being symmetrically arranged with respect to the force beam, and a second fill chamber extending between said force-measuring diaphram and said second sensing diaphragm,

E. a second measuring diaphragm in parallel relation to said second sensing diaphragm to define a fill space, and

F. a pin linking said second measuring diaphragm to said force beam.

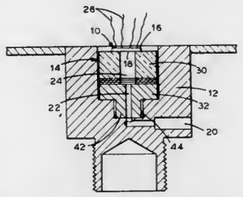
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**4,019,388**

## GLASS TO METAL SEAL

George R. Hall, II, Euclid; Jack M. White, Novelty, and Roger L. Krechmery, Mentor, all of Ohio, assignors to Bailey Meter Company, Wickliffe, Ohio

Filed Mar. 11, 1976, Ser. No. 665,828
Int. Cl.² G01L 9/04
U.S. Cl. 73—398 AR 11 Claims




1. A method of indirectly mounting a pressure sensitive Silicon element to a corrosion resistant metallic housing comprising the steps of:

brazing a Nickel-Iron holder assembly to a corrosion resistant metallic stem;

mounting the Silicon element to a glass holder assembly;

soldering the Nickel-Iron holder assembly to the glass holder assembly; and

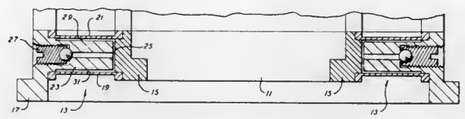
soldering the corrosion resistant stem to the corrosion resistant housing to indirectly mount the Silicon element to the housing.

**4,019,389**

## VISCOUS DAMPER

Jerry Frank LaSala, Pompton Plains, and Walter Joseph Krupick, Succasana, both of N.J., assignors to The Singer Company, Little Falls, N.J.

Filed Feb. 11, 1976, Ser. No. 657,116
Int. Cl.² G01D 11/12; F16F 9/52
U.S. Cl. 73—430 13 Claims




1. Apparatus for damping linear vibrations along an axis to isolate a precision instrument such as a vibrating beam accelerometer comprising:

a. an external flange for mounting the apparatus to the body to which the instrument is to be mounted;

b. an internal flange for mounting the instrument;

c. first and second diaphragms extending between said external and internal flanges to form a cavity bounded by said diaphragms and said flanges;

d. means to divide said cavity extending parallel to said diaphragms and forming a narrow space adjacent each diaphragm, said means rigidly attached to one of said external and internal flanges;

e. a single gap coupling the spaces adjacent said first and second diaphragms at the other of said external and internal flange to which said means to divide are not attached; and

f. a damping fluid filling said narrow spaces and said gap.

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**4,019,390**

## SYSTEM AND METHOD FOR COMPLETE ON LINE TESTING OF A MECHANICAL OVERSPEED TRIP CHANNEL ASSOCIATED WITH AN ELECTROHYDRAULIC EMERGENCY TRIP SYSTEM FOR A TURBINE POWER PLANT

Millard F. Smith, Westown; Frederick J. Behringer, Middletown; John R. Doyle, Collingdale, and Daniel P. McFadden, East Goshen, all of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Apr. 22, 1976, Ser. No. 679,294
Int. Cl.² F01K 13/02
U.S. Cl. 73—432 R 6 Claims

1. On line testing apparatus for an emergency trip system of a turbine power plant, the latter including a channel to drain for hydraulic fluid, a normally closed valve therein, means for maintaining under fluid pressure the valve closed under normal operating conditions of the turbine and means for releasing such pressure to open the valve upon the occurrence of a contingency indicative of an unsafe turbine operating condition, the testing apparatus comprising:

a source of hydraulic fluid maintained at a pressure distinct from the pressure in the channel,

means defining a flow path from said source to said channel for conveying fluid under pressure from said source to a point of intersection with said channel,

means at said point of intersection controllably operable to obstruct the channel for providing isolation of an upstream portion thereof from a downstream portion thereof while establishing a flow of fluid from said flow path into said downstream portion,

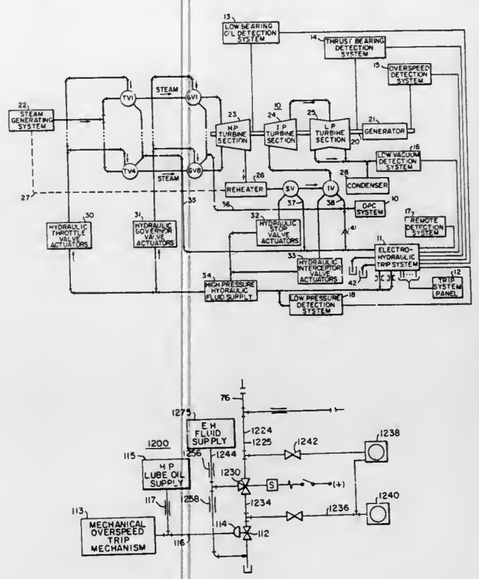
means interconnecting said upstream and downstream portions for maintaining fluid communication therebetween,

first means associated with said interconnecting means of sensing a predefined differential pressure between said upstream and downstream portions of the channel,

second means associated with said interconnecting means in said downstream portion for sensing a reduction in pressure below a predetermined value, and



means for monitoring the test from initiation to completion thereof having a first element associated with said first sensing means for providing verification of the isolation of the downstream portion of the channel from the upstream portion thereof and a second element associated with said second sensing means for providing verification of opening of the downstream portion to drain upon release of the pressure maintaining the valve in its normally closed position.



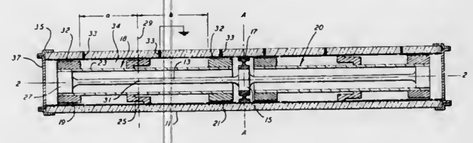

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**4,019,391**

## VIBRATORY GYROSCOPE

Bo Hans Gunnar Ljung, Wayne, N.J., assignor to The Singer Company, Little Falls, N.J.

Filed July 25, 1975, Ser. No. 599,126
Int. Cl.² G01C 19/56
U.S. Cl. 73—505 36 Claims



1. A vibrating gyroscope comprising:

a. an elogated hollow casing having a longitudinal axis, said casing having an inside perimeter;

b. first and second vibrating assemblies each comprising:

1. a support tube having an outside perimeter less than the inside perimeter of said casing;

2. a first inertial weight on one end of said tube; and

3. a second inertial weight on the other end of said tube;

c. first and second flexures disposed between the outside perimeter of the support tubes of said first and second vibrating assemblies respectively and the inside perimeter of said casing supporting said first and second vibrating assemblies symmetrically along said longitudinal axis within said casing such that said one end of said first assembly lies next to said one end of said second assembly; and

d. an elongated flexible rod lying on said longitudinal axis coupling said first and second vibrating assemblies to each other.

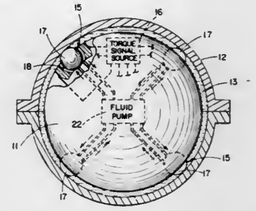
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**4,019,392**

## TORQUING SYSTEM FOR STABILIZING INERTIAL PLATFORMS

Napoleon Leon Zamfirescu, Torrance, Calif., assignor to Northrop Corporation, Los Angeles, Calif.

Filed Oct. 14, 1975, Ser. No. 621,965
Int. Cl.² G01C 19/28
U.S. Cl. 74—5 R 5 Claims




1. A torquing system for inertially stabilizing a spherical platform in a housing comprising a plurality of torquer units having spherical rotors spaced around the periphery of said platform for mechanically imparting stabilizing torques to said platform, each of said torquer units comprising:

a ball shaped rotor substantially smaller than said platform mechanically coupling the platform and housing and mounted therebetween,

first and second pairs of stators positioned adjacent to said rotor in mutually orthogonal relationship, and

means for providing a torquing signal to said stators in accordance with a platform stabilizing signal to effect magnetic torquing of said rotors, thereby causing said rotors to mechanically torque the platform in response to the stabilizing signals, there being an effective step down gear ratio provided between the rotation of said rotors and the rotation of the platform resulting therefrom.

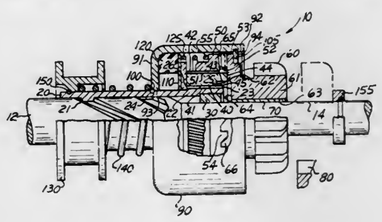
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**4,019,393**

## ENGINE STARTER GEARING

Harold Richard Mortensen, Horseheads, N.Y., assignor to Facet Enterprises, Inc., Tulsa, Okla.

Filed Jan. 12, 1976, Ser. No. 648,441
Int. Cl.² F02N 15/06
U.S. Cl. 74—6 18 Claims



1. Starter gearing comprising:

a shaft;

a driven clutch sleeve member mounted coaxially with said shaft, said driven clutch member having radially extending gear teeth on one end portion and axially extending dentil clutch teeth on the opposite end portion;

a driving clutch sleeve member mounted adjacent said driven clutch sleeve member, said driving clutch member havine one end portion and an opposite end portion, said one end portion having axially extending clutch teeth, said clutch teeth being inclined torque transmitting dentil tceth mutually engageable with said dentil clutch teeth of the driven clutch sleeve member for transmitting torque between said driven and driving clutch sleeve members;

a third sleeve member coaxially disposed with said driving

clutch sleeve member, said third sleeve member having one end portion and an opposite end portion, said third sleeve member further comprising:

means for permitting axial movement of said third sleeve member with respect to said shaft;

means for limiting axial movement of said third sleeve member with respect to said shaft; and

means for permitting axial and rotatable movement of said driving clutch sleeve member with respect to said third sleeve member;

means for maintaining into engagement the clutch teeth of said driving and driven clutch sleeve members for transmitting torque therebetween; and

means for axially and rotatably translating said third sleeve member, driving clutch sleeve member and driven clutch sleeve member along said shaft.

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**4,019,394**

## DRIVE DEVICE FOR CLAMP HOLDER CARRIAGES OF A CONTINUOUSLY OPERATING PILGER MILL

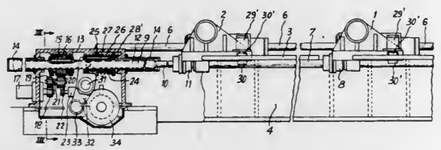
**Pierre Peytavin, Neuilly-sur-Seine, France, assignor to Vallourec, Paris, France**

**Filed May 20, 1974, Ser. No. 471,833**

**Claims priority, application France, May 24, 1973, 73.18908**

**Int. Cl.² F16H** *21/02*

**U.S. Cl. 74—27** **7 Claims**



1. Drive device for clamp holder carriages of a pilger rolling mill, said device comprising

slides parallel to the rolling axis of the mill and on which said carriages are slidably mounted,

a pair of rotatable screw members mounted for axial movement parallel to said slides, with each screw member having a threaded portion.

means for attaching each of said carriages to one of said screw members of axial movement therewith,

drive means including clutch means for selectively rotating each of said screw members either clockwise or counterclockwise,

an internally threaded nut mounted on each screw member with its threads engaging the threaded portion of said screw members, and means restraining said nuts against rotation on said screw members,

means for periodically urging said nuts in one direction axially of said screw members,

whereby rotation of either one of said screw members in one angular direction while the nut mounted on said screw member is being urged in said one axial direction will advance the carriage attached to said one screw member in said one axial direction and whereby rotation of either one of said screw members in the opposite angular direction will move the carriage attached to said screw member in the opposite axial direction.

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**4,019,395**

## PISTON DRIVE ASSEMBLY

**William D. Vork, Edina, and William Clements, Deephaven, both of Minn., assignors to Graco Inc., Minneapolis, Minn.**

**Filed July 7, 1975, Ser. No. 593,449**

**Int. Cl.² F16H** *21/18*

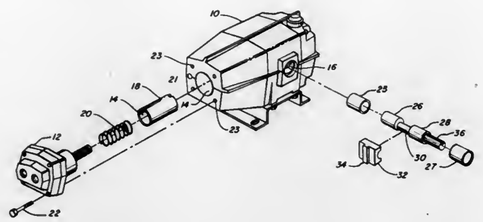
**U.S. Cl. 74—49** **13 Claims**

1. Apparatus for providing a reciprocating drive motion for a rotating shaft mounted in a housing, comprising:

a. a portion of said shaft having an axially offset segment of predetermined diameter;

b. a cylinder passage in said housing in perpendicular alignment with said axially offset segment;

c. a bearing block having a bearing surface mating and partially encompassing said axially offset segment, and



having an outer bearing surface with a guide member aligned transverse said shaft axial direction;

d. a piston in said cylinder passage having a bearing surface contacting said bearing block outer bearing surface; and

e. a compression spring contacting said piston and said housing and urging said piston toward said bearing block outer bearing surface.

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**4,019,396**

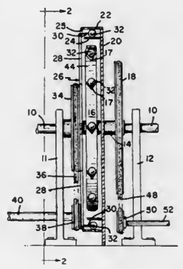
## POWERED WHEEL SYSTEM

**Alphonse A. Frechette, 8 Cypress St., Salem, Mass. 01970**

**Continuation-in-part of Ser. No. 593,723, July 7, 1975, abandoned. This application Mar. 23, 1976, Ser. No. 669,633**

**Int. Cl.² F16H** *21/12*

**U.S. Cl. 74—63** **15 Claims**



1. A powered wheel system comprising a rotatable substantially vertically mounted wheel, a plurality of weight holders spaced around said wheel proximate the periphery thereof; a plurality of weights for said system; means for loading said weights on said holders on the downward side of said wheel at least proximate the top portion thereof to rotate said wheel in a desired direction; means for unloading said weights from said holders at least proximate the bottom portion of said wheel and lifting means for transporting in the same direction the so-unloaded weights back to the top portion of said wheel for reloading onto said holders such that said wheel is driven by the so-applied weights.

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**4,019,397**

## BELT DRIVE MECHANISM

**John Bochan, Louisville, Ky., assignor to General Electric Company, Louisville, Ky.**

**Filed Oct. 6, 1975, Ser. No. 619,692**

**Int. Cl.² F16H** *7/00, 7/12, 7/10*

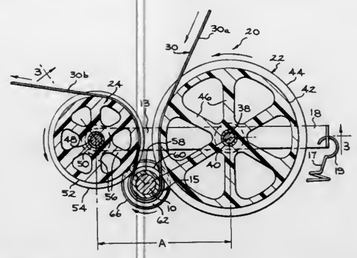
**U.S. Cl. 74—227** **12 Claims**

1. In a belt drive mechanism for transmitting torque between a driving rotatable member and a driven rotatable member through a drive belt, a belt tensioner comprising:

a pulley assembly pivotable about the driving member as a



center and including two pulleys with outside diameter flanges, reduced interior diameters, and having their longitudinal axes of rotation parallel and spaced a fixed distance apart; the driving member having its longitudinal axis of rotation parallel to the rotational axes of the pul-



leys and arranged in a wedge-like relationship therebetween, the flanges of each pulley being in contact with the driving member; and

the drive belt passing over the driving member and then over the reduced diameter of both of the flanged pulleys.

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**4,019,398**

## V-BELT PULLEY WITH AUTOMATIC TENSIONING DEVICE

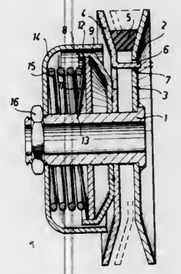
**Reinhard Wesemeier, Neuss, Germany, assignor to International Harvester Company, Chicago, Ill.**

**Filed Nov. 26, 1975, Ser. No. 635,566**

**Claims priority, application Germany, Nov. 29, 1974, 2456553**

**Int. Cl.² F16H** *9/00, 9/12, 7/08*

**U.S. Cl. 74—230.17 C** **7 Claims**



1. In a V-belt pulley having an automatic V-belt tensioning arrangement comprising a shaft, a first pulley half carried on the shaft, a compression spring resiliently urging the first pulley half axially along the shaft towards a second pulley half fixed to the shaft, key means drivingly connecting the pulley halves and a means between the spring and the first pulley half for permitting expansion of the spring and limiting the axial movement of the first pulley half to only one direction.

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**4,019,399**

## ENDLESS POWER TRANSMISSION BELT

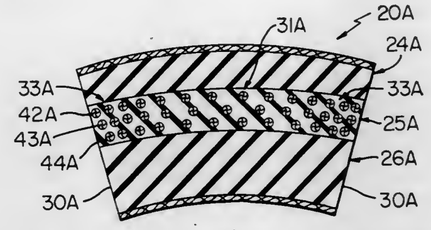
**Dale L. Waugh, Springfield, Mo., assignor to Dayco Corporation, Dayton, Ohio**

**Filed Jan. 21, 1976, Ser. No. 651,375**

**Int. Cl.² F16G** *1/28, 5/00, 1/00;* **B29H** *7/00*

**U.S. Cl. 74—231 C** **19 Claims**

1. An endless power transmission belt made primarily of elastomeric material and being adapted to be operated in an endless path with said belt comprising, a tension section, a load-carrying section including load-carrying means, and a compression section having a plurality of teeth arranged transverse said endless path, said belt having a central portion and opposed non-parallel sides, said belt including all of its sections and teeth having an arched cross-sectional configuration under no load, said arched configuration and teeth providing optimum transverse rigidity and a non-dished cross-sectional



configuration under load, said load-carrying means having a comparatively high concentration thereof adjacent said opposed sides where the load concentration is greatest under load and said load-carrying means have a comparatively low concentration thereof at said central portion.

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**4,019,400**

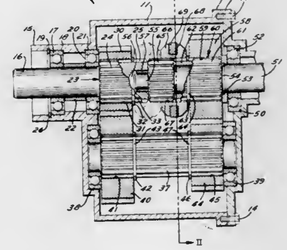
## AUXILIARY TWO-SPEED TRANSMISSION

**James M. Stump, 8642 E. Main St., Galesburg, Mich. 49053**

**Continuation of Ser. No. 533,137, Dec. 16, 1974, abandoned, which is a continuation of Ser. No. 341,958, March 16, 1973, abandoned. This application Aug. 28, 1975, Ser. No. 608,555**

**Int. Cl.² F16H** *3/08*

**U.S. Cl. 74—333** **3 Claims**



1. In a transmission comprising:

1. a housing,

2. a power input shaft and a power output shaft rotatably mounted in said housing in coaxial arrangement, each of said shafts having one end journalled in said housing, and the other ends being both axially coextensive and mutually constrained, by virtue of one said shaft end being rotatably journalled within the other said shaft end,

3. a first externally splined clutch member affixed to one of said shafts,

4. a second externally splined clutch member freely rotatably mounted over the other of said shafts,

5. a third externally splined clutch member affixed to said shaft having said second clutch member freely rotatably mounted thereon and positioned intermediate and adjacent said first two splined clutch members, said splined clutch members being characterized by a number of equally spaced grooves cut in the clutch member so as to form a series of projecting keys,

6. a coupling member having an internally splined bore having a spline configuration complementary to the spline configuration of said clutch members and being mounted on said third splined clutch member and adapted to slide axially thereon and to couple said third

splined clutch member alternatively to said first or second splined clutch member,

7. means for moving said coupling member axially,

8. a gear train comprising a pair of gears having internally splined bores mounted one on a portion of each of said first and second splined clutch members, a further portion of each of said splined clutch members extending beyond said gears and being engageable by said coupling member; an externally splined counter shaft journalled in said housing parallel to said input and output shafts; and a second pair of gears having internally splined bores mounted one on each end of said splined countershaft, each gear being engaged with one of the gears mounted on said splined clutch members, whereby when said coupling member is moved to a position wherein said second and third splined clutch members are coupled together, said power input shaft drives said power output shaft through said countershaft and associated gears at a rotative speed determined by the relationship of said gears, and whereby when said coupling member is moved to the other position coupling said first and third splined clutch members together, said power input shaft directly drives said power output shaft at the same rotative speed as that of said power input shaft;

the improvement in which the splined clutch members and the splined bores of said coupling member and said pair of gears all have the same diameter and spline configuration, so that each gear fits all of the splined clutch members, and in which the splined countershaft and the splined bores of the second pair of gears have the same diameter and spline configuration as the splined clutch members and the splined bores of the first pair of gears, whereby in dissembling the transmission, said gears can be removed off the said other ends of said input and output shafts and whereby the first and second pairs of gears are interchangeable.

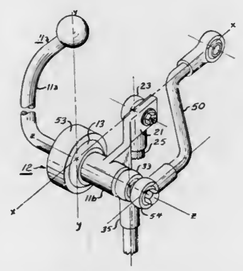
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**4,019,401**

## DUAL PIVOT AXIS CONTROL LEVER

**Gary Alan Drone, Springfield, Ill., assignor to Fiat-Allis Construction Machinery, Inc., Deerfield, Ill.**

**Filed Oct. 9, 1975, Ser. No. 620,965**
**Int. Cl.² G05G 9/02**
**U.S. Cl. 74—471 XY** **10 Claims**



1. A uni-lever control mechanism for selectively operating multiple actuators comprising

a lever having a control portion for effecting movement thereof, said control portion selectively movable in predetermined planes, and a support portion operatively connected to said multiple actuators for controlling the actuation thereof in response to movement of said control portion in said predetermined planes,

universal pivot means supported by said lever between said control portion and said support portion for effecting multi-planar movement of said control portion,

stabilizing means connected to said support portion for stabilizing the movement thereof during multi-planar movement of said control portion,

first actuator means operatively connected to said support portion for selectively effecting linear actuating movement to a first controlled function in response to movement of said control portion in a first predetermined plane,

second actuator means operatively connected to said support portion for selectively effecting linear actuating movement to a second controlled function in response to move of said control portion in a predetermined plane other than said first predetermined plane, and

said stabilizing means comprising a link pivotally connected to said support portion for pivotal movement of said support portion relative thereto when said control portion is moved in said first predetermined plane to actuate the first controlled function, and pivotally secured at a position spaced from said pivotal connection to said support portion to stabilize arcuate movement of said support portion during movement of said control portion in a plane other than said first predetermined plane to actuate the second controlled function.

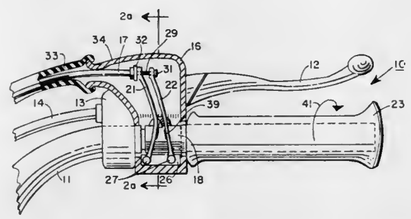
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**4,019,402**

## MOTORCYCLE THROTTLE TWIST-GRIP CONTROL

**William Henry Leonheart, San Carlos, Calif., assignor to William Henry Leonheart, San Carlos, Calif.**

**Filed Oct. 3, 1974, Ser. No. 511,946**
**Int. Cl.² G05G 11/00; F16C 1/12**
**U.S. Cl. 74—489** **8 Claims**



1. In a remote control actuator serving to translate rotational angular movement to linear movement, the combination comprising a base member, at least one lever arm pivotally mounted with respect to said base member, a rotatable member arranged for rotational movement about an axis of about 90° with respect to said base member, cam means movable with said rotatable member and having a rise in cam profile at least equal to the desired length of linear movement, said cam means being arranged to urge said lever arm to pivot with respect to said base as said rotatable member is moved, control actuator cable means including an inner cable member slidably movable with respect to a co-axially arranged outer cable member, one of said cable members being anchored upon and movable with said lever arm, and means independent of said one lever arm,

operative to oppose the movement of the other one of said cable members when said first mentioned cable member is moved by said lever arm permitting relative movement between said cable members as said first cable member is shifted in response to movement of said lever arm by said cam means.

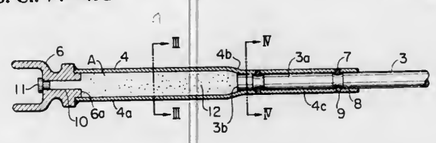


**4,019,403**

## SHOCK ABSORBING TYPE STEERING DEVICE

**Takeo Kondo, Toyota; Yoichi Hyodo. Takahama; Hiroyuki Ono, Anjo, and Shiro Yuasa, Toyota, all of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota and Aisin Seiki Kabushiki Kaisha, Kariya, both of, Japan**

**Filed Jan. 2, 1976, Ser. No. 646,071**
**Claims priority, application Japan, Jan. 14, 1975, 50-6688[U]**
**Int. Cl.² B62D 1/18**
**U.S. Cl. 74—492** **11 Claims**



1. A shock absorbing type steering device for transmitting torque from a steering wheel to a steering gear in a motor vehicle, comprising:

a. a solid, axially straight shaft, an end portion thereof having a non-circular cross-section;

b. a hollow shaft, a first portion of said hollow shaft having a cross-sectional shape substantially conforming to the cross-sectional shape of the non-circular portion of said solid shaft for mating said shafts and forming a steering column and a second portion of said hollow shaft having a cross-sectional area greater than the cross-sectional area of the first portion of said hollow shaft;

c. shear pins interconnecting the non-circular portion of said solid shaft with the first portion of said hollow shaft;

d. a bracket for joining said steering column to said steering gear;

e. a rupturable, resilient, shock absorbing material contained within said second portion of said hollow shaft; and

f. a passageway between the interior of the second portion of said hollow shaft and the atmosphere for ejection of said material.

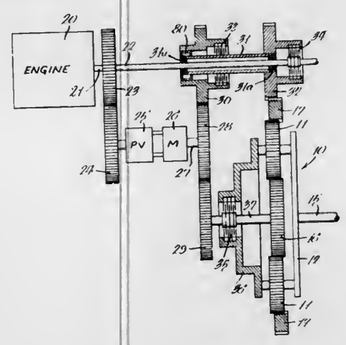
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**4,019,404**

## POWER TRANSMISSION

**George A. Schauer, Ames, Iowa, assignor to Sundstrand Corporation, Rockford, Ill.**

**Filed Mar. 21, 1975, Ser. No. 560,998**
**Int. Cl.² F16H 47/04**
**U.S. Cl. 74—687** **21 Claims**




1. A continuously variable power transmission utilizing a differential unit having a ring gear, a sun gear, and a carrier connected to the output of the transmission, a power input shaft, a variable speed hydrostatic transmission driven by said power input shaft and rotatively fixed to one of said gears, and means for controlling the drive relation between said differential gears including means for selective connection of the hydrostatic transmission to the other of said differential unit gears to provide a low-speed range hydrostatic drive, means for selectively connecting the power input shaft to the other of said differential unit gears for an intermediate speed range hydromechanical drive, and means for selectively locking up the differential for a high-speed range hydrostatic drive.

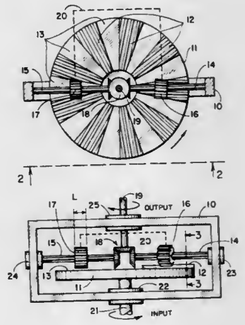
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**4,019,405**

## VARIABLE SPEED POSITIVE GEAR TRANSMISSION

**Carl E. Winter, deceased, late of Los Angeles, Calif., and by Julia Winter Cohen, legal representative, 2444 Madison Road, Apt. 1210, Cincinnati, Ohio 45208**

**Filed Jan. 16, 1975, Ser. No. 541,385**
**Int. Cl.² F16H 37/05**
**U.S. Cl. 74—691** **4 Claims**




1. An infinitely variable speed positive gear to gear contact transmission including:

a. a frame;

b. an input shaft bearingly supported in said frame;

c. an output shaft bearingly supported in said frame;

d. a flat circular disc mounted on one of said input and said output shafts and having on its face an odd number of pie shaped toothed segments upon each of which parallel teeth are defined running from the periphery towards the center of the disc in parallel relationship to a diameter of the disc bisecting the pie shaped toothed seegment, said pie shaped toothed segments being equally circumferentially spaced about the disc face to define an odd number of pie shaped blank segments therebetween such that there is always a blank segment directly diametrically opposite a toothed segment;

e. first and second coaxially alligned shafts individually bearingly supported by said frame in a position over said face of said disc in alignment with a diameter of the disc when viewed in plan;

f. first and second pinion gears mounted on said first and second coaxially aligned shafts respectively and keyed to the shafts for slidable movement along the shafts, said pinion gears being equally radially spaced outwardly from the center of the disc, one pinion gear being in threaded meshing engagement with a toothed segment whenever the other is out of engagement with any toothed segment as a result of the presence of a blank segment thereunder, by virtue of which there is continuous meshing engagement between selective ones of said pinion gears and said flat circular disc;

g. means to adjust the radial distance of said pinion gears from the center of the disc to thereby adjust the ratio of the speed between the input and output shafts;

h. and central gear means mounted on the other of said input and said output shafts and intercoupling the inner opposed ends of the said first and second coaxially

aligned shafts which are rotatable in opposite directions about their common axis so that when said first and second pinion gears alternatively rotate in opposite directions said central gear means rotates continuously in one direction, said central gear means being disposed over the center of the face of said disc when viewed in plan;

by virtue of all of which rotation of said input shaft effects rotation of said output shaft regardless of whether said pinion gears drive said disc or said disc drives said pinion gears.

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**4,019,406**

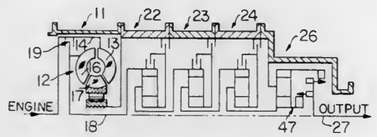
## MODULAR POWER TRANSMISSION WITH SELF-ENERGIZING CLUTCH

**Charles H. Herr, Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.**

**Division of Ser. No. 459,109, April 8, 1974, Pat. No. 3,916,729. This application Aug. 20, 1975, Ser. No. 606,151**

**Int. Cl.² F16H** *57/10, 3/44*

**U.S. Cl. 74—766** **5 Claims**




1. A power transmission including a plurality of similar, sequentially arranged modules each providing both direct and reduction drive ratios, each of the modules comprising

a fixed housing forming a modular portion of the housing for the complete power transmission,

an input shaft,

an output shaft, the output shaft of each module within the sequence being coupled with the input shaft of the next succeeding module,

a planetary gear set having a sun gear, a ring gear and a plurality of planetary gears mounted upon a rotatable carrier and engaged with the ring gear and the sun gear, the input shaft being coupled for rotation with the ring gear and the output shaft being coupled for rotation with the carrier,

a reduction brake for selectively locking the sun gear against rotation,

a direct drive clutch selectively engageable for causing rotation of the ring gear together with the sun gear,

a source of signal fluid under pressure,

means for operating both the direct drive clutch and reduction clutch in response to a single fluid pressure signal,

and further comprising

means securing the fixed housing of the modules together to form an enclosure for the complete power transmission and to assure proper engagement between the output shaft and input shaft for adjacent power transmission modules,

a common center shaft extending through the plurality of similar sequentially arranged modules and supporting the planetary gear set of each sequential module, and

each of the modular housing portions being penetrated by a passage formed in the lower portion of the housing, the passages of the assembled modular housing providing a common sump for the complete transmission.

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**4,019,407**

## SAW CHAIN GRINDER FIXTURE

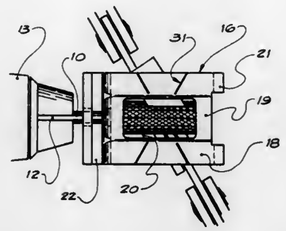
**Robert J. Penberthy, Gladstone, Oreg., assignor to Omark Industries, Inc., Portland, Oreg.**

**Filed Oct. 29, 1975, Ser. No. 626,839**

**Int. Cl.² B23D** *63/16;* **B24B** *23/02*

**U.S. Cl. 76—37** **7 Claims**

1. A saw chain grinder fixture comprising; a rod, one end of the rod adapted to be fixed to the chuck of a power tool for rotatively driving the rod, a grinding portion on the rod adapted when rotatively driven to grind the cutting edge of a cutting link of a saw chain; a guide fixture including a reference portion nd a depending guide portion having a guide opening, said reference portion having a central opening and guide surfaces on each side of the opening adapted to rest




respectively on the top plate and depth gauge of the cutting link, and said rod inserted into said guide opening of said depending guide portion to position the rod axially along the guide fixture, and means fixing the axial position of the rod relative to the guide fixture to position the grinding portion of the rod in the opening of the guide fixture and relative to the guide surfaces for proper sharpening of the cutting edge as the rod is rotatively driven.

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**4,019,408**

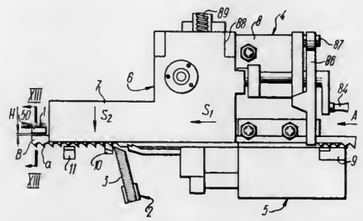
## METHOD OF GRINDING BAND SAW TEETH

**Vladimir Viktorovich Idel, ulitsa Gertsena, 3, kv. 37, Zavolzhie Gorkovskoi oblasti, U.S.S.R.**

**Division of Ser. No. 531,722, Dec. 11, 1974, Pat. No. 3,918,130. This application Jan. 27, 1976, Ser. No. 652,890**

**Int. Cl.² B23D** *63/12;* **B24B** *1/00*

**U.S. Cl. 76—112** **1 Claim**




1. A method of grinding band saw teeth, comprising the following steps: effecting a reciprocating feed of the saw to an abrasive wheel for the purpose of grinding the front and back edges of adjacent teeth; effecting a pitch feed of the saw to said abrasive wheel upon completion of the grinding of said front and back edges of adjacent teeth; positioning the saw so that during a part of the pitch feed the portion of the tooth back edge adjacent to the tooth tip comes into contact with one shaped surface of a supporting element, whereby the saw is retarded and at the same time said portion of the tooth edge is strengthened and planished, and during the remaining part of the pitch feed making the portion of the tooth front edge adjacent to the tooth tip contact the other shaped surface of said supporting element, whereby said portion of the tooth front edge is strengthed and planished.



**4,019,409**

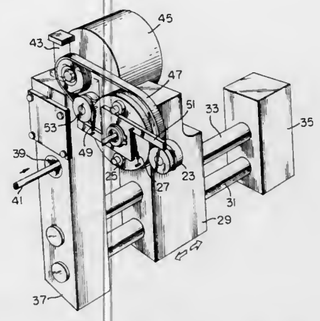
## STRIPPING AND DEFILLERING METHOD AND APPARATUS

**Carl William McKeever, Kendallville, Ind., assignor to Lyall Electric, Inc., Albion, Ind.**

**Filed Aug. 4, 1975, Ser. No. 601,473**

**Int. Cl.² H02G** *1/12*

**U.S. Cl. 81—9.51** **10 Claims**




1. Apparatus for performing an operation on electrical cable comprising:

a head selectively rotatable about an axis;

at least one pivotable element pivotably supported on the head at a first location spaced from the axis;

at least another pivotable element pivotably supported on the head at a second location spaced from the axis and spaced axially from the first location;

means for urging each pivotable element away from the axis; and

the center of mass of each pivotable element disposed relative to the respective pivot support location so that rotation of the head about the axis urges a portion of each pivotable element toward the axis and into working engagement with a cable, the portion of the one pivotable element for engaging the cable comprising a cutter for substantially severing cable insulation and the portion of the another pivotable element for engaging the cable comprising means for twisting the conductor strands near one end of the cable.

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**4,019,410**

## ROTARY SUPPORT FOR USE IN A MACHINE TOOL

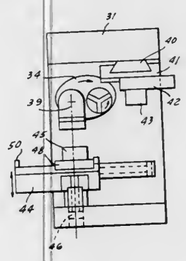
**Rudolf Staszkiewicz, Kapellenstrasse 57, 62 Wiesbaden, Germany**

**Filed Mar. 7, 1975, Ser. No. 557,608**

**Claims priority, application Germany, Mar. 8, 1974, 2411059**

**Int. Cl.² B23B** *13/02, 13/04*

**U.S. Cl. 82—2.5** **12 Claims**




1. In a machine tool, a combination comprising a frame; a support mounted on said frame for rotation about a support axis; a plurality of carriers mounted on said support so as to share the rotation thereof about said support axis, each of said carriers having a carrier axis and a supporting surface substantially normal to said carrier axis; means for indexing said support about said support axis between a plurality of positions in each of which one of said carrier axis is substantially normal to a horizontal plane and the respective supporting surface faces downwardly and another carrier axis is substantially parallel to said plane; and conveyor means for supplying workpieces to a respective carrier the carrier axis of which extends normal to said plane, and for withdrawing finished workpieces therefrom, including a lifting table, and means for lifting said table toward said respective supporting surface so as to bring a workpiece supported on said table into contact with said respective supporting surface.

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**4,019,411**

## BAR FEED CONTROL ARRANGEMENT FOR BAR LOADING MAGAZINES

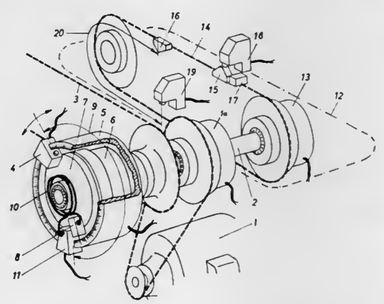
**Burkhard W. Bohn; Alfred Evers, and Karl-Heinz Friederichs, all of Kiel, Germany, assignors to Hagenuk Vormals Neufeldt & Kunke GmbH, Kiel, Germany**

**Filed Aug. 13, 1975, Ser. No. 607,112**

**Claims priority, application Germany, Aug. 14, 1974, 2438934**

**Int. Cl.² B23B** *15/00*

**U.S. Cl. 82—2.7** **8 Claims**




1. In a bar loading magazine for the automatic feeding of bars to a bar machine, the bar loading magazine being of the type comprised of bar-engaging means, a feed chain for driving the bar-engaging means, and a start switch arrangement for sensing the arrival of the leading end of a bar, the bar loading magazine including in combination therewith a feed control arrangement for establishing the feed distance required for properly positioning the leading end of the bar in the bar machine, the feed control arrangement including first and second distance-measuring means operative successively and independently of each other for controlling respective first and second components of the movement of the feed chain, the first component of the movement being a cyclical incremental movement, the second component of the movement occurring after a plurality of the cyclical incremental first components of the movement, said first distance-measuring means including fixed stop means operative for limiting the first component of the movement of the feed chain.

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**4,019,412**

## TORQUE RELEASE WRENCH

**Robert A. Kraus, and Edmund J. Kraus, both of 14160 Redhill Ave. No. 39, Tustin, Calif. 92680**

**Filed Sept. 12, 1975, Ser. No. 612,845**

**Int. Cl.² B25D** *23/142*

**U.S. Cl. 81—52.4 R** **12 Claims**

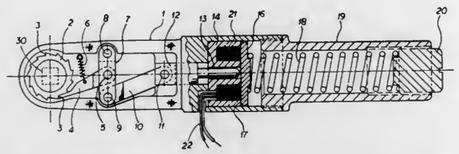
1. A wrenching structure, comprising along its general centerline, a compressive spring, a magnet plate, an annular

magnet having pole faces, as well as a center aperture and a plunger extending through that annular magnet's center aperture,

wherein that annular magnet's attractive forces together with that spring's predetermined compressive force presses that magnet plate against that annular magnet's pole faces toward that plunger,

and wherein a variable force of lesser magnitude is exerted by that plunger against that magnet plate in opposing direction toward that spring,

whereby as that variable force of lesser magnitude increases



to a point where that variable force acting toward that spring, exceeds the combined force of that spring together with that magnetical pole faces attracting forces toward that plunger, that magnet plate will separate from that magnetical pole faces in the direction toward that spring,

wherein the portion of force representing the magnetical attraction, is substracted from the combined forces of that compressive spring together with that magnetical attractive force, acting in direction toward that plunger, at the moment when that magnet plate separates from that annular magnet's pole faces in direction toward that spring.

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**4,019,413**

## PACKING MACHINES

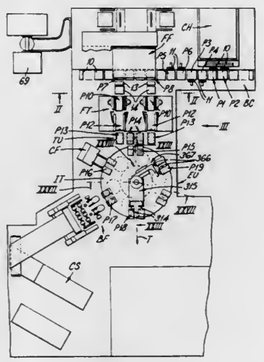
**Robert William Davies, and Leonard Richard Wager, both of Deptford, England, assignors to Molins Limited, London, England**

**Filed Nov. 11, 1974, Ser. No. 522,798**

**Claims priority, application United Kingdom, Nov. 15, 1973, 53158/73**

**Int. Cl.² B26D 7/06; B65H 3/40**

**U.S. Cl. 83—88** **5 Claims**



1. Apparatus for forming overlapped wrappers for wrapping articles, such as groups of cigarettes, comprising means for cutting a web of wrapping material to form a succession of wrappers, each wrapper consisting of a large piece of web material and a small piece of web material, a larger carrier and a smaller carrier having substantially flat suction surfaces to receive said large and small pieces respectively, feed means to feed wrappers one at a time from said cutting means to said carriers, and conveyor means to convey wrappers received from said carriers towards the articles to be wrapped, said carriers being movable towards each other and being together movable between said feed means and said conveyor means, said suction surfaces of said carriers being arranged to hold said large and small pieces with their adjacent edge portions in different planes so that during movement of the carriers towards each other said pieces are brought into overlapping relationship.

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**4,019,414**

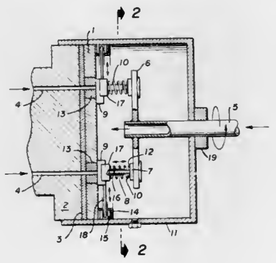
## STRAND GRANULATION MACHINE

**Dorsey O. Thomas, Jr., Chesterfield, and Alvah B. Terry, St. Louis, both of Mo., assignors to Monsanto Company, Decatur, Ala.**

**Filed Jan. 12, 1976, Ser. No. 648,606**

**Int. Cl.² D01G 1/04; B26D 5/08**

**U.S. Cl. 83—356.3** **1 Claim**



1. Apparatus for granulating a strand, comprising

a. an extrusion die having a plurality of extrusion channels arranged in a ring,

b. a wear plate secured to the die and having mounted therein a plurality of shear bushings having openings for passage of the strands formed by the extrusion channels,

c. a plate spaced from the wear plate and mounted for rotation about an axis concentric with the ring of extrusion channels,

d. a plurality of spring-loaded cutter yokes mounted on the plate,

e. a plurality of cutters mounted on the cutter yokes for sliding movement in directions radial to said axis,

f. a cam track mounted off center with respect to said axis,

g. a plurality of cam rollers positioned to roll along said cam track, and

h. a plurality of cam arms each connecting one of the cam rollers to one of the cutters in such a manner that each cutter reciprocates radially as the plate is rotated.

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**4,019,415**

## KEY CUTTING MACHINE

**Horst W. Wich, 816 Brent St., South Pasadena, Calif. 91030**

**Continuation of Ser. No. 458,708, April 8, 1974, abandoned. This application Sept. 22, 1975, Ser. No. 615,396**

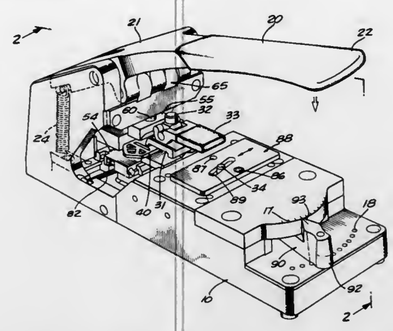
**Int. Cl.² B26F 1/12**

**U.S. Cl. 83—413** **12 Claims**

11. In a key cutting machine, a movable carriage having punch and die means associated therewith, a springloaded punch actuating handle, a fine carriage positioning means



responsive to the operation of said handle before the punch is actuated, and a coarse carriage positioning means responsive



to the release of said handle for advancing the carriage to its next cutting location.

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**4,019,416**

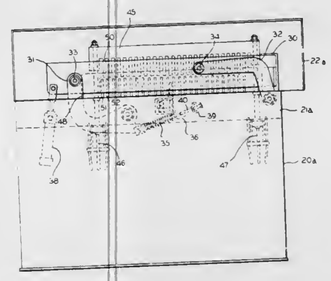
## HYDRAULIC PAPER CUTTER

**Edward W. Krauss, Skokie, Ill., assignor to IPEC, Inc., Chicago, Ill.**

**Filed Apr. 28, 1975, Ser. No. 572,262**

**Int. Cl.² B26D 5/04, 7/02**

**U.S. Cl. 83—437** **11 Claims**



1. A low profile hydraulic paper cutter comprising a supporting table having a hold-down clamp means, a back gauge, a paper knife, and a protective housing around the knife above the top of said table and means for controlling said hold down clamp means, back gauge and knife positioned below the top of said table, means for pivotally mounting said paper knife adjacent its opposite ends on a pair of arcuate arms pivotally attached to said supporting table below the table top, means also located below the table top for selectively operating said paper knife blade to swing it on said arcuate arms with a slicing action, said operating means extending from below the supporting table to the knife blade, whereby the blade operating apparatus is positioned beneath and not above the table, means under said table top for enabling quick sets of the back gauge to position said paper under the knife blade, and means for operating said quick set means from a point above the table top.

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**4,019,417**

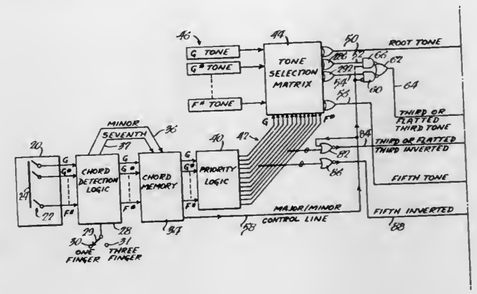
## ELECTRICAL MUSICAL INSTRUMENT WITH CHORD GENERATION

**Alden J. Carlson, Edmonds, Wash., assignor to Warwick Electronics Inc., Chicago, Ill.**

**Filed June 24, 1974, Ser. No. 482,064**

**Int. Cl.² G10H 1/00**

**U.S. Cl. 84—1.01** **8 Claims**




1. An electrical musical instrument having a plurality of tone generators for respectively generating a plurality of tone signals, in which the improvement comprises the combination of:

chord selection means for developing chord signals each representative of a chord composed of a different plurality of selected tone signals, said chord selection means having a separate output line for each one of said chord signals,

priority logic means connected to said output lines and responsive to selection of more than one chord for disabling all but one of the chord output lines from developing a chord signal; and

a tone selection matrix responsive to said chord signals for passing the plurality of tone signals from the tone generators respectively associated with said chord signals, the tone selection matrix including a plurality of gates, each of said gates coupled to only one of said tone generators and responsive to only one of said chord signals to pass the tone signal from the generator connected thereto and each of said chord signals causing all of those gates connected with tone generators which generate tone signals of the chord represented thereby to pass said tone signals.

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**4,019,418**

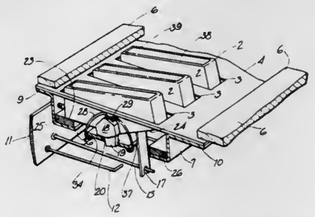
## ORGAN STOP TABLET MECHANISM

**Thomas E. Kimble, Covington, Ky., and Marion B. Gregory, Cincinnati, Ohio, assignors to D. H. Baldwin Company, Cincinnati, Ohio**

**Filed Apr. 1, 1976, Ser. No. 672,598**

**Int. Cl.² G10B 3/10; G10C 3/12**

**U.S. Cl. 84—343** **18 Claims**



1. A stop tablet mechanism comprising a supporting frame, an elongated stop tablet seated on said frame, means mounting said stop tablet for pivotal movement to and from alternate positions of use, a pair of narrow shoulders projecting outwardly from the opposite sides of said tablet intermediate its

opposite ends, the upper edges of said shoulders defining nose-shaped cam surfaces, detent springs having their opposite ends engaging said frame on opposite sides of said shoulders with their central portions engaging said nose-shaped cam surfaces, said springs having centrally disposed inwardly directed detent points adapted to follow the nose-shaped cam surfaces as the stop tablet is moved from one position of use to the other.

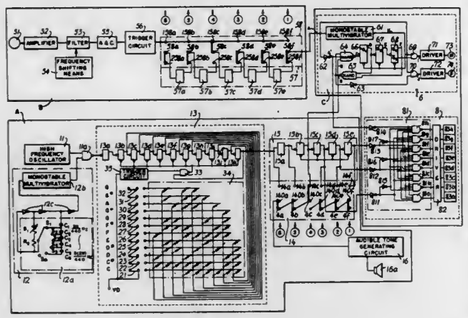
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**4,019,419**

## TUNING DEVICE

**Haruzo Yoshikawa; Keiji Shimano, and Noritoshi Oishi, all of Oyama, Japan, assignors to Kabushiki Kaisha Daini Seikosha, Japan**

**Filed May 27, 1975, Ser. No. 580,789**
**Claims priority, application Japan, May 24, 1974, 49-58618**
**Int. Cl.² G10G 7/02**
**U.S. Cl. 84—454** **14 Claims**



1. A tuning device for tuning musical instruments or voices comprising:

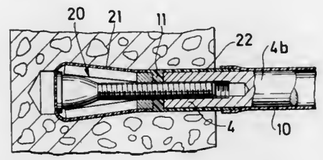
a standard pitch generating circuit including a high frequency oscillator for generating high frequency pulses at a predetermined frequency, means for generating mixing pulses having a pulse width much narrower than that of the high frequency pulses and at one of a plurality of preselected frequencies, means connected to receive both the high frequency pulses and the mixing pulses for mixing them together to accordingly shift the pitch of the high frequency pulses to thereby obtain pitch-shifted pulses, a synthesizer connected to receive the pitch-shifted pulses and operative to synthesize therefrom synthesized pulses of a desired standard pitch in a higher octave, and an octave divider circuit connected to receive the synthesized pulses to divide the same into divided pulses of the standard pitch in a lower octave; a tone-electric transducing circuit including means for detecting a tone which is to be tuned and transducing the tone into a corresponding electric signal, and a trigger circuit connected to receive the electric signal to shape the same and produce a shaped tone signal; and indicating means receptive of both the divided pulses from said octave divider circuit and the shaped tone signal from said trigger circuit for providing a visual indication of the pitch difference between the two.

**4,019,420**

## ANCHORING DEVICE FOR USE IN MASONRY AND LIKE STRUCTURES AND HAVING PROTECTION AGAINST DELETERIOUS INFLUENCES

**Artur Fischer, Altheimer Strasse 219, D-7241 Tumlingen, Germany**

**Continuation-in-part of Ser. No. 476,289, June 4, 1974, abandoned. This application Oct. 30, 1974, Ser. No. 519,102**
**Claims priority, application Germany, Nov. 2, 1973, 2354825; June 9, 1973, 2329667**
**Int. Cl.² F16B 13/06**
**U.S. Cl. 85—74** **6 Claims**




1. An anchoring device for use in masonry and like structures, comprising a first element adapted to be received and anchored in a hole of a structure, said first element including an expander member having a threaded shaft portion and operative for expanding at least a leading end of said first element; a second element having a first turnably-actuated portion located in said hole and being formed with a tapped bore which is threadedly connected with said shaft for moving said expander member in direction generally outwardly of the hole, and a second portion having a part extending outwardly from said hole and having means adapted to carry an object to be mounted on said structure; and means for preventing access of corrosion-producing media to said elements, said preventing means being of synthetic plastic material and including an axially-yieldable tubular sleeve portion sealingly surrounding said part of said second element intermediate said expander member and said object, an annular section having a pair of end faces in respective engagement with said first and second elements, said annular section frictionally engaging said shaft portion so as to prevent undesired turning of said first element during movement of said expander member, a tubular extension section sealingly surrounding another part of said second element, and a cap-shaped section sealingly surrounding said first element, all of said sections being of one-piece with each other and preventing access of corrosion-producing media to said elements.

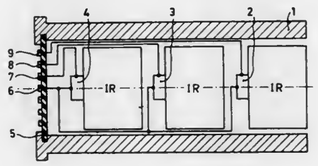
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**4,019,421**

## ARRANGEMENT FOR SELECTIVE FIRING OF SO-CALLED IR-TORCHES

**Johan Paul Ström, Jarfalla, Sweden, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Nov. 19, 1975, Ser. No. 633,282**
**Claims priority, application Sweden, Nov. 22, 1974, 7414669**
**Int. Cl.² F41F 5/02**
**U.S. Cl. 89—1.5 R** **9 Claims**




7. A magazine adapted to be interchangeably mounted in a firing ramp of an aircraft or the like comprising, a plurality of tubular frames situated within the magazine and extending parallel to the longitudinal axis of the magazine, a plurality of tubular cartridges insertable in said tubular frames with each cartridge holding a plurality of IR-torches adapted to be selectively fired in response to electric firing control signals received via a plurality of electric contact elements provided on said firing ramp, said magazine including first and second recesses adapted to mate with a respective central guiding pin and a polar guiding pin extending from the firing ramp so that the magazine will have a predetermined axial position and angular position relative to the firing ramp, each of said cartridges further comprising a plate made of an electric insulating material on which a plurality of individual electrically conductive contact rings are arranged concentrically about a central axis of the cartridge, the number of contact rings being at least one more than the number of IR-torches in said cartridge, said plate being located at the end of the cartridge which is to be directed towards the firing ramp and being arranged perpendicular to the central axis of the cartridge, said contact rings being arranged to be placed into contact with respective corresponding ones of said electric contact elements of the firing ramp when the magazine is mounted on the firing ramp.

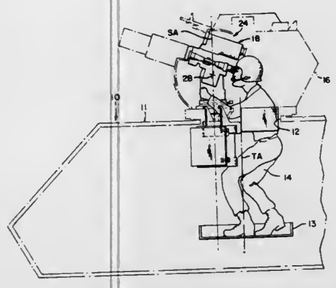


**4,019,422**

## VEHICULAR MOUNTED TOW MISSILE SYSTEM

**Roland A. Magnuson, Renton, Wash., assignor to Paccar Inc., Bellevue, Wash.**

**Filed July 19, 1976, Ser. No. 706,806**
**Int. Cl.² F41F 3/04; F41G 1/38**
**U.S. Cl. 89—1.815** **11 Claims**




1. A vehicular turret mounting system for a TOW missile system of the type having a traversing unit, said traversing unit having a means providing an elevation pivot axis, an optical sighting and tracking unit mounted for movement about said axis, handle means for manually traversely rotating said traversing unit, means for elevationally pivoting said sighting and tracking unit, and a base having viscous bearing means supporting said traversing unit and for providing a resistance to said manual traverse rotation of the traversing unit, the improvement comprising:

a vehicle having a hull, an opening in the hull, and a turret supported for rotational movement about a turret axis concentric with said hull opening, at least one missile launch tube elevationally pivotally mounted on said turret, a personnel station in said opening generally aligned with said turret axis, means mounting said traversing unit on said turret adjacent the periphery of said hull opening offset from said turret axis, said mounting means including means for holding the orientation of said base stationary with said hull for simulating a ground-supported TOW missile system, and servo means for traversing said turret in response to movements of said traversing unit on said base.

**4,019,423**

## AUTOMATIC OR SEMI-AUTOMATIC FIREARM

**James H. Johnson, 818 S. Willow Ave., Tampa, Fla. 33606**

**Division of Ser. No. 780,034, Nov. 28, 1968, abandoned. This application Oct. 19, 1970, Ser. No. 82,113**
**Int. Cl.² F41C 21/18**
**U.S. Cl. 89—178** **7 Claims**



1. A firearm comprising: A frame, a bolt reciprocally mounted along the longitudinal axis of said frame, a barrel reciprocally mounted along the longitudinal axis of said frame between a first and second position, said bolt having a cartridge receiving means for receiving and inserting a cartridge in the chamber of said barrel and a cartridge extracting means for extracting said cartridge after being fired, firing means for firing said cartridge, a bolt drive spring disposed to drive said bolt forwardly, barrel biasing means to bias said barrel toward said first position, cartridge supply means for supplying a cartridge to said bolt, said bolt arranged to receive the cartridge on its forward stroke and afterwards insert the cartridge into the chamber of said barrel, said cartridge fired when in said chamber by said firing means, said bolt being biased into operative engagement with said barrel when said cartridge is fired, said bolt and said barrel in mechanically free engagement relative to each other, a gas system means for controlling the movement of said barrel relative to said frame, said gas system means including at least one propellant gas port in said barrel adjacent to the forward end of the chamber of said barrel, said gas system means further including an expandable compression chamber, said expandable cmpression chamber disposed between a portion of said barrel and a portion of said frame, said compression chamber in communication with said propellant gas port whereby when said cartridge is fired, propellant gas enters said compression chamber to act on said barrel portion to initiate rearward movement of said barrel relative to said frame, said bolt moving rearwardly under the force of said cartridge such that the initial relative motion between said bolt and said barrel is substantially zero whereby said bolt and said barrel remains in mechanically-free contact during at least a portion of the rearward movement.

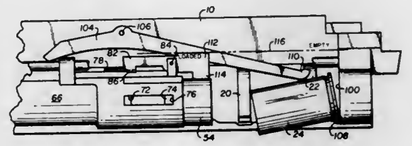
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**4,019,424**

## CARTRIDGE SOFT FEED MECHANISM WITH MAGAZINE INTERRUPTER

**George L. Reynolds, Cambridge, Ill., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Apr. 12, 1976, Ser. No. 675,852**
**Int. Cl.² F41D 11/14**
**U.S. Cl. 89—137** **8 Claims**




1. A cartridge soft feed mechamism comprising:

a feed actuator mounted for longitudinal movement along an axis parallel to that of a gun barrel,

a feed lever pivotally mounted on a gun,

a cartridge magazine mounted on said gun and having an

open rear end from which cartridges exit upon being chambered, said rear end being at least a cartridge length forward of a receiver breech block to permit passage of a cartridge therebetween,

a pair of feed lifters pivotally mounted to extend one behind the other on said gun,

said feed lever being positioned forwardly of and pivotally connected to said feed lifters to pivot said lifters, thereby moving a cartridge that is positioned between said magazine and said breech block to its chamber position rearwardly of said barrel upon longitudinal movement of said feed actuator.

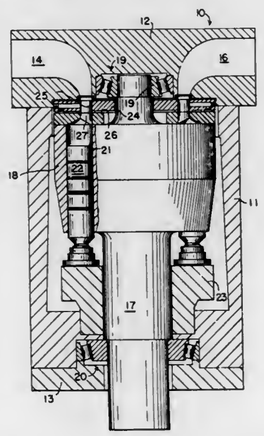
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**4,019,425**

## PISTON PUMP WITH FLOATING PORT PLATE PROVIDING VARIABLE FORCE BALANCE FOR HYDROSTATIC BALANCE

**Ralph Anthony Matzelle, Brimfield, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.**

**Filed Feb. 7, 1975, Ser. No. 547,905**
**Int. Cl.² F01B 13/04**
**U.S. Cl. 91—487** **5 Claims**



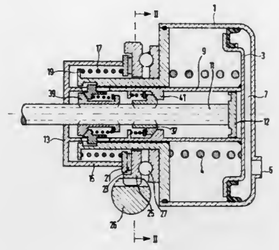
1. A port plate for a hydraulic fluid pressure energy translating device floatingly disposed between a barrel and a port cap of said device and having a plurality of ports for communicating therebetween, said port plate having hydrostatic presure balancing means for balancing hydrostatic pressures of both sides thereof within the device to obtain an optimum bearing clearance between said port plate and said barrel, said balancing means includes a plurality of fluid-containing recess means within a bearing surface of said port plate directed toward said barrel and flow control means including a fluid-flow passageway communicating between a port of said port plate and said recess means, and for regulating flow into said recess means, fluid restricting means including an orifice between said passageway and said recess means for regulating pressure within said recess means, narrow band sill means surrounding each of said ports between said port plate and said port cap and responsive to fluid pressure within said ports for acting in opposition to pressure in said recess means for balancing hydrostatic pressure acting on said port plate, said narrow band sill means being defined by a seal disposed between said port plate and said cap and having one surface in contact with said port plate and an opposing second surface defining said sill means in open communication with fluid in said port.

**4,019,426**

## HAND BRAKE FOR A BRAKE CYLINDER

**Bernd Wosegien, and Georg Stäuble, both of Munich, Germany, assignors to Knorr-Bremse GmbH, Munich, Germany**

**Filed Nov. 6, 1975, Ser. No. 629,662**
**Claims priority, application Germany, Nov. 12, 1974, 2453497**
**Int. Cl.² F01B 31/00; F16J 1/10**
**U.S. Cl. 92—113** **8 Claims**



1. In a brake cylinder, the combination of a cylinder having a piston reciprocable therein, a piston tube extending from said piston outwardly of said cylinder, an actuating rod slidably positioned within said piston tube and extending outwardly thereof for connection to a brake linkage, means including a thrust ring acting upon a portion of said piston tube for adjusting said actuating rod with respect to said piston tube, an intermediate element connected to said piston tube, a brake ring rotatably mounted around said piston tube and axially displaceable toward said intermediate element, means engaging said brake ring for manually rotating said brake ring, wedge gcar means acting upon said brake ring for displacing said brake ring axially upon rotation thereof, said axial displacement of said brake ring axially displacing said intermediate element and connected piston tube such that said tube portion acts upon said thrust ring to displace axially said actuating rod to operate brake linkage which is connected to said actuating rod.

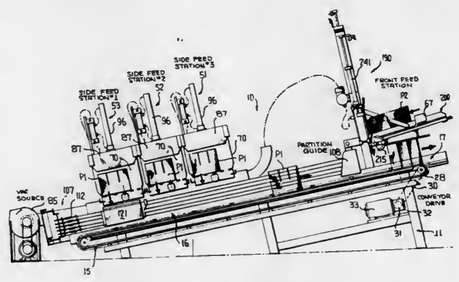
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**4,019,427**

## PARTITION ASSEMBLER

**Alfred G. Down, Wood Dale, Ill., and Robert L. Nebeling, Wayne, N.J., assignors to Continental Can Company, Inc., New York, N.Y.**

**Continuation of Ser. No. 228,559, Feb. 28, 1972, abandoned. This application Dec. 1, 1975, Ser. No. 636,568**
**Int. Cl.² B31D 3/04**
**U.S. Cl. 93—37 R** **28 Claims**



25. A method of assembling elements in generally crossed relationship comprising the steps of feeding at least two elements in succession along a first path, said elements being fed with a trailing edge of a leading element being followed by a leading edge of a trailing element and said trailing and leading elements being in a uniplanar plane, shifting the leading of the two elements transversely out of the first path, conveying the two elements in unison along a second path in transverse relationship to said first path, feeding a further element along a third path in transverse relationship to said second path, and cross assembling said two and further elements at an intersection of said second and third paths.



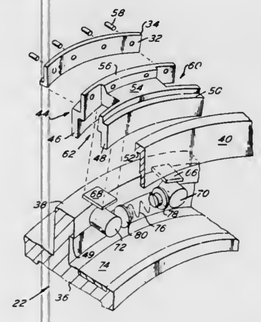
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**4,019,428**

## QUICK-SET SLOTTER KNIFE

**William Grobman, Philadelphia, Pa., assignor to Molins Machine Company, Inc., Camden, N.J.**

**Division of Ser. No. 504,934, Sept. 11, 1974, Pat. No. 3,954,050. This application Nov. 28, 1975, Ser. No. 636,286**
**Int. Cl.² B31B 1/22**
**U.S. Cl. 93—58.2 R** **5 Claims**



1. An article of manufacture for use in apparatus for processing planar box blanks comprising an annular head, a slotter knife releasably mounted on said head and projecting beyond the periphery of said head, means for releasably locking said knife to said head, whereby the position of the slotter knife on the head may be adjusted, said locking means including a knife carrier mounted in a channel on the outer periphery of said head for circumferential movement of said carrier about the axis of the head, and expansible means effective between said carrier and head for retaining said carrier in a preselected position in said channel, said expansible means being within said carrier and accessible for actuation adjacent at least one end of said carrier.

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**4,019,429**

## VENTILATOR

**Yukio Sado, Asahi, Japan, assignor to Yoshida Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Nov. 25, 1975, Ser. No. 635,174**
**Claims priority, application Japan, Nov. 28, 1974, 49-145410**
**Int. Cl.² F24F 13/18**
**U.S. Cl. 98—37** **8 Claims**

1. A ventilator for use in a building component comprising:

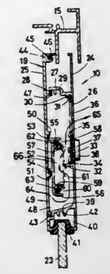
a. an inner plate having air vent means formed therein:

b. an outer plate near upper and lower margins secured to said inner plate and spaced therefrom in the transverse direction of the ventilator, and having an air-intake opening vertically displaced from said air vent means;

c. a filter-retaining means having grooves at its upper and lower edges, said filter-retaining means being disposed between and secured to one of said inner and outer plates;

d. a filter extending between said grooves across a hollow space therebetween and secured in said grooves; and

e. a partition extending from the other of said inner and outer plates toward said one plate and abutting against said filter for directing a flow of air at least twice through said filter.



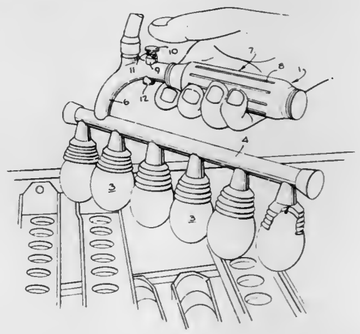
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**4,019,430**

## VACUUM EGG LIFTING AND PENETRATING MEANS

**William H. Warren, 729 S. Main St., Centerville, Mass. 02632**

**Filed July 9, 1975, Ser. No. 594,334**
**Int. Cl.² A23P 1/00**
**U.S. Cl. 99—485** **8 Claims**



1. An improved vacuum egg handling means comprising the combination of:

a vacuum support means for receiving and supporting eggs;

means for connecting said support means to a source of vacuum;

punch means positioned on said support means for punching an aperture in the shells of eggs held by said support means; and

said connecting means including means for controlling the vacuum such that said eggs as a result of said vacuum are forced into engagement with said punch means.

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**4,019,431**

## METHOD OF DEWATERING SLUDGE

**Wendel Bastgen, Betzdorf, Sieg, Germany, assignor to Alb. Klein KG, Niederfischbach, Germany**

**Filed June 7, 1974, Ser. No. 477,413**
**Claims priority, application Germany, June 13, 1973, 2330029; Mar. 17, 1973, 233368**
**Int. Cl.² B30B 9/24**
**U.S. Cl. 100—37** **8 Claims**

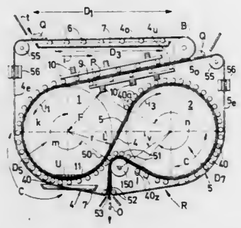
1. A method of dewatering sludge, said method comprising the steps of:

feeding successive quantities of sludge in cake form through a preliminary dewatering zone in the form of a moving filter band;

then feeding the partially dewatered cakes through a preliminary pressure zone in the form of two spaced apart relatively moving filter bands by guiding the cakes between said two bands and causing the bands to exert pressure upon the cakes while moving along and between bands;

then guiding the two filer bands with the cakes therebetween about part of the periphery of a rotary first main dewatering pressure zone and applying pressure to the outer one of said bands and thus to the cakes while being guided by and on said first main pressure zone;

then guiding the two filter bands with the cakes therebetween from said first main pressure zone to and partly



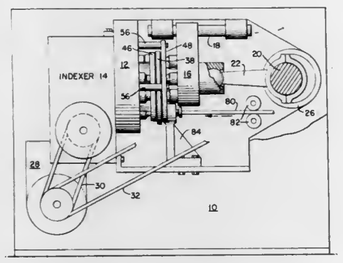
over the periphery of a rotary second main dewatering pressure zone and applying pressure to the filter bands and thus to the cakes therebetween while rotating the second main pressure zone in opposition to the first main pressure zone and so as to reverse the inner and outer portions of the filter bands relative to the main pressure zones;

subjecting the filter bands while being guided through the preliminary pressure zone and the two main pressure zones to the action of vibration generating pressure means causing vibrations of the filter bands and thus of sludge cakes therebetween; and

then discharging the cakes from the second main pressure zone.

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**4,019,432**
**RIVET MAKING MACHINE**
**Albert Dunkin, 12 Split Rock Road, South Norwalk, Conn. 06854**
**Filed Jan. 21, 1976, Ser. No. 651,149**
**Int. Cl.² B21K** *1/58*
**U.S. Cl. 10—13** **22 Claims**




1. A rivet making machine comprising:

means supporting a stationary set of working tools at laterally spaced stations;

ram means for supporting a reciprocable set of working tools at said laterally spaced stations to be in axial alignment with said stationary set of working tools and cooperable therewith to apply working force to opposite ends of a blank positioned at one or more of said stations upon axial advancing movement of said reciprocal set toward said stationary set;

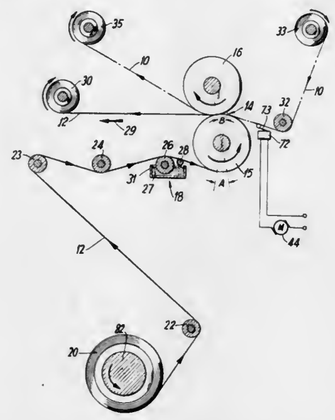
an indexing plate interposed between said sets of working tools and in an axial position fixed with respect to said stationary set;

a set of body dies carried by said indexing plate for incremental lateral movement between said stations, each body die of said set of body dies having an axial, open-ended die cavity and being independently movable in an axial direction relative to said plate, whereby each such body die and a blank located in the die cavity thereof may be advanced axially by any one of said reciprocal set of working tools into working engagement with a corresponding one of said stationary set of working tools at any one of said stations; and

means supported independently of said indexing plate to axially position said body dies relative to said indexing plate during lateral indexing movement thereof.

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**4,019,433**
**PATTERN TRANSFER MACHINE**
**Frank J. Cutri, deceased, late of Brooklyn, N.Y., and by Louise Cutri, administratrix, 9214 Ridge Blvd., Brooklyn, N.Y. 11209**
**Filed Apr. 9, 1973, Ser. No. 348,959**
**Int. Cl.² B41L** *7/08*
**U.S. Cl. 101—132.5** **11 Claims**



1. A duplicating machine for transferring a pattern from a moving master sheet to a moving copy sheet, comprising:

a pair of parallel upper and lower engaged rolls forming therebetween a nip for receiving said master copy sheets in face-to-face contact,

motor means rotatably driving at least one of said pair of engaged rolls, and

means mounting at least one of said pair of engaged rolls in yieldable pressure contact with the other roll of said pair of rolls,

whereby said engaged rolls rotate in counter-rotating directions to thereby feed said master and copy sheets therebetween in face-to-face pressure contact;

a master sheet supply roll and a master sheet rewind roll mounted parallel to and on opposite sides of said pair of engaged rolls at a point above said nip, whereby said master sheet passes from its supply roll through said nip to its rewind roll in a generally V-shaped path;

fluid wetting roll means mounted parallel and in closely spaced relation to the lower roll of said pair of engaged rolls at a point adjacent the lower portion thereof and on the same side thereof as said master sheet rewind roll;

a copy sheet supply roll mounted parallel to said pair of engaged rolls at a point below said nip and also below said fluid wetting roll means;



copy sheet idler roll means located in spaced relationship between said copy sheet supply roll and said fluid wetting roll means and positioned so as to guide said copy sheet in a generally horizontal line over said fluid wetting roll means in pressure contact therewith and thence into contact with the circumferential surface of said lower roll of said pair of engaged rolls,

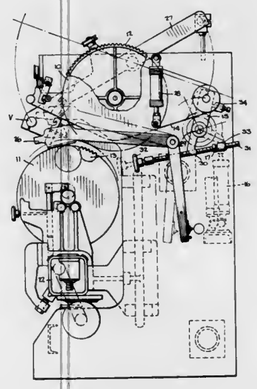
said fluid wetting roll mens engaging a first surface of said copy sheet to locate said copy sheet for subsequent engagement with said lower roll of said pair of engaged rolls and for applying fluid reactive with a pattern carried by said master sheet for moistening said first surface thereof, said copy sheet thereafter engaging said lower roll of said pair of engaged rolls on a second surface thereof which is opposite said first surface,

said copy sheet engaging said lower roll of said pair of engaged rolls at a point at least 180° upstream of said nip formed between said lower roll and said upper roll engaged therewith; and

a copy sheet rewind roll mounted parallel to and spaced from said pair of engaged rolls on the same side thereof as the master sheet rewind roll and defining therewith a return run of said copy sheet from said nip formed between said pair of engaged rolls with the printed pattern from said master sheet imprinted thereon, said return run of said copy sheet moving in a direction generally parallel to said generally horizontal line along which said copy sheet travels over said fluid wetting roll means.

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**4,019,434**
**MOUNTING-PROOFING MACHINE FOR FLEXOGRAPHIC PLATES**
**Rolf Hoexter, Engelwood, N.J., assignor to Mosstype Corporation, Waldwick, N.J.**
**Filed Apr. 1, 1976, Ser. No. 672,771**
**Int. Cl.² B41F** *5/00*
**U.S. Cl. 101—216** **8 Claims**



1. A flexographic mounting-proofing machine comprising:

A. an impression cylinder rotatable on a first shaft about a fixed horizontal axis;

B. an impression cylinder gear having the same diameter as the impression cylinder and rotatable on a second shaft and a swingable arm for supporting said second shaft about a horizontal axis which as the arm swings is displaced with respect to the fixed axis of the impression cylinder from an initial position in which the two axes are coaxial with each other to a displaced parallel position;

C. a parallel displacement coupling interlinking thre first and second shafts whereby rotation of the impression cylinder results in a corresponding rotation of the impression cylinder gear regardless of the position of the second shaft relative to the first shaft;

D. a plate cylinder rotatable on a third shaft about a horizontal axis parallel to the fixed axis;

E. a plate cylinder gear mounted for rotation on said third shaft and having the same diameter as said plate cylinder whereby rotation of the plate cylinder gear results in a corresponding rotation of the plate cylinder, said plate cylinder gear intermeshing with said impression cylinder gear whereby rotation of said impression cylinder is transmitted by said coupling to said plate cylinder and results in rotation of the plate cylinder in the reverse direction to an extent determined by the ratio of said gears;

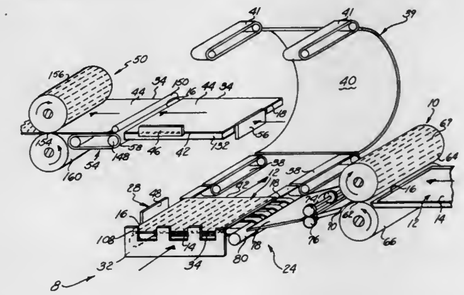
F. elevator means to raise said plate cylinder and the plate cylinder gear associated therewith from a mounting state in which said plate cylinder is separated from said impression cylinder to a proofing state in which said plate cylinder makes contact with said impression cylinder and a print point on said plate cylinder is physically coincident with a print point on said impression cylinder;

G. a retractable viewer, and means to shift the viewer to a retracted position in the proofing state and to an operative position in the mounting state in which the viewer occupies a position in which an observation site on said plate cylinder is optically coincident with an equidistant observation site on said impression cylinder, and

H. means to shift said arm to an extent causing said impression cylinder gear to ride on said plate cylinder gear and to rotate, the rotation of the impression cylinder gear and to rotate, the rotation of the impression cylinder gear being transmitted by the coupling to the impression cylinder to cause the print point on the impression cylinder to occupy the observation site thereon.

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**4,019,435**
**SHEET INVERTING**
**William A. Davis, Wickliffe, Ohio, assignor to Addressograph Multigraph Corporation, Cleveland, Ohio**
**Filed Aug. 21, 1975, Ser. No. 606,660**
**Int. Cl.² B41F** *21/00*
**U.S. Cl. 101—232** **23 Claims**



1. An apparatus for sequentially working on flexible sheets which comprises:

first work means for working on a sheet as it moves therethrough in a first path with one side facing upwardly and a first edge leading;

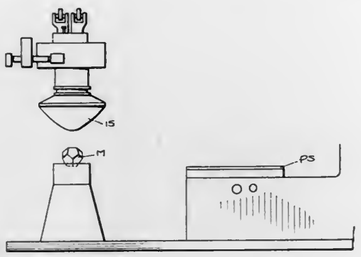
second work means spaced from said first work means for subsequently working on the sheet with the other side of the sheet facing upwardly as it moves therethrough in a second path which is a substantial extension of said first path; and

sheet inverting means between said first and second work means for receiving said sheet from said first work means along said first path, for moving said sheet along a U-shaped turnover path substantially normal to said first and second paths with a second edge normal to said first edge leading, and for thereafter feeding the sheet along

said second path to said second work means with said second side facing upwardly and said first edge leading.

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**4,019,436**
**TECHNIQUE FOR PRODUCING A PRE-DISTORTED DESIGN FORMAT FOR USE IN TRANSFER PRINTING**
**Martin Handweiler, 568 Grand St., New York, N.Y. 10002, and George Castanis, 444 6th Ave., New York, N.Y. 10011**
**Filed June 16, 1976, Ser. No. 696,765**
**Int. Cl.² B41F 17/00**
**U.S. Cl. 101—463** **7 Claims**




1. The technique for producing a pre-distorted design format on a printing plate for use in a print transfer system in which the inked design on the plate is picked up by a conformable transfer pad and impressed on the irregular surface of an article to be imprinted, the pad being forced against the surface and being distorted to conform thereto, said technique comprising the steps of:
A. forming a physical master which is an exact replica of the article to be imprinted;
B. treating the surface of the master to create a distortion-free design thereon which is capable of accepting ink;
C. inking the design on the master;
D. picking up the inked design on the master by the transfer pad and pressing the inked transfer pad onto a proof sheet to produce thereon a distorted design whose degree of distortion reflects the transfer process; and
E. producing a printing plate having said distorted design thereon whereby when articles are printed by transfer from said printing plate, the design imprinted on said article conforms to the design on said physical master.

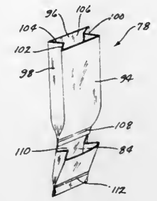
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**4,019,437**
**PLANOGRAPHIC PRINTING MASTER**
**Richard G. Crystal, Los Altos, Calif., assignor to Xerox Corporation, Stamford, Conn.**
**Filed Apr. 13, 1973, Ser. No. 351,129**
**Int. Cl.² B41C 3/06, 1/10**
**U.S. Cl. 101—466** **10 Claims**




1. A method of producing a printing master comprising:
a. providing a suitable substrate,
b. coating said substrate with a layer of an uncured silicone gum,
c. depositing a particulate image pattern on said layer, whereby said particles adhere to said layer in imagewise configuration,
d. curing said layer to an ink releasable condition thereby fixing said particles in said layer without substantial coalescence of said particles, and
e. removing said fixed particles to reveal an ink receptive image corresponding to said deposited image pattern.

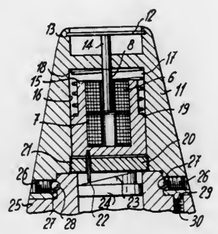
**4,019,438**
**SLEEVING AND SLEEVING STAND APPARATUS AND METHOD**
**Floyd R. Swanson, Jr., Cedar Falls, Iowa, assignor to Swanson Engineering, Inc., Cedar Falls, Iowa**
**Filed June 16, 1975, Ser. No. 586,957**
**Int. Cl.² F42B 3/00**
**U.S. Cl. 102—24 R** **2 Claims**




1. A blast hole liner sleeve having a top opening, and a bottom, comprising:
a heat sealable front wall panel,
a heat sealable rear wall panel,
said front and rear wall panels being joined by a pair of oppositely disposed gusset walls,
a first heat seal transverse to the longitudinal axis of said sleeve and spaced upwardly from the bottom of said sleeve,
an opening below said first heat seal defined by said front wall panel and said gusset walls, and
a bottom heat seal spaced apart from and below said first heat seal and said opening.

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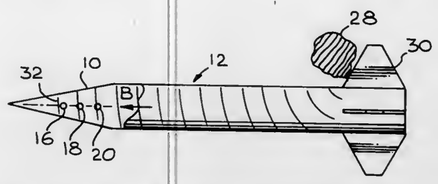
**4,019,439**
**ELECTRIC FIRING DEVICE FOR A PYROTECHNIC CHARGE**
**Roger Beuchat, Geneva, Switzerland, assignor to Mefina S.A., Fribourg, Switzerland**
**Filed June 23, 1975, Ser. No. 589,544**
**Claims priority, application Switzerland, July 5, 1974, 9247/74; May 30, 1975, 6967/75**
**Int. Cl.² F42C 11/00**
**U.S. Cl. 102—70.2 R** **7 Claims**




1. In a projectile, an electric firing device for a pyrotechnic charge, comprising a pulse generator, a firing control element activable by at least one pulse, and control means for the application of pulses from said pulse generator to said element, said control means comprising an electromagnetic transducer mounted within said projectile and including a primary winding having first and second ends, said first end receiving pulses from said pulse generator, said second end connected to ground, a secondary winding having first and second terminals, said first terminal connected to ground, said second terminal connected to said element, a ferromagnetic core providing a coupling between the two windings, and means for mounting the core and at least one of the windings for movement relative to one another to vary and control said coupling.



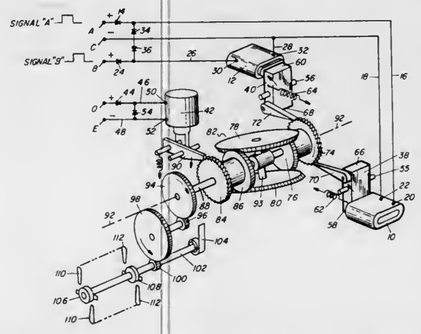
**4,019,440**
**IMPACT DISCRIMINATING APPARATUS FOR MISSILES AND THE LIKE, AND METHOD FOR IMPACT DISCRIMINATION**
**Robert Strike, Pomona, Calif., assignor to General Dynamics, Pomona Division, Pomona, Calif.**
**Filed July 10, 1975, Ser. No. 594,903**
**Int. Cl.² F42C 11/00**
**U.S. Cl. 102—70.2 R** **13 Claims**




10. A method for impact shock discrimination, which comprises the steps of:
a. arranging, within a movable object, a plurality of impact shock sensors in spaced relationship generally along a preselected line of impact, said sensors having output signals responsive to shock waves sensed thereby,
b. converting said output signals from each of said sensors into pulses,
c. causing widths of said pulses to vary in direct relationship with spacing of associated sensors from a preselected point of impact, whereby a shock wave propagated along said line of impact rearwardly through said object from said impact point causes an overlapping of said pulses and whereby a shock wave propagated forwardly through said object along said line of impact toward said impact point does not cause overlapping of said pulses, and
d. feeding said pulses into a discriminating element which discriminates between overlapping pulses and non-overlapping pulses, whereby directional discrimination of shock wave propagation is provided.

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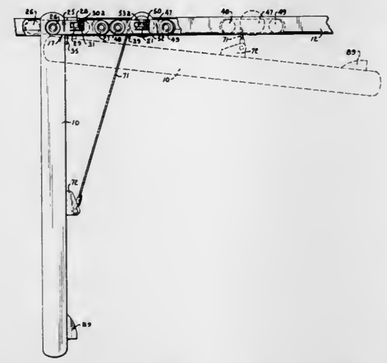
**4,019,441**
**WARHEAD ENABLE SWITCH FOR USE IN A MISSILE**
**Melvin Morgen, Rockaway; Richard Herman, Clifton, both of N.J., and Raymond A. Wolski, New Britain, Conn., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.**
**Filed Mar. 8, 1976, Ser. No. 664,448**
**Int. Cl.² F42C 15/40**
**U.S. Cl. 102—70.2 R** **4 Claims**




1. A warhead enable switch for safing and arming a missile warhead circuit under missile stress environments which comprises:
differential means for generating a single rotary output in response to a plurality of mechanical inputs;
dual solenoid drive means for providing a first mechanical input to said differential means;
solenoid locking means for providing a second mechanical input to said differential means;
series diode means electrically coupled to said solenoid drive means and said solenoid locking means permitting electrical signals of only a specific polarity to initiate said solenoid drive means;
shunt diode means electrically coupled in parallel with the coils of said solenoid means said solenoid locking means for reducing the peak inverse voltage on the coils of said solenoid drive means and said solenoid locking means when the magnetic fields on said coils collapse;
spring biased rotary switch means for placing said missile in an "armed" position when each of said dual solenoid drive means and said solenoid lock means have received a proper input signal thereto, and for returning said missile to a zero "safe" position when either of said dual solenoid drive means and said solenoid lock means receive an improper input signal; and
gearing means for mechanically coupling said rotary switch means to the rotary output of said differential means.

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**4,019,442**
**BULKHEAD ASSEMBLY AND COUNTERBALANCE MECHANISM THEREFOR**
**Earnest M. Lee, Shawnee Mission, Kans., and Grady L. Clyma, Kansas City, Mo., assignors to Roll-O-Matic Chain Company, Kansas City, Mo.**
**Filed Mar. 6, 1975, Ser. No. 555,985**
**Int. Cl.² B60P 7/14**
**U.S. Cl. 105—376** **8 Claims**



1. Apparatus for partitioning a carrier vehicle having a pair of opposite side walls, a floor, and a ceiling, said apparatus comprising:
a bulkhead having a size to fit closely within said vehicle in a substantially upright position to effect a seal therein;
means for mounting said bulkhead in extension substantially between said side walls for pivotal movement about a substantially horizontal pivot axis located in proximity to said ceiling, and for longitudinal movement within the vehicle in a manner to permit said bulkhead to be oriented in said upright position at a variety of locations along the length of the vehicle;
a winding member;
means supporting said winding member for rotation within said vehicle and for longitudinal movement therewithin along with said bulkhead;
a flexible cable wound on said winding member and having an end coupled to said bulkhead at a location offset from the pivot axis thereof; and
yieldable means exerting a rotative force on said winding member, said yieldable means being operable when said

seal is broken to rotate said winding member in a direction to wind up said cable and thereby pivot said bulkhead about its pivot axis from said upriht position to a raised position adjacent said ceiling.

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**4,019,443**

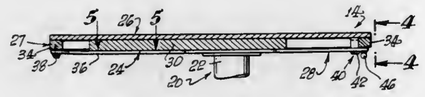
**TABLE**

**Ferris E. Jones, 943 Millbury Ave., La Puente, Calif. 91746**

**Continuation-in-part of Ser. No. 365,438, May 31, 1973, abandoned. This application Feb. 12, 1975, Ser. No. 549,136**

**Int. Cl.² A47B *13/00***

**U.S. Cl. 108—137** **9 Claims**



1. A table comprising:

a supporting base including a horizontal platform,

a table top overlying and slidably supported on said platform for edgewise adjustment relative to the platform,

said top having larger edgewise dimensions than said platform and projecting edgewise beyond said platform, and

means for firmly clamping said top against edgewise movement relative to said platform including a clamping bar extending across the underside of said platform and beyond two opposite edges of the platform, whereby said bar has opposite ends located beyond said opposite platform edges and below said top, means pivotally mounting said clamping bar on said top to swing in a plane parallel to said top and platform, and means for effecting movement of said clamping bar into and from clamping engagement with the underside of said platform in response to swinging of the member about its pivot axis.

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**4,019,444**

**METHOD OF AND APPARATUS FOR INCINERATING REFUSE**

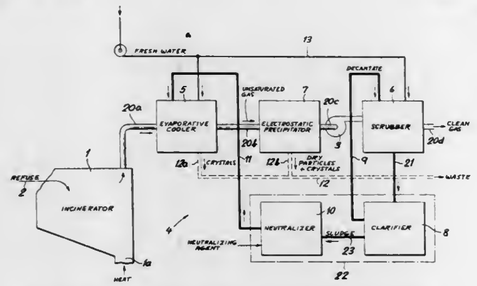
**Ulrich Kleeberg, Mulheim (Ruhr); Jürgen Leimkühler, Essen, and Johannes Kautz, Heiligenhaus, all of Germany, assignors to Gottfried Bischoff Bau Kompl., Essen, Germany**

**Filed Feb. 14, 1975, Ser. No. 550,013**

**Claims priority, application Germany, Feb. 21, 1974, 2408223; Feb. 23, 1974, 2408815**

**Int. Cl.² F23B *1/00***

**U.S. Cl. 110—7 R** **8 Claims**




1. A method of treating refuse comprising the steps of:

incinerating refuse to produce a hot impurity-bearing gas;

evaporatively cooling said gas with a cooling liquid which is flash evaporated;

thereafter separating particles from said gas in a dry process;

thereafter contacting said gas with a scrubbing liquid to scrub said gas and produce a scrubbing liquor;

clarifying said liquor to produce a decantate and a sludge;

recirculating said decantate for use as said scrubbing liquid;

neutralizing said sludge;

recirculating the neutralized sludge and using same as at least part of said cooling liquid, whereby impurities in said gas are dissolved in said scrubbing liquid and separated out as crystals during the dry-particle separation step;

maintaining said gas above its dewpoint during evaporative cooling of said gas and particle separation therefrom;

maintaining said gas under superatmospheric pressure during evaporative cooling thereof, particle separation therefrom, and scrubbing thereof, said gas being scrubbed in a tower, said gas being maintained under superatmospheric pressure by varying the flow cross-section for gas leaving said tower in accordance with incinerator pressure.

3. A system for treating refuse comprising:

an incinerator for burning refuse and producing a hot gas;

a conduit defining a flow path for said gas;

means in said conduit for evaporatively cooling said gas with a cooling liquid;

dry separator means downstream of the evaporative-cooler means in said conduit for separating particles from said gas in a dry process;

scrubbing means downstream of said dry separator means in said conduit for contacting said gas with a scrubbing liquid for scrubbing said gas and producing a scrubbing liquor;

clarifying means connected to said scrubbing means for reducing said liquor to a decantate and a sludge

circulating means for recirculating said decantate between said clarifying means and said scrubbing means and thereby feeding said decantate into said scrubbing means as said scrubbing liquid;

means connected to said clarifying means for neutralizing said sludge and forming salts therein; and

means connected to the neutralizing means for feeding the neutralized sludge back to said evaporative-cooler means as at least part of said cooling liquid, said evaporative-cooler means producing crystals in said gas from the salts formed in said neutralizing means, said crystals being recovered from said gas by said dry separator means.

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**4,019,445**

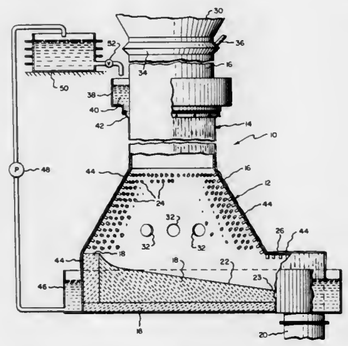
**STUDDED HEARTH**

**John Z. Stoia, Lewiston, and Clarence E. Wright, Tonawanda, both of N.Y., assignors to The Carborundum Company, Niagara Falls, N.Y.**

**Filed Oct. 8, 1975, Ser. No. 620,893**

**Int. Cl.² F23G *5/00*; F23J *1/00***

**U.S. Cl. 110—10** **6 Claims**



1. A slagging pyrolysis furnace including a hearth defined by a metal wall having one side thereof facing said hearth, a plurality of protrusions affixed directly to said one side of said wall and freely extending in spaced relation into said hearth without any refractory material being interposed therebetween, and cooling means comprised of means for passing fluid along said wall on the side thereof facing away from said hearth for cooling said wall and said protrusions and for solidifying a layer of slag to coat and protect said protrusions and said one side of said wall.



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**4,019,446**

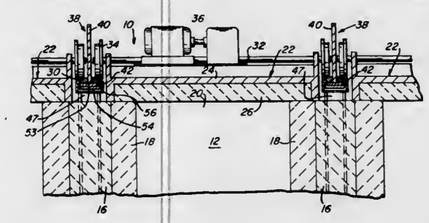
**RAIL GIRDER FOR SOAKING-PIT COVER**

**Eugene V. Abarotin, Murrysville; Michael A. Buckiso, Pittsburgh; Daniel T. Farley, North Huntingdon, and Stephen R. Simko, Pittsburgh, all of Pa., assignors to United States Steel Corporation, Pittsburgh, Pa.**

**Filed Nov. 26, 1975, Ser. No. 635,500**

**Int. Cl.² F23M *7/00***

**U.S. Cl. 110—173 A** **8 Claims**



1. In an industrial furnace arrangement including upstanding end and median walls defining a plurality of mutually adjacent chambers; the tops of said walls cooperating to define substantially rectangular openings to said chambers; wheeled carriage-mounted covers for closing said openings; a plurality of rails parallel to the tops of said median walls engaging the wheels of said carriages for guiding the movement thereof toward and away from said openings; the improvement comprising support structure for said rails, said support structure including:

a. an elongated beam of inverted T-shaped cross sectional configuration having an upstanding web portion sized to present sufficient surface area to effectively dissipate heat therefrom to prevent inordinate thermal stressing of said beam;

b. a base flange coextensive with said web and connected thereto along the bottom edge thereof;

c. means for mounting said rails on the upper surfaces of said base flange on opposite sides of said web; and

d. means for mounting said beam above the top of a median wall.

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**4,019,447**

**APPARATUS FOR AUTOMATICALLY CONTROLLING MOVEMENT OF MATERIAL WITH RESPECT TO A WORK POINT IN A MACHINE**

**Hubert Blessing, Dallas, Tex., and Kenneth A. Benjamin, Wilton, Conn., assignors to Ivanhoe Research Corporation, Stamford, Conn.**

**Filed Sept. 19, 1975, Ser. No. 614,936**

**Int. Cl.² D05B *19/00***

**U.S. Cl. 112—121.11** **13 Claims**

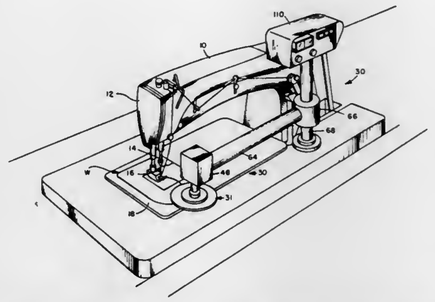
1. Apparatus for automatically controlling movement of a fabric workpiece with respect to a workpoint in a fastening machine which includes feed means for feeding the fabric workpiece along a line of approach toward the workpoint with fastening means acting at the workpoint for performing fastening of the fabric workpiece, said apparatus comprising

revolvable contacting means for contacting the fabric workpiece,

mounting means rotatably mounting said contacting means in a position for engaging only a localized region of the fabric workpiece,

said localized region of the fabric workpiece being directly in front of the workpoint and being on said line of approach,

said mounting means holding said revolvable contacting means continuously in contact with the fabric workpiece directly in front of the workpoint as the fabric workpiece is moving toward the workpoint along said line of approach,



reversible drive means for revolving said contacting means in either direction for moving said localized region of the workpiece either to the left or right laterally with respect to said line of approach, and

control means connected to said reversible drive means for controlling its operation.

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**4,019,448**

**WORKPIECE GUIDE FOR SEWING MACHINES**

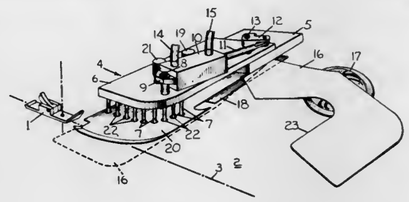
**Nerino Marforio, Milan, Italy, assignor to Rockwell-Rimoldi S.p.A., Milan, Italy**

**Filed Oct. 9, 1975, Ser. No. 621,224**

**Claims priority, application Italy, Mar. 12, 1975, 21156/75**

**Int. Cl.² D05B *35/10***

**U.S. Cl. 112—153** **3 Claims**



1. In a workpiece guide for sewing machines having a vertical wall disposed perpendicular to the work surface of the machine on the right hand side of the sewing axis with an upper plate spaced from the work surface and extending parallel with the latter beyond the sewing axis, the improvement comprising:

a. at least one movable plate (16) pivotably mounted intermediate the upper plate and the work surface;

b. means for pivoting said movable plate between an operative position overlying the sewing axis and an inoperative position spaced from the sewing axis; and

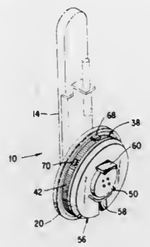
c. means on the work surface for operative association with said movable plate for elevating the latter in its inoperative position to a location above its operative position for effecting a descending movement thereof during its return to the latter position by said pivoting means.

**4,019,449**

## AUTOMATIC BUTTONHOLING SIZING DEVICE

**Robert Conrad Hauf, Upper Montclair, N.J., assignor to The Singer Company, New York, N.Y.**

**Filed Oct. 18, 1976, Ser. No. 733,510**
**Int. Cl.² D05B** *3/02*
**U.S. Cl. 112—158 B** **3 Claims**



**1.** In a zigzag sewing machine having an endwise reciprocating needle bar, a mechanism for jogging said needle bar laterally to produce zigzag stitches including a member regulating the neutral position of the needle-jogging motion, a work-feeding mechanism including a feed-regulating member having a range of positions corresponding to forward and reverse directions of work feed, an actuating mechanism in said sewing machine operatively connected to impart endwise reciprocatory and lateral vibratory movements to said needle bar and movements to said work-feeding mechanism in timed relation thereto, a buttonholing assembly for controlling the functions of said sewing machine in the formation of a buttonhole, and a sensing wheel assembly for metering the size of the buttonhole being sewn having adjusting means for programming various size buttonholes, in combination with an automatic buttonhole sizing device comprising means for supporting a button for gauging the size of a buttonhole, means or measuring the size of said button, and means for connecting said measuring means to said adjusting means.

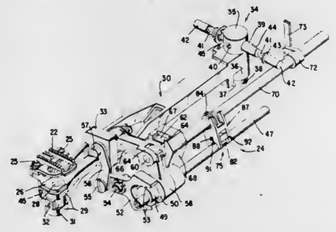
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**4,019,450**

## FEED REGULATOR LOCKS

**Kenneth Douglas Adams, Madison, N.J., assignor to The Singer Company, New York, N.Y.**

**Filed Aug. 12, 1976, Ser. No. 713,953**
**Int. Cl.² D05B** *27/02*
**U.S. Cl. 112—215** **4 Claims**



**1.** A work feed system for a sewing machine having a frame including a work supporting bed housing said feed system, a throat plate carried by said work supporting bed and having a feed dog accommodating slot therein, said feed system including a feed dog having a work supporting rib arranged in said feed dog accommodating slot of said throat plate, a feed shaft, a feed lift cam supported on said feed shaft for alternately raising and lowering said feed dog to and from a work advancing position with said work supporting rib extending through said feed dog accommodating slot, a feed regulator shaft, a regulator affixed to said feed regulator shaft for selectively varying the direction and rate of work advance movement, means for rotating said feed regulator shaft for selective variation of the direction and rate of said work advance movement, wherein the improvement comprises:

a radially functioning camming device on said feed shaft operating in synchronism with said feed lift cam; a brake member affixed to said feed regulator shaft; and shiftable means extending in a plane transverse to said feed shaft between said camming device and said brake member and responsive to said camming device during said raising of said feed dog to said work advancing position for inhibiting movement of said brake member and said feed regulator.

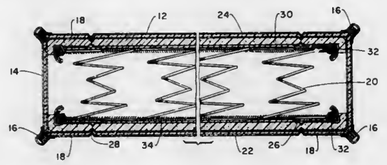
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**4,019,451**

## MATTRESS CONSTRUCTION AND METHOD OF MAKING

**William L. Autrey, 13612 Carroll Way, Tustin, Calif. 92680**

**Filed Dec. 8, 1975, Ser. No. 638,564**
**Int. Cl.² D05B** *1/00*
**U.S. Cl. 112—262** **4 Claims**



**1.** A method of constructing a mattress comprising:

tacking first and second pre-cut covers to first and second pre-cut foam pads of the same size;

stitching flanging material around the edge of the cover assemblies a predetermined distance from the edge to provide a wide flange of cover material;

fastening the first and second covers to first and second sides of a coil spring by securing the flange material around the rim of the spring;

stitching a side cover to said first cover with a border tape;

stitching said side cover to said second cover while pulling said wide flange to stretch said cover and foam pad laterally to produce a relatively flat surface with squared sides.

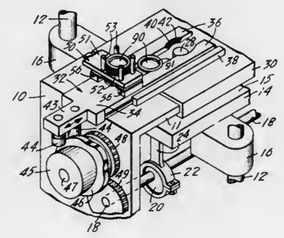
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**4,019,452**

## CAN END FEED MECHANISM

**John W. Rouse, Fairlawn, N.J., assignor to American Can Company, Greenwich, Conn.**

**Filed May 6, 1976, Ser. No. 683,935**
**Int. Cl.² B21D** *43/00, 43/16*
**U.S. Cl. 113—114 BE** **18 Claims**



**1.** In a mechanism for feeding individual can ends from a stack thereof, which ends have curled peripheral edge portions, the combination comprising: stacking means for disposing a multiplicity of can ends in a generally vertical stack; gate means having a platform portion for providing underlying support for the ends disposed in said stacking means, and having an open portion through which the ends may pass; and means for mounting said gate means for movement so as to sequentially align on said axis of said stacking means said platform portion and said open portion thereof, said gate means including a pair of elongated blades mounted in confronting relationship to one another along the opposite sides of said open portion thereof, the spacing between said blades gradually decreasing from their forward ends, to cause rearward portions thereof to project beyond the adjacent margins of said open portion and to thereby cooperatively define a tapered channel thereto, the inner edges of said forward portions of said blades being of generally wedge-shaped cross section to provide upper and lower inclined surfaces thereon, said blades also having upper support surfaces on said rearward portions thereof, which support surfaces are more horizontally disposed than said upper inclined surfaces of said inner edges, to provide ledge portions for support of the stack of can ends on said blades, said blades being so disposed on said gate means as to pass between the lowermost end and the adjacent end with the stack thereof supported on said platform portion, and so that, upon movement of the gate means from a position in which said platform portion is aligned on said stacking axis to a position in which said open portion is aligned thereon, first contact of the can ends occurs on said forward portions of said blades, with said inclined surfaces of said edge portions thereof making substantially tangential contact with the curled peripheral edge portions of the lowermost end and the end thereabove, thereby urging the end apart and effecting disengagement of the lowermost end so as to permit it, upon further movement of said gate means and alignment of said open portion thereof on said stacking axis, to drop thereinto while the remainder of the stack is supported upon said ledge portions of said blades.



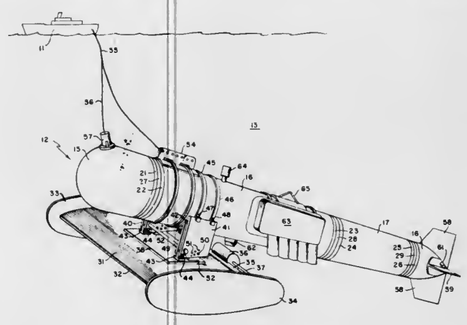
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**4,019,453**

## UNDERWATER VEHICLE

**Vance F. Boswell, Rocky River, and Robert L. Shoemaker, Wickloff, both of Ohio, assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Nov. 18, 1965, Ser. No. 508,600**
**Int. Cl.² B63G** *8/18, 8/00;* **B63C** *11/48*
**U.S. Cl. 114—16 R** **2 Claims**



**1.** A submarine vehicle adapted for probing predetermined ocean depths and transporting predetermined instruments and utilization equipment while being towed by an ancilliary tractor means comprising in combination,

a hollow nose section,

an intermediate hollow shell section joined to said hollow nose section,

a hollow tail section joined to said hollow intermediate shell section,

a wing having negative lift characteristics, means interconnecting the aforesaid intermediate hollow shell section and said wing for the support thereof in a predetermined fixed relative relationship,

a pair of side plates respectively attached to the ends of said wing,

an aileron connected to the trailing edge of said wing,

means mounted on said aileron and connected to at least one of the aforesaid side plates for changing the position of said aileron with respect to said wing,

lug means connected to said intermediate hollow shell section,

means connected to the aforesaid lug means for supplying a towing force thereto,

electrical conductor means extending through the aforesaid nose section and supported by said towing force supplying means for conducting electrical energy to the hollow thereof, and

packing gland means attached to said nose section for passing said electrical conductor means therethrough in a water-tight manner.

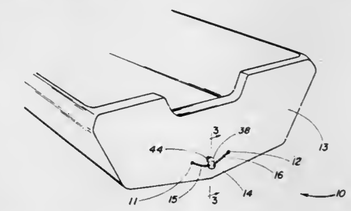
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**4,019,454**

## BOAT PLUG APPARATUS

**Joseph E. Landwerlen, Shelbyville, Ind., assignor to J & L Tool & Machine, Inc., Indianapolis, Ind.**

**Filed Jan. 23, 1976, Ser. No. 651,736**
**Int. Cl.² B63B** *13/00*
**U.S. Cl. 114—197** **13 Claims**



**1.** A boat plug apparatus which comprises:

a boat having an upwardly extending transom,

a drain hole located in the lower portion of said transom and having a circular orifice at the exterior of said transom;

an essentially spherical, semi-rigid ball having a diameter larger than the diameter of said circular orifice of said drain hole;

a first attaching means for attaching said ball to the exterior of said transom at a first point above and to one side of said circular orifice, said first attaching means including a first flexible member attached to the first point and connecting said ball to the first point; and,

a second attaching means for attaching said ball to the exterior of said transom at a second point on the opposite side of said circular orifice from the first point associated with said first attaching means, said second attaching means including a second flexible member attached to the second point and connecting said ball to the second point, whereby said ball is positioned partially within said circular orifice when water attempts to flow through said drain hole into the boat, causing an essentially water-tight seal between said ball and said circular orifice.

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**4,019,455**

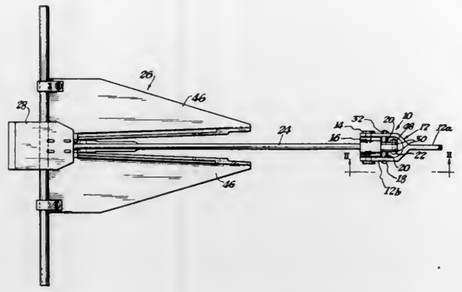
## SHANK MOUNTED FOULED ANCHOR RELEASE

**Daniel Comstock Hungerford, N. Palm Beach, Fla., assignor to Brunswick Corporation, Skokie, Ill.**

**Filed Jan. 28, 1976, Ser. No. 653,160**
**Int. Cl.² B63B** *21/46*
**U.S. Cl. 114—298** **19 Claims**

**1.** A device, mountable on a conventional anchor shank having an aperture near its free end, to provide anchor line reverse pull on the anchor when fouled comprising:

shank slide mounted around and moveably along said shank exterior surface;
means connected to said slide for attaching an anchor line to said slide;



slide stop connected to the free end of said shank; and
shearable fastening means connected to said slide and said shank for retaining said slide in a fixed position relative to said shank free end.

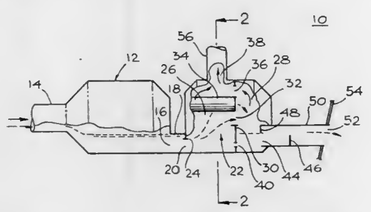
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**4,019,456**

## MARINE WET EXHAUST SYSTEM AND IMPROVEMENTS IN POWERED MARINE VESSEL

**Earl W. Harbert, Fort Lauderdale, Fla., assignor to Whittaker Corporation, Los Angeles, Calif.**

**Filed May 5, 1976, Ser. No. 683,452**
**Int. Cl.² B63H *21/34*; F01N *3/04***
**U.S. Cl. 115—73** **27 Claims**



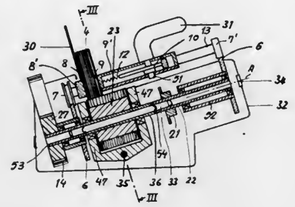
1. An improved marine wet exhaust system comprising, in combination:
A. An exhaust gas-cooling water separation chamber having a cooling water and exhaust gas entrance, a water exit spaced downstream from said entrance and a gas exit disposed above the level of said entrance and said water exit;
B. a water deflector disposed in said separation chamber above the level of said entrance and said water exit but below said gas exit for deflecting water away from said gas exit while permitting gas to pass into said gas exit;
C. a gas dam disposed in said water exit to block the passage of gas from said chamber through said water exit;
D. A gas collection chamber connected to said gas exit and having a predetermined cross section; and,
E. gas acceleration and flow shaping conduit means connected to the downstream end of said gas collection chamber and having a portion gradually tapering downstream to provide a predetermined back pressure in said exhaust system and a terminal portion connected thereto and shaped to cause exhaust gases when exiting therefrom to penetrate the turbulent boundary layer of air associated with the periphery of a boat in motion,
said system being adapted to propel exhaust gases sufficiently far away from said boat to preclude said gases from being passed into the rear of said boat by the station wagon effect.

**4,019,457**

## APPARATUS FOR APPLYING HOT-MELT GLUE TO EDGE OF SHEET STACK

**Josef Wetzler, Rosenheim-Schlossberg; August Gaschler, Rosenheim, and Heinz Hofmann, Oberwohr near Rosenheim, all of Germany, assignors to Planatolwerk Willy Hesselmann, Thansau, Germany**

**Filed July 2, 1975, Ser. No. 592,672**
**Claims priority, application Germany, July 4, 1974, 2432540**
**Int. Cl.² B05C *1/02***
**U.S. Cl. 118—35** **10 Claims**



1. A bookbinding apparatus for applying an adhesive to the edge of a stack of sheets, said apparatus comprising:
a generally straight horizontal track having an upstream end and a downstream end;
a support surface at said upstream end and inclined at an angle of more than 8° to the horizontal;
a carriage inclined at said angle to the horizontal displaceable along said track above said surface and between said ends;
a pair of clamping elements on said carriage parallel to each other and perpendicular to said surface;
means on said carriage for displacing one of said elements toward the other element for clamping a stack of sheets therebetween with the edge of said stack lying on said surface when said carriage is at said upstream end;
a generally cylindrical applicator between said ends and rotatable about an axis substantially parallel to said surface and transverse to said track, whereby displacement of said carriage between said ends with a stack clamped between said elements will wipe said edge over said applicator; and
means including an adhesive reservoir tilted at said angle to the horizontal for applying adhesive to said applicator.

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**4,019,458**

## RESIST APPLICATION FOR SELECTIVE PLATING OF ETCHED SHEETS OF PRECISION CHEMICAL MACHINED COMPONENTS

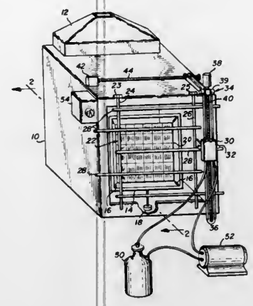
**Franz Kolterer, Los Altos, Calif., assignor to Koltron Corporation, Sunnyvale, Calif.**

**Filed Sept. 2, 1976, Ser. No. 719,902**
**Int. Cl.² B05B *13/04***
**U.S. Cl. 118—321** **8 Claims**

1. A photoresist spraying apparatus for spray coating both sides of an etched metal sheet with light-sensitive photoresist comprising:
chamber means including a front wall having an opening, and a rear wall, said chamber means also including vent means located proximate said rear wall;
filter means for trapping excess photoresist spray, said filter means located inside said chamber means proximate said vent means and between said front wall and said vent means;
rack means for holding the metal sheet, said rack means being rotatably mounted inside said chamber means proximate said opening so as to be able to rotate **360°**;
spray means for atomizing and spraying liquid photoresist;
guide means for guiding said spray means along a predetermined path, said guide means being hingedly attached to said front wall proximate said rack means; and



positioning means for moving said spray means along said guide means whereby said spray means sprays photoresist



upon said metal sheet as said spray means moves along said guide means and whereby air flow caused by said vent means draws excess spray into said filter means.

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**4,019,459**

## AMPHIBIAN CULTURE BY INSECT FEEDING

**Gregor N. Neff, 85 Myrtle Ave., Dobbs Ferry, N.Y. 10522**

**Division of Ser. No. 477,839, June 10, 1974, abandoned, which is a continuation-in-part of Ser. No. 460,619, April 12, 1974, Pat. No. 3,939,802, which is a continuation-in-part of Ser. No. 213,966, Dec. 30, 1971, abandoned. This application Feb. 20, 1976, Ser. No. 659,690**
**Int. Cl.² A01K *67/00***
**U.S. Cl. 119—3** **8 Claims**



5. A method of frog culture comprising the steps of enclosing said frogs in a cage, partially immersing said cage in water, providing a support in said cage for said frogs to sit upon out of the water, and trapping flying insects in said cage with said frogs.

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**4,019,460**

## AQUARIUM TANK COVER

**Louis M. Muller, 4021 Clifford Dr., Metairie, La. 70002**

**Continuation-in-part of Ser. No. 489,682, July 18, 1974, abandoned. This application June 30, 1976, Ser. No. 701,226**
**Int. Cl.² A01K *63/00***
**U.S. Cl. 119—5** **10 Claims**



1. An improved cover for an aquarium tank designed with a given water level and having an open top, comprising:
a horizontally extended top member adapted to at least generally completely cover over the open top of the tank and be supported by the walls of the tank, there however being at least some small gap(s) between the sides of the tank and the corresponding facing surface(s) of said top member to allow gases to escape and air to enter;
downwardly depending flange means spaced inwardly a relatively short distance from the periphery and at least substantially around the periphery of said top member for extending down inside and inwardly around said tank and below the water level therein, said downwardly depending flange means being spaced from each other a distance close to but at least in part less than the distance walls of the tank, whereby there is a small space between said downwardly depending flange means and the sides of the tank; and
relatively small side opening means defined in said depending flange means and above said water level for permitting the escape of gases generated in said tank and the entrance of fresh air into said tank through said small space and said gap(s), whereby said cover substantially prevents the escape of water droplets from said tank without hermetically sealing it.

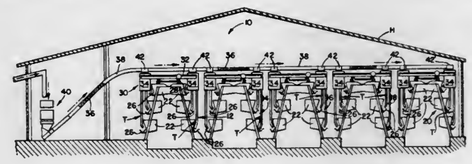
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**4,019,461**

## SYSTEM FOR CONTROLLING FEED OF LIVESTOCK

**Everett Morgan Keen; Anthony John Siciliano, both of Vineland; Kiran Chhabildas Shah, Millville; Serge Artamonoff, Vineland, and Leonard Roy Stigen, Williamstown, all of N.J., assignors to Diamond International Corporation, New York, N.Y.**

**Filed Nov. 7, 1975, Ser. No. 630,015**
**Int. Cl.² A01K *5/02***
**U.S. Cl. 119—18** **23 Claims**



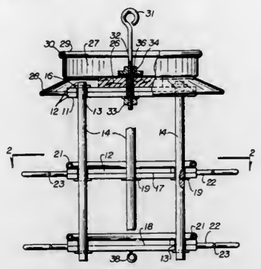
19. A system for controlling the feed to be automatically distributed to livestock in numerous repeated cycles over the course of a day or like periods whereby the feed is accurately metered and dispensed comprising in combination:
a. means for segregating livestock into a plurality of groups;
b. feed receptacle means situated adjacent to said segregating means from which livestock may avail themselves of feed;
c. separate mobile feed distributing units for accurately metering and dispensing feed into feed receptacle means of the various groups;
d. power actuated drive means operatively connected to said mobile feed distributing feed units along a line generally parallel to said feed receptacle means;
e. dispensing means drivingly connected to said drive means to effect dispensing of feed from units in one direction of said driving means;
f. dispensing means of one of said units being of such capacity as to dispense in a day a total amount of feed equal to all that the livestock of a first one of said groups can eat and the dispensing means of all others of said units are each of equal capacity to each other but of less capacity than the dispensing means of said one of said units by as much as from about 5% to 10% and
g. means for periodically filling each of said feed distributing units; and
h. switching means for sensing the filled condition of said feed distributing units and facilitating actuation of said units and for sensing the unfilled condition of said feed distributing units and sounding an alarm to alert an attendant of such condition.

**4,019,462**

## BIRD FEEDER, WATER AND BATH HANGING SUPPORT

**Paul Palfalvy, 1105 Woodside Road, Redwood City, Calif. 94061**

**Filed Nov. 20, 1975, Ser. No. 633,621**
**Int. Cl.² A01K** *5/00*
**U.S. Cl. 119—51.5** **3 Claims**



**1.** A device for feeding and watering birds comprising a plurality of platforms each formed with a plurality of holes spaced adjacent the peripheries of said platforms, the holes in said platforms being aligned, a plurality of vertical posts passing through the holes in said platform, said posts being formed with holes perpendicular to the axes of said posts, pins passing through said holes, one said pin being located below one said platform for each said post, said pins attaching said posts to said platforms, said pins being capable of removal to disassemble said device, a bath pan supported above the uppermost of said platforms, a truncated conical skirt attached to the bottom of said pan to protect said platforms from the elements and from splashing from said pan, at least one said platform having a raised edging around the peripheries of said one platform, a plurality of radial arms extending out from the peripheral edge of one of said platforms, a perch supported near the inner ends of said arms, and support means for elevating said device above the ground.

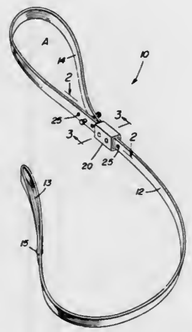
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**4,019,463**

## LEASH WITH SLIP LOOP

**Earl M. Kitchen, 1025 E. Lomita St., Glendale, Calif. 91205**

**Filed Oct. 30, 1975, Ser. No. 627,243**
**Int. Cl.² A01K** *27/00*
**U.S. Cl. 119—109** **4 Claims**



**1.** A leash for dogs and similar animals wherein it is desirable to have a slip loop for choking purposes to aid in control of the animal comprising; a leash, a hand loop at one end of said leash, a slip loop at the other end of said leash, and means for limiting the minimum loop size which said slip loop can be reduced to for the purpose of preventing injury to the animal, the means for limiting the minimum size of the slip loop including a connector sleeve attached to the extreme other end of said leash and having the main body portion of said leash engaged in a slidable manner therethrough, the said connector sleeve includes a rectangular tube of limited length having two holes through each side thereof, said two holes on one side being double riveted to said extreme end of the leash mounted inside the rectangular tube, at least one limit screw adjustably mounted through one of a plurality of evenly spaced holes in said leash proper for engagement with said connector sleeve to positively limit the minimum slip loop, and the connector sleeve has means for the purpose of reducing friction and reducing side play which includes an additional member riveted on the inside of the sleeve on the portion thereof opposite to the side having the end of said leash attached thereto for the purpose of providing spaced means so that the leash proper will slide inside said connector sleeve between said spacer means and said extreme end of the leash.

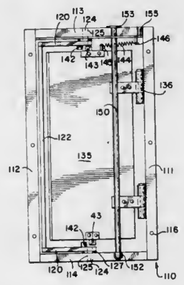
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**4,019,464**

## ANIMAL SIZE SORTING AND CONTROL GATE

**Thomas G. Miller, R.R. 1, Box 88, Burlington, Iowa 52601**

**Filed June 7, 1976, Ser. No. 693,635**
**Int. Cl.² A01K** *29/00*
**U.S. Cl. 119—155** **12 Claims**



**12.** An animal size sorting and control gate comprising:
a pair of vertically disposed frame members including a first frame member and a second frame member;
a pair of horizontally disposed frame members including an upper frame member and a lower frame member, said vertically disposed and horizontally disposed frame members connected together near ends thereof to define a rectangular opening therebetween;
a width limiter having a pair of horizontally disposed arms and a verical rail extending between a first pair of ends of said arms;
pivoting means near a second pair of ends of said arms for pivoting said width limiters with respect to horizontally disposed frame members;
means for fixing the width limiter in one of a range of operating positions such that the maximum width of animals capable of passing through said gate is determined by the spacing between the vertical rail of said width limiter and the second frame member;
stop means on at least one of said pair of arms near said second pair of ends thereof, said stop means in eccentric relationship to said pivoting means;
a door hingedly connected to said first frame member;
resilient means to urge the door toward a normally closed position;
edge means along at least one horizontal edge of said door, said edge means positioned along said edge such that said edge means will cooperate against said stop means to permit the door to open in only one direction when said width limiter is fixed in one of a range of operating positions, but will allow said stop means to pass by said edge means when said width limiter is pivoted to a position whereat said width limiter is generally co-planar with said door, thereby permitting said width limiter to be further pivoted to an opposite operating position whereat said door opens only in an opposite direction thereby reversing the direction of flow of animals through said gate.



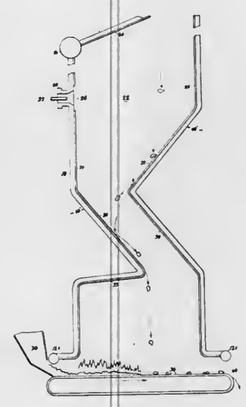
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**4,019,465**

## FURNACE DESIGN FOR PULVERIZED COAL AND STOKER FIRING

**John William Regan, Windsor, and Douglas Michael Rode, Newington, both of Conn., assignors to The Air Preheater Company, Inc., Wellsville, N.Y.**

**Filed May 17, 1976, Ser. No. 687,276**
**Int. Cl.² F22B** *31/00*; **F23G** *5/08*
**U.S. Cl. 122—240 A** **5 Claims**



**1.** A boiler furnace having upright walls enclosing a vertically disposed combustion chamber, a burner for pulverized coal in one of said walls adapted to project fuel for combustion into said chamber, means providing a supply of pulverized coal to said burner, a grate at the bottom of said chamber movable to define an entrance end and a discharge end for a quantity of fuel thereon, means supplying a quantity of fuel to the entrance end of said grate, and baffle means having inclined sides that flank a transverse opening intermediate the coal burner and the movable grate arranged to intercept solid products of combustion falling from the upper end of said boiler to the grate below.

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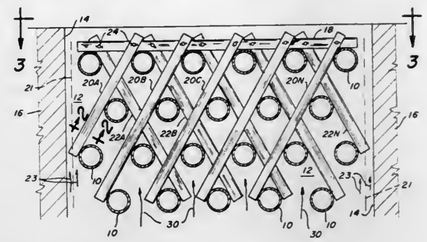
**4,019,466**

## APPARATUS FOR RADIANT HEAT TRANSFER

**Robert D. Reed, Tulsa, Okla., assignor to John Zink Company, Tulsa, Okla.**

**Filed Nov. 3, 1975, Ser. No. 627,848**
**Int. Cl.² F23M** *9/00*
**U.S. Cl. 122—367 R** **7 Claims**

**1.** In a process heater including; a furnace, a convection section and a stack for the flow of combustion gases, a plurality of parallel pipe sections in series connection, for the passage of a fluid through said pipes to receive heat from said heater, said pipe sections, arranged in the convection section in a plurality of vertically spaced horizontal rows defining inclined spacings from top to bottom; the improvement in means to improve the heat transfer from the combustion gases to said pipes comprising:
a plurality of thin wide straight metal strips resting within said inclined spacings against said pipes such that said wide dimension is parallel to the flow of said gases and said thin dimension is angularly transverse to said flow.



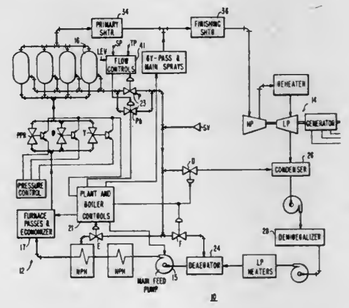
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**4,019,467**

## VALVE SEQUENCING STARTUP CONTROL SYSTEM FOR ONCE-THROUGH BOILER

**Morton H. Binstock, Pittsburgh, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed Apr. 20, 1976, Ser. No. 678,526**
**Int. Cl.² F22B** *29/12*
**U.S. Cl. 122—406 ST** **10 Claims**



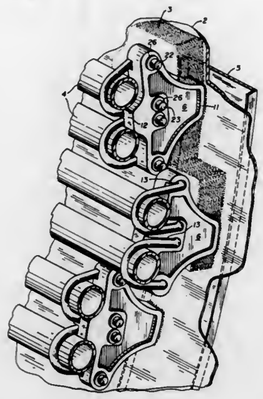

**1.** A startup system for a once-through boiler having a boiler feed pump for controllably driving water as a working fluid through the boiler where heat is added to the working fluid under burner control, said system comprising separator means disposed in the main boiler flow path, a plurality of valves connected in the main flow path upstream from said separator means, means for generating a demand signal representative of the difference between a predetermined boiler process pressure and a predetermined pressure setpoint, and means for controlling the operation of said valves in a predetermined opening or closing sequence in response to the pressure signal, said controlling means including respective means for driving each valve in opening or closing movement in response to the demand signal and a valve select signal, means for generating a plurality of signals indicating whether each of the respective valves is operating, and sequencer means for generating respective valve select signals for the respective valves in the predetermined sequence, said sequencer means advancing the sequence of the valve select signals to operate the next valve in the sequence when pressure demand exists and no valve is operating.

**4,019,468**

## SUPPORT FOR FURNACE TUBES

**Bert Benton Miles, Tulsa, Okla., assignor to Combustion Engineering, Inc., Windsor, Conn.**

**Filed Apr. 21, 1976, Ser. No. 675,356**
**Int. Cl.² F22B** *37/24*
**U.S. Cl. 122—510** **4 Claims**



1. A support structure for furnace tubes in a furnace space, including,
   a base member attached to the interior wall of the furnace space and extending its mass normal to the wall surface,
   a pair of holes extended through the base member in a direction parallel the surface of the wall,
   grooves in the body of the base and extending from each of the pair of holes normal the surface of the wall,
   and a strap member arranged with its ends engaged in the holes and extending along the grooves in the body of the base to provide lateral support to the strap member and about a furnace tube to capture the tube on the base and substantially shield the surface of the base from the heat of radiation of the combustion of the furnace.

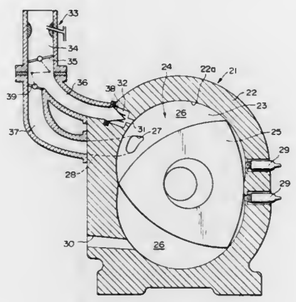
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**4,019,469**

## INTAKE MEANS FOR ROTARY PISTON ENGINES

**Kenichi Yamamoto, Hiroshima, and Kuniaki Kakui, Minamishowa, both of Japan, assignors to Toyo Kogyo Co., Ltd., Japan**

**Filed Feb. 27, 1976, Ser. No. 662,274**
**Claims priority, application Japan, Mar. 26, 1975, 50-37245**
**Int. Cl.² F02B** *53/10*
**U.S. Cl. 123—8.13** **8 Claims**



1. Rotary piston engine comprising a casing which includes a rotor housing formed with an inner wall of multi-lobed trochoidal configuration having a major axis and a minor axis and a pair of side housings secured to the opposite sides of the rotor housing so as to define a rotor chamber therein, a substantially polygonal rotor disposed in said rotor chamber for rotation and revolution with apex portions in sliding contact with the trochoidal inner wall of the rotor housing so as to define working chambers of variable volume between the inner wall of the rotor housing and flanks of said rotor, intake port means including at least one intake port formed in at least one of the side housings and opening to the rotor chamber at one of the working chambers which is in intake stroke and an intake passage formed in said one of the side housings, said intake passage including a curved portion leading to the intake port and having a radius of curvature which varies widthwise of the passage to provide varying resistance to mixture flow passing therethrough so that the mixture flow is given with a velocity component in the direction of rotation of the rotor.

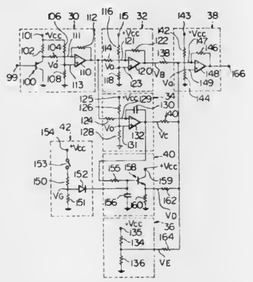
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**4,019,470**

## CLOSED LOOP AIR-FUEL RATIO CONTROL SYSTEM FOR USE WITH INTERNAL COMBUSTION ENGINE

**Masaharu Asano, Yokohama, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan**

**Filed Feb. 5, 1976, Ser. No. 655,567**
**Claims priority, application Japan, Feb. 6, 1975, 50-15813; June 20, 1975, 50-74300**
**Int. Cl.² F02D** *5/02*
**U.S. Cl. 123—32 EE** **8 Claims**



1. An electronic closed loop control system for supplying an optimum air-fuel mixture to an internal combustion engine, which system includes in combination, an exhaust gas sensor for sensing a concentration of a component in exhaust gases and generating a signal representative thereof, an air-fuel ratio control unit connected to said exhaust gas sensor for deriving the signal therefrom and generating a signal indicative of an optimum air-fuel ratio based on the signal from said exhaust gas sensor, an actuator control unit connected to said air-fuel ratio control unit for deriving the signal therefrom and generating an actuator controlling signal based on at least the signal from said air-fuel ratio control unit, and an actuator connected to said actuator control unit to optimally control an air-fuel mixture to said internal combustion engine in dependence of said actuator controlling signal,
   wherein an improvement comprises:
   said air-fuel control unit including in combination, first means connected to said exhaust gas sensor deriving the signal therefrom to compare the same with a reference value and generating a signal representing a differential therebetween, second means including an integrator which is connected to said first means and receives the signal therefrom to integrate the same with respect to time and then generates an integrated signal, third means connected to said second means receiving said integrated signal to smooth the same, and fourth means connected to said second and third means and receiving and adding the signals from respective means, said fourth means being connected to said actuator control unit for applying its output signal thereto.

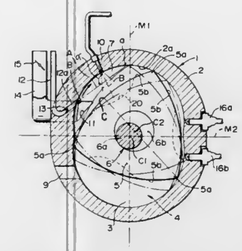


**4,019,471**

## FUEL INJECTION TYPE ROTARY PISTON ENGINES

**Masaharu Shimoji; Haruhiko Satow, and Atsumichi Yamasaki, all of Hiroshima, Japan, assignors to Toyo Kogyo Co., Ltd., Hiroshima, Japan**

**Filed Mar. 11, 1976, Ser. No. 665,874**
**Claims priority, application Japan, Apr. 1, 1975, 50-40034; Apr. 1, 1975, 50-40035; Apr. 2, 1975, 50-40511**
**Int. Cl.² F02B** *53/10*
**U.S. Cl. 123—8.09** **14 Claims**



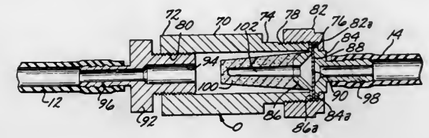
1. Rotary piston type internal combustion engine comprising a casing which includes a rotor housing having an inner wall of multi-lobed trochoidal configuration and a pair of side housings secured to the opposite sides of the rotor housing to define therein a cavity of multi-lobed trochoidal configuration having a center axis, a substantially polygonol rotor having a center axis and disposed in said cavity for rotation about its own center axis and revolution about the center axis of the trochoid of the cavity with apex portions in sliding contact with the inner wall of the rotor housing, said rotor having flanks each defining with said inner wall of the rotor housing a working chamber variable in volume through an intake, a compression, an expansion and an exhaust strokes in each cycle of rotation of the rotor, eccentric shaft means having a first portion with an axis aligned with the center axis of the rotor and carrying said rotor and a second portion offset from the first portion and having an axis aligned with the center axis of the trochoid, exhaust port means provided in said casing so as to open to the cavity at a working chamber which is in the exhaust stroke, first intake port means provided in said rotor housing so as to open to said cavity at a working chamber which is in intake stroke, first intake passage means having a longitudinal axis and leading to said first intake port means, said axis of the first intake passage means being slanted in the direction of rotor rotation at least in the vicinity of the first intake port means, second intake port means provided in at least one of said side housings so as to open to said cavity at the intake working chamber, second intake passage means leading to the second intake port means and having control valve means provided therein, means for opening said control valve means in relatively high load range of engine operation, fuel injection nozzle means having an axis and provided in said rotor housing between said first intake port means and point of intersection of said longitudinal axis of said first intake passage means with the inner wall of the rotor housing, means for supplying fuel to the fuel injection nozzle means in such a manner that the fuel is injected therefrom into the intake working chamber at a timing when point of intersection between extension of the axis of the nozzle means and the flank of the rotor is in an area of the flank which is at the leading side of rotor rotation from the center of the flank and when the angle of rotation of said eccentric shaft means is between 60° before and 75° after an orientation of the shaft wherein the rate of volume change of the working chamber is the largest, each flank of the rotor being formed with recess means in said area which is at the leading side of rotor rotation.

**4,019,472**

## WATER INJECTION DEVICE FOR INTERNAL COMBUSTION ENGINES

**William Dale Skaggs, 1572 Belle St., San Bernardino, Calif. 92404**

**Continuation-in-part of Ser. No. 522,029, Nov. 8, 1974, Pat. No. 3,955,542. This application Feb. 9, 1976, Ser. No. 656,437**
**Int. Cl.² F02D** *19/00*
**U.S. Cl. 123—25 L** **3 Claims**



1. In combination with an internal combustion engine that has a carburetor with an air intake, which carburetor delivers an air-fuel mixture to said engine, a device for supplying water in the form of minute globules to said air-fuel mixture when said engine is operating to lessen the content of carbon monoxide in the exhaust from the engine, said device including:
   a. a vented reservoir for water;
   b. a first tube connected to the interior of said reservoir, said first tube having a first free end portion;
   c. an elongate hollow housing that has first and second ends;
   d. first apertured means that connect said first free end portion to said first end of said housing;
   e. a second tube connected to said air intake of said carburetor, said second tube having a second free end;
   f. an orifice defining plate transversely disposed adjacent said second end of said housing;
   g. second apertured means that connect said second end to said second end portion of said housing and hold said orifice defining plate at a fixed position relative to said housing; and
   h. an elongate porous cup that is supported from said second means and extends into the interior of said housing, said cup, second means and orifice defining plate cooperating to provide a confined space, said cup of such porosity that water will flow into said confined space and then discharge from said orifice as a stream of said globules only when said engine is operating to impress a negative pressure in said second tube, said cup serving as a filter to remove solid particles from water in said reservoir that might clog said orifice prior to said water entering said confined space, said cup tending to prevent water from said reservoir flowing to said air intake when said engine is not operating, and said confined space serving as storage for a body of filtered water that is immediately available to be formed into said globules when said engine is started and said second tube has a negative pressure therein.

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**4,019,473**

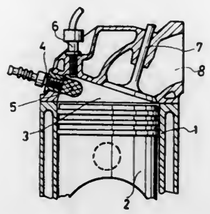
## STRATIFIED COMBUSTION TYPE ENGINE

**Minoru Kamiya, 2-46-3, Minami Otsuka, Toshima, Tokyo, Japan**

**Filed Dec. 4, 1974, Ser. No. 529,512**
**Claims priority, application Japan, Dec. 5, 1973, 48-135345; Dec. 5, 1973, 48-135346**
**Int. Cl.² F02B** *19/10*
**U.S. Cl. 123—32 ST** **2 Claims**

1. A stratified combustion type engine comprising an engine cylinder, a main combustion chamber located above the cylinder, a spark plug within the main combustion chamber, an injection nozzle directed towards the main combustion chamber for injecting auxiliary fuel, and a cage having peripheral openings therein and a larger opening which is aligned with

the injection nozzle, the cage surrounding the spark plug tip and projectingly installed within the main combustion chamber in the path of auxiliary fuel flow from the injection nozzle for holding and vaporizing the flow of fuel from the nozzle.



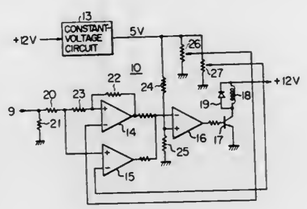
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**4,019,474**

**AIR-FUEL RATIO REGULATING APPARATUS FOR AN INTERNAL COMBUSTION ENGINE WITH EXHAUST GAS SENSOR CHARACTERISTIC COMPENSATION**

**Torazo Nishimiya, Mito, and Takao Sasayama, Hitachi, both of Japan, assignors to Hitachi, Ltd., Japan**

**Filed Oct. 30, 1975, Ser. No. 627,370**
**Claims priority, application Japan, Nov. 1, 1974, 49-125454**
**Int. Cl.² F02B *3/00***
**U.S. Cl. 123—32 EE** **3 Claims**




1. In an air-fuel ratio regulating apparatus for an internal combustion engine comprising fuel supply means for supplying fuel to suction means of the internal combustion engine, a combustion chamber for burning a fuel-air mixture supplied by said suction means, and detector means for detecting a specific component of exhaust emissions from said combustion chamber, said apparatus being adapted to regulate the amount of fuel supplied by said fuel supply means in accordance with the output of said detector means, the improvement comprising a first comparator having a hysteresis range and a second comparator having no hysteresis and having an operation level whose value is within the hysteresis range of said first comparator, said first and second comparators forming a circuit which receives a supply of output from said detector means for detecting the specific component of the exhaust emissions and which produces an output used for varying the volume of fuel supplied by said fuel supply means.

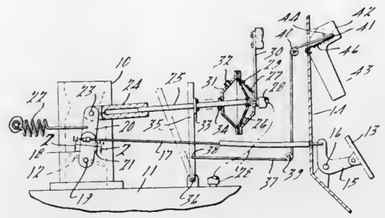
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**4,019,475**

**AUTOMOBILE ACCELERATION CONTROL FOR FUEL ECONOMY**

**Christopher Nuss, Warren, Mich., assignor to Chrysler Corporation, Highland Park, Mich.**

**Filed June 6, 1974, Ser. No. 477,125**
**Int. Cl.² F02D *11/08***
**U.S. Cl. 123—103 E** **8 Claims**



1. In a device for an automobile having a fuel and air inlet manifold and also having driver controlled throttle means for controlling the inlet flow in said manifold, means for alerting the automobile driver when the throttle means is opened too rapidly for acceptable fuel economy comprising the combination of yieldable means for opposing opening movement of said throttle means with a force detectable by said driver and being yieldable upon the application of additional throttle opening force by said driver to enable opening of said throttle means against said detectable force, and means for operatively connecting said manifold and throttle means and cooperable with said yieldable means for operating the latter to enable opening movement of said throttle means unopposed by said detectable force when the pressure in said manifold is less than a predetermined value corresponding to the extent of opening of said throttle means, said means for connecting comprising a pair of members arranged for movement in directions toward and from positions of throttle resisting relationship with respect to each other, means independent of said pressure for connecting said throttle means with one of said members for moving the latter in the directions toward and from said throttle resisting relationship in unison with opening and closing respectively of said throttle means, and reciprocating means responsive to said pressure and cooperable with the other of said members for urging the latter in the direction from said throttle resisting relationship whenever said pressure is less than said predetermined value, said yieldable means comprising means cooperable with said other member and reciprocating means for yieldingly opposing the pressure responsive operation of the latter urging said other member in the direction from said throttle resisting relationship and also for yieldingly urging said other member in the direction toward said throttle resisting relationship regardless of said pressure.

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**4,019,476**

**VAPORIZER APPARATUS**

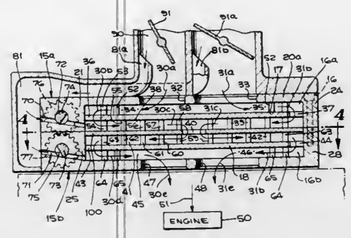
**Donald M. Ackley, 1115 17th St., Hermosa Beach, Calif. 90254**

**Filed Mar. 31, 1975, Ser. No. 563,693**
**Int. Cl.² F02M *23/02***
**U.S. Cl. 123—119 DB** **13 Claims**

1. In apparatus for enhancing vaporization of liquid particles entrained in a gaseous carrier,

a. means including a chamber and plates defining at least two flow paths for said carrier and particles, the carrier and particles in each path defining a flow stream, said plates extending in generally parallel and spaced apart relation, the flow paths separating and merging at opposite sides, respectively, of each plate,

b. said means including certain baffles proximate certain plate sides causing said separating flow streams to themselves divide and combine, and other baffles proximate other plate sides causing said merging flow streams to themselves divide and recombine, said baffles extending generally normal to the plates and being integral therewith to cause the flow to impinge on the baffles.



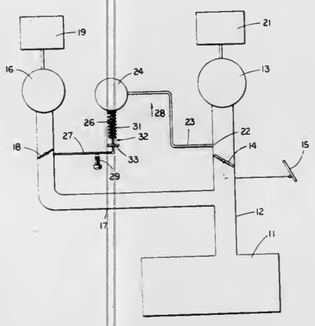

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**4,019,477**

**DUEL FUEL SYSTEM FOR INTERNAL COMBUSTION ENGINE**

**Delbert L. Overton, 9011 Hibben Ave., Indianapolis, Ind. 46229**

**Filed July 16, 1975, Ser. No. 596,514**
**Int. Cl.² F02M *13/04***
**U.S. Cl. 123—127** **13 Claims**



1. A dual fuel system for an internal combustion engine comprising:

primary fuel-air mixing means to produce a primary fuel-air mixture of a primary fuel and air;

auxiliary fuel-air mixing means to produce an auxiliary fuel-air mixture of an auxiliary fuel and air;

manually operable control means to control passage of the primary mixture to an intake manifold;

a vacuum source coupled to and influenced by said control means;

auxiliary fuel flow control means coupled to said auxiliary fuel-air mixing means and to said vacuum source for enabling increased auxiliary fuel-air mixture flow to said manifold in response to increasing vacuum above 3''Hg at said vacuum source and for decreasing auxiliary fuel-air mixture flow to said manifold in response to decreasing vacuum above 3''Hg at said vacuum source but maintaining auxiliary fuel-air mixture flow to said manifold notwithstanding source vacuum less than 3''Hg.



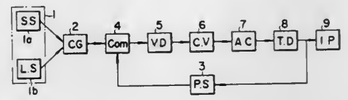
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**4,019,478**

**FUEL INJECTION TIMING CONTROL SYSTEM FOR INTERNAL COMBUSTION ENGINE**

**Nobuhito Hobo, Inuyama; Nizo Enomoto, Chita; Yutaka Suzuki, Nishio; Itsushi Kawamoto, Kariya; Michio Iyoda, Aichi; Yoshihiko Tsuzuki, Kariya; Kenro Sekino, and Hironari Nukata, both of Toyota, all of Japan, assignors to Nippondenso Co., Ltd., Kariya and Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, both of, Japan**

**Continuation of Ser. No. 381,385, July 23, 1973, abandoned.**
**This application Sept. 12, 1975, Ser. No. 613,017**
**Int. Cl.² F02M *3/00***
**U.S. Cl. 123—139 AP** **3 Claims**




1. A fuel injection timing control system for an internal combustion engine comprising:

a fuel injection timing control element provided in an injection pump; operating parameter detecting means for detecting the operating parameters of an engine in the form of electric signals, said detecting means including at least a speed signal generator for detecting the rotational speed of the engine and a fuel injection quantity signal generator for detecting the position of a fuel control rack of an injection pump; a control voltage generator for receiving the signals generated by said operating parameter detecting means and for generating a control voltage corresponding to a predetermined fuel injection timing control characteristic of the engine; an injection timing voltage generator for generating a voltage corresponding to the injection timing of said injection pump; a comparator for comparing said control voltage and said injection timing voltage to generate a deviation signal corresponding to the difference therebetween; and a driving circuit responsive to said deviation signal to actuate said fuel injection timing control element wherein when said fuel control rack of said injection pump reaches a predetermined position, a signal is generated by said fuel injection quantity signal generator for changing the control voltage of said control voltage generator from a control voltage corresponding to a first predetermined fuel injection timing control characteristic to a control voltage corresponding to a second predetermined fuel injection timing control characteristic of said engine.

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**4,019,479**

**APPARATUS FOR MODIFYING AN INTERNAL COMBUSTION ENGINE**

**Arthur Garabedian, Fullerton, Calif., assignor to Dudley B. Frank, Santa Ana, Calif.**

**Filed Sept. 6, 1974, Ser. No. 503,718**
**Int. Cl.² F02D *9/00*; F02M *13/04***
**U.S. Cl. 123—198 F** **16 Claims**

1. A split internal combustion engine having two stages of operation, said engine comprising:

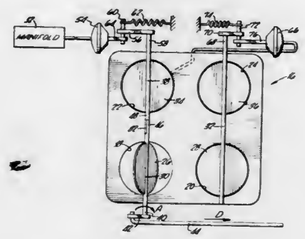
at least one primary cylinder;

at least one secondary cylinder, said primary and secondary cylinders receiving fuel and air to produce power in said engine;

a first carburetor throttle valve in fluid communication with said primary cylinder; and

a second carburetor throttle valve in fluid communication with said secondary cylinder, said first and second carburetor throttle valves respectively controlling the flow of said fuel and air to each of said primary and secondary cylinders, said first carburetor throttle valve supplying said fuel and air to said primary cylinder during both a

first stage of operation in which said engine is under relatively low load and a second stage of operation in which said engine is under relatively high load, said second carburetor throttle valve supplying said fuel and air to said secondary cylinder during only the second stage of



said two stages, said second carburetor throttle valve blocking the flow of said fuel and air to said secondary cylinder during the first stage of said two stages of operation, said secondary cylinder operating in a relatively high vacuum condition during said first stage.

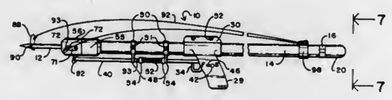
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**4,019,480**

## PNEUMATICALLY OPERATED SPEAR GUN

**Abdulwahab Kenaio, Rte. 1, Box 385, Elkton, Fla. 32233**

**Filed Dec. 29, 1975, Ser. No. 644,829**
**Int. Cl.² F41B** *11/00*
**U.S. Cl. 124—61** **10 Claims**



**1.** A spear gun (**10**) for underwater fishing and like purposes comprising a gun barrel (**14**), a pneumatic valve means (**16, 24**) secured (**24**) to the rear end (**16**) of said barrel (**14**) permitting a desired air pressure to be provided therethrough into said barrel, a valve protecting cap (**20**) threaded over said barrel rear end (**16**), a gun stock (**28**) secured (**30, 32**) about said gun barrel (**14**), a piston (**58**) fitting snugly yet slidably within said gun barrel, said piston (**58**) having a plurality of O-ring piston grooves (**60**) and O-rings (**64**) therein spaced apart along its cylindrical surface and a lubrication groove (**62**) intermediate each pair of O-ring piston grooves (**62**) maintaining the pressure in said barrel (**14**), said discharge end of said gun barrel (**14**) being externally threaded (**49**), a cylindrical bored plug (**55**) threaded at one end on said externally threaded discharge end (**49**) of said barrel, a bored head (**56**) having its rear end threadedly secured to the other end of said plug (**55**), a spear (**13**) having a cylindrical rod extendable through said bored plug (**56**) and through said bored head (**55**) into contact with the forward end (**68**) of said piston (**58**), said spear rod (**12**) having a conically reduced portion (**84**) adjacent to but spaced from its spearing end (**94**) providing a radial shoulder (**86**) facing toward said spearing end, said spearing end being threaded (**94**) to receive and secure a harpoon hook (**96**) thereon, a V-shaped spear lock (**74**) secured in said bored head (**56**) adjacent its bore to pivot (**72**) its upper tine (**73**) against said conical portion (**84**) of said spear rod (**14**) to abut said spear rod radial shoulder (**86**) when said shoulder is positioned thereagainst, an L-shaped sear (**78**) pivotally (**76**) secured in said head (**56**) with its upper L-leg (**80**) extending into the mouth of the V of said V-shaped spear lock (**74**) and with its other L-leg (**82**) extending externally of and below said head (**56**), a trigger rod (**40**) pivoted (**83**) at one end to said externally extending L-leg (**82**), the other end of said trigger rod (**40**) providing a trigger (**34**) extendable partly (**36**) into said gun stock (**28**), an eccentric trigger locking and releasing cam (**42**) pivoted (**44**) in said gun stock (**28**) and a manually operable lever handle (**46**) secured to said cam (**42**) extending externally of said gun stock (**28**) for rotating said cam to abut said trigger (**34**) and lock it against operation or for rotating it away from said trigger (**34**) for releasing said trigger for operation, a pair of spaced apart rings (**50**) secured (**51**) on said barrel (**14**) supporting depending bearings (**48**) about said trigger rod (**40**) through which said trigger rod may be freely reciprocated, a trigger spring (**52**) biased against one of said bearings (**48**) and against an abutment (**53**) secured to said trigger rod (**40**) biasing said trigger rod to spear rod locking position (**73** and **86**) whereby when said gun barrel has been pressurized (**66**) through said pneumatic valve (**22**) to the desired pressure, said spear rod (**12**) may be manually inserted and pressed against said piston (**58**) to push said piston against the pressure (**66**) in said gun barrel (**14**) to move said spear rod (**14**) into the gun barrel (**14**) until said trigger spring (**52**) biases said sear (**78**) to actuate said spear lock (**74**) into spear rod locking position abutting against said spear rod radial shoulder (**86**), and when said trigger (**34**) is pulled, after said eccentric cam has been rotated to the trigger releasing position, said spear lock (**74**) will release said spear rod (**12**) to be ejected from said gun barrel (**14**) under the pressure (**66**) in said gun barrel (**14**), said pressure (**66**) remaining substantially unimpaired in said barrel for subsequent operations of said spear gun.

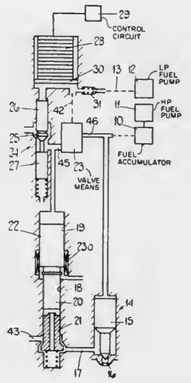
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**4,019,481**

## FUEL INJECTION SYSTEMS

**Paul Lakra, Wembley, England, assignor to C.A.V. Limited, Birmingham, England**

**Filed Mar. 4, 1976, Ser. No. 663,852**
**Claims priority, application United Kingdom, Mar. 7, 1975, 9519/75**
**Int. Cl.² F02M** *51/00*
**U.S. Cl. 123—139 E** **12 Claims**




**1.** A fuel injection system for supplying fuel to internal combustion engines, the system comprising an accumulator in which fuel is stored at a high pressure, pump means for charging the accumulator with fuel, a piston slidable within a cylinder, a fuel outlet from one end of the cylinder, said fuel outlet in use communicating with the inlet of an injection nozzle of the engine, valve means operable to place the other end of the cylinder in communication with said accumulator when it is desired to deliver fuel to the engine, said valve means when open allowing fuel to flow from the accumulator to said other end of the cylinder to cause displacement of said piston thereby to expel fuel from said one end of the cylinder, a stack of piezo electric crystals arranged when energised to generate a control pressure which is applied to a second piston forming part of said valve means to operate said valve means, an electrical control network for controlling the operation of said stack of crystals in timed relationship with the associated engine, said valve means comprising a second cylinder, said second piston being slidably located in said cylinder, a valve head connected to said second piston by a portion of reduced cross sectional area as compared with the piston, a valve seating for co-operation with said head, an outlet from said second cylinder intermediate the piston and the valve head, said outlet being connected to said other end of said first mentioned cylinder, said valve head being exposed to the pressure of fuel within the accumulator so that the valve head is forced onto the seating by the pressure of fuel within the accumulator, a third cylinder, a third piston slidable within said third cylinder, said third piston engaging said second piston, a fourth cylinder and a fourth piston within said fourth cylinder, said fourth piston engaging said third piston and at its end remote from said third piston being subjected to the fuel pressure within said accumulator, the area of said second and fourth pistons being substantially equal and also substantially equal to the seat area of the valve head, the area of said third piston being less than that of the fourth piston, said control pressure being applied to the presented faces of said second and third pistons and means for supplying a backing pressure to the presented faces of said third and fourth pistons, the control pressure when the stack of crystals is energised, being higher than said backing pressure but falling to a value less than the backing pressure when the crystals are de-energised, the arrangement being such that upon energisation of the crystals, the valve head will be moved away from the seating to permit flow of fuel from the accumulator to said first mentioned cylinder.



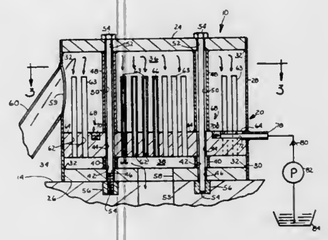
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**4,019,482**

## FUEL SEPARATOR

**Rocco J. Pugliese, 501 Emmons, Lincoln Park, Mich. 48146**

**Filed Feb. 5, 1976, Ser. No. 655,520**
**Int. Cl.² F02B** *25/06*
**U.S. Cl. 123—141** **7 Claims**



**1.** A fuel separating device adapted to be connected between a carburetor and an intake manifold of an internal-combusion engine for removing excess fuel from the fuel-air mixture provided by said carburetor, said device comprising:

a housing having upper and lower chambers;

plate means separating said chambers;

an inlet port for communicating with said upper chamber and adapted to be connected to the outlet of said carburetor for communicating the fuel-air mixture from said carburetor to said upper chamber;

an outlet port communicating with said lower chamber and adapted to be connected to the inlet of said manifold for communicating said fuel-air mixture from said lower chamber to said intake manifold;

a plurality of upright tubular members extending through said plate means, one end of each of said tubular members terminating in the upper regions of said upper chamber, the other ends of said tubular members opening into said lower chamber to provide a fluid flow passage for directing said mixture from said carburetor to said manifold while excess fuel droplets carried by said air-fuel mixture drop to the bottom of said upper chamber; and

means associated with said upper chamber for drawing off said excess fuel which accumulates therein.

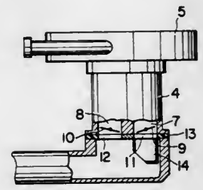
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**4,019,483**

## FUEL SYSTEM FOR MULTICYLINDER ENGINES

**Toshiaki Konomi; Jyoji Nurita, and Takeshi Masuda, all of Susono, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Japan**

**Filed July 15, 1974, Ser. No. 488,278**
**Claims priority, application Japan, Nov. 7, 1973, 48-124475**
**Int. Cl.² F02M** *29/00*
**U.S. Cl. 123—141** **9 Claims**



**1.** A duplex carburetor system comprising a primary barrel, a secondary barrel disposed on one side of said primary barrel laterally spaced therefrom, each of said primary and secondary barrels including a downstream end, intake manifold means in flow communication with both said downstream ends of said primary and secondary barrels arranged to direct flow from said downstream end of said primary barrel laterally in a direction toward said downstream end of said secondary barrel, a hollow cylindrical member having a first end attached in flow communication with said downstream end of said primary barrel and a second end extending into said intake manifold means, said primary barrel and said cylindrical member each including a central axis and being in general axial alignment with each other, a deflector attached to said cylindrical member adjacent said second end thereof and arranged on a side of said cylindrical member laterally remote from said secondary barrel, said deflector extending transversely to the axis of said cylindrical member and terminating at an edge extending chordally of said cylindrical member and spaced inwardly from the side of said cylindrical member closest to said secondary barrel, with said side of said cylindrical member closest to said secondary barrel being cut along a plane extending obliquely to the axis of said cylindrical member and passing through said edge, said plane also extending through a portion of said cylindrical member located upstream of said edge and forming an opening defined by said edge and said upstream portion of said cylindrical member, said opening facing in the direction of said secondary barrel.

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**4,019,484**

## IGNITION APPARATUS FOR INTERNAL COMBUSTION ENGINE

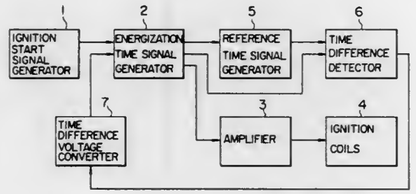
**Yasunori Mori, Hitachi, Japan, assignor to Hitachi, Ltd., Japan**

**Filed Feb. 10, 1975, Ser. No. 548,800**
**Claims priority, application Japan, Feb. 12, 1974, 49-16209; Apr. 30, 1974, 49-47671**
**Int. Cl.² F02P** *1/00*
**U.S. Cl. 123—148 E** **4 Claims**

**1.** In an ignition apparatus for an internal combustion engine comprising a direct current potential source, an ignition coil having a primary winding, an energizing circuit including a switching transistor for controlling an energizing current through said primary winding, an ignition signal generator for producing an alternating current ignition signal in timed relationship with the rotation of an engine, and an energization

time duration signal generator means for generating an energization time during signal in means for generating an energization time during signal in synchronism with said alternating current ignition signal, and wherein said energizing circuit for operating said switching transistor feeds said energizing current to said primary winding at the beginning of said energization time duration signal and breaks said energizing current at the end of said energization time duration signal;

the improvement comprising means for producing a reference time duration signal in synchronism with said energization time duration signal, a time duration difference detector means for producing a duration difference signal proportional to the difference in length of time duration between said reference time duration signal and said energization time duration signal, a feed back means to negatively feed back said time duration difference signal to said energization time duration signal generator means thereby minimizing the difference in length of time duration between said energization signal and said reference time signal.




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**4,019,485**

**FLYWHEEL MAGNETO HAVING CAPACITIVE IGNITION SYSTEM**

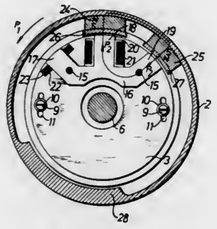
**Hans Thorsten Henrik Carlsson, Amal, Sweden, assignor to Aktiebolaget Svenska Electromagneter, Sweden**

**Continuation of Ser. No. 269,764, July 7, 1972, abandoned. This application Aug. 14, 1974, Ser. No. 497,296**

**Claims priority, application Sweden, Dec. 3, 1971, 15572/71**

**Int. Cl.² F02P** *1/00*

**U.S. Cl. 123—148 E** **2 Claims**



1. An ignition system comprising:

a. a flywheel having a plurality of permanent magnets with pole faces directed toward the rotational axis of the flywheel;

b. a ferromagnetic coil disposed inside said flywheel and comprising superimposed laminations, each individual lamination having three pole legs whose ends are disposed adjacent to the rotational path of said pole faces;

c. a charging coil disposed on the intermediate pole leg of said coil core;

d. a trigger coil disposed on the last leg of said coil core when viewed in the direction of rotation of the flywheel;

e. a charging circuit including said charging coil, a rectifier, a storage capacitor, and the primary winding of an ignition transformer, all connected together in a single series, said transformer having a secondary winding adapted to be connected in circuit with a spark plug;

f. a thyristor connected by its anode and its cathode across a portion of said charging circuit including the series-connected capacitor and the primary winding; and

g. means connecting one end of said charging coil to the anode of said thyristor, the other end of said charging coil being connected (1) through said trigger coil and a diode to the control terminal of said thyristor, and (2) through a resistor to said control terminal.

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**4,019,486**

**MOTOR IGNITION SYSTEM WITH MAGNETICALLY SELECTABLE GAS DISCHARGE DEVICES**

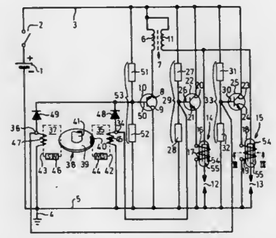
**Gert Siegle, Sperlingsstieg, Germany, assignor to Robert Bosch G.m.b.H., Stuttgart, Germany**

**Filed Nov. 14, 1974, Ser. No. 523,867**

**Claims priority, application Germany, Nov. 16, 1973, 2357188**

**Int. Cl.² F02P** *1/00*

**U.S. Cl. 123—148 E** **10 Claims**



1. In an ignition distribution system for a multi-cylinder internal combustion engine having a plurality of spark plugs arranged to receive their ignition voltage selectively from a common source, the improvement comprising the combination of:

a low-voltage source of current and means for energizing said ignition voltage source from said low-voltage current source during repeated pre-ignition periods;

a gas discharge device (**16,18**) interposed in series between each spark plug and said ignition voltage source, each said gas discharge device being so constituted that its gas discharge characteristic is subject to variation by the application of a magnetic field;

a first semiconductor switch (**10**) having a first and a second state for enabling said ignition voltage source to be energized in said first state and for causing a high voltage discharge from said voltage source in said second state;

means (**35,37,38,48,49,53**) controlled by the rotation of said engine for changing the state of said switch (**10**) from said first state to said second state at moments corresponding respectively to predetermined positions in a rotary cycle of said engine, for thereby initiating a discharge in a selected spark plug, and for restoring the state of said switch (**10**) to said first state promptly after said discharges are completed, and

means controlled by the rotation of said engine (**35,37,38,29,33,22,25,17,19**) for selectively applying, by current from said low-voltage source, a magnetic field in turn to each of said gas discharge devices without immediately producing a discharge therein upon the application of said field, and for applying said field in each case for a predetermined engine-rotation-controlled period beginning prior to one of said position corresponding moments and ending after the state of said first switch is next restored to said second state, said field applying means including a plurality of additional semiconductor switches (**22,25**) and a coil (**17,19**) individually encircling each of the respective gas discharge devices (**16,18**) and arranged for switching in succession to said low-voltage current source through one of said additional switches.



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**4,019,487**

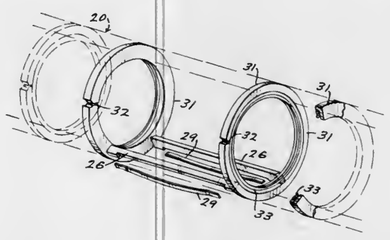
**ROTARY VALVE SEAL ASSEMBLY**

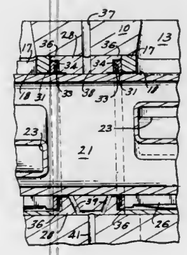
**William D. Guenther, Hagerstown, Ind., assignor to Dana Corporation, Toledo, Ohio**

**Filed Nov. 26, 1975, Ser. No. 635,713**

**Int. Cl.² F01L** *7/00*

**U.S. Cl. 123—190 E** **16 Claims**





1. A seal assembly for an internal combustion engine having a combustion chamber defined by a cylinder, a piston within the cylinder and a cylinder head and having a cylindrical, driven valve rotor adjacent the combustion chamber for establishing timed, sequential communication between the combustion chamber and a manifold through a diametrically extending passage to the valve rotor, said seal assembly comprising:

a cylindrical hollow rotor housing within the cylinder head and having a combustion side opening in communication with the combustion chamber and a manifold side opening in communication with the manifold, said openings being aligned for registry with the valve rotor passage upon rotation of the rotor;

first seal means within said housing, extending along the axis of the cylindrical valve rotor and located adjacent the axial lengths of each of said combustion side openings, said seals comprising a sealing surface in sealing contact with an outer wall of the valve rotor and having means for biasing said sealing surface against the rotor wall;

second seal means adjacent opposite ends of said housing and extending about the circumference of the valve rotor adjacent opposite ends of each of said combustion side openings and in abutting contact with ends of said first seal means; said second seals comprising an inside sealing surface in sealing contact with the outer wall of the valve rotor and means for inwardly biasing said sealing surface against the rotor wall;

a generally cylindrical hollow rotor bearing adjacent each opposing end of said rotor housing and in rotatively supportive engagement with said rotor;

means for spacing apart said bearing and said housing and for spanning said second seal whereby said second seal is free for axial movement on the rotor; and

means for axially biasing each of said second seals against said rotor housing.

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**4,019,488**

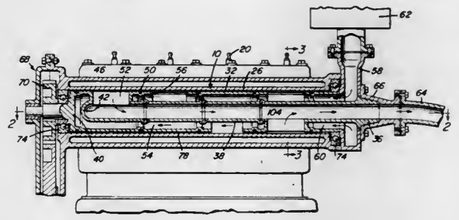
**ROTARY VALVE ENGINE WITH LUBRICATOR**

**Alphonse E. Kremer, 1900 E. Beach Blvd., Gulfport, Miss. 39501**

**Continuation-in-part of Ser. No. 398,789, Sept. 19, 1974, abandoned. This application Dec. 20, 1974, Ser. No. 534,868**

**Int. Cl.² F01L** *7/00*

**U.S. Cl. 123—190 BB** **8 Claims**



1. In an internal combustion engine having one or more cylinders, each cylinder having one port in the combustion chamber for the admission of air or combustible mixture and the discharge of combustion products, said engine having a rotary valve mechanism with a stationary sleeve communicating with the ports, a rotary member disposed in said sleeve and being rotatably driven, said rotary member comprising concentrically arranged and spaced inner and outer tubular members with the inner tubular member defining an exhaust passage and the annular space between the inner and outer tubular members defining an intake passage, said outer tubular member including an intake port for alignment with the port in communication with the combustion chamber, said inner tubular member including a radially extended passageway extending to the periphery of the outer tubular member is isolated relation to the annular space for communication with the port in the combustion chamber for selectively admitting air or a combustible mixture into the combustion chamber and discharging exhaust products therefrom through the port in the combustion chamber, said inner tubular member defining the exhaust passage and the annular space defining the intake passage being substantially straight throughout the length thereof, said inner tubular exhaust member being made in sections connected together with expansion joints, said outer tubular member being constructed of unitary construction, said expansion joints enabling transverse and longitudinal expansion of the inner tubular member thereby eliminating distortion of the outer tubular member due to differences in expansion and contraction.

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**4,019,489**

**SAFETY APPARATUS FOR ENGINES**

**George Bowen Cartmill, 43 Conifer St., Alderley, Queensland 4051, Australia**

**Filed Dec. 8, 1975, Ser. No. 638,559**

**Claims priority, application Australia, Dec. 9, 1974, 9943/74**

**Int. Cl.² F02B** *77/08*

**U.S. Cl. 123—198 D** **11 Claims**

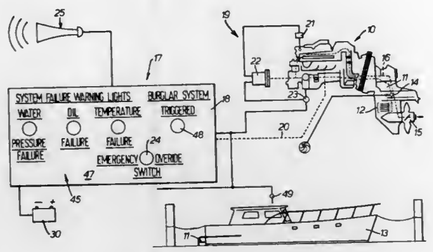
1. Monitoring and control apparatus in combination with a marine engine including:

a. flow detection means for monitoring the engine's coolant flow;

b. temperature detecting means for monitoring the engine temperature;

c. signal means associated with said flow detecting means and said temperature detecting means and adapted to transmit a signal upon detecting an abnormal operating condition of said coolant flow or said temperature;

d. alarm means associated with said signal means and activated upon receipt of a signal for said signal means;
e. automatic engine speed control assembly for reducing the speed of said marine engine upon receiving an operative signal from said signal means;
f. time delay means interposed between said signal means and said speed control assembly and arranged so that an



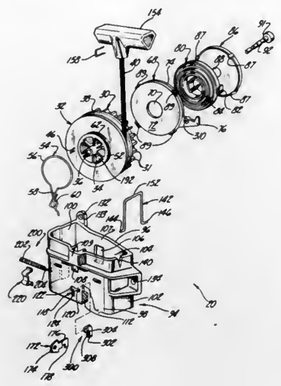

operative signal will not be transmitted to said speed control assembly until said abnormal operating condition continues for a predetermined period of time, and
g. manually operable override means operable to prevent actuation of said speed control assembly upon existence of said abnormal operating condition for a period longer than said predetermined period of time.

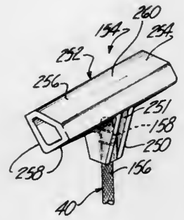
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**4,019,490**
**PULL-ROPE RECOIL STARTER**
**Paul T. Reese, New Holstein, Wis., assignor to Tecumseh Products Company, Tecumseh, Mich.**
**Filed May 9, 1975, Ser. No. 576,199**
**Int. Cl.² F02N** *1/00*
**U.S. Cl. 123—185 A** **68 Claims**

**1.** A pull-rope recoil starter for an internal combustion engine which has a first starter gear operatively coupled to an engine crankshaft, said starter comprising support means fixedly attached to said engine and having a pair of spaced slots extending in the direction of said first starter gear, engine cranking means including a second starter gear and having shaft means axially extending between said slots and slidably journalled therein for rotation about the axis of said shaft and bodily movement in a direction transverse to said axis, rope winding means operatively coupled to said second gear, a pull rope extractably wound upon said rope winding means for activation of said starter by an operator, said engine cranking means being responsive to pulling on said rope by an operator to translate said second gear in said slots into engagement with said first gear, continued pulling on said rope causing corotation of said starter gears to crank said engine, a recoil spring encircling said shaft axis and having an inner end operatively connected to said engine drive means, and a spring anchor operatively connecting an outer end of said recoil spring to said engine such that said recoil spring acts to translate said second gear in said slots out of engagement with said first starter gear when said rope is released by the operator.

**44.** A pull-rope handle comprising a T-shaped body having a hollow stem adapted to encompass a pull-rope and a head having oppositely projecting wings, each of said wings having a handle gripping surface which is substantially V-shaped in

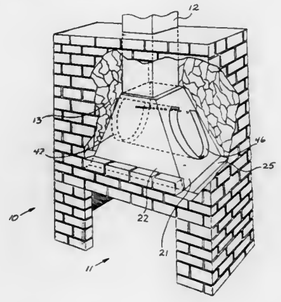




cross section axially of said wings proximate to and contiguous with said stem.

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**4,019,491**
**NO DOWN DRAFT CHIMNEY THROAT**
**Nicholas DiRocco, P.O. Box 3428, Incline, Nev. 89450**
**Filed Apr. 7, 1975, Ser. No. 565,724**
**Int. Cl.² F24B** *1/18*
**U.S. Cl. 126—120** **2 Claims**

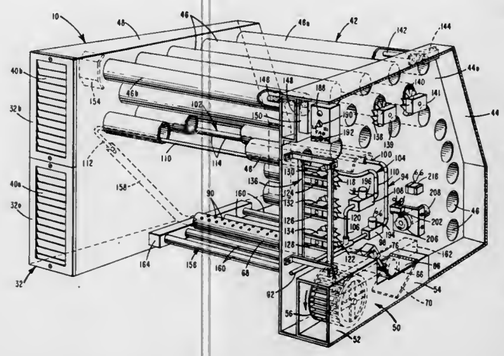


**1.** A no down draft chimney throat located beneath a chimney flue comprising: a chimney hood assembly containing no damper lid; and an air shelf consisting of a trough and located within the chimney hood assembly with one side and two ends adhering to said chimney hood assembly and one side not adhering to said chimney hood assembly so as to provide a passage for smoke between the said assembly and said non-adhering side, wherein the non-adhering side edge is positioned outside an imaginary vertical line drawn down the opening of the chimney flue so that water or debris or air coming down the chimney flue will not directly strike the outer edge of said non-adhering side, and wherein the said trough is provided with a cleaning hole adjacent its lower portion, the said cleaning hole being cooperative with another hole located in the outside of the chimney.



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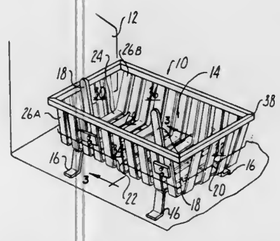
**4,019,492**
**METHOD AND APPARATUS FOR AUTOMATIC FURNACE**
**Joseph A. Rush, 26121 Cornor Drive, Damascus, Md. 20750**
**Filed Feb. 4, 1975, Ser. No. 547,085**
**Int. Cl.² F24B** *7/04*
**U.S. Cl. 126—121** **21 Claims**



**1.** In a furnace having a grate disposed therein and a heat exchanger disposed about the grate, the improvement comprising:
a. at least one perforated air delivery tube in communication with said heat exchanger for supplying combustion air to said furnace;
b. duct means forming a part of said heat exchanger for supplying air to said perforated air delivery tube; and
c. damper means in said duct means dor supplying air to said perforated air delivery tube for adjusting the amount of air communicated to said perforated air delivery tube, said damper means operating in response to predetermined temperatures existing within said furnace.

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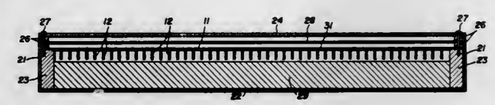
**4,019,493**
**GUARD FIXTURE FOR A FIREPLACE GRATE**
**Edward R. McCullough, 1219 Irving, Royal Oak, Mich. 48067**
**Filed Mar. 8, 1976, Ser. No. 665,048**
**Int. Cl.² F23H** *13/02*
**U.S. Cl. 126—165** **3 Claims**



**1.** For use in combination with a fireplace grate of the type having a frame formed of a plurality of spaced, substantially parallel rib members which extend fore and aft when placed in a fireplace opening and in application are supportive of a plurality of logs arranged in a stacked reltionship, said ribs being substantially perpendicular to the axes of extension of said logs, a guard fixture comprising: an elongate post of substantially greater length than width; a first flange plate integrally fixed to the elongate post at one end thereof and of greater width than said post; a second flange plate separate from said post and of greater width than said post, the first and second flange means each being of width greater than the spacing between adjacent rib members, and adapted to abut opposed sides of a pair of adjacent rib members; and fastener means extending between the flange plates for fastening the first and second flange plates in abutting relation with the pair of adjacent rib members whereby said post is affixed to the frame so as to cause it to project substantially upwardly with respect to the frame, the vertical height of said post substantially exceeding the height of said grate, the portion of said post that exceeds the height of said grate being operative to prevent logs within said stack from rolling forwardly out of said grate.

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**4,019,494**
**SOLAR AIR HEATER ASSEMBLY**
**Yahya B. Safdari, 610 E. Center, Eureka, Ill. 61530**
**Continuation-in-part of Ser. No. 594,532, July 9, 1975, abandoned. This application Aug. 11, 1976, Ser. No. 713,400**
**Int. Cl.² F24J** *3/02*
**U.S. Cl. 126—270** **12 Claims**



**1.** A heat exchange plate adapted for heat transfer to a stream of fluid moving in a direction generally parallel to and in contact with a face of said plate, comprising:
a generally flat heat-conducting base plate;
a plurality of flat thin heat-conducting fins attached to and extending outwardly from said face of said base plate;
said fins being arranged in a plurality of adjacent rows transverse to the direction of fluid flow, all of the fins in a row being generally parallel to the direction of fluid flow, the lateral spacing between adjacent fins in all rows being substantially constant, each row of fins being laterally displaced in one direction from the adjacent upstream row;
the lateral spacing between adjacent fins in a row being S, the length of the fins being about 0.75 S to 5.0 S, the height of the fins being about 1.0 S to 5.0 S, and the lateral displacement between fins in adjacent rows being about 0.1 S to 0.5 S.

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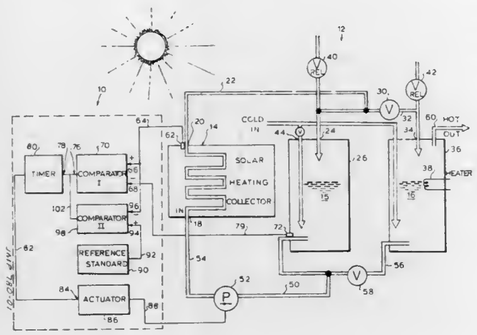
**4,019,495**
**CONTROL SYSTEM FOR SOLAR HEATER**
**Clive A. Frazier, 5325 Curry Ford Road A-203, and Marion L. Cunningham, 3210 Wickersham Ct., both of Orlando, Fla. 32806**
**Filed Dec. 29, 1975, Ser. No. 644,928**
**Int. Cl.² C24J** *3/02*
**U.S. Cl. 126—271** **17 Claims**

**1.** A system for controlling the flow of a liquid through a solar heating system of the type having the output of a solar energy collector coupled to the input of a storage tank and having a circulating pump interposed along a return liquid pipe coupled between the recirculating output of the storage tank and the input of the solar energy collector, the control system comprising in combination:
first temperature means for sensing the temperature of said liquid adjacent said output of said solar energy collector, said first temperature means generating a first signal responsive thereto;
second temperature means or sensing the temperature of said liquid at a second location within said solar heating

system, said second temperature means generating a second signal responsive thereto;

first comparator means, coupled between said first and second temperature means, for generating a run signal responsive to the difference between said first and second signals exceeding a predetermined level;

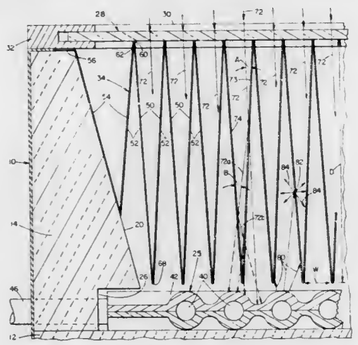
actuating means for powering said circulating pump responsive to said run signal, whereby said liquid is circulated within said solar heating system; and




timing means interposed between said first comparator means and said actuating means, said timing means for passing said run signal therethrough and for sustaining said run signal therethrough for a minimum time period if the duration of said run signal should be less than said minimum time period, whereby said circulation pump when activated will be powered for at least said minimum time period.

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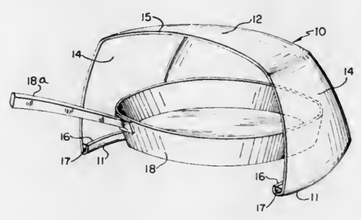
**4,019,496**
**COLLECTING SOLAR ENERGY**
**Richard Daniel Cummings, Reading, Mass., assignor to Daystar Corporation, Burlington, Mass.**
**Filed Apr. 7, 1975, Ser. No. 565,439**
**Int. Cl.² F24J** *3/02*
**U.S. Cl. 126—271** **12 Claims**



1. In a solar-to-thermal energy converter comprising an insulated frame, a solar energy absorber mounted in said frame, fluid flow heat exchanger means thermally coupled to said absorber to carry away as thermal energy the absorbed solar energy, and a window transmissive to solar energy mounted in said frame and spaced from said absorber, that improvement consisting of a heat loss suppressor comprising a multiplicity of walls extending between said window and said absorber, adjacent said walls being at least in part non-parallel to each other to define a first set of elongated channels generally diverging and opening toward said window interleaved with a second set of elongated channels generally diverging and opening toward said absorber, said walls being of material transmissive to solar energy and absorptive of thermal energy, adjacent said walls being at an acute angle to each other so that, (a) when said converter is installed with said channels extending generally parallel to an east-west arc, incoming sun rays passing through said window and impinging upon said walls will be split into a major transmitted component directed toward said absorber and a minor reflected component also directed toward said absorber, (b) said channels will be narrow enough to substantially reduce convection heat loss, and (c) said channels will be deep enough to substantially reduce radiation heat loss.

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**4,019,497**
**FRYING PAN GREASE SHIELD**
**Margaret R. Koons, 1300 Dorsh Road, South Euclid, Ohio 44121**
**Filed Oct. 30, 1975, Ser. No. 627,073**
**Int. Cl.² F24C** *15/00*
**U.S. Cl. 126—299 C** **1 Claim**



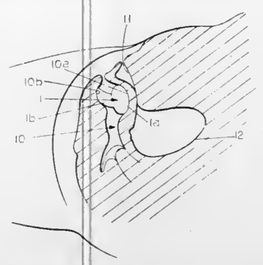
1. A frying pan grease shield consisting of an integral imperforate hollow shell having a planar open bottom edge and a top, and one end wall and two generally parallel side walls connected with said top and extending to said bottom edge, and the end opposite said one end being entirely open between said bottom edge and said top and side walls, and a continuous grease accumulation trough bent smoothly inward and then upward around said bottom edge along said side walls and one end wall, said trough having a continuous open top along its entire length and having partitions closing the ends of said trough at the open end of said shield, said shield sloping slightly outwardly and downwardly from the front center of said top to said side walls and end wall, and sloping outwardly and downwardly from top to bottom edge of said side walls and end wall to said trough sufficiently to cause gravity flow of hot grease along said walls to said trough.

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**4,019,498**
**DEVICE FOR CONTROL OF FEMALE URINARY INCONTINENCE**
**Charles E. Hawtrey, and Paul Walter Vervais, both of Iowa City, Iowa, assignors to The University of Iowa Research Foundation, Iowa City, Iowa**
**Filed June 27, 1975, Ser. No. 590,892**
**Int. Cl.² A61B** *19/00*
**U.S. Cl. 128—1 R** **7 Claims**

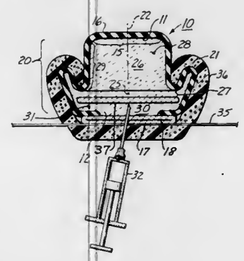
1. A device for insertion in the vagina to control incontinence comprising a solid mass of compressible cellular material having a major surface and a portion which extends to a selected distance away from said major surface, said device being of high enough compressibility and said distance being selected so that when said device is compressed and inserted in the vagina with said major surface contacting the anterior wall thereof and underlying a portion of the uretha, said portion firmly contacts the opposed wall of the vagina, and the device remains partially compressed between said anterior wall and said opposed wall with sufficient force to upwardly distend the contacted portion of the anterior vagina wall to close the uretha.





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**4,019,499**
**COMPRESSION IMPLANT FOR URINARY INCONTINENCE**
**Martin Bruce Fitzgerald, Santa Barbara, Calif., assignor to Heyer-Schulte Corporation, Goleta, Calif.**
**Filed Apr. 22, 1976, Ser. No. 679,250**
**Int. Cl.² A61B** *19/00*
**U.S. Cl. 128—1 R** **12 Claims**

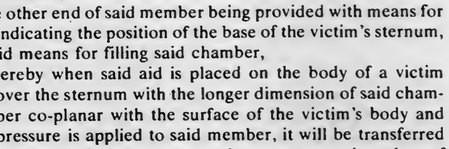


1. A compression implant to resist flow of urine through the urethra comprising: a flexible cap; and external pressure face on the cap; a base; a peripheral wall continuously interconnecting the cap and the base; a peripheral fold in the peripheral wall enabling the face to move toward and away from the base by changing the shape of the fold without stretching the material which forms the wall; the cap, base and peripheral wall defining an internal cavity; fluid-like material in the cavity including the portion of the cavity contiguous to the base, whereby the spacing apart of the face and base can be determined by selection of the amount of said fluid-like material in the cavity, and the resistance of the cap to force exerted on the pressure face which tends to move it toward the base can similarly be determined.

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**4,019,500**
**SPONGE RETAINING CUP FOR MEDICAL ELECTRODE**
**Charles T. Patrick, Jr., Centerville, Ohio, and David W. King, Connersville, Ind., assignors to NDM Corporation, Dayton, Ohio**
**Filed May 27, 1975, Ser. No. 580,622**
**Int. Cl.² A61B** *5/04*
**U.S. Cl. 128—2.1 E** **3 Claims**

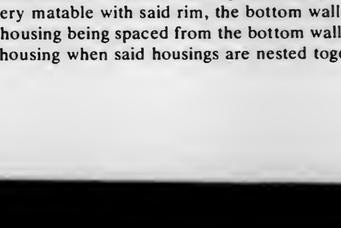
1. In an electrode cup having a base and a rim defining a cavity for receiving a prefilled electrolyte sponge, said electrode cup having a conductive element attached to said base and communicating with the interior of said cup for transmitting an electrical signal to or from said sponge, barb means affixed to said rim and sufficiently sloping downwardly toward the base of said cup for guiding said sponge when deposited thereon in free sliding movement toward the base of said cup



for contact with said conductive element, said barb means poised for snagging said sponge to prevent removal of said sponge from said cup after said sponge has slid on said barb means to the base of said cup.

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**4,019,501**
**CPR BREASTPLATE COMPRESSION AID**
**Jack R. Harris, 2606 W. Wolf St., Phoenix, Ariz. 85017**
**Filed Feb. 20, 1976, Ser. No. 659,673**
**Int. Cl.² A61H** *1/00*
**U.S. Cl. 128—24 R** **8 Claims**



1. A breastplate compression aid for placement on the chest of a human victim over the victim's sternum comprising:

an elongated compressible hollow member having approximately the length and shape of the sternum of an adult person,

said member defining a closed hollow chamber along its length having substantially an oval cross-sectional configuration,

a pressure gauge attached at one end of said member in fluid pressure contact with the hollow interior of said member,

the other end of said member being provided with means for indicating the position of the base of the victim's sternum,

fluid means for filling said chamber,

whereby when said aid is placed on the body of a victim over the sternum with the longer dimension of said chamber co-planar with the surface of the victim's body and pressure is applied to said member, it will be transferred to the victim's sternum and a representation thereof indicated on said gauge.

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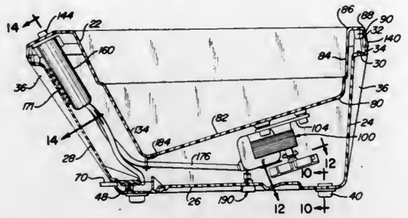
**4,019,502**
**HYDROTHERAPY DEVICES**
**Christopher W. Elkins, Fort Collins, Colo., assignor to Teledyne Water Pik, Fort Collins, Colo.**
**Filed Mar. 22, 1976, Ser. No. 669,283**
**Int. Cl.² A61H** *9/00*
**U.S. Cl. 128—65** **14 Claims**

1. A hydrotherapy device comprising:

a generally tub-shaped lower housing having an upper rim;

a generally tub-shaped upper housing of resilient material and nested within said lower housing and having an upper periphery matable with said rim, the bottom wall of said upper housing being spaced from the bottom wall of said lower housing when said housings are nested together;

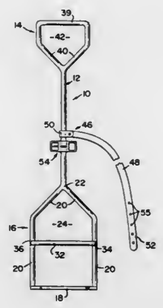
means for fastening said rim to said periphery as the only support of said upper housing;



and vibratory means secured to a wall of said upper housing and disposed between the respective walls of said housings.

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**4,019,503**
**CRADLE ASSEMBLY**
**Willie R. Smith, Rte. 2, Box 255, Inverness, Fla. 32650**
**Filed Dec. 1, 1975, Ser. No. 636,530**
**Int. Cl.² A61F 5/04**
**U.S. Cl. 128—83.5** **10 Claims**

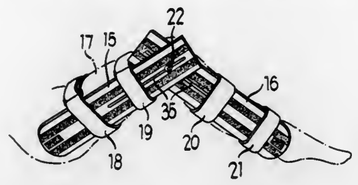


1. A cradle assembly of the type primarily for positioning a limb disposed in a cast structure, said cradle assembly comprising base means extending in interconnecting disposition between opposite end portions of said cradle assembly, stirrup means substantially defining one end of said cradle assembly, handle means connected to said base means at the substantially opposite end of said base means relative to said stirrup means, said base means comprising a rigid shaft element disposed in integral, interconnected relation between said stirrup means and said handle means, said stirrup means comprising an aperture means, said aperture means including a predetermined dimensioned configuration, whereby said stirrup means is disposed at least partially in surrounding relation to a portion of the casted limb.

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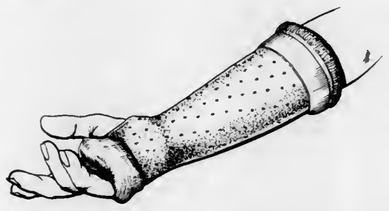
**4,019,504**
**MEDICAL SPLINT KIT**
**Robert E. Sterling, 210 Brom Bones Lane, Longwood, Fla. 32750**
**Filed May 7, 1975, Ser. No. 575,577**
**Int. Cl.² A61F 5/04**
**U.S. Cl. 128—88** **13 Claims**

1. An emergency medical-splint kit for application to an injured body portion at the site of an accident comprising:
   a. two substantially rigid elongated members substantially transparent to X-irradiation;
   b. fixing means for retaining said members adjacent to each other and in a substantially fixed relationship, said fixing means permitting changes in the relationship with which said members are affixed to each other;
   c. at least one web of sufficient dimension to wrap around a body portion for affixing said members adjacent to a body portion;
   d. holding means for adhering said web to said elongated members in a substantially fixed relationship, a first part of said holding means being connected to at least one of said elongated members and a second part of said holding means being connected to said web, said holding means allowing said web to be adhered to and removed from said one elongated member a plurality of times; and
   e. joining means forming part of said web means for, with said holding means adhering said web means to said elongated member and with said web means wrapped around said elongated member and a body portion, adjoining together two parts of said web means to affix said member adjacent to a body portion.



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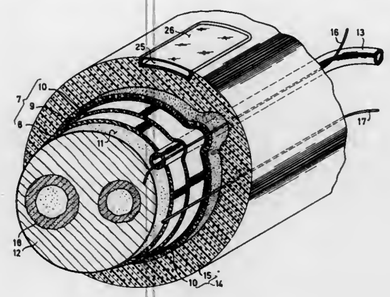
**4,019,505**
**METHOD OF FORMING AN ORTHOPEDIC CAST**
**Lloyd H. Wartman, Norwalk, Conn., assignor to Norman S. Blodgett, Worcester, Mass.**
**Continuation of Ser. No. 510,448, Sept. 30, 1974, abandoned.**
**This application Oct. 20, 1975, Ser. No. 623,736**
**Int. Cl.² A61F 5/04**
**U.S. Cl. 128—90** **3 Claims**



1. A method of forming an orthopedic cast, comprising the steps of:
   a. forming a flat sheet of a primary polymer in the form of poly (epsilon-caprolactone) having a melting point of between 50° C and 75° C and a half-time of crystallization at body temperature greater than 1 minute but less than 20 minutes, wherein the primary polymer is coated on a substrate, the substrate being a solid at the melting point of the primary polymer, the substrate being formed of an open weave netting of a secondary polymer, which secondary polymer is capable of being thermoformed by viscous flow at temperatures between 90° C and 170° C,
   b. heating the sheet to the thermoforming temperature of the substrate a secondary polymer, molding the sheet to a preform contour suitable for conforming to a portion of the body and, immobilizing the pre-form by cooling,
   c. subsequently heating the pre-form to a temperature above the softening point of the primary polymer but below the thermoforming temperature of the secondary polymer by immersing the pre-form in water at a suitable temperature,
   d. applying the pre-form to the portion of the body to be immobilized, and
   e. allowing the sheet to cool to body temperature.



**4,019,506**
**RIGID SUPPORTING BANDAGE AND METHOD FOR APPLYING SAME**
**Peter Eschmann, 82 Weinbergstrasse, 8006 Zurich, Switzerland**
**Filed Mar. 8, 1976, Ser. No. 665,052**
**Claims priority, application Switzerland, Mar. 14, 1975, 3168/75**
**Int. Cl.² A61F 5/04**
**U.S. Cl. 128—90** **21 Claims**

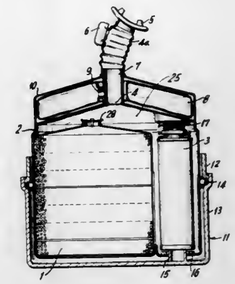


1. A rigid supporting bandage being applied in situ for fixing and repositioning a part of the live body which is at least partially covered with skin, which bandage comprises
   a. a flexible base layer of textile material adapted to lie innermost on the body part to be fixed and repositioned, and being adapted to the shape of said body part,
   b. an outer layer of hard self-cured synthetic polymer resin on the outside of said bandage, and
   c. an intermediate layer on top of said base layer and underneath said layer of polymer resin, and consisting essentially of several plies of meshes of textile material filled with the same hard polymer resin which constitutes said outer layer;
   at least the innermost ply of meshes of said base layer being free from said hard polymer resin,
   said base layer having at least one front end uncovered by said intermediate and outer layers, and containing channels which open at said at least one front end to the outside of said bandage, said channels being covered, on the side thereof toward said body part, by said innermost polymer resin-free ply of meshes of said base layer.

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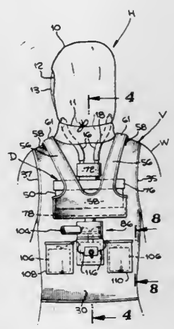
**4,019,507**
**PROTECTIVE BREATHING DEVICE HAVING A FILTERING APPARATUS AND ADDITIONAL OXYGEN SUPPLY FOR EMERGENCY USE**
**Georg-Wilhelm Oetjen, and Ernst Warncke, both of Lubeck, Germany, assignors to Dragerwerk Aktiengesellschaft, Germany**
**Filed Sept. 24, 1975, Ser. No. 616,208**
**Claims priority, application Germany, Sept. 28, 1974, 2446410**
**Int. Cl.² A62B 7/08, 7/10; A61M 16/00**
**U.S. Cl. 128—142 R** **5 Claims**

1. A protective breathing device, comprising a housing having an upper portion with a breathing duct passage terminating in an outer end having a fitting for breathing by a user, said housing upper portion having an economy chamber therein communicating with said duct, exhaling valve means connected to said duct, said housing including a lower portion with an ambient air inlet opening, a filter positioned over the opening and having an inlet adjacent its lower end communicating with the opening for the passage of ambient air therethrough and also having a discharge adjacent its upper end communicating through said housing to said duct, check valve means in said filter outlet permitting flow only out of said filter outlet, a solid oxygen supply cartridge in said housing lower portion adjacent said filter and having a top end with a discharge communicating with said duct, and firing means connected to said cartridge to effect the liberation of oxygen therefrom out through said cartridge discharge into said duct and into said economy chamber for release through said fitting.



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**4,019,508**
**WEARABLE, SELF-CONTAINED FULLY MOBILE PERSONAL BREATHING APPARATUS FOR SURGEONS AND OPERATING ROOM PERSONNEL**
**Estephan Der Estephanian, Altadena; Robert E. Foreman, Santa Ana; Robert D. Scott, West Covina, and Odd Friis, Huntington Beach, all of Calif., assignors to Research Development Systems, Inc., Pasadena, Calif.**
**Filed May 21, 1976, Ser. No. 688,734**
**Int. Cl.² A62B 7/02**
**U.S. Cl. 128—142.7** **19 Claims**



1. A wearable, self-contained and fully mobile personal breathing apparatus to be worn by a surgeon or like operating room wearer to control contamination of operating room space by the air normally expired by such wearer during surgery, the apparatus comprising:
   vest means adapted to fit closely about the upper body of the wearer,
   an expiried-air-decontaminating high efficiency, particulate air filter means for removing from said expired air entering the filter upstream side 99.9 percent of all particulate contaminants therein above 0.1 micron in size, said vest means including means for supporting said filter means, means for capturing wearer-expired air at its locus of expiration in locus unconfining relation and for directing said expired air to the upstream side of said filter means including conduit means communicating said locus with the upstream side of said filter means, and means arranged to return air thus decontaminated to said operating room space from the downstream side of said filter

including a blower connected to the downstream side of said filter means inducing expired air flow in said conduit and through said filter in decontaminating relation.

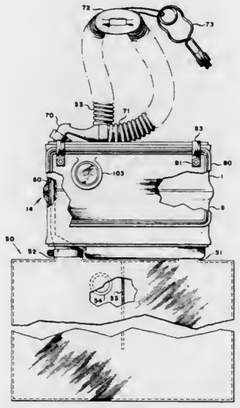
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**4,019,509**

## SELF-RESCUE BREATHING APPARATUS

**Yi-Sheng Li, San Mateo; Rudolph Cesar Leon, Sr., Cupertino, and Eugene Norman Perry, Sunnyvale, all of Calif., assignors to Lockheed Missiles & Space Company, Inc., Sunnyvale, Calif.**

**Filed Aug. 28, 1975, Ser. No. 608,723**
**Int. Cl.² A62B** *7/08*
**U.S. Cl. 128—147** **11 Claims**



1. In a lightweight, self-contained, personal breathing apparatus including a casing containing a canister, a plurality of parallelly disposed discrete layers of chemical constituting a bed adapted to react with the $CO^2$ and moisture in exhaled breath to produce oxygen, a mouthpiece incuding an exhalation one-way valve connected via an exhalation conduit to an input port on one side of said chemical bed, a flexible reservoir bag having an input port and an output port, an output port on the other side of said chemical bed connected to the input port of the flexible reservoir bag, a chimney juxtaposed in said casing to said canister, one end of said chimney connected to the output port of said flexible bag, the opposite end of said chimney connected to the inlet valve in said mouthpiece via an inhalation conduit, and in which said layers of chemical are separated by pairs of spaced screens spaced from the bottom wall of said canister, the improvement in which

said canister is provided beneath said chemical bed with a trammel to prevent deliquesced chemical from entering into the bag,

said trammel comprising a tubular duct essentially parallel to and spaced from the bottom wall of said canister and supported therefrom by a tubular support which interconnects one end of said duct with the inside of said bag, the opposite end of said duct communicating with the interior of said canister being downwardly truncated to provide an upper surface overhanging the lower,

a pair of angular baffles, generally L-shaped in cross section, secured to said canister and extending generally parallel to said duct and substantially across approximately one half of the bottom of said canister, said opposite end of said duct positioned over said pair of angular baffles,

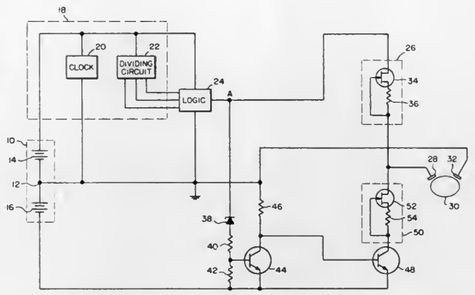
one generally horizontal leg of said angular baffle positioned between the lower surface of said duct and the bottom wall of said canister.

**4,019,510**

## THERAPEUTIC METHOD OF USING LOW INTENSITY DIRECT CURRENT GENERATOR WITH POLARITY REVERSAL

**Franklin Hammond Ellis, Rochester, N.Y., assignor to Sybron Corporation, Rochester, N.Y.**

**Filed Feb. 10, 1975, Ser. No. 548,352**
**Int. Cl.² A61N** *1/36*
**U.S. Cl. 128—172.1** **2 Claims**




1. A method of therapeutic healing skin lesions, ulcers, and the like, comprising the steps of:

maintaining electrodes at least one of which is silver bearing in proximity to said skin lesions, ulcers, and the like;

applying a first current flow of positive polarity having a first magnitude in the order of 4 microamps through said electrodes for a first period of time in the order of 50 minutes;

applying a second current flow of negative polarity and having a second magnitude in the order of 250 microamps for a second period of time in the order of 5 minutes through said electrodes, and

alternately repeating said applying steps for the duration of the therapy.

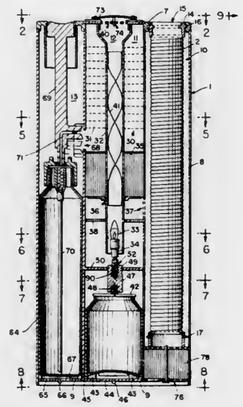
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**4,019,511**

## PORTABLE CONDITIONED AIR BREATHING DEVICE

**Peter N. Choporis, 543 S. Beverly Lane, Arlington Heights, Ill. 60005, and Robert N. Choporis, 880 N. Lake Shore Drive, Chicago, Ill. 60611**

**Filed Sept. 11, 1975, Ser. No. 612,278**
**Int. Cl.² A62B** *7/12*
**U.S. Cl. 128—212** **16 Claims**



1. A portable conditioned heated air breathing device comprising a compartmented canister having a top, sides and bottom and containing a plurality of side by side compartments running from the top toward the bottom thereof, said compartments comprising:

a. a conditioned air and breathing tube means compartment containing breathing tube means and having exit means for said breathing tube means at the upper end of said compartment and an inlet opening in a sidewall for transmitting conditioned air to said compartment, whereby conditioned air can be transmitted from said compartment through said tube breathing means to the user,

b. an air conditioning compartment adjacent said compartof (a) having one or more openings in a sidewall and at the upper end thereof and an outlet opening in a sidewall thereof communicating with said inlet opening in said compartment of (a), passageways extending longitudinally of and adjacent to said air conditioning compartment and having air inlet openings at the lower ends thereof adjacent the lower end of said canister, said passageways communicating with said air conditioning compartment via said inlet openings in the sidewall thereof, whereby fresh air enters said air inlet openings in said passageways and passes through said inlet openings at the upper end of said air conditioning compartment.

c. a heating compartment in heat exchange relationship with said compartment of (b), said compartment of (b) being airtight with respect to said heating compartment and said heating compartment comprising an elongated metal tube and heating means for said tube whereby the walls of said tube are heated, said heated walls being within and spaced from the inner walls of the compartment of (b) whereby fresh air introduced into said inlet openings of said compartment of (b) passes along said heated walls and is heated by heat exchange therewith prior to passing through said outlet opening to said compartment of (a) and therefter through said tube breathing means.



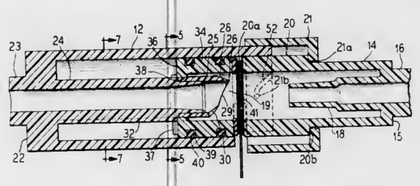
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**4,019,512**

## ADHESIVELY ACTIVATED STERILE CONNECTOR

**Francis J. Tenczar, P.O. Box 42919, Evergreen Park, Ill. 60642**

**Filed Dec. 4, 1975, Ser. No. 637,750**
**Int. Cl.² A61M** *5/14;* **F16L** *37/24*
**U.S. Cl. 128—214 R** **16 Claims**



1. A connector assembly for transferring fluids from one source to another under contaminant precluding conditions, including

a first connector having one end for conduit connection to a fluid source and an opposite open end, a first tubular coupling element positioned within said first connector, said first tubular coupling element being communicable with said conduit connection, a penetrating end associated with said first tubular coupling element,

a second connector having one end for conduit connection to a fluid source and an opposite open end, a second tubular coupling element positioned within said second connector, said second tubular coupling element being communicable with said conduit connection, said second tubular coupling element having an end engageable with said first tubular coupling element,

a penetratable barrier assembly closing the open end of each of the connectors, each barrier assembly including a penetratable barrier and a removable protective member, an adhesive film covering a substantial portion of the area between the barrier and the protective member in at least one of said barrier assemblies, said protective member having a barrier portion covering the penetratable barrier, and a handle portion folded over the barrier portion and extending beyond the connector, said handle portions progressively exposing said adhesive film upon being pulled to progressively adhere the protective barriers to each other, and

means to permit relative movement between the penetrating end and the adjoined barriers so that said penetrating end moves through said area of adhesion, said first coupling element engages said second coupling element to establish a fluid path after the adhered barriers are penetrated, said fluid moving through said engaged coupling elements without contacting the penetrated barriers on the penetrating end.

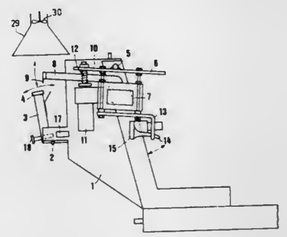
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**4,019,513**

## AUTOMATED APPARATUS FOR SHAPING THE BEAK OR BILL OF YOUNG FOWL

**Janeck Kaniecki, Pacy-sur-Eure, France, assignor to Jean Lissot, Pacy-sur-Eure, France**

**Filed Aug. 4, 1975, Ser. No. 601,423**
**Claims priority, application France, Aug. 7, 1974, 74.27481**
**Int. Cl.² A61B** *17/00;* **A61D** *1/00*
**U.S. Cl. 128—223** **10 Claims**



1. An apparatus for shaping beaks of fowl, said apparatus comprising a blade, first support means mounting said blade for reciprocation along a path, a platen member for reception in the mouth of a fowl with the upper part of the beak of a fowl supported thereon, second support means mounting said platen member for movement between a retracted beak receiving position and a forward operative position aligned with the path of said blade means for varying the forward operative position of said platen member within the path of said blade to vary the length of a cut upper beak, drive means connected to said first support means for effecting reciprocation of said blade, and control means for said drive means, said control means including means responsive to movement of said second support means to said forward operative position whereby said blade reciprocates toward said platen member to trim an upper part of a beak to a predetermined length.

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**4,019,514**

## SURGICAL SYSTEM FOR CONTROLLING THE INFUSION OF FLUID TO AND THE EVACUATION OF FLUID AND MATERIAL FROM AN OPERATING FIELD

**Anton Banko, Bronx, N.Y., assignor to Surgical Design Corporation, Long Island City, N.Y.**

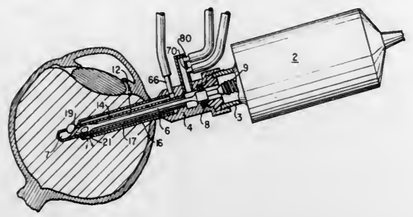
**Continuation-in-part of Ser. No. 475,398, June 3, 1974, Pat. No. 3,920,014. This application Nov. 17, 1975, Ser. No. 632,768**
**Int. Cl.² A61M** *1/00*
**U.S. Cl. 128—230** **10 Claims**

1. In combination, a system for use with a surgical instrument of the type having an operative portion at an operating site with the operative portion including selectively operable

means for separating material from the object being operated on, a first means for delivering an infusion fluid to the operating site and a second means for removing separated material from the operating site,

a source of infusion fluid,

means including a single valve means for supplying infusion fluid from said source at variable pressure to said first means of said instrument,



means producing a pressure differential condition at said second means of the instrument with respect to the pressure of the infusion fluid at said first means to provide removal of material from the operating site,

and means for selectively operating said single valve of said infusion fluid supply means in first and second conditions wherein in the first condition when said means for separating material is inoperative to produce a lower pressure than when in said second condition when the means for separating material is operative.

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**4,019,515**

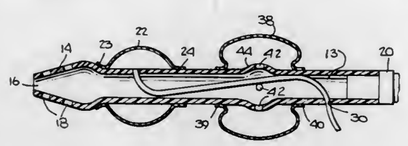
**ENEMATA ADMINISTERING DEVICE**

**Daniel Kornblum, 4606 W. Central Ave., Toledo, Ohio 43615, and John S. Efroymson, 5154 Saddlecreed Road, Toledo, Ohio 43623**

**Filed Dec. 8, 1975, Ser. No. 638,337**

**Int. Cl.² A61B 6/00; A61M 25/00**

**U.S. Cl. 128—246** **11 Claims**



1. In an enemata administering device having a hollow stem with an exit port at a first end thereof and an inlet at the second end thereof, the improvement comprising:

a first inflatable and deflatable annular retention balloon sealed across a portion of the stem near the forward end thereof,

an airway extending to a first post in the stem under said first balloon to provide inflation and deflation of said first balloon, and

a second inflatable and deflatable annular balloon sealed across a portion of the stem rearward from said first balloon,

said stem having a second port providing communication between the interior of said stem and the interior of said second balloon,

said second balloon inflating solely when liquid is flowed through said stem, and said first balloon inflating solely when fluid is forced through said airway,

when said balloons are so inflated, said second balloon automatically conforming to a patient's external anatomy and causing the inflated first balloon to be held in a sealing position within the patient.

**4,019,516**

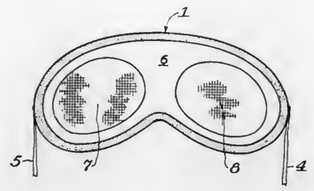
**EYE SHIELD DEVICE**

**Rosemarie D'Auria, Jersey City, N.J., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest**

**Filed Nov. 10, 1975, Ser. No. 630,677**

**Int. Cl.² A61F 7/02**

**U.S. Cl. 128—268** **1 Claim**



1. An eye shield device, comprising

an eye covering member comprising a unitary strip of opaque material having an inner surface adjacent the eyes of a wearer when in use;

layers of padding material affixed to the inner surface of the opaque material;

fastening means on the eye covering member for removably affixing said member over the eyes of a wearer;

a pair of spaced recesses formed in the layers of padding material and bounded by the adjacent inner surface of said unitary strip of the eye covering member over the eyes of a wearer; and

a pair of medicated eye pads removably accommodated in said recesses for applying medication to the eyes of a wearer.

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**4,019,517**

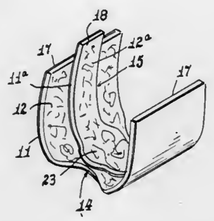
**DISPOSABLE DIAPER**

**Jacob A. Glassman, 1680 Meridian Ave., Miami Beach, Fla. 33139**

**Filed July 2, 1975, Ser. No. 592,406**

**Int. Cl.² A61F 13/16**

**U.S. Cl. 128—284** **5 Claims**



1. A double-duty diaper comprising, in combination, a main diaper including at least one relatively thick, substantially rectangular layer of highly moisture-absorbent material having a longitudinal central portion, an insert strip of less width than the main diaper also of highly moisture absorbent material superimposed on said longitudinal central portion of and being lightly adhered to the inner surface of said one layer, means carried by the main diaper for securing same about the waist portion of a human body with said insert strip in position to contact the body, and means for removing said insert strip from the main diaper without corresponding removal of or impairment of the diapering potential of said main diaper comprising said insert strip having length greater than that of the longitudinal central portion of the main diaper whereby at least one end of the insert strip extends as a pull tab beyond a related end edge of the main diaper.



**4,019,518**

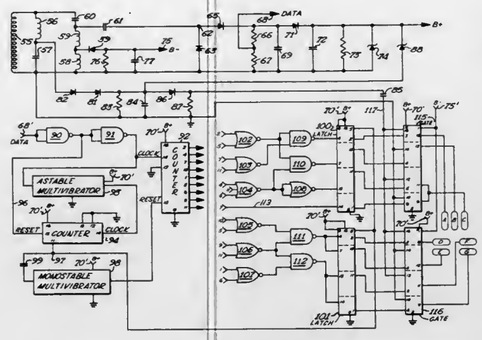
**ELECTRICAL STIMULATION SYSTEM**

**Donald D. Maurer, Anoka, and Paul D. Sorenson, Blaine, both of Minn., assignors to Medtronic, Inc., Minneapolis, Minn.**

**Filed Aug. 11, 1975, Ser. No. 603,434**

**Int. Cl.² A61N 1/34**

**U.S. Cl. 128—419 R** **34 Claims**




1. In an electrical stimulation system for selectively stimulating portions of the body of the type having external means for transmitting stimulus signals and control signals, implantable means for receiving said transmitted signals, a plurality of output means adapted to apply said stimulus signals to the body and means interconnecting said receiving means and said output means and responsive to said control signals for routing said stimulus signals to said output means, the improvement wherein: said output means are adapted for combination in a plurality of preselected configurations: said transmitting means includes means for alterably preselecting a predetermined characteristic of each control signal, said predetermined characteristic manifesting a desired one of said output means configurations; and said routing means comprises means for selectively routing said stimulus signals to the desired output means configuration in accordance with the predetermined characteristic of said control signals.

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**4,019,519**

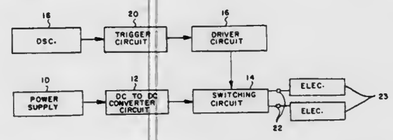
**NERVE STIMULATING DEVICE**

**Leonardus Johannes Geerling, Hillsboro, Oreg., assignor to Neuvex, Inc., Portland, Oreg.**

**Filed July 8, 1975, Ser. No. 594,024**

**Int. Cl.² A61N 1/36**

**U.S. Cl. 128—422** **12 Claims**




9. A nerve stimulating device for stimulating nerves of a body comprising:

oscillator means for producing variable rate timing pulses;

trigger circuit means for receiving said timing pulses and for generating trigger signals of predetermined pulse width;

driver circuit means for receiving said trigger signals and for generating driving signals in response thereto;

voltage conversion means for providing adjustable regulated voltages; and

switching means for receiving said driving signals and said adjustable regulated voltages and producting output timed pulses of amplitude equal to said regulated voltages and of constant width; and

electrode means connected to said switching means and adapted to be secured to a selected area of a body so that said timed pulses stimulate the nerves at said selected area.

**4,019,520**

**TOBACCO SUBSTITUTE CONTAINING BORIC OXIDE, BORON OXYACIDS, AND AMMONIUM, ALKALI METAL, OR ALKALINE EARTH METAL SALTS OF BORON OXYACIDS**

**David G. Strubel, Jeffersontown, and Robert R. Johnson, Louisville, both of Ky., assignors to Brown & Williamson Tobacco Corporation, Louisville, Ky.**

**Filed Nov. 25, 1974, Ser. No. 527,175**

**Int. Cl.² A24D 1/18**

**U.S. Cl. 131—2** **33 Claims**

21. A tobacco substitute comprising:

a. from about 2 to about 25% by weight of a boron compound selected from the group consisting of boric oxide, a boron oxyacid, and ammonium, alkali metal, and alkaline earth metal salts of a boron oxyacid;

b. from about 40 to about 93% by weight of an inorganic filler selected from the group consisting of alumina, alumina trihydrate, magnesium carbonate, calcium carbonate, and charcoal;

c. up to about 15% by weight of a material selected from the group consisting of monoammonium phosphate or diammonium phosphate; and

d. from about 5 to about 35% by weight of an organic binder

e. wherein during combustion said boron compound melts or fuses to form a stable ash.

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**4,019,521**

**SMOKABLE MATERIAL AND METHOD FOR PREPARING SAME**

**Theodore S. Briskin, Beverly Hills, Calif., assignor to Philip Morris Incorporated, New York, N.Y.**

**Continuation of Ser. No. 367,447, June 6, 1973, abandoned. This application Mar. 27, 1975, Ser. No. 562,735**

**Int. Cl.² A24B 15/00**

**U.S. Cl. 131—2** **5 Claims**

1. In the method of producing a smokable material, the steps of exposing a carbohydrate material selected from the group consisting of cellulose, cellulosic derivatives, starch, pectin, polyvinyl alcohol, gum and aliginates to a temperature of from about 350° to about 750° C for a time sufficient to effect a weight loss of at least about 50% but not more than 90%, said time being not more than about 10 minutes, maintaining the material in a non-oxidizing gas during the heat treatment, and then processing the thermally reacted product to a form desired for the smoking material.

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**4,019,522**

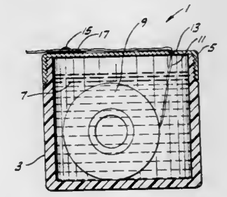
**DENTAL HYGIENE PACKAGE**

**Charles H. Elbreder, 1702 Chase Drive, Fenton, Mo. 63026**

**Continuation-in-part of Ser. No. 541,636, Jan. 16, 1975, abandoned. This application May 5, 1976, Ser. No. 683,268**

**Int. Cl.² A61C 15/00**

**U.S. Cl. 132—90** **12 Claims**



1. A dental hygiene package comprising:

a container;

a body of viscous material including a dental medicament in said container, said material hving a viscosity in the order of between 2,500 and 78,000 centipoises;

a supply of dental floss immersed in said body of material

thereby to impregnate the floss and adhere to the strands thereof;

an orifice in said container through which the medicament-carrying dental floss may be withdrawn from said container, said orifice being of a size substantially larger than the cross-section of the floss and having a size and shape relative to that of the floss whereby a predetermined and controlled amount of medicament is supplied per length of medicament-carrying floss drawn through the orifice from said container; and

means secured to said container for severing the medicament-carrying floss into desired lengths.

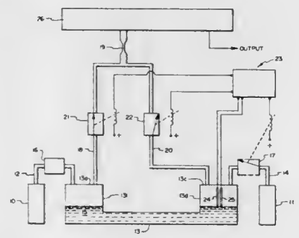
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**4,019,523**

## METHOD AND APPARATUS FOR MIXING GASES

**Justin S. Clark, 720 E. 3120 South, Salt Lake City, Utah 84106, and Wm. Dean Wallace, 408 Second Ave., Salt Lake City, Utah 84103**

**Filed Feb. 7, 1975, Ser. No. 547,856**
**Int. Cl.² G05D** *11/13*
**U.S. Cl. 137—7** **4 Claims**




1. A method of mixing gases, which comprise the steps of

a. balancing the pressures of gases to be mixed against one another until the gases are all at the same pressure;

b. sequentially flowing the gases through a common restrictor while maintaining the pressures in a balanced condition; and

c. regulating the flow of each gas through the restrictor to a mixing chamber according to a time that is proportionate to the desired concentration of the gas in the mixing chamber and flow ratios of the gases.

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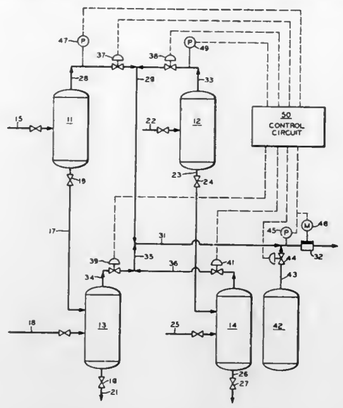
**4,019,524**

## USE OF EQUALIZATION CHAMBER IN DISCONTINUOUS VENTING OF VESSEL

**Bobbie L. Whitson, and John A. Morgan, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.**

**Continuation of Ser. No. 391,662, Aug. 27, 1973, abandoned, which is a division of Ser. No. 225,171, Feb. 10, 1972, Pat. No. 3,780,761. This application June 17, 1976, Ser. No. 697,005**
**Int. Cl.² G05D** *7/06, 16/20*
**U.S. Cl. 137—14** **15 Claims**

13. A method of venting on a discontinuous basis gas from a first vessel wherein each venting operation for said first vessel comprises: venting said first vessel by withdrawing gaseous material from said first vessel by providing fluid communication between said first vessel and a second vessel, having a significantly lower initial gas pressure than said first vessel, for a period of time sufficient for the gas pressures in said first and second vessels to at least substantially reach equilibrium condition, thereby transferring an equilibrium quantity of gaseous material from said first vessel to said second vessel; discontinuing said fluid communication at the end of said period of time to isolate said first vessel from said second vessel; and thereafter withdrawing from said second vessel the equilibrium quantity of gaseous material, transferred thereto from said first vessel, until the gas pressure in said second vessel reaches said lower initial gas pressure by providing fluid communication between said second vessel and the inlet of a gas compressing means, while said first vessel is isolated from the inlet of said gas compressing means, until




the gas pressure in said second vessel reaches said lower initial gas pressure, thereby completing the venting operation of said first vessel and making said second vessel and said gas compressing means available for the next venting operation.

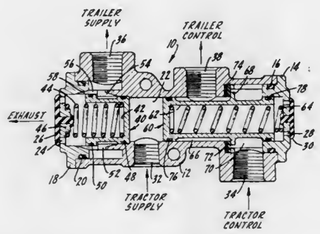
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**4,019,525**

## TRACTOR PROTECTION VALVE

**Charles Horowitz, Niles, Ill., assignor to Sloan Valve Company, Franklin Park, Ill.**

**Filed Jan. 22, 1976, Ser. No. 651,410**
**Int. Cl.² G05D** *7/00*
**U.S. Cl. 137—107** **11 Claims**




1. A tractor protection valve including a housing having tractor supply and control ports, trailer supply and control ports and an exhaust port, a chamber in said housing with all of said ports opening into said chamber, a first piston movable in said chamber between said tractor supply and trailer supply ports, spring means urging said first piston to a position closing communication between said tractor supply and trailer supply ports and opening communication between said trailer supply and exhaust ports, a second piston movable in said chamber on the same axis as said first piston and between said tractor control and trailer control ports, spring means urging said second piston to a position closing communication between said tractor control and trailer control ports, said tractor supply port being positioned intermediate said first and second pistons with air pressure at said tractor supply port causing said first and second pistons to move in opposite directions in said chamber to open communication between said tractor control and trailer control ports and between said tractor supply and trailer supply ports.

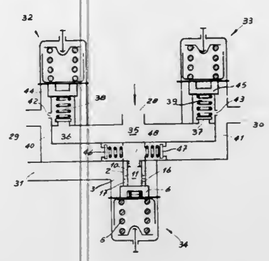


**4,019,526**

## DEVICE FOR SHUTTING OFF DAMAGED SECTIONS IN PNEUMATIC MULTI-SECTION BRAKING SYSTEMS FOR VEHICLES

**Bruno Zoppi, Milan, Italy, assignor to Fabbrica Italiana Magneti Marelli, S.p.A., Milan, Italy**

**Filed Nov. 5, 1975, Ser. No. 629,072**
**Claims priority, application Italy, Nov. 15, 1974, 29469/74**
**Int. Cl.² B60T** *15/46;* **G05D** *11/00*
**U.S. Cl. 137—110** **9 Claims**



1. A shutting off valve for a pneumatic braking system, particularly for shutting off damaged sections of the system, said valve comprising:

A first body; said first body having a first base; a first valve seat being defined on said first base; an opening in said first body extending inwardly from said first base;

a second body located in said opening in said first body; said second body being movable through said opening with respect to said first body; said second body having a respective second base that faces the same direction as said first base; a second valve seat being defined on said second base; said second body being movable through said opening and toward a shutter up to a first maximum distance; a flow path defined through said second body providing communication between said opening and said second valve seat;

a shutter located in opposed relation to both of said first and said second valve seats; means biasing said shutter toward engagement with said valve seats; said shutter being movable away from said bases through a distance greater than said first maximum distance;

said first and said second valve seats being spaced apart; said first and said second valve seats being shaped to define an enclosed plenum chamber between said valve seats; said plenum chamber being further defined by and communicating with said shutter;

said opening being connectible with a source of pneumatic fluid under pressure and said flow path; a calibrating, pressure transmitting passage through said second body communicating between said opening in said first body and said plenum chamber.

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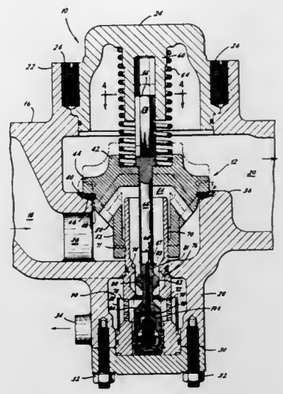
**4,019,527**

## MODULATING FLOW CONTROL VALVE

**Warren H. Brand, Blue Bell, Pa., assignor to Yarway Corporation, Blue Bell, Pa.**

**Filed Mar. 3, 1975, Ser. No. 554,401**
**Int. Cl.² G05D** *11/00*
**U.S. Cl. 137—115** **19 Claims**

1. A modulating flow control valve assembly including main check valve means movable between a fully closed and a fully open position in response to flow of fluid from a pressure source to a demand system and including an intermediate position wherein the fluid flow to said demand system corresponds to a preselected minimum flow from said pressure source, and bypass valve means for controlling the flow of fluid from said pressure source to a recirculation system, said bypass valve means having a fully open position when said main check valve means is in its fully closed position and being movable to a fully closed position when said main check valve means is in its intermediate position, piston means operatively associated with said bypass valve means, said piston means being in fluid communication with the inlet side of said main



check valve means whereby pressure at inlet side of said main check valve means is operative in moving said bypass valve means between said fully open and fully closed positons, pilot valve means for controlling the pressure acting on said piston means.

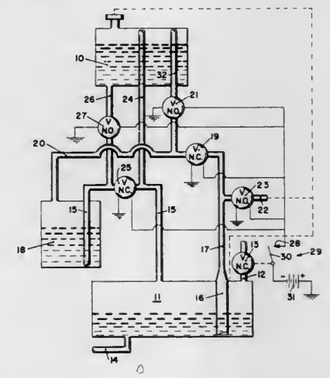
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**4,019,528**

## FLUID MIXING APPARATUS

**James Robert Tyrrell, Bloomington, Minn., assignor to Anton Braun, Minneapolis, Minn.**

**Filed July 23, 1975, Ser. No. 598,204**
**Int. Cl.² B67D** *5/04*
**U.S. Cl. 137—209** **3 Claims**



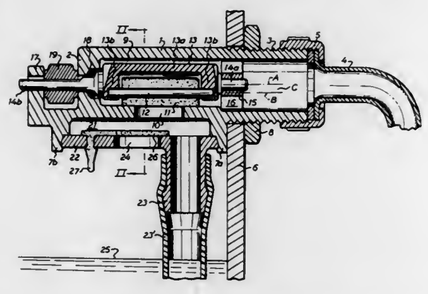
1. Fluid mixing apparatus comprising a tank for a first fluid, a container for receiving a second fluid, dispensing means having a first portion extending from a point at or near the bottom of said container to said tank and a second portion extending from a point at or near the bottom of said tank to the top portion of said container, an opening for filling said tank, a normally closed first valve in said opening, a normally closed second valve in the first portion of said dispensing means, interlock means between said first and second valves to cause them to open and close substantially simultaneously, first and second vent means leading from said second portion

of said dispensing means at points between said tank and said container, a normally open third valve in the first of said vent means that is operably connected to said interlock means so as to close when said first valve opens, a storage tank for said second fluid with a refill conduit extending between it and said container, a normally open fourth valve located in said refill conduit, a normally open fifth valve located in the second of said vent means, a normally closed sixth valve in said second portion of said dispensing means between said first and second vent means, said fourth, fifth and sixth valves being operably connected to said interlock means so as to move to their other positions when said first valve is opened.

## 4,019,529
## VALVE WITH ROLLER

**Per Torsten Faxen, Bromma, and Frans Harry Karlsson, Lund, both of Sweden, assignors to Hykon-Patent Aktiebolag, Lund, Sweden**

**Filed May 12, 1975, Ser. No. 576,520**
**Claims priority, application Sweden, May 13, 1974, 7406344**
**Int. Cl.² F16K** *1/16, 45/00*
**U.S. Cl. 137—218** **4 Claims**

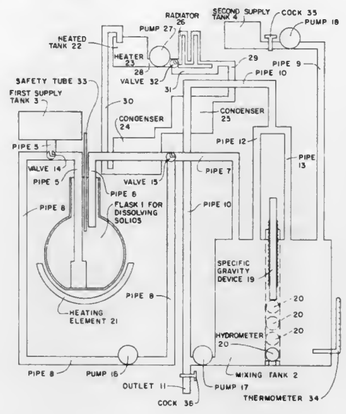


1. A rotary valve comprising an elongated valve housing having opposed ends and at least a portion of said central cavity having a substantially cylindrical inner peripheral surface and an outlet opening extending through said peripheral surface, an axial inlet at one of said housing ends, extension means on said one end for connecting the valve to a supply conduit, a roller support mounted within said housing for rotation about an axis parallel to the axis of said inlet opening, a single roller rotatably mounted on said roller support in said valve housing portion, said extension permitting insertion of said roller support and said roller into the housing, a pair of stub shafts on said roller support one at each end thereof, spaced bearing means in said housing for receiving said stub shafts to rotatably support said roller support, one of said bearing means being detachably fixed in the valve housing in a transitional region between the valve housing and the valve housing extension, said valve housing and valve housing extension each having such inner dimensions throughout their entire length that said roller support, said roller and said one bearing means are insertable through the end of said extension into the valve housing whereby the other of said stub shafts may thereby be inserted in the corresponding bearing means, said roller support being fixable in the housing by said insertable, fixable bearing means by insertion of the latter in the housing in a position on the corresponding roller support stub shaft and fixing this bearing means in the valve housing, operating means for moving said support and said roller for closing and opening said valve, said roller being supported in position to roll on said cylindrical surface to and from open and closed positions in relation to said outlet opening whereby in the closed position the outlet is fully covered by a portion of the circumference of the roller and in the open position the roller is spaced from said outlet, said roller being mounted by said roller support for rotation about an axis parallel to and spaced from the axis of rotation of said roller support.

## 4,019,530
## CHEMICAL DILUTING SYSTEM

**Issabhai I. Chandroga, Oshawa, Canada, assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest**

**Filed Feb. 17, 1976, Ser. No. 658,373**
**Int. Cl.² B01F** *1/00*
**U.S. Cl. 137—334** **4 Claims**

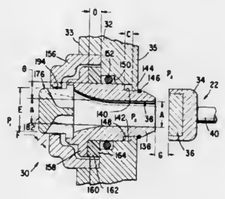



1. A chemical diluting system, comprising
a heated flask for dissolving solids;
a mixing tank;
a first supply tank;
a second supply tank;
pipe means connecting the first tank to the flask, connecting the flask to the mixing tank, connecting the first supply tank to the flask and to the mixing tank, connecting the second supply tank to the mixing tank and connecting the mixing tank to an outlet;
valve means in the pipe means for selectively controlling the connection of the first supply tank to the flask and to the mixing tank and of the mixing tank to the flask and to the first supply tank; and
pump means in the pipe means for pumping liquids through the pipe means.

## 4,019,531
## INLET ORIFICE DEVICE TO CONTROL THRUPUT FLOW FOR PRESSURE REGULATORS

**Dwight N. Johnson, Anaheim, Calif., assignor to The Singer Company, New York, N.Y.**

**Continuation of Ser. No. 535,072, Dec. 20, 1974, abandoned, which is a division of Ser. No. 426,294, Dec. 19, 1973, Pat. No. 3,892,255. This application Apr. 7, 1976, Ser. No. 674,334**
**Int. Cl.² F16K** *31/12*
**U.S. Cl. 137—504** **3 Claims**



1. An inlet orifice device for controlling the pressure of the flow gas therethrough comprising:
a. a housing havng a transverse partition therein to divide the housing into an inlet side and an outlet side,

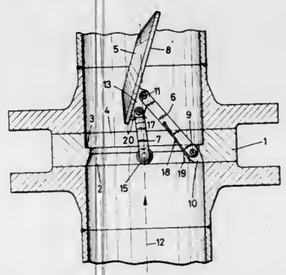


b. a valve body slidably mounted in the partition to move toward or away from the outlet side,
c. an orifice formed in the body having an inlet portion and an outlet portion to communicate the inlet side with the outlet side,
d. a poppet element fixedly carried by the body on the inlet side thereof,
e. a nozzle member connected on the inlet side of the housing to coact with the poppet element to form a continuously open and variable inlet flow area between the inlet side and the orifice, whereby the smaller the inlet flow area, the greater the reduction of inlet pressure,
f. an inlet face formed on the poppet element exposed to inlet pressure and to define a poppet piston to urge the body to move toward the outlet side responsive to the inlet pressure,
g. a resilient means operatively connected between the housing and the body to urge the body toward the inlet side,
h. the inlet portion of the orifice defining an orifice piston, and
i. the areas of the poppet piston and the orifice piston being equal.

## 4,019,532
## FLAP VALVE

**Friedrich Schittek, Bremen, Germany, assignor to Gustav F. Gerdts KG, Bremen, Germany**

**Filed May 28, 1975, Ser. No. 581,462**
**Claims priority, application Germany, June 7, 1975, 2427577**
**Int. Cl.² F16K** *15/02*
**U.S. Cl. 137—527** **7 Claims**

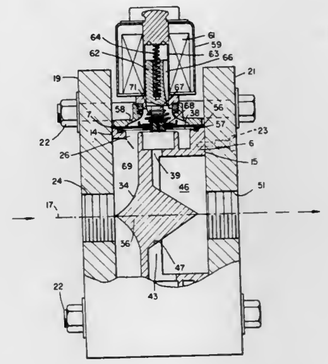


1. A flap valve and in particular a return flap valve comprising:
a flat disk-like valve housing having inlet and outlet openings along its longitudinal axis defining a flowthrough channel;
a valve seat formed in said housing and surrounding said outlet opening;
a valve disk disposed on said valve seat for closing and sealing the output opening, said disk having pivot axis means projecting toward the input opening and offset from the valve axis;
a first control lever having its ends pivotably coupled to diametrically opposite portions of said housing in the inlet opening and its center portion pivotably coupled to said pivot axis means; and
a second control lever having one end pivotably coupled to said pivot axis means, and its opposite end pivotably coupled to said housing in close proximity with respect to a wall of said flowthrough channel at the inlet opening, the pivot axes of both control levers being arranged parallel to each other so that when said valve disk is closed on said valve seat, both control levers be in the same plane which is perpendicular to the valve axis, and when said valve disk is opened, said first control lever displaced said disk apart from said valve seat and said second control lever maintains the disk in a non-perpendicular position with respect to valve axis.

## 4,019,533
## DIGITAL VALVE ASSEMBLY

**James B. Jerde, Mountain View, and Victor B. van Blerk, San Jose, both of Calif., assignors to Digital Dynamics, Inc., Sunnyvale, Calif.**

**Filed July 17, 1975, Ser. No. 596,581**
**Int. Cl.² F16K** *11/24*
**U.S. Cl. 137—599** **3 Claims**

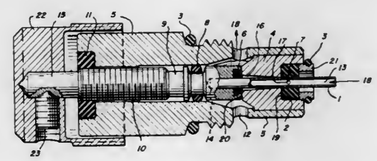


1. A digital valve assembly comprising a polygonal body exteriorly bounded by a plurality of joining planar sides and also bounded by a pair of parallel planar end faces, means forming an inlet passage opening on one of said end faces of said body and in communication with means forming a plurality of discrete inlet branch passages each having a discrete and separate inlet valve opening entirely on a respective one of sid planar sides, means forming an outlet passage opening on the other of said end faces of said body and in communication with means forming a plurality of discrete outlet branch passages each having a discrete and separate outlet valve opening entirely on a respective one of said planar sides adjacent to and concentric with a respective one of said inlet valve openings, the flow areas of said outlet branch passages having a predetermined and different size relationship to each other, and a plurality of valves each having a planar end substantially abutting and mounted on said body at and entirely outside of a respective one of said planar sides and overlying and interconnecting related ones of said inlet valve openings and concentric outlet valve openings and in position to control flow between said related ones of said inlet and outlet valve openings.

## 4,019,534
## NEEDLE VALVE ASSEMBLY

**Thomas W. Clements, Ambler, and E. Craig Waters, Lansdale, both of Pa., assignors to Will Ross, Inc., Milwaukee, Wis.**

**Filed Oct. 6, 1975, Ser. No. 619,748**
**Int. Cl.² F16K** *1/52*
**U.S. Cl. 137—614.18** **11 Claims**



1. A valve body assembly comprising a housing, a valve

stem holder axially movable within said housing between a first position and a second position, a hollow, tubular valve stem secured to said valve stem holder and extending outwardly from said housing, a valve stem guide retained between said housing and said valve stem, and an annular orifice plug retained between said valve stem and said housing and between said valve stem guide and said valve stem holder, said orifice plug having an inner taper forming a tapered orifice between said valve stem and said plug, said valve stem having a cross-flow channel through the wall thereof and a continuous circumferential groove on the outer surface thereof in fluid communication with said channel, whereby when said valve stem holder is at said first position, said groove is sealingly retained within said valve stem guide, and when said valve stem holder is at said second position, said groove is in fluid communication with said tapered orifice.

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**4,019,535**

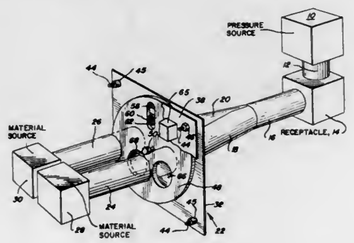
## MATERIAL SELECTOR SYSTEM

**Paul J. Buckethal, Villa Hills, Ky., assignor to Globe-Union Inc., Milwaukee, Wis.**

**Continuation of Ser. No. 365,599, May 31, 1973, abandoned. This application May 19, 1975, Ser. No. 578,571**

**Int. Cl.² F16K** *11/06, 3/00*

**U.S. Cl. 137—625.15** **16 Claims**




1. Selector apparatus for comminuted material entrained in a gaseous fluid comprising:

a. first and second pieces of substantially rigid material, each defining a surface, each of said pieces of material having at least one hole in said surface;

b. means supporting said pieces of material with their surfaces in fixed relationship to define a uniform space therebetween and with the holes in substantial alignment;

c. a web of deformable material disposed between said first and second pieces, said web having a transverse dimension significantly less than the transverse dimension of said space, whereby said web is freely movable in said space and said fluid may pass freely between said web and said plate surfaces, said web being transversely deformable under pressure to engage one of said surfaces to form a substantial fluid tight seal without substantial loss of shape of integrity and having an aperture therethrough such that when said aperture is aligned with said holes a passageway is provided between said holes, said transverse dimension being sufficient to permit movement of said web between said surfaces while substantially filling said space, the web being sufficiently large to overlie said holes when said web is moved to a position where said aperture is not aligned with said holes;

d. mounting means supporting said web in a position with said aperture in alignment with said holes and permitting movement of said web means in said space relative to said plates to a position where said aperture is out of alignment with said holes; and

e. moving means for moving said web relative to said pieces to alternatively bring said aperture into and out of alignment with said holes.

**4,019,536**

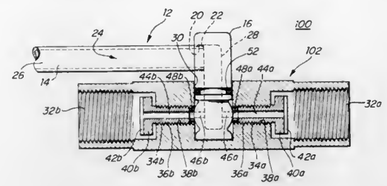
## SWING SPOUT FAUCET

**Poy Dong, 70 Louise St., Newton, Mass. 02158, and James P. Fahey, 34 Powder House Blvd., Somerville, Mass. 02143**

**Filed Oct. 1, 1975, Ser. No. 618,391**

**Int. Cl.² F16K** *11/087*

**U.S. Cl. 137—625.41** **9 Claims**



1. A faucet comprising: a spout having a main duct; a housing; a recess in said housing for rotatably receiving the inner end of said spout; said spout being rotatable between at least two positions, a first position and a second position; a first transverse duct in said spout proximate said inner end of said spout and communicating with said main duct of said spout; a first bore in said housing for connection with a first fluid source and extending to said recess and said inner end of said spout; a first adjustable sealing member in said bore; and a first passage extending through said adjustable sealing member to said recess for communicating with said first transverse duct in said first position and not in said second position.

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**4,019,537**

## ARRANGEMENT FOR MOUNTING GUIDE VANES OR OTHER TRANSVERSE OBJECTS INSIDE A CONDUIT

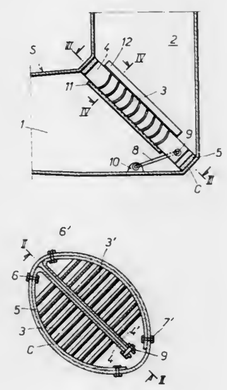
**Pierre Marcel Bonnard, Beynes; Pierre Bonnet, and Louis Duthion, both of Paris, all of France, assignors to Bertin & Cie, Plaisir and Aeroport de Paris, Paris, both of, France**

**Filed Mar. 27, 1975, Ser. No. 562,663**

**Claims priority, application France, Mar. 28, 1974, 74.10802**

**Int. Cl.² F15D** *1/04*

**U.S. Cl. 138—37** **4 Claims**



1. A fluid conveying duct bounded by a wall having two opposite portions facing one another, comprising:

two closely adjacent though mutually spaced plates generally parallel to and on both sides of a plane extending longitudinally with respect to the fluid flow direction in said duct and bounding therebetween a laminar gap extending in said plane, said plates projecting from a first location of said wall intermediate said facing portions thereof, generally crosswise of said duct, to end short of a second location of said wall intermediate said facing portions thereof and opposite to said first location, whereby each of said plates has a proximal end adjacent said first location and a distal end spaced from said second location,

a gusset fast with said wall at a third location adjacent said second location,

a tie-link hingedly connecting the distal end of said plates to said gusset, and

a first and a second stationary set of transverse fluid guiding members each having an outer end respectively fixed to one or the other of said opposite wall portions and an inner end respectively fast with that one of said two plates which is on the same side of said plane as the respective member.



**4,019,539**

## HOLLOW FLEXIBLE TUBULAR BODY, PROCESS AND APPARATUS FOR MAKING THE SAME

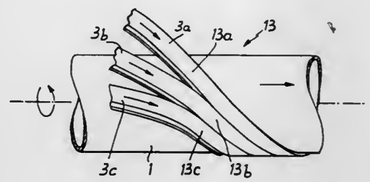
**Daniel Hoffmann, Bourg-en-Bresse, and Remi Reynard, Bordeaux, both of France, assignors to Societe des Hauts Fourneaux de la Chiers, Longwy-Bas; Coflexip and Institut Francais due Petrole, des Carburants et Lubrifiants et Entreprise de Recherches et d'Activities Petrolieres Elf, both of Rueil-Malmaison, all of, France**

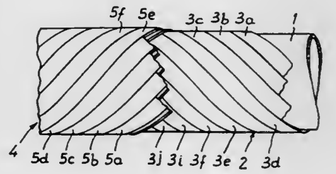
**Continuation of Ser. No. 355,081, April 27, 1973, abandoned. This application June 9, 1975, Ser. No. 584,933**

**Claims priority, application France, Apr. 28, 1972, 72.15295**

**Int. Cl.² F16L** *11/00, 11/12, 11/14*

**U.S. Cl. 138—118** **5 Claims**





1. A flexible tubular body comprising a plurality of superposed tubular layers, each formed from a plurality of elongated strips of resilient metal having two substantially parallel edges and helically wound about a hollow flexible tube to form a layer, each strip having its parallel edges hooked in opposite directions, with the edges of adjacent helically wound strips overlapping and so engaged as to permit limited relative sliding axially of said body, and each strip having been prestressed by twisting it helically until permanently deformed before being wound about said flexible tube, the strips in the innermost of each two adjacent layers being deformed to form helices having an inner diameter approximating the outer diameter of the said flexible tube, and the strips of the outermost layer being deformed to form helics having an inner diameter smaller than the outer diameter of said innermost layer, so as to exert compressive force on said innermost layer.

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**4,019,538**

## CENTERING AND FIXING MEANS AND METHOD FOR ITS FABRICATION

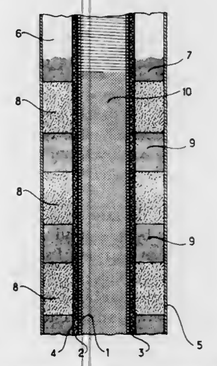
**Pierre Desse, Orleans, and Jean-Pierre Trezeguet, Venissieux, both of France, assignors to Les Cables de Lyon, Lyon Cedex, France**

**Filed Apr. 3, 1975, Ser. No. 564,974**

**Claims priority, application France, Apr. 25, 1974, 74.14462**

**Int. Cl.² F16L** *9/14*

**U.S. Cl. 138—108** **3 Claims**



1. In combination, a tubular body having an axially extending internal wall, a long thin object axially disposed inside said tubular body, a filling material made of a granular substance extending between the long thin object and the internal wall of said tubular body, said filling material comprising an axial succession of agglomarated layers separated by non-agglomarated layers of granular substance, said agglomarated layers comprising filling material being agglomaratedly hardened in situ by a resinous compound hardened when cold, in a short time by contact with a gas borne catalyst such that the assembly formed thereby is free of thermal stress.

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**4,019,540**

## LOOM FOR PRODUCING THREE DIMENSIONAL WEAVES

**Harry A. Holman, Ladue; Albert W. Kallmeyer, Crestwood; Henry C. Paulsen, Chesterfield, all of Mo., and William W. Weaver, Detroit Lakes, Minn., assignors to McDonnell Douglas Corporation, St. Louis, Mo.**

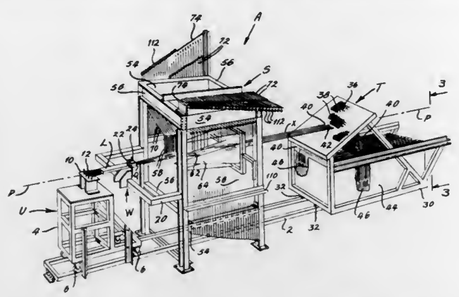
**Filed Mar. 12, 1976, Ser. No. 666,241**

**Int. Cl.² D03D** *41/00*

**U.S. Cl. 139—20** **24 Claims**

1. In a weaving machine having means for positioning a plurality of longitudinal strands in an array with the strands of the array extended generally in the same direction and located generally side by side in both crosswise directions, a shedding apparatus for moving selected strands of the array so as to create shed openings through which other strands may be extended generally through the array in two crosswise direc-

tions so as to form a three dimensional weave, said apparatus comprising: a frame, a plurality of first elongated positioning elements extended crosswise through the array between adjacent longitudinal strands thereof, the first elements being generally parallel to each other; a plurality of second elongated positioning elements extended crosswise through the



array between adjacent strands thereof, the second elements being generally parallel to each other and being located at an angle with respect to the first elements; and actuating means for moving the elements between inner and outer positions so as to increase the spacing between selected adjacent strands of the array and thereby create a shed opening in the array.

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**4,019,541**

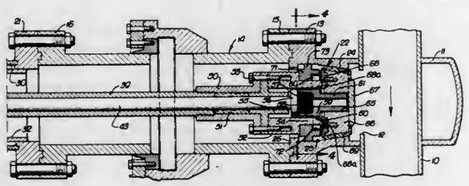
**REMOVABLE PLUG FOR PIPE JUNCTION, AND METHOD AND APPARATUS FOR INSTALLING**

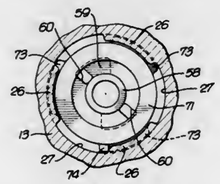
**Leo T. Koppl, 1432 S. Birch, Montebello, Calif. 90640**

**Filed Sept. 8, 1975, Ser. No. 611,124**

**Int. Cl.² F16L** *55/10*

**U.S. Cl. 139—94** **9 Claims**





1. In a device for plugging a pipe having a frusto-conical seat therein, the combination of:

a frusto-conical plug member adapted to seat on the pipe seat in fluid-tight relation therewith;

a generally circular plate member axially aligned with said plug member and threaded thereinto and axially movable relative thereto in one direction; and

an annular locking collar axially aligned with said plate member and carried thereby and axially movable thereby in said direction, adapted to engage and cooperate with the pipe when said collar is moved in said direction to lock the plate member and plug member against axial movement away from the seat of the pipe.

**4,019,542**

**LUG STRAP**

**Joseph A. Arsenault, Concord, N.H., assignor to Page Belting Company Incorporated, Concord, N.H.**

**Filed Feb. 6, 1976, Ser. No. 655,776**

**Int. Cl.² D03D** *49/40*

**U.S. Cl. 139—153** **4 Claims**

1. Lug strap for use with a picker stick, comprising

a. two parallel elongated legs,

b. a bight being formed of a webbing of woven fibers of nylon the webbing being impregnated with polyurethane, the bight being formed with a central portion extending perpendicular to the longitudinal direction of the legs and with two transition portions each leading angularly from the end of one leg to the adjacent end of the central portion, the central portion having an inner surface that is curved in planes parallel to the inner sufaces of the legs, and

c. a pad of solid urethane located on the inner surfaces of the central portion and the transition portions.

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**4,019,543**

**METHOD OF FIXING AN END PORTION OF A LINE TO A REEL**

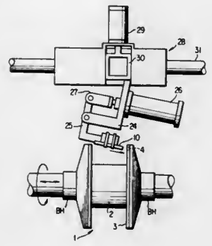
**Kichiro Sasaki, Takatsuki; Kazuo Takeuchi, Suita; Shiro Kazitani, Kobe; Kazuo Shimizu, Kobe, and Yoshiteru Yoshida, Kobe, all of Japan, assignors to Kobe Steel Ltd., Kobe, Japan**

**Filed Feb. 25, 1975, Ser. No. 552,878**

**Claims priority, application Japan, Feb. 25, 1974, 49-22047**

**Int. Cl.² B21F** *3/027*; **B65H** *75/28*

**U.S. Cl. 140—111** **5 Claims**



1. A method of fixing a wind-terminating end portion of a wound metal wire to a flange portion of a reel comprising the steps of:

stopping the rotation of said reel after a predetermined amount of wire has been wound upon said reel;

fixedly holding the rear portion of said wire;

plastically bending said wind-terminating end portion of said wire so as to form a substantially U-shaped recession within said wind-terminating end portion of said wire which extends transversely to the longitudinal direction of said wire;

disposing said bent wind-terminating end portion of said wire within a groove provided within the end of a means for inserting said wind-terminating end portion of said wire within said flange portion of said reel so as to facilitate the guidance of said wind-terminating portion of said wire during said insertion thereof within said reel;

moving said inserting means so as to insert said U-shaped recessed portion of said wire into an appropriately configured slot provided within said flange portion of said reel; and

cutting said wind-terminating end portion of said wire.



**4,019,544**

**APPARATUS FOR FORMING A CONTINUOUS WIRE INTO A MAT**

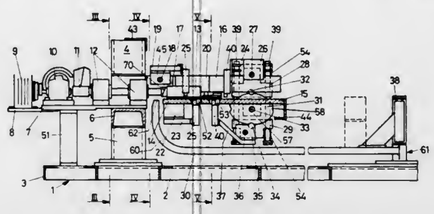
**Hans Jäggi, Wangen; Ernesto Lehmann, Neuhausen, and Hugo Rechsteiner, Schaffhausen, all of Switzerland, assignors to Georg Fischer Aktiengesellschaft, Schaffhausen, Switzerland**

**Filed Oct. 2, 1975, Ser. No. 618,932**

**Claims priority, application Switzerland, Oct. 9, 1974, 13547/74**

**Int. Cl.² B21F** *27/10*

**U.S. Cl. 140—112** **15 Claims**



1. Apparatus for the manufacture of mats from a continuous wire, such as a plastic-coated wire, with the wire being folded back and forth into juxtaposed wire sections joined by return bends at the opposite ends of each wire section, comprising a winding plate having a first surface and an oppositely facing second surface with a leading edge along one side and a trailing edge along the opposite side thereof, a pair of laterally spaced substantially parallel spindles located opposite and adjacent to the first surface of said plate, the axes of said spindles being substantially parallel to the first surface of said winding plate and extending in the direction between said leading and trailing edges, a wire feed member located opposite the second surface of said winding plate, said winding feed member having a wire outlet located adjacent the leading edge of said winding plate and a wire inlet spaced from said wire outlet in the direction extending from the leading edge toward the trailing edge of said winding plate, means supporting said wire feed member for swinging said member in an arc extending transversely of the direction extending between the leading edge and trailing edge so that the wire outlet can be displaced in a path extending generally along the leading edge of said winding plate, each said spindle having a helically shaped wire guide located adjacent the leading edge of said winding plate and a screw thread extending from said wire guide in the direction toward the trailing edge of said winding plate, means for rotating each of said spindles in an opposite direction to the direction of rotation of the other said spindle, each said screw thread having a pitch corresponding substantially to the wire diameter of the mat to be formed and each said helically shaped wire guide having a pitch significantly greater than the pitch of said screw thread.

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**4,019,545**

**SAMPLE FRACTION COLLECTOR**

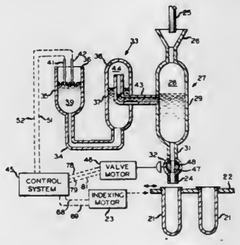
**James E. Vinatieri, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.**

**Filed Dec. 29, 1975, Ser. No. 645,180**

**Int. Cl.² B65B** *3/36*, *43/60*

**U.S. Cl. 141—130** **5 Claims**

1. Apparatus for sequentially dispensing a plurality of uniform volume samples of a liquid material, comprising means defining a sample chamber having a sample inlet and a sample outlet; means for continuously introducing liquid to be sampled through said sample inlet into said sample chamber; valve means having a valve inlet, a valve outlet, and a rotatable valve element having a passageway therethrough to provide liquid communication between said valve inlet and said valve outlet when said valve element is in the open position and to block liquid communication between said valve inlet and said valve outlet when said valve element is in the closed position; means for rotating said valve element from each of said open and closed positions to the other of said open and closed positions; means connecting said valve inlet to said sample outlet; outlet conduit means connected to said valve outlet and having a dispensing end; rack means for sequentially positioning individual sample receptacles beneath said dispensing end of said outlet conduit means; a generally U-shaped tube having first and second substantially vertical legs with liquid communication therebetween, one of said legs having a closed end and the other of said legs having an open end; said U-shaped tube legs and ends being adapted to contain an electrolytic solution therein; a generally L-shaped tube extending from said means defining a sample chamber, at a level in said sample chamber substantially below the level reached in said sample chamber by the desired volume of sample liquid, into said one of said legs having a closed end and then upwardly toward said closed end to a point above the maximum level of electrolyte solution in said one of said legs having a closed end, to provide fluid communication between




said sample chamber and the interior of the upper portion of said one leg; first and second electrode means positioned in said open end of the said other leg to contact the electrolytic solution when the desired volume of sample liquid has accumulated in said sample chamber; whereby sample liquid entering the generally L-shaped tube causes an increase in the fluid pressure in the closed end of said one leg, thereby causing movement of part of the electrolytic solution from said one leg toward said other leg, thereby causing said electrolytic solution to contact both of said first and second electrode means; and control means responsive to each occurrence of the electrolytic solution contacting both of said first and second electrode means to actuate said rack means to move a sample receptacle beneath said dispensing end of said outlet conduit means and then to actuate the valve element rotating means to rotate said valve element to the open position for a predetermined drain interval to drain the sample liquid accumulated in said sample chamber into the sample receptacle positioned beneath said dispensing end of said outlet conduit means.

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**4,019,546**

**ROTARY PACKER AND METHOD OF FILLING BAGS**

**Niels E. Hastrup, Copenhagen Valby, Denmark, assignor to F. L. Smidth & Co., Cresskill, N.J.**

**Filed July 17, 1975, Ser. No. 596,599**

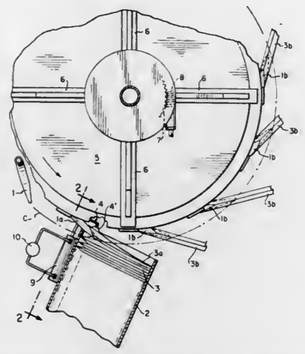
**Claims priority, application United Kingdom, July 18, 1974, 31953/74**

**Int. Cl.² B65B** *1/04*

**U.S. Cl. 141—10** **40 Claims**

1. A method of introducing material by means of a rotary packer into bags such as sacks defining at least one opening at one end portion and positioned in at least one carrying means including rotary packing means having a plurality of bag filling spouts positioned about peripheral portions so as to be rotatable therewith, said spouts further being movable from positions generally radial relative to said rotary packing means toward positions generally tangential relative to peripheral portions of said rotary packing means, means to supply material to said spouts for filling said bags with material to predetermined levels comprising:

a. positioning said bag carrying means adjacent said rotary packing means in a manner such that at least one bag is positioned at least adjacent a path defined by said spouts;
b. rotating said rotary packing means about its axis in a direction such that said bag filling spouts traverse a generally arcuate path and successively approach said bag carrying means in the direction of rotation;
c. successively rotating each bag filling spout about an axis associated therewith toward positions generally tangential relative to peripheral portions of said rotary packing

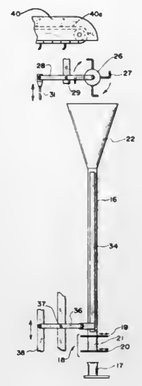


means such that at least a portion of each bag filling spout approaches the general direction of said opening of the bag closest thereto while approaching said bag carrying means;
d. successively permitting each bag filling spout to enter said opening of the bag closest to said spout and transporting said bag therewith away from said bag carrying means as said rotary packing means is rotated; and
e. introducing material from said filling spout into said bag as said bag is positioned about the filling spout and transported away from the bag carrying means.

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**4,019,547**
**CAN FILLING METHOD AND APPARATUS**
**Edward E. Ross, San Rafael, Calif., assignor to Del Monte Corporation, San Francisco, Calif.**
**Continuation of Ser. No. 469,089, May 13, 1974, abandoned, which is a continuation-in-part of Ser. No. 366,414, June 4, 1973, abandoned. This application Mar. 22, 1976, Ser. No. 669,327**
**Int. Cl.² B65B** *1/08*
**U.S. Cl. 141—11** **15 Claims**

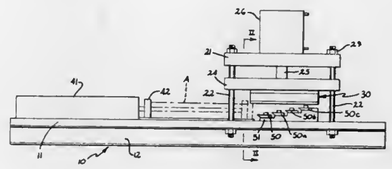
**1.** In a method of successively filling containers with wet food material, making use of a vertically extending unobstructed tube having cut-off means at its lower end, the steps of continuously supplying the material to a region above the upper open end of the tube and causing free-falling movement of the same into the upper tube portion to form a column of the material of predetermined height within the tube, continuously shaking the tube in a vertical direction to cause the column of material to move freely downwardly through the tube, causing the material in the column to be subjected only to gravity compacting pressure which gradually increases to a predetermined degree of compaction toward the lower end of the tube whereby for the lower portion of the column there is a predetermined fixed ratio of volume to weight, and recurrently cutting off lower end portions of the pressure com-



pacted column that are of equal volume and causing such portions to be transferred to containers.

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**4,019,548**
**MACHINE FOR SHEAR-SLICING WOOD**
**Thomas A. Lenderink, and Roger P. Hordyk, both of Plainfield Township, Kent County, Mich., assignors to Lenderink, Inc., Belmont, Mich.**
**Filed Feb. 2, 1976, Ser. No. 564,337**
**Int. Cl.² B27C** *1/00*
**U.S. Cl. 144—175** **19 Claims**



**1.** A device for separating a wood block by shearing it into a plurality of sheet-like strips, said device including a plurality of rigidly supported, vertically spaced shearing knives, said knives arranged one behind the other to form a shearing zone, a wood block supporting base and means for forcing a wood block along said base and past said knives, the improvement in said device comprising: a pressure applicator having a surface for engaging the face of a wood block opposite from said base; said surface being formed of a plurality of separate elements extending the full width of the wood block and resilient means for separately urging each of said elements against the wood block, said applicator extending the entire length of said shearing zone and downstream of the last of said knives.

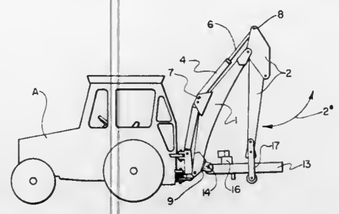
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**4,019,549**
**WOOD SPLITTING APPARATUS**
**Thurston V. Williams, Pead Hill, Wilton, N.H. 03086**
**Filed Mar. 19, 1976, Ser. No. 668,474**
**Int. Cl.² A47J** *49/02*; **B27L** *7/00*
**U.S. Cl. 144—193 A** **9 Claims**

**1.** A wood splitting attachment for a backhoe having a main boom and a secondary boom pivotted thereto, the attachment comprising:
an elongate guide track, means for mounting the track on the backhoe extending toward the secondary boom,



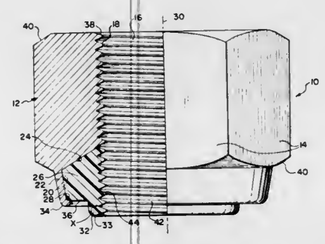
a follower slidingly engaging the guide track and including means for connecting the follower to the secondary boom so as to guide the secondary boom along the track, and



a wood splitting wedge on the track opposed to the secondary boom so that when the two booms are swung toward each other the wedge is driven through a wood stick pushed along the track by the secondary boom.

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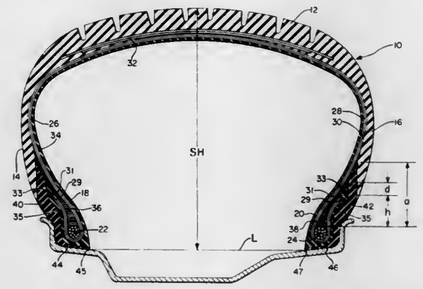
**4,019,550**
**SEALING NUT WITH NYLON INSERT**
**Lon DeHaitre, Arlington Heights, Ill., assignor to Abbott Screw & Mfg. Co., Chicago, Ill.**
**Filed June 9, 1975, Ser. No. 584,922**
**Int. Cl.² F16B** *39/34*
**U.S. Cl. 151—7** **15 Claims**



**1.** A sealing nut which is adapted to be screwed onto a male threaded stud or the like and brought into axial end engagement with the bearing surface of a body through which the stud threadedly extends in order to seal the joint defined by the stud and body and to lock the nut onto the stud while the joint is so sealed, the nut comprising:
A. a nut body of metal having a central independently fabricated insert of a relatively stiff, high durometer polyamide resin arranged coaxially therewith and at one end thereof,
B. the body and insert being locked together and there being a continuous threaded bore in the nut with a portion of the bore being in the body and a portion of the bore being in the insert,
C. the insert having a shoulder at an axial end thereof and the body having an integral, generally cylindrical wall terminating at said one end in an angular radially inwardly bent over lip engaging the shoulder to provide for said locking of said insert, said insert additionally having an axially extending, integral relatively thin crown adjacent the insert bore and having at least a portion of said threaded bore on the inner surface of said crown which is spaced radially inward from the lip to provide an annular axially facing gallery between lip and crown,
D. the lip being the limit to which the nut body extends axially at said one end,
E. the axial length of the crown before the nut has been used being such that the free end thereof is spaced substantially beyond the lip in an axial direction away from the nut body,
F. the crown being inverted in a radially outward direction when pressed axially against a bearing surface by screwing said nut towards said surface such action tending to produce a turtle-neck-like fold and bringing a substantial portion of the crown end into the gallery to occupy substantially all of said gallery.

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**4,019,551**
**CHIPPERLESS RADIAL PLY TIRE**
**Michael A. Kolowski, Tallmadge, and George J. Siefert, North Canton, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio**
**Filed Jan. 23, 1976, Ser. No. 651,746**
**Int. Cl.² B60C** *15/06*, *9/02*
**U.S. Cl. 152—354** **9 Claims**



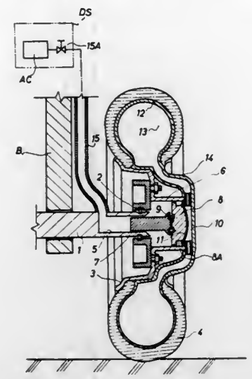
**1.** A pneumatic tire having a tread portion, a pair of sidewall portions, a pair of bead portions and a carcass structure extending circumferentially about the tire and from bead portion to bead portion, said tire being characterized by the carcass plies being turned axially outwardly about and radially outwardly of each bead core to a point between one and three times the thickness of the bead core radially outwardly of the bead core with the centerline of at least the radially outer two-tenths of an inch of the turned-up portion of the carcass structure being no further removed from the neutral stress line than one and one-half times the thickness of the carcass structure, an air impervious inner liner extending about the bead core and completely encasing the carcass plies and an annular hard rubber chafer strip disposed axially outwardly of the turned-up portion of the carcass ply and extending from a point axially adjacent the radially outer extremity of the bead core to a point radially outwardly of the terminus of the air impervious inner liner.

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**4,019,552**
**REMOTE CONTROL OF PNEUMATIC TIRE PRESSURE AND ITS APPARATUS**
**Yasuo Tsuruta, 22-2, 4-chome, Sanno, Ota, Tokyo, Japan**
**Filed Jan. 30, 1975, Ser. No. 545,631**
**Claims priority, application Japan, Mar. 30, 1974, 49-036154**
**Int. Cl.² B60C** *23/10*
**U.S. Cl. 152—417** **8 Claims**

**1.** Apparatus for controlling the pressure in a pneumatic tire on a vehicle equipped with a wheel carrying said tire and supporting means on which said wheel is mounted for rotation relative to said supporting means, said apparatus comprising:
a first variable volume chamber at least partially defined within said supporting means, the volume of which chamber is responsive to changes in fluid pressure supplied thereto from a remotely controlled source of pressure fluid,
a first piston responsive to changes in the pressure within said chamber,
a second variable volume chamber in said wheel,
said second chamber having a flexible wall and being completely sealed except for means connecting said second chamber to a space within a tire when said tire is mounted on said wheel,

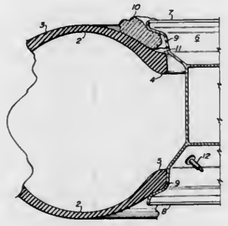
and thrust bearing means for transmitting the movement of said piston to the flexible wall of said second variable



volume chamber to vary the volume thereof, without transmitting the rotation of said wheel through said piston to said supporting means.

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**4,019,553**
**METHOD FOR MOUNTING AND INFLATING TUBELESS TIRES**
**James I. Lefgren, 311 E., 160 S., Smithfield, Utah 84335**
**Filed Dec. 24, 1975, Ser. No. 644,099**
**Int. Cl.² B60C** *25/00*
**U.S. Cl. 157—1.1** **7 Claims**

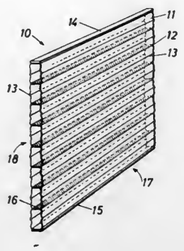


1. The method for mounting and inflating a tubeless, pneumatic tire on a wheel rim comprising the steps of:
placing the tire on the wheel rim so that its side-wall beads are inside the flanges of the wheel rim;
filling any gap between a tire side-wall bead and its adjacent wheel-rim flange with partially water soluble material of doughy consistency; and
introducing pressurized air into the tire, whereby at least one tire bead is forced against the adjacent wheel-rim flange and the partially water soluble doughy material is forced out of the gap.

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**4,019,554**
**THERMAL INSULATING CURTAIN, ESPECIALLY FOR USE IN GREENHOUSES**
**Max Otto Henri Rasmussen, Rabjerg 7, 2690 Karlslunde, Denmark**
**Filed Apr. 25, 1975, Ser. No. 571,486**
**Claims priority, application Denmark, Apr. 29, 1974, 2346/74**
**Int. Cl.² E06B** *3/9*
**U.S. Cl. 160—84 R** **9 Claims**

1. A heat insulating collapsible curtain comprising a plurality of parallel tubular members of plastic foil having adjoining sides bonded together to form lamellae along the bonded areas, the sides of the members extending in parallel planes connected by said lamellae, so as to form a curtain with spaced walls, a rigid member fastened along the upper and lower surfaces of the top and bottom tubular members, respectively, said rigid members being angularly adjustable to



move the spaced walls of said curtain in their respective planes and move the lamellae angularly relatively to said walls, each of said tubular members having creases along opposite sides to form folding lines for flattening the tubular member, so that said curtain may be collapsed by flattening all said tubular members, thereby forming a stack of such flattened members.

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**4,019,555**
**WINDOW WITH VENTILATING CAPABILITY**
**Seiri Oshiro, 27-banchi 7, Kyohara, Naha, Okinawa, Japan**
**Filed Nov. 12, 1975, Ser. No. 631,333**
**Claims priority, application Japan, Nov. 15, 1974, 49-132334; Aug. 19, 1975, 50-114664; Sept. 4, 1975, 50-122603**
**Int. Cl.² E06B** *5/00*
**U.S. Cl. 160—371** **5 Claims**



1. A window with a ventilating capability that does not decrease the insulating effect comprising a window sash, a plurality of net screens disposed within said sash at regular spaced intervals and forming insulating air layers between opposed pairs of net screens, a porous sheet material, adhesive means securing said porous sheet material to at least one side of at least one of said net screens, said window sash being provided with a plurality of grooves formed around the inner portion thereof, retaining bars accommodated with said grooves, said retaining bars securing the peripheral edges of said net screens within said grooves.

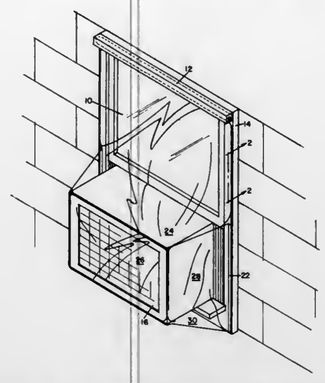
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**4,019,556**
**AIR CONDITIONER COVER**
**Arthur G. Selger, 154 Johnson Ave., Dumont, N.J. 07628**
**Filed Apr. 28, 1976, Ser. No. 681,135**
**Int. Cl.² A47G** *5/02*
**U.S. Cl. 160—238** **5 Claims**

1. A cover for a window air conditioner unit projecting outwardly from a window frame comprising:



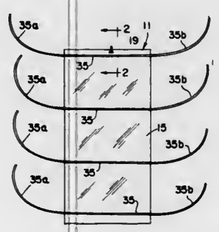
a window shade roller adapted to be mounted on the top of a window frame;
a flexible sheet of transparent plastic material having a plurality of foldable panels which form a box-like shape



to cover an air conditioner unit attached to said window shade roller; and
means on the periphery of said flexible sheet for continuously fastening said sheet to a window frame.

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**4,019,557**
**EMERGENCY TEMPORARY DOOR COVER**
**John J. Earley, P.O. Box 196, 207 McKinley Ave., Lansdowne, Pa. 19050**
**Filed Aug. 22, 1975, Ser. No. 606,749**
**Int. Cl.² A47H** *33/00*
**U.S. Cl. 160—354** **7 Claims**



1. An emergency temporary door cover for covering a broken glass door pane until the broken glass pane can be replaced comprising
a cover sheet large enough to cover the pane area of a door, said sheet being foldable for easy storage when not being used to a cover a door pane area,
suspension means extending from the top of the sheet for suspending the sheet from the top of the door,
and grasping means extending outwardly from the sides of the sheet for grasping the side edges of the door to spread the sheet laterally and hold it temporarily in place against the front of the door until the sheet can be fastened to the door,
said suspension and grasping means being operable from the front of the door,
said grasping means being permanently attached to said sheet, and
fastening means for fastening the cover sheet to the door and extending from the sides of the sheet and held by the grasping means across the rear of the door until an installer can operate the fastening means.

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**4,019,558**
**METHOD OF FORMING FOUNDRY MOULDS**
**Ervin I. Szabo, Manotick, Canada, assignor to Canadian Patents and Development Limited, Ottawa, Canada**
**Filed Aug. 20, 1976, Ser. No. 716,356**
**Claims priority, application Canada, Sept. 26, 1975, 236501**
**Int. Cl.² B22C** *9/04*
**U.S. Cl. 164—26** **6 Claims**

1. A method of forming a foundry mould, comprising:
a. applying an initial coating of refractory particles, to a meltable mould former, from a slurry having a suspended solids content in the range 30 to 50% by volume of the total volume of the slurry, and containing a siliceous binder for the refractory particles and a thixotropic modifier for the slurry, then
b. applying additonal refractory particles to the mould former, in the form of a stucco layer of relatively coarser refractory particles, then
c. applying a plurality of further coatings of refractory particles to the mould former to form a foundry mould, the further coatings comprising slurry coatings alternating with stucco layers of relatively coarser refractory particles, with each slurry coating being applied from a slurry having a suspended solids content is the range 20 to 40% by volume of the total volume of the slurry, and containing a siliceous binder for the refractory particles and a thixotropic modifier for the slurry, then
d. allowing the coatings and layers to set and dry, and then
e. heating the mould former to melt it and then removing the molten mould former material from the foundry mould, and wherein
f. the thixotropic modifier comprises particles of at least one substance selected from the group consisting of aluminum alkoxides, aluminum aryloxides, clays, carbon blacks, fumed silicas, fumed alumina, fumed titanium oxide, fumed zirconium oxide, fumed hafnium oxide and fumed chromium oxide.

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**4,019,559**
**METHOD OF FORMING A FOUNDRY MOLD**
**Ervin I. Szabo, Manotick, Canada, assignor to Canadian patents and Development Limited, Ottawa, Canada**
**Filed Aug. 20, 1976, Ser. No. 716,358**
**Claims priority, application Canada, Dec. 30, 1975, 242825**
**Int. Cl.² B22C** *9/04*
**U.S. Cl. 164—26** **7 Claims**

1. A method of forming a foundry mould, comprising:
a. applying an initial coating of refractory particles, to a mould former, from a first slurry comprising the refractory particles and a binder therefor, the first slurry having a suspended solids content in the range 30% to 55% by volume of the total volume of the slurry, then
b. applying additional refractory particles to the mould former, in the form of a first stucco layer of relatively coarser refractory particles, then
c. applying a second refractory particle binder coating to the stucco layer, then
d. applying additional refractory particles, to the coated mould former, in the form of a second, stucco layer of relatively coarser refractory particles, then
e. applying a third refractory particle binder coating to the second, stucco layer, then
f. repeating steps (b) to (e) in the same order and finishing with one of the refractory particle binder coatings, to form a foundry mould, then
g. allowing the coatings and layers to set and dry, and then
h. heating the mould former to melt it and then removing the molten mould former material from the foundry mould, and wherein the improvement comprises:
i. the refractory particle binders of steps (a) and (e) are substantially immiscible with the refractory particle binder of step (b),
j. at least one of the refractory particle binders of steps (c)

and (e) is a slurry containing refractory particles and having a suspended solids content in the range 20% to 40% by volume of the total volume of the slurry, and

k. each of the refractory particle binders comprises at least one substance selected from the group consisting of partially hydrolized, organo silicon compounds and alcohol tolerant non-alkaline aqueous colloidal silicas.

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**4,019,560**

## SPRAY COOLING OF CONTINUOUSLY CAST INGOTS

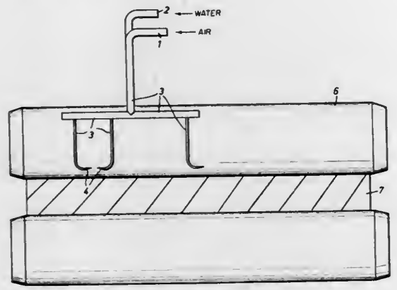
**Hans Gruner, Duisburg-Rahm; Gerd Diederich, Angermund; Hans Butz, Duisburg; Peter Wahls, Meerbusch, and Engelbert Weins, Duisburg, all of Germany, assignors to Mannesmann Aktiengesellschaft, Dusseldorf, Germany**

**Filed Sept. 18, 1975, Ser. No. 614,534**

**Claims priority, application Germany, Sept. 16, 1974, 2444613**

**Int. Cl.² B22D** *11/12*

**U.S. Cl. 164—89** **9 Claims**




**1.** Apparatus for spray cooling a continuously cast ingot as withdrawn from the mold by plural rolls arranged along the ingot and having horizontal axes, the rolls each extending for at least the width of the ingot in undivided configuration, comprising:

a plurality of nozzles arranged between respective two vertically spaced rolls and one each side of the ingot;

means for mixing a coolant with a pressurized propellant and for accelerating the coolant by the propellant prior to feeding the coolant to said nozzles; and

the nozzles disposed and constructed to cause wide fan - out flow against the surface of the ingot, beginning along an axis extending parallel to the surface.

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**4,019,561**

## INJECTION APPARATUS FOR DIE CAST MACHINES

**Kazuteru Aoki, Zama, Japan, assignor to Toshiba Kikai Kabushiki Kaisha, Tokyo, Japan**

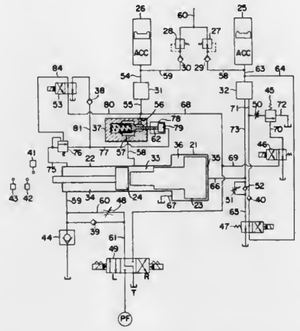
**Filed Feb. 7, 1975, Ser. No. 547,813**

**Claims priority, application Japan, Feb. 12, 1974, 49-16929**

**Int. Cl.² B22D** *17/32*

**U.S. Cl. 164—155** **5 Claims**

**1.** In an injection apparatus for a die casting machine comprising an injection cylinder containing an injection piston for injection molten metal into metal mold of the die cast machine; a booster cylinder including a small diameter portion connected to said injection cylinder and a large diameter portion; a booster piston contained in the booster cylinder having a small diameter piston portion operatively connected to said injection piston through operating fluid in a large diameter piston portion contained in the large diameter portion of said booster cylinder, said large diameter portion of said booster piston being slideably contained in the large diameter portion of said booster cylinder to define a rear chamber and a fore chamber; a source of pressurized operating fluid; a low-high speed pilot valve connected between said source of operating fluid and the rear chamber of said injection cylinder, said low-high speed pilot valve being set at a low speed condition at the start of the injection operation, a first throttle valve connected to a conduit for discharging the operating fluid in a fore chamber of the injection cylinder defined by the injection cylinder and injection piston thereby permitting the injection piston to advance at a low speed; a pilot check valve connected to said conduit operatively connected to said first throttle valve and the fore chamber of said injection cylinder, a first limit switch operatively connected to said pilot check valve and located in the path of the movement of said injection piston to be operated thereby for opening said pilot check valve to rapidly discharge the operating fluid in the fore chamber of the injection cylinder and for switching said low-high speed pilot check valve to a high speed condition for supplying a large quantity in the operating fluid to a rear chamber of the injection cylinder defined by the injection piston, the injection cylinder, the small diameter portion of



the booster cylinder and the small diameter portion of the booster piston so as to advance the injection piston at a high speed, a booster pilot valve connected between said source of operating fluid and the rear chamber of the booster cylinder, a solenoid valve and a second throttle valve which are connected between the source of operating fluid and the rear chamber of the booster cylinder, a second limit switch operatively connected to said solenoid valve and positioned along the path of the injection piston to be operated thereby for opening said solenoid valve thus advancing the booster piston at a low speed, a third limit switch operatively connected to said booster pilot check valve and located along the path of the injection piston at a point near the limit of pouring of molten metal, said third limit switch when actuated by the injection piston fully opening said booster pilot check valve thus admitting a large quantity of operating fluid into the rear chamber of the booster cylinder for advancing the booster piston at a high speed.

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**4,019,562**

## AUTOMATIC MOLDING APPARATUS WITH MEANS FOR CONTROLLING POURING RATE

**Toshio Shiraiwa; Sumio Kobayashi, both of Amagasaki; Katsukiyo Marukawa, and Syoji Anezaki, both of Ibaragi, all of Japan, assignors to Sumitomo Metal Industries, Ltd., Osaka, Japan**

**Filed Oct. 15, 1975, Ser. No. 622,730**

**Claims priority, application Japan, Nov. 21, 1974, 49-134506**

**Int. Cl.² B22D** *37/00*

**U.S. Cl. 164—155** **12 Claims**

**1.** An automatic molding apparatus comprising:

a container filled with molten metal;

a mold into which said molten metal is fed from said container;

said container having a nozzle through which said molten metal is fed to said mold;



said nozzle having stopper means for adjusting the quantity of said molten metal passing through said nozzle;

means for detecting the rate of increase of the level of said molten metal within said mold without contacting said mold, said detecting means comprising:

a. first means for producing microwaves;

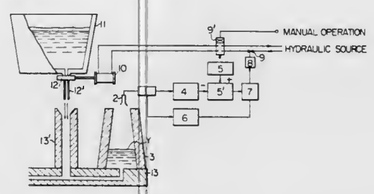
b. second means for transmitting said microwaves to the surface of said molten metal within said mold and for receiving reflected microwaves from said surface of said molten metal;

c. third means, operatively connected to said second means, for combining said transmitted and reflected microwaves and producing an output signal representative thereof; and

d. fourth means for detecting the Doppler frequency of said output signal of said third means and for determining the rate of increase of said level as a function thereof, said fourth means comprising:

i. a reference pulse generator;

ii. a counter for counting reference pulses from said generator;




iii. means for producing pulses synchronized with said Doppler frequency of said output signal of said third means;

iv. means, connected to said counter and said pulse producing means, for resetting said counter by said synchronized pulses;

v. temporary memory means for storing a counted output from said counter; and

vi. means for computing said rate of increase of said level as a function of an output of said temporary memory and for producing a detected rising speed signal representative thereof;

means for producing a speed pattern signal representative of a desired molding speed pattern; and

means, connected to said stopper means and responsive to an error between said detected rising speed signal and said speed pattern signal, for controlling operation of said stopper means and therefore the quantity of said molten metal passing through said nozzle.

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**4,019,563**

## METHOD AND APPARATUS FOR CONTROLLING THE BATCHING OF A MELT FOR PRESSURE TAPPING FURNACE

**Kjell Bergman, and Lars Carlsson, both of Vasteras, Sweden, assignors to ASEA Aktiebolag, Vasteras, Sweden**

**Filed Nov. 7, 1975, Ser. No. 629,990**

**Claims priority, application Sweden, Nov. 11, 1974, 7414101**

**Int. Cl.² 222** *595*; **B22D** *37/00, 39/00*

**U.S. Cl. 164—155** **16 Claims**

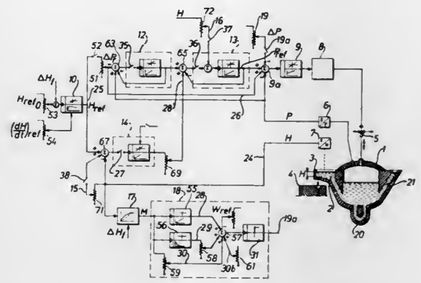
**14.** A method for batching a metal melt such as steel for a pressure tapping furnace comprising:

a. developing a signal representing melt flow;

b. determining the integral of said melt flow signal;

c. determining the rate of change of said melt flow signal; and

d. terminating batching when the sum of a predetermined constant, the melt flow, the integral of said melt flow and



said rate of change of melt flow are a predetermined level.

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**4,019,564**

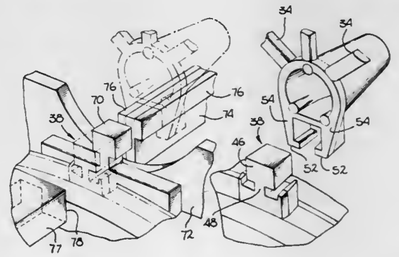
## CASTING SUPPORT FOR AUTOMATIC CAST TRIM MACHINES

**Victor O. Anderson, 17250 S. Main St., Gardena, Calif. 90248**

**Filed Nov. 5, 1975, Ser. No. 628,992**

**Int. Cl.² B22D** *17/22*

**U.S. Cl. 164—271** **13 Claims**



**1.** A casting support for an automatic cast-trim machine comprising a member for fitting between the stationary platen and the moving platen to define part of the closed mold cavity, said member having means for mounting said member to an indexing system, said member having first and second faces for face to face disposition with the stationary platen and moving platen mold halves, respectively, said member having an outer extension with first and second sides for extending into the mold cavity about which a casting may be formed, said member having on each of said first and second sides a means for entrapping a portion of a casting formed about said member and preventing said portion of the casting from spreading away from said outer extension, whereby said casting will be encouraged into tight grip on said outer extension upon cooling and shrinkage of the casing.

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**4,019,565**

## INGOT MOLD FOR CONTINUOUS ROTARY CASTING

**Michel Mola, Paris, France, assignor to Creusot-Loire Vallourec, Paris, France**

**Filed Aug. 9, 1976, Ser. No. 712,966**

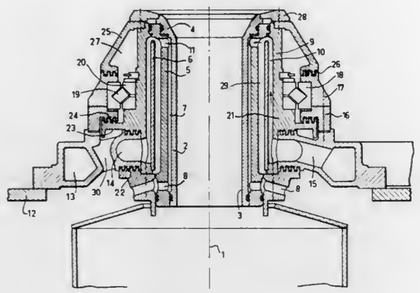
**Claims priority, application France, Aug. 14, 1975, 75.25325**

**Int. Cl.² B22D** *11/04*

**U.S. Cl. 164—283 M** **6 Claims**

**1.** In an ingot mold for substantially vertical continuous rotary casting, which mold is externally cooled by the circulation of a cooling fluid and comprises a rotary member

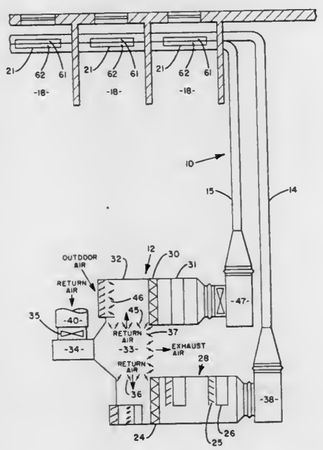
mounted on bearings and having a cooling wall the external surface of which is cooled by a concentric duct having an outlet in the lower part of the mold, said rotary member being mounted on a bearing supported by a coaxial stationary part for supplying cooling fluid thereto, a seal between the rotary part and the stationary part being provided by means of annular labyrinths comprising a plurality of teeth to force said fluid to flow along the length of said cooling wall in the duct, the improvement according to which the stationary member com-



prises a fluid distributing chamber positioned in the lower part of the ingot mold above the outlet of said first-mentioned duct beneath said bearing, and opening into a second duct formed in the rotatary member, concentrically 6ith the first duct, between an external jacket and an internal partition separating the two ducts, said ducts being connected to each other near the upper part of the mold, and said jacket having two sets of labyrinth teeth cooperating with two corresponding sets inside the distribution chamber.

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**4,019,566**
**AIR CONDITIONING SYSTEM**
**George E. Cobb, Houston, Tex., assignor to Carrier Corporation, Syracuse, N.Y.**
**Division of Ser. No. 528,074, Nov. 29, 1974, Pat. No. 3,949,810. This application Jan. 20, 1976, Ser. No. 650,659**
**Int. Cl.² F25B** *29/00*
**U.S. Cl. 165—2** **2 Claims**



1. A method of operating an air conditioning system for conditioning air in a plurality of enclosed areas in a building comprising the steps of:

delivering a stream of air conditioned to a relatively constant cold temperature level to a terminal provided in each of the areas;

regulating the quantity of relatively cold conditioned air discharged into the area in accordance with the temperature level therein;

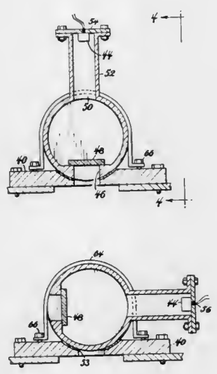
generating a control signal, the magnitude thereof varying in accordance with the quantity of constant temperature conditioned air supplied to the area;

monitoring the magnitude of the control signal; and

activating a warm air supply terminal when the magnitude of the control signal indicates that the quantity of constant temperature relatively cold air discharged into the area has decreased below a predetermined level.

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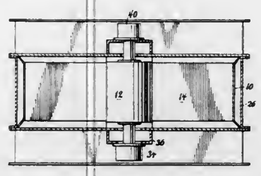
**4,019,567**
**LENS HOLDER**
**Donald F. Wixson, Wellsville, and George K. Ostrander, Angelica, both of N.Y., assignors to The Air Preheater Company, Inc., Wellsville, N.Y.**
**Filed Mar. 24, 1976, Ser. No. 670,011**
**Int. Cl.² F28D** *19/04*
**U.S. Cl. 165—5** **3 Claims**



1. A heat exchanger having a housing wall including spaced inlet and outlet ducts for a heating fluid and for a fluid to be heated, a matrix of heat absorbent material carried in said chamber, means for subjecting said matrix to the heating fluid and to the fluid to be heated, an opening in the housing of the heat exchanger axially spaced from said matrix and arranged to receive infra-red rays radiating therefrom, a cylindrical lens housing for an infra-red ray detector lying laterally adjacent the opening in said heat exchanger housing and having an opening in the peripheral wall thereof that coincides with the opening in the heat exchanger housing, an infra-red ray detector in the lens housing lying opposite the opening therein to receive the infra-red rays emitted from said matrix, a lens covering the opening in said lens housing, and yoke means encircling the cylindrical lens housing holding said housing laterally adjacent the heat exchanger housing whereby said lens housing may be rotated about its axis to selectively align the opening in the heat exchanger housing and the opening in the lens housing.



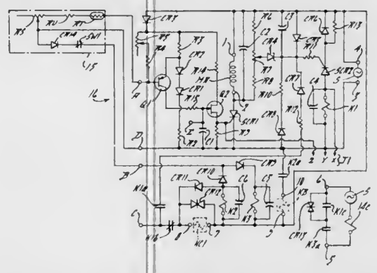
**4,019,568**
**ROTOR CENTERING DEVICE**
**Tadek Brzytwa, Wellsville, N.Y., assignor to The Air Preheater Company, Inc., Wellsville, N.Y.**
**Filed Jan. 22, 1976, Ser. No. 651,309**
**Int. Cl.² F28D** *19/04*
**U.S. Cl. 165—8** **5 Claims**



1. Rotary regenerative heat exchange apparatus including a cylindrical rotor housing having end plates at opposite ends thereof with apertures therethrough for a heating fluid and a fluid to be heated, a rotor of heat absorbent material concentrically disposed about a vertical rotor post positioned within the cylindrical rotor housing to receive the heating fluid and the fluid to be heated, a housing for a support bearing subjacent the rotor having an annular shelf with a cylindrical central chamber therein concentric with the rotor, means affixing the housing for the support bearing concentrically to the rotor housing, an annular support bearing lying on said shelf adapted to support the rotor for rotation about its axis, a centering device in the central chamber having a disc with an axially aligned stem attached to the rotor post, said disc having a bearing contact with the arcuate walls of the cylindrical chamber, and a radial guide bearing adapted to replace said centering device having substantially the same diameter as said centering device and adapted to extend concentrically through the cylindrical chamber to the rotor post to position said post concentric with the central chamber and to prevent lateral displacement of the rotor.

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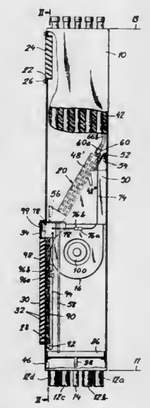
**4,019,569**
**BURNER CONTROL CIRCUIT**
**Wilbur S. McMann, Utica, and Charles Stang, Jr., Detroit, both of Mich., assignors to Maxitrol Company, Southfield, Mich.**
**Division of Ser. No. 347,618, April 4, 1973, Pat. No. 3,838,811. This application Sept. 24, 1974, Ser. No. 508,847**
**Int. Cl.² F25B** *29/00*
**U.S. Cl. 165—26** **23 Claims**



1. In a heating/cooling system selectively operable to a heating mode and to a cooling mode for controlling the temperature of a building space wherein there are provided a heater means operative in the heating mode including a burner means operable from a source of gas to supply heat to the building space and a valve means for controlling the flow of gas from the source to the burner meas such that the flow of gas to the burner means is modulated over a range of flow rates in accordance with building demand to maintain a desired building temperature, a refrigeration means operative in the cooling mode for supplying cooling to the building space when the building temperature rises above a desired temperature, and a blower means operative to circulate air in the building space: a control system for controlling said heating-/cooling system comprising a control circuit module comprising a control circuit and input circuit means for said module comprising means for sensing the building temperature, means for setting a desired building temperature, means for supplying a signal representing the difference between the set and sensed temperatures, mode control switch means selectively operable to cool, off and heat positions, and blower switch means for operating said blower means, said system having a plurality of only four conductors connecting said input circuit means with said control circuit module such that the said refrigeration means is rendered operative when said mode control switch means is cool, said heater means is rendered operative when said mode control switch means is in heat, said heater means and said refrigeration means are rendered inoperative when said mode control switch means is in off, and said blower means is operative from said blower switch means when said mode control switch means is in any of its three operating positions.

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**4,019,570**
**HEATING AND COOLING APPARATUS**
**Sidney Siegel, 989 Schenectady Ave., Brooklyn, N.Y. 11203**
**Division of Ser. No. 447,784, March 4, 1974, Pat. No. 3,908,750. This application July 9, 1975, Ser. No. 594,228**
**Int. Cl.² F28F** *9/00*
**U.S. Cl. 165—67** **2 Claims**



1. A riser-pipe assembly for an air-treatment apparatus, said assembly comprising:

at least two upright riser pipes;

a pair of plates flanking said pipies and each formed adjacent each pipe with a respective upright slit in line with the respective pipe and having a predetermined vertical length; and

at least four resiliently deformable elongated clamp strips arranged in two pairs bridging said plates and each embracing a respective pipe, each strip having one end engaged in a slit of one plate and another end engaged in the corresponding slit of the other plate, said strips each having a vertical height substantially less than said predetermined height of said slits, whereby said pipes and said strips are vertically displaceable relative to said plates, each of said strips having a generally cylindrically arcuate

center region and at each end a generally planar region extending through the respective slit and formed with a bent-over portion preventing withdrawal from said slit, the bent-over portions at each slit extending in opposite directions.

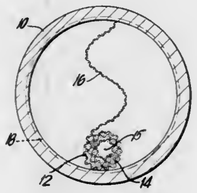
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**4,019,571**

## GRAVITY ASSISTED WICK SYSTEM FOR CONDENSERS, EVAPORATORS AND HEAT PIPES

**Robert L. Kosson, Massapequa, and John A. Quadrini, Northport, both of N.Y., assignors to Grumman Aerospace Corporation, Bethpage, N.Y.**

**Filed Oct. 31, 1974, Ser. No. 519,788**
**Int. Cl.² F28D** *15/00*
**U.S. Cl. 165—105** **27 Claims**




1. A wick system for use in a suitable casing capable of acting as an evaporator, a condenser or a conduit therebetween in a gravity environment in vertical and inclined orientations, comprising:

a casing having an outer wall and an inner wall;

a wall capillary in contact with the inner wall of said casing;

at least one artery structure comprising a plurality of generally unspaced-apart screen mesh layers defining a canal substantially central to said artery structure; and

biasing means for urging said artery structure toward and in contact with the wall capillary,

such that when said casing functions as an evaporator, vaporizable liquid flowing downwardly through said canal under the influence of gravity flows outwardly to said wall capillary due to capillary forces, said liquid evaporating when said casing is heated, and, such that when said casing functions as a condenser, vapors of said liquid condensing on said inner wall travel along said wall capillary toward and into said artery structure due to capillary forces, said condensed liquid flowing downwardly through said canal under the influence of gravity.

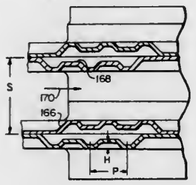
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**4,019,572**

## RADIATOR ASSEMBLY FOR FLUID FILLED ELECTRICAL APPARATUS

**Larry R. Harlan, Muncie, and Patrick L. Thiel, Springport, both of Ind., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed June 23, 1975, Ser. No. 589,098**
**Int. Cl.² F28D** *15/00*
**U.S. Cl. 165—106** **5 Claims**




1. A radiator assembly for fluid filled electrical apparatus, comprising:

a plurality of radiator sections each constructed of at least first and second panels; said first and second panels each having a plurality of ridges and furrows forming a corrugated surface;

a header assembly connecting the radiator sections together in flow communication relationship; and

means for connecting the header assembly to the fluid filled electrical apparatus;

said first and second panels being connected together such that said ridges and furrows form a plurality of ducts which extend through the panels, with the ridges of said first panel being aligned with the furrows of said second panel;

said radiator sections being aligned along a common axis such that the ridges on the first panel of one radiator section are aligned with the furrows on the facing panel of an adjacent radiator section, thereby providing a flow path between said radiator sections which has a substantially constant cross-sectional area.

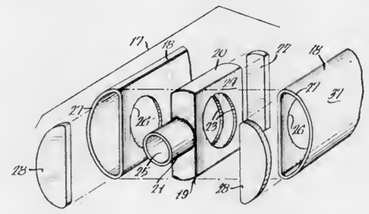
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**4,019,573**

## HEAT EXCHANGER

**Arthur B. Modine, Racine, Wis., assignor to Modine Manufacturing Company, Racine, Wis.**

**Filed Sept. 25, 1975, Ser. No. 616,670**
**Int. Cl.² F28F** *1/02, 1/38, 9/00;* **F28D** *7/00*
**U.S. Cl. 165—175** **12 Claims**




1. A heat exchanger for exchanging heat between fluids, comprising: a plurality of conduits for parallel flow of a first fluid through all said conduits, each said conduit comprising a manifold with a first port at one end and a plurality of adjacent second ports spaced from said first port and a plurality of fluid tubes each attached to one of said plurality of ports, the outer peripheral surfaces of the plurality of tubes of each said conduit substantially describing a conduit cylinder and the inner confronting surfaces of said tubes of each conduit being spaced apart to provide an open fluid flow area between the tubes; means for directing a first fluid through all said conduits and thereby all said tubes; and means for directing a second fluid over and around said outer peripheral surfaces and through said open areas between the tubes for achieving maximum surface area contact heat transfer with minimum cross sectional area of each of the conduits.

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**4,019,574**

## SUBSURFACE WELL APPARATUS HAVING FLEXING MEANS AND METHOD OF USING SAME

**James D. Mott, Houston, Tex., assignor to Hydril Company**

**Filed May 23, 1975, Ser. No. 580,228**
**Int. Cl.² E21B** *33/035, 43/12*
**U.S. Cl. 166—.5** **3 Claims**

1. A running tool apparatus for installing an articulated surface-controlled safety valve having a valve element and valve operator at a subsurface operating location in a well using through-the-flowline techniques, including:

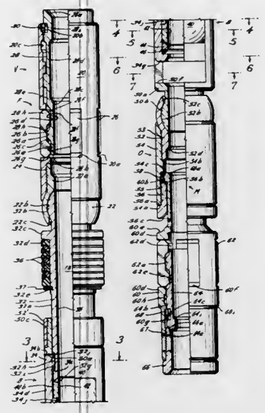
a running tool body having means for connecting with a carrier tool for moving the running tool to and from the subsurface valve operating location in the well, said running tool body extending within the articulated safety valve body;



means mounted with said running tool body for releasably securing the articulated safety valve with the running tool body;

means mounted with said running tool body for operating the articulated safety valve to releasably secure the safety valve at the subsurface operating location in the well;

means mounted with said running tool body for releasing the secured articulated safety valve from the running tool to enable movement of the running tool from the safety valve; and



said running tool body having a first body portion and a second body portion and means for connecting said first body portion and said second body portion for enabling angular movement of said first body portion relative to said second body portion wherein said running tool body flexes, said means for connecting said first body portion and said second body portion disposed within the articulated safety valve when moving the safety valve to the subsurface operating location.

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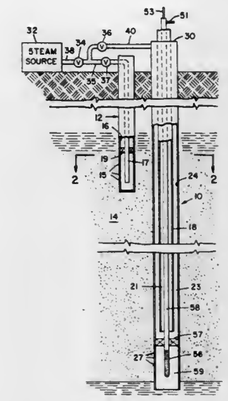
**4,019,575**

## SYSTEM FOR RECOVERING VISCOUS PETROLEUM FROM THICK TAR SAND

**Peter Pisio, and Charles F. Kirkvold, both of Calgary, Canada, assignors to Chevron Research Company, San Francisco, Calif.**

**Filed Dec. 22, 1975, Ser. No. 643,579**
**Int. Cl.² E21B** *43/24*
**U.S. Cl. 166—61** **3 Claims**

1. A system for assisting the recovery of viscous petroleum from a petroleum-containing formation comprising a substantially vertical well formed through a petroleum-containing formation, said formation having an initial low potential for fluid injectivity, a casing string having a production opening near its lower portion positioned in said vertical well, a production flow line in said vertical well extending from a position adjacent said production opening to the earth's surface, packing means packing off the space between the interior of said casing string and the exterior of said production flow line above said production opening, a tubular member in said vertical well between the interior of said casing string and the exterior of said production flow line, said tubular member extending from the earth's surface to a position above said packing means to form a closed-loop flow path from the earth's surface to said packoff means and back to the earth's surface, hot fluid generating means connected to said closed-loop flow path for circulation of hot fluid therethrough to heat viscous petroleum in said formation adjacent at least a portion of said vertical well to provide a potential flow path for fluid in said formation, a second well penetrating said formation closely spaced apart from said vertical well and in communication with said potential flow path for fluid in said formation, and means for injecting a drive fluid through said second well




into the upper portion of said formation into said potential flow path for fluid in said formation to promote flow of petroleum to the production opening near the lower portion of said casing string of said vertical well.

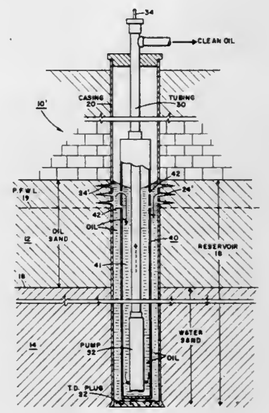
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**4,019,576**

## OIL RECOVERY FROM AN OIL-WATER WELL

**William C. Finch, Houston, Tex., assignor to William C. Finch and Michael P. Breston, both of Houston, Tex., part interest to each**

**Filed Nov. 23, 1973, Ser. No. 418,482**
**Int. Cl.² E21B** *43/12, 47/04*
**U.S. Cl. 166—250** **2 Claims**




1. In a method for the production of a hydrocarbon fluid from an underground formation which is penetrated by a cased well, said hydro-carbon fluid being in contact with water in said formation, said water tending to form a cone and be produced with said hydrocarbon fluid when said well is placed on production, the improvement comprising the steps of:

determining the potential free water level in said well by

measuring the height of the hydrocarbon column in said well and multiplying said height by the specific gravity of the hydrocarbon;

withdrawing said hydrocarbon fluid from said well in a noncommingled condition with said water;

producing into said well by gravity said hydrocarbon fluid through spaced perforated intervals in the casing of said well from spaced producing intervals in said formation, said intervals all being substantially above said determined potential free water level; and

the casing of said well forming a closed-bottom reservoir extending substantially below the level of the oil-water interface.

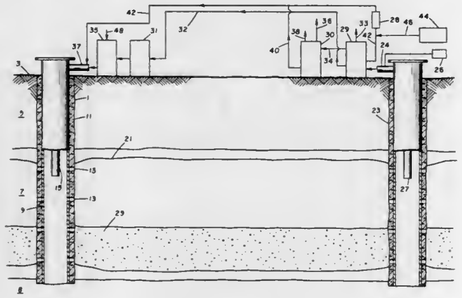
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**4,019,577**

## THERMAL ENERGY PRODUCTION BY IN SITU COMBUSTION OF COAL

**John L. Fitch, Dallas, and Malcolm K. Strubhar, Irving, both of Tex., assignors to Mobil Oil Corporation, New York, N.Y.**

**Filed Feb. 23, 1976, Ser. No. 660,079**
**Int. Cl.² E21B** *43/24*
**U.S. Cl. 166—259** **12 Claims**



1. A method for recovering heat energy from a subterranean coal formation having a preferred vertical fracture orientation, comprising:

a. providing an injection well and a production well which extend from the surface of the earth and communicate with said coal formation;

b. forming by hydraulic fracturing techniques a vertical fracture in said coal formation to communicate with said injection well and said production well;

c. propping the lower portion of said vertical fracture to a height of no more than one-third the height of said fracture and leaving unpropped the upper portion thereof to provide high permeability in the propped portion only of the fracture;

d. injecting a combustion-supporting gas via said injection well into said lower propped portion of said vertical fracture;

e. igniting said coal to form a combustion zone about said lower propped portion of said vertical fracture and to generate hot combustion gases;

f. continuing to inject said combustion-supporting gas to propagate said combustion zone through said formation along the propped portion of the fracture; and

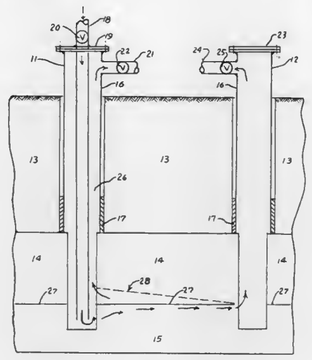
g. producing said hot combustion gases into said production well to recover the heat energy contained thereby.

**4,019,578**

## RECOVERY OF PETROLEUM FROM TAR AND HEAVY OIL SANDS

**Ruel C. Terry, 3090 S. High St., Denver, Colo. 80210, and Xerxes T. Stoddard, 4617 W. 27th Ave., Denver, Colo. 80212**

**Filed Mar. 29, 1976, Ser. No. 671,259**
**Int. Cl.² E21B** *43/24*, *43/26*
**U.S. Cl. 166—267** **8 Claims**



1. A method of mobilizing and producing normally immobile hydrocarbons from an underground location, comprising the steps of

establishing a first passage between a surface location and a underground deposit of carbonaceous material that is capable of becoming liquid upon application of heat, said first passage containing a fluid injection and a fluid withdrawal means,

establishing a second passage between a surface location and the said underground deposit, the second passage being spaced apart from the said first passage,

establishing a subsurface communication third passage between the the first passage and the second passage,

passing a fluid having a temperature above the pour point temperature of the said carbonaceous material through the said subsurface communication third passage between the first passage and the second passage, said fluid being under a pressure greater than the hydrostatic head pressure, thereby establishing a flow of heat from the injection means in the first passage through the subsurface communication third passage and through the second passage,

transferring heat from the circulating fluid to the said carbonaceous material until the temperature of the said carbonaceous material is at least as much as the pour point temperature of the said material, and

removing the fluid along with the liquid carbonaceous material through the fluid withdrawal means in the first passage and through the second passage.

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**4,019,579**

## APPARATUS FOR RUNNING, SETTING AND TESTING A COMPRESSION-TYPE WELL PACKOFF

**Erik Thuse, Santa Clara, Calif., assignor to FMC Corporation, San Jose, Calif.**

**Continuation of Ser. No. 574,177, May 2, 1975, abandoned. This application Mar. 3, 1976, Ser. No. 663,382**
**Int. Cl.² E21B** *23/00*, *43/10*
**U.S. Cl. 166—123** **11 Claims**

1. A well tool for running and setting a pressure-holding well device within an outer well element, comprising

a. an annular body,

b. means for connecting the body to a well pipe for running the well tool into a well,

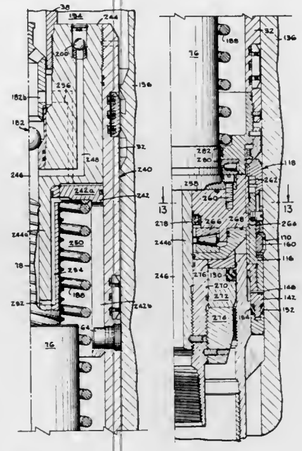
c. fluid piston means disposed within the body for linear movement therein in response to fluid pressure entering said body from the well pipe,

d. screw means in said body and connected to said fluid piston means for linear movement with said piston means,

e. helical nut means supported in said body for rotation in response to linear movement of the screw means, and

f. means connected to the helical nut means to transmit





rotary movement of said helical nut means to a pressure-holding well device when said well tool and said well device are interconnected, whereby the pressure-holding well device can be run into a well on the well pipe and then set into fluid pressure-tight condition in the outer well element by hydraulic fluid conducted through the well pipe to the well tool, without rotation of said well pipe.

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**4,019,580**

## APPARATUS AND METHOD FOR RUNNING, SETTING AND TESTING A COMPRESSION-TYPE WELL PACKOFF

**Michael R. Garrett, Houston, Tex., assignor to FMC Corporation, San Jose, Calif.**

**Continuation of Ser. No. 574,145, May 2, 1975, abandoned. This application Jan. 19, 1976, Ser. No. 650,101**
**Int. Cl.² E21B** *23/04*, *23/06*
**U.S. Cl. 166—315** **22 Claims**

17. In a well tool for running and actuating a well device within an outer well element, said well tool including a body and means for connecting the body to a pipe for running the well tool into a well, the improvement comprising

a. fluid piston means disposed within the body for linear movement therein,

b. means for conducting hydraulic fluid to said piston means to cause linear movement thereof,

c. means within said body and connected to the piston means to convert the linear movement of said piston means into torque,

d. means connected to the linear movement conversion means to transmit said torque to a well device when said well tool and said well device are interconnected, and

e. means for shifting the axial load of said well tool from said well device onto a well element,

whereby the well device can be run into a well on the well pipe, actuated by hydraulic fluid conducted to the well tool, and the axial load of the well tool shifted from the well device to a well element, without rotation of said well pipe.

22. A method for running and actuating a well device comprising,

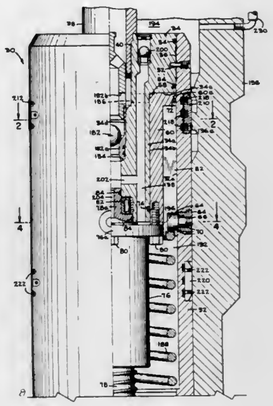
a. running the well device and a well tool as an assembly into a well,

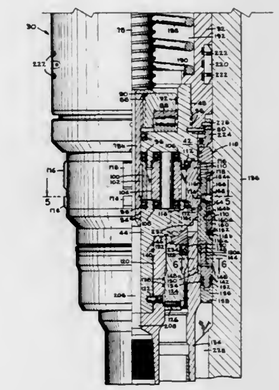
b. landing the well device in the well,

c. effecting linear movement of a piston within the well tool in response to fluid pressure.

d. converting the linear movement of said piston into torque,

e. transmitting the torque to the well device to actuate said well device, and





f. shifting the axial load of the well tool from the well device onto a well element, whereby said well device can be tested under conditions simulating those encountered in normal service.

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**4,019,581**

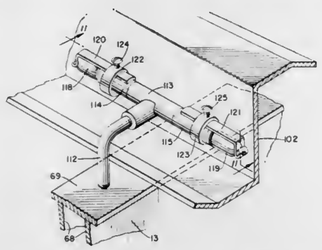
## METAL BUILDING WITH COMBINED TEMPERATURE CONTROL AND FIREFIGHTING SYSTEM

**Richard E. Diggs, South 12A Road, Carthage, Mo. 64836**

**Continuation-in-part of Ser. No. 604,663, Aug. 14, 1975. This application Dec. 18, 1975, Ser. No. 641,906**
**Int. Cl.² A62C** *37/14*
**U.S. Cl. 169—16** **7 Claims**

1. Combined temperature control and firefighting system for a metal building having side walls and a roof, and wherein the building includes a metal frame structure supporting the walls and roof, said frame structure having hollow members defining water flow passages for circulation of water throughout the building structure to regulate the temperature of the

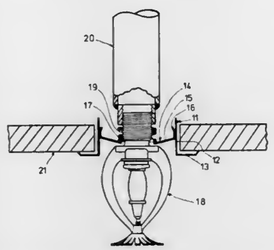
building dependent upon the temperature of the circulated water, flow control means in the flow passages, heat responsive means positioned in the building for sensing the presence of a fire and the like in the building and connected with the flow control means to operate the flow control means in the event of a fire in the building to effect circulation of water through the hollow members to maintain them cool and prevent destruction thereof by the temperature associated with the fire, said building frame structure including roof purlins on which the roof is supported, and first water discharge means associated with the purlins and connected with the flow passages to discharge water on the purlins in the event of a fire in the building, said first water discharge means comprising a plurality of hollow pipes connected with the water flow passages in the frame structure and having frangible plug means



associated therewith for precluding the flow of water therethrough during normal operation, said plug means being broken in the event of a fire occurring in the proximity thereof to enable discharge of water therefrom onto the roof purlins, each said frangible plug means comprising a rubber plug snugly fitted into the end of a hollow pipe, closing the pipe to flow of water therefrom, a hollow glass capsule filled to approximately 90% of its capacity with a liquid material and engaged against the rubber plug, a generally L-shaped bracket engaged with the capsule to hold it in position, and a circular clip engaged with the bracket and pipe to hold the bracket and plug securely in position during normal use, whereby the temperature associated with a fire heats the liquid in the capsule, increasing the pressure therein and fracturing the capsule, and enabling the rubber plug to be expelled from the pipe.

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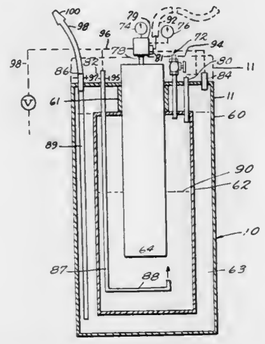
**4,019,582**
**SPRINKLER SYSTEMS**
**David Bruce Gangell, Epping, Australia, assignor to Environ Mechanical Services Pty. Limited, Sydney, Australia**
**Filed Nov. 7, 1975, Ser. No. 629,871**
**Claims priority, application Australia, Dec. 6, 1975, 82079/75**
**Int. Cl.² A62C** *37/08*
**U.S. Cl. 169—37** **20 Claims**



7. A sprinkler assembly comprising a sprinkler, a dropper conduit for passing a liquid therethrough, said sprinkler being connected to the outlet end of said dropper conduit, a resilient escutcheon means positioned and maintained between said dropper conduit and said sprinkler, a ceiling means including an aperture therein to permit the passage of said sprinkler and said escutcheon means therethrough and a cover plate inserted into said aperture, said cover plate having a flange on the lower portion thereof and a cross sectional opening smaller than the cross sectional area of said escutcheon means whereupon inserting the upper end of said cover plate past said escutcheon means the escutcheon means is substantially deformed to abut the interior of said cover plate and hold said cover plate in position such that the said flange abuts against the said ceiling means to substantially cover the periphery of said aperture.

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**4,019,583**
**SAFETY TANK AND FIRE EXTINGUISHER**
**Sidney Simon, 936 Ornmore St., Pittsburgh, Pa. 15201**
**Continuation-in-part of Ser. No. 624,161, Oct. 20, 1975, which is a continuation-in-part of Ser. No. 550,889, Feb. 19, 1975, Pat. No. D240,903. This application Feb. 26, 1976, Ser. No. 661,754**
**Int. Cl.² A62C** *35/12*
**U.S. Cl. 169—62** **14 Claims**



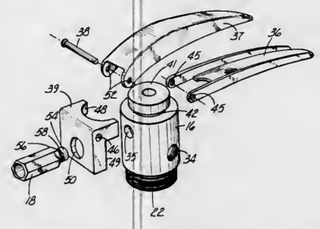
1. A combination gasoline safety tank and fire extinguisher comprising a double walled tank body the inner wall of which forms a container, a manifold removably mounted to said tank body, inlet means mounted to said manifold, outlet means mounted to said manifold, said inlet means and outlet means being interchangeable and adapted to receive and discharge fluid, a conduit connected to said inlet means and extending into the area formed by the inner surface of the container, a pressurized gas source means mounted to said manifold and placed within said container and selectively connected to said inlet means to discharge pressurized inert gas into said container through said conduit so that said inert gas bubbles up through a liquid contained in said container into the top of the container cooling said liquid and pressurizing the liquid in said tank, said double walled tank body forming an outer compartment substantially surrounding said container filled with an incombustible material pressurized by said pressurized gas source, a second conduit located within said outer compartment and discharge means mounted to said tank body adapted to selectively discharge pressurized gas from said gas source, liquid from said container and incombustible material from said outer compartment.

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**4,019,584**
**FIRE EXTINGUISHER**
**Norbert Allmendinger, Willoughby Hills, Ohio, assignor to Richmond Industries, Inc., Willoughby, Ohio**
**Filed Dec. 1, 1975, Ser. No. 636,522**
**Int. Cl.² A62C** *13/00*
**U.S. Cl. 169—74** **11 Claims**

1. A fire extinguisher comprising tank means for holding fluid under pressure, valve means operable from a closed condition to an open condition to effect a discharge of fluid from said fire extinguisher, said valve means including a valve body connected with one end portion of said tank means, said valve body including surface means defining a groove in said valve body, said groove having a bottom surface and upper and lower side surfaces which extend outwardly from said bottom surface, first handle means for supporting said fire extinguisher, said first handle means including a body portion adapted to be manually engaged during operation of said fire extinguisher and an end portion disposed adjacent to said valve body, said end portion including an end surface disposed in engagement with said bottom surface of said groove and side surfaces disposed in engagement with said upper and

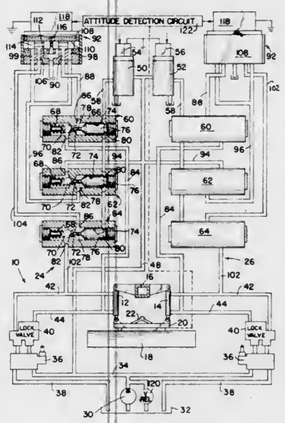




lower side surfaces of said groove, said end portion further including a pair of spaced apart and generally parallel support arms extending outwardly from opposite sides of said end surface and disposed adjacent to opposite sides of said valve body, second handle means for actuating said valve means, said second handle means being connected with outer end portions of said support arms on a side of said valve body opposite from a side of said valve body on which said body portion of said first handle means is disposed, and nozzle means connected with said valve body for directing a flow of fluid upon actuation of said valve means, said nozzle means being disposed on a side of said valve body opposite from the side of said valve body on which said body portion of said first handle means is disposed.

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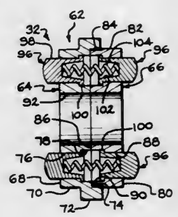
**4,019,585**
**COMBINED AUTOMATIC AND MANUAL HYDRAULIC CONTROL FOR MOTOR GRADER BLADE**
**Joseph Edward Dezelan, Joliet, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.**
**Continuation of Ser. No. 427,791, Dec. 26, 1973, abandoned. This application Mar. 17, 1976, Ser. No. 667,737**
**Int. Cl.² E02F** *3/76*; **F01B** *25/02*, *25/04*
**U.S. Cl. 172—4.5** **6 Claims**



4. A combined automatic and manual control system for a motor grader for controlling the angle and vertical position of a grader blade comprising:
- a frame member;
- a grader blade supported by said frame member for movement relative thereto;
- a hydraulic motor for positioning said blade;
- a source of pressurized fluid for powering said hydraulic motor;
- a manual control valve in continuous uninterrupted communication with said source for directing fluid from said source for operation of said motors;
- lock valve means disposed between said manual control valve and said motor for locking said motor in a selected position when said manual control valve is in a neutral position;
- attitude detection means for detecting deviations in a predetermined attitude of said blade and generating a signal in response to any such change;
- attitude responsive valve means connected in parallel with said manual control valve between said source and said hydraulic motor and responsive to said signal for controlling communication of fluid to said motor for thereby making corrections in the attitude of said work member;
- first pilot fluid operated check valve means for normally blocking flow of fluid from said source to said attitude responsive valve means;
- second pilot operated check valve means for normally blocking communication of fluid from said motor to said attitude responsive valve means; and,
- pilot control valve means connected to said source for simultaneously providing fluid for opening said first and said second pilot operated check valve means for providing open communication of said source to said attitude responsive valve means and for providing open communication of said attitude responsive valve means with said hydraulic motor.

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**4,019,586**
**SHIFT DOG FOR TRANSMISSION**
**Hans Hauser, Fredericktown, Ohio, assignor to The J. B. Foote Foundry Co., Fredericktown, Ohio**
**Filed Sept. 19, 1975, Ser. No. 614,908**
**Int. Cl.² F16D** *11/10*
**U.S. Cl. 192—48.91** **7 Claims**

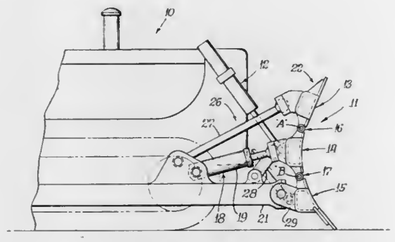


1. A shift dog for an in-line transmission, said dog comprising a casing of generally cylindrical shape with a generally cylindrical outer wall and two circular end faces, said cylindrical outer wall having a configuration to be engaged by a shifter fork, each of said end faces having at least one opening therein opposite one another and communicating with a larger common cavity within said casing, a projection in each of said openings and having an outer position in which the projection extends outwardly beyond the respective end face and an inner position in which the projection is substantially entirely behind the respective end face, each of said projections having means for preventing movement thereof beyond their outer positions, said cavity having a depth such that the distance between the projections when in their outer positions at least equals the extent to which said projections extend beyond the end faces when in the outer positions, each of said projections having a recess facing toward one another in said common

cavity, and resilient means in said cavity with end portions received in said recesses for urging said projections toward their outer positions.

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**4,019,587**
**WORK VEHICLE HAVING VARIABLE CURVATURE BLADE ASSEMBLY**
**Thomas C. Meisel, Jr., Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.**
**Filed May 17, 1976, Ser. No. 687,054**
**Int. Cl.² E02F** *3/76*
**U.S. Cl. 172—802** **9 Claims**



**1.** In a work vehicle having a blade assembly and means connected to the blade assembly for controllably raising and lowering said blade assembly, the improvement comprising:

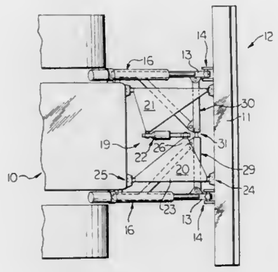
said blade assembly being formed of at least upper, middle, and lower generally horizontally extending blade portions;

first and second means for pivotally connecting the blade portions one to another for pivotal movement of the upper and lower blade portions relative to the middle blade portion and about first and second generally horizontally extending axes; and

third means for controllably pivoting the blade portions about said first and second axes, said third means including at least one fluid cylinder for controllably moving the pivotal connection of at least one of the blade portions, said fluid cylinder being at a location sufficient for providing said movement with a horizontal direction component.

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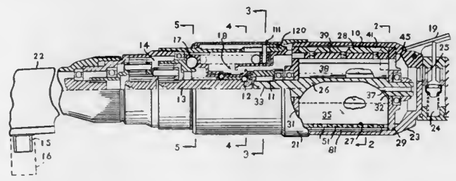
**4,019,588**
**TILTING MEANS FOR BULLDOZER BLADES**
**Thomas P. Casey, Burlington, Iowa, assignor to Caterpillar Tractor Co., Peoria, Ill.**
**Filed June 30, 1975, Ser. No. 591,662**
**Int. Cl.² E02F** *3/76*; **A01B** *65/00*
**U.S. Cl. 172—804** **12 Claims**



**1.** In a mounting arrangement interconnected between a unitary work implement and a vehicle, the invention comprising combined support and tilt means, including first and second members each pivotally interconnected between said work implement and said vehicle and extensible and retractable actuating means pivotally interconnected directly between said first and second members for selectively pivoting said members relative to each other to tilt said work implement by alternately raising opposite ends thereof upon alternate extension and retraction of said actuating means.

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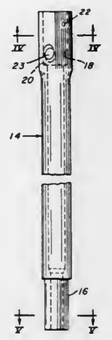
**4,019,589**
**PULSE MOTOR NUT RUNNER**
**William K. Wallace, Barneveld, N.Y., assignor to Chicago Pneumatic Tool Company, New York, N.Y.**
**Filed Dec. 2, 1975, Ser. No. 636,911**
**Int. Cl.² B25B** *23/14*
**U.S. Cl. 173—12** **16 Claims**



**1.** A pneumatically powered nut running tool comprising an air driven torque pulse transmitting motor having a rotor operable in a chamber, an air exhaust passage connected for exhausting spent air from the chamber, a valve in the exhaust passage controlling escape of spent air from the chamber having a normally open condition, a spindle connectible with an article to be torqued, a drive train connecting the rotor with the spindle including reduction gearing, clutch means in the drive train adapted to transmit torque pulses from the motor only in a forward direction to the spindle, releasable latch means in the drive train adapted when released to disable the drive train from transmitting further torque pulses to the spindle, and torque responsive cam means connected to the reduction gearing responsive to a predetermined torque overload developing in the reduction gearing to cause closing of the valve and release of the latch means.

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**4,019,590**
**METHOD OF ROOF DRILLING**
**Lloyd B. Hansen, Bridgeport, and Eugene R. Smarrella, Shinnston, both of W. Va., assignors to Carmet Company, Pittsburgh, Pa.**
**Division of Ser. No. 554,878, March 3, 1975, abandoned. This application Oct. 1, 1975, Ser. No. 618,701**
**Int. Cl.² E21B** *17/00*
**U.S. Cl. 175—57** **3 Claims**

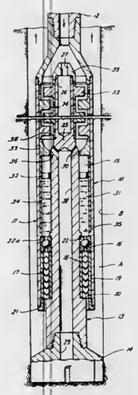


**1.** The method of drilling a hole in a mine chamber roof to a greater depth than the height of the chamber below the roof which comprises providing a starter-driver bar including a first end adapted to be driven by a motor and a second end having a female socket therein, a plurality of rod extensions each having a male end shaped to be received in said female socket and a female socket at its other end of the same cross-sectional size and shape as the first named female socket, and a bit having a male shank of the same cross-sectional shape as said male end; each of said starter-driver bar and rod extensions having an axial hole therethrough, each of said female sockets having a hole through the wall thereof at a distance from the top end of said socket less than the length of the corresponding male end; securing the bit shank in the female socket of said starter-driver with the axial hole in said starter bar in communication with the hole in the socket of said starter bar and connecting the first end of the starter-driver to said motor to provide a first assembly, then drilling a hole in said roof with said first assembly, while applying suction to the bottom of said starter-driver bar, then separating said bit from said starter-driver, then securing the bit in the female socket of a first rod extension and the male end of said first rod extension in the socket of said starter-driver and covering the hole through the wall of the female socket, and then continuing drilling said hole while applying suction to the bottom of said starter-driver bar.



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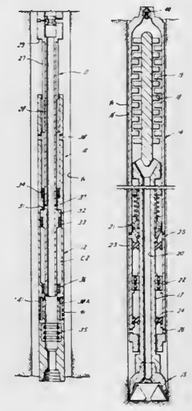
**4,019,591**
**WELL DRILLING TOOL**
**Fred K. Fox, Houston, Tex., assignor to Engineering Enterprises, Inc., Houston, Tex.**
**Continuation-in-part of Ser. Nos. 584,964, June 9, 1975, and Ser. No. 546,006, Jan. 31, 1975, Pat. No. 3,971,450. This application Dec. 31, 1975, Ser. No. 645,930**
**Int. Cl.² E21B** *3/12*, *41/00*
**U.S. Cl. 175—107** **54 Claims**



**1.** A well tool adapted to be connected as part of a pipe string through which drilling fluid is circulated, comprising inner and outer members defining an annular space therebetween having one end opening to the inside of the tool and another end opening to the outside of the tool, bearing means on the members within said space supporting them for rotation with respect to one another, motor means within said space for so rotating the members, means sealing between said members for separating the fluid on the other side of said tool from that within the said space above the seal means, and a body of material within the space above the sealing means which includes a metallic weighting substance which is liquid during drilling operations, said material having a specific gravity which is sufficiently greater than that of the drilling fluid and being sufficiently insoluble with the drilling fluid, during such drilling operations, that it substantially excludes drilling fluid therefrom.

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**4,019,592**
**BY-PASS TOOL**
**Fred K. Fox, Houston, Tex., assignor to Engineering Enterprises, Inc., Houston, Tex.**
**Filed Dec. 31, 1975, Ser. No. 645,799**
**Int. Cl.² E21B** *17/00*, *3/12*
**U.S. Cl. 175—234** **5 Claims**



**1.** A tool for connection as a part of a pipe string which is adapted to be disposed within a well bore, comprising a first tubular member, a second tubular member arranged concentrically within the first member to provide an annular space therebetween, said tubular members being longitudinally reciprocable with respect to one another between extended and retracted positions, first means carried by the second member for sealably engaging the first member, second means carried by the first member for sealably engaging the second member to define a first annular chamber between the first and second sealing means, a first port in the second member connecting the interior of the second member with the first chamber, third means for sealably engaging between the first and second members to define a second annular chamber between the first and third sealing means when said pipe string is lowered to move said tubular members to retracted position, and a second port in the first member connecting the second chamber with the exterior of the tool, said second member having an opening therein which connects the interior of said second member with said second chamber when the pipe string is raised to move said members to extended position, so as to permit drilling fluid to flow through said second chamber and out said second port and thereby by-pass the portion of the pipe string below said tool.

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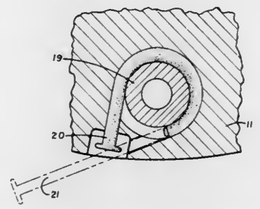
**4,019,593**
**REMOVABLE DRILL BIT NOZZLE**
**Paul George Craig, Dallas, Tex., assignor to Dresser Industries, Inc., Dallas, Tex.**
**Filed Jan. 30, 1976, Ser. No. 654,148**
**Int. Cl.² E21B** *9/08*
**U.S. Cl. 175—340** **1 Claim**

**1.** In a rotary drill bit including a body having cutting means mounted thereon and a passage for discharging drilling fluid downwardly, the lower portion of the passage having an enlarged bore of circular cross-section providing a downwardly facing shoulder in the passage; a nozzle of hard and brittle material adapted for replacement and having a circular cross-section adapted to be slipped upwardly and without rotation into the enlarged bore of the passage until the upper end of the nozzle is adjacent the shoulder, the improvement comprising:

said body having a first groove therein surrounding the nozzle and intermediate the ends of the nozzle;

said nozzle having a second groove to match the first groove of the body and to therewith form a locking passageway, said first groove and said second groove lying in a common plane;

a retainer member adapted to be deformed into a circular form about the nozzle structure by being forced into the locking passageway formed by the first groove and the matching second groove to bridge between the nozzle and body and lock the nozzle against the body shoulder to prevent movement of the nozzle with respect to the body;

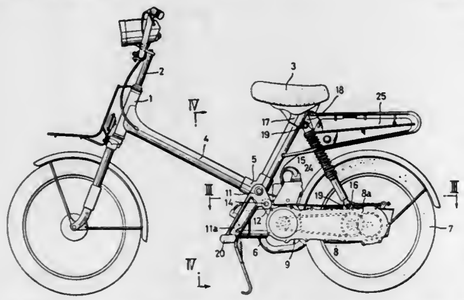



a first passageway extending through said body from the exterior of the body to said locking passageway for allowing said retainer member to be introduced into said locking passageway; and

a second passageway extending through said body at an angle to said first passageway from the exterior of the body to said locking passageway for allowing said retainer member to be forced from said locking passageway, one of said first passageway and second passageway being at an angle to said common plane.

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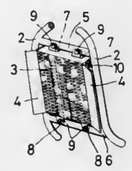
**4,019,594**
**MOTORIZED TWO-WHEELED VEHICLE CONSTRUCTION WITH POWER UNIT SWING SYSTEM**
**Mikihiro Koyama, Kawagoe, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**
**Filed Sept. 3, 1975, Ser. No. 610,079**
**Claims priority, application Japan, Sept. 12, 1974, 49-104357**
**Int. Cl.² B62K** *25/06*
**U.S. Cl. 180—33 A** **7 Claims**




1. A motorized two-wheeled vehicle construction comprising front and rear wheels, a head pipe connected to the front wheel, a seat structure for a driver, said seat structure having a lower portion, a frame connecting said head pipe and said seat structure, said frame being L-shaped and including at the bend thereof an elbow portion, a power unit including an internal combustion engine and an integral power transmission drive mechanism extending from the engine adjacent one side of the rear wheel for drive thereof, means pivotably connecting said power unit to said frame at said elbow portion, said elbow portion including laterally extending pipe sections, said means which pivotally connects the power unit to the frame comprising depending arms connected to said pipe sections, said power unit being pivotally connected to said depending arms, steps mounted on said depending arms at the lower ends thereof, said depending arms has two branches, one a longer branch extending in continuation of one of the legs of said L-shaped frame and carrying a respective said step at the lower end thereof, the other branch beng a shorter branch pivotally connected to said power unit, and shock absorbing means connecting said power unit to said lower portion of the seat structure.

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**4,019,595**
**RADIATOR APPARATUS IN A MOTORIZED TWO-WHEELED VEHICLE**
**Masahiro Imai, Tokyo, and Satoshi Ishikawa, Kamifukuoka, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**
**Filed Aug. 29, 1975, Ser. No. 609,058**
**Claims priority, application Japan, Sept. 4, 1974, 49-105600[U]**
**Int. Cl.² B62D** *63/04*, *61/02*
**U.S. Cl. 180—33 R** **2 Claims**



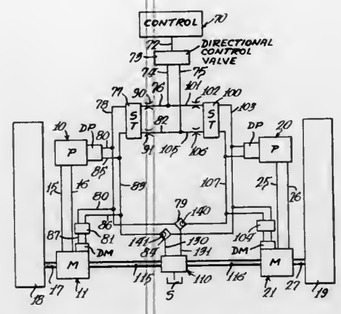

1. A motorized two-wheel vehicle comprising a vehicle body with spaced left and right front frame elements, upper and lower cross pipes between said frame elements defining a rectangular aperture, a radiator mounted in said aperture between said frame elements and said cross pipes, said radiator having upper and lower surfaces and side surfaces, left and right air guide plates mounted on the side surfaces of said radiator and being coextensive in height therewith, said guide plates projecting obliquely forwardly and outwards said radiator to cover the left and right front frame elements at the front surfaces thereof to direct air flow to said radiator while preventing generation of turbulence at said frame elements, and means on the upper and lower surfaces of said radiator directly securing said radiator to said cross pipes.

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**4,019,596**
**SYNCHRONOUS CONTROL SYSTEM**
**Stanley W. Crull, Ames, Iowa, assignor to Sundstrand Corporation, Rockford, Ill.**
**Filed Dec. 30, 1975, Ser. No. 645,391**
**Int. Cl.² B62D** *11/06*
**U.S. Cl. 180—6.48** **19 Claims**

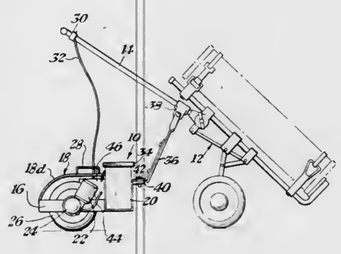
1. A synchronous control system for a pair of hydrostatic transmission with each of the latter having a pressure-responsive displacement control for one of the pump or motor of each hydrostatic transmission for controlling the output speed of the transmission, means for establishing a control pressure, and means including a pair of pressure lines with flow restrictors extended fron said control pressure establishing means and one to each displacement control for applying the control pressure to the displacement controls, said system comprising: a rotary valve with a pair of relatively rotatable valve members; means for rotating one of said valve members at a speed proportional to the output speed of one transmission; means for rotating the other of said valve members at a speed proportional to the output speed of the other transmission; said rotary valve having an outlet connected to a sump and a pair of inlets connected one to each of said pressure lines; and said valve members each having port means coacting to control the flow communication between said inlets and said sump and with the relation between the port means of the valve members varying corresponding to a difference in the output speeds of the hydrostatic transmissions to modify the control pressure in one of said pressure lines and synchronize the speed of the hydrostatic transmissions.






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**4,019,597**
**PORTABLE CART-MOUNTED PROPULSION UNIT**
**James W. Carmichael, Clearwater, Fla., assignor to Haja, Inc., Coral Gables, Fla.**
**Filed Dec. 31, 1975, Ser. No. 645,830**
**Int. Cl.² B62D** *51/04*
**U.S. Cl. 180—11** **4 Claims**




1. A propulsion unit removeably attachable to a conventional manually driven cart comprising:

a rigid, unitary supporting member, said supporting member including a first arcuate end portion, a middle flat portion, and a second end U-shaped portion, said end U-shaped portion sized to receive a storage battery;

first and second rigid side plates, each plate attached on opposite sides of said supporting member, one end of each said side plates attached to the arcuate end of said supporting member and the opposite end of each of said side plates attached to said U-shaped end portion;

a wheel rotatably mounted between and to each of said rigid side plates, said wheel disposed between the first arcuate end portion of said supporting member and the second U-shaped end portion;

an electric motor mounted on the outside of one of said side rigid plates;

a gear drive means connected to said wheel and to said motor mounted on the outside of one of said rigid plates, said motor and gear means mounted on the same rigid plate;

a battery storage container mounted within the U-shaped end supporting member;

a battery disposed within said battery storage receptacle, said battery lying within the plane of said wheel;

means for electrically connecting said battery to said motor;

an electrical switch connected to said means connecting said battery and said motor;

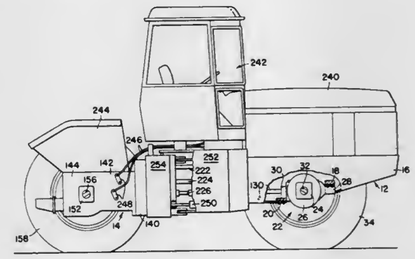
a horizontally disposed bracket attached to said end U-shaped portion of said supporting member and extended outwardly therefrom, said bracket including a flat plate horizontally disposed having an aperture disposed therein;

a movable pin receivable within said aperture; and

a cart shank attaching bracket pivotally coupleable to said horizontally disposed flange and said movable pin.

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**4,019,598**
**ARTICULATED TRACTOR**
**Karl Heinz Fresmann, and Saul Herscovici, both of Waterloo, Iowa, assignors to Deere & Company, Moline, Ill.**
**Filed Jan. 27, 1975, Ser. No. 544,064**
**Int. Cl.² B60K** *17/34*
**U.S. Cl. 180—51** **7 Claims**

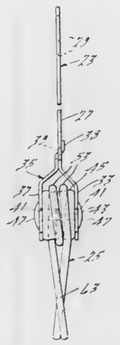



1. An articulated tractor comprising: front and rear frame structures pivotally connected for articulation about a generally upright axis; front and rear axle assemblies connected to the front and rear frame structures, respectively, and each including a differential driving a pair of oppositely extending drive axles with a pair of drive wheels connected to and driven by the drive axles on opposite sides of the respective frame structure; an engine mounted on the front frame structure and having a rearwardly extending output shaft; a first speed change transmission section mounted on the front frame structure having an input shaft operatively coupled to the engine output shaft and a rearwardly extending output shaft; a second speed change transmission section mounted on the rear frame structure and having a fore-and-aft extending input shaft and a fore-and-aft extending output shaft with its aft end drivingly connected to the rear differential; a gearbox mounted on the rear frame structure having an upper, forwardly extending, input shaft, an intermediate output shaft parallel to the input shaft drivingly connected to the second transmission section input shaft and coupled to the gearbox input shaft by first gear means, and a lower fore-and-aft extending transfer shaft having its aft end coupled to the fore-end of the second transmission section output shaft; a first driveshaft means coupled between the first transmission section output shaft and the gearbox input shaft and having front and rear universal joints respectively disposed forwardly and rearwardly of the axis of articulation between the front and rear frame structures; a second driveshaft means having one end coupled to the fore-end of the transfer shaft, a second end drivingly coupled to the forward differential, and front and rear universal joints respectively disposed forwardly and rearwardly of the axis of articulation between the front and rear frame structure; a PTO shaft journaled on the front frame structure and having a forward end drivingly coupled to the engine output shaft by second gear means; an intermediate PTO shaft journaled in the gearbox between the gearbox input and transfer shafts; PTO driveshaft means disposed between the first and second driveshaft means and coupled between a forward end of the intermediate PTO shaft and a rearward end of the PTO shaft journaled on the front frame structure and

having front and rear universal joints respectively disposed forwardly and rearwardly of the axis of articulation between the front and rear frame structures; and a PTO output shaft journaled in the rear frame structure below the second transmission section output shaft and coupled to the intermediate PTO shaft by third gear means.

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**4,019,599**
**SPRING TYPE PIPE SUPPORT**
**Larry E. Strunk, Jackson, Mich., assignor to Tenneco Inc., Racine, Wis.**
**Filed Sept. 27, 1973, Ser. No. 401,507**
**Int. Cl.² F16L** *3/02*
**U.S. Cl. 180—64 A** **9 Claims**



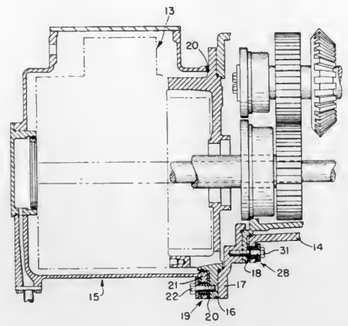
**1.** A spring type support for a pipe or the like comprising a support post having an axis, a resilient outer layer on the post and coaxial therewith, a spring clamp formed from a single piece of spring wire and shaped to a substantially figure eight configuration consisting essentially of only a first section and a second section, said first section comprising a holding section and being entirely closed and mounted on and around said resilient layer, said second section comprising a pipe clamping section and being open on the portion opposite to the first section to form a pair of resilient jaws and a mouth for the insertion and removal of a pipe, spreading of said jaws causing a reduction in diameter of said first section and compression by said first section of said resilient layer, said jaws being offset in opposite directions with respect to a midplane of the clamp normal to said post axis and intersecting such midplane and extending to opposite sides thereof whereby said jaws crisscross across said midplane and the ends of said jaws will respectively engage opposite sides of a pipe at two points that are separated along the length of the pipe and on opposite sides of said midplane, said crisscross arrangement of said jaws providing means to resist twisting of the clamp off a pipe.

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**4,019,600**
**ANTI-NOISE MOUNTING MEANS FOR TRANSMISSIONS**
**Ralph E. Master, Washington; Arthur J. Ritter, Jr., Metamora, and David L. Perry, Peoria, all of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.**
**Filed June 9, 1975, Ser. No. 584,995**
**Int. Cl.² B60K** *20/00*
**U.S. Cl. 180—70 R** **1 Claim**

**1.** In a mobile construction vehicle including a metallic frame, a transmission assembly mounted on said frame and a metallic bell housing mounted on said transmission assembly, the improvement comprising:

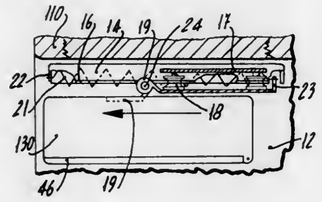
an annular flange on said bell housing, an annular flange on said transmission assembly, a plurality of first anti-vibration and noise suppressing means detachably connecting said bell housing flange to said transmission housing flange while preventing metallic contact therebetween, a first support member attached to said transmission assembly flange, a second metallic support member attached to said first support member, an annular flange on said frame, and a plurality of second anti-vibration and noise



suppressing means detachably connecting said second support member to said metallic frame flange while preventing metallic contact therebetween, each of said first and second anti-vibration and noise suppressing means including elastomeric pad means.

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**4,019,601**
**AUTOMATIC CONTAINER-BEARER BAR FOR MOTOR VEHICLES**
**Italo Di Giovanni, Via Francesco Hayez, 6, 20129 Milan, Italy**
**Filed Apr. 25, 1975, Ser. No. 572,495**
**Claims priority, application Italy, May 6, 1974, 22309/74**
**Int. Cl.² B60K** *37/04*
**U.S. Cl. 180—90** **10 Claims**



**1.** A bar for bottles and the like for use in a motor vehicle, said bar comprising:

a. a cabinet container having top and bottom ends and side walls when in a vertical position,

b. elongated guide means adapted to be mounted beneath the dashboard of said vehicle and to extend substantially horizontally from the face of said dashboard towards the front of said vehicle,

c. slide means arranged to slide along the length of said guide means,

d. pivot means for pivotally securing one of said side walls of said container at a position intermediate the top and bottom ends thereof to said slide means,

e. a rack, a sprocket wheel engaging said rack, and a first motor for driving said sprocket wheel to move said slide means horizontally along said guide means, and

f. a worm gear and a second motor for driving said worm gear to pivot said container,

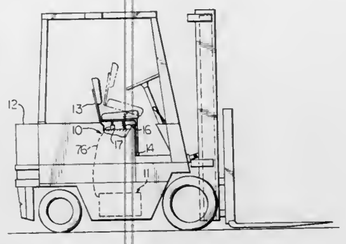
e. whereby said container may be moved from said horizontal storage position horizontally along said guide means towards the rear of said vehicle and then pivotally upwardly to said vertical position such that a portion of said container extends above the plane of said guide means for



access by an occupant of said vehicle and subsequently may be returned to said storage position when not in use.

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**4,019,602**
**SEAT ACTUATED FLUID DRIVE NEUTRALIZING ARRANGEMENT**
**Cyril W. Habiger, Joliet, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.**
**Filed June 7, 1976, Ser. No. 693,392**
**Int. Cl.² B60K** *28/00*
**U.S. Cl. 180—101** **7 Claims**



**1.** In a vehicle of the type having an operator's seat movable between a raised unoccupied position and a lowered occupied position, an engine, a wheel drive line, and a fluid drive arrangement shiftable to forward, neutral and reverse drive conditions and including an overcenter variable displacement fluid pump driven by the engine and a fluid motor drivingly connected to the drive line, an auxiliary source of pressurized fluid, and hydraulic actuator means operatively connected to the fluid pump for establishing the forward and reverse drive conditions when actuating fluid from the auxiliary source of fluid is directed thereto and for establishing the neutral position when the flow of actuating fluid thereto is blocked, wherein the improvement comprises:

solenoid operated valve means disposed between the auxiliary source of fluid and the hydraulic actuator means and having an energized fluid supplying position for directing actuating fluid from the auxiliary source of fluid to the hydraulic actuator means and a de-energized fluid blocking position for blocking pressurized fluid from the hydraulic actuator means;

a source of electrical energy;

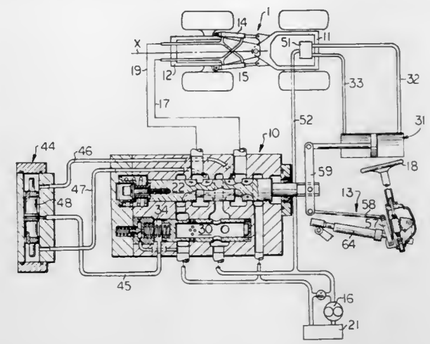
a conductor connecting the source of electrical energy to the solenoid operated valve means; and

an electrical switch disposed within the enductor and having a closed position for completing an electrical circuit to energize the solenoid operated valve means and an open position for de-energizing the solenoid valve, the electrical switch being disposed beneath the operator's seat in a position to be engaged by the seat and actuated to its closed position when the seat is moved to the lowered occupied position and is actuated to its open position when the seat is moved to the raised unoccupied position.

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**4,019,603**
**UNDERSTEER VEHICLE STEERING SYSTEM**
**Dale H. Unruh, Peoria, Ill., and Jan B. Yates, Reynoldsburg, Ohio, assignors to Caterpillar Tractor Co., Peoria, Ill.**
**Filed Dec. 24, 1975, Ser. No. 644,369**
**Int. Cl.² B62D** *5/06*
**U.S. Cl. 180—134** **10 Claims**

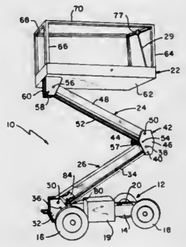
**1.** In an articulated wheeled vehicle having an operator actuated steering system a steering control assembly for producing an understeer steering characteristic in said vehicle, said control assembly comprising; accelerometer means mounted on said vehicle proximate an axle and the dynamic roll axis thereof for sensing lateral acceleration of said vehicle and for producing a signal in proportion thereto, compensating actuator means for automatically modifying the operator actuated steering of said vehicle solely in response to a signal from said accelerometer means, communication means be-



tween said accelerometer means and said compensating actuator means for transmitting said signal to said compensating actuator means.

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**4,019,604**
**ELEVATING PLATFORM APPARATUS**
**Lyman David Benson, Santa Rosa, Calif., assignor to Fabtek, Inc., Healdsburg, Calif.**
**Filed June 16, 1975, Ser. No. 587,354**
**Int. Cl.² B66F** *11/04*
**U.S. Cl. 182—2** **4 Claims**



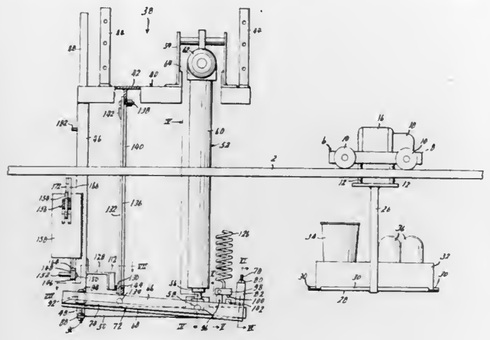
**1.** In an aerial lift apparatus having a main support frame, the combination of a first parallelogram boom assembly including a pair of elongate parallel first arms mounted at their proximal ends on the support frame and extending at an upwardly inclined angle from the support frame, a floating frame pivotally mounted on the distal ends of the first arms, at least a second parallelogram boom assembly including a pair of elongate parallel second arms pivotally mounted at their proximal ends on the floating frame adjacent said pivotal mounting between the first arms and floating frame, said second arms extending at an angle which inclines upwardly from said base in a direction opposite said inclined angle of the first arms, an end frame pivotally mounted on the distal ends of the second arms, rigid tension link means interconnected between the distal end of one of the first arms and a proximal end of one of the second arms for applying a moment force on the latter to pivot the second boom assembly in an angular direction about the floating frame which is opposite to the angular direction of pivoting of the first arms relative to the main support frame, and means for pivoting the first arms relative to the main support frame.

**4,019,605**

## FOOD DELIVERY SYSTEM FOR RESTAURANTS

**Frederic F. Kropf, 2419 N. 72nd Place, Kansas City, Kans. 66109**

**Filed Aug. 23, 1976, Ser. No. 716,466**
**Int. Cl.² E04H** *3/04*
**U.S. Cl. 186—1 R** **12 Claims**



1. A food delivery system for restaurants comprising:
a. a horizontal elevated conveyor track,
b. a carriage operable to move along said track from a central station successively past a plurality of delivery stations spaced along said track, and operable to carry a food container,
c. an elevator tray disposed at each of said delivery stations,
d. a trip member at each of said delivery stations and operable when set in an operative position to transfer said food container from said carriage to the associated elevator tray as said carriage moves past said delivery station, and having an inoperative position in which it does not transfer said food container,
e. trip control means operable to move said trip member between its operative and inoperative positions,
f. elevator means at each of said delivery stations and operable to lower the associated elevator tray from a normal raised position in which it receives said food container to a lower delivery position, and to re-elevate it to its normal raised position, and
g. elevator control means operable to raise or lower said elevator means.

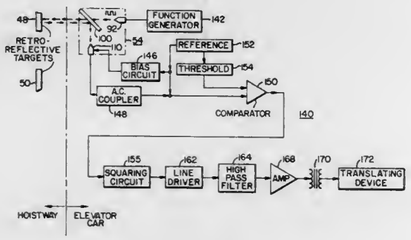
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**4,019,606**

## ELEVATOR SYSTEM

**William R. Caputo, Wyckoff, and Albert J. Pisatowski, Wayne, both of N.J., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed Mar. 21, 1975, Ser. No. 560,460**
**Int. Cl.² B66B** *1/40*
**U.S. Cl. 187—29 R** **7 Claims**




1. An elevator system, comprising:
a structure having a plurality of landings,
an elevator car mounted for movement relative to said structure to serve at least certain of the landings,
transmitter means providing electromagnetic radiation having a predetermined wavelength, with the electromagnetic radiation being pulsed at a predetermined rate,
receiver means responsive to electromagnetic radiation of the wavelength provided by said transmitter means,
a housing,
beam splitter means,
said transmitter means, receiver means, and beam splitter means being mounted within said housing with predetermined orientations,
a control device,
said housing and control device being mounted to provide relative motion between them when said elevator car moves relative to said structure,
said control device including a surface effective to reflect electromagnetic radiation from said transmitter means to said receiver means when said elevator car is in a predetermined position relative to a selected landing,
translating means operable from a first to a second condition when energized,
said receiver means including a photoresponsive device and biasing means, said biasing means biasing said photoresponsive device to provide an output current regardless of the level of electromagnetic radiation the photoresponsive device is subjected to,
said photoresponsive device changing the magnitude of its output current when subjected to electromagnetic radiation,
and means responsive to the changes in the output current of said photoresponsive device, said means energizing said translating means when such changes occur at a rate within a predetermined range which includes the rate at which the electromagnetic radiation provided by said transmitter means is pulsed.

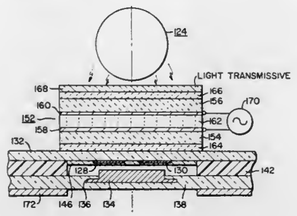
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**4,019,607**

## SIGNAL INPUT DEVICES AND SYSTEMS

**Alan F. Mandel, Pittsburgh, and Leonard C. Vercellotti, Verona, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed May 16, 1975, Ser. No. 578,302**
**Int. Cl.² B66B** *3/00*
**U.S. Cl. 187—29 R** **46 Claims**




1. A signal input device, comprising:
a switch having first and second opposed sides,
a light source adapted for continuous energization,
an electro-optic light valve disposed between said light source and the second side of said switch, said electro-optic light valve being operable between first and second conditions, with one of the conditions being a light transmitting condition and the other a light blocking condition,
and detector means responsive to actuation of said switch for operating said electro-optic light valve from the first to the second condition,
said switch being constructed to enable light from said light source to be visible on the first side of the switch when said electro-optic light valve is in the light transmitting condition.

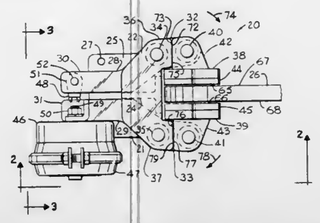


**4,019,608**

## LEVER ACTUATED CALIPER BRAKE

**Norman Allen Johnson, 5325 Tenth Ave., South Delta, B. C., Canada**

**Filed May 5, 1975, Ser. No. 574,609**
**Int. Cl.² F16D** *55/224*
**U.S. Cl. 188—59** **6 Claims**



1. A lever actuated caliper brake, in combination with a clamped member having a pair of clamped surfaces, comprising a base means having integral base lug means, said base lug means having only a single planar guide surface substantially perpendicular to said clamped surfaces of said clamped member, a pair of lever means each having an actuated end and an actuating end, each of said lever means pivotally mounted in said base lug means intermediate said actuated and actuating ends, a pair of brake shoe means each having a braking surface on one side thereof and integral shoe lug means extending outwardly from the other side thereof, said shoe lug means having only a single planar guide surface substantially perpendicular to said clamped surfaces of said clamped member and said guide surface of said shoe lug means being in abutting relation to said guide surface of said base lug means, said actuating end of each of said pair of lever means pivotally mounted in said shoe lug means of one of said pair of brake shoe means, said shoe lug means and said base lug means guide surfaces being in slidable opposed ralation, actuator means operatively interconnected to said actuated ends of said pair of lever means, whereby actuation of said actuator means causes said brake shoe means to move toward each other and slidable contact between said guide surfaces of said shoe lug means and said base lug means maintains each of said braking surfaces in substantially parallel relation with one of said pair of clamped surfaces.

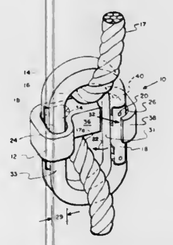
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**4,019,609**

## BRAKE APPARATUS FOR USE IN RAPPELLING

**Kelly B. Wagner, 14510 SE. Woodland Way, Milwaukie, Oreg. 97222**

**Filed Nov. 3, 1975, Ser. No. 628,068**
**Int. Cl.² B65H** *59/14*
**U.S. Cl. 188—65.4** **5 Claims**



1. A braking apparatus for use in rappelling, comprising an elongate brake bar body member defining a pair of apertures extending respectively through each end thereof in a direction substantially perpendicular to the longitudinal axis of said body member, each said aperture having two open ends, and a plurality of carabiners removably attached to said body member adjacent one another so that a portion of the loop of each carabiner is disposed within each said aperture, said body member including a slot formed therein extending between the two open ends of one said aperture for receiving said carabiners, said slot defining a gap in a portion of said body member which forms said one aperture, and said other aperture of said body member including a jog formed in said body member and directed toward the center thereof for facilitating the attachment of a subsequent one of said plurality of carabiners after a first of said carabiners has been attached to said body member.

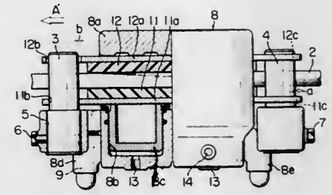
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**4,019,610**

## FLOATING CALIPER DISC BRAKE

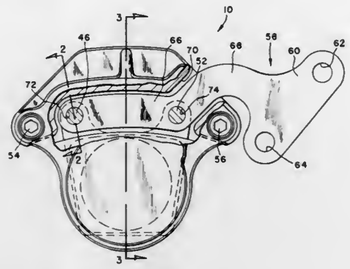
**Hiroshi Hirai, Satte, Japan, assignor to Akebono Brake Industry Co., Ltd., Tokyo, Japan**

**Filed July 15, 1975, Ser. No. 595,996**
**Int. Cl.² F16D** *55/224*
**U.S. Cl. 188—73.3** **4 Claims**



1. A floating caliper disc brake comprising:
a. a rotatable brake disc;
b. a support being located only on one side of said disc and fixed to a stationary vehicle element;
c. two friction pad guide pins for respectively positioning each of a pair of friction pads in such a manner that said pads can be removed by withdrawing said guide pin means, said guide pin means being releasably secured to said support and extended towards said disc and in parallel with a rotational axis of said disc beyond the periphery of said disc;
d. two caliper guide pins other than said two friction pad guide pins being secured to said support and extended towards the opposite direction to said disc and in parallel with the rotational axis of said disc;
e. said pair of friction pads being disposed on the opposed sides of said disc and provided with openings on the side portions of a backing plate associated with each of said friction pads so that said openings of each of said friction pads slidably receive respectively one of said friction pad guide pins in such a manner that the pair of said friction pad guide pins absorb the braking torque generated on said friction pads during braking and the pair of said friction pads can be removed in a circumferential direction by removing said friction pad guide pins without dismounting said caliper and a wheel; and
f. a caliper having an operating means which engages one of said friction pads with a surface of said disc and a reacting portion which engages another one of said friction pads with another surface of said disc due to the reaction of said operating means, and said caliper being positioned between said friction pad guide pins and guided in the direction of the rotational axis of said disc by means of said caliper guide pins.

**4,019,611**
**DISC BRAKE**
**Irving R. Ritsema, South Bend, Ind., assignor to The Bendix Corporation, South Bend, Ind.**
**Filed Mar. 15, 1976, Ser. No. 666,833**
**Int. Cl.² F16D** *55/224*; **B62L** *1/00*
**U.S. Cl. 188—73.3** **4 Claims**

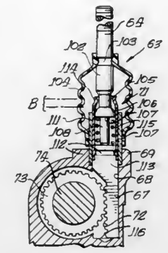


1. In a disc brake for a vehicle:
a rotor mounted for rotation with a member to be braked and having a pair of opposed friction faces;
a pair of friction elements carried adjacent said friction faces and adapted frictionally engage said opposed friction faces when a brake application is effected;
a torque member secured to a non-rotative portion of the vehicle;
a pair of pins carried by said torque member and restrained against relative movement with respect thereto, said pins being circumferentially spaced and extending axially with respect to said rotor, said friction elements having apertures for slidably mounting said friction elements on said pins;
a caliper carried by said torque member, said caliper having a pair of inwardly extending portions disposed adjacent said friction elements for urging the latter into braking engagement with their corresponding friction faces, said caliper further including a bridge portion traversing the periphery of said rotor and interconnecting said inwardly extending portions, and fluid motor means carried by the caliper for effecting a brake application;
each of said inwardly extending portions defining corresponding bores therein located radially outwardly of said periphery of the rotor, the bores in one of said inwardly extending portions registering with corresponding bores in the other portion, said registering bores receiving opposite ends of said pins, said pins extending through the apertures on said friction elements and into the registering bores on said caliper for slidably mounting the friction elements and the caliper on said pins.

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**4,019,612**
**AUTOMATIC SLACK ADJUSTER WITH INTERNAL REFERENCE POINT**
**George P. Mathews, Birmingham, and Thaddeus Lech, Jr., Roseville, both of Mich., assignors to Borg-Warner Corporation, Chicago, Ill.**
**Filed July 14, 1976, Ser. No. 705,378**
**Int. Cl.² F16D** *65/56*
**U.S. Cl. 188—196 BA** **39 Claims**

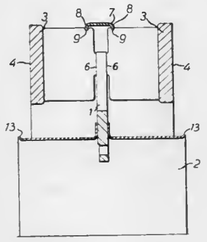
1. In a slack adjusting mechanism usable in lever actuating systems including an actuatable rotatable lever connected to and rockable about the axis of rotation of a cam shaft for actuation of the system, linkage means operatively connected to a load-biased wormshaft and coupling to provide a fixed reference point internal to the adjuster cooperating with a variably located external pivot point, including a rack, an actuating rod and lost-motion means, such that when the external pivot point is at a fully released position, said rod



abuts said rack and said rack abuts said internal reference point, and adjustment is terminated.

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**4,019,613**
**DISCS FOR DISC BRAKES**
**Anthony William Harrison, Birmingham, England, assignor to Girling Limited, Birmingham, England**
**Filed Sept. 23, 1975, Ser. No. 615,893**
**Claims priority, application United Kingdom, Oct. 2, 1974, 42701/74**
**Int. Cl.² F16D** *65/12*
**U.S. Cl. 188—218 XL** **14 Claims**



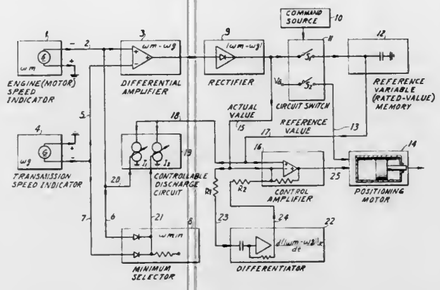
1. A disc for a disc brake comprising a central plate adapted to be mounted on a rotatable part, two separate braking portions located one on each side of said central plate and each comprising a continuous annulus having an outer side and an inner side, said outer side providing a radial braking surface and said inner side having angularly spaced axially extending vanes of which the free ends abut said central plate, clamping means for holding said free ends of said vanes against and in engagement with said central plate, said clamping means having a certain amount of resilience for resiliently urging said braking portions tightly against said central plate, and coupling means for transmitting torque from said braking portions to said central plate and for maintaining said braking portions concentric with said central plate, said coupling means being separate from said central plate and said braking portions.

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**4,019,614**
**VEHICLE ELECTRONIC CLUTCH CONTROL**
**Karl Prenzel, Nuremberg, and Adam Dittner, Hochstadt, both of Germany, assignors to Frieseke & Hoepfner GmbH Erlangen-Bruck, Erlangen-Bruck, Germany**
**Filed Dec. 1, 1975, Ser. No. 636,661**
**Claims priority, application Germany, Nov. 29, 1974, 2456509**
**Int. Cl.² F16D** *43/284*
**U.S. Cl. 192—103 F** **3 Claims**

2. An apparatus for controlling the clutch between an engine and transmission of a vehicle during shifting of gears in the transmission, comprising, electrical means coupled to the engine and transmission for forming a difference signal corresponding to the difference between the engine speed and the transmission speed and for forming a minimum signal corresponding to the minimum of the engine speed and transmission speed, memory means responsive to disengagement of the clutch and coupled to the electrical means storing the difference signal in a memory as a reference variable in response to start of shifting gears until the gears are shifted, delay means coupled to said electrical means and said memory means and

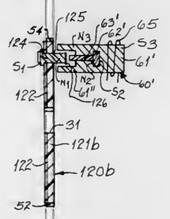




responsive to completion of shifting of the gears for delaying reengagement of the clutch in response to the then occurring difference signal and the reference variable until a predetermined relationship exists between the difference signal and reference variable, varying means coupled to said electrical means and said memory means for varying the reference variable in response to the engine speed and the minimum signal and varying the then occurring difference signal in response to an auxiliary signal including the time rate of change of the difference signal.

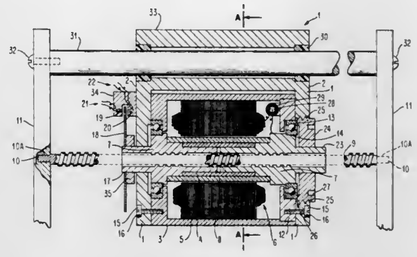
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**4,019,615**
**LOW INERTIA IMPACT PRINTING MEANS**
**Martin E. Gerry, 13452 Winthrope St., Santa Ana, Calif. 92705**
**Division of Ser. No. 578,216, May 16, 1975, Pat. No. 3,985,218. This application July 26, 1976, Ser. No. 708,587**
**Int. Cl.² B41J** *1/24*
**U.S. Cl. 197—53** **7 Claims**



1. A print head comprising the combination:
a disk of non-magnetic material having apertures through said material orthogonal to the plane of the disk spaced about the disk periphery;
a plurality of straight radially disposed magnetizable wires embedded in the non-magnetic material; and
a plurality of elongated permanently magnetized fonts retained by said disk and disposed within said apertures, one of said fonts per one of said apertures, each of the fonts having an axis of elongation which is orthogonal to the plane of the disk, at least some of the fonts having characters integral therewith in a plane substantially parallel to the plane of the disk, said fonts being magnetically held in said apertures by said wires.

**4,019,616**
**LINEAR MOTION DRIVE APPARATUS FOR A PRINTER CARRIAGE**
**William Duncan Thorne, Raleigh, N.C., assignor to International Business Machines Corporation, Armonk, N.Y.**
**Filed June 24, 1976, Ser. No. 699,286**
**Int. Cl.² B41J** *19/00*
**U.S. Cl. 197—90** **1 Claim**



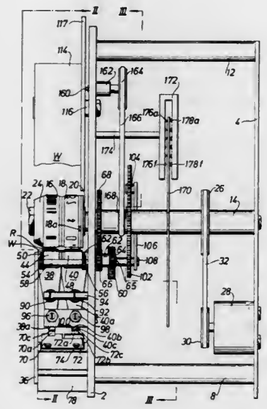
1. Linear motion drive apparatus for a printer carriage or similar mechanism for a business machine, comprising:
a movably mounted carrier means for carrying an operative printing or similar marking element along a line of action within said machine;
a threaded screw means fixedly mounted in said machine parallel to, and at least as long as, said line of action to be traversed by said carrier means;
at least one threaded nut means laterally restrained and mounted for free rotation thereof in said carrier means and threadedly and concentrically engaging said screw means;
an electric motor having a rotor, a stator and a casing, said rotor, stator and casing being assembled concentrically with one another and with said nut means;
said rotor being affixed to said nut means to rotate said nut means;
said motor casing being affixed to said carrier means to prevent rotation of said motor casing;
said movably mounted carrier means being affixed to a slideable support means for permitting sliding motion of said carrier means in a direction parallel to said screw means; and
means for applying electricity to said motor to cause it to rotate, thereby rotating said nut and producing linear motion thereof and of said motor and carrier means along said screw means.

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**4,019,617**
**PRINTING DEVICE**
**Gösta R. Englund, Stockholm, and Ernst C-G Lindelöw, Taby, both of Sweden, assignors to Svenska Dataregister AB, Solna, Sweden**
**Continuation of Ser. No. 439,957, Feb. 5, 1974, abandoned. This application Oct. 16, 1975, Ser. No. 622,937**
**Claims priority, application Sweden, Feb. 9, 1973, 7301788**
**Int. Cl.² B41L** *47/46*
**U.S. Cl. 197—133 R** **7 Claims**

1. A printing device having at least one printing station for printing on labels in the form of a striplike record medium comprising:
first and second coaxially mounted rotatable typewheels of substantially the same diameter;
a rotatable pressure roller associated with each typewheel and arranged in spaced relation to its associated typewheel;
actuating means for bringing said typewheels and said pressure rollers into engagement for printing upon a label disposed therebetween while advancing said label through said printing station;

said label being advanced through a distance which is a function of the period of time said typewheels and said pressure rollers are engaged;
said actuating means removing said typewheels and said presure rollers from engagement after completion of a label-printing and label-advancing operation; and
motorized drive means coupled to said typewheels and said pressure rollers and being adapted to continuously rotate said typewheels and said pressure rollers at substantially the same peripheral speed;
said first typewheel being provided around the periphery thereof with a plurality of alphanumeric type characters;
said second typewheel being provided around the periphery



thereof with a plurality of type characters in coded form corresponding to at least certain ones of said alphanumeric characters;
one of said typewheels being provided at the periphery thereof with at least one projection located on said typewheel at a position at which said typewheel is not provided with type characters;
said at least one projection being adapted to contact a label disposed between said typewheel and said pressure rollers; whereby,
during rotation of said typewheel and said presure rollers, said at least one projection advances said label through a distance which is a function of the period of time said typewheels and said pressure rollers are engaged.

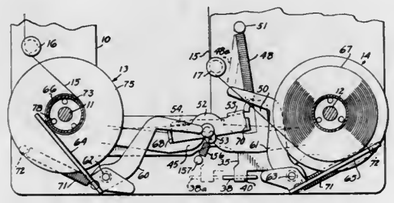
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**4,019,618**

**REVERSIBLE RIBBON DRIVE MECHANISM**

**Richard E. Busch, La Puente, Calif., assignor to Addmaster Corporation, San Gabriel, Calif.**

**Filed Apr. 8, 1976, Ser. No. 674,814**
**Int. Cl.² B41J** *33/44*
**U.S. Cl. 197—161** **13 Claims**



**1.** In a ribbon mechanism having a pair of spaced ribbon spools,
a ribbon extending between said spools, and
ratchet members connected to said spools for rotation about spaced parallel axes;
reversible feeding mechanism for said ribbon comprising drive pawl devices engageable with respective ones of said ratchet members,
a first link connecting said pawl devices,
means for oscillating said link to actuate said pawl devices to advance said ratchet members,
disabling devices for respective ones of said pawl devices,
a second link connecting said disabling devices to move in unison from a first condition to a second condition,
said disabling devices being effective in said first condition to disable one of said pawl devices and being effective in said second condition to disable the other of said pawl devices,
a coupler,
said coupler being settable in a first position or a second position,
said coupler being effective in said first position to couple said second link to said first link upon movement of said first link in a first direction only whereby to cause said second link to move said disabling devices to said first condition,
said coupler being effective in said second position thereof to couple said second link to said first link upon movement of said first link in a second direction only whereby to cause said second link to move said disabling devices to said second condition, and
sensing means controlled by a ribbon roll on a first one of said spools for moving said coupler into said first position when the diameter of the ribbon roll on said first spool reaches a predetermined diameter,
said sensing means being controlled by a ribbon roll on the other of said spools for moving said coupler into said second position when the diameter of the ribbon roll on said other spool reaches a predetermined diameter.

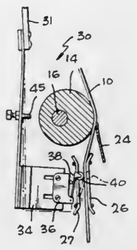
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**4,019,619**

**PAPER FEED SENSING MECHANISM FOR PRINTER**

**Leo J. Emenaker, Playa del Rey, Calif., assignor to Printronix, Inc., Irvine, Calif.**

**Filed Mar. 22, 1976, Ser. No. 669,245**
**Int. Cl.² B41J** *29/44*
**U.S. Cl. 197—189** **7 Claims**



**1.** A sensing mechanism for indicating the presence or absence of paper movable along a predetermined path and an operative position of a platen movable outwardly relative to the paper from the operative position, comprising:
cantilevered spring arm means having a fixed end and a free end disposed adjacent the paper, an intermediate region of the spring arm means being adjacent the platen, the position of the free end of said spring arm means being responsive to the position of the platen when moved from the operative position; and
switch means coupled to said spring arm means in the vicinity of the free end thereof, said switch means including actuator arm means extending toward the paper path, the displacement distance of the free end of said spring arm means being substantially greater than the travel of said actuator arm means, and the platen holding the actuator



arm means away from the paper path when the platen is not in the operative position and permitting said spring arm means to urge said actuator arm means toward the paper path under spring force when the platen is in the operative position, such that said actuator arm means is automatically displaced from the paper path when the platen is moved out from the operative position but reliably responds to the presence of paper despite aberrations and irregularities in the paper when the platen is in the operative position.

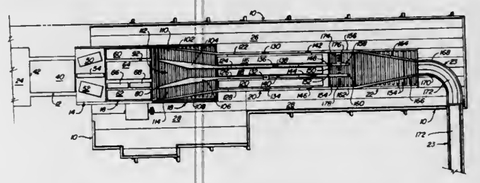
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**4,019,620**

**METHOD AND APPARATUS FOR SEPARATING A PALLETIZED ARRAY OF CONTAINERS INTO SINGLE FILE LINE**

**Robert Leland Frenkel, Englewood; Peter Vischer, Golden, and James Allen Gulka, Arvada, all of Colo., assignors to Coors Container Company, Golden, Colo.**

**Filed Feb. 23, 1976, Ser. No. 660,722**
**Int. Cl.² B65G** *47/00*
**U.S. Cl. 198—399** **37 Claims**



**1.** A method of separating containers in a generally rectangular array, the array being comprised of a plurality of abutting generally rectangular shaped containers having longitudinal and transverse orientations within the array, comprising:
advancing all the containers of the array generally in a direction generally parallel with the longitudinally oriented containers,
transversely spacing the containers into a first plurality of lines extending generally parallel to the longitudinally oriented containers as the containers are advanced,
turning the containers in the lines with transverse orientations to longitudinal orientations as the containers are advanced , and
converging the longitudinally oriented containers in a longitudinal offset manner into a single line of single file longitudinally oriented containers.

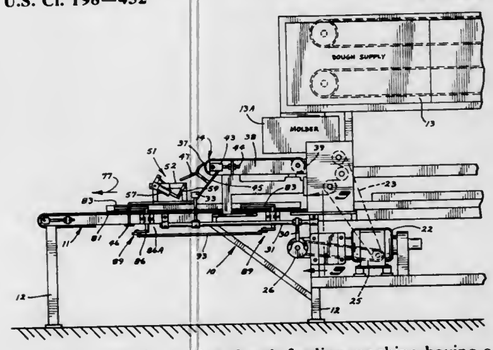
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**4,019,621**

**DOUGH PLACER IMPROVEMENTS**

**Douglas R. Hanson, 1720-9th Ave. S., Anoka, Minn. 55303**

**Filed Aug. 4, 1975, Ser. No. 601,352**
**Int. Cl.² B65G** *47/22*
**U.S. Cl. 198—432** **10 Claims**



**1.** In combination with a dough feeding machine having a main frame and including a discharge conveyor for carrying dough pieces and for discharging dough pieces in direction toward a baking pan positionable below the discharge end of the conveyor, and a dough piece orienter means comprising a pair of gate members movable to a first position to receive said dough pieces and position them with respect to a baking pan, and movable to a second position to discharge said dough pieces, and wherein said conveyor includes adjustment means at the discharge end for adjusting the tension of the belt, the improvement comprising support means attached to said adjustment means and movable with the adjustment means for supporting said dough piece orienter with respect to said machine, slidable guide means mounted on said main frame and supporting portion of said support means, said dough piece orienter means including actuator means mounted on said support means for actuating said gate members, said actuator means comprising fluid pressure cylinder means, lever means connected between said fluid pressure cylinder means and one of said gate members to pivot said one gate member when the cylinder means is operated, and linkage means betwen said one gate member and the other gate member to cause simultaneous operation of said gate members from said first position to said second position.

**10.** In a dough feeding machine including a pan conveyor movable in a first direction, and having a pair of guides, one adjacent each of the sides of said conveyor for guiding said pan in a desired path, said guides each being mounted on opposite sides of said machine with a pair of links pivotally mounted to said guides in spaced relationship therealong, a pair of shafts mounted for substantially upright pivotal movement, said links being fixed to said shafts, and a separate arm member on each of said shafts positioned at an opposite end of said shaft from said links, said arms being fixed to said shaft, a separate connecting link positioned between associated pairs of said arm members, said separate connecting links being substantially parallel to said guides, and separate friction clutch means between each of said separate connecting links and each of its connected arm members to permit individual adjustment of said guides at opposite ends thereof and relative to each other and to retain said guides in adjusted position under frictional force.

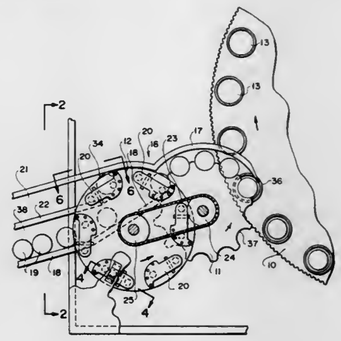
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**4,019,622**

**DUAL WHEEL DISCHARGE FOR CAN TESTER**

**Harry Clifford Messervey, East Randolph, N.Y., assignor to Borden, Inc., Columbus, Ohio**

**Filed Mar. 19, 1976, Ser. No. 668,701**
**Int. Cl.² B65G** *47/32*
**U.S. Cl. 198—441** **3 Claims**



**1.** In a switching mechanism for selectively diverting successive advancing articles, a first wheel having disposed about its periphery a plurality of spaced-apart pockets for engaging and supporting said advancing articles, a fixed member disposed about the periphery of said first wheel for cooperatively engaging and diverting one of said advancing articles and

thereby depositing it in a pocket of said first wheel, a double-disc second wheel disposed adjacent to said first wheel so that one disc is on each side of said first wheel and the outer peripheries of the first and second wheel overlap, disposed about the periphery of said second wheel a plurality of equally spaced, two-position, hinged flippers secured to a disc of said second wheel, each of said flippers having a plurality of pins secured to said flipper, said disc having at least one opening therein to allow said pins to protrude into the space between said discs of said second wheel in such a manner as to support an advancing article between said discs when said flipper is in one position and to allow complete removal of said pins from said space between discs when the flipper is in the second position, and a permanent magnet associated with said hinged flipper to hold it in said one position and a second permanent magnet to hold said flipper in said second position.

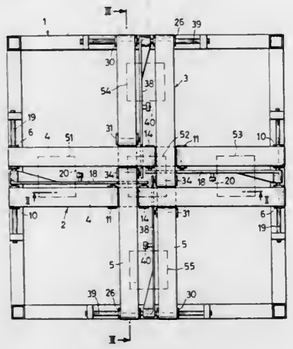
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**4,019,623**

## CONVEYANCE UNIT WITH CROSSING, ESPECIALLY FOR THE CONVEYANCE AND SWITCHING OF NEWSPAPERS, MAGAZINES AND OTHER ARTICLES COMPOSED BY SUPERPOSED SHEETS

**Lamberto Tassi; Aris Ballestrazzi, and Gianni Tosarelli, all of Vignola, Italy, assignors to Situno Holding S.A., Luxembourg, Luxembourg**

**Filed Apr. 5, 1976, Ser. No. 673,548**
**Claims priority, application Italy, Apr. 3, 1975, 21969/75**
**Int. Cl.² B65G** *47/00*
**U.S. Cl. 198—457** **2 Claims**



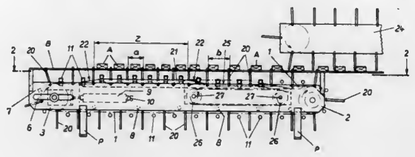
1. A conveyance system with crossing, especially suitable for the conveyance and switching of newspapers, magazines and other articles composed by superposed sheets, comprising two conveyors which cross perpendicularly to one another and are displaceable in the vertical direction with respect to one another so that either of them is alternately positioned at a higher level than the other one, characterized in that each of these conveyors is composed by a couple of parallel and coplanar belts, which cross those of the other couple while undergoing temporary U-shaped deflections with respect to their normal run direction so as to be passed the ones beneath the others, the crossing being so obtained that a first belt of a first couple is passed beneath a first belt of the second couple, the second belt of the first couple is passed beneath the second belt of the second couple, the first belt of the second couple is passed beneath the second belt of the first couple and the second belt of the second couple is passed beneath the first belt of the first couple.

**4,019,624**

## DEVICE FOR INTERMITTENTLY RECEIVING AND CONTINUOUSLY DELIVERING OBJECTS

**Jean Torres, Lausanne, Switzerland, assignor to SAPAL Societe Anonyme des Plieuses Automatiques, Switzerland**

**Filed Oct. 7, 1975, Ser. No. 620,325**
**Claims priority, application Switzerland, Dec. 19, 1974, 16944/74**
**Int. Cl.² B65G** *47/26*
**U.S. Cl. 198—459** **2 Claims**



1. A device for continuously delivering to a machine, a series of objects intermittently received, said device comprising in combination an endless chain mounted on a driving wheel driven at constant speed and a driven wheel, said driven wheel being mounted on a sliding yoke fixed to a tensioner constantly tensioning the chain, an upper track and a lower track, first and second rollers fixed alternately to the chain, fingers carried by the chain at positions corresponding to either of the first and second rollers for driving the objects along a table, the first rollers moving on the lower track and the second rollers moving on the upper track to fold the chain in a zig-zag section where the speed of the chain is intermittently reduced or cancelled for receiving the series of objects, a vertically movable track disposed at the end of the zig-zag section at the outlet of the upper track to receive the second rollers leaving said upper track, said vertically movable track being controlled by eccentric means driven in synchronization with the driving wheel to produce a vertical reciprocating movement of the vertically movable track, whereby the fingers may once more move at the same speed as the extended chain and with a uniform output pitch.

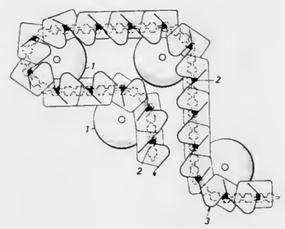
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**4,019,625**

## BUCKET CONVEYOR

**Hans Holger Wiese, Wieloweg 9, 3001 Fuhrberg, Germany**

**Filed May 19, 1975, Ser. No. 578,590**
**Claims priority, application Germany, May 24, 1974, 2425036**
**Int. Cl.² B65G** *17/12*
**U.S. Cl. 198—708** **4 Claims**



1. In a bucket conveyor comprising two toothed endless flexible carrying belts of elastomeric material, drive and guide rollers over which the belts pass, transverse elements interconnecting the belts, and buckets suspended from said transverse elements, said buckets having a substantially rigid leading wall and a substantially rigid trailing wall which extend in a direction transverse to the direction of travel and substantially rigid side walls connected to said trailing wall, portions of adjacent leading and trailing walls being interlocked at the transverse element without relative movement therebetween, the improvement comprising a weakened region in each of said leading walls extending across the width thereof adjacent to said transverse elements forming a flexible wall part, said weakened region being below said transverse elements and being free of any connection with said side walls and being connected to the rear wall of the preceding bucket, said weakened region having a reduced cross-section relative to the remainder of said leading wall, thereby permitting flexing of the interlocked buckets.



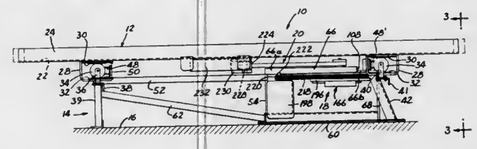
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**4,019,626**

## SHAKER CONVEYOR AND DRIVE MECHANISM THEREFOR

**Haim J. Kamner, Palatine, Ill., assignor to Goodman Equipment Corporation, Chicago, Ill.**

**Filed Feb. 27, 1975, Ser. No. 553,437**
**Int. Cl.² B65G** *25/04*
**U.S. Cl. 198—750** **19 Claims**



1. A shaker conveyor for conveying particles and the like, comprising, in combination, frame means, a conveyor trough, means supporting said conveyor trough on said frame means for reciprocating movement of said trough, and drive mechanism means operatively associated with said conveyor trough in a manner to effect said reciprocating movement thereof, said drive mechanism means including housing means defining a first longitudinal axis, input crank means rotatably supported by said housing means for rotation about an axis coincident with said first longitudinal axis, said input crank means having an input crank arm the axis of which is eccentric to said axis of rotation of said input crank means, output crank means rotatably supported by said housing means for rotation about an axis parallel and eccentric to said first longitudinal axis, said output crank means having an output crank arm the axis of which is parallel and eccentric to said axis of rotation of said output crank means, means for effecting rotation of said input crank means at a substantially constant rotational speed, means interconnecting said input crank arm to said output crank means including a cylindrical slide block carried by said input crank arm with the longitudinal axis of said slide block being substantially perpendicular to the longitudinal axis of said input crank arm, said slide block being cooperable with said output crank means in a manner to effect rotation of said output crank means at a predetermined variable angular velocity during each revolution thereof upon rotation of said input crank means, and means connecting said output crank arm to said conveyor trough to effect said reciprocating movement of said conveyor trough in a manner to cause particle movement therealong during rotation of said input crank means.

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**4,019,627**

## TURNTABLE

**Glenn J. Eggert, Cedarburg, and Phillip L. Lee, Greenfield, both of Wis., assignors to Rexnord Inc., Milwaukee, Wis.**

**Filed Sept. 12, 1975, Ser. No. 612,972**
**Int. Cl.² B65G** *13/02*
**U.S. Cl. 198—786** **2 Claims**

I. A turntable comprising:

a. a plurality of transfer roller assemblies mounted in planar array, each of said transfer roller assemblies comprising:

i. a hollow cylindrical roller having a plurality of spaced apertures in the surface thereof and

ii. a plurality of stub rollers mounted in said hollow cylindrical roller such that their axes of rotation are not parallel to the axis of rotation of said hollow cylindrical roller and a portion of the surface of each of said stub rollers protrudes through a corresponding one of said plurality of spaced apertures in said hollow cylindrical roller;

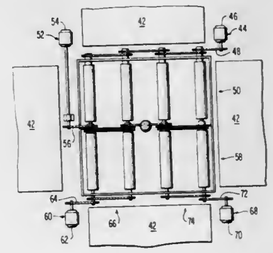
b. first means for rotating said hollow cylindrical rollers in a first subset of adjacent ones of said transfer roller assemblies in a selected direction;

c. scond means for rotating said hollow cylindrical rollers in a second subset of adjacent ones of said transfer roller assemblies in a selected direction, said second subset being axially aligned with the first subset;

d. third means for rotating said stub rollers in said first subset of said transfer roller assemblies in a selected direction;

e. fourth means for rotating said stub rollers in said second subset of said transfer roller assemblies in a selected direction;

f. fifth means for rotating said hollow cylindrical roller in a third subset of adjacent ones of said transfer roller assemblies in a selected direction;



g. sixth means for rotating said hollow cylindrical rollers in a fourth subset of adjacent ones of said transfer roller assemblies in a selected direction, said fourth subset being axially aligned with the third subset;

h. seventh means for rotating said stub rollers in said third subset of said transfer roller assemblies in a selected direction;

i. eighth means for rotating said stub rollers in said fourth subset of said transfer roller assemblies in a selected direction; and

j. ninth means for controlling said first, second, third, fourth, fifth, sixth, seventh, and eighth means so that the directions in which said third and fourth means cause the stub rollers in said first and second subsets of said transfer roller assemblies to rotate are independent of the directions in which said seventh and eighth means cause the stub rollers in said third and fourth subsets of said transfer roller assemblies to rotate and so that an object positioned upon said plurality of transfer roller assemblies can be caused to rotate and/or translate with respect to said plurality of transfer roller assemblies.

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**4,019,628**

## DISPOSAL SYSTEM

**Robert L. Derby, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.**

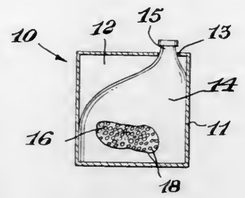
**Division of Ser. No. 353,194, April 20, 1973, Pat. No. 3,881,295. This application Oct. 30, 1974, Ser. No. 519,385**
**Int. Cl.² B65D** *81/26*; **C09K** *3/00*
**U.S. Cl. 206—524.4** **6 Claims**

1. A shipping container particularly suited for the disposal of ecologically undesirable polymer swelling chlorinated hydrocarbon liquids, the shipping container comprising

a combustible ecologically undesirable chlorinated hydrocarbon polymer swelling liquid-impermeable hollow body defining

a space therein, disposed within said space

a chlorinated hydrocarbon liquid swellable crosslinked synthetic resinous polymer which swells but does not dissolve in the liquids, the polymer being present in a




quantity sufficient to form a gel when an ecologically undesirable polymer swelling chlorinated hydrocarbon liquid is added to the space.

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**4,019,629**

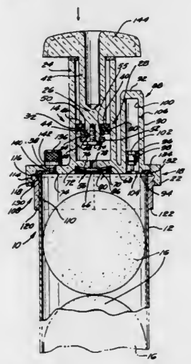
**PRESSURIZED TENNIS BALL CONTAINER**

**Robert B. Dubner, 40 Dogwood Ave., and Harold Bienenfeld, 145 Dogwood Ave., both of Roslyn Harbor, N.Y. 11576**

**Filed Feb. 13, 1975, Ser. No. 549,473**

**Int. Cl.² B65D** *85/16*

**U.S. Cl. 206—315 B** **9 Claims**



**1.** A cover assembly for use with a metal tennis ball can to form a pressurized tennis ball container, comprising a transparent cover member sized to overlie the top of said can and having a integral pump cylinder upstanding therefrom, a pump piston extending into said pump cylinder, piston seal means mounted on said piston including a sealing ring slidably mounted on said piston and providing a wiping seal between said piston and said pump cylinder for preventing the flow of air past said piston on the downstroke of said piston and with said means opening to permit airflow past said piston on the upstroke of said piston to refill said cylinder, valve means disposed to permit the flow of air from said cylinder into said tennis ball can and to prevent the flow of air in the reverse direction, means for mounting said cover member on said tennis ball can, pressure release mounted on said cover member for venting pressure from said tennis ball cans, and pressure indicator means on said cover for indicating the attainment of a selected pressure within the can upon which said cover member is mounted by operation of said pump piston, said pressure indicating means including a transparent cylinder formed integrally with said transparent cover member and upstanding therefrom, said transparent cylinder having a closed top end and an open bottom end communicating with the interior of said can, a piston slidably mounted in said cylinder and visible therethrough, and a reference line on said cylinder at a location to indicate the attainment of said selected pressure within said can when said piston registers with said reference line, said pressure indicator means providing a continuous visual indication of the pressure within said can until said pressure is released by said pressure release means.

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**4,019,630**

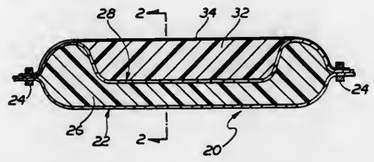
**CARTRIDGE CONTAINING A SELF-SETTING COMPOSITION**

**Anthony Cecil Plaisted, North Royalton, Ohio, assignor to Fosroc A.G., Zug, Switzerland**

**Filed July 28, 1975, Ser. No. 599,496**

**Int. Cl.² B65D** *25/08, 31/12*

**U.S. Cl. 206—219** **4 Claims**




**1.** A cartridge of a two component, interactive, self-setting composition, comprising a tube of a flexible, rupturable material sealed at each end and having a first interactive component of said composition sealed therein, the wall of said tube being depressed inwardly toward the facing wall portion beyond the center of the tube to form a depression in the filled tube, said depression extending substantially toward each end of said tube and being filled with the second interactive component of said composition, said filled depression extending continuously from the outer surface of said tube past the center of said tube, with the portion of said tubing forming said depression serving as a barrier wall precluding the interaction of said components and sealing means sealing said second component within said depression.

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**4,019,631**

**SCREW PACKAGE**

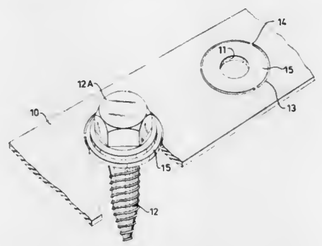
**Sixten Harald Lejdegard, Ramnas, and Stig Lennart Björklind, Hallstahammar, both of Sweden, assignors to Bulten-Kanthal Aktiebolag, Sweden**

**Filed Apr. 18, 1975, Ser. No. 569,398**

**Claims priority, application Sweden, Apr. 18, 1974, 7405197**

**Int. Cl.² B65D** *85/24, 73/00*

**U.S. Cl. 206—347** **4 Claims**




**1.** A screw package comprising:

a. a carrier strip of flat sheet material having a series of holes;

b. means defining circular lines of weakness in said strip entirely surrounding each of said holes whereby a prospective flat washer is defined in said strip; and

c. a plurality of screws having heads and shanks, said heads having entirely flat undersides disposed against the uppermost surface of said strip, and said shanks extending through said holes and having a snug screw-retaining fit with said strip in said holes.



**4,019,632**

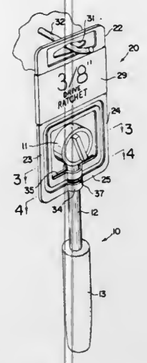
**TOOL HANDLE DISPLAY AND HANGER DEVICE**

**Hugh T. Greenlee, Gates Mills, Ohio, assignor to The Wright Tool & Forge Co., Barberton, Ohio**

**Filed May 11, 1976, Ser. No. 685,349**

**Int. Cl.² B65D** *61/00, 85/20*

**U.S. Cl. 206—349** **1 Claim**




**1.** In combination a socket wrench tool drive component and a display and hanger device therefor,

said drive component having an enlarged operating head and a relatively thin elongated stem portion connected to said head, and

said display and hanger device being formed of relatively thin, flat, rigid formable plastic material and having a rectangular opening at its lower portion of sufficient size to permit positioning of said operating head therein said opening being defined by two parallel side portions and a bottom portion, said bottom portion having a semi-cylindrical hump formed therein with an inner diameter corresponding to the diameter of said stem, and

said display and hanger device also having a rectangular strip initially formed contiguous with and generally coplanar with said bottom portion and having a semi-cylindrical hump formed thereon corresponding in size and shape to said hump in said bottom portion,

said rectangular strip being readily removable from said bottom portion and adapted to be secured back-to-back to the rear face of said bottom portion with said humps in reverse relationship to define an annular collar adapted to receive said stem to retain and secure said drive component to said display and hanger device with said operating head in said opening,

and means defining a hole in said display and hanger device for hanging said device and said drive component on a hook.

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**4,019,633**

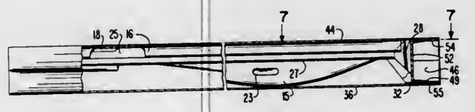
**CARTONED MEDICAL INSTRUMENT PACKAGE**

**Nathan Roth, San Francisco, Calif., assignor to Alza Corporation, Palo Alto, Calif.**

**Filed July 18, 1975, Ser. No. 597,020**

**Int. Cl.² B65D** *83/10, 5/50*

**U.S. Cl. 206—364** **5 Claims**




**1.** A cartoned medical instrument package comprising in combination:

a. a package comprising:

i. a thermoplastic tray having a cavity for holding the instrument, a convexly curved marginal ledge about the cavity extending outwardly from the opening of the cavity and defining the top surface of the tray, an end wall extending downwardly from each end of the ledge, and a flange extending outwardly from the bottom of each end wall,

ii. a cover for said cavity, and

iii. means for adhesively securing the cover to said ledge about the complete perimeter of the cavity such that the cover may be peeled away to expose the cavity; and

b. a carton adapted to envelop the package completely comprising:

i. a bottom wall against which the bottom of the package rests,

ii. a pair of single piece end walls, each of which is foldably connected to the bottom wall and has an inwardly extending section that overlies one of the flanges of the tray of the package whereby the package is held firmly in place in the carton,

iii. a first flap foldably connected to an opposite edge of the bottom wall, said first and second flaps adapted to fold over the top of the package in overlapping relationship to each other, and

v. means for releasably interconnecting said first and second flaps while they are in said overlapping relationship.

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**4,019,634**

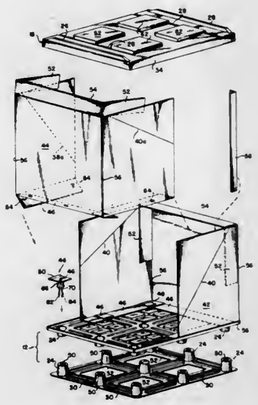
**COLLAPSIBLE SHIPPING CONTAINER**

**Pierre Edmond Michel Bonnot, 3 Place Marine, Maisons-Laffitte, France**

**Filed Mar. 19, 1975, Ser. No. 560,263**

**Int. Cl.² B65D** *19/00*

**U.S. Cl. 206—386** **14 Claims**



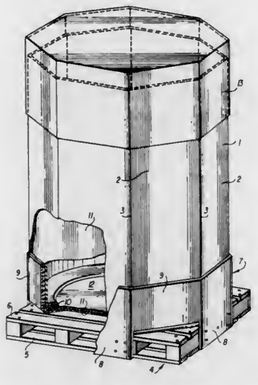
**1.** A collapsible shipping container comprising an upper section and base portions, a pallet for supporting said upper section, and fastener means for attaching said upper section to said pallet, said pallet having openings therein, said base portions having openings therein overlying said openings in said pallet, said fastener means including a flat base, resilient arms extending from said base, said arms extending through the openings in the pallet and through the openings in said base portions, each of said resilient arms carrying a flange pair defining a groove for receiving a portion of said pallet surrounding said openings, one member of said flange pair providing a surface which rests on said portion of said pallet and thereby shares in sustaining the load in said container.

**13.** A collapsible shipping container comprising, an upper storage section, a pallet for supporting said upper storage

section, and fastening means for attaching said upper storage section to said pallet, said upper storage section including a pair of U-shaped panel sections each having base means which are securable to said pallet by said fastening means, said pair of U-shaped panel means overlapping so as to form four walls of said container, each of said U-shaped panels including a pair of thrust-absorbing tabs which extend partially toward the bottom of said container when in position, said tabs connected by a horizontal panel extending along the upper edge of one side of said container, said tabs transforming at least part of a vertical stacking load into a horizontal component directed toward the sides of said U-shaped panels.

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**4,019,635**
**PALLET-CONTAINER FOR TRANSPORTING BULK MATERIAL**
**Gerardus Anthonius Maria Boots, Zaandam, Netherlands, assignor to Akzo N.V., Arnhem, Netherlands**
**Filed Nov. 14, 1975, Ser. No. 631,914**
**Claims priority, application Netherlands, Nov. 14, 1974, 7414833; Apr. 29, 1975, 7505061**
**Int. Cl.² B65D** *19/00*
**U.S. Cl. 206—386** **3 Claims**

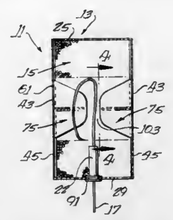


**1.** A container comprising a pallet having a top and sides, a first wall member enclosing an elongated space having a polygonal cross-section, the lower ends of at least two segments of the said wall member extending downwardly along the sides of the pallet and secured thereto and the lower ends of at least two segments of the wall member being folded to form inwardly extending flaps disposed against the top of the pallet, a second wall member open at both ends and having a cross-section similar to that of the first wall member, one end of the second wall member being slidably disposed in the first member with its edge disposed on the said flaps and extending above the first member, said second wall member being adapted to expand under the weight of material contained therein and pressed into engagement with the first wall member, whereby the two said members are secured together solely by said expansion of the second member.

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**4,019,636**
**STRAND PACKAGE AND CARTON THEREFOR**
**Thomas Q. Wise, Glen Ellyn, Ill., assignor to Belden Corporation, Geneva, Ill.**
**Filed Nov. 3, 1975, Ser. No. 628,528**
**Int. Cl.² B65D** *85/67*
**U.S. Cl. 206—396** **6 Claims**

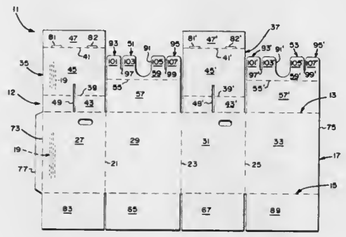
**1.** A non-reel dispensing package of coiled strand material comprising an open-center coil of the material capable of being payed out from the interior thereof without rotation of the coil; a perimeter of connected walls surrounding said coil, each said wall having opposed hinged flaps; and a tapered tab located at the center of the edge of each of said flaps opposite the hinged connection thereof to its associated wall, the tabs of the flaps on each of the two opposing sides of said coil

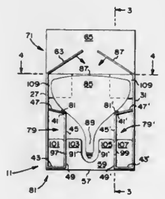


interlocking to form a tapered boss to facilitate payout of the strand material, the two bosses extending into the open center of the coil in spaced facing relation, their facing ends being separated by a gap.

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**4,019,637**
**CATHODE RAY TUBE PACKAGING**
**Joseph M. Kurtz, Ottawa, Ohio, assignor to GTE Sylvania Incorporated, Stamford, Conn.**
**Filed July 16, 1976, Ser. No. 705,775**
**Int. Cl.² B65D** *85/42*
**U.S. Cl. 206—418** **8 Claims**



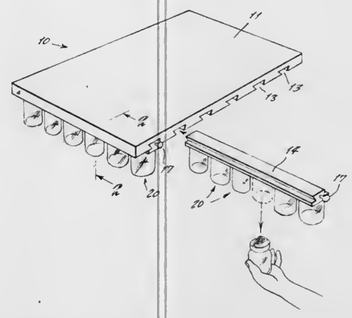


**1.** An improvement in a single cavity packaging enclosure for supporting and protecting a cathode ray tube comprising:
an integrated packaging structure formed from a unitary sheet of foldable substantially rigid material of substantially elongated shaping having spaced apart alpha and omega fold-score-lines extending longitudinally therein and defining therebetween the central portion of said sheet; three parallel spatially-related fold-score-lines traverse said central portion in a manner normal to said alpha and omega score lines to divide said central portion into first, second, third and fourth integral wall-members and subsequently provide corner formations therefore; extending outward from said alpha score-line related to said first and third wall members are similar integral substantially rectangular extension members wherein each has spaced apart and parallelly related proximal and distal traversal score-lines dividing said extension members into base, side and terminal portions, each of said rectangular extensions having a slot formed therein normal to said alpha score-line in a manner to substantially bisect said base portion and extend partially into said side portion; extending outward from said alpha score-line related to said second and fourth wall members are similar integral substantially configurated alpha closure members wherein each has a structural score-line dividing said member into a rectangular planar portion and a plural-tongue projecting portion, said configurated closure members conjunctively providing a subsequent alpha closure arrangement for said packaging means; extending outward from said omega score-line are separate substantially rectangular flap-like members integral with said respective wall members to collectively provide a subsequent overlapping closure arrangement for said tube packaging means.



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**4,019,638**
**HANGING JAR CAP WITH STORING UNIT**
**Matt Miller, 1118 Bay Oaks, Houston, Tex. 77008**
**Filed Aug. 14, 1975, Ser. No. 604,717**
**Int. Cl.² A47F** *5/08*
**U.S. Cl. 211—74** **5 Claims**

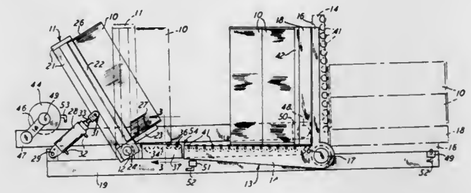


**1.** In an improved storage unit, the combination of:
a plurality of jars for containing an assortment of various objects,
a screw cap on each jar releasably attached to the jar,
an open loop extending upwardly from each cap, the loop being generally triangular with the base of the triangle adjacent the cap,
a series of notches extending downwardly from the two legs of the open triangular loop,
a plurality of hooks depending from the storage unit, each loop arranged to hang from a hook, whereby each cap and jar attached thereto may be suspended from a hook, and
the hook engaging the loop between adjacent notches such that each jar may be suspended vertically by sideways displacement of the loop when the weight of objects in the jar is offset.

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**4,019,639**
**AUTOMATIC PALLETIZER AND METHOD FOR BUNDLED STACKS OF SHEETS**
**Walter John Stobb, Pittstown, N.J., assignor to Stobb, Inc., Clinton, N.J.**
**Filed Jan. 26, 1976, Ser. No. 652,371**
**Int. Cl.² B65G** *57/28*
**U.S. Cl. 214—6 C** **16 Claims**

**15.** A means for automatic palletizing of bundles of sheets, comprising a tiltable means for receiving a row of bundles of sheets, a tiltable collecting means disposed adjacent said tiltable means and having an entrance for collecting said row of bundles of sheets from said tiltable means when the latter is tilted toward said collecting means, support means upstandingly disposed on said collecting means at the side thereof opposite said entrance and disposed to have said bundles of sheets supported against said support means in an upstanding position, said collecting means being tiltable through an angle and toward said side thereof with said support means for disposing said support means in a reclining position with said bundles of sheets thereon and in the reclining position, said tiltable means being tiltable toward and away from said collecting means, rotatable support means on said tiltable means for movably supporting said bundles of sheets thereon and being disposed in two groups rotatable on respective axes at right angles to each other, with one of said groups being axially oriented for moving said bundles of sheets along said tiltable means and the other of said groups being axially oriented for moving said bundles of sheets away from said tiltable means and onto said collecting means.



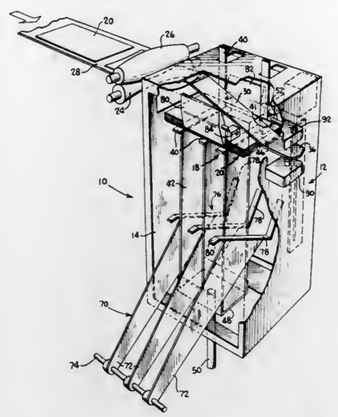
**16.** A method for automatic palletizing of bundles of sheets, comprising the steps of disposing a pallet in upstanding position on a tiltable holder, disposing said bundles on a tiltable receiver disposed adjacent said tiltable holder and receiving a row of said bundles thereon, power driving said bundles on said receiver in one tilted position of said receiver, tilting said receiver toward said holder and thereby interrupt the power drive and move said row of said bundles onto said tiltable holder and toward said pallet, positioning the plurality of bundles of sheets in upstanding positions on a declining anti-friction support on said tiltable holder for moving said bundles under gravity to adjacent said pallet, tilting said tiltable holder in the direction toward said pallet and disposing said pallet and said bundles in reclining positions with said bundles on said pallet.

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**4,019,640**
**SHEET MATERIAL STACKING AND TRANSFER APPARATUS**
**M. James Marin, South Norwalk, and Robert E. Mersereau, Stamford, both of Conn., assignors to Pitney-Bowes, Inc., Stamford, Conn.**
**Filed June 16, 1975, Ser. No. 587,388**
**Int. Cl.² B65H** *29/22*
**U.S. Cl. 214—6 H** **10 Claims**

**1.** Sheet material stacking and transfer apparatus comprising:
means for receiving sheets of material in stacked relation,
means connected to said receiving means for lowering said receiving means as said sheets of material are stacked on said receiving means,
oscillating means disposed in the path of movement of said receiving means as said receiving means is lowered for removing and transferring said stack of sheet material from said receiving means,
means for forming an auxiliary receiving means that is engageable with a major portion of the lower surface of said stack intermediate its ends for subsequent sequentially fed sheet material while said oscillating means removes and transfers previously accumulated sheet material from said receiving means, and

means for pivoting said receiving means to a complemental attitude with respect to said oscillating means as said



receiving means is lowered towards said oscillating means.

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**4,019,641**

**ELEVATING AND CONVEYING SYSTEM FOR UNLOADING VESSELS OR THE LIKE**

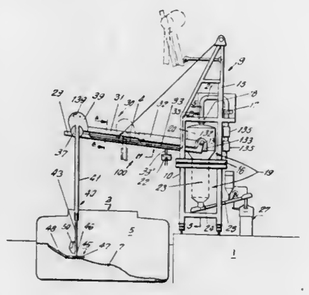
**Walter Merz, Allmendboden, Switzerland, assignor to Schweizerische Aluminium AG, Chippis, Switzerland**

**Continuation-in-part of Ser. No. 426,742, Dec. 20, 1973, abandoned, which is a continuation of Ser. No. 201,517, Nov. 23, 1971, abandoned. This application Oct. 21, 1975, Ser. No. 624,191**

**Claims priority, application Switzerland, Dec. 2, 1970, 17863/70**

**Int. Cl.² B63B** *27/24*

**U.S. Cl. 214—14** **24 Claims**



1. An elevating and conveying system for unloading particulate materials from vessels, or the like, said system comprising:

a source of vacuum;

a first material transport conduit for being disposed approximately vertically in the vessel, or the like during unloading; said first conduit having an upper end and a lower end; a suction inlet orifice located at said first conduit lower end; an outlet at said first conduit upper end; said first conduit having an inside, free cross-sectional area along its entire length narrowed in relationship to the area of the conduit through which the suction force is supplied by said vacuum source such that the particulate material is pneumatically sucked through said first conduit by said vaccum source;

a second material transport conduit disposed more horizontally and having an inlet at one end and having an outlet; said second conduit having an inside, free cross-sectional area along its entire length that is greater than said cross-sectional area of said first conduit; said cross-sectional area of said second conduit being related to the suction force supplied by said source of vacuum such that that said cross-sectional area is large enough to permit and cause particulate material to settle out of the air flow in said second conduit to the bottom of said second conduit;

a joining bend joining said first conduit upper end outlet and said second conduit inlet;

conveying means provided in said second conduit and located generally along the bottom of said second conduit thereby to receive particulate material that settles in said second conduit; said conveying means being designed and adapted for moving the settled particulate material toward said second conduit outlet; means communicating with said second conduit outlet for receiving the particulate material that has been conveyed through said second conduit by said conveying means, blown through said bend and sucked through said first conduit by said vacuum source.

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**4,019,642**

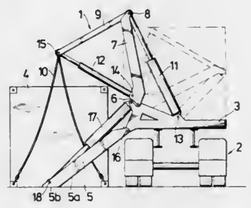
**LOADING DEVICE**

**Bengt-Olof Hammar, Olsforshus 510 35, Bollebygd, Sweden**

**Filed Aug. 11, 1975, Ser. No. 603,614**

**Int. Cl.² B60P** *1/48*

**U.S. Cl. 214—77 R** **2 Claims**



1. Loading device arranged on a vehicle having a frame spring mounted on a chassis, said device being adapted to carry out a side-wise transfer of a load onto or away from said vehicle and comprising two lifting means spaced from each other and movable substantially in parallel planes, each lifting means having a supporting leg which can be pivoted outside of the outer contour of the vehicle, said supporting leg being pivotably carried in a pivot bearing close to the outer contour of the vehicle and having a free end portion, a piston-cylinder unit for pivoting said supporting leg having one end pivotably connected to the free end portion of said supporting leg, the other end of said piston-cylinder unit being pivotably carried in a bearing positioned further inside the contour of the vehicle and at a higher level than said pivot bearing of said supporting leg, said supporting leg having a supporting surface extending substantially along the main portion of said leg, and said supporting surface being adapted to reach plane contact with an adjacent load surface by springing action of the vehicle frame relative to the chassis so that the pivot bearing of the supporting leg will arrive substantially at the same level as the adjacent load surface.

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**4,019,643**

**HAY CARRYING APPARATUS**

**Lester R. Kampman, and James H. Hodgson, both of Vinton, Iowa, assignors to Chromalloy American Corporation, New York, N.Y.**

**Filed July 22, 1975, Ser. No. 598,061**

**Int. Cl.² B60P** *1/28*

**U.S. Cl. 214—505** **23 Claims**

1. Apparatus for picking up and transporting a mass of material, said apparatus comrpising, in combination:

a chassis having supporting wheels;

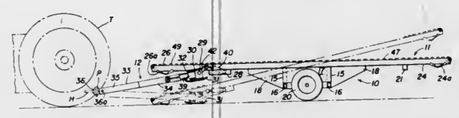


an elongated load carrying bed having a front end and a rear end, said bed being mounted on the chassis for tilting movement about a transverse axis which is in the vicinity of said wheels and of the transverse median plane of the bed;

a draft tongue the forward end of which is attachable to a tractor;

means connecting said draft tongue to the bed adjacent a front corner thereof, said means being constructed and arranged so that at least the forward portion of the draft tongue is swingable with respect to the bed in a generally vertical plane and in a generally horizontal plane;

first power driven means operatively connected to the bed for tilting it between a substantially horizontal transport position, a front loading position with its front end on a



supporting surface, and a rear loading position with its rear end on a supporting surface;

second power driven means for turning the swingable portion of the draft tongue in a generally horizontal plane between a transport position in which the forward end of the tongue is substantially on a projection of the longitudinal median plane of the bed and a front loading position in which said forward end of the tongue is offset laterally outwardly from the longitudinal plane of the adjacent side of the bed;

longitudinally movable means on the bed which is adapted to engage a mass of material and move it toward and end of the bed;

and reversible rotary hydraulic motor means for driving said movable means toward either end of the bed.

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**4,019,644**

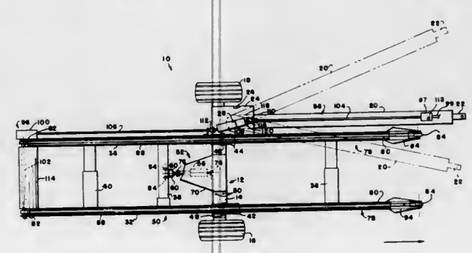
**LARGE ROUND BALE HANDLING APPARATUS**

**Shaun A. Seymour, New Holland, Pa., assignor to Sperry Rand Corporation, New Holland, Pa.**

**Continuation of Ser. No. 529,983, Dec. 5, 1974, abandoned. This application Jan. 12, 1976, Ser. No. 648,609**

**Int. Cl.² B60P** *1/16*

**U.S. Cl. 214—506** **8 Claims**



1. An apparatus for handling crop material packages, such as large round bales or the like, comprising:

a transverse mobile frame adapted for movement across a field, said frame including a transverse beam;

a bed assembly including a pair of elongated, laterally spaced apart support members and transverse means extending between and interconnectingsaid support members;

mounting structure secured on said transverse frame beam pivotally mounting each of said support members about a generally common horizontal axis generally intermediately of its opposite ends and positioning each of said support members in spaced relationship above said transverse frame beam;

said transverse means of said bed assembly interconnecting said pair of support members at the lower sides thereof such that an elongated, unobstructed channel is defined between said support members and above said transverse frame beam and said transverse means, said pair of members thereby being capable of supporting a cylindrical bale or the like with its longitudinal axis extending generally parallel to said members and a lower cylindrical portion of said bale or the like extending downwardly into said channel;

means for pivotally tilting said bed assembly about said horizontal axis relative to said frame between a generally horizontal position and a rearwardly inclined position in which forward ends of said support members of said bed assembly are disposed adjacent the field, said tilting means further for supporting said bed assembly at said positions relative to said frame;

means movably mounted on and along each of said support members and having an upper course extending between the opposite ends of its respective one of said support members and supported throughout its extent on an upper side of its respective one support member so as to move on and along and extend above said upper side of said support member and above said unobstructed channel defined between said support members and beyond at least said forward end of said support member for delivering a bale or the like from the field to upon said forward ends of said support members and into said unobstructed channel defined therebetween when said bed assembly is disposed in its rearwardly inclined position and for moving said bale or the like along and through said channel and along and on said upper sides of said support members toward rear ends thereof;

means for driving said movable means; and

an elongated draft member pivotally mounted at one end about a generally vertical axis to said frame and adapted at the other end for attachment to a vehicle for towing said apparatus across the field, said draft member and said frame being pivotally movable relative to each other about said vertical axis for moving said bed assembly and frame between a transport position and a field operating position laterally displaced from said transport position and said towing vehicle.

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**4,019,645**

**CRUCIBLE OF FUSED VITREOUS SILICA**

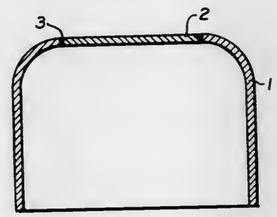
**Karl Seiler, Hanau; Martin Selke, Mittelbuchen; Oswald Siegling, Klein-Auheim; Heinz Herzog, Dettingen; Horst Albrecht, Hanau, and Heinrich Mohn, Hailer, all of Germany, assignors to Heraeus-Schott Quarzschmelze GmbH, Hanau am Main, Germany**

**Filed Dec. 3, 1973, Ser. No. 420,824**

**Claims priority, application Germany, Dec. 4, 1972, 2259353**

**Int. Cl.² C03B** *23/20;* **B65D** *23/00;* **B01D** *1/00*

**U.S. Cl. 215—1 R** **5 Claims**

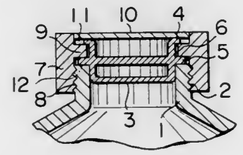


1. In a silica containing crucible for making monocrystals having a generally hollow cylindrical portion forming the sides

thereof and a bottom portion, the improvement wherein said hollow cylindrical portion has a lower concave terminal end portion about its circumference which is directed inwardly toward the center of said crucible and terminates short of the center of said crucible, said bottom portion joined to said terminal end portion, the junction of said bottom portion and said terminal end portion having a weld seam, said bottom portion having an area equal to at least one-tenth and at most four-fifths of the total area of said terminal end portion and said bottom portion.

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**4,019,646**
**CAP WITH INSIDE STOPPER FOR RECEPTACLE**
**Masanaga Imamura, Tokyo, Japan, assignor to Ricoh Co., Ltd., Tokyo, Japan**
**Filed Jan. 19, 1976, Ser. No. 650,315**
**Claims priority, application Japan, Jan. 23, 1975, 50-10178**
**Int. Cl.² B65D** *41/28*
**U.S. Cl. 215—329** **9 Claims**



1. A cap assembly adapted to be threaded on the externally screw-threaded neck of a container, comprising: a cap body having a sidewall, said sidewall having an internally screw-threaded, cylindrical axially inner portion adapted to be threaded onto the neck of the container, said cap body having a radially inwardly extending wall portion located axially outwardly of said screw-threaded portion of said sidewall; an inside stopper having a cylindrical sidewall extending generally parallel to and spaced radially inwardly from said inner portion of said sidewall of said cap body and adapted to sealingly engage the internal sidewall of the central opening of the neck of the container, said sidewall of said inner stopper having an annular radially outwardly extending flange adjacent the outer end thereof disposed in radially overlapping relationship with said wall portion of said cap body, said flange extending toward the interior surface of said sidewall with the radially outer edge of said flange being radially inwardly spaced from the interior surface of said sidewall to define an annular gap therebetween so that said inner stopper can move radially relative to said cap body, said wall portion of said cap body being adapted to press said flange against the outer end of the neck of the container; and means for interlocking said cap body and said inner stopper so that they can be removed as a unit from the container.

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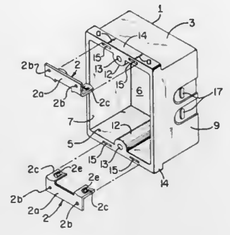
**4,019,647**
**ELECTRICAL WIRING BOX WITH ATTACHED MOUNTING ELEMENTS**
**William O. Arnold, Parkersburg, W. Va., assignor to Union Insulating Company, Parkersburg, W. Va.**
**Filed Oct. 14, 1975, Ser. No. 621,772**
**Int. Cl.² H02G** *3/08*
**U.S. Cl. 220—3.3** **10 Claims**

1. A box assembly adapted to be mounted to a supporting structure, comprising:

A box including a plurality of walls arranged to define a space for receiving a device in said space, said box further including a mounting portion extending generally transversely from one of the walls and having a first surface and a second surface, said mounting portion having an opening extending therethrough from the first surface to the second surface, said opening having a predetermined height in the direction of the mounting portion and being surrounded by the material of the mounting portion; and

a mounting member comprising:

a unitary bowed locking element having a maximum height essentially equal to the height of the opening in the mounting portion, said locking element being disposed within the opening in the mounting portion with a point along its bowed surface abutting against an inner surface of the opening thereby to retain the locking element within the opening;

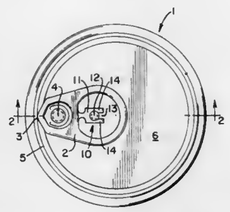


a projection extending outwardly from the bowed surface of the locking element at an acute angle and having a free end, said projection being outside of the opening in the mounting portion with the free end thereof abutting angularly against the second surface of the mounting portion along a line generally transverse to the aforesaid one of the walls of the box following the insertion of the locking element into the opening, said free end of the projection facing in a direction toward the first and second surfaces of the mounting portion; and

a portion connected with the locking element for use in mounting the box to a supporting structure.

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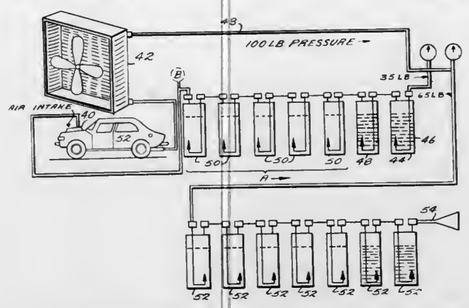
**4,019,648**
**CHILDPROOF CLOSURE**
**Nick S. Khoury, Worth, Ill., assignor to The Continental Group, Inc., New York, N.Y.**
**Continuation of Ser. No. 578,686, May 19, 1975, abandoned.**
**This application Mar. 11, 1976, Ser. No. 666,109**
**Int. Cl.² B65D** *41/32*
**U.S. Cl. 220—273** **11 Claims**



1. An improved safety closure for use on a can or similar container comprising an end panel, a score formed in said end panel and defining an opening flap therein, a pull tab secured to said end panel and having means for fracturing said score to open said consequent to lifting of said tab, retention means for restraining lifting of said tab to fracture said score, and programmable release means for releasing said tab upon application of a preprogrammed force for opening said container, said tab comprising a lift portion, an intermediate portion and a nose portion, said retention means comprising tether means on said lift portion of said tab, and an auxiliary rivet integrally formed in said end panel retainingly cooperative with said tether means.



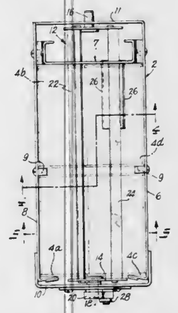
**4,019,649**
**SAFETY TANK SYSTEM**
**Sidney Simon, 936 Oranmore St., Pittsburgh, Pa. 15201**
**Continuation-in-part of Ser. No. 550,589, Feb. 19, 1975, Pat. No. 4,000,726. This application Oct. 20, 1975, Ser. No. 624,161**
**Int. Cl.² B65D** *25/00, 25/18*
**U.S. Cl. 220—88 B** **21 Claims**



1. A gasoline safety tank system comprising a double walled tank body, a manifold removably secured to said tank body, inlet means mounted to said manifold, outlet means mounted to said manifold, said inlet means and outlet means being interchangeable and adapted to receive and discharge fluid, a conduit connected to said inlet means and extending into the area formed by the inner surface of the inner wall of said tank body adjacent the floor of said tank body, a pressurized gas source means mounted to said manifold and selectively connected to said inlet means to discharge pressurized inert gas into said inner surface through said conduit so that said inert gas bubbles up through the liquid in said inner surface into the top of said tank cooling said liquid and pressurizing the liquid in said tank, said double walled tank body forming a cylindrical compartment filled with an incombustible material which is adapted to be pressurized and transported from said compartment when said compartment has a pressure differential greater than that of the outside atmosphere and communicates with the outside atmosphere.

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**4,019,650**
**TANDEM COLUMN VENDER APPARATUS**
**Kenneth W. Oden, Charles Town, W. Va., assignor to Dixie-Narco, Inc., Ranson, W. Va.**
**Filed Oct. 29, 1975, Ser. No. 626,643**
**Int. Cl.² B65G** *59/00*
**U.S. Cl. 221—116** **2 Claims**



1. In a vending apparatus having opposed longitudinal side walls, a rear wall and a front wall defining a compartment for containing and confining at least two columns of generally cylindrical articles with articles of one column axially displaced from the articles of the other column in a front to rear direction, and a longitudinally extending bail extending below both columns in supporting relation to at least the bottom articles thereof and being mounted for lateral movement from a first position supporting said articles to a terminal position wherein all portions thereof are sufficiently spaced from one side wall to permit downward passage of said articles therebetween, the improvement comprising:

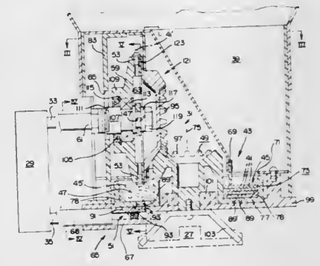
said bail comprising an inverted V-shaped, one piece, elongated member having a laterally extending longitudinal flange defining a portion of the edge thereof nearest said one side wall, said one side wall being planar;

said flange below only one of said columns extending farther toward said one side wall than the remainder of the member whereby said bail may be moved laterally away from said one side wall to permit the bottom article of the other of said columns to drop therepast while said flange supports the bottom article of said one column and further lateral movement of said bail to said terminal position then permits said bottom article of said one column to drop therepast;

said bail being pivotally mounted for arcuate swinging movement about a fore-and-aft axis, and means in rigidly fixed relation thereto and swingable therewith and arranged to swing into supporting engagement with those articles of said columns above said bottom articles in response to swinging movement of said bail away from said first position.

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**4,019,651**
**SEED PLANTER WITH A SUCTION PICKUP MECHANISM**
**George N. Starr, Memphis, Tenn., and Boyd C. Robertson, Jr., Jonesboro, Ark., assignors to Floyd R. Bridger, Jr., Jonesboro, Ark.**
**Filed Sept. 19, 1975, Ser. No. 615,174**
**Int. Cl.² A01C** *7/04*
**U.S. Cl. 221—211** **11 Claims**



1. In a seed planter of the type incorporating a suction pump in conjunction with the seed pickup mechanism and having ground engaging drive means operable by pulling the seed planter along over the ground, and a hopper for containing a given supply of the seeds intended to be planted; the improvement which comprises dispensing means for dispensing from said hopper a layer of the seeds thus establishing a stable seedbed having a predetermined thickness, a seed pickup chamber disposed adjacent said dispensing means, means coupled to said ground engaging drive means for carrying said seedbed through said seed pickup chamber, said means for carrying said seedbed through said seed pickup chamber including an annular continuous trough rotatably driven about a vertical axis interposed between said dispensing means and said seed pickup chamber, said trough having an annular bottom with said seedbed being restingly supported thereon, means for expanding said seedbed whereby the density of said seedbed is decreased resulting in an increased thickness of said seedbed while it passes through said seed pickup chamber, said means for expanding said seedbed including a source of air under pressure and including means for communicating

said seed pickup chamber with said source of air under pressure which is effective to slightly lift and separate the seeds whereby an unstable or fluidal state exists within said seedbed as it passes through said seed pickup chamber, said seed pickup mechanism including at least one nozzle means coupled to said ground engaging drive means and being communicated with said suction pump for repeatedly withdrawing one seed at a time from said expanded seedbed, said nozzle means being cyclically moved into said seed pickup chamber at a spaced distance above said stable seedbed thence to a seed discharge zone, and means for releasing the seeds from said nozzle means as said nozzle means enters said seed discharge zone thus enabling the seeds to subsequently gravitate to the ground at predetermined spaced apart intervals.

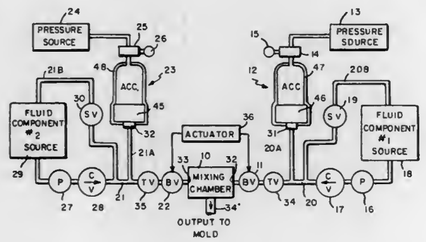
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**4,019,652**

## FLUID DELIVERY AND MIXING SYSTEMS

**Nam P. Suh, Sudbury; Salvatore C. Malguarnera, Medford, and Frederick H. Anderson, Reading, all of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.**

**Filed Nov. 5, 1975, Ser. No. 628,965**
**Int. Cl.² B67D** *5/60*
**U.S. Cl. 222—1** **13 Claims**




1. A system for mixing at least two fluid components, said system comprising

at least two sources for providing at least two different fluid components;

at least two accumulator means;

means for supplying under pressure to each of said accumulator means a different one of said fluid components from said fluid component sources, said accumulator means each thereby being independently charged to a selected predetermined pressure;

a mixing device having at least two input ports for receiving said at least two fluid components and at least one output port for delivering a mixture of said at least two fluid components therefrom; and

means associated with each of said accumulator means for independently controlling the mass flow rates of each of said fluid components being supplied to said mixing device from each of said accumulator means, said controlling means being operable to supply said at least two fluid components from said accumulator means substantially simultaneously to said mixing device.

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**4,019,653**

## AUTOMATIC PROPORTIONING PAINT SPRAY SYSTEM

**William C. Scherer, Minneapolis, Minn., and Raymond A. Vincent, Detroit, Mich., assignors to Graco Inc., Minneapolis, Minn.**

**Filed Aug. 22, 1975, Ser. No. 606,926**
**Int. Cl.² B05B** *7/04;* **B67D** *5/28*
**U.S. Cl. 222—1** **25 Claims**

1. An apparatus for the controlled proportioning and mixing of two paint components during the flow of said components to a paint spray gun, comprising:

a first flow sensor coupled to the flow path of the first paint component, said sensor having means for generating a signal representative of the rate of flow of said first paint component;

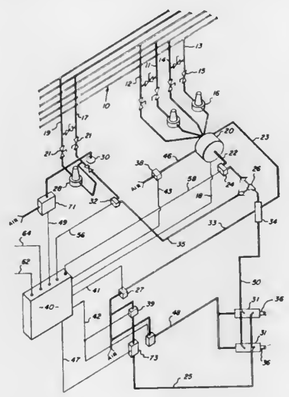
a second flow sensor coupled to the flow path of the second paint component, said sensor having means for generating a signal representative of the rate of flow of said second paint component;

an adjustable flow restricting valve in the flow path of the first paint component;

subtracting means for generating an output signal representative of the difference between two input signals, and having two input terminals for receiving said two input signals;

means for connecting the subtracting means output signal to said adjustable flow restricting valve in valve adjusting sense whereby a valve adjusting drive is created proportional to said output signal;

signal transformation means, coupled between said first



flow sensor means for generating a signal and said subtracting means first input signal terminal, for selectively transforming the magnitude of said signal representative of the rate of flow of said first paint component;

means for manually setting the selective signal transformation level of said signal transformation means;

means for coupling said second flow sensor signal representative of the rate of flow of said second paint component to said subtracting means second input signal terminal;

means for sensing the initial flow to said spray gun and for generating a blocking signal for a predetermined time after said initial flow is sensed;

means for generating a predetermined initial position signal for said adjustable flow restricting valve; and

switch means, connecting said predetermined initial position signal to said adjustable flow restricting valve and disconnecting said subtracting means output signal, said switch means being actuated by said blocking signal.

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**4,019,654**

## MANUAL CARTRIDGE DISPENSER

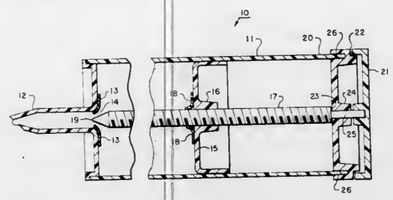
**Dick T. van Manen, Canandaigua, N.Y., assignor to Voplex Corporation, Pittsford, N.Y.**

**Filed Feb. 25, 1976, Ser. No. 661,294**
**Int. Cl.² B65D** *83/00*
**U.S. Cl. 222—1** **12 Claims**

9. A method of dispensing material from a disposable cartridge having a disposable resin plunger positioned inward from the rear end of said cartridge and having a threaded and sealed central opening, said dispensing method using a threaded rod having a turning knob and a relatively rotatable anchorage adapter, and said method comprising:

a. turning said knob and said rod in one direction to thread said rod through said plunger and said seal and to advance said rod through said material to bring said adapter adjacent said rear end of said cartridge;

b. manually moving said adapter onto said rear end of said cartridge for removably securing said adapter to said rear end of said cartridge;



c. turning said knob in the opposite direction to advance said plunger into said cartridge to dispense said material; and

d. turning said knob slightly in said one direction to retract said plunger to prevent drool upon interruption of said dispensing.



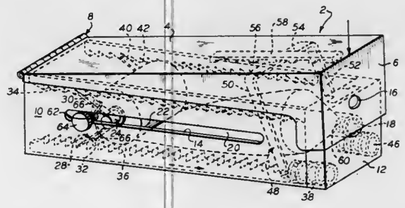
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**4,019,655**

## MECHANICAL DISPENSER

**Wolfgang W. Moeller, 4 Glen Cove Drive, Glen Head, N.Y. 11545**

**Filed Dec. 17, 1975, Ser. No. 641,710**
**Int. Cl.² B65D** *35/28*
**U.S. Cl. 222—96** **17 Claims**



1. A dispenser comprising a housing and a face plate, said face plate having an openable and closable aperture therein through which material in said housing is dispensed, said housing having a cover pivotally connected thereto and carrying an overplate which ridably overlies said face plate, said housing having therewithin a compressor, said compressor having engaging means, said engaging means engaged in a longitudinally disposed track in said housing, an actuating means connected to said cover and connected to a transmission for urging said compressor longitudinally within said housing; whereby when it engages a container within said housing of a yieldable material containing material to be dispensed, said material is dispensed, said transmission comprising a first rack and a second rack, said first rack facing said second rack, said first and second racks running along a side of said compressor in the direction of travel of said compressor, said first rack being connected to a spring biased against said face plate and being movable in the direction of travel of said compressor, said second rack being stationarily secured to said housing and running longitudinally therewith; said actuating means comprising a lever hingedly positioned against said cover on the inside thereof and biased against said spring, said first and second racks engaged by a yieldable leaf spring attached to said compressor.

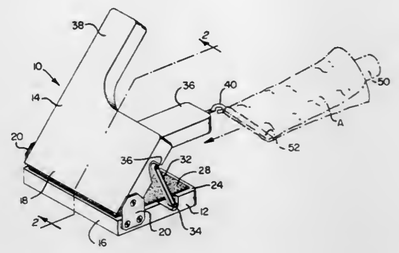
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**4,019,656**

## COLLAPSIBLE TUBE SQUEEZING DEVICE

**Cecil Julius Spears, 112 McFarland Road, Enfield, N.C. 27823**

**Filed Apr. 26, 1976, Ser. No. 680,280**
**Int. Cl.² B65D** *35/28*
**U.S. Cl. 222—103** **4 Claims**



1. A collapsible tube-squeezing device comprising a pair of pivotal substantially planar jaw members, each of said substantially planar jaw members having a front edge and a rear edge to receive a portion of a collapsible tube therebetween said jaw members including:

a. a bevelled surface along the rear edge of one of the said jaw members;

b. a pair of links;

c. one of each of the pair of links being secured to the side edges of the other of the jaw members adjacent the rear edge;

d. pivot pin means pivotally connecting the said one jaw member to said pair of links with the bevelled edge generally directed toward the other of the jaw members;

e. a pair of operating handles, one of said handles being attached to each of said jaw members and off-set to one side of the front edges and extending forwardly of the collapsible tube receiving portions of the jaw members, said off-set handles cooperating with each other in applying pressure between said jaw members; and,

f. resilient means urging said jaw members into a closed position and wherein said bevelled surface cooperates with the other jaw member to grip the sealed edge of a collapsible tube.

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**4,019,657**

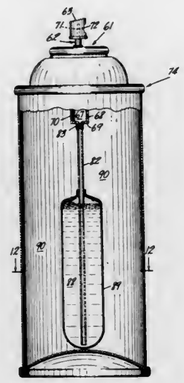
## AEROSOL CONTAINERS FOR FOAMING AND DELIVERING AEROSOLS

**Joseph George Spitzer, 44 Coconut Row, Palm Beach, Fla. 33480; Marvin Small, 1100 Park Ave., New York, N.Y. 10028; Lloyd 1. Osipow, 2 Fifth Ave., New York, N.Y. 10003; Dorothea C. Marra, 107 Fernwood Road, Summit, N.J. 07901**

**Continuation-in-part of Ser. Nos. 554,388, March 3, 1975, Pat. No. 3,970,219, and Ser. No. 566,562, April 9, 1975, abandoned, and Ser. No. 620,448, Oct. 7, 1975, abandoned, and Ser. No. 628,283, Nov. 3, 1975, abandoned. This application Mar. 26, 1976, Ser. No. 670,913**
**Int. Cl.² B65D** *83/14, 83/00*
**U.S. Cl. 222—136** **11 Claims**

1. An aerosol container for foaming an aerosol composition therein prior to expulsion from the container, and then expelling the resulting foam, comprising, in combination, a pressurizable container having a valve movable between open and closed positions, with a valve stem, a foam-conveying passage therethrough and a delivery port in flow connection therewith; bias means for holding the valve in a closed position; and means for manipulating the valve against the bias means to an open position, for expulsion of aerosol foamed composition within the container via the valve passage and delivery port;

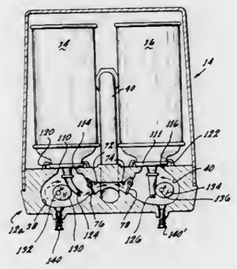
means defining at least two separate compartments in the container, of which a first compartment has a volume of at least 0.5 cc and is in direct flow connection with the valve passage, and a second compartment is in flow connection with the valve passage only via the first compartment; at least one first liquid tap orifice having a diameter within the range from about 0.012 to about 0.2 cm and communicating the first and another compartment for flow of liquid aerosol composition into the first compartment from the other compartment, and of sufficiently small dimensions to restrict flow of liquid aerosol composition therethrough; the ratio of first compartment volume/first orifice diameter being from about $10/x$ to about



$400/x$, where $x$ is 1 when the orifice length is less than 1 cm, and 2 when the orifice length is 1 cm or more; at least one second gas tap orifice having a total cross-sectional open area within the range from about $4 \times 10^{-5}$ to about $1.3 \times 10^{-2}$ cm$^2$ and communicating the first and second compartments for flow of propellant into the first compartment from the second compartment therethrough, and of sufficiently small dimensions to restrict flow of propellant gas and form bubbles of such gas in liquid aerosol composition across the line of flow thereof to the valve, thereby to foam the aerosol composition upon opening of the valve to atmospheric pressure, and to expel foamed aerosol composition through the open valve.

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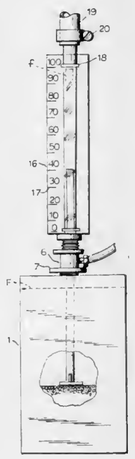
**4,019,658**
**COMBINATION SHOWER HEAD AND TOILETRIES MIXING AND DISPENSING APPARATUS**
**Kenneth E. Consaul, 3100 Plaza Drive, Penthouse I-12, Santa Ana, Calif. 92704**
**Filed July 24, 1975, Ser. No. 599,007**
**Int. Cl.² B67D** *5/54*
**U.S. Cl. 222—144.5** **5 Claims**



**1.** As an article of manufacture, means comprising a housing having in it a flow path for shower water and plurality of disposable dispensing type containers for additive for shower water, each of the containers having at one end a dispensing means including a stem actuatable by a lateral tilting movement thereof to dispense additive from the container, the housing having a wall part to which the containers are attached, selectively actuatable rotor means in said wall part for tilting said stem laterally and thereby causing the containers to dispense additive to channels including a channel providing communication to said flow path.

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**4,019,659**
**SOLIDS LEVEL INDICATOR**
**William F. Deneen, 306 E. Forest St., Marengo, Ill. 60152**
**Filed May 21, 1975, Ser. No. 579,852**
**Int. Cl.² B67D** *5/22, 5/54*
**U.S. Cl. 222—193** **5 Claims**



**1.** Apparatus for indicating levels of dissolvable solids in a closed vessel through which liquid circulates, said apparatus comprising:

a substantially transparent duct having open top and bottom ends wherein the bottom end registers with the vessel and the top end is an inlet for introducing liquid into the vessel;

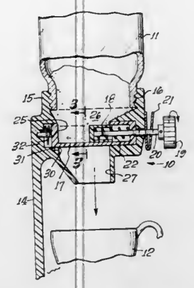
an elongated gauge member telescopically mounted in said duct for reciprocation therein, said elongated gauge member projecting beyond the bottom end of said duct and into said vessel and being provided with a solid foot which rests on said solids while the fluid circulates, means for conveying the liquid from the inlet and over the foot to hold the foot in engagement with the solids, wherein the level of the solids in the vessel controls the height of the gauge in the duct and wherein a selected portion of the gauge member is visible through the duct thereby indicating the level of solids in the vessel;

mounting means for coupling said apparatus to the vessel, said mounting means including an annular connector through which the duct member extends, said annular connector having a diameter greater than the duct member, so that there is an annular space between the annular connector and the duct member which registers with the vessel, and

an outlet through the annular connector wherein liquid in the vessel exits from the vessel through the outlet as the liquid dissolves the solids.



**4,019,660**
**INSTANT COFFEE DISPENSER**
**R. Scott Berkey, 11425 Miller Road, Whittier, Calif. 90604**
**Filed Dec. 29, 1975, Ser. No. 644,767**
**Int. Cl.² G01F** *11/26*
**U.S. Cl. 222—304** **4 Claims**



**1.** A device for dispensing a pre-measured amount of a particulate solid, said device comprising:

a base member;

jar attachment means affixed to said base member for holding a jar of particulate solid in an inverted position said attachment means having a generally horizontal cylindrical opening for holding a dispensing cylinder and further having a spout for directing solid from the device;

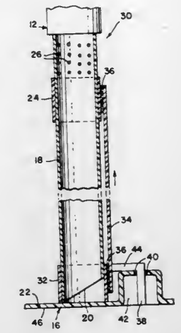
a dispensing member having a partially hollow cylindrical body positioned in the cylindrical opening of said jar attachment means, said cylindrical body having a cavity with piston means therein, said piston means being connected to an arm extending outwardly of the jar attachment means, and positioning means affixed to said arm for longitudinally affixing said piston within said cavity and an opening the ends of which extend over no more than 180° as measured from the longitudinal axis of said cylindrical body, said opening being located within the side wall of the cylindrical body whereby the axial rotation of said cylindrical body causes the cavity to fill when said opening is in an upward orientation and to empty when it is in a downward position; and

biasing means urging said piston toward a closed configuration.

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**4,019,661**
**LIQUID DISPENSER FOR SELECTIVE UPSIDE DOWN OR RIGHT SIDE UP USE**
**Janos Szabo, 214 E. 82nd St., New York, N.Y. 10028**
**Filed July 17, 1975, Ser. No. 596,730**
**Int. Cl.² B67D** *5/40*
**U.S. Cl. 222—376** **1 Claim**

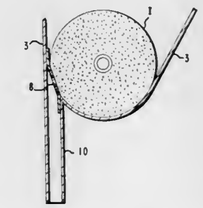
**1.** A liquid dispenser for a container for dispensing liquid in a first mode when said container is upright and in a second mode when said container is upside down, said dispenser comprising: removeable cap means for the top of said container; pump and nozzle means mounted through said cap means; a suction tube within said container coupled to said pump and nozzle means and extending downward towards the bottom of said container; a first fluid intake opening in said tube proximate the top of said container; first sealing means slideably mounted on said tube proximate said first intake opening, said first sealing means being positionable in an upper position for covering said first intake opening and in a lower position for uncovering said first intake opening; a second fluid intake opening formed in said tube proximate the bottom of said container; second sealing means slideably mounted on said tube proximate said second intake opening; said second sealing means being positionable in an upper position for uncovering said second intake opening and in a lower position for covering said second intake opening; linkage means extending between and attached to said first and second sealing means for linking said first and second sealing means for movement as a unit; and control means coupled to



said linkage means and extending through a wall of said container for enabling manual application of a force for moving said unit.

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**4,019,662**
**FEEDER FOR COHERENT PARTICULATE MATERIAL**
**Paul Robert Dana, Wilmington, Del., assignor to Milliken Research Corporation, Spartanburg, S.C.**
**Filed Apr. 9, 1973, Ser. No. 349,305**
**Int. Cl.² G01F** *11/20*
**U.S. Cl. 222—414** **7 Claims**



**1.** A device for spreading coherent powder, said device comprising

a powder storage bin having a foraminous wall discharge area located to provide an uninterrupted vertical path to a substrate, said foraminous wall containing perforations of dimension between 0.02 inch and 0.125 inch;

a cylinder of pore-bearing resilient reticulated foam rotatably mounted within said bin and disposed such that on rotating it presses against the wall discharge area forcing said powder through perforations;

means for rotating said cylinder; and

means for moving the device over the substrate.

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**4,019,663**
**SEPARATING MEANS FOR PLASTIC CLOSURE TOP**
**Gunter Krautkramer, Budenheim, Mainz, Germany, assignor to Patentkommerz AG, Zurich, Switzerland**
**Filed July 8, 1975, Ser. No. 594,371**
**Claims priority, application Sweden, July 9, 1974, 89830/74**
**Int. Cl.² B65D** *47/10*
**U.S. Cl. 222—529** **2 Claims**

**1.** In an integrally formed plastic closure means for closing an opening in a container wherein said closure means comprises:

a base, said base having a bottom which has an opening into it; a ring at said base which is adapted to be introduced into the container opening; a snap fastening slot on said

base for seating against the container, thereby to hold said closure means in position on the container;

a noncompressible spout defined at the opposite end of said closure means from said base and comprising an opeing into said closure means; said spout having a base end and a closable end;

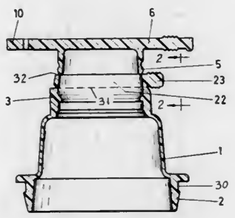
a compressible bellows extending from said base to said spout base end; said closure means being hollow from said base opening through said bellows and said spout, thereby to enable fluent material to pass completely through said closure means;

a closure element for closing said spout opening; said closure element comprising a hollow cylinder having a first open end; said hollow cylinder having an opposite second end; an integrally connected disc sealing closed said cylinder second end of said closure element; joining means for joining said closure element to said spout closable end; and the entire said closure means being a one piece, integral plastic material unit,

the improvemet comprising:

said joining means comprising a tear band interposed between and integrally connected on the one hand with said closure element cylinder first end and on the other hand with said spout around said spout closable end;

at said integral connection between said spout closable end and said tear band is defined a first tearable section that is comprised of such material and that is of such thickness and that has such characteristics that it is adapted to be torn upon application of tearing force thereto;




at said integral connection between said closure element cylinder first end and said tear band is defined a second tearable section that is comprised of such material and that is of such thickness and that has such characteristics that it is adapted to be torn upon application of tearing force thereto;

a graspable handle integrally formed on said tear band such that grasping and pulling said handle tears said first and said second tearable sections and thereby tears said tear band from said closure means and enables removal of said tear band, to initially separate the integrally connected said tear band from both of said spout and said closure element;

said compressible bellows being shaped such that when said bellows is compressed, the portion of said spout and of said closure element at said tear band are compressed by the compression of said bellows inside the portion of said bellows away from said tear band, whereby said tear band and said tearable sections are within and protected by said bellows;

said spout and said closure element cylinder being respectively cooperatingly contoured such that said closure element cylinder is shaped to seal said spout opening after said tear band has been removed from said closure means; said closure element having a grippable portion by which said closure element can be held, removed and replaced on said spout opening.

**4,019,664**

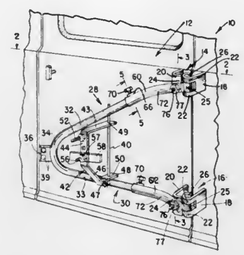
## WHEEL AND TIRE CARRIER FOR ATTACHMENT TO MOTOR VEHICLE DOORS

**Raywood C. Weiler, 17586 Vine St., Fontana, Calif. 92335**

**Filed Nov. 21, 1975, Ser. No. 634,198**

**Int. Cl.² B62D** *43/02*

**U.S. Cl. 224—42.24** **6 Claims**



1. A wheel and tire carrier for attachment to the door of a motor vehicle in which the door is hingedly supported adjacent its rear edge by upper and lower hinge means, said wheel and tire carrier comprising a frame member having upper and lower arms and a vertical rod supported between said arms, an extension attachable to each of the free rear ends of the upper and lower arms, fastening means for securing the opposite ends of the extensions to the door hinges, fastening means for securing the front end of the frame member to the door adjacent the front end of the door, a bracket slidable vertically on said vertical rod and swingably supported on said frame member intermediate the front and rear of said frame member, said bracket adapted to be manually moved from a non-use position where is it substantially positioned between the arms of the frame member to its in-use position at right angles to the frame member, said bracket having means at its lower end to engage said lower arm of said frame member when it is moved to its in-use position to retain said bracket at right angles to said frame member.

**4,019,665**

## FEED DEVICE FOR ROD OR STRIPLIKE MATERIAL

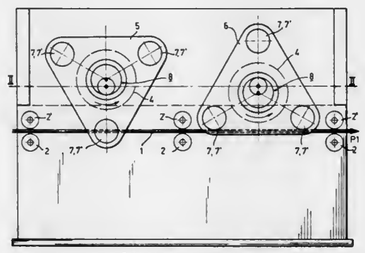
**Klaus Ritter; Hans Gott; Gerhard Ritter, and Josef Ritter, all of Graz, Austria, assignors to Firma Evg Entwicklungs-u Verwertungsgesellschaft, Graz, Austria**

**Filed Dec. 19, 1975, Ser. No. 642,387**

**Claims priority, application Austria, Dec. 20, 1974, 10211/74**

**Int. Cl.² B65H** *51/18*

**U.S. Cl. 226—112** **7 Claims**



1. A feed device for rod- or strip-like material, comprising, in combination:

a housing:

at least two feed members each having a central axis and being longitudinally spaced apart from each other to define a feed path for said material;



a plurality of gripping means disposed on each of said feed members about its central axis and each of said gripping means being operable for engaging and moving said material along said feed path;

driving means disposed in said housing and operable for rotating each of said feed members around its central axis and simultaneously, around a fixed axis parallel to the respective central axis;

the rotation of each of said feed members moving each of said gripping means along a trochoidal path including a substantially straight portion substantially along said feed path;

said gripping means being operable for moving said material along at least a part of said straight portion;

said driving means rotating said feed members so that said gripping means of one and the other of said feed members alternately engage said material with an overlap in the respective periods of time engagement.

**4,019,666**

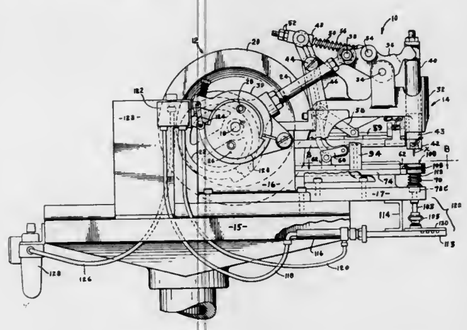
## FASTENER ATTACHING MACHINE HAVING MEANS FOR ORIENTING CAPS, BUTTONS, AND THE LIKE

**Jonathan Asa Foults, Wolcott, Conn., assignor to Scovill Manufacturing Company, Waterbury, Conn.**

**Filed Nov. 10, 1975, Ser. No. 630,449**

**Int. Cl.² A41H** *37/10*

**U.S. Cl. 227—119** **9 Claims**



1. In an attaching machine for fastener elements each having a depression offset from its center, the machine having a vertically fixed die surrounded by a vertically movable element-receiving gripping head and a movable setting plunger adapted to cooperate with the die, a horizontally disposed slide bracket directed at said head and a pusher for moving the element along the slide bracket to the head, said bracket having means for rotating the element, the pusher having a depression-engaging finger adapted to hold the element from rotating and hold the rotary orientation of the element once the orientation is in a predetermined direction as the element moves along the slide bracket; the improvement including means to rotate the die and head about a vertical axis to re-orient the fastener element to the desired extent prior to the descent of the setting plunger toward the die.

**4,019,667**

## MACHINE FOR CONVEYING A MATERIAL IN WEB FORM THROUGH TREATMENT TUBS

**Lodovico Falomo, Strada Statale Pontebbana Orcenigo Inf., Zoppola (Pordenone), Italy**

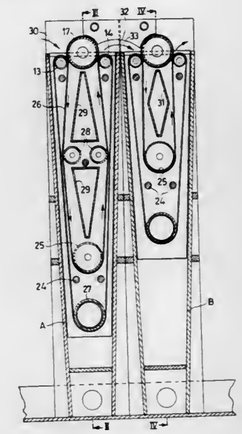
**Filed Jan. 17, 1975, Ser. No. 542,044**

**Claims priority, application Italy, Jan. 24, 1974, 19772/74**

**Int. Cl.² B65H** *17/34*

**U.S. Cl. 226—171** **9 Claims**

1. An apparatus for conveying a sheet material within a tub of a treatment installation including a plurality of adjacent tubs in which treatment baths for the sheet material are contained, said apparatus comprising two first parallel rotary rollers placed in laterally spaced relationship at the top of the tub, a second parallel rotary roller located below said first rollers at a selected distance thereform, a flexible endless web passing over each one of said first rollers and below said second roller to form within the tub an innermost U-shaped bend engaged with the first and second rollers and having an inner surface adapted to accompany the sheet material through a U-shaped path within the tub and an outermost U-shaped bend provided with tensioning means, driving means coupled to at least one of said first and second rollers



to rotate the coupled roller and to consequently advance the flexible web, a rotary pressure cylinder parallelly resting on the first rollers to maintain the sheet material adherent to the flexible web at the beginning and the end of said U-like path and parallel rotary idler rollers disposed intermediated said first and second rollers and cooperating with the inner surface of the descending and rising portions of the innermost bend of the flexible web to engage and maintain the sheet material adherent to the flexible web at the descending and rising portions of said U-like path.

**4,019,668**

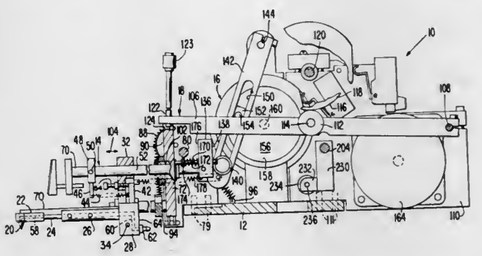
## MECHANISM AND METHOD FOR MOVING TOOL OR THE LIKE

**John C. Diepeveen, 1737 Kimberly Drive, Sunnyvale, Calif. 94086**

**Filed Dec. 30, 1974, Ser. No. 537,523**

**Int. Cl.² B23K** *37/04*

**U.S. Cl. 228—3.1** **21 Claims**



1. A transfer mechanism comprising: a support; a holder for a device to be moved from a first location to a second location spaced from said first location; means on the support and coupled with the holder for mounting the latter for substantially rectilinear up and down movement relative to the support, whereby the holder can move toward and away from either of said locations when the same is vertically aligned

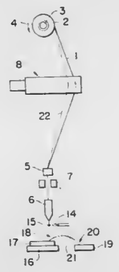
therewith, said holder being carried on said mounting means for substantially rectilinear fore and aft movement relative to said support, whereby the holder can move between respective positions vertically aligned with and spaced from said locations; means coupled with the mounting means for moving the holder toward and away from a location vertically aligned therewith; means independent of said moving means and coupled with the holder for shifting the same relative to said mounting means and between said positions; first means coupled with the holder for biasing the same in a direction extending longitudinally of its path of up and down movement; and second means coupled with the holder for biasing the same in a direction extending longitudinally of its path of fore and aft movement.

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**4,019,669**
**WIRE BONDING APPARATUS**

**Michio Tanimoto, Hachioji, and Yuzo Taniguchi, Kunitachi, both of Japan, assignors to Hitachi, Ltd., Japan**

**Filed Sept. 15, 1975, Ser. No. 613,542**
**Claims priority, application Japan, Sept. 13, 1974, 49-105021**
**Int. Cl.² H05K** *13/06*; **B65H** *59/16*
**U.S. Cl. 228—4.5** **10 Claims**



**1.** A wire bonder comprising: a spool for supplying the wire to be bonded, a shaft means for rotatably mounting said spool, means for holding the wire in a position extended downwardly from said spool, means disposed between said spool and said holding means for tensioning the wire, said means for tensioning including a means for directing a jet of a gas against the wire and means for regulating the flow of the jet of gas, said regulating means including a pair of guide plates, said guide plates being spaced from one another and disposed along the flow of the jet of gas, the wire extending from said spool through the space between said guide plates to said holding means, said holding means including a capillary bonding head, and means for applying a back tension on said spool.

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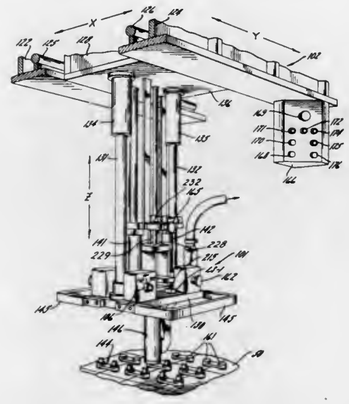
**4,019,670**
**SELF-BALANCING POSITIVE DISPLACEMENT CASTING SYSTEM**

**Robert Holbrook Cushman, Shrewsbury, N.J., and Kurt R. Stirner, deceased, late of Churchill, Pa. (by Genevieve E. Stirner, executrix), assignors to Gould Inc., Rolling Meadows, Ill.**

**Filed Jan. 21, 1974, Ser. No. 435,172**
**Int. Cl.² B23K** *37/02*, *37/04*
**U.S. Cl. 228—45** **5 Claims**

**1.** In a positive displacement casting system of the type having a frame, a bracket, and a positive displacement casting head including a barrel and a coaxial ram suspended from the frame, the method of supporting and activating said head comprising the steps of:

a. mounting the ram and bracket on a piston associated with first fluid operated means carried by the frame;
b. mounting the barrel in coaxial surrounding relation to the ram on the piston associated with second fluid operated means carried by the bracket;
c. pressurizing said first fluid operated means so as to balance the weight of said head and to establish a balanced float condition therefor;
d. positioning a meltable workpiece on a support surface beneath said head and relatively aligning said workpiece and the ram on a common work axis;
e. manually shifting said head downwardly against the balanced float force maintained by said first fluid operated means so as to engage the barrel with said meltable workpiece;
f. pressurizing said first fluid operated means to overcome the balance force theretofore applied and urging the ram into engagement with said meltable workpiece;



g. heating the ram to a temperature sufficient to convert said meltable workpiece in the path of ram movement to the molten state;
h. moving the heated ram through the barrel and axially into and at least partially through said meltable workpeice with the ram positively displacing the molten material thus formed upwardly into the barrel in surrounding relation with the ram; and
i. reversing the pressure conditions on said first fluid operated means while maintaining said second fluid operated means depressurized so as to retract the ram from engagement with any unmelted portion of said workpiece and the molten material.

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**4,019,671**
**METHOD FOR DIP-SOLDERING SEMICONDUCTOR COMPONENTS**

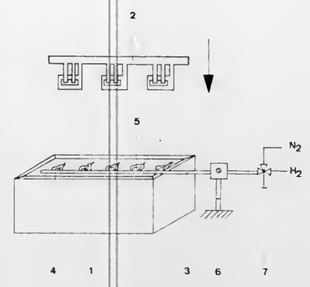
**Altan Akyuerek, Heppenheim, Germany, assignor to BBC Brown Boveri & Company Limited, Baden, Switzerland**

**Filed Mar. 11, 1976, Ser. No. 665,762**
**Claims priority, application Germany, Mar. 14, 1975, 2511210**
**Int. Cl.² H01L** *21/60*
**U.S. Cl. 228—123** **2 Claims**

**1.** A method of dip-soldering semicondictor components, in particular components mass-produced with the use of comb elements, comprising the steps of:



homogeneously sweeping the surface of a solder bath with a hydrogen gas flame; and



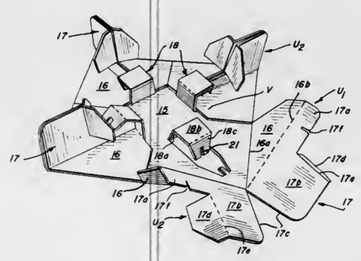
dipping said semiconductor components and contact elements, in a flux-free state, into said solder bath.

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**4,019,672**
**PACKING INSERT AND BLANK THEREFOR**

**Nunzio E. Giannini, Pompton Lakes, N.J., assignor to Packaging Corporation of America, Evanston, Ill.**

**Filed Feb. 3, 1976, Ser. No. 654,894**
**Int. Cl.² B65D** *5/58*
**U.S. Cl. 229—14 C** **11 Claims**



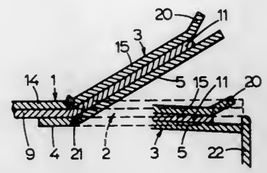
**1.** A packing insert formed from a blank of foldable sheet material and adapted for disposition within a multi-sided container to position a product in a predetermined relation within the container interior, said insert comprising a base panel having a peripheral configuration corresponding substantially to the area delimited by the side walls of the container, a plurality of foldable support units adjacent predetermined corners of said base panel and protruding from a surface of said base panel and inwardly towards the center of said base panel, and a plurality of retainer means struck out from said base panel and interlocking with said support units and retaining same in predetermined folded relation with respect to said base panel, the number of said retainer means corresponding to the number of said predetermined corners; each support unit including a first section overlying in face-to-face relation a surface of said base panel, said first section being foldably connected to a peripheral segment of said base panel adjacent a predetermined corner of said base panel, and a second section disposed inwardly of the periphery of said base panel and being foldably connected to said first section and protruding transversely from said base panel surface, said second section having an inner portion thereof engaged and retained by a retainer means in said transversely protruding relation with respect to said base panel surface.

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**4,019,673**
**CARDBOARD BOX**

**Arnold Salomons, Amersfoort, Netherlands, assignor to Gladu A.G., Glarus, Switzerland**

**Filed Apr. 2, 1976, Ser. No. 673,105**
**Claims priority, application Netherlands, Apr. 8, 1975, 7504187**
**Int. Cl.² B65D** *5/72*
**U.S. Cl. 229—17 R** **2 Claims**



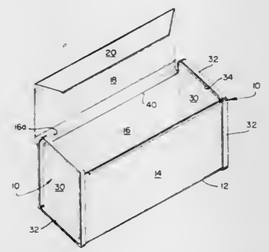
**1.** A cardboard box comprising a three layered wall portion provided with an outlet opening, a closing lip which can be swung open and reclosed to open and close said outlet opening, said lip being constituted by the three layers of material of the box that have been glued together, the middle closing-lip layer being bounded by a cutout portion and being shorter and narrower than the outer and inner closing-lip layers, so that the closing lip, after having been opened, is clampingly reclosable since said closing lip, when swung back to the reclosed position, is capable of being pressed over the entire width of its free end, one layer of box material farther into the box than in the original closed position.

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**4,019,674**
**RIGID WALLED STRUCTURES FOR CONTAINERS, FURNITURE AND THE LIKE**

**Gerald S. Ikelheimer, and Gilbert d'Andrea, both of Yorktown Heights, N.Y., assignors to Ikelheimer-Ernst, Inc., New York, N.Y.**

**Filed June 30, 1975, Ser. No. 591,571**
**Int. Cl.² B65D** *3/10*
**U.S. Cl. 229—23 R** **8 Claims**



**1.** A rigid walled support structure comprising a pair of spaced rigid cap members of resinous material each selectively contoured to provide main rigid walled support panel portions each perimetrically bounded by a transversely extending wall portion defining corresponding internally facing U-shaped receiving and retainer slots; and

an intermediate rigid walled unitary support body portion selectively contoured to define boundary portions which correspond to the main panel portions and having a predetermined portion of the terminal marginal edges of the body portion disposed within said receiving slots;

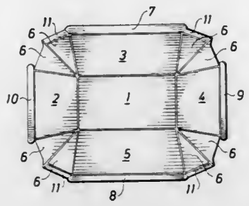
said terminal marginal edges of said body portion being disposed within said U-shaped slots engaging the adjacent interfacial surfaces of said cap members.

4,019,675

## LOCKING CONTAINER

Rolf Andersson, Lund; Bengt Björklund, Kavlinge, and Tommy Hedberg, Lund, all of Sweden, assignors to AB Akerlund & Rausing, Lund, Sweden

Filed Oct. 21, 1975, Ser. No. 624,411
Claims priority, application Sweden, Nov. 8, 1974, 7414033
Int. Cl.² B65D 5/24, 5/12
U.S. Cl. 229—31 R 8 Claims



1. A container comprising a bottom wall, at least one wall projecting upwardly from said bottom wall to define a cavity, said at least one wall comprising at least two oppositely disposed side portions, a flange projecting outwardly from said wall, said flange having reinforcing means secured thereto at said side portions, a cover member comprising an outer edge flange integral with an inner countersunk portion disposed in a different plane than said outer edge flange and connected thereto by a substantially vertical portion, said reinforcing means being so constructed that it extends inwardly from said wall into said cavity to receive and lock in place said cover member in sealing relationship to said container, and said countersunk portion and said substantially vertical portion cooperating with said reinforcing means to lock said cover member in sealing relationship to said container.

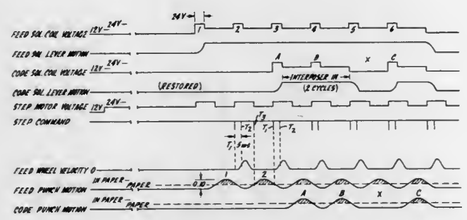
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4,019,676

## TAPE PUNCH MACHINE

Gerhard Cless, and Edward L. Kaplan, both of Northbrook, Ill., assignors to Extel Corporation, Northbrook, Ill.

Division of Ser. No. 485,906, July 5, 1974. This application Dec. 8, 1975, Ser. No. 639,000
Int. Cl.² G06K 1/10
U.S. Cl. 234—115 8 Claims



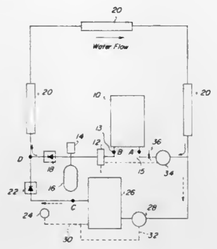
1. In a cyclically operable tape punch machine, punches selectable for operation, means to operate the selected punches, interposer slides moveable between a retracted and actuated position for selecting the punches, means including an electromagnetic means operable by an operating voltage of predetermined value to move an interposer from restored to actuated position in a cycle of the machine when its punch is to be operated and means to apply a reduced holding voltage to the electromagnetic means merely to hold an interposer in actuated position when that interposer is to be active in a cycle following the cycle in which it was actuated.

4,019,677

## HEATING SYSTEM FOR BUILDING STRUCTURES

Anton A. Dotschkal, R.D. 2 Fairville Road, and James J. Massaro, R.D. 2 Desmith Road, both of Newark, N.Y. 14513

Filed June 4, 1976, Ser. No. 693,106
Int. Cl.² F24B 9/04
U.S. Cl. 236—9 A 9 Claims



1. A heating system for a building structure comprising in combination:
a. a first heating unit comprising a fireplace;
b. a heat exchange coil having an inlet and an outlet for a heating medium situated within said fireplace;
c. a first pumping means in fluid conducting relationship with the inlet of said heat exchange coil;
d. first control means for sensing the temperature of the heating medium at the outlet of said heat exchange coil and for activating and deactivating said first pumping means responsive to the sensed temperature;
e. a first flow control means in fluid conducting relationship with the outlet of said heat exchange coil for controlling the direction of flow of the heating medium;
f. a second heating unit having an inlet and outlet for heating said medium;
g. second pumping means in fluid conducting relationship with the inlet of said second heating unit;
h. second control means for sensing the ambient temperature within the building structure and activating or deactivating said second heating unit and said second pumping means responsive to the sensed temperature;
i. second flow control means in fluid conducting relationship with the outlet of said second heating unit for controlling the direction of flow of the heating medium; and
j. heat radiation means in fluid conducting relationship with said first and second flow control means and said first and second pumping means.

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4,019,678

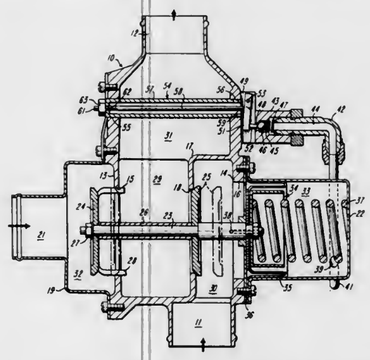
## MIXING VALVE

Thomas J. Lord, Dayton, Ohio, assignor to United Aircraft Products, Inc., Dayton, Ohio

Continuation of Ser. No. 479,794, June 17, 1974, abandoned. This application Dec. 4, 1975, Ser. No. 637,779
Int. Cl.² G05D 23/13
U.S. Cl. 236—12 A 4 Claims

1. A mixing valve device, including:
a. a body having spaced apart interior walls defining on opposite sides thereof inlet chambers and between them a mixing chamber opening into an outlet chamber,
b. said body having an end wall cooperating with one of said interior walls in defining one of said inlet chambers,
c. said interior walls and said end wall having aligned apertures,
d. a guide plate fixed to said body in a superposing relation to said end wall aperture,
e. a valve shaft axially adjustable in said body and valve plates on said shaft movable into and out of closing relation to respective apertures in said spaced apart interior walls responsive to axial adjustment of said shaft,
f. said valve shaft having spaced apart bearings in said body including a bearing for one end thereof in said guide plate, said one end of said valve shaft projecting through and beyond said guide plate,
g. means forming a piston chamber into which said one end of said valve shaft projects, said piston chamber having a closed end and an open end the latter communicating through said guide plate with said one inlet chamber,
h. piston means in said piston chamber attached to said one end of said valve shaft and defining at one end with the closed end of said piston chamber a pressure chamber and exposed at the other end to the fluid pressure existing in said one inlet chamber,
i. a restricted flow passage in said valve shaft having entrance and exit ends on respectively opposite sides of said piston means and delivering fluid from said one inlet chamber to said pressure chamber at a uniform rate,





j. means defining a relatively unrestricted vent passage from said pressure chamber,
k. spring means urging said piston means in a direction away from the closed end of said piston chamber,
l. means sensing a changing temperature of mixed fluids reaching said outlet chamber,
m. means utilizing temperature changes as sensed by said sensing means to control the escape of fluid from said pressure chamber by way of said vent passage to vary the pressure in said pressure chamber and thereby to induce changes in the axial position of adjustment of said valve shaft,
n. and said body providing inlets to said inlet chambers and an outlet from said outlet chamber.

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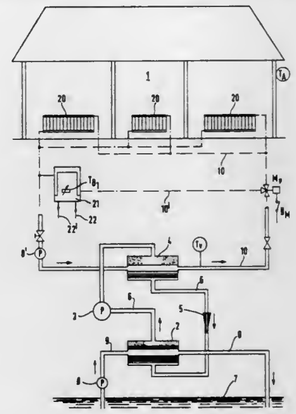
4,019,679

## THERMOSTATICALLY CONTROLLED HEATING ARRANGEMENT INCLUDING A HEAT PUMP

Alfred Vogt, Schaan, Liechtenstein, and Herbert Bolter, Bludenz, Austria, assignors to Interliz Anstalt, Vaduz, Liechtenstein

Filed Dec. 15, 1975, Ser. No. 640,579
Claims priority, application Austria, Dec. 20, 1974, 10244/74
Int. Cl.² G05D 23/00
U.S. Cl. 237—2 B 8 Claims

1. A heating arrangement comprising:
a. a heat pump including
1. a condenser,
2. an expansion nozzle,
3. an evaporator, and
4. compressor means for compressing and thereby liquefying a volatile first heat transfer medium, for sequentially driving said medium through said condenser, said expansion nozzle, and said evaporator, and for receiving the medium evaporated in said evaporator,
i. said compressor means including a plurality of individually driven pumping units connected in parallel between said evaporator and said condenser;
b. a heating circuit including
1. heater means for heating an area,
2. circulating means for circulating a second heat transfer medium through said condenser and said heater means for heat transfer between said first heat transfer medium and said area,
3. first temperature sensing means for sensing the ambient outdoor temperature outside of said area, and



4. second temperature sensing means for sensing the temperature of said second heat transfer medium circulated by said circulating means; and
c. control means operatively connected to said first and second temperature sensing means and to said compressor means for increasing and decreasing the number of driven pumping units in said compressor means in response to increases and decreases respectively in the difference of the temperatures respectively sensed by said first and second temperature sensing means.

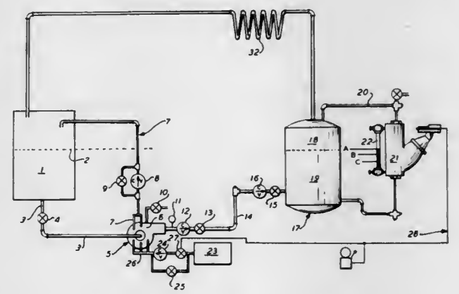
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4,019,680

## STEAM GENERATING SYSTEM INCLUDING MEANS FOR REINITIATING THE OPERATION OF A STEAM BOUND BOILER FEED PUMP

Orlin R. Norris, 36 Reservoir Road, Parsippany, N.J. 07054

Continuation-in-part of Ser. No. 512,498, Oct. 7, 1974, Pat. No. 3,940,058. This application Nov. 24, 1975, Ser. No. 634,817
Int. Cl.² F24D 1/02
U.S. Cl. 237—9 R 9 Claims



1. An improved steam boiler system comprising:
a steam boiler including a water level detector for detecting the level of water in said boiler;
a centrifugal pump for pumping water into said boiler, said pump having a low pressure input side and a high pressure output side;

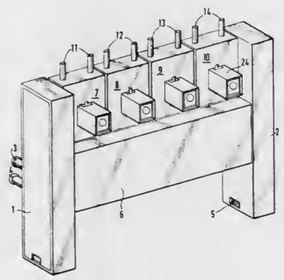
a boiler feed water line connecting said pump to said boiler;
a condensate tank for supplying water to said centrifugal pump;
a suction line connecting said condensate tank to said pump;
a heating system for passing steam from said boiler back to said condensate tank; and,
an automatic cool water injection means for injecting water into said pump when said pump is in the steam bound condition, said cool water injection means being responsive to said water level detector.

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**4,019,681**
**THERMAL DISTRIBUTING UNIT**

**Josef Dumser, Jakobstrasse 47, 6745 Offenbach, and Wilhelm Korner, Logauweg 3, 79 Ulm, both of Germany**

**Filed Feb. 12, 1976, Ser. No. 657,628**
**Claims priority, application Germany, Feb. 19, 1975, 2507044**
**Int. Cl.² F24D** *3/02*
**U.S. Cl. 237—63** **13 Claims**



1. A thermal distributing unit comprising a first structure carrying main supply and return connections for a thermal working fluid, a second structure carrying an electrical connection for receiving electric power from an external power source, and an intermediate structure extending between and connected to the first and second structures, which intermediate structure carries a plurality of branch connections communicating with said main supply connection for distributing said thermal working fluid from the main supply connection to remote locations and carries a plurality of branch return connections communicating with said main return connection for the return of the working fluid to the main return connection.

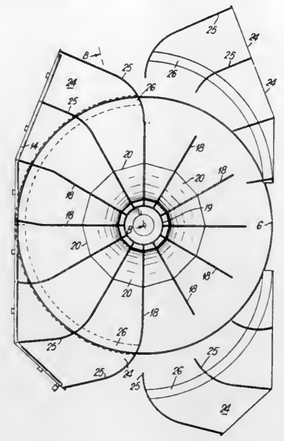
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**4,019,682**
**ORCHARD SPRAYING MACHINES**

**Anthony Pawson Smith, Stockbury, England, assignor to Drake & Fletcher Limited, England**

**Filed May 14, 1975, Ser. No. 577,454**
**Claims priority, application United Kingdom, May 16, 1974, 21789/74**
**Int. Cl.² A01N** *17/08*
**U.S. Cl. 239—77** **11 Claims**

1. An orchard spraying machine comprising:
a vehicular frame;
a chamber mounted on the frame having a forward-facing open end disposed at the front of said machine;
an axial flow fan mounted in said open end of the chamber with its axis horizontal so as to draw air into the chamber through said open end;
a plurality of peripheral air outlets in the chamber disposed substantially radially of the fan axis and spaced rearwardly of the fan;
spray material supply means for discharging material to be sprayed into the air streams passing through said outlets; and
means dividing the chamber downstream of the fan, said chamber having a diameter substantially corresponding to the diametrical extent of the fan blades, into a plurality of discrete, axially extending air passages spaced angularly about the fan axis, said air passages being respectively continuously fluidically connected to said peripheral air outlets for directing air from said fan, through said air chamber passages, and to said peripheral air outlets.

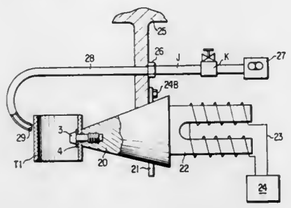


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**4,019,683**
**LIQUID ATOMIZING APPARATUS UTILIZING ULTRASONIC WAVE**

**Kiyokazu Asai, and Akihiro Takeuchi, both of Nagoya, Japan, assignors to Kabushiki Kaisha Toyota Chuo Kenkyusho, Japan**

**Filed Sept. 30, 1975, Ser. No. 618,235**
**Claims priority, application Japan, Sept. 30, 1974, 49-113149**
**Int. Cl.² B05B** *17/06*
**U.S. Cl. 239—102** **36 Claims**



1. A liquid atomizing apparatus comprising:
an ultrasonic wave oscillator;
an ultrasonic wave transducer connected to said ultrasonic wave oscillator for transforming an electrical oscillation of said oscillator into a mechanical vibration;
a mechanical vibration amplifying member integrally connected to one end of said ultrasonic wave transducer for amplifying the amplitude of said mechanical vibration transmitted from said ultrasonic wave transducer;
an ultrasonic vibratory member of a hollow annular body being open at both ends thereof, being circular in radial cross-section, having a predetermined length between said ends thereof, having a predetermined wall thickness which is constant in the axial direction of said annular body, and being integrally connected, at an outer circumferential side wall portion thereof, to the output end of said mechanical vibration amplifying member with the axis thereof being disposed perpendicular to the axis of said mechanical vibration amplifying member; and



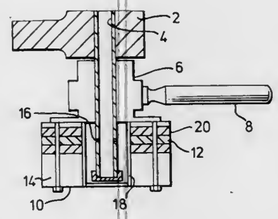
liquid supply means connected to a liquid source for supplying a predetermined amount of liquid to at least one of the outer and inner circumferential surfaces of said ultrasonic vibratory member,
whereby said liquid supplied to said circumferential surface of said ultrasonic vibratory member upon said circumferential surface of said ultrasonic vibratory member may be atomized as a result of the ultrasonic vibration thereof.

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**4,019,684**
**ATOMIZER**

**Charles Stephen Parkin, Potterspury, England, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.**

**Continuation of Ser. No. 561,443, March 24, 1975, abandoned. This application Mar. 11, 1976, Ser. No. 666,119**
**Int. Cl.² A01G** *27/00*
**U.S. Cl. 239—145** **11 Claims**



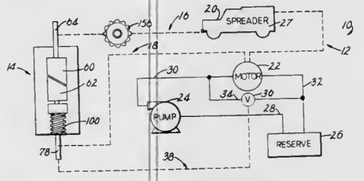
1. A rotary atomiser comprising an axially apertured disc of reticulated metal foam, means for feeding liquid to be atomised to the surface of the aperture, and means for rotating the disc at such speeds that the liquid to be atomised travels radially through the disc and is atomised at the outer surface thereof.

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**4,019,685**
**APPARATUS FOR SYNCHRONIZING THE SPEED OF A MATERIAL SPREADER OR THE LIKE WITH THE SPEED OF A VEHICLE UPON WHICH IT IS MOUNTED**

**Lawrence N. Tangeman, Beatrice, and Arthur Linsenmeyer, Wymore, both of Nebr., assignors to Dempster Industries, Inc., Beatrice, Nebr.**

**Filed Oct. 31, 1975, Ser. No. 627,676**
**Int. Cl.² B05B** *9/06*
**U.S. Cl. 239—156** **8 Claims**



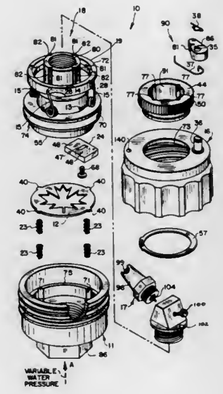

1. Apparatus for evenly spreading material from a spreader vehicle having mobilizing means including ground-engaging wheel means, said apparatus comprising:
selectively actuatable, variable output spreading means for spreading said material during travel of said vehicle and including hydraulic motor means and material-dispensing apparatus coupled to the motor means;
means for controlling the output of said spreading means for ensuring substantially even application of said material onto a field or the like during travel of the vehicle at constant and varying speeds, including:
a first rotatable cam member;
means operatively coupling said first cam member and said mobilizing means of said vehicle for rotation of the first cam member in response to travel of the vehicle and at a rotational speed related to and varying in general correspondence with the travel speed of said vehicle;
a second rotatable cam member;
means operatively coupling said second cam member and said motor means of said spreading means for rotation of the second cam member in response to the operation of said motor means and at a rotational speed and related to and varying in general correspondence with the operational speed of the motor means;
means mounting said first and second cam members in biased-together engagement and permitting relative shifting movement therebetween,
said first and second cam members having respective, oblique engagement surfaces and being cooperatively configured for causing variable relative shifting movement therebetween while remaining in at least partial engagement when the respective cam members are rotated at varying differential rotational speeds;
shiftable structure located adjacent said first and second cam members and engageable by one of the latter during said relative shifting movement of the cam members for shifting of said structure in response to the relative shifting of the cam members;
valve means including a movable valving element operably coupled to said hydraulic motor means for controlling the operational speed of the latter; and
means connecting said shiftable structure and said valving element for movement of the element in response to said shifting of the shiftable structure for regulating the amount of hydraulic fluid delivered to the motor means to thereby control the output of the material-dispensing apparatus and to coordinate said output with vehicle speed.

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**4,019,686**
**WATER SPRINKLER OPERATED BY REGULARLY VARYING WATER PRESSURE**

**Florencio Neto Palma, 263 Keele St., Toronto, Ontario, Canada**

**Filed May 27, 1975, Ser. No. 580,922**
**Int. Cl.² B05B** *1/30, 3/06, 15/10*
**U.S. Cl. 239—205** **4 Claims**



1. A water sprinkler having an inlet connected to a source of water varying with regular pulses of pressure from a preset maximum to a preset minimum, comprising in combination;
a head movably contained within a cap and a base, said inlet being connected to said base to introduce water therein, said head being hollow with a solid bottom having a window opening therethrough;

a plate having particularly shaped pattern cut therefrom positioned between said base and said bottom of said head, said opening serving to restrict the passage of water into said head thereby decoding said pattern into a variable volume of water passing into said head;

spring means adapted to provide a torque to said head within said cavity in reaction to a maximum pulse of the water pressure on the bottom of said head; means for preventing the head from returning to its untorqued position in said cavity upon reduction of said pressure to said minimum and action of said spring means returning said head to an extended position within said cavity, thereby to provide a stepping of said opening in said bottom over said pattern;

and a water nozzle outlet in said head for distributing a varying flow and throw of water in step with the variation of segmented portions of the pattern.

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**4,019,687**

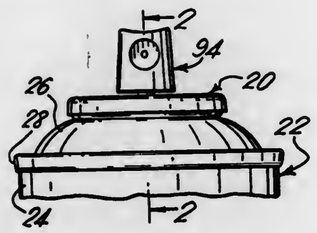
## AEROSOL VALVE AND SPRAYHEAD

**Edward H. Green, 11 Army Trail Road, Addison, Ill. 60101**

**Continuation of Ser. No. 304,695, Oct. 8, 1972, abandoned, which is a continuation of Ser. No. 122,935, March 10, 1971, abandoned. This application Mar. 21, 1975, Ser. No. 560,877**

**Int. Cl.² B05B *1/30***

**U.S. Cl. 239—573** **8 Claims**




1. A valve structure for a pressurized package, comprising:

A. a cover member adapted to be installed in said package,

B. a housing connected to the bottom of the cover member and being enclosed but for a first opening through the cover member and a second opening adapted to communicate with the interior of the package,

C. an elastomeric gasket between the housing and the cover member and having a passageway aligned with the first opening,

D. a valve plunger in the housing spring-biased against the elastomeric gasket and when so biased blocking passage of pressurized product from the interior of the housing to the exterior of the cover member, said valve plunger comprising

1. a body having a cylindrical wall defining a central upwardly opening socket with a blind bottom floor and including a central upwardly extending center post,

2. the cylindrical wall having a valve seat at its upper end around the upper entrance of the socket,

3. channel means in the interior of the socket in said wall extending generally axially of the cylindrical wall, opening at the upper end thereof adjacent the valve seat and opening at the bottom end adjacent said floor,

E. a sprayhead consisting of an exterior push button and a hollow stem, the stem passing through the first opening and the passageway of the elastomeric gasket in a sealing and sliding engagement and having the exterior of the wall thereof sealingly engaged in said socket and extending substantially to the bottom floor thereof, the lower part of said stem wall being imperforate and having an axial end opening, and

F. the lower end of the socket having means providing passage from the bottom end of said channel to the axial end opening of the stem,

the pressurized product adapted to be conveyed from the interior of the housing over the valve seat when the push button is depressed and then to pass by way of said channel means to the bore of the stem and thence out to the atmosphere by way of said push button, said push button having an external orifice communicating with said bore.

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**4,019,688**

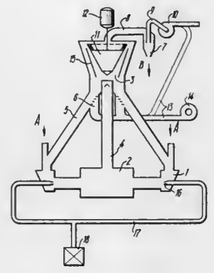
## DEVICE FOR TREATING LOOSE MATERIALS

**Viktor Ivanovich Akunov, Nagatinskaya ulitsa, 83, korpus 2, kv. 420; Ivan Timofeevich Blinov, Kutuzovsky prospekt, 30/32, kv. 801; Viktor Fedorovich Boryakov, Begovaya alleya, 3, kv. 198; Nikolai Evgenievich Ermolaev, Vostochnaya ulitsa, 1/7, korpus 4, kv. 68; Georgy Vladimirovich Zavadsky, Rizhsky proezd, 7, kv. 79; Vladimir Viktorovich Lopatin, prospekt Vernadskogo, 61, kv. 19, and Gennady Fedorovich Rusakov, ulitsa Butlerova, 14, korpus 2, kv. 205, all of Moscow, U.S.S.R.**

**Filed June 2, 1975, Ser. No. 583,093**

**Int. Cl.² B02C *19/06***

**U.S. Cl. 241—39** **1 Claim**



1. A device for treating loose material in counterflow, comprising: a chamber defined in a housing; injectors built in said chamber and directed toward each other; a main separator including a central rotor communicating with said chamber and said injectors; pipelines through which said separator is connected to said injectors; additional separators for withdrawing a fraction of the finished product that remains in the material to be returned into said injectors for additional treatment, said additional separators being built in at least one of said pipelines; and a cone-shaped hollow member accommodated in said main separator about said rotor thereof to prevent the gaseous suspension of the finished product being withdrawn in an undesirable manner by said additional separators.

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**4,019,689**

## FOOD MATERIAL CHOPPER

**William Joseph Hunt, London, England, assignor to Beed (Dishwashers) Limited, Ipswich, England**

**Filed Oct. 15, 1975, Ser. No. 622,461**

**Claims priority, application United Kingdom, Oct. 18, 1974, 4554/74**

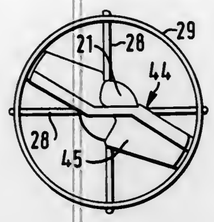
**Int. Cl.² B02C *18/18***

**U.S. Cl. 241—282.1** **12 Claims**

1. A chopper unit for chopping food material, the unit comprising a shaft arranged to receive a rotational drive at one end, cutter blade means secured to said shaft at the other end thereof, a generally tubular member rotatably mounting said shaft and extending towards said cutter blade means, a ring supported by said tubular member so as to surround said cutter blade means, the ring having a cutting edge extending around at least the major part of the periphery of the area



swept by said cutter blade means at a position longitudinally of said shaft beyond said cutter blade means, and at least one




aperture for chopped food material between said ring and said tubular member supporting said ring.

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**4,019,690**

## WINDING DEVICE FOR AUTOMATICALLY CHANGING BOBBIN TUBES

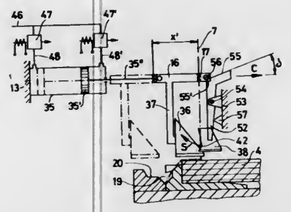
**Gujer Peter, Effretikon, and Olivier Wust, Seuzach, both of Switzerland, assignors to Rieter Machine Works, Ltd., Winterthur, Switzerland**

**Filed Sept. 24, 1975, Ser. No. 616,253**

**Claims priority, application Switzerland, Oct. 4, 1974, 13360/74**

**Int. Cl.² B65H *67/04*, *54/34***

**U.S. Cl. 242—18 A** **9 Claims**



1. A winding device for automatically changing tubes for takin-up endless threads or the like, said winding device being provided with a thread traversing device for generating thread winding wraps, a thread deflecting device for lifting the thread off the thread traversing device, a thread holding device provided with a thread guiding device for guiding the thread in its lifted-off position during the change of the bobbin tube, a drive drum, and at least two bobbin chucks driven by said drive drum and alternately brought into a bobbin or tube change position respectively, each of said bobbin chucks supporting one tube, a thread catching- and cutting zone arranged adjacent to one end of the associated tube and rotating with such tube, said thread holding device being arranged such that the thread lifted off the thread traversing device is guided thereby in the immediate vicinity of the thread catching and cutting zone, shifting means for shifting the thread holding device and thereby the thread in a first thread shifting step from a position at the immediate vicinity of the thread catching- and cutting zone through such zone and onto an end portion of the tube adjacent thereto, and which shifting means in a second thread shifting step shifts the thread over a predetermined distance on such tube for creating reserve wraps, said shifting means shifting the thread at a higher shifting speed during the second step than during the first step, said shifting means comprising a substantially linearly movable drive element movable in a direction substantially parallel to the lengthwise axis of the associated bobbin chuck, said drive element being connected with the thread holding device, a first thread guide element provided with a thread guide notch for taking-up the thread after the latter has moved over a distance corresponding to the first thread shifting step, means for mounting said first thread guide element, a second thread guide element connected with the thread holding device at a location between the drive element and the thread guiding device of the thread holding device, said second thread guide element being provided with a thread guide surface arranged at an inclination with regard to the direction of movement of the thread holding device such that said thread guide surface, during such time as the thread holding device moves over a distance corresponding to the second shifting step, shifts the thread along a side surface of said thread guide notch of the first thread guide element and immediately prior to completion of the second shifting step shifts the thread over an end of such side surface, the improvement comprising:

said means for mounting the first thread guide element including means for arranging said first guide element to be movable in a direction of the thread shifting movement in a manner such that at least one additional shifting step is performed between the first and second shifting steps and which additional shifting step is directed opposite to said first and second shifting steps.

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**4,019,691**

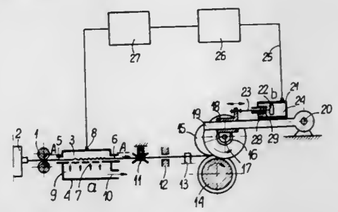
## METHOD AND APPARATUS FOR WINDING YARN ONTO A CROSS-AND-CONE WOUND BOBBIN

**Zbigniew Wroclawski; Stanislaw Kedzia, and Tadeusz Pawlowski, all of Lodz, Poland, assignors to Centralny Osrodek Badawxzorozwojowy Maszyn Wlokienniczych "Centamatex", Lodz, Poland**

**Filed Nov. 10, 1975, Ser. No. 630,648**

**Int. Cl.² B65H *59/38***

**U.S. Cl. 242—45** **8 Claims**



1. A method of winding yarn fed at a constant speed from a work station onto a conical shaft to form a cross-and-cone wound bobbin, said method comprising driving the bobbin by frictional contact thereof with a drive element driving said drive element around an axis of rotation which is inclined at an acute angle with the axis of rotation of the bobbin such that the frictional contact of the bobbin with the drive element is at a point along a generating line of the bobbin cone, passing the yarn from the work station to the bobbin through a transit receptacle where the yarn is temporarily accumulated, measuring the degree of filling the yarn in the receptacle, and varying the winding speed of the bobbin to compensate for the varying diameters of the bobbin while keeping a constant feed of the yarn by displacing the bobbin cone to change the position of the contact point of the drive element along the generating line of the bobbin cone in response to the measured degree of filling of the yarn in the receptacle to maintain a substantially constant degree of filling therein.

3. Apparatus for winding yarn fed at a constant speed from a work station as a cross-and-cone wound bobbin, said apparatus comprising a pair of yarn take-up shafts for feeding yarn at a constant speed, a vacuum receptacle for receiving the yarn and temporarily accumulating the yarn therein, said receptacle comprising a holding chamber through which the yarn travels, a suction chamber and a wall separating the holding chamber and the suction chamber, said wall having two rows of yarn laying parts for forming loops of yarn due to suction in the holding chamber, means for measuring the degree of filling of said yarn in said holding chamber, a conical drive shaft, a conical support shaft for receiving yarn from the holding chamber and for winding the yarn on the support

shaft, said shafts having axes which are inclined at an acute angle relative to one another, said drive shaft being in peripheral contact with said yarn wound on the support shaft at a point along the generating line of the conically wound bobbin to drive the bobbin in rotation, and control means for displacing said conical shaft relative to said drive shaft to vary the position of the contact point of the drive element along the generating line of the conically wound bobbin to compensate for varying winding diameters of the conical bobbin while keeping a constant feed of the yarn, said control means being coupled to said means which measures the degree of filling of the yarn in said holding chamber to maintain said degree of filling substantially constant by varying said position of said contact point.

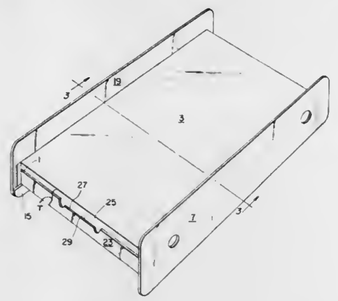
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**4,019,692**

## REINFORCED REEL

**Wallace E. Hanson, Hampden, Mass., assignor to Champion International Corporation, Stamford, Conn.**

**Filed Dec. 18, 1975, Ser. No. 641,726**
**Int. Cl.² B65H** *75/14*
**U.S. Cl. 242—71.8** **13 Claims**



**1.** An improved reinforced reel of one piece of foldable material with an outside surface and an inside surface comprising:

first and second outer side panels each shaped like the intended reel flange and having said outside surface facing outwardly of the reel and said inside surface facing inwardly of the reel, said panels being arranged in spaced apart substantially parallel reltionship relative to each other;

first and second major reinforcing panels of the same configuration as said outer side panels;

said first and second major reinforcing panels hingedly connected to one side of each of the outer side panels and folded against and secured to the inside surface of said outer side panels;

a first minor reinforcing panel being hingedly connected to the opposite side of, reversely folded against the inside surface of, and secured to said first major reinforcing panel; said first minor reinforcing panel being of a size and shape to cover a major area of the inside surface of said first outer side panel and said first major reinforcing panel;

first and second hub panels arranged in respective substantially parallel planes which are substantially perpendicular to the planes in which said outer side panels are disposed, said hub panels both located between said outer side panels and spacing apart the outside panels and their respective reinforced panels;

said second hub panel being hingedly connected on one edge to the other edge of the first minor reinforcing panel;

a glue panel hingedly connected by its opposite sides between said first hub panel and said first outer side panel, respectively, and reversely folded against and secured into surface to surface contact with said first minor reinforcing panel;

an anchor reinforcing panel hingedly connected to said first hub panel on the edge opposite said glue panel and positioned adjacent to and secured to said second major reinforcement panel when the latter is in its folded position; said anchor reinforcing panel being of a size and shape to cover a major area of the inside surface of said second outer side panel and said second major reinforcing panel; and

a second minor reinforcement panel being hingedly connected between and to the other side of said second hub panel and said second outer side panel and folded to lie in contact with said anchor panel when said anchor panel is adhered to said second major reinforcement panel;

whereby each outer side panel is reinforced over a major portion of its surface area by at least three plies of material.

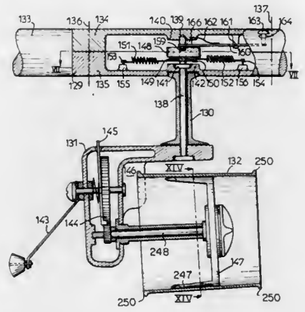
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**4,019,693**

## FISHING REEL

**Jean Lesage, 37 rue Le Campion, 50 Granville, France**

**Filed Dec. 2, 1974, Ser. No. 528,929**
**Claims priority, application France, Dec. 10, 1973, 73.43926; Oct. 11, 1974, 74.34270**
**Int. Cl.² A01K** *89/015*
**U.S. Cl. 242—84.2 B** **7 Claims**



**1.** A fishing reel apparatus comprising, in combination:

an elongated foot for attachment of the reel apparatus to a fishing rod extending parallel to the direction of elongation of the foot;

a spool;

a crank handle and means connecting said handle and said spool together for revolving said spool;

a support having a mounting for said spool allowing said spool to revolve relative to said support;

a bushing mounted externally of said foot and interposed between said foot and said spool support;

a disk mounted within said foot;

a rotatable shaft fixedly attached to said disk and to the spool support and extending through said bushing;

a pair of helicoidal springs for elastically urging said disk towards a predetermined relative angular position thereof, being arranged symmetrically with respect to said foot and each having a first end and a second end respectively attached to said foot and to said disk;

said disk having a first off-center opening and a second circumferentially elongated off-center opening at a mutual circumferential offset of substantially 90°, **as measured between centers;**

a control device for selectively indexing the relative angular position of said disk, comprising a lever bearing at one end a control button and at the other end a pin capable of engaging either of said openings and arranged to engage said first opening snugly and to engage said elongated opening with allowance of a limited amount of play;

said disk being affixed to said shaft with an orientation such that said pin is caused to engage in said elongated opening when the axis of said spool is approximately perpendicular to the longitudinal direction of said foot, and

a stop member provided on said foot for limiting the rotation of said disk, shaft and spool support to substantially a single quadrant plus an allowance for said play to enable the spool axis to swing in response to cranking forces, said disk having a peripheral groove into which said stop member projects.



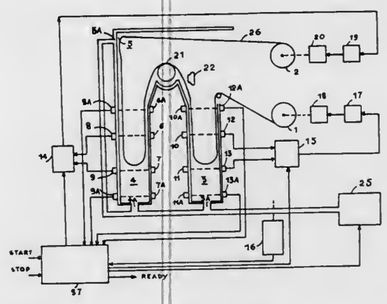
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**4,019,694**

## SEMIAUTOMATIC LOADING OF TAPE TRANSPORTS

**Carlo Fare, and Francesco De Bartolomeis, both of Milan, Italy, assignors to Honeywell Information Systems Italia, Milan, Italy**

**Filed Dec. 15, 1975, Ser. No. 641,125**
**Claims priority, application Italy, Dec. 20, 1974, 30808/74**
**Int. Cl.² G11B** *15/66, 15/58*
**U.S. Cl. 242—182** **6 Claims**



**1.** In a tape transport of the type using capstan means for selectively moving tape past a recording/readout station, said capstan means and said station being located in an enclosed compartment of said transport, a pair of tape reels rotatably supported externally of said compartment and selectively adapted to dispense or receive said tape traveling therebetween, means for manually inserting said tape into a first tape path extending from said reels into said compartment and conforming to a predetermined configuration imposed by the structure of said compartment, means for disabling the operation of said transport in the absence of predetermined operating conditions, means selectively actuated for automatically shifting said tape within said compartment in sequential steps from said first path into a second tape path, said second path extending between said reels and placing said tape into position for recording/readout operation, means for at least partially inhibiting said disabling means during the tape shifting operation, a pair of loop chambers located in said compartment each adapted to accept a tape loop when said tape is disposed in said second path, said capstan means being positioned in said second path substantially symmetrically with respect to said pair of loop chambers, means for applying vacuum pressure to said loop chambers to facilitate the formation of said tape loops under tension said apparatus further including an internal guide surface in a defined region of said compartment spaced from said capstan means and said loop chambers respectively and means for applying vacuum pressure to said defined region to conform said tape to said internal guide surface, said internal guide surface substantially constituting an extension of a tape contacting wall of one of said loop chambers, said surface deflecting said second tape path between said last recited loop chamber and one of said tape reels.

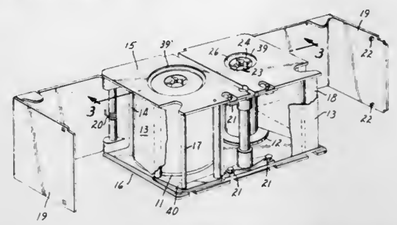
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**4,019,695**

## TAPE CARTRIDGE WITH MOVABLE GUIDE MEMBER

**John L. Wharam, Eagan, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

**Filed Apr. 28, 1976, Ser. No. 680,902**
**Int. Cl.² G03B** *1/04;* **G11B** *15/32*
**U.S. Cl. 242—199** **2 Claims**



**1.** A video tape cartridge for housing a pair of spaced apart tape reels in parallel relationship to each other, which cartridge includes a fixed portion with a rectangularly shaped main wall and two parallel rectangularly shaped sidewalls that protrude from opposite side edges of said main wall for semi-permanently journaling said reels in said housing, two L-shaped doors that are hingedly connected at one end to the other of the opposite side edges of said base wall, and guide means disposed between said sidewalls at opposite ends of said housing for holding tape on said reels in a proper position for engagement with a record/reproduce apparatus, said cartridge characterized by the feature that:

each of said reels includes a spring loaded bearing member that normally engages one of said sidewalls to support one end of its corresponding reel when in a relatively uncompressed condition and is disengaged from said one of said sidewalls in a compressed condition; and

one of said guide means is movable from a normal operating position partially blocking the end of the housing in which it is disposed to an open position whereby said end is open to permit at least one of said reels to be removed from said cartridge through said open end when the bearing member of said reel is disengaged from one of said sidewalls.

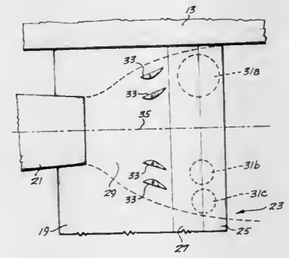
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**4,019,696**

## METHOD OF AND APPARATUS FOR ENHANCING COANDA FLOW ATTACHMENT OVER A WING AND FLAP SURFACE

**William J. Hirt, Bellevue, and Charles A. Grotz, Seattle, both of Wash., assignors to The Boeing Company, Seattle, Wash.**

**Continuation of Ser. No. 429,657, Dec. 28, 1973, abandoned.**
**This application Aug. 28, 1975, Ser. No. 608,667**
**Int. Cl.² B64C** *21/00*
**U.S. Cl. 244—42 CD** **14 Claims**



**1.** A method of providing enhanced Coanda flow attachment to the upper wing and flap surface of an upper surface blowing aircraft wherein a jet engine exhaust stream passes

over said upper wing and flap surface, said method comprising the steps of:

vertically thinning said jet exhaust stream, prior to said exhaust stream passing over said upper wing and flap surface in a manner such that a downward thrust component, adapted to augment the aerodynamic lift of said wing, occurs when the flap portion of said wing is extended; and,

directing, from points on said wing and flap surface located substantially downstream from the region whereat said vertically thinned jet exhaust stream is thinned, said thinned exhaust stream spanwise across said wing and flap surface toward regions whereat said thinned exhaust stream tends to separate from said wing and flap surface when said flap is extended, so as to create outward velocity components that prevent ambient air from flowing in under the thinned exhaust stream from the sides of the thinned exhaust stream.

**3.** In an upper surface blowing type aircraft wherein the exhaust stream of a jet engine is vertically thinned when a flap of an associated wing and flap structure is extended, and the thinned exhaust stream is directed to flow over said wing and flap surface, said thinned exhaust stream adhering to said wing and flap surface when said flap is so extended in a manner such that a downward thrust component, adapted to augment the aerodynamic lift of said wing, occurs when said flap is extended, the improvement comprising horizontal, spanwise directing means, mounted in said thinned exhaust stream and on said wing and flap surface substantially downstream of the region whereat said thinned exhaust stream is thinned for horizontally directing a portion of said thinned exhaust stream spanwise toward regions whereat said thinned exhaust stream tends to separate from said wing and flap surface.

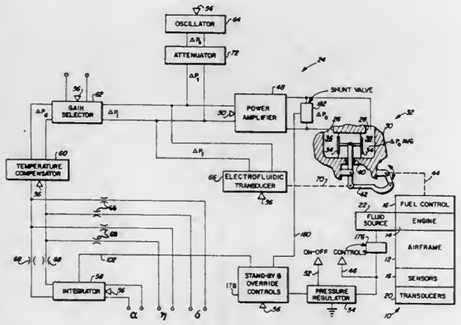
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**4,019,697**

**FLUIDIC APPROACH POWER COMPENSATOR CONTROL SYSTEM**

**Thomas B. Tippetts, Scottsdale, Ariz., assignor to The Garrett Corporation, Los Angeles, Calif.**

**Filed Aug. 25, 1975, Ser. No. 607,530**
**Int. Cl.² B64D** *37/00*
**U.S. Cl. 244—78** **44 Claims**




**1.** A method of fluidically controlling rate of fuel flow to the engine of an aircraft during landing approach operation thereof whereby the power generated by the engine is automatically controlled through a preselected schedule during landing approach, comprising the steps of:

sensing a plurality of aircraft flight parameters including angle of attack of the aircraft, aircraft acceleration normal to the direction of aircraft flight, and position of the elevator of the aircraft;

generating fluidic parameter signals in relation to said sensed parameters;

fluidically combining said fluid parameter signals in a preselected manner into a single fluid signal indicative of a desired rate of fuel flow to the aircraft engine for developing power in accordance with said preselected schedule;

generating a fluidic feedback signal in relation to the actual rate of fuel flow being delivered to said engine;

fluidically comparing said signal fluid signal and said fluidic feedback signal and producing a fluidic error signal indicative of the difference said actual rate of fuel flow and said desired rate of fuel flow; and

adjusting said actual rate of fuel flow in relation to said fluidic error signal whereby said engine develops power in accordance with said preselected schedule.

**12.** Apparatus for fluidically controlling adjustable fuel delivery means which supply fuel flow to the engine of an aircraft during landing approach operation thereof whereby the power generated by the engine is automatically controlled through a preselected schedule during landing approach, comprising:

sensing means for sensing a plurality of aircraft flight parameters including angle of attack of the aircraft, aircraft acceleration normal to the direction of flight thereof, and position of the elevator of the aircraft;

generating means operably coupled with said sensing means for generating fluidic parameter signals in relation to said sensed parameters;

combining means operably coupled with said generating means for fluidically combining said fluidic parameter signals in a preselected manner into a single fluidic signal indicative of a desired rate of fuel flow to the engine for developing power in accordance with said preselected schedule;

feedback means operably coupled with said fuel deliverly means for generating a fluidic feedback signal in relation to the actual rate of fuel being delivered to said engine;

comparing means operably coupled with said feedback means and said combining means for fluidically comparing said single fluidic signal and said fluidic signal, and for producing a fluidic error signal indicative of the difference between said actual rate of fuel flow and said desired rate of fuel flow; and

actuator means operably coupled with said comparing means and said fuel deliverly means for adjusting said fuel delivery means to alter said actual rate of fuel flow in relation to said fluidic error signal whereby said engine develops power in accordance with said preselected schedule.

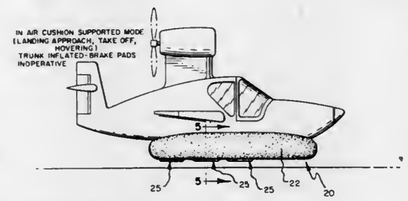
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**4,019,698**

**AIR CUSHION UNDERCARRIAGE BRAKE SYSTEM**

**T. Desmond Earl, Buffalo, N.Y., assignor to Textron, Inc., Providence, R.I.**

**Filed Mar. 25, 1976, Ser. No. 670,258**
**Int. Cl.² B60V** *3/08;* **B64C** *25/32*
**U.S. Cl. 244—110 A** **11 Claims**




**1.** In an aircraft, in combination;

an aircraft body having a bottom surface;

a flexible inflatable bag-like trunk formed of elastic sheet material circumscribing at least a portion of said bottom surface to define an air cushion space therebelow;

means for maintaining the interior of said trunk under superatmospheric air pressure to balloon it downwardly below said bottom surface of the body, said trunk when inflated having a footprint area;



means for supplying said air cushion space with air at a rate sufficient to elevate said aircraft from a reaction surface;

said trunk including brake means on said footprint area thereof for engaging the reaction surface;

said brake means comprising at least one brake unit including an elastomeric base plate portion affixed to the sheet material of said trunk externally thereof and having paired longitudinally parallel running friction brake shoes extending therefrom; and

actuation means under aircraft operator control for causing said brake unit and its associated portion of the trunk sheet to be elastically projected below the normal footprint area profile of said trunk device with said friction brake shoes deployed in unison for contact with a reaction surface;

whereby upon deactivation of said actuation means said elastically projected portions of said trunk sheet return to normal trunk inflation condition, and whereby upon deflation of said trunk said brake shoes assume paired pleat-folded relationships to accommodate elastic contractions of associated portions of said trunk sheet.

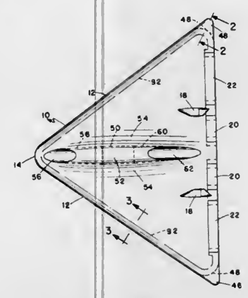
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**4,019,699**

**AIRCRAFT OF LOW OBSERVABILITY**

**Robert W. Wintersdorff, San Diego, and George R. Cota, La Jolla, both of Calif., assignors to Teledyne Ryan Aeronautical a Division of Teledyne Industries, Inc., San Diego, Calif.**

**Continuation of Ser. No. 465,540, April 30, 1974, abandoned.**
**This application July 21, 1975, Ser. No. 597,969**
**Int. Cl.² B64D** *7/00*
**U.S. Cl. 244—121** **5 Claims**



**1.** An aircraft of low observability, comprising:

a wing having a nose portion, swept back leading edges extending from the nose portion, and a trailing edge, major portions of the edges being substantially straight in planform;

said wing having upper and lower surfaces, major portions of which are substantially flat;

the wing having rounded tips blending tangentially into said leading and trailing edges and having a radius of at least one quarter wavelength of the lowest frequency radar expected to be encountered;

extended aerodynamic tips of radar transparent material fixed to said rounded tips;

and all surfaces of the wing having substantially continuous electrical conductivity.

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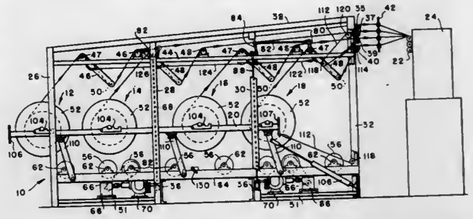
**4,019,700**

**BEAM CREEL**

**Herbert R. King, Spartanburg, Scotland, assignor to Milliken Research Corporation, Spartanburg, S.C.**

**Filed Dec. 3, 1975, Ser. No. 637,384**
**Int. Cl.² B65H** *49/02;* **D02H** *1/00;* **D03J** *5/08*
**U.S. Cl. 242—131.1** **8 Claims**

**1.** A creel to supply yarn to a yarn consuming machine comprising: a frame, means to rotate a plurality of yarn beams mounted in said frame, means to support a plurality of yarn beams operably associated with said frame, means to supply yarn from the yarn beams to the yarn consuming machine mounted on said frame and means to move said yarn beam



support means into and out of operative relationship with said means to rotate the yarn beams, said means to support yarn beams including a pair of elongated beams pivotally mounted in said creel.

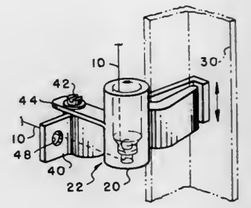
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**4,019,701**

**TENSION CONTROL**

**Robert W. McCullough, Spartanburg, S.C., assignor to Milliken Research Corporation, Spartanburg, S.C.**

**Continuation of Ser. No. 507,510, Sept. 19, 1974, abandoned, which is a division of Ser. No. 403,174, Oct. 3, 1973, Pat. No. 3,905,210. This application Oct. 14, 1975, Ser. No. 621,858**
**Int. Cl.² B15H** *59/10*
**U.S. Cl. 242—152.1** **1 Claim**



**1.** Yarn tension control apparatus comprising: an elongated body member, a flange portion connected to said body member and extending outwardly and substantially perpendicular to said body member, a lip portion connected to said body member extending towards and closely adjacent said flange member to form an elongated narrow space between said body member and said lip portion to provide a space to slidably accommodate a structural member to which said apparatus is to be attached, said body member having an enlarged portion thereof spaced from said flange member and extending outwardly from said body portion in a direction opposite to said flange portion, a yarn tension control means connected to said enlarged portion and a second flange member connected to and extending outwardly from said enlarged portion to support a yarn guide member.

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**4,019,702**

**METHOD AND APPARATUS FOR GUIDING A JET AIRCRAFT IN A NOISE-ABATED POST-TAKEOFF CLIMB**

**Gordon D. Annin, Bellevue, Wash., assignor to The Boeing Company, Seattle, Wash.**

**Filed Nov. 13, 1975, Ser. No. 631,525**
**Int. Cl.² B64C** *15/00*
**U.S. Cl. 244—182** **13 Claims**

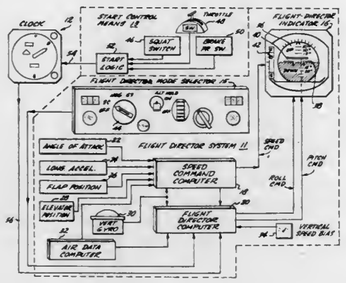
**1.** An apparatus for guiding a jet aircraft in a noise-abated post-takeoff climb, comprising:

a flight director having a first circuit means for producing a first electrical signal representing a difference between a sensed longitudinal air speed and a predetermined longi-

tudinal air speed, and having a second circuit means for producing a second electrical signal representing a difference between a sensed vertical speed and a predetermined vertical speed;

signal utilization means including means for commanding a longitudinal air speed and means for commanding a pitch attitude, said means for commanding a longitudinal air speed being connected and responsive to said first electrical signal produced by said first circuit means;

switching means connected between said flight director and said utilization means and having first and second modes, said switching means connecting said means for commanding pitch attitude to receive said first electrical signal produced by said first circuit means when said switching means is in its first mode and connecting said means for commanding pitch attitude to receive said second electrical signal produced by said second circuit




means when said switching means is in its second mode; and

timing control means for producing a control signal for operating said switching means at a predetermined elapsed time from the start of a takeoff run, said switching means initially assuming said first mode so that said means for commanding a pitch attitude produces a command that for a predetermined takeoff thrust level causes the aircraft to achieve and maintain said predetermined longitudinal air speed, said switching means being responsive to said control signal to assume said second mode in which said means for commanding a pitch attitude now produces a command in accordance with said predetermined vertical air speed which at said predetermined longitudinal air speed as commanded by said means for commanding a longitudinal air speed requires a reduction in thrust to a level that is substantially less than said predetermined takeoff thrust level.

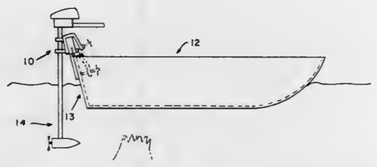
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**4,019,703**

**TROLLING MOTOR SAFETY MOUNT**

**Robert Wayne Meredith, 2518 Montreal Drive, and Norman B. McCreary, 45 Lakeshore Drive, both of Little Rock, Ark. 72204**

**Filed Mar. 17, 1976, Ser. No. 667,827**
**Int. Cl.² B63H** *21/26, 21/30*
**U.S. Cl. 248—4** **10 Claims**




1. Apparatus for mounting a trolling motor or the like to the stern section of a boat, said apparatus comprising

clamping means for releasable clamping engagement with the stern section of a boat,

a hollow mounting block having closed top and side walls thereof, and an open bottom end thereof, said mounting block having the proper dimensions to receive a mounting clamp for a trolling motor or the like thereon,

means for pivotally mounting said mounting block to said clamping means so that a motor clamped to said mounting block can be pivoted from a first position wherein it is in stable operating position in water in which the boat is disposed with the mounting block open end abutting a portion of said clamping means, to a second position wherein the motor is closer to the water's surface then in said first position and said open end of said mounting block does not abut a portion of said clamping means, to a third position wherein the motor is generally pivoted out of the water,

detent means located within the area defined by said hollow mounting block when said block is in said first position for releasably latching said mounting block in said first position so that the normal thrust of a motor mounted on said mounting block will not cause said mounting block to be pivoted to said second position, but so that should the motor on said mounting block strike an object that is underwater said mounting block will be moved to said second position, and so that after the underwater object is passed by the motor, the normal weight of the motor and the mounting block will move said mounting block back to said first position and cause said detent means to latch said mounting block in said first position, and

means separate from said detent means for locking said mounting block in said third position when manually moved to said third position.

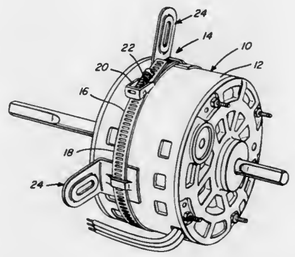
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**4,019,704**

**MOTOR MOUNTING STRUCTURE**

**Fred Levine, Bay Harbor Islands, Fla., assignor to Acme Service Corporation, Miami, Fla.**

**Filed May 28, 1975, Ser. No. 581,688**
**Int. Cl.² F16F** *15/00*
**U.S. Cl. 248—16** **2 Claims**




1. A motor mounting bracket including a generally cylindrical adjustable circumference clamp-type band, at least two L-shaped brackets, each of said brackets including a pair of generally right angulated first and second elongated flanges integrally joined at one pair of adjacent ends, said first flange of each bracket having a mounting fastener opening formed therethrough and the second flange of each bracket including a central elongated longitudinally extending strip portion extending longitudinally thereof defined by and disposed between a pair of generally parallel longitudinal slits formed in said second flange, the opposite end portions of said strip portion being integral with the portions of said second flange disposed between the pairs of corresponding ends of said slits and said strip portion including a longitudinal central portion thereof extending between its opposite end portions laterally displaced outwardly of the side of said second flange defining one side of the included angle formed by said second flange and defining a flattened sleeve opening intermediate the opposite side edges of said second flange with said opening extending transversely of said second flange centrally intermediate the opposite end thereof and with one marginal portion of said sleeve opening coextensive with the surfaces of said second flange disposed outwardly of the remote sides of said slits and defining said one side of the included angle, said brackets being disposed on said band with the latter having longitudinally spaced portions thereof slidingly received through the sleeve openings of said brackets and with said second flanges of said brackets, exclusive of said strip portion abutted against the inner surface portions of the corresponding band portions and said first flanges projecting outwardly from the outer periphery of said band and disposed in substantially coplanar relation, the openings in each first flange comprising an elongate opening extending longitudinally of said first flange each of said first flanges including a central oval portion thereof laterally offset to one side of the central plane of said first flange, said opening in each first flange being centrally disposed relative to said oval offset portion.



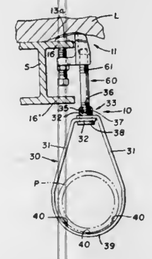
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**4,019,705**

**PIPE HANGING APPARATUS**

**Blair A. Habuda, Sr., 1890 Woodlawn Ave., Youngstown, Ohio 44514, and Anthony Kopatich, 742 Whipple Ave., Campbell, Ohio 44405**

**Filed Apr. 5, 1972, Ser. No. 241,342**
**Int. Cl.² F16L** *3/00*
**U.S. Cl. 248—58** **4 Claims**




1. A beam clamp for connecting a projecting flange of a structural member having a proximate layer of building material and components supporting a pipe comprising, a body portion, a pair of jaw means extending outwardly from said body portion, fastening means selectively positionable with respect to one of said pair of jaw means to engage the flange of the structural member between it and the other of said pair of jaw means for holding the clamp positioned on the structural member, securing means in said body portion for engaging the components supporting a pipe, and rib means on the outside of one of said pair of jaws positioned substantially longitudinally thereof to facilitate insertion of said one of said pair of jaws between the projecting flange of the structural member and the proximate layer of building material and to thereafter resist turning forces applied to the beam clamp.

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**4,019,706**

**PIPE HANGER**

**George N. Weiland, Sr., Mundelein, Ill., assignor to Imoco-Gateway Corporation, Chicago, Ill.**

**Filed Mar. 8, 1976, Ser. No. 664,705**
**Int. Cl.² E21F** *17/02*
**U.S. Cl. 248—62** **3 Claims**

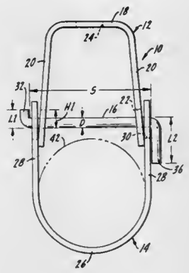
1. A pipe hanger comprising:

an inverted generally U-shaped yoke including a bight portion and two yoke arms, each yoke arm having an aperture therein, the two yoke arm apertures being of uniform size and having top and bottom edges each forming a continuous curve;

mounting means for mounting the yoke on a support with the bight portion of the yoke substantially horizontal and the yoke arms extending downwardly therefrom;

a substantially U-shaped saddle having a generally semicircular bight portion and two saddle arms, the saddle arms being assembled on the yoke arms in partial overlapping arrangement, each saddle arm having an aperture at least partially aligned with the aperture in the adjacent yoke arm, the two saddle arm apertures being of uniform size and having top and bottom edges each forming a continuous curve;

and a mounting rod of substantially uniform diameter D and consistent cross-sectional configuration throughout its length, extending through the apertures in both yoke arms and both saddle arms to join the saddle to the yoke, the mounting rod having a first end of length L1 bent at an angle of about 90° to the axis of the rod and the opposite end of a greater length L2 bent at an angle of about




90° to the axis of the rod, the two rod ends being separated by a distance S only slightly larger than the distance across the assembled yoke and saddle;

the apertures in the innermost arms of the yoke-saddle assembly having a vertical dimension slightly larger than L1 but smaller than L2;

and the apertures in the outermost arms of the yoke-saddle assembly having a vertical dimension H2 slightly larger than L1 but smaller than L2 and a horizontal dimension W slightly larger than D but smaller than L1;

whereby the pipe hanger can be assembled with the mounting rod in any orientation in which the first end of the rod is aligned with the vertical dimension H2 of the apertures in the outermost arms of the assembly and with either arm of the yoke engaging either arm of the saddle, and the weight of the saddle will maintain the pipe hanger in assembled condition and preclude inadvertent withdrawal of the mounting rod.

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**4,019,707**

**DEVICE FOR SUPPORTING FLUID RECEPTACLES**

**David G. Quinn, Round Lake, Ill., and Richard A. Rauschenberger, Brookfield, Wis., assignors to Will Ross, Inc., Milwaukee, Wis.**

**Filed Oct. 30, 1975, Ser. No. 627,442**
**Int. Cl.² B65B** *67/12*
**U.S. Cl. 248—95** **15 Claims**

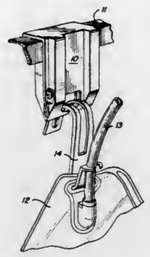
1. A device for supporting fluid receptacles on frame members comprising:

a first member having a substantially-flat main portion and a substantially-flat minor portion perpendicular to said main portion at one end thereof for support on the top of a frame member;

attachment means on said main portion for engaging a fluid receptacle;

a second member having a substantially-flat main portion hingedly-joined at one end to said first member at the end opposite said perpendicular portion for rotation from an open position to a closed position, and having a semi-rigid, wing at the other end thereof for contacting the

lower surface of a frame member, said wing extending outwardly and upwardly below said perpendicular portion when said device is in its closed position; and



latching means on said main portions of said first and second members for cooperative engagement thereof and operable to secure a frame member between first and second members.

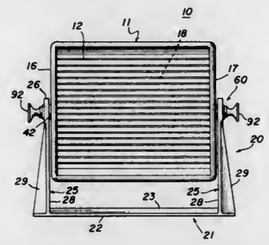
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**4,019,708**

**LATCHABLE SWIVEL MOUNT FOR LOUDSPEAKER**

**Robert E. Croup, Indianapolis, Ind., assignor to Acoustic Fiber Sound Systems, Inc., Indianapolis, Ind.**

**Filed Oct. 29, 1975, Ser. No. 626,745**
**Int. Cl.² A47F 5/12**
**U.S. Cl. 248—137** **21 Claims**



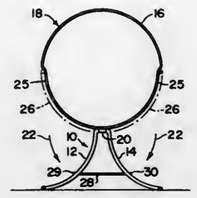
1. A latchable swivel mount comprising first and second swivel members coupled for relative rotational movement about a predetermined common axis and for relative axial movement along said axis, first detent means carried by said first swivel member, second detent means carried by said second swivel member and adapted for engagement with said first detent means to prevent relative rotational movement of said first and second swivel members, said first and second swivel members being movable axially between a swivel configuration wherein said first and second detent means are disengaged to permit relative rotational movement of said first and second swivel members and a latching configuration wherein said first and second detent means are engaged to prevent relative rotational movement of said first and second swivel members, and latch mechanism operable between a latching condition for locking said first and second swivel members in the latching configuration thereof and a release condition permitting relative axial movement of said first and second swivel members between the swivel and latching configurations thereof, said latch mechanism being manually operable between the latching and release conditions thereof only when said first and second detent members are in the latching configuration thereof.

**4,019,709**

**DRUM STAND**

**Harold F. Mason, P.O. Box 10139, Tampa, Fla. 33679**

**Filed May 30, 1975, Ser. No. 582,437**
**Int. Cl.² A47G 23/02**
**U.S. Cl. 248—150** **3 Claims**



1. A support device in combination with a substantially cylindrical container having an external surface including indentation means formed in inset relation to the exterior surface of the container, said indentation means extending about a substantial portion of the substantially cylindrical container, said support device comprising:

first and second support leg means each having a arcuate configuration substantially corresponding to the curved surface of the substantially cylindrical container;

base means affixedly attached to the substantially cylindrical container and disposed in interconnecting relation between said first and second support leg means and the container said first and second leg means being movably interconnected to said base and being movable relative to the substantially cylindrical container and between a supporting and a non-supporting position; and

retaining means disposed in interconnecting relation to each of said leg means when in said supporting position, whereby said leg means are maintained in said supporting position due to interconnection by said retaining means;

said indentation means being a depth dimension substantially equal to the thickness of each of said first and second support leg means to establish a substantially flush engagement between said first and second support leg means and the exterior surface of the substantially cylindrical container enabling the container to be rolled when said first and second support leg means are positioned in said indentation means in the non-support position.

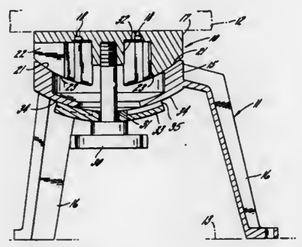
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**4,019,710**

**INSTRUMENT SUPPORT SOCKET**

**Chadwell O'Connor, Newport Beach, and Richard A. Charlson, Dana Point, both of Calif., assignors to Chadwell O'Connor, Newport Beach, Calif.**

**Filed Feb. 11, 1976, Ser. No. 657,036**
**Int. Cl.² F16M 11/14**
**U.S. Cl. 248—181** **1 Claim**



1. An instrument support comprising, in combination, a base having an upper ring defining an annular locking surface having a substantially open center, a plate adapted to mount an instrument and proportioned to fit over said ring, said plate having a plurality of spaced, radially extending feet with surfaces engaging said locking surface, said feet surfaces defining segments of an annular surface that is a section of an external spherical surface so that said plate rocks smoothly in said ring, said feet being spaced and proportioned to define substantial clearance spaces between adjacent feet, said feet surfaces terminating with sharp, radially extending edges so as to clean and better grip said locking surface, a threaded member for selectively drawing together and thus clamping said external spherical surfaces against said annular locking surface so as to prevent relative movement between said base and said plate, said member being threaded into said plate and sandwiching a washer against a clamping surface on said ring, said washer and said clamping surface defining spherical sections having the same approximate center as said internal and external spherical surfaces, and said washer spherical section being defined by a plurality of sharp edged ridges on the washer so as to substantially reduce the contacting area of said spherical sections.



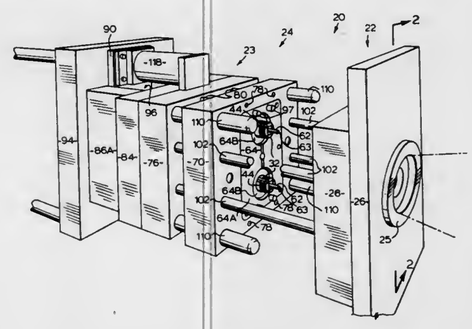
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**4,019,711**

**MOULD FOR CLOSURE CAPS WITH INTERMITTENT THREADS UNDERCUTS OR HOLD-DOWN LUGS**

**Jack Altenhof; John Altenhof, both of Windsor, and Robert Chartier, Toronto, all of Canada, assignors to J & J Tool and Mold Ltd. and Consumers Glass Co., Ltd., both of Toronto, Canada**

**Filed Nov. 10, 1975, Ser. No. 630,327**
**Int. Cl.² B29F 1/14; B29D 15/00; B29C 7/00**
**U.S. Cl. 249—59** **16 Claims**



1. A core, useful for moulding closure caps, each closure cap having a top, a depending skirt, and having securing means secured to the inner wall of the skirt, said securing means comprising interrupted threads or hold-down lugs, said core having:

a. a top forming portion;

b. a plurality of skirt forming portions, circumferentially separated by a plurality of generally axially disposed channels in the outer peripheral wall of the core, each channel extending from at least a point intermediate the length of the core to the top forming portion and having its bed sloped generally radially inwardly in a direction towards said top forming portion from a position adjacent the other end of the channel;

c. a plurality of riser segments corresponding to the plurality of channels secured for slidable movement within the channels, relative to the core, each riser segment having an outwardly directed flange secured on the end of the segment opposite the top forming portion to permit simultaneous movement of the riser segments relative to the core from a position completely within the channel having one end proximate the top forming portion of the core, to a position on the side of the top forming portion, remote the other end of the core, each riser segment being of the same thickness as the corresponding depth of the channel in which it is situate when such end of the riser is proximate the top forming portion of the core so as to form on the outer periphery of such end of each riser, a top forming portion to co-act with the top forming portion of the core when juxtaposed therewith and skirt and securing means forming portions;

and

d. an annular ring secured about the periphery of said core and over said channels and said risers for securing said riser segments within said channels.

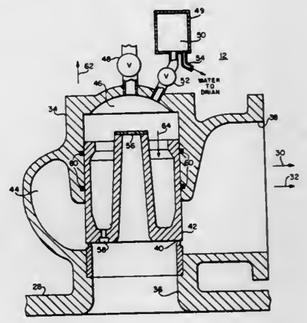
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**4,019,712**

**POSITIVE CLOSURE SYSTEM FOR FREE FLOATING DISC VALVE**

**Harry F. Martin, Media, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Continuation of Ser. No. 469,930, May 14, 1974, abandoned.**
**This application Feb. 26, 1976, Ser. No. 661,590**
**Int. Cl.² F16K 31/122**
**U.S. Cl. 251—26** **2 Claims**



1. A free floating disc valve for ON-OFF control of an elastic fluid, said free floating disc valve comprising:

a housing having an inlet port and an outlet port disposed therein,

a valve disc movable within said housing from a seated position to a fully open position,

said disc being so disposed within said housing to isolate said inlet port of said outlet port when said disc is in said seated position,

said disc having an opening extending therethrough,

a pressure chamber defined by the interior of said housing and said disc, so that when said disc is in its seated position, said elastic fluid passes through said opening in said disc and accumulates in said pressure chamber,

containment means having a single opening through which said elastic fluid passes, said single opening being disposed in communication with said pressure chamber,

means for venting said pressure chamber to a lower pressure region, and

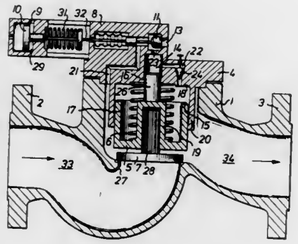
means for opening and shutting communication between said containment means and said pressure chamber,

said opening and shutting means and said venting means being operable in such a manner that when said disc is seated and said venting means is closed, said means for opening and shutting communication between said containment means and said pressure chamber are open, allowing elastic fluids to fill said containment means, and when said venting means is open, said opening and shutting means are shut trapping elastic fluid in said containment means, whereby said disc moves from its seated position to its fully open position, and upon closing said

venting means said opening and closing means opens thereby rapidly initiating movemnent of said disc from its fully open position to its seated positions.

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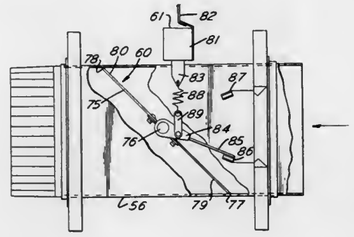
**4,019,713**
**RAPID SHUTOFF EXTRACTION CHECK VALVE**
**Hans Deinlein-Kalb, Nurnberg, Germany, assignor to AEG-Kanis Turbinenfabrik GmbH, Nurnberg, Germany**
**Filed July 22, 1975, Ser. No. 598,024**
**Claims priority, application Germany, July 25, 1974, 2435728**
**Int. Cl.² F16K** *31/122*
**U.S. Cl. 251—28** **8 Claims**



1. A rapid shutoff extraction check valve comprising in combination:
a. a valve housing;
b. means defining a main inlet in said valve housing;
c. means defining a main outlet in said valve housing;
d. means defining a valve seat in said valve housing between said main inlet and said main outlet; said valve seat dividing the inner space of said valve housing into an upstream housing chamber continuously communicating with said main inlet and a downstream housing chamber continuously communicating with said main outlet;
e. a guide cylinder supported in said valve housing and defining a pressure chamber;
f. an actuating piston slidably received in said guide cylinder and bounding said pressure chamber; said actuating piston having an outer piston face operatively exposed to pressure prevailing in said downstream housing chamber; said actuating piston having a withdrawn position and an advanced position;
g. a movable valve body held in said actuating piston by a support means; said support means providing for a mechanically free movement of said movable valve body into a closed position in which it engages said valve seat for blocking communication between said main inlet and said main outlet and into an open position in which it is spaced from said valve seat for maintaining communication between said main inlet and said main outlet; said mechanically free movement of said movable valve body being relative to said actuating piston and being provided solely in said withdrawn position of said actuating piston;
h. means defining a discharge outlet in said valve housing;
i. first channel means connecting one of said housing chambers with said discharge outlet;
j. second channel means connecting said pressure chamber with said discharge outlet and with said one housing chamber through said first channel means; and
k. auxiliary valve means having a first position in which it maintains communication, through said first and second channel means, between said one housing chamber and said pressure chamber and blocks communication between said pressure chamber and said discharge outlet; said auxiliary valve means having a second position in which it maintains communication, through said second channel means, between said pressure chamber and said discharge outlet and blocks communication between said one housing chamber and said pressure chamber;
l. means for moving said actuating piston from said withdrawn position into said advanced position solely in said first position of said auxiliary valve means; and
m. means provided on said actuating piston for moving said valve body into said closed position upon movement of said actuating piston into said advanced position and for maintaining said valve body in said closed position as long as said actuating piston is maintained in said advanced position.

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**4,019,714**
**VALVE CONSTRUCTION**
**Marlin Kemmerer, 2511 S. Lloyd St., Philadelphia, Pa. 19142**
**Division of Ser. No. 566,038, April 7, 1975. This application Oct. 24, 1975, Ser. No. 625,509**
**Int. Cl.² F16K** *1/22*
**U.S. Cl. 251—138** **2 Claims**



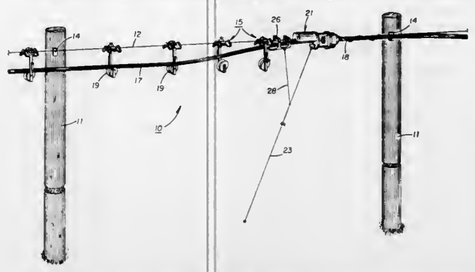
1. A valve construction comprising a duct, a valve element extending across and in closing relation with the duct when oblique to the duct axis, freely rotative generally horizontal pivot means mounting said valve element in said duct for swinging movement about a generally horizontal axis between said oblique closed position and a longitudinal open position, said pivot means being spaced from the center of said valve element downstream of said duct so that the valve element portion upstream of the pivot means is of relatively greater area and weighted for gravitational movement of the upstream region of said valve element to said oblique closed position with fluid flow from the upstream duct region aiding in maintaining said valve element closed, an arm exteriorly of the duct extending from said pivot means rigidly relative to said valve element and at an angle thereto for up and down swinging movement on respective opening and closing of said valve element, and solenoid actuated valve operating means depending toward and connected to said arm to operate the valve element against the force of gravity and differential fluid pressure.

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**4,019,715**
**CABLE BLOCK**
**Andrija Vugrek, Madison, N.J., assignor to Western Electric Company, Inc., New York, N.Y.**
**Filed June 9, 1976, Ser. No. 694,425**
**Int. Cl.² E21C** *29/16*
**U.S. Cl. 254—134.3 R** **10 Claims**

1. A cable block adapted for mounting on a supporting strand, and for temporarily supporting a section of cable prior to the latter being supported along and by the strand comprising:
a frame having at its upper end a strand-engaging hanger section, and at its lower end a pulley support section
a pulley rotatably mounted on said lower support section for temporarily supporting and guiding the cable, and
a strand confining and cable block locking means mounted on said upper frame hanger section, said means including a pair of pivotal cams adapted to engage said strand from opposite sides thereof such that said cams permit axial movement of said cable block along said strand in only one preselected direction, which direction depending on the particular oppositely inclined angles of orientation

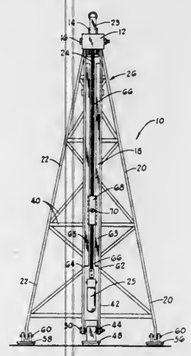




chosen for said cams relative to an engaged strand, while positively locking said cable block from movement along said strand in the opposite direction.

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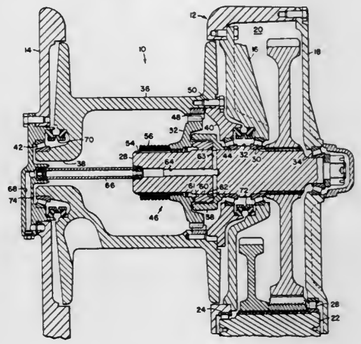
**4,019,716**
**FOLDABLE SELF-LEVELING TRIPOD SHAPED VEHICLE BUMPER JACK**
**Eugene C. Smith, 412 Maple St., Greensburg, Kans. 67054**
**Filed Sept. 2, 1975, Ser. No. 609,672**
**Int. Cl.² B66C** *23/60*
**U.S. Cl. 254—139** **3 Claims**



1. A foldable self-leveling tripod shaped vehicle bumper jack comprising:
a. a housing having a pulley mounted inside the center portion thereof, a handle attached to the upper portion of said housing;
b. a channeled vertical leg having a rotatable base plate attached to one end of said vertical leg, said plate rotatable in a plane perpendicular to the plane of the vehicle's bumper, said channeled vertical leg partially closed forming a slot along the length thereof;
c. first and second angled legs having rotatable base plates attached to one end of said angled legs, the other end of said angled legs attached to said housing; said plates rotatable in a plane perpendicular to the plane of the vehicle's bumper, said angled legs rigidly secured together by bracing attached to the sides thereof;
d. a cable riding inside said channeled vertical leg, said cable having a bumper hook attached to one end of said cable for securing to the vehicle's bumper;
e. a worm gear driven windlass attached to said vertical leg for winding the other end of said cable thereon, said windlass turned by a removable crank, said windlass receiving said cable as it is wound around said pulley;
f. a hook, the end of said hook attached to said vertical leg, the hook portion of said hook secured to said bracing so that said angled legs are held in place as the vehicle is raised and lowered; and
g. a cable lock secured to the cable and riding in said channeled vertical leg, the width of said slot greater than the width of said cable and less than the width of said cable lock.

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**4,019,717**
**WINCH CABLE DRUM MOUNTING AND DRIVE CONNECTION**
**Thomas William Freiburger, Dubuque, Iowa, assignor to Deere & Company, Moline, Ill.**
**Filed May 5, 1975, Ser. No. 574,556**
**Int. Cl.² B66D** *1/00*
**U.S. Cl. 254—187.8** **6 Claims**



1. In a winch of the type including a housing, a drive train mounted in the housing and including an output shaft at its terminus, a hollow winch drum mounted for rotation about a fixed axis coaxial with said output shaft and having said output shaft extending thereinto, a clutch means including a first clutch element axially shiftably mounted on said output shaft, a biasing means normally urging said first clutch element to a first location on said output shaft, a second clutch element fixed to said drum so as to be engaged with said first clutch element for being driven by the latter when it is in said first location, and actuator means for selectively shifting said first clutch element in opposition to the biasing means to a second location on said shaft wherein the first clutch element is disengaged from the second clutch element, an improved mounting for the winch drum and output shaft, comprising: first and second bearing means respectively mounting opposite first and second ends of the winch drum for rotation in a first wall of the housing and for rotation on the output shaft; third and fourth bearing means respectively mounting said output shaft for rotation in second and third walls of said housing; said second bearing means being mounted on the output shaft between, and in direct engagement with, a shoulder of the output shaft and with the actuator means; and said actuator means being supported on the output shaft for concurrent action against the first clutch element and reaction against the second bearing means during shifting of the first clutch element to its second location, whereby the winch drum may be disengaged from being driven by the output shaft without reaction forces from the clutch means being transferred thereto.

6. A winch comprising: a housing; a drive train mounted in said housing and including an output shaft rotatably mounted in adjacent first and second walls of the housing; a hollow cable drum located between a third and the second wall of said housing and having an end of said output shaft terminating therewithin; said drum having opposite ends respectively rotatably mounted in said third wall and on said output shaft; clutch means normally establishing a driving connection between the output shaft and the drum and including a first toothed clutch element axially shiftably mounted on a portion of the output shaft located within the drum; a biasing means mounted on the output shaft between the terminal end thereof

and the first toothed clutch element and normally acting against the latter to position it in a first location; a second toothed clutch element fixed to the drum and being engaged with the first toothed clutch element when the latter is in said first location; an actuator means including an actuating element shiftably mounted on said output shaft for moving the first toothed clutch element in opposition to said biasing means to a second location wherein the first and second toothed elements are disengaged from each other; and said actuator means including reaction force transferring means acting against said output shaft when the actuator means is actuated, whereby reaction forces imposed on said output shaft respectively by said biasing means and said actuating means during actuation of the latter balance each other resulting in no forces being transferred to the winch drum as a result of disengagement of the clutch means so as to permit free spooling of the drum.

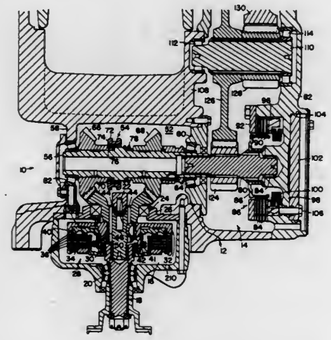
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**4,019,718**

## WINCH CONSTRUCTED SPECIALLY FOR EASY LUBRICATION THEREOF

**Thomas William Freiburger, Dubuque, Iowa, assignor to Deere & Company, Moline, Ill.**

**Filed May 5, 1975, Ser. No. 574,555**
**Int. Cl.² B66D** *1/00*
**U.S. Cl. 254—187.5** **4 Claims**



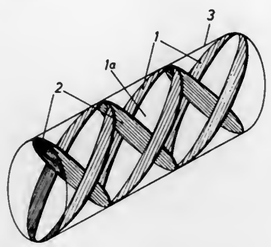
1. A winch construction and lubrication means therefor, comprising: a housing defining first and second spaced upright wall sections and a fluid-tight cavity formed in part by said second wall section; a cable drum having a hollow interior and opposite first and second open ends; first and second bearing means rotatably supporting said first and second ends of the cable drum respectively in said first and second wall sections; a drive train located in said cavity and including an output shaft extending into said drum; a lubrication fluid path means including the interior of said cable drum and providing fluid communication among said first and second bearing means and said cavity; said drive train including hydraulically operable main clutch means and brake means including respective pressurizable cylinders; a source of fluid pressure; a reservoir; control valve means connected between said source of fluid pressure and the pressurizable cylinder of said main clutch means, the pressurizable cylinder of said brake means and said lubrication fluid path means; fluid passage means exclusive of said control valve means connecting the pressurizable cylinders of said brake means and said clutch means to said lubrication fluid path means; said control valve means being shiftable at least between a neutral position blocking the source of fluid pressure from the brake means and main clutch means and first operating position wherein the source of fluid pressure is connected to the brake means and clutch means.

**4,019,719**

## FLUID MIXING DEVICE

**Hans H. Schuster, 166 Luitpoldstrasse, and Peter Zehner, 11 Alwin-Mittasch-Platz, both of 6700 Ludwigshafen, Germany**

**Filed Apr. 1, 1976, Ser. No. 672,612**
**Claims priority, application Germany, June 5, 1975, 2525020**
**Int. Cl.² B01F** *5/00*
**U.S. Cl. 259—4 AB** **11 Claims**




1. A device for mixing a plurality of fluid material streams, said device comprising:
a flow-bounding tube;
a plurality of consecutively arranged mixing elements of equal spatial configuration positioned within said tube between its inlet and outlet ends;
each of said mixing elements comprising an outer baffle having its minor axis normal to the longitudinal axis of the tube, its major axis angularly disposed with respect to the longitudinal axis of the tube, its outer peripheral contour substantially in contact with the internal wall surface of the tube, and an orifice-like opening formed at its center;
each of said mixing elements further comprising an inner baffle positioned within said orifice-like opening in a manner such that the minor axes of said outer and inner baffles coincide and that the angle formed by said outer and inner baffles includes the longitudinal axis of the tube.

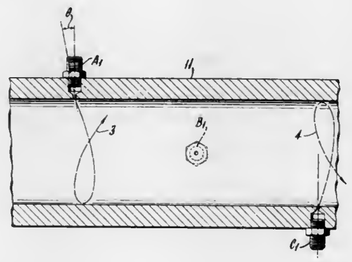
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**4,019,720**

## METHOD AND APPARATUS FOR MIXING VISCOUS MATERIALS

**Gerard A. Levesque, Hudson, and Glen E. W. Saidla, Hampton Falls, both of N.H., assignors to Exxon Research and Engineering Company, Linden, N.J.**

**Filed Oct. 16, 1975, Ser. No. 623,104**
**Int. Cl.² B01F** *15/00*
**U.S. Cl. 259—4 R** **6 Claims**




4. A static mixer for mixing viscous material comprising:
an elongated tube having a first end and a second end for transversal therethrough toward said second end by a stream of viscous material to be mixed;
a plurality of successive first nozzle means being spaced at predetermined locations along said elongted tube, said nozzle mean having a substantially radially directed entry port inclined in a forwardly direction toward said second end of said elongated tube at an angle of about 10° with respect to the radius of said elongated tube for introducing jets of high pressure fluid substantially radially to the longitudinal axis of said elongted tube and in a forwardly direction, each succeeding first nozzle means being located on opposite sides of the elongated tube from the preceding first nozzle means;
a plurality of successive second nozzle means being spaced at predetermined locations along said elongated tube, alternate members of said second nozzle means having a substantially tangentially directed entry port and inclined in a forwardly direction toward said second end of said elongated tube at an angle of about 10° with respect to the radius of said elongated tube for introducing jets of high pressure fluid in a first substantially tangential and forward direction, and the remainder of said second nozzle means having a substantially counter tangentially directed entry port and inclined in a forwardly direction toward said second end of said elongated tube at an angle of about 10° with respect to the radius of said elongated tube for introducing jets of high pressure fluid in second substantially tangential and forward direction, each succeeding second nozzle means being located along the elongated tube at a point which is between two successive first nozzle means.



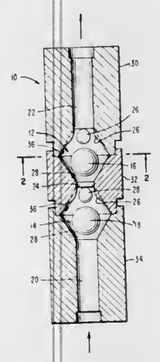
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**4,019,721**

## FLOWING FLUID MIXING DEVICE AND METHOD

**Rene J. Langner, Chelsea, N.Y., assignor to Bio/Physics Systems, Inc., Mahopac, N.Y.**

**Filed June 30, 1975, Ser. No. 591,482**
**Int. Cl.² B01F** *13/00*
**U.S. Cl. 259—4 AC** **19 Claims**



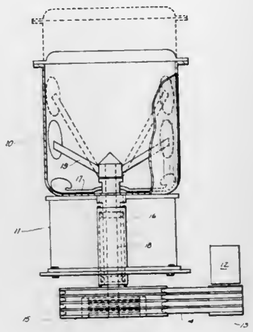
1. A flowing fluid mixing device comprising
a housing defining at least one chamber,
a single spherical body confined within said chamber,
said housing defining an inlet opening communicating with one end of said chamber and an outlet opening communicating with the other end of said chamber,
said outlet opening being the only inlet to said chamber,
means for supplying a plurality of substantially fluid unmixed materials to said inlet opening for transmission through said chamber,
the diameter of said spherical body being smaller than the diametric spacing of the walls of said chamber so as to permit free movement of said spherical body within said chamber.

**4,019,722**

## HIGH INTENSITY MIXER UTILIZING A SINGLE SPEED MOTOR

**Albert J. Shohet, Hamilton, Ohio, assignor to Littleford Bros. Inc., Florence, Ky.**

**Filed Nov. 28, 1975, Ser. No. 635,890**
**Int. Cl.² B01F** *7/00*
**U.S. Cl. 259—105** **3 Claims**



1. A high intensity mixer utilizing a single speed motor, said mixer to be responsive to mixing conditions, said mixer comprising: a mixing bowl, a first set of mixing elements disposed for rotation in said bowl to effect mild agitation, a second set of mixing elements disposed for rotation in said bowl to effect increased agitation when operatively connected with said first set of mixing elements, a first rotatable shaft to which said first set of mixing elements is fixed for rotation therewith, a second rotatable shaft to which said second set of mixing elements is fixed for rotation therewith, said second shaft being free-wheelable with respect to said first shaft, a single speed motor, drive means connecting said first shaft to said motor so that said first shaft is rotatable at a certain speed when said motor is actuated, first connect means fixed to said first rotatable shaft for rotation therewith, second connect means fixed to said second rotatable shaft for rotation therewith, clutch means to selectively engage and disengage said first and second connect means to control mixing and process requirements, and a sensor for actuating said clutch means in response to mixing conditions in said bowl, whereby when said clutch means are actuated to engage said first and second connect means said second shaft will rotate with said first shaft at said certain speed and in the same direction, and whereby when said first and second connect means are disengaged said second shaft will free-wheel with respect to said first shaft.

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**4,019,723**

## MANURE TREATMENT APPARATUS AND PROCESS

**Marvin L. Urbanczyk, Rte. No. 2, White Deer, Tex. 79097**

**Filed Feb. 18, 1975, Ser. No. 550,272**
**Int. Cl.² B01F** *7/04*
**U.S. Cl. 259—183** **5 Claims**

1. Apparatus comprising a rigid frame assembly, a flail assembly, a wheel assembly, a spray assembly and a power means in operative combination;
1. said rigid frame assembly comprising a rigid elevated horizontal transversely and longitudinally extending platform and, firmly attached to the sides thereof, a rigid longitudinally extending left vertical wall and a rigid longitudinally extending right vertical wall;
2. said flail assembly comprising a rigid transversely extending rotatably mounted flail frame with a series of flail means supported on and spaced along the length of said flail frame, and
a. flail frame assembly mounting support means on said frame assembly for said flail frame assembly, said flail

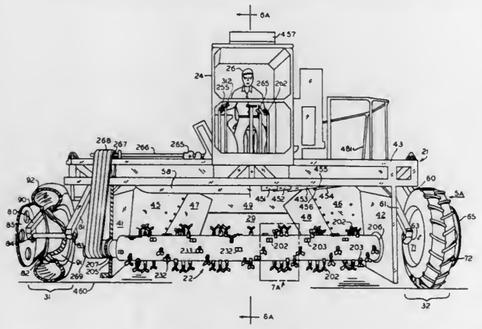
frame rotatably supported on said flail frame assembly support means,

b. flail drive means supported on said frame assembly and operatively attached to said flail frame for rotating said flail frame about the length thereof and driving the flail means of the flail assembly first upwardly and then downwardly with respect to the direction of motion of said frame assembly;

c. said flail means located on the flail frame at points equi-spaced around the circumference of the flail frame and equi-spaced along the length thereof, each of said flail means comprising a rigid flail base firmly attached to said rotatable flail frame and a flail blade unit pivotally attached to said flail base,

i. and said rigid flail base is a radially extending rigid column fixed firmly at a central end thereof to the outer surface of said rotatable frame and said flail base column extends from said rotatable flail frame in a direction transverse to the length of said rotatable flail frame to a radial end of said flail base,

ii. and each of said flail blade units is a T-shaped blade unit comprising a horizontally extending flat left flail blade portion and a horizontally extending flat right flail blade portion and a rigid center arm, said center arm extending transversely to the central longitudinal axis of the rotatable flail frame, and each flail blade portion has a sharp-edged front cutting edge extending in a direction parallel to said central longi-



tudinal axis of said rotatable flail frame and a thick rear edge, said edges spaced apart from each other in a direction transverse to the central longitudinal axis of said flail frame and each said flail blade is firmly joined to a radial portion of said center arm, and said center arm is pivotally attached to said rigid flail base near its radial end, said right and left flail blade portions being mirror images of each other and extending in a plane which is parallel to the length of the rotatable frame and which plane is transverse to the length of said center arm,

iii. and a pivotal flail blade support means is attached to said flail base column near its radial end and extends parallel to said longitudinal axis of said rotatable flail frame and the center arm of one of said T-shaped flail blade units is pivotally attached to and supported by said pivotal blade support means on said flail base column and thereby pivotally supported for pivotal movement about an axis parallel to and radially spaced away from said longitudinal axis of said rotatable frame.

3. said flail assembly located in chamber formed by

a. an imperforate roof located below said elevated horizontal elevated horizontal platform; and

b. said vertically extending left vertical wall and said vertically extending right vertical wall; and

c. a rear wall with a central rear orifice opening therein, said rear wall comprising a left rear wall extending rightwards to a flexible left rear orifice edge thereof and a right rear wall extending leftwards to a flexible right rear orifice edge thereof and a top rear wall extending downwardly from said chamber roof to a horizontally extending lower edge reaching from the left edge of said flexible left rear orifice edge to the flexible right rear orifice edge; said left rear wall and said right rear wall and said top rear wall being resilient, said left and right rear walls being firmly held at their lateral edges by said left and right vertical walls respectively and said top rear wall firmly held at its top by said elevated horizontal platform, and said central rear orifice being wider at its bottom than at its top,

d. a front opening below said roof and between the front ends of said side walls and said drum and said flail assembly being rotatably supported on said side walls in said chamber on said flail frame assembly support means therefor,

4. said spray assembly comprising a plurality of nozzle means extending transversely of said chamber and a baffle means, said nozzle means attached to said roof and located rearwardly and above and directed at said baffle means, said baffle means attached at its front end to said roof and extending downwardly and rearwardly and located rearwardly and above said flail assembly and extending below said nozzle means, said baffle and said roof outlining a space within which are located said nozzle means, and a conduit for operatively connecting said nozzle means to a source of water;

5. said wheel assembly comprising a pair of drive wheels, one on each side of said frame assembly exterior of said chamber near the front end of said rigid frame assembly, and another pair of rear wheels, one on each side of said frame assembly near the rear end thereof, and

6. an operator compartment firmly attached to said elevated horizontal platform near the front thereof, power means supported on said platform, and control means for said flail assembly located in said compartment and operatively connected to said power means and operatively attached to said flail drive means, and wheel assembly control means located in said compartment and operatively connected to said power means and connected to said drive wheels.

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**4,019,724**

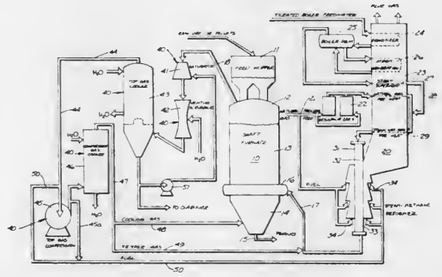
**APPARATUS FOR THE DIRECT REDUCTION OF IRON ORES**

**Clyde L. Cruse, Jr., and Arthur P. Kerschbaum, both of Middletown, Ohio, assignors to Armco Steel Corporation, Middletown, Ohio**

**Division of Ser. No. 333,673, Feb. 20, 1973, Pat. No. 3,905,806. This application Mar. 10, 1975, Ser. No. 557,167**

**Int. Cl.² C22B** *5/12*

**U.S. Cl. 266—156** **5 Claims**



1. In apparatus for the gaseous reduction of sized iron ores in a shaft furnace, by means of a reducing gas atmosphere introduced into said furnace at elevated temperature, the combination of a catalytic hydrocarbon and steam reformer comprising an elemental nickel catalyst adapted to generate a reducing gas atmosphere consisting essentially of about 85% to about 98% hydrogen and carbon monoxide by volume, and about 1% to about 14% water vapor by volume, with the hydrogen: carbon monoxide volume ratio being at least 2:1; a shaft furnace comprising a reducing section, a cooling section and a top section; means for transferring said reducing gas atmosphere as generated in said reformer directly to said reducing section of said shaft furnace at elevated temperature without drying and reheating of said atmosphere; means for withdrawing said gas atmosphere from said top section of said shaft furnace; means for cleaning, cooling and drying the withdrawn top gas; and means for delivering at least a portion of the cleaned and cooled top gas to said reformer for combustion with air while precluding any contact of said top gas with said catalyst.



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**4,019,725**

**GAS SEAL AND SILENCER FOR USE ON TUYERE BODY**

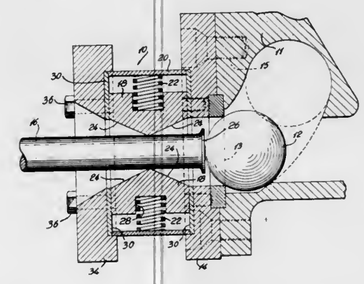
**Toussaint Cote, Noranda, Canada, assignor to Noranda Mines Limited, Toronto, Canada**

**Filed July 24, 1975, Ser. No. 598,806**

**Claims priority, application Canada, Apr. 21, 1975, 225085**

**Int. Cl.² F27D** *3/16*

**U.S. Cl. 266—169** **9 Claims**



1. A gas seal and silencer for attachment to a tuyere body to minimize the gas volume and pressure loss during the insertion of a punch bar through a the blast of gas leaking out during opening of the tuyere valve, comprising:

a. a housing adapted to be secured to the tuyere body with its longitudinal axis substantially in alignment with the longitudinal axis of the tuyere and having end walls provided with a central opening for passing a punch bar through the longitudinal axis of the housing;

b. a plurality of closure members mounted for movement toward and away from the longitudinal axis of the housing and including means located inside the housing for pressing said closure members toward the longitudinal axis of the housing before insertion of the punch bar through the longitudinal axis of the housing and for forcing said closure members against the periphery of the punch bar after insertion of the punch bar so as to form a seal between the closure members and the punch bar; and

c. means for guiding said closure members in their movement toward and away from the longitudinal axis of the housing, said means for guiding the closure members consisting of wear plates located on each side of the closure members, said wear plates and the sides of the closure members being both made of hardened metals so as to reduce wear of the sliding surfaces.

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**4,019,726**

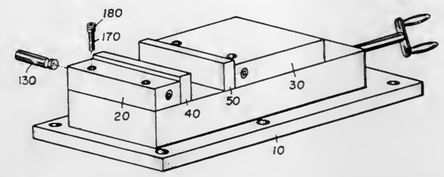
**CAM LOCK JAWS FOR MACHINIST VISE**

**Lester Willis Turner, Longmont, Colo., assignor to The Raymond Lee Organization, Inc., a part interest**

**Filed May 4, 1976, Ser. No. 683,012**

**Int. Cl.² B25B** *1/24*

**U.S. Cl. 269—261** **3 Claims**



1. In combination:

a machinist's vise having a fixed head and a movable head, each head having first and second pairs of cylindrical recesses, the recesses in each first pair being parallel and being disposed longitudinally in the corresponding head, the recesses in each second pair being disposed along a common axis and being disposed transversely in the corresponding head, each first pair recess intersecting a corresponding second pair recess;

a pair of jaws, each jaw having two parallel spaced cylindrical members extending outward therefrom at right angles, each jaw being associated with a corresponding head with the members secured thereto extending into corresponding first pair recesses in the corresponding head; and

four cylinders, each cylinder being disposed in a corresponding one of the two second pairs of recesses and being rotatable therein.

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**4,019,727**

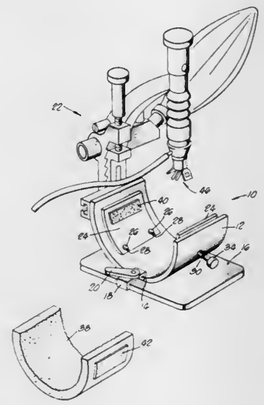
**HEAD SUPPORT AND RESTRAINING APPARATUS**

**William O. Martin, Chesterland, and Harry Derda, Beachwood, both of Ohio, assignors to Case Western Reserve University, Cleveland, Ohio**

**Filed Nov. 20, 1975, Ser. No. 633,840**

**Int. Cl.² A61G** *13/00*

**U.S. Cl. 269—328** **12 Claims**



1. An apparatus for supporting and restraining the head of a patient during medical treament comprising:

a base member,

an outer support member mounted on said base member, said outer support member comprising a generally arcuate support member adapted to be moved in a generally arcuate path relative to said base member so as to position said arcuate support member in any one of a number of desired angular positions relative to said base member,

means for holding said arcuate support member in a desired angular position,

head restraint means mounted within said outer support member for restraining a patient's head, said restraint means including movable portions adapted to conform to and restrain a patient's head; and

means for moving said movable portions of said head restraint means to positions wherein said restraint means will accommodate and restrain a patient's head.

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**4,019,728**

## APPARATUS AND SHINGLED STRIP FORMED THEREFROM

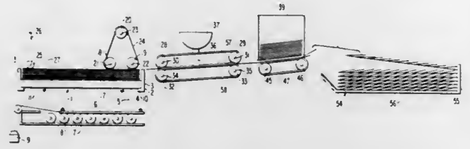
**Rafael A. Liclican, 160 Kamias Road, Quezon City, Philippines**

**Filed Aug. 1, 1974, Ser. No. 493,948**

**Claims priority, application Philippines, Aug. 10, 1973, 14898**

**Int. Cl.² B65H** *39/02*

**U.S. Cl. 270—58** **8 Claims**



**1.** An apparatus for the manufacture of a shingled strip comprising:

a. a stack of tape sheets (**17**) supported on a supporting block (**4**);

b. a plurality of guide members (**3**) slidably supporting said supporting block (**4**);

c. at least one mounting frame (**6**);

d. a plurality of legs (**5**) pivotally connected to the supporting block (**4**) and the at least one mounting frame (**6**);

e. a stationary base structure (**7**);

f. a plurality of rollers (**8**) engaging said base structure (**7**) and the at least one mounting frame (**6**) such that the mounting frame (**6**) is movable relative to the base structure (**7**); movement of the mounting frame (**6**) causing the supporting block (**4**) and stack of tape sheets (**17**) to move upwardly;

g. belt means engaging the uppermost tape sheet on the stack of tape sheets such that movement of said belt means removes the uppermost tape sheet from the stack;

h. bonding material applicating means (**36, 37**) to apply a bonding material to at least a portion of the tape sheet removed from said stack;

i. first feeding means to feed said tape sheet from said belt means to said applicating means;

j. a shingle strip magazine (**39**) containing a stack of shingle strips to be affixed to the tape sheet;

k. second feeding means to feed the tape sheet from said first feeding means to said shingle strip magazine, said second feeding means positioned relative to said strip magazine such that the strips have one edge attached to the tape sheet by the bonding material as the sheet passes said magazine; and

l. means to store the completed shingled strips.

**4,019,729**

## APPARATUS FOR CONTROLLABLY LOWERING AND LIFTING A PLY PICKING UNIT

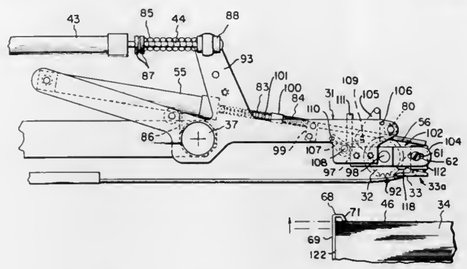
**Kenneth O. Morton, Troy, N.Y., assignor to Cluett, Peabody & Co., Inc., New York, N.Y.**

**Division of Ser. No. 471,029, May 17, 1974, Pat. No. 3,940,125. This application Nov. 12, 1975, Ser. No. 631,077**

**The portion of the term of this patent subsequent to Feb. 24, 1993, has been disclaimed.**

**Int. Cl.² B65H** *3/22*

**U.S. Cl. 271—18.3** **10 Claims**



**1.** In an apparatus for nipping and lifting a limp ply from a stack thereof, a lifting unit for controllably lowering and lifting a ply picking unit, which comprises

a. a frame

b. a ply picking unit for nipping and lifting a limp ply from a stack thereof,

c. support means for said ply picking unit, comprising a lifting lever pivotally mounted on said frame,

d. actuator means pivotally mountd on said frame and operable through a predetermined stroke,

e. a spring interconnecting said actuator means and said lifting lever,

f. means independent of said actuator means for effectively substantially balancing said lifting lever, and

g. adjustable means interconnecting said spring and said actuator means for controlling the amount of displacement of said spring caused by the predetermined stroke of said actuator means whereby the maximum force imparted by said actuator means to be lifting lever will be limited by said adjustable means thereby permitting accurate control of the pressure applied by said ply picking unit to a top ply of a ply stack.

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**4,019,730**

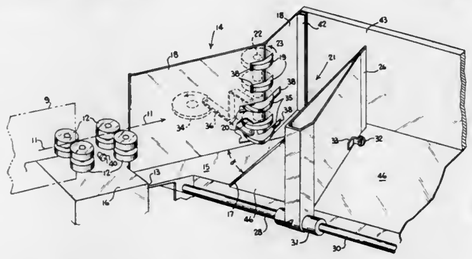
## ENVELOPE STACKING SYSTEM

**Frederick J. Staudinger, North Salem, N.Y., and James G. Montagnino, Monroe, Conn., assignors to Pitney-Bowes, Inc., Stamford, Conn.**

**Continuation-in-part of Ser. No. 584,001, June 5, 1975, abandoned. This application July 23, 1976, Ser. No. 708,260**

**Int. Cl.² B65H** *29/44*

**U.S. Cl. 271—181** **5 Claims**



**1.** An envelope stacking system for receiving envelopes being transported in seriatim along a feed path and stacking said envelopes in a contiguous stack, said envelopes being transported and stacked with a vertical orientation, said envelope stacking system, comprising:

means defining an envelope feed path;

transporting means disposed along said feed path for feeding envelopes in seriatim to a stacking deck, said transporting means feeding said envelopes with a vertical orientation;

a stacking deck for supporting a stack of vertically oriented envelopes, said deck having means defining an inlet window, said inlet window comprising a guide wall for guiding incoming envelopes, said guide wall having an angle bend;

driving means adjacent said guid wall for recieving incoming envelopes and thrusting them along said guide wall toward a rear portion of said guide wall causing said incoming envelopes to bend to conform to the angle bend of said guide wall;

oscillating camming means diposed adjacent and coaxially with said driving means for moving a newly received envelope agaist the stack of envelopes disposed on said deck, said oscillating camming means holding the newly received envelope against the stack until a subsequent envelope is transported to the stacking deck and approaches the inlet window, the holding of said newly received envelope against the stack serving the dual prupose of eliminating contact of said stack of envelopes with said driving means to prevent wear upon the envelopes of said stack, and in order to clear said inlet window and provide an open inlet for a subsequent incoming envelope; and

biasing means supported by the deck for biasing the stack of envelopes toward said driving means.

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**4,019,731**

## DEVICE FOR PLACEMENT OF RHYTHMICALLY CONVEYED SHEETS ON A STACK

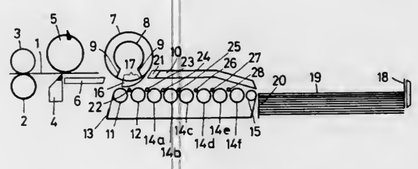
**Hilmar Vits, Leichlingen, Germany, assignor to Vits-Maschinenbau GmbH, Langenfeld, Germany**

**Filed July 20, 1976, Ser. No. 707,100**

**Claims priority, application Germany, July 23, 1975, 2532880; Apr. 10, 1976, 2615864**

**Int. Cl.² B65H** *29/68*

**U.S. Cl. 271—183** **18 Claims**



**1.** A device for placing rhythmically conveyed sheets from a conveying plane individually on a stack one after another, comprising a conveyor means for conveying the sheets, and a suction means for braking the speed of the sheets below the conveying plane, a deflecting member disposed above the conveying plane for passing the ends of the sheets into effective range of said suction means, said deflecting member being a suction conveyor roller having a plurality of projections on its periphery and rotating rhythmically with the ends of the sheets for the sheet ends to be placed on said projections.



**4,019,732**

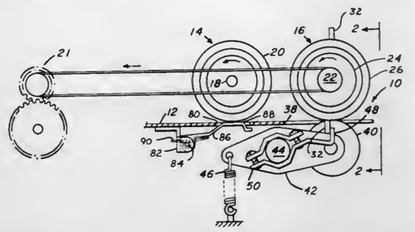
## SHEET REGISTRATION MECHANISM

**Clayton Edward Hunt, Jr., Rochester, and Donald James Spooner, Webster, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed July 2, 1976, Ser. No. 702,314**

**Int. Cl.² B65H** *9/06*

**U.S. Cl. 271—245** **7 Claims**



**1.** A sheet registration mechanism comprising: a support establishing a travel path for sheets; means for urging such sheets seriatim along said support in said travel path; means downstream of said urging means for registering and feeding such sheets at a precise point in a predetermined time cycle for sheet movement in said travel path, said registering and feeding means including a continuously rotating feed roller mounted on a drive shaft and a pinch roller mounted in engagement with said feed roller to form a nip for feeding a sheet therebetween, a rotatable registration disc for selectively intercepting and at least momentarily stopping a sheet in said travel path upstream of said feed roller, and means for axially loading said registration disc into frictional driving engagement with said feed roller; means for selectively latching said registration disc to prevent rotation of said registration disc by said feed roller when said registration disc is in position to intercept a sheet; and adjustable means for unlatching said latching means to release said registration disc at said precise point in said time cycle whereby said registration disc may be rotated out of said sheet intercepting position enabling said feed roller to feed the intercepted sheet.

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**4,019,733**

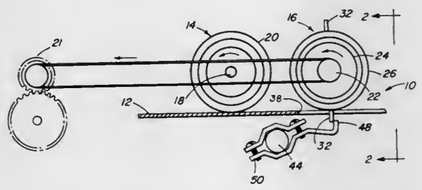
## SHEET REGISTRATION MECHANISM

**Michael Samuel Montalto, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.**

**Filed July 2, 1976, Ser. No. 702,313**

**Int. Cl.² B65H** *9/06*

**U.S. Cl. 271—245** **4 Claims**



**1.** A sheet registration mechanism comprising: a support establishing a travel path for sheets; means for urging such sheets seriatim along said support in said travel path; means downstream of said urging means for registering and feeding such sheets at a precise point in a predetermined time cycle for sheet movement in said travel path, said registering and feeding means including a continuously rotating feed roller mounted on a drive shaft, a rotatable registration disc for selectively intercepting and at least momentarily stopping a sheet in said travel path upstream of said feed roller, and means for axially loading said registration disc into frictional driving engagement with said feed roller; means for selectively

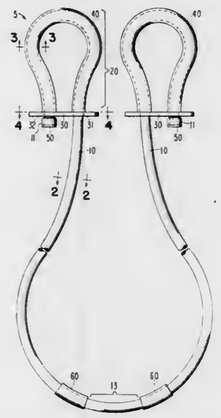
latching said registration disc to prevent rotation of said registration disc by said feed roller when said registration disc is in position to intercept a sheet; and means for unlatching said latching means to release said registration disc at said precise point in said time cycle whereby said registration disc may be rotated out of said sheet intercepting position enabling said feed roller to feed the intercepted sheet.

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**4,019,734**
**ELASTIC PULL TYPE ISOTONIC/ISOMETRIC EXERCISER**

**Wayne Lee, 814 N. Delaware, No. 301, San Mateo, Calif. 94401, and John Richardson, Rte. 2, Box 680-79, Sonora, Calif. 95370**

**Filed July 31, 1975, Ser. No. 600,161**
**Int. Cl.² A63B** *21/02*
**U.S. Cl. 272—137** **1 Claim**



1. An exercising apparatus comprising:

A single length of elastic tubing of substantially constant diameter.

first and second flexible sleeves slidably mounted over opposite ends of the elastic tubing leaving exposed a portion of each end of the elastic tubing,

first and second fastener means, each including a sheet of flexible material having two circular holes therethrough, each hole having substantially the same diameter as the elastic tubing, and each fastener means including a plug to expand the diameter of the end of the elastic tubing to prevent it from passing through either hole in the flexible material,

wherein one end of the elastic tubing is passed through one hole in one of the sheets of flexible material, one flexible sleeve is slipped onto the elastic tubing, and the exposed portion of the end of the elastic tubing is returned in the opposite direction to the previous passage through the other hole in said flexible sheet of material, and one plug is inserted into the open end of tubing,

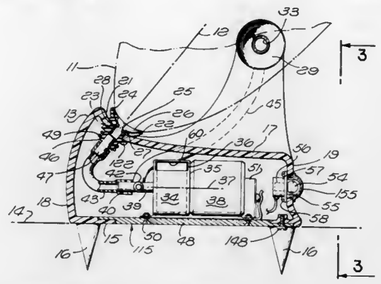
wherein the other end of the elastic tubing is passed through one hole in the other sheet of flexible material, the other sleeves is slipped onto the plastic tubing, and the exposed portion of that end of the elastic tubing is returned in the opposite direction to the previous passage through the remaining hole in said flexible sheet of material, and the remaining plug is inserted into the open end of the elastic tubing, and

wherein two additional flexible sleeves are slideably mounted over that portion of the elastic tubing between the first and second fasterner means.

**4,019,735**
**FOOTBALL KICKING TEE WITH VACUUM BALL RETAINER**

**James E. Thompson, 4201 Don Tomaso Drive, Los Angeles, Calif. 90008**

**Filed July 21, 1975, Ser. No. 597,486**
**Int. Cl.² A63B** *67/00*
**U.S. Cl. 273—55 B** **12 Claims**



3. A football kicking tee comprising:

a portable body adapted to be removably placed on and be supported by the playing surface of a football field;

a football holding structure carried by said body and constructed to engage a football and support it in an upstanding kicking position at approximately the level of said playing surface of a field on which the body is placed, and in a relation enabling a player running along said surface to kick the ball as he runs;

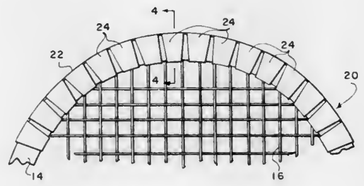
said holding structure including suction means carried by said body for retaining the ball by suction against accidental dislocation from said kicking position.

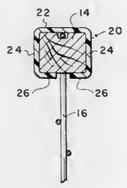
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**4,019,736**
**PROTECTIVE DEVICE FOR RACKETS**

**Donald L. Lehew, 13315 Flagstone, Dallas, Tex. 75240**

**Continuation of Ser. No. 124,350, March 15, 1971, abandoned. This application Oct. 14, 1975, Ser. No. 621,694**
**Int. Cl.² A63B** *49/14*
**U.S. Cl. 273—73 R** **3 Claims**





3. A protective device for removable attachment to the curved end portion of the string network frame of a racket of the type including a handle and said string network frame, said protective device being a one-piece resilient body adapted to snap over said curved end portion and comprising:

a. an elongated strip so formed to be substantially coextensive with, and disposed flush against, the forward end of said curved end portion,

b. a plurality of fingers transversely intersecting said elongated strip along loci of intersection which, when said protective device is attached to said curved end portion, are coextensive with the opposed edges of said forward end of said curved end portion, adjacent ones of said fingers being joined together through said elongated strip solely at loci of intersection and being otherwise spaced apart a sufficient distance to enable relative movement between adjacent fingers during attachment to said curved end portion, and

c. keeper portions transversely intersecting respective end portions of said fingers and adapted to gripably engage the underside of said curved end portion, said fingers and keeper portions being of a trapezoidal configuration and arranged in paired sets, each keeper portion of a paired set being spaced apart from, but mutually aligned with, the other keeper portion of said paired set; whereby said plurality of fingers and keeper portions provide the sole means for attaching said protective device to the curved end portion of said racket.

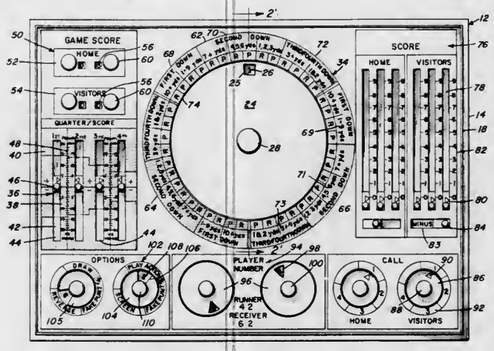


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**4,019,737**
**FOOTBALL GAME BOARD**

**William L. Witzel, 13914 Shannon Drive, Silver Spring, Md. 20904**

**Filed Nov. 17, 1972, Ser. No. 307,495**
**Int. Cl.² A63F** *3/00*
**U.S. Cl. 273—94 R** **25 Claims**

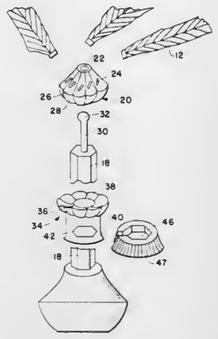



1. A game apparatus comprising a game board having a substantially flat upper surface, means to indicate the quarter score point differential between two opposing teams of a football game placed on said upper surface, said point differential score means being divided into a plurality of scoring zones, a game point selection means comprising a second indicator means mounted to said board, a plurality of segmented down and distance character indicia zones placed on said board opposite said second indicator means, each said down and distance character indicia zone containing down and distance characters representing the down of a football game and the yards needed to obtain a first down for said down and being correlated to one of said point differential scoring zones, a run and pass character indicia zone with associated indicia including numerical values placed on said board surface adjacent to and aligned with said down and distance zone, said second indictor means being adapted to be moved to designate that segment of said down and distance character indicia zone corresponding to the particular down and distance needed for a first down in a football game which is correlated to the point differential score means scoring zone indicated by the first indicator means, while simultaneously designating a numerical value for a selection of a football play, said designated numerical value accounting for the scoring of the game when the correct football play is selected.

**4,019,738**
**GAME DEVICE AND GAME**

**Te-Kong Tong, 370 15th St., Norwood, N.J. 07648**

**Continuation of Ser. No. 592,890, July 3, 1975, abandoned. This application May 17, 1976, Ser. No. 687,095**
**Int. Cl.² A63B** *67/18*
**U.S. Cl. 273—106 R** **8 Claims**



1. A game device comprising a generally pot bellied bottle shaped structure having a base portion and a conical lower wall portion forming an angle of greater than about 90° therewith, said conical lower wall portion upwardly and outwardly extending from said base portion and then reversing direction and inwardly tapering continuously to form an arcuate shaped upper wall portion having a varying diameter steadily reducing dimension, an elongated shaft in longitudinal alignment with said structure and upwardly extending therefrom, said shaft terminating in an axle member having an enlarged distal head, said axle member having a lesser diameter than that of said shaft, said shaft having a non-circular cross-section, said axle portion having a circular cross-section, a bowl shaped braking member defining a first aperture having a non-circular cross-section corresponding to that of said shaft, said first aperture having a diameter greater than the external diameter of said shaft, said shaft communicating with said aperture, said member adapted to slide upon said shaft, a wheel member defining a second aperture, said second aperture having a circular cross-section, said member disposed on said axle portion, said member having a truncated cone shaped upper section and a bowl shaped lower section, said lower section having an external shape corresponding to the inner shape of said braking member; said wheel member adapted to slide and rotate about said axle portion, said axle member being at least as long as the depth of said wheel member, said truncated cone shaped upper section defining a plurality of slotted apertures, at least one feather like projection disposed in each of said slotted apertures, said braking member adapted to slide along said shaft between said wall portion and said wheel member.

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**4,019,739**
**SHOVEL GAME**

**Eric L. Waite, 14808 Clark St., Van Nuys, Calif. 91401**

**Continuation-in-part of Ser. No. 507,332, Sept. 19, 1974, abandoned. This application Sept. 10, 1975, Ser. No. 611,924**
**Int. Cl.² A63B** *63/00*
**U.S. Cl. 273—95 D** **5 Claims**

1. A game to be placed upon a floor comprising:

a horizontal polygonal shaped base having a plurality of identically sized scoring openings arranged in a particularly selected pattern, said base being located upon said floor and spaced thereabove;

side means connected to the periphery of said base, said side means extending substantially vertically;

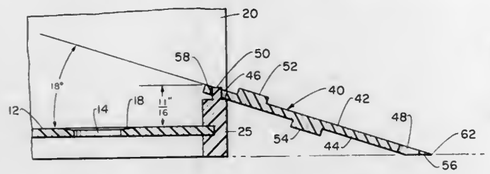
an access opening formed within said side means;

a ramp connected by connecting means to said base and

positioned within said access opening, said ramp being inclined in respect to said base, one end of said ramp contacting said floor, the other end of said ramp located a spaced distance above said base, the spacing of said ramp above said base being constant, the forward edge of said ramp being a straight line;

a plurality of separate balls to be moved over said ramp upon said base and in contact with said scoring openings, each said ball being substantially larger in diameter than each said opening, each of said openings being circular;

said ramp being reversible with said ramp having a first ball propelling surface and a second ball propelling surface located on opposite sides of said ramp, said first ball propelling surface adapted to receive balls that are moved




across a hard surface and said second ball propelling surface adapted to receive balls that are moved across a carpeted surface;

a first kick bar depending from said first propelling surface substantially adjacent an end of said ramp, said first kick bar extending substantially the entire width of said ramp;

a second kick bar depending from said second propelling surface, said second kick bar being positioned substantially at the longitudinal center of said ramp and extending substantially the entire width of said ramp; and

a scoop adapted to receive a single said ball, said scoop being attached to a handle, said scoop to be manually moved across the floor to release the retained ball and propel such over said ramp and onto said base.

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**4,019,740**

**BOARD GAMES**

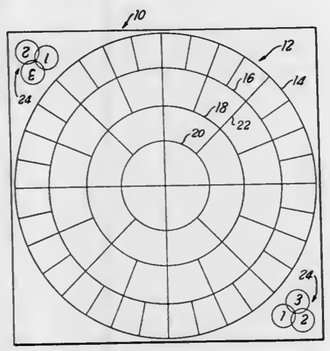
**John Anthony Ball; Keith Arthur Warburton, both of Basingstoke, England, and Raymond Donald Carew, Edinburgh, Scotland, assignors to John Anthony Ball, Basingstoke, England**

**Filed Sept. 10, 1975, Ser. No. 611,883**

**Claims priority, application United Kingdom, Sept. 16, 1974, 40198/74**

**Int. Cl.² A63F** *3/00*

**U.S. Cl. 273—131 KN** **11 Claims**




1. A board game for two players comprising a board having a playing area divided into playing spaces, said playing area having a substantially circular boundary and said playing spaces being defined by circles concentric with and of lesser diameter than said boundary and by radii of said circles and said boundary, two similar armies of playing pieces for positioning on said playing spaces and for movement about said playing area by the players whereby each player may take pieces of the other player's army, a non-playing area for each player, each non-playing area being adapted to accommodate a playing piece of that player, and a marker for each player, each marker being adapted to be accommodated on a playing space, whereby either player can move a playing piece of his army from a playing space of said playing area to his non-playing area and denote the playing space from which said playing piece was moved by positioning his marker on said playing space.

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**4,019,741**

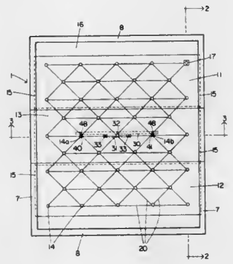
**GAME WITH MECHANICAL CAPTURE MEANS**

**Straud D. Herriman, 229 Kentucky Ave., Danville, Ill. 61832**

**Filed Dec. 5, 1975, Ser. No. 638,050**

**Int. Cl.² A63F** *3/00*

**U.S. Cl. 273—131 BA** **6 Claims**



1. A peg-board type game composing a peg-board playing surface having a plurality of spaced vertical holes therein adapted to receive and retain dowels positioned on the bottom of manually movable playing pieces for said game, a frame for supporting said playing surface, said playing surface being divided into at least three components, two of said playing surface components being spaced laterally apart and being essentially horizontal, and the third of said playing surface components being positioned between said two horizontal components and having an upper surface which traverses the space between and rises above the upper surface of said two horizontal playing surfacecomponents, means positioned below said third playing surface component for ejecting the dowels of playing pieces from predetermined holes in said third playing surface component, said dowel ejecting means comprising a lever pivoted between the ends thereof and having, positioned on opposite sides of said pivot, two peg elements, each of said peg elements being adapted for essentially vertical movement upwardly into and downwardly out of one of a pair of said predetermined holes upon a pivoting movement of said lever, so that a dowel of a first playing piece is adapted to be ejected from one of a pair of said predetermined holes by the respective peg element adjacent thereto, upon a dowel of a second playing piece being inserted into the other of said pair of predetermined holes and causing thereby said lever to pivot.

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**4,019,742**

**BOARD GAME APPARATUS**

**Lee W. Thompson, 42 Westbury Ave., Plainview, N.Y. 11803**

**Filed Dec. 24, 1975, Ser. No. 644,216**

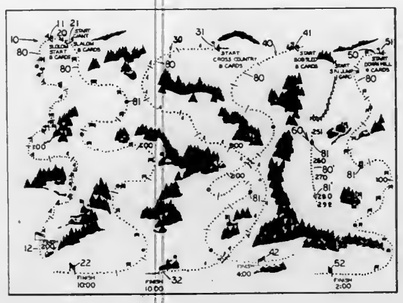
**Int. Cl.² A63F** *3/00*

**U.S. Cl. 273—134 CA** **2 Claims**

1. A board game simulating racing events comprising a board imprinted with a design indicating at least one course for a racing event and starts and finishes of the courses, indicia along each course indicating simulated units of time, said



indicia also extending beyond the finishes of the courses, pieces representing racers to be moved along the courses and means for selecting by chance the number of indicia a piece is to be moved along the course, said selecting means comprising



a first set of cards marked with integers for indicating the number of indicia on a course a piece is to be moved and a second set of cards marked with integers from 1 to 9 indicating respective tenths of a second.

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**4,019,743**

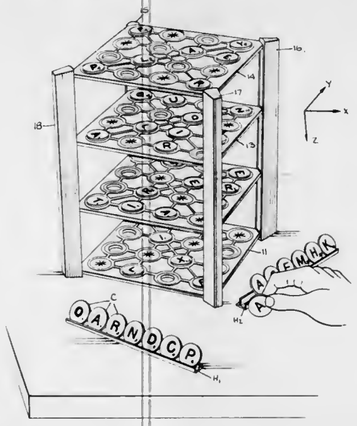
**EDIFICE FOR PLAYING WORD GAME**

**George Castanis, 444 6th Ave., New York, N.Y. 10011**

**Filed Feb. 26, 1976, Ser. No. 661,772**

**Int. Cl.² A63F** *3/00*

**U.S. Cl. 273—135 D** **7 Claims**




1. An assembly for playing a three-dimensional word game in which the highest score is obtained by forming words having a fixed number of letters with the highest point value, said assembly comprising:

A a multi-level edifice having a plurality of transparent platforms supported in superposed relation more or less above ground to provide playing levels equal in number to the fixed number, each level having formed thereon a rectangular array of equi-spaced circular playing sites equal in number to the squares of the fixed number, corresponding sites on the several levels being in vertical registration, the majority of the sites having circular wells therein provided with finger holes, said circular sites being interconnected by straight lines in the X, Y and diagonal directions to indicate the straight line directions in which words may be formed on each level, the remainder of said sites being integrally provided with permanent discs carrying stars to indicate "wild" spaces; and

B a bank of disc-shaped playing chips, each having a letter thereon associated with a numeral representing a point value, said chips having a diameter slightly smaller than that of said wells and being receivable therein to create words having said fixed number of letters in a straight line in the X, Y and diagonal directions across any level, and in the Z and diagonal directions passing through said levels, whereby words may be formed in three dimensions, said chips being removable from said wells by inserting a finger in said finger holes.

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**4,019,744**

**MULTIPLE BINGO GAME APPARATUS**

**Stephen J. Pizur, Sr., 905 Oak Ave., Barnesboro, Pa. 15714**

**Filed Jan. 5, 1976, Ser. No. 646,589**

**Int. Cl.² A63F** *3/06*

**U.S. Cl. 273—135 B** **11 Claims**

| B | I | N | G | O |
|---|---|---|---|---|
| 4 13 | 19 24 | 32 34 | 47 53 | 73 70 |
| 13 1 | 29 16 | 34 31 | 47 46 | 67 62 |
| 8 10 | 22 17 | 42 40 | 51 55 | 69 67 |
| 7 2 | 17 26 | 39 36 | 52 45 | 72 61 |
| 10 15 | 18 23 | Free | 48 57 | 72 64 |
| 5 6 | 25 21 | Space | 46 53 | 74 66 |
| 6 6 | 26 22 | 40 42 | 50 47 | 67 68 |
| 4 12 | 22 28 | 41 44 | 57 55 | 70 71 |
| 7 7 | 27 26 | 48 35 | 49 57 | 65 62 |
| 1 5 | 30 25 | 40 45 | 54 56 | 60 72 |

1. An improved bingo game including; means for playing up to four games simultaneously on one card, means for marking the numbers called off by the game master for the individual games being played up to four without overlap or confusion by the players, the means for playing up to four games simultaneously on one card including a card with each of the usual twenty-four numbered squares divided into four quadrants and with each of the four quadrants within each square being appropriately numbered, and the four numbered quadrants of each square color coded differently from each other, and the same color coding is used for the corresponding quadrants in all of the other squares.

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**4,019,745**

**ELECTRICAL CHESS GAME**

**Enrique Mustelier, 307 Bird Road, Coral Gables, Fla. 33134**

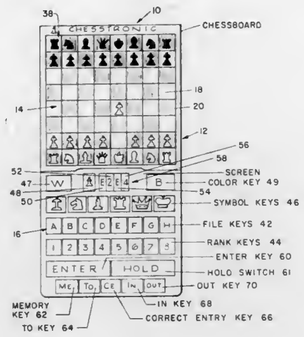
**Filed Oct. 29, 1975, Ser. No. 626,977**

**Int. Cl.² A63F** *3/02*

**U.S. Cl. 273—136 A** **1 Claim**

1. A chess game apparatus comprising: a chessboard matrix of ranks and files of electrically operable optical display cells; each of said cells being configured to selectively display at least twelve states in the form of symbols generally in the shape of the six types of chessmen of each of two colors in response to a coded digital input signal; board position memory means coupled to said cell matrix and organized for storing and supplying said digital input signal for each cell corresponding to the state of each cell; input and keyboard means coupled to said board position memory means for commanding a desired change of position of said cell matrix by designating the rank and file of any of said cells, the chessmen symbol currently displayed at said designated cell, and the rank and file of the cell to which the symbol at said designated cell is to be moved, said keyboard means comprising: a set of eight rank

keys in one to one correspondence with the six types of chessmen symbols; and a set of two color keys in one to one correspondence with said two colors of chessmen; said chess game apparatus further comprising a move memory means fed by said keyboard means for storing a sequence of the last previ-




ous changes of position of said cell matrix; said keyboard means including a memory key coupled for enabling transfer of information from said move memory means to said board memory means to enable sequentially undoing moves in response to each actuation of said memory key.

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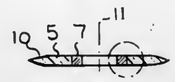
**4,019,746**
**SET OF GAME PIECES**
**Herbert K. Hare, R.F.D. No. 1, Box 90, Hillsboro, N.H. 03244**
**Filed May 19, 1976, Ser. No. 688,072**
**Int. Cl.² A63F** *3/02*
**U.S. Cl. 273—137 AB** **5 Claims**



1. A game comprising two sets of playing pieces, each of the playing pieces comprising one of said two sets being variantly colored from each of the playing pieces comprising the other of said two sets, a plurality of attachment pieces, each of said plurality of attachment pieces being removably engaged within a first cavity in a first lateral surface in the playing pieces of said one of said two sets and in the playing pieces of said other of said two sets, stacking means for stacking a first of said playing pieces to a second of said playing pieces, said second of said playing pieces being disposed above said first of said playing pieces when said each of said plurality of attachment pieces are removed from said first cavity disposed within said first lateral surface of said first of said playing pieces, said first cavity residing at the center of said first lateral surface, said first lateral surface bounded by a circular marginal edge, a playing piece wall, said playing piece wall substantially defining a cylindrical surface and normal to said first lateral surface, the lowermost marginal edge of said playing piece wall defining a second lateral surface, said each of said plurality of attachment pieces having a disc-like shape, the thickness of said disc-like shape being greater than the depth of said first cavity, the diameter of said first cavity being greater than the diameter of said disc-like shape.

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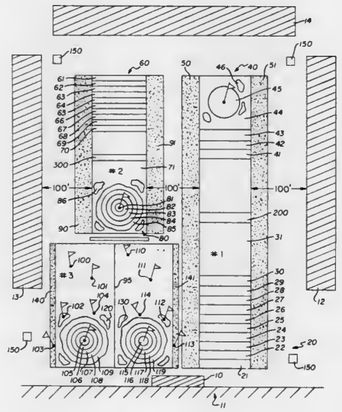
**4,019,747**
**MAGNETIC BINGO MARKERS**
**Antonio Chuilli, Colonial Apt., 31 Vine St., Weymouth, Mass. 02188**
**Filed Feb. 6, 1975, Ser. No. 547,470**
**Int. Cl.² A63F** *3/06*
**U.S. Cl. 273—137 AE** **11 Claims**



1. A marker piece for use on a game board such as the game of Bingo and the like so constructed that the piece can be picked up by the player of the game manipulating a magnet when clearing the board of a plurality of such pieces, comprising, in combination,
   a. a transparent disc of substantially uniform thickness and given diameter,
   b. a ring of magnetically permeable material,
   c. the axial thickness of the ring being no greater than the thickness of the disc.
   d. the inside diameter of the ring being no greater than the given disc diameter,
   e. the ring being fixedly attached to the disc concentric therewith, and
   f. a magnet separate from the game board readily manipulated by the player,
   g. whereby the magnet held near the marker piece will pick up the piece.

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**4,019,748**
**METHOD OF PLAYING A GOLF GAME**
**Gerald P. Healey, 1265 Wednesbury Circle, Akron, Ohio 44313**
**Continuation-in-part of Ser. No. 451,455, March 15, 1974, abandoned. This application Mar. 24, 1975, Ser. No. 561,280**
**Int. Cl.² A63B** *69/36*
**U.S. Cl. 273—176 AB** **3 Claims**

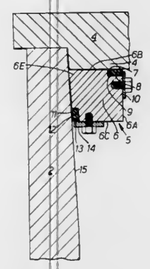


1. A method of playing a game of golf on a three-hole golf course in which the second and third holes are disposed parallel to the first, each hole having a plurality of teeing areas and graded target areas separated by a fairway area, comprising the steps of;
   A. successively hitting five balls from the teeing areas on the first hole and being apprised of the points awarded based upon the particular graded target area reached by each ball;
   B. moving to the teeing areas of the second hole;
   C. successively hitting five balls from the teeing areas on the second hole and being apprised of the points awarded based upon the particular graded target area reached by each ball; and
   D. moving to the teeing areas of the third hole;
   E. successively hitting five balls from the teeing areas on the third hole and being apprised of the points awarded based upon the particular graded target areas reached by each ball, and putting five balls and being apprised of the points awarded based upon the graded target area from which they are putted.



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**4,019,749**
**SEALS**
**Peter Dawson, Bourne End, and Charles Jack Barrett, Hillingdon, both of England, assignors to Taylor Woodrow Construction Limited, Southall, England**
**Filed Oct. 23, 1975, Ser. No. 625,153**
**Claims priority, application United Kingdom, Oct. 24, 1974, 46125/74**
**Int. Cl.² F16J** *15/00*
**U.S. Cl. 277—58** **17 Claims**

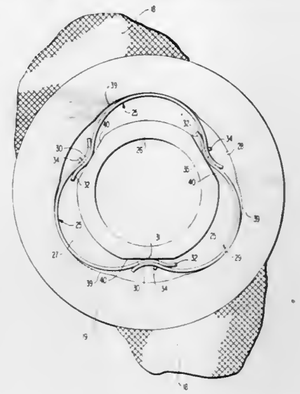


1. The combination of a hollow substantially cylindrical member a member extending across the cylindrical member to close an end thereof, and a seal for maintaining closure between these two members during radial movement of the cylindrical member; the seal comprising a carrier of ring configuration having an axis, a first surface on the carrier for sliding contact with the inner surface of the cylindrical member, a second surface on the carrier for sliding contact with a surface of the other member, said first surface tapering in a direction away from said second surface to form an acute angle with said axis, and seal means carried by the carrier and disposed to be in contact with said surfaces of said members when said surfaces of said carrier and said members are in contact, the carrier being able to expand or contract to permit said seal means to remain so in contact during said radial movement of the cylindrical member.

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**4,019,750**
**BEARING SUPPORT OF THE HEAT-EXCHANGER DISK OF A REGENERATIVE HEAT-EXCHANGER**
**Klaus Wiegard, Esslingen, Germany, assignor to Daimler-Benz Aktiengesellschaft, Germany**
**Filed Dec. 11, 1974, Ser. No. 531,795**
**Claims priority, application Germany, Dec. 12, 1973, 2361697**
**Int. Cl.² F16F** *1/26*
**U.S. Cl. 267—160** **14 Claims**

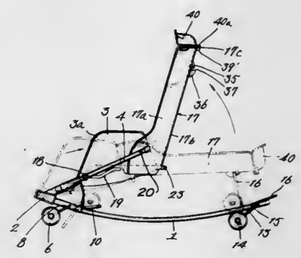
1. A leaf spring element which is adapted to be interconnected with other leaf springs into an annular shape, characterized in that the leaf spring element includes an approximately cylindrical, outwardly curved arcuate portion in the unstressed condition which is adjoined on both sides in the unstressed condition by approximately cylindrical, inwardly curved arcuate portions which have a smaller radius and smaller sector angle compared to the outwardly curved arcu-



ate portion, and in that at least one outwardly directed extension means at one of the inwardly curved arcuate portions and an aperture means in the other inwardly curved arcuate portion into which the extension means of an adjacent spring element is adapted to engage.

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**4,019,751**
**MULTI-PURPOSE INFANT'S WHEELED CHAIR**
**Shinroku Nakao, Yokohama, Japan, assignor to Combi Co., Ltd., Tokyo, Japan**
**Filed May 20, 1975, Ser. No. 579,202**
**Claims priority, application Japan, May 30, 1974, 49-62359[U]**
**Int. Cl.² B62B** *3/04*
**U.S. Cl. 280—31** **9 Claims**



1. A multi-purpose infant's wheeled chair comprising a downwardly arched base member having the front and rear ends directed upwardly, front wheel support rods having one end pivoted to said front end of the base member and rotatably supporting front wheels at the other ends, rear wheel support rods having one end pivoted to said rear end of the base member and rotatably supporting rear wheels at the other ends, sector members provided at said front end of the base member receiving the front end of said base member, chair body support rods having the front ends received in said sector members and the rear ends extending from said sector members toward said rear end of the base member, a chair body slidably supported on the opposite sides by said chair body support rods, a back rest hinged to said chair body for pivotal movement between upright and horizontal positions, a head cover detachably connected to said back rest, a back rest upholding rod pivoted to said rear end of the base member for movement between the upright back rest supporting position

and the horizontal position and engaging means provided on said base member and sector members for engaging said front and rear wheel support rods to selectively maintain the front and rear wheels supported by the wheel support rods in the operative and stowage positions pivoted positions thereof under stabilized conditions.

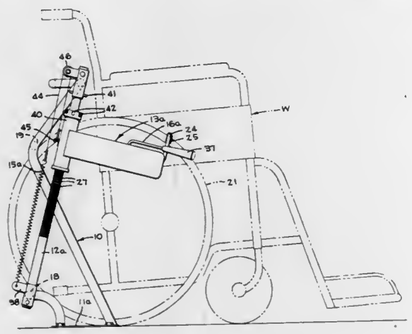
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**4,019,752**

## WHEELCHAIR RESTRAINT DEVICE

**Denny Leon, Mountain View, and Frederick M. Stewart, Los Gatos, both of Calif., assignors to FMC Corporation, San Jose, Calif.**

**Filed Sept. 10, 1975, Ser. No. 612,436**
**Int. Cl.² B60P** *7/00*
**U.S. Cl. 280—179 R** **15 Claims**



1. A restraint device for maintaining a wheelchair in a stationary position on a floor, for use with a wheelchair having at least two wheels rotatably mounted to the sides of said chair, said device comprising:
   a base member secured to said floor;
   a horizontal member spaced above the floor and secured to said base member whereby the wheels of said chair can be moved into position against said horizontal member;
   a pair of clamping members, said clamping members each including means for engaging a portion of one of said wheels spaced from said floor to retain said wheel between said horizontal member and a corresponding one of said clamping members;
   means mounting each of said clamping members for travel along a path toward and away from said floor and intersecting a respective one of said wheels; and
   means for releasably locking said clamping members to their respective mounting means to selectively lock said clamping members in their said paths in positions engaging said wheels to thereby clamp each of said wheels between said horizontal member and a corresponding one of said clamping members.

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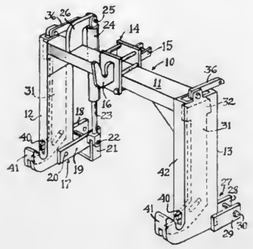
**4,019,753**

## ADJUSTABLE THREE-POINT TRACTOR HITCH

**Frederick J. Kestel, Rte. 1, Box 44, New Lenox, Ill. 60451**

**Filed Nov. 13, 1975, Ser. No. 631,741**
**Int. Cl.² B60D** *1//10*
**U.S. Cl. 280—415 A** **6 Claims**

1. An adjustable quick-latch hitch for tractors providing three-point draft link connections comprising
   a. a hitch attachment comprising a rigid frame including a pair of depending legs interconnected by a substantially horizontal support member,
   b. said support member and one of said legs providing connecting brackets adapted to be connected to corresponding draft links of the tractor for connecting said attachment thereto,
   c. a link member pivotally connected at one end to said other of said legs and at its opposite end to a draft link of the tractor,
   d. pivoting means carried by said support member and connected to said link member for pivoting the same relative to its connection to said other of said legs and to



the draft link of the tractor so as to vertically move said other of said legs to vary the plane of said hitch attachment relative to the tractor, and
   e. means provided by each of said legs for releasably connecting said hitch attachment to an implement to be pulled thereby.

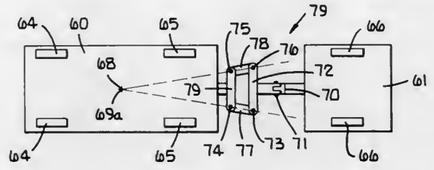
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**4,019,754**

## VEHICLE CONNECTING DEVICE

**John A. Hinckley, 26th St. and 72nd Ave., Lawton, Mich. 49065**

**Filed Jan. 22, 1973, Ser. No. 325,540**
**Int. Cl.² B62D** *53/00*
**U.S. Cl. 280—456 R** **10 Claims**



1. A device which is for connecting a second vehicle to a first vehicle and which comprises:
   a. a second vehicle;
   b. connecting means for rotatably connecting said second vehicle to a first vehicle which connecting means includes means for causing at least a portion of rotational movement between a first vehicle and said second vehicle to be about an axis which does not intersect said connecting means; and
   c. said connecting means including:
      1. first and second pivot means each for allowing pivoting of a first element with respect to a second element, each of said first and second pivot means having only 1° of rotational freedom;
      2. first maintaining means for maintaining the axes of rotation of said first and second pivot means parallel and not collinear;
      3. means for connection of each of said first elements of said first and second pivot means to a first vehicle;
      4. third and fourth pivot means each for allowintg pivoting of a first element with respect to a second element, each of said third and fourth pivot means having only 1° of rotational freedom;
      5. second maintaining means for maintaining the axes of rotation of said third and fourth pivot means parallel, not collinear, and at a different distance apart than said first and second pivot means;
      6. means for connecting each of said first elements of said third and fourth pivot means to said second vehicle;
      7. said second element of said first pivot means connecting to or being integral with said second element of said third pivot means and said second element of said second pivot means connecting to or being integral with said second element of said fourth pivot means;
   d. said means for connection to a first vehicle including;
      1. fifth and sixth pivot means for allowing pivoting of a first element with respect to a second element, each of said fifth and sixth pivot means having only 1° of rotational freedom;
      2. means for maintaining the axes of rotation of said fifth and sixth pivot means parallel and not collinear;
      3. means for connection of each of said first elements of said fifth and sixth pivot means to a first vehicle;
      4. seventh and eighth pivot means for allowing pivoting of a first element with respect to a second element, each of said seventh and eighth pivot means havig only 1° of rotational freedom;
      5. means for maintaining the axes of rotation of said seventh and eighth pivot means parallel, not collinear, and at a different distance apart than said fifth and sixth pivot means, each of said first elements of said seventh and eighth pivot means being connected to said first elements of said first and second pivot means;
      6. said second element of said fifth pivot means connecting to or being integral with said second element of said seventh pivot means and said second element of said sixth pivot means connecting to or being integral with said second element of said eighth pivot means.



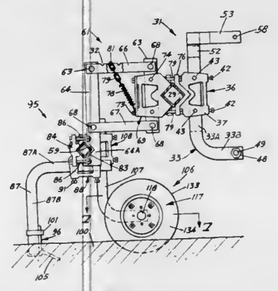
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**4,019,755**

## HITCH ASSEMBLY FOR MOUNTING A TRANSVERSE BEAM ON A THREE-POINT HITCH

**Fred W. Eisenhardt, Fargo, N. Dak., assignor to Alloway Manufacturing, Inc., Fargo, N. Dak.**

**Continuation-in-part of Ser. No. 474,048, May 28, 1974, abandoned. This application May 9, 1975, Ser. No. 576,229**
**Int. Cl.² A01B** *59/06*
**U.S. Cl. 280—490 A** **13 Claims**



1. Hitch means for mounting a transverse beam on a three-point hitch having a pair of draft links and a control link of of a draft vehicle comprising: a pair of first members, each of said members having a forwardly directed portion and an upright portion, first clamp means for connecting the upright portion of one of said members to the beam, said one member being movable relative to the first clamp means to a selected position, said first clamp means having releasable means holding said one member in the selected position, second clamp means for connecting the upright portion of the other of said members to the beam, said other member being movable relative to the second clamp means to a selected position, said second clamp means having releasable means holding said other member in the selected position, transverse bar means extended between the forwardly directed portions of the first members, means connected to the bar means at the outer end portions thereof to attach the bar means to the forwardly directed portions of the first members, means connected to the outer end portions of the bar means and mounted on the forwardly directed portions of the first members connectable to the draft links of a three-point hitch, a second member having an upright portion and a forwardly directed portion, third clamp means for connecting the upright portion of the second member to the beam, said second member being movable relative to the third clamp means to a selected position, said third clamp means having releasable means holding the second member in the selected position, said forwardly directed portion of said second member being connectable to the control link of a three-point hitch.

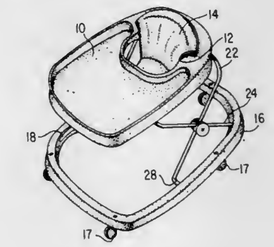
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**4,019,756**

## BABY WALKER

**Hajime Ishida, Tokyo, Japan, assignor to Tomy Kogyo Co., Ltd., Tokyo, Japan**

**Filed Aug. 18, 1975, Ser. No. 605,518**
**Int. Cl.² B62B** *7/06*
**U.S. Cl. 280—649** **2 Claims**



1. A walker, comprising:
   a top member provided with an opening therein and a seat suspended below said opening;
   a bottom member;
   means operably connecting said top and bottom members for permitting the walker to be collapsed, wherein said top and bottom members are positioned near each other, and for permitting the walker to be expanded through several positions wherein the distance between said top and bottom members is variably adjusted,
   said collapsing and expanding means comprises a first strut having a top portion mounted to said top member for rotation about a fixed axis and a bottom portion consisting of arms, said bottom member including means for mounting said arms of said first strut to slide with respect to said bottom member,
   said collapsing and expanding means also comprising a second strut having a top portion and a bottom portion consisting of arms, said top member including means permitting said top portion to slide along the underneath of said top member, said bottom member including means for mounting said arms of said second strut to rotate about fixed points on said bottom member,
   said struts having intermediate portions between said top and bottom portions intersecting each other on each side of said walker,
   said top member slide means comprises a block, wherein said top portion of said second strut passes through said block and is mounted to rotate about an axis through said block, a rail mounted longitudinally below said top member, said block mounted to slide along said rail, and
   means located on said top member for locking said collapsing and expanding means to set said top and bottom members in a desired one of said positions, wherein said locking means comprises a series of teeth along said rail, a threaded post extending outwardly from said block, a knob threaded on said post, and a member intermediately adjacent said rail and said knob provided with teeth complementary in configuration with respect to said teeth of said rail, such that as said knob is threaded on said post

said knob forces said teeth of said member into engagement with said teeth of said rail prohibiting said top portion of said second strut from sliding, thereby locking said collapsing and expanding means in one of said several positions.

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**4,019,757**

## FOLDABLE PRAM CHASSIS

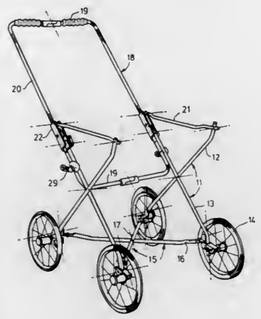
**Udo Beger, Landshut, Germany; Gabriel Saillard, and Ari Pasquini, both of Cholet, France, assignors to Etablissements Morellet-Guerineau GmbH & Co. Handels KG, Munich, Germany**

**Filed Aug. 14, 1975, Ser. No. 604,731**

**Claims priority, application Germany, Aug. 31, 1974, 2441870**

**Int. Cl.² B62B** *11/00*

**U.S. Cl. 280—649** **9 Claims**



**1.** A foldable pram chassis comprising:

two horizontal carriage body and seat fixing struts, said struts each having a forward end and a rearward end;

two lateral X-shaped frames each including two struts each having an upper end, a respective one of the upper ends of one of said two last-mentioned struts being pivotally connected with a respective one of said forward ends of said two horizontal carriage body and seat fixing struts;

U-shaped plates, one for each said lateral X-shaped frames connected articularly thereto, each of the upper ends of the other of said lateral X-shaped frame struts being pivotally connected with a respective one of said U-shaped plates;

a rectangular slide frame having upper and lower cross-struts each foldable in the middle thereof, the upper cross strut forming a handle grip, said slide frame including longitudinal struts, said fixing struts and said lateral frames, being rotatably mounted about an axle by means of said U-shaped plates; and,

said longitudinal struts and said upper ends of said other of said lateral X-shaped frame struts including operatively associated rotational and pivotal means; whereby said longitudinal struts, said fixing struts and said other of said lateral X-shaped frame struts being pivotal in a longitudinal direction of the pram chassis, and said longitudinal and said other of said lateral X-shaped frame struts being rotatable relative to each other about said longitudinal direction of the pram chassis.

**4,019,758**

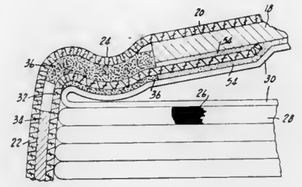
## BOOK BINDING PROCESS

**William C. Heller, Jr., Milwaukee, Wis., and Leonard Shatzkin, Croton-On-Hudson, N.Y., assignors to William C. Heller, Jr., Milwaukee, Wis.**

**Continuation-in-part of Ser. No. 335,555, Feb. 26, 1973, abandoned, which is a division of Ser. No. 74,271, Sept. 22, 1970, Pat. No. 3,370,806. This application Mar. 8, 1976, Ser. No. 665,007**

**Int. Cl.² B29C** *19/02*; **B42D** *1/00*

**U.S. Cl. 281—21 R** **5 Claims**



**1.** An improved process of forming a bound book of conventional construction by affixing the end papers and crash of a body of leaves inside the covers of the case, said end papers and crash and covers having portion suitable for being brought into abutment to form a joint having a first region defined by the end papers and boards of the covers and having a second hinge region which is subjected to stress during use of the book, said process employing conventional book binding paste in said first region and a solidifiable flexible thermoplastic bonding agent meltable to assume a viscid state of short duration responsive to exposure to a high frequency electric field in said second region, said process comprising the steps of:

applying conventional book binding paste to an abuttable portion of at least one of the body and case in the first region of the joint;

applying a layer of the bonding agent in liquid form to an abuttable portion of at least one of the body and case in the second hinge region, said layer being applied in a thickness which provides a quantity of bonding agent sufficient to generate rapid melting of the bonding agent upon exposure to the high frequency electric field;

allowing the bonding agent to assume a solid, nonviscid state;

inserting the body into the case to form the joint from the abuttable portions of the body and case, the second hinge region of said joint containing the nonviscid bonding agent;

exposing the second region to a high frequency electric field to rapidly melt the bonding agent;

applying pressure to the joint of the book containing the bonding agent during the period of viscidness of the bonding agent to bring the abutting portions of the joint into bonding contact to effect an attachment and to reduce the thickness of the bonding agent and the generation of heat in the bonding agent; and

allowing the conventional book binding paste to dry while said joint is held in position by the bonding agent.

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**4,019,759**

## INDEXING SYSTEM

**Bernard M. Stanton, 4605 Ocean Front Ave., Virginia Beach, Va. 23451**

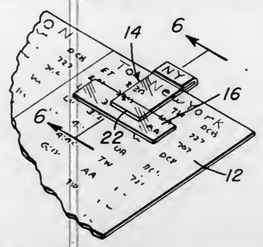
**Filed Jan. 20, 1976, Ser. No. 650,709**

**Int. Cl.² B42F** *22/00*

**U.S. Cl. 283—42** **9 Claims**

**1.** In a multiple page book, an index system comprising index tabs associated with selected pages of the book, and mounting means removably securing each tab on the associated page, each of said index tabs comprising a flat strip of transparent material, each tab overlying one edge of the associated page and projecting both outwardly and inwardly of said one edge, said tab terminating in an inner end inwardly spaced from said one edge, said mounting means comprising transparent adhesive tape overlying and affixed to said inner end and the portion of the tab immediately adjacent thereto,





said tape projecting inwardly beyond said inner end and being secured to the associated page, thereby fixing said tab to the page in a manner whereby the tab can pivot upwardly away from said page about the inner end for a complete exposure of said tab, without stripping of that portion of the tape inward of the inner edge, to enable a stripping of the tab from the page secured tape and a repositioning of the tape on the page.

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**4,019,760**

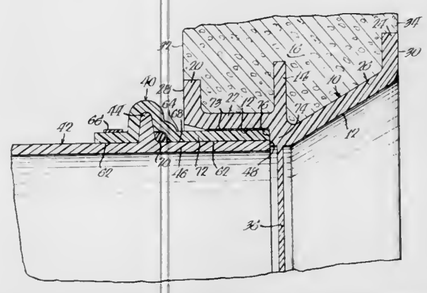
## DEVICE FOR CONNECTING CONDUIT TO A MANHOLE OR THE LIKE

**Kenneth F. Streit, Mount Prospect, Ill., assignor to Phone-Ducs, Inc., West Chicago, Ill.**

**Filed Jan. 27, 1975, Ser. No. 544,379**

**Int. Cl.² E04C** *1/39*

**U.S. Cl. 285—3** **18 Claims**



**1.** A device suitable for connecting a conduit section having a longitudinal axis to a manhole having a vertical wall, comprising:

an adapter having inner walls and at least one outwardly disposed rib, said adapter being embedded in the wall of said manhole with each said rib preventing movement of said adapter perpendicularly to said manhole wall, said adapter having a first end portion directed toward said conduit,

said conduit having a first end portion with an outer surface,

a coupling sleeve juxtaposed to said outer surface of said conduit along said first end portion of said conduit,

mens for claimping said coupling sleeve to said conduit,

cooperating rib and recess means on said sleeve and said conduit means for preventing longitudinal movement of said coupling sleeve relative to said conduit.

said first emnd portion of said adapter having an inside transverse dimension which is greater than the outside transverse dimension of said coupling sleeve along said first end portion of said conduit when said coupling sleeve is juxtaposed to said conduit,

sealing means for securing said coupling sleeve to said adapter along said first end portion of said adapter,

said first end portion of said conduit and said coupling sleeve being insertable into said first end portion of said adapter for securement thereto to connect said conduit to said manhole.

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**4,019,761**

## CONNECTION FOR FOAM INSULATED PIPES

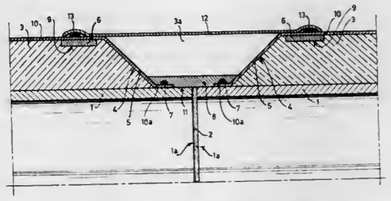
**Gerrit Heidemann, Oldenzaal, Netherlands, assignor to Industriele Onderneming Wavin N.V., Zwolle, Netherlands**

**Filed Jan. 7, 1972, Ser. No. 216,052**

**Claims priority, application Netherlands, Jan. 8, 1971, 7100216**

**Int. Cl.² F16L** *59/14*

**U.S. Cl. 285—47** **3 Claims**



**1.** A pipe connection comprising two aligned pipes having opposed ends which are secured together, each pipe including an external layer of foam plastic material thereon, said layer of foam material not extending to the end of the respective pipe so that the layers on the secured pipes define a space therebetween, a finishing cover layer of thermoplastic material on each said foam layer, said finishing layer being of substantially uniform thickness, an elastic sealing ring mounted on the finishing layer on each pipe proximate the end thereof, a sleeve enclosing said space and having ends surrounding the rings, said sleeve being heat shrunk onto the finishing layers to compress the sealing rings, said finishing layer of thermoplastic material tending to creep under the pressure applied to the sealing rings, and a ring of rigid material embedded in each layer of foam plastic material underneath the finishing layer in the region of the associated sealing ring to prevent deformation of the finishing layer and presserve the seal thereat, said ring being cylindrical and having a rectangular cross-section of greater thickness than the finishing layer with opposed parallel side surfaces in abutment with the foam plastic material in which it is embedded, a bottom surface resting on the foam plastic material, and an upper surface flush with the upper surface of the foam layer and in contact with said finishing layer.

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**4,019,762**

## RAINTIGHT CONNECTOR FOR ELECTRICAL CONDUIT

**Jonah Eidelberg, Huntington Station; Thomas Mooney, Mount Sinai, and Richard A. Bauer, Mastic Beach, all of N.Y., assignors to I-T-E Imperial Corporation, E. Farmingdale, N.Y.**

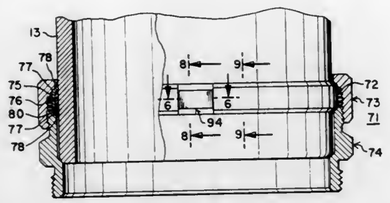
**Continuation-in-part of Ser. No. 501,084, Aug. 27, 1974, abandoned, which is a continuation of Ser. No. 297,657, Oct. 16, 1972, abandoned. This application Apr. 11, 1975, Ser. No. 567,378**

**Int. Cl.² F16L** *19/08*

**U.S. Cl. 285—340** **5 Claims**

**1.** A connector device for an electrical conduit comprising first and second collars having mating inner and outer threaded sections and inner axially spaced confronting faces delineating an annular space, a first relatively soft deformable sealing ring registering with said annular space and a second relatively stiff ring of a resilient metal encircling said first ring and split across the circumference thereof to form confronting end faces and including tongues of reduced width directed toward each other and extending from said end faces, said first

ring having a protuberance extending radially outwardly therefrom into the circumference of said second ring and disposed between said ring end faces, said protuberance having a longitudinal bore peripherally aligned with and engaged



by said tongues, said split ring being entrapped between said collar confronting faces and being compressible thereby to bring said ring end faces into compressible sealing engagement within said protuberance.

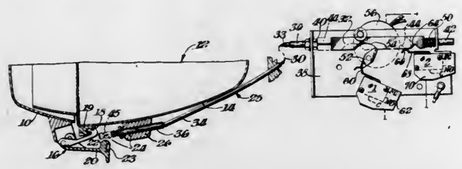
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**4,019,763**

## SAFETY LOCKING MECHANISM

**William David Webb, Sr., Huntington, Conn., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Jan. 21, 1976, Ser. No. 651,116**
**Int. Cl.² E05C** *3/06, 13/04*
**U.S. Cl. 292—207** **13 Claims**



1. A safety locking mechanism for a closure assembly on a compartment housing a centrifuge rotor to be protected against, said rotor having a driving motor, said mechanism having a mechanical linkage positionable to lock and unlock said closure assembly when said assembly is in a lockable position comprising, in combination,

driven means connected to position said mechanical linkage to lock and unlock said closure assembly,

prime mover means for driving said driven means and hence said mechanical linkage in a first sense to a first position when said rotor is stopped;

spring means for driving said driven means in a second sense opposite said first sense to a second position to lock said closure assembly when said assembly is in said lockable position, and

first sensing means electrically coupled to said motor and responsive to said driven means being in said second position for enabling said motor.

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**4,019,764**

## CLAMPING DEVICE ADAPTED TO CLAMP PLATE-LIKE MEMBERS

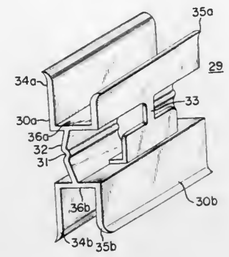
**Kouichi Okamura, Fukuoka, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Japan**

**Filed Dec. 3, 1975, Ser. No. 637,301**
**Claims priority, application Japan, Dec. 10, 1974, 49-96369; Feb. 17, 1975, 50-22143; Feb. 17, 1975, 50-24074; Feb. 17, 1975, 50-24094**
**Int. Cl.² E05C** *19/18*
**U.S. Cl. 292—288** **7 Claims**

1. A clamping device for clamping plate-like members comprising

a. two clamping members having a substantially U-shaped cross sectional configuration;

b. an interconnecting member interconnecting between said two clamping members comprising two web members rigidly connected to said clamping members, a hinge portion formed between said web members for permitting mutual rotation of said web members, each web member and its rigidly connected clamping member forming a clamping sub-assembly; and



c. an intermediate member formed integrally with one of said two clamping sub-assemblies and extending toward the other clamping sub-assembly a distance sufficient to contact said other sub-assembly when the closed ends of the U-shaped cross sectional configuration are parallel, thereby preventing further rotation of said extended interconnecting member.

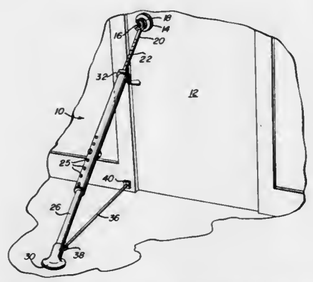
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**4,019,765**

## DOOR SECURITY GUARD

**Vernon A. Nichola, Dodgeville, Mich., assignor to Nichola-Vern, Inc., Dodgeville, Mich.**

**Filed Oct. 29, 1975, Ser. No. 627,013**
**Int. Cl.² E05C** *17/44*
**U.S. Cl. 292—338** **6 Claims**



1. A security guard device for a door mounted in a doorjamb; a main adjustable body structure, second adjustable means provided thereon for permitting a fine adjustment of the device, means for attaching the device to a door, and further means for engaging the floor to thereby prevent the door from being opened, still further means to prevent the means for engaging the floor from slipping on same, and the means for engaging the floor including a floor-engaging foot and the still further means preventing slipping being an additional member of solid material attached between the foot and the doorjamb.

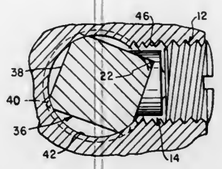


**4,019,766**

## SETTING MEANS FOR DOORLOCK ASSEMBLIES

**Andrew D. Hall, David's Hill Road, Bedford Hills, N.Y. 10507**

**Filed Oct. 20, 1975, Ser. No. 623,770**
**Int. Cl.² E05C** *19/00*
**U.S. Cl. 292—350** **12 Claims**



1. In a door handle mechanism having a threaded operating shaft with a polygonal cross-sectional shape, a handle threaded onto one end of the shaft, a tapped hole in said handle communicating with the peripheral side surface of the operating shaft, and setting means, including a threaded member, for threading into the tapped hole and into engagement with the peripheral side surface of the shaft to secure the handle on the shaft against rotation, the improvement in the setting means comprising:

a. a shaft engaging member positioned at the leading end of the threaded member for engaging against the side surface of the shaft upon rotation of the threaded member into said tapped hole, said engaging member including:

1. locking means for engaging against one of the corners of the side surface of the shaft for holding the handle against rotation with said corner facing into said tapped hole; and

b. coupling means for rotatably attaching the shaft engaging member to said threaded member.

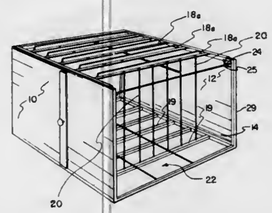
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**4,019,767**

## QUICKLY ATTACHABLE AND DETACHABLE TINE FRAME FOR A TOBACCO BOX RACK

**Dalma Therman Edwards, and Gene Strickland, both of Springhope, N.C. 27882**

**Filed July 22, 1976, Ser. No. 707,689**
**Int. Cl.² A24B** *1/08*
**U.S. Cl. 294—5.5** **9 Claims**



6. A quickly attachable and detachable tine frame for attachment to an open top tobacco box rack for storing and curing tobacco leaves, the box rack being of a type having a bottom, an open top, a pair of opposite sides, and a pair of opposite ends, each of the ends of said pair of ends having a top transverse retaining member connected between said opposite sides, said tine frame having rigid hooking members at opposite ends thereof for sliding engagement beneath the top transverse retaining members at the opposite ends of the box rack for quickly attaching and detaching said tine frame to said box rack over said open top, said tine frame being attachable to said box rack by first sliding the hooking members at one end of the tine frame under the top transverse retaining member at one end of the box until the hooking members at the other end of the tine frame clear the transverse retaining member at the other end of the box rack, lowering the other end of the tine frame until the hooking members at said other end of the tine frame are at a level to just slide beneath the top transverse retaining member at the other end of the box rack, and sliding said tine frame at said level toward the other end of the box rack until said hooking members at said other end of tine frame are engaged under the top retaining member at the other end of the box rack.

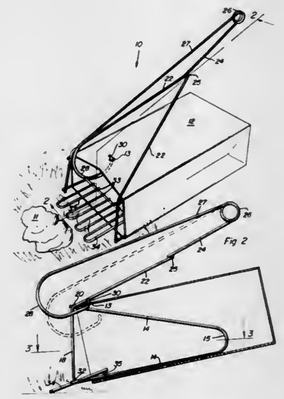
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**4,019,768**

## DEVICE FOR SANITARY PICKUP OF GROUND DEPOSITED EXCREMENT

**Melvin L. Niece, Lakeview, Ohio, assignor to NBS Incorporated, Huntsville, Ohio**

**Filed Nov. 5, 1975, Ser. No. 629,615**
**Int. Cl.² A47F** *13/06*
**U.S. Cl. 294—19 R** **8 Claims**



1. A device for sanitary pickup of ground deposited excrement comprising; a frame structure for supporting a conventional type bag in an open position thereon, a handle attached to said frame structure, hook means associated with said handle to positively yet releasably retain the open bag on said frame and also to positively release the bag, and further means attached to said frame for contacting excrement to be picked up, the means associated with the handle to positively yet releasably retain the open bag includes two rod portions connected by a convolute spring portion at on end of said rod portions and the other end of one of the rod portions having a bag engaging hook thereon, the convolute spring permitting a releasing action of the bag by the hook when the rod portions are squeezed together by a user of the device.

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**4,019,769**

## SCREEN GRIPPER

**Arnold J. Filion, Apt. 308 1397 Beacon St., Brookline, Mass. 02146**

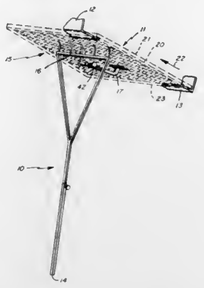
**Filed Jan. 19, 1976, Ser. No. 650,529**
**Int. Cl.² A47F** *13/06*
**U.S. Cl. 294—19 R** **7 Claims**

1. A hand-operated tool for use in removing and replacing grease screen and trap elements positioned at elevated locations in frame means for holding said elements in operative position, said tool comprising,

an elongated member having a hand gripping portion and carrying an element gripping and moving end spaced from said hand gripping portion,

said gripping and moving end comprising first means for engaging a first portion of said element and moving said

element to a release position to release a margin of said element from said frame means, and second means for supporting a second portion of said element by underlying said second portion to maintain said element in a predetermined plane and allow said element to be relocated to a desired area.



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**4,019,770**

## HOISTING HOOK ASSEMBLY AND METHOD FOR HOISTING A LOAD

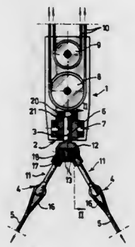
**Cornelis Frederikus Poelma, Nuenen; Alexandre Horowitz, Eindhoven, and Petrus Joseph Marie Verschure, Amsterdam, all of Netherlands, assignors to Varitrac A.G., Zug, Switzerland**

**Filed Jan. 27, 1976, Ser. No. 652,888**

**Claims priority, application Netherlands, Feb. 3, 1975, 7501270**

**Int. Cl.² B66C *1/14***

**U.S. Cl. 294—78 R** **9 Claims**



**1.** Hoisting hook assembly for hoisting a load by a plurality of load ropes comprising a block, a hoisting element on said block comprising a shaft, said shaft being rotatable around its vertical axis and supported in said block, said shaft further comprising a plurality of means for attaching the load ropes to the hoisting hook assembly, each of said means being rotatably attached to said shaft and capable of swinging about a center line situated in a plane perpendicular to said shaft.

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**4,019,771**

## RELEASABLE CONNECTOR HAVING IMPROVED LOAD CARRYING AND RELEASING CAPABILITY

**George R. Perez, Alexandria, Va., assignor to AMF Incorporated, White Plains, N.Y.**

**Filed May 20, 1976, Ser. No. 688,215**

**Int. Cl.² B66C *1/34***

**U.S. Cl. 294—83 R** **8 Claims**

**1.** In a releasable connector apparatus the combination comprising,

first and second rigid side plates,

means including first and second shafts for maintaining said side plates in spaced parallel relationship,

means extending between said side plates for attaching said apparatus to support means,

said first and second shafts extending between the side plates at respective regions on opposite sides of a transverse plane through the central regions of the side plates,

the second one of the shafts being freely rotatable,

pivot arm means extending outwardly from the second shaft and between the side plates,

a fulcrum plate having a pivot means on one end region for pivotally engaging the top region and one side region only of the first shaft,

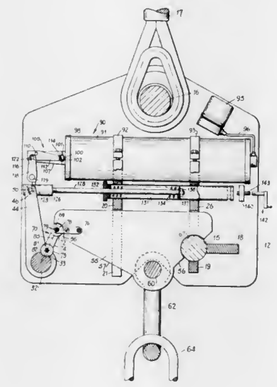
said pivot means permitting disengagement of the fulcrum plate from the first shaft upon pivotal rotation of the fulcrum plate by a given angle in a given direction,

the fulcrum plate having a length to pass freely by the second shaft when it pivotally rotates through said given angle in said given direction,

a cam surface in the second shaft,

elongated latch means pivotally engaging said cam surface on one end and pivotally engaging the opposite end of the fulcrum plate,

means for attaching a load to the fulcrum plate at a location thereon closer the first shaft than the second shaft, whereby the first shaft carries a major portion of said load,



said latch means releasably supporting the opposite end of the fulcrum plate on said second shaft and the cam surface in the second shaft being angularly positioned to receive the weight of the load transmitted thereto in a direction substantially only radial, whereby said load produces substantially no rotational force on the second shaft,

spring loaded means coupled to the outward end of the pivot arm means for applying a force to rotate the pivot arm means toward the fulcrum plate and rotate the second shaft to disengage the latch means therefrom,

releasable restraining means for restraining said spring loaded means and thus preventing rotation of the pivot arm means, and

release means operable to release said releasable restraining means for permitting said spring loaded means to rotate the pivot arm means and rotate the cam surface by an angle sufficient to cause the latch means to freely release from the cam surface,

said fulcrum plate being pivoted in said given direction about the first shaft by the load upon release of the latch means and pivoting through said given angle to fall free of the first shaft and away from the side plates.



**4,019,772**

## HOSPITAL TROLLEYS

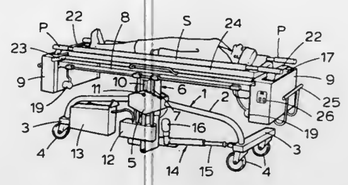
**Norman John Lee, London, England, assignor to Matburn (Holdings) Limited, London, England**

**Filed Aug. 27, 1975, Ser. No. 608,171**

**Claims priority, application United Kingdom, Feb. 7, 1975, 5289/75**

**Int. Cl.² A61G *1/00***

**U.S. Cl. 296—20** **3 Claims**



**1.** A hospital transfer trolley comprising a wheeled undercarriage; a left ram mounted on the undercarriage and movable up and down with respect to the undercarriage, said left ram being tiltable about a horizontal pivot; an upper frame mounted on the left ram and means to raise, lower, or tilt said frame selectively in response to varying positions of the ram, the upper frame having parallel end pieces sufficiently transversely spaced from each other to receive therebetween a hospital bed, operation table or trolley, opposed tracks in the end pieces, the end pieces being provided with lift members which can be raised or lowered with respect to the end pieces; a patient supporting element which can be inserted in the opposed tracks in the end pieces said element being movable to and from a position in which it is supported below a stretcher or the like supported by the lift members in a raised position; power means for selectively raising, lowering or tilting the ram, and power means for selectively raising and lowering the end pieces and wherein said undercarriage is U-shaped and comprises an elongated beam, two substantially parallel wheeled end pieces on which the ends of said beam are supported, a first central support column secured to said beam, a second support column pivotally mounted in said first support column and tiltable about a horizontal axis, a lift ram movable up and down within said second support column, an upper frame carried at the top of said lift ram, said upper frame including a side beam and parallel end pieces providing a U-shape generally coincidental with that of the undercarriage, and extendable braces connecting said pivotable support column with one of the end pieces of the undercarriage, and means for selectively extending or retracting said brace thereby to lift said second support column and also the upper frame about a horizontal axis.

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**4,019,773**

## MOBILE CARPET DISPLAY CENTER

**Floyd W. Vehling, 7234 E. Coronado Road, Scottsdale, Ariz. 85257**

**Filed Jan. 5, 1976, Ser. No. 646,847**

**Int. Cl.² B60P *3/02***

**U.S. Cl. 296—21** **2 Claims**

**1.** A self contained trailer for the promotion and selling of rolled merchandise such as carpet comprising:

a trailer having a wheel mounted trailer bed, a roof spaced from and mounted on said bed by substantially vertically positioned posts, and side and end members,

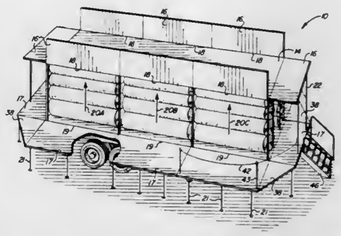
each of said side and end members comprising a plurality of flaps part of which are hingedly mounted adjacent the edges of said bed and the remainder hingedly mounted adjacent the edges of said roof, whereby when said flaps are rotated to a substantially vertical position said flaps cooperatively enclose the sides and ends of the trailer,

means for supporting said part of said flaps in a horizontal position when these flaps are rotated to a horizontal position to form a walk around the sides and ends of said bed,

a pair of racks each mounted longitudinally of the bed and each adjacent a different edge of said bed within the trailer for supporting longitudinally of the bed a plurality of substantially horizontally positioned rolls of merchandise,

said racks being spaced from each other to provide a walk space therebetween,

each of said racks comprises at least a pair of sections axially aligned and each section mounting in a vertical array a plurality of substantially horizontally positioned rolls of merchandise,



mounting means comprising a hook-shaped configuration opening upwardly toward said roof provided on each of said sections of said pairs of racks for rotatively supporting and mounting the rolls of merchandise,

motor means mountable on each of said racks for rotating said rolls of merchandise, and

step means hingedly mounted to an edge of a flap hingedly mounted to one end of said truck bed for pivotal movement away from said truck bed for resting on the ground to provide steps for ascending to the walk around the truck bed, and when pivotally rotated in the opposite direction moving into said walk space for storage purposes.

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**4,019,774**

## MOTORCYCLE FAIRING

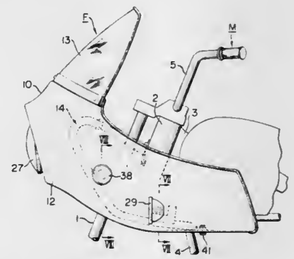
**Takeshi Tsukahara, Kawagoe; Minoru Morioka, Niiza; Yoichi Oguma, Asaka, and Yoshitaka Omori, Wako, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Oct. 24, 1975, Ser. No. 625,518**

**Claims priority, application Japan, Aug. 15, 1975, 50-99598**

**Int. Cl.² B62J *17/00***

**U.S. Cl. 296—78.1** **4 Claims**



**1.** A fairing for a motorcycle having a tubular head post with left and right handlebars, and a pair of left and right side frame members extending rearwardly and downwardly, said fairing comprising: a windshield including a lower section shaped to cover the front portion of the motorcycle to which the fairing

is fitted and an upper transparent section connected to said lower section so as to be upstanding therefrom and disposed in front of the handle bars of the motorcycle, a supporting yoke fixedly secured to the inside of the windshield, an instrument panel supported by said yoke in a position below said upper windshield section on the inside thereof, said yoke comprising a framework including a central rod having a rear end detachably connected to and extending forwardly from said head post, and a pair of side rod portions initially extending laterally from the front end of said central rod in opposite directions and then forwardly together to form a forwardly open U-shaped yoke portion within which said instrument panel is disposed, said side rod portions further extending downwardly and rearwardly from said U-shaped yoke portion for detachable connection at the rear ends to the frame of the motorcycle at respective locations thereon so as to define, together with the connection point of said central rod with said head post, three apexes of an isosceles triangle, a headlight mounted in an opening provided in the front portion of said lower windshield section, a pair of left and right direction indicators disposed outside opposite side portions of said lower windshield section, and connection means on said supporting yoke for detachably connecting the latter to said head post and to the bottom portions of the side frame members of the motorcycle, respectively.

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**4,019,775**

## SLIDING DOOR FOR VEHICLES, ESPECIALLY AUTOMOBILES

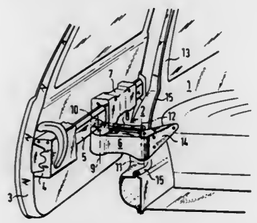
**Alfred Grossbach, Tamm, and Ralf Mertin, Sprockhovel, both of Germany, assignors to Lunke & Sohn GmbH, Witten (Ruhr), Germany**

**Filed Sept. 18, 1975, Ser. No. 614,647**

**Claims priority, application Germany, Oct. 7, 1974, 2447698**

**Int. Cl.² B60J** *5/06*

**U.S. Cl. 296—155** **3 Claims**



1. A sliding door assembly for motor vehicles mounting a vehicle door upon a generally vertically oriented side wall of a vehicle body for movement between a closed position flush with the side wall and an open position generally parallel to the side wall, said assembly comprising a horizontal guide bar affixed to said door and extending across the width thereof, a guide head slidably receiving said guide bar to enable relative sliding movement of said door, a horizontally extending parallelogram linkage system swivelly mounting said guide head upon said vehicle body, said parallelogram linkage system comprising a horizontal supporting arm having a pair of ends, a first pivot mounting one end of said supporting arm to said vehicle body, a second pivot mounting the other end of said supported arm to said guide head, a guide rod having a pair of ends, a third pivot mounting one end of said guide rod to said vehicle body, a fourth pivot mounting the other end of said guide rod to said guide head, each of said first, second, their and fourth pivots having a vertical pivot axis and arranged with the distance between said first and second pivots being equivalent to the distance between said third and fourth pivots and with the distance between said first and third pivots being equivalent to the distance between said second and fourth pivots.

**4,019,776**

## REPLACEABLE SEAT COVER

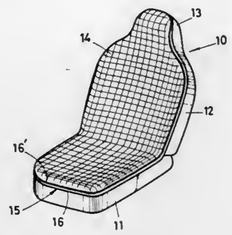
**Ikuo Takamatsu, Uozu, Japan, assignor to Yoshida Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Jan. 22, 1976, Ser. No. 651,403**

**Claims priority, application Japan, Feb. 3, 1975, 50-15765[U]**

**Int. Cl.² A47C** *27/00*

**U.S. Cl. 297—219** **4 Claims**



1. A seat construction comprising:

a. a seat base having a generally horizontal seat portion and a generally vertical back portion, said seat and back portions meeting along a linear line to provide a continuous front surface and a continuous peripheral surface on said seat base;

b. a seat cover covering the entire front surface of said seat base, said seat cover being substantially complementary in shape to the front surface of said seat base and having a periphery coextensive with the peripheral surface on the seat base; and

c. a sliding clasp fastener directly detachably attaching said seat cover to said seat base substantially completely thereabout, said sliding clasp fastener including a pair of stringer tapes carrying along their longitudinal edges rows of interengageable fastener elements, a slider movable along the rows of fastener elements to close and open said sliding clasp fastener, and a pair of end stops secured to opposite ends of said sliding clasp fastener, one of said stringer tapes being secured to and extending along substantially the complete periphery of said seat cover, and the other of said stringer tapes being secured to and extending along substantially the complete peripheral surface of said seat base, whereby the detachable attaching of the seat cover to the seat base is effected completely thereabout.

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**4,019,777**

## LUMBAR SUPPORT REGULATING APPARATUS

**Masayuki Hayashi, Toyohashi, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Kariya, Japan**

**Filed Jan. 30, 1976, Ser. No. 653,692**

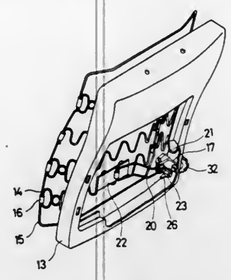
**Claims priority, application Japan, Feb. 6, 1975, 50-15594**

**Int. Cl.² A47C** *3/00*

**U.S. Cl. 297—284** **6 Claims**

1. A lumbar support regulating apparatus comprising a seat back having a rigid frame, spring means provided on said seat back, a torsion spring, pivot means on said frame pivotally supporting said torsion spring, a plate member connected to said torsion spring and disposed between said spring means and said torsion spring to distribute the force of said torsion spring to said spring means and a screw regulating means mounted for rotation on said frame and operatively connected to the other end of said torsion spring whereby upon rotation of said screw regulating means said torsion spring is rotated about said pivot means to vary the force said one end of said torsion spring exerts on said spring means, said screw regulating means being provided with stop means to limit the movement of said other end of said torsion spring.





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**4,019,778**

## DENTAL PATIENTS' CHAIR WITH A PARALLELOGRAM SUPPORTING ARM

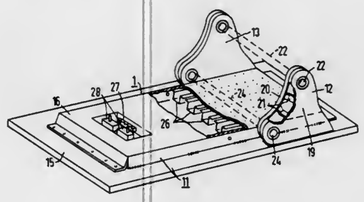
**Erich Heubeck, Bensheim, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany**

**Continuation of Ser. No. 407,257, Oct. 17, 1973, abandoned. This application May 30, 1975, Ser. No. 582,163**

**Claims priority, application Germany, Oct. 21, 1972, 2251809**

**Int. Cl.² A47C** *3/20*

**U.S. Cl. 297—346** **3 Claims**



1. A dental patients' chair, comprising a base having a horizontal substantially rectangular base part consisting of a bottom part which consists of a metal plate and a box-shaped cover with edges welded to the bottom part to form an elongated flat hollow box, a seat, two parallelogram supporting arms each having an end carrying said seat, two parallel short side pieces, each of said side pieces consisting of two half shells welded to each other, said side pieces being welded to opposite sides of said hollow box close to an end thereof, bearing axles carried by said side pieces and connected with the other ends of said supporting arms, said side pieces extending upwardly only a short distance from said box to said bearing axles, and struts located within said box and extending parallel to its longitudinal sides for strenthening the box.

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**4,019,779**

## LAMINATED ARMREST

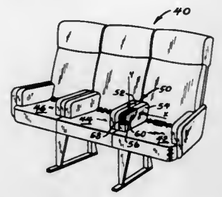
**Gerard T. Hogan, Southington, Conn., assignor to Universal Oil Products Company, Des Plaines, Ill.**

**Division of Ser. No. 537,482, Dec. 30, 1974, abandoned. This application Sept. 8, 1975, Ser. No. 611,475**

**Int. Cl.² A47C** *7/54*

**U.S. Cl. 297—411** **1 Claim**

1. In combination, a multi-passenger seat and an armrest for separating a pair of adjacent seating positions thereon, the armrest having a pair of armrest portions on either side of a rigid central support member, said armrest portions offering greater resistance to loading in a vertical direction than in a sideways direction so that their deflection for a given loading is at least three times greater sideways than downwardly, said armrest portions each comprising a plurality of spaced layers of relatively rigid foam and a plurality of spaced layers of relatively soft foam, said soft foam layers having a thickness not exceeding about one inch and said rigid foam layers being of lesser thickness, said rigid foam layers and said soft foam layers being alternately bonded to each other in vertical planes and attached to each side of said rigid central support member.



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**4,019,780**

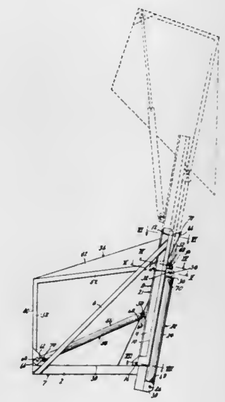
## DUMP TRUCK BED

**Jerald W. Bishop, Osborne, Kans., assignor to Gilmore-Tatge Manufacturing Co., Inc., Clay Center, Kans.**

**Filed Nov. 19, 1975, Ser. No. 633,423**

**Int. Cl.² B60P** *1/34*

**U.S. Cl. 298—11** **5 Claims**



1. A dump truck bed comprising:

a. a frame including a base adapted to be mounted on a wheeled truck chassis, and one or more rigid posts affixed to said base and projecting upwardly therefrom,

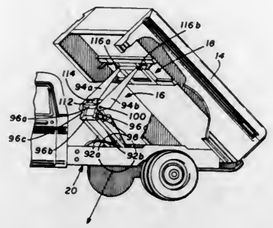
b. a carriage mounted on said frame for vertical movement relative thereto, and including a generally tubular slide mounted telescopingly on each of said posts,

c. a first power means operable to raise said carriage relative to said frame, said carriage elevating means comprising a hydraulic ram extending parallel to each of said posts and interconnecting said post to its associated slide,

d. a normally upright dump bucket mounted in said carriage for pivotal movement relative thereto on a horizontal axis parallel to and adjacent one of its upper side edges, and

e. a second power means operable to pivot said bucket relative to said carriage to a generally inverted position to dump its contents, said first and second power means being operable independently of each other whereby said bucket may be dumped at any desired position in its range of vertical movement.

**4,019,781**
**HYDRAULIC HOIST FOR PICKUP BED**
**Louis M. Ray, 11027 Ferguson Road, Dallas, Tex. 75228**
**Filed Nov. 10, 1975, Ser. No. 630,290**
**Int. Cl.² B60P *1/16***
**U.S. Cl. 298—22 J** **10 Claims**



1. An attachment for converting a fixed bed truck with a passenger cab and hauling bed supported on a frame to a tilting bed truck where the truck bed may be rotated from a horizontal to a tilt position, such attachment permitting the truck cab and bed, when the bed is in the horizontal position, to assume the same relative relationship as before the conversion, comprising:

at least two hinges fixedly attached between the underside of the hauling bed and the rear of the truck frame to permit relative rotation between the hauling bed and frame,

a first arm pivotally connected at one of its ends to the forward portion of the frame and extending forwardly from the frame,

a second arm pivotally connected at one of its ends to the underside of the truck bed adjacent the forward end thereof and extending forwardly from the truck bed,

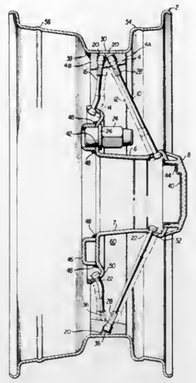
a coupling member pivotally connected at its opposite ends between said other ends of said first and second arms,

a variable length actuator arm interconnected between said first and said second arm for exerting a lifting force between the frame and second arms when said actuator arm is extended such that said second arm is moved substantially longitudinally against said truck bed to tilt the bed rearwardly, and for retracting the truck bed when said actuator arm is retracted by causing said second arm to move downwardly with said first arm and said coupling member.

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**4,019,782**
**AUTOMOTIVE WIRE WHEEL AND MANUFACTURING METHOD**
**Merlyn R. Reppert, Torrance, Calif., assignor to W. R. Grace & Co., New York, N.Y.**
**Filed May 2, 1975, Ser. No. 573,870**
**Int. Cl.² B60B *1/04***
**U.S. Cl. 301—58** **13 Claims**

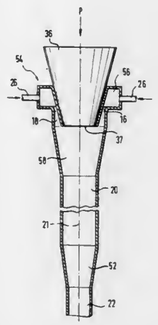
1. In a metal spoked automotive wheel comprising a tubeless tire rim with a drop center, a hub having openings for receiving wire spokes, a plurality of wire spokes extending radially outward from the hub and having threads to cooperate with threaded spoke nipples; the improvement comprising a solid metal felly of substantially uniform solid cross-sectional configuration and comprising an inner annular surface and having nipple receiving holes formed therein at varying predetermined positions and angles for cooperation with the hub



openings to mount the spokes therebetween, and means to integrally join said felly to the rim drop center.

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**4,019,783**
**PROCESS AND APPARATUS FOR CONTINUOUSLY CONVEYING PARTICULATE MATERIAL**
**Lutz Tilo Kayser, Am Bismarckturm 10, Stuttgart, Germany**
**Filed July 28, 1975, Ser. No. 599,546**
**Claims priority, application Germany, Aug. 6, 1974, 2437856**
**Int. Cl.² B65G *53/14, 53/42***
**U.S. Cl. 302—25** **20 Claims**

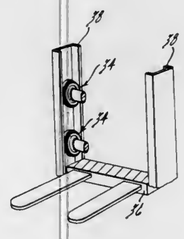


11. A conveyor for particulate material, particularly for continuously transporting coal dust particles towards a combustion chamber, comprising means for conveying a stream of carrier fluid at predetermined pressure along a path; means in the path for reducing the predetermined pressure of the stream, said reducing means including a nozzle having an upstream converging section provided with a discharge gap at which it communicates with the path, and a downstream diverging section for diffusing the stream and generating a low pressure zone at a downstream portion of the path; a chamber downstream of and in communication with said diverging section; and means for admitting particulate material into the presence of the stream passing through said chamber, said admitting means including a container having an outlet opening for centrally admitting particulate material into said chamber in direction of the path, said outlet opening being located in said downstream portion of the path and downstream of said gap so as to admit the particulate material at said low pressure zone free of agglomerations, and said outlet opening being surrounded by said diverging section so that the stream issuing therefrom towards said chamber forms an envelope about the particulate material therein to thereby entrain and uniformly mix the particulate material.



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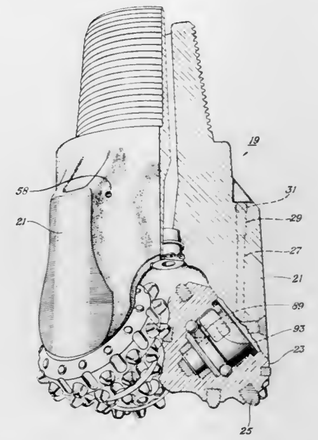
**4,019,784**
**HIGH-IMPACT CAPACITY BAIL BEARING ASSEMBLY**
**Eli M. Ladin, Ann Arbor, Mich., and Paul D. Green, Shelbyville, Ind., assignors to Federal-Mogul Corporation, Southfield, Mich.**
**Filed Nov. 12, 1973, Ser. No. 414,803**
**Int. Cl.² F16C *17/00***
**U.S. Cl. 308—6 R** **6 Claims**



2. In a fork lift vehicle lifting mechanism including a lift member mounted for guided movement along upright guide channels, the improvement comprising a plurality of high impact, high load capacity anti-friction bearing wheel assemblies rotatably mounted on the lift member and disposed in guided engagement with the guide channels, each wheel assembly comprising a bearing assembly and an annular wheel member therearound, each bearing assembly comprising a steel inner race member formed with a radial outwardly facing annular raceway extending around the outside thereof and disposed coaxial with the axis of rotation of said wheel assembly, a steel outer race member circumferentially encompassing and disposed radially outwardly of said inner race member and formed with an inward facing annular raceway extending around the inside thereof coaxial with the axis of rotation of said wheel assembly, said outer race member including an axially and radially extending crack line to permit the adjacent ends thereof to be pulled apart during assembly of said bearing assembly to insert the maximum number of bearing elements between the annular raceways as permitted by the geometry thereof, a plurality of generally spheroidal anti-friction bearing elements confined between said outer and said inner race member and riding in the annular raceways thereof, each said annular raceway formed in axial cross section to provide a two-point contact with each bearing element, the points of contact of each raceway with each bearing element being at points disposed on opposite sides of an imaginary line extending through the center of said bearing element perpendicular to the axis of said bearing assembly, said annular wheel member formed with an axially extending aperture for receiving and circumferentially encompassing said outer race member in an interference fit for retaining and supporting the cracked said outer race member, said wheel member composed of a material having physical characteristics providing greater impact resistance and toughness than either of the race members whereby the impact loads sustained by the lifting mechanism are absorbed within the wheel member and a substantially decreased load is transferred to the bearing elements.

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**4,019,785**
**DRILL BIT UTILIZING LUBRICANT THERMAL EXPANSION AND RELIEF VALVE FOR PRESSURE CONTROL**
**Leon Berthal Stinson, and Edward Milburn Galle, both of Houston, Tex., assignors to Hughes Tool Company, Houston, Tex.**
**Filed May 30, 1975, Ser. No. 582,506**
**Int. Cl.² F16C *19/00***
**U.S. Cl. 308—8.2** **9 Claims**



1. In an earth boring drill bit having a rotatable cutter retained on a bearing shaft, a lubrication system, and seal means between the cutter and shaft, the improvement comprising:

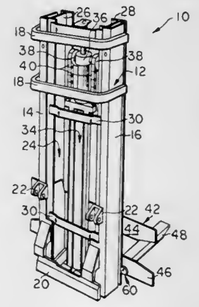
lubricant in a closed and rigid cavity of a lubrication system isolated from external pressure except for displacement of the seal means;

pressure relief means in the lubricant system to discharge lubricant responsive to thermally induced expansion;

said lubrication system pressure being controlled by the pressure relief means.

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**4,019,786**
**SHIELDED SIDE THRUST ROLLER ASSEMBLY FOR LIFT TRUCK MAST UNITS**
**William T. Yarris, Brookpark, Ohio, assignor to Towmotor Corporation, Mentor, Ohio**
**Filed Apr. 30, 1975, Ser. No. 573,207**
**Int. Cl.² F16C *17/00*; B65G *47/00*; B66B *9/20***
**U.S. Cl. 308—6 R** **8 Claims**

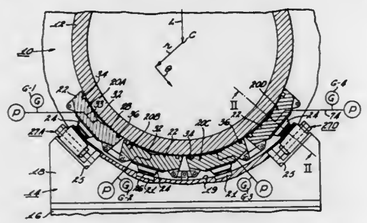


1. In a lift truck mast unit including an upright element having a lateral surface, a carriage being arranged for longitudinal movement relative to the upright element and motor

means for moving the carriage relative to the upright element,
a shielded side thrust roller assembly, comprising
a roller suitable for engagement along its periphery with the lateral surface of the upright element, the roller having a bore extending axially therethrough, the carriage forming a bore of different diameter than the bore in the roller and in axial alignment therewith,
an adjusting spacer having an irregular bore, the adjusting spacer being arranged between the roller and the carriage,
a thrust bearing arranged between the roller and adjusting spacer,
the adjusting spacer being formed with a counterbore facing the roller, the counterbore having a diameter slightly larger than the roller and an axial depth sufficient to receive the thrust bearing and an axial portion of the roller,
a shaft having segments formed to mate respectively with the bores in the roller, the adjusting spacer and the carriage, the shaft segments mating with the roller bore and carriage bore having their axes radially offset from each other in eccentric fashion, and
means for retaining the shaft within the roller bore and carriage bore.

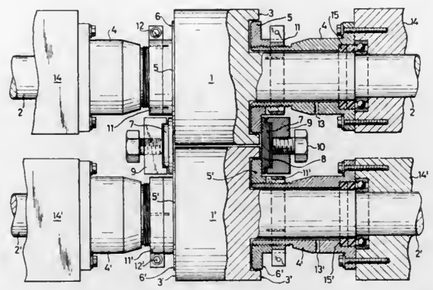
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**4,019,787**
**METHOD OF EQUALIZING RADIAL LOAD ON PLURALITY OF PIVOTED BEARING PADS**
**Raymond C. Jenness, Milwaukee, Wis., assignor to Allis-Chalmers Corporation, Milwaukee, Wis.**
**Division of Ser. No. 508,983, Sept. 25, 1974, Pat. No. 3,984,159. This application Apr. 30, 1976, Ser. No. 682,074**
**Int. Cl.² F16C** *11/02*
**U.S. Cl. 308—73** **7 Claims**



1. The method of substantially equalizing the radial load division between a plurality of pivoted bearing pads in a journal bearing of the type having in excess of two bearing pads spaced from each other circumferentially of the journal being supported and lying beneath the circumference of the journal and symmetrically positioned about the vertical axis of the bearing, and in which two of said bearing pads are located in a generally central region of the circumferential span of the plurality of bearing pads, and in which the support surfaces for said two bearing pads are substantially radially fixed, said method comprising the steps of:
a. Radially adjusting the position of the remainder of said bearing pads while supplying a pressurized hydraulic liquid to the interface between all of the bearing pads and the journal, the source of pressurized hydraulic liquid for each interface being substantially hydraulically isolated from the sources of hydraulic liquid for the other interfaces.
b. Obtaining an indication of the pressure of the hydraulic liquid at the respective interfaces between all of the respective bearing pads and the journal; and
c. Discontinuing the radial adjustment of said remainder of said bearing pads when the pressure readings at the respective interfaces of all of said bearing pads, (including said radially fixed bearing pads) are at a predetermined desired value.

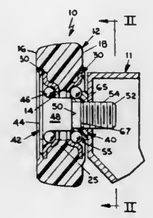
**4,019,788**
**SEALING DEVICE**
**Artur Buchalla, Bobingen, Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany**
**Filed Apr. 21, 1975, Ser. No. 570,226**
**Claims priority, application Germany, Feb. 13, 1975, 2506091**
**Int. Cl.² F16C** *33/76*
**U.S. Cl. 308—187.1** **3 Claims**



1. An end-face sealing device between rotating pairs of rolls supported by bearing blocks and stationary chambers of an apparatus, comprising sealing elements fitted in the end-faces of the rolls and sealing plates fitted in the side walls of the chambers in such a manner that they are pressed on the sealing elements, the improvement being characterized by means to mount the sealing elements in adjustable manner on parts of the apparatus which do not rotate and are stationary in relation to the shaft of the respective roll, the sealing elements being adjustably connected with the non rotating parts by means of supporting bodies, the stationary parts of the apparatus being the bearing blocks of the shafts, the supporting bodies being tubes surrounding the shafts of the rolls, the sealing elements having the shape of flanges, and screw threads adjustably connecting the flanges with the supporting bodies.

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**4,019,789**
**TROLLEY WHEEL**
**Walter M. Rosin, Grand Rapids; Douglas J. VanDerMeulen, Shelbyville, and Charles C. Frost, Grand Rapids, all of Mich., assignors to C. L. Frost & Son, Inc., Grand Rapids, Mich.**
**Filed May 10, 1976, Ser. No. 684,627**
**Int. Cl.² F16C** *33/00*
**U.S. Cl. 308—190** **16 Claims**



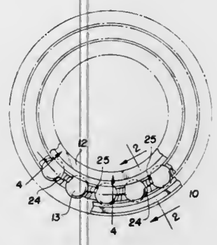
1. An antifriction trolley wheel assembly comprising a plastic wheel having a central opening and an axis therethrough; an annular, metallic, outer bearing race positioned on said wheel adjacent said opening; axial means extending through said opening having an annular, metallic, inner bearing raceway extending about at least a portion of said axial means and spaced from said outer race; a plurality of antifriction means disposed in said space defined between said race and raceway



for rotatably supporting said wheel and outer bearing race with respect to said inner raceway; said outer race including an annular, contoured portion matched to the contour of said antifriction means for rotational support thereof and an annular flange extending radially outwardly from said contoured portion and engaging said wheel, said flange having a noncircular circumferential edge engaging a similarly shaped portion of said wheel to prevent rotation of said outer race with respect to said wheel.

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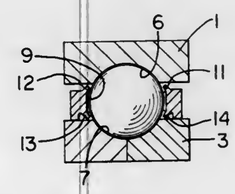
**4,019,790**
**BALL SEPARATOR FOR BALL BEARINGS**
**Melvin L. Earsley; Stephen L. Earsley, and James L. Earsley, all of 616 E. Slaton Road, Lubbock, Tex. 79404**
**Filed Apr. 22, 1976, Ser. No. 679,138**
**Int. Cl.² F16C** *19/20*
**U.S. Cl. 308—201** **15 Claims**



1. A ball separator for use in a ball bearing which includes an outer race, an inner race, and a plurality of balls coacting with said outer and inner races; said ball separator including an annular base, a plurality of annularly spaced fingers projecting generally axially from said base defining an interrupted annular rib adapted to be received between the outer and inner races of said ball bearing assembly, said rib fingers defining individual annularly spaced ball enclosing pockets; the improvement comprising
each of said fingers comprising a pedestal for at least two independently flexing ears which are integral extensions of the pedestal; said at-least-two ears being radially separate and partially overlapping, and with the distal ends thereof projecting axially from the pedestal and into respective adjacent pockets, whereby each pocket is partially defined by reentrant ears of its associated fingers.

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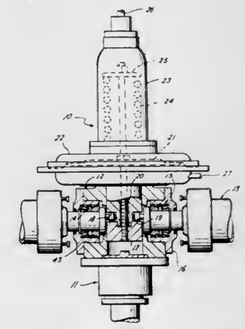
**4,019,791**
**BALL BEARING RETENTION CONSTRUCTION**
**Grant M. Loberg, Los Angeles, Calif., assignor to Industrial Tectonics, Inc., Ann Arbor, Mich.**
**Filed Dec. 10, 1975, Ser. No. 639,287**
**Int. Cl.² F16C** *19/20*
**U.S. Cl. 308—217** **16 Claims**



1. A retainer for ball bearings, comprising:
an annulus having radially inner and outer faces;
means defining a plurality of circumferentially spaced openings in said annulus, said openings extending substantially radially through said inner and outer faces;
at least one bearing retaining fin or one of said faces, said fin being directed radially and away from said one face of said annulus, said fin extending circumferentially of said annulus in one of tangential and intercepted relation with said openings, one radially extending surface of said fin being flush with and continuing from the perpheral wall of said opening, said fin being bendable axially inward of said annulus to a radial-axial angled position in which its said one surface overlaps part of said opening for retaining of a ball therein.

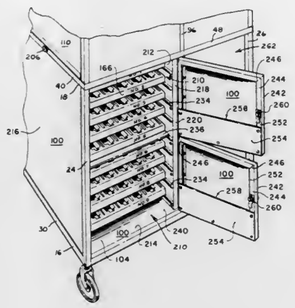
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**4,019,792**
**BEARING ASSEMBLY**
**Robert C. Monroe, Houston, Tex., assignor to Hudson Products Corporation, Houston, Tex.**
**Filed Apr. 29, 1976, Ser. No. 681,567**
**Int. Cl.² F16C** *19/00*
**U.S. Cl. 308—219** **8 Claims**



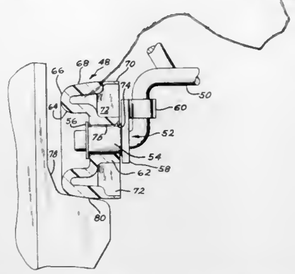
1. In combination with apparatus which includes a bearing housing and a shaft which is disposed concentrically within the housing to provide an annular space between its outer circumference and the inner circumference of the housing, and wherein the outer circumference of the shaft and the inner circumference of the housing have oppositely facing end surfaces at opposite ends of the space; a bearing assembly comprising first and second, bearing elements surrounding the shaft within the space in axially spaced relation, each bearing element including a radially inner part which is rotatable with the shaft and a radially outer bearing part which is held against rotation with the inner part, and a spacer disposed between oppositely facing end surfaces on the outer bearing parts of the first and second bearing elements, the outer part of each bearing element comprising a body having a conically shaped inner surface over which the outer surface of the inner part thereof is slidable, with the conically shaped surface of the first bearing element being divergent in a direction toward the end surface of the shaft, and the conically shaped surface of the second bearing element being divergent in a direction toward the end surface on the housing, an end surface on the inner part of the first bearing element being engaged by the end surface on the shaft, so as to receive the thrust of the shaft, and the other end surface on the outer part of the second bearing element engaging the end surface of the housing, whereby thrust loading is transmitted from the first bearing element through said spacer and outer part of the second bearing element to said housing, and said inner part of the first bearing element comprising a body having a conically shaped outer surface which conforms to and is slidable over the conically shaped inner surface of the outer part thereof.

**4,019,793**
**PHARMACEUTICAL DOSAGE DISTRIBUTION APPARATUS**
**Paul W. Gerding, 7505 Kilbourn Drive, Fort Wayne, Ind. 46809**
**Filed Mar. 14, 1975, Ser. No. 558,320**
**Int. Cl.² A47B 81/00; A61B 19/02; B01L 9/02; A47B 91/00**
**U.S. Cl. 312—209** **6 Claims**



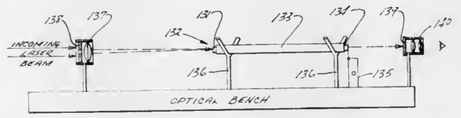
1. A pharmaceutical dosage distribution apparatus comprising at least one transporting case having an opening in one side thereof, a door closing said opening and coupled to said case for movement between open and closed positions, said open position being within said case, first locking means for holding said door in said closed position, said case having a plurality of tray supports extending generally horizontally inwardly into the interior of said case, a plurality of nurse medicine pass trays adapted to be positioned on said tray supports within said case, each of said trays having a thickness dimension and a plurality of compartments therein for receiving a predetermined single dose of medication in a pre-package having a top and bottom, said tray supports being vertically spaced apart, the distance between said tray supports being less than the sum of the thickness of one of said trays and the distance between said top and bottom of one of said pre-packages, each of said trays having adjacent each of said compartments printed materials having patient and drug identification information thereon relative to the pre-package received in the adjacent compartment, a traveling nurse's station including a frame means having at least three frame compartments, a plurality of closure panels secured to said frame means enclosing at least one of said compartments, one of the remaining compartments having at least a floor, said case being slidably received in the remaining of said compartments, second locking means for locking said case to said frame means in its received position in one of said remaining compartment, said case having means thereon for manually lifting and transporting the same apart from said station, said station having a plurality of wheels operatively connected to said frame means, whereby said transporting case can be loaded at a pharmacy with said nurse medicine pass trays having said pre-packages positioned in said compartments and identified for distribution to patients at an institution at a given time, locked and transported to said institution without disloding said pre-packages from said trays, placed in said remaining compartment of one of said traveling nurse's station located at said institution, locked to said station frame means, and used during nurse's rounds.

**4,019,794**
**ROLLER FOR DISHWASHER RACK**
**Richard A. Rowe, Louisville, Ky., assignor to General Electric Company, Louisville, Ky.**
**Filed Feb. 18, 1976, Ser. No. 659,115**
**Int. Cl.² A47B 97/00; F16C 21/00**
**U.S. Cl. 312—311** **3 Claims**



1. A roller, mounted on a dishwasher rack adapted to be movable within a dishwasher tub having a polymeric resinous material covering an interior sidewall and a support, comprising:
a hub having an axle-receiving aperture extending centrally therethrough;
an outer load-bearing rim including: (a) a curved support-engaging surface on the exterior thereof; (b) a peripheral skirt attached to one edge of said load-bearing rim adjacent said rack, said skirt being flexible to provide a load-bearing area that does not damage said polymeric resinous material; and (c) a curved section defining the opposite edge of said load-bearing rim adjacent said dishwasher tub sidewall, said curved section being generously radiused to prevent damage to said polymeric resinous material upon abutting said sidewall; and
an intermediate support means connecting said hub and said outer load-bearing rim.

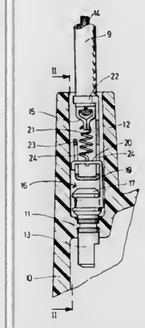
**4,019,795**
**PASSIVE ALIGNMENT OF LASER MIRRORS**
**James A. Ringlien, Maumee, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio**
**Filed June 11, 1975, Ser. No. 586,008**
**Int. Cl.² H01J 9/00**
**U.S. Cl. 316—1** **6 Claims**




1. In a manufacturing process for the assembly of a gaseous laser device, said device comprising a laser capillary tube filled with a laseable gas, at least two reflective end pieces being associated with the capillary tube, at least one of the end pieces comprising an output coupler and at least one of the end pieces having a maximum reflectance at the wave length of the laser output,
the process improvement which comprises optically aligning at least one output coupler with respect to at least one maximum reflectance end-piece before the capillary tube is filled with a laseable gas,
said process improvement comprising the steps of:
a. positioning an output coupler at one end of the capillary tube and positioning a maximum reflectance end piece at the opposite end of the capillary tube;
b. passing a laser beam coaxially through the capillary, said laser beam being introduced into the capillary from an external laser beam source through a reflective end piece positioned at one end of the capillary;
c. and adjusting the end piece positioned at the opposite end of the capillary with respect to the laser beam passing through the capillary such that an optimum optical resonance condition is achieved between the two reflective end pieces positioned at the respective ends of said laser capillary tube.



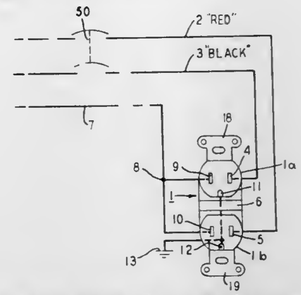
**4,019,796**
**SEPARABLE CONTACT AND CONNECTION ARRANGEMENT FOR IGNITION CABLES TO A FIXED TERMINAL, FOR EXAMPLE THE DISTRIBUTOR CAP OF A DISTRIBUTOR-BREAKER ASSEMBLY**
**Jörg Issler, and Richard Gerber, both of Stuttgart, Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany**
**Filed Aug. 25, 1976, Ser. No. 717,528**
**Claims priority, application Germany, Sept. 10, 1975, 2540239**
**Int. Cl.² H01R 11/30**
**U.S. Cl. 339—12 R** **19 Claims**



1. Severable contact and connecting arrangement for ignition cables with fixed terminals having
an ignition cable (9), a wire (14) within the cable and forming a movable electrode in the arrangement;
a socket (12) and a fixed electrode (13, 63) located therein and forming a fixed electrode of the arrangement, the movable electrode being axially insertable in the socket for engagement with the fixed electrode,
comprising, in accordance with the invention,
an axially acting contact spring (21, 31) located between the movable electrode and the fixed electrode and forming a current carrying contact means while exerting axially directed bias force between said elements;
and releasable holding means (FIGS. 1-3: 16; FIG. 4: 30, 34, 36; FIGS. 5-7: 40, 41, 43; FIGS. 8-9: 64, 61, 67) releasably positively connecting the cable and the socket, whereby the electrical connection is spring-loaded to effect positive contact even under severe vibration and shock conditions while releasably securing the cable in the socket.

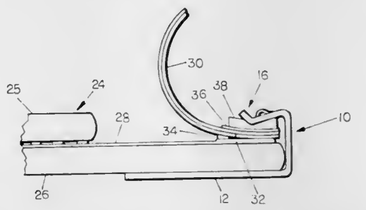
**4,019,797**
**SYSTEM INCLUDING HOUSEHOLD CONNECTOR PLUG FOR SPLIT WIRE RECEPTACLE**
**Henry W. Praml, 275 South St., Murray Hill, N.J. 07974**
**Filed Nov. 17, 1975, Ser. No. 632,447**
**Int. Cl.² H01R 3/06**
**U.S. Cl. 339—14 P** **10 Claims**

1. A unitary electrical connecting plug constructed to mate with a standard split wire duplex receptacle having two electrically isolated female slots respectively connected to high potential power terminals at substantially equal and opposite potential, two female neutral slots electrically connected together to a neutral terminal at a potential substantially halfway between the potentials of said high potential power terminals, and means comprising one or more slots for connection to ground potential, said plug comprising in combination:
an insulative housing having a rear wall including connecting means to an insulating conduit, side walls and a front wall opposite said rear wall,
electrically conducting ground means rigidly disposed in said housing to extend outwardly in a substantially normal direction from the external face of said front wall and to extend inwardly to conducting means for making ground contact, and




at least one pair of electrically conducting power blades insulated from each other and from said ground means, said pair rigidly disposed in said housing and extending outwardly in substantially normal direction from the face of said front wall and extending inwardly in said housing to separately insulated conducting means constructed for connection to a pair of electrically isolated high potential contacts,
said power blades spaced apart on the external surface of said front face a distance which coincides with the spacing between said two electrically isolated high potential female slots of said split wire duplex receptacle, and constructed and arranged to engage said slots simultaneously as said ground means engages said means comprising a slot for connection to ground.

**4,019,798**
**FLEXIBLE ELECTRICAL CIRCUIT CONNECTIONS**
**Eugene J. Zielinski, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio**
**Filed Mar. 24, 1976, Ser. No. 669,950**
**Int. Cl.² H05K 1/12**
**U.S. Cl. 339—17 F** **2 Claims**



1. In a gas discharge panel having a pair of elongated flat glass plates spacedly joined to form a thin gas discharge chamber, wherein said plates are joined with their long axis transverse, wherein a plurality of conductors extend parallel to the long direction of each plate on the surface of each of said plates and terminate in mounting pads which are exterior of the location wherein said plates are joined, an improved system for the connection of said gas discharge panel to electrical signals which comprises, in combination:

flexible circuit means, having multiple conductors terminating in pads which correspond in spacing to the spacing of said mounting pads on said plate, for carrying electrical signals;

adhesive means for holding the pads of said flexible circuit means in alignment with said mounting pads on said plates;

clip members for securing said flexible circuit means in position by the application of spring forces on said flexible circuit means and on said plates, said clip members each including;

a bottom member underlying said glass plate on the side away from said plate mounting pads;

an upstanding wall portion extending toward said plate mounting pads and being of a height less than the combined thickness of said pair of flat glass plates; and

a generally V-shaped spring portion connected to the upper marginal edge of said wall portion with the notch thereof pointing toward said flexible circuit means, said spring portion being defined by a downwardly extending leg attached to said upstanding wall portion and an upwardly extending leg, attached to the lower marginal edge of said downwardly extending leg, which is shorter in length than said downwardly extending leg; and

force distribution means, positioned between said flexible circuit means and said clip members, for preventing concentration of spring forces from said clip members onto said flexible circuit means and said mounting pads on said plates and for compensating for any surface irregularities, said notch portion of said spring portion being in contact with said force distribution means.

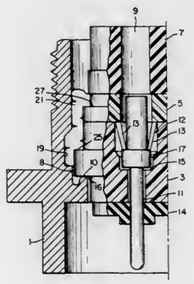
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**4,019,799**

## ELECTRICAL CONNECTOR

**Alfred Joseph Bouvier, Sidney, N.Y., assignor to The Bendix Corporation, Southfield, Mich.**

**Filed Feb. 11, 1976, Ser. No. 657,124**
**Int. Cl.² H01R** *13/40*
**U.S. Cl. 339—59 R** **8 Claims**



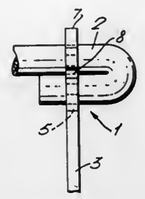
1. An electrical connector comprising a shell; an insert member and a wafer stacked in the shell, said insert member and wafer each separated from the shell by a space; said insert member and wafer having apertures aligned with one another for receiving respective electrical terminals; retention means carried within the apertures of the insert member for retaining an electrical terminal in each of the apertures; and means for maintaining the insert member and wafer within the shell, said maintaining means comprising a laminate of deformable material disposed between the shell and insert member and between the shell and wafer, the laminate deformed to substantially fill the space therebetween.

**4,019,800**

## UNIPLANAR ELECTRICAL CONTACT

**Lucas Soes, Vught, Netherlands, assignor to AMP Incorporated, Harrisburg, Pa.**

**Filed May 7, 1976, Ser. No. 684,336**
**Claims priority, application United Kingdom, May 31, 1975, 23731/75**
**Int. Cl.² H01R** *9/08*
**U.S. Cl. 339—97 R** **3 Claims**



1. An electrical connection between an insulated conductor and an electrical contact, the electrical contact being in the form of a uniplanar member including a pair of spaced arms, opposed edges of which arms define between them a pair of intercommunicating slots of different widths, the insulated conductor being folded so that portions overlap, one portion extending into the slot of narrower width so that the edges of the arms defining the narrower slot pierce the insulation and electrically engage the conductor, and the other portion extending into the wider slot so that edges of the arms defining the wider slot pierce the insulation to provide a strain relief effect.

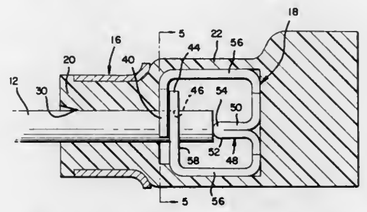
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**4,019,801**

## ELECTRICAL SPLICE

**Ronald Clarence Hoffman, Williamstown, Pa., assignor to AMP Incorporated, Harrisburg, Pa.**

**Filed Jan. 19, 1976, Ser. No. 650,219**
**Int. Cl.² H01R** *9/08*
**U.S. Cl. 339—98** **7 Claims**



1. A device for electrically splicing two wires together, which comprises: a strip of conductive material with one end being provided with a pair of parallel wire-receiving slots and the other end being provided with a pair of wire-receiving openings and the strip intermediate the two ends being provided with a pre-weakened section, said strip being formed into a four sided frame with the two ends forming a first side with one end adapted to move past another and the pre-weakened section forming a second side opposing and parallel to the first side so that as the sides of the frame perpendicular to the first and second sides are compressed towards one another one end moves past the other end and a pair of wires which may be positioned in the openings are received in the slots with the edges of the slots making electrical contact therewith and further the pre-weakened section becomes deformed and thereby prevents one end from moving back past the other end so that the wires are retained in the slots.

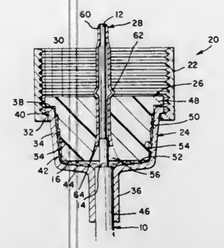


**4,019,802**

## FIELD-APPLIABLE UHF COAXIAL CONNECTOR

**Suel Grant Shannon, Harrisburg; Harold Chester Timmins, and Kenneth Earl Gookin, both of Hershey, all of Pa., assignors to AMP Incorporated, Harrisburg, Pa.**

**Filed Nov. 4, 1975, Ser. No. 628,640**
**Int. Cl.² H01R** *17/18*
**U.S. Cl. 339—177 R** **3 Claims**



1. A field appliable UHF connector for use with coaxial cable of the type having a center conductor and a braided outer conductor, which comprises:

a. a shell member having a hollow, cup-shaped forward portion and an elongated rearward extension of less diameter than the forward portion, a passageway through said extension and opening into the forward portion, said passageway adapted to receive therethrough a coaxial cable, the walls of the forward portion converging rearwardly at an angle of from about three degrees to about six degrees, further, the forward portion having an outwardly extending radial flange on the leading edge of the forward portion;

b. a generally solid cup-shaped insulating body having a passageway therethrough to receive a contact therein, and further the side walls being tapered inwardly toward the base of the body and having one or more steps thereabout, said body being adapted to be received within the forward portion of the shell member with the braided shield of the coaxial cable trapped therein between with the steps providing points of high force concentration against the braided shield;

c. an elongated center contact seated in the passage of the insulating body and adapted to receive the center conductor of the coaxial cable therein, said contact having securing means thereon comprising an upset intermediate its ends adapted to abut the forward face of the insulating body and the rear end of the contact flared outwardly to frictionally engage the walls of the passage in the insulating body, and further a nose of reduced diameter on its front end for insertion into a socket or the like; and

d. a coupling nut rotatably positioned around the shell member and having internal threads therein for being threadably received by a threaded jack or the like.

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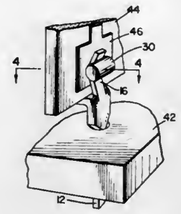
**4,019,803**

## SOLDER SUBSTRATE CLIP

**Mark Samuel Schell, New Cumberland, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Oct. 15, 1975, Ser. No. 622,747**
**Int. Cl.² H01R** *9/06*
**U.S. Cl. 339—275 B** **14 Claims**

1. A terminal adapted to be soldered to a metal pad comprising a contact arm stamp-formed from thin sheet metal stock having a contact surface adapted to engage the pad, a solder-mounting surface on the other side of the arm from the contact surface and at least one sheared edge extending between said surfaces, a mass of solder metallurgically bonded to the solder-mounting surface and extending to one side of the mounting surface beyond the sheared edge, and a rounded solder globule projecting from the solder mass at the edge across the thickness of the contact substantially to or beyond the contact surface whereby, on positioning of the contact



against the pad and melting of the solder mass, molten solder flows from the mass to the pad.

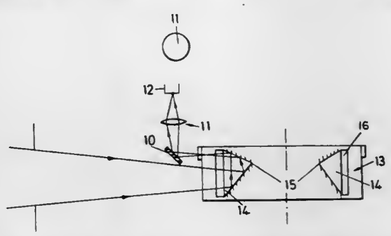
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**4,019,804**

## OPTICAL SCANNING SYSTEMS WITH IMAGE CURVATURE CORRECTING MEANS

**David Thomas Collier, Dunstable, England, assignor to Hawker Siddeley Dynamics Limited, England**

**Filed May 29, 1975, Ser. No. 581,871**
**Claims priority, application United Kingdom, June 10, 1974, 25707/74**
**Int. Cl.² G02B** *27/17*
**U.S. Cl. 350—7** **6 Claims**



1. An optical scanning system comprising a rotary scanner, transfer optical means generating a beam that forms adjacent the periphery of said rotary scanner an image of a light-responsive or light-emitting device, optical objective means having a flat image field adjacent said image formed by said beam, said rotary scanner comprising a series of reflectors arranged around the periphery of said scanner and sequentially sweeping said image across said image field as the scanner rotates to generate a raster, and optical correcting means disposed in the path of the beam forming said image which optical correcting means having a surface configured with a multiplicity of incremented steps of such size to adjust the position of said image by a multiplicity of incremental amounts in a direction normal to said flat image field during the passage of each reflector past said field to compensate for curvature of the image introduced by the transfer optical means, the angle of the beam forming said image being maintained constant during said image position adjustments, thereby making the image motion during scanning substantially rectilinear and parallel to said flat image field.

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**4,019,805**

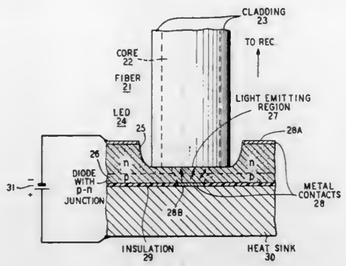
## OPTIMIZED PARABOLIC-INDEX OPTICAL FIBER COMMUNICATION SYSTEM WITH INCOHERENT LIGHT SOURCE

**Enrique Alfredo Jose Marcatili, Rumson, and Dietrich Marcuse, Lincroft, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed July 25, 1975, Ser. No. 599,082**
**Int. Cl.² G02B** *5/14*
**U.S. Cl. 350—96 C** **2 Claims**

1. An optical fiber communication system of the type em-

ploying an incoherent light-emitting source having a light-emitting region concentrically mounted directly on the end of an approximately parabolic-index profile optical fiber having




a core surrounded by a cladding material, characterized in that the ratio of the radius of the light-emitting region of said source to the radius of the parabolic-index profile core of the optical fiber is approximately 0.2.

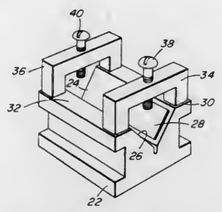
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**4,019,806**

## ECCENTRIC OPTICAL FIBER COUPLER

**Daniel Fellows, Framingham; Stanley Zemon, Boston; Phillip A. Sturk, Haverhill, and Samuel M. Stone, Lynnfield, all of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.**

**Filed Sept. 4, 1975, Ser. No. 610,505**
**Int. Cl.² G02B 5/14**
**U.S. Cl. 350—96 C** **3 Claims**




1. An optical fiber coupler comprising

a pair of circularly cylindrical optical fiber connectors each having an end of an optical fiber located at one end of the connector at a respective first distance from the axis thereof,

a coupler block having a V-groove channel therethrough to receive and locate the pair of connectors with their one ends in a juxtaposed,opposed relationship, one surface of the V-groove channel being planar and continous over the length of the V-groove, the other surface of the V-groove being divided laterally into two parallel planar segments, the planes of the segments being separated by a second distance which is greater than the difference between the respective first distances, and less than the sum of the respective first distances, and

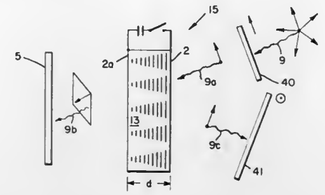
means for firmly seating and retaining each fiber optic connector in the channel and against a respective segment to enable efficient optical coupling between the optical fibers.

**4,019,807**

## REFLECTIVE LIQUID CRYSTAL LIGHT VALVE WITH HYBRID FIELD EFFECT MODE

**Donald D. Boswell, Granada Hills; Jan Grinberg, Los Angeles; Alexander D. Jacobson, Topanga, and Gary D. Myer, Reseda, all of Calif., assignors to Hughes Aircraft Company, Culver City, Calif.**

**Filed Mar. 8, 1976, Ser. No. 664,776**
**Int. Cl.² G02F 1/13**
**U.S. Cl. 350—160 LC** **10 Claims**




1. In a reflective mode alternating current driven liquid crystal light valve of the type having first and second parallel opposed transparent electrode means for application of an alternating electric field across first and second parallel opposed transparent insulating layers which are positioned between and parallel to said first and second electrode means to define in cooperation with an annular spacer member separating said first and second insulating layers an enclosed space containing nematic liquid crystal material, said light valve further having photoconductor means and mirror means positioned between said second transparent electrode and said second transparent insulating layer, said photoconductor means being positioned to receive input writing signal light through said second transparent electrode to spatially and temporally vary the magnitude of said electrode field applied across said liquid crystal material as a function of the intensity of said writing light, the hybrid filed effect mode improvement comprising:

a. means operatively associated with the first of said transparent insulating layers in the absence of an electric field for aligning the axes of the molecules of a first portion of said liquid crystal material adjacent to said first layer in a first direction in a plane which is parallel to said first layer;

b. means operatively associated with the second of said transparent insulating layers in the absence of an electric field for aligning the axes of the molecules of a second portion of said liquid crystal material which is adjacent to said second layer in a second direction in a plane which is parallel to said second layer, the respective orthogonal projections of said first and second directions in any plane which is between and parallel to both said first and second planes intersecting at an acute angle for producing a twisted alignment of the axes of said nematic liquid crystal molecules in the absence of said electric field and a tilted orientation of said axes in the presence of said electric field;

c. means for providing polarized projection light through said first transparent electrode and said first transparent insulating layer to traverse said liquid crystal material contained between said first and second insulating layers and be reflected by said mirror means to re-traverse said liquid crystal material and exit through said first transparent electrode of said light valve, said polarized projection light being subject to changes in polarization state as it traverses said layer of liquid crystal material in both directions, said polarization sate being rotated by said twisted nematic alignment of said molecules of said liquid crystal material in the off state of said field and by the birefringence of said tilted oreintation of said molecules of said liquid crystal material in the on-state of said field; and,



d. means positioned to intercept said light exiting from said first transparent electrode means for blocking all of said projection light exiting from said light valve except that which is in a predetermined polarization state.

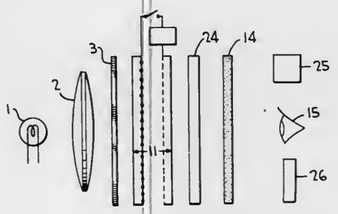
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**4,019,808**

## ARRANGEMENT FOR A POLYCHROME DISPLAY

**Terry James Scheffer, Wettingen, Switzerland, assignor to Fraunhofer-Gesellschaft zur Förderung der Angewandten Forschung e.V., Munich, Germany**

**Continuation of Ser. No. 477,541, June 7, 1974. This application May 5, 1976, Ser. No. 683,342**
**Claims priority, application Germany, June 9, 1973, 2329618**
**Int. Cl.² G02F 1/13**
**U.S. Cl. 350—160 LC** **11 Claims**




1. An arrangement for a polychrome display, comprising in serial association a light source, a linear polarizing filter, at least one electro-optical nematic liquid crystal rotating element adapted to rotate the plane of polarization of a light ray when no electrical potential is applied and to leave the plane of polarization unchanged when potential is applied, and a pleochroic color selective linear polarizer forming an assembly.

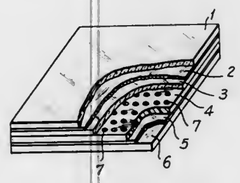
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**4,019,809**

## ELECTROCHROMIC DISPLAY DEVICE

**Tsutomu Otake; Hiroshi Takeshita; Akihiko Kouchi, all of Suwa, and Kunihiro Inoue, Okaya, all of Japan, assignors to Kabushiki Kaisha Suwa Seikosha**

**Filed June 25, 1975, Ser. No. 590,343**
**Claims priority, application Japan, June 25, 1974, 49-72492**
**Int. Cl.² G02B 5/23; G02E 1/01**
**U.S. Cl. 350—160 R** **7 Claims**




1. A display device useful as an image converter over the range from X-rays to infra-red and as a memory—non-memory device, comprising in spatial sequence, a first transparent substrate a transparent first electrode supported on said first transparent substrate, a layer of photoconductive material, a layer of insulating material having a multiplicity of openings therethrough, said opening having a maximum diameter of 5 mm and being arranged to produce a halftone effect, a second electrode, and a second transparent substrate, said second electrode being supported on said second transparent substrate and said openings containing electrochromic material making conductive paths between said layer of photoconductive material and said second electrode, said electrochromic material being viologen bromide and said insulating material being between 10 and 1 mm. in thickness.

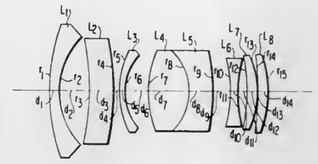
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**4,019,810**

## PHOTOGRAPHIC WIDE ANGLE LENS

**Takahiro Sugiyama, Tokyo, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Nov. 17, 1975, Ser. No. 632,599**
**Claims priority, application Japan, Nov. 18, 1974, 49-132507**
**Int. Cl.² G02B 13/04**
**U.S. Cl. 350—214** **4 Claims**




1. A photographic wide angle lens system comprising seven elements composed of eight lenses, said elements consisting of a first element in the form of a negative meniscus lens $L_1$ convex to the object, a second element in the form of a positive meniscus lens $L_2$ concave to the object, a third element in the form of a negative meniscus lens $L_3$ convex to the object, a fourth element in the form of a positive lens in which two lenses, a positive lens $L_4$ and a negative lens $L_5$, are joined together, a fifth element in the form of a negative lens $L_6$, a sixth element in the form of a positive lens $L_7$, and a seventh element in the form of a positive lens $L_8$, wherein the radii of curvature $r$, the lens thicknesses or distance between lenses $d$, the refractive indices N and the Abbe Numbers $\nu$ of the lens system are:

Aperture ratio 1 :2.0, $F = 100$, where $F$ is the focal length of the whole system, Angular field 75°

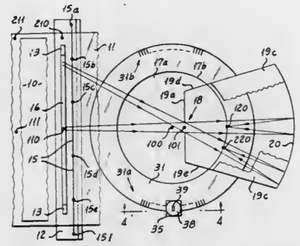
| lens | Radius of Curvature r (mm) | Lens Thickness or Distance d (mm) | Refractive Index N | Abbe No. $\nu$ |
|---|---|---|---|---|
| $L_1$ | $r_1$= 199.730 | $d_1$= 4.126 | $N_1$=1.49831 | $\nu_1$=65.0 |
| | $r_2$= 68.296 | $d_2$=30.168 | | |
| $L_2$ | $r_3$=−305.836 | $d_3$=24.273 | $N_2$=1.68250 | $\nu_2$=44.7 |
| | $r_4$=−206.318 | $d_4$= 3.710 | | |
| $L_3$ | $r_5$= 85.301 | $d_5$= 4.161 | $N_3$=1.71300 | $\nu_3$=53.9 |
| | $r_6$= 52.914 | $d_6$=23.683 | | |
| $L_4$ | $r_7$= 104.026 | $d_7$=38.455 | $N_4$=1.80610 | $\nu_4$=40.9 |
| | $r_8$= −52.914 | $d_8$=24.481 | | |
| $L_5$ | $r_9$=−196.956 | $d_9$=17.754 | $N_5$=1.72342 | $\nu_5$=38.0 |
| $L_6$ | $r_{10}$=−124.352 | $d_{10}$= 4.161 | $N_6$=1.84666 | $\nu_6$=23.9 |
| | $r_{11}$= 146.676 | $d_{11}$= 8.461 | | |
| $L_7$ | $r_{12}$=−274.954 | $d_{12}$= 8.842 | $N_7$=1.73400 | $\nu_7$=51.5 |
| | $r_{13}$= −77.738 | $d_{13}$= 0.347 | | |
| $L_8$ | $r_{14}$=−1074.933 | $d_{14}$= 9.536 | $N_8$=1.71300 | $\nu_8$=53.9 |
| | $r_{15}$=−115.465 | | | |

$f_B = 127.640$, where $f_B$ is the back focal length, $F_{1,2,3,4,5,6} = -169.837$, where $F_{1,2,3,4,5,6}$ is the combined focal length of lenses $L_1$ through $L_6$, and

the sum of Petzval = 0.168.

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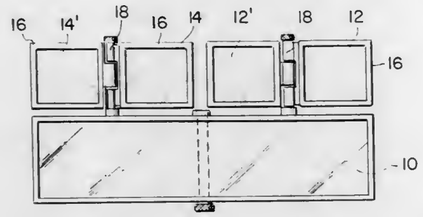
**4,019,811**
**OPTICAL SCANNER**
**Lawrence D. Lorah, Concord; Richard W. Stresau, Somerville; Lawrence B. Lapson, Boston, and Curtis P. van Vloten, Cambridge, all of Mass., assignors to Rapifax Corporation, Fairfield, N.J.**
**Continuation of Ser. No. 322,002, Jan. 8, 1973, abandoned. This application Mar. 26, 1975, Ser. No. 562,135**
**Int. Cl.² G02B *25/00***
**U.S. Cl. 350—274** **20 Claims**



1. An optical line scanning system including in combination means for focusing an image of a line upon an arc of a circle, means providing at least one field stop, and means for causing the field stop means to traverse said circle, said focusing means having a focal length and having an optical center disposed in the plane of said circle, said traversing means including means mounting the field stop means for rotation about an axis which orthogonally intersects the plane at a point offset from said optical center in a direction such that the distance of the field stop means from the focusing means when traversing the image arc exceeds said focal length.

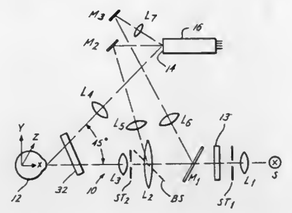
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**4,019,812**
**REARVIEW MIRROR ASSEMBLY WITH ROTATABLE MIRRORS**
**Elmo Carnine, 1260 NE. 115th St., Miami, Fla. 33161**
**Filed June 5, 1975, Ser. No. 584,220**
**Int. Cl.² G02B *5/08***
**U.S. Cl. 350—304** **8 Claims**



1. A rear view mirror assembly comprising an existing rear view vehicular mirror, an elongated base portion, connecting means for connecting said base portion to said existing mirror, at least a pair of rotational means, each adapted to longitudinally rotate on its own axis, each of said rotational means extending outwardly from the same side of said base portion in a direction upwardly from said existing mirror, each of said rotational means being transverse to said base portion, at least two mirror sections, each of said mirror sections rotatably engaged to one of said rotational means, said mirror sections being adjacent and extending between said pair of rotational means, said mirror sections being vertically disposed above said existing mirror.

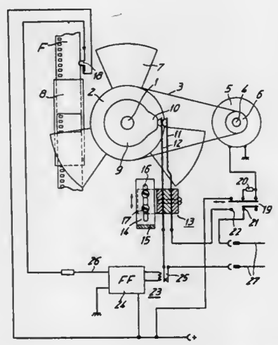
**4,019,813**
**OPTICAL APPARATUS FOR OBTAINING MEASUREMENTS OF PORTIONS OF THE EYE**
**Tom N. Cornsweet, and Richard A. Harrison, both of Houston, Tex., assignors to Baylor College of Medicine, Houston, Tex.**
**Filed Jan. 19, 1976, Ser. No. 650,391**
**Int. Cl.² A61B *3/10, 3/14***
**U.S. Cl. 351—14** **22 Claims**



1. An optical apparatus for obtaining one or more measurements of portions of an eye comprising,
- means for providing a narrow beam of light through the center of curvature of the cornea of the eye including a light source, first lens means, and at least one narrow slit,
- second lens means positioned in front of the eye but at an angle to the narrow beam of light for collecting light that is reflected from the eye,
- a television camera positioned to receive the eye image collected by the second lens means, said television camera co-acting with means for obtaining the desired measurements of portions of the eye
- means for measuring when the narrow beam of light passes through the center of curvature of the cornea for indicating alignment of the eye with said television camera, and
- means for focusing light on the eye and for focusing the reflected eye image on the television camera for measuring when the eye is correctly positioned along the optical axis of the apparatus for proper focus in the first and second lens means.

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**4,019,814**
**DEVICE FOR USE ON A FILM PROJECTOR FOR COPYING FILMS**
**Ludwig Blaschke, Munich, Germany, assignor to Braun Aktiengesellschaft, Kronberg, Taunus, Germany**
**Filed Nov. 5, 1973, Ser. No. 412,648**
**Claims priority, application Germany, Nov. 7, 1972, 2254445**
**Int. Cl.² G03B *21/38***
**U.S. Cl. 352—169** **3 Claims**



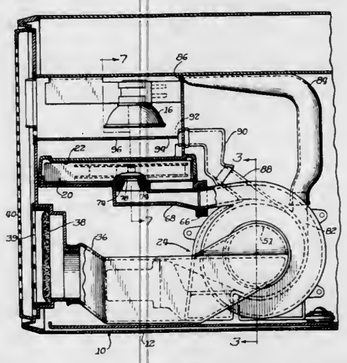
1. A device for use in cooperation with a film projector for photographing a film projection with a movie camera equipped with a single-frame releaser operable from a signal, said device comprising



- a speed-changing means operable for changing the speed of projection of said film projector to less than 8 framer per second,
- a pulse-generating means operable for producing a pulse signal synchronously with the film feed of said film projector,
- coupling means for coupling said pulse signal to said movie camera to cause release of a single-frame exposure thereof, and
- phase variable means for adjusting the phase relationship of operation of said pulse-generating means with respect to the film feed of said film projector, whereby synchronization between said pulse-generating means and the film feed, can be optimized.

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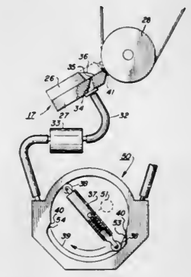
**4,019,815**
**FILM HANDLING APPARATUS BLOWER SYSTEM**
**Frank L. Weninger, Chicago; John P. Bagby, Lake Forest; Kenyon A. Hapke, Libertyville; Jack W. Hinshaw, Northbrook; George C. Karalus, Arlington Heights; Eugene F. Koppensteiner, Niles, and Roger R. Tomlinson, Wheeling, all of Ill., assignors to Polaroid Corporation, Cambridge, Mass.**
**Division of Ser. No. 374,285, June 28, 1973, abandoned. This application Mar. 26, 1975, Ser. No. 562,112**
**Int. Cl.² G03B *21/16***
**U.S. Cl. 353—61** **2 Claims**



1. In a film-handling apparatus having a projection lamp, a drive motor, and a cassette well adapted to receive a film cassette having an air intake port, a blower system comprising:
- a blower having a first blower section for developing a relatively high-pressure, low-volume output and a second blower section for developing a relatively low-pressure, high-volume output, said first blower section including means defining a volute blower chamber having a volute integrity maintained through a geometric angular excursion of more than one revolution, an axial intake port and a tangential outlet port, and a circular impeller of cellular material rotatably driven in said volute chamber, said second blower section including means defining a second volute blower chamber having an axial intake port, a tangential outlet, and a cylindrically bladed fan-wheel rotatably driven in said second volute chamber, and said circular impeller of said first blower section and said circular impeller of said second blower section being secured to a common drive shaft rotatably driven by said drive motor;
- means for directing output air flow from said first blower section to said cassette air intake port for flow into the interior of said cassette, said means for directing output air flow to said cassette air intake port including a laterally movable air-directing element resiliently biased into the region in which said cassette is received by said film-handling apparatus, said air-directing element being positioned and configured to include a cam surface arranged such that said element is laterally displaced by said cassette upon insertion of said cassette into said receiving region and caused to bear against the cassette to direct said air flow into said cassette air intake port;
- means for directing output air flow from said second blower section into proximity with said projection lamp for cooling said projection lamp;
- heat baffle means interposed between said projection lamp and said cassette well for minimizing the quantity of projection lamp radiant heat incident on said cassette well, said heat baffle having an aperture therein for passage of the projection lamp light beam;
- means for directing additional output air flow from said second blower section into proximity with said heat baffle means; and
- means for directing additional output air flow from said second blower section into proximity with said drive motor for cooling said drive motor.

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**4,019,816**
**COATING SYSTEM HAVING A COMPOSITE APPLICATOR ASSEMBLY PROVIDED WITH A RECIPROCATING BLADE**
**John S. Bernhard, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.**
**Filed May 16, 1975, Ser. No. 578,296**
**Int. Cl.² G03G *15/00***
**U.S. Cl. 355—3 P** **11 Claims**



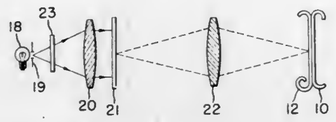
1. A coating apparatus comprising:
- a composite blade assembly having a coater blade base, an applicator plate supported on the top surface of said base, means for supplying a coating fluid to the top surface of said base, means for reciprocating said applicator plate forward and backward and means for coordinating the reciprocation of the applicator plate with the supply of coating fluid to the top surface of the coater blade base.

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**4,019,817**
**METHOD OF COLOR IMAGE RECORDING**
**Kazuya Matsumoto, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan**
**Continuation of Ser. No. 400,554, Sept. 25, 1973, abandoned. This application May 7, 1975, Ser. No. 575,245**
**Claims priority, application Japan, Sept. 28, 1972, 47-97797**
**Int. Cl.² G03B *27/08***
**U.S. Cl. 355—132** **8 Claims**

1. A method of recording an object recorded on a color positive film onto a monochrome recording medium as diffraction grating images in respective color components, comprising:
- contacting the color positive film with the monochrome recording medium;
- projecting onto said color positive film, through a plurality of diffraction gratings, a plurality of superimposed component color images correspondng to different diffraction

grating images, each corresponding to a color of said object recorded on said color positive film, without changing the relative position between said monochrome recording medium and said color positive film at the time of the projection, and




passing each of said diffraction grating images through its respective color component portion of said color positive film, and forming diffraction grating images corresponding to said color components on said monochromatic recording medium.

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**4,019,818**

## INTERFEROMETRIC TECHNIQUE FOR DETERMINING ULTRASONIC WAVE INTENSITY

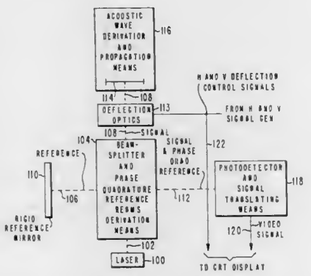
**David Herman Raphael Vilkomerson, South Brunswick, N.J., assignor to RCA Corporation, New York, N.Y.**

**Filed Apr. 8, 1976, Ser. No. 675,222**

**Claims priority, application United Kingdom, Mar. 4, 1976, 08665/76**

**Int. Cl.² G01N *21/46***

**U.S. Cl. 356—106 R** **10 Claims**




**1.** In a system responsive to the intensity of radiated ultrasonic wave energy having a given frequency; the combination comprising:

a. first means including photodetector and signal translating means, responsive to the simultaneous illumination thereof with respective first and second beams of coherent light of a predetermined wavelength each of which has an intensity component at said given frequency, for deriving an output signal having a magnitude in accordance with the sum of the squares of the respective intensity components at said given frequency of each of said first and second beams, and

b. second means comprising an interferometer for simultaneously illuminating said photodetector and signal translating means with said first and second beams, said interferometer including a substantially rigid reference mirror, a displaceable signal mirror adapted to be insonified by said ultrasonic wave energy, and beam splitter and phase quadrature reference beam derivation means illuminated by said coherent light, said beam splitter and phase quadrature beam derivation means being cooperatively located with respect to said reference mirror and said signal mirror to derive as said first beam the interference between signal light reflected from an insonified spot of said signal mirror and first reference light reflected from said reference mirror that has a first temporal reference phase and to derive as said second beam the interference between said signal light and second reference light reflected from said reference mirror that has a second temporal reference phase substantially in quadrature with said first temporal reference phase.

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**4,019,819**

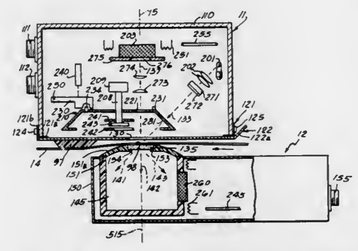
## OPTICAL PROPERTY MEASUREMENT AND CONTROL SYSTEM

**Fred P. Lodzinski, Port Edwards, Wis., assignor to Nekoosa Papers Inc., Port Edwards, Wis.**

**Continuation-in-part of Ser. No. 429,637, Dec. 28, 1973, abandoned. This application Jan. 10, 1975, Ser. No. 540,251**

**Int. Cl.² G01N *21/00*; G01V *1/28*; G01N *21/16***

**U.S. Cl. 356—73** **45 Claims**




**1.** Apparatus for obtaining a quantitative measure of a paper optical property, said apparatus comprising:

a. an optical measuring device having a receiving region for receiving in operative relation thereto a single thickness of paper sheet material,

b. said optical measuring device having an optical system with at least two substantially independent photometric sensors and at least two distinct light energy paths each including at least light source and spectral response filter means and a respective one of said photometric sensors, and each intersecting said receiving region prior to the respective associated photometric sensor,

c. each of said at least two distinct light energy paths having substantially a common spectral response characteristic sufficient to characterize said paper optical property but being respectively arranged for collecting reflected and transmitted light energy from the receiving region after impingement of the light energy on a single thickness of paper sheet material at said region so as to essentially characterize the reflectance and transmittance of the paper sheet material, whereby the paper optical property is characterized with substantially greater accuracy than any characterization of said paper optical property by either a reflectance or a transmittance measurement taken by itself, and

d. automatic digital computer means connected on line with said optical measuring device and coupled with the respective photometric sensors of said distinct light energy paths for receiving therefrom respective output signals in accordance with the reflectance and transmittance of the paper sheet material and automatically operable on the basis of said output signals to calculate a quantitative indication of said paper optical property,

e. said optical system having two distinct light energy paths each having a spectral response characteristic substantially corresponding to the standard brightness spectral distribution of light energy, and said quantitative indication representing the standard brightness of said paper sheet material.



**4,019,820**

## MUCUS SAMPLING AND MEASURING SYSTEMS, DEVICES AND PROCESSES

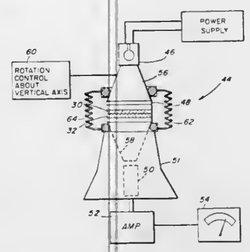
**Louis Kopito, Brookline, and Samuel R. Schuster, Wellesley, both of Mass., assignors to Ovutime, Inc., Wellesley, Mass.**

**Continuation-in-part of Ser. No. 399,145, Sept. 20, 1973, Pat. No. 3,891,325. This application May 1, 1975, Ser. No. 573,730**

**The portion of the term of this patent subsequent to June 24, 1992, has been disclaimed.**

**Int. Cl.² G01N *21/24***

**U.S. Cl. 356—205** **14 Claims**




**1.** A process for determining the phase of a menstrual cycle, said process comprising the steps of contacting a face of a first plate with a sample of bodily mucus, superposing a face of a second plate on said face of said first plate and uniformly applying a pressure across said plates to produce a mucus stratum between said faces, at least one of said plates being at least partially transparent to certain radiation, at least one of said plates being formed with a port through which excess bodily mucus is extruded, transmitting said radiation through said transparent plate and said mucus stratum in order to produce an indication functionally related to absorptivity of said mucus stratum with respect to said radiation, and processing said indication to a form representative of said phase of said menstrual cycle.

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**4,019,821**

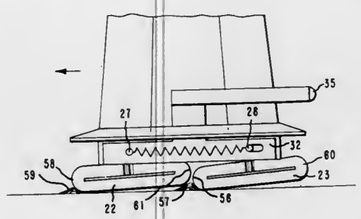
## APPARATUS FOR TONING TACKY SURFACES

**Helmut Gustav Sandner, Oceanport, N.J., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Division of Ser. No. 605,541, Aug. 18, 1975. This application July 30, 1976, Ser. No. 710,102**

**Int. Cl.² B05C *11/02***

**U.S. Cl. 401—4** **6 Claims**




**1.** A toner applicator apparatus comprising a housing for containment of toner, at least one free moving weight within said housing for breaking up toner aggregates and agitating the toner, a pair of separable applicator pad members forming the bottom wall of said housing, means to impart-translation to said members to open and close said housing thereby releasing said toner onto a substrate to be developed, said pads being hingedly mounted to facillitate application of a mound of said released toner to the image areas of said substrate upon functional movement of said apparatus over said substrate, and at least two hinged pads mounted on the housing.

**4,019,822**

## PENCILS NOT REQUIRING SHARPENING

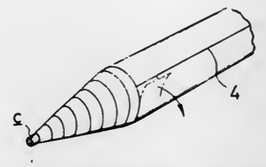
**Takeshi Matsumoto; Hidehiko Kaji, both of Sodegaura; Osamu Isogai, Ichihara, and Masami Tomikawa, Sodegaura, all of Japan, assignors to Idemitsu Kosan Kabushiki-Kaisha (Idemitsu Kosan Co., Ltd.), Tokyo, Japan**

**Filed Sept. 2, 1975, Ser. No. 609,517**

**Claims priority, application Japan, Sept. 6, 1974, 49-107698**

**Int. Cl.² B43K *19/14***

**U.S. Cl. 401—96** **8 Claims**




**1.** Pencil not requiring sharpening, comprising:

a core material; and

an unperforated uniaxially stretched thermoplastic resin sheet, having a plurality of spaced lines of molecules oriented generally in the stretched direction, wrapped around said core material so that a stretched direction of the sheet, and said lines of molecules, form a spiral along the length of said core material and that the sheet forms a smooth outer-surfaced holder, the sheet being selectively tearable off of said core in strips substantially along said lines of molecules to selectively expose said core material.

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**4,019,823**

## RING BINDER

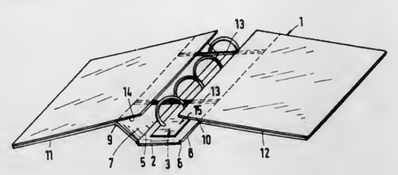
**Heinz Kleinert, Lubbecke, and Karl-Heinz Schudy, Espelkamp, both of Germany, assignors to Robert Krause KG Hindenburgring, Germany**

**Continuation of Ser. No. 529,206, Dec. 3, 1974, abandoned. This application Feb. 27, 1976, Ser. No. 661,923**

**Claims priority, application Germany, Dec. 6, 1973, 2360721**

**Int. Cl.² B42F *13/00***

**U.S. Cl. 402—75** **2 Claims**

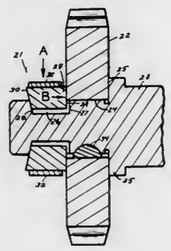



**1.** A ring book comprising a spine, a ring binding mechanism having rings for holding punched stationery sheets secured to said spine, intermediate cover parts hinged to said spine at a first hinge axis, cover members hinged to said intermediate cover parts at a second hinge axis, said spine, said intermediate cover parts, and said cover members being formed in one piece and comprising outer plies integral with one another, a writing support member secured to each of said cover members and projecting from said respective cover member beyond said second hinge axis toward said ring binding mechanism, said writing support members comprising inner plies of said cover members presenting a support surface forming a coextensive extension of said cover members, flexible connecting webs of invariable length extending between said intermediate cover parts and secured to said intermediate cover parts adjacent said second hinge axes, said webs having

a length greater than the width of said spine such that said intermediate cover parts are disposed at an obtuse angle relative to said spine when the ring book is open and said webs are taut, said writing support members having a width such that when the book is in said open position the inner terminating edges of said writing support members fall without an imaginary cylinder defined by said rings whereby said cover members and coextensive writing support members are freely movable independently of said rings, said spine and intermediate cover parts being pivotally connected at said first and second hinges such that angular displacement of one of said intermediate cover parts relative to said spine effects a corresponding but opposite angular displacement of said other intermediate cover part relative to said spine, said intermediate cover parts being pivotal relative to said spine to an operative position to dispose one of said writing support members in a position such that an imagined extension of the plane of said one writing support member intersects said rings chordally when the ring book is open and lying on a flat surface member and to dispose the other writing support member in a position such that an imagined extension of the plane of said other writing support member is approximately tangential to said rings when the ring book is open to thereby preclude interference by the rings as handwriting is manually effected on the edge portion of a punched stationery sheet disposed on said other writing support member.

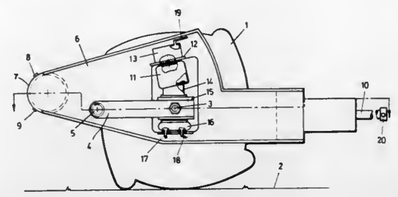
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**4,019,824**
**POSITIVE RING RETAINING SYSTEM**
**Vernon L. Percy, P. O. Box 684, Wedderburn, Oreg. 97491**
**Filed Feb. 3, 1976, Ser. No. 654,929**
**Int. Cl.² F16B** *21/00*
**U.S. Cl. 403—261** **10 Claims**



1. In a positive retaining ring assembly for axially securing a work element to a shaft, the combination including:
a shaft adapted to axially receive a work element thereon, said shaft having an annular work element retaining shoulder means thereon, said shaft provided with an annular recess proximate to said shoulder means, said annular recess having essentially a trapezoidal dross-sectional configuration open on a parallel side;
a segmented ring having a trapezoidal cross-sectional configuration with an outer circumferential surface normal to the axis of said ring, said ring adapted to matingly engage said annular recess and the side of a work element mounted on the shaft intermediate said recess and said shoulder means; and
clamping means provided in operative engagement with the outer circumferential surface of said segmented ring, said clamping means adapted to move radially inwardly against said segmented ring so as to selectively exert a direct inward radial force upon said segmented ring normal to the outer circumferential surface thereof and wedge said ring radially into said recess whereby said ring exerts a resultant axial retentive force against the side of the work member to lockably retain said work member against said shoulder means.

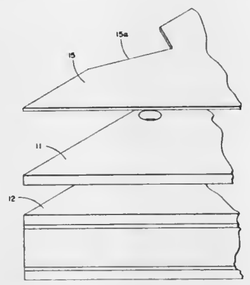
**4,019,825**
**SOIL COMPACTOR**
**Aubrey Ralph Berrangé, 147 Marais St., Brooklyn, Pretoria, Transvaal, South Africa**
**Filed Nov. 21, 1975, Ser. No. 634,321**
**Int. Cl.² E01C** *19/34*
**U.S. Cl. 404—133** **1 Claim**



1. A soil compactor comprising a non-circular compacting roller adapted to perform a tamping action when moved over a surface to be compacted and a draw frame for the roller, the roller having an axle performing a translatory oscillating motion during the tamping action, a pair of substantially horizontal crank arms, the extremities of said axle being mounted on the draw frame through said pair of crank arms, by the corresponding ends of said crank arms, said extremities of the axle being journalled and the other corresponding ends of said crank arms being journalled to said frame, a pneumatic suspension system with upper and lower air cushions between the ends of the crank arms to which the roller axle is journalled and said frame, the upper air cushions comprising an air spring and being attached to said ends of said crank arms, the lower air cushions being free of said ends and comprising a buffer against excessive motion of the roller axle relative to said frame, said upper air cushions having air back-up volume means to counteract variation of the spring force with compression of the upper air cushions, the upper and lower air cushions being respectively located substantially above and below said roller axle.

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**4,019,826**
**METHOD FOR DRILLING CIRCUIT BOARDS**
**James P. Block, Long Beach, Calif., assignor to LCOA Laminating Company of America, Cerritos, Calif.**
**Filed June 18, 1973, Ser. No. 371,303**
**The portion of the term of this patent subsequent to Oct. 24, 1989, has been disclaimed.**
**Int. Cl.² B23B** *35/00*
**U.S. Cl. 408—1 R** **5 Claims**



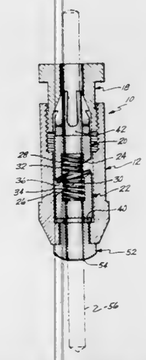
1. A technique for drilling holes in a circuit board comprising the steps of:
placing the circuit board on a back-up board with one of the broad surfaces of the circuit board resting against a broad surface of the back-up board wherein said back-up board is formed of a pressed wood fibrous core having metal foil laminated to both sides thereof;



placing a metal foil over the other surface of the circuit board;
placing retaining means on said foil and circuit board to temporarily retain the foil on the board;
drilling through the foil and the circuit board to the back-up board; and
after the drilling has been completed, removing the metal foil from the circuit board surface.

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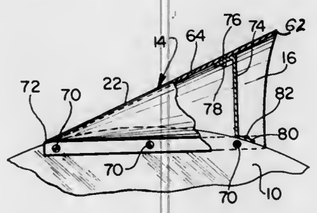
**4,019,827**
**DRILL STOP**
**Merrill Andrew Christianson, Puyallup, and Horace Earl Hill, Renton, both of Wash., assignors to The Boeing Company, Seattle, Wash.**
**Filed Sept. 29, 1975, Ser. No. 617,620**
**Int. Cl.² B23B** *47/00, 49/00*
**U.S. Cl. 408—202** **17 Claims**



1. A drill stop comprising: a washer located inside a housing to encircle a drill extending along a longitudinal axis, means for forcing the washer between sleeves having facing inclined surfaces into an inclined position with respect to said longitudinal axis for locking to the drill, and resilient means for releasing the washer from the drill when the means for forcing the washer is removed.

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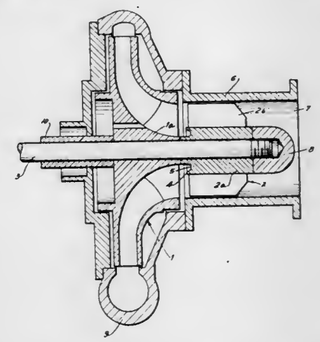
**4,019,828**
**WIND DRIVEN APPARATUS**
**George J. Bunzer, 54 Crown Point, Nokomis, Fla. 33555**
**Filed Nov. 1, 1974, Ser. No. 519,805**
**Int. Cl.² F03D** *7/06, 3/04*
**U.S. Cl. 415—122 R** **9 Claims**



1. Wind driven apparatus comprising, a base, means mounting said base for rotation about an axis, means responsive to the flow of wind past the base for rotating the base about said axis, said means including a plurality of wind receiving members operatively associated with the base and each having a mouth for receiving the wind passing the apparatus and responsive thereto rotating the base about said axis, and each member having a closed end opposite said mouth and converging from said mouth toward said end for deflecting the wind about the member, each member further including means spaced slightly inwardly of the outer periphery of the mouth and defining an inner portion of the mouth and substantially preventing passage of wind from said mouth into said end portion, said members being mounted on said base in a spaced apart series about said axis with the mouth of each member spaced from the end of the adjacent member and facing in a generally contrarotational direction of said base with the mouth substantially unobstructed by the adjacent end as the mouth moves into the path of the wind, and the converging ends directed in the rotational direction of said base.

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**4,019,829**
**CENTRIFUGAL PUMP WITH INDUCER**
**Hans-Dieter Knopfel, and Heinz-Bernd Matthias, both of Frankenthal, Germany, assignors to Klein, Schanzlin & Becker Aktiengesellschaft, Frankenthal, Germany**
**Filed Aug. 8, 1975, Ser. No. 603,087**
**Claims priority, application Germany, Aug. 22, 1974, 2440230**
**Int. Cl.² F04D** *1/00*
**U.S. Cl. 415—143** **8 Claims**



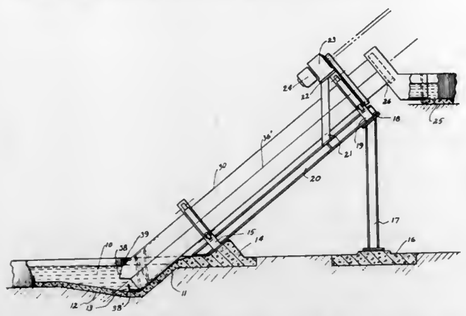
1. In a centrifugal pump, a combination comprising a casing having an intake; a centrifugal impeller rotatably mounted in said casing and having a first hub provided with an upstream end face; and a rotary inducer coaxial with said impeller and disposed in said casing intermediate said intake and said impeller, said inducer including a second hub having a downstream end face abutting said upstream end face of said first hub and having a diameter larger than said upstream end face of said first hub, said second hub further having an annular fluid recess provided in said downstream end face in the outer portion of said downstream end face, and said recess having an inner diameter which is at least equal to the outer diameter of said upstream end face of said first hub, said annular fluid recess facing towards said first hub, whereby turbulence tending to form at the downstream end of said inducer in the fluid flowing through said casing is alleviated.

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**4,019,830**
**CONE PUMP**
**Robert A. Reid, Charlton City, Mass., assignor to CPC Engineering Corporation, Sturbridge, Mass.**
**Filed Oct. 6, 1975, Ser. No. 619,569**
**Int. Cl.² F04D** *3/00*
**U.S. Cl. 415—72** **4 Claims**

1. A conveyor for liquids comprising
a cylindrical tube formed around a longitudinal axis and
a conveyor screw having a plurality of flights within the tube, each flight having a generally helical form and mounted around a central longitudinal axle,
the pitch of said screw being such that the individual flights are pitched at an angle of 20° to 45° downward in rotation to the central axis of the said cylinder tube.

said conveyor screw having the outer edge of the helical flights integrally joined to the tube and having inner free edges adjacent the axis of said cylindrical tube,



the inner edge of said helical flights being upwardly directed and from said corresponding outer edge,

means for supporting the tube at the two ends thereof, and means for rotating the tube.

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**4,019,831**

**COOLED ROTOR BLADE FOR A GAS TURBINE**

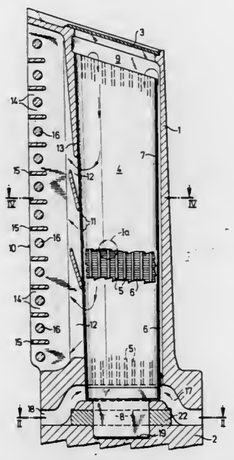
**Clifford John Franklin, Winterthur, and Hans Melliger, Wil, both of Switzerland, assignors to Brown Boveri Sulzer Turbomachinery Ltd., Zurich, Switzerland**

**Filed Aug. 28, 1975, Ser. No. 608,754**

**Claims priority, application Switzerland, Sept. 5, 1974, 12079/74**

**Int. Cl.² F01D** *5/18*

**U.S. Cl. 416—97 R** **11 Claims**



1. A cooled rotor blade for a gas turbine comprising

a hollow jacket having a perforated partition therein defining a hollow chamber on one side of said partition and having a leading edge, a trailing edge, a blade root and a blade tip;

a plurality of ribs on said jacket within said hollow chamber and extending from said blade root to said blade tip;

at least one insert disposed within said hollow chamber against said ribs to define flow passages therebetween;

a first cooling-air chamber in said blade root in communication with said flow passages;

a second cooling air chamber in said blade tip in communication with said flow passages and with the interior of said insert; and

a plurality of air outlets extending over said blade trailing edge and being in communication with said insert interior through orifices in said insert and said perforated partition whereby cooling air passing into said first cooling-air chamber flows through said flow passages, said second cooling-air chamber, said insert interior, said partition and said outlets in said trailing edge.

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**4,019,832**

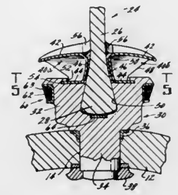
**PLATFORM FOR A TURBOMACHINERY BLADE**

**Charles T. Salemme; Richard Ravenhall, both of Cincinnati, and David J. Harris, Fairfield, all of Ohio, assignors to General Electric Company, Cincinnati, Ohio**

**Filed Feb. 27, 1976, Ser. No. 661,968**

**Int. Cl.² B64C** *11/06*; **F01D** *7/00*

**U.S. Cl. 416—135** **10 Claims**



2. A rotor apparatus comprising:

a blade having a root portion and an airfoil portion;

means for supporting said blade;

a blade platform for providing an aerodynamic flow path around the blade, the platform comprising a pair of complementary elements, each having an outer flow path defining shroud extending generally laterally of the blade, an inner flange also extending generally laterally of the blade and into a cooperating locking groove formed within the blade supporting means to limit outward displacement of the platform, and a contoured member extending between the shroud and the flange having a surface generally conforming to an overlapping wedge retaining means disposed upon the blade airfoil portion for further limiting outward displacement of the platform.

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**4,019,833**

**MEANS FOR RETAINING BLADES TO A DISC OR LIKE STRUCTURE**

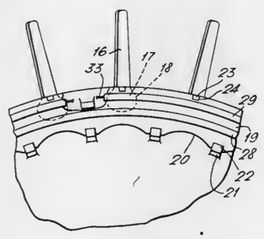
**Anthony George Gale, Wollaton, England, assignor to Rolls-Royce (1971) Limited, London, England**

**Filed Oct. 31, 1975, Ser. No. 627,785**

**Claims priority, application United Kingdom, Nov. 6, 1974, 47904/74**

**Int. Cl.² F01D** *5/32*

**U.S. Cl. 416—220 R** **7 Claims**



1. A rotor assembly comprising: a plurality of blades, a rotor disc having means for supporting said plurality of blades thereon against radial movement therefrom, a ring carried on said disc and engaging said blades to restrain their axial movement in one direction, a bayonet type of connection between said ring and said disc for holding said ring to said disc, and means providing engagement of at least some of said blades with said ring upon assembly of said blades on said disc to prevent said ring from rotating with respect to said disc and consequent disconnection of said ring from said disc.



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**4,019,834**

**GAS EXTRACTION APPARATUS FOR THERMAL INSTALLATIONS**

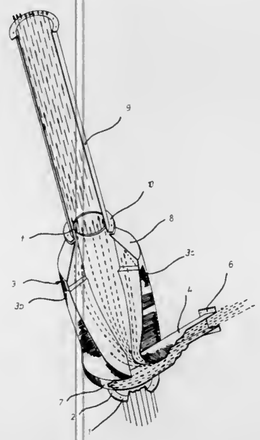
**Constantin Teodorescu, Bucharest, Romania, assignor to Institutul National Pentru Creatie Stintifica si Technica, Bucharest, Romania**

**Filed May 23, 1975, Ser. No. 580,329**

**Claims priority, application Romania, May 23, 1974, 78906**

**Int. Cl.² F04F** *5/20*

**U.S. Cl. 417—84** **1 Claim**



1. An apparatus for treating a hot gas, said apparatus comprising:

an elongated constant-cross section tube having an inlet end for receiving said hot gas and an outlet end downstream therefrom;

a jacket extending axially along said tube forming at a plurality of elongated compartments arranged around and extending along said tube and in heat-exchange relationship with said tube, said compartments each being of increasing cross-sectional dimension toward said outlet end but terminating short thereof;

an inwardly converging shell extending from said compartments and defining an annular nozzle slot opening downstream and at said outlet end of said tube;

a constant-cross section mixing duct at said outlet end surrounding said outlet end and said nozzle;

blower means for forcing air into the upstream end of said compartment, whereby said air is heated in said compartment and issues under pressure from said nozzle slot to suck said hot gas from said tube;

an annular inlet manifold communicating with the upstream ends of said compartments adjacent said inlet end of said tube and extending only over a part of the length of said tube at the inlet end thereof; and

a tangential conduit opening into said manifold and connecting said manifold with said blower means, said jacket and said shell extending substantially over the entire length of said duct.

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**4,019,835**

**LIQUID FUEL INJECTION PUMPING APPARATUS**

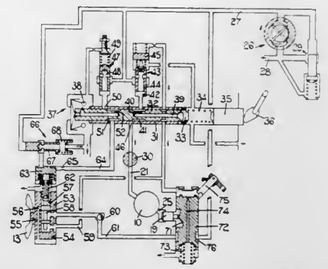
**Robert Thomas John Skinner, High Wycombe, England, assignor to C.A.V. Limited, Birmingham, England**

**Filed July 17, 1975, Ser. No. 596,894**

**Claims priority, application United Kingdom, July 19, 1974, 32018/74**

**Int. Cl.² F04B** *3/00*

**U.S. Cl. 417—253** **15 Claims**



1. A liquid fuel injection pumping apparatus for supplying fuel to an internal combustion engine, comprising: an injection pump adapted to be driven in timed relationship with an internal combustion engine and having a cam, a feed pump for supplying fuel under pressure, a body, a movable throttle member located within said body, said throttle member and body defining an adjustable orifice through which fuel is adapted to flow for supply to said injection pump, fluid pressure operable means coupled to said cam whereby movement of said fluid operable means adjusts the timing of delivery of fuel by said injection pump; a first valve means operable to provide a first pressure which varies as the square of the speed at which said apparatus is driven, said first pressure being applied to said fluid pressure operable means whereby the timing of delivery of fuel is responsive to the speed at which the apparatus is driven, second valve means for providing a second pressure which varies in accordance with the law $RN^2$ where R is a constant and N the speed at which the apparatus is driven, fuel at said second pressure being supplied to the injection pump through said adjustable orifice, a third valve for providing a third pressure having a substantially constant value, and a further adjustable orifice defined by said throttle member and body for deriving control pressure from said third pressure, a piston adapted to be subjected to said control pressure, and resilient means, said piston acting to control the force exerted on said fluid pressure operable means by said resilient means acting in opposition to said first pressure.

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**4,019,836**

**PLASTIC MOTOR-PUMP BASE FOR A SUBMERSIBLE PUMP UNIT**

**Elmer M. Deters, Muscatine, Iowa, assignor to Weil-McLain Co., Inc., Dallas, Tex.**

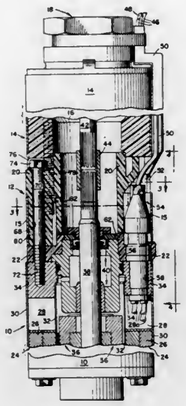
**Continuation of Ser. No. 520,650, Nov. 4, 1974, abandoned. This application Apr. 20, 1976, Ser. No. 678,534**

**Int. Cl.² F04B** *17/00*, *39/12*, *47/06*

**U.S. Cl. 417—360** **11 Claims**

1. A submersible deep-well pump unit of the type comprising a motor and a pump interconnected by a suction manifold base through which a driving connection between the motor and pump is made, wherein the improvement comprises said

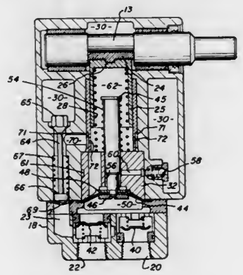
base being made of plastic, and fastening means connecting said base to the pump and the motor of placing said base



under axial compression over its length to increase its strength.

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**4,019,837**
**PRESSURE UNLOADING APPARATUS FOR A DIAPHRAGM PUMP**
**Marvin J. Eull, St. Michael, Minn., assignor to Graco Inc., Minneapolis, Minn.**
**Filed May 30, 1975, Ser. No. 582,262**
**Int. Cl.² F04B** *9/08, 35/02*
**U.S. Cl. 417—386** **2 Claims**



1. A diaphragm pump apparatus of the type having a mechanically reciprocated piston driving a pumping diaphragm through an intermediary hydraulic fluid displacement chamber to cause the pumping diaphragm to deflect to pump liquid through an inlet and outlet check valve to an output, comprising:

a. a hydraulic fluid reservoir in said apparatus for storing a supply of hydraulic fluid;

b. a fluid chamber having a passage to said hydraulic fluid reservoir and having a connecting port to said displacement chamber;

c. a valve in said passage between said fluid chamber and said hydraulic fluid reservoir, having a valve surface exposed to said displacement chamber pressure to develop valve opening forcing thereon

d. a passage between said fluid chamber and said output and a control diaphragm interposed across said passage in fluid sealing relationship;

e. a slidable plunger adjacent, but not connected to, said control diaphragm, and spring biasing means for urging said plunger toward said control diaphragm;

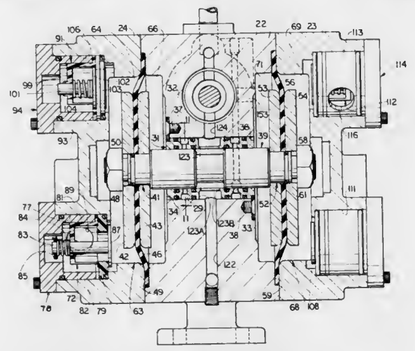
f. a rod connected between said plunger and said valve for translating control diaphragm deflection to valve opening and closing motion;

g. a valve passage between said displacement chamber and said reservoir, said valve passage having therein a check valve openable by an excess differential pressure in said reservoir relative to displacement chamber; and

h. a slide valve connected to said pumping diaphragm and slidable over said valve passage to open said valve passage during a maximum deflection of said pumping diaphragm

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**4,019,838**
**AIR PRESSURE-ACTUATED DOUBLE-ACTING DIAPHRAGM PUMP WITH MEANS TO PRODUCE A SELECTED START-UP POSITION**
**Henry T. Fluck, 7735 Jolain Drive, Cincinnati, Ohio 45242**
**Filed Sept. 3, 1975, Ser. No. 609,954**
**Int. Cl.² F04B** *17/00, 35/00;* **F01L** *25/02;* **F15B** *13/16*
**U.S. Cl. 417—393** **3 Claims**

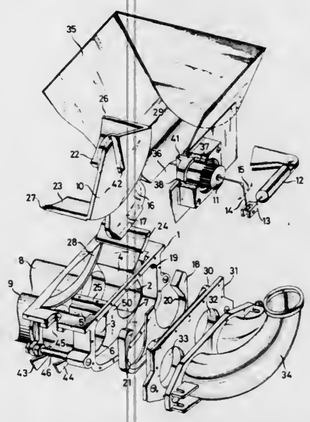


1. In combination with a two-stage pump which includes a pair of reciprocating pump members operating in opposed pump chambers and a connecting rod connecting the pump members to cause the pump members to operate in unison, a control valve for supplying air under pressure to said pump chambers which comprises a spool valve member, a guide sleeve guiding said spool valve member for reciprocation, said spool valve member including an inner pair of outwardly extending portions defining a central pressure slot and an outer pair of outwardly extending portions, each of the outer pair defining an exhaust slot with one of the inner pair, means in the sleeve for connecting the central pressure slot with a source of air under pressure, means in the sleeve for releasing pressure in each of the exhaust slots, a first port in the sleeve communicating with a first one of the chambers, a second port in the sleeve communicating with the other of the chambers, the spool valve member moving between a first limit position in which the first port is in communication with the pressure slot and the second port is in communication with one of the exhaust slots to cause movement of the connecting rod and the pump members in one direction and a second limit position in which the second port is in communication with the pressure slot and the first port is in communication with the other of the exhaust slots to cause movement of the connecting rod and the pump members in an opposite direction, there being pressure chambers at opposite ends of the sleeve member, means controlled by the connecting rod for supplying air under pressure to one of said pressure chambers when the connecting rod is in one position to cause movement of the spool valve member toward the other of said pressure chambers, means controlled by the connecting rod for supplying air under pressure to the other pressure chamber to cause movement of the spool valve member toward the first pressure chamber when the connecting rod is in a second position, and means releasably engageable with the spool valve member for advancing the spool valve member to one of the limit positions to position the spool valve member for starting the pump, there being metering air passageways exhausting air from the pressure chambers.



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**4,019,839**
**DISTRIBUTING VALVES FOR VISCOUS MATERIALS**
**Friedrich Schwing, Wanne-Eickel, Germany, assignor to Friedrich Wilhelm Schwing GmbH, Wanne-Eickel, Germany**
**Filed Mar. 27, 1975, Ser. No. 562,580**
**Claims priority, application Germany, Mar. 29, 1974, 2415276**
**Int. Cl.² F04B** *15/02, 39/10*
**U.S. Cl. 417—517** **14 Claims**



1. A distributing valve for use with twin cylinder pumps supplying viscous materials, such as concrete, each cylinder of said pump having a pressure orifice and a suction orifice, said valve comprising:

a casing connectable to the pump and having a portion which is subjected at least partially to the pressure to the pump;

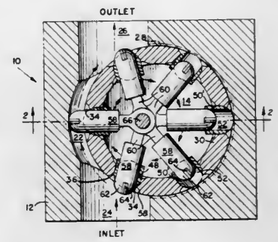
a shaft journalled in said casing outside the portion subjected to the pump pressure for movement about an axis generally parallel to the cylinders; and

an oscillating body coupled to, and adapted to be driven by, said shaft, said oscillating body having closing elements which alternately open the suction orifice of one of the pump cylinders and the pressure orifice of the other of the pump cylinders responsive to oscillatory movement of said body, said closing elements being arranged on the same side of the rotating shaft and including a pair of closing elements for either the suction orifices of the pressure orifices.

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**4,019,840**
**POSITIVE DISPLACEMENT VANE TYPE ROTARY PUMP**
**Charles A. Christy, 201 Airport Drive, Farmington, N. Mex. 87401**
**Filed Apr. 2, 1975, Ser. No. 564,289**
**Int. Cl.² F03C** *3/00*
**U.S. Cl. 418—241** **15 Claims**

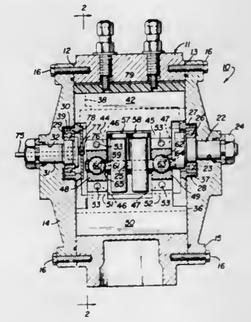
1. A vane rotary device comprising a housing member having a cavity extending therethrough, first and second end closure members, a rotor disposed in said cavity and rotatably supported in said housing member, said rotor having a plurality of radial openings therein, vane means disposed in each of said radial openings for sliding movement therein and rotary movement along with said rotor, an inlet passage and an outlet passage on spaced apart portions of said housing member communicating with said cavity, said cavity including a generally cylindrical circumferential portion and a channel offset radially beyond said generally cylindrical portion and extending from said inlet passage to said outlet passage, said channel in operation of said pump serving as a fluid pumping chamber, said vane means being supported on a fixed journal element concentric with said channel for pivotal movement thereabout and extending radially outwardly of said rotor and in pressure




sealing relationship with said channel while being rotated through said channel by said rotor thereby pumping fluid from said inlet passage to said outlet passage, said cylindrical portion extending between said outlet passage and said inlet passage, said vane means being retracted within said rotor as said rotor passes said cylindrical portion and a circumferential groove extending in said cylindrical portion providing communication between radial openings simultaneously passing said cylindrical portion to relieve pressure therein and thereby to facilitate radial movement of said vane means.

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**4,019,841**
**YOKE MECHANISM FOR FLUID DISPLACEMENT DEVICE**
**Arthur Kamin, 303 W. Hawley, Mundelein, Ill. 60060, and Clifford A. Evans, Rte. No. 3 Box 85, Waukegan, Ill. 60085**
**Continuation-in-part of Ser. No. 437,361, Jan. 28, 1974, abandoned. This application July 17, 1975, Ser. No. 596,857**
**Int. Cl.² F04C** *1/00*
**U.S. Cl. 418—257** **6 Claims**



1. A positive displacement fluid device, comprising

a fluid chamber,

a rotor journaled for rotation in said chamber,

said rotor being provided with a plurality of sets of diametrically opposed slots,

a shaft offset from the axis of rotation of said rotor,

a plurality of slide members each having a transverse opening therein rotatably receiving said shaft,

a plurality of yoke members each having a bore therein slidably receiving a respective one of said slide members,

a first pair of vanes disposed in one of said sets of slots with

each of said vanes being connected by freely pivotably connections to each of a pair of said yoke members to form a parallelogram, and

a second pair of vanes disposed in another of said sets of slots with each of said second pair of vanes being connected by freely pivotable connections to each of another pair of said yoke members to form a parallelogram,

whereby said pairs of vanes are movable in the planes of the respectively associated slots to provide limited self-adjustment of said vanes in said chamber.

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**4,019,842**

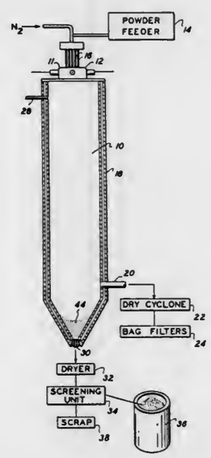
## APPARATUS FOR FORMING MAGNETITE ELECTROSTATOGRAPHIC CARRIERS

**Rudolph Forgensi, Webster, and Robert J. Hagenbach, Rochester, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.**

**Division of Ser. No. 552,589, Feb. 24, 1975. This application May 27, 1976, Ser. No. 690,687**

**Int. Cl.² B29C *23/00*; B28B *1/54***

**U.S. Cl. 425—7** **11 Claims**




1. An apparatus for manufacturing spheroidized beads comprising a walled chamber, a carbon arc plasma flame assembly positioned atop said walled chamber, a vibrating feeder means for feeding ore particles in the presence of an inert gas via feed ports to said plasma flame assembly, means for feeding at least one gas to said plasma flame assembly, a purge system connected to the upper portion of said walled chamber, an exhaust system leading from the lower portion of said walled chamber, and an output conduit located at the bottom of said walled chamber for recovery of said spheroidized beads.

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**4,019,843**

## FILM BLOWHEAD FOR PRODUCING TUBULAR FILM

**Werner Josef Zimmermann, Lengerich of Westphalia, Germany, assignor to Windmoller & Holscher, Lengerich of Westphalia, Germany**

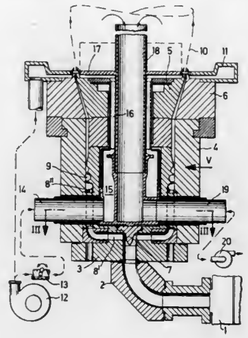
**Filed Sept. 23, 1975, Ser. No. 616,069**

**Claims priority, application Germany, Sept. 24, 1974, 2445545**

**Int. Cl.² B29D *23/04***

**U.S. Cl. 425—72 R** **4 Claims**

1. A film blowhead for producing tubular film from thermoplastic material comprising, in combination, a blowhead housing, a blowhead insert in said housing provided with a distributing helix defining with said housing an overflow gap that continuously increases in size, a central melt supply conduit, a plurality of distributing passages connected to said supply conduit extending radially outward from said supply conduit towards said blowhead housing and opening into said distributing helix, each of said distributing passages including a radial passage portion connected to said central melt supply conduit and extending in a common radial plane towards a marginal region of said blowhead insert and an axial passage portion extending upwardly at a right angle to said radial



passage portion to open into said distributing helix, internal air cooling means including inlet and outlet tubes disposed in axially extending, concentric relationship to form inlet and outlet guide passages respectively for internal cooling air, at least one air inlet connected to said inlet guide passage and at least one outlet tube connected to said outlet guide passage, said at least one air inlet and outlet tubes being disposed between adjacent axial passage portions of said distributing passages in at least one radial plane.

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**4,019,844**

## APPARATUS FOR PRODUCING MULTIPLE LAYERS CONJUGATE FIBERS

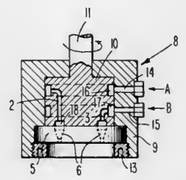
**Masafumi Ogasawara; Masanori Akita, both of Otsu; Kazuhiko Saito, Kusatsu; Yoshikazu Kikuchi, and Mitsuhiro Shiokawa, both of Otsu, all of Japan, assignors to Toray Industries, Inc., Tokyo, Japan**

**Division of Ser. No. 443,506, Feb. 19, 1974, Pat. No. 3,924,045. This application July 2, 1975, Ser. No. 592,453**

**Claims priority, application Japan, Feb. 26, 1973, 48-22246; Mar. 31, 1973, 48-37155; Apr. 6, 1973, 48-38765**

**Int. Cl.² D01D *3/00, 5/28***

**U.S. Cl. 425—131.5** **7 Claims**



1. An apparatus for producing a multiple layer conjugate fiber, comprising:

a. a housing having a spinning plate mounted thereon and a plurality of polymer feed inlets, said spinning plate having a plurality of orifices,

b. a cylinder plug having a plurality of polymer feed grooves and passages, mounted in said housing,

c. said passages being arranged so as to communicate with at least one of said grooves,

d. said grooves being arranged along the outer periphery of said cylinder plug and each groove being in communication with one of the polymer inlets in said housing,



e. said passages having outlets arranged along a circumference located at a position corresponding to the circumference of the spinning orifices arranged on the spinning plate, and an annular multi-laminar chamber formed between the spinning orifices and the outlet of said polymer passages, one of said spinning plate and said cylinder plug being stationary and the other being mounted for rotation.

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**4,019,845**

## CONTROL SYSTEM FOR INJECTION-MOLDING MACHINE

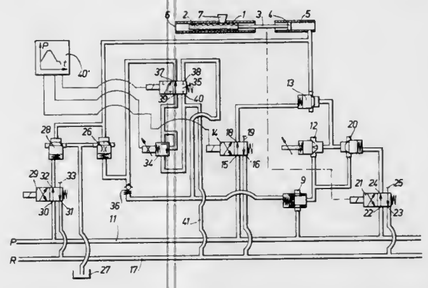
**Hans Birkhofer, Windenreute; Arno Stöhr, and Werner Schrammel, both of Emmendingen, all of Germany, assignors to Klockner-Werke AG, Duisburg, Germany**

**Filed Apr. 21, 1976, Ser. No. 678,941**

**Claims priority, application Germany, May 27, 1975, 2523303**

**Int. Cl.² B29F *1/06*; F15B *21/02***

**U.S. Cl. 425—146** **10 Claims**



1. In combination with an injection-molding machine having a drive ram with a pressurizable chamber and with a source of fluid under pressure having a high-pressure side and a low-pressure side, a control system comprising: a pressure-reducing valve having an inlet port connected to the said high-pressure side, an outlet port connected to said chamber, and a pilot port, means operable in said pressure-reducing valve whereby the pressure at said pilot port determines the pressure at said outlet port; a pressure-relief valve having an inlet port connected to said chamber, an outlet port connected to said low-pressure side, and a pilot port, means operable in said pressure-relief valve whereby the pressure at said inlet port of said pressure-relief valve is determined by the pressure at its said pilot port; a pressure-control valve having an outlet side connected to said low-pressure side and an inlet side and having means operable to maintain a first predetermined pressure differential between said inlet and outlet sides in an injecting mode and to maintain a second predermined pressure differential between said inlet and outlet sides in a clamping mode; and function-control means including a valve having a first connection coupled to said inlet side and second and third connections each coupled to a respective one of said pilot ports and operable between a filling position connecting said pilot port of said pressure-relief valve to said pressure-control valve and an injecting/holding position connecting said pilot port of said pressure-reducing valve to said pressure-control valve.

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**4,019,846**

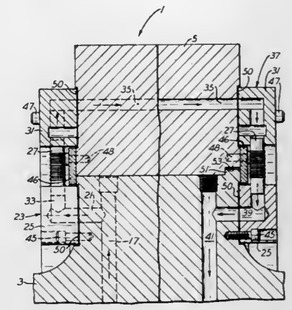
## ROLLS IN A BRIQUETTING MACHINE OR LIKE MACHINES

**Joseph Irwin Greenberger, Pittsburgh, Pa., assignor to Wean United, Inc., Pittsburgh, Pa.**

**Continuation of Ser. No. 584,240, June 5, 1975, abandoned. This application Sept. 30, 1976, Ser. No. 728,500**

**Int. Cl.² B28B *17/00***

**U.S. Cl. 425—194** **1 Claim**



1. In a briquetting machine, an improvement for controlling the temperature of the working surface of a composite roll thereof having an axis of rotation relative to said machine consisting of:

a passageway within the roll to permit termperature control medium to flow axially in an arbor on the roll,

egress and ingress radial passageways within said arbor to permit temperature control medium to flow from and to said axial passageway to and from the outer portion of said arbor,

a readily removable and replaceable sleeve arranged concentric about and supported by said arbor, said sleeve having an outer working surface,

a system of passageways, including a series of axially spaced passageways, located beneath said working surface and formed in said sleeve to permit temperature control medium to flow continuously through said sleeve in a manner to control the temperature of said working surface, at least a first and a second of said passageways of said system of passageways terminating adjacent opposite ends of the roll; said series of axially spaced passageways formed into a number of distinct groups,

a first number of manifold assemblies arranged external of and at one end of the roll,

a second number of manifold assemblies arranged external of and at the opposite end of the roll,

said first and second manifold assemblies connecting said radial passageways to said first and second passageways of said system of passageways to create an uninterrupted flow of temperature control medium through said arbor and said sleeve of the roll and serving as entry and delivery ports respectively for said groups,

a set of first and second manifold assemblies being connected to each group of said groups of axially spaced passageways,

said first manifold assemblies having first medium receiving means for receiving medium from said radial passageways for transfer to second medium receiving means,

first fastening means for securing said receiving means to said arbor,

a said second medium receiving means in each said first manifold assemblies for transferring medium to said first and second passageways of said system of passageways from said first receiving means,

second fastening means for securing said other receiving means to said sleeve,

said second manifold assemblies having third medium re-

ceiving means for transferring medium from said first and second passageways of said system of passageways to fourth medium receiving means,

said fourth medium receiving means in each said second manifold assemblies for receiving medium from said third receiving means for transfer to said radial passageways,

said second manifold assemblies having third and fourth fastening means similar in function to said first and second fastening means,

a ring means arranged on said one end of the roll, and a ring means arranged on said opposite end of said roll,

fifth and sixth fastening means for securing different ring means to said sleeve to their respective ends,

said ring means having restraining portions which abut both said sleeve and arbor operative to restrain axial relative movement between said sleeve and arbor,

said sleeve and said arbor having radial engaging surfaces on said opposite end of the roll arranged to prevent axial movement of the sleeve relative to said arbor in one axial direction, but allowing axial movement in an opposite axial direction,

the construction being such that the removal of said first fastening means on said one end of the roll and the removal of said fourth and fifth fastening means on said opposite end of the roll allows said sleeve and said first manifold assemblies on said one end to be remmoved as a unit from said arbor while the second manifold assemblies on said opposite end remains attached to said arbor by said third fastening means.

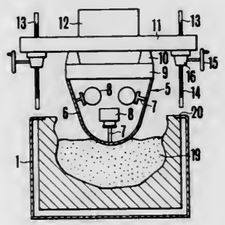
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**4,019,847**

## APPARATUS FOR FORMING A REFRACTORY LINING FOR A CONTAINER

**Hiroyuki Imai; Hidenobu Itoi; Hiromu Shimizu, all of Himeji, and Yukio Kuroda, Hyogo, all of Japan, assignors to Nippon Steel Corporation, Tokyo, Japan**

**Filed Sept. 19, 1975, Ser. No. 614,906**
**Claims priority, application Japan, Oct. 7, 1974, 49-114670**
**Int. Cl.² B28B *1/10, 7/00***
**U.S. Cl. 425—421** **10 Claims**




1. In apparatus for forming a refractory lining for a container comprising a vibration-pressing mold to be placed on a refractory mix charged in the container, the outer shell of said mold being composed of a metal plate, a plurality of vibrators attached respectively to a vibration-transfer frame provided on the inside of said metal plate, an anti-vibration member provided on the upper end of said mold, a supporting frame for supporting said mold provided on said anti-vibration member, and a guide member for maintaining said mold in a stabilized posture during its sinking-down movement into said refractory mix, the improvement wherein said mold is portable and is placed on the refractory mix charged in the container to be lined, said mold is sinkable by its own weight, said supporting frame is extended beyond the width of the mold, a weight is placed on said supporting frame, a plurality of guide members extending essentially vertically to said supporting frame are provided so as to move up and down by means of a driving member attached thereto, and a changeable space is established between the lower sides of said guide members and the upper face of said container.

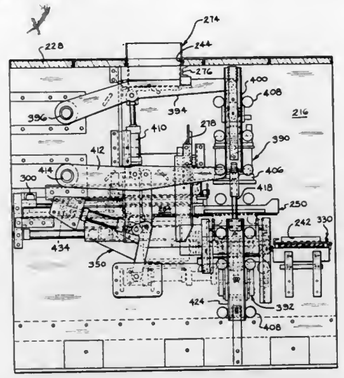
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**4,019,848**

## BLOCK MOLDING MACHINE HAVING A PALLET FEEDER AND EJECTOR

**Milo G. Balborn, Waterloo, Iowa, assignor to Old Fort International, Inc., Adrian, Mich.**

**Division of Ser. No. 544,137, Jan. 27, 1975, Pat. No. 3,961,874. This application Feb. 13, 1976, Ser. No. 657,943**
**Int. Cl.² B28B *3/04***
**U.S. Cl. 425—443** **3 Claims**




1. In a block molding machine, a frame, a moldbox supported by the frame and open at the bottom under which a pallet can be supported during block molding operations, a pallet magazine on the rearward side of said moldbox having a discharge portion on its front side for release of a pallet for transfer to said moldbox, a conveyor extending in a forward direction from said moldbox for receiving a block-loaded pallet from below said moldbox, a strip mechanism supported by the frame and extending under the moldbox for supporting and lowering a block-loaded pallet when the block is stripped from said moldbox and subsequently for raising and supporting against the bottom of the moldbox the next succeeding pallet transferred from said magazine, and an ejector and pallet feed mechanism mounted on said frame for reciprocal movement between forward and rearward positions, said ejector and pallet feed mechanism including a pallet feeder having an ejector element operable when said feed mechanism is moved forward for transferring forward on said conveyor a block-loaded pallet positioned below said moldbox, and a feeder element for engaging and cooperaing in transferring forward simultaneously the next succeeding pallet in said magazine to a position under said moldbox for subsequently being supported by said strip mechanism, said pallet feeder and said frame have cooperating guide means so that when said ejector and pallet feed mechanism is moved forward the pallet feeder will be elevated to position the next succeeding pallet adjacent to the underside of the moldbox.

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**4,019,849**

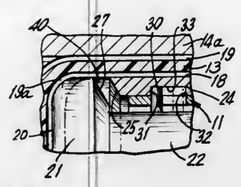
## RAPID PARISON COOLING IN INJECTION BLOW MOLDING

**John Jerome Farrell, Greenbrook, N.J., assignor to Consupak, Inc., Morristown, N.J.**

**Filed Oct. 31, 1975, Ser. No. 627,508**
**Int. Cl.² B29C *17/07***
**U.S. Cl. 425—445** **13 Claims**

1. An apparatus for cooling a parison having a neck portion and a close-ended tubular body portion comprising a core rod having the parison extending substantially the entire length thereof and the parison being supported at the neck portion, a mold in which the core rod and parison are situated with a space between the parison body portion and the core rod and a space between the parison body portion and the mold, the core rod comprising means to circulate a first cooling fluid in the space between the core rod and parison along substantially the entire inside surface of the parison body portion, and the mold comprising means to circulate a second cooling fluid in the space between the parison and the mold along substantially the entire outside surface of the parison body portion, said two cooling fluid means being operable at about the same time so that said parison body portion is spaced from the core rod and the mold by the two cooling fluids.





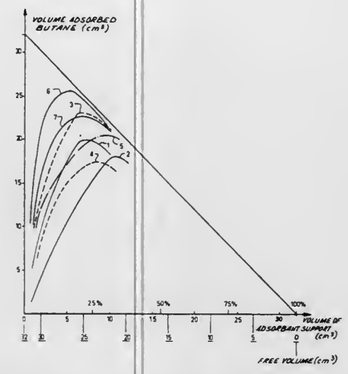

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**4,019,850**

## METHOD FOR THE STORAGE OF LIQUEFIED GAS IN THE PRESENCE OF A FIBROUS ADSORBANT SUPPORT

**Georges Tallonneau, Avon, France, assignor to S.T. Dupont, Paris, France**

**Filed Oct. 15, 1974, Ser. No. 515,035**
**Claims priority, application France, Oct. 12, 1973, 73.36495**
**Int. Cl.² F17C *7/02***
**U.S. Cl. 431—12** **8 Claims**




1. A process of storing a liquified gas for distribution exclusively in gaseous form into an atmosphere whose pressure is less than that of the storage chamber, the liquified gas being combustible and being stored in the storage chamber constituted by a feed reservoir of a device having a burner directly connected to an evacuation orifice of the reservoir without interposition of auxiliary gas evaporation apparatus and without auxiliary expansion apparatus, said process comprising disposing in the storage chamber conjointly with the stored liquified gas, a quantity of a fibrous capillary adsorbant support whose fibers have a diameter between 0.5 and 25 microns, the minimum value of the actual volume of the support, constituted by the volume remaining after deduction of all interstitial spaces, going from (a) 2% of the volume of the storage chamber for a capillary support having loosely entangled fibers, in a layer, of a diameter of about 0.5 microns to (b) 12% of the volume of the storage chamber for a capillary support having entangled fibers, in a layer, of a diameter of 25 microns, the amount of liquified gas disposed in the chamber corresponding to the volume of the support such that all the liquefied gas is adsorbed by the support and only gaseous form of the liquefied gas is discharged upon opening of the evacuation orifice, the said minimum value of the actual volume of the support being of such magnitude to be sufficient to insure the distribution of the liquefied gas exclusively in gaseous form to the burner without auxiliary gas evaporation apparatus and auxiliary expansion apparatus.

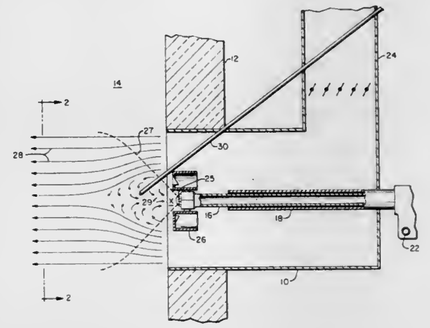
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**4,019,851**

## HIGH ENERGY ARC IGNITOR FOR BURNER

**Donald Arthur Smith, Haddan, Conn., and John Joseph Marshall, Feeding Hills, Mass., assignors to Combustion Engineering, Inc., Windsor, Conn.**

**Filed Sept. 22, 1975, Ser. No. 615,324**
**Int. Cl.² F23Q *3/00***
**U.S. Cl. 431—2** **6 Claims**




1. In combination, a first longitudinal pipe supplied with combustion air at its inlet end and open at its discharge end, a second pipe positioned axially within the first pipe, said second pipe being supplied at a first end with a hard to ignite liquid fuel, the second pipe having a tip at its second end containing fuel passages located such that the fuel is discharged in the shape of a hollow conical curtain, baffle means transverse to the second pipe and surrounding it adjacent to the tip such that eddy currents of air are formed on the downstream side thereof, some of the eddy currents breaking through the curtain of fuel and forming a recirculation zone having an inner edge inside the conical curtain flowing back to point directly in front of the tip of the second pipe, and ignition means positioned within the conical curtain and along the inner edge of the recirculation zone for igniting the liquid fuel.

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**4,019,852**

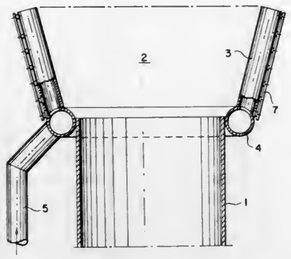
## QUIET AND SMOKELESS FLARING OF OFF-GASES CONTAINING HYDROCARBONS

**Gerd Hemmer, Ludwigshafen; Klaus Hess, Bad Durkheim; Rolf Becker, Luetzelsachsen, and Klaus Liebhaber, Frankenthal, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany**

**Filed Oct. 20, 1975, Ser. No. 623,932**
**Claims priority, application Germany, Oct. 23, 1974, 2450205**
**Int. Cl.² F23G *7/06***
**U.S. Cl. 431—5** **8 Claims**

1. A process for the quiet and smokeless flaring of combustible process gases from a flare stack which comprises discharging from the end of a flare stack a stream of a combustible process gas into a mixing zone located within a series of injector tubes arranged in a circle about and extending beyond said end of the flare stack, and discharging through respective longitudinal passages in the outwardly facing sides of said

tubes and then about said tubes toward said mixing zone a stream of propellant gas for drawing atmospheric air between



said tubes and through said circle into said stream of combustible gas.

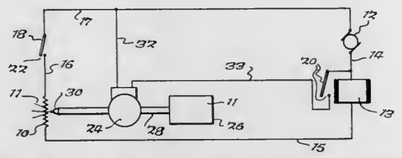
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**4,019,853**

## AUTOMATIC FUEL IGNITION APPARATUS

**Arthur H. Sears, Youngstown, and August J. Siuta, Jr., Lockport, both of N.Y., assignors to The Carborundum Company, Niagara Falls, N.Y.**

**Filed Nov. 3, 1975, Ser. No. 628,300**
**Int. Cl.² F23N *5/00***
**U.S. Cl. 431—67** **16 Claims**



1. Apparatus for automatic fluid fuel ignition, comprising:
a. an electrical resistance igniter means for igniting fluid fuel;
b. fluid fuel supply means including a normally closed fluid fuel valve;
c. fluid fuel flow means for flowing the fuel proximate the igniter means when the fluid fuel valve is open; and
d. valve opening means comprising an electrically activated time delay relay, electrically connected in series to the igniter means, for opening the fluid fuel valve, sufficient electrical current to activate said relay passing through said relay only after the igniter means is at a temperature above the ignition temperature of the fluid fuel.

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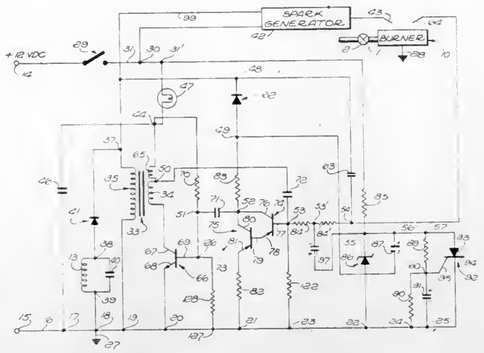
**4,019,854**

## DIRECT SPARK IGNITION SYSTEM UTILIZING GATED OSCILLATOR

**Elmer A. Carlson, Agoura; Joseph G. Raffaelli, Granada Hills, and Ronald A. Gann, La Crescenta, all of Calif., assignors to International Telephone and Telegraph Corporation, New York, N.Y.**

**Filed Feb. 27, 1976, Ser. No. 661,938**
**Int. Cl.² F23H *5/12***
**U.S. Cl. 431—80** **2 Claims**

1. A direct spark ignition system, said system comprising: a fluid fuel burner; an electrically operable valve connected to said burner to control the fuel admitted thereto; an oscillator; a timing circuit actuable to cause said oscillator to oscillate for a predetermined period; a spark generator connected from said oscillator to ignite fuel emanating from said burner; and a flame sensor to sustain oscillations of said oscillator after said period when a flame exists at said burner, said oscillator including an amplifier having a feedback path with a gate connected therein, said flame sensor being connected to said gate to cause the same to close and to complete said feedback path in manner to cause said oscillations to be sustained after said




period when a flame exists at said burner, said flame sensor holding said gate open in the absence of flame to allow said oscillations to die out.

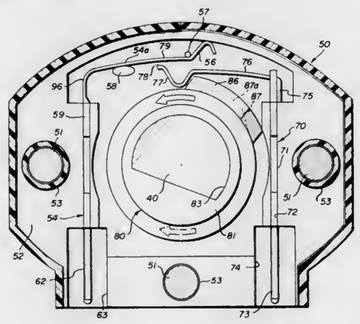
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**4,019,855**

## ELECTRICAL SWITCH FOR IGNITION IN GAS APPLIANCES

**Charles Carl Camillo, Western Springs, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.**

**Filed Oct. 14, 1975, Ser. No. 622,216**
**Int. Cl.² F23Q *7/12***
**U.S. Cl. 431—256** **7 Claims**



1. An electrical switch for association with a gas valve comprising housing means, a rotatable cam body disposed on said housing means, said cam body being of a predetermined width and having an axis of rotation associated therewith, a cam guide on said cam body and extending transversely of the axis of rotation thereof and along a predetermined arcuate extent of an outer surface of said cam body, a cam lobe on said cam body adjacent said cam guide at one side thereof, fixed contact means secured within said housing means and spaced from said cam body, and shiftable contact means secured within said housing means and adjacent said cam body for selective engagement with said fixed contact means, said shiftable contact means being shiftable laterally and deflectable vertically, said cam guide being constructed for engaging said shiftable contact means and shifting said shiftable contact means laterally toward said cam lobe upon rotation of said cam by a predetermined amount in one direction, said cam subsequently deflecting said shiftable contact means vertically for actuation thereby into electrical contact with said fixed contact means for a predetermined interval of rotation of said cam body from its initial position, which initial position corresponds to a closed valve, when said cam body is rotated by an additional predetermined amount in said one direction, and said cam guide being constructed for engaging and shifting said shiftable contact means laterally away from said cam lobe for preventing deflection of said shiftable contact means in said vertical direction by said cam lobe and electrical contact of said shiftable contact means with said fixed contact means when said cam body is rotated in the opposite direction to said one direction, back toward its initial position.



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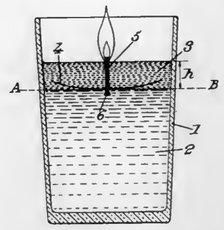
**4,019,856**

## OIL LAMP

**Jean R. Lacroix, 167 bis, Avenue Victor Hugo, 75116 - Paris, France**

**Filed Sept. 15, 1975, Ser. No. 613,539**
**Claims priority, application France, Oct. 22, 1974, 74.35445**
**Int. Cl.² F23D *3/02***
**U.S. Cl. 431—298** **11 Claims**

1. An oil lamp comprising a container containing a layer of oil on top of an incombustible liquid, and at least one float in which is fitted at least one upstanding wick, wherein each float rests continuously on the oil-incombustible liquid interface regardless of the depth of the oil layer or complete submergence of the float in the oil, each wick having an initial length




which is greater than the depth of the layer of oil so that in the floating position the said wick emerges directly from the surface of said layer.

## 4,019,857
## PROCESS FOR THE COLORATION OF HYDROPHOBIC CHEMICAL FIBERS BY METALLIFEROUS DYESTUFFS OF CATIONIC CHARACTER

**Antoine Georges Leon Jacques Breda, Bois Guillaume, France, assignor to Produits Chimiques Ugine Kuhlmann, Paris, France**

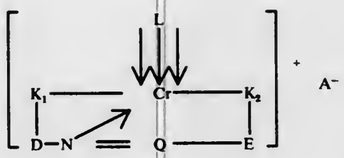
**Filed Mar. 11, 1974, Ser. No. 450,112**

**Claims priority, application France, Mar. 20, 1973, 73.09880**

**Int. Cl.² C09B** *29/38, 29/00;* **D06P** *1/13, 1/02*

**U.S. Cl. 8—42 C** **17 Claims**

**1.** A process for dyeing or printing synthetic or artificial hydrophobic textile fibers based on polyesters or cellulose triacetate in an aqueous medium containing a dyestuff having the formula:



in which N is nitrogen,

Q represents a nitrogen atom or a methine group,

D and E each represent a radical not containing an ionic group and having an aromatic, heterocyclic or aliphatic character, this radical carrying in the vicinal position with respect to the grouping —N=Q— a chelating group $K_1$ or $K_2$;

Cr is trivalent chromium;

$K_1$ represents —O— or —COO—;

$K_2$ represents —O— or —NR—;

R being an alkyl or aryl substituent or a hydrogen atom;

L represents a group of 3 neutral monodentate ligands, or neutral bidentate ligand and a neutral monodentate ligand, or a neutral tridentate ligand; and

A represents a simple anion carrying one negative charge, the cationic part of which dyestuff does not contain an ionized group,

which process comprises contacting said fibers with an aqueous dyeing medium at a pH of 3 to 7 and a temperature at least equal to 80° C containing a complexing agent sparingly soluble in water and not containing an ionized group and more soluble in the fiber than in the aqueous dyeing medium, and with the premetallized dyestuff;

said complexing agent being capable of fixation on the metal of the premetallized dyestuff with liberation of a proton and of chelating agent forming a five- or six-membered ring with the chromium of the dyestuff complex thereby rendering it neutral.

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## 4,019,858
## CONCENTRATED DIRECT DYE SOLUTION AND PROCESS THEREFOR

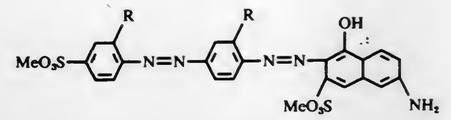
**Joseph Clyde Conger, Sr., Somerville, N.J., assignor to American Cyanamid Company, Stamford, Conn.**

**Filed May 21, 1975, Ser. No. 579,360**

**Int. Cl.² C09B** *67/00;* **D06P** *1/645*

**U.S. Cl. 8—85 R** **4 Claims**

**1.** A concentrated dye solution comprising per 100 parts by weight thereof, 54–55 parts of water, 17–18 parts of process salts, 15–16 parts of urea and 12–13 parts of a dye having the formula:



where Me is an alkali metal and R is H, $-CH_3$ or $-C_2H_5$.

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## 4,019,859
## TRIETHYLENE TETRAMINE STABILIZATION OF COBALT CATALYZED SULFITE SOLUTIONS AND USE THEREOF IN CONTROLLING OXYGEN CORROSION IN BOILER WATER SYSTEMS

**Walter M. Lavin, Horsham; James I. McFarlane, Warminster, and Dennis L. Rose, Fairless Hills, all of Pa., assignors to Betz Laboratories, Inc., Trevose, Pa.**

**Filed Sept. 20, 1976, Ser. No. 724,443**

**Int. Cl.² C23F** *11/04;* **C02B** *1/23, 1/10, 5/06*

**U.S. Cl. 21—2.7 R** **18 Claims**

**1.** A method of stabilizing an aqueous solution of an alkali metal sulfite or bisulfite containing a water-soluble cobalt catalyst, which solution with an increase of pH will experience the precipitation of a said cobalt as its sulfite salt, which method comprises incorporating in said solution a stabilizing amount of triethylene tetramine.

**15.** A method of controlling oxygen corrosion in a boiler water system due to the dissolved oxygen in the water which comprises adding to said boiler water an oxygen scavenging amount of a composition comprising an alkali metal sulfite or bisulfite, a water-soluble cobalt catalyst, and a stabilizing amount of triethylene tetramine.

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## 4,019,860
## ANALYTICAL REAGENT FOR CYANIDE

**Wolfgang Fischer, and Renate Linck, both of Darmstadt, Germany, assignors to Merck Patent Gesellschaft mit beschränkter Haftung, Darmstadt, Germany**

**Filed Apr. 5, 1976, Ser. No. 673,490**

**Claims priority, application Germany, Apr. 19, 1975, 2517483**

**Int. Cl.² C07D** *239/22;* **C09B** *57/00;* **G01N** *21/02, 31/00*

**U.S. Cl. 23—230 R** **2 Claims**

**1.** In a method for the colorimetric determination of cyanide in an unknown wherein the cyanide is reacted with chloramine-T to form cyanogen chloride, said cyanogen chloride is reacted with pyridine to form glutaconic dialdehyde, said dialdehyde is reacted with an organic compound to form a colored compound, and the content of cyanide in said solution is determined from the color intensity of said colored compound,

wherein the improvement comprises employing as said organic compound, N,N′-dialkyl-barbituric acid, the alkyl groups being each of 1–6 carbon atoms.

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## 4,019,861
## METHOD AND APPARATUS FOR MEASUREMENT OF $CO_2$ AND CHLORIDE IN BODY FLUIDS

**Harald Dahms, Ossining, N.Y., assignor to Corning Glass Works, Corning, N.Y.**

**Filed June 30, 1976, Ser. No. 701,164**

**Int. Cl.² G01N** *33/16, 27/30, 27/42*

**U.S. Cl. 23—230 B** **39 Claims**

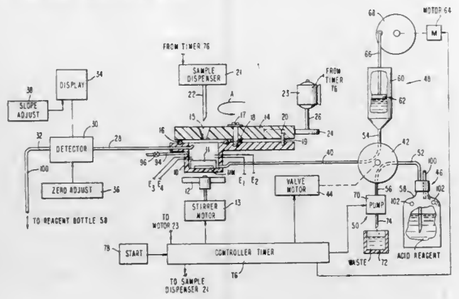
**1.** A method for measuring $CO_2$ and chlorides in a sample of body fluid, comprising the steps of:

reacting said sample and a reagent in a vessel to release $CO_2$ into a gas space filled substantially with air at essentially atmospheric pressure to produce a mixture of said released $CO_2$ and air, said gas space having a volume greater than the volume of sample in said vessel,

transferring at least a portion of said mixture in said gas

space to a detector by adding a displacing liquid to said vessel,

measuring the concentration of said transferred gas mixture in said detector, and




coulometrically titrating said sample and reagent in said vessel to determine chloride concentration in said sample.

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**4,019,862**

**$CO_2$ MEASUREMENT AND REAGENTS THEREFOR**

**Harald Dahms, Ossining, N.Y., assignor to Corning Glass Works, Corning, N.Y.**

**Filed June 23, 1976, Ser. No. 698,868**

**Int. Cl.² G01N *33/16***

**U.S. Cl. 23—230 B** **35 Claims**

**9.** A method for analyzing $CO_2$ in body fluids comprising the steps of

adding an acid reagent to a sample of said body fluid to release $CO_2$ therefrom into a gas space, said reagent being comprised of an acid having a pH less than 4 and a vapor pressure not in excess of 10mm mercury together with an ether of a fatty alcohol and polyoxyethylene having the structure $R—O—(C_2H_4—O)_nH$, and

displacing said released $CO_2$ to a detector where a sample of said $CO_2$ is measured.

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**4,019,863**

**SELECTIVE DETECTION OF A CONSTITUENT IN AN ATMOSPHERE**

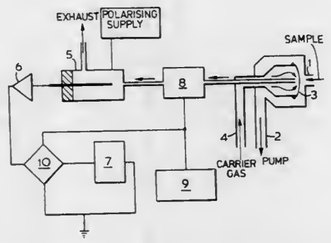
**Anthony Jenkins, 54 Finchams Close, Linton, Cambridgeshire, and James Ephraim Lovelock, Bowerchalke, Salisbury, Wiltshire, both of England**

**Filed Apr. 8, 1975, Ser. No. 566,057**

**Claims priority, application United Kingdom, Apr. 8, 1974, 15556/74**

**Int. Cl.² G01N *1/22*, *33/22***

**U.S. Cl. 23—232 E** **16 Claims**




**1.** A method for selectively distinguishing a constituent of interest from the remaining constituents in a gas sample, comprising:

continuously flowing sample gas through a switching device into a detector;

heating the switching device:

alternately raising and lowering the temperature of the gas flow furnished by the switching device to said detector above and below a temperature at which the flow to the detector of the consitutent of interest is interrupted without affecting the flow of the remaining consitituents in the sample gas, such alternating raising and lowering of the temperature including periodically switching a condition of the switching device;

monitoring output signals from the detector and correlating such detector output signals with the switching of said switching device and from such correlation indicating the presence and concentration of the constituent of interest in the gas flow.

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**4,019,864**

**METHOD FOR MEASURING RADIOACTIVITIES OF TRITIUM AND CARBON-14 IN SAMPLE AIR AND APPARATUS FOR PERFORMING THE SAME METHOD**

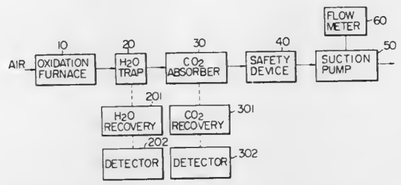
**Tomo Saito, Sagamihara; Kazuo Watanabe, Yokohama; Yumiko Nishiyama, Hatano, and Naotake Morikawa, Tokyo, all of Japan, assignors to Sagami Chemical Research Center, Tokyo, Japan**

**Filed Sept. 10, 1975, Ser. No. 611,958**

**Claims priority, application Japan, Sept. 10, 1974, 49-104215; Apr. 10, 1975, 50-48522[U]; Apr. 10, 1975, 50-43624**

**Int. Cl.² G01N *31/12*; G01T *1/167***

**U.S. Cl. 23—253 PC** **4 Claims**




**1.** A radioactive measuring apparatus for tritium and carbon-14 contained in a flowing gas sample, comprising

an oxidation means having an inlet port and an outlet port for continuously converting compounds containing hydrogen and carbon into water and carbon dioxide;

at least one water collecting means comprising a cold-trap having an inlet port connected to said outlet port of said oxidation means and an outlet port, for collecting the water content of the oxidized gas;

at least one carbon dioxide collecting means having an inlet port connected to said outlet port of said water collecting means and an outlet port and containing monoethanol amine to absorb carbon dioxide in the output gas from said water collecting means wherein said carbon dioxide collecting means comprises a syphon and an upstanding body portion defined by portion and cylindrical wall with an inlet port at the bottom thereof and an outlet port at an upper end thereof, one end of said syphon portion being connected to said outlet port of said cold-trap and the other end of said syphon portion being connected to said inlet port of said upstanding body portion, the inner surface of said wall being provided with a plurality of protrusions, whereby, when monoethanol amine is supplied from said outlet port of said upstanding body portion into the interior of said body portion up to a level corresponding to the height of said syphon portion and then the gas containing carbon dioxide is fed through said syphon to said inlet port of said body portion, the gas rises as bubbles through monoethanol amine, each of the bubbles is subdivided by said protrusions on the way of the rising thereof and broken at around the level of monoethanol amine to facilitate the dissolution of carbon dioxide into monoethanol amine;



a suction pump means having an inlet port connected to said outlet port of said carbon dioxide collecting means for producing a flow of the gas through the series connection of said oxidation means, said water collecting means and said carbon dioxide collecting means; and

means for measuring radioactivities of tritium and/or carbon-14 contained in the water and/or carbon dioxide collected by said water collecting means and said carbon dioxide collecting means.

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**4,019,865**

**$H_2S$ INDICATOR**

**Robin A. Sinclair, St. Paul, Minn., and Eileen A. Glasspoole, Hudson, Wis., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

**Filed Feb. 13, 1976, Ser. No. 658,127**

**Int. Cl.² G01N *21/12*, *31/22***

**U.S. Cl. 23—253 TP** **10 Claims**

**1.** A device for indicating the prolonged attainment within a gaseous environment of a concentration of $H_2S$ sufficient to tarnish free metal silver in said environment before tarnishing of said free metal silver comprising:

1. a base support surface,

2. an upper surface which is not water penetrable forming at least an enclosed volume with said support surface, said upper surface having a translucent or transparent portion exposing at least a part of said enclosed volume and allowing penetration of vapor through said upper surface so that penetrating vapor will contact:

3. a light-stable composition within said enclosed volume which undergoes a visible light-stable change which is a change in tone or color or intensification of its tone or color when reacted with $H_2S$, said composition undergoing said visible change within 1 day when exposed to a constant concentration of 1 part per million of $H_2S$, and said composition in said enclosed volume having free vapor access to its surrounding environment.

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**4,019,866**

**RECIRCULATING REACTION APPARATUS FOR CONTINUOUS PREPARATION OF A POLYAMIDE**

**Iqbalsingh Jaswal, Copper Cliff, and Kalev Pugi, Kingston, both of Canada, assignors to Du Pont of Canada Limited, Montreal, Canada**

**Division of Ser. No. 392,511, Aug. 29, 1973, Pat. No. 3,900,450. This application Jan. 10, 1975, Ser. No. 540,277**

**Claims priority, application Canada, Mar. 5, 1973, 165282**

**Int. Cl.² B01J *1/00***

**U.S. Cl. 23—260** **4 Claims**

**1.** Apparatus for the continuous preparation of a polyamide from a polyamide forming aqueous salt solution prepared from a diamine and a dicarboxylic acid comprising:

rectification column having a base section, a top portion, and a mid-section;

a combination partial condenser-preheater which is located within said top portion and has an inlet line for the polyamide forming aqueous salt solution and a line for feeding the salt solution from the condenser-preheater to the column mid-section, and which is for condensing a portion of vapor in the top portion of the rectification column for reflux and for simultaneously preheating the polyamide forming aqueous salt solution to be fed to said mid-section;

a separator comprising the base section of the rectification column, said separator having a bottom portion and a midportion;

a vertical thermosyphon reboiler having a bottom and an upper end;

a recirculating loop connecting the bottom of the separator to the bottom of the reboiler;

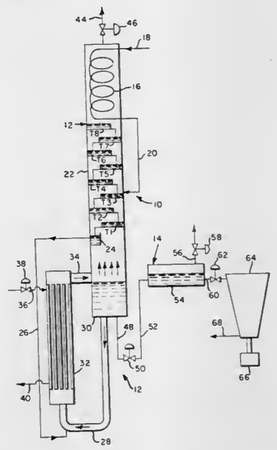
a vapor pipe connecting the reboiler at its upper end to the midportion of the separator;

collecting means located in the column above the separator for collecting salt solution mixed with reflux from the mid-section of the rectification column;

injecting means for injecting the salt solution and reflux from the collecting means into the recirculating loop connecting the bottom of the separator to the bottom of the reboiler;

a vent line in the top portion of the rectification column for venting uncondensed vapor;

control means for venting uncondensed vapor from the separator through the vent line in the top portion of the rectification column and for maintaining a predetermined pressure therein;




an exit line connected to the bottom portion of the separator;

control means for maintaining a constant level of prepolymer in the separator and for withdrawing a controlled flow of prepolymer through the exit line;

heating means in the reboiler for partially vaporizing and partially reacting the salt solution to form a prepolymer and a vapor; and

control means for the heating means in the reboiler for maintaining the prepolymer in the separator at a predetermined temperature.

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**4,019,867**

**APPARATUS FOR THE CONTINUOUS PURIFICATION OF GASES CONTAMINATED WITH TRITIUM**

**Hans Fabian, Hanau, Germany, assignor to Nukem G.m.b.H., Grossauheim, Germany**

**Filed Dec. 27, 1973, Ser. No. 428,697**

**Claims priority, application Germany, June 22, 1973, 7323277[U]**

**Int. Cl.² B01D *53/00*; B01J *8/00*; C01B *1/30*, *1/32***

**U.S. Cl. 23—260** **4 Claims**

**1.** Apparatus for the continuous purification of gases contaminated with tritium by the catalytic burning of tritium enriched hydrogen in a catalytic furnace, said apparatus comprising

a source of tritium contaminated gas,

at least first and second gas storage containers,

at least one catalytic furnace for burning tritium from tritium contaminated gas and hydrogen to form water,

a pump in operative communication with each of said gas storage containers and said catalytic furnace,

first conduit means for operatively connecting said source to said first and second storage containers,

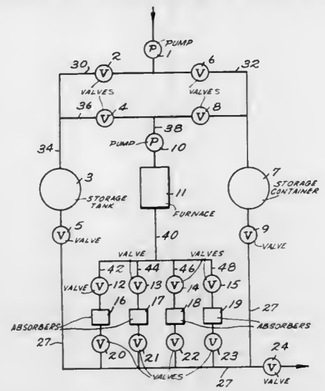
second conduit means for connecting said storage containers to each other,

third conduit means for connecting said second conduit means to said catalytic furnace, said pump being disposed in said third conduit means,

means for absorbing the fluid water formed in said catalytic furnace, said means including at least one absorption unit,

fourth conduit means connecting said absorption unit with said furnace,

first valve means disposed in said first conduit means for permitting gas contaminated with tritium to pass from said source of contaminated gas to one of said storage




containers, while selectively preventing tritium contaminated gas from entering the other of said storage containers, and

second valve means located within said second conduit means for selectively permitting gas to pass from said first storage container to said catalytic furnace while selectively preventing the gas from passing from said second storage container to said catalytic furnace and for reversing the process whereby gas is prevented from passing from said first storage container to said catalytic furnace and gas is permitted to pass from said second storage container to said furnace.

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**4,019,868**

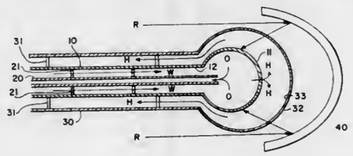
**SOLAR HYDROGEN GENERATOR**

**Daniel I. Sebacher, Seaford, and Alexander P. Sabol, Williamsburg, both of Va., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.**

**Filed Mar. 24, 1976, Ser. No. 669,928**

**Int. Cl.² B01J 7/00; C01B 1/00**

**U.S. Cl. 23—281** **5 Claims**



1. Apparatus for using solar energy to manufacture hydrogen gas by dissociating water molecules into hydrogen and oxygen molecules comprising:

an inlet tube means for transporting water;

a hollow globe means affixed to one end of said inlet tube means for receiving the water; said globe means being pervious to hydrogen molecules and being impervious to oxygen molecules and undissociated water molecules;

an outlet tube means extending into said globe means and being concentrically positioned within said inlet tube means;

a reflector means for concentrating solar energy on said globe means thereby heating the water contained in said globe means to the dissociation temperature of said water whereupon the water decomposes into hydrogen and oxygen molecules; the hydrogen molecules permeate through said globe means and the oxygen molecules and undissociated water enter said outlet tube means for removal from said globe means; a collector tube means for collecting the hydrogen molecules after the hydrogen molecules pass through said globe means;

said collector tube means having an enlarged closed end which encases said hollow globe means and a tubular length extending from said enlarged closed end concentrically positioned about said inlet tube means; thereby transferring heat from the hydrogen molecules to the water in said inlet tube means and

wherein said collector tube means is constructed of material transparent to solar radiation to thereby permit solar radiation to pass through said collector tube means to reach said hollow globe means.

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**4,019,869**

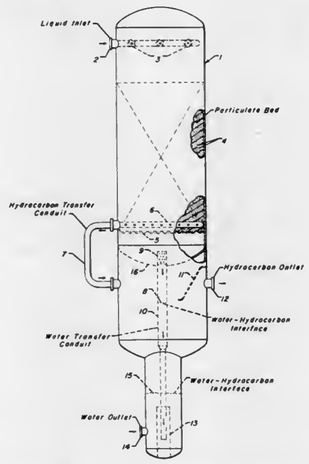
**COMBINATION REACTOR-SEPARATOR APPARATUS**

**J. Wayne Morris, Romeoville, Ill., assignor to UOP Inc., Des Plaines, Ill.**

**Filed Nov. 10, 1975, Ser. No. 630,601**

**Int. Cl.² B01J 8/02; C10G 19/00**

**U.S. Cl. 23—288 R** **4 Claims**




1. A combination catalytic reaction-liquid-liquid separation apparatus for use with liquid reactants which comprises in cooperative combination:

a. an elongated, unitary outer vessel which is vertically orientated about the longitudinal axis thereof, having an internal volume formed by an outer wall and which is separated into an upper chamber and a lower chamber by an imperforate liquid barrier which horizontally traverses said internal volume;

b. a cylindrical bed of catalytic particulate matter comprising charcoal containing 0.1 to 2.0 wt. % metal phthalocyanine located within an upper portion of said upper chamber;

c. a liquid feed stream inlet and distribution means operatively communicating with said internal volume at a point above said bed of particulate matter;

d. a liquid water transfer conduit located within said internal volume and which passes vertically through said imperforate liquid barrier from a first point within a lower portion of said upper chamber and a cylindrical agitation reducing means located at a point within a lower portion of said lower chamber, said conduit discharging into said reducing means;

e. a liquid hydrocarbon transfer conduit which passes from a higher, second point within said upper chamber to a point within an upper portion of said lower chamber;

f. a liquid water outlet means operatively communicating with said lower portion of said lower chamber; and,

g. a liquid hydrocarbon outlet means operatively communicating with said upper portion of said lower chamber.



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**4,019,870**

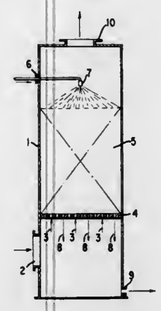
**AIR POLLUTION CONTROL OF OXIDES OF NITROGEN**

**William J. Gilbert, Jr., Manville, N.J., assignor to Croll-Reynolds Company, Inc., Westfield, N.J.**

**Division of Ser. No. 545,791, Jan. 31, 1975, Pat. No. 3,949,057, which is a continuation-in-part of Ser. No. 327,412, Jan. 29, 1973, abandoned. This application Sept. 10, 1975, Ser. No. 612,198**

**Int. Cl.² B01J 8/00, 35/04**

**U.S. Cl. 23—288 F** **2 Claims**



1. An apparatus for removing nitrogen oxides from a gaseous mixture of waste gases containing oxygen and nitrogen dioxide and nitrogen oxide, said gaseous mixture of waste gases containing up to 1% by volume of nitrogen oxides and an oxygen concentration of at least ten times greater than the nitrogen dioxide and nitrogen oxide concentration, comprising a vessel having gas inlet and gas outlet means and inlet and liquid outlet means and containing a knitted wire mesh packing material of stainless steel containing at least 8% Ni and having a diameter of from 0.003 to 0.015 inches, said packing material having from 180 to 800 square feet of surface area per cubic foot of volume, means for supplying to the vessel a liquid selected from the group consisting essentially of water and dilute aqueous alkaline solutions at a flow rate of from 10 to 60 gallons per minute per thousand cubic feet per minute of said gaseous mixture evenly to the upper surface of said packing material, means for supplying said gaseous mixture to the lower surface of said packing material, the volume of said packing material in said vessel and the flow rate of said gaseous mixture being selected whereby a residence time of from 3.5 to 15 seconds for said gaseous mixture to be in the presence of said packing material is maintained.

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**4,019,871**

**RECOMBINER APPARATUS**

**Robert T. Anderson, Jacksonville, Fla.; Henry L. Loy, San Jose, Calif., and William J. Nesbit, Scarborough, Maine, assignors to General Electric Company, Schenectady, N.Y.**

**Filed Sept. 30, 1974, Ser. No. 510,634**

**Int. Cl.² B01J 8/02**

**U.S. Cl. 23—288 K** **1 Claim**

1. A recombiner process vessel comprising:

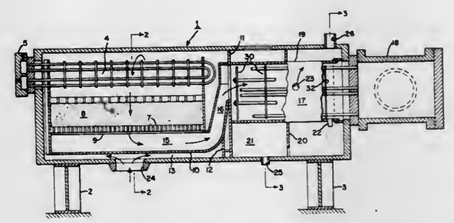
a horizontally disposed, substantially cylindrical outer shell having a process fluid inlet disposed therethrough in a lower portion of said outer shell;

substantially vertical wall means dividing the inner volume of said outer shell into a reaction portion and a condenser portion;

a liner disposed within said outer shell reaction portion, said liner having an arcuate portion substantially symmetric with the lower portion of said outer shell and spaced therefrom to form an annular path therebetween; said arcuate portion disposed above said process fluid inlet;

a preheater tube bundle within said liner and disposed across said arcuate portion whereby said process fluid flows from the inlet to the preheater tube bundle through the annular path formed by the outer surface of the liner and the inner surface of the outer shell;

a catalyst bed supported within the inner liner substantially enclosed by said arcuate portion below said preheater tube bundle;



a plenum formed by the lower surface of said catalyst bed and the inner surface of said liner whereby process fluid flows from said preheater tube bundle through said catalyst bed and into said plenum;

transition means interconnecting said plenum with the condenser portion through said wall means;

a substantially cylindrical condenser shell disposed within said outer shell condenser portion, said condenser shell in fluid communication with said transition means for receiving said process fluid from said plenum;

a coolant tube bundle disposed within said condenser shell;

a drain well formed by the inner surface of said outer shell, said wall means, and the outer surface of said condenser shell, said condenser shell having a drain opening therethrough; and,

a gas outlet through said outer shell in fluid communication with a gas outlet through said condenser shell whereby non-condensible process fluid is removed from said process vessel.

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**4,019,872**

**PRODUCING SODIUM CARBONATE MONOHYDRATE FROM CARBONATE SOLUTION INCLUDING ADDITION OF ALUMINUM IONS**

**John Walden, Hightstown, N.J., assignor to Intermountain Research and Development Corporation, Green River, Wyo.**

**Continuation-in-part of Ser. No. 436,999, Jan. 28, 1974, abandoned. This application Apr. 30, 1975, Ser. No. 573,172**

**Int. Cl.² C01D 7/00; B01D 9/02; C01D 7/12, 7/24**

**U.S. Cl. 23—300** **7 Claims**

1. A process for producing high bulk density sodium carbonate monohydrate crystals from an aqueous solution of sodium carbonate, which comprises: adding to said aqueous solution of sodium carbonate a crystal growth additive of at least 30 parts per million soluble aluminum ions, until the soluble aluminum ions in the sodium carbonate solution is about 30 to about 300 ppm soluble aluminum ions, said amount added being in addition to the amount of soluble

aluminum ions inherently present in the sodium carbonate solution prior to the additive addition; crystallizing sodium



carbonate monohydrate from the sodium carbonate solution; and recovering the sodium carbonate monohydrate crystals.

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**4,019,873**

## COATED HARD METAL BODY

**Norbert Reiter, Mettmann, Germany, assignor to Fried. Krupp Gesellschaft mit beschränkter Haftung, Essen, Germany**

**Filed June 3, 1976, Ser. No. 692,304**

**Claims priority, application Germany, June 6, 1975, 2525185**

**Int. Cl.² C22C *29/00*; B22F *7/02***

**U.S. Cl. 428—217** **8 Claims**

**1.** A wear-resistant shaped body comprised of (1) a core of hard metal body of at least one carbide as hard material and at least one binder metal and (2) a surface coating on the core, said surface coating being composed of two superimposed layers including an outer, extremely wear-resistant layer consisting essentially of at least one material selected from the group consisting of aluminum oxide and zirconium oxide, and an inner layer of at least one boride selected from the group consisting of the borides of the elements titanium, zirconium, hafnium, vanadium, niobium, tantalum, chromium, molybdenum and tungsten.

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**4,019,874**

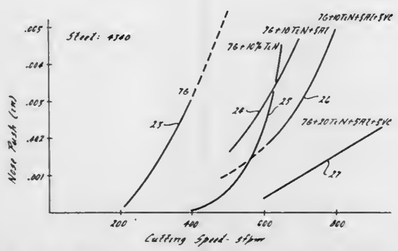
## CEMENTED TITANIUM CARBIDE TOOL FOR INTERMITTENT CUTTING APPLICATION

**David Moskowitz, Southfield, Mich., assignor to Ford Motor Company, Dearborn, Mich.**

**Filed Nov. 24, 1975, Ser. No. 634,972**

**Int. Cl.² C22C *29/00***

**U.S. Cl. 75—241** **8 Claims**




**1.** A composition useful for making a cutting tool, comprising:

a sintered powdered compact having a carbide matrix and a binding alloy, the carbide matrix consisting essentially of titanium carbide, chromium carbide, molybdenum carbide and at least one of the elements selected from the group consisting of vanadium carbide, titanium nitride, the binding alloy consisting essentially of nickel, molybdenum and aluminum, the binding alloy being present in an amount comprising 10–50% of the mass of the compact, the sum of molybdenum in all forms being present in an amount between 25–70% of the binding alloy, aluminum being present in an amount between 2.5–7.5 percentage weight of the binding alloy, vanadium carbide being present in an amount between 5–20% of the mass of the compact, and titanium nitride being present in an amount, when selected, between 2.5–20% by weight of the mass of the compact.

**2.** A sintered powdered compact useful as a cutting tool, comprising:

a matrix consisting essentially of titanium carbide having controlled dissolved amounts of chromium carbide, molybdenum carbide, and at least one member selected from the group consisting of vanadium carbide and titanium nitride, said compact comprising a binding alloy phase consisting essentially of nickel dissolved amounts of molybdenum and at least one member selected from the group consisting of aluminum and chromium, the binding alloy being present in an amount comprising 10–50% of the mass of the compact, said vanadium carbide, when selected, being present in said compact in an amount between 5–20% of the mass of the compact, and titanium nitride, when selected being present in an amount of 2.5–20% of said compact, said molybdenum being present in said binder in an amount between 25–70% of the binding alloy, said aluminum, when selected being present in the binding alloy in an amount between 2.5 and 6.85% by weight of the binding alloy, and chromium when selected being present in the binding alloy in an amount about 10% of the weight of the binding alloy.

**7.** A sintered composition of the TiC-Ni-Mo system type, comprising:

the matrix of said system consisting essentially of TiC with some minor amounts of $Mo_2C$, said matrix being particularly characterized by having selected dissolved amounts of either vanadium carbide or titanium nitride, said vanadium carbide when selected being present in the range of 5–10% of the composition and said titanium nitride when selected being present in an amount of 5–10% of the composition, the binding alloy of said system consisting essentially of molybdenum nickel and a controlled amount of dissolved aluminum at least when said vanadium carbide is selected, said binding alloy constituting 10–50% of the mass of the sintered composition and the sum of molybdenum and molybdenum carbide being present in an amount between 25–70% of the binding alloy.

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**4,019,875**

## ALUMINUM-COATED NICKEL OR COBALT CORE FLAME SPRAY MATERIALS

**Ferdinand J. Dittrich, Massapequa; George J. Durmann, Farmingdale, and Herbert S. Ingham, Jr., Northport, all of N.Y., assignors to Metco, Inc., Westbury, N.Y.**

**Continuation-in-part of Ser. No. 377,152, July 6, 1973, abandoned. This application June 13, 1975, Ser. No. 586,784**

**Int. Cl.² B23P *3/00*; B21C *37/00*; B05B *7/20***

**U.S. Cl. 428—570** **26 Claims**

**1.** A flame spray powder material in the form of a composite suitable for flame spraying formed of at least two metal components, said material comprising:

a. a first core powder component, which core component consists essentially of a self-fluxing alloy which consists essentially of at least about 40% of its weight of nickel or cobalt and about 1 to 6% by weight boron, and

b. a coating component of fine aluminum powder on said core, which powder coating is held to said core by a binder, the core component being present in an amount of about 66 to 99% by weight of the combined weight of the first and second components, said component being in the form of a structurally integral unit where each particle of core component has bonded thereto the coating component, said spray material additionally containing in the form of a blend therewith up to about 20% by weight of a third component comprising nickel.



**4,019,876**

## ELECTRICAL CONTACT ELEMENT AND METHOD OF PRODUCING THE SAME

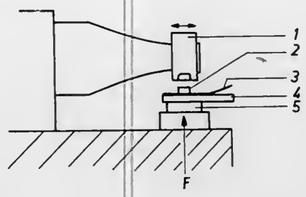
**Dieter Stöckel, Pforzheim, and Hans-Jürgen Oberg, Kelten-Dietlingen, both of Germany, assignors to G. Rau, Pforzheim, Germany**

**Filed Apr. 19, 1976, Ser. No. 678,383**

**Claims priority, application Germany, Apr. 19, 1975, 2517347**

**Int. Cl.² B32B *15/20*; B23K *21/02***

**U.S. Cl. 428—621** **9 Claims**




**1.** An electrical contact element comprising at least one contact piece having a contact surface for making selective electrical connection with a corresponding contact surface of a contact piece on another contact element, a carrier for supporting the or each contact piece and to which the or each contact piece is joined by means of ultrasonic welding, and an intermediate layer of readily cold-weldable metal material which is inserted between the contact piece and the carrier prior to the ultrasonic welding of the or each contact piece to the carrier.

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**4,019,877**

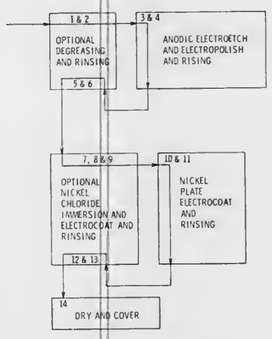
## METHOD FOR COATING OF POLYIMIDE BY ELECTRODEPOSITION

**William R. Gass, Pittsburgh; Luciano C. Scala, Murrysville, and David C. Phillips, Penn Hills Township, Allegheny County, all of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed Oct. 21, 1975, Ser. No. 624,352**

**Int. Cl.² C25D *13/06*; B23P *3/00***

**U.S. Cl. 428—626** **14 Claims**




**9.** A method of coating the surface of a copper substrate comprising the steps of:

A. cleaning the substrate in a degreasing solution and rinsing with water,

B. microsmoothing the copper substrate surface by making the surface a positive electrode in an acid bath selected from the group consisting of phosphoric acid and sulfuric acid, said bath having a pH of from about 0.25 to 2.0, at a current density of between 100 amp./sq. ft to 2,000 amp./sq. ft. to dissolve copper and to provide a substantially smooth copper surface, and rinsing with water,

C. placing the copper substrate in a nickel containing bath of nickel chloride, making the substrate a cathode, and applying current effective to reduce any oxides present to copper metal and to electrocoat the substrate with a nickel strike film,

D. placing the nickel strike coated copper substrate in a nickel containing bath selected from the group consisting of nickel sulfamate solution and nickel sulfate solution, making the substrate a cathode, and electrocoating the substrate with a pin hole free nickel film having a thickness of between about 2.5 microns to about 12.5 microns, said film being effective to prevent copper ion diffusion,

E. single step, non-aqueous electrocoating the microsmoothed, nickel coated substrate with a pin hole free polyamic acid polymer film from a composition comprising a polyamic acid polymer, a nitrogen containing base which reacts with the acid to form a salt, and a dual liquid system consisting of a liquid, organic, non-aqueous solvent for the acid and a liquid, non-aqueous, non-solvent for the salt of the acid, and

F. curing the polyamic acid coating to form a polyimide film free of copper ion deposits.

**14.** A wound copper coil coated by the method of claim **9.**

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**4,019,878**

## ADDITIVE COMBINATION FOR COLD FLOW IMPROVEMENT OF MIDDLE DISTILLATE FUEL OIL

**Max J. Wisotsky, Highland Park, N.J., assignor to Exxon Research and Engineering Company, Linden, N.J.**

**Filed Dec. 17, 1974, Ser. No. 533,513**

**Int. Cl.² C10L *1/20***

**U.S. Cl. 44—62** **11 Claims**

**1.** A distillate fuel oil improved in its cold flow characteristics comprising a major proportion of an atmospheric distillate petroleum oil having a cloud point of at least about −15° C., and a synergistic flow improving combination in the range of about 0.005 to 3 wt.% of:

A 0.3 to 10 parts by weight of an oil soluble ethylene-containing polymeric pour point depressant having a number average molecular weight in the range of about 500 to 50,000, and selected from the group consisting of:

1. branched polyethylene;
2. ethylene polymer chlorinated to contain about 5 to 35 wt.% chlorine;
3. copolymers of 3 to 40 molar proportions of ethylene with a $C_3$ to $C_{16}$ alpha monoolefin, or a monoethylenically unsaturated mono- or diester of the general formula:



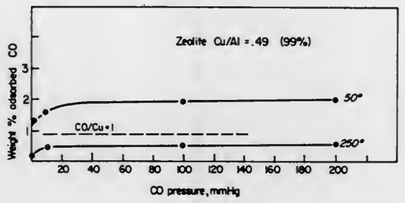
wherein $R_1$ is hydrogen or methyl; $R_2$ is a $-OOCR_4$ or $-COOR_4$ group wherein $R_4$ is hydrogen or a $C_1$ to $C_{16}$ alkyl group; and $R_3$ is hydrogen or $-COOR_4$;

per part by weight of coadditive selected from the group consisting of (B) beeswax, (C) ozokerite wax and (D) a mixture of alpha-monoolefins having at least 24 carbon atoms up to about 50 carbon atoms, wherein a major proportion by weight of said olefin mixture is $C_{30}$ and higher olefins.

**4,019,879**
## SELECTIVE ADSORPTION OF CARBON MONOXIDE FROM GAS STREAMS

**Jule Anthony Rabo, Armonk; James Nelson Francis, Peekskill, and Charles Leslie Angell, Pleasantville, all of N.Y., assignors to Union Carbide Corporation, New York, N.Y.**

**Filed Sept. 26, 1975, Ser. No. 617,084**
**Int. Cl.² B01D** *53/04*
**U.S. Cl. 55—68** **6 Claims**




**1.** Process for removing carbon monoxide from a gas stream comprising at least 10 ppm CO by volume and at least one other constituent selected from the group consisting of $H_2O$ and $CO_2$ which process comprises passing said gas stream at a temperature of from 0 to 300° C. through an adsorbent mass of a crystalline zeolitic molecular sieve having a framework $SiO_2/Al_2O_3$ molar ratio of from 20 to 200 and having as zeolite constituents monovalent copper cations, whereby CO molecules are adsorbed and a CO-depleted effluent gas stream is obtained.

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**4,019,880**
## ADSORPTION OF CARBON MONOXIDE USING SILVER ZEOLITES

**Jule Anthony Rabo, Armonk; James Nelson Francis, Peekskill, and Charles Leslie Angell, Pleasantville, all of N.Y., assignors to Union Carbide Corporation, New York, N.Y.**

**Continuation of Ser. No. 617,082, Sept. 26, 1975, abandoned. This application Aug. 10, 1976, Ser. No. 713,034**
**Int. Cl.² B01D** *53/34*
**U.S. Cl. 55—68** **4 Claims**

**1.** Process for removing carbon monoxide from a gas stream comprising at least 10 ppm CO by volume and at least one other constituent selected from the group consisting of $H_2O$ and $CO_2$ which comprises passing said gas stream at a temperature of from 0 to 300° C. through an adsorbent mass of a crystalline zeolitic molecular sieve having a framework $SiO_2./Al_2O_3$ molar ratio of from 20 to 200 and having as zeolitic constituents silver cations, whereby CO molecules are adsorbed and a CO-depleted effluent gas stream is obtained.

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**4,019,881**
## MOISTURE SEPARATOR FOR A NUCLEAR STEAM TURBINE

**Josef Herzog, Scotia, N.Y.; Kenneth K. Woods, Cape Elizabeth, Maine, and William S. Hubble, Gulfport, Miss., assignors to General Electric Company, Schenectady, N.Y.**

**Filed June 3, 1975, Ser. No. 583,354**
**Int. Cl.² B01D** *19/00*
**U.S. Cl. 55—185** **13 Claims**

**1.** A moisture separator comprising:

a. a vessel sealed at both ends and having a generally horizontal axis,

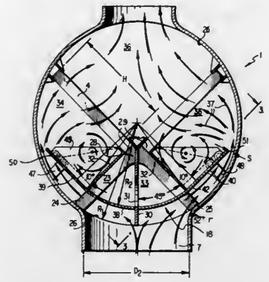
b. a plurality of axially displaced wet steam inlets disposed below said horizontal axis,

c. a plurality of dry steam outlets disposed above said horizontal axis,

d. a plurality of inertial-type moisture separator elements disposed in axially extending banks between said wet steam inlets and said dry steam outlets,

e. a drain trough below said moisture separator elements for collecting condensate and directing it to a hot well,

f. a plurality of support means axially displaced along the length of said vessel for supporting said drain trough and said moisture separator elements,



g. an impingement baffle for each of said wet steam inlets, each impingement baffle being disposed between its respective wet steam inlet and said moisture separator elements, and

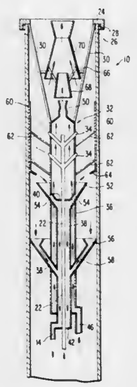
h. each of the ends of said impingement baffles being spaced from the inner surface of said vessel by a distance such that a vortex is imparted to the steam to effect more even distribution of steam to said moisture separator elements and to assist in the removal of condensate from said moisture separator elements.

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**4,019,882**
## STACK GAS CLARIFIER

**Andres Herrera, 12166 Loiza Station, Santurce, P.R. 00914**

**Filed Feb. 5, 1976, Ser. No. 655,357**
**Int. Cl.² B01D** *47/06*
**U.S. Cl. 55—220** **7 Claims**



**1.** Stack gas clarifying apparatus for mounting within and to remove particulate and soluble gaseous pollutants from stack gases passing upwardly through an upstanding smokestack comprising a wall portion having an outer periphery and an inner portion having an inner surface of a given inner diameter and within which stack gases may pass from the base portion to the top portion thereof, said stack gas clarifying apparatus including support means engageable with the top portion of and for supporting said apparatus within a smokestack with which said apparatus is to be used; a plurality of arms mounted on and projecting downwardly and inwardly from said support means; a scrubber assembly mounted on said arms and including first and second concentric conduits rigidly joined together and mounted on said arms in position to extend in substantially coaxial relation with a smokestack within which said apparatus is to be supported by said support means; inlet means for directing gas under pressure into said first concentric conduit; outlet means operatively connected to the lower end portion of said second conduit; a plurality of annular, upwardly open fluid collecting troughs extending around said concentric conduits in vertically spaced relation to one another; drain means providing fluid communication between said troughs and said second conduit; gas discharge means on the top end portion of said first conduit for directing a stream of gas under pressure upwardly above said concentric conduits and through the interior portion of a smokestack within which said apparatus is to be supported by said support means; a plurality of liquid spray nozzles mounted above said trough means in a position to discharge liquid under pressure in an upwardly inclined direction within a smokestack within which said apparatus is to be used; and a third conduit operatively connected to said nozzles for supplying a scrubbing liquid thereto.

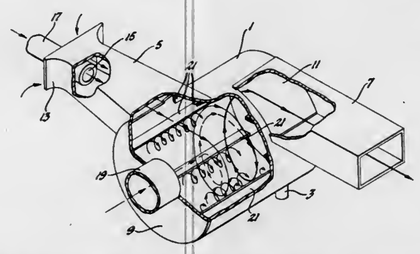


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**4,019,883**
## VORTEX SULFURIC ACID SEPARATOR

**Edward D. Klomp, Mount Clemens, Mich., assignor to General Motors Corporation, Detroit, Mich.**

**Filed June 2, 1975, Ser. No. 582,776**
**Int. Cl.² B01D** *51/00*
**U.S. Cl. 55—264** **3 Claims**



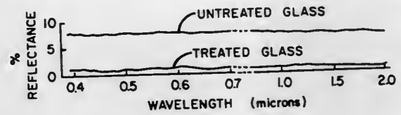
**1.** A device in combination with an exhaust tube for removing sulfuric acid from a hot exhaust gas stream which flows through said exhaust tube comprising a substantially cylindrical body member having a gas inlet means at one end and a gas outlet at the other end, both said inlet means and said outlet being arranged tangent to the cylinder inner wall surface to form a vortical flow path through said cylinder between said ends, said inlet means having an open inlet end which is positioned with respect to said exhaust tube such as to receive the exhaust gas stream for treatment, and for supplying cooling air to said gas inlet end, a plurality of means provided on said inner wall surface and projecting therefrom into the vortical flow path to create turbulent flow in said gas stream to enable a maximum surface contact and intermixture of the air and exhaust gas and maximum mass transfer to said surface, and a drain provided in said body member through which condensed sulfuric acid may be removed, said inner wall surface being at a temperature below the condensation temperature of the sulfuric acid in the exhaust gas stream, molecular transport and the turbulent mixing of the gases tending to maintain the acid concentration constant across any radial section through the body member to thus cause a flow of acid molecules and very small droplets toward the cool inner wall surface at which the acid concentration in the gases is the least.

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**4,019,884**
## METHOD FOR PROVIDING POROUS BROAD-BAND ANTIREFLECTIVE SURFACE LAYERS ON CHEMICALLY-DURABLE BOROSILICATE GLASSES

**Thomas H. Elmer, Corning, and Helen Walters, Painted Post, both of N.Y., assignors to Corning Glass Works, Corning, N.Y.**

**Filed Jan. 22, 1976, Ser. No. 651,429**
**Int. Cl.² C03C** *15/00*
**U.S. Cl. 65—30 R** **6 Claims**




**1.** A process for providing a glass article having a porous broad-band antireflective surface layer exhibiting a reflectance not exceeding about 2% at all wavelengths in the 0.4–2.0 micron range consisting of the steps of:

a. selecting a borosilicate glass article composed of a glass having an oxide composition, in weight percent, of about 72–82% $SiO_2$, 13–16% $B_2O_3$, 3–10% total of alkali metal oxides selected from the group consisting of $Na_2O$, $K_2O$ and $Li_2O$, and 0–4% $Al_2O_3$, these oxides making up at least about 93% by weight of the glass;

b. heating the borosilicate glass article to a temperature in the range of 630°–660° C. for a time in the range of about 1–10 hours to develop phase separation therein and producing a non porous surface; and thereafter

c. contacting the nonporous surface of the borosilicate glass article with an aqueous treating solution containing both hydrogen and fluoride ions, said solution having a hydrogen ion normality of at least about 0.02 gram equivalents per liter and a fluoride ion normality of at least about 0.02 gram equivalents per liter, for a time at least sufficient to produce a porous antireflective surface layer on said article.

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**4,019,885**
## REMOVING METAL DEPOSITS FROM THE SUPERSTRUCTURE OF A FLOAT GLASS CHAMBER

**Richard R. Snow, Perrysburg, Ohio, assignor to Libbey-Owens-Ford Company, Toledo, Ohio**

**Filed Feb. 13, 1976, Ser. No. 657,928**
**Int. Cl.² C03B** *18/02*
**U.S. Cl. 65—32** **16 Claims**

**1.** A method of removing metal deposits from the superstructure of a float chamber having a non-oxidizing atmosphere over a bath of molten metal, wherein a portion of said molten metal has evaporated from said bath and condensed on said superstructure, comprising the steps of:

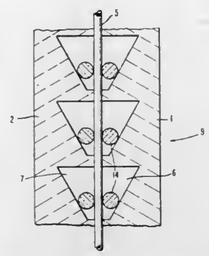
a. introducing a fluxing agent selected from the group consisting of halogens, haldies and mixtures thereof, into said non-oxidizing atmosphere; and

b. permitting said fluxing agent to travel along said superstructure with the natural flow of said non-oxidizing atmosphere so that said metal deposits condensed on said superstructure and contacted by said fluxing agent coalesce and drop from said superstructure.

**4,019,886**
**METHOD OF MANUFACTURE OF MULTIPLE GLASS NOZZLE ARRAYS**

**Arthur Rowland Hoffman, Longmont, Colo.; Arthur Harry Kendall, Franklin Lakes, N.J., and Robert Lewis Rohr, Scarsdale, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Dec. 12, 1975, Ser. No. 640,138**
**Int. Cl.² C03B 23/20**
**U.S. Cl. 65—43** **15 Claims**



1. A method of manufacturing multiple nozzle arrays for use in ink jet recording apparatus comprising

forming an assembly of two plates having intersecting channels therebetween which carry orifice elements and sealing material in which the sealing material has a lower melting point than said orifice elements and said plates;

placing said assembly on a support so that said orifice elements are positioned with a downward inclination and said sealing material in each intersecting channel is in contact with a portion of each said orifice element above the area to be sealed;

entering said assembly into a furnace having appropriate controls for temperature regulation;

heating said assembly in a manner to cause only said sealing material to melt and to flow by capillary and gravity action to seal said orifice elements and said plates;

cooling said assembly gradually from the set point temperature of said sealing material to room temperature;

slicing said assembly into a plurality of multiple nozzle wafers.

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**4,019,887**
**METHOD FOR COATING GLASS**

**Bernard James Kirkbride, Wigan; Robert Andrew Downey, Burscough; Charles Victor Thomasson, Preston, and Joseph Earle Lewis, Burscough, all of England, assignors to Pilkington Brothers Limited, St. Helens, England**

**Filed June 10, 1975, Ser. No. 585,522**
**Claims priority, application United Kingdom, June 14, 1974, 26522/74**
**Int. Cl.² C03C 17/20**
**U.S. Cl. 65—60 C** **10 Claims**

1. A method of producing a silicon coating on a glass surface, comprising:

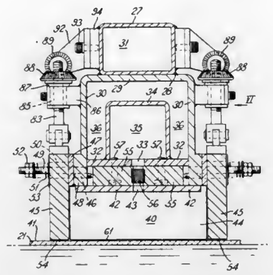
moving the glass surface at a temperature of at least 400° C past a hot zone of a coating station, which hot zone extends across the glass surface and opens towards the glass surface;

maintaining non-oxidising conditions in the hot zone;

supplying silane-containing gas to the coating station and feeding the gas to said hot zone;

cooling the silane-containing gas at the coating station as it is fed towards said hot zone; and

releasing the cool silane-containing gas into the hot zone at a substantially constant pressure across that zone so that the gas is rapidly heated as it traverses the hot zone and reaches the glass surface at a substantially constant temperature and pressure across the glass surface for pyrolysis thereon to produce a silicon coating of predetermined thickness on the glass surface.

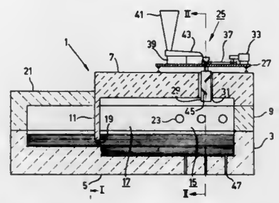


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**4,019,888**
**METHOD OF MELTING A RAW BATH AND A GLASS FURNACE FOR PERFORMING THE METHOD**

**Paulus Jozef Maria Verhappen; Antonius Johannes Maria Van Tienen; Johannes Feenstra, and Petrus Theodorus Cornelis Bastings, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed Dec. 10, 1975, Ser. No. 639,577**
**Claims priority, application Netherlands, Feb. 10, 1975, 7501530**
**Int. Cl.² C03B 5/18**
**U.S. Cl. 65—135** **4 Claims**



1. A method of melting a raw batch in a glass melt having a melting zone and a fining zone, the raw batch being continuously fed into the melting zone for melting, comprising the steps of supplying heat to the melting zone, supplying raw batch in the form of prepared particles at a controlled rate, uniformly scattering said particles in a layer over the surface of molten glass in the melting zone, controlling the rate of supplying said raw batch and said heat so that said layer is a monolayer, and injecting a gas into the molten glass below said layer at a rate sufficient to puncture any foam blanket tending to form on the molten glass.

3. An apparatus for melting and fining glass, comprising a melting tank having a melting compartment having a roof thereover and a bottom, a fining compartment, means for firing the tank, means for communicating with a forehearth, and a charging device mounted over the melting compartment, wherein said roof has an opening, and said charging device comprises a rotor having distributing vanes mounted in said roof opening at a height remote from the surface of the melt and adapted for spreading prepared particles in a single layer over the surface of the melt, and said melting compartment comprises a gas inlet tube in said bottom.



**4,019,889**
**SLOW ACTING FERTILIZER**

**Joseph P. Kealy, Winterhaven, Fla., assignor to Swift Chemical Company, Chicago, Ill.**

**Division of Ser. No. 360,099, May 14, 1973, Pat. No. 3,925,053. This application July 21, 1975, Ser. No. 597,322**
**Int. Cl.² C05C 9/00**
**U.S. Cl. 71—29** **7 Claims**

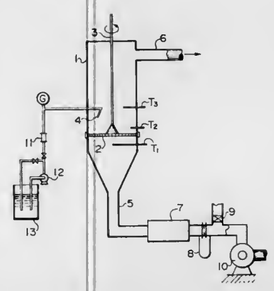
1. A method for producing granular pellets of about 2 mm to about 25 mm having slow release characteristics and particularly useful for garden line plants which comprises charging plant food containing isobutylidene diurea and vitreous masses of $P_2O_5$ into a mixer, steaming the plant food to a temperature of about 140° F. to 210° F. so as to give a moisture content of between about 2% and about 8%, charging calcium sulfate hemihydrate into the mixer in an amount such that the ultimate pellets contain about 10–50%, by weight, of hydrated calcium sulfate and about 90–50%, by weight, of plant food, adding hot water to the charged mixture in an amount sufficient for crystallization of the calcium sulfate, forming a granuable mixture and subsequently drying the granules.

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**4,019,890**
**METHOD FOR PRODUCING COATED FERTILIZER**

**Toshio Fujita; Chigo Takahashi; Masanari Ohshima, all of Fujishi; Tsunezo Ushioda, Tokyoto, and Hirozo Shimizu, Fujishi, all of Japan, assignors to Chissoasahi Fertilizer Co., Ltd., Tokyoto, Japan**

**Filed Dec. 3, 1974, Ser. No. 529,125**
**Claims priority, application Japan, Dec. 28, 1973, 49-144724**
**Int. Cl.² C05C 5/02**
**U.S. Cl. 71—64 F** **15 Claims**



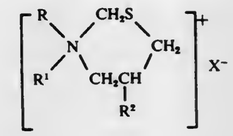
1. A method for producing slow-releasing granular fertilizer fully coated with water-resisting, transparent, lustrous layer of resin in such a manner that the coated granules do not stick together, which comprises spraying a solution having a viscosity of 40 C.P. or less at close to its boiling point of a thermoplastic resin in a hydrocarbon or chlorinated hydrocarbon solvent, upon fertilizer granules, and drying said fertilizer granules upon being sprayed with said solution, continuously and immediately on the spout with hot, dry air at an air speed of at least 15m/sec., said solution having the property capable of forming a solution while it is hot but turning into jelly-like gel when it is cooled and said granules being at a temperature of 40°–90° C during the drying and spraying steps.

**4,019,891**
**PROCESS FOR CONTROLLING ALGAE WITH TETRAHYDRO-1,3-THIAZINIUM SALTS**

**Ludwig Konrad Huber, King of Prussia, Pa., assignor to Pennwalt Corporation, Philadelphia, Pa.**

**Division of Ser. No. 584,330, June 6, 1975, Pat. No. 3,966,929, which is a division of Ser. No. 461,556, April 17, 1974, Pat. No. 3,919,422, which is a division of Ser. No. 220,372, Jan. 24, 1972, Pat. No. 3,821,210. This application Apr. 8, 1976, Ser. No. 675,046**
**Int. Cl.² A01N 9/12**
**U.S. Cl. 71—67** **4 Claims**

1. The method of killing and inhibiting the growth of algae comprising contacting the algae with an effective amount of tetrahydro-1,3-thiazinium salt represented by the formula



where X is an anion selected from the group consisting of chloride, bromide, iodide, acetate, formate, perchlorate and tosylate, $R^2$ is hydrogen or hydroxyl, and R and $R^1$ are independently alkyl having one to 20 carbon atoms or alkyl having one to 20 carbon atoms substituted with one or two hydroxyl groups, the total of the number of carbon atoms in $R + R^1$ being from about 12 to 24.

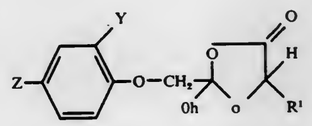
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**4,019,892**
**HERBICIDAL HETEROCYCLIC COMPOUNDS**

**Kurt H. G. Pilgram, Modesto, Calif., assignor to Shell Oil Company, Houston, Tex.**

**Filed Dec. 31, 1975, Ser. No. 645,598**
**Int. Cl.² C07D 317/34**
**U.S. Cl. 71—88** **9 Claims**

1. A compound of the formula



wherein Y is halogen or alkyl of 1 to 6 carbon atoms; Z is halogen and $R^1$ is hydrogen or alkyl of 1 to 6 carbon atoms.

8. A method for controlling undesirable plant growth which comprises applying to the locus to be protected a herbicidally effective amount of a compound as claimed in claim 1 or a composition thereof.

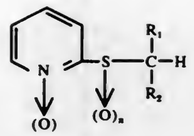
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**4,019,893**
**HERBICIDAL METHOD USING 2-SULFINYL OR 2-SULFONYL PYRIDINE N-OXIDE DERIVATIVES**

**Howard L. Plant, Milford, and Allyn Roy Bell, Cheshire, both of Conn., assignors to Uniroyal Inc., New York, N.Y.**

**Filed Mar. 17, 1975, Ser. No. 559,188**
**Int. Cl.² A01N 9/22**
**U.S. Cl. 71—94** **17 Claims**

1. A method of controlling weeds comprising applying, to a locus at which it is desired to control weeds, a herbicidally effective amount of a 2-sulfinyl or 2-sulfonyl pyridine N-oxide compound of the formula:



where

*n* is 1 or 2;

$R_1$ is hydrogen, alkyl having 1 to 3 carbon atoms or phenyl;

$R_2$ has one of the following values when $R_1$ is hydrogen:

benzyl, styryl, naphthyl, methylnaphthyl, phenyl, substituted phenyl with 1 to 5 substituents which may be the same or different and are selected from alkyl having 1 to 3 carbon atoms, halogen, nitro, cyano, alkoxy having 1 to 2 carbon atoms and trifluoromethyl;

$R_2$ has one of the following values when $R_1$ is other than hydrogen:

naphthyl, phenyl, substituted phenyl with 1 to 3 substituents which may be the same or different and are selected from alkyl having 1 to 2 carbon atoms, halogen, nitro, and methyl sulfonyl.

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**4,019,894**

**PLANT GROWTH REGULATING AGENT**

**Christian Vogel, Binningen, and Rudolph Aebi, Basel, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

**Division of Ser. No. 548,042, Feb. 7, 1975, Pat. No. 3,952,056, and a continuation-in-part of Ser. No. 328,202, Jan. 31, 1973, abandoned. This application Jan. 29, 1976, Ser. No. 653,556**

**Claims priority, application Switzerland, Feb. 7, 1972, 1739/72; May 16, 1972, 7283/72**

**Int. Cl.² A01N** *9/20*

**U.S. Cl. 71—118** **3 Claims**

1. A herbicidal composition containing as active substance a herbicidally effective amount of the compound 2-chloro-2′,-6′-dimethyl-N-(1-methoxyprop-2-yl)-acetanilide, together with a suitable carrier.

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**4,019,895**

**METHOD OF REDUCING ORE USING A PLASMA BURNER**

**Sven Santen, Hofors, Sweden, assignor to SKF Industrial Trading and Development Company, B.V., Nieuwegein, Netherlands**

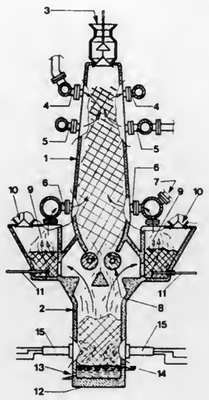
**Filed Feb. 10, 1975, Ser. No. 548,743**

**Claims priority, application Sweden, Feb. 20, 1974, 7402210**

**Int. Cl.² C21C** *5/52*

**U.S. Cl. 75—11** **6 Claims**

1. In a method of reducing iron ore, the steps comprising: providing first and second furnaces, feeding said ore into said first furnace, flowing reduction gas from said second furnace into said first furnace, partially reducing said ore in said first furnace with said reduction gas, preheating said ore in said first furnace by burning at least some of said reduction gas therein, feeding into said second furnace a charge comprising a solid carbon reducing agent in lump form, and said partially-reduced ore from said first furnace, said charge forming a permeable mixture, supplying heat energy to a gas and flowing said heated gas into said second furnace through said charge therein and thereby heating said charge by heat exchange therewith, and in said second furnace finally reducing and melting said partially-reduced ore from said first furnace in the presence of said solid carbon reducing agent, and thereby producing at least a portion of said reduction gas subsequently fed into said first furnace, and flowing said reduction gas from said second furnace into heat exchange with and thereby preheating said solid carbon reducing agent and reducing said reduction gas temperature before said reducing agent is fed



into said second furnace, this preheated reduction gas being said reduction gas flowed into said first furnace from said second furnace.

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**4,019,896**

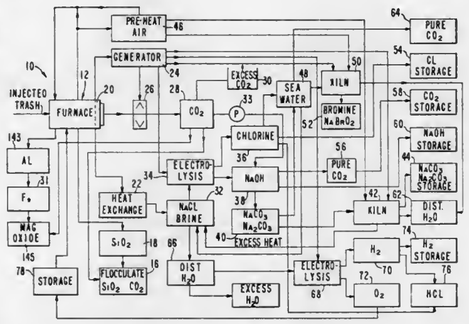
**TRASH DISPOSAL SYSTEM**

**Vernon L. Appleby, 1720 W. Bayshore, No. 19, Palo Alto, Calif. 94303**

**Continuation-in-part of Ser. No. 300,632, Oct. 25, 1972, abandoned. This application July 3, 1975, Ser. No. 593,150**

**Int. Cl.² C21B** *15/00*

**U.S. Cl. 75—44 S** **11 Claims**




1. A trash disposal method comprising: burning a mass of pulverized trash free of large bulky items and containing carbonaceous material, metals and glass in a first region and allowing a gaseous effluent resulting from the burning of said trash to exit from said first region and to flow through a second region; directing a fluid in heat exchange relationship with said first region for heating the fluid to thereby increase the energy content thereof; generating electrical power as a function of the energy content of the fluid; applying a portion of said electrical power across said second region to generate an electrical arc and to subject the effluent thereto, whereby any carbonaceous particle matter in the effluent will be vaporized and converted to carbon dioxide; electrolyzing a mass of seawater to form a mass of chlorine and a mass of sodium hydroxide; storing the chlorine and sodium hydroxide masses in third and fourth regions, respectively; directing a portion of the carbon dioxide from the effluent to said fourth region to form at least one of a mass of sodium carbonate and a mass of sodium bicarbonate; and storing said masses of sodium carbonate and sodium bicarbonate in a fifth region.



**4,019,897**

**DESULFURIZING AND INOCULATING AGENT FOR MOLTEN IRON**

**Hiroshi Yoshida, Kasukabe, Japan, assignor to Aikoh Co., Ltd., Tokyo, Japan**

**Filed Sept. 8, 1975, Ser. No. 611,084**

**Claims priority, application Japan, Aug. 13, 1975, 50-97671**

**Int. Cl.² C21C** *7/02*

**U.S. Cl. 75—58** **4 Claims**

1. A magnesium base molding for the treatment of molten iron comprising 1 to 20% by weight of refractory fibrous material; 0.1 to 10% by weight of organic fibrous material; in excess of 1.2% by weight magnesium particles, said magnesium particles having a diameter of less than about 10 mm; and 0.1 to 10% by weight of binder.

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**4,019,898**

**BENEFICIATION OF ILMENITE ORE**

**James H. Chen, and Lewis W. Huntoon, both of Corpus Christi, Tex., assignors to Benilite Corporation of America, New York, N.Y.**

**Filed Apr. 30, 1976, Ser. No. 682,099**

**Int. Cl.² C22B** *1/00, 34/12*

**U.S. Cl. 75—101 R** **8 Claims**

1. In a process for the beneficiation of ilmenite ore wherein the ilmenite ore is leached with a hydrochloric acid leach liquor to provide a mother liquor containing acid-soluble iron contaminant values and acid-insoluble titanium values and these values are subsequently separated from one another to yield a solid beneficiated ilmenite product, the improvement which comprises leaching the ilmenite ore with a stoichiometric excess of the hydrochloric acid leach liquor containing added sulfate ion in a small amount of from about 0.5% to about 2.5% of the weight of the ilmenite ore, whereby fines or slime formation in the mother liquor is minimized and the color of the solid beneficiated ilmenite product is lighter.

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**4,019,899**

**EROSION-RESISTANT MATERIALS**

**Akira Negishi; Kiyoshi Takayanagi; Masaru Ikeda, and Shinji Kousaka, all of Tokyo, Japan, assignors to The Furukawa Electric Co., Ltd., Tokyo, Japan**

**Continuation-in-part of Ser. No. 151,068, June 8, 1971, abandoned. This application Aug. 1, 1974, Ser. No. 493,846**

**Claims priority, application Japan, June 11, 1970, 45-50454**

**Int. Cl.² C22C** *14/00, 19/02*

**U.S. Cl. 75—134 F** **3 Claims**

1. An erosion-resistant and wear-resistant Ti-Ni-$M_1$-$M_2$ alloy consisting essentially of 42.5 to 54.4 atomic percent of Ti, in which $M_1$ is Ta or Nb and $M_2$ is Mo, and the atomic ratio of $M_1 + M_2$ to the total atoms other than Ti is 1 to 55%.

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**4,019,900**

**HIGH STRENGTH OXIDATION RESISTANT NICKEL BASE ALLOYS**

**Mathur Raghavan, and Eugene Shapiro, both of Hamden, Conn., assignors to Olin Corporation, New Haven, Conn.**

**Filed Apr. 1, 1976, Ser. No. 672,664**

**Int. Cl.² C22C** *19/05*

**U.S. Cl. 75—171** **12 Claims**

1. A nickel base alloy having high resistance to oxidation at elevated temperatures, good hot workability, good creep resistance, good high temperature mechanical properties and high creep rupture strength, said alloy consisting essentially of from 2 to 6% by weight aluminum, 1 to 6% by weight chromium, 0.5 to 4% by weight silicon, 5 to 20% by weight cobalt, 0.03 to 0.30% by weight carbon, 0.005 to 0.25% by weight magnesium, balance nickel.

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**4,019,901**

**ULTRA-HIGH STRENGTH STEEL HAVING IMPROVED RESISTANCE TO ENVIRONMENTAL STRESS CORROSION CRACKING**

**Herbert E. Townsend, Jr., Allentown; James B. Horton, Bethlehem, and Louis R. Woodyatt, Whitehall, all of Pa., assignors to Bethlehem Steel Corporation, Bethlehem, Pa.**

**Division of Ser. No. 371,195, June 18, 1973, Pat. No. 3,966,421. This application May 10, 1976, Ser. No. 685,019**

**Int. Cl.² B22F** *3/16;* **C22C** *1/05*

**U.S. Cl. 75—206** **2 Claims**

1. In a process for producing a powder metallurgy article of manufacture having a dispersion of a metal oxide in a ferrous metal matrix including in order the steps of mixing a metal oxide powder, a ferrous metal powder, zinc stearate, and natural graphite to form a mixture, forming a compact from said mixture, heating said compact, sintering said compact, hot working said compact, and heat treating said compact, the improvement comprising:

a. calcining said metal oxide powder before said metal oxide powder is mixed with said ferrous metal powder, zinc stearate, and natural graphite.

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**4,019,902**

**PHOTORECEPTOR FABRICATION**

**Lewis B. Leder, Rochester; John C. Schottmiller, Penfield, and Harold H. Schroeder, Rochester, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.**

**Continuation-in-part of Ser. No. 477,736, June 10, 1974, abandoned. This application Aug. 15, 1975, Ser. No. 605,136**

**Int. Cl.² G03G** *5/04*

**U.S. Cl. 96—1.5** **13 Claims**

1. A method for obtaining flexible photoreceptors having improved durability and adhesion between components thereof and containing a metal- or metal-coated substrate and a photoconductive layer of an ionizable inorganic photoconductive material in good charge blocking contact with the substrate, comprising initially bombarding the substrate, as cathode, under partial vacuum, with positive ions of a non-metallic gas under glow discharge in the presence of air or a mixture of oxygen with at least one inert ion-forming gas; and exposing the resulting oxidized substrate to a vapor cloud of photoconductive material consisting essentially of both charged and uncharged photoconductive particles in and adjacent to an electrical field utilizing a donor of said photoconductive material or container thereof or adjacent structure and the substrate as an electrode, the exposure of the oxidized substrate being effected separately or in conjunction with at least part of the initial substrate bombardment step.

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**4,019,903**

**ELECTROSTATIC DEVELOPMENT**

**Robert J. Hagenbach, Rochester, N.Y., and Robert D. Fenity, deceased, late of Webster, N.Y. (by Nancy Fenity, executrix), assignors to Xerox Corporation, Stamford, Conn.**

**Division of Ser. No. 104,498, Jan. 6, 1971, abandoned. This application Oct. 26, 1973, Ser. No. 409,993**

**Int. Cl.² G03G** *9/02, 13/08*

**U.S. Cl. 96—1 SD** **11 Claims**

1. A process for providing a visible image from a latent electrostatic image, comprising:

passing over an electrostatic latent image-bearing surface an electrostatographic developer composition consisting of a toner material electrostatically clinging to an uncoated carrier having an average diameter of from between about 30 and about 1,000 microns, said carrier consisting of a material containing at least one member selected from the group consisting of crystalline double oxides of a member selected from the group consisting of titanium, hafnium, zirconium, tin and germanium and at least one member selected from the group consisting of alkaline earths and lead, whereby said toner material is

attracted to said surface to render said latent image visible.

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**4,019,904**

**PLANOGRAPHIC PRINTING PLATES AND A METHOD OF PREPARING THEM USING PHOTOPOLYMERIZABLE ORGANOPOLYSILOXANES WITH MALEIMIDO GROUPS**

**Atsumi Noshiro, Chiba; Minoru Takamizawa, Annaka; Yasushi Yamamoto, Annaka; Yoshio Inoue, Annaka, and Hitoshi Fujii, Tokyo, all of Japan, assignors to Dai Nippon Printing Company Limited and Shin-Etsu Chemical Company Limited, both of Tokyo, Japan**

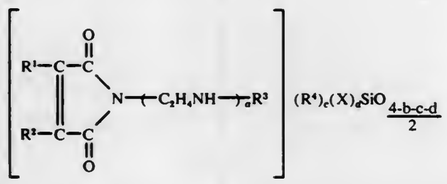
**Filed Mar. 30, 1976, Ser. No. 671,737**

**Claims priority, application Japan, Apr. 14, 1975, 50-4969**

**Int. Cl.² G03F *7/02*; G03C *1/68***

**U.S. Cl. 96—33** **23 Claims**

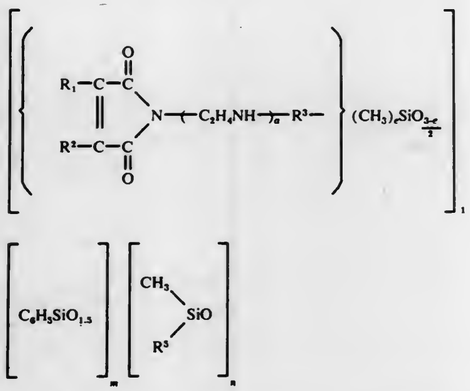
1. A planographic printing plate comprising a base having ink-receptive areas and ink-repellent areas thereon, wherein said ink-repellent areas are covered by a cured and hardened layer of a photopolymerizable organosilicon compound represented by the average unit formula



$$\left[\begin{array}{l} O \\ \| \\ R^1-C-C \\ \quad\quad\quad\quad N-(-C_2H_4NH-)_a-R^3 \\ R^2-C-C \\ \| \\ O \end{array}\right] (R^4)_c(X)_dSiO_{\frac{4-b-c-d}{2}}$$

where $R^1$ is a monovalent aromatic group or a monovalent heterocyclic group, $R^2$ is an atom or a group selected from the class consisting of a hydrogen atom, a halogen atom, a cyano group and a monovalent hydrocarbon group with 1 to 4 carbon atoms, $R^3$ is a divalent hydrocarbon group with 1 to 10 carbon atoms, $R^4$ is a monovalent hydrocarbon group, X is a hydroxy group or a hydrolyzable group, a is 0 or 1, and b, c and d each are numbers expressed by $0<b\ \ 1, 0\ \ c\ \ 3$ and $0\ \ d\ \ 3$, respectively, with the proviso that $0<b+c+d\ \ 4$.

2. A planographic printing plate comprising a base having ink-receptive areas and ink-repellent areas thereon, wherein said ink-repellent areas are covered by a cured and hardened layer of a photopolymerizable organopolysiloxane represented by the average unit formula



$$\left[\left\{\begin{array}{l} O \\ \| \\ R_1-C-C \\ \quad\quad\quad\quad N-(-C_2H_4NH-)_a-R^3- \\ R^2-C-C \\ \| \\ O \end{array}\right\}(CH_3)_cSiO_{\frac{3-c}{2}}\right]_l \quad \left[C_6H_5SiO_{1.5}\right]_m \quad \left[\begin{array}{l} CH_3 \\ \quad\diagdown \\ \quad\quad SiO \\ \quad\diagup \\ R^5 \end{array}\right]_n$$

wherein $R^1$ is a monovalent aromatic group or a monovalent heterocyclic group, $R^2$ is an atom or a group selected from the class consisting of a hydrogen atom, a halogen atom, a cyano group and a monovalent hydrocarbon group with 1 to 4 carbon atoms, $R^3$ is a divalent hydrocarbon group with 1 to 10 carbon atoms, $R^5$ is a methyl group or a 3,3,3-trifluoropropyl group, $a$ is 0 or 1, $e$ is 0 or 1, n is a positive number not less than 25, and l and m each are positive numbers with the proviso that $n/l$ is from 25 to 2,000 and $n/m$ is from 2.5 to 50.

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**4,019,905**

**METHOD FOR FORMING FLUORESCENT SCREEN OF COLOR CATHODE RAY TUBES USING FILTER LAYER**

**Yoshifumi Tomita; Kiyoshi Miura, and Hiromitu Nakai, all of Mobara, Japan, assignors to Hitachi, Ltd., Japan**

**Filed June 17, 1975, Ser. No. 587,664**

**Claims priority, application Japan, June 17, 1974, 49-68195**

**Int. Cl.² G03C *5/00***

**U.S. Cl. 96—36.1** **16 Claims**

1. A method for preparing a plurality of screen elements on a faceplate panel of a color cathode ray tube having a color selecting mask, said method comprises the steps of:

coating a filter layer being responsive to only a first actinic radiation on a faceplate panel of the tube, said filter layer including an organic vehicle and an organic filter material that is turned into a transparent state to a second actinic radiation by exposing to a first actinic radiation;

overcoating a photosensitive screening layer on said filter layer,

forwardly exposing said filter layer through a color selecting mask to the first actinic radiation for turning the exposed portions of the filter layer into a transparent state and for turning the exposed portion of the photosensitive layer into a water-insoluble state cooperating with exposing to the second actinic radiation,

backwardly exposing said photosensitive screening layer through the panel and said filter layer of forward exposed portions to the second actinic radiation to which the photosensitive screening layer is responsive, and

developing said screen to remove unsaturated exposed portions of the photosensitive screening layer, and to provide said screen elements thereon.

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**4,019,906**

**CURTAIN COATING METHOD**

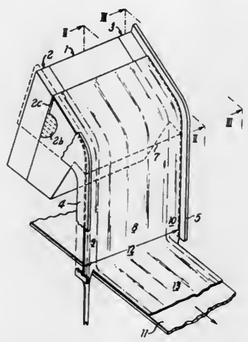
**Kenneth Arthur Ridley, Ilford, England, assignor to Ciba-Geigy AG, Basel, Switzerland**

**Filed Oct. 11, 1974, Ser. No. 514,255**

**Claims priority, application United Kingdom, Oct. 12, 1973, 47671/73**

**Int. Cl.² B05D *1/30*; G03C *3/00***

**U.S. Cl. 96—68** **3 Claims**



1. A method of coating a travelling web with at least two layers of a liquid photographic coating composition, said method comprising:

moving a web to be coated along a path through a coating zone; and

forming at said coating zone a free-falling vertical curtain which extends transversely of said path and impinging said curtain on said travelling web to deposit thereon a photographic coating, said step of forming comprising providing said free-falling curtain composed of three separately formed free-falling partial curtains which are integrally joined edge-to-edge to form an integral curtain wider than the width of said web to be coated, a first and a second of said partial curtains constituting edge regions of the integral curtain, and the third partial curtain constituting a central region of said integral curtain, said third partial curtain being narrower than the width of said web to be coated and consisting of at least two juxtaposed laminae of coating liquid, and said first and second partial curtains each being formed to consist of a single lamina of liquid which is different from the liquids forming said third partial curtain, but which with respect to the rheological properties thereof is compatible therewith.



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**4,019,907**

**PHOTOSENSITIVE AZIDO COLOR-FORMING ELEMENT**

**Takahiro Tsunoda, Funabashi; Minoru Ozutsumi, Tokyo; Shigeo Maeda, Tokyo; Susumu Suzuka, Tokyo; Hidetoshi Komiya, Tokyo, and Hideaki Shinohara, Tokyo, all of Japan, assignors to Hodogaya Chemical Co., Ltd. and Oji Paper Co., Ltd., both of Tokyo, Japan**

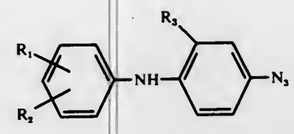
**Filed Oct. 17, 1974, Ser. No. 515,571**

**Claims priority, application Japan, Oct. 24, 1973, 48-119543; July 8, 1974, 49-77407**

**Int. Cl.² G03F *7/08*; G03C *1/52***

**U.S. Cl. 96—75** **12 Claims**

1. A photosensitive color forming element comprising a support and a photosensitive color-forming layer coated on said support and containing therein at least one photosensitive color forming azido compound of the formula (I):



wherein $R_1$ and $R_2$ respectively represent a substituent selected from the group consisting of hydrogen and halogen atoms and alkyl, alkoxyl, dialkylamino, acylamino, and hydroxyl radicals, and are respectively in 2 - and 4 - positions, 3 - and 5 - positions or 2 - and 5 - positions of said benzene ring with respect to said -NH- group of said benzene ring, and $R_3$ represents an alkylcarboxyl radical.

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**4,019,908**

**SILVER HALIDE PHOTOGRAPHIC MATERIAL**

**Peter John Wright, Ilford, England, assignor to Ilford Limited, England**

**Filed Nov. 6, 1973, Ser. No. 413,202**

**Claims priority, application United Kingdom, Nov. 22, 1972, 53869/72**

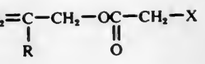
**Int. Cl.² G03C *1/72, 1/68***

**U.S. Cl. 96—114** **7 Claims**

1. A silver halide photographic element comprising a photobase having coated thereon at least one colloid layer which comprises gelatin and a film forming copolymer derived from:

I. a monomer mixture comprising vinyl acetate and at least one other monomer copolymerisable therewith, said mixture of monomers being selected such that the glass transition temperature of the copolymer of vinyl acetate and the other monomer or monomers is below 20° C, and

II. an allyl or methallyl monomer of the formula



$$CH_2=\underset{\underset{R}{|}}{C}-CH_2-O\underset{\underset{O}{\|}}{C}-CH_2-X$$

where R is a hydrogen atom or a methyl group and X is an aliphatic acyl group or a cyano group, the proportion of component II being 1–20% by weight based on the total weight of components I and II.

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**4,019,909**

**PHOTOHARDENABLE VESICULAR IMAGE-FORMING ELEMENTS**

**Abraham Bernard Cohen, Springfield, and Leo Roos, New Shrewsbury, both of N.J., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Continuation of Ser. No. 11,887, Feb. 16, 1970, abandoned. This application June 21, 1972, Ser. No. 264,951**

**Int. Cl.² G03C *1/68***

**U.S. Cl. 96—115 P** **9 Claims**

1. An element comprising a support bearing at least one solid photohardenable layer that softens at 40° to 220° C. and is capable of forming a positive vesicular image, said layer comprising (a) about 60 to 99% by weight of at least one thermoplastic ethylenically unsaturated photohardenable material and (b) in admixture with said photohardenable material, about 1 to 40% by weight of a blowing agent which, when heated to at least 75° C., produces gas bubbles in areas of said layer which are not photohardened, said blowing agent being stable to actinic radiation by which said photohardenable material is photohardened.

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**4,019,910**

**ELECTROLESS NICKEL POLYALLOY PLATING BATHS**

**Glenn O. Mallory, Jr., Inglewood, Calif., assignor to The Richardson Chemical Company, Des Plaines, Ill.**

**Filed May 24, 1974, Ser. No. 473,147**

**Int. Cl.² C23C *3/02***

**U.S. Cl. 106—1** **38 Claims**

1. An aqueous plating bath for electrolessly depositing a polymetallic nickel alloy containing nickel, an element selected from boron or phosphorus and a metal selected from the group consisting of tin, tungsten, molybdenum or copper, such bath comprising a source of nickel metal cation and a source of at least one metal cation selected from the group consisting of tin, tungsten, molybdenum and copper, a reducing agent selected from the group consisting of boron hydrides, amine boranes, alkylamine boranes, and a source of hypophosphite ion, and an ester complex formed by reacting an inorganic acid with a polyhydric acid or alcohol.

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**4,019,911**

**TONER COMPOSITIONS**

**Bheema R. Vijayendran, Bethel, and R. Clark DuBois, Fairfield, both of Conn., assignors to Pitney-Bowes, Inc., Stamford, Conn.**

**Division of Ser. No. 416,936, Nov. 19, 1973, Pat. No. 3,939,087. This application Sept. 25, 1975, Ser. No. 616,845**

**Int. Cl.² C09D *11/00***

**U.S. Cl. 106—23** **5 Claims**

1. A hydrophobic, oleophilic concentrate to be used for a liquid toner for use in a copier duplicator, wherein an electrostatic image is created on a photoconductive layer, comprising: 0.1 to 12.0% pigment having a particle size not greater than 25 millimicrons, 10 to 40% polymer having a high affinity for the adsorption of said pigment, 40 to 65% hydrocarbon carrier having a K.B. number less than 30, a dielectric constant of less than 3.5, a resistivity of at least $10^9$ ohm centimeters, and a TCC flash point of at least 100° F, said hydrocarbon carrier having a composition containing less than 2% aromatic liquid constituents and said polymer being soluable

in said hydrocarbon carrier and 1.0 to 12% silane treated fumed silica having a particle size of 5 to 15 millimicrons and a BET surface area of 100 to 400 $m^2/gm$, said silane having some of the bonds of the silane linkage substituted by saturated or unsaturated hydrophobic organic groups.

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## 4,019,912
## FRICTIONAL MATERIAL REINFORCED WITH CARBONACEOUS FIBERS

**Wilfried Augustin, Reinbek, Germany, assignor to Jurid Werke GmbH, Glinde, Germany**

**Filed Aug. 31, 1972, Ser. No. 285,524**

**Claims priority, application Germany, Sept. 4, 1971, 2144367**

**Int. Cl.² C09K** *3/14*

**U.S. Cl. 106—36** **1 Claim**

1. A friction material consisting essentially of a compressed and burned mixture of 30–60 parts by weight of a particulate inorganic nonmetallic binder selected from the group consisting of steatite powder, glass frits and clay, 10–30 parts by weight of at least one friction-modifying constituent selected from the group consisting of metal powder, metal fibers, silicon carbide powder and graphite powder, and 30–40 parts by weight of carbonized organic fibers.

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## 4,019,913
## PROCESS FOR FABRICATING SILICON CARBIDE ARTICLES

**Gerald Q. Weaver, Princeton, and Bradford A. Olson, Leicester, both of Mass., assignors to Norton Company, Worcester, Mass.**

**Filed July 18, 1975, Ser. No. 597,171**

**Int. Cl.² C04B** *35/56*

**U.S. Cl. 106—44** **5 Claims**

1. A process for manufacturing a silicon carbide body which comprises the steps of preparing a fluid mixture of a liquid, fine silicon carbide powder having an average particle size less than 10 microns and colloidal graphite, said graphite being present in an amount of from 5 to 40% by weight of the total weight of graphite and silicon carbide, thoroughly mixing said silicon carbide and graphite, eliminating agglomerates of the powder having a size greater than 325 mesh, drying the powder, forming the dry powder to shape and thereafter firing the shaped body at a temperature in excess of 2000° C. in the presence of silicon to convert the colloidal graphite to silicon carbide.

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## 4,019,914
## METHOD OF MANUFACTURING α-ALUMINA

**Friedrich Esper, Leonberg, and Karin Bethge, Stuttgart, both of Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany**

**Filed June 24, 1974, Ser. No. 482,458**

**Claims priority, application Germany, June 27, 1973, 2332561**

**Int. Cl.² C04B** *35/04, 35/10, 35/12*

**U.S. Cl. 106—62** **9 Claims**

1. A process for preparing a finely ground α-alumina with a degree of purity of at least 98% consisting of

a. grinding a mixture of (i) at least one alumina source material selected from the group consisting of aluminum hydroxide and hydrated alumina oxide, and (ii) at least one calcination auxilary agent selected from the group consisting of $Fe_2O_3$ and $Cr_2O_3$ in an amount of between 0.03% and 2% by weight based on the total $Al_2O_3$, to produce an admixture of said alumina souce material and said calcination auxiliary agent ground to a grain size of not more than 0.4 μm which corresponds to a specific surface of at least 5 $m^2/g$,

said alumina source material containing not more than 0.1% Na, calculated as $Na_2O$ and not more than 0.1% Ti, calculated as $TiO_2$,

b. calcining said admixture at a temperature of between about 1120° C and 1350° C until said alumina source material is converted into α-alumina with a degree of purity of at least 98%, and

c. cooling said calcined α-alumina and then finely grinding said calcined α-alumina to produce a finely ground α-alumina having excellent sintering activity.

6. The process of claim 1 wherein said admixture also contains MgO in an amount up to 0.5%.

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## 4,019,915
## METHOD OF PRODUCING OPTICALLY TRANSPARENT CERAMICS

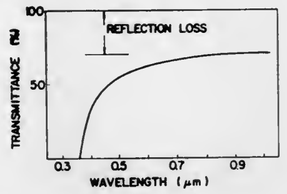
**Katsuki Miyauchi; Iwao Matsuyama, both of Hachioji, and Gyozo Toda, Hino, all of Japan, assignors to Hitachi, Ltd., Japan**

**Filed Oct. 21, 1974, Ser. No. 516,498**

**Claims priority, application Japan, Oct. 19, 1973, 48-116839; Sept. 20, 1974, 49-107821; Sept. 25, 1974, 49-109552; Sept. 25, 1974, 49-109553**

**Int. Cl.² C04B** *35/46*

**U.S. Cl. 106—73.31** **21 Claims**




1. A method of producing an optically transparent ceramic having a perovskite-type crystal structure and represented by the general formula $ABO_3$, wherein the component A consists of Pb and at least one other element selected from the group consisting of Ba and Sr and the component B is selected from the group consisting of Zr or a mixture of Zr and Ti, said method comprising forming a powdery mixture of lead oxide, a solid solution which consists of either barium oxide or strontium oxide or both with an oxide of at least one of the elements of component B, calcining the resultant powdery mixture to form a complex oxide powder, molding said complex oxide powder under pressure to yield a green compact, and hot-pressing said green compact under a pressure greater than 70 $kg/cm^2$ at a temperature of 1200°–1500° C. for more than 2 hours in an oxygen atmosphere.

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## 4,019,916
## AIR ENTRAINING AGENTS

**David Stainsley Golightly, and Allan Onions, both of Whitehaven, England, assignors to Albright & Wilson Limited, Warley, England**

**Filed May 5, 1975, Ser. No. 574,398**

**Claims priority, application United Kingdom, May 5, 1974, 3766/74**

**Int. Cl.² C04B** *7/35*

**U.S. Cl. 106—88** **11 Claims**

1. In the method of making cement based building materials which comprises agitating a mixture containing cement, water and an air entraining agent, and thereby entraining air in the said mixture, the improvement which consists in employing as said air entraining agent, a water soluble sulphosuccinamate salt, said sulphosuccinamate salt being selected from the group consisting of the sodium, potassium, lithium, ammonium, and amine salts of alkyl, alkenyl, alkylalkoxy, alkenyl alkoxy, alkyl polyalkoxy and alkenyl polyalkoxy sulphosuccinamates, wherein said alkyl and alkenyl moieties have from 8 to 22 carbon atoms, and which contain an average of from 0 to 20 alkylene oxide moieties.



## 4,019,917
## EARLY STRENGTH CEMENTS

**Ransom James Murray, Gravesend, and Arthur William Brown, London, both of England, assignors to The Associated Portland Cement Manufacturers Limited, London, England**

**Filed Dec. 1, 1975, Ser. No. 636,457**

**Claims priority, application United Kingdom, Dec. 9, 1974, 53104/74**

**Int. Cl.² C04B** *7/02, 7/32, 7/35*

**U.S. Cl. 106—89** **16 Claims**

1. An early strength hydraulic cement comprising 7.0 to 90 percent by weight of $C_{12}A_7$, the majority of the balance being hydraulic calcium silicates, characterised in that the $C_{12}A_7$ phase is formed in an underlimed clinker burned to a low free lime, an underlimed clinker being defined as a clinker in which the lime limitation factor (LLF) is less than unity where

$$LLF = \frac{CaO}{1.87\ SiO_2 + 0.94\ Al_2O_3 + 0.65\ Fe_2O_3}$$

the chemical symbols representing the amounts of the represented substances present; and in that the underlimed condition is at least counterbalanced in the cement by the presence of a substance effective to increase the basicity of the composition.

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## 4,019,918
## PORTLAND CEMENT COMPOSITIONS

**Milton Herman Wills, Jr., Adelphi, Md., assignor to Martin Marietta Corporation, Bethesda, Md.**

**Filed Feb. 2, 1976, Ser. No. 654,336**

**Int. Cl.² C04B** *7/02, 7/02, 13/00*

**U.S. Cl. 106—90** **14 Claims**

1. A high strength Portland cement mix comprising Portland cement clinker which has been ground to a specific surface area of between about 4400 $cm^2/g$ and 6000 $cm^2/g$, alkali or alkaline earth lignosulfonate in an amount of between about 0.75 and 1.25 percent by weight, sodium bicarbonate in the amount of between about 1.5 and 2.5 percent by weight, and gypsum in an amount of between about 1.5 and 4.0 percent by weight, wherein said lignosulfonate and said bicarbonate are present in a ratio of about one to two and wherein a cement product formed from the cement mix will have a porosity of less than about 5% by volume voids, an adequate plastic period of in excess of 90 minutes, and an adequate 1-day strength of in excess of 5000 pounds per square inch.

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## 4,019,919
## FULL STRENGTH, LOW DENSITY CONCRETE

**Joseph L. DeSalvo, 23509 Ridge Road, Westlake, Ohio 44145**

**Filed Mar. 23, 1976, Ser. No. 669,685**

**Int. Cl.² C04B** *7/02, 7/35*

**U.S. Cl. 106—90** **2 Claims**

1. A high strength concrete composition, said concrete having a binder phase of cement, and an aggregate phase made up at least in part of polyethylene particles, said polyethylene particles having substantially roughened and greatly uneven surfaces with extreme variations in contour thereof on a macro scale, said concrete having an average composition strength of at least 2700 lbs. per square inch, said concrete including said polyethylene particles being substantially free of entrained gas.

## 4,019,920
## GYPSUM SET ACCELERATOR

**Edward A. Burkard, East Amherst, and Donald A. Kossuth, Buffalo, both of N.Y., assignors to National Gypsum Company, Buffalo, N.Y.**

**Division of Ser. No. 514,455, Oct. 15, 1974, Pat. No. 3,920,465, Continuation of Ser. No. 358,191, May 7, 1973, Pat. No. 3,870,538. This application May 23, 1975, Ser. No. 580,136**

**Int. Cl.² C04B** *11/22*

**U.S. Cl. 106—114** **2 Claims**

1. The method of making gypsum wallboard comprising the steps of compression milling a mixture of from about 1:3 to about 3:1 parts by weight of calcium sulfate dihydrate and starch for a period of time sufficient to reduce the particle size to provide a surface area of about 10,000 to about 20,000 $cm^2/gm$ as measured by a Fisher Sub-Sieve Sizer, mixing said milled mixture into an aqueous slurry comprising the wallboard forming ingredients including a major portion of calcined gypsum and a minor portion water of hydration, fiber reinforcement and density reducing agent, said slurry also including excess water whereby the slurry can be suitably formed, said milled mixture being only separate additive for accelerating the setting and for providing the necessary additional bonding strength needed by the settable gypsum to bond itself to paper cover sheets, disposing said slurry onto paper cover sheets, forming said wallboards of said slurry and paper cover sheets, maintaining said wallboard form while said slurry sets and hardens, and drying said wallboard.

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## 4,019,921
## CHEMICAL CONDENSATION PRODUCTS, THEIR PREPARATION AND USE

**Adolf Koebner, The Retreat, St. Bees, Cumbria, CA27 OBY, England**

**Filed Feb. 11, 1975, Ser. No. 549,083**

**Claims priority, application United Kingdom, Feb. 18, 1974, 7209/74**

**Int. Cl.² C08J** *3/02*

**U.S. Cl. 106—238** **6 Claims**

1. A condensation for use in the sizing of paper which consists essentially of unsaponifiable constituents of tall oil having a boiling range of 60° – 160° C at 1 mm Hg, an iodine value of 250 – 350 and an acid value of substantially zero condensed at temperatures between 140° and 260° C with one or more alpha, beta - unsaturated acids and anhydrides thereof selected from the group consisting of acrylic acid, methacrylic acid, crotonic acid, fumaric acid, maleic acid, maleic anhydride, itaconic acid, citric acid, and dehydrated citric acid.

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## 4,019,922
## FIRE-RESISTANT RESIN

**Howard A. Whittum, Worcester, and Michael J. Hjelm, Ashby, both of Mass., assignors to Advance Coatings Company, Westminster, Mass.**

**Division of Ser. No. 346,354, March 30, 1973, Pat. No. 3,940,549. This application Jan. 22, 1976, Ser. No. 651,446**

**Int. Cl.² C08L** *91/06*

**U.S. Cl. 106—271** **10 Claims**

1. A liquid polymerizable mixture comprising

a. from 4–50 wt.% of a first monomer chosen from the group consisting of hydroxy ethylacrylate, hydroxy propylacrylate, hydroxy butylacrylate, ethylene glycol monoethyl ether acrylate, and diacetone acrylamide,

b. from 0–50 wt.% of an alkyl methacrylate monomer, and

c. from 30–70% of a chlorinated paraffin containing from 40–70% chlorine.

4,019,923

## POLYDISPERSIBLE PIGMENT COMPOSITIONS

Jean Mahé, Chantilly, France, assignor to Produits Chimiques Ugine Kuhlmann, Paris, France

Filed June 16, 1975, Ser. No. 587,020
Claims priority, application France, Apr. 7, 1974, 74.23263
Int. Cl.² C08J 3/00
U.S. Cl. 106—308 Q 6 Claims

1. A pigment concentrate composition which comprises:
5 to 75% by weight of an organic or inorganic finely divided pigment
15 to 70% by weight of a solvent or mixture of solvents miscible with water
7 to 35% by weight of a dispersing agent consisting of a product of addition of ethylene oxide and castor oil, and a product of addition of ethylene oxide and paranonylphenol.

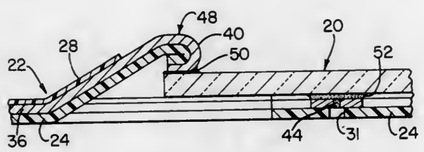
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4,019,924

## SOLAR CELL MOUNTING AND INTERCONNECTING ASSEMBLY

William T. Kurth, Wenham, Mass., assignor to Mobil Tyco Solar Energy Corporation, Waltham, Mass.

Filed Nov. 14, 1975, Ser. No. 631,817
Int. Cl.² H01L 31/04
U.S. Cl. 136—89 P 15 Claims




15. In a solar cell assembly of the type comprising at least two solar cells, each having top and bottom surface electrodes, and means for interconnecting said cells comprising a laminate having a first sheet of electrically-insulative material and a layer of electrically-conductive material disposed on said first sheet in a predetermined geometric pattern, said layer comprising first and second portions electrically-insulated from one another, said first portions being electrically-connected to the bottom surface electrode of each one of said cells, said laminate being provided with incisions so as to form a plurality of bendable tabs with each of said tabs including said second portions wherein said second portions are electrically-connected to said top surface electrode of each one of said cells, the improvement comprising:
a second sheet of electrically-insulative material having a plurality of openings and being disposed over said layer so as to expose said first and second portions of said layer through said openings.

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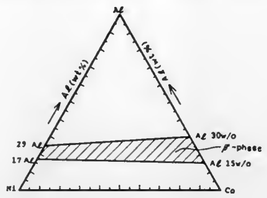
4,019,925

## METAL ARTICLES HAVING A PROPERTY OF REPEATEDLY REVERSIBLE SHAPE MEMORY EFFECT AND A PROCESS FOR PREPARING THE SAME

Soji Nenno, Suita, and Kazuyuki Enami, Itami, both of Japan, assignors to Osaka University, Osaka, Japan

Filed Apr. 7, 1975, Ser. No. 565,671
Claims priority, application Japan, May 4, 1974, 49-49901
Int. Cl.² C22F 1/10
U.S. Cl. 148—2 25 Claims

1. A process for preparing metal articles having a property of repeatedly reversible shape memory effect, comprising applying deformation stress to a β-brass type martensitic Ni-Al alloy consisting essentially of 55 –65 at % of Ni and the remainder of Al at a temperature below Md point, in which the value of said deformation stress is within a range exceeding the first yield point of martensite crystal in said alloy beyond easy plastic flow region but below the point at which




a large amount of permanent strain is produced by glide deformation.

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4,019,926

## PREVENTION OF CORROSION OF METALS

Geoffrey Oliver Lloyd, Twickenham; John Ernest Rhoades-Brown, Hanworth, and Stuart Richard John Saunders, New Malden, all of England, assignors to The Secretary of State for Industry in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, England

Filed July 1, 1974, Ser. No. 485,017
Int. Cl.² C23F 7/04
U.S. Cl. 148—6.35 6 Claims

1. A method for the diminution of high temperature oxidation in an iron alloy containing from 5% to 20% by weight of chromium comprising,
at least partially enclosing in a oxygen-containing atmosphere said alloy and a volatile inorganic boron compound physically separate from said alloy and selected from the group consisting of borosilicate glasses, sodium metaborate, sodium tetraborate, boric acid, and boric oxide,
treating said boron compound to a temperature sufficient to volatilize at least a component of said volatile inorganic boron compound and
contacting said volatilized component with at least one surface of said alloy at a temperature within the range of 400° C to 900° C, whereby a boron-containing oxide film is formed on the said at least one surface which protects said surface from further oxidation.

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4,019,927

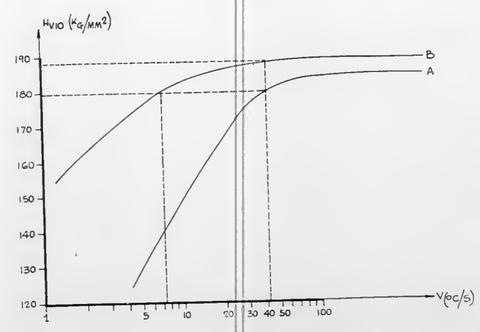
## PRODUCTS FORGED IN ALUMINUM ALLOYS WITH IMPROVED MECHANICAL CHARACTERISTICS AND A METHOD FOR OBTAINING SAME

Jean Marie Amédée Bouvaist, Grenoble, France, assignor to Societe de Vente de l'Aluminium Pechiney, Paris, France

Filed Dec. 23, 1974, Ser. No. 535,738
Claims priority, application France, Jan. 7, 1974, 74.00398
Int. Cl.² C22D 1/04
U.S. Cl. 148—11.5 A 10 Claims

1. A method for improving the isotropic structure and lowering the critical quenching rate of wrought products of aluminum alloy by reducing the hydrogen content of the alloy to below 0.1 ppm, maintaining the product for from ½ to 12 hours at a temperature $T_t$ above the solidus temperature $T_1$ but below the liquidus temperature $T_2$ while keeping the hydrogen content of the alloy below 0.1 ppm and then heat treating the product at a temperature below $T_1$ to resorb






heterogeneities formed during the preceding heat treatment between $T_1$ and $T_2$ and quenching the heat treated product.

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4,019,928

## PROCESS FOR NITRIDING IRON AND STEEL IN SALT BATHS REGENERATED WITH TRIAZINE POLYMERS

Hermann Beyer; Peter Biberbach, and Christian Scondo, all of Hanau, Germany, assignors to Duetsche Gold- und Silber-Scheideanstalt vormals Roessler, Frankfurt, Germany

Continuation-in-part of Ser. No. 608,240, Aug. 27, 1975, abandoned, which is a continuation-in-part of Ser. No. 448,065, March 4, 1974, abandoned. This application June 30, 1976, Ser. No. 701,361
Claims priority, application Germany, Mar. 5, 1973, 2310815; Aug. 29, 1974, 2441310
Int. Cl.² C21D 1/48
U.S. Cl. 148—15.5 34 Claims

1. In a process comprising nitriding iron or steel in a salt bath at nitriding temperature, and regenerating the salt bath ir which there has been loss of cyanate during the nitriding, the improvement comprising heating the iron or steel in a salt bath consisting essentially of a member of the group consisting of:
1. potassium cyanate alone;
2. potassium cyanate admixed with at least one compound of the group consisting of sodium cyanate, potassium carbonate, sodium carbonate and an alkali metal chloride; and
3. sodium cyanate admixed with at least one compound of the group consisting of potassium carbonate, sodium carbonate and an alkali metal chloride,
said bath containing 25–57 weight % cyanate calculated as cyanate ion, 0–5 weight % cyanide calculated as cyanide ion, 0–30 weight % alkali metal chloride and balance potassium ion, sodium ion and carbonate ion and after the cyanate content of the bath has fallen and the carbonate content increased readjusting the cyanate content and carbonate content by adding triazine polymer of the group consisting of melon, melan and melem to the salt bath without removing waste salts from the bath, the amount of said triazine polymer added being 0.5 to 1.5% for each 1% decrease of cyanate.

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4,019,929

## ENAMELING COLD ROLLED STEEL SHEET WITH A HIGH ENAMEL ADHESIVE PROPERTY

Kazuo Matsudo; Takayoshi Shimomura; Teruo Kurokawa, and Takao Arayama, all of Fukuyama, Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan

Filed May 20, 1975, Ser. No. 579,231
Claims priority, application Japan, June 24, 1974, 49-71381
Int. Cl.² C22C 38/04
U.S. Cl. 148—31.5 8 Claims

1. A cold rolled steel sheet having a Mn content within the range of 0.05 to 0.2 percent by weight, characterized by being obtained by the sequence of steps of preparing said cold rolled steel sheet and degreasing said sheet, and by the relationship between the surface roughness of said sheet and the Mn content thereof satisfying at least one of the following two equations:

(a) Number of peaks of 1.3μ and over per inch $\geq 1{,}200 \cdot (Mn\% - 0.1)$,

(b) Rz, in μ, $\geq 60 \cdot (Mn\% - 0.1)$, wherein Rz is defined by JIS-B 0601,

said steel sheet capable of being enameled without prior pickling and when enameled having a P.E.I. Adherence Index of at least 68 percent.

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4,019,930

## DEEP HARDENING MACHINABLE ALUMINUM KILLED HIGH SULFUR TOOL STEEL

Paul T. Aylward, Bethlehem, Pa., assignor to Bethlehem Steel Corporation, Bethlehem, Pa.

Filed Nov. 19, 1975, Ser. No. 633,343
Int. Cl.² C22C 38/06, 38/60
U.S. Cl. 148—36 3 Claims

1. A low alloy, aluminum killed, water quenched, resulfurized, martensitic, deep hardening steel, highly machinable in the hardened condition consisting essentially of by weight percent:

| | |
|---|---|
| Carbon | .33 to .42% |
| Manganese | .70 to 1.25% |
| Phosphorus | .025% maximum |
| Sulfur | .03 to .110% |
| Silicon | .15 to .45% |
| Aluminum | .019% to .077% |
| Chromium | .90 to 1.85% |
| Molybdenum | .10 to .50% |

and the balance iron with residual impurities.

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4,019,931

## THREAD PLATE PROCESS

William C. Setzer, Creve Coeur, Mo.; Harvey P. Cheskis, New Haven, and Michael J. Pryor, Woodbridge, both of Conn., assignors to Swiss Aluminium Ltd., Chippis, Switzerland

Filed Mar. 4, 1976, Ser. No. 663,760
Int. Cl.² C22F 1/04
U.S. Cl. 148—11.5 A 10 Claims

1. A method for the preparation of aluminum base alloys in wrought form possessing improved tensile properties which consists of:
A. providing an aluminum base alloy containing up to about 1.5% magnesium and up to 1.35% silicon in the cast condition;
B. homogenizing said alloy at a temperature above 900° F for a period of from 8–14 hours;
C. hot rolling said alloy in excess of 20% reduction at a starting temperature of above 900° F;
D. continuously hot rolling said alloy at temperatures below the solubility limit thereof, during which said alloy is held for no more than about 4 minutes at a temperature of about 850° F, no more than about 2 minutes at a temperature of about 800° F and no more than about 1 minute in the temperature range of from about 750°–550° F, and quenching the alloy whereby the temperature of said alloy is reduced to below 550° F in no more than 1 minute.

## 4,019,932
## INCENDIARY COMPOSITION

**Fred Schroeder, Lakeview Terrace, Calif., assignor to Dow Corning Corporation, Midland, Mich.**

**Continuation of Ser. No. 487,474, July 11, 1974, abandoned. This application Apr. 14, 1976, Ser. No. 676,826**
**Int. Cl.² C06B** *45/10, 33/00*
**U.S. Cl. 149—19.1** **6 Claims**

1. In combination with an explosive charge an incendiary composition consisting essentially of by weight 20 to 40 percent magnesium powder, 30 to 60 percent metallic oxide chosen from the group consisting of $Fe_3O_4$, $MnO_2$ and $TiO_2$ and the remainder of elastomeric polysiloxane, said remainder being at least 10 percent.

## 4,019,933
## POT LIFE EXTENSION OF ISOCYANATE CURED PROPELLANTS BY AZIRIDINE COMPOUNDS

**Marjorie T. Cuksee, Huntsville, and Henry C. Allen, Decatur, both of Ala., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

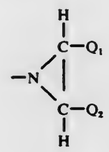
**Filed July 27, 1973, Ser. No. 385,930**
**Int. Cl.² C06B** *45/10*
**U.S. Cl. 149—19.4** **3 Claims**

1. An isocyanate curable composite propellant composition having extended pot life, said composition comprised of hydroxy terminated polybutadiene, an isocyanate curing agent, and the inorganic oxidizer, ammonium perchlorate, that is less than 20 micron particle size and the is coated with an aziridine compound selected from compounds represented as follows:

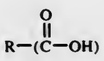
a reaction product formed from tri-aziridinylphosphine oxides or derivatives thereof reacted with monofunctional carboxylic acids, said tri-aziridinylphosphine oxides or derivatives thereof represented by the structure:



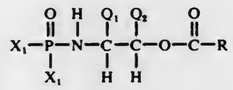
wherein $X_1$ represents an aziridine group of the structure:



wherein $Q_1$ and $Q_2$ are selected from the group consisting of hydrogen or alkyl groups of one to four carbon atoms and said monofunctional carboxylic acid represented by the structure:



wherein R is an organic entity containing one or more carbon atoms, said reactio product represented by the structure:



wherein $X_1$, $Q_1$, $Q_2$, and R are as defined above.

## 4,019,934
## INORGANIC GEL-AMMONIUM NITRATE COMPOSITE MATERIAL AND METHOD OF MANUFACTURING THE SAME

**Taro Takayama, No. 10-27, 2-chome, Komazawa, Setagaya, Tokyo, and Eiya Kakegawa, Otsu 17, Honmachi, Komoro, Nagano, both of Japan**

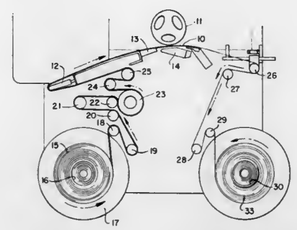
**Filed Mar. 30, 1972, Ser. No. 239,707**
**Int. Cl.² C06B** *33/04*
**U.S. Cl. 149—43** **4 Claims**

1. An inorganic gel-ammonium nitrate explosive composite material consisting essentially of an aluminum powder and a ripened mixture of ammonium nitrate and a purified and swollen inorganic gel.

## 4,019,935
## AUTOMATIC FEEDING OF LABELS FOR APPLICATION TO BOTTLES OR OTHER CONTAINERS

**Albert J. Harvey, Detroit, Mich., assignor to Diamond International Corporation, New York, N.Y.**

**Filed May 14, 1975, Ser. No. 577,178**
**Int. Cl.² B65C** *1/00*
**U.S. Cl. 156—64** **13 Claims**



1. Apparatus for indexing of labels on a label web for movement of the web in register with bottles or the like moved to receive the labels and have them affixed thereto comprising

a label web having register marks thereon and connected between a feed means and a take-up means;

means to detect said register marks, positioned along the path of said label web;

means to move said label web, and stop said label web upon detection of each said register mark, positioned along the path of said label web; and

means along the path of said label web to apply labels from said label web to bottles or the like;

said detecting means including

a roller with a shaft therethrough having said label web pass at least partially around said detecting means roller, and

photoelectric means adjustably mounted on said roller having a light source and a detection photocell adjacently mounted on the same side of said web.

10. A method of indexing labels for application to bottles or the like comprising the steps of

moving the labels on a label web which web is moved between a feed roll and a take-up roll;

detecting register marks printed on said label web of labels at spaced intervals;

metering the feed of the labels to an application station for applying the labels;

moving said label web by reciprocal motion means imparting a start and stop motion to said label web controlled by said detecting means.



## 4,019,936
## METHOD FOR FLOORING ON A CLOSED UNDERLAYER

**Erik Gustav Lennart Eriksson, Valberg, Sweden, assignor to AB Karlstadplattan, Valberg, Sweden**

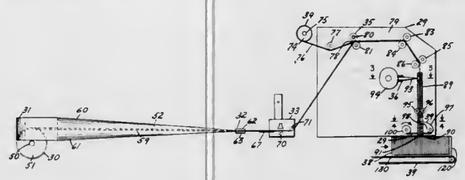
**Continuation-in-part of Ser. No. 478,952, June 13, 1974, Pat. No. 3,959,195, which is a continuation-in-part of Ser. No. 136,774, April 23, 1971, abandoned. This application May 5, 1975, Ser. No. 574,699**
**Claims priority, application Sweden, May 15, 1974, 7406503**
**Int. Cl.² E04B** *5/00*
**U.S. Cl. 156—71** **9 Claims**

1. A method for laying flooring on a solid sub-floor, comprising the steps of applying to the sub-floor a layer consisting substantially of sawdust fractions of predetermined particle size, said sawdust fractions comprising coarse and fine fractions, the coarse fractions of which are sifted from the fine fractions and split substantially along the grain thereof to provide particles of sawdust of increased length to width ratio, spreading the sawdust layer on said sub-floor and screeding it with particles of sawdust in said fractions in random orientation relative to said sub-floor to form felted particles to a substantially uniform depth of from 5 to 25 mm, and applying at least one semi to fully rigid plate of predetermined thickness onto said sawdust treated during one of the recited steps of the process with an agent which hardens and binds the sawdust particles, the thickness of the plate being a direct function of the expected load upon and the thickness of the sawdust layer.

## 4,019,937
## SLEEVED PHOTO ALBUM PAGE AND MEANS AND METHOD FOR MAKING SAME

**Sheldon Holson, Norwalk, Conn., assignor to The Holson Company, Wilton, Conn.**

**Filed Apr. 5, 1976, Ser. No. 673,448**
**Int. Cl.² B31B** *23/60, 23/74*
**U.S. Cl. 156—73.1** **5 Claims**



1. The method of making a photographic print display device, said device including a relatively rigid planar base and a plurality of open-ended sleeve elements hingedly attached thereto in staggered relation, comprising the steps of:

a. providing a rigid planar base having at least one surface for the attachment of said sleeve elements;

b. providing a web of clear heat-sealable synthetic resinous material of indeterminate length;

c. progressively folding said web along a principal longitudinal axis to form an envelope having a pair of abutted longitudinal edges;

d. progressively sealing said edges together to form a flattened sleeve having a pair of longitudinally extending edges;

e. applying a strip of adhesively-surfaced tape to a surface of said sleeve in an area adjacent a longitudinal edge thereof in such manner that a longitudinally extending adhesive-bearing area thereof extends laterally from said edge;

f. serially severing said sleeve and tape at substantially uniformly spaced intervals to form a plurality of open-ended sleeve elements;

g. providing a jigging structure for supporting said sleeve elements in mutually spaced parallel relation with said adhesive laterally-extending areas of said tape projecting therefrom;

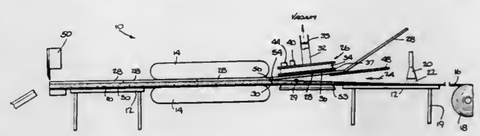
h. while maintaining said sleeve elements within said jigging structure, pressing said jigging structure against a surface of said base to simultaneously adhere each of said adhesive laterally extending areas thereto; and

i. removing said sleeve elements from said jigging structure.

## 4,019,938
## APPARATUS AND PROCESS FOR MANUFACTURING INSULATION BOARD

**Harry Forrester, Newton, N.J., assignor to United States Mineral Products Company, Stanhope, N.J.**

**Filed Jan. 14, 1976, Ser. No. 649,088**
**Int. Cl.² B32B** *5/20*
**U.S. Cl. 156—78** **19 Claims**

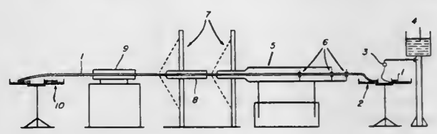


1. An apparatus for making a laminate having a foam core sandwiched between a layer of relatively thin flexible material and a layer of relatively thick inflexible material comprising means for moving an elongated sheet of said flexible material from a first station to a second station, dispensing means intermediate said first and second stations for dispensing foam forming urethane chemicals in layer form on said flexible sheet as it moves toward said second station, said foam forming chemicals expanding and adhering to said flexible sheet during movement toward said second station, and depositing means for moving individual undeposited segments of said inflexible material having opposite leading and trailing ends, in a first direction toward said second station and consecutively depositing said individual undeposited segments in side-by-side abutting relationship onto the expanding foam as said foam and said flexible sheet move toward said second station such that the leading edge of a deposited segment abuts against the trailing edge of an adjacent deposited segment, said depositing means including means for impelling the leading end of an undeposited segment against the trailing end of an immediately preceding segment to avoid the formation of gaps therebetween as the undeposited segment moves in said first direction for disposition onto the expanding foam.

## 4,019,939
## PROCESS FOR THE MANUFACTURE OF HOSE

**Jean Barbier, Lyon, and Paul Cachon, Caluire, both of France, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio**

**Filed Aug. 28, 1975, Ser. No. 608,618**
**Claims priority, application France, Oct. 4, 1974, 74.34177**
**Int. Cl.² B29C** *25/00;* **B29B** *3/00;* **B32B** *1/08*
**U.S. Cl. 156—80** **7 Claims**



1. A process for the manufacture of a hose comprising an inner tube and reinforced by a textile or metallic structure surrounding said tube with the constituents of the reinforcing structure being applied to said tube while said tube is supported by a mandrel, the inprovement wherein the hose is manufactured by the successive steps of:

A. introducing a congealable fluid in liquid form into said tube during or after the manufacture of said tube;

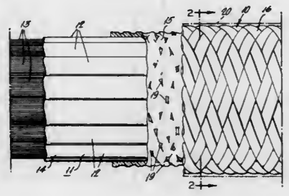
B. cooling and solidifying said liquid to form a solid mandrel capable of withstanding mechanical stresses during the manufacture of said hose;
C. applying said reinforcing structure to said tube;
D. converting the solidified liquid into liquid form and curing said hose into an integral structure; and
E. removing the liquid thus formed from said tube.

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## 4,019,940
## METHOD OF MANUFACTURING PARALLEL YARN ROPE

**Henry Alexander Hood, Moorestown, N.J., assignor to Wall Industries, Inc., Beverly, N.J.**

**Division of Ser. No. 434,627, Jan. 18, 1974, Pat. No. 3,911,785. This application July 25, 1975, Ser. No. 599,108**
**Int. Cl.² B32B** *5/08*
**U.S. Cl. 156—148** **14 Claims**



1. A method of making rope, comprising the steps of: advancing lengthwise a plurality of rope yarns each composed of a series of filaments, tensioning said rope yarns as they advance to compact said filaments, coating said rope yarns with a layer of an uncured binder material as said yarns advance under tension to distribute the binder material predominantly on the surface of each rope yarn and to prevent penetration of said binder material deeply into the interior of said rope yarns and among inner ones of the filaments of each rope yarn, joining said yarns together lengthwise in parallel relation to form a core, applying a layer of an uncured binder material on said core, and heating the assembly to cure the binder materials.

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## 4,019,941
## METHOD OF CONSTRUCTING CONVEYOR BELTING

**Eric Victor Donald Prince, Bulleen; Kenneth Llewellyn Lewis, Doncaster, and Leonard John Michael Ralph, Essendon, all of Australia, assignors to Dunlop Australia Limited, Port Melbourne, Australia**

**Filed Feb. 28, 1975, Ser. No. 553,981**
**Claims priority, application Australia, Mar. 18, 1974, 6939/74**
**Int. Cl.² B29C** *27/30*; **B32B** *27/30, 27/38*; **C09J** *7/00*
**U.S. Cl. 156—179** **12 Claims**

1. A method of producing steel cord reinforced conveyor belt comprising forming two cover layers of P.V.C. based material with a plurality of longitudinally extending grooves formed in one face of at least one layer, the grooves being shaped and arranged so that when the two layers are assembled with said one face abutting a face of the other layer there is formed a plurality of longitudinal apertures, assembling the two layers to form said apertures with a steel cord in at least some of the said apertures so formed and with a coating of adhesive having a P.V.C. base and including an epoxy resin and an epoxy resin curing agent between each cord and the wall of the aperture that the cord is disposed in, and curing the assembly under heat and pressure.

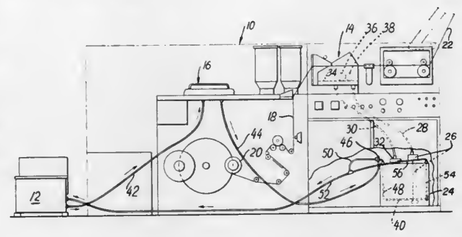
12. A method of binding a layer P.V.C. to a metal component comprising applying a layer of adhesive having a P.V.C. base and including an epoxy resin and an epoxy resin curing agent between the P.V.C. layer and the metal, and curing the assembly under heat and pressure.

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## 4,019,942
## MAINTAINING PLASTICIZER TEMPERATURE IN TOBACCO FILTER ROD FORMATION, AND APPARATUS THEREFOR

**James A. Kay, Jr., Richmond, Va., assignor to Philip Morris Incorporated, New York, N.Y.**

**Filed Mar. 12, 1975, Ser. No. 557,514**
**Int. Cl.² G05G** *15/00*
**U.S. Cl. 156—180** **4 Claims**



1. In a cigarette filter rod forming operation in which a plasticizer material is conveyed from a pond thereof and applied to a tow band of filter material in an application operation preliminary to enclosing said tow band in a wrapper, the conveyance and application of said plasticizer being made under such conditions that heat is transferred to said plasticizer with a portion of the said plasticizer conveyed to the application operation being returned to said pond whereby the temperature of said pond tends to increase, the improvement of

establishing and maintaining the temperature of said pond of plasticizer material at substantially the ambient temperature of the environment in which said forming operation is carried out by circulating a flow of cooling water through said pond in a closed circuit flow course extending substantially across the full expanse of said pond adjacent the bottom thereof.

3. In apparatus for forming cigarette filter rod which includes means for advancing a tow band of filter material in a predetermined direction, an upright tank, a source of plasticizer material received in said tank as a pond thereof, application means for applying said plasticizer material to said advancing tow band, and means for conveying plasticizer from said pond to said application means, there further being means for collecting and returning unused plasticizer from said application means to said pond, the improvement comprising means for maintaining the temperature of said pond at a value in a predetermined range, said means comprising

a source of circulating cooling fluid,

a coil disposed in said tank, said coil having at least a portion thereof disposed in said pond closely adjacent to but spaced from the bottom of said tank, said portion comprising a plurality of relatively sinuous windings disposed in substantialy planar alignment across substantially the full expanse of said tank, and

means operative for establishing flow communication between said coil and said cooling fluid source whenever the temperature of the plasticizer in said pond exceeds the maximum value in said predetermined range, said means being inoperative whenever the temperature of the plasticizer in said pond is at a value within or below said predetermined range, said means for establishing flow communication between said coil and said cooling fluid source including a three-way valve having connection respectively with said cooling fluid source, said coil, and a by-pass conduit, and a thermostat control sensing the temperature of said plasticizer and operative to orient said three-way valve to pass cooling fluid from said source to said coil, or from said source to the by-pass conduit.

4. The apparatus of claim 3 in which said cooling fluid is chilled water, the plasticizer material being triacetin, and the means for establishing flow communication between said coil and said pond of cooling fluid being operative whenever the temperature of the plasticizer exceeds 80° F.

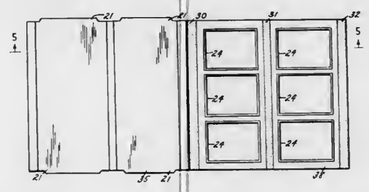


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## 4,019,943
## PHOTOGRAPHIC ALBUM PAGE AND METHOD OF MAKING SAME

**Sheldon Holson, Norwalk, Conn., assignor to The Holson Company, Wilton, Conn.**

**Continuation-in-part of Ser. No. 508,526, Sept. 23, 1974, abandoned, which is a division of Ser. No. 422,922, Dec. 10, 1973, Pat. No. 3,869,820. This application Jan. 6, 1976, Ser. No. 646,653**
**Int. Cl.² B29D** *23/10*
**U.S. Cl. 156—227** **3 Claims**



1. The method of making a photographic album page comprising the steps of:

providing an elongate planar blank of fibrous material having a pair of longitudinal side edges and first and second free end edges;

delineating three adjacent, substantially equally sized, rectangular areas along the principal axis of said blank to form interconnected first, second and third laminae;

cutting from only two of said first, second and third laminae a corresponding plurality of rows of substantially rectangular apertures to form a pair of apertured laminae, and a single imperforate laminae;

applying an adhesive in a plurality of transversely extending rows to at least one surface of said blank in areas bordering said rows of apertures in said pair of apertured laminae;

folding one of said apertures laminae upon said imperforate lamina to adhere a surface of the former upon the latter, and defined a plurality of pockets accessible from the longitudinal edges of the now laminated laminae; and

folding the other of said apertured laminae; about said imperforate lamina to adhere a second surface of said imperforate lamina and define a second plurality of similar pockets disposed in substantially congruent relation relative to said first set of pockets.

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## 4,019,944
## METHOD OF AND HIGH FREQUENCY WELDER ASSEMBLY FOR BINDING A COVER MATERIAL ONTO A BASE MATERIAL

**Keiji Tomita, Tondabayashi, Japan, assignor to Kabushiki Kaisha Tomita Sangyo, Osaka, Japan**

**Filed Mar. 19, 1975, Ser. No. 559,703**
**Claims priority, application Japan, Dec. 6, 1974, 49-144795**
**Int. Cl.² B32B** *19/02, 3/04*
**U.S. Cl. 156—380** **5 Claims**

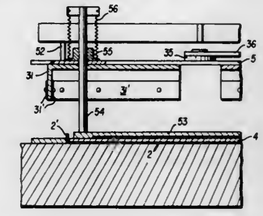
1. Apparatus for binding the marginal edge of a cover material which has been folded over a base material, the apparatus comprising:

means for generating high frequency electrical energy;

pressing means comprising a folding frame for pressing said marginal edge against said base material and applying said electrical energy to said marginal edge to bind it to said base material;

said pressing means including an electrically conductive first portion for conducting said high frequency electrical energy comprising at least one vertical disposed member extending along the length of said marginal edge, and at least one electrically insulative second portion comprising a layer of electrically insulative material disposed along at least one side of said vertically disposed member, where both said first and second portions contact said marginal edge so that the heat applied across the width of said marginal edge varies;

a table adapted to dispose said cover material under said base material so that said marginal edge of the cover



material substantially vertically extends above said base material;

means for lowering said folding frame to said table and including means for maintaining sections of said folding frame in a separated condition while said frame is being lowered to said table; and

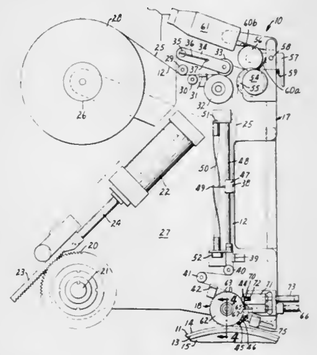
means for drawing said folding frame sections together after said frame has been lowered to the table to fold and press the marginal edge over the base material.

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## 4,019,945
## STRIP APPLYING DEVICE

**Thomas F. Look, New Brighton; Richard T. Podvin, Fridley, and Carlyle A. Weigel, Maplewood, all of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

**Filed Mar. 10, 1976, Ser. No. 665,411**
**Int. Cl.² B29H** *17/20, 21/02*
**U.S. Cl. 156—405** **8 Claims**



1. In a device adapted for applying lengths of elastic reflex-reflective strip material to tire casings from a supply length of strip material having a protective liner applied thereto, said device comprising means adapted for driving a said tire casing past an applying station; a head assembly including a frame, an applying wheel rotatably mounted on said frame, and means for defining a path for said strip material along said frame including a path portion partially around said applying wheel; means mounting said head assembly for movement between a spaced position spaced from said applying station and an applying position with said wheel positioned to press strip material along the path portion thereon against the tire casing at said applying station to apply strip material as the tire casing

is driven past the applying station; and means along said path in advance of said applying wheel adapted for stripping said liner from said strip material, the improvement wherein said means for stripping said liner comprises a stripping finger adapted for guiding said liner around approximately an 180° turn; means mounting said striping finger for movement relative to said frame along a linear path parallel to a linear portion of said path for said strip material with said stripping finger oriented to guide said liner about said turn throughout said linear path for said stripping finger; means adapted for driving engagement with said separated liner; a variable speed motor coupled to said means adapted for driving engagement with said separated liner; means for varying the speed of said motor comprising an actuator rotatable about an axis aligned parallel to said path for said stripping finger, a member fixed to said actuator, said member defining a surface generally helical about said axis and extending along the path for said stripping finger, and means fixed to said stripping finger for providing driving engagement with said helical surface to rotate said member and actuator upon movement of said stripping finger along its path, said actuator being connected to increase the speed of said motor upon movement of said stripping finger along its path toward said applying wheel, and to decrease the speed of said motor upon movement of said stripping finger along its path away from said applying wheel to adjust the rate of speed of said means adapted for driving engagement with said separated liner to the same rate of speed at which the strip material is being applied to said tire casing.

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**4,019,946**

## HEAT SEALING APPARATUS

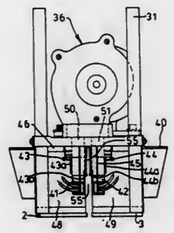
**Samuel Greisman, London, England, assignor to The Thames Sack and Bag Company Limited, London, England**

**Filed Feb. 14, 1975, Ser. No. 549,855**

**Claims priority, application United Kingdom, Feb. 14, 1974, 6832/74**

**Int. Cl.² B29D** *23/00*

**U.S. Cl. 156—497** **13 Claims**



1. A hot air heat sealing apparatus for sealing together two layers of heat softenable plastics material comprising a fan, ducting arranged to divide the air stream from the fan into at least two flows, a heater disposed in the path of one of said flows, means by which air heated by the heater is directed in use onto the layers of plastics material thereby to soften said layers at a region thereof where they are to be sealed together, means for pressing the layers together to form a seal, and guide means disposed in the path of the other of said flows for guiding said other flow into contact with said layers above said region, to cool the area above said region whereby said layers are not softened above said region.

**4,019,947**

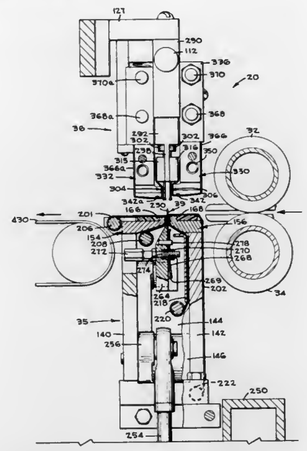
## MULTIPURPOSE SEALING AND SEVERING METHOD AND MECHANISM

**David K. Stock, and Robert J. Wech, both of Green Bay, Wis., assignors to FMC Corporation, San Jose, Calif.**

**Filed Sept. 10, 1975, Ser. No. 612,059**

**Int. Cl.² B32B** *31/00*

**U.S. Cl. 156—510** **30 Claims**



1. A multipurpose sealing and severing mechanism for making articles from a web of thermosealing material comprising: means for moving the web in a feed direction along a predetermined path; opposed pairs of sealing bars disposed on opposite sides of the path of movement of the web for applying sealing pressure to the web in two transverse zones; heating means associated with each sealing bar for raising the web to a bonding temperature along said zones when activated; severing means movable in a cutting plane extending transversely of the web and disposed between said zones; means for clamping the web between the sealing zones and both sides of said cutting zones; drive means for moving a sealing bar of each opposed pair of sealing bars and said clamp means into pressure engagement with the web and for causing said severing means to sever the web; and selectively operable electrical control means for connecting or disconnecting one or both pair of said opposed pairs of heating means from a source of electrical power.

23. In a sealing and severing mechanism for making articles from a web of thermosealing material, web clamping means comprising; a segmented row of clamping elements, support means for supporting said clamping elements for limited sliding movement relative thereto, resilient means in said support means for independently urging each clamping element toward the web, means for moving said support means and clamping elements toward the web with each said clamping element being moved into independent resilient engagement against the web for applying a uniform clamping force on the web throughout substantially the full length of the segmented row of clamping elements, and force resisting means on the other side of the web for resisting the clamping force.

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**4,019,948**

## APPLICATOR FOR HEAT-ACTIVATABLE TAPE

**Mark G. Hudalla, St. Paul, and Steven C. Schultz, Hastings, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

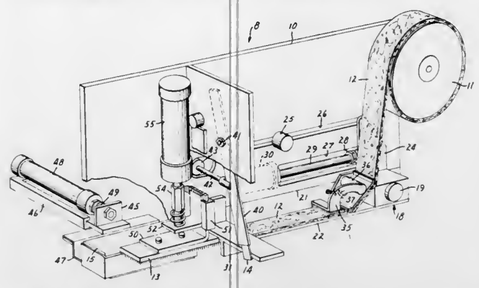
**Filed Sept. 22, 1975, Ser. No. 615,774**

**Int. Cl.² B65C** *9/18, 9/25*

**U.S. Cl. 156—519** **10 Claims**

1. A tape applicator for applying strips of tape to a receptor surface, which tape has a fibrous surface opposite an adhesive coated surface, said applicator comprising an applicating pad having a tape supporting and applying surface substantially covered by a plurality of wire bristles extending parallel to each other and terminating in a plane, a support for said applicating pad, and means for moving said support and said





applicating pad along a path from a first position where said applicating pad can receive a length of tape to a second position placing said length of tape in contact with a receptor surface, and platen means movable toward and away from said bristles for transporting a length of tape into contact with said bristles.

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**4,019,949**

## HEAT SEALING APPARATUS

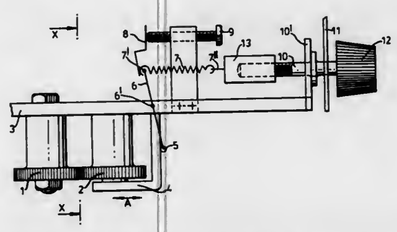
**Samuel Greisman, London, England, assignor to The Thames Sack and Bag Company Limited, London, England**

**Filed Mar. 11, 1975, Ser. No. 557,327**

**Claims priority, application United Kingdom, Mar. 12, 1974, 11059/74**

**Int. Cl.² B32B** *31/00*; **B30B** *3/04*

**U.S. Cl. 156—582** **4 Claims**



1. A heat sealing apparatus for sealing together two layers of heat softenable plastics material, for example two sides of the top of a bag or sack, comprising a frame, a first roller mounted on the frame for rotation about a fixed axis, a carrier slidably mounted on the frame for rectilinear movement perpendicular to said fixed axis, a second roller mounted on said carrier for rotation about an axis parallel to said fixed axis, spring loading means acting on said carrier to urge said second roller towards said first roller, stop means inhibiting the loading of the spring loading means on the carrier in the absence of layers of plastics material between the rollers, said spring loading means comprising a lever and a spring arranged to urge the lever to bear at one end thereof against the stop means, and at the other end thereof against said carrier, thereby to urge said carrier and the second roller mounted thereon towards said first roller.

**4,019,950**

## CRYSTALS AND THEIR MANUFACTURE

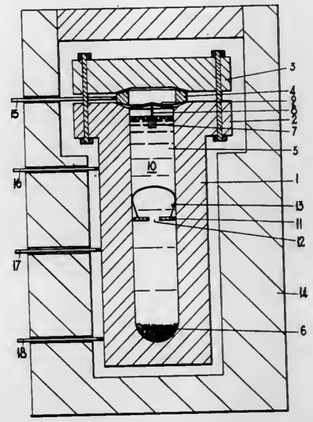
**Derek Francis Croxall, London; Robert Christopher Kell, South Harrow, and Robert Lambert, Eastbourne, all of England, assignors to The General Electric Company Limited, London, England**

**Filed Nov. 7, 1975, Ser. No. 629,800**

**Claims priority, application United Kingdom, Nov. 25, 1974, 50933/74**

**Int. Cl.² B01J** *17/04*; **C01G** *21/14*

**U.S. Cl. 156—623 R** **7 Claims**



1. A method of manufacturing crystals of lead carbonate, which comprises heating in a sealed autoclave, under pressure of 500 to 1500 atmospheres, a quantity of nutrient material consisting of a compound of lead which is a member of the group consisting of the carbonate and the basic carbonate, in contact with a solvent medium consisting of an aqueous solution of an alkali metal bicarbonate of concentration in the range of 0.5 to 5.0 molar, which solvent medium occupies from 80 to 95% of the free space in the autoclave chamber, the autoclave being heated in such a manner that the exterior of the autoclave wall adjacent to the nutrient material and to the region of the solvent medium in the vicinity thereof is maintained at a temperature in the range of 200° to 400° C and that the exterior of the autoclave wall adjacent to the region of the solvent medium remote from the nutrient material is maintained at a temperature which is in the range of 170° to 315° C and is from 5° to 150° C lower than that of the exterior of the autoclave wall adjacent to the nutrient material, whereby a temperature gradient is produced in the solvent medium and the lead carbonate crystallises out in a location remote from the nutrient material.

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**4,019,951**

## MAGMA COOLING TOWER

**Loren G. Kragh, 29600 Eighth Ave. South, Federal Way, Wash. 98002**

**Filed July 20, 1973, Ser. No. 381,340**

**Int. Cl.² B01D** *1/16, 1/00*

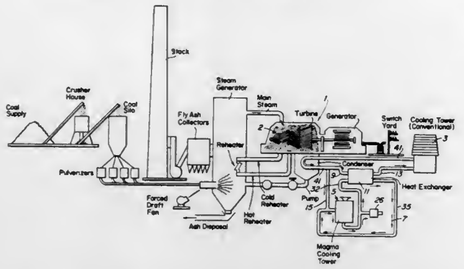
**U.S. Cl. 159—4 CC** **7 Claims**

1. A crystallizing evaporator comprising:
means forming a fluid circulation loop having an input and an output wherein the output of the loop comprises mechanical separating means connected in parallel with the loop;
seed crystal injecting means connected to the said loop;
a source of heat energy disposed within said loop to raise the temperature of ~~fluid~~ circulating therein;
an evaporator disposed in said loop comprising:
an enclosed housing having an opening in the top thereof

and vent means in the lower sides thereof to permit a flow of air therethrough;

fluid distribution means disposed within the top portion of the housing and connected to the said loop;

fluid collecting means disposed at the bottom of the housing and connected to the said loop;




a plurality of spaced apart surfaces disposed between the distribution means and the collecting means for maximizing the surface area of the fluid flowing between the distribution means and collecting means.

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**4,019,952**

## METHOD OF PURIFYING THE WASTE WATER OF PAPER MILLS

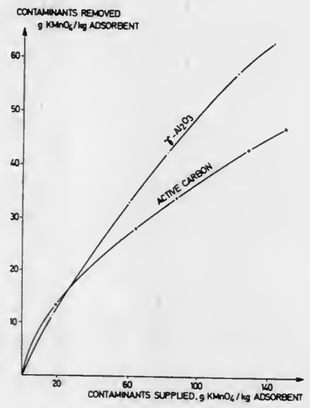
**Theodor Ploetz, deceased, late of Hoesel, Germany; by Adelbert Hasse, administrator, Ratingen, and Volker Franzen, Heidelberg, both of Germany, assignors to Feldmuhle Anlagen- und Produktionsgesellschaft mit beschrankter Haftung, Duesseldorf-Oberkassel, Germany**

**Continuation-in-part of Ser. No. 461,613, April 17, 1974, abandoned. This application Dec. 12, 1975, Ser. No. 639,996**

**Claims priority, application Germany, Apr. 25, 1973, 2320799**

**Int. Cl.² C02C** *5/02, 5/10*

**U.S. Cl. 162—29** **3 Claims**




1. A method of purifying waste water of a paper mill of contaminating, oxygen-demanding lignin values which comprises:

a. holding granular γ-alumina in contact with said waste water until said lignin values are adsorbed on said alumina and the oxygen demand of said waste water is reduced; and

b. separating the waste water of reduced oxygen demand from the alumina having said lignin values adsorbed thereon.

**4,019,953**

## APPARATUS FOR REMOVING DUST FROM REGION ADJACENT DOCTOR BLADE

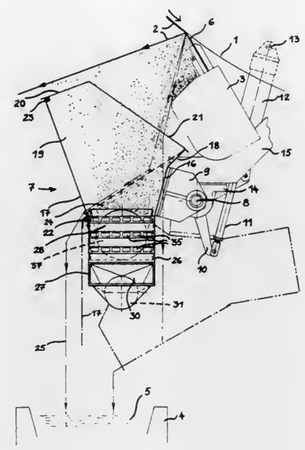
**Karl Gustav Nystrom, Vaxjo, Sweden, assignor to Aktiebolaget Svenska Flaktfabriken, Nacka, Sweden**

**Filed Jan. 22, 1976, Ser. No. 651,587**

**Claims priority, application Sweden, Jan. 31, 1975, 7501053**

**Int. Cl.² D21G** *3/04*

**U.S. Cl. 162—272** **13 Claims**



1. In combination with doctor blade means operable to produce dust in a dust production region adjacent said doctor blade:

dust pick-up receptacle means forming an open-topped chamber adjacent said dust-production region for receiving said dust, said receptacle means having opposite lateral wall portions which diverge from each other in the direction toward said dust-production region and shield members associated therewith for at least partially confining said dust to the vicinity of said region of its production;

said receptacle means also having an air-stream inlet and an air-stream outlet in the walls thereof, said outlet being of larger cross-sectional area than said inlet;

the lower portion of said receptacle means being in the form of a box-like elongated trough the bottom of which is sloped from one end to the other end at a substantial angle to the horizontal;

foraminous partition means extending across the interior of said receptacle means at a position spaced above the bottom thereof, said partition means being pervious to said dust;

means mounting said receptacle means pivotably and independently of said doctor blade means to permit swinging said receptacle means into and out of adjacency to said dust production region;

said mounting means comprising shaft means, support means pivotably mounting said receptacle means on said shaft means, fluid-pressure operable cylinder means including piston means reciprocable therein, and swinging arms connecting said piston means to said support means for pivoting said receptacle means in response to reciprocation of said piston means; and

means responsive to air supplied from said inlet for forming a plurality of higher speed jets directed toward said outlet to entrain and remove dust-laden air in said receptacle by way of said outlet.



**4,019,954**

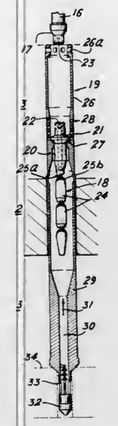
## SAFETY DEVICE FOR A NUCLEAR REACTOR AND ESPECIALLY A FAST REACTOR

**Fernand Giordano, Saint-Etienne; Pierre Marmonier, and Jean Vayra, both of Aix-en-Provence, all of France, assignors to Commissariat a l'Energie Atomique, Paris, France**

**Filed Nov. 7, 1974, Ser. No. 521,900**

**Int. Cl.² G21C** *9/00*

**U.S. Cl. 176—38** **5 Claims**



1. In a fast nuclear reactor having a reactor core, a safety device comprising an articulated absorber element, a supporting head for said element, a disconnectable coupling joining said head to the lower extremity of an axially movable vertical operating stem, said absorber element after separation of the disconnectable coupling dropping under gravity from a top position to a bottom position within a passage through the reactor core, a casing for said passage open at the upper extremity thereof and located within the core among wrappers containing nuclear fuel and having the same length as said wrappers, the upper part of said casing being located at the same level as said wrappers, the reactor core being cooled by an upward circulation of liquid metal, a central fuel zone in said core, a peripheral blanket zone in said core which completely surround the central zone, said disconnectable coupling being an electromagnet armature on said stem and in the top position of said absorber element being located about the same level as the upper part of said casing, said head being engaged within said casing, said absorber element extending in said casing through said peripheral blanket zone externally of said central zone, said head of said absorber element in the bottom position engaging an external annular projection on said head with an internal abutment shoulder in said casing to stop the fall of said absorber element at the vertical level of said central core zone and means formed by said head and said casing for damping the fall of said element by acting on said head of said absorbent element.

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**4,019,955**

## VESSEL STEAM RELIEF SYSTEM FOR A NUCLEAR REACTOR

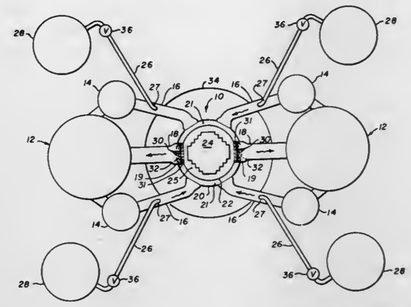
**Francis Thomas Grubelich, Wethersfield, Conn., assignor to Combustion Engineering, Inc., Windsor, Conn.**

**Filed Dec. 31, 1975, Ser. No. 645,494**

**Int. Cl.² G21C** *9/00, 15/24*

**U.S. Cl. 176—38** **10 Claims**

1. An improved nuclear reaction having a pressure vessel which has first and second nozzle penetrations therethrough, said first nozzle penetration affording an entrance for coolant into said pressure vessel and said second nozzle penetration affording an exit for coolant from said pressure vessel, a core support barrel suspended on the inside of said pressure vessel, said core support barrel separating the interior of the pressure vessel into first and second regions, said first region comprising that space which lies exterior to said core support barrel and being in fluid communication with said first nozzle penetration and said second region comprising that space which lies interior to said core support barrel and being in fluid communication with said second nozzle penetration, and a nuclear core through which coolant flows from the first region to the second region supported within said core support barrel, wherein the improvement comprising:



a. a plurality of passages through said core support barrel arranged in a pattern which girdles a cylindrical section of said core support barrel, thereby connecting said first and second regions; and

b. a rupturable seal band whose width is larger than the diameter of said passages, said seal band encircling the exterior of said cylindrical section of said core support barrel and held in flow blocking position adjacent to said passages.

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**4,019,956**

## PROCESS FOR RECOVERING HAIR BY DISSOLVING THE SKIN OR HIDE

**Carnot E. A. R. Saby, Saint Quentin, France, assignor to Omnium de Prospective Industrielle, S.A., Neuville Saint Amand, France**

**Filed July 22, 1975, Ser. No. 598,028**

**Claims priority, application France, July 30, 1974, 74.26342**

**Int. Cl.² C12B** *1/00*

**U.S. Cl. 195—6** **11 Claims**

1. In a process for recovery of hair by dissolving the epidermal layers of animal skins or hides in a solution of bacterial protease, wherein said skins or hides are first rehydrated in water and thereafter scoured in an aqueous solution, the improvement comprising: (a) predigesting and plumping the rehydrated and scoured skins in a bath containing an effective amount of sodium perborate and 1 to 10% by weight urea based upon the weight of dried skins or hides at a pH of 8 to 10 for sufficient time to predigest and plump said rehydrated and scoured skins; (b) adding 0.5 to 5% by weight of a bacterial protease based upon said weight of dried skins or hides to said bath to complete the digestion of the epidermal layer and to separate hair therefrom; and (c) recovering the separated hair.

4,019,957
**PROCESS FOR PRODUCING (2'-AMINO-2'-DEOXYPENTOFURANOSYL) GUANINE**
**Takeo Suzuki, Hofu, and Toshihide Nakanishi, Machida, both of Japan, assignors to Kyowa Hakko Kogyo Kabushiki Kaisha, Tokyo, Japan**
**Division of Ser. No. 516,708, Oct. 21, 1974, Pat. No. 3,987,030. This application July 19, 1976, Ser. No. 706,865**
**Int. Cl.² C12D *13/06***
**U.S. Cl. 195—28 N** **8 Claims**

1. A process for producing (2'-amino-2'-deoxypentofuranosyl) guanine, comprising culturing a microorganism capable of producing (2'-amino-2'-deoxypentofuranosyl) guanine and belonging to the genus Aerobacter in a culture medium, and recovering the accumulated (2'-amino-2'-deoxypentofuranosyl) guanine from the fermented liquor.

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4,019,958
**CONTINUOUS PROCESS OF PRODUCING PANCREATIN AND PRODUCT THEREOF**
**Hans Hell, Neustadt am Rubenberg; Günter Peschke, Hannover; Horst Oppermann; Rudolf Kaufung, both of Neustadt am Rubenberg; Siegfried Funke, Hannover, and Werner Stühmer, Springe, all of Germany, assignors to Kali-Chemie Pharma GmbH, Hannover, Germany**
**Filed Mar. 19, 1976, Ser. No. 668,524**
**Claims priority, application Germany, Mar. 22, 1975, 2512746**
**Int. Cl.² C07G *7/026***
**U.S. Cl. 195—62** **13 Claims**

1. A process of producing pancreatin of a high amylolytic, lipolytic, and proteolytic activity, said pancreatin having a low germ content and being substantially free of fibrous tissue material, comprising the steps of:
a. contacting frozen, finely comminuted pancreas glands with a mixture of liquid chlorinated hydrocarbon and of a liquid fluoro-chloro-carbon, wherein the ratio of chlorinated hydrocarbon to fluoro-chloro-carbon is between 1:0.05 and 1:2.0, for a period of time sufficient to remove the fat therefrom and to destroy the pathogenic germs;
b. separating the fat-solvent phase from the enzyme phase;
c. concentrating the enzyme phase; and
d. drying the concentrated enzyme phase.

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4,019,959
**BACTERIAL PRODUCTION OF LIPASE AND PYOCYANINE FROM N-PARAFFINS**
**Len J. Gawel, Ponca City, Okla., and Chi-Sin Chen, San Jose, Calif., assignors to Continental Oil Company, Ponca City, Okla.**
**Filed Oct. 6, 1975, Ser. No. 620,490**
**Int. Cl.² C12D *13/10*; C07G *7/02***
**U.S. Cl. 195—66 R** **6 Claims**

1. A method for the bacterial production of Lipase from n-paraffin substrates comprising growing a Pseudomonas-like bacteria designated NRRL B-8110 on a substrate comprising n-paraffins having from 10 to 22 carbon atoms (b) allowing the bacterial cell growth to reach optimum levels; (c) separating the cells from the substrate; (d) rupturing the cell walls; (e) removing cell debris; and (f) recovering the lipase.

4,019,960
**PROCESS FOR THE PRODUCTION OF A SACCHARASE INHIBITOR**
**Werner Frommer; Walter Puls, and Delf Schmidt, all of Wuppertal, Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany**
**Filed Feb. 28, 1973, Ser. No. 336,741**
**Claims priority, application Germany, Mar. 1, 1972, 2209834**
**The portion of the term of this patent subsequent to Apr. 22, 1992, has been disclaimed.**
**Int. Cl.² C12D *13/02***
**U.S. Cl. 195—80 R** **6 Claims**

1. A method of producing a saccharase inhibitor comprising growing Actinoplanaceae Strain CBS 961.70 or Strain CBS 617.71 in a starch-free nutrient medium to produce a culture and separating the saccharase inhibitor from the culture.

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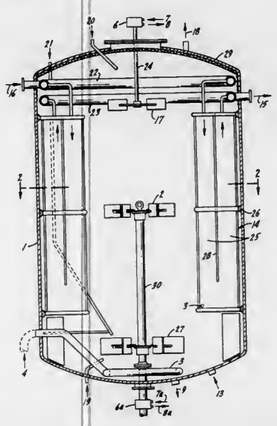
4,019,961
**ANALYTICAL ENZYMATIC DETERMINATION**
**Sigmar Klose; August Wilhelm Wahlefeld, both of Weilheim, and Alexander Hagen, Tutzing, all of Germany, assignors to Boehringer Mannheim G.m.b.H., Mannheim-Waldhof, Germany**
**Filed Mar. 10, 1975, Ser. No. 556,961**
**Claims priority, application Germany, Mar. 14, 1974, 2412354**
**Int. Cl.² G01N *31/14***
**U.S. Cl. 195—103.5 R** **13 Claims**

1. In an analytical process for enzymatic determination of a substrate in a biological fluid by phosphorylation of a substrate with ATP with the liberation of ADP, reaction of ADP with phosphoenol pyruvate in the presence of pyruvate kinase with the formation of pyruvate, hydrogenation of the pyruvate with NADH in the presence of lactate dehydrogenase, the improvement which comprises,
reacting the biological fluid substrate, in the absence of its specific kinase but in the presence of a NADH-regenerating enzymatic system which is the specific dehydrogenase and a substrate for the dehydrogenase with adenoisine triphosphate, phosphoenol pyruvate, and NADH,
separating the enzymes from the reaction mixture,
adding the specific kinase for the substrate, pyruvic kinase and lactate dehydrogenase to the liquid product free of enzymes,
measuring the NADH consumption, thereby measuring only the amount of phosphorylated substrate.

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4,019,962
**APPARATUS FOR AEROBIC FERMENTATION**
**Richard L. Allen, Munster; Benny M. Benjamin, Skokie; Terry A. Lappin, Naperville; John A. Ridgway, Jr., La Porte, and Elmer J. Saunders, Downers Grove, all of Ill., assignors to Standard Oil Company (Indiana), Chicago, Ill.**
**Filed Aug. 11, 1975, Ser. No. 603,460**
**Int. Cl.² C12B *1/00***
**U.S. Cl. 195—142** **13 Claims**

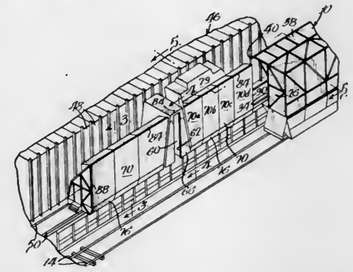
1. Apparatus for continuous aerobic fermentation processes for growth of single-cell microorganisms including a vertical cylindrical fermentor vessel shell component (1) having an upper and lower section, which has attached thereto:
a. a coolant inlet means (16) extending inside through the wall of said vessel shell component and attached to the inlet coolant header (22) located within said shell component, and a coolant outlet means (15) extending inside through the wall of said vessel shell component and attached to the outlet coolant header (23) located within said shell component, both said coolant means (15, 16) being situated near the upper end of the fermentor shell section to describe a continuous flow therethrough;
b. the said inlet coolant header (22) and said outlet coolant header (23) are positioned horizontally in the upper section of the fermentor, each said headers having a separate sealable attachment to a single chamber section (25) within the vertically aligned hollow baffles (14) located within said vessel shell component;
c. the plurality of said hollow baffles (14) have a partially partitioned interior section created by the vertical shield (28) extending from an upper position inside the baffle to a position near the bottom therein to create chamber sections (25) which permit the downward flow of coolant in one chamber section of the baffle and the upward flow of coolant in the remaining chamber section of the baffle, said baffles being fitted with support mounts (26) to the inner-perimeter of the shell section in a vertical alignment and equipped with a drain plug (5) near the bottom section of the baffles;
d. the entry means for substrate (21), and macro-nutrient (20), being attached to the upper head section extending inside said vessel shell component;
e. the entry means for micro-nutrient (19) being attached to the lower shell section, extends inside said vessel shell component;
f. the head jacket (29) being located along the inner perimeter of the upper head section said head jacket consisting of cooling jackets and coils;
g. the spent air outlet means (18) attached to the upper head section, extends inside said vessel shell component;



h. the foam knocker (17) positioned within the upper head section adjacent to said inlet and outlet coolant headers (22, 23), said knocker having a shaft (24) extending vertically through the top shell section;
i. the flat blade turbine agitators (2) and (27) having an agitator shaft (30) extending vertically into the fermentor vessel through the lower shell section;
j. the air sparger (3) located inside the lower shell section beneath the lowest most flat blade unit (27) which is attached to an air inlet (4) entering from the lower shell section of the fermentor vessel;
k. the double mechanical seals (6) and (6*a*) are located on the said agitator and foam knocker shafts (24) and (30) outside the fermentor vessel, said seals (6) and (6*a* ) having entry means (7) and (7*a*) and exit means (8) and (8*a*) for bactericidal liquid; and
l. the non-vaporlocking circulating pump (10) is attached to the lower exterior section of the fermentor vessel through the broth line (9) extending from within the fermentor vessel and connected to hydroclone unit(s) (11) which has a froth line (13) attached to the exterior section of the fermentor vessel and a de-aerated broth line (12) affording a discharge means for the liquid broth from said pump.



4,019,963
**COKE DISCHARGING SYSTEM**
**John F. Hanley, Jr., Roswell, Ga., assignor to Envirotech Corporation, Menlo Park, Calif.**
**Filed Oct. 6, 1975, Ser. No. 619,850**
**Int. Cl.² C10B *27/00***
**U.S. Cl. 202—263** **7 Claims**



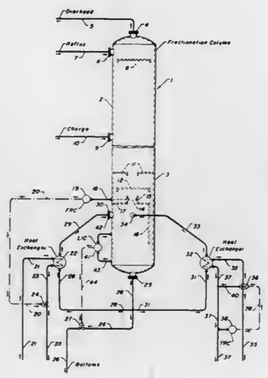
1. In a coke discharging system for reduced pollutant emissions around a coke quench car, the combination comprising: an enclosed, movable coke quench car having a roof, a bottom wall and forward and rearward walls defining one enlarged side opening providing access to a coke-receiving cavity, a hood connected to the roof and extending sidewardly in overhanging relationship with respect to vertical edges on said forward and rearward walls, means connected to said quench car for providing a draft through said opening and through said cavity, a coke push guide positioned between said quench car and a coke oven, said push guide having a planar forward surface with an opening adapted to be aligned with a portion of said side opening in said quench car, a pair of closure plates associated with said push guide and extending in opposite directions from said push guide, the forward faces of said closure plates define a forward surface substantially common with the forward surface of said push guide, each closure plate extends horizontally from said opening in the push guide a distance substantially equal to the length of the side opening in the quench car minus the width of the push guide and being horizontally spaced a short distance from said vertical edges of said side opening to form narrow gaps therebetween, said closure plates extending vertically from a location closely spaced from the bottom wall of the quench car to form a bottom gap, to a location closely spaced from the roof of the quench car to form a top gap therebetween, whereby the inflow of air created by said draft is concentrated through said gaps into said cavity to pick up and transport the emissions from coke being pushed into said cavity.

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4,019,964
**METHOD FOR CONTROLLING THE REBOILER SECTION OF A DUAL REBOILER DISTILLATION COLUMN**
**R. Gene Fickel, Roselle, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.**
**Continuation-in-part of Ser. No. 459,992, April 11, 1974, abandoned. This application June 16, 1975, Ser. No. 587,469**
**Int. Cl.² B01D *3/42***
**U.S. Cl. 203—1** **3 Claims**

1. A method for controlling heat input to the reboiler section of a distillation column comprising a reboiler section and a fractionation section, said column having two external heat-recovery reboiler heaters appurtenant thereto, which method comprises the steps of:
a. withdrawing a liquid bottoms stream from said reboiler section;
b. regulating the quantity of a first portion of said bottoms stream removed from said distillation column as a bottoms product, in response to the level of liquid in said reboiler section;

c. introducing a second portion of said bottoms stream into a first of said external heaters, and therein heating and partially vaporizing said second portion via indirect contact therein with an external process stream;
d. passing the heated, mixed-phase second portion of said bottoms stream into a substantially liquid-free area of said reboiler section, and therein disengaging liquid from said heated mixed-phase;
e. introducing a third portion of said bottoms stream into the second of said external heaters, and therein heating and partially vaporizing said third portion;



f. passing the heated, mixed-phase third portion of said bottoms stream into said substantially liquid-free area of the reboiler section, and therein disengaging liquid therefrom;
g. measuring, within said reboiler section, the quantity of vapor passing upwardly from the reboiler section into said fractionation section of said distillation column; and
h. regulating the heat input to said second external reboiler heater in response to a signal representative of the measured quantity of vapor passing into said fractionation section, thereby regulating the heat input to said reboiler section.

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**4,019,965**

**SEPARATION OF PHENOL, CYCLOHEXANONE, AND CYCLOHEXYLBENZENE CONTAINING MIXTURES EMPLOYING DIALKYL AND DICYCLOALKYL PHTHALATES**

**George B. Fozzard, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.**

**Filed July 20, 1976, Ser. No. 706,993**
**Int. Cl.² B01D** *3/40;* **C07C** *39/04, 49/30*
**U.S. Cl. 203—60** **4 Claims**

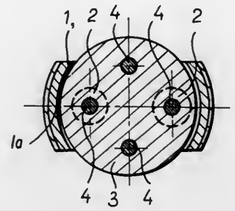
1. An extractive distillation of a mixture containing phenol and cyclohexanone, which mixture may contain cyclohexylbenzene which comprises employing as a solvent at least one of dialkyl and a dicycloalkyl phthalate.

**4,019,966**

**METHOD OF AMPEROMETRIC DETERMINATION OF THE CONCENTRATION OF ARENDIAZONIUM SALTS**

**Miroslav Remes; Miroslav Matrka, and Zdenek Sagner, all of Pardubice, Czechoslovakia, assignors to Vyzkumny ustav organickych syntex, Pardubice, Czechoslovakia**

**Filed June 4, 1976, Ser. No. 583,632**
**Claims priority, application Czechoslovakia, June 4, 1974, 3947/74; Dec. 6, 1974, 8345/74**
**Int. Cl.² G01N** *27/46*
**U.S. Cl. 204—1 T** **2 Claims**




1. In an amperometric method of determining the concentration of arendiazonium salts in a diazocoupling reaction mixture, the method comprising the steps of applying a DC voltage across a tellurium measuring electrode in contact with the mixture and a reference electrode so that only ions of arendiazonium salts in the mixture are reduced on the surface of the measuring electrode, measuring the resultant current through the measuring and reference electrodes, and periodically cleaning the measuring electrode.

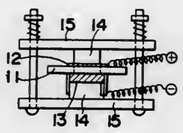
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**4,019,967**

**METHOD OF USING VITREOUS SOLID ELECROLYTE**

**Shoji Tsuchihashi; Yoji Kawamoto, both of Kobe, and Masayoshi Inoue, Sakai, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan**

**Continuation of Ser. No. 444,802, Feb. 22, 1974, abandoned. This application Oct. 7, 1975, Ser. No. 620,350**
**Claims priority, application Japan, Feb. 28, 1973, 48-23858; Feb. 28, 1973, 48-23859**
**Int. Cl.² G01N** *27/46;* **H01M** *6/18;* **H01G** *9/00*
**U.S. Cl. 204—1 T** **4 Claims**




1. In a method of using a solid electrolyte in a silver ion concentration cell, the improvement wherein the solid electrolyte is a vitreous solid electrolyte composition of the formula As-S-Ag lying within the range defined by the quadrilateral having apices $As_{34}S_{56}Ag_{10}$, $As_{20}S_{50}Ag_{30}$, $As_{16}S_{44}Ag_{40}$, $As_{23.5}S_{46.5}Ag_{30}$ in the triangular phase diagram indicating the atomic percentages of As-S-Ag in FIG. 1B of the attached drawing.

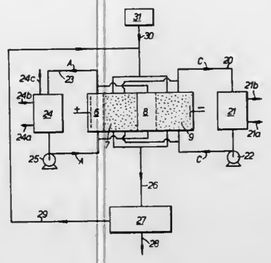


**4,019,968**

**ELECTROCHEMICAL CELL**

**Placido M. Spaziante, and Carlo Traini, both of Milan, Italy, assignors to Parel Societe Anonyme, Luxembourg, Luxembourg**

**Filed May 27, 1975, Ser. No. 580,691**
**Claims priority, application United Kingdom, May 30, 1974, 24077/74**
**Int. Cl.² C25D** *5/04, 17/12*
**U.S. Cl. 204—23** **14 Claims**



1. An electrochemical apparatus which includes at least two electrochemical cells separated from ech other by an impermeable bipolar means having a plate-like portion which defines a boundary between an electrode compartment of a first polarity in one of the electrochemical cells and an electrode compartment of an opposite polarity in the other of the electrochemical cells, the bipolar means having at least a portion of one face thereof substantially planar, wherein each of said cells comprises at least one particulate electrode, a counter electrode and means for preventing an electrical short circuit between particles of the particulate electrode and the counter electrode, wherein the bipolar means provides an electrical connection between the particulate electrode of one cell and the counter electrode of the other cell, and wherein at least the substantially planar portion of said one face of the bipolar means is in electrical contact with the particulate electrode and is a current feeder for the particulate electrode.

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**4,019,969**

**METHOD OF MANUFACTURING CATALYTIC TUBES WITH WALL-SUPPORTED CATALYST, PARTICULARLY FOR STEAM REFORMING OF HYDROCARBONS AND METHANATION**

**Andrzej Golebiowski; Stanislawa Paluch; Zdzislaw Janecki; Alfred Polanski; Waclaw Hennel, all of Pulawy; Jerzy Zielinski, Warszawa; Cezary Warzec, Warszawa, and Wojciech Lisowski, Warszawa, all of Poland, assignors to Instytut Nawozow Sztucznych, Pulawy, Poland**

**Filed Nov. 17, 1975, Ser. No. 633,018**
**Int. Cl.² C25D** *5/50, 7/04*
**U.S. Cl. 204—26** **17 Claims**

1. A method of manufacturing a catalytic tube with wall-supported catalyst particularly for steam reforming of hydrocarbons and methanation, comprising depositing a porous coating of metal sponge on the tube surface by electrolysis, impregnating the sponge with aqueous solutions of salts which after roasting yield metal oxides irreducible in the presence of hydrogen and of salts, which yield reducible metal oxides, and roasting the impregnated sponge coated tube to form metal oxides deposited in said metal sponge.

**4,019,970**

**PROCESS FOR MAKING TITANIUM-SUPPORTED LEAD ELECTRODE**

**Heinz Peter Fritz; Dietrich Wabner, both of Munich, and Rainer Huss, Augsburg-Hochzoll, all of Germany, assignors to Rheinisch-Westfalisches-Elektrizitatswerk Aktiengesellschaft, Essen, Germany**

**Filed Sept. 16, 1975, Ser. No. 613,797**
**Claims priority, application Germany, Sept. 18, 1974, 2444691**
**Int. Cl.² C25B** *1/30*
**U.S. Cl. 204—32 R** **6 Claims**

1. A process for making an electrode containing lead oxide as an active material, comprising the steps of:
a. immersing a body of titanium in a hot aqueous solution of oxalic acid for cleansing said body;
b. adsorptively coating the cleansed titanium body with a layer of titanium (IV) by immersing said body for a prolonged period in a treatment bath consisting essentially of a boiling aqueous solution of a Ti(IV) salt of ethylenediaminetetraacetic acid; and
c. anodically coating the titanium body, treated in step (b), with $PbO_2$ in an electrolyte containing Pb(II) ions.

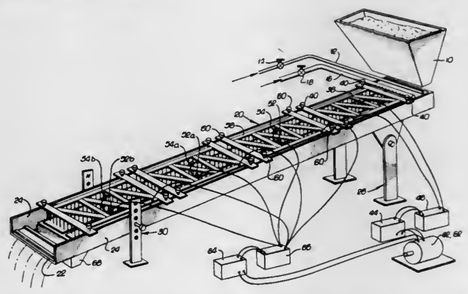
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**4,019,971**

**METHOD OF RECOVERING FINE GOLD FROM ORE**

**Virgil C. Crites, Tustin, Calif., assignor to Peter J. Bonin, Tustin, Calif.**

**Filed Sept. 22, 1975, Ser. No. 615,623**
**Int. Cl.² C25C** *1/22*
**U.S. Cl. 204—130** **9 Claims**



1. In the amalgamation process for recovering precious metal wherein ore containing particles of a precious metal which form a mercury-metal amalgam upon contact of clean metal with clean mercury is passed in water ore pulp over one or more mercury coated amalgamating plates to thereby cause such precious metal particles to contact and adhere to the mercury coating by amalgamation, the improvement comprising inhibiting flouring of mercury for the amalgamating plates by creating an electric field between at least one electrode charged relative to a positively charged metal surface, and passing the pulp over the positively charged metal surface before the pulp is passed over the amalgamating plate, whereby the pulp passes through the electric field between the positively charged metal surface and the negatively charged electrode.

## 4,019,972
## PHOTOPOLYMERIZABLE COPYING COMPOSITIONS CONTAINING BIURET-BASED POLYFUNCTIONAL MONOMERS

**Raimund Josef Faust, Wiesbaden-Biebrich, Germany, assignor to Hoechst Aktiengesellschaft, Germany**

**Filed Dec. 2, 1974, Ser. No. 528,836**
**Claims priority, application Germany, Dec. 7, 1973, 2361041**
**Int. Cl.² C08F 8/00; C08G 18/00**
**U.S. Cl. 204—159.15** **12 Claims**

I. A photopolymerizable copying composition comprising at least one binder, at least one photoinitiator, and at least one polymerizable acid amide group-containing acrylic acid derivative or alkyl acrylic acid derivative which is not volatile at 100° C and contains at least three polymerizable unsaturated groups in the molecule, the polymerizable compound containing at least one compound of the following general formula

$$A\,(-X-NH-CO-G)_p$$

wherein:
A stands for $-N(-CO-NH-)_2$
G stands for

$$-C(=CH_2)-C_nH_{2n+1}, \quad -O-CH_2-C_mH_{2m}-O-CO-C(=CH_2)-C_nH_{2n+1},$$

or

$$-O(-CH_2-CH_2-O-)_k-CH_2-C(R_1)(R_2)-R_3,$$

wherein
$n$ is 0, 1, or 2,
$m$ is a whole number from 1 to 11,
$k$ is 0 or a whole number from 1 to 4,
$R_1$ is alkyl with 1 to 3 carbon atoms, or $-R_4$ or $-CH_2-R_4$
$R_4$ and $R_3$, which may be the same or different, are $-H$, $-CH_3$, or $-CH_2R_4$, and
$R_4$ is

$$-O-CO-C(=CH_2)-C_nH_{2n+1}$$

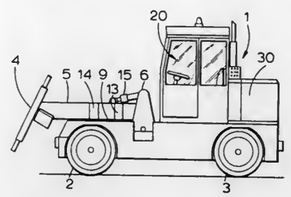
and is present at least one of the groups $R_1$, $R_2$, and $R_3$,
X stands for a saturated or unsaturated bi-valent hydrocarbon group with 2 to 12 carbon atoms, and
$p$ is a whole number from 2 to 4.

## 4,019,973
## CRUST-BREAKING MACHINE

**Rolf Natvik, Ovre Ardal, and Rolf Rådahl, Rakkestad, both of Norway, assignors to A/S Ardal og Sunndal Verk, Oslo, Norway**

**Filed Dec. 18, 1975, Ser. No. 641,924**
**Claims priority, application Norway, Aug. 27, 1975, 752948**
**Int. Cl.² C25D 21/00, 21/12**
**U.S. Cl. 204—194** **4 Claims**

1. A crust-breaking machine comprising:
a self-propelled carriage having front wheels, rear wheels and a driver's seat;
a column mounted on said carriage at a position between said front and rear wheels and in front of said driver's seat;
a support arm connected at a first end thereof to said column;
a crust-breaking tool of the continuously breaking type supported at a second end of said support arm;
means, connected to said support arm, for selectively moving said support arm and said crust-breaking tool in a vertical plane;
means, operatively connected to said column, for selectively rotating said column about a vertical axis and for thereby moving said support arm and said crust-breaking

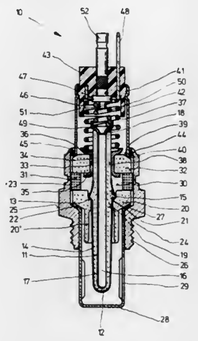



tool in a horizontal plane between first and second working positions on opposite lateral sides of said carriage and a rest position extending forwardly of said carriage; and
support cradle means, positioned at each of said first and second working positions, for supporting said support arm and transferring stresses imparted thereto by said crust-breaking tool to said carriage while reducing transfer of such stresses to said column.

## 4,019,974
## ELECTROCHEMICAL SENSOR CONSTRUCTION

**Helmut Weyl, Schwieberdingen, and Leo Steinke, Waiblingen-Hegnach, both of Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany**

**Filed Dec. 23, 1975, Ser. No. 643,934**
**Claims priority, application Germany, Feb. 1, 1975, 2504206**
**Int. Cl.² G01N 27/46**
**U.S. Cl. 204—195 S** **17 Claims**




1. Electrochemical sensor construction to determine the oxygen content of gases having a solid electrolyte tube (11) closed at one end (12);
an electron conductive porous layer (14) at the outside of the tube covering at least part of the surface exposed to the gases;
a first connecting terminal (48) in electrically conductive connection with the conductive layer (14);
an inner conductor (17) on the inside of the tube, and in contact with the inside surface thereof;
a second connecting terminal (52) in electrically conductive connection with the inner conductor (17);
an electrically conductive housing (24, 41) concentrically surrounding the tube and formed to permit ingress of air interiorly of the tube while exposing the outside thereof to the gases, and retaining said terminals in insulated relation with respect thereto;
wherein the solid electrolyte tube (11) is formed with a shoulder (13);
a first electrically insulating spacer ring (20) spacing the shoulder from the housing (24);
a conductive resilient sealing mass (30) in contact with the conductive layer (14) of the solid electrolyte tube (11);
an insulating sealing mass (31) surrounding the conductive sealing mass (30) and spacing the conductive sealing mass (30) from the housing (24, 41) to electrically insulate the conductive sealing mass, and hence the conductive layer (14) with respect to the housing;
a conductive element (34) surrounding the tube and bearing against the electrically conductive sealing mass (30);
first conductive means (37) contacting the conductive element (34) and the first terminal (48);
second conductive means (50) in contact with the inner conductor (17) in the interior of the tube and the second terminal (52);
and an insulating terminal block (43) closing off the housing (24, 41), the connecting terminals (48, 52) being secured in and passing through said terminal block to provide electrically and mechanically accessible terminals to the conductive layer (14) and the second conductor (17) and to electrically insulate the tube, and its terminals from the housing (24, 41).



## 4,019,975
## HYDROGENATION OF COAL

**Donald Bremner Urquhart, Cheltenham, England, assignor to Coal Industry (Patents) Limited, London, England**

**Filed Oct. 29, 1974, Ser. No. 518,787**
**Claims priority, application United Kingdom, Nov. 8, 1973, 51930/73**
**Int. Cl.² C10G 1/08**
**U.S. Cl. 208—10** **8 Claims**

1. A process for the hydrogenation of coal which comprises
mixing the coal with an organic solvent having one or more utilizable solvent components, hydrogen, and a catalyst which is a salt or oxide of a non-noble metal,
maintaining the resulting mixture at a temperature above the critical temperature of the solvent and below 550° C whereby the solvent is in the aqueous phase and the sum of the reduced partial pressures of the solvent components is at least one, said catalyst being liquid or solid at said temperature,
separating the gaseous phase and residue, and
condensing hydrogenated products contained in the resulting separated gaseous phase therefrom.

## 4,019,976
## PROCESS FOR HYDROGENATING HIGHLY CUTS UNSATURATED HEAVY HYDROCARBON

**Jean Cosyns, Nanterre; Jean-Pierre Franck, Bougival; Jean-Claude Guibet, Le Vesinet, and Yves Jacquin, Sevres, all of France, assignors to Institut Francais du Petrole, Rueil-Malmaison, France**

**Filed Apr. 21, 1975, Ser. No. 569,788**
**Claims priority, application France, Apr. 24, 1974, 74.14536**
**Int. Cl.² C10G 23/02**
**U.S. Cl. 208—57** **16 Claims**

1. A process for hydrogenating an unsaturated heavy hydrocarbon cut containing at least 80% by weight of alkylaromatic, polyaromatic, indenic and/or alkenylaromatic hydrocarbons and boiling above 200° C under atmospheric pressure, comprising passing said cut in the presence of hydrogen over a first catalyst and then over a second catalyst, each catalyst containing an alumina carrier, at least one molybdenum and/or tungsten compound and at least one nickel and/or cobalt compound, the ratio

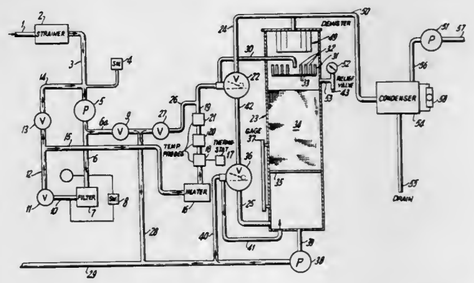
$$R = \frac{\text{Ni and/or Co}}{\text{W and/or Mo}},$$

in which the proportions are expressed in gram-atoms of metals, being from 1.5 : 1 to 10 : 1 for the first catalyst and from 0.1 : 1 to 1 : 1 for the second catalyst, and the alumina carrier of the first catalyst having a heat of neutralization by ammonia absorption lower than 10 calories per gram at 320° C under an ammonia pressure of 300 nm of mercury.

## 4,019,977
## DEMISTER-COALESCER IN A PROCESS FOR REMOVING WATER FROM OIL

**Robert Haig Hachadoorian, Great Neck, and Mark Lincoln Shyman, Kings Park, both of N.Y., assignors to Aquanetics, Inc., Long Island, N.Y.**

**Continuation-in-part of Ser. No. 505,977, Sept. 16, 1974, abandoned. This application Apr. 30, 1975, Ser. No. 573,354**
**Int. Cl.² C10G 33/06**
**U.S. Cl. 208—188** **1 Claim**




1. In a process for removing water from oil by passing a mixture of oil having both free and dissolved water contained therein over a dispersing material contained in a vessel and subjecting said dispersed mixture within said vessel to pressure lower than the vapor pressure of the water within said mixture whereby said water is vaporized into vapor, the improvement which comprises, passing said vapor through demisting-coalescing means having low surface energy material which is preferentially wetted by oil to coalesce and separate oil droplets from said vapor.

## 4,019,978
## PROCESS FOR THE PRODUCTION OF ALUMINA

**Arthur William Miller, Frodsham, and William Atkinson, Penketh, both of England, assignors to Laporte Industries Limited, London, England**

**Division of Ser. No. 284,540, Aug. 29, 1972, Pat. No. 3,864,461. This application Nov. 4, 1974, Ser. No. 520,999**
**Int. Cl.² C10G 23/02; B01J 23/76, 23/48, 21/04**
**U.S. Cl. 208—213** **10 Claims**

10. A process for the production of an alumina based catalyst comprising the steps of:
a. forming an aqueous solution of aluminum sulphate having a concentration of at least 2% by weight calculated as $Al_2O_3$.
b. forming an aqueous solution of sodium aluminate having a concentration of from 2% to 7% by weight calculated as $Al_2O_3$.
c. forming a mixture of the solutions formed in stages (a) and (b) to precipitate hydrous alumina in the form of a slurry having a concentration of from 2% to 7% by weight, by introducing the sodium aluminate solution into the aluminum sulfate solution until the mixture reaches a composition of from 10% excess aluminum sulphate to 10% excess sodium aluminate and wherein the addition takes place with sufficient agitation over a period of

about 1 minute to 5 hours until the mixture has a pH of from 7.3 to 10.0 to precipitate at least half of the hydrous alumina under acidic conditions while maintaining the mixture at a temperature in the range 12° to 35° C or in the range of 45° to 75° C.

d. separating the hydrous alumina from its mother liquor and washing the separated hydrous alumina.

e. impregnating the hydrous alumina from step (d) with at least one compound of at least one metal selected from Group I*b*, VI*a* and VIII, and

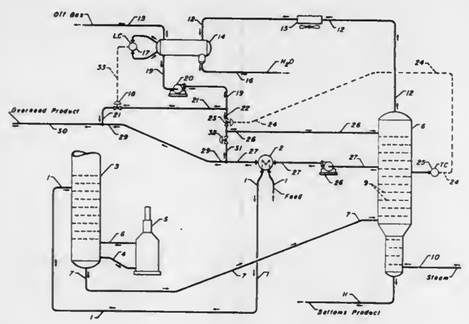
f. calcining the treated hydrous alumina at a temperature above 400° C.

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## 4,019,979
## FRACTIONATION OF HYDROCARBONS

**John P. Nolley, Jr., Glendale Heights, Ill., assignor to UOP Inc., Des Plaines, Ill.**

**Filed Mar. 19, 1976, Ser. No. 668,545**
**Int. Cl.² C10G 7/00**
**U.S. Cl. 208—353** **1 Claim**




1. A process for fractionating hydrocarbons which comprises the steps of:

a. passing a feed stream into a fractionation column at a first intermediate point while the fractionation column is operated at conditions effective to cause the fractionation of the feed stream;

b. withdrawing a bottoms product stream from the fractionation column;

c. withdrawing an overhead vapor stream from the fractionation column, passing the overhead vapor stream through a condensing means, and passing a resultant mixed phase hydrocarbon stream into an overhead receiver;

d. removing a liquid hydrocarbon stream from the overhead receiver and dividing the liquid hydrocarbon stream into a first aliquot portion and a second aliquot portion;

e. removing a liquid sidecut stream from the fractionation column at a second intermediate point located above the first intermediate point;

f. heat exchanging the liquid sidecut stream and effecting the removal of heat therefrom, and dividing the liquid sidecut stream into a first aliquot portion and a second aliquot portion;

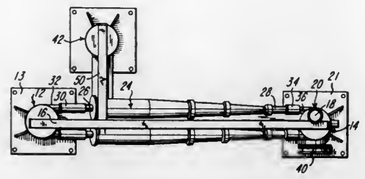
g. admixing the first portion of the liquid hydrocarbon stream with the first portion of the liquid sidecut stream, and passing the resultant admixture into the fractionation column as a reflux stream; and,

h. admixing the second portion of the liquid hydrocarbon stream with the second portion of the liquid sidecut stream and removing the resultant admixture as a product stream of the fractionation column.

## 4,019,980
## MULTIPLE HYDROCYCLONE ARRANGEMENT

**James P. Beery, Springfield, Ohio, assignor to The Bauer Bros. Co., Springfield, Ohio**

**Filed Jan. 24, 1975, Ser. No. 543,868**
**Int. Cl.² B04C 5/28**
**U.S. Cl. 209—211** **21 Claims**



1. A cleaner system comprising a first pipe-like conduit, a second pipe-like conduit, at least one centrifugal cleaner including means defining an axially directed accepts outlet and means defining an axially directed rejects outlet, said means defining an axially directed accepts outlet being axially extended by means defining a tangential inlet to said first pipe-like conduit and said means defining an axially directed rejects outlet being axially extended by means defining a tangential inlet to said second pipe-like conduit, whereby to provide that the accepts and rejects enter the respective conduits in vortex flow pattens conducive, inherently, to the separation of constituents embodied therein, a second centrifugal cleaner positioned adjacent and in vertically offset generally parallel relation to said one cleaner having means defining an axially directed accepts outlet axially extended by means defining a tangential inlet to said first pipe-like conduit arranged to direct accepts to move into said first pipe-like concuit in a flow counter to that of the accepts directed interiorly of said first pipe-like conduit from said first-mentioned centrifugal cleaner and said second centrifugal cleaner further having means defining an axially directed rejects outlet axially extended by means defining a tangential inlet to said second pipe-like conduit.

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## 4,019,981
## METHOD AND APPARATUS FOR THE PREPARATION OF MINERAL MIXTURES ON A JIG CONTROLLED BY COMPRESSED AIR

**Hanns Stern, Dortmund-Hoechsten, and Alexander Lotz, Wengern-Ruhr, both of Germany, assignors to Klöckner-Humboldt-Deutz Aktiengesellschaft, Germany**

**Continuation of Ser. No. 515,922, Oct. 18, 1974, abandoned. This application Dec. 1, 1975, Ser. No. 636,607**
**Claims priority, application Germany, Oct. 20, 1973, 2352798**
**Int. Cl.² B03B 5/24**
**U.S. Cl. 209—455** **6 Claims**

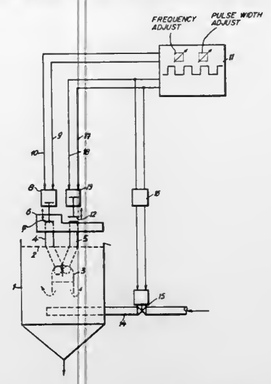
1. In a method of preparing mineral mixtures wherein a separating liquid is moved upwardly and downwardly in a settling tank of a jig through the material supported on a perforate carrier by feeding compressed air into and venting an air chamber located within the settling tank to cause up and down pulsation of the liquid, the chamber having air feed and vent lines, and wherein the tank has a separating liquid feed line with a valve therein to introduce separating liquid into the tank, the improvement comprising the steps of:

generating electrical pulses corresponding to the desired up and down movement of the liquids:

applying the electrical pulses to valve control mechanisms of feed and vent valves in the feed and vent valves in accordance with a predetermined time sequence; and



opening the separating liquid valve after opening of the vent




valve to introduce separating liquid and retard the settling of separating liquid downwardly through the material.

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## 4,019,982
## METHOD FOR TREATMENT OF WASTE WATER CONTAINING ORGANIC POLLUTANTS

**Yoshikatsu Ikari, Narashino; Shoichiro Yokoyama, Tokyo; Hideharu Yokoi, and Tatsuo Murakami, both of Kamiichi, all of Japan, assignors to Agency of Industrial Science & Technology, Chiyoda and Fuji Chemical Industry Co., Ltd., Toyama, both of, Japan**

**Filed May 29, 1975, Ser. No. 581,941**
**Claims priority, application Japan, May 31, 1974, 49-61633**
**Int. Cl.² C02C 5/02**
**U.S. Cl. 210—30 R** **6 Claims**

1. A process for removing colored soluble organic pollutants from waste water which comprises mixing with said waste water a solid product prepared by the process which comprises mixing an aqueous aluminum solution with an aqueous solution of a calcium or magnesium, adjusting the pH of the resulting mixture to a value greater than 8, whereby the metallic components react with each other and a gel precititates; separating the precipitated gel from the reaction mixture and then drying the gel; the mixing ratio of said aqueous solutions being chosen such that when said aqueous calcium solution is mixed with said aqueous aluminum solution, the aluminum content of the gel calculated as $Al_2O_3$, is in the range of from about 30 to 60% by wt. and the calcium content of the gel, calculated as CaO, is in the range of from about 10 to 25% by wt., and when said aqueous magnesium solution is mixed with said aqueous aluminum solution, the aluminum content of the gel, calculated as $Al_2O_3$, is in the range of from about 15 to 30% wt.% and the magnesium content of the gel, calculated as MgO, is in the range of from about 20 to 40 wt.%.

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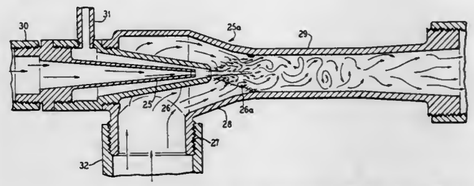
## 4,019,983
## DISINFECTION SYSTEM AND METHOD

**Mikkel G. Mandt, Prophetstown, Ill., assignor to Houdaille Industries, Inc., Buffalo, N.Y.**

**Continuation-in-part of Ser. No. 513,724, Oct. 10, 1974, abandoned. This application Apr. 7, 1975, Ser. No. 565,872**
**Int. Cl.² C02B 1/36; B01F 3/04**
**U.S. Cl. 210—62** **9 Claims**

1. A rapid and efficient method for disinfecting sewage effluent, comprising the steps of

continuously mixing and passing sewage effluent having pretreatment biological values to be disinfected and an effective sewage treatment disinfectant dose level of a fluid disinfectant through a turbulent mixing zone while maintaining a turbulent energy dissipation level in the turbulent mixing zone such that the mixing rate in the mixing zone is at least about 5 seconds$^{-1}$ to provide a turbulently mixed product stream having a substantially uniform toxic environment for organism inactivation, said turbulent mixing zone being produced by introducing at least one motive stream of a minor portion of the sewage effluent to be treated into an induction zone which is supplied with the major portion of the sewage effluent to be treated, wherein the ratio of the volumetric rate of induction of sewage effluent from the induction zone into the turbulent mixing zone to the volumetric flow rate of the motive stream is in the range of about 1.4:1 to about 23:1 and wherein the velocity of the motive stream introduced into the induction zone is at least about 17 feet per second,



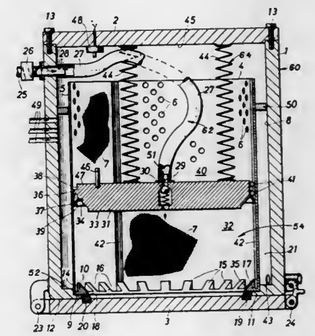
conducting the turbulently mixed sewage effluent and disinfectant product stream from said mixing zone to provide a treated discharge stream such that the average residence time in said turbulent mixing zone of said product stream conducted from said mixing zone is about 1.5 seconds or less while maintaining a specific energy requirement of at least about 0.2 horsepower per million gallons per day of the discharge stream and excluding from said discharge stream sewage effluent which has not passed through said turbulent mixing zone to provide treated effluent with at least a 99.9 percent bacterial kill rate as measured by fecal coliform removal and a viral kill rate of at least 99 percent as measured by $f_2$ virus removal.

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## 4,019,984
## CONTINUOUS FILTER WITH PRESSING MEANS

**Helmuth Mohn, Dutenhofen, Germany, assignor to Gesellschaft fur Strahlen- und Umweltforschung mbH, Munich, Germany**

**Filed Apr. 14, 1975, Ser. No. 568,128**
**Claims priority, application Germany, Apr. 13, 1974, 2418189**
**Int. Cl.² B01D 37/04; C02B 3/02**
**U.S. Cl. 210—66** **21 Claims**



1. Method for continuously filtering liquids containing microorganisms, macromolecules and/or fine particles of solid material as substances to be filtered out and collecting the substances that are filtered out in the form of a filter cake formed within an upright sieve basket, comprising:

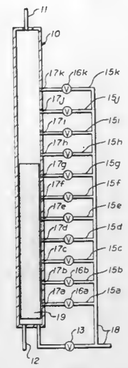
a. introducing liquid to be filtered into the top of a chamber within the upright sieve basket, said chamber being defined by a pressing means and a lower portion of said sieve basket where the filtrate is separated from the substances to be filtered out;
b. continuously exerting pressure on the liquid in the sieve basket during step (a) by the pressing means so that the filtrate leaves the sieve basket and the entire top surface of the cake formed in the sieve basket from the filtered-out substances, at any given time, always has approximately a uniform height;
c. increasing the pressure at which the liquid to be filtered is introduced into the chamber in response to build-up of the cake within the chamber and thereby increase the backpressure of the liquid in the chamber; and
d. lifting the pressing means a small distance above the cake in the sieve basket by creating a backpressure of the liquid in the chamber which is higher than the pressure of the pressing means on the liquid to increase the height of the chamber and expose fresh areas of the sieve basket to liquid to be filtered so that the cake can grow in height.

**3.** Apparatus for continuously filtering liquids containing microorganisms, macromolecules and/or fine particles of solid matter as substances to be filtered out and collecting the substance comprising:
a. a housing having a shell, a bottom cover closing the bottom of the shell, and a top cover closing the top of the shell,
b. a sieve basket mounted in the housing for receiving the liquid to be filtered in the interior of the sieve basket, the sieve basket being open at its top and bottom and situated at the bottom of the housing, the sieve basket forming a filtrate chamber with the housing,
c. an axially movable disc mounted in the sieve basket and dividing the interior of the sieve basket into a lower chamber which receives the liquid to be filtered and an upper chamber which is sealed from the lower chamber, said disc having a bore for passage of the liquid to be filtered into the lower chamber,
d. an inlet line entering into and mounted in the housing, said inlet being connected to the bore for bringing the liquid to be filtered into the lower chamber of the sieve basket through the bore; and
e. force applying means within the upper chamber acting on the disc which together with the disc comprises a pressing means which exerts pressure on the liquid in the lower chamber of the sieve basket.

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**4,019,985**
**METHODS FOR FLUIDIZING A FILTER MEDIA**
**Matthew H. Fuller, Richmond, Va., and William R. Deever, Beaumont, Tex., assignors to Texaco Inc., New York, N.Y.**
**Continuation-in-part of Ser. No. 600,259, July 30, 1975, abandoned. This application June 17, 1976, Ser. No. 697,292**
**Int. Cl.² B01D** *23/24*
**U.S. Cl. 210—80** **12 Claims**

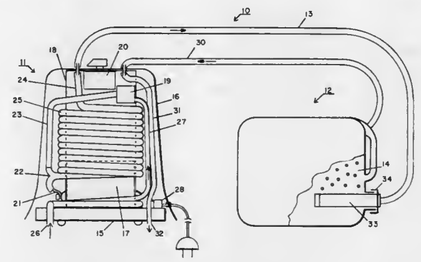
**1.** A method for rapidly breaking up and fluidizing a plug of filter media comprising the steps of,
a. breaking up a lower portion of the plug with a horizontal high pressure plug-breaking-up fluid jet injecting into the plug at a predetermined distance above the bottom of the plug,
b. breaking up the next lower portion of the plug with a horizontal high pressure a plug-breaking-up fluid jet injecting into the plug at a predetermined distance above the previous horizontal plug-breaking-up fluid jet, and
c. continuing the breking up of successive and consecutive next lower portions of the plug with successive and consecutive horizontal high pressure plug-breaking-up fluid jets, each fluid jet injecting into the plug at a predetermined distance above the last horizontal high pressure



plug-breaking-up fluid jet until all of the plug is broken up for rapidly breaking up and fluidizing a filter media plug.

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**4,019,986**
**PORTABLE WATER PURIFIER**
**William Alan Burris, 7 E.Jefferson Circle, Pittsford, N.Y. 14634, and Charles A. Beaman, 2 Beaman Road, Rochester, N.Y. 14624**
**Filed June 11, 1973, Ser. No. 368,702**
**Int. Cl.² C02B** *1/38*
**U.S. Cl. 210—139** **14 Claims**

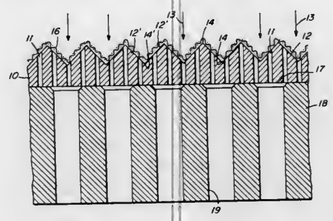


**1.** A portable water purifier comprising:
a. a portable ozone generator;
b. a portable water container independently positionable relative to said generator;
c. a flexible tube leading from said generator to said container to conduct ozone to said container;
d. a manually disconnectable connection joining said flexible tube to said generator;
e. a filter connected to the end of said flexible tube opposite said disconnectable connection;
f. means for connecting said filter to said portable water container;
g. said portable water container being orientable for disposing said filter in a lower region of said portable water container so said filter serves as a bubbler for bubbling said ozone into said lower region of the water in said container;
h. vent means for venting gas from said portable water container;
i. said vent means having an ozone decomposition catalyst arranged so said gas vented through vent means passes through said catalyst to decompose any ozone in said vented gas;
j. said flexible tube serving as a water output line from said portable water container after ozone treatment of said water;
k. said flexible tube being arranged as a siphon for providing a pressure head for drawing said purified water from said container; and
l. said filter serving as a filter for water withdrawn from said portable water container under pressure of said siphon.



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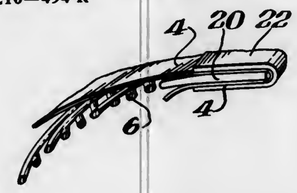
**4,019,987**
**EXTENDED AREA FILTERS**
**Leonard L. Krasnow, 293 Turnpike Road, Westboro, Mass. 01581**
**Filed Jan. 14, 1976, Ser. No. 649,052**
**Int. Cl.² B01D** *29/00*
**U.S. Cl. 210—232** **11 Claims**



**1.** In an apparatus to filter a fluid material under high pressure in the range of **10,000** pounds per square inch or greater, said apparatus including means defining a passage through which said material is forced to flow under such high pressure, extended-area filter means located in the path of said flow comprising a rigid breaker plate across said passage in a principal plane which is essentially the same as a right-cross section of said flow, said plate having a rigid corrugated surface extending across said passage for confronting oncoming high pressure flow with an enlarged filter area that is substantially two times larger than the plane area of said principal plane contained within the bounds of said passage, means providing a plurality of holes through said breaker plate and said corrugated surface for passage therethrough of filtered material, screen means removably supported on said corrugated surface, said screen means comprising at least one primarily two-dimensional screen made of a shape-retaining material and having substantially permanently fixed therein a corrugated shape configuration that corresponds substantially identically to the shape-configuration of said rigid corrugated surface, said plate giving substantially uniform support throughout said enlarged filter area to said screen means against said high pressure for preventing collapse of said screen means during the intended operation of said apparatus.

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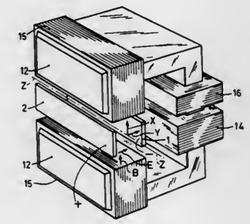
**4,019,988**
**DIALYZER MEMBRANE SEAL AND TUBING CONNECTOR**
**Lloyd L. Ziegler, Collegeville, Pa., assignor to Extracorporeal Medical specialities Inc., King of Prussia, Pa.**
**Filed Aug. 28, 1975, Ser. No. 608,627**
**Int. Cl.² B01D** *29/06, 13/00*
**U.S. Cl. 210—494 R** **9 Claims**



**1.** In a dialyzer coil comprising a core with permeable tubing and support material spirally wound thereon, blood inlet and outlet assemblies secured to the permeable tubing and a tubing clamp extending the length of at least one end of said permeable tubing to mechanically seal said tubing and secure it to the support material to promote transfer of the fluid weight in said tubing to the support material.

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**4,019,989**
**WIEN FILTER**
**Nicolaas Hazewindus, and Jacob Maria van Nieuwland, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.**
**Filed Oct. 22, 1975, Ser. No. 624,579**
**Claims priority, application Netherlands, Nov. 25, 1974, 7415318**
**Int. Cl.² H01J** *39/36*
**U.S. Cl. 250—396 ML** **5 Claims**

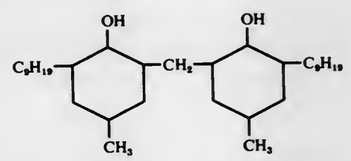


**1.** A Wien filter for selecting particles having a given velocity from a beam of charged particles and comprising means to maintain an electric field and a magnetic field, which fields extend substantially at right angles to each other and extend each substantially at right angles of the axis of the said beam, which magnetic field is produced between the poleshoes of an electromagnet which has means to provide an adjustable gradient in the said magnetic field, said gradient being substantially parallel to the electric field, characterized in that the means producing the said gradient comprise two coils which are present on either side of the said beam and the axis of which extend substantially parallel to the electric field, the magnetic field strengths generated in the coils being directed substantially opposite to each other.

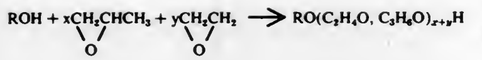
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**4,019,990**
**PRODUCTION OF POLYESTER TIRE YARN POLYGLYCOL ETHER SPIN FINISH COMPOSITION**
**Robert Moore Marshall, Chester, and Kimon Constantine Dardoufas, Richmond, both of Va., assignors to Allied Chemical Corporation, Morris Township, N.J.**
**Filed July 23, 1975, Ser. No. 598,465**
**Int. Cl.² D06M** *15/10*
**U.S. Cl. 252—8.9** **1 Claim**

**1.** A finish composition for yarn consisting essentially of about 0.5 to 3 parts by weight of an antioxidant compound having the formula:



and about 97 to 99.5 parts by weight of a polyalkylene glycol compound which is a mixed polyoxyethylatedpolyoxypropylated monoether prepared in accordance with the equation



where R is an alkyl group having 3 to 5 carbon atoms, *x* and *y* are the number of moles of propylene oxide and ethylene oxide, respectively, and wherein ethylene oxide comprises 40 to 60 percent of the combined total of ethylene oxide and propylene oxide and $x + y$ has a value to produce a molecular weight of from 300 to 1,000.

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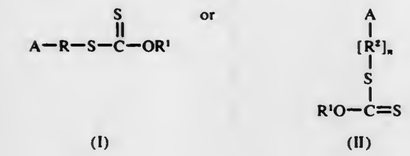
**4,019,991**

## SULPHUR CONTAINING LUBRICATING OIL ADDITIVES

**Gerald John Joseph Jayne, and Herbert Frank Askew, both of Bracknell, England, assignors to Edwin Cooper & Company Limited, Bracknell, England**

**Filed Feb. 27, 1975, Ser. No. 553,738**
**Int. Cl.² C10M *1/38***
**U.S. Cl. 252—48.2** **27 Claims**

1. compound having the formula:

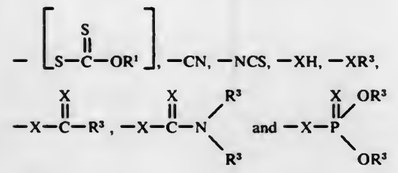


(I)



(II)

wherein in Formula (I) R is a sulfur-bridged hydrocarbon ring derived from 1,3,5-cycloheptatriene or 1,5,9-cyclododecatriene, said sulfur-bridge being a single sulfur bridge between two non-adjacent carbon atoms of said ring forming a bicyclo compound and wherein in Formula (II) $R^2$ is a polymer comprising the residue of a plurality of *n* hydrocarbon rings which are derived from 1,3,5-cycloheptatriene, cyclooctatetrene, 1,3-cyclooctadiene, 1,5-cyclooctadiene, 3-alkoxy derivatives thereof and 1,5,9-cyclododecatriene, said *n* hydrocarbon rings being connected through a sulfur bridge, *n* being the degree of polymerization such that said compound is oil-soluble, $R^1$ is the same or different and is an alkyl, alkenyl or aralkyl group and A is a nucleophyllic group selected from



wherein $R^1$ is as above, X is oxygen or sulfur and $R^3$ is alkyl, aryl, alkaryl or aralkyl.

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**4,019,992**

## CORROSION INHIBITORS FOR ABSORPTION REFRIGERATION SYSTEMS

**Robert Harold Krueger, Palatine, Ill., assignor to Borg-Warner Corporation, Chicago, Ill.**

**Filed Nov. 3, 1975, Ser. No. 628,270**
**Int. Cl.² C09K *5/04***
**U.S. Cl. 252—68** **2 Claims**

**1.** An anhydrous working fluid composition for use in absorption refrigeration systems comprising from 52 to 25% by weight alcohol, and from 48 to 75% by weight of a 2/1 mole ratio lithium bromide/zinc bromide mixture and from 0.2 to about 1% by weight based on said working fluid of a 1:1 mixture of the sodium salt of ethylenediamine tetraacetic acid and arsenic trioxide.

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**4,019,993**

## MANUFACTURING PROCESS FOR LIQUID DEVELOPER

**Yasuo Tamai; Sadao Osawa, and Satoru Honjo, all of Asaka, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan**

**Filed Oct. 20, 1971, Ser. No. 191,078**
**Claims priority, application Japan, Oct. 21, 1970, 45-92660**
**Int. Cl.² G03G *9/00***
**U.S. Cl. 252—62.1** **8 Claims**

**1.** A process for making a liquid developer intended for developing an electrostatic latent image, said process comprising the steps of (1) polymerizing one or more kinds of addition-polymerizable monomers with a mixture containing pigment and polymerization initiator to thereby obtain a graft polymer of said monomers and said pigments and treating the resultant polymerized product with a polar solvent of 12 or higher in dielectric constant, and then (2) dispersing the component of said resultant product insoluble in the said polar solvent in the carrier liquid of said liquid developer, said carrier liquid having high electric resistance and being selected from the group consisting of aliphatic hydrocarbon solvents, alicyclic hydrocarbon solvents, silicone, oil, and fluoro chloro hydrocarbon solvents whereby (a) the electric resistance of said developer, (b) the uniformity of the charge of the toner in the developer, and (c) the length of charge stability are enhanced because of said treating step.

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**4,019,994**

## PROCESS FOR THE PREPARATION OF AQUEOUS MAGNETIC MATERIAL SUSPENSIONS

**Jack R. Kelley, Bellingham, Wash., assignor to Georgia-Pacific Corporation, Portland, Oreg.**

**Filed Aug. 28, 1975, Ser. No. 608,463**
**Int. Cl.² G01N *27/82*; H01F *1/00***
**U.S. Cl. 252—62.52** **15 Claims**

**1.** A process for the preparation of magnetic fluid of a suspension of a ferromagnetic iron material in an aqueous medium which comprises mixing a petroleum sulfonate in the aqueous medium, dissolving an iron compound in the aqueous medium, adding an alkali to the aqueous medium, and reacting the mixture at a pH in the range of 5.5 to 8 to form magnetic iron oxide or magnetic hydroxyoxide, said iron being present in the aqueous medium as ferric and ferrous forms, and said petroleum sulfonate being mixed in an amount sufficient to disperse the iron oxide or iron hydroxide.

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**4,019,995**

## LIGNOSULFONATE COMPOSITION AND PROCESS FOR ITS PREPARATION

**William Scott Briggs, Bellingham, and Niels J. Kjargaard, Oak Harbor, both of Wash., assignors to Georgia-Pacific Corporation, Portland, Oreg.**

**Continuation-in-part of Ser. No. 439,579, Feb. 4, 1974, abandoned. This application Nov. 7, 1975, Ser. No. 630,071**
**Int. Cl.² G01N *27/82*; H01F *1/00***
**U.S. Cl. 252—62.53** **31 Claims**

**1.** A composition comprising a material selected from the group consisting of lignosulfonate and sulfonated tannin combined with iron, said composition being ferromagnetic.



**4,019,996**

## DIELECTRIC COMPOSITIONS

**Pierre Jay, St.-Didier du Mont d'Or, and Ghislain Schwachhofer, Miribel, both of France, assignors to Rhone-Poulenc Industries, Paris, France**

**Filed July 7, 1975, Ser. No. 593,304**
**Claims priority, application France, July 16, 1974, 74.25788; Dec. 3, 1974, 74.40725; May 28, 1975, 75.17209**
**Int. Cl.² H01B *3/18*, *3/22***
**U.S. Cl. 252—63.7** **11 Claims**

**1.** A dielectric composition comprising a liquid dielectric component selected from the group consisting of mineral oil, castor oil, chlorodiphenyls, aromatic hydrocarbons and alkylates thereof, and esters of organic acids and containing an effective amount of at least one member selected from the group consisting of monocyanophenoxybenzene, monocyanodiphenyl and monocyanoterphenyl to impart the desired permittivity characteristic to said dielectric composition.

**2.** The composition as defined by claim **13**, wherein the said second dielectric component comprises from about 3 percent to 50 percent thereof.

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**4,019,997**

## SILICONE FLUID USEFUL AS A BRAE FLUID

**Edgar D. Brown, Jr., Schenectady, and Frank J. Traver, Troy, both of N.Y., assignors to General Electric Company, Waterford, N.Y.**

**Continuation-in-part of Ser. No. 439,388, Feb. 4, 1974, abandoned, which is a division of Ser. No. 290,075, Sept. 18, 1972, abandoned. This application Jan. 13, 1976, Ser. No. 648,692**
**Int. Cl.² C10M *3/48*, *3/44***
**U.S. Cl. 252—78.3** **8 Claims**

**1.** A process for transmitting force through a hydraulic system having hydraulic activating means, hydraulic activated means and hydraulic line means connecting said hydraulic activating means with said hydraulic activated means comprising substantially filling said hydraulic activating means, said hydraulic activated means and said hydraulic lines with a hydraulic fluid mixture having an acceptable water tolerance comprising a linear silicone hydraulic fluid of the formula,



where *n* varies from 1 to 2,000, R is selected from the class consisting of monovalent hydrocarbon radicals, halogenated monovalent hydrocarbon radicals and cyanoalkyl radicals and the viscosity of said fluid varies from 20 to 500 centistokes at 25° C where there is present at a concentration of 1 to 60% by weight of the total fluid of a water tolerance additive selected from the class consisting of an ester of the formula,

$$R_c^5 B(OR^{4a\ 6})_{3-c}$$

and partially hydrolyzed products of the foregoing ester where $R^5$ and $R^6$ are selected from the class consisting of monovalent hydrocarbon radicals and halogenated monovalent hydrocarbon radicals, *e*is 1.

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**4,019,998**

## PROCESS FOR PREPARING A PYROPHOSPHATE-SILICATE DETERGENT PRODUCT

**Richard W. Benson, Cincinnati; Steven D. Cherney, Springdale, and Everett J. Collier, Cincinnati, all of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio**

**Continuation-in-part of Ser. No. 587,455, June 16, 1975, abandoned, which is a continuation-in-part of Ser. No. 550,058, Feb. 14, 1975, abandoned, which is a continuation-in-part of Ser. No. 509,866, Sept. 27, 1974. This application Sept. 29, 1975, Ser. No. 618,303**
**Int. Cl.² C11D *3/06*, *3/08*, *3/12*, *11/02***
**U.S. Cl. 252—135** **18 Claims**

**1.** A detergent composition prepared by the process of:

1. forming an aqueous slurry comprising
   a. from about 2 to about 20% on a dry weight basis of an alkali metal silicate having the formula $SiO_2:M_2O$, wherein the $SiO_2:M_2O$ weight ratio is from about 2.4:1 to about 4:1, and M is an alkali metal or mixtures thereof;
   b. from about 9 to about 50% on a dry weight basis of an alkali metal pyrophosphate having the formula $M_xH_y(P_2O_7)$ and the sum of $x + y$ are integers equal to 4; M is an alkali metal or mixtures thereof;
   c. from about 0.1 to about 80% on a dry weight basis of a diluent selected from the group consisting of natural and synthetic clays, alkali metal carbonates, bicarbonates, and sesquicarbonates, borates, perborates, sulfates, chlorides, bisulfates, aluminates, and calcium carbonate, and mixtures thereof;
   d. from about 5 to about 40% on a dry weight basis of an anionic, nonionic, zwitterionic, or ampholytic detergent and mixtures thereof; then,
2. spray drying the slurry of (1) to form an alkaline solid granular detergent composition characterized in that when 1.2 grams of the alkaline solid granular detergent composition are added to one liter of distilled water at 25° C, agitated for one minute to avoid lumping, and filtered through a 142 mm diameter, five micron pore size filter under nitrogen at 6.8 atmospheres pressure, the molar ratio of the filtrate $SiO_2$ to the total $SiO_2$ from the silicate in the complete alkaline detergent composition is no more than about 3.3:4, and
3. admixing from about 0 to about 60% on a dry weight basis of the material described in (1)(b) to give a detergent composition combining from about 12% to about 45% by weight $M_4(P_2O_7)$ wherein M is an alkali metal;

wherein the total amount of alkali metal tripolyphosphate present is less than about 20% by weight of the total pyrophosphate present and wherein the total detergent composition contains from about 0.1% to about 4% by weight of a glassy phosphate of the formula

$$(M_2O)_x(P_2O_5)_y$$

wherein *y* is from about 5 to 50 and the ratio of y:x is from about 1:1 to about 1:1.5 and M is an alkali metal.

**18.** A process for forming a detergent composition comprising the steps of:

1. forming an aqueous slurry comprising
   a. from about 2 to about 20% on a dry weight basis of an alkali metal silicate having the formula $SiO_2:M_2O$, wherein the $SiO_2:M_2O$ weight ratio is from about 2.4:1 to about 4:1, and M is an alkali metal or mixtures thereof;
   b. from about 9 to about 50% on a dry weight basis of an alkali metal pyrophosphate having the formula $M_xH_y(P_2O_7)$ and the sum of $x + y$ are integers equal to 4; M is an alkali metal of mixtures thereof;
   c. from about 0.1 to about 80% on a dry weight basis of a diluent selected from the group consisting of natural and synthetic clays, alkali metal carbonates, bicarbonates, and sesquicarbonates, borates, perborates, sulfates, chlorides, bisulfates, aluminates, and calcium carbonate, and mixtures thereof;

d. from about 5 to about 40% on a dry weight basis of an anionic, nonionic, zwitterionic, or ampholytic detergent and mixtures thereof; then,

2. spray drying the slurry of (1) to form an alkaline solid granular detergent composition characterized in that when 1.2 grams of the alkaline solid granular detergent composition are added to one liter of distilled water at 25° C, agitated for one minute to avoid lumping, and filtered through a 142 mm diameter, five micron pore size filter under nitrogen at 6.8 atmospheres pressure, the molar ratio of the filtrate $SiO_2$ to the total $SiO_2$ from the silicate in the complete alkaline detergent composition is no more than about 3.3:4, and

3. admixing from about 0 to about 60% on a dry weight basis of the material described in (1)(b) to give a detergent composition containing from about 12 to about 45% by weight $M_4(P_2O_7)$ wherein M is an alkali metal;

wherein the total amount of alkali metal tripolyphosphate present is less than about 20% by weight of the total pyrophosphate present and wherein the total detergent composition contains from about 0.1 to about 4% by weight of a glassy phosphate of the formula

$$(M_2O)_x(P_2O_5)_y$$

wherein $y$ is from about 5 to 50 and the ratio of $y$:$x$ is from about 1:1 to about 1:1.5 and M is an alkali metal.

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**4,019,999**

**SPRAY-DRIED GRANULAR DETERGENT CONTAINING ALUMINOSILICATE, SILICATE, AND PYROPHOSPHATE**

**Tom H. Ohren, and Gary W. Kingry, both of Cincinnati, Ohio, assignors to The Procter & Gamble Co., Cincinnati, Ohio**

**Filed July 23, 1975, Ser. No. 598,292**

**Int. Cl.² C01B 33/28; C11D 3/06, 3/12, 11/02**

**U.S. Cl. 252—140** **16 Claims**

1. A spray-dried granular detergent product comprising:

a. from about 1% to about 40% by weight of an organic detergent component selected from the group consisting of anionic, nonionic, zwitterionic, and ampholytic detergents and mixtures thereof;

b. from about 3% to about 25% by weight of a water insoluble crystalling aluminoslicate ion exchange material of the formula

$$Na_{12}[AlO_2{\cdot}SiO_2]_{12}{\cdot}x\ H_2O$$

wherein $x$ is an integer of from about 20 to about 30, said aluminosilicate having a particle size range of from about 0.2 micron to about 10 microns, having a calcium ion exchange capacity of at least about 200 mg. eq. $CaCO_3$/g. and an ion exchange rate with calcium of at least about 2 grains of calcium ion per gallon per minute per gram;

c. from about 5% by weight of alkali metal pyrophosphate;

d. from about 7% to about 25% by weight of an alkali metal silicate having the weight ratio $SiO_2$:$M_2O$ of from about 2.0:1 to about 4.0:1 wherein M is sodium metal;

said product having a total free moisture content of from about 4.5% to about 7% by weight of the composition.

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**4,020,000**

**CONTROL OF CORROSION AND SCALE IN CIRCULATING WATER SYSTEMS BY MEANS OF PARTIAL ESTERS OF POLYFUNCTIONAL ORGANIC ACIDS**

**Tzeng Jiueq Suen, New Canaan; Arthur James Begala, Jr., Fairfield, and Martin Grayson, Stamford, all of Conn., assignors to American Cyanamid Company, Stamford, Conn.**

**Division of Ser. No. 456,119, March 29, 1974, Pat. No. 3,974,083. This application Sept. 5, 1975, Ser. No. 610,808**

**Int. Cl.² C23F 11/10, 11/00; C02B 5/06**

**U.S. Cl. 252—180** **5 Claims**

1. An additive composition for inhibiting corrosion and scale on ferrous metal parts of a circulating water system by addition of said additive to said water in inhibiting amounts, said composition consisting essentially of a mixture of a) the partial ester condensation product of an alcohol having the formula

$$R(O{-}CH_2CH_2)_mOH$$

wherein

R is hydrocarbon having 8 to 20 carbon atoms and $m$ is 2 to 4

with an acid selected from citric, malic, tartaric, succinic, adipic, phthalic and maleic acids, wherein one carboxyl group in said acid is unesterified, and b) from about one to about one-half part of a light hydrocarbon or vegetable oil per part of said condensation product and sufficient amount of a surfactant for dispersing said oil in water.

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**4,020,001**

**DIOL CURATIVE FOR POLYURETHANE**

**John R. White, Wadsworth, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio**

**Filed Mar. 31, 1975, Ser. No. 563,434**

**Int. Cl.² C09K 3/00; C08G 79/00**

**U.S. Cl. 252—182** **2 Claims**

1. A polyol curative satisfactory for curing polyurethane reaction mixtures, said curative comprising ethylene glycol and a second diol selected from the class consisting of thio diethylene and the carbamates of diethanol, ethanol isopropanol and ethanol diethanol.

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**4,020,002**

**NON-SCHIFF BASE FIELD EFFECT LIQUID CRYSTAL COMPOSITION**

**Chan S. Oh, Diamond Bar, Calif., assignor to Beckman Instruments, Inc., Fullerton, Calif.**

**Filed Feb. 28, 1974, Ser. No. 446,806**

**Int. Cl.² C09K 3/34; G02F 1/13**

**U.S. Cl. 252—299** **2 Claims**

1. A liquid crystal composition for use in information transmission, storage, handling and display systems consisting essentially of two components; a solute consisting essentially of the strongly positive dielectric anisotropic nematic non-Schiff base compound 4′-cyanophenyl-4-n-heptylbenzoate; and a solvent consisting essentially of a composition of the weakly negative dielectric anisotropic nematic non-Schiff base compounds 4′-n-butylphenyl-4-n-hexyloxybenzoate, 4′-methoxyphenyl-4-n-heptylbenzoate, 4′-n-pentylphenyl-4-n-hexyloxybenzoate and 4′-n-pentylphenyl-3-chloro-4-(4′-n-pentylbenzoyloxy)-benzoate; the strongly positive dielectric anisotropic nematic solute comprising from about two percent to about fifty percent of the composition, the composition having a net positive dielectric anisotropy and exhibiting nematic behavior in the range encompassing normal room temperature and extending below and above normal room temperature and extending below and above normal room temperature to cover usual ambient operating temperatures, and exhibiting electro-optic behavior under nematic conditions within the range of from about 0.1 to about 20.0 volts at 0 to 10 kilohertz in a layer from about 6$\mu$ to about 25$\mu$ in thickness in an electro-optic display device which comprises the layer of nematic liquid crystal composition between spaced substrates which have electrically conductive elements for applying the voltage through the layer of liquid crystal composition.



**4,020,003**

**FIXATION OF TRITIUM IN A HIGHLY STABLE POLYMER FORM**

**Meyer Steinberg, Huntington Station; Peter Colombo, Patchogue, and Jacob Pruzansky, E. Islip, all of N.Y., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.**

**Filed Feb. 24, 1976, Ser. No. 660,909**

**Int. Cl.² G21F 9/16**

**U.S. Cl. 252—301.1 W** **2 Claims**

1. A method of fixing tritiated water comprising the steps of:

a. reacting said tritiated water and calcium carbide to produce tritiated calcium hydroxide and acetylene;

b. separating the calcium hydroxide from the acetylene;

c. polymerizing the acetylene to form polyacetylene; and

d. incorporating the polyacetylene in a solidfying matrix of cement and water.

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**4,020,004**

**CONVERSION OF RADIOACTIVE FERROCYANIDE COMPOUNDS TO IMMOBILE GLASSES**

**Wallace W. Schulz, and A. Louise Dressen, both of Richland, Wash., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.**

**Filed Nov. 21, 1975, Ser. No. 634,224**

**Int. Cl.² G21F 9/34**

**U.S. Cl. 252—301.1 W** **7 Claims**

1. A method of converting solid radioactive ferrocyanide precipitates of the general formula $^{134\text{-}137}Cs_aM_b[FE(CN)_6]_c \cdot xH_2O$, where M represents Ni, Cu, Fe, Co, Cd, Mn or $UO_2$; $a$, $b$, and $c$ are integers; and $x$ is zero or a small number, to an insoluble silicate glass comprising the step of heating and melting said radioactive ferrocyanide in a charge consisting essentially of from 10 to 30 percent of said ferrocyanide and from 15 to 25 percent sodium carbonate and a mixture selected from the group consisting of (a) from 40 to 60 percent basalt and from 5 to 15 percent boron trioxide and (b) from 40 to 60 percent silica and from 5 to 10 percent calcium oxide.

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**4,020,005**

**GELLED REAGENT MATERIALS**

**John L. Lang, P.O. Box 1242, Midland, Mich. 48640**

**Continuation-in-part of Ser. No. 552,053, Feb. 24, 1975, abandoned, which is a continuation-in-part of Ser. No. 155,345, June 21, 1971, abandoned, which is a continuation-in-part of Ser. No. 734,553, June 5, 1968, abandoned, which is a continuation-in-part of Ser. No. 531,755, March 4, 1966, abandoned, which is a continuation-in-part of Ser. No. 242,910, Dec. 7, 1962, abandoned. This application Jan. 19, 1976, Ser. No. 650,454**

**Int. Cl.² B01J 13/00**

**U.S. Cl. 252—316** **6 Claims**

1. A shaped dimensionally-stable reagent material product of appropriate stoichiometrically proportionate compositions comprising at least one chemically active liquid reagent substance, said reagent substance being a part of a solidified gel phase, the primary gelling agent thereof consisting of a polymeric material capable of forming said gel in the presence of said liquid chemically active reagent substance and being non-deleterious with the reagent substance, and the gel being susceptible to de-gellation when said gelled reagent material product is subjected to exposure to the reaction medium in which said gelled reagent substance is intended to be employed.

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**4,020,006**

**FLUID CONTAINING DISPERSED PARTICLES SIMULATING LEUKOCYTES AND METHOD FOR PRODUCING SAME**

**James E. Parker, Long Beach, Calif., assignor to ICL/Scientific, Fountain Valley, Calif.**

**Filed Aug. 14, 1975, Ser. No. 604,614**

**Int. Cl.² G01N 33/16, 1/30; C09K 3/00**

**U.S. Cl. 252—408** **11 Claims**

1. In a method for preparing a standard body fluid for use as a control in clinical testing comprising the steps of introducing materials into a body fluid to bring the proportion of constituent components to a predetermined level followed by lyophilization to remove the liquid phase therefrom and adding liquid to reconstitute the lyophilized sample prior to its use, the improvement comprising:

introducing into said standard body fluid a predetermined amount of particles simulating leukocytes, said particles consisting of the microspores of plants selected from the group consisting of *Broussonetia papyrifera*, *Morus albus* and *Carya illinoensis*, said microspores having a particle size ranging between about 10 microns and about 25 microns and being reactive with a biological tissue staining compound for staining leukocytes to reveal a defined nucleus and cytoplasm.

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**4,020,007**

**CATALYST FOR PREPARATION OF POLYBUTADIENE**

**Floyd E. Naylor, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.**

**Division of Ser. No. 463,978, April 25, 1974, Pat. No. 3,896,102. This application Apr. 28, 1975, Ser. No. 572,045**

**Int. Cl.² B01J 31/02**

**U.S. Cl. 252—429 B** **5 Claims**

1. A catalyst for polymerizing 1,3-butadiene to produce trans polybutadiene comprising:

a. an organoaluminum hydride represented by the general formula $R_aAlH_b$ wherein R is alkyl, cycloalkyl or mixtures thereof containing from about 1 to 16 carbon atoms, a is an integer from 1 to 2, b is an integer from 1 to 2 such that the sum of a plus b equals 3;

b. an organolithium or organosodium compound represented by the general formula $R'M_x$ wherein x is an integer from 1 to 4, R′ is a hydrocarbon radical selected from the group consisting of aliphatic and cycloaliphatic radicals containing from about 1 to 20 carbon atoms per radical and M is lithium or sodium;

c. a titanium halide component selected from the group consisting of titanium tetrachloride plus molecular iodine, titanium tetrabromide plus molecular iodine, and titanium tetraiodide; and

d. an ether represented by the general formula R″OR‴ wherein R″ and R‴ are alkyl or cycloalkyl groups containing from about 1 to 12 carbon atoms per R″ or R‴ group and wherein the ether contains up to 20 carbon atoms per molecule.

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**4,020,008**

**CATALYSTS FOR PRODUCING HIGH TRANS-POLYBUTADIENE**

**Floyd E. Naylor, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.**

**Division of Ser. No. 447,201, March 1, 1974, Pat. No. 3,926,933. This application Sept. 4, 1975, Ser. No. 610,358**

**Int. Cl.² C08F 4/60**

**U.S. Cl. 252—429 B** **5 Claims**

1. A catalyst useful for the production of high trans-polybutadiene consisting essentially of:

a. an oxyether solution of a reducing agent represented by the general formula $XMH_4$, wherein X is a metal selected from the group consisting of lithium, sodium, potassium, rubidium, and cesium, and M is Al;

b. a titanium halide component selected from the group consisting of titanium tetrachloride plus molecular iodine, titanium tetrabromide plus molecular iodine, and titanium tetraiodide; and

c. at least one thioether represented by the general formula

R—S—R'

wherein R and R' are hydrocarbon radicals selected from the group consisting of alkyl and cycloalkyl radicals containing from about 1 to 12 carbon atoms, or R and R' are hydrocarbon radicals selected from the group consisting of alkylene groups joined to the sulfur atom and to each other to form a saturated heterocyclic thioether containing from about 4 to 10 carbon atoms.

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**4,020,009**

## CATALYST COMPOSITION AND METHOD OF PREPARATION

**Michael Gulla, Sherborn, Mass., assignor to Shipley Company, Inc., Newton, Mass.**

**Filed Sept. 30, 1975, Ser. No. 618,033**
**Int. Cl.² B01J 31/30**
**U.S. Cl. 252—429 R** **42 Claims**

**1.** An essentially dry composition which, upon admixture with an aqueous hydrohalide acid solution having a pH of less than 1, forms a stable colloidal catalyst solution for catalyzing a substrate prior to the deposition of an electroless metal, said essentially dry composition comprising a catalytic metal in a reduced form insoluble in an aqueous acid solution of pH less than 1 and tin compounds, at least a portion of said tin compounds being in stannous form, the molar ratio of stannous tin to catalytic metal being at least 2:1.

**40.** A plastic substrate having the catalyst composition of claim 1 dispersed throughout at least its surface.

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**4,020,010**

## TIN TITANIUM COMPLEXES AS ESTERIFICATION/TRANSESTERIFICATION CATALYSTS

**Herwart C. Vogt, Grosse Ile; Manher Parekh, Woodhaven, and John T. Patton, Jr., Wyandotte, all of Mich., assignors to BASF Wyandotte Corporation, Wyandotte, Mich.**

**Filed Dec. 29, 1975, Ser. No. 644,357**
**Int. Cl.² B01J 31/2**
**U.S. Cl. 252—431 C** **7 Claims**

**1.** The method of preparing complexes comprising mixing a tetraalkyl or tetraaryl titanate compound having the formula $Ti(OR)_4$ wherein R is a radical selected from the group consisting of an aliphatic radical having from 1 to 18 carbon atoms, an alicyclic radical having between 1 and 3 rings, between 5 and 6 carbon atoms per ring, and between 5 and 18 carbon atoms per molecule, and an aromatic radical having between 1 and 3 rings and between 6 and 18 atoms per molecule, with a stannous carboxylate having the formula

$$Sn\left(\begin{matrix}O\\ \|\\ OCR'\end{matrix}\right)_2$$

wherein R' is an organic radical having from 1 to 18 carbon atoms in a mole ratio from 1:1 to 1:8 titanate to stannous carboxylate and stirring the mixture until substantially all the titanate has reacted with the stannous carboxylate to form said complex.

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**4,020,011**

## METHOD FOR PREPARING HYDROCARBON CONVERSION CATALYST

**Eiichiroh Nishikawa, Saitama; Takuji Itoh, Sayama, and Tadashi Miura, Saitama, all of Japan, assignors to Toa Nenryo Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Apr. 10, 1975, Ser. No. 566,979**
**Claims priority, application Japan, Apr. 19, 1974, 49-44194**
**Int. Cl.² B01J 27/06**
**U.S. Cl. 252—441** **21 Claims**

**1.** In a method for preparing a hydrocarbon conversion catalyst comprising from about 0.01 to about 3 weight % of a Group VIII noble metal component, from about 0.1 to about 5 weight % of a halogen component and a tin component composited with a refractory carrier, the improvement which comprises compositing said tin component with said carrier by impregnating said carrier or the carrier which supports the said noble metal component and/or halogen component with a solution comprising an organic solvent containing a hydrogen halide and a soluble compound of tin.

**13.** A method for preparing a hydrocarbon conversion catalyst which comprises the following steps in combination:

1. impregnating a refractory carrier with an aqueous halogen acid solution comprising from about 0.01 to 2 weight % of a Group VIII noble metal compound;
2. washing and drying the impregnated carrier from step (1);
3. impregnating the product of step (2) with a solution comprising an organic solvent containing a hydrogen halide and from about 0.01 to 2 weight % of a soluble compound of tin; and
4. washing and drying the product of step (3).

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**4,020,012**

## METHOD FOR PREPARING HYDROCARBON CONVERSION CATALYST

**Tadashi Miura, Saitama; Tomio Nomura, Higashi-matsuyama, and Kohei Kubota, Kasukabe, all of Japan, assignors to Toa Nenryo Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Dec. 29, 1975, Ser. No. 644,606**
**Claims priority, application Japan, Jan. 31, 1975, 50-13239**
**Int. Cl.² B01J 27/06**
**U.S. Cl. 252—441** **12 Claims**

**1.** In a method for preparing a hydrocarbon conversion catalyst which comprises a Group VIII noble metal component, a tin component, and a halogen component composited with a refractory carrier, the improvement which comprises impregnating the said carrier or the carrier which supports the said noble metal component and/or halogen component with a solution comprising a soluble compound of tin dissolved in a solvent consisting of an organo thionyl compound, whereby the tin component is uniformly dispersed from the surface into the inner part of said catalyst.

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**4,020,013**

## CATALYTIC COMPOSITE FOR TREATING EXHAUST GASES FROM AN INTERNAL COMBUSTION ENGINE

**John F. Brennan, Des Plaines, Ill., assignor to UOP Inc., Des Plaines, Ill.**

**Filed Oct. 20, 1975, Ser. No. 624,210**
**Int. Cl.² B01J 21/04, 23/42, 23/46**
**U.S. Cl. 252—466 PT** **4 Claims**

**1.** A catalytic composite suitable for use in the treatment of exhaust gases from an internal combustion engine to convert nitrogen oxides to nitrogen, said composite consisting of ruthenium, platinum and from about 0.02 to about 0.10 wt. % rhodium deposited on a high surface area refractory inorganic oxide carrier wherein the weight ratio of rhodium to ruthenium is from about 1:1 to about 2:1 and wherein said platinum is in from about a 1:1 to about 8:1 weight ratio with said rhodium.



**4,020,014**

## SEMI-CONDUCTIVE SILICONE ELASTOMERS

**Alfred Lewis Service, Watervliet, and George Christie, Jr., Albany, both of N.Y., assignors to General Electric Company, Waterford, N.Y.**

**Filed Jan. 21, 1976, Ser. No. 650,969**
**Int. Cl.² H01B 1/06**
**U.S. Cl. 252—511** **21 Claims**

**1.** In a composition vulcanizable to an electrically conductive silicone elastomer, said composition comprising:

i. a vinylorganopolysiloxane gum;

ii. an organohydrogenpolysiloxane;

iii. an electically conductive carbon black filler in an amount capable of rendering the cured composition electrically conductive; and

iv. a small, effective amount, sufficient to cure the composition with steam or under compression molding conditions, of a peroxide catalyst which is not normally capable of curing the composition on exposure to hot air, the improvement which comprises including in said composition

v. a catalyst comprising platinum or a platinum compound in a small amount, at least effective to render the composition vulcanizable upon exposure to hot air but less than an amount which will cause any substantial cross-linking of the composition within 24 hours at a temperature of about 23° C.

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**4,020,015**

## DETERGENT COMPOSITIONS

**Geoffrey Bevan, Wirral, England, assignor to Lever Brothers Company, New York, N.Y.**

**Continuation of Ser. No. 350,262, April 11, 1973, abandoned. This application Nov. 14, 1975, Ser. No. 632,040**
**Claims priority, application United Kingdom, Oct. 12, 1971, 47397/71**
**Int. Cl.² C11D 3/37, 17/00**
**U.S. Cl. 252—544** **3 Claims**

**1.** In an improved built laundry detergent composition in powder form including a soil-release agent selected from the group consisting of:

a. a copolymer, in the range of 1:2 to 1:10, of polyoxyethylene glycol and polyethylene terephthalate;

b. a condensation product of (i) polyoxyethylene glycol, (ii) adipic acid and (iii) caprolactam or hexamethylene diamine or its salts of caprolactam or hexamethylene diamine with adipic acid; or

c. a cellulose containing an ether-linked, unsubstituted $C_1$ to $C_4$ alkyl group and an ether-linked substituent based on a $C_2$ to $C_4$ hydroxy alkyl group in which the total number of substituent groups per glucose unit of the cellulose is between 1.5 to 3.0,

wherein the improvement comprises the incorporation into said detergent composition of said soil release agents in the form of granules, said granules consisting essentially of about 5 to about 70% by weight of said agent dispersed throughout a solid, water soluble, detergent compatible carrier, said carrier being a material other than said soil-release agents.

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**4,020,016**

## CLEANING COMPOSITIONS EFFECTIVE IN DISSOLVING SOAP CURD

**Charles S. Sokol, Forest Park, Ohio, assignor to The Drackett Company, Cincinnati, Ohio**

**Filed Feb. 28, 1975, Ser. No. 554,034**
**Int. Cl.² C11D 1/10, 1/83**
**U.S. Cl. 252—546** **8 Claims**

**1.** A soap curd dissolving cleaning composition consisting essentially of:

a. from about 1–5% by weight of a member selected from the group consisting of an ammonium, alkylamine or hydroxyalkylamine salt of nitrilotriacetic acid, an alkylene polyamine polycarboxylic acid, or mixtures thereof, wherein said alkylene polyamine polycarboxylic acid has the formula

$$(HOOCCH_2)_2N[(CH_2)_xNCH_2COOH]_yCH_2COOH$$

wherein the values of $x$ and $y$ may vary independently from 1 to 7,

b. from about 0.75–2% by weight of at least one nonionic surfactant characterized as having an HLB number of at least about 13.5 selected from the group consisting of:

1. ethoxylated linear primary alcohols having the formula

$$C_mH_{2m+1}O(CH_2CH_2O)_nH,$$

wherein $m$ can vary from 12 to 15 and $n$ is at least 12;

2. an ethoxylated linear primary alcohol which is a clear liquid having an HLB number of 14, a freezing point of 1° $C_9$ a cloud point of 400° F, a pH of 6–8, and a specific gravity of 1.02 at 25° C;

3. ethoxylated linear secondary alcohols having the formula

$$CH_3(CH_2)_m\underset{\displaystyle O-(CH_2CH_2O)_nH}{\underset{|}{CH}}(CH_2)_pCH_3$$

wherein the sum of $m$ and $p$ is 9 to 13 and of $n$ is at least 12; and

4. ethoxylated octyl phenols having the formula

$$C_8H_{17}\text{—}C_6H_4\text{—}(OCH_2CH_2)_n\text{—}OH,$$

wherein $n$ is at least 9; and

c. up to about 98.25% by weight of water wherein the alkyl substituent of said alkylamine and hydroxy-alkylamine has a chain length of from 1 to 5 carbon atoms and said composition is substantially free of sodium ions.

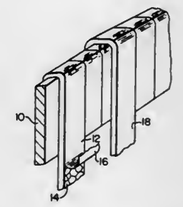
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**4,020,017**

## EPOXIDES CONTAINING ORGANO-TIN COMPOUNDS AND ELECTRICAL MEMBERS INSULATED THEREWITH

**James D. B. Smith, Turtle Creek, and Robert N. Kauffman, Monroeville, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed May 8, 1975, Ser. No. 575,755**
**Int. Cl.² C08G 59/24, 59/68**
**U.S. Cl. 260—2 EC** **15 Claims**

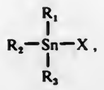



**1.** A resinous composition consisting essentially of:

A. an epoxide mixture having a weight ratio of non-glycidyl ether epoxide containing more than one 1,2 epoxy group per molecule selected from the group consisting of cycloaliphatic epoxides and glycidyl ester epoxides: reactive low viscosity epoxide diluent containing more than one 1,2 epoxy group per molecule, of between about 1:0.10 to 1:0.90; and

B. an amount of an organo-tin compound, acting as a latent

catalyst, selected from compounds having the structural formula:



wherein $R_1$, $R_2$ and $R_3$ are selected from the group consisting of alkyl groups having from about 1 to 10 carbon atoms, aryl groups, Cl, Br, or NO2 substituted aryl groups, alkaryl groups with the alkyl constituent having from about 1–10 carbon atoms, Cl, Br, or NO2 substituted alkaryl groups with the alkyl constituent having from about 1–10 carbon atoms, aralkyl groups with the alkyl constituent having from about 1–10 carbon atons, cyclopentane groups, cyclopentene groups, cyclopentadiene groups, cyclohexane groups, cyclohexene groups, cyclohexadiene groups, pyrrolidine groups, pyrrole groups, tetrahydrofuran groups, dioxane groups ,pyridine groups, and piperidine groups, and X is selected from the group consisting of halide, hydroxide, acetate, butyrate, propionate and dimethyl phosphate, to be effectively dissolved in the epoxide mixture.

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**4,020,018**

## ALKENE OXIDE OR ACRYLATE POLYMERIZATION OR COPOLYMERIZATION CATALYZED BY ORGANOALUMINUM-ORGANOPHOSPHINE-METAL SALT OF A BETA-DIKETONE

**Henry L. Hsieh, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.**

**Division of Ser. No. 416,816, Nov. 19, 1973, Pat. No. 3,925,317. This application May 13, 1975, Ser. No. 577,137**

**Int. Cl.² C08F 4/52; C08G 65/12, 65/14, 65/26**

**U.S. Cl. 260—2 A** **19 Claims**

1. A process for the polymerization of a monomer comprising at least one mono-oxirane monomer under polymerization conditions, employing a catalyst system comprising (I) hydrocarbon aluminum compound $R_nAlH_m$ wherein each R is a hydrocarbon radical, $n$ is an integer of 1 to 3, inclusive, and $m$ is zero or an integer of 1 to 2, such that $n + m$ equal 3, (II) triorganophosphine compound $R'_3P$ where R′ is hydrocarbon or alkoxy-substituted hydrocarbon, and (III) a beta-diketone substantially as the metal salt of said beta-diketone, in catalytically effective ratios,

wherein said metal of said (III) is beryllium, magnesium, calcium, strontium, barium, boron, aluminum, gallium, indium, thallium, germanium, tin, lead, zinc, cadmium, or mercury.

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**4,020,019**

## ANTICARIES AGENTS

**Gianluigi Soldati, 486 Flock Road, Mercerville, N.J. 08619; Ralph G. Eilberg, 46 Seventh St., Cresskill, N.J. 07626; Helga Melger, 60 Taft Ave., Edison, N.J. 08817, and William M. Wooding, 24 Bertrand Drive, Princeton, N.J. 08540**

**Filed Jan. 29, 1975, Ser. No. 545,030**

**Int. Cl.² C08G 73/04, 79/02**

**U.S. Cl. 260—2 EN** **8 Claims**

1. A method of preparing polyethylenimines of the formula:

$$[CH_2CH_2NH]_x \cdot [(HO_mPF_n]_y$$

wherein $x$ has a value of 7.5 to 1000 and m and n are positive whole integers whose sum is three and y has a value of up to 80% of $x$ which comprises combining an aqeuous or alcoholic solution of a polyethylenimine reactant having a molecular weight of from about 300 to about 40,000 with an aqueous or alcoholic solution of an acid reactant selected from the group consisting of mono and diflurophosphoric acid at temperatures ranging from about 5° C to about 26° C at a rate such that the temperature of said reactant solutions and the resulting reaction mixture is kept as nearly constant as possible throughout the combination step and recovering the desired solid polyethylenimine fluorophosphate.

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**4,020,020**

## METHOD OF TREATING WASTE SHEET FLOORING

**Francis J. Appleyard, East Petersburg, and Stavros C. Stavrinou, Lancaster, both of Pa., assignors to Armstrong Cork Company, Lancaster, Pa.**

**Filed June 17, 1975, Ser. No. 587,547**

**Int. Cl.² C08J 11/04**

**U.S. Cl. 260—2.3** **3 Claims**

1. A process for recovering scrap sheet floor covering material which is composed of a felted fibrous backing cured to a nonfibrous resin wear surface which comprises the steps of;

a. dicing said scrap sheet floor covering to reduce it to small pieces,

b. masticating the sheet floor covering pieces with an intense shearing action while under mechanical compression to grind up the fibrous backing and the resin wear surface for the purpose of comingling these materials,

c. adding supplemental resin materials to the comingled mass of fibrous backing and resin wear surface materials to the point that a desired ratio of resin to fibrous material is secured in the resulting mass, and

d. blending the resulting mass which now blended can be utilized as part of a new floor covering materials of blended fiber and resin material.

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**4,020,021**

## PROCESS FOR MANUFACTURING POLYMERS OF BICYCLO [2.2.1] HEPTENE-2 AND ITS SUBSTITUTION DERIVATIVES

**Jean Lahouste, Verneuil-en-Halatte; Maurice Lemattre, Cinqueux; Jean-Claude Muller, and Claude Stein, both of Verneuil-en-Halatte, all of France, assignors to Societe Chimique des Charbonnages, Courbevoie, France**

**Filed Mar. 25, 1975, Ser. No. 561,789**

**Claims priority, application France, Mar. 26, 1974, 74.10368**

**Int. Cl.² C08J 9/00; C08F 2/00, 4/44, 110/00**

**U.S. Cl. 260—2.5 H** **7 Claims**

1. In a method for manufacturing finely divided expanded ring opened polymers comprising polymerizing a bicyclo [2.2.1.] heptene-2 compound in the presence of a catalyst system selected from the group consisting of a noble metal compound with a reducing substance and a tungsten compound with a compound having at least one metal-hydrocarbon link, the improvement comprising:

effecting said polymerization in a polymerization zone under super-atmospheric pressure and at an elevated temperature, passing the obtained mixture into an expansion zone maintained at a pressure substantially lower than that of said polymerizing zone and at a temperature higher than the vaporization temperature of the constituents of the reaction mixture to thereby simultaneously blow the so obtained polymer and dry said polymer, and dividing the resultant polymer to provide an apparent density from 0.2 to 0.8.



**4,020,022**

## PROCESS FOR PRODUCING PARTICLES OF EXPANDABLE STYRENE POLYMERS AND ARTICLES OF CELLULAR STRUCTURE FORMED FROM SAID PARTICLES

**Gianfranco Biglione; Antonio Alvares, both of Mantova, and Guido Bertazzoni, Campitello di Marcaria (Mantova), all of Italy, assignors to Montedison Fibre S.p.A., Milan, Italy**

**Continuation of Ser. No. 470,856, May 17, 1974, abandoned. This application Aug. 12, 1975, Ser. No. 603,812**

**Int. Cl.² C08J 9/22**

**U.S. Cl. 260—2.5 HB** **12 Claims**

1. Process for the preparation of shaped bodies based on expanded styrene polymers comprising, in the given order: the polymerization of styrene or a mixture thereof with at least one monomer copolymerizable therewith, the addition of an expanding agent, pre-expansion of the resulting expandable particles, ageing of the pre-expanded particles, and molding thereof in a pressure resistant and non gas-tight mold, characterized in that the polymerization is carried out in the presence of 0.001 to 1% parts by weight of at least one elastomeric olefinic copolymer selected from the group consisting of elastomeric binary copolymers of ethylene and propylene and elastomeric terpolymers of ethylene, propylene and a diene.

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**4,020,023**

## ADDITIVES FOR INCREASING THE DENSITY OF URETHANE FOAMS PREPARED FROM ADNC

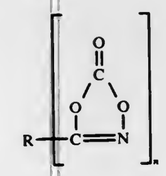
**Larry G. Wolgemuth, Flossmoor, Ill., assignor to Atlantic Richfield Company, Los Angeles, Calif.**

**Continuation-in-part of Ser. No. 351,695, April 16, 1973, abandoned. This application Jan. 8, 1974, Ser. No. 539,471**

**Int. Cl.² C08G 13/00, 18/80**

**U.S. Cl. 260—2.5 A** **11 Claims**

1. In a process for preparing a polymeric composition by condensing-rearranging a cyclic nitrile compound of the structural formula



wherein R is an organic radical free of reactive hydrogen atoms as determined by the Zerewithinoff test, and $n$ is at least 2 with an organic compound containing at least two functional groups selected from the group consisting of hydroxyl, thiol, primary amine, secondary amine, and mixtures of these, the improvement comprising carrying out the reaction in the presence of a sufficient amount of a metal oxide selected from the group consisting of calcium oxide, barium oxide, or mixtures of these to produce a composition having the desired density.

11. A high density cellular polyurethane composition prepared by reacting adipodi(nitrile carbonate) with a polyester polyol or polyether polyol having a molecular weight of greater than about 750 and a hydroxyl number of about 10 to 600 in the presence of calcium oxide, barium oxide, or mixtures of these.

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**4,020,024**

## HALOGENATED POLYETHER-POLYOLS AND POLYURETHANE FOAMS MANUFACTURED FROM THE LATTER

**René Walraevens, Brussels, and André Collin, Ligny, both of Belgium, assignors to Solvay & Cie, Brussels, Belgium**

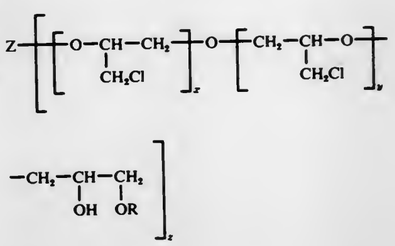
**Filed Oct. 23, 1974, Ser. No. 517,396**

**Claims priority, application France, Oct. 24, 1973, 73.38186**

**Int. Cl.² C08J 9/00**

**U.S. Cl. 260—2.5 AP** **22 Claims**

1. In the production of a semi-rigid or rigid polyurethane foam from a polyether-polyol, the improvement wherein the polyether-polyol comprises at least one polyether-polyol according to the general formula:



in which z represents a number from 2 to 6; $x$ and $y$ represent numbers from 0 to 7 such that the average value $x + y$ per chain is from 0 to 7; $z(x + y)$, wherein $x + y$ represents the average value of $x + y$ throughout the entire molecule, is from 1 to 42; Z represents a $C_2$ to $C_6$ aliphatic radical of valency $z$; and R represents a $C_1$ to $C_5$ monovalent aliphatic radical.

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**4,020,025**

## EXTRUDABLE FOAMABLE COMPOSITION COMPRISING AN OLEFIN POLYMER, A STYRENE POLYMER AND A HYDROGENATED STYRENE BUTADIENE BLOCK COPOLYMER

**Gerhard Zeitler, Hessheim, and Heinz Mueller-Tamm, Ludwigshafen, both of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany**

**Continuation of Ser. No. 467,256, May 6, 1974, abandoned. This application May 17, 1976, Ser. No. 686,901**

**Claims priority, application Germany, May 8, 1973, 2323031; Mar. 22, 1974, 2413863**

**Int. Cl.² C08J 9/14**

**U.S. Cl. 260—2.5 HB** **8 Claims**

1. Extrusion-foamable composition of polyolefins and styrene polymers, which comprises a mixture of

a. 5 to 90% by weight of ethylene or propylene polymers,

b. 10 to 95% by weight of styrene polymer,

c. 0.5 to 10% by weight, based on the combined weight of polyolefin (a) and styrene polymer (b), of a hydrogenated styrene/butadiene block polymer and

d. 5 to 30% by weight, based on the combined weight of polyolefin (a) and styrene polymer (b), of at least one low-boiling expanding agent, said styrene polymer (b) having a higher molecular weight, measured by the melt index, than that of the polyolefin (a) and is finely dispersed in the polyolefin (a) forming the continuous phase, and said hydrogenated styrene/butadiene block polymer (c) having a viscosity average moleclar weight of from 3,000 to 800,000.

4,020,026

## PLASTICITY INDEX IMPROVERS AND METHOD OF USE

**Frits W. Janssen, Serbalawan, Sumatra, Indonesia, and Edward A. Sinclair, Kent, Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio**

**Filed Apr. 17, 1975, Ser. No. 568,876**
**Int. Cl.² C08L 7/02**
**U.S. Cl. 260—3** **5 Claims**

1. A method of improving plasticity and plasticity retention index of natural rubber comprising treating a natural rubber latex with about 0.05 to 1.0 part of polyethylenimine of about 600 to 100,000 molecular weight per 100 parts of rubber, coagulating the latex and recovering the rubber from the latex.

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4,020,027

## FOUNDRY MOULDING MATERIALS

**Kenneth Ernest Lewis Nicholas, Birmingham, and John Glyn Morley, Alcester, both of England, assignors to The British Cast Iron Research Association, Birmingham, England**

**Filed June 14, 1976, Ser. No. 695,466**
**Int. Cl.² C08L 3/02**
**U.S. Cl. 260—17.2** **14 Claims**

1. A composition for making foundry moulds and cores comprising a granular refractory material, a sodium silicate binder, and in addition a polymeric resin reaction product resulting from the heating of a mixture of phenol, a carbohydrate and formaldehyde in the presence of a catalyst.

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4,020,028

## PROCESS AND BATH COMPOSITION FOR INCREASING THE RATE OF POLYMER DEPOSITION IN ELECTROCOATING

**Michael Alan Dudley, Beaconsfield, Canada, assignor to Canada Wire and Cable Limited, Toronto, Canada**

**Filed Jan. 2, 1974, Ser. No. 429,771**
**Claims priority, application Canada, Dec. 29, 1972, 160228**
**Int. Cl.² C08J 3/20**
**U.S. Cl. 260—18 EP** **16 Claims**

1. An electrocoating bath composition for depositing a coat of polymer material onto an anode, said bath composition comprising an essentially aqueous solution, emulsion or dispersion of said polymer suitable for electrodeposition on the anode when an electric current is passed therethrough, and comprising 0.01 to 2.0% by weight with reference to the bath composition of a compound of the general formulae:

X - R - X'

wherein

R is acyclic, saturated carbocyclic, unsaturated carbocyclic containing one C ring, heterocyclic, or carbocyclic and heterocyclic rings linked together through a ring atom or linked together through an acyclic saturated or unsaturated radical,

X is a phenolic or enolic —OH group, and

X' is a hydrogen atom or X,

said groups X being in such electronic configuration with reference to R that there is always a presence of labile protons therein under operative conditions of the electrocoating bath, or of a salt of said compound, said compound or its salt being in an at least partially disassociated state in said electrocoating bath composition and capable of proton association in close vicinity of the anode under conditions of operation.

4,020,029

## TACKIFIER

**Walter Gorbunow, Coon Rapids, Minn., assignor to PDI, Inc., St. Paul, Minn.**

**Filed Oct. 1, 1975, Ser. No. 618,516**
**Int. Cl.² C08L 91/00**
**U.S. Cl. 260—24** **3 Claims**

1. A normally inert coating composition activatable under hand heat and pressure to form a tacky film and adapted for application to gripping handles of hand-held instruments and comprising a composition having the formulation:

| Component | Parts by Weight |
|---|---|
| coumarone-indene resin having a softening point of about 60° C. | 6 to 12 |
| Pentaerythritol ester of rosin having a softening point of about 105° C. | 8 to 12 |
| Aliphatic hydrocarbon solvent | balance |

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4,020,030

## REACTION PRODUCTS OF EPOXY RESINS, ORGANIC SULFIDES AND PROTIC ACIDS

**Robert F. Harris, and Nancy B. Tefertiller, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.**

**Filed Feb. 24, 1975, Ser. No. 552,519**
**Int. Cl.² C08G 51/24, 30/04**
**U.S. Cl. 260—29.2 EP** **27 Claims**

1. A water-soluble or water-dispersible reaction product of (1) an epoxy resin bearing a plurality of vicinal epoxy groups and having an epoxy equivalent weight (EEW) of at least about 500; (2) an organic sulfide; and (3) a protic acid having a dissociation constant of at least $1 \times 10^{-5}$.

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4,020,031

## POLY(ARYLENE SULFIDE) COATING COMPOSITIONS CONTAINING ALKALI METAL ALKYLBENZENESULFONATE

**R. F. Merrill, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.**

**Filed Sept. 15, 1975, Ser. No. 613,668**
**Int. Cl.² C08J 3/06**
**U.S. Cl. 260—29.2 R** **31 Claims**

1. A composition comprising at least one poly(arylene sulfide) resin and at least one alkali metal alkylbenzenesulfonate.

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4,020,032

## CONTINUOUS PROCESS FOR THE REMOVAL OF MONOMERIC IMPURITIES FROM AQUEOUS DISPERSIONS OF HOMO- AND COPOLYMERS OF VINYL CHLORIDE

**Josef Kalka, Herten; Hermann Winter, Marl, and Jurgen Beckmann, Oer-Erkenschwick, all of Germany, assignors to Chemische Werke Huls Aktiengesellschaft, Marl, Germany**

**Filed Aug. 21, 1975, Ser. No. 606,736**
**Claims priority, application Germany, Aug. 27, 1974, 2440957**
**Int. Cl.² C08L 57/08**
**U.S. Cl. 260—29.6 R** **10 Claims**

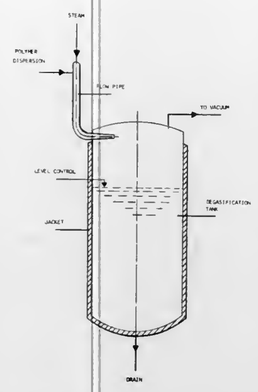
1. A process for removing residual monomer from an emulsifier-containing aqueous dispersion of a solid vinyl chloride polymer which dispersion has a surface tension of less than 60 dyne/cm., which comprises:

a. continuously admixing said dispersion with steam having a temperature of not greater than 100° C. in a fluid flow pipe to form an admixture therein having a pressure of 150–600 torr, a temperature of about 60°–94° C. and a flow velocity therethrough of 1–20 m./sec;

b. passing said admixture at an exit velocity of 30–100 m./sec horizontally into and along the walls of a degasification tank having a pressure 30–200 torr lower than the pressure in said flow pipe to evaporate residual monomer from said dispersion; and

c. continuously withdrawing the resultant dispersion from the degasification tank.






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4,020,033

## POLYTHIOETHER SEALANT COMPOSITIONS

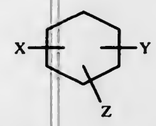
**Bobby F. Dannels, Grand Island, N.Y., assignor to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.**

**Continuation-in-part of Ser. No. 501,716, Aug. 29, 1974, abandoned. This application June 2, 1975, Ser. No. 582,959**
**Int. Cl.² C08K 5/09**
**U.S. Cl. 260—31.8 Z** **18 Claims**

1. A sealant system comprising as a first component a mercaptan-terminated polythioether of the formula

$$HS[(RS)_nR^1S]_m(RS)_nH$$

where R is propylene or trimethylene or mixtures thereof, $R^1$ is propylene or a mixture of propylene and a substituted cyclohexane radical of the formula




wherein X, Y and Z are substituents attached to different carbon atoms of the cyclohexane ring and two of X, Y and Z are $-CH_2CH_2-$ and one of X, Y and Z is $-CH_2CH_2(SR)_n[SR^1(SR)_n]_mSH$, said substituted cyclohexane radical being present at about 0.1 to about 3 mole percent of the total moles of R, *n* is 1 to about 10 and *m* is 1 to about 200; a filler; a plasticizer selected from the group consisting of chlorinated methylstearate; a phthalate ester and mixtures thereof; an adhesion additive selected from gamma-mercaptopropyltrimethoxysilane and gamma-glycidoxypropyltrimethoxysilane; and a cure accelerator selected from the group consisting of tetraethylthiuram disulfide, tetramethylthiuram disulfide, para quinone dioxime, and tri(dimethylamino)-phenol and mixtures thereof, and as a second component, an oxidative curing agent selected from manganese dioxide and lead dioxide.

4,020,034

## EPOXY RESIN COATING COMPOSITION

**Edward R. Freiter, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.**

**Filed Aug. 11, 1975, Ser. No. 603,894**
**Int. Cl.² C08K 5/01, 5/02, 5/06, 5/07**
**U.S. Cl. 260—32.8 EP** **3 Claims**

1. An epoxy resin coating composition which comprises

A. an epoxy resin which is the adduct of glycidol with an aliphatic or cycloaliphatic diisocyanate in a molar ratio of 2:1 respectively;

B. a curing quantity of an aliphatic or cycloaliphatic acid or anhydride thereof; and

c. a suitable organic solvent or mixture thereof in a quantity such as to provide the coating composition with a suitable application viscosity.

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4,020,035

## RESIN COMPOSITIONS

**Alfred Gerald Edwards, Stourport on Severn, and Glyn Islwyn Harris, Hagley, both of England, assignors to Albright & Wilson Limited, Midlands, England**

**Filed Sept. 16, 1974, Ser. No. 506,242**
**Claims priority, application Canada, Sept. 17, 1973, 181229**
**Int. Cl.² C08L 61/10, 61/18**
**U.S. Cl. 260—38** **27 Claims**

1. A composition comprising at least 50% by weight (based on the total weight of resin components (a) and (b)) of resin component (a), a resin haing repeating units of the formula




wherein $Ar^x$ is a divalent or trivalent aromatic hydrocarbyl radical selected from the group consisting of aromatic hydrocarbyl groups and aromatic hydrocarbyl groups having at least one substituent selected from the groups consisting of chlorine and fluorine atoms and methyl groups, and Ar is the residue formed by removal of two nuclear hydrogen atoms from a phenolic compound with 1 – 3 hydroxyl groups and at least two nuclear hydrogen atoms and *n* is 0 or 1, and 1 to 50% by weight (based on the total weight of resin components (a) and (b)) of resin component (b), a resin formed by reaction of a phenolic compound and an aldehyde and selected from the group consisting of novolac resins and resole resins.

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4,020,036

## THERMOSETTING POLYESTER COMPOSITION CONTAINING NORMALLY SOLID CARBOXY-CONTAINING DIENE POLYMER

**Aubrey South, Jr., Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.**

**Filed Apr. 22, 1976, Ser. No. 679,284**
**Int. Cl.² C08L 67/06**
**U.S. Cl. 260—40 R** **16 Claims**

1. A composition comprising:

a. an unsaturated polyester prepared by reacting an unsaturated dicarboxylic acid and a polyol;

b. a normally solid carboxy-containing polymer of a conjugated diene having a weight average molecular weight within the range of 30,000 to 400,000;

c. a vinyl monomer;

d. a catalyst; and

e. at least one of a reinforcing agent or a filler.

4,020,037

## PROCESS FOR THE SPIN-DYEING OF POLYMERS OR COPOLYMERS OF ACRYLONITRILE

**Manfred Hähnke, Kelkheim, Taunus; Theodor Papenfuhs, Frankfurt am Main, and Wolfgang Teige, Kelkheim, Taunus, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany**

**Filed Nov. 26, 1974, Ser. No. 527,414**

**Claims priority, application Germany, Nov. 29, 1973, 2359466**

**Int. Cl.² C08K** *5/00;* **C08L** *33/20;* **D01F** *1/06*

**U.S. Cl. 260—42.21** **2 Claims**

1. In a process of spin-drying of acid modified polymers or copolymers of acrylonitrile with vinyl compounds selected from the group consisting of vinyl chloride, vinyl fluoride, vinylidene chloride, vinyl acetate, vinylpropionate, vinyl pyridine, vinyl imidazole, vinyl pyrrolidone, vinyl alcohol, acrylic acid esters, methacrylic acid esters and acrylamides these copolymers containing at least 70% by weight of acrylonitrile and acid groups, with basic dyestuffs selected from the group consisting of the triarylmethane, indoldiarylmethane, azine, oxazine, thiazine, acridine and xanthene series, by means of spinning solutions of the polymers containing the basic dyestuff, the improvement consisting of using the dyestuff in the spinning solution in the form of its imine base or carbinol base.

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4,020,038

## PAINTABLE RUBBER COMPOSITION AND PRODUCTS PREPARED THEREFROM

**Joseph F. O'Mahoney, Jr., Stow, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio**

**Filed Sept. 19, 1975, Ser. No. 615,137**

**Int. Cl.² C08K** *3/06*

**U.S. Cl. 260—42.33** **9 Claims**

1. A polymeric composition suitable for use in sight shields and automotive facia comprising (A) 50 to 80 parts by weight of a rubbery butadiene/styrene copolymer, (B) 20 to 50 parts by weight of an ethylene/propylene/nonconjugated diene terpolymer and (C) 15 to 50 parts by weight of a butadiene/styrene resin, all parts being by weight per 100 parts by weight of (A) plus (B) wherein the rubbery butadiene/styrene copolymer has a bound styrene content of from 5 to 50 weight percent and the butadiene/styrene resin has a bound styrene content of from 75 to 90 weight percent.

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4,020,039

## VULCANIZABLE ELASTOMERIC COMPOSITIONS

**John Robert Dunn, and Douglas Currie Coulthard, both of Sarnia, Canada, assignors to Polysar Limited, Sarnia, Canada**

**Filed Feb. 28, 1975, Ser. No. 554,142**

**Claims priority, application Canada, May 13, 1974, 199653**

**Int. Cl.² C08K** *3/36*

**U.S. Cl. 260—42.37** **10 Claims**

1. An improved vulcanizable elastomeric composition comprising:

1. 100 parts by weight of a rubbery polymer containing at least 50 weight percent but not more than 85 weight percent of polymerized $C_4$–$C_6$ conjugated alkadiene units;
2. from 10 parts to 200 parts by weight of filler selected from the non-black inorganic particulate fillers;
3. antioxidant;
4. a vulcanization system containing in combination
   a. from 0.05 to 2.5 parts by weight of sulphur,
   b. from 2 to 20 parts by weight of magnesium oxide,
   c. from 2 to 10 parts by weight of one of cadmium oxide or zinc oxide.
   d. one of
      i. 1 to 8 parts by weight of cadmium dialkyl dithiocarbamate wherein said alkyl groups contain 1 to 5 carbon atoms, or
      ii. 0.2 to 8 parts by weight of a tetraalkyl thiuram disulphide wherein said alkyl groups contain 1 to 4 carbon atoms;

the improvement being the presence of from 0.5 to 10 parts by weight of as vulcanization co-agent N,N′-m-phenylene dimaleimide.

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4,020,040

## COLORING COMPOSITIONS OF POWDER FORM

**Tsutomu Kattoh, Suita; Junichi Kumabe, Kobe, and Satoshi Hirabayashi, Nagaokakyo, all of Japan, assignors to Dainippon Ink and Chemicals, Incorporated, Tokyo, Japan**

**Filed Dec. 3, 1974, Ser. No. 529,084**

**Claims priority, application Japan, Dec. 4, 1973, 48-137122**

**Int. Cl.² C08J** *3/22*

**U.S. Cl. 260—42.56** **4 Claims**

1.A coloring composition of powder form excelling in dispersiveness in solutions of resinous coating materials, comprising (a) a pigment, (b) a vinyl chloride copolymer of an average degree of polymerization of 350–800 and in which the other monomer copolymerized with vinyl chloride is contained in a proportion of 5–30 weight parts per 100 weight parts of vinyl chloride, and (c) a ketonic resin having a molecular weight of from 500–1000 and whose viscosity in a 40 weight % dimethyl-formamide solution is 80–7500 centipoises, said (b) and (c) being present on a weight basis in proportions of 1:0.5–5 said (a) being present in proportions of 20–80% by weight of the sum total of (a), (b) and (c).

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4,020,041

## POLYMERS STABILIZED WITH BIS-HETEROCYCLIC BENZOATES

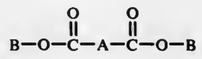
**Gether Irick, Jr., and Charles A. Kelly, both of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Division of Ser. No. 484,843, July 1, 1974, Pat. No. 3,963,738. This application Feb. 12, 1976, Ser. No. 657,509**

**Int. Cl.² C08K** *5/35*

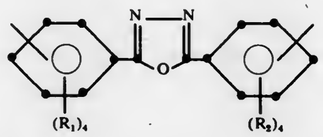
**U.S. Cl. 260—45.8 NZ** **9 Claims**

1. A synthetic polymer composition susceptible to ultraviolet light degradation stabilized against such degradation with a stabilizing amount of at least one aryl ester of a heterocyclic aromatic acid having the formula:



wherein

A has the structure



wherein $R_1$ and $R_2$ are hydrogen, chloro, bromo, lower alkyl or cyano and are present on all positions of the benzenoid rings, except the carbon atoms attached to the carboxyl group connecting the heterocyclic aromatic A group with the aromatic B group, said carboxyl connecting group is attached to the benzenoid ring in either the meta or para position from the carbon atom connected to the heterocyclic ring;

B is a group having the formula





wherein at least one $R_3$ or $R_7$ is hydrogen and the other $R_3$, $R_4$, $R_5$, $R_6$ and $R_7$ are hydrogen, lower alkyl, lower alkoxy, hydroxy, cyano, chloro and bromo.

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4,020,042

## PHENOLIC ANTIOXIDANTS

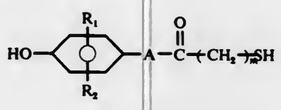
**Kirkwood S. Cottman, Akron, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio**

**Filed Nov. 20, 1974, Ser. No. 525,439**

**Int. Cl.² C08K** *5/37;* **C07C** *5/00*

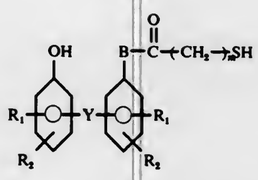
**U.S. Cl. 260—45.85 H** **4 Claims**

1. Phenolic compounds with a structural formula selected from the group consisting of



(I)

and



(II)

wherein $R_1$ and $R_2$ are the same or different radicals selected from the group consisting of hydrogen, alkyl radicals having from 1 to 10 carbon atoms, cycloalkyl radicals having from 5 to 8 carbon atoms, aralkyl radicals having from 7 to 9 carbon atoms, and substituted and unsubstituted aryl radicals containing from 6 to 8 carbon atoms, *m* is 1 or 2, A is selected from the group consisting of —K—X—, —X—Z—X— or —T—Z—X— and B is —X—Z—X— wherein K is an alkylene group containing from 1 to 10 carbon atoms, Z is an alkylene radical containing from 2 to 10 carbon atoms, X is oxygen, T is sulfur, Y is a bivalent radical selected from the group consisting of —O—, —S— and alkylene radicals containing from 1 to 5 carbon atoms.

3. An ole fin polymer having incorporated therein in an antioxidant amount a compound according to claim 1.

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4,020,043

## VULCANIZABLE ALKOXYSILYL CAPPED POLYMER COMPOSITION

**Mark W. Siefken, Woodbury, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

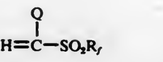
**Filed Mar. 7, 1975, Ser. No. 556,495**

**Int. Cl.² C08G** *77/04*

**U.S. Cl. 260—46.5 G** **6 Claims**

1. A storage stable viscous resinous composition curable at room temperature on exposure to moisture, comprising:

a. a vulcanizable polymer having at least one terminal trialkoxysilyl radical; and
b. homogenously blended with said polymer a catalytic amount of a fluoroaliphaticsulfonyl substituted ethylene compound sufficient to cause crosslinking of said vulcanizable polymer to a cured product, wherein the fluoroaliphaticsulfonyl substituted ethylene compound has the formula



wherein $R_f$ is a monovalent saturated fluoroaliphatic radical; Q is a monovalent, non-ionic, electron withdrawing radical at least as electron withdrawing as a benzoyl radical; and Z is an aromatic group or an unsaturated, conjugated heterocyclic organic radical and having a valence on a carbon atom.

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4,020,044

## METHOD OF INCREASING THE MOLECULAR WEIGHT OF HYDROXYL ENDBLOCKED POLYDIORGANOSILOXANES

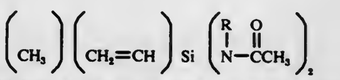
**Irvin D. Crossan, Homer Township, Midland County, and Louis H. Toporcer, Ingersol Township, Midland County, both of Mich., assignors to Dow Corning Corporation, Midland, Mich.**

**Filed July 16, 1975, Ser. No. 596,475**

**Int. Cl.² C08G** *77/04*

**U.S. Cl. 260—46.5 UA** **7 Claims**

1. A method of increasing the molecular weight of a hydroxyl endblocked polydiorganosiloxane consisting essentially of mixing the hydroxyl endblocked polydiorganosiloxane where the organic groups are monovalent radicals selected from the group consisting of methyl, phenyl, and 3,3,3-trifluoropropyl, the organic groups being at least 50 percent methyl radicals, and a silane of the formula



in which R is a monovalent radical selected from the group consisting of an alkyl radical of one to four carbon atoms per radical and phenyl radical, the silane being present in an amount sufficient to provide about one mole of silane per mole of silicon-bonded hydroxyl, and thereafter recovering a polydiorganosiloxane gum having a molecular weight higher than the polydiorganosiloxane mixed with the silane and having methylvinylsiloxane units distributed along the chain of the polydiorganosiloxane of increased molecular weight, said methylvinylsiloxane units coupling the polydiorganosiloxane molecules initially mixed with the silane.

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4,020,045

## PROCESS FOR CONTROLLING THE MOLECULAR WEIGHT OF AROMATIC POLYCARBONATES

**Joseph M. Baggett, Freeport, Tex., assignor to The Dow Chemical Company, Midland, Mich.**

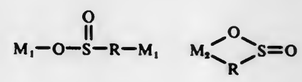
**Filed Feb. 26, 1976, Ser. No. 661,672**

**Int. Cl.² C08G** *17/13*

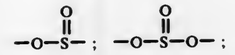
**U.S. Cl. 260—47 XA** **6 Claims**

1. A process for controlling the molecular weight of thermoplastic aromatic polycarbonates having hydroxyl terminated end groups which comprises reacting under interfacial polycarbonate-forming conditions

1. a carbonyl halide,
2. a dihydric phenol or mixtures of dihydric phenols,
3. a catalyst useful to form polycarbonates and
4. a chain terminating amount of a compound having one of the formulas



wherein $M_1$ is a metal of Group IA, $M_2$ is a metal of Group IIA, R is



or —O—.

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**4,020,046**

## AROMATIC POLYSULPHONE COATED ARTICLE AND BONDED STRUCTURE

**Terence King, New Barnet, and John Brewster Rose, Letchworth, both of England, assignors to Imperial Chemical Industries Limited, London, England**

**Division of Ser. No. 461,405, April 16, 1974, Pat. No. 3,984,604, which is a continuation-in-part of Ser. No. 381,380, July 27, 1973, abandoned, which is a continuation-in-part of Ser. No. 150,905, June 8, 1971, Pat. No. 3,769,150. This application May 6, 1975, Ser. No. 575,062**

**Claims priority, application United Kingdom, Apr. 16, 1973, 18183/73; Apr. 16, 1973, 18185/73; Apr. 16, 1973, 18184/73; June 19, 1970, 29907/70; July 15, 1970, 34317/70; Feb. 5, 1971, 4033/71; Nov. 19, 1973, 53582/73**

**Int. Cl.² C08L** *27/12*

**U.S. Cl. 260—900** **7 Claims**

1. A method for increasing the molecular weight of aromtic polysulphone comprises heating a thermoplastic aromatic polysulphone having reduced viscosity of at least 0.3 (as measured at 25° C on a solution in dimethyl formamide containing 1 g of polymer in 100 $cm^3$ of solution) and containing at least 0.2 aromatically bound hydroxyl groups per 100 polymer repeat units at a temperature of 330° C to 450° C in the presence of oxygen.

7. The product obtained by the process of claim 1.

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**4,020,047**

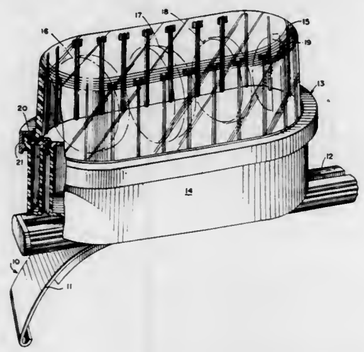
## EMERGENCY VEHICLE LIGHT

**Oliver John Burland, 252 Bay Point, Naples, Fla. 33940**

**Filed July 11, 1975, Ser. No. 595,294**

**Int. Cl.² F21V** *9/08*

**U.S. Cl. 240—46.59** **1 Claim**



1. In an emergency vehicle light including an elongated base adapted to be mounted on a vehicle roof and equipped with a plurality of longitudinally aligned warning lights mounted atop said base, and an elongated translucent globe mounted on said base and enclosing said lights, the improvement characterized by the fact that

said globe is generally obround in plan having generally straight sidewalls and generally hemicylindrical end walls all integral with a generally flat top, a plurality of horizontally spaced apart, vertically extending ribs on the interior of said walls adapted to receive placards to transmit different visual images than from said lights alone, a plurality of placards mounted between adjacent ribs, the ribs on said sidewalls having a stepped profile in horizontal section to support the vertical edge of an associated placard away from its associated sidewall, each of said sidewall ribs having associated therewith clip means for restraining inward movement of said associated placard, said clip means being integral with said sidewalls and located adjacent the top thereof.

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**4,020,048**

## TACKIFIER FOR RUBBER

**William H. Harrop, Downington, Pa., assignor to Rohm and Haas Company, Philadelphia, Pa.**

**Division of Ser. No. 488,379, July 15, 1974, Pat. No. 3,962,156. This application May 12, 1975, Ser. No. 576,540**

**Int. Cl.² C08L** *7/00, 9/02, 9/06, 63/00*

**U.S. Cl. 260—51.5** **7 Claims**

1. A process comprising reacting about 0.7 to 1.3 mole parts lower alkyl aldehyde with about 0.50 to 0.95 mole parts of predominantly monosubstituted alkyl, alkoxy, or alkenyl phenol and about 0.50 to 0.05 mole parts of cycloaliphatic polyamine containing at least two primary amine groups in the presence of an acid catalyst.

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**4,020,049**

## PROCESS FOR PREPARING POLYESTER RESIN

**Verne R. Rinehart, Akron, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio**

**Continuation-in-part of Ser. No. 667,854, Sept. 14, 1967, abandoned, which is a continuation-in-part of Ser. No. 254,754, Jan. 29, 1963, abandoned. This application Apr. 2, 1971, Ser. No. 130,743**

**Int. Cl.² C08G** *63/22*

**U.S. Cl. 260—75 M** **16 Claims**

1. The method for the commercial scale production of polyesters which comprises adding commercial scale quantities of ethylene glycol and a free aromatic dicarboxylic acid in the molar ratio of glycol to acid of from 1.7:1 to 1.05:1 to a solvent consisting of a preformed low molecular weight linear condensation polyester of a glycol and a dicarboxylic acid, said polyester having an average degree of polymerization of from 1.4 to 10, heating and reacting the mixture at a temperature above the melting temperature of the low molecular weight linear polyester at a pressure of from about 20 to about 1000 pounds per square inch gauge pressure until a linear condensation polyester resin of said glycol and acid having an average degree of polymerization of from 1.4 to 10 is formed.

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**4,020,050**

## METHOD OF PREPARING POLYMER FROM DIANHYDRIDE AND HYDRAZINE OR DIHYDRAZIDE

**Karl F. Schimmel, Verona, and Marco Wismer, Gibsonia, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.**

**Division of Ser. No. 369,628, June 13, 1973, abandoned. This application Oct. 2, 1974, Ser. No. 511,322**

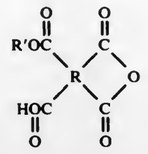
**Int. Cl.² C08G** *73/08, 73/10*

**U.S. Cl. 260—78 TF** **1 Claim**

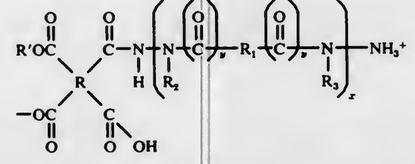
1. A method of producing a high temperature polymer comprising:

reacting a tetracarboxylic dianhydride with a monofunctional alcohol to form an ester-acid having the structural formula:

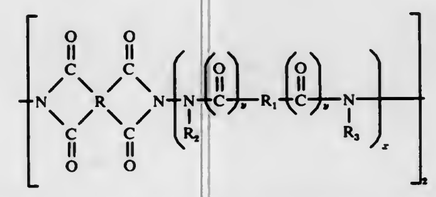




reacting said ester-acid with a member selected from the group consisting of a hydrazine and a hydrazide, thereby forming a polysalt having the structural formula:



heating said polysalt to form a high temperature resistant polymer having the structural formula:



wherein R is a tetravalent organic radical having at least 2 carbon atoms, $R_1$ is a divalent organic radical having at least two carbon atoms, R′ is a monovalent organic radical having 1 to 20 carbon atoms, $R_2$ and $R_3$ are selected from the group consisting of alkyl, aryl, aralkyl, cycloalkyl, and hydrogen radicals and $x$ and $y$ are either 1 or 0.

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**4,020,051**

## CONTROL OF NITROGEN OXIDE REACTIONS IN OFF-GASES FROM THE DIAZOTIZATION/COUPLING OF AROMATIC AMINES

**Frank Edward Herkes, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Nov. 25, 1975, Ser. No. 635,058**

**Int. Cl.² C07C** *115/00, 113/00;* **C01B** *21/00;* **B01J** *8/00*

**U.S. Cl. 260—140 R** **12 Claims**

1. In a process for preparing a 1,3-diaryl triazene by the diazotization and coupling of a primary carboxylic aromatic monoamine in the liquid phase whereby a residual gas containing one or more nitrogen oxides and unreacted primary carbocyclic aromatic monoamine is separated from the triazene-containing reaction liquid, the improvement comprising conducting said residual gas through a pipeline to a waste-gas disposal system and performing at least one of the following steps: heating the walls of said pipeline during the passage of said residual gas therethrough conducting said residual gas out of said pipeline before a carbocyclic aromatic diazonium nitrate deposits on the walls thereof, and preventing the substantial entry of formation of nitrogen dioxide in said pipeline.

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**4,020,052**

## TREATMENT OF AROMATIC AMINES WITH GAS MIXTURES DERIVED FROM THE OXIDATION OF AMMONIA TO EFFECT DIAZOTIZATION/COUPLING

**John Kent Detrick, Woodbury, N.J., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Nov. 25, 1975, Ser. No. 635,059**

**Int. Cl.² C01B** *21/26;* **C07C** *113/00, 115/00*

**U.S. Cl. 260—140 R** **14 Claims**

1. A method of preparing a 1,3-diaryl triazene comprising, in sequence, catalytically oxidizing ammonia by means of a gas comprising diluted molecular oxygen so as to form a gas mixture comprising a dilute nitrogen oxide component selected from the group consisting of nitrogen dioxide ($NO_2$) and mixtures of nitrogen dioxide and nitric oxide, said nitrogen oxide component being represented by the formula $NO_x$ wherein $x$ is $(1 + n)$, $n$ being the $NO_2$ fraction of the nitrogen oxide component; and contacting said gas mixture with a primary carbocyclic aromatic monoamine in the liquid phase so as to result in a monoamine temperature in the range of about from 25° C. to 90° C. during contact, while maintaining at least about 5 percent by weight of unconsumed monoamine.

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**4,020,053**

## PHENYLAZO-(N-ALKYLANILINO)-M-TOLUENE SULFONIC ACID OR SULFONAMIDE ACID DYES FOR POLYAMIDE FIBER MATERIALS

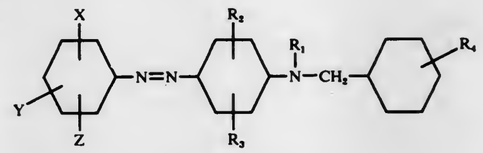
**Allan M. Huffman, Lock Haven, Pa., assignor to American Color & Chemical Corporation, Charlotte, N.C.**

**Filed Dec. 2, 1974, Ser. No. 528,692**

**Int. Cl.² C09B** *29/08;* **D06P** *1/06, 1/08, 3/26*

**U.S. Cl. 260—205** **6 Claims**

1. A dye of the formula:



wherein:

a. X is a member selected from the group consisting of $SO_3M$ and $SO_2NR_5R_6$ in which:
   1. M is hydrogen, alkali metal, ammonium or hydroxyalkylammonium wherein the alkyl has 3–12 carbon atoms; and
   2. $R_5$ and $R_6$ are independently selected from the group consisting of hydrogen, lower alkyl, cyano lower alkyl, phenyl, and hydroxy lower alkyl;

b. Y and Z are members independently selected from the the group consisting of hydrogen, chlorine, bromine, lower alkyl, and lower alkoxy;

c. $R_2$ and $R_3$ are members independently selected from the group consisting of hydrogen, lower alkyl, lower alkoxy, chlorine and bromine;

d. $R_1$ is a member selected from the group consisting of lower alkyl, cyano lower alkyl and N-lower alkyl carbamyl; and

e. $R_4$ is independently selected from the same group as X, except that when $R_4$ is $SO_3M$, X is $SO_2NR_5R_6$ and that when X is $SO_3M$, $R_4$ is $SO_2NR_5R_6$.

**4,020,054**

## IMPACT RESISTANT HIGH VINYL POLYDIENE THERMOSETTING COMPOSITIONS CONTAINING FIBROUS SULFUR-CONTAINING ORGANIC POLYMER

**Lawrence M. Fodor, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.**

**Filed July 3, 1975, Ser. No. 592,836**
**Int. Cl.² C08K** *3/34*
**U.S. Cl. 260—23.7 M** **8 Claims**

1. A thermosetting composition comprising:
1. high vinyl polymer of conjugated diene, said diene having 4–10 carbon atoms per molecule with the polymer having at least 50 percent unsaturation in the form of pendant groups having olefinic unsaturation,
2. silane coupling agent,
3. process aid,
4. organic peroxide curing agent, and
5. filler comprising:
a. inorganic, particulate metal silicate or metal oxide and
b. phenylene sulfide polymer fiber.

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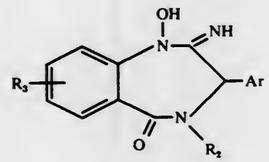
**4,020,055**

## INTERMEDIATES FOR 2-AMINOBENZODIAZEPINE-5-ONES

**Richard J. Mohrbacher, Maple Glen, and Philip P. Grous, Philadelphia, both of Pa., assignors to McNeil Laboratories, Incorporated, Fort Washington, Pa.**

**Division of Ser. No. 615,667, Sept. 22, 1975. This application June 23, 1976, Ser. No. 699,093**
**Int. Cl.² C07D** *243/20*
**U.S. Cl. 260—239.3 D** **1 Claim**

1. A compound having the formula:



wherein:
Ar is a member selected from the group consisting of phenyl, trifluoromethylphenyl and phenyl substituted with from 1 to 3 members selected from the group consisting of halo, loweralkyl, hydroxy and loweralkoxy;
$R_2$ is loweralkyl; and
$R_3$ is a member selected from the group consisting of hydrogen, halo, nitro, loweralkoxy, and loweralkyl.

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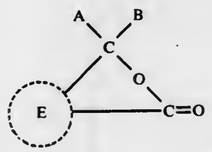
**4,020,056**

## DI-VINYL PHTHALIDES COLOR FORMERS

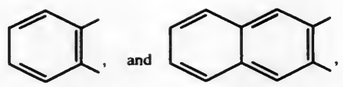
**Sheldon Farber, Appleton, Wis., assignor to NCR Corporation, Dayton, Ohio**

**Filed Apr. 10, 1975, Ser. No. 566,851**
**Int. Cl.² C07D** *307/88*
**U.S. Cl. 260—240 D** **7 Claims**

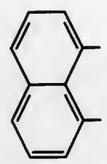
1. A compound represented by the formula:



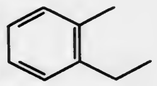
wherein E is

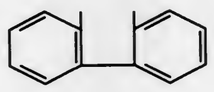


unsubstituted and alkyl-, chloro-, dichloro-, trichloro-, tetrachloro-, bromo-, dibromo-, tribromo-, tetrabromo-, nitro- and dialkylamino-substituted;



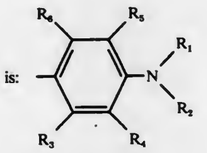
unsubstituted and nitro-substituted;





A and B are:





X is:

Y is: X or hydrogen;
Z is: hydrogen or methyl;
$R_1$ and $R_2$ are: hydrogen, alkyl, phenyl, and benzyl, and but $R_1$ and $R_2$ are not both phenyl;
$R_3$, $R_4$, $R_5$, and $R_6$ are: hydrogen, alkyl, phenyl, benzyl, alkoxy, halo, dialkylamino, monoalkylamino, amino, acetylamino; and
wherein alkyl, each occurrence, and alkoxy have one to six carbon atoms.

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**4,020,057**

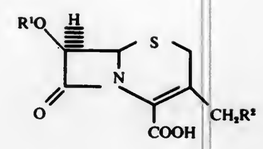
## 7β-ACYLOXY CEPHALOSPORINS

**John G. Gleason, Delran, N.J., assignor to SmithKline Corporation, Philadelphia, Pa.**

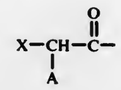
**Filed June 18, 1975, Ser. No. 588,096**
**Int. Cl.² C07D** *501/00*
**U.S. Cl. 260—243 C** **3 Claims**

1. A compound of the formula:





in which:
$R^1$ is



where:
X is thienyl; dihydrophenyl; phenyl; phenyl monosubstituted with hydroxy, hydroxymethyl, formamido, ureido, carboxymethylamino; 3-fluoro-4-hydroxyphenyl or 3,4-dihydroxyphenyl;
A is $NH_2$, OH, COOH or $SO_3H$; or formyloxy when X is phenyl; and
$R^2$ is acetoxy,
or a non-toxic pharmaceutically acceptable salt thereof.

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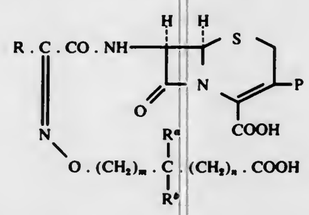
**4,020,058**

## IMPROVEMENTS IN OR RELATING TO CEPHALOSPORIN ANTIBIOTICS

**John Derek Cocker, Chalfont St. Peter, and Derek Ronald Sutherland, Harrow, both of England, assignors to Glaxo Laboratories Limited, Greenford, England**

**Filed Dec. 16, 1974, Ser. No. 533,315**
**Claims priority, application United Kingdom, Oct. 3, 1974, 43005/74**
**Int. Cl.² C07D** *501/16*
**U.S. Cl. 260—243 C** **7 Claims**

1. A compound selected from the group consisting of a cephalosporin antibiotic of the formula:



(I)

wherein R is thienyl or furyl; $R^a$ and $R^b$ are each hydrogen, $C_{1-4}$ alkyl, $C_{2-4}$ alkenyl, $C_{3-7}$ cycloalkyl, phenyl, naphthyl, thienyl, furyl, carboxy, $C_{2-5}$ alkoxycarbonyl or cyano, or $R^a$ and $R^b$ together with the carbon atom to which they are attached form a $C_{3-7}$ cycloalkylidene or cycloalkenylidene group; *m* and *n* are each 0 or 1 such that the sum of *m* and *n* is 0 or 1; and P is hydrogen, or the physiologically acceptable salts, esters, 1-oxides and solvates thereof.

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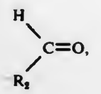
**4,020,059**

## PROCESS FOR PREPARING TERTIARY AMINES

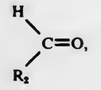
**Isamu Maeda; Hiroshi Koike, both of Takatsuki, and Takashi Ohara, Nishinomiya, all of Japan, assignors to Nippon Shokubai Kagaku Kogyo Co., Ltd., Japan**

**Filed June 2, 1975, Ser. No. 582,822**
**Int. Cl.² C07D** *295/00*
**U.S. Cl. 260—243 B** **16 Claims**

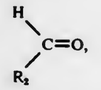
1. A process for preparing tertiary amines which comprises in absence of added formic acid reacting a carbonyl compound with a formyl derivative of a secondary amine at a temperature of 200° to 300° C. in the presence of at least one compound selected from the group consisting of water and lower aliphatic alcohols containing 1 to 4 carbon atoms, the amount of said at least one compound selected from the group consisting of water and lower alcohols containing 1 to 4 carbon atoms being 1 to 10 mols per mol of the carbonyl compound, said carbonyl compound being selected from the group consisting of:
1. aliphatic aldehydes of the general formula



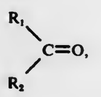
wherein $R_2$ is an aliphatic radical containing 1 to 40 carbon atoms,
2. alicyclic aldehydes of the general formula



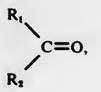
wherein $R_2$ is an alicyclic radical containing 5 to 20 carbon atoms,
3. aromatic aldehydes of the general formula



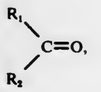
wherein $R_2$ is an aromatic radical,
4. aliphatic ketones of the general formula



wherein $R_1$ and $R_2$ represent an aliphatic radical containing 1 to 20 carbon atoms,
5. aliphatic-aromatic ketones of the general formula



wherein $R_1$ is an aliphatic radical containing 1 to 20 carbon atoms and $R_2$ is an aromatic radical,
6. aliphatic-heterocyclic ketones of the general formula

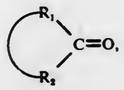


wherein $R_1$ is an aliphatic radical containing 1 to 20 carbon atoms and $R_2$ is a heterocyclic radical,
7. aromatic ketones of the general formula



wherein $R_1$ and $R_2$ represent an aromatic radical, and

8. alicyclic ketones of the general formula



wherein $R_1$–$R_2$ is a biradical containing 4 to 40 carbon atoms,

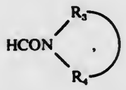
said formyl derivative of a secondary amine being selected from

i. formyl derivatives of aliphatic secondary amines of the general formula



wherein $R_3$ and $R_4$ represent an aliphatic radical containing 1 to 20 carbon atoms, and

ii. formyl derivatives of cyclic secondary amines of the general formula



wherein $R_3$–$R_4$ represents a biradical containing 3 to 20 carbon atoms, all of said aliphatic and alicyclic radicals and alcohols being saturated.

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**4,020,060**

**7-[α-AMINO-ω-(3,4-METHYLENEDIOXYPHENYL-)ACYLAMIDO]CEPHALOSPORANIC ACID DERIVATIVES**

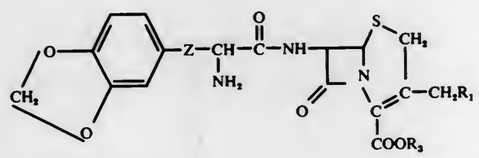
**Raymond C. Erickson, and Ronald E. Bambury, both of Cincinnati, Ohio, assignors to Richardson-Merrell Inc., Wilton, Conn.**

**Filed July 22, 1975, Ser. No. 598,152**

**Int. Cl.² C07D** *501/36, 501/22, 501/20*

**U.S. Cl. 260—243 C** **11 Claims**

1. A 7-[α-amino-ω-(3,4-methylenedioxyphenyl-)acylamido]cephalosporanic acid having the formula:



wherein

Z is selected from the group consisting of a sigma bond, methylene and ethylene;

$R_1$ is selected from the group consisting of hydrogen, hydroxy, acetoxy, pyridinium and —S—$R_2$;

$R_2$ is a heterocycle selected from the group consisting of pyrazolyl, imidazolyl, triazolyl, tetrazolyl, thiazolyl, isothiazolyl, thiadiazolyl, oxazolyl, isoxazolyl, oxadiazole, pyrimidinyl, pyrazinyl, pyridazinyl and the mono or dimethyl and mono or diethyl derivatives thereof;

$R_3$ is selected from the group consisting of hydrogen, formyloxymethyl and alkanoyloxymethyl in which the alkanoyl group contains from 1 to 5 carbon atoms; and the pharmaceutically acceptable salts thereof.

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**4,020,061**

**3-OXOMETHYL-2-(1-NITRO-2-OXO-ETHYLIDENE)-TETRAHYDRO-2H-1,3-THIAZINES**

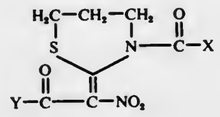
**Steven A. Roman, Oakdale, Calif., and James E. Powell, Rodmersham Green near Sittingbourne, England, assignors to Shell Oil Company, Houston, Tex.**

**Continuation-in-part of Ser. No. 564,258, April 2, 1975, abandoned. This application Mar. 3, 1976, Ser. No. 663,316**

**Int. Cl.² C07D** *279/06*

**U.S. Cl. 260—243 R** **1 Claim**

1. A compound of the formula:



wherein X and Y each is R, R—O— or R—S—, R containing up to 30 carbon atoms and being alkyl, alkenyl, alkynyl, cycloalkyl, cycloalkylalkyl, haloalkyl, haloalkenyl, mono- and poly-(alkoxy)alkyl, alkylthioalkyl, alkylsulfinylalkyl, alkylsulfonylalkyl; 2,4-dichlorophenoxymethyl, 2-methyl-4-chlorophenoxymethyl, 2,4,5-trichlorophenoxy-methyl; phenyl or phenalkyl, or any of these substituted on the ring by one to two of one or more of halogen, nitro, cyano, alkyl, phenyl, alkoxy or phenoxy; is aminoalkyl, $(CH_2)_mNR^1R^2$, wherein $m$ is 1 or 2, $R^1$ and $R^2$ is alkyl, alkenyl, cycloalkyl, phenyl or phenalkyl; or is $(CH_2)_nR^5$, wherein $n$ is zero, 1 or 2, and $R^5$ is heterocyclic moiety selected from furanyl, tetrahydrofuranyl, dioxolanyl, thienyl, thiopyranyl, pyridinyl, pyrrolidinyl, morpholinyl and their -methyl and -ethyl counterparts, with the proviso that one or both of X and Y is 2,4-dichloro-, 2-methyl-4-chloro- or 2,4,5-trichloro-phenoxymethyl.

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**4,020,062**

**N-(SUBSTITUTED CARBONYLMETHYL) ISATOIC ANHYDRIDES**

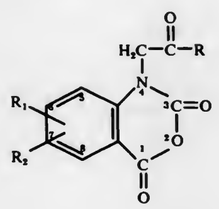
**Goetz E. Hardtmann, Florham Park, N.J., assignor to Sandoz, Inc., E. Hanover, N.J.**

**Filed Jan. 3, 1975, Ser. No. 538,408**

**Int. Cl.² C07D** *265/00, 273/00, 295/00;* **A01N** *9/00*

**U.S. Cl. 260—244 A** **11 Claims**

1. A compound of the formula:

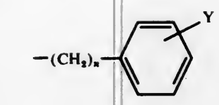


wherein

$R_1$ and $R_2$ are independently hydrogen, fluoro, chloro, bromo, alkyl of 1 to 4 carbon atoms or alkoxy of 1 to 4 carbon atoms or $R_1$ and $R_2$ together form 7,8-methylenedioxy,

R is alkyl of 1 to 5 carbon atoms or





$n$ is 0, 1 or 2, and

$Y$ is hydrogen, fluoro, chloro, bromo, alkyl of 1 to 4 carbon atoms or alkoxy of 1 to 4 carbon atoms.

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**4,020,063**

**OXADIAZEPINE CATIONIC DYESTUFFS**

**Uwe Mayer, Cologne, and Karl-Heinz Schündehütte, Opladen, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany**

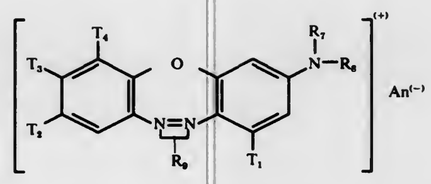
**Filed Aug. 24, 1973, Ser. No. 391,298**

**Claims priority, application Germany, Aug. 24, 1972, 2241626**

**Int. Cl.² C07D** *273/06*

**U.S. Cl. 260—247.5 H** **7 Claims**

1. Cationic dyestuff of the formula



wherein

$R_7$ and $R_8$ independently of one another are hydrogen; methyl; ethyl; propyl; methyl, ethyl or propyl substituted by chlorine, bromine, nitrile, thiocyanate, hydroxyl, methoxy, ethoxy, chloroethoxy, bromoethoxy, cyanoethoxy, acetoxy, propionyloxy, butyryloxy, benzoyloxy, methoxycarbonyl, ethoxycarbonyl, phenoxycarbonyl, methoxycarbonyloxy, ethoxycarbonyloxy, or phenoxycarbonyloxy; cyclohexyl; benzyl; phenyl; or phenyl substituted by methyl, ethyl methoxy, ethoxy, phenyloxy, halogen, nitrile or nitro;

$R_9$ is methyl, ethyl, propyl, butyl, aminocarbonylethyl or benzyl;

$T_1$ and $T_4$ independently of one another are hydrogen, chlorine, methyl, methoxy or ethoxy;

$T_2$ and $T_3$ independently of one another are hydrogen, fluorine, chlorine, bromine, methyl, ethyl, n-propyl, isopropyl, n-butyl, isobutyl, tert-butyl, isoamyl, cyclohexyl, β-chloroethyl, β-cyanoethyl, β-hydroxyethyl, β- or γ-hydroxypropyl, benzyl, phenyl, hydroxyl, methoxy, ethoxy, n-propoxy, isopropoxy, n-butoxy, β-methoxyethoxy, β-ethoxyethoxy, benzyloxy, 2-phenylethyloxy, phenylpropyl-(2,2)-oxy, phenoxy, methylthio, ethylthio, propylthio, benzylthio, phenylthio, formyl, acetyl, n-propionyl, n-butyryl, benzoyl, benzylcarbonyl, methoxycarbonyl, ethoxycarbonyl, acetylamino, ureido, N-methylureido, carbamoyl, N-methylcarbamoyl, N,N-dimethylcarbamoyl, sulphamoyl, N-methylsulphamoyl, N-ethylsulphamoyl, N,N-dimethylsulphamoyl, N,N-diethylsulphamoyl, methoxycarbonylmethyl, ethoxycarbonylmethyl, methylphenoxy, chlorophenoxy or methoxyphenoxy; and

$An^{(-)}$ is an anion.

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**4,020,064**

**3-[SUBSTITUTED-2-(METHYLAMINO) PHENYL]-4-[2-OXO-2-(HETERO-CYCLIC) ETHYL]-5-SUBSTITUTED-1,2,4-TRIAZOLES**

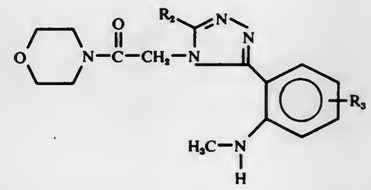
**Peter C. Wade, Pennington, N.J., and Berthold Richard Vogt, Yardley, Pa., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.**

**Division of Ser. No. 582,549, May 30, 1975, Pat. No. 3,969,366. This application Apr. 26, 1976, Ser. No. 680,315**

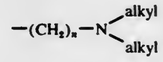
**Int. Cl.² C07D** *413/02*

**U.S. Cl. 260—247.5 E** **6 Claims**

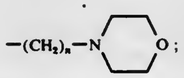
1. A compound of the formula



wherein $R_2$ is hydrogen, alkyl of 1 to 4 carbons, trifluoromethyl, phenyl, benzyl,



wherein each alkyl is of 1 to 4 carbons or



$n$ is an integer from 1 to 4; and $R_3$ is hydrogen, halogen, nitro, trifluoromethyl, alkyl of 1 to 4 carbons, alkoxy of 1 to 4 carbon, or alkylthio of 1 to 4 carbons; and a pharmaceutically acceptable salt thereof.

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**4,020,065**

**1,3,4-THIADIAZOLYL-(2)-HEXAHYDRO-TRIAZINONES**

**Paul Rathgeb, Basel, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.**

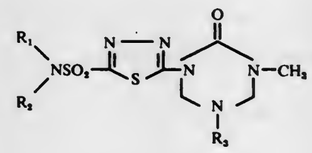
**Filed Apr. 1, 1975, Ser. No. 564,017**

**Claims priority, application Switzerland, Apr. 3, 1974, 4689/74**

**Int. Cl.² C07D** *251/08*

**U.S. Cl. 260—248 NS** **6 Claims**

1. A 1,3,4-thiadiazolyl-(2)-hexahydrotriazinone compound of the formula



wherein

$R_1$ and $R_2$ each independently represent $C_1$–$C_4$ alkyl, or together with the nitrogen atom carrying them the pyrrolidino, piperidino, hexahydroazepino or morpholino radical, and

$R_3$ represents $C_1$–$C_7$ alkyl, $C_2$–$C_4$ alkenyl, $C_3$ alkynyl, alkoxyalkyl having $C_1$–$C_4$ alkyls or alkylthioalkyl having $C_1$–$C_4$ alkyls, or benzyl.

**4,020,066**

## FORMYLAMINO-2-TRIAZINES

**René Bosshard, Birsfelden, and Hans U. Brechbühler, Basel, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

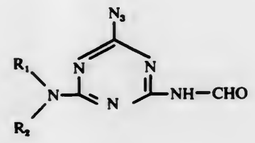
**Filed Sept. 10, 1975, Ser. No. 612,124**

**Claims priority, application Switzerland, Sept. 12, 1974, 12419/74; Aug. 15, 1975, 10662/75**

**Int. Cl.² C07D *251/66***

**U.S. Cl. 260—249.6** **14 Claims**

1. A compound of the formula I



(I)

wherein

$R_1$ represents a hydrogen atom or a $C_1$–$C_4$-alkyl radical, and

$R_2$ represents a $C_1$–$C_4$-alkyl, $C_3$–$C_6$-cycloalkyl, $C_3$–$C_4$-alkenyl, $C_3$–$C_5$-alkynyl or methoxy-($C_1$–$C_4$)-alkyl radical, or $R_1$ and $R_2$ together with the adjacent nitrogen atom represent a (heterocyclic ring) pyrrolidino radical.

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**4,020,067**

## TRIAZINYL-AMIDINES

**René Bosshard, Birsfelden, and Hans U. Brechbühler, Basel, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

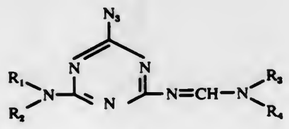
**Filed Sept. 10, 1975, Ser. No. 612,125**

**Claims priority, application Switzerland, Sept. 12, 1974, 12418/74; Aug. 15, 1975, 10661/75**

**Int. Cl.² C07D *251/66***

**U.S. Cl. 260—249.6** **15 Claims**

1. A compound of the formula I



(I)

wherein

$R_1$ represents a hydrogen atom or a $C_1$–$C_4$-alkyl radical, and

$R_2$ represents a $C_1$–$C_4$-alkyl, $C_3$–$C_6$- cycloalkyl, $C_3$–$C_4$-alkenyl, $C_3$–$C_5$-alkynyl or methoxy ($C_1$–$C_4$)-alkyl radical, or $R_1$ and $R_2$ together with the N atom represent a pyrrolidino radical, and

$R_3$ and $R_4$ each represent methyl or ethyl.

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**4,020,068**

## CHROMOGENIC FUROQUINOXALINES

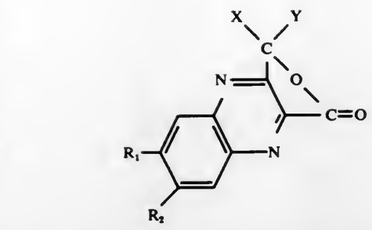
**Sheldon Farber, Appleton, Wis., assignor to NCR Corporation, Dayton, Ohio**

**Continuation-in-part of Ser. No. 468,112, May 8, 1974, abandoned. This application Feb. 28, 1975, Ser. No. 554,257**

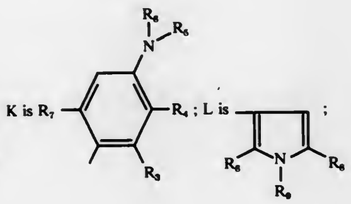
**Int. Cl.² C07D *491/04***

**U.S. Cl. 260—250 Q** **6 Claims**

1. A chromogenic compound represented by the formula:



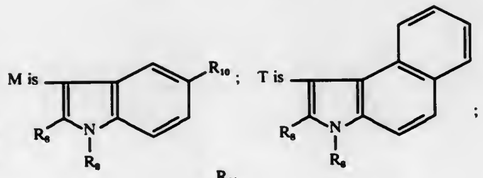
wherein X is one of K, L, M, T, W and Z and Y is one of K, L, M and T; and



K is $R_7$; L is



;



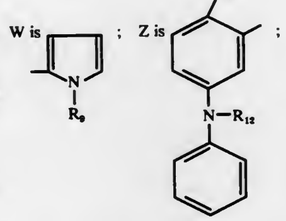
M is



; T is



;



W is



; Z is



;

$R_1$, $R_2$, $R_3$, $R_4$ and $R_7$ are hydrogen, chlorine, nitro, alkyl, alkoxy, and dialkylamino, wherein alkyl and alkoxy are less than seven carbon atoms; $R_5$and $R_6$ hydrogen, phenyl, benzyl, and alkyl, wherein alkyl is less than seven carbon atoms and, additionally, when one of $R_5$ and $R_6$ is phenyl, alkyl and alkoxy wherein alkyl and alkoxy are less than seven carbon atoms; $R_9$ is hydrogen, phenyl and alkyl wherein alkyl is less than seven carbon atoms; $R_{10}$ is hydrogen, alkyl and alkoxy wherein alkyl and alkoxy are less than seven carbon atoms; $R_{11}$ is alkoxy less than seven carbon atoms; $R_{12}$ is hydrogen, methyl and ethyl.

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**4,020,069**

## PREPARATION OF AROMATIC TETRACARBOXYLIC ACIDS

**Donald S. Johnson, Scotia, and Howard M. Relles, Rexford, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.**

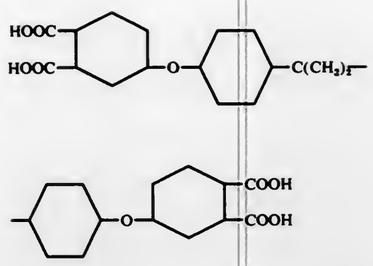
**Filed July 25, 1975, Ser. No. 598,950**

**Int. Cl.² C07C *65/14***

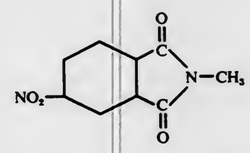
**U.S. Cl. 260—520 E** **1 Claim**

1. The process of making a tetracarboxylic acid of the formula





which comprises (1) simultaneously effecting reaction under substantially anhydrous conditions and in an inert atmosphere at a temperature within the range of from about 110° to 200° C between a nitrophthalimide of the formula



with bisphenol-A, the said reaction being conducted in a dimethyl sulfoxide solvent and in the presence of potassium carbonate in a mol ratio of from 2.1 to 3 mols of the latter per mol of bisphenol-A, and converting the resulting bisimide product by hydrolysis to the abovedescribed tetracarboxylic acid.

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**4,020,070**

## ALKYL-SUBSTITUTED 6-CHLORO-2-THIOURACILS

**Kailash Kumar Gauri, Lentfoehrden, Germany, assignor to Robugen GmbH, Esslingen (Neckar), Germany**

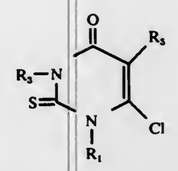
**Continuation-in-part of Ser. No. 369,232, June 12, 1973, abandoned. This application Nov. 6, 1975, Ser. No. 629,535**

**Claims priority, application Germany, June 12, 1972, 2228484**

**Int. Cl.² C07D *239/10***

**U.S. Cl. 260—251 R** **11 Claims**

1. A 2-thio-6-chlorouracil having the formula:



wherein $R_1$ is hydrogen, lower alkyl or alkenyl of 1 to 4 carbon atoms, phenyl or phenyl-substituted lower alkyl, and $R_3$ and $R_5$ are the same or different and are selected from the group consisting of lower alkyl of 1 to 4 carbon atoms.

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**4,020,071**

## DERIVATIVES OF 1-PHENOXY-3-AMINO-PROPAN-2-OL

**Thomas Raabe, Rodenbach; Otto Gräwinger, Frankfurt am Main; Josef Scholtholt, Mittelbuchen; Rolf-Eberhard Nitz, Bergen-Enkheim, and Eckhard Schraven, Frankfurt am Main, all of Germany, assignors to Cassella Farbwerke Mainkur Aktiengesellschaft, Frankfurt am Main-Fechenheim, Germany**

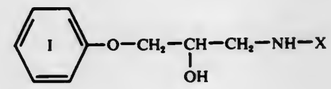
**Filed Dec. 10, 1974, Ser. No. 531,324**

**Claims priority, application Netherlands, Dec. 20, 1973, 7369042**

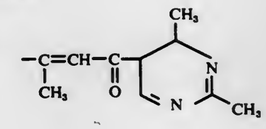
**Int. Cl.² C07D *239/06***

**U.S. Cl. 260—256.4 R** **11 Claims**

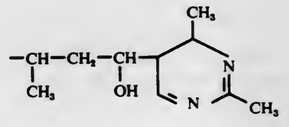
1. 1-phenoxy-3-amino-propan-2-ol having the structural formula wherein X denotes



wherein X denotes



or



and the phenyl radical I can be mono-. di- or tri-substituted by alkyl having 1 to 4 C atoms, alkenyl having up to 6 C atoms, alkynyl having up to 6 C atoms, cycloalkyl having a ring of 5 to 8 C atoms, cycloalkenyl having a ring of 5 to 8 C atoms, alkoxy having up to 8 C atoms, alkenyloxy having up to 5 C atoms, alkylnyloxy having up to 5 C atoms, phenyl, chlorine or bromine, or the radical $—NR_1R_2$, or wherein $R_1$ represents alkyl having 1 to 4 C atoms or acyl of an aryl or alkyl carboxylic acid having up to 11 C atoms, and $R_2$ represents hydrogen or alkyl having up to 4 C atoms, or a pharmaceutically acceptable acid addition salt thereof.

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**4,020,072**

## 5-AMINOMETHYL-1H-PYRAZOLO[3,4-b]PYRIDINES

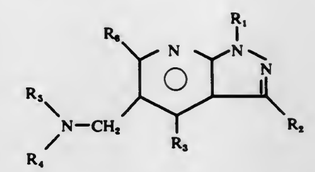
**Hans Hoehn, Tegernheim, Germany, assignor to E. R. Squibb & Sons, Inc., Princeton, N.J.**

**Filed May 4, 1976, Ser. No. 682,930**

**Int. Cl.² C07D *471/04***

**U.S. Cl. 260—293.6** **16 Claims**

1. A compound of the formula



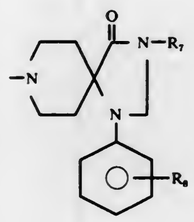
wherein $R_1$ and $R_2$ each is hydrogen, lower alkyl or phenyl;

$R_3$ is hydrogen, lower alkyl, hydroxy or halogen;

$R_4$ and $R_5$ each is hydrogen, lower alkyl, phenyl, di(lower alkyl)amino-lower alkyl or together the group



is piperidino, pyrrolidino, piperazinyl, lower alkylpiperidino, lower alkylpiperazinyl, (hydroxy-lower alkyl)-piperazinyl or



wherein

$R_7$ is hydrogen or lower alkyl and $R_8$ is hydrogen, lower alkyl or halogen;

$R_6$ is hydrogen, lower alkyl or hydroxy; and acid addition salts thereof.

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**4,020,073**

## PROCESS FOR O-ACYLATING THALLUS SALTS OF 2-PYRIDONE

**Edward C. Taylor, and Alexander McKillop, both of 1500 Spring Garden St., Philadelphia, Pa. 19101**

**Division of Ser. No. 112,815, Feb. 4, 1971, Pat. No. 3,832,381, which is a division of Ser. No. 700,352, Jan. 25, 1968, Pat. No. 3,626,018. This application May 21, 1974, Ser. No. 471,926**

**Int. Cl.² C07D** *213/64*

**U.S. Cl. 260—294.8 R** **9 Claims**

1. A process for O-acylating in a suitable solvent a lactam, said lactam being a 2-pyridone, comprising treating the thallous salt of said 2-pyridone with an acyl halide, said acyl being acetyl, benzoyl, tosyl, 3,5-dinitrobenzoy, mesitoyl, pivaloyy, or p-anisoyl.

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**4,020,074**

## NITROLAMINES

**Camillo Corvi Mora, Milan, Italy, assignor to Camillo Corvi S.p.A., Piacenza, Italy**

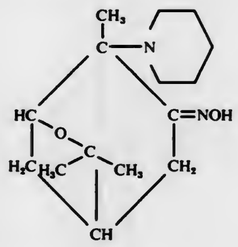
**Division of Ser. No. 378,008, July 10, 1973, abandoned. This application Sept. 8, 1975, Ser. No. 611,333**

**Claims priority, application Italy, July 14, 1972, 27021/72**

**Int. Cl.² C07D** *405/04*

**U.S. Cl. 260—293.58** **2 Claims**

1. A nitrolamine selected from the group consisting of a compound of the formula



and the hydrochloride thereof.

**4,020,075**

## 2-BROMO-1-HYDROXYQUINOLIZINIUM BROMIDE SUBSTITUTED ANILINIUM SALTS

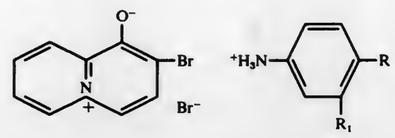
**Robert J. Alaimo, and Marvin M. Goldenberg, both of Norwich, N.Y., assignors to Morton-Norwich Products, Inc., Norwich, N.Y.**

**Filed May 13, 1974, Ser. No. 469,472**

**Int. Cl.² C07D** *471/00*

**U.S. Cl. 260—296 B** **7 Claims**

1. A compound of the formula:



wherein R is methoxy, ethoxy, phenoxy or allyloxy and $R_1$ is hydrogen or methoxy.

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**4,020,076**

## NOVEL PHOSPHORYLOXY-THIAZOLES

**Jacques Perronnet, Paris, and Laurent Taliani, Les Pavillons-sous-Bois, both of France, assignors to Roussel-UCLAF, Paris, France**

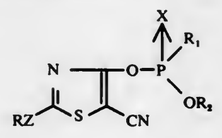
**Filed Sept. 9, 1975, Ser. No. 611,710**

**Claims priority, application France, Sept. 20, 1974, 74.31841**

**Int. Cl.² C07D** *277/56*

**U.S. Cl. 260—302 E** **18 Claims**

1. A compound of the formula



wherein R is selected from the group consisting of alkyl of 1 to 6 carbon atoms, alkenyl of 2 to 6 carbon atoms, cycloalkyl of 3 to 8 carbon atoms and benzyl optionally substituted with 1 to 2 members of the group consisting of halogen, methyl and methoxy, $R_1$ is selected from the group consisting of alkyl an alkoxy of 1 to 3 carbon atoms, $R_2$ is alkyl of 1 to 3 carbon atoms and X and Z are individually selected from the group consisting of oxygen and sulfur.

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**4,020,077**

## ANTIBIOTICS

**Martin Christopher Cook, Chalfont St. Peter, and Brian Laundon, Northolt, all of England, assignors to Glaxo Laboratories Limited, Greenford, England**

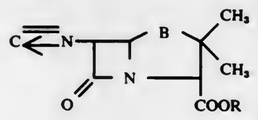
**Division of Ser. No. 377,247, July 9, 1973, Pat. No. 3,974,150. This application May 21, 1976, Ser. No. 688,778**

**Claims priority, application United Kingdom, July 21, 1972, 34298/72**

**Int. Cl.² C07D** *499/02*

**U.S. Cl. 260—306.7 C** **3 Claims**

1. A penicillin compound having the formula



wherein R is a conventional carboxyl blocking group; and B is >S or >S 0.



**4,020,078**

## 3-BENZYL-2-METHYLIMINO-5-PHENYL-DELTA-4-1,3,4-THIADIAZOLINES

**Norman A. Dahle, Lenexa, Kans., assignor to Gulf Oil Corporation, Pittsburgh, Pa.**

**Division of Ser. No. 503,211, Sept. 4, 1974. This application Feb. 2, 1976, Ser. No. 654,136**

**Int. Cl.² C07D** *285/12*

**U.S. Cl. 260—306.8 D** **12 Claims**

1. 3-benzyl-5-(3-chlorophenyl)-2-methylimino-$\Delta^4$-1,3,4-thiadiazoline.

2. 5-(3-chlorophenyl)-3-(3-methylbenzyl)-2-methylimino-$\Delta^4$-1,3,4-thiadiazoline.

3. 5-(3-chlorophenyl)-3-(4-methylbenzyl)-2-methylimino-$\Delta^4$-1,3,4-thiadiazoline.

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**4,020,079**

## ANTI-INFLAMMATORY SYDNONES

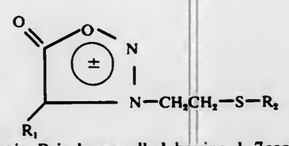
**Richard E. Ray, Morton Grove, and Hans A. Wagner, Skokie, both of Ill., assignors to G. D. Searle & Co., Chicago, Ill.**

**Filed Aug. 1, 1974, Ser. No. 493,930**

**Int. Cl.² C07D** *271/04*

**U.S. Cl. 260—307 A** **4 Claims**

1. A compound of the formula



wherein $R_1$ is lower alkyl having 1–7carbon atoms inclusive and $R_2$ is cycloalkyl having 5–8carbon atoms inclusive or adamantyl.

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**4,020,080**

## OXADIAZOLYLPHENYL AROMATIC ESTER COMPOUNDS AND THEIR USE AS ULTRAVIOLET STABILIZER IN ORGANIC COMPOSITIONS

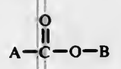
**Gether Irick, Jr., and Charles A. Kelly, both of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed July 1, 1974, Ser. No. 484,844**

**Int. Cl. C07d** *271/10*

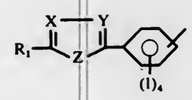
**U.S. Cl. 260—307 G** **9 Claims**

1. A compound having the formula



wherein

A is a member of the group comprising members having the structure



wherein

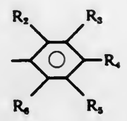
X and Y are a nitrogen atom;

Z is an oxygen atom;

$R_1$ is hydrogen, chloro, bromo, lower alkyl, chloro substituted lower alkyl, cyclohexyl, phenyl, alkoxy containing 1 to 20 carbon atoms, cyano, dimethyl substituted amino and phenyl substituted with not more than two members of the group consisting of chloro, phenyl, cyano, lower alkyl, and alkoxy containing 1 to 20 carbon atoms;

I is the same as $R_1$ and is present on all positions of the benzenoid ring, except the carbon atom attached to the Y substituent and the carbon atom attached to the carboxyl group connecting the heterocyclic aromatic A group with the aromatic B group, said carboxyl connecting group is attached to the benzenoid ring in either the meta or para position from the carbon atom connected to the Y substituent; and

B is a group having the formula



wherein

at least one $R_2$ or $R_6$ is hydrogen and the other $R_2$, $R_3$, $R_4$, $R_5$ and $R_6$ are hydrogen, or not more than three members of the group consisting of lower alkyl, cyclohexyl, phenyl, phenyloxy, alkoxy containing 1 to 20 carbon atoms, hydroxy, nitrile, chloro and bromo.

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**4,020,081**

## CERTAIN BENZOXAZOLES AND THE USE THEREOF AS METAL EXTRACTANTS

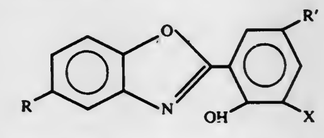
**Kenneth D. MacKay, Circle Pines, and Edgar R. Rogier, Hopkins, both of Minn., assignors to General Mills Chemicals, Inc., Minneapolis, Minn.**

**Filed Oct. 25, 1974, Ser. No. 518,011**

**Int. Cl.² C07D** *263/56*

**U.S. Cl. 260—307 D** **11 Claims**

1. A compound of the structure



where R is hydrogen or alkyl having from 1 to 20 carbon atoms, R′ is hydrogen, chlorine or alkyl having from 1 to 20 carbon atoms, X is hydrogen or chlorine, the total number of carbon atoms in R and R′ is 6 to 40 and one of R and R′ must be alkyl of at least 6 carbon atoms.

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**4,020,082**

## 2-AMINOMETHYL- AND 2-(2-AMINOETHYL)-SUBSTITUTED 4,5-DIPHENYLOXAZOLES

**Enzo Marchetti, Via Casilina 125, Rome, Italy**

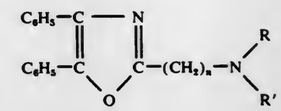
**Continuation-in-part of Ser. No. 117,117, Feb. 19, 1971, abandoned. This application Aug. 5, 1975, Ser. No. 602,097**

**Claims priority, application Italy, Feb. 21, 1970, 20946/70**

**Int. Cl.² C07D** *263/32*, *413/06*

**U.S. Cl. 260—307 R** **6 Claims**

1. A compound of the formula:



or a pharmaceutically acceptable salt thereof, wherein *n* is the integer 1 or 2 and R and R′ are the same or different and represent hydrogen, alkyl of 1 to 4 carbon atoms, hydroxyalkyl of 1 to 4 carbon atoms, dialkylaminoalkyl wherein the alkyl is of 1 to 4 carbon atoms and carbalkoxy wherein the alkyl is of 1 to 4 carbon atoms.

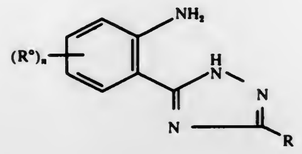
**4,020,083**

## 5-(2-AMINOPHENYL)-S-TRIAZOLES

**Faizulla G. Kathawala, West Orange, N.J., assignor to Sandoz, Inc., E. Hanover, N.J.**

**Filed July 8, 1975, Ser. No. 594,125**
**Int. Cl.² C07D *249/08***
**U.S. Cl. 260—308 R** **3 Claims**

1. A compound of the formula:



wherein

R° is hydrogen, halo selected from the group consisting of bromo, chloro and fluoro, alkoxy of 1 to 4 carbon atoms, alkyl of 1 to 4 carbon atoms or $CF_3$ or two adjacent R° together form methylenedioxy,

R is hydrogen or alkyl of 1 to 4 carbon atoms, and

*n* is 1 or 2,

or a pharmaceutically acceptable acid addition salt thereof, provided that

i. when *n* is 1, and one of R° and R signifies hydrogen, the other signifies other than hydrogen,

ii. when *n* is 1, and R signifies alkyl of 1 to 4 carbon atoms, then R° signifies other than hydrogen, and

iii. when *n* is 2, then only one R° signifies hydrogen.

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**4,020,084**

## CYCLIC AMINALS OF AROMATIC ALDEHYDES

**Jurgen Hocker, Cologne, and Rudolf Merten, Leverkusen, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany**

**Filed Nov. 9, 1973, Ser. No. 414,482**
**Claims priority, application Germany, Nov. 11, 1972, 2255290**
**Int. Cl.² C07D *249/00***
**U.S. Cl. 260—308 A** **2 Claims**

1. 2-Hydroxy-4-[4-methyl-5-phenyl-triazol-(2)-yl]-(1,3-diphenyl-2-imidazolidinyl)-benzene.

2. 2-hydroxy-4-[2H-naphto [1,2-d]-triazol-(2)-yl]-(1,3-diphenyl-2-imidazolidinyl)-benzene.

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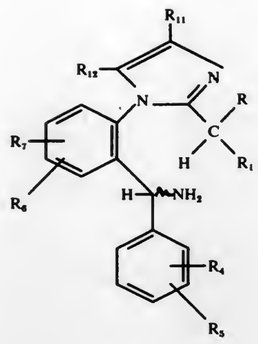
**4,020,085**

## 1-(α-AMINO-α-PHENYL-O-TOLYL)IMIDAZOLES

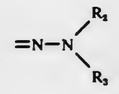
**Martin Gall, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.**

**Division of Ser. No. 475,459, June 3, 1974, Pat. No. 3,970,666. This application Apr. 28, 1976, Ser. No. 681,184**
**Int. Cl.² C07D *233/64, 233/58***
**U.S. Cl. 260—309** **6 Claims**

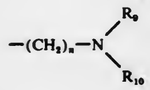
1. A compound of the formula:



wherein R and $R_1$ taken separately are each hydrogen or when taken together represent a group of the formula:



in which $R_2$ is hydrogen or alkyl of 1 to 3 carbon atoms, inclusive and $R_2$ is alkyl as defined above; $R_4$, $R_5$, $R_6$, and $R_7$ are each hydrogen, alkyl as defined above, halo, nitro or trifluormethyl; $R_{11}$ is hydrogen, alkyl as defined above, hydroxymethyl, or a dialkylaminoalkyl of the formula:



in which $R_2$ and $R_{10}$ are each alkyl as defined above and *n* is a whole number from 1 to 3, inclusive; and $R_{12}$ is hydrogen, alkyl as defined above, cyclopropyl, hydroxymethyl or dialkylaminoalkyl as defined above; and the pharmacologicaly acceptable acid addition salts thereof.

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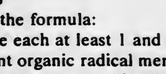
**4,020,086**

## HYDANTOIN-CONTAINING POLYTHIOL COMPOSITIONS

**Charles R. Morgan, Brookeville, Md., assignor to W. R. Grace & Co., New York, N.Y.**

**Division of Ser. No. 461,207, April 15, 1974, Pat. No. 3,945,982. This application Sept. 18, 1975, Ser. No. 614,576**
**Int. Cl.² C07D *233/72***
**U.S. Cl. 260—309.5** **2 Claims**

1. A polythiol of the formula:



wherein *m* and *n* are each at least 1 and *m* and *n* are 2 to 22 and $R_3$ is a polyvalent organic radical member free of reactive carbon-to-carbon unsaturation and is selected from the group consisting of aryl, aralkyl, cycloalkyl, and alkyl groups each of up to 16 carbon atoms and mixtures thereof.



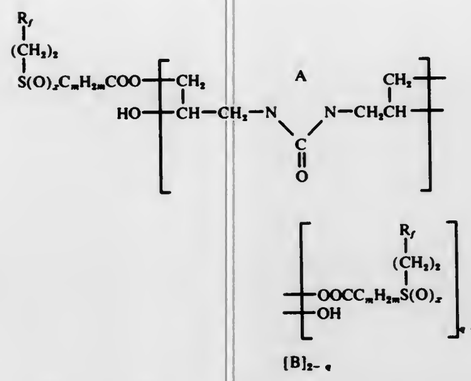
**4,020,087**

## N-IMIDAZOLIDINONE PERFLUOROALKYLCARBOXYLIC ACID ESTER

**Armin Hiestand, Binningen, and Horst Jäger, Bettingen, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

**Division of Ser. No. 436,553, Jan. 25, 1974, Pat. No. 3,914,225. This application Mar. 3, 1976, Ser. No. 663,186**
**Claims priority, application Switzerland, Feb. 2, 1973, 1562/73**
**Int. Cl.² C07D *233/34***
**U.S. Cl. 260—309.7** **6 Claims**

1. A perfluoroalkylcarboxylic acid ester of the formula



wherein $R_f$ represents a perfluoroalkyl radical with 4 to 18 carbon atoms, A represents a radical of the formula



wherein $R_1$ and $R_2$ represent hydrogen or methyl, B is [—O—] or [—OH Cl—], *m* is a whole number from 1 to 3, *q* is 1 or 2 and *x* is 0, 1 or 2, with *x* being 0 or 1 if *m* is 1.

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**4,020,088**

## CONDITIONING OF PERHALOGENO-COPPER PHTHALOCYANINES

**Diether Wessling, Cologne, Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Germany**

**Filed Oct. 14, 1975, Ser. No. 621,798**
**Claims priority, application Germany, Oct. 16, 1974, 2449148**
**Int. Cl.² C09B *47/04***
**U.S. Cl. 260—314.5** **2 Claims**

1. Process for the preparation of a perhalogenocopper phthalocyanine pigment in granular form, characterised in that a perhalogeno-copper phthalocyanine crude pigment having a solids content of about 30 to 45% is introduced into 50 to 150% by weight relative to dry pigment of an aromatic solvent in which is suspended 0.1 to 10% by weight relative to dry pigment of a long-chain alcohol-sulphate, the mixture is heated to 100° to 150° C under pressure, the granules are filtered off and the solvent is washed out or distilled off in steam.

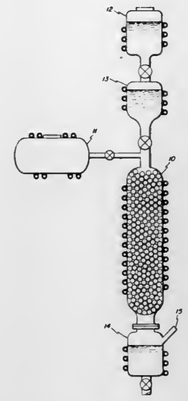
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**4,020,089**

## METHOD FOR MAKING N-ALKYLPHTHALIMIDES

**Ronald L. Markezich, Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.**

**Filed July 1, 1975, Ser. No. 592,190**
**Int. Cl.² C07D *209/34***
**U.S. Cl. 260—326 R** **1 Claim**



1. A continuous method for making N-methylphthalimide which comprises,

1. introducing a gaseous mixture consisting essentially of methylamine and an inert gas into a reaction zone,
2. gravitating fluid phthalic anhydride into the reaction zone of (1) at a temperature of from about 150° C to 500° C,
3. allowing sufficient time to effect reaction between the phthalic anhydride fluid and the gaseous methylamine
4. venting water of reaction from the reaction zone while collecting N-methylphthalimide as it forms therefrom, where the gaseous mixture of step 1 is maintained at a rate which is sufficient to provide at least a slight excess of methylamine in the reactor at all times.

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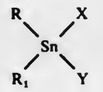
**4,020,090**

## ORGANOTIN COMPOUNDS

**John Desmond Collins, Albrighton; Harold Coates, Wombourn, and Iftikhar Hussain Siddiqui, Birmingham, all of England, assignors to Albright & Wilson Limited, West Midlands, England**

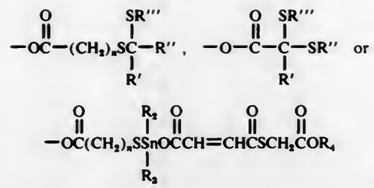
**Continuation-in-part of Ser. No. 308,018, Nov. 20, 1972, abandoned. This application Nov. 19, 1974, Ser. No. 525,119**
**Claims priority, application United Kingdom, Nov. 19, 1971, 53892/71**
**Int. Cl.² C07F *7/22***
**U.S. Cl. 260—429.7** **35 Claims**

1. Chemical compounds of the general formula

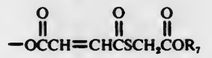


wherein R and $R_1$ are individually selected from the group consisting of alkyl groups containing between 1 and 12 carbon atoms, cycloalkyl and phenyl groups;

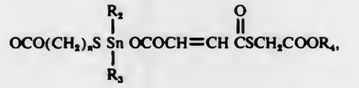
X is a group of the formula



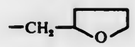
wherein R′ is a hydrogen, $C_1$ to $C_{20}$ alkyl, cycloalkyl, aryl group
R″ is a $C_1$ to $C_{20}$ alkyl, aryl or hydroxyphenyl or methoxyphenyl group or $CH_2COOR_5$ where $R_5$ is an alkyl group of 1 to 8 carbon atoms;
R‴ is $R_6$ or is $(CH_2)_n COOR_6$ where $R_6$ is an alkyl group of from 1 to 20 carbon atoms, a cycloalkyl or an aryl group, *m* is an integer from 3 to 7 and *n* is an integer from 1 to 4;
$R_2$ and $R_3$ are selected from the same group as R;
$R_4$ is selected from the same group as R′;
Y is selected from the same group as X or a member selected from the group consisting of $-S(CH_2)_nCOOR_7$, $-OOCCH{=}CH\ COOR_7$ and $-OOCCH{=}CH\ COSCH_2COOR_7$, with the proviso that Y is



when X is



where $R_7$ is an alkyl group of from 1 to 20 carbon atoms, a cycloalkyl or phenyl group or a group of the formula

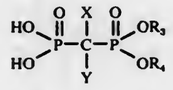


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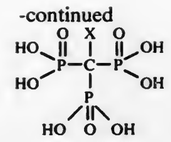
**4,020,091**
**CHELATION**
**Edward G. Budnick, Scotch Plains, N.J., assignor to Plains Chemical Development Co., Scotch Plains, N.J.**
**Division of Ser. Nos. 505,471, Oct. 28, 1965, abandoned, and Ser. No. 813,384, Feb. 28, 1969, and a continuation-in-part of Ser. No. 485,624, Sept. 7, 1965, Pat. No. 3,471,406, Ser. No. 482,257, Aug. 23, 1965, Pat. No. 3,471,552, and Ser. No. 818,802, April 23, 1969, Pat. No. 3,892,676, which is a division of Ser. No. 485,624,. This application Apr. 30, 1970, Ser. No. 33,513**
**The portion of the term of this patent subsequent to Aug. 26, 1986, has been disclaimed.**
**Int. Cl.² C07F** *7/22*
**U.S. Cl. 260—429.7** **6 Claims**

1. Tin salts of polyphosphonic acids having a formula selected from the group consisting of

(a)

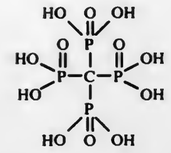


(b)



and

(c)



where X is selected from the group consisting of hydrogen, alkyl, alkenyl, aryl, chloroalkyl, chloroaryl and halogen of atomic weight 35 to 80, Y is selected from the group consisting of hydroxyl, phenyl and halogen of atomic weight 35 to 80 and Z is selected from the group consisting of hydrogen, phenyl and halogen of atomic weight 35 to 80.

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**4,020,092**
**COMPOUNDS BIS(TRIBUTYLTIN)CHROMATE AND BIS(TRIPHENYLTIN)CHROMATE**
**Thomas J. Pullukat, Des Plaines, Ill., assignor to Chemplex Company, Rolling Meadows, Ill.**
**Division of Ser. No. 414,177, Nov. 8, 1973, Pat. No. 3,876,554. This application Nov. 27, 1974, Ser. No. 527,602**
**Int. Cl.² C07F** *7/22*
**U.S. Cl. 260—429.7** **3 Claims**

3. The new compounds of the class consisting of bis(tributyltin) and bis(triphenyltin) chromates.

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**4,020,093**
**METHOD FOR SYNTHESIZING THIOCARBAMIC ACID ESTERS**
**Paolo Koch, S. Giuliano Milanese (Milan), and Bartolomeo Anfossi, Milan, both of Italy, assignors to ANIC S.p.A., Palermo, Italy**
**Filed Apr. 20, 1976, Ser. No. 678,669**
**Claims priority, application Italy, Apr. 23, 1975, 22617/75**
**Int. Cl.² C07C** *155/02*
**U.S. Cl. 260—455 A** **10 Claims**

1. A method for the preparation of esters of thiocarbamic acids comprising the step of reacting carbon monoxide and organic disulphides having the formula R′—S—S—R wherein R and R′, equal to or different from each other, represent hydrocarbon radicals, either unsubstituted or substituted, with compounds having the formula:

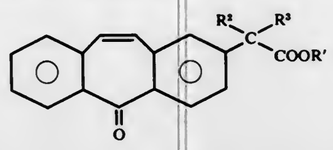
$$X - (A)_n - NH_2$$

wherein A is an arylene radical, either unsubstituted or substituted with halogens, hydrocarbon radicals, alkoxy groups, or it can be an alkylene radical having from 1 to 15 carbon atoms, either straight or branched, unsubstituted or substituted, in which *n* can be 0 or 1, whereas X can be hydrogen, $-NH_2$, or it can be the group $H_2N-Z-$, in which the bivalent function Z derives from alkyl, aryl, cycloalkyl, alkaryl, aralkyl radicals, in their turn unsubstituted or substituted.



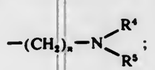
**4,020,094**
**2-SUBSTITUTED-5-OXO-5H-DIBENZO[a,d]CYCLOHEPTENES, THE SALTS AND ESTERS THEREOF, HAVING PHARMACEUTICAL ACTIVITY**
**Peter H. Nelson, and Karl G. Untch, both of Los Altos, Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.**
**Continuation-in-part of Ser. No. 463,211, April 22, 1974, abandoned. This application Mar. 24, 1975, Ser. No. 561,517**
**Int. Cl.² C07C** *65/20, 69/95*
**U.S. Cl. 260—469** **26 Claims**

1. A compound selected from the group of compounds represented by the formula:



(I)

where R′ is hydrogen, alkyl having 1 to 12 carbon atoms, or



*n* is an integer from 2 through 4, inclusive; $R^4$ and $R^5$ are independently lower alkyl having 1 to 6 carbon atoms; one of $R^2$ and $R^3$ is hydrogen and the other is hydrogen, methyl, or ethyl, or together $R^2$ and $R^3$ are methylene; and the pharmaceutically acceptable salts thereof.

26. A compound selected from the group consisting of 2′-carboxyphenyl 2-(5-oxo-5H-dibenzo[a,d]cycloheptene-2-yl)propionate, 2′-carbomethoxyphenyl 2-(5-oxo-5H-dibenzo[a,d]cycloheptene-2-yl)propionate, and phenyl 2-(5-oxo-5H-dibenzo[a,d]cycloheptene-2-yl)propionate.

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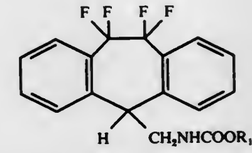
**4,020,095**
**BIS-THIOUREIDO-BENZENES, PREPARATION AND USES THEREOF**
**Teruhisa Noguchi, Tokyo; Keisuke Kohmoto, Tottori, and Kimpei Kato, Ohiso, all of Japan, assignors to Nippon Soda Company Limited, Tokyo, Japan**
**Continuation-in-part of Ser. No. 771,269, Oct. 28, 1968, abandoned. This application July 8, 1976, Ser. No. 703,610**
**Int. Cl.² C07C** *149/40*
**U.S. Cl. 260—470** **21 Claims**

1. A compound selected from the group consisting of
1,2 - bis [(3-methoxycarbonyl) thioureido] benzene
1,2 - bis [(3-ethoxycarbonyl) thioureido] benzene
1,2 - bis [(3-isopropoxycarbonyl) thioureido] benzene
1,2 - bis [(3-isobutoxycarbonyl) thioureido] benzene
3,4 - bis [(3-ethoxycarbonyl) thioureido] toluene
1,2 - bis [(3-ethoxycarbonyl) thioureido]-4-chlorobenzene
1,2 - bis [(3-ethoxycarbonyl) thioureido]-4-nitrobenzene
1,2 - bis [(3-ethoxycarbonyl) thioureido]-4,5-dichlorobenzene
1,2 - bis [(3-ethoxycarbonyl) thioureido]-3,4,6-trichlorobenzene
1,2 - bis [(3-benzyloxycarbonyl) thioureido] benzene
1,2 - bis [(3-betamethoxyethoxycarbonyl) thioureido] benzene
1,2 - bis [3-(2-chloroethoxycarbonyl) thioureido] benzene
1,2 - bis [(3-allyloxycarbonyl) thioureido] benzene
1,2 - bis [3-(2-propynyloxycarbonyl) thioureido] benzene
1,2 - bis [3-(4-chlorophenoxycarbonyl) thioureido] benzene
1,2 - bis [3-(4-methylphenoxycarbonyl) thioureido]-4-chlorobenzene
1,2 - bis [3-(4-chlorophenoxycarbonyl) thioureido]-4-methylbenzene
1,2 - bis [3-(2-naphthoxycarbonyl) thioureido] benzene
1,2 - bis [3-(2-naphthoxycarbonyl) thioureido]-4-nitrobenzene
1 - (3-ethoxycarbonyl-2-thioureido)-2-(3-methoxycarbonyl-2-thioureido) benzene

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**4,020,096**
**10,11,DIHYDRO-N-ALKOXYCARBONYL-10,10,11,11-TETRAFLUORO-5H-DIBENZO[a,d]CYCLOHEPTENE-5-METHYLAMINES**
**Marcia Elizabeth Christy, Perkasie, Pa., assignor to Merck & Co., Inc., Rahway, N.J.**
**Division of Ser. No. 438,924, Feb. 1, 1974, Pat. No. 3,950,423. This application Apr. 17, 1975, Ser. No. 569,134**
**Int. Cl.² C07C** *125/06*
**U.S. Cl. 260—471 C** **2 Claims**

1. A compound of the formula

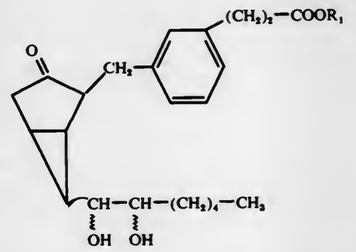


wherein $R_1$ is a loweralkyl substituent, or a derivative thereof wherein one or two of the hydrogens at the 1-, 2-, 3-, 4-, 6-, 7-, 8-, or 9- positions is replaced with a substituent selected from halogen, loweralkyl, loweralkoxy, trifluoromethyl, lower alkylmercapto, loweralkylsulfonyl and dialkylsulfamoyl of from 2–8 carbon atoms.

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**4,020,097**
**BICYCLO [3.1.0]HEXANE-3-ONE DERIVATIVES OF 11-DEOXY PGE**
**Norman A. Nelson, Galesburg, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.**
**Division of Ser. No. 604,158, Aug. 13, 1975, abandoned. This application May 7, 1976, Ser. No. 684,150**
**Int. Cl.² C07C** *69/76*
**U.S. Cl. 260—473 A** **5 Claims**

1. An optically active compound of the formula



or a racemic mixture of that compound and the enantiomer thereof, wherein $R_1$ is hydrogen, alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, or phenyl substituted with one, 2, or 3 chloro or alkyl of one to 4 carbon atoms, inclusive, and wherein ~ indicates attachment of the side chain to the cyclopropane ring in endo or exo configuration and attachment to the side chain in alpha or beta configuration.

**4,020,098**

## PROCESS FOR THE PREPARATION OF 5-SUBSTITUTED RESORCINOLS AND RELATED INTERMEDIATES

**Jacques Gosteli, Basel, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.**

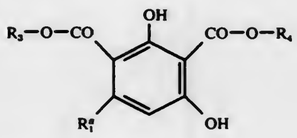
**Division of Ser. No. 419,579, Nov. 28, 1973, abandoned. This application July 9, 1975, Ser. No. 594,412**

**Claims priority, application Switzerland, Dec. 7, 1972, 17825/72**

**Int. Cl.² C07C** *69/76*

**U.S. Cl. 260—473 S** **9 Claims**

1. A compound of the formula IVa



(IVa)

wherein

$R_1$ represents alkyl having 3–12 carbon atoms or phenyl, and $R_3$ and $R_4$ each represents lower alkyl.

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**4,020,099**

## PURIFICATION OF DIPHENYL TEREPHTHALATE

**Vincent P. Kuceski, Chicago, Ill., assignor to The C. P. Hall Company, Stow, Ohio**

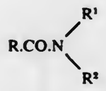
**Continuation-in-part of Ser. No. 269,120, Oct. 10, 1972, abandoned. This application Jan. 27, 1975, Ser. No. 544,259**

**Int. Cl.² C07C** *69/80, 69/82*

**U.S. Cl. 260—475 PN** **3 Claims**

1. The method of purifying a diphenyl phthalate which comprises crystallizing it from a solution which contains a dipolar-aprotic solvent and a hydrocarbon solvent wherein the ratio of the hydrocarbon solvent to the dipolar-aprotic solvent is 1:1 to 20:1, the dipolar-aprotic solvent being selected from the class consisting of

a. amides of the formula



in which R is

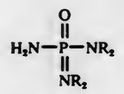
hydrogen, an alkyl group of 1 to 10 carbon atoms, phenyl, tolyl and xylyl; and $R^1$ and $R^2$ are from the class consisting of hydrogen and alkyl groups of 1 to 4 carbon atoms;

b. dimethyl sulfoxide;

c. nitrile of the formula R—C—N in which R is from the class consisting of alkyl groups of 1 to 6 carbon atoms and phenyl;

d. phosphates of the formula RR'R''-O=P-O in which R, R'and R'' are the same or different and are alkyl groups of 1 to 4 carbon atoms;

e. phosphoramides of the formula



in which the R's are methyl or ethyl;

f. N,N'-dialkyl carboxylic acid esters of the formula $R'_2NOC-(CH_2)_3$ to $_4$-COOR in which the alkyl groups are the same or different and contain 1 to 4 carbon atoms; and

g. nitrobenzene.

**4,020,100**

## HYDROXAMIC BETAINES

**William Price Evans, Wirral, and Appayya Raghunath Naik, Birkenhead, both of England, assignors to Lever Brothers Company, New York, N.Y.**

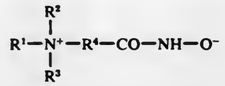
**Continuation of Ser. No. 396,933, Sept. 13, 1973, abandoned. This application Dec. 3, 1975, Ser. No. 637,249**

**Claims priority, application United Kingdom, Sept. 19, 1972, 43274/72**

**Int. Cl.² C07C** *103/70, 101/04*

**U.S. Cl. 260—501.13** **5 Claims**

1. A hydroxamic betaine of the general formula



in which $R^1$ is a monovalent hydrocarbon group having from 1 to 25 carbon atoms, $R^2$ and $R^3$ can be a hydroxyalkyl group having from 1 to 4 carbon atoms, or a monovalent hydrocarbon group having from 1 to 25 carbon atoms, $R^4$ is a bivalent, methylene, ethylene, propylene or butylene group, with the proviso that the betaine contains not more than 45 carbon atoms and at least one carbon chain of at least 12 carbon atoms.

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**4,020,101**

## α-ALKYL-PHOSPHONOSUCCINIC ACID COMPOUNDS AND SEQUESTERING COMPOSITIONS CONTAINING THEM

**Hans Geffers, Cologne; Walter Radt, Leverkusen; Reinhard Schliebs, Cologne, and Hartmut Schulz, Leverkusen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany**

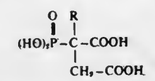
**Continuation of Ser. No. 218,516, Jan. 17, 1972, abandoned. This application Jan. 20, 1975, Ser. No. 542,741**

**Claims priority, application Germany, Mar. 28, 1970, 2015068**

**Int. Cl.² C07F** *9/38*

**U.S. Cl. 260—502.4 R** **7 Claims**

1. α-Alkyl-phosphonosuccinic acid compound of the formula



in which R is lower alkyl, or lower alkenyl or lower alkynyl.

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**4,020,102**

## PRODUCTION OF 2-HYDROXYNAPHTHALENE-3-CARBOXYLIC ACID

**Hans-Juergen Quadbeck-Seeger, Bad Duerkheim, and Helmut Hoch, Wachenheim, both of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany**

**Filed Sept. 25, 1975, Ser. No. 616,684**

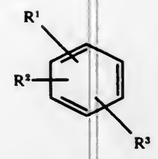
**Claims priority, application Germany, Oct. 19, 1974, 2449779**

**Int. Cl.² C07C** *51/15, 51/48*

**U.S. Cl. 260—520 A** **22 Claims**

1. A process for the manufacture of 2-hydroxynaphthalene-3-carboxylic acid which comprises reacting sodium β-naphtholate or a mixture of sodium β-naphtholate and 0.02 to 0.5 mol, per mol of sodium β-naphtholate, of potassium β-naphtholate with carbon dioxide at a temperature of at least 180° C and at a pressure of 2 to 50 atmospheres in the absence of an organic solvent, and extracting β-naphthol, xanthone, and resins and/or condensation products of naphthol from the reaction mixture in the presence of at least 15 moles of water per mole of starting naphtholate at a pH of from 4 to 8 and at a temperature of from 30° to 120° C with a phenyl compound of the formula (I):





(I)

in which

$R^1$, $R^2$ and $R^3$ are identical or different and each is a hydrogen atom, alkyl of 1 to 6 carbon atoms or a halogen atom, in a ratio of from 0.2 to 1.8 moles of phenyl compound (I) per mole of starting naphtholate and recovering 2-hydroxynaphthalene-3-carboxylic acid from the aqueous phase of the extraction step.

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**4,020,103**

## RECOVERY OF CALCIUM PANTOTHENATE

**Julian Robert Trocki, Bayonne, N.J., assignor to Diamond Shamrock Corporation, Cleveland, Ohio**

**Filed Dec. 24, 1975, Ser. No. 644,080**

**Int. Cl.² C07C** *99/12*

**U.S. Cl. 260—534 A** **10 Claims**

1. A process for recovery of calcium pantothenate comprising:

Adding a mixture of calcium pantothenate in methanol to a still containing a solvent heated to a temperature above the methanol boiling point at an addition rate which balances heat input rate to the still so that methanol evaporates on contact with the hot solvent and calcium pantothenate precipitates as solid particles in the hot solvent.

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**4,020,104**

## PROCESS FOR ISOMERIZING CIS,CIS- AND CIS,TRANS-ISOMERS OF DI-(P-AMINOCYCLOHEXYL)METHANE TO THE CORRESPONDING TRANS,TRANS-ISOMER

**Reinhard H. Richter, North Haven, Conn., assignor to The Upjohn Company, Kalamazoo, Mich.**

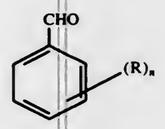
**Filed Sept. 20, 1976, Ser. No. 724,585**

**Int. Cl.² C07C** *85/18, 85/20*

**U.S. Cl. 260—563 B** **7 Claims**

1. A process for the isomerization of the cis-cis- and cis,-trans-isomers of di-(p-aminocyclohexyl)methane to form predominantly the corresponding trans,trans-isomer which comprises

reacting said stereoisomers of di-(p-aminocyclohexyl)methane with a benzaldehyde of the formula:



wherein *n* is an integer from 0 to 3 is an inert substituent to form the corresponding bis-benzaldimine of di-(p-aminocyclohexyl)methane;

contacting said bis-benzaldimine with a base in a polar solvent at ambient temperature to effect isomerization of the cis,cis- and cis,trans-isomers of said bis-benzaldimine to the corresponding trans,trans-isomer; and

subjecting the resulting product to acid hydrolysis to yield di-(p-aminocyclohexyl)methane enriched in trans,trans-isomer.

**4,020,105**

## OXIME

**Norman Ackerley; Peter Albert Mack, and David Harold Johnson, all of Manchester, England, assignors to Imperial Chemical Industries Limited, London, England**

**Filed Sept. 29, 1975, Ser. No. 617,393**

**Claims priority, application United Kingdom, Sept. 30, 1974, 42340/74**

**Int. Cl.² C07C** *131/00, 131/14*

**U.S. Cl. 260—566 A** **2 Claims**

1. 5-Heptyl-2-hydroxybenzaldoximes in which the heptyl group is attached to the benzene ring through a tertiary carbon atom.

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**4,020,106**

## METAL EXTRACTION PROCESS

**Norman Ackerley, and Peter Albert Mack, both of Manchester, England, assignors to Imperial Chemical Industries Limited, London, England**

**Continuation of Ser. No. 340,922, March 13, 1973, abandoned. This application Aug. 12, 1975, Ser. No. 603,968**

**Claims priority, application United Kingdom, Mar. 21, 1972, 13158/72**

**Int. Cl.² C07C** *131/00, 131/14*

**U.S. Cl. 260—566 A** **1 Claim**

1. A mixture of 5-nonyl-2-hydroxy benzaldoximes wherein the nonyl is a mixture of branched chain isomers.

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**4,020,107**

## CATALYTIC REDUCTION OF HALONITROAROMATIC COMPOUNDS

**John R. Kosak, Greenville, Del., assignor to E. I. Du Pont de Nemours and Co., Wilminton, Del.**

**Filed Apr. 7, 1975, Ser. No. 565,945**

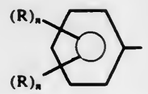
**Int. Cl.² C07C** *85/11;* **C07B** *29/00*

**U.S. Cl. 260—580** **12 Claims**

1. Improved process for minimizing dehalogenation during the catalytic hydrogenation of a mononitro aromatic hydrocarbon having 6 to 14 ring carbon atoms and 1 or 2 halogen atom substituents, at a temperature of 25° to 200° C and a pressure of 100 to 700 psig, the catalyst being a platinum or palladium catalyst, the amount of catalyst being such that the weight ratio of nitro compound being hydrogenated to catalyst metal is between 10,000:1 and 100,00:1, the improvement consisting essentially of carrying out the hydrogenation in the presence of 0.01 to 10 weight %, based on the weight of nitro compound being hydrogenated, of an acidic phosphorus compound of the formula



wherein X is H, OH, $C_{1-12}$alkyl, phenyl or



wherein each *n* is 0 or 1 and R is $C_{1-3}$ alkyl, said amount of acidic phosphorus compound being such that the pH of the reaction mass after hydrogenation is no greater than 3.

**4,020,108**

## SELECTIVE HYDROGENATION OF UNSATURATED COMPOUNDS

**William J. Ehmann, Orange Park, Fla., assignor to SCM Corporation, New York, N.Y.**

**Continuation-in-part of Ser. No. 530,750, Dec. 9, 1974, abandoned, and a continuation-in-part of Ser. No. 530,732, Dec. 9, 1974, abandoned. This application June 30, 1976, Ser. No. 701,149**

**Int. Cl.² C07B *1/00*; C07C *45/00***

**U.S. Cl. 260—586 P** **12 Claims**

1. In a process for the selective catalytic hydrogenation of the unsaturation of unsaturated compounds wherein the hydrogenation is performed in the presence of a cobaloxime catalyst, the improvement which comprises carrying out the hydrogenation in a vehicle of a glyoxime complexing agent for cobalt wherein the molar ratio of said complexing agent to cobalt is at least about 16:1 and the molar ratio of unsaturated compound to cobalt is at least about 100:1.

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**4,020,109**

## STABILIZING ALKANALS

**Raymond N. Fleck, West Covina, and Donald C. Young, Fullerton, both of Calif., assignors to Union Oil Company of California, Brea, Calif.**

**Filed Dec. 26, 1972, Ser. No. 318,176**

**Int. Cl.² C07C *47/02***

**U.S. Cl. 260—601 R** **6 Claims**

1. The method of inhibiting the aldol condensation of an alkanal having from 2 to about 25 carbons and at least one hydrogen on the alpha carbon, in the absence of solvent or in the presence of an organic solvent inert to the inhibitor hereinafter defined, which comprises admixing therewith an inhibitor selected from the group consisting of:

a. finely divided elemental metals having particle sizes sufficiently small to pass a 100 mesh screen and selected from cadmium, indium, thallium, cobalt, nickel, molybdenum, tin, lead, copper and combinations thereof;

b. the finely divided oxides of multivalent metal cations selected from chromous, titanous, vanadous, stannous, cuprous cations and combinations thereof; and

c. salts of oxidizable multivalent metal cations selected from chromous, titanous, vanadous, stannous and cuprous cations, and anions selected from nitrate, sulfate, halide, $C_1$–$C_{12}$ carboxylate and alkyl and aryl sulfonate anions and combinations thereof;

said metals and cations having standard oxidation potentials between −0.20 and +0.41 volts, in an amount from 0.005 to 1.0 weight percent expressed as the metal and based on said alkanal.

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**4,020,110**

## PRODUCTION OF TERTIARY METHYLPHOSPHINE OXIDES

**Bernd Lippsmeier, Huth-Knapsack; Klaus Hestermann, Erftstadt Bliesheim, and Martin Reuter, Frankfurt am Main-Unterliederbach, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany**

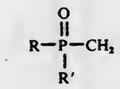
**Filed Mar. 20, 1975, Ser. No. 560,294**

**Claims priority, application Germany, Mar. 22, 1974, 2413823**

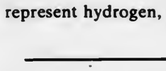
**Int. Cl.² C07F *9/53***

**U.S. Cl. 260—606.5 P** **4 Claims**

1. In the process for making tertiary methylphosphine oxides of the formula



in which R and R′ are identical or different alkyl groups other than a hydroxymethyl group, having from 1 to 6 carbon atoms by rearranging tertiary mono(hydroxymethyl)-phosphines of the formula



in which R and R′ have the meanings given above, in the presence of a catalyst and in the absence of oxygen, water and alcohol at temperatures within the range minus 10° C and plus 250° C, the improvement which comprises using $BF_3$.etherate as catalyst.

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**4,020,111**

## PROPYNYLOXY ALKYL ARENE INSECTICIDES

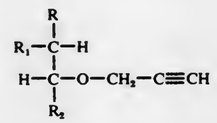
**Douglas J. Hennessy, 47 Grayson Place, Teaneck, N.J. 07666**

**Division of Ser. No. 397,127, Sept. 13, 1973, abandoned, which is a division of Ser. No. 164,411, July 20, 1971, abandoned. This application May 28, 1975, Ser. No. 581,536**

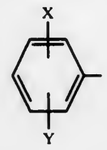
**Int. Cl.² C07C *41/00***

**U.S. Cl. 260—611 A** **7 Claims**

1. A propynyloxy alkyl arene compound represented by the formula



wherein R represents hydrogen or alkyl of not more than three carbon atoms, $R_1$ represents nitro, and $R_2$ represents an aromatic hydrocarbon selected from the class consisting of naphthyl and groups having the structural formula



wherein X and Y represent hydrogen, nitro or halogen other than iodine.

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**4,020,112**

## OXIDATIVE FLUORINATION OF PHENOLS

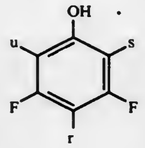
**George Albert Boswell, Jr., Wilmington, Del., and Charles William Tullock, Landenberg, Pa., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Feb. 6, 1975, Ser. No. 547,495**

**Int. Cl.² C07C *43/20***

**U.S. Cl. 260—612 R** **2 Claims**

1. A method for the oxidative fluorination of phenols which comprises reacting a 3,5-difluorophenol of the formula



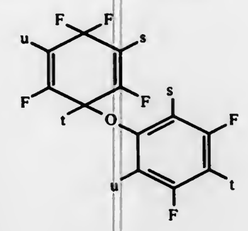
where



*s* and *u*, alike or different, are chlorine, bromine or fluorine, and

*r* is hydrogen, chlorine, or fluorine

with 0.1 to 10 moles per mole of starting phenol of sulfur tetrafluoride in sufficient hydrogen fluoride to keep the reactants in solution at a temperature of 0° to 100° C, thereby forming 1,1,3,5-tetrafluoro-2,4,6-trihalo-4-(3,5-difluoro-2,4,6-trihalophenoxy)-2,5-cyclohexadiene of the structure



where

*s* and *u* are as specified above, and

*t* is chlorine, or fluorine, provided that

when *r* is hydrogen or fluorine, *t is fluorine, and,*

when *r* is chlorine, *t* is chlorine.

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**4,020,113**

## 4,4′-METHYLENEBIS(2,6-DIISOBUTYLPHENOL)

**Gordon D. Brindell, Crystal Lake, and Rudy F. Macander, Cary, both of Ill., assignors to The Quaker Oats Company, Chicago, Ill.**

**Filed Jan. 15, 1972, Ser. No. 253,341**

**Int. Cl.² C07C *39/16***

**U.S. Cl. 260—619 A** **1 Claim**

1. 4,4′-methylenebis(2,6-diisobutylphenol).

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**4,020,114**

## PROCESS FOR SEPARATING BUTADIENE FROM $C_4$ HYDROCARBONS STREAMS OBTAINED BY STREAM-CRACKING

**Carlo Rescalli, and Alessandro Ginnasi, both of San Donato Milanese, Italy, assignors to Snam Progetti S.p.A., San Donato, Milanese, Italy**

**Filed May 21, 1975, Ser. No. 579,714**

**Claims priority, application Italy, May 21, 1974, 23008/74**

**Int. Cl.² C07C *7/00***

**U.S. Cl. 260—681.5 R** **12 Claims**

1. A process for separating butadiene from $C_4$ hydrocarbon streams obtained by steam cracking containing, besides butadiene, $C_4$ linear saturated and olefinic hydrocarbons, isobutylene and acetylenic compounds characterized in that isobutylene is etherified in a first reactor with methanol or another alcohol in presence of an acid ion exchange resin, the acetylenic compounds are etherified with methanol or another alcohol in a second reactor in presence of the same or of different acid ion exchange resin containing mercuric ions in amount also lower than that of the acid ions and thereafter subjecting to distillation operations the ether containing mixture for separating both the saturated and olefinic hydrocarbons and said ethers from butadiene.

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**4,020,115**

## ALKALINE BARIUM ALCOHOLATES

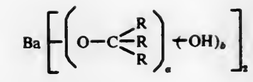
**Ivan Glen Hargis, Tallmadge; Russell Anthony Livigni, and Sundar Lal Aggarwal, both of Akron, all of Ohio, assignors to The General Tire & Rubber Company, Akron, Ohio**

**Division of Ser. No. 593,579, July 7, 1975, Pat. No. 3,992,561. This application Apr. 23, 1976, Ser. No. 679,542**

**Int. Cl.² C07C *29/00*, *31/30*, *35/21***

**U.S. Cl. 260—632 A** **10 Claims**

1. A compound having the formula



where at least one R is a methyl or cyclohexyl radical and where the remaining Rs are selected from the group consisting of alkyl and cycloalkyl radicals having from 1 to 6 carbon atoms which may be the same or different, and where the mol ratio of *a* to *b* is from about 99.5:0.5 to 88:12.

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**4,020,116**

## VAPOR PHASE CATALYTIC PROCESS FOR PREPARING ALPHA, BETA-ETHYLENICALLY UNSATURATED ALCOHOLS

**Thomas H. Vanderspurt, Gillette, N.J., assignor to Celanese Corporation, New York, N.Y.**

**Filed May 12, 1976, Ser. No. 685,610**

**Int. Cl.² C07C *29/14***

**U.S. Cl. 260—638 B** **14 Claims**

1. A selective vapor phase process for preparing alpha, beta-ethylenically unsaturated alcohols which comprises reacting at least one alpha, beta-ethylenically unsaturated aldehyde with a hydrogen-containing gas in the vapor phase in the presence of a supported rhenium catalyst comprising (I) at least one rhenium compound having a formal oxidation number on the rhenium atom of three or less, and (2) at least one support for said rhenium compound, said support having an average pore diameter greater than about 40 A

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**4,020,117**

## ADSORPTIVE RECOVERY SYSTEM FOR METHYL CHLORIDE AND METHYLENE CHLORIDE

**Richard M. Sisson, Washougal, Wash., assignor to Stauffer Chemical Company, Westport, Conn.**

**Continuation of Ser. No. 517,694, Oct. 24, 1974, abandoned, which is a continuation of Ser. No. 317,891, Dec. 26, 1972, abandoned, which is a continuation-in-part of Ser. No. 68,266, Aug. 21, 1970, abandoned. This application Aug. 14, 1975, Ser. No. 603,842**

**Int. Cl.² C07C *17/38***

**U.S. Cl. 260—652 P** **12 Claims**

1. A process for the recovery of methyl chloride and methylene chloride from a methane chlorination reactor effluent containing significant amounts of relatively noncondensable gases comprising cooling the reactor effluent to a temperature of from about −50° C. to about 20° C., passing the cooled reactor effluent to an adsorption stage containing a solid adsorbent material selected from the group consisting of silica gels, activated carbon, activated alumina, molecular sieves and combinations thereof to adsorb the methyl chloride and methylene chloride, stripping the methyl chloride and methylene chloride from the adsoprtion stage at a temperature of from about 100° C. to about 400° C. by the use of methane feed for the chlorination reactor, and subsequently cooling the adsorption stage.

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**4,020,118**

## PROCESS FOR PRODUCING ISOPRENE TRIMERS

**Hiroyuki Morikawa; Takahiro Sato, and Isao Okada, all of Ibaraki, Japan, assignors to Mitsubishi Petrochemical Company Limited, Japan**

**Filed Feb. 11, 1976, Ser. No. 657,308**

**Claims priority, application Japan, Feb. 17, 1975, 50-19591**

**Int. Cl.² C07C *3/035*, *13/27***

**U.S. Cl. 260—666 B** **14 Claims**

1. In a process for producing a cyclic trimer of isoprene by oligomerization of isoprene over a catalyst, the improvement which comprises contacting isoprene a catalyst consisting essentially of:

A. a reducible nickel compound;
B. an aluminum compound of the formula:

$$AlR_m(OR')_{3-m}$$

wherein R and R' respectively represent an alkyl group having from 1 to 10 carbon atoms or an aryl group, and $m$ is an integer of 0 to 3;
C. a reaction product of triethyl phosphite and pentaerythritol; and
D. a monohydric alcohol having from 2 to 6 carbon atoms.

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**4,020,119**

## SELECTIVE HYDROGENATION PROCESS

**Marvin M. Johnson; Donald C. Tabler, and Gerhard P. Nowack, all of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.**

**Division of Ser. No. 390,799, Aug. 23, 1973, Pat. No. 3,900,526, which is a division of Ser. No. 249,726, May 2, 1972, Pat. No. 3,787,511, which is a division of Ser. No. 44,665, June 8, 1970, Pat. No. 3,697,448, which is a continuation-in-part of Ser. No. 6,971, Jan. 29, 1970, abandoned. This application May 5, 1975, Ser. No. 574,824**
**Int. Cl.² C07C *11/02***
**U.S. Cl. 260—677 A** **13 Claims**

1. A process for hydrotreating an acyclic monoolefin feedstream containing undesirable materials including acetylenic compounds, organic sulfur compounds, carbonyl compounds, diolefins, and other unsaturated impurities to selectively hydrogenate said undesirable materials which comprises contacting hydrogen and said feedstream under hydrogenation conditions with a catalyst consisting essentially of an arsenide having empirical formula $MAs_x$, M being iron, or cobalt and $x$ being a number from about 0.6 to about 1.0 at an elevated temperature sufficient to selectively hydrogenate and remove a substantial portion of said undesirable materials present in said feedstream without significant conversion of acyclic monoolefin to saturates and recovering said acyclic monoolefin feedstream substantially reduced in said undesirable materials.

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**4,020,120**

## MODIFIED ZINC FERRITE OXIDATIVE DEHYDROGENATION CATALYSTS

**Harold F. Christmann, Seabrook, and Edward J. Miklas, Conroe, both of Tex., assignors to Petro-Tex Chemical Corporation, Houston, Tex.**

**Division of Ser. No. 502,382, Sept. 3, 1974, Pat. No. 3,998,760. This application Dec. 8, 1975, Ser. No. 638,742**
**Int. Cl.² C07C *11/12***
**U.S. Cl. 260—680 D** **8 Claims**

1. The process of oxidative dehydrogenation of organic compounds having from about 2 to about 20 carbon atoms and at least one



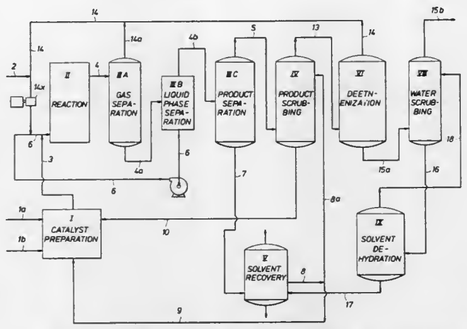
group at temperature of from about 500° to about 1,200° F. and in the presence of from about 0.2 to about 2.0 mols of oxygen per mol organic compound to thereby produce a dehydrogenated compound having the same number of carbon atoms in the presence of a catalyst composition consisting essentially of zinc ferrite having the empirical formula $Zn_xFe_yO_z$ wherein $x$ is from 0.1 to about 2, $y$ is about 0.3 to about 12, and $z$ is about 3 to about 18 and a promoter of magnesium oxide in an amount of from about 0.1 to about 10 wt.% and manganese oxide in an amount of about 0.1 to about 10 wt.% based on the weight of the zinc ferrite composition.

**4,020,121**

## OLIGOMERIZATION REACTION SYSTEM

**Albert T. Kister, and Eugene F. Lutz, both of Houston, Tex., assignors to Shell Oil Company, Houston, Tex.**

**Filed Dec. 15, 1975, Ser. No. 640,597**
**Int. Cl.² C07C *3/10***
**U.S. Cl. 260—683.15 D** **7 Claims**




1. In the process for the oligomerization of ethylene to linear alpha-olefins wherein (1) ethylene is oligomerized by contact in liquid phase at elevated pressure with a solution of an oligomerization catalyst composition comprising catalytically active nickel complex in a polar organic solvent; (2) at least part of the resulting reaction product is separated at elevated pressure into a liquid solvent phase and a liquid hydrocarbon product phase containing dissolved ethylene, catalyst and solvent; and (3) said product phase is separated into unreacted ethylene and ethylene oligomers, the improvement which comprises scrubbing said hydrocarbon product phase, after separation from the solvent phase and while at sufficiently elevated pressure to maintain said ethylene dissolved therein, with sufficient polar organic solvent to remove the residual amount of catalytically active nickel complex from said product phase.

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**4,020,122**

## PROCESS FOR THE PREPARATION OF POLYESTER COMPOSITIONS HAVING INCREASED MELT ELASTICITY

**Willem F. H. Borman, Pittsfield, and John A. Rock, Dalton, both of Mass., assignors to General Electric Company, Pittsfield, Mass.**

**Filed Jan. 5, 1973, Ser. No. 321,266**
**Int. Cl.² C08L *63/00***
**U.S. Cl. 260—835** **8 Claims**

1. A process for increasing the melt elasticity of a high molecular weight linear polyester resin consisting essentially of poly(1,4-butylene terephthalate), said process comprising adding to said high molecular weight resin an organic compound containing at least two epoxide groups to form a mixture of said compound and said resin, the amount of said compound comprising from about 0.1 to about 5% by weight based on the total weight of the mixture, and heating the mixture until the desired increase in melt elasticity is attained.

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**4,020,123**

## POLYAMINE COATING COMPOSITIONS

**Louis E. Trapasso, Watchung, N.J., assignor to Celanese Corporation, New York, N.Y.**

**Filed Dec. 11, 1974, Ser. No. 531,580**
**Int. Cl.² C08G *39/10*, *45/14***
**U.S. Cl. 260—837 R** **11 Claims**

1. A coating composition curable at ambient temperatures comprising a mixture of thermoplastic resin containing a plurality of groups selected from primary and secondary amino groups, and an organic polyester derivative which contains between 2 and about 5 isopropenyl ester groups.



**4,020,124**

## BLENDS OF A POLYPHENYLENE ETHER RESIN, ALKENYL AROMATIC RESINS MODIFIED WITH EPDM RUBBER AND GRAFT POLYMERIZED HIGH RUBBER CONTENT POLYMERS

**Visvaldis Abolins; Glenn D. Cooper, both of, Delmar, and Gim F. Lee, Jr., Albany, all of N.Y., assignors to General Electric Company, Pittsfield, Mass.**

**Division of Ser. No. 443,150, Feb. 15, 1974, Pat. No. 3,981,841. This application Dec. 22, 1975, Ser. No. 642,982**
**Int. Cl.² C08L *51/04*, *31/04***
**U.S. Cl. 260—876 R** **4 Claims**

1. A thermoplastic molding composition which comprises:
a. from 20–65% by weight of a polyphenylene ether resin;
b. from 25–70% by weight of an alkenyl aromatic resin that is modified with a rubbery interpolymer which comprises 10–90 mole percent of ethylene, 10–90 mole percent of an alpha olefin having from 3–10 carbon atoms and from 0.1–10 mole percent of a polyene that is a non-conjugated cyclc or open-chain diene that has from 5–10 carbon atoms; and
c. from 5–20% by weight of a graft copolymer comprising (1) from 20–80% by weight of a back-bone polymer of the units of butadiene or butadiene and styrene, wherein the butadiene units are present in quantities of at least 40% by weight of the backbone polymer, (2) 80–20% by weight of an acrylic monomer graft polymerized to (1) the acrylic monomer units chosen from the group consisting of lower alkyl methacrylates, alicyclic methacrylates and alkyl acrylates, and (3) 0 to 60% by weight of a styrene monomer graft polymerized to (1) sequentially before the polymerization of (2).

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**4,020,125**

## THERMOSETTING RESIN

**Hisao Suzuki, Fujisawa; Akira Musashi; Yoshiyuki Ando, and Tomoyuki Inoue, all of Ichihara, all of Japan, assignors to Nippon Soda Company Limited, Tokyo, Japan**

**Filed Sept. 12, 1972, Ser. No. 288,374**
**Claims priority, application Japan, Sept. 14, 1971, 46-70890**
**Int. Cl.² C08L *75/00***
**U.S. Cl. 260—859 R** **4 Claims**

1. A resin consisting essentially of a reaction product between (1) hydrogenated polybutadienediol which is prepared by hydrogentating polybutadienediol having an average molecular weight of 500 to 20,000 and 85 to 100% of 1,2-configuration, said polybutadienediol having been hydrogenated to the extent that at least 30% of the double bonds contained therein are hydrogenated and (2) an isocyanate compound obtained by the reaction of an organic diisocyanate and a hydroxyalkyl acrylate or an hydroxyalkyl methacrylate, wherein the ratio of isocyanate groups in the diisocyanate to the hydroxyalkyl acrylate or hydroxyalkyl methacrylate is from 1.1:1 to 2.5:1 and the ratio of isocyanate groups in the isocyanate compound to hydroxy groups in the polybutadienediol is from 0.5:1 to 1.2:1.

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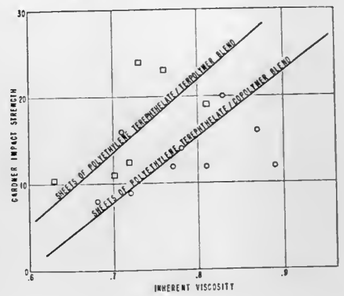
**4,020,126**

## POLYETHYLENE TEREPHTHALATE/TERPOLYMER BLENDS; FILMS, SHEETS, AND ARTICLES MADE USING SUCH BLENDS; AND METHOD OF MAKING TRAYS USING SUCH SHEETS

**Frederick W. Gander, Kennett Square, Pa.; Erhard F. Hoegger, Wilmington, Del., and William P. Kane, Bon Air, Va., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Continuation of Ser. No. 488,826, Aug. 2, 1974, abandoned. This application June 27, 1975, Ser. No. 591,096**
**Int. Cl.² C08G *39/10***
**U.S. Cl. 260—873** **19 Claims**

1. A thermoformable sheet made from a blend including: 99 to 95% polyethylene terephthalate and 1 to 5% of a terpolymer of at least 65% ethylene with (a) at least 5% by weight of a vinyl ester of a lower (1–6 carbon) saturated monobasic aliphatic carboxylic acid and (b) 0.5




to 10% by weight of an acid of the group consisting of acrylic and methacrylic acids, said terpolymer having been made by a free-radical initiated polymerization of a mixture of ethylene, said ester and said acid.

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**4,020,127**

## BIGRAFT COPOLYMERS AND PROCESS FOR THE PREPARATION THEREOF

**Joseph P. Kennedy, Copley, Ohio, and Alain Vidal, Mulhouse, France, assignors to The University of Akron, Akron, Ohio**

**Filed Sept. 9, 1975, Ser. No. 611,634**
**Int. Cl.² C08F *255/06*, *257/02*, *255/02*, *259/04***
**U.S. Cl. 260—878 R** **25 Claims**

1. A bigraft copolymer product comprising:
a polymer backbone selected from the class consisting of saturated and unsaturated hydrocarbon homopolymers, copolymers and terpolymers, such polymers having halogen functionality and
a plurality of at least two different graft polymer branches wherein said polymer branches are formed from monomers selected from the group consisting of monovinyl aromatic compounds having from about 8 to 20 carbon atoms per molecule and isoolefins having from 4 to about 8 carbon atoms per molecule.

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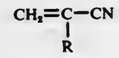
**4,020,128**

## POLYMERIZATES OF OLEFINIC NITRILES AND DIENE RUBBERS

**Walid Y. Aziz, Warrensville; Lawrence E. Ball, Cuyahoga Falls, and George S. Li, Aurora, all of Ohio, assignors to Standard Oil Company, Cleveland, Ohio**

**Filed Feb. 13, 1976, Ser. No. 657,867**
**Int. Cl.² C08F *279/02***
**U.S. Cl. 260—879** **10 Claims**

1. The polymeric composition resulting from the polymerization of 100 parts by weight of
A. from about 60 to 90% by weight of at least one nitrile having the structure



wherein R is hydrogen, a lower alkyl group having from 1 to 4 carbon atoms, or a halogen,
B. from 10 to 30% by weight of an alpha-olefin having the structure



wherein R′ and R″ are alkyl groups having from 1 to 7 carbon atoms, and

C. from 1 to 20% by weight of at least one member selected from the group consisting of indene and coumarone

wherein the given percentages of (A), (B) and (C) are based on the combined weight of (A), (B) and (C) in the presence of from 1 to 40 parts by weight of

D. a rubbery polymer of at least 50% by weight of a conjugated diene monomer selected from the group consisting of butadiene and isoprene and up to 50% by weight of at least one member selected from the group consisting of styrene, acrylonitrile, and ethyl acrylate.

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## 4,020,129
## PRODUCTION OF DITHIOPHOSPHORIC ACID-O,O-DIESTERS

**Hilmar Roszinski; Bernd Lippsmeier, both of Hurth-Knapsack, and Gerhard Hartlapp, Hurth-Hermulheim, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany**

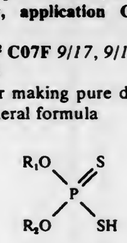
**Filed Apr. 29, 1975, Ser. No. 572,838**

**Claims priority, application Germany, May 3, 1974, 2421462**

**Int. Cl.² C07F** *9/17, 9/173, 9/18, 9/177*

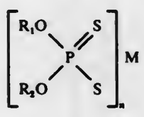
**U.S. Cl. 260—983** **8 Claims**

1. A process for making pure dithiophosphoric acid-O,O-diesters of the general formula



(I)

in which the radicals $R_1$ and $R_2$, being identical or different, each stand for linear and/or branched alkyl, cycloalkyl, alkenyl, alkinyl, aralkyl or aryl radicals having up to 18 carbon atoms, from their salts of the general formula



(II)

in which $R_1$ and $R_2$, respectively, have the meanings given hereinabove, M stands for a metal or ammonium cation, and *n* stands for the valency of the particular cation, which comprises mixing at temperatures within the range −5° and plus 60° C the salts with strong mineral acids having a strength within the range 30 and 90 weight % in the quantity necessary to ensure dissolution of the salts and formation of two separate liquid phases, and separating the two phases from one another.

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## 4,020,130
## SPLASH BAR FOR COOLING TOWER FILL ASSEMBLY

**John C. Ovard, 3465 Ridgeview Drive, Santa Rosa, Calif. 95405**

**Filed Aug. 21, 1975, Ser. No. 606,031**

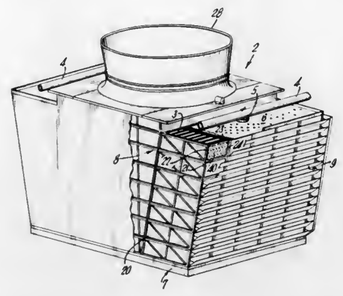
**Int. Cl.² F28C** *1/00*

**U.S. Cl. 261—111** **7 Claims**

1. For use with a crossflow water cooling tower having a hot water distributor for distributing water onto the splash type fill assembly structure, a cold water basin and means for inducing crossflow movement of air therebetween, a combination therewith of splash type fill assembly structure comprising,

a series of elongated generally horizontal fill members;

means supporting the fill members in the space between the hot water distributor and said cold water basin in horizontal and vertical spaced relationship;



said fill members having their longitudinal axis generally parallel with the direction of air flow and said fill members having a substantially flat elongated upper surface element, a substantially flat elongated lower surface element and a connecting elongated substantially vertical surface element, said upper and lower surface elements being substantially parallel to each other and all of said surface elements being perforated throughout for passage and dispersal of liquid falling thereon.

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## 4,020,131
## PREPARATION OF MIXED OXIDE NUCLEAR FUEL

**Melville A. Feraday, Deep River, Canada, assignor to Atomic Energy of Canada Limited, Ottawa, Canada**

**Filed Dec. 1, 1975, Ser. No. 636,678**

**Claims priority, application Canada, Feb. 28, 1975, 221017**

**Int. Cl.² G21C** *21/00*

**U.S. Cl. 264—.5** **4 Claims**

1. A method of making enriched mixed oxide nuclear fuel comprising:

a. sintering green oxide fuel pellets of a first nuclear fuel material in a first stage of sintering until the pellets have a 3–25% open porosity, said sintering being carried out at a temperature in the range 1100° to 1400° C,

b. grinding off the outer surface layer of the pellets,

c. impregnating the pellets with a salt of a second nuclear fuel material in solution, and

d. subjecting the impregnated pellets to a second stage of sintering in the temperature range 1500° to 1700° C to convert the salt of the second nuclear material to oxide of the material.

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## 4,020,132
## CONSTRUCTION JOINT FOR REINFORCED CONCRETE STRUCTURES

**Anthony J. Calini, Rte. No. 1, Guilford, Conn. 06437**

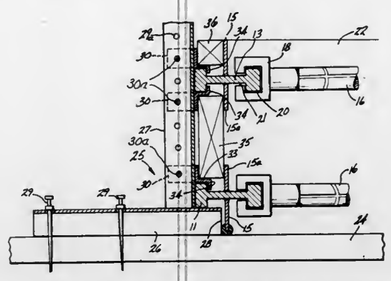
**Continuation of Ser. No. 171,090, Aug. 12, 1971, abandoned.**

**This application Nov. 26, 1975, Ser. No. 635,291**

**Int. Cl.² E04G** *21/00*

**U.S. Cl. 264—34** **5 Claims**

1. A method of connecting a first concrete section to a later poured section on site comprising the steps of providing a form for the first section with a dam at an edge of the first section and providing an elongated rigid coupling member extending along the length of said dam and having integral side edges extending laterally therefrom through said dam and essentially parallel to said member, providing reinforcing bars having coupling means on the ends thereof, said coupling means and said side edges having cooperating interlocking means permitting said coupling means to be joined to said side edges and moved longitudinally for positioning thereon but preventing withdrawal of said coupling means from said side edge, mechanically interlocking said coupling means of said reinforcing bars to said coupling member along the side edge thereof within the formed section with the reinforcing bars



extending substantially perpendicular to said elongated member, and positioning said bars along the length of said coupling member, pouring the first section, removing the dam, mechanically interlocking reinforcing bars to said coupling member along the other side edge thereof and positioning said bars along the length of said coupling member, and pouring the second section.

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## 4,020,133
## ANTI-LUMPING COATING FOR POLYSTYRENE BEADS

**Timothy Altares, Jr., Valencia, Pa., assignor to ARCO Polymers, Inc., Philadelphia, Pa.**

**Filed Aug. 2, 1976, Ser. No. 710,939**

**Int. Cl.² B29D** *27/00*

**U.S. Cl. 264—53** **2 Claims**

1. In a method for the preparation of expandable polystyrene beads, the combination of steps which includes:

preparing an aqueous system containing from about 0.02 to about 1% collagen having an average molecular weight of at least 60,000;

preparing the complex resulting from the interaction of an introduced aluminum ion of a water soluble aluminum salt with said collagen in said aqueous system, the weight concentration of the aluminum ion introduced being from about 20% to about 200% of the weight concentration of the collagen;

agitating and dispersing said complex in said aqueous system;

suspending approximately spherical beads of a polymer which is predominantly polystyrene in said agitated dispersion, relying upon said complex as the major suspending agent, the aqueous suspension of the beads being in an impregnation vessel;

introducing blowing agent into said impregnation vessel containing said aqueous suspension of beads and controlling the sequence of pressure and temperture to impregnate blowing agent into said beads and to cool the impregnated beads, the said blowing agent being selected from the inert organic materials consisting of $C_2$–$C_7$ hydrocarbons, halogenated hydrocarbons having a volatility within the volatility range of said $C_2$–$C_7$ hydrocarbons ethers having a volatility range of said $C_2$–$C_7$ hydrocarbons, and mixtures thereof, said impregnation introducing from about 3% to about 7% blowing agent into said beads;

draining aqueous material from the impregnated beads and removing said impregnated beads from said impregnating vessel and washing the beads, a measurable amount of said complex of collagen and aluminum salt being a wash-resistant deposit on the exterior of the bead;

and withdrawing said washed beads as the product of the method, said beads being suitable for the molding of an article having a predominant volume of cellular polystyrene by steps comprising pre-expanding beads at a temperature in the temperature range embraced by low pressure steam to prepare pre-puffed particles, filling a mold with said prepuffed particles, and subjecting the mold to heating and cooling to form said article, said beads having surface deposits of a complex of an aluminum salt and a collagen having a molecular weight of at least 60,000, said deposits being present on the bead surface in measurable amounts and being adhered sufficiently tenaciously to resist mild washing and said deposits promoting the formation of prepuffed particles having significantly fewer lumps than the prepuffed particles derived from corresponding beads lacking such deposits, and said prepuffed particles passing static electrical tests better than the prepuffed particles derived from corresponding beads lacking such deposits.

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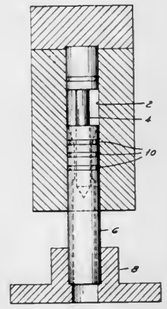
## 4,020,134
## METHOD FOR PREPARING SHAPED, GREEN CERAMIC COMPACTS

**Ronald S. Gordon, Salt Lake City; Ralph W. Sutton, Tooele, both of Utah, and Gerald J. Tennenhouse, Oak Park, Mich., assignors to Ford Motor Company, Dearborn, Mich.**

**Filed Jan. 29, 1975, Ser. No. 545,046**

**Int. Cl.² C04B** *35/64*

**U.S. Cl. 264—63** **19 Claims**



14. A method for preparing shaped, green ceramic compacts suitable for firing to form high density $\beta''$-alumina containing ceramic bodies having a density of between about 45 and about 60 percent of the theoretical density for $\beta''$-alumina comprising:

1. mixing between about 2.5 parts by weight and about 4.5 parts by weight of a ceramic composition comprising at least about 80 weight percent of aluminum oxide, between about 5 and about 15 weight percent of sodium oxide and between about 0.1 and 5 weight percent of lithium oxide, magnesium oxide or a mixture thereof with 1 part by weight of a binder composition consisting essentially of between about 20 weight percent and about 35 weight percent of polyvinyl pyrrolidone having a molecular weight of between about 30,000 and about 50,000 and between about 80 weight percent and about 65 weight percent of ethylene glycol;

2. extruding the mixture so formed through a die of the desired configuration at a pressure of between about 3000 psi and about 50,000 psi at a rate of between about 0.25 inch/min. and for about 50 inch/min.

**4,020,135**

## DYEABLE RUBBER PRODUCTS

**V. Lindsay Chase, Butler, N.J., assignor to J. P. Stevens & Co., Inc., New York, N.Y.**

**Filed Sept. 29, 1975, Ser. No. 617,615**
**Int. Cl.² D01F 1/06**
**U.S. Cl. 264—78** **6 Claims**

4. A process for preparing rubber threads which are receptive to disperse dyes comprising mixing 100 parts by weight of uncured rubber with about 2 to 15 parts by weight of powdered dimethyl terephthalate, forming the mixture of rubber and dimethyl terephthalate into thin sheets, curing the rubber in said sheets and slitting said sheets to form threads.

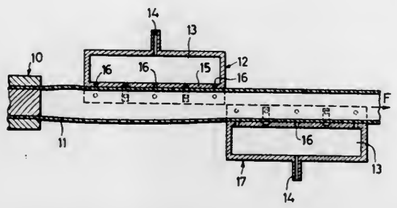
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**4,020,136**

## METHOD AND APPARATUS FOR THE SIZING OF TUBULAR BODIES OF A THERMOPLASTIC MATERIAL WHICH ARE CONTINUOUSLY EXTRUDED

**Giosue Zaro, Via Adua, 21, Lonate Pozzolo, Varese, Italy**

**Continuation-in-part of Ser. No. 27,333, April 10, 1970, abandoned. This application Sept. 14, 1972, Ser. No. 289,140**
**Claims priority, application Italy, Apr. 12, 1969, 15501/69**
**Int. Cl.² B29C 17/07**
**U.S. Cl. 264—89** **10 Claims**




1. A method for the sizing of a tubular blank of a thermoplastic material in a sizing tool, said method comprising extruding the tubular blank through an extrusion head from which the blank exits in a plastic state, and subjecting the plastic blank to the action of a vacuum, in sequence, first over no more than a fraction of its outer surface so as to press said fraction only against part of the sizing tool which is provided with a cross-sectional outline for said fraction of the finished tubular article, and subsequently subjecting the balance of the plastic blank to a vacuum to press said balance against the balance of the sizing tool to give the balance of the blank its finished shape, that part of the blank which is not subjected to vacuum being subjected to ambient atmospheric conditions.

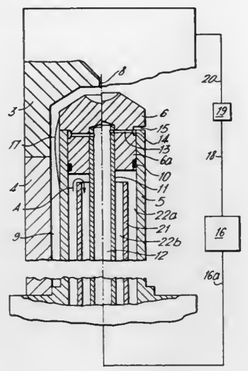
6. A device comprising an extrusion head for extruding a tubular blank of thermoplastic material, first and second sizing tools arranged in sequence downstreams of said head and angularly displaced with respect to one another around the longitudinal axis of the extruded blank, said tools being located at such a distance from the extrusion head that the thermoplastic material is plastically deformable when received by said tools, each of said two tools having a cross-sectional profile substantially corresponding to a corresponding fraction of a cross-sectional profile desired for a finished extrudate, said tools each having a set of openings adapted for communication with a vacuum source.

**4,020,137**

## METHOD OF INJECTION MOULDING HOLLOW PREFORMS

**Otto Lachner, Kempten; Ludwig Beyerlein, Lenzfried, and Klaus Spelthahn, Kempten, all of Germany, assignors to Lever Brothers Company, New York, N.Y.**

**Continuation of Ser. No. 423,953, Dec. 12, 1973, abandoned. This application June 23, 1975, Ser. No. 589,316**
**Int. Cl.² B29C 17/07; B29F 1/00**
**U.S. Cl. 264—90** **3 Claims**




1. A method for injection moulding a hollow preform of thermo-plastic material comprising the steps of:

a. heating the thermo-plastic material to a desired injection moulding temperature;

b. injecting the heated thermo-plastic material under pressure through an injection nozzle into an injection mould having an annular core cavity formed by the presence of a mandrel having a blowing channel therein and an outlet communicating with the annular core cavity and a valve means displaceable to open and close said outlet to allow a desired intermittent communication between the blowing channel and annular core cavity, said communication being closed throughout the injection moulding of thermo-plastic material;

c. applying a vacuum within the blowing channel before the injection pressure on the preform is released to prevent leakage of air through the outlet, where not closed in an airtight manner, from the blow channel into the annular core cavity;

d. maintaining the application of said vacuum within said blowing channel until the preform has completely cooled to set, whereby separation of said preform from said mandrel due to shrinkage is prevented;

e. removing the hollow preform from the injection mold while being carried on the mandrel; and

f. adjusting the temperature of the preform to that required for its subsequent processing while the preform is in contact with the mandrel.

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**4,020,138**

## CAST IMPREGNATED MOLDING PLATE FOR MOLDING PRINTING PLATES

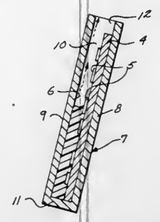
**Raphael Daniel Nettesheim, New Berlin, and Robert R. Guyer, Hartland, both of Wis., assignors to Schwaab, Inc., Milwaukee, Wis.**

**Filed June 9, 1975, Ser. No. 584,696**
**Int. Cl.² B29C 13/04**
**U.S. Cl. 264—130** **7 Claims**

I. A method of making a molding plate for use in molding a printing plate, comprising the steps of placing a type form sheet having a surface bearing raised indicia in a mold cavity with the sheet being at an acute angle to the vertical and said indicia facing upwardly, said surface being spaced from a wall



of the mold to provide a clearance therebetween, applying a coating of graphite to said surface of the type form sheet, introducing a liquid thermosetting resin into said cavity with the air expelled into said clearance and being discharged from




the upper end of the cavity, curing the resin to form a cured thermosetting resin molding plate having a molding surface with recessed indicia, and impregnating the graphite into the mold surface during curing of said resin.

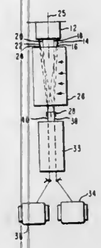
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**4,020,139**

## PROCESS FOR MELT SPINNING A PLURALITY OF ECCENTRIC SHEATH-CORE FILAMENTS

**Roger Allen Ross, and Donald Rittler Strachan, both of Martinsville, Va., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Apr. 1, 1976, Ser. No. 672,714**
**Int. Cl.² B29F 3/10; B32B 31/30**
**U.S. Cl. 264—171** **10 Claims**



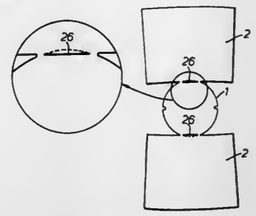

1. In a process of melt spinning a plurality of filaments each having a core component eccentrically disposed within a sheath component, the eccentricity of the core component within the sheath component providing the sheath component with a cross section varying from a thin region to a thick region relative to one another, gas quenching said filaments and converging said filaments together into yarn, wherein the converging filments stick together where a thin sheath region of one filament contacts a thin sheath region of another filament, but wherein sticking does not occur between contacting thin-thick or thick-thick regions of respective contacting filaments, the improvement comprising selecting the filaments to be converged into said yarn to avoid contact between the thin sheath regions of the filaments during convergence, the number of filaments required for said yarn being at least three and requiring the convergence into at least one bundle to avoid said contact, said one bundle being said yarn when the number of filaments therein is equal to the number required for said yarn, and when more than one bundle is formed by said convergence to obtain avoidance of said contact, converging the resultant bundles together into said yarn, whereby neither the thin sheath regions nor any other regions of the filaments in said yarn stick together.

**4,020,140**

## METHOD OF MAKING A FRUSTO-CONICAL CONTAINER HAVING REDUCED DISTORTION TENDENCIES FROM A BLANK SEAMED BY INJECTION MOLDING

**Kenneth Francis Rumball, Great Bookham, England, assignor to Airfix Industries Limited, London, England**

**Filed June 2, 1975, Ser. No. 582,898**
**Int. Cl.² B29D 23/02; B29F 1/10**
**U.S. Cl. 264—261** **3 Claims**




1. In the method of making from a substantially planar blank of paper, card or board material a container having at least a part thereof of a curved shaped and juxtaposed edges of the blank joined together by a seam of injected molded material and wherein during the making of the container the blank is constrained in a blank cavity with its edges juxtaposed in a mold cavity, said cavities conforming to the final shape of the finished container and being defined between closed core and cavity tools of an injection molding machine, a curved part of one of said tools being on the concave side of the curved part of said blank and a complementarily curved part of the other of said tools being on the convex side of the curved part of said blank, said blank material having inherent resiliency tending to return it to its planar condition when constrained to a curved shape, the improvement comprising providing the surface of the mold tool on the concave side of the curved part of the blank with surface deforming means and providing the other mold tool with a substantially smooth surface, pressing the mold tools against the inner and outer surfaces of the blank until the concave side of the curved part of the blank is deformed by said surface deforming means, and thereafter injecting molten plastic material into said mold cavity to seam the juxtaposed edges of the blank material, the surface deformation of the concave side of the blank material by said surface deforming means being sufficient to reduce the inherent resiliency of the blank tending to return it to its planar condition and thereby reduce the strain on each seam between juxtaposed edges of the blank due to said inherent resiliency of said blank material.

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**4,020,141**

## METHOD OF MAKING HEAT-SEALABLE, HEAT-SHRINKABLE, BIAXIALLY ORIENTED POLYESTER FILM

**James Maurice Quinn, Chillicothe, Ohio, and Allen Gregg Kirk, Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Division of Ser. No. 478,972, June 13, 1974, abandoned, which is a continuation-in-part of Ser. No. 397,311, Sept. 14, 1973, abandoned. This application Mar. 5, 1975, Ser. No. 555,447**
**Int. Cl.² B29D 7/24**
**U.S. Cl. 264—289** **2 Claims**

1. A method of making a heat-sealable, heat-shrinkable biaxially oriented polyester film, such film being usable in making shrink packages having improved seals and improved optics, such method including the steps of:

forming a polymer consisting primarily of poly(ethylene terephthalate) with additional monomeric units selected from a second glycol and/or a second acid such polymer having a relative viscosity (at 1% concentration in 60/40 tetrachloroethane/phenol at 30° C.) of at least 1.80 and a melting point of from about 215° C. to 230° C.;

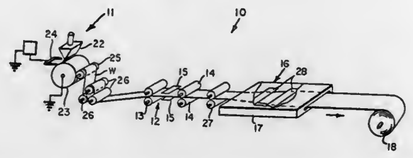
casting a molten web of the polymer onto a cooled quenching surface to cool it below its glass transition temperature and thereby form a film;

stripping the film from the quenching surface;

heating the film to a temperature from about 60° to 80° C. by passage between and contact with slow nip rolls of a nip-roll stretcher;

further heating the film to a temperature from about 65° to 85° C. by radiant heat after emergence from the slow nip rolls, but before engagement with fast nip rolls of the nip-roll stretcher;

stretching the film in the machine direction by a stretch ratio from about 2.5 to 3.6 by maintaining the peripheral



velocity of the fast nip rolls greater than the slow nip rolls by a factor equivalent to the stretch ratio, the stretching span being substantially less than the distance between the slow and fast nip rolls;

preheating the film from about 50° to 80° C. prior to entering a tenter frame for transverse stretching;

stretching the film in the tenter frame while heating such film at from about 50° to 85° C. so that the portion of the film subjected to stretching is stretched in the cross-machine direction by a factor of from about 2.9 to 4.0;

further heating the stretched film in the tenter frame to a temperature from about 65° to 100° C. while permitting the film to relax in width by a factor from about 0 to 5.0% its stretched width.

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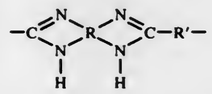
**4,020,142**

## CHEMICAL MODIFICATION OF POLYBENZIMIDAZOLE SEMIPERMEABLE

**Howard J. Davis, and Norman W. Thomas, both of Warren, N.J., assignors to Celanese Corporation, New York, N.Y.**

**Filed Aug. 21, 1975, Ser. No. 606,617**
**Int. Cl.² C08G *73/18*; B01D *39/00***
**U.S. Cl. 264—347** **19 Claims**

1. A process for chemically modifying a preformed polybenzimidazole semipermeable membrane wherein said polybenzimidazole is soluble in N,N-dimethylacetamide and consists essentially of recurring units of the formula:



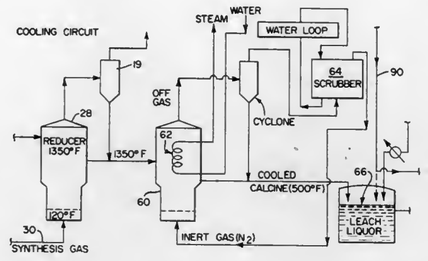
wherein R is a tetravelent aromatic nucleus, with the nitrogen atoms forming the benzimidazole rings paired upon adjacent carbon atoms of said aromatic nucleus, and R′ is selected from the group consisting of (1) an aromatic ring, (2) an alkylene group having from 4 to 8 carbon atoms, and (3) a heterocyclic ring selected from the group consisting of (a) pyridine, (b) pyrazine, (c) furan, (d) quinoline, (e) thiophene, and (f) pyran, comprising contacting said membrane with a strong polybasic acid having a $pK_A$ value below 4 or its acid halide which is dissolved in a relatively mild acid medium having a $pK_A$ value of about 4 to 5 in a concentration sufficient to form a cross-linked polybenzimidazole which is not soluble in N,N-dimethylacetamide wherein said polybasic acid or acid halide reacts with the imidazole groups of said polybenzimidazole membrane.

**4,020,143**

## USE OF RAW MANGANESE NODULES FOR OXIDATION LEACHING OF REDUCTIVELY ROASTED MANGANESE NODULES

**Robert E. Lueders, Needham; Roger N. Kust, Acton, both of Mass., and Lester J. Szabo, York, Canada, assignors to Kennecott Copper Corporation, New York, N.Y.**

**Filed Aug. 26, 1974, Ser. No. 500,492**
**Int. Cl.² C01G *3/14*, *51/12*, *53/12*, *39/00***
**U.S. Cl. 423—32** **46 Claims**




1. A process for treating a manganese ore containing copper and nickel base metal values to enable the copper and nickel base metal values in the ore to be recovered comprising the steps of calcining the ore to convert the $MnO_2$ to intermediate oxides of manganese, reducing the calcined ore to convert the intermediate oxide of manganese to MnO, leaching the reduced ore with an ammoniacal-ammonium carbonate leach solution to produce a leach solution containing copper and nickel metal values, and oxidizing metal values in the leach solution with raw manganese nodules to convert metal values in the leach solution to a higher oxidation state and to enable the metal values in the raw nodules to be leached in the leach solution.

12. A process for treating a manganese ore containing copper and nickel base metal values to enable the copper and nickel base metal values in the ore to be recovered comprising the steps of:

a. grinding the ore;

b. drying the ground ore to remove free moisture;

c. calcining the ground, dried ore in a fluid bed to remove remaining free moisture and combined moisture and to convert the $MnO_2$ in the ore to intermediate oxides of manganese;

d. reducing the ground, dried, calcined ore in a fluid bed reducer to convert the oxides of manganese in the ore to MnO;

e. introducing the reducer product from the fluid bed reducer into an ammonia-ammonium carbonate leach liquor containing cupric copper to oxidize the metals in the reducer product to a higher oxidation state in which they become solubilized in the leach liquor while the cupric copper is reduced to cuprous copper; and,

f. oxidizing the cuprous copper produced in step (d) with raw manganese nodules to convert the cuprous copper to cupric copper and to enable the metal values in the raw nodules to be leached.

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**4,020,144**

## METHOD FOR REMOVAL OF GASEOUS SULFUR AND NITROGEN COMPOUNDS FROM GAS STREAMS

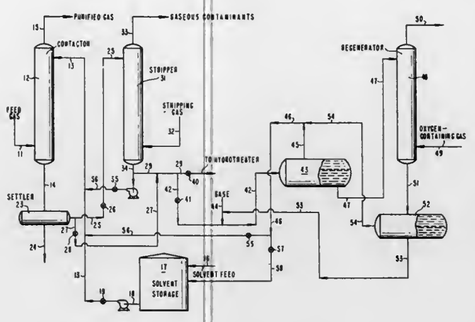
**David S. Bosniack, Baytown, Tex., assignor to Exxon Research and Engineering Company, Linden, N.J.**

**Continuation-in-part of Ser. No. 574,182, May 2, 1975, abandoned. This application Mar. 1, 1976, Ser. No. 662,793**
**Int. Cl.² B01D *53/34***
**U.S. Cl. 423—226** **25 Claims**

1. A process for removing a gaseous constituent selected from the group consisting of gaseous sulfur and nitrogen compounds from a mixture of gases containing said gaseous constituent in combination with at least one other gas comprising:

a. contacting said mixture of gases with a liquid organic solvent in a contacting zone, said solvent comprising at least one compound of the formula $R_1 — S — S — R_2$ wherein $R_1$ and $R_2$ are selected from the group consisting






of straight and branched chain aliphatic radicals having from 1 to about 15 carbon atoms, cycloaliphatic radicals having from 3 to about 20 carbon atoms, and aryl radicals having from 6 to about 42 carbon atoms; and

b. withdrawing gas from which said gaseous constituent has been removed from said contacting zone.

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**4,020,145**

## CARBON FIBER PRODUCTION

**John W. Soehngen, Berkeley Heights, and Albert G. Williams, West Orange, both of N.J., assignors to Celanese Corporation, New York, N.Y.**

**Continuation of Ser. No. 324,695, Jan. 18, 1973, abandoned. This application Mar. 12, 1975, Ser. No. 557,519**
**Int. Cl.² C01B *31/07***
**U.S. Cl. 423—447.4** **21 Claims**

1. A process for producing a pyrolyzed carbonaceous filamentary material comprising:

a. providing a homogeneous molten blend comprising 1 part by weight of polystyrene exhibiting a number average molecular weight of about 100,000 to 300,000 and 0.25 to 1.5 part by weight of pitch exhibiting a mean molecular weight of about 400 to 2,000,

b. extruding said homogeneous molten blend through a spinneret having at least one extrusion orifice,

c. passing the resulting extruded molten blend in the direction of its length through a solidification zone provided with a gaseous atmosphere at a temperature below 80° C. wherein said extruded molten blend is transformed to a solid filamentary material,

d. hot drawing said resulting solid filamentary material at least 2 times its as-spun length while maintained below the temperature at which coalescence of filaments occurs,

e. thermally stabilizing said resulting hot drawn filamentary material to render the same capable of undergoing carbonization, said thermal stabilization comprising the sulfonation of said hot drawn filamentary material, and

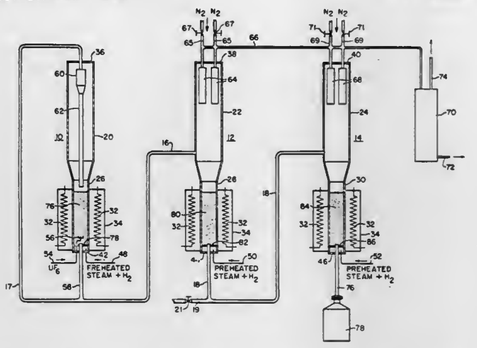
f. heating said resulting stabilized filamentary material to a temperature of at least 1000° C. in an inert atmosphere where it is maintained until a pyrolyzed carbonceous filamentary material is formed which contains at least about 98 percent carbon by weight.

**4,020,146**

## PRODUCTION OF URANIUM DIOXIDE

**Irving E. Knudsen, Murrysville, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Continuation-in-part of Ser. No. 843,062, July 18, 1969, abandoned. This application July 5, 1973, Ser. No. 376,847**
**The portion of the term of this patent subsequent to Dec. 15, 1987, has been disclaimed.**
**Int. Cl.² C01G *43/02*; G21C *3/00***
**U.S. Cl. 423—261** **9 Claims**




8. A process for converting uranium hexafluoride continuously to high quality ceramic-grade uranium dioxide having very low residual fluoride values comprising the steps of:

a. establishing and maintaining in contact with a first fluidized bed a gaseous mixture of from about 18 to 24 lbs./hr. of $UF_6$, about 6.3 lbs./hr. of steam and of from about 0.48 to 0.55 lbs./hr. of hydrogen,

b. concurrently heating the bed to a temperature ranging from about 475° to about 600° C to produce first intermediate reaction products including $UO_2F_2$ and $U_3O_8$,

c. conveying the first intermediate reaction products to a second fluidized bed,

d. establishing and maintaining a second fluidized bed comprising a mixture of the intermediate reaction products from step (b) in contact with steam ahd hydrogen, there being introduced about 12.8 lbs./hr. of steam and about 0.38 lbs./hr. of hydrogen,

e. concurrently heating the second fluidized bed to a temperature ranging from about 575° to 650° C to produce second intermediate reaction products including $U_3O_8$ and $UO_2$,

f. conveying the second intermediate reaction products to a third fluidized bed,

g. establishing and maintaining a third fluidized bed comprising a mixture of the second-intermediate reaction products from step (e) in contact with steam and hydrogen, there being introduced about 12.8 lbs./hr. of steam and about 0.38 lbs./hr. of hydrogen, and

h. concurrently heating the third fluidized bed to a temperature ranging from 575° to 650° C to produce fine particles of ceramic-grade $UO_2$ capable of being readily formed into compacts and fired into pellets having a density of 90 to 96% of theoretical density and having residual fluorine values of not over about 0.015 weight percent.

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**4,020,147**

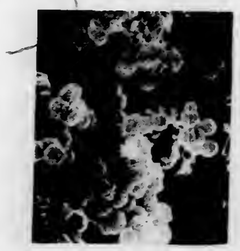
## METHOD FOR PREPARING CATHODOCHROMIC SODALITE

**Igal Shidlovsky, Princeton, N.J., assignor to RCA Corporation, New York, N.Y.**

**Filed June 2, 1975, Ser. No. 583,185**
**Int. Cl.² C01B *33/26*; C09K *11/08***
**U.S. Cl. 423—329** **10 Claims**

1. In a hydrothermal growth process for preparing sodalite particles which includes the steps of uniformly heating a

sealed reaction tube containing a water slurry of $Al_2O_3$, $SiO_2$, NaOH and NaX wherein X is at least one member of the group consisting of Cl—, Br—, and I—; continuing said uniform heating for an extended period of time to allow for the dissolution of $Al_2O_3$ and $SiO_2$; and rapidly cooling said reaction tube so as



to precipitate uniform sized spherical particles of sodalite having a particle size of less than 7 microns, wherein the improvement comprises:

uniformly heating said sealed reaction tube to a temperature of less than or equal to 325° C.

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**4,020,148**

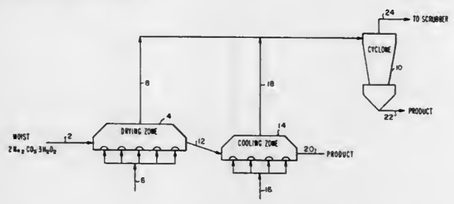
## PROCESS FOR DRYING SODIUM CARBONATE PEROXIDE

**Richard A. Mohr, Martinsville; Sushil K. Bhalla, Princeton, both of N.J., and Peter H. Zeh, Williamsville, N.Y., assignors to FMC Corporation, Philadelphia, Pa.**

**Filed July 15, 1975, Ser. No. 596,200**

**Int. Cl.² C01B 15/10**

**U.S. Cl. 423—415 P** **4 Claims**




1. In a process of manufacturing a dry, free-flowing, crystalline sodium carbonate peroxide product by reacting hydrogen peroxide and sodium carbonate in an aqueous medium, crystallizing, recovering and drying the resulting moist sodium carbonate peroxide product, the improvement in reducing the loss of active oxygen during drying which comprises:

a. passing the moist sodium carbonate peroxide into a drying zone, passing a heated gas stream at a temperature between 70° and 150° C into said drying zone, maintaining the temperature of the exit gas from said drying zone at a reduced temperature between 50° and 130° C, maintaining the sodium carbonate peroxide within said drying zone in contact with said heated gas stream until the sodium carbonate peroxide contains between 0.05 and 0.5% by weight residual moisture;

b. rapidly cooling the hot sodium carbonate peroxide by passing the dried sodium carbonate peroxide into a cooling zone, passing a gas stream at a temperature between −20° and 40° C into said cooling zone, maintaining the temperature of the exit gas from said cooling zone at an increased temperature between 0° and 50° C; maintaining the sodium carbonate peroxide within said cooling zone in contact with said gas stream until the sodium carbonate peroxide is cooled to between 0° and 40° C, and the sodium carbonate peroxide has a lowered residual moisture content, and recovering the cooled material as a stable, dry, free-flowing, crystalline sodium carbonate peroxide product containing between 0.001% and 0.20% by weight residual moisture.

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**4,020,149**

## PROCESS FOR THE PRODUCTION OF SULFUR

**David S. Bosniack, Baytown, Tex., assignor to Exxon Research and Engineering Company, Linden, N.J.**

**Continuation-in-part of Ser. No. 574,182, May 2, 1975, abandoned. This application Mar. 1, 1976, Ser. No. 662,792**

**Int. Cl.² C01B 17/04**

**U.S. Cl. 423—575** **8 Claims**

1. A process for producing elemental sulfur comprising:

a. reacting hydrogen sulfide with sulfur dioxide in the presence of a liquid organic solvent in a reaction zone, said solvent comprising at least one compound of the formula $R_1 — S — S — R_2$ wherein $R_1$ and $R_2$ are selected from the group consisting of straight and branched chain aliphatic radicals having from 1 to about 15 carbon atoms, cycloaliphatic radicals having from 3 to about 20 carbon atoms, and aryl radicals having from 6 to about 42 carbon atoms; and

b. separating elemental sulfur from said solvent.

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**4,020,150**

## ADMINISTRATION OF SILVER SULFADIAZINE AND RADIOACTIVE DERIVATIVES THEREOF

**Michael S. Wysor, New York, N.Y., assignor to Michael Ebert, Mamaroneck and Eugene J. Kalil, New York, both of, N.Y., part interest to each**

**Continuation-in-part of Ser. No. 415,637, Nov. 14, 1973, abandoned. This application Dec. 19, 1974, Ser. No. 534,288**

**Int. Cl.² A61K 43/00, 31/63; A61L 13/00**

**U.S. Cl. 424—1** **4 Claims**

1. A method of treating systemic infections such as malaria comprising the step of administering an aqueous suspension of insoluble silver sulfadiazine particles orally or subcutaneously in a dosage which is effective against the infection and has minimal toxicity.

3. A method of eradicating neoplastic tissue in living bodies comprising the steps of internally administering an aqueous suspension of insoluble particles consisting essentially of a radioactive derivative of silver sulfadiazine in a dosage of minimal toxicity which is sufficient to cause said particles to lodge in said tissue and eradicate same.

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**4,020,151**

## METHOD FOR QUANTITATION OF ANTIGENS OR ANTIBODIES ON A SOLID SURFACE

**Gunner Bolz, Santa Clara; Fred H. Deindoerfer, Northridge; Chun P. Hu, Santa Clara; Naomi Kameda, Foster City, and Robert Wang, San Jose, all of Calif., assignors to International Diagnostic Technology, Inc., Santa Clara, Calif.**

**Filed Feb. 17, 1976, Ser. No. 658,298**

**Int. Cl.² G01N 33/00, 33/16; G21H 5/02**

**U.S. Cl. 424—1.5** **10 Claims**

1. In a method for quantitation of antigens or antibodies in a liquid sample, the steps of

a. sorbing said sample antibody or antigen directly onto an immunologically unreactive solid support surface sorptive for said sample antibody or antigen,

b. exposing the sorbed surface to an aqueous reagent including an excess of labelled specific antibody or antigen immunologically reactive with said sample antigen or antibody to cause said immunological reaction to occur on said surface,

c. removing the unreacted reagent from said surface, and

d. measuring the quantity of reacted labelled antigen or antibody on said surface.



**4,020,152**

## BARIUM TITANATE AND BARIUM ZIRCONATE IN RADIOLOGICAL CONTRAST PRODUCTS

**Fernand Alfred Désiré Heitz, Saint-Mande, France, assignor to Thann & Mulhouse, Thann, France**

**Filed Dec. 19, 1973, Ser. No. 426,016**

**Claims priority, application France, Dec. 19, 1973, 73.45166**

**Int. Cl.² A61K 29/02**

**U.S. Cl. 424—4** **24 Claims**

1. An orally administrable radiological contrast product comprising an aqueous suspension containing from two to twenty parts by weight of barium titanate of the formula $BaTiO_3$ in from two to twenty parts by weight of water and a stabilizing agent selected from the group consisting of methyl cellulose, ethyl cellulose, gum arabic, gelatin and agar-agar.

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**4,020,153**

## CYCLIC SULPHONAMIDES AND SULPHINAMIDES HAVING A PHYSIOLOGICAL COOLING EFFECT

**David G. Rowsell, Staines, and David J. Spring, Datchet, both of England, assignors to Wilkinson Sword Limited, England**

**Filed July 20, 1973, Ser. No. 381,099**

**Claims priority, application United Kingdom, July 20, 1972, 33993/72**

**Int. Cl.² A61K 7/16, 31/18**

**U.S. Cl. 424—49** **11 Claims**

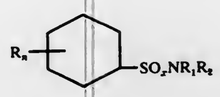
1. In a comsumer product manufactured for application to or consumption by the human person and being:

a. a personal care product comprising a topically or orally administrable base medium containing a flavourant, perfume or antiseptic ingredient;

b. a pharmaceutical preparation comprising a topically or orally administrable base medium containing a pharmaceutically active ingredient; or

c. a tobacco-containing consumer product;

said consumer product is also containing an ingredient capable of stimulating the cold receptors of the nervous system of the surface tissues of the body when brought into contact therewith by application or consumption of the said consumer product, the improvement which comprises using as the cold receptor stimulating ingredient an effective amount of a cold receptor stimulating cyclic sulphonamide or sulphinamide of the formula:



where

R is $C_1$–$C_5$ alkyl;

$R_1$ and $R_2$, when taken separately, are each hydrogen, $C_1$–$C_6$ alkyl or $C_1$–$C_6$ hydroxyalkyl, and together provide a total of no more than 6 carbon atoms, with the proviso that when $R_1$is hydrogen $R_2$ may also be alkylcarboxyalkyl or up to 6 carbon atoms;

$x$ is an integer of from 1–2 inclusive; and

$n$ in an integer of from 1–4 inclusive.

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**4,020,154**

## MANUFACTURE OF GAS-FREE DENTIFRICE

**Giulio Perla; Giuseppe Mannara, and Domenico Milesi, all of Rome, Italy, assignors to Colgate-Palmolive Company, New York, N.Y.**

**Continuation of Ser. No. 325,804, Jan. 22, 1973, abandoned. This application Dec. 9, 1974, Ser. No. 531,254**

**Int. Cl.² A61K 7/16**

**U.S. Cl. 424—49** **13 Claims**

1. In a method for the manufacture of a dentifrice by mixing a gel of a gelling agent and a polyhydric alcohol with a powdered polishing agent which is at least ten percent of the dentifrice, an improvement for obtaining the dentifrice in gas-free form which comprises preparing the gel in gas-free form, applying vacuum to the gel and admixing it under vacuum with degassed powdered polishing agent.

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**4,020,155**

## SURFACE ACTIVE AGENTS

**Gregoire Kalopissis, Paris, and Guy Vanlerberghe, Mitry-Mory, both of France, assignors to Societe Anonyme dite: L'Oreal, Paris, France**

**Continuation-in-part of Ser. No. 576,852, Sept. 2, 1966. This application Apr. 15, 1971, Ser. No. 134,390**

**Claims priority, application Luxembourg, Sept. 6, 1965, 49442**

**Int. Cl.² A61K 7/06, 7/09**

**U.S. Cl. 424—70** **3 Claims**

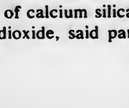
1. A cosmetic composition for hair comprising in aqueous solution 1 to 10% by weight of at least one compound corresponding to the following formula:

$$[A^+ — CH_2CONH — (CH_2)_n — B]\ X^-$$

in which:

$n$ is a whole number equal to 2 or 3

A represents a radical of the formula:

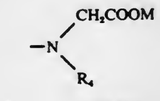


in which $R_1$ is a radical selected from the group consisting of: methyl, cetyl and a radical derived from copra fatty acid having 6 – 18 carbon atoms;

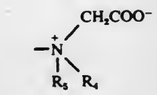
$R_2$ and $R_3$ are selected from the group consisting of: alkyl and hydroxy-alkyl radicals having 1 to 3 carbon atoms;

B is a radical selected from the group consisting of:

a)



and b)



in which $R_4$ is selected from the group consisting of alkyl and hydroxy alkyl radicals having 1 – 3 carbon atoms and a radical derived from copra fatty acid having 6 – 18 carbon atoms; $R_5$ is a lower alkyl radical having from 1 to 3 carbon atoms, and M represents an alkali metal selected from the group consisting of potassium and sodium, and $X^-$ is a chloride ion.

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**4,020,156**

## CONTROLLED FRAGRANCE RELEASING CRYSTAL BEADS

**Thomas E. Murray, Rockaway Township, N.J., and Vincent T. Bocchino, Port Chester, N.Y., assignors to Norda Incorporated, New York, N.Y.**

**Filed Feb. 13, 1976, Ser. No. 658,038**

**Int. Cl.² A61K 7/46, 7/50; A61L 9/01**

**U.S. Cl. 424—76** **8 Claims**

1. A fragrant bead composition which comprises a multiplicity of prilled urea beads having an adherent surface coating consisting essentially of:

a. finely divided particles of an adsorbent selected from the group consisting of calcium silicate, magnesium carbonate and silicon dioxide, said particles having a surface

area of from about 80 to about 400 square meters per gram and containing a fragrance adsorbed therein, and

b. dextrin, as a binder; said adsorbent being present in the composition in a ratio of from about 1 to 5 parts per 100 parts by weight of urea and being present in the coating in a ratio of about 0.2 to 2 parts per part by weight of dextrin, and the fragrance being present in a ratio of from 1 to 3 parts per part by weight of adsorbent.

**8.** A deodorant pet litter bead composition comprising a multiplicity of prilled urea beads having an adherent surface coating consisting essentially of:

a. finely divided adsorbent synthetic calcium silicate particles having a surface area of from about 80 to about 400 square meters per gram containing a germicide and a fragrance adsorbed therein,

b. dextrin as a binder, and

c. a food approved color;

the silicate being present in the composition in a ratio of from about 1 to 5 parts per 100 parts by weight of urea and being present in the coating in a ratio of about 0.2 to 2 parts per part by weight of dextrin, the fragrance being present in a ratio of from 1 to 3 parts per part by weight of silicate, and the germicide being present in a ratio of from about 0.1 to 0.5% based on the weight of the urea.

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**4,020,157**

## SHORTENED ANALOGS OF SOMATOSTATIN

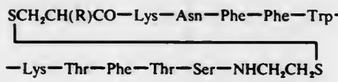
**Nedumparambil A. Abraham, Dollard Des Ormeaux; Hans U. Immer, Mt. Royal; Verner R. Nelson, Kirkland, and Kazimir Sestanj, Pointe Claire, all of Canada, assignors to Ayerst McKenna and Harrison Ltd., Montreal, Canada**

**Filed July 8, 1975, Ser. No. 594,159**

**Int. Cl.² A61K** *37/00;* **C07C** *103/52*

**U.S. Cl. 424—177** **36 Claims**

**8.** A compound of the formula 1




in which R is hydrogen or NHR¹ wherein R¹ is a lower aliphatic acyl having from 1 – 6 carbon atoms, or benzoyl.

**26.** A method of treating acromegaly in mammals, which comprises administering to said mammal an effective dose of a compound of the formula 1 as claimed in claim **8.**

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**4,020,158**

## INCREASING METALS IN BIOLOGICAL TISSUE

**Harvey H. Ashmead, 719 E. Center St., Kaysville, Utah 84037, and Paul A. Little, P.O. Box 172, Avivacao, Ariz. 85601**

**Continuation-in-part of Ser. No. 607,370, Aug. 8, 1975, abandoned, which is a continuation-in-part of Ser. No. 420,033, Nov. 29, 1973, abandoned, which is a continuation-in-part of Ser. No. 739,141, June 24, 1968, abandoned. This application Feb. 17, 1976, Ser. No. 658,243**

**Int. Cl.² A61K** *37/00, 31/295*

**U.S. Cl. 424—177** **14 Claims**

**1.** A method of raising the levels of essential bivalent metals in the tissues of animals which comprises administering to said animal an effective amount of exogenously synthesized metabolically assimilable metal proteinates, said proteinates being in the form of chelates of said metals with one or more protein hydrolysates selected from the group consisting of polypeptides, peptides and amino acids wherein said proteinates are formed by dissolving salts of said metals in an aqueous solution containing the protein hydrolysates and adding sufficient base to raise the ph to a value between about 7.5 and 10 to precipitate said metal proteinates.

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**4,020,159**

## METHODS OF AND MEDICATIONS FOR TREATING CARDIAC DISORDERS BY USING STROPHANTHIN

**Joseph Peter Herrmann, Wiesbaden, Germany, assignor to Apotheker A. Herbert K.G., Fabrik Pharmazeutischer Praparate Wiesbaden, Wiesbaden, Germany**

**Filed Oct. 8, 1974, Ser. No. 513,151**

**Int. Cl.² A61K** *31/70*

**U.S. Cl. 424—180** **10 Claims**

**1.** An orally administrable medication for treating angina pectoris, heart collapse, hypertonicity, and arrhythmia which comprises g-strophanthin distributed in an oleophilic vehicle in an amount and concentration effective to produce a threshhold myocardial concentration of the g-strophanthin via absorption through mucous membranes, the concentration of the g-strophanthin in the oleophilic vehicle ranging from three to twenty percent based on the total weight of the medication, and said oleophilic vehicle containing from 60 to 90 percent by weight of a stable, physiologically harmless fatty oil or mixture of fatty oils; from 2 to 20 percent by weight of a wax or wax mixture for adjusting and stabilizing the physical properties of the vehicle; and a lecithin in an amount ranging from 2–20 percent by weight and sufficient to reduce the irritating effect of the strophanthin on mucous tissue and to stabilize the dispersion of the strophanthin in the vehicle.

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**4,020,160**

## CYCLODEXTRIN SULFATE SALTS AS COMPLEMENT INHIBITORS

**Seymour Bernstein, New City, N.Y.; Joseph Peter Joseph, Cliffside Park, N.J., and Vijay Nair, Nanuet, N.Y., assignors to American Cyanamid Company, Stamford, Conn.**

**Filed Aug. 15, 1975, Ser. No. 604,986**

**Int. Cl.² A61K** *31/715*

**U.S. Cl. 424—180** **7 Claims**

**1.** A method of inhibiting the complement system in a warm-blooded animal in need of such therapy which comprises internally administering to said animal an effect complement inhibiting amount of a pharmaceutically acceptable cyclodextrin polysulfate salt.

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**4,020,161**

## THIOLOPHOSPHORAMIDATES AND THEIR USE AS INSECTICIDES

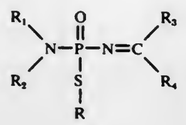
**Arnold D. Gutman, Berkeley, Calif., assignor to Stauffer Chemical Company, Westport, Conn.**

**Filed Mar. 31, 1976, Ser. No. 672,191**

**Int. Cl.² A01N** *9/36;* **C07C** *9/24*

**U.S. Cl. 424—211** **20 Claims**

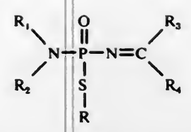
**1.** A compound having the formula



in which R and $R_1$ are lower alkyl, $R_2$ and $R_3$ are independently hydrogen or lower alkyl, provided that at least one of $R_2$ and $R_3$ is lower alkyl, and $R_4$ is amino or lower alkoxy.

**14.** A method for controlling insects comprising applying to the insect or habitat thereof an insecticidally effective amount of the compound having the formula





in which R and $R_1$ are lower alkyl, $R_2$ and $R_3$ are independently hydrogen or lower alkyl, provided that at least one of $R_2$ and $R_3$ is lower alkyl, and $R_4$ is amino or lower alkoxy.

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**4,020,162**

## OXYTETRACYCLINE SOLUTION FOR PARENTERAL, PERORAL AND LOCAL ADMINISTRATION AND PROCESSES FOR THE PRODUCTION THEREOF

**Hans Peter Ghilardi, Therwil, and Kaya Atasoy, Munchenstein, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

**Filed Feb. 7, 1975, Ser. No. 548,051**

**Claims priority, application Switzerland, Feb. 19, 1974, 2276/74**

**Int. Cl.² A61K** *31/65*

**U.S. Cl. 424—227** **7 Claims**

**1.** A process for the production of oxytetracycline solutions which comprises suspending 4–11% oxytetracycline in the form of the free base or the hydrochloride salt in 18–28% polyethylene glycol having a mean molecular weight of about 300 to 600, and thereafter admixing therewith in the presence of a nitrogen gas stream, 2.5–5.5% magnesium chloride, 1.3–4.3% of a base, 0.4–0.5% of a preservative, tris-(hydroxymethyl)-aminomethane-hydrochloride in a total concentration of 0.1–0.35% amino methane and 2.0–8.5% 0.1N HCl and 40–80%, by weight, of water; said concentration being based on the weight of the total solution.

**2.** An aqueous oxytetracycline solution for parenteral, peroral and local administration, which comprises, 4–11% of oxytetracycline in the form of the free base or the hydrochloride salt, 2.5–5.5% of magnesium chloride, 18–28% of polyethylene glycol having a mean molecular weight of about 300 to 600, 1.3–4.3% of a base, 0.4–0.5% of a preservative for said solution, tris-(hydroxymethyl)-aminomethane-hydrochloride in a total concentration of 0.1–0.35% aminomethane and 2.0%–8.5% 0.1N HCl, and 40 to 80% of water; said concentrations being based on the weight of the total solution.

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**4,020,163**

## USE OF HETEROCYCLIC ESTERS OF 5H-[1]BENZOPYRANO [3,4-b]PYRIDINES AS ANALGESICS

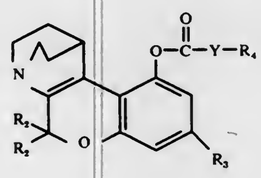
**Louis Selig Harris, Richmond, Va.; Harry George Pars, Lexington, Mass.; Raj Kumar Razdan, Belmont, Mass.; John Clark Sheehan, Lexington, Mass., and Barbara Zitko Terris, Cambridge, Mass., assignors to Sharps Associates, Cambridge, Mass.**

**Division of Ser. No. 434,089, Jan. 17, 1974, Pat. No. 3,905,969. This application July 10, 1975, Ser. No. 594,713**

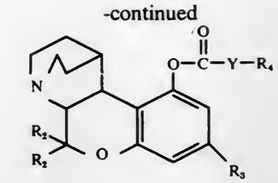
**Int. Cl.² A61K** *31/44, 31/54, 31/445, 31/535*

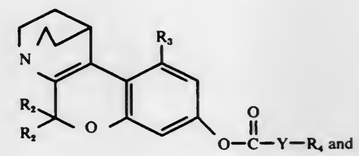
**U.S. Cl. 424—248.55** **5 Claims**

**1.** A method which comprises administering to an animal, to induce an analgesic effect in the animal, a compound of the formulas

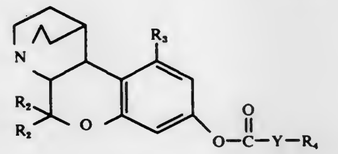


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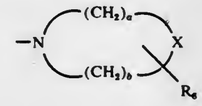




and



wherein $R_2$ is lower alkyl, $R_3$ is an alkyl having one to twenty carbon atoms, a cycloalkyl-lower alkyl or a phenyl-lower alkyl, Y is a straight or branched chain alkylene having one to eight carbon atoms, and $R_4$ is a group of the formula



wherein *a* is an integer from 1 to 4, *b* is an integer from 1 to 4 and X is $CH_2$, O, S or N-$R_5$ with $R_5$ being hydrogen or lower alkyl, and $R_6$ is hydrogen or a lower alkyl group bonded to a carbon in the ring, or a nontoxic pharmaceutically acceptable acid addition salt thereof, in an amount which is safe and effective in inducing an analgesic effect in the animal.

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**4,020,164**

## BENZOMORPHAN DERIVATIVES

**Dieter Rahtz; Eberhard Schroder; Reinhard Horowski; Gert Paschelke; Dieter Palenschat; Helmut Wachtel, and Wolfgang Kehr, all of Berlin, Germany, assignors to Schering Aktiengesellschaft, Berlin & Bergkamen, Germany**

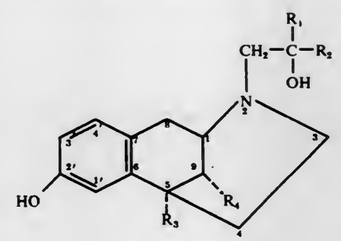
**Continuation of Ser. No. 374,021, June 27, 1973, abandoned. This application Feb. 18, 1975, Ser. No. 550,611**

**Claims priority, application Germany, June 30, 1972, 2233088**

**Int. Cl.² C07D** *221/26;* **A61K** *31/445*

**U.S. Cl. 424—267** **18 Claims**

**1.** A benzomorphan of the formula



wherein $R_1$ is H, $CH_3$, $C_2H_5$; $R_2$ is $CH_3$ or $C_2H_5$; and $R_3$ and $R_4$ each are alkyl of 1–4 carbon atoms, in free base form or as an acid addition salt thereof with a physiologically acceptable acid.

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**4,020,165**

## CONTROL OF ACARIDS USING CERTAIN BENZOTHIAZOLES OR BENZOTHIAZOLINES

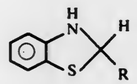
**Winchester L. Hubbard, Woodbridge; Robert E. Grahame, Jr., Cheshire; Rupert A. Covey, Bethany, and Elmar H. Jancis, Naugatuck, all of Conn., assignors to Uniroyal Inc., New York, N.Y.**

**Division of Ser. No. 606,376, Aug. 20, 1975, Pat. No. 3,974,287, which is a division of Ser. No. 543,717, Jan. 24, 1975, Pat. No. 3,928,617, which is a division of Ser. No. 420,749, Nov. 30, 1973, Pat. No. 3,876,791. This application June 4, 1976, Ser. No. 693,054**

**Int. Cl.² A01N *9/22***

**U.S. Cl. 424—270** **6 Claims**

1. A method of controlling acarids comprising applying, to a locus subject to attack by acarids, an acaricidal amount of benzothiazoline of the formula



where R is 1-naphthyl or 2-naphthyl.

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**4,020,166**

## HALOALKYL ESTERS OF 5-NITROIMIDAZOLE-1-CARBOXYLIC ACID DERIVATIVES

**Hans Nesvadba, and Hellmuth Reinshagen, both of Vienna, Austria, assignors to Sandoz, Ltd., Basel, Switzerland**

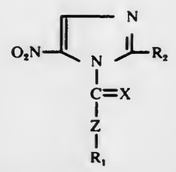
**Filed Dec. 3, 1975, Ser. No. 637,312**

**Claims priority, application Switzerland, Dec. 6, 1974, 16233/74**

**Int. Cl.² C07D *233/94***

**U.S. Cl. 424—273** **20 Claims**

1. A compound of the formula,



in which

$R_1$ signifies straight or branched chain alkyl of 1 to 12 carbon atoms which contains a mono-, di- or trihalomethyl group in place of a methyl group in the alkyl chain.

$R_2$ signifies hydrogen or straight or branched chain lower alkyl of 1 to 4 carbon atoms and

X and Z, which may be the same or different, each signifies oxygen or sulphur.

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**4,020,167**

## ETHANOL INTOXICATION WITH 2[(3-TRIFLUOROMETHYLPHENOXY)METHYL]-2-IMIDAZOLINE

**Abdulmunien H. Abdallah, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.**

**Filed Oct. 16, 1975, Ser. No. 623,178**

**Int. Cl.² A61K *31/415***

**U.S. Cl. 424—273** **5 Claims**

1. A method for combatting ethanol intoxication and narcosis in mammals comprising administering internally to an intoxicated mammal an ethanol intoxication and narcosis antagonizing amount of 2((3-trifluoromethylphenoxy)methyl)-2-imidazoline or a pharmaceutically-acceptable salt thereof.

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**4,020,168**

## SUBSTITUTED 2,3-DIHYDRO-1,4-OXATHIIN PLANT GROWTH

**Bruce A. Graham; Michael A. Puttock, both of Guelph; Ethel E. Felauer, Arkell, all of Canada, and Robert W. Neidermyer, Cheshire, Conn., assignors to Uniroyal Inc., New York, N.Y. and Uniroyal, Ltd., Ontario, Canada**

**Division of Ser. No. 459,442, April 9, 1974, Pat. No. 3,947,264. This application Nov. 6, 1975, Ser. No. 629,731**

**Int. Cl.² C07D *327/06***

**U.S. Cl. 260—327 P** **8 Claims**

1. A chemical selected from the group consisting of 2,3-dihydro-5,6-diphenyl-1,4-oxathiin 4-oxide, 2,3-dihydro-5-(4-methylphenyl)-6-phenyl-1,4-oxathiin, 2,3-dihydro-5-(4-methylphenyl)-6-phenyl-1,4-oxathiin 4-oxide, 2,3-dihydro-5-(3-methylphenyl)-6-phenyl-1,4-oxathiin 4-oxide, 2,3-dihydro-5-(4-methoxyphenyl)-6-phenyl-1,4-oxathiin 4-oxide, 3-(4-chlorophenyl)-5,6-dihydro-2-phenyl-1,4-oxathiin 4-oxide, 3-(3-chlorophenyl)-5,6-dihydro-2-phenyl-1,4-oxathiin 4-oxide, 3-(4-bromophenyl)-5,6-dihydro-2-phenyl-1,4-oxathiin 4-oxide, 2-(4-fluorophenyl)-5,6-dihydro-3-phenyl-1,4-oxathiin 4-oxide, 3-(4-fluorophenyl)-5,6-dihydro-2-phenyl-1,4-oxathiin 4-oxide and 3-(3,5-dimethylphenyl)-5,6-dihydro-2-phenyl-1,4-oxathiin 4-oxide.

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**4,020,169**

## PROCESS FOR PREPARING ARYL TRIFLUOROMETHYLSULFIDES

**David C. Remy, North Wales, and Mark B. Freedman, Glenside, both of Pa., assignors to Merck & Co., Inc., Rahway, N.J.**

**Filed Dec. 22, 1975, Ser. No. 642,865**

**Int. Cl.² C07D *335/16*; C07C *148/00***

**U.S. Cl. 260—328** **8 Claims**

1. A process for the preparation of aryl trifluoromethylsulfides which comprises reacting an aryl iodide or aryl bromide with trifluoromethylthiocopper in an inert polar organic solvent at 50°–200° C. for 0.5 to 24 hours.

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**4,020,170**

## CERTAIN LOWER ALKYL 4,5-DIHYDROTHIOPHENE-3-THIOLS

**Godefridus Antonius Maria van den Ouweland, and Hendricus Gerardus Peer, both of Zevenaar, Netherlands, assignors to Lever Brothers Company, New York, N.Y.**

**Filed June 27, 1969, Ser. No. 838,053**

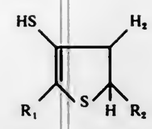
**Claims priority, application United Kingdom, July 1, 1968, 31378/68**

**Int. Cl.² C07D *333/34***

**U.S. Cl. 260—329 S** **5 Claims**

1. A compound of the formula





and the cis-trans isomers thereof; wherein $R_1$ and $R_2$ are selected from the group containing of hydrogen, methyl and ethyl and wherein $R_1$ and $R_2$ cannot both be hydrogen simultaneously.

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**4,020,171**

## CYCLIC KETONE MERCAPTAL S-OXIDES

**Genichi Tsuchihashi, Tama, and Katsuyuki Ogura, Sagamihara, both of Japan, assignors to Sagami Chemical Research Center, Japan**

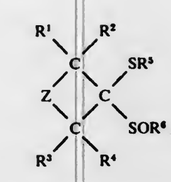
**Filed Feb. 25, 1975, Ser. No. 552,737**

**Claims priority, application Japan, Mar. 4, 1974, 49-24293; Mar. 4, 1974, 49-24294**

**Int. Cl.² C07D *317/06***

**U.S. Cl. 260—340.5** **4 Claims**

1. A cyclic ketone mercaptal S-oxide of the formula



wherein $R^1$, $R^2$, $R^3$ and $R^4$, independently of each other, represent hydrogen or alkyl containing 1 to 5 carbon atoms, $R^5$ and $R^6$ represent alkyl containing 1 to 5 carbon atoms, and Z represents ethylene 1,2-substituted by isopropylidenedioxy.

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**4,020,172**

## LACTONE ALDEHYDES

**Richard Philip Peel, and James Kenneth Sutherland, both of Manchester, England, assignors to Imperial Chemical Industries Limited, London, England**

**Division of Ser. No. 465,557, April 30, 1974, Pat. No. 3,952,019. This application Nov. 28, 1975, Ser. No. 636,296**

**Claims priority, application United Kingdom, May 15, 1973, 23045/73**

**Int. Cl.² C07D *311/94***

**U.S. Cl. 260—343.2 R** **2 Claims**

1. A lactone-aldehyde of the formula:



wherein $R^2$ is bromine, chlorine or iodine.

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**4,020,173**

## 4α,6-DIHYDROXY-2β-CARBOXALDEHYDE-3α-TETRAHYDROPYRANACETIC ACID γ-LACTONE, 6-ALKYL ETHERS

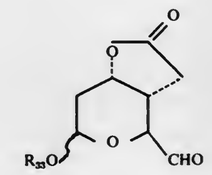
**Robert C. Kelly, Kalamazoo, and Norman A. Nelson, Galesburg, both of Mich., assignors to The Upjohn Company, Kalamazoo, Mich.**

**Filed Apr. 14, 1976, Ser. No. 676,890**

**Int. Cl.² C07D *493/04***

**U.S. Cl. 260—343.6** **2 Claims**

1. A thromboxane intermediate of the formula



wherein $R_{33}$ is alkyl of one to 5 carbon atoms, inclusive.

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**4,020,174**

## REACTIVATION OF MALEIC ANHYDRIDE PRODUCING PHOSPHORUS-VANADIUM-OXYGEN COMPLEX OXIDATION CATALYSTS BY TREATMENT WITH HALIDE CONTAINING MATERIALS

**Walter Partenheimer, Naperville, Ill., assignor to Standard Oil Company (Indiana), Chicago, Ill.**

**Filed Sept. 24, 1975, Ser. No. 616,370**

**Int. Cl.² C07D *307/60***

**U.S. Cl. 260—346.8 A** **48 Claims**

1. In a process for the preparation of maleic anhydride from the oxidation of feed materials selected from the group consisting of alkanes, alkenes, or mixtures thereof or aromatics which comprises contacting said feed material and a gas containing molecular oxygen in the vapor phase with a solid catalyst comprising a phosphorus-vanadium-oxygen complex having from about 0.5 to about 5 atoms of phosphorus for each atom of vanadium, wherein the improvement comprises contacting said catalyst complex at reactivating conditions with an effective amount of a reactivating agent selected from the group consisting of:

A. Molecular halogens;

B. Organic halides being in the vapor state above about 250° C. at atmospheric pressure represented by the formula:

$$c(X)n$$

where each X is selected halide and n is an integer from 1 to 4, any remaining radicals being hydrogen;

C. Organic halides being in the vapor state above about 250° C. at atmospheric pressure represented by the formula:

$$R(X_1)m$$

where R is alkane, alkene or alkyne of straight or branched structure having at least two carbon atoms and $X_1$ is independently a primary, secondary or tertiary halide and m is an integer of from 1 to about 20 consistent with the number of carbon atoms of said structure; and

D. Hydrogen halides;

or mixtures thereof to thereby enhance the selectivity of the catalyst for the production of maleic anhydride.

**4,020,175**

## CERTAIN 3-FURYL SULFIDES

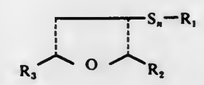
**William John Evers, Long Branch, N.J., assignor to International Flavors & Fragrances Inc., New York, N.Y.**

**Continuation of Ser. No. 864,227, Oct. 6, 1969, abandoned, which is a continuation-in-part of Ser. No. 796,923, Feb. 5, 1969, Pat. No. 3,666,495. This application Oct. 10, 1972, Ser. No. 295,859**

**Int. Cl.² C07D *307/64***

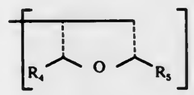
**U.S. Cl. 260—347.2** **9 Claims**

**1.** A furan derivative having the formula



wherein $R_3$ is hydrogen or lower alkyl of one to five carbon atoms, and:

(1) *n* is one, two, three or four and $R_1$ is moiety of the formula



wherein $R_4$ is the same as $R_2$ and $R_5$ is the same as $R_3$ wherein each dashed line represents a single or double bond and the dashed line adjacent to $R_4$ has the same value as the dashed line adjacent to $R_2$ and the dashed line adjacent to $R_5$ has the same value as the dashed line adjacent to $R_3$, $R_2$ is lower alkyl of from two to five carbon atoms when *n* is two and $R_2$ is alkyl of from one to five carbon atoms when *n* is one, three, or four; or

(2) *n* is two or three, each dashed line is a single or double bond, and $R_1$ and $R_2$ are lower alkyl containing from one to five carbon atoms and provided that when *n* is two and $R_1$ and $R_2$ are methyl the dashed lines are not both double bonds.

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**4,020,176**

## HIGHLY FLUORINATED DIAZIDES AND PROCESS THEREFOR

**Richard B. Greenwald, Lexington, Mass., assignor to Polaroid Corporation, Cambridge, Mass.**

**Filed July 14, 1975, Ser. No. 595,488**

**Int. Cl.² C07C *117/00***

**U.S. Cl. 260—349** **6 Claims**

**1.** A compound of the formula

$$N_3CH_2(CF_2)_xCH_2N_3$$

wherein *x* is a positive integer from 2 to 12.

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**4,020,177**

## SUBSTITUTED PHENOXY-TRIDECANOIC ACIDS

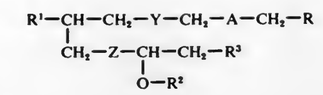
**Edward J. Cragoe, Jr., and John B. Bicking, both of Lansdale, Pa., assignors to Merck & Co., Inc., Rahway, N.J.**

**Continuation-in-part of Ser. No. 502,126, Aug. 30, 1974, abandoned. This application June 18, 1975, Ser. No. 587,924**

**Int. Cl.² C07C *65/02***

**U.S. Cl. 260—399** **16 Claims**

**1.** A compound of the formula



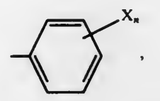
wherein

R is selected from the group consisting of carboxy and a carboxy salt;

$R^1$ is selected from the group consisting of acetyl, propionyl, 1-hydroxyethyl, 1-hydroxypropyl, and hydroxymethyl;

$R^2$ is hydrogen;

$R^3$ is O—$R^6$ or S—$R^6$ wherein $R^6$ is phenyl, substituted phenyl,



where X is halogen, trifluoromethyl, lower alkyl, lower akoxy, dimethylamino, nitro, mesyl, lower alkanoyl, attached *o*, *m*, or *p*, and *n* is 1 or 2;

A is methylene (—$CH_2$—);

Y is ethylene; and

Z is ethylene.

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**4,020,178**

## 1,4-DIHYDROPYRIDINE ESTERS USED AS CORONARY DILATORS AND ANTI-HYPERTENSIVES

**Friedrich Bossert, Wuppertal; Egbert Wehinger, Neviges; Wulf Vater, Opladen, and Kurt Stoepel, Wuppertal, all of Germany, assignors to Bayer Aktiengesellschaft, Germany**

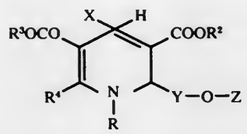
**Divisıon of Ser. No. 485,300, July 2, 1974, abandoned. This application June 11, 1975, Ser. No. 585,963**

**Claims priority, application Germany, July 12, 1973, 2335466**

**Int. Cl.² A61K *31/455***

**U.S. Cl. 424—266** **22 Claims**

**1.** A pharmaceutical composition for achieving coronary dilating and anti-hypertensive effects which comprises an effective amount of a compound selected from the group consisting of a dihydropyridine of the formula:



and the pharmaceutically acceptable nontoxic salts thereof, wherein

Y is alkylene of 1 to 4 carbon atoms;

Z is alkyl of 1 to 4 carbon atoms;

R is hydrogen, alkyl of 1 to 4 carbon atoms, or alkenyl of 2 to 4 carbon atoms;

each of $R^2$ and $R^3$, independent of the other, is alkyl of 1 to 6 carbon atoms, alkenyl of 2 to 6 carbon atoms, alkynyl of 2 to 6 carbon atoms or cycloalkyl of 3 to 10 carbon atoms;

$R^4$ is hydrogen, alkyl of 1 to 6 carbon atoms or Z—O—Y wherein Z and Y are as defined above; and

X is phenyl or naphthyl, unsubstituted or substituted by one or two members independently selected from the group consisting of halo, alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms, trifluoromethyl, cyano, nitro, azido, phenyl, hydroxy, amino, alkylamino of 1 to 4 carbon atoms, dialkylamino of 1 to 4 carbon atoms in each alkyl group, carbalkoxy of 1 to 4 carbon atoms in the alkoxy moiety, acetamido, propionamido, acetoxy, propionyloxy, methyl.$S(O)_m$ or ethyl-$S(O)_m$ in which *m* is 0, 1 or 2, in admixture with a pharmaceutically acceptable carrier.



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**4,020,179**

## 7-SUBSTITUTED-2-INDOLINONES

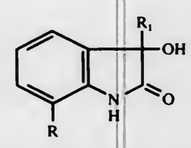
**John L. Irvine, West Allis, Wis., assignor to Richardson-Merrell Inc., Wilton, Conn.**

**Filed May 15, 1975, Ser. No. 577,631**

**Int. Cl.² A61K *31/40*; C07D *209/38***

**U.S. Cl. 424—274** **10 Claims**

**1.** A compound of the formula



I

in which R is chloro, bromo, fluoro or trifluoromethyl, and $R_1$ is lower alkyl of 1 to 4 carbon atoms, phenyl, benzyl, phenethyl, chlorobenzyl, chlorophenyl, methoxyphenyl or dichlorophenyl, or pharmaceutically acceptable salts thereof.

**10.** The method of controlling convulsions in animals which comprises administering to an animal susceptible to such convulsions a safe and effective anticonvulsant amount of a compound of claim **I**.

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**4,020,180**

## NONCORROSIVE CUPRAMMONIA FUNGICIDE AND METHOD FOR USING SAME

**Hans Woerner, Mount Pleasant, N.C., assignor to Mineral Research & Development Corporation, Charlotte, N.C.**

**Continuation-in-part of Ser. No. 223,702, Feb. 4, 1972, Pat. No. 3,900,504. This application Aug. 11, 1975, Ser. No. 603,355**

**Int. Cl.² A01N *9/00***

**U.S. Cl. 424—294** **8 Claims**

**1.** A substantially noncorrosive aqueous concentrate solution which is dilutable with water to a fungicide compositlon comprising an aqueous cuprammonium lower carboxylate complex of copper lower carboxylate and ammonium lower carboxylate in weight proportions of about 13 parts of copper lower carboxylate as measured as the dihydrate to about 2 parts of ammonium lower carboxylate, and about 10 parts of 29 percent aqueous ammonia, said solution being at a pH in the range of about 7.1 to 7.4.

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**4,020,181**

## METHOD OF REPELLING INSECTS FROM DOMESTIC MAMMALS

**Gerald Gordon Blackman, and Michael Derek Matthewson, both of Berkhamsted, England, assignors to Burroughs Wellcome Co., Research Triangle Park, N.C.**

**Filed May 7, 1975, Ser. No. 575,195**

**Claims priority, application United Kingdom, May 8, 1974, 20224/74**

**Int. Cl.² A61K *31/215***

**U.S. Cl. 424—305** **15 Claims**

**1.** A method of repelling insects of the order Diptera from a domestic mammal which comprises depositing on said mammal a non-toxic effective Diptera insect repellent amount of a compound, 3-phenoxybenzyl-2,2-dimethyl-3-(2,2-dichlorovinyl) cyclopropane-1-carboxylate or of a formulation comprising said compound in intimate admixture with a carrier or diluent therefor.

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**4,020,182**

## PESTICIDAL FORMALDEHYDE CONCENTRATE

**Leo E. Burt, Robbinsville, N.C., and Stephen E. Frazier, Orlando, Fla., assignors to Leo E. Burt, Robbinville, N.C.**

**Continuation-in-part of Ser. No. 349,796, April 10, 1973, abandoned, which is a continuation-in-part of Ser. No. 187,900, Oct. 8, 1971, abandoned. This application Nov. 21, 1974, Ser. No. 525,830**

**Int. Cl.² A01N *9/20, 9/24*; C05C *9/00***

**U.S. Cl. 424—327** **2 Claims**

**1.** A concentrated pesticidal composition for use upon dilution with water on foliage of growing plants, around roots, on grass, and in the surrounding soil, said diluted composition being non-phytotoxic, anti-fungal, anti-bacterial, anti-nematode, and also effective against certain small insects such as mites, flies, scale insects, caterpillars, and aphids, said concentrated composition comprising in aqueous solution 30–50 parts by weight formaldehyde; 0.5–3.5 parts by weight of a hydrazinium salt selected from the group consisting of 1,1-dimethylhydrazine oxalate, hydrazine monohydrochloride, and methylhydrazine sulfate; and 0.5–3.5 parts by weight of an ammonium salt selected from the group consisting of ammonium benzoate and ammonium citrate.

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**4,020,183**

## NONIONIC SURFACE ACTIVE ANTI-HERPES SIMPLEX VIRAL AGENTS

**Samuel Simon Ascual, St. Louis, Mo.; Alfred B. Kupferberg, deceased, late of Somerville, N.J.; by Beatrice Kupferberg, coexecutrix, Somerville, N.J., and by Meyer Halpern, coexecutor, Lauderhill, Fla., assignors to Ortho Pharmaceutical Corporation, Raritan, N.J.**

**Filed Dec. 3, 1974, Ser. No. 529,180**

**Int. Cl.² A61K *31/09***

**U.S. Cl. 424—341** **6 Claims**

**1.** A method of inactivating herpes simplex virus infectivity in humans which comprises applying to the affected area an effective amount for treating herpes simplex virus of a nonionic surfactant in a pharmaceutically acceptable carrier, said nonionic surfactant having at least one ether linkage.

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**4,020,184**

## METHOD OF MAKING PIZZA BREAD ANALOG

**Jack B. Chesner, 2747 Alice Terrace, Union, N.J. 07083**

**Filed Jan. 2, 1976, Ser. No. 646,348**

**Int. Cl.² A21D *8/04***

**U.S. Cl. 426—19** **7 Claims**

**1.** A method for making a pizza flavored food product in the form of a bread analog comprising the steps of preparing a dough having a homogeneously distributed mixture of a tomato based formulation of flavoring ingredients, allowing the dough to ferment, releasing the gases formed during said fermentation, scaling the dough into desired shapes, proofing the dough, providing an incision penetrating an upper surface and extending interiorly into the dough, placing a liquefied charge of stabilized flavor intensifier into the incision, baking the dough in an oven for partial sealing of the incision and limited migration of the flavor intensifier to provide an included area having a soft moist texture, removing the dough from the oven prior to completion of the baking procedure, applying a flowable cheese sauce composition to the upper surface of the dough, reinserting the dough into the oven to complete the baking procedure wherein the sauce composition sets to form a surface lamina.

**4,020,185**

## STARTER CULTURE MEDIA CONTAINING WHEY

**Delmar Lloyd Andersen, Syracuse; Louis Russell Boston, Chiltenanga, and William H. Seleen, De Witt, all of N.Y., assignors to Borden, Inc., Columbus, Ohio**

**Division of Ser. No. 259,862, June 5, 1972, Pat. No. 3,852,158. This application Apr. 29, 1974, Ser. No. 464,758**

**Int. Cl.² A23C** *19/02, 21/00*

**U.S. Cl. 426—36** **6 Claims**

1. Process for preparing cheese from milk comprising adding to the milk an effective amount of a starter culture to coagulate the milk by fermentation, the starter culture is prepared from ingredients consisting essentially of A, B, and C in amounts specified below, or about 100 parts basis, by making a solution of ingredients A and B and then inoculating the solution with ingredient C and incubating the inoculated solution to produce the starter culture:

A. from 1 to 20 parts of dry culture medium consisting essentially of ingredients (a), (b) and (c) in amounts specified below on a 100 parts dry basis:

a. from 0.5 to 10 parts of a nitrogen source selected from the group consisting of yeast extract, yeast autolysate, solubilized yeast and food yeast,

b. from 1 to 30 parts of a citrate source selected from the group consisting of citric acid and salts of citric acid, amount of the citrate source being based on citrate anion exclusive of cation weight, and

c. from 70 to 95 parts of a milk product to provide 100 parts of the culture medium on dry basis consisting essentially of a major amount of undecalcified sweet whey and a minor amount of undecalcified nonfat dry milk;

B. from 80 to 99 parts of water; and

C. an effective amount of a lactic acid producing bacteria to inoculate the solution of A and B to cause growth of the bacteria to flourish.

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**4,020,186**

## METHOD FOR MANUFACTURE OF RICOTTA CHEESE

**John L. Edwards, Wildwood, Ill., assignor to Kraftco Corporation, Glenview, Ill.**

**Filed Dec. 16, 1974, Ser. No. 532,837**

**Int. Cl.² A23C** *19/00*

**U.S. Cl. 426—36** **5 Claims**

1. A method for the manufacture of Ricotta cheese which reduces the amounts of fat lost in the process, comprising introducing skim milk into a setting tank, adding an acidulant to the skim milk at a level sufficient to establish a pH of from about 5.6 to about 6.4, heating the acidulated skim milk to a temperature of from about 170° to about 190° F. to set the skim milk to provide a mixture of curd and whey, separating the curd from the whey, adding cream to said curd at a level sufficient to provide a finished Ricotta cheese product containing from about 2.0 percent to about 16 percent by weight fat and comminuting the mixture of curd and cream to reduce the curd particle size.

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**4,020,187**

## METHOD OF PRODUCING DRY PET FOOD

**Michael G. McCulloch, Topeka, and Woodrow E. Nelson, Berryton, both of Kans., assignors to Theracon, Inc., Topeka, Kans.**

**Filed Dec. 9, 1974, Ser. No. 530,929**

**Int. Cl.² A23L** *1/30, 3/34*

**U.S. Cl. 426—72** **3 Claims**

1. The process of manufacturing an expanded animal food product comprising:

1. grinding a quantity of meat and meat by-products;

2. adding water and fat to product a meat slurry of over 25% fat content;

3. heating said mixture to a temperature sufficient to liquefy said fat;

4. homogenizing said heated mixture to reduce particle size and distribute fat content uniformly through the mixture;

5. preparing a dried ground mix of cereals and appropriate vitamins, minerals, and preservatives;

6. combining the heated meat slurry and the dry mix in such proportions that (involving from 30% to 50% of) the meat slurry represents 25% to 50% of the mixture by weight, and mixing same in a blender;

7. extrusion cooking the mixture at temperatures from 225° to 325° F. and pressures in excess of 50 p.s.i. and extruding the cooked material to atmospheric conditions through a die at a temperature in excess of 225° F., thereby expanding the cooked product by flashing of contained water to steam; and

8. heating the expanded product to remove only water to attain a moisture content of 7% to 15%, thereby producing a micro-biologically stable, appetizing animal food with a minimum fat content on the order of 7.5%.

3. A dried expanded pet food product produced in accordance with claim 1.

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**4,020,188**

## COOKED DOUGH HAVING A FROZEN DESSERT FILLING AND METHOD THEREFOR

**John H. Forkner, 2116 Mayfair Drive West, Fresno, Calif. 93703**

**Filed Nov. 28, 1975, Ser. No. 636,134**

**Int. Cl.² A21D** *13/08;* **A23G** *9/04*

**U.S. Cl. 426—95** **16 Claims**

1. A method for the manufacture of food products having an inner filler of frozen dessert and an outer layer of cooked dough, comprising forming a composite sheet consisting of a layer of uncooked farinaceous dough and a continuous layer of protective backing material applied to one surface of the dough, applying the composite sheet about the exterior surfaces of an edible frozen filling, with the backing layer adjacent the filling and between the filling and the layer of uncooked dough, subjecting the product to a cooking cycle whereby the dough layer is heated and cooked, the backing layer during the cooking cycle serving to protect the filling against undue heating and to inhibit infusion of filling material into the dough, the temperature and time factors of the cooking cycle being controlled to complete cooking of the dough layer without substantial cooking of the backing layer.

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**4,020,189**

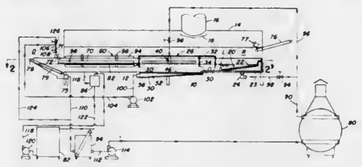
## PROCESS FOR DEEP-FAT COOKING

**Edward S. Wright, Pittsburgh, Pa.; John W. Angstadt, Williamsville, and Gerald L. Garrow, Buffalo, both of N.Y., assignors to Blaw-Knox Food and Chemical Equipment, Inc., Buffalo, N.Y.**

**Continuation of Ser. No. 363,379, May 24, 1973, abandoned, which is a division of Ser. No. 108,303, Jan. 21, 1971, Pat. No. 3,754,468. This application July 2, 1975, Ser. No. 592,365**

**Int. Cl.² A23L** *1/10*

**U.S. Cl. 426—438** **4 Claims**



1. In a continuous process for cooking comestibles in cooking oil in an elongated cooking area defined by an entry end, an exit end, and a horizontally elongated body of heated cooking oil continuously flowing horizontally from adjacent said entry end to said exit end, and having a separate source of heated cooking oil, the steps which comprise



a. segregating said body into first and second cooking zones by an area of restricted horizontal flow;

b. continuously flowing heated cooking oil from said source upwardly at a plurality of spaced points dispersed over the entire bottom surface of said first cooking zone to effect a generally vertical upward flow of cooking oil over the entire said first cooking zone;

c. simultaneously with said flowing step, continuously introducing comestibles into said first zone, said comestibles falling through said upwardly moving oil from said flowing step;

d. comingling said cooking oil and said comestibles in said first zone for the cooking thereof and causing moisture removal therefrom, whereby said comestibles become buoyant in said cooking oil;

e. continuously moving horizontally said partially cooked now floating comestibles through said area of restricted flow to said second cooking zone by hydraulic action of horizontal flow of upper portions of said body of oil from said first zone;

f. continuously cooking said comestibles in said second zone as they are moved therethrough by said horizontally moving body of oil;

g. continuously removing said comestibles from said exit end; and

h. continuously withdrawing cooking oil from said exit end for the recycling thereof to said source.

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**4,020,190**

## CHEESE FLAVOR CONTAINING ALKYL AMINES AND PROCESS OF FLAVORING

**Karl Heinz Ney, Hamburg; I. Poetoe Gde Wirotama, Rellingen, and Wolfram Gustav Freytag, Halstenbek, all of Germany, assignors to Lever Brothers Company, New York, N.Y.**

**Continuation of Ser. No. 407,701, Oct. 18, 1973, abandoned, which is a continuation-in-part of Ser. No. 240,816, April 3, 1972, abandoned. This application Dec. 9, 1974, Ser. No. 530,894**

**Claims priority, application Luxembourg, Apr. 8, 1971, 62955; Apr. 8, 1971, 69954**

**Int. Cl.² A23L** *1/226*

**U.S. Cl. 426—534** **4 Claims**

1. A ripe Cheddar cheese flavoring composition consisting essentially of:

i. from 0.1 to 1 part by weight of alkyl amines having from 3 to 5 carbon atoms or equivalent amounts of salts thereof; and

ii. from 60 to 95 parts by weight of alkanoic acids having from 2 to 10 carbon atoms containing from 40 to 60% by weight of hexanoic acid, not more than 40% by weight of alkanoic acids having from 7 to 10 carbon atoms, and not more than 4% by weight of branched chain alkanoic acids having 4 or 5 carbon atoms; and

iii. from 0.4 to 6 parts by weight of alkanones having from 5 to 13 carbon atoms;

iv. from 0 to 35 parts by weight of 2-oxoalkanoic acids having from 2 to 6 carbon atoms and 2-oxoalkanedioic acids having 4 or 5 carbon atoms;

v. from 0 to 2 parts by weight of aldehydes having from 2 to 10 carbon atoms;

vi. from 0 to 0.1 parts by weight of methyl and ethyl esters of alkanoic acids having from 4 to 10 carbon atoms, and

vii. from 0 to 0.01 parts by weight of methional.

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**4,020,191**

## METHOD FOR FORMING FLAT DISPLAY PANEL PHOSPHOR DOTS

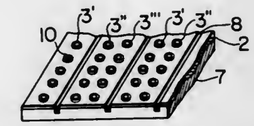
**Waichi Nagashiro; Tadao Okabe; Atsushi Sumioka, all of Hachioji, and Mitsuru Oikawa, Tokyo, all of Japan, assignors to Hitachi, Ltd., Japan**

**Filed Sept. 10, 1975, Ser. No. 611,985**

**Claims priority, application Japan, Sept. 13, 1974, 49-104989**

**Int. Cl.² B05D** *3/06*

**U.S. Cl. 427—12** **13 Claims**




1. A method of forming a flat display panel having phosphor dots comprising the steps of:

a. applying a paste layer containing a phosphor, photoresist material and powdered glass onto the areas of a dielectric layer by means of a printing procedure, said areas covering at least the predetermined portions of said dielectric layer on which the phosphor dots are to be formed, and being broader than said portions;

b. placing a mask having the beam apertures on the paste layer on said dielectric layer;

c. irradiating light onto said paste layer through said beam apertures of the mask to harden the areas of said paste layer coated on said predetermined portions of said dielectric layer;

d. developing said paste layer so as to remove the nonhardened areas of said paste layer;

e. heating the hardened portions of the paste layer at a first temperature of from 250° to 450° C. to decompose and thereby to remove organic materials contained in said paste layer;

f. then heating said paste layer at a second temperature higher than the first temperature to fuse said glass powder contained in said paste layer, said second temperature ranging from 450° to 550° C.

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**4,020,192**

## XEROGRAPHIC REPRODUCTION PROCESS AND TONER CARRIER FOR USE THEREWITH

**Toll Nozaki, Minami-ashigara, Japan, assignor to Fuji Xerox Co., Ltd., Tokyo, Japan**

**Filed Sept. 9, 1974, Ser. No. 504,387**

**Claims priority, application Japan, Sept. 10, 1973, 48-101085**

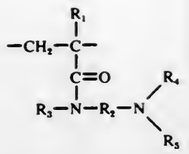
**Int. Cl.² B05D** *1/06;* **G03G** *13/06*

**U.S. Cl. 427—19** **17 Claims**

1. A xerographic reproduction process comprising the steps of

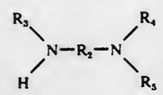
forming an electrostatic latent image on a recording layer and

developing the image with a developer comprising a toner and a carrier, the carrier comprising a core coated with an organic polymer coating containing about 0.01% by weight to 100% by weight of a monomer unit having the following formula

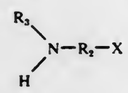


where $R_1$, $R_3$, $R_4$ and $R_5$ are each a hydrogen atom or a hydrocarbon residue having 1 to 12 carbon atoms and $R_2$ is a hydrocarbon residue having 1 to 12 carbon atoms, said organic polymer coating being selected from the group consisting of

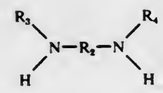
1. a homopolymer of a first monomer selected from the group consisting of dimethylaminoethyl methacrylamide, dimethylaminopropyl methacrylamide, dimethylaminobutyl methacrylamide, dimethylaminohexyl methacrylamide, dimethylaminodecyl methacrylamide, diethylaminoethyl methacrylamide, diethylaminobutyl methacrylamide, dipropylaminoethyl methacrylamide, dibutylaminoethyl methacrylamide, dimethylaminoethyl acrylamide, dimethylaminopropyl acrylamide, dimethylaminobutyl acrylamide, dimethylaminohexyl acrylamide, dimethylaminodecyl acrylamide, diethylaminoethyl acrylamide, diethylaminobutyl acrylamide, dipropylaminoethyl acrylamide and dibutylaminoethyl acrylamide;
2. a copolymer of (a) said first monomer and (b) a second monomer selected from the group consisting of alkyl acrylate, alkyl methacrylate, cycloalkyl acrylate, cycloalkyl methacrylate, hydroxyalkyl acrylate, hydroxyalkyl methacrylate, acrylamide, methacrylamide, alkylol acrylamide, alkylol methacrylamide, acrylonitrile, methacrylonitrile, styrene, vinyltoluene, vinyl acetate and vinyl chloride; and
3. a polymer formed by reacting with a starting polymer selected from the group consisting of polymethacrylic acid, polymethyl methacrylate, polyethyl methacrylate, polypropyl methacrylate, polybutyl methacrylate, polyacrylic acid, polymethyl acrylate, polyethyl acrylate, polypropyl acrylate and polybutyl acrylate and copolymers and terpolymers thereof, a reagent selected from the group consisting of compounds having the following formula



(a)



(b)



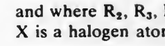
(c)

where a first further reagent having the following formula is reacted with said starting polymer subsequent to the reaction of said reagent having the above formula (b):



(d)

where a second further reagent having the following formula is reacted with said starting polymer subsequent to the reaction of said reagent having the above formula (c):



and where $R_2$, $R_3$, $R_4$ and $R_5$ are as defined hereinbefore and X is a halogen atom.

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**4,020,193**

## METHOD OF FORMING A NON-GLOSSY FILM

**Marco Wismer, Gibsonia, and Earl E. Parker, Allison Park, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.**

**Continuation of Ser. No. 135,797, April 20, 1971, abandoned. This application July 10, 1973, Ser. No. 377,992**

**Int. Cl.² C08F 8/00; C08L 67/06**

**U.S. Cl. 427—54** **8 Claims**

1. The method of preparing a cured, non-glossy film comprising

A. applying to a substrate a layer of a composition consisting essentially of

1. a polyester resin comprising
   a. from about 40 percent to about 90 percent by weight of unsaturated polyester prepared from an alpha,-beta-ethylenically unsaturated polycarboxylic acid and polyhydric alcohol; and
   b. from about 10 percent to about 60 percent by weight of copolymerizable ethylenically unsaturated monomer;
2. at least about 5 percent by weight of ultraviolet-absorbing pigment; and
3. a peroxide catalyst selected from the group consisting of organic peroxides, organic hydroperoxides and esters thereof; and

B. curing said layer by subjecting it to actinic light.

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**4,020,194**

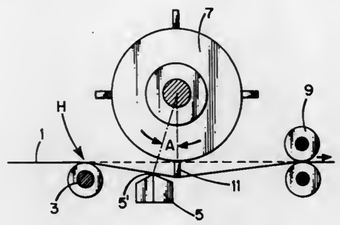
## PROCESS FOR DISCONTINUOUS COATING OF A WEB BY PERIODIC DEFLECTION THEREOF AGAINST A FLUID COATING

**Donald B. McIntyre, and Frederic S. McIntyre, both of Wellesley Hills, Mass., assignors to Acumeter Laboratories, Inc., Newton Lower, Mass.**

**Filed Dec. 30, 1974, Ser. No. 537,064**

**Int. Cl.² B05D 1/18, 5/00**

**U.S. Cl. 427—172** **5 Claims**




1. A process of fluid application, that comprises, moving a sheet under tension at a predetermined speed longitudinally along a predetermined substantially straight path and past a predetermined stationary line transverse to the longitudinal movement of said sheet and spaced from said path at one side of said sheet; rotating a projection about an axis spaced from and transverse to said path at the opposite side of said sheet, said axis being displaced the direction of sheet movement from training said transverse line, with the direction of rotation selected so that said projection moves in the direction of sheet movement in the vicinity of said line; periodically forcing the rotating projection against said opposite side of the sheet in the vicinity of said transverse line and deflecting said sheet from said path substantially to said transverse line; producing along said transverse line globules of fluid to be deposited on said sheet as coatings; timing such globule production to occur at substantially the time of and between periodic deflection of the sheet; adjusting the size of the globules to be sufficient to contact the sheet on its said one side along said transverse line when the sheet is deflected in order to cause the deflected sheet to wipe off the globules as coatings thereon selecting the said displacement of the rotational axis so as to determine the dwell time of the deflected sheet upon the globules produced at said transverse line.



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**4,020,195**

## METHOD FOR ENAMELLING THE EDGES OF SANITARY ARTICLES

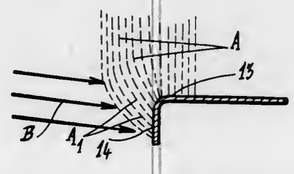
**André Primault, Garches, France, assignor to Societe Generale de Fonderie, Paris, France**

**Continuation-in-part of Ser. No. 361,608, May 18, 1975, Pat. No. 3,904,128. This application May 30, 1975, Ser. No. 582,239**

**Claims priority, application France, June 27, 1972, 72.23187**

**Int. Cl.² B05D 3/02, 1/34**

**U.S. Cl. 427—193** **3 Claims**




1. A method of enamelling the edges of sanitary articles such as baths, in which enamel powder is deposited in a solid state on the article which has previously been heated to a temperature above the melting temperature of the enamel, said edges having a top surface and a lateral surface, wherein a flux of solid enamel powder is caused to fall from a dusting unit onto the edge to be enamelled and also to project outwards therefrom with respect to the vertical line of extension of the lateral surface of the edge, and wherein the projecting portion of said flux is turned towards the lateral surface by blowing thereto a jet of gas which is directed transversely towards said lateral surface and passes in the vicinity of the vertical center line of the enamel flux from the dusting unit and below the latter so as to substantially intersect said flux.

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**4,020,196**

## PROCESS FOR TREATING FILAMENTARY PRODUCTS

**René Guillermin, Bron; Jean Joly, Craponne, and Sylvio Sangalli, Caluire, all of France, assignors to Rhone-Poulenc-Textile, Paris, France**

**Filed June 5, 1975, Ser. No. 583,914**

**Claims priority, application France, June 10, 1974, 74.20253**

**Int. Cl.² D06B 3/06; B05D 1/18**

**U.S. Cl. 427—248 G** **5 Claims**

1. A process for treating at least one moving textile yarn in a treatment zone including surfaces which define at least one groove wherein the groove is pierced with at least one orifice, through which a treatment fluid is introduced, and wherein the improvement resides in the simultaneous steps of advancing the yarn through the treatment zone, while treating the yarn with the fluid and suspending the yarn in the fluid so that the yarn does not engage the surfaces defining the groove.

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**4,020,197**

## PROCESS FOR THE CATALYTIC SENSITIZATION OF NON-METALLIC SURFACES FOR SUBSEQUENT ELECTROLESS METALLIZATION

**Horst Steffen, Geldern, Germany, assignor to Kollmorgen Technologies Corporation, Dallas, Tex.**

**Filed Feb. 5, 1975, Ser. No. 547,360**

**Claims priority, application Germany, Feb. 22, 1974, 2409251**

**Int. Cl.² C23C 3/02**

**U.S. Cl. 427—304** **19 Claims**

1. A process for the formation of catalytic nuclei on a surface to be metallized comprising:

i. treating said surface with a sensitizing solution comprising a copper (I) ion compound capable of forming ionic solutions including such solutions of a complex compound and a solvent therefor, the compound and/or its hydrolysis products having a solubility product so low that they are sparingly soluble or insoluble in water;
ii. subsequently rinsing the excess solution from the so-treated surface with water, whereby the copper compound is hydrolyzed and anchored firmly to the surface; and thereafter
iii. exposing the surface to a solution containing a reducing agent or agents to form active nuclei for electroless metal deposition by reduction of said copper (I) compound.

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**4,020,198**

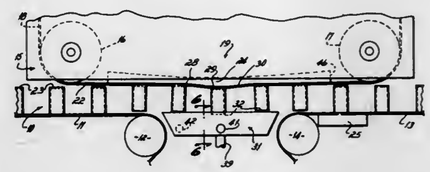
## PREVENTING FORMATION OF EXCESSIVE BEAD OF COATING MATERIAL ON METAL CAN RIMS

**James W. Cornelius, and Robert T. Mallon, both of Cincinnati, Ohio, assignors to Eagle-Picher Industries, Inc., Cincinnati, Ohio**

**Filed July 28, 1976, Ser. No. 709,504**

**Int. Cl.² B05D 5/00**

**U.S. Cl. 427—336** **5 Claims**



1. In a process for applying a surface coating to a can wherein a free-flowing hardenable coating material is applied to an inverted metal can and thereafter drains downwardly toward the lower edge of the can and tends to form a bead thereon,

the method of eliminating an excessively thick bead of the coating material on the lower edge of said can, said method comprising,

holding the can so that it hangs suspended while said material is collecting at said edge to form a bead,

before the bead has hardened, moving the can thus suspended along a path such that only the lower edge of the can, at which the bead is forming, is dipped below the surface of a bath containing a pool of thinner for the coating material, for a period of time sufficient that the thinner substantially removes the unhardened bead of coating material,

removing the can from the bath,

maintaining the can in inverted position until unhardened coating material remaining on the can above said edge drains onto said edge and recoats the same but not excessively,

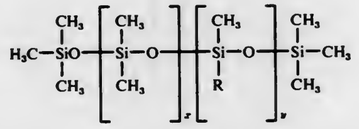
and then hardening said coating material.

## 4,020,199
## PROCESS FOR PRODUCING ACRYLIC FIBERS HAVING ANIMAL HAIR-LIKE HAND

**Katsuaki Nomura, and Masaaki Fujimatsu, both of Okayama, Japan, assignors to Japan Exlan Company Limited, Japan**

**Continuation of Ser. No. 415,400, Nov. 13, 1973, abandoned.**
**This application Sept. 24, 1975, Ser. No. 616,311**
**Claims priority, application Japan, Nov. 14, 1972, 47-114132**
**Int. Cl.² B32B** *27/30*; **C08J** *7/04*
**U.S. Cl. 427—334** **1 Claim**

1. A process for preparing acrylic fibers having an animal hairlike hand which comprises preparing an emulsion of pH 5.5 to 6.8 consisting essentially of (1) a silicone resin of the formula



wherein R is $R'NH_2$, $R'NHR''$ or $R'NR''_2$, R′ is $-(CH_2)_n-$, $n$ is 1 to 3, R″ is $C_mH_{2m+1}$, $m$ is 1 to 3, $x$ and $y$ are positive integers and the molecular weight of the silicone resin is less than 100,000 and (2) an emulsifier selected from the group consisting of polyoxyethylene (n′) monoalkylphenyl phosphates, wherein n′ is the number of ethylene oxide groups and is a value of 5 to 15, and the alkyl group contains 8 to 12 carbon atoms, and (3) water, depositing said emulsion on undried wet-spun swollen gelly acrylic fibers containing 40 to 100% by weight of water based on the dry weight of the fibers, in an amount of 0.1 to 3.0% by weight of the silicone resin based on the dry weight of the fibers, immediately drying the resultant fibers to fix said silicone resin on the fiber surfaces and applying a spinning oil agent to the dried fibers.

## 4,020,200
## PROCESS OF PROTECTING UNDERWATER SURFACES WITH A WAX COATING CONTAINING BIOCIDES

**Aleksander Jerzy Groszek, London; Colin Walter Parkes, Peachey near Uxbridge, and Ronald Alfred Crump, Horsham, all of England, assignors to The British Petroleum Company Limited, London, England**

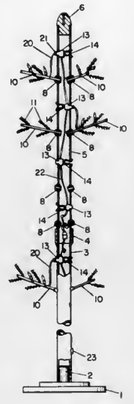
**Filed Mar. 7, 1975, Ser. No. 556,307**
**Claims priority, application United Kingdom, Mar. 13, 1974, 11186/74; Mar. 13, 1974, 11187/74; June 6, 1974, 25084/74**
**Int. Cl.² C09D** *5/14*; **B05D** *7/00*; **B32B** *9/04*
**U.S. Cl. 427—416** **2 Claims**

1. A process for protecting an underwater surface against weed and/or shell growth comprising applying to said underwater surface to a thickness of from 5 to 500 micrometers a coating composition consisting essentially of a wax which is a film-forming component and in a major amount of the total amount of the total components of the coating composition, the coating also containing at least one biocide effective against weed and/or shell growing, said biocide being a polymeric material selected from polyionenes and metal salts of a polyacrylic acid having an average molecular weight of from 200 to 500,000, said metal being selected from the group consisting of copper, zinc, nickel, cobalt and tin, the total biocide component being in a minor amount of the total components of the coating composition, the biocide amount being from 1 to 70% by weight of the amount of wax.

## 4,020,201
## ARTIFICIAL TREE

**Jeanne Marylyn Miller, 3221 W. Colorado Ave., Colorado Springs, Colo. 80904**

**Filed Feb. 11, 1976, Ser. No. 657,042**
**Int. Cl.² A47G** *33/06*
**U.S. Cl. 428—8** **5 Claims**



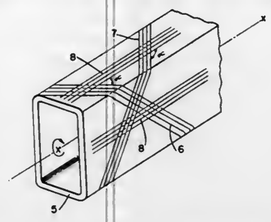
1. An artificial tree structure comprising vertically extending hollow tubular trunk members coupled together, a base for said members, said trunk members having a plurality of spaced apertures therein, some of said apertures being oppositely arranged, first socket means in some of said apertures, limb members removably sleeved in said first socket means said first socket means is tubular and flexible and formed with spaced annular flanges thereon for flexibly engaging the periphery of some of said apertures, second electrical socket means having a flat base arranged in others of said apertures, spring clip means having a bowed inwardly extending base portion in apertures opposite those having said second socket means therein and said bowed base engaging and pressing against said flat base for retaining said second socket means in said trunk members, said bowed portion terminates in outwardly and oppositely bent ends for engaging the periphery of said apertures, main double conductor wires extending within said trunk members and connected to said second socket means and to a source of current, double strings of light sockets with bulbs therein and having a male plug thereon, said plugs being adapted to be connected to at least some of said second socket means and arranged on limbs adjacent to said second socket means.

## 4,020,202
## BEAM AND STRUT GIRDER

**Holger Kreft, Karlsfeld, Germany, assignor to Maschinenfabrik Augsburg-Nurnberg AG, Germany**

**Filed July 8, 1974, Ser. No. 486,349**
**Claims priority, application Germany, July 7, 1973, 2334645**
**Int. Cl.² B32B** *9/00*
**U.S. Cl. 428—33** **14 Claims**

1. A beam and strut girder for application in vehicles and civil engineering, which comprises a girder structure having a longitudinal centerline and consisting of reinforcing fibers made of carbon or boron embedded within a plastic matrix; said reinforcing fibers being embedded in the plastic matrix at an angle of 30° to 60° with said longitudinal centerline and said girder structure being formed of at least one shaped section comprising a fraction of a hollow shaped body, said



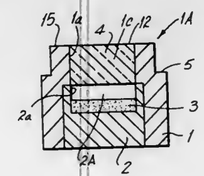
body having windings of said reinforcing fibers positioned within said plastic matrix.



## 4,020,203
## LUMINOUS MARKING IN AN INDENTATION OF AN OBJECT

**Oscar Thuler, Freiburgstrasse 624, 3172 Niederwangen, Berne, Switzerland**

**Filed Mar. 27, 1975, Ser. No. 562,516**
**Claims priority, application Switzerland, May 22, 1974, 7056/74; June 15, 1973, 8751/73**
**Int. Cl.² B32B** *3/08, 3/10*; **C09K** *11/00*; **H05B** *33/00*
**U.S. Cl. 428—35** **15 Claims**



1. Luminous marking on an object, said object having an indentation therein, comprising a phosphor in said indentation, a source of nuclear radiation in said indentation and an artificial, transparent sapphire crystal shaped to conform to the mouth of said indentation and to form a seal for confining said phosphor and source of nuclear radiation within said indentation and for preventing entry of corrosives or acids from the exterior, the outer surface of said sapphire crystal being essentially flush with the outer surface of said object at said indentation.

## 4,020,204
## VINYL TRANSFER SHEET MATERIAL AND METHOD FOR APPLYING SAME TO VINYL SUBSTRATE

**John Sebring Taylor, Newark, Del., and Wilbur Thomas Brader, Media, Pa., assignors to FMC Corporation, Philadelphia, Pa.**

**Filed Dec. 24, 1975, Ser. No. 644,219**
**Int. Cl.² E04F** *13/20, 15/16*
**U.S. Cl. 428—40** **10 Claims**

1. A method of preparing a protected substrate comprising:
(a) contacting a vinyl chloride polymer or copolymer substrate with an/exposed film surface of a transfer sheet material, wherein the transfer sheet material comprises (1) a continuous, flexible, non-fibrous cellulosic carrier and (2) a film of plasticized vinyl chloride and vinyl acetate copolymer resin releasably adhered directly onto one side of the non-fibrous cellulosic carrier, the copolymer resin consisting essentially of about 75% to about 95% vinyl chloride and of about 5% to 25% vinyl acetate, all percentages by weight based on the copolymer resin weight, and from about 5 to 20 parts of plasticizer per hundred parts of copolymer resin;
b. pressing, in the presence of heat, the contacting surfaces of the transfer sheet film and the substrate so as to provide a laminate in which the film is tenaciously bonded to the substrate; and
c. thereafter cooling the laminate.

10. A transfer sheet material which comprises a continuous, flexible, non-fibrous cellulosic carrier and (b) a film of plasticized vinyl chloride and vinyl acetate copolymer resin releasably adhered directly onto one side of the non-fibrous cellulosic carrier, the copolymer resin consisting essentially of about 75% to about 95% vinyl chloride and of about 5% to 25% vinyl acetate, all percentages by weight based on the copolymer resin weight, and from about 5 to 20 parts of plasticizer per hundred parts of copolymer resin.

## 4,020,205
## STRUCTURAL CORES

**Philip J. Haselbauer, Newport News, Va., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed June 13, 1975, Ser. No. 587,007**
**Int. Cl.² B32B** *3/12*
**U.S. Cl. 428—116** **3 Claims**



1. A structural core medium formed from structural core elements,
each structural core element being a strip formed from a continuous ribbon, the ribbon being in the form of a series of offset sections, each section having bend lines defining the sides of six alternate upright and inverted triangular surfaces having the bend lines as common sides therebetween, the last triangular surface of each section having superimposed thereabove, with a common side therebetween, the first triangular surface of a subsequent section to form the next offset section, the triangular surfaces of each section being angularly disposed relative to each other by bends along the bend lines to form dihedral angles, the common sides between triangular surfaces forming the vertices of the dihedral angles, the triangular surfaces of each offset section forming two terminal and three internal dihedral angles, the terminal angles opening in one direction, the internal dihedral angles opening in the opposite direction, the superimposed triangular surfaces forming a dihedral section-connecting angle opening in the same general direction as the internal dihedral angles, and at least two offset sections thus bent forming said strip, the structural core medium resulting from two similarly bent strips being joined at their common sides to form a row of alternately offset open-faced tetrahedrons.

## 4,020,206
## THICK-FILM CIRCUIT ON A SUBSTRATE WITH THROUGH-CONTACTS BETWEEN CONDUCTOR PATHS ON OPPOSITE SIDES OF THE SUBSTRATE

**Martin Beil, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany**

**Continuation-in-part of Ser. No. 445,939, Feb. 26, 1974, abandoned. This application May 30, 1975, Ser. No. 582,380**
**Claims priority, application Germany, Feb. 28, 1973, 2310062**
**Int. Cl.² B05D** *5/12;* **B32B** *3/10*
**U.S. Cl. 428—137** **1 Claim**

1. In a thick film circuit structure of the type comprising an electrically insulative ceramic substrate in the form of a flattened structure having a pair of opposed, generally parallel side faces and having at least on through hole extending therethrough from one such face to the other thereof, said substrate having conductor paths deposited upon each of said side faces, at least one such conductor path on each said side face being located in adjacent relationship to the perimeter of such one through hole, the improvement which comprises a conductive path extending through and substantially completely filling such one through hole, said conductive path being formed by the steps of

a. filling substantially completely such one through hole in a ceramic substrate with a paste composition comprising on a 100 weight percent total weight basis

1. from about 48 to 64 weight percent of gold in the form of particles at least about 90 weight percent of which have number average particle sizes not greater than about 10 microns and not more than about 5 weight percent of which are larger than about 25 microns,

2. from about 3 to 9 weight percent of an inorganic binder comprised of a preformed fritted glass in the form of particles having a number average size of less than about 30 microns and characterized by a capacity to sinter when exposed to temperatures ranging from about 800° to 1000° C.,

said glass comprising on a 100 weight percent total glass wight basis

from about 30 to 65 weight percent PbO
from about 8 to 35 weight percent $SiO_2$
from about 0.5 to 7 weight percent $Al_2O_3$
from about 0 to 10 weight percent $TiO_2$

said glass further optionally containing:

from about 10 to 30 weight percent $B_2O_3$

in combination with

from about 10 to 30 weight percent LiO and
from about 10 to 30 weight percent CdO by replacement of up to about 25 weight percent of each of said PbO and said $SiO_3$ therewith,

3. from about 15 to 40 weight percent of inorganic refractory particles having a size in the range from about 5 to 8 microns and characterized by a capacity to not melt at temperatures below about 1000° C., said particles being selected from the group consisting of metal carbides, metal oxides, and quartz, and

4. from about 9 to 17 weight percent of at least one organic liquid which is substantially inert as respects said gold, said inorganic binder and said particle,

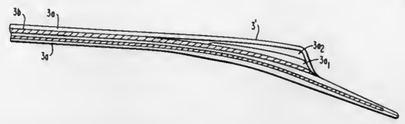
b. drying the resulting so filled ceramic substrate at a temperature below about 200° C., and

c. heat the so dried ceramic substrate at a temperature in the range of from about 800° to 1000° C., for a time of less than about 1 hour the extract such time and such temperature relationship in any given instance being sufficient to sinter said compositions, thereby to produce said conductive path, said conductive path being comprised of material which has not shrunk substantially compared to said paste composition as so dried.

## 4,020,207
## INTERIOR COVERING WITH REINFORCEMENT

**Franz-Werner Alfter, Siegburg; Joachim Becke, Troisdorf; Hans-Ulrich Breitscheidel, Troisdorf, and Herbert Laubenberger, Troisdorf, all of Germany, assignors to Dynamit Nobel Aktiengesellschaft, Germany**

**Filed Dec. 7, 1973, Ser. No. 422,725**
**Claims priority, application Germany, Dec. 7, 1972, 2259862; Apr. 27, 1973, 2321282**
**Int. Cl.² B32B** *3/26*
**U.S. Cl. 428—138** **16 Claims**



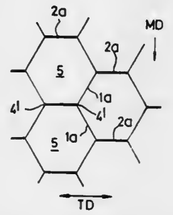
1. An interior dome covering for automotive vehicles that is insulating and self-supporting, which comprises a molded laminate structure having a contoured configuration with a variable cross-section, and consisting of at least two sheets of crosslinked polyethylene foam permanently bonded together with an intermediate polymer-containing non-foamed reinforcing layer to form a multiple-layered structure; said reinforcing layer being made from a material selected from the group consisting of polyethylene, polypropylene, ethylene-propylene copolymers, vulcanized fiber reinforced rubber, polyvinylchloride, and cellulosic material impregnated with phenolic resin or melamine resin.

14. The interior dome covering according to claim 1, wherein the reinforcing layer is formed as a perforated sheet.

## 4,020,208
## EXTRUDED PLASTIC MESH

**Frank Brian Mercer, and Keith Fraser Martin, both of Blackburn, England, assignors to Netlon Limited, England**

**Filed Sept. 3, 1975, Ser. No. 609,927**
**Claims priority, application United Kingdom, Sept. 11, 1974, 39546/74**
**Int. Cl.² B32B** *5/02;* **D01D** *5/12;* **D02J** *1/22;* **B29D** *23/06*
**U.S. Cl. 428—255** **4 Claims**




1. An extruded plastic mesh having mesh openings each of which is a six-sided figure bounded on four sides by portions of four separate strands and on oppositely disposed two sides by elongate members comprising confluent portions of pairs of said four strands and forming a crotch at each end of each elongate members, said strands and elongate members having preferred molecular orientation of the plastic material thereof in the direction of their major dimension and passing through and around the crotches of the elongate members of adjacent mesh openings.



## 4,020,209
## COATED FABRICS AND LAMINATED ARTICLES THEREFROM

**Edward Lung Yuan, Philadelphia, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Continuation-in-part of Ser. No. 357,774, May 4, 1973, abandoned. This application Apr. 2, 1975, Ser. No. 564,485**
**Int. Cl.² D03D** *13/00*
**U.S. Cl. 428—257** **10 Claims**

1. A coated article comprising: a triaxial woven fabric and a polymeric material impregnating and coating said fabric, said polymeric material present in an amount sufficient to set the yarn courses of said fabric where they cross one another and so that said coated fabric has:

a. a tensile strength, measured at the weakest direction according to ASTM D-1682-64, of at least three times the uncoated fabric;

b. a tensile strength, measured at the weakest direction according to ASTM D-1682-64, of at least 50% of that measured in the transverse direction; and

c. an average tongue tear resistance of the machine and transverse directions measured according to ASTM D-2261-64 of at least twice the tensile strength of an individual yarn used in the woven fabric

wherein the triaxial woven fabric is of fibers selected from the group consisting of glass, polyester, cotton, polyamide and aromatic polyamide and blends thereof;

wherein the polymeric material is selected from the group consisting of an elastomer, an epoxy resin, an acrylic resin, a polyester resin and a perfluorocarbon resin; and

wherein the polymeric material to fabric weight ratio is within the range of about 0.2 to 2.

## 4,020,210
## ENCAPSULATED WATER PAPER

**Loren E. Geer, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

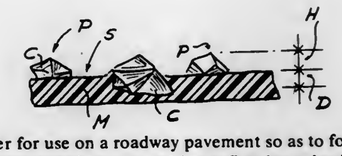
**Filed Dec. 15, 1975, Ser. No. 640,603**
**Int. Cl.² B32B** *5/16, 27/14*
**U.S. Cl. 428—307** **11 Claims**

1. In a paper sheet adapted for the electrostatographic reproduction of images on both sides thereof by the deposition on its surface of toner particles in imagewise configuration and fusing the toner into the sheet by the application of heat and pressure thereto, the improvement which comprises a surface size on one or both sides of said sheet, said surface size comprising a binder material and a plurality of microcapsules which comprise a core of water or hydrated salt encased in an impervious capsule wall of a solid material capable of being ruptured by the heat and pressure applied to the sheet during the fusing of the image formed on the first side thereof and in the situation where a hydrated salt is employed as the microcapsule core the salt is selected from those hydrates which give up their water of hydration at a temperature equal to or below that to which the paper is subjected during the fusing operation, said microcapsules being present in an amount which will release sufficient water into the paper sheet so as to provide about two percent water by weight of the paper sheet after the fusing of the image formed on the first side thereof.

## 4,020,211
## ANTI-SKID AND WEAR RESISTANT ROAD SURFACE MARKING MATERIAL

**Ludwig Eigenmann, Vacallo, Ticino, Switzerland**

**Continuation-in-part of Ser. No. 153,218, June 15, 1971, Pat. No. 3,782,843. This application May 22, 1973, Ser. No. 362,757**
**Claims priority, application Italy, May 24, 1972, 24785/72**
**The portion of the term of this patent subsequent to Jan. 27, 1993, has been disclaimed.**
**Int. Cl.² B32B** *5/16;* **E01F** *9/00*
**U.S. Cl. 428—323** **16 Claims**




1. A marker for use on a roadway pavement so as to form a traffic-regulating indicium, comprising a first layer having a first surface adapated to face away from a roadway pavement, said first layer including an elastomeric binder; a second highly light-reflective layer having a second surface adapted fo face away from the roadway pavement and another surface juxtaposed with said first surface, said second layer including a resin of the group consisting of polyamide resins, polyurethane resins and polyterephthalic derivative resins, and said elastomeric binder being selected so as to be compatible with said resin and being a member of the group consisting of elastomeric binders suitable as constituents of traffic-regulating indicia, said second layer being bonded to said first layer over substantially the entire interfacial area between said first and other surfaces by bonds formed due to the compatibility of said resin and binder, and said second surface including spaced first surface sections and subtantially smooth, substantially planar second surface sections constituting a substantial part of said second surface and which are exposed for the reflection of light from said second surface; and a plurality of particles bonded to said second layer and projecting outwardly therefrom at said first surface sections, said particles having a minimum hardness of about 6 on the Mohs Hardness Scale and including pointed end portions outwardly of said second surface for imparting good anti-skid properties to said second layer, and said second layer having a thickness no greater than about the average dimension of said particles and comprising a minimum of about 10 percent by weight of said particles, said particles being securely bonded to said second layer due to the wetting and the resultant intimate contacting of said particles by said resin when said particles are contacted with said resin prior to setting of the latter and due to the nature of said resin which results in the presence of high-strength bonds formed by the attraction of hydrogen atoms for the electrons of the outer electron rings of neighboring oxygen atoms.

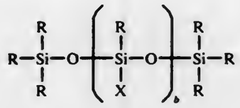
## 4,020,212
## POLYOLEFIN FIBERS USEFUL AS FIBERFILL TREATED WITH FINISHING AGENT COMPRISING AN ORGANOPOLYSILOXANE AND A SURFACE ACTIVE SOFTENER

**Wayne K. Erickson, Greenville, S.C., assignor to Phillips Petroleum Company, Bartlesville, Okla.**

**Division of Ser. No. 505,916, Sept. 13, 1974, Pat. No. 3,968,042. This application Apr. 21, 1976, Ser. No. 679,122**
**Int. Cl.² A47C** *27/00;* **D06M** *13/18, 13/46*
**U.S. Cl. 428—361** **10 Claims**

1. A product comprising polyolefin fiber having deposited thereon a thin coating of a small but effective amount, sufficient to reduce the scroopiness of said fibers, of a finishing agent composition comprising:

on a dry solids basis, from about 60 to about 80 weight percent of a first component and from about 20 to about 40 weight percent of a second component wherein said first component comprises an organopolysiloxane represented by the formula



wherein each R is individually selected from the group consisting of alkyls having from 1 to 6 carbon atoms, each X is individually selected from the group consisting of R and $(-CH_2CH_2O-)_cH$ with from 10 to 20% of the X's being R, *b* is an integer having a value of at least 10, and *c* is an integer having a value of at least 20 and said second component comprises from about 86 to about 98 weight percent of a quaternary ammonium salt surface-active material having softening properties for polyolefin fibers; from about 0.3 to about 2 weight percent of a nonionic wetting agent; from about 0.7 to about 4 weight percent of a buffering agent; and from about 1 to about 8 weight percent of a corrosion inhibitor; with the amounts of said components being adjusted within said ranges relative to each other so that when said composition is dispersed in water to provide an aqueous dispersion containing from about 1 to about 20 weight percent solids, said dispersion has a pH within the range of from 6 to 8.

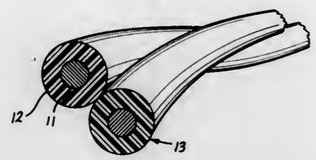
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**4,020,213**

## MANUFACTURING AN INSULATED CONDUCTOR AND THE ARTICLE PRODUCED THEREBY

**Sven Raymond Berglowe, Jr., Edgewood, and Earl Salvator Sauer, Perry Hall, both of Md., assignors to Western Electric Company, Inc., New York, N.Y.**

**Filed Mar. 20, 1975, Ser. No. 560,068**
**Int. Cl.² B05D** *5/12*
**U.S. Cl. 428—379** **6 Claims**




1. A method of covering a electrical conductor conductor with a composition to obtain a controlled adhesion of the composition to the conductor member, which includes the steps of:

advancing the conductor member along a path;

preheating the conductor member to a temperature within a temperature range of approximately 525° F to 650° F; and

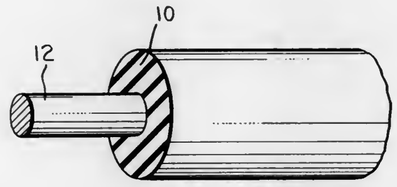
extruding over the conductor member while the temperature thereof is substantially within the specified temperature range an epoxy resin-free composition which consists essentially of a plasticized polyvinyl chloride, a stabilizer, a filler system, a lubricant, and a carbon black constituent, the composition upon being exposed to the specified predetermined temperature range characterized by the release of a reaction product at the interface of the conductor and the composition which treats the outwardly facing surface of the conductor in a manner to cause a controllable adhesion of the composition to the conductor.

**4,020,214**

## METHOD OF MAKING AN INSULATED ELECTRICAL CONDUCTOR USING PRESSURELESS CURING OF FILLED ETHYLENE CONTAINING POLYMERIC COMPOSITIONS, AND AN INSULATED CONDUCTOR FORMED THEREBY

**Burton Thornley MacKenzie, Jr., Monroe, Conn., assignor to General Electric Company, New York, N.Y.**

**Division of Ser. No. 372,084, June 21, 1973, Pat. No. 3,923,731. This application Nov. 28, 1975, Ser. No. 626,246**
**Int. Cl.² B32B** *9/00, 15/00;* **B05D** *5/12;* **B29F** *3/10*
**U.S. Cl. 428—389** **8 Claims**




7. An electrical conductor having a relatively dense and substantially non-porous cured polymeric insulation thereon, comprising a conductor and a layer of insulation comprising the cured product in approximate parts by weight of: an ethylene-containing polymer selected from the group consisting of polyethylene, copolymers of ethylene and vinyl acetate, copolymers of ethylene and propylene, and terpolymers of ethylene and propylene with a diene, and mixtures thereof in an amount of 100 parts; at least one mineral filler selected from the group consisting of aluminum silicate, magnesium oxide, titanium dioxide, silica, and glass in amounts of about 15 to 200 parts; tertiary organic peroxide curing agent in an amount of about 0.5 to 10 parts; and, at least one organic titanate selected from the group consisting of tetrakis (2-ethylhexyl) titanate, tetrabutyl titanate, and a mixed alkyl titanate comprising about 85 parts isopropyl $C_3$ by weight and about 15 parts stearyl $C_{18}$ by weight in an amount of about 2 to 10 parts by weight per 100 parts by weight of the mineral filler.

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**4,020,215**

## EXTRUSION OF POLYOLEFIN ONTO PAPER AT DECREASED TEMPERATURES

**Lubomir Michaylov, Castro Valley, Calif., assignor to Crown Zellerbach Corporation, San Francisco, Calif.**

**Filed May 30, 1975, Ser. No. 582,340**
**Int. Cl.² B32B** *27/10, 27/32, 27/30*
**U.S. Cl. 428—420** **14 Claims**

1. A laminate comprising successively

a. a paper substrate coated with a polyalkyleneimine,

b. a layer of a polymer containing functional groups which react chemically with the imino groups of the polyalkyleneimine, the functional groups constituting from about 1 to 25 mole percent of the polymer, and

c. a layer of a polyolefin.

12. In a method of extruding a layer of polyolefin onto a paper substrate coated with a polyalkyleneimine, the improvement of interposing between the coated substrate and the polyolefin layer a layer of a polymer containing 1–25 mole percent functional groups which react chemically with the imino groups of the polyalkyleneimine and extruding the polyolefin layer at a temperature of from about 500° to 580° F.



**4,020,216**

## COATING COMPOSITION FOR FLEXIBLE SUBSTRATES

**Lester I. Miller, Troy, Mich., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed June 3, 1975, Ser. No. 583,453**
**Int. Cl.² B32B** *27/40;* **C08K** *5/05, 1/14*
**U.S. Cl. 428—425** **16 Claims**

1. A coating composition comprising 5–60% by weight of a film-forming binder and 40–95% by weight of an organic solvent for the binder; wherein the binder consists essentially of about

A. 20–90% by weight of an acrylic polymer containing hydroxyl groups selected from the group of an acrylic polymer consisting essentially of 20–40% by weight of methyl methacrylate, 40–74% by weight of an alkyl methacrylate having 2–12 carbon atoms in the alkyl group or an alkyl acrylate having 1–12 carbon atoms in the alkyl group, 5–15% by weight of a hydroxy alkyl methacrylate or a hydroxy alkyl acrylate each having 2–4 carbon atoms in the alkyl group and 1–5% by weight of an alkyl amino alkyl methacrylate or an alkyl amino alkyl acrylate and an acrylic polymer consists essentially of 20–44% by weight of methyl methacrylate, 50–70% by weight of an alkyl methacrylate having 6–12 carbon atoms in the alkyl group or an alkyl acrylate having 2–12 carbon atoms in the alkyl group, 5–20% by weight of a hydroxy alkyl acrylate or a hydroxy alkyl methacrylate or a mixture thereof of each having 2–4 carbon atoms in the alkyl group and 1–20% by weight of an $\alpha,\beta$ ethylenically unsaturated carboxylic acid; wherein the acrylic polymer has a weight average molecular weight of about 5,000–80,000 determined by gel permeation chromatography;

B. 5–40% by weight of a hydroxy terminated ester of a bis primary diol of 2–22 carbon atoms and a hydroxy terminated mono carboxylic acid or a hydroxy terminated polyester of the esterification product of neopentyl glycol and mixed methyl esters of succinic acid, glutaric acid and adipic acid; and

C. 5–75% by weight of an organic aliphatic or cycloaliphatic polyisocyanate;

wherein a dried film of about 2 mils thick of the composition on a flexible hydrocarbon rubber substrate can withstand a 360° mandrel bend test at 5° C. without cracking of the film or loss of adhesion of the film to the substrate.

16. A flexible hydrocarbon rubber or polyvinyl chloride substrate coated with a dried coalesced layer of the composition of claim 1.

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**4,020,217**

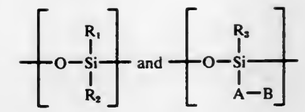
## LAMINATED GLASS STRUCTURES AND PROCESS FOR PRODUCTION THEREOF

**Isao Karasudani, Kyoto; Toshiyuki Takashima, and Yoshiyuki Bokuda, both of Shiga, all of Japan, assignors to Sekisui Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan**

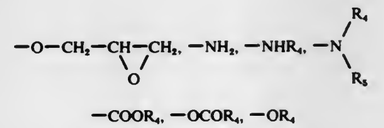
**Filed Mar. 7, 1975, Ser. No. 556,414**
**Claims priority, application Japan, Mar. 9, 1974, 49-27406; Mar. 9, 1974, 49-27407**
**Int. Cl.² B32B** *27/42;* **C08L** *91/00*
**U.S. Cl. 428—429** **25 Claims**

1. A laminated glass structure comprising at least two glass sheets bonded to each other through an interlayer of a plasticized polyvinyl acetal resin having a degree of acetalization of 55 to 80 mole %, said polyvinyl acetal resin being treated with a member selected from the group consisting of

a. a modified liquid siloxanes containing 1 to 30 recurring units of each of the formulae



wherein $R_1$, $R_2$ and $R_3$, independently from each other, represent a monovalent hydrocarbon group; A represents an alkylene group containing not more than 20 carbon atoms which is optionally substituted with a hydroxyl group, or an oxyalkylene group containing not more than 250 carbon atoms which is optionally substituted with a hydroxyl group; and B represents



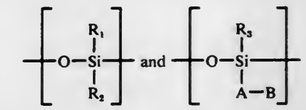
$-COOR_4$, $-OCOR_4$, $-OR_4$

or -OH, in which $R_4$ and $R_5$, independently from each other, represent an alkyl group, with the proviso that when B is -OH, A represents the oxyalkylene group, wherein said modified siloxane is used in a proportion of 0.005 to 0.5 part by weight per 100 parts by weight of polyvinyl acetal resin and

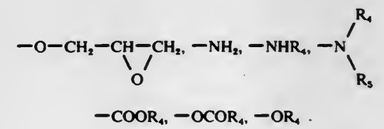
b. a combination of said modified siloxane with at least one alkali metal or alkaline earth metal salt of an organic mono- or dicarboxylic acid.

25. A process for preparing a laminated glass structure, which comprises interposing between at least two glass sheets an interlayer of a plasticized polyvinyl acetal resin having a degree of acetalization of 55 to 80 mole %, said resin being treated with a member selected from the group consisting of

a. a modified liquid siloxane containing 1 to 30 recurring units of each of the formulae



wherein $R_1$, $R_2$ and $R_3$, independently from each other, represent a monovalent hydrocarbon group; A represents an alkylene group containing not more than 20 carbon atoms, which is optionally substituted with a hydroxyl group, or an oxyalkylene group containing not more than 250 carbon atoms which is optionally substituted with a hydroxyl group; and B represents



$-COOR_4$, $-OCOR_4$, $-OR_4$

or —OH, in which $R_4$ and $R_5$, independently from each other, represent an alkyl group, with the proviso that when B is —OH, A represents the oxyalkylene group, wherein said modified siloxane is used in a proportion of 0.005 to 0.5 part by weight per 100 parts by weight of polyvinyl acetal resin and

b. a combination of said modified siloxane with at least one alkali metal or alkaline earth metal salt of an organic mono- or dicarboxylic acid wherein said organic monocarboxylic acid is an aliphatic monocarboxylic acid containing not more than 22 carbon atoms and said organic

dicarboxylic acid is an aliphatic dicarboxylic acid containing 4 to 9 carbon atoms and said salt component is used in a proportion of 0.005 to 0.5 part by weight per 100 parts by weight of the polyvinyl acetal resin, and

maintaining the resultant assembly at a temperature of 80° to 160° C. and a pressure of 5 to 10 kg/cm² for 10 to 60 minutes.

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**4,020,218**

## POLYSULFIDE SEALANT AND CAULK COMPOSITIONS

**Maurice W. Ranney, Rockland, and Robert J. Pickwell, Westchester, both of N.Y., assignors to Union Carbide Corporation, New York, N.Y.**

**Filed Mar. 27, 1975, Ser. No. 562,779**

**Int. Cl.² B32B** *27/06, 9/04;* **B05D** *1/36*

**U.S. Cl. 428—447** **7 Claims**

1. The process for enhancing the bonding of polysulfide sealant or caulks to solid inorganic substrates which comprises providing at the interface of the substrate and the sealant or caulk a silane or its hydrolyzate or condensate of the formula

$$R - SiX_3$$

wherein R is a bicyclopentenyl or mercaptonorbornyl containing radical, and X is a hydrolyzable group comprised of chlorine, alkoxy or acetoxy radicals.

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**4,020,219**

## METAL DECORATING METHOD INVOLVING MECHANICAL SHAPING

**Richard Martorano, Marlton, N.J.; William H. Brendley, Jr., Hatboro, and Thomas H. Haag, Feasterville, both of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.**

**Continuation-in-part of Ser. No. 377,685, July 9, 1973, abandoned, which is a continuation of Ser. No. 130,808, April 2, 1971, abandoned. This application Nov. 27, 1974, Ser. No. 527,791**

**Int. Cl.² B32B** *15/08;* **B21C** *23/22*

**U.S. Cl. 428—460** **11 Claims**

7. A shaped sheet metal article containing a cured coating having a thickness of 0.05 to 5 mils of a pigmented or unpigmented thermosettable composition adapted for direct-roller coating of metals comprising an alkaline aqueous blend having a binder consisting essentially of:

A. a latex of a water-insoluble addition copolymer obtained by emulsion polymerization having a molecular weight of from 250,000 to 1,000,000 of (1) a monovinyl aromatic monomer, (2) at least one ester of acrylic or methacrylic acid, (3) at least one olefinically unsaturated monomer having an amide or a hydroxyl group, and (4) an olefinically unsaturated monomer having a carboxyl group, the amount of (3) being from 1.5 to 5 percent and the amount of (4) being from .5 to 2 percent, based on the total weight of monomers, the Tg of the copolymer being below 0° C., and

B. a water-soluble urea-formaldehyde reaction product or a water-soluble methanol or ethanol ether thereof, the weight ratio of A to B on a solids basis being from 35:65 to 65:35, the minimum film-forming temperature of the composition being no higher than about 15° C., and the solids content of the composition being between 40 and 80 percent.

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**4,020,220**

## COMPOSITE COATING HAVING ENHANCED CORROSION RESISTANCE

**Victor V. Germano, Kirtland, Ohio, assignor to Diamond Shamrock Corporation, Cleveland, Ohio**

**Filed Mar. 20, 1975, Ser. No. 560,376**

**Int. Cl.² B05D** *7/14, 1/38;* **B32B** *15/04*

**U.S. Cl. 428—472** **12 Claims**

1. In the process of protecting a coatable metal substrate with a coating composite, wherein a portion of said coating composite comprises an undercoating and a subsequent coating, each established from heat curable compositions that before curing contain, in liquid medium, a hexavalent-chromium-providing substance which is susceptible to valency reduction to a lower valence state during curing of applied composition, said chromium being at least partially present in said composition in the hexavalent higher valency state, said compositions each further containing reducing agent for said chromium, the improvement in said process for providing extended substrate corrosion resistance protection which comprises:

A. establishing said undercoating in said composite on the surface of said substrate, for providing substrate protection, but in non water-resistant condition;

B. precuring said established undercoating, at elevated temperature, to a dry and water-resistant coating, with the conditions of said elevated temperature precuring being selected to orient the undercoating towards reduction of said chromium in said higher valency state;

C. establishing said subsequent coating of said composite for providing substrate protection, with said subsequent coating being established in non water-resistant condition; and,

D. curing said subsequent coating, at elevated temperature, with the conditions of said elevated temperature curing being selected for first passing said subsequent coating through the conditions of said precuring, thereby initially orienting the chromium of said subsequent coating towards reduction from said higher valency state, and with said elevated temperature conditions, by continuation thereof, then orienting the chromium of said subsequent coating towards a return to said higher valency state.

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**4,020,221**

## THIN FILM DEVICE

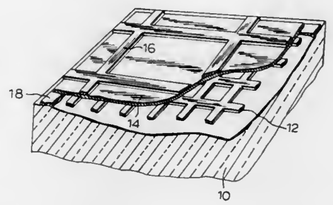
**Hideaki Kusakawa; Kenzoo Takahashi, and Shigeki Ikebata, all of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 455,352, March 27, 1974, abandoned. This application Dec. 3, 1975, Ser. No. 637,113**

**Claims priority, application Japan, Mar. 28, 1973, 48-35307**

**Int. Cl.² B32B** *3/00, 3/12*

**U.S. Cl. 428—166** **4 Claims**




1. A thin film device for displaying images impressed thereon by a beam of electrons, consisting essentially of a substrate formed of a dielectric material having a light transmitting property, and a single unitary thin metallic film having protrusions as a structural part thereof and on one surface of said thin metallic film, said protrusions being in contact with said dielectric substrate to position said thin metallic film in said spaced superposed relationship therewith, the edges of said film being secured to said substrate.

3. A thin film device for displaying images impressed thereon by a beam of electrons consisting essentially of a substrate formed of a dielectric material having a light transmitting property, electrically conducting protrusions disposed on said dielectric substrate, and a single unitary thin metallic film having one surface having no protrusions thereon being in contact with said protrusions on said substrate, said film having protrusions as a structural part thereof and on the surface thereof facing away from said substrate, the surface of said thin metallic film having no protrusions being maintained in spaced superposed relationship with said substrate by said protrusions on the substrate, the edges of said film being secured to said substrate.



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**4,020,222**

## THIN FILM CIRCUIT

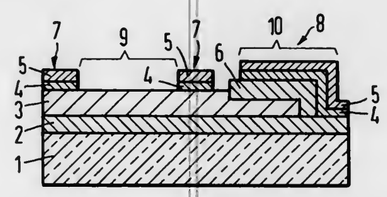
**Helmold Kausche, Munich, and Alois Schauer, Gruenwald, both of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany**

**Filed June 18, 1975, Ser. No. 587,965**

**Claims priority, application Germany, June 19, 1974, 2429434**

**Int. Cl.² B05D** *5/12*

**U.S. Cl. 428—209** **8 Claims**




1. A thin film circuit comprising a planar substrate of insulating material, supported by said substrate at least one metal film, from which are made by photolithographic techniques the capacitors as well as the resistors, said metal film consisting of an alloy of aluminum with between 2 and 20 atom per cent tantalum and containing oxygen in an amount sufficient so that the temperature coefficient of the resistors is between −300 and −500 ppm/K in order to compensate the positive TCC of the capacitors with the negative TCR of the resistors in RC-networks.

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**4,020,223**

## FLUORINATION OF POLYOLEFIN AND POLYACRYLONITRILE FIBERS

**Dale D. Dixon, Kutztown, and Larry J. Hayes, Macungie, both of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.**

**Continuation-in-part of Ser. No. 434,284, Jan. 17, 1974, abandoned. This application Oct. 30, 1975, Ser. No. 627,029**

**Int. Cl.² B32B** *27/00;* **D02G** *3/00;* **D04H** *1/58*

**U.S. Cl. 428—224** **12 Claims**

1. An oil stain release moisture transporting fiber form comprising a synthetic resin selected from the group consisting of polyolefins and polyacrylonitriles, said fiber form being surface fluorinated from about [$4 \times 10^{-7}$ to $4 \times 10^{-1}$ mg F/cm²] $1 \times 10^{-6}$ to $1 \times 10^{-3}$ mg F/cm² on an after wash basis, said fluorinated fiber form exhibiting a neutralization equivalent of below about [$1 \times 10^{6}$] $2 \times 10^{5}$ and an F/COOH ratio no greater than 25.

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**4,020,224**

## FLAME RETARDANT METHOD

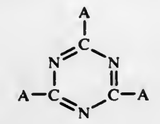
**Albert Y. Garner, Yellow Springs, Ohio, assignor to Monsanto Research Corporation, St. Louis, Mo.**

**Division of Ser. No. 490,607, July 22, 1974. This application Jan. 16, 1976, Ser. No. 649,882**

**Int. Cl.² C09K** *3/28;* **C09D** *5/18*

**U.S. Cl. 428—272** **7 Claims**

1. A process for making flame-retardant material from cotton and polyester-cotton having about 30 to 70% by weight cotton comprising treating said material with an aqueous solution of a mixture comprising compounds of the formula




wherein A is $NH_2$ or $N=P(NH_2)_3$, provided at least one A is $N=P(NH_2)_3$ in sufficient amount and curing the treated material at a sufficient temperature to make the treated and cured material self-extinguishing when subjected to a flame sufficient to ignite and consume the untreated material.

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**4,020,225**

## METAL CLAD LAMINATE COMPOSED OF FLAME RESISTANT THERMOSETTING RESIN COMPOSITION

**Hiroshi Fujiwara, Soka, and Hiroshi Suzuki, Ichikawa, both of Japan, assignors to Maruzen Oil Co. Ltd., Osaka, Japan**

**Division of Ser. No. 548,108, Feb. 7, 1975. This application Nov. 18, 1975, Ser. No. 633,134**

**Int. Cl.² B32B** *15/12*

**U.S. Cl. 428—251** **11 Claims**

1. A metal clad laminate comprising at least one base material impregnated with a flame resistant thermosetting resin and a metal sheet or foil laminated on at least one side of said base material, said thermosetting resin composition comprising:

i. an epoxy resin comprising an epoxy compound having at least two epoxy groups per molecule, and

ii. a halogenated polyhydroxystyrene or a mixture of a halogenated polyhydroxystyrene and polyhydroxystyrene, wherein the halogenated polyhydroxystyrene has a mean degree of polymerization of from about 2 to 10,000 and the equivalent ratio of the number of hydroxyl groups in the halogenated polyhydroxystyrene and polyhydroxystyrene to the number of epoxy groups in the epoxy resin is in the range of 0.3 to 10.

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**4,020,226**

## FIBROUS FRICTION MATERIAL

**Kuzma Andrianovich Andrianov, Vystavochny pereulok, 3, kv. 9; Georgy Nikolaevich Bagrov, Universitetsky prospekt, 23, korpus 4, kv. 16; Tatyana Vsevolodovna Vasilieva, ulitsa Volgina, 9, korpus 2, kv. 96; Vladimir Alexandrovich Vasjukov, ulitsa Krasnodarskaya, 46, kv. 14; Sergei Ivanovich Lebedev, Schelkovsky proezd, 3, korpus 2, kv. 34; Vladimir Alexandrovich Makarov, ulitsa Sedova, 8, korpus 1, kv. 68, and Lotari Mikhailovich Khananashvili, ulitsa Sumskaya, 6, korpus 2, kv. 244, all of Moscow, U.S.S.R.**

**Filed Apr. 23, 1975, Ser. No. 570,573**

**Int. Cl.² F16D** *69/02*

**U.S. Cl. 428—290** **1 Claim**

1. A fibrous friction material, essentially consisting of carbon fabric; impregnated with a polymeric thermosetting binder, essentially consisting of polyoxyphenylmethanephenoxysiloxanes of the formula

$$[\text{-Si}\{OC_6H_4(CH_2C_6H_3OH)_nCH_2C_6H_4OH\}_2\text{-}]_m,$$

where

$n = 0–2;$

$m = 10–100,$

hexamethylenetetramine, and barium sulfate; said components being present in the following percentages by weight:

| | |
|---|---|
| polyoxyphenylmethanephenoxysiloxanes | 10–40 |
| hexamethylenetetramine | 1–2.5 |
| barium sulfate | 15–30 |

-continued

| | |
|---|---|
| carbon fabric | the balance. |

4,020,227
MAGNETIC TAPE
Robert J. Deffeyes, Graham, Tex., assignor to Graham Magnetics Incorporated, Graham, Tex.
Continuation of Ser. No. 153,882, June 16, 1971, abandoned. This application June 16, 1976, Ser. No. 696,556
Int. Cl.² H01F 10/02
U.S. Cl. 428—306 19 Claims

1. In a magnetic recording tape of the type comprising a backing film and a magnetic coating thereon wherein said coating is formed of iron oxide magnetic particles within a resinous matrix therefor, the improvement wherein

a. the matrix resin comprises at least about 50% by weight of a poly-urethane elastomer resin characterized by a minimum elongation of about 400%, a minimum tensile strength of 6000 psi, and a minimum 300% modulus of about 1200 psi, and comprises from about 0 to 50% by weight of a supplemental resin; and

b. wherein said magnetic coating comprises said iron oxide particles having an oil absorption value of less than 50 ml per 100 grams;

wherein said magnetic coating has properties including a minimum tensile strength of about 1100 psi; a minimum elongation of about 10%; and a minimum toughness of about 100 inch-pounds per cubic inch; all said properties of said coating being measured when said coatings consists essentially of, in addition to the matrix resin, (a) at least 70% by weight of an acicular gamma $Fe_2O_3$ particle of a 0.5 micron length and an oil absorption of at least 25 ml per 100 grams (b) at least 3.5% by weight of carbon black having a surface area of about 230 square meters per gram and a di-butyl phthalate absorption of 185 cc per gram.

4,020,228
GEL COMPOSITION, HEAT SEALABLE SUBSTRATES, AND PROCESS FOR HEAT SEALING
Frank E. Eastes, Spartanburg, S.C., assignor to W. R. Grace & Co., Duncan, S.C.
Filed Nov. 11, 1974, Ser. No. 522,544
Int. Cl.² C09J 7/02; B32B 27/32
U.S. Cl. 428—347 16 Claims

1. A heat sealable article comprising a solid substrate selected from the group consisting of polyolefinic and cellulosic sheets having coated on at least one surface of the substrate a substantially dry residue of a substantially wax free gel composition adapted to contact another surface in heat sealing engagement, and wherein said gel consists essentially of:

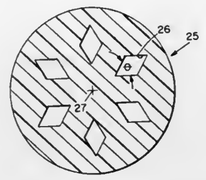
a. an aliphatic saturated monocarboxylic acid having from about 10 to about 24 carbon atoms;

b. an interpolymer of ethylene and a vinyl ester of a monocarboxylic acid having from 1 to about 4 carbon atoms;

c. a tackifying resin; and

d. an organic solvent wherein, per 100 parts by total weight of said components (a), (b) and (c), the saturated carboxylic acid component is present in an amount from about 5 to about 40 parts by weight, the interpolymer component is present in an amount from about 20 to about 60 parts by weight, and the tackifying resin is present in an amount from about 5 to about 40 parts by weight wherein said interpolymer includes from about 15 to about 50 percent by weight of said vinyl ester.

4,020,229
MULTI-CAVITY FILAMENTS
Paul R. Cox, Jr., Cary, N.C., assignor to Hercules Incorporated, Wilmington, Del.
Filed Aug. 7, 1975, Ser. No. 602,953
Int. Cl.² D02G 3/00
U.S. Cl. 428—372 5 Claims




1. A polypropylene filament having a substantially round cross-section, the cross-section at any point along the length of the filament having three or more cavities of substantially equal cross-section therein, each of said cavities having two legs forming a vertex angle therebetween of between about 65° and 140°, with said vertex angle being pointed substantially directly toward the center axis of the filament.

4,020,230
MICROPOROUS POLYETHYLENE HOLLOW FIBERS AND PROCESS OF PREPARING THEM
Robert D. Mahoney, Dublin, and Stephen E. Schneider, Concord, both of Calif., assignors to The Dow Chemical Company, Midland, Mich.
Filed Oct. 3, 1975, Ser. No. 619,431
Int. Cl.² B01D 47/00, 59/10; D02G 3/00
U.S. Cl. 428—398 4 Claims

1. A microporous hollow fiber in which the porosity is contiguous, the $O_2$ gas permeability is at least $2\times10^{-5}$ cc (STP) per $cm^2$ per second per cm Hg. transmembrane pressure differential and said fiber consists essentially of polyethylene.

4,020,231
PIGMENTED PHOSPHORS AND METHOD OF MAKING
Robert A. Hedler, and W. Wentworth Slobbe, both of Seneca Falls, N.Y., assignors to GTE Sylvania Incorporated, Stamford, Conn.
Filed Mar. 31, 1976, Ser. No. 672,249
Int. Cl.² C09K 11/08, 11/20, 11/42
U.S. Cl. 428—403 14 Claims

1. A method of making free-flowing, pigmented phosphor comprising the steps of: preparing an aqueous mixture of particles of phosphor, particles of a pigment and a free-flowing agent and mixing thoroughly; adding a precipitation causing agent in sufficient amount to cause said free-flowing agent and said pigment to co-precipitate upon and coat said phosphor; allowing said now coated phosphor to settle; removing the supernatant liquid; and drying said coated phosphor.

13. A composite article comprising: a core of a phosphor particle having the capability of emitting light in a relatively narrow frequency band containing a preferred frequency and other frequencies when excited by a suitable form of energy; said core being encapsulated by a light modifying layer; said layer being composed of a co-precipitated mixture of a material selected from the group consisting essentially of silica or pyrophosphate and a pigment which is substantially transparent to light of said preferred frequency and substantially opaque to light of said other frequencies.



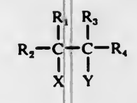
4,020,232
HEAT-SENSITIVE RECORDING SHEETS
Isao Kohmura; Kiyoshi Futaki, and Kozo Haino, all of Nagaokakyo, Japan, assignors to Mitsubishi Paper Mills, Ltd., Tokyo, Japan
Filed May 14, 1975, Ser. No. 577,594
Claims priority, application Japan, May 17, 1974, 49-54572; May 18, 1974, 49-55989
Int. Cl.² B41M 5/18
U.S. Cl. 428—411 17 Claims

1. A heat sensitive recording sheet which comprises a support and a heat sensitive composition coated thereon which comprises a solid amine derivative and at least one acylated lactone or sultone type acidic leuco dye capable of reacting with said amine derivative at an elevated temperature to form a color.

4,020,233
HEAT ACTIVATED ETHYLENICALLY UNSATURATED-POLYTHIOL COMPOSITIONS
Charles Robert Morgan, Brookeville, Md., assignor to W. R. Grace & Co., New York, N.Y.
Filed Jan. 22, 1976, Ser. No. 651,365
Int. Cl.² B32B 27/06
U.S. Cl. 428—419 11 Claims

1. A heat activatable composition comprising an ethylenically unsaturated compound, a polythiol, the mole ratio of the carbon-to-carbon double bonds in the ethylenically unsaturated compound to the thiol groups in the polythiol being in the range of 1:10 to 10:1 respectively, and 0.01–5% by weight based on the weight of the ethylenically unsaturated compound and

polythiol of a pinacol of the general formula:



wherein $R_1$ and $R_3$ are members independently selected from the group consisting of a substituted and unsubstituted aromatic radicals, $R_2$ and $R_4$ are members independently selected from the group consisting of substituted and unsubstituted aliphatic and aromatic radicals and X and Y are members independently selected from the group consisting of hydroxyl, alkoxy and aryloxy.

4,020,234
HIGH-ALUMINA CONTENT COMPOSITIONS CONTAINING BAO-MGO-$SiO_2$ GLASS AND SINTERED CERAMIC ARTICLES MADE THEREFROM
Richard A. Gardner, Wappingers Falls, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.
Division of Ser. No. 430,329, Jan. 2, 1974, Pat. No. 3,935,017. This application Nov. 7, 1975, Ser. No. 629,811
Int. Cl.² B32B 27/40
U.S. Cl. 428—433 9 Claims

1. In a sintered multilayer ceramic sandwich comprising a plurality of ceramic layers separated by internal conductive metallization, the improvement wherein said ceramic layers consist essentially of a sintered alumina and material sinterable in a reducing atmosphere without blistering or mottling consisting essentially of alumina and a pre-fused ternary glass sintering aid from the system:

$BaO-MgO-SiO_2$

said sintering alumina ceramic material having a dielectric constant of at most 9.5, which permits adequate speeds upon use in computer circuitry, and a dissipation factor less than 0.005, said ternary glass sintering aid being selected from compositions within the area bounded by A-B-C in the Figure, which points A-B-C represent the following compositions:

| Point | Mol % BaO | Mol % MgO | Mol % $SiO_2$ |
|---|---|---|---|
| A | 15.0 | 15.0 | 70.0 |
| B | 43.5 | 17.5 | 39.0 |
| C | 17.5 | 43.5 | 39.0 |

4,020,235
NOVEL COMPOSITE DIAPHRAGM MATERIAL
Luigi Giuffre, Milan, Italy; Vittorio De Nora, Nassau, Bahamas, and Placido Spaziante, Milan, Italy, assignors to Oronzio de Nora Impianti Elettrochimici S.p.A., Milan, Italy
Filed May 7, 1975, Ser. No. 575,415
Claims priority, application Italy, Mar. 6, 1975, 20989/75
Int. Cl.² C25B 13/06, 13/08
U.S. Cl. 428—443 5 Claims

1. A composition comprising an inert fibrous material impregnated with a copolymer of styrene and divinyl benzene copolymerized directly on the material in the absence of a solvent and then sulfonated and halogenated.

4,020,236
PROCESS FOR PRODUCING A MAGNETIC MATERIAL AND MAGNETIC RECORDING MEDIUM CONTAINING THE SAME
Masashi Aonuma, and Yasuo Tamai, both of Odawara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan
Filed July 22, 1975, Ser. No. 598,098
Int. Cl.² H01F 1/02; C04B 35/04
U.S. Cl. 428—457 16 Claims

1. A process for preparing a ferromagnetic material which comprises mixing an aqueous solution containing at least a salt of Fe, Co, Fe-Co, Fe-Ni, Co-Ni and Fe-Co-Ni and whose pH has been adjusted to about 3.0 or less, with a solution of a reducing agent containing at least one boron hydride compound or a derivative thereof to perform an oxidation-reduction reaction, and adjusting the pH of the reaction mixture at the end of the reaction to at least about 3.0 or higher.

4,020,237
PAPER COVERED GYPSUM BOARD AND PROCESS OF MANUFACTURE
Romulis S. von Hazmburg, Laguna Hills, Calif., assignor to United States Gypsum Company, Chicago, Ill.
Continuation of Ser. No. 512,762, Oct. 4, 1974, abandoned, which is a continuation of Ser. No. 174,313, Oct. 15, 1971, abandoned, which is a continuation of Ser. No. 47,584, June 18, 1970, abandoned, which is a division of Ser. No. 612,351, Jan. 30, 1967, Pat. No. 3,562,097. This application Sept. 22, 1975, Ser. No. 615,271
Int. Cl.² B32B 13/00, 29/00, 31/00
U.S. Cl. 428—535 8 Claims

1. A gypsum board comprising a core of cast gypsum and having a porous paper cover sheet formed of a plurality of plies, said paper cover sheet consisting essentially of a major proportion of cellulosic fibers and a minor proportion of mineral fibers in an amount of from about 2 to 20% by weight of said paper cover sheet with the amount of mineral fibers in any one ply of said paper cover sheet not exceeding about 43% by weight thereof.

**4,020,238**

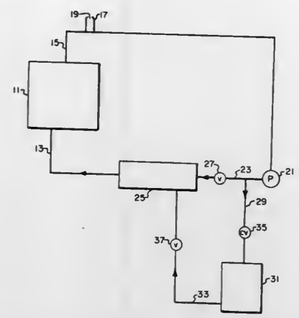
## CONTROL OF GENERATION OF CHLORINE FEED FROM CHLORINE HYDRATE FOR USE IN A METAL CHLORINE ELECTRIC ENERGY STORAGE DEVICE

**Philip C. Symons, Birmingham, Mich., assignor to Energy Development Associates, Madison Heights, Mich.**

**Continuation of Ser. No. 376,018, July 2, 1973, abandoned. This application Apr. 7, 1975, Ser. No. 565,990**

**Int. Cl.² H01M 8/04**

**U.S. Cl. 429—15** **3 Claims**



1. An apparatus for controlling the generation and feeding of chlorine from a source of chlorine hydrate during the discharge of an electric energy storage device having an electrode compartment with a stack of metal-chlorine electrodes therein and also having an inlet means and an outlet means connected by a first conduit so as to provide a continuous electrode compartment loop, said device further having a storage compartment with an inlet means and outlet means and being adapted to contain the source of chlorine hydrate, pumping means for flowing an electrolyte in the continuous loop and which pumping means pumps continuously during discharge, a second conduit connecting said first conduit at a first point downstream of said pumping means with said storage compartment inlet means, check valve means located in the second conduit adapted to prevent backflow out from the storage compartment inlet means in response to pressure buildup in the storage compartment as the chlorine hydrate therein decomposes, a third conduit means connecting the storage compartment outlet means with said first conduit at a second point downstream of said first point and adapted to provide for flow of the decomposition products of the chlorine hydrate and electrolyte to said first conduit, a first adjustable valve means located in said first conduit between said first and second points, a second adjustable valve means located in the third conduit, said first and second adjustable valve means being adapted to be adjusted such that the pressure drop across the first adjustable valve means will balance the sum of the pressure drops across the second adjustable valve means, the resistance of the third conduit and due to the hydrate storage during flow when the check valve means is open.

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**4,020,239**

## CATHODE FOR HYDRAZINE/AIR CELL

**William A. Armstrong, Ottawa, Canada, assignor to Her Majesty the Queen in right of Canada as represented by the Minister of National Defence, Ottawa, Canada**

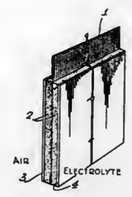
**Filed Jan. 23, 1976, Ser. No. 651,741**

**Claims priority, application Canada, July 17, 1975, 231707**

**Int. Cl.² H01M 4/100**

**U.S. Cl. 429—42** **11 Claims**

1. A cathode for use in a hydrazine/air fuel cell comprising an electrically conductive substrate having an electrocatalyst deposited thereon, a semipermeable hydrophobic membrane applied to one side of said electrocatalyst-deposited substrate, and a hydrophilic microporous separator membrane applied to the other side of said electrocatalyst-deposited substrate,



said electrocatalyst-deposited substrate being wetproofed with from 1.5 to 3 mg/cm² of polytetrafluoroethylene.

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**4,020,240**

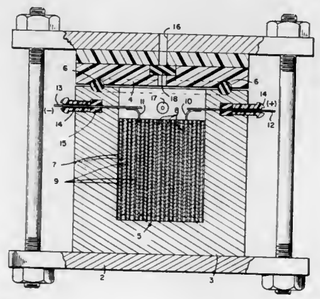
## ELECTROCHEMICAL CELL WITH CLOVOBORATE SALT IN ELECTROLYTE AND METHOD OF OPERATION AND COMPOSITION OF MATTER

**Carl R. Schlaikjer, Arlington, Mass., assignor to P. R. Mallory & Co., Inc., Indianapolis, Ind.**

**Filed Sept. 3, 1975, Ser. No. 610,518**

**Int. Cl.² H01M 6/14**

**U.S. Cl. 429—50** **26 Claims**



1. A composition of matter including a compound having a metal cation and a clovoborate anion as an electrolyte salt and a material selected from the group consisting of fluid oxyhalides, fluid non-metallic oxides, fluid non-metallic halides and mixtures thereof.

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**4,020,241**

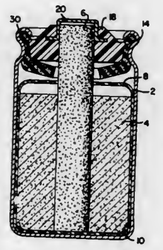
## GALVANIC CELL HAVING A RESEALABLE VENT CLOSURE

**Henry Heinz, Jr., Berea, Ohio, assignor to Union Carbide Corporation, New York, N.Y.**

**Filed Mar. 29, 1976, Ser. No. 671,674**

**Int. Cl.² H01M 2/12**

**U.S. Cl. 429—54** **16 Claims**



1. In a galvanic cell comprising a container having an open end and an inner disposed anode, a cathode within said container, a porous separator disposed between said anode and said cathode, an electrolyte disposed within said container and a cover for said container; the improvement being a resealable vent closure comprising a gas-impermeable, resiliently compressible elastomeric sponge gasket compressed between the upper wall of the container and the cover.



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**4,020,242**

## PRIMARY-CELLS

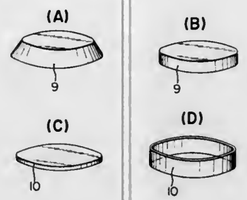
**Ryoji Okazaki, Katano; Kan Aoki, and Tomoyuki Shinagawa, both of Hirakata, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Filed Nov. 25, 1975, Ser. No. 635,257**

**Claims priority, application Japan, Dec. 4, 1974, 49-139715**

**Int. Cl.² H01M 6/00**

**U.S. Cl. 429—66** **17 Claims**




1. A primary-cell wherein a cell element assembly comprising a cathode electrode, anode electrode and separator interposed between said cathode and anode is surrounded by a hermetically sealed jacket comprising a primary-cell enclosure member and a top closure member sealing said enclosure and electrically insulated therefrom, said top closure serving as one of the terminals of the primary-cell, and said cell enclosure serving as the other terminal; and a spacer between one of said electrodes and said jacket member electrically connected to said at least one of said electrodes, said spacer being chemically stable in said primary-cell, electrically conductive, and capable of holding the electrolyte and is adapted to reduce its apparent volume when pressure is applied thereto.

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**4,020,243**

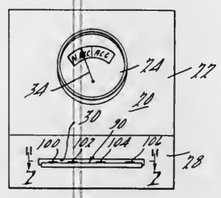
## ELECTRICAL MEASURING SYSTEM FOR TESTING ELECTRICAL COMPONENTS

**William G. Oldford, 4944 Lakeshore Road, Lexington, Mich. 48450**

**Continuation of Ser. No. 453,850, March 22, 1974, abandoned. This application Oct. 31, 1975, Ser. No. 627,691**

**Int. Cl.² H01M 2/10**

**U.S. Cl. 429—93** **12 Claims**




1. An electrical measuring arrangement for testing electrical components having at least a first and second terminal comprising a package for the electrical component including a body portion enclosing the electrical component, a tab portion extending from said body portion and continguous therewith, first and second electrical conductors extending from said body portion through said tab portion, said conductors extending to the exterior of said tab portion, said conductors being in contact with said first and second terminals of the electrical component, said conductors within said tab portion being spaced apart a predetermined distance in accordance with an electrical characteristic of said electrical component, and a console assembly having an indicator mounted thereon for indicating an electrical condition of the electrical component, and receptacle assembly for receiving said tab portion and operable in response to said characteristic, including circuit means within said console for connecting said first and second conductors with said indicating means in accordance with said characteristic, said tab portion of said package assembly being removably inserted within said receptacle assembly of said console and cooperating therewith in such a manner that said indicator is electrically connected to a selected portion of said circuit means and said electrical component so as to display an electrical condition thereof said circuit portion being selected by said predetermined spaced apart distance of said conductors.

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**4,020,244**

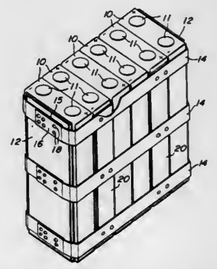
## CLAMPING STRUCTURE FOR BATTERY CELLS

**George Joseph Selinko, Lighthouse Point, Fla., assignor to Motorola, Inc., Schaumburg, Ill.**

**Continuation-in-part of Ser. No. 550,253, Feb. 18, 1975, abandoned. This application Mar. 3, 1976, Ser. No. 663,398**

**Int. Cl.² H01M 2/10**

**U.S. Cl. 429—100** **8 Claims**



1. A self-supporting battery cell clamping structure for use with a stack of rechargeable battery cells to prevent expansion of the cells in response to the build-up of pressure therein, including in combination.

first and second pressure plates for positioning against substantially the entire surface area presented by the ends of the stack of cells, and

a plurality of strips adapted for positioning about the stack of cells and engaging said pressure plates, said strips each having ends secured together to form a pre-tightented band to hold said pressure plates against movement with respect to each other and prevent expansion of the cells positioned between said plates.

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**4,020,245**

## CELL ADAPTER

**Kenichi Mabuchi, and Yoshihisa Tsuchimochi, both of Tokyo, Japan, assignors to Mabuchi Motor Co. Ltd., Tokyo, Japan**

**Filed Oct. 31, 1975, Ser. No. 627,674**

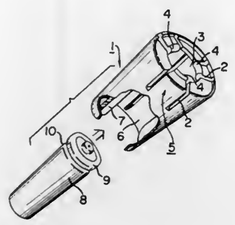
**Claims priority, application Japan, Nov. 6, 1974, 49-133685[U]; Nov. 20, 1974, 49-142271[U]**

**Int. Cl.² H01M 2/10**

**U.S. Cl. 429—100** **4 Claims**

1. A cell adapter comprising a hollow cylindrical body having an outer diameter agreeing with a predetermined diametral size, an opening formed in the top end face of said hollow cylindrical body, slits cut in said top end face and the peripheral wall of said hollow cylindrical body and extending from said peripheral wall of the hollow cylindrical body to said

opening thereof, and tongue members formed in said top end face by said slits, the tips of said tongue members together



form a circle, said slits and tongue members providing a resilient means for elastically holding the cell inserted.

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**4,020,246**

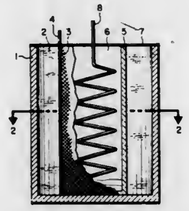
## LOW TEMPERATURE PRIMARY ELECTROLYTE CELL

**Eddie T. Seo, Torrance; Herbert P. Silverman, Orange, and Robert J. Day, Manhattan Beach, all of Calif., assignors to TRW Inc., Redondo Beach, Calif.**

**Continuation-in-part of Ser. No. 448,158, March 4, 1974, abandoned. This application Jan. 21, 1976, Ser. No. 651,013**

**Int. Cl.² H01M** *6/14*

**U.S. Cl. 429—104** **10 Claims**



1. A primary cell comprising an enclosed container having:
A. a solid alkali metal anode;
B. a ceramic electrolyte separator;
C. a liquid cathode;
D. means to conduct electric current to the exterior of said container; and
wherein said anode is in intimate contact with said separator, and said cathode is in intimate contact with the opposite side of said separator.

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**4,020,247**

## WATER ACTIVATED PRIMARY BATTERIES

**Dennis Courtney Parsons Birt, Bournemouth; Ronald Holland, Wareham, and Leonard John Pearce, Broadstone, all of England, assignors to The Secretary of State for Defense in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, England**

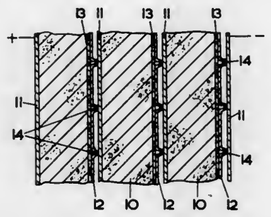
**Continuation-in-part of Ser. No. 539,683, Jan. 9, 1975, abandoned. This application May 10, 1976, Ser. No. 684,984**

**Claims priority, application United Kingdom, Jan. 9, 1974, 1082/74; July 31, 1974, 33839/74**

**Int. Cl.² H01M** *6/34*

**U.S. Cl. 429—119** **6 Claims**

1. A water activated primary battery comprising a plurality of cells which are assembled in juxtaposed relation to one another, each of said cells being of sandwich construction and comprising a cathode consisting of a flat layer of porous cathode material having an imperforate electrically conductive flat backing plate in surface engagement with one flat side of said porous layer, said cell including a porous membrane of electrically insulating sheet material in surface engagement with the other flat side of said porous cathode layer, said porous membrane being permeable to the flow of liquids and gases therethrough, and said cell further including an anode constituting a flat plate of conductive material extending in a plane substantially parallel to the plane of said cathode backing plate in surface engagement with the side of said porous, insulating membrane remote from said porous cathode layer, said conductive anode plate being perforated to permit entry of electrolyte for said cell through the perforations in said anode plate to said porous cathode layer via said intervening porous membrane of insulating material during initial priming of the cell, as well as subsequent ingress of fresh electrolyte through said perforated anode during discharge of the cell, and to facilitate the escape of gas from within the cell through said porous membrane and thence through the perforations in said anode plate during operation of said cell, the conductive anode plate in each of said cells being formed with an array of integral conductive dimples extending in spaced relation to one another outwardly of the plane of said anode plate in a direction away from the cathode of said cell, said plurality of



cells being juxtaposed and maintained in assembled configuration under pressure with their respective anodes and cathodes positioned in substantially parallel relation to one another and with the outwardly extending conductive dimples of the perforated anode in each cell being in direct pressure engagement with the outer surface of the conductive cathode backing plate of the next adjacent cell thereby to provide the direct electrical connection between the conductive anode plate of one cell and the conductive cathode backing plate of the next adjacent cell as well as to provide uniform compaction of the plural layers of porous cathode material in said battery, said arrays of dimples further defining planar gaps located respectively between the outermost surface of the perforated anode plate of each cell and the outermost surface of the cathode backing plate of the next adjacent cell, said gaps acting as electrolyte passageways within said battery through which electrolyte may flow on the anode side of each cell remote from the cathode of said cell for entry of electrolyte into each cell through the perforated anode of said cell and thence through the porous insulating membrane of said cell.

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**4,020,248**

## PRIMARY ELECTROCHEMICAL CELL CAPABLE OF HIGH DISCHARGE RATES

**Franz Goebel, Ashland, Mass., assignor to GTE Laboratories Incorporated, Waltham, Mass.**

**Filed Sept. 18, 1975, Ser. No. 614,451**

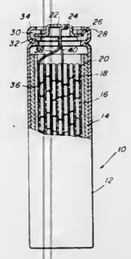
**Int. Cl.² H01M** *6/14*

**U.S. Cl. 429—164** **19 Claims**

1. A primary electrochemical cell which is capable of achieving high discharge currents comprising
an outer cell casing,
a first terminal on the exterior of the casing,
an electrochemical system for a primary electrochemical cell including
an anode material connected to the first terminal,
a cathode material comprising a plurality of porous, semi-rigid, discrete globules having the following composition: from about 40 to 99 weight percent of carbon black, at least 1 percent of a mechanical binder which is inert in the primary electochemical cell, and the remainder being graphite, said discrete globules being



spaced from one another to thereby define spaces therebetween, and
an electrolytic solution including a cathode depolarizer that is electrochemically reduced on the surface of the cathode material during discharge of said cell,
a porous separator of non-conductive material disposed between the anode material and the cathode material,
a second terminal located on the exterior of the casing,
means for electrically insulating the second terminal from the first terminal, and



a cathode current collector connecting the cathode material to the second terminal, the cathode current collector comprising a plurality of electrically interconnected layers of porous metallic material, the cathode material globules being interposed between the layers of cathode current collector so that the cathode current collector extends throughout the cathode material, the electrolytic solution being diffused throughout the porous separator and the porous cathode current collector through the spaces between the plurality of discrete cathode globules.

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**4,020,249**

## PHOTODEGRADABLE POLYOLEFINS CONTAINING HALOALKYL- OR HALOBENZENE-SULFONYL HALIDES

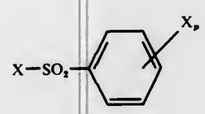
**Bernard Freedman, Berkeley, and Martin J. Diamond, Oakland, both of Calif., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.**

**Division of Ser. No. 603,080, Aug. 8, 1975, Pat. No. 3,968,096, which is a division of Ser. No. 543,706, Jan. 23, 1975, Pat. No. 3,929,723. This application Apr. 21, 1976, Ser. No. 678,818**

**Int. Cl.² C08J** *3/20*

**U.S. Cl. 526—3** **4 Claims**

1. A photodegradable composition comprising a polyolefin and about from 0.1 to 10%, based on the weight of polyolefin, of an additive of the structure



wherein:
each X is chlorine, bromine, or iodine
*p* is an integer from 1 to 5, inclusive.

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**4,020,250**

## PREPARATION OF HALOGENATED POLYMERS

**Joginder Lal, Akron, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio**

**Continuation of Ser. No. 484,736, July 1, 1974, abandoned. This application Aug. 2, 1976, Ser. No. 710,500**

**Int. Cl.² C08F** *210/00, 212/00*

**U.S. Cl. 526—13** **9 Claims**

1. Halogenated interpolymer compositions consisting of the reaction product of one or more α-olefins having 4 to 20 carbon atoms with one or more nonconjugated polyolefins having from 5 to 40 carbon atoms, said α-olefins and non-conjugated polyolefins having been polymerized in the presence of coordination catalysts to form unsaturated interpolymers, said unsaturated interpolymers being characterized by having pendant groups containing double bonds, and subsequently reacting said unsaturated interpolymers with halogenating compounds.

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**4,020,251**

## 1,3-CYCLODIENE-ACYCLIC CONJUGATED DIENE COPOLYMERS

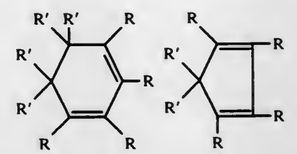
**Henry L. Hsieh, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.**

**Continuation-in-part of Ser. No. 446,426, Feb. 27, 1974, abandoned. This application Mar. 17, 1975, Ser. No. 559,197**

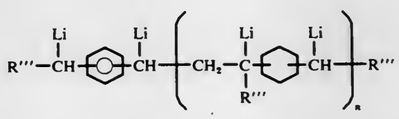
**Int. Cl.² C08F** *4/08, 8/04, 232/06*

**U.S. Cl. 526—20** **21 Claims**

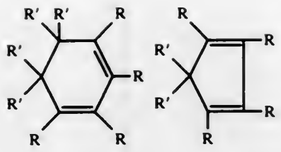
1. A method for the production of a copolymer by polymerizing a monomer mixture consisting essentially of
1,3-butadiene;
a 1,3-cyclodiene represented by the general formulas



wherein R is selected from the group consisting of hydrogen, methyl and ethyl radicals, R′ is selected from the group consisting of hydrogen, cycloalkyl, aryl and linear and branced alkyl radicals such that the maximum number of carbon atoms per R′ radical is about 6 and the total number of carbon atoms per cyclodiene monomer is in the range of from about 5 to 20;
an organolithium initiator consisting of alpha-lithio multisubstituted dialkylbenzenes and dialkylbenzene oligomers represented by the general formula



wherein R‴ is a linear or branched alkyl containing 2 to 12 carbon atoms, and *n* is an integer from 0 to 2;
optionally a vinylaromatic compound containing in the range of from about 8 to 14 carbon atoms per molecule;
optionally an ether or tertiary amine in an amount in the range of from about 0.01 to 50 parts by weight per 100 parts by weight monomer; and
optionally a hydrocarbon diluent which is not detrimental to said polymerization.
14. A copolymer consisting essentially of
units of 1,3-butadiene;
units of a 1,3-cyclodiene represented by the general formulas



wherein R is selected from the group consisting of hydrogen, methyl and ethyl radicals, R′ is selected from the group consisting of hydrogen, cycloalkyl, aryl and linear and branched alkyl radicals such that the maximum number of carbon atoms per R′ radical is about 6 and the total number of carbon atoms per cyclodiene monomer is in the range of from about 5 to 20;

optionally units of a vinylaromatic compound containing in the range of from about 8 to 14 carbon atoms per molecule; and

wherein the 1,3-butadiene portion of said copolymer has a trans and vinyl content ranging from about 48 to 99 percent when said copolymer does not contain units of said vinylaromatic compound and 39 to 99 percent when said copolymer does contain units of said vinylaromatic compound.

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**4,020,252**

## VULCANIZATION ACCELERATOR SYSTEM FOR RUBBER COMPOSITIONS

**Iwao Sugiyama; Teruhide Furuhama, both of Hiratsuka; Fumiaki Nagano, Chigasaki, and Hiroshi Hirakawa, Isehara, all of Japan, assignors to The Yokohama Rubber Co., Ltd., Tokyo, Japan**

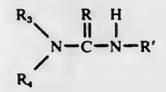
**Filed July 1, 1975, Ser. No. 592,173**

**Claims priority, application Japan, July 2, 1974, 49-74986**

**Int. Cl.² C08K** *5/39*

**U.S. Cl. 526—30** **4 Claims**

1. A vulcanizable rubber composition comprising rubber containing an olefinically unsaturated group; ferric ethylenebisdithiocarbamate; and an amine-isocyanate addition compound having the following formula:



in which $R_3$ and $R_4$ each represent a mono-valent hydrocarbon radical having from 1 to 8 carbon atoms; or together, a divalent hydrocarbon radical having from 2 to 7 carbon atoms; or together, a divalent non-acidic radical having from 2 to 8 carbon atoms and at least one atom selected from the group consisting of oxygen, sulfur and nitrogen; and R′ represents an aromatic or alkyl radical having from 4 to 18 carbon atoms.

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**4,020,253**

## STRESS-CRACK RESISTANT ETHYLENE-PERHALOETHYLENE COPOLYMERS

**Stephen R. Schulze, Gillette, N.J., assignor to Allied Chemical Corporation, Morris Township, N.J.**

**Filed Apr. 2, 1975, Ser. No. 564,232**

**Int. Cl.² C08F** *210/02*

**U.S. Cl. 526—89** **23 Claims**

1. Copolymers of from about 40 to about 60 mol percent ethylene and correspondingly from about 60 to about 40 mol percent of a halogenated comonomer selected from the group consisting of tetrafluoroethylene, chlorotrifluoroethylene and mixtures thereof and containing high and low molecular weight components of said copolymers such that equations (1) and (2) are satisfied:

$$\sum_{i=1}^{\infty} X_i \overline{M}w_i = f \cdot \overline{M}w, \text{ and} \quad (1)$$

$$0.02 \leq \frac{\overline{M}w \sum_{i=1}^{\infty} X_i}{\sum_{i=1}^{\infty} X_i \overline{M}w_i} \leq 0.6, \quad (2)$$

wherein

$X_i$ represents the weight fraction of each high molecular weight component i.

$\overline{M}w$ represents the weight-average molecular weight of the copolymer,

$\overline{M}w_i$ represents the weight-average molecular weight of each component i,

$$\overline{M}w = \sum_{i=1}^{\infty} X_i \overline{M}w_i + \sum_{j=1}^{\infty} X_j \overline{M}w_j$$

wherein

$X_j$ represents the weight fraction of each low molecular weight component j, and

$\overline{M}w_j$ represents the weight-average molecular weight of each component j, and

$0.1 \leq f \leq 0.95$, the high molecular weight components having a weight-average molecular weight, expressed in terms of melt index, of from about 0.0001 to 1.0 and the low molecular weight components having a weight-average molecular weight, expressed in terms of melt index, of from about 3 to 3000,

and therefore wherein said copolymers contain from 0.2 to 57 weight percent of said high molecular weight components and from 99.8 to 43 weight percent of said low molecular weight components.

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**4,020,254**

## METATHESIS POLYMERIZATION OF CYCLOOLEFINS

**Eilert A. Ofstead, Cuyahoga Falls, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio**

**Continuation-in-part of Ser. No. 510,528, Sept. 30, 1974, abandoned. This application June 20, 1975, Ser. No. 588,981**

**Int. Cl.² C08F** *4/72, 32/04*

**U.S. Cl. 526—128** **7 Claims**

1. A cycloolefin methathesis polymerization process comprising contacting at least one unsaturated alicyclic compound selected from the group consisting of (1) unsaturated alicyclic compounds containing five carbon atoms in the ring and containing one double bond in the ring, (2) non-conjugated unsaturated alicyclic compounds containing at least seven carbon atoms in the ring and at least one double bond in the ring, and (3) polycyclic olefins and diolefins, by subjecting said alicyclic compounds or mixtures thereof to a catalyst system comprising (A) at least one transition metal salt selected from the group consisting of tungsten halides and tungsten oxyhalides, (B) at least one compound selected from the group consisting of dialkylaluminum halides, alkylaluminum sesquihalides and alkylaluminum dihalides, and (C) at least one compound of the formula $RO\,Si\,R'_3$ wherein R is $CH_3$— or $Y\text{-}CH_2CH_2$—, wherein Y is hydrogen, halogen, nitrile, alkyl containing from 1 to 4 carbon atoms or alkoxy containing from 1 to 4 carbon atoms and where R′ is a methyl or ethyl radical and where the molar ratios of A/B/C is within the range of 1/0.5–10/0.5–3.



**4,020,255**

## CONTINUOUS INSITU CATALYST ADDITION FOR POLYBUTADIENE POLYMERIZATION

**Donald P. Schoneman, Tallmadge, and Robert W. Stachowiak, Akron, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio**

**Filed May 7, 1975, Ser. No. 575,311**

**Int. Cl.² C08F** *4/14, 4/70, 136/06*

**U.S. Cl. 526—133** **5 Claims**

1. A method of preparing high cis-1,4-polybutadiene which comprises continuously polymerizing butadiene in mixture with an inert aliphatic or cycloaliphatic solvent employing as a catalyst a mixture comprising (A) at least one trialkyl aluminum wherein the alkyl group contains from 2 to 8 carbon atoms, (B) at least one nickel salt of carboxylic acids and (C) at least one boron trifluoride complex of ethers, wherein the mole ratio of the trialkyl aluminum to the nickel salt of carboxylic acid ranges from about 3/1 to about 90/1 and the mole ratio of the aluminum trialkyl to the boron trifluoride etherates ranges from about 0.25/1 to about 1.2/1, in which each of the individual catalyst components are continuously and separately injected into the polymerization vessel containing the mixture of butadiene and inert solvent.

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**4,020,256**

## METHOD FOR PREPARING POLYMERS FROM WATER SOLUBLE VINYL MONOMERS

**Maurice L. Zweigle, and Samuel J. Kasley, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.**

**Filed July 3, 1975, Ser. No. 593,157**

**Int. Cl.² C08F** *2/34, 2/10, 4/34, 20/56*

**U.S. Cl. 526—88** **5 Claims**

1. A method for preparing a polymer from a water-soluble vinyl monomer which comprises forming a concentrated aqueous solution of said monomer containing a peroxide catalyst in the amount of from about 50 to 500 parts by weight per million parts of vinyl monomer, purging said solution until substantially free of inhibitory oxygen and spraying the purged solution at a temperature of from about 15° to about 30° C into an atmosphere substantially free of oxygen and containing a catalytic amount of sulfur dioxide gas.

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**4,020,257**

## CATALYSTS

**Josef Witte, Cologne, and Gunther Lehnert, Leverkusen, both of Germany, assignors to Bayer Aktiengesellschaft, Germany**

**Division of Ser. No. 523,022, Nov. 12, 1974, Pat. No. 3,966,637. This application June 24, 1975, Ser. No. 589,935**

**Claims priority, application Germany, Nov. 16, 1973, 2357193**

**Int. Cl.² C08F** *4/22, 32/04*

**U.S. Cl. 526—143** **4 Claims**

1. A process for the ring opening polymerization of monocyclic monoolefins having 4, 5 or from 7 to 12 carbon atoms in the ring, said process comprising contacting a 5 to 50% by weight solution of at least one of said monocyclic monoolefins in an inert organic solvent at −60° to 60° C. with a catalyst composition comprising:

A. a reaction product of 1 mol tungsten hexachloride with from 1 to 4 mols of a mixture of 2-chloroethanol and 2,2,2-trichloroethanol in a molar ratio of from 1:3 to 3:1 and

B. from 1 to 20 mol, per mol of tungsten in component (A), of an organometallic aluminum compound,

said catalyst composition being employed in a quantity supplying from 0.05 to 10 mmol tungsten per 100 g. of said olefin.

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**4,020,258**

## ADDITION OF COUPLING AGENT DURING ORGANOLITHIUM INITIATED POLYMERIZATIONS

**Ralph C. Farrar, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.**

**Continuation of Ser. No. 195,810, Nov. 4, 1971, abandoned. This application Mar. 1, 1974, Ser. No. 447,203**

**Int. Cl.² C08F** *4/08, 4/16*

**U.S. Cl. 526—178** **26 Claims**

1. In a process for the polymerization of at least one polymerizable monomer comprising a polymerizable conjugated diene, polymerizable monovinyl-substituted aromatic compound, or both, under polymerization conditions with an organolithium initiator, the improvement which comprises adding to the polymerization reaction system commencing after at least about 3 percent monomer conversion and prior to about 75 percent conversion at least one nonpolymerizable silicon or tin coupling agent essentially continuously during at least a portion of the remaining course of said polymerization, thereby preparing a polymer of improved processability.

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**4,020,259**

## PROCESS FOR THE POLYMERIZATION OF ALLYL HALIDES

**David H. Blount, 5450 Lea St., San Diego, Calif. 92105**

**Continuation-in-part of Ser. No. 551,534, Feb. 21, 1975, which is a continuation-in-part of Ser. No. 71,628, Sept. 11, 1970, abandoned. This application Oct. 15, 1975, Ser. No. 622,525**

**Int. Cl.² C08F** *2/00, 4/16, 14/14, 214/16*

**U.S. Cl. 526—194** **6 Claims**

1. The process for the production of poly(allyl halide) polymer which comprises the steps of:

a. providing a quantity of silicon acid;

b. mixing therewith an allyl halide in the ratio of 1 part by weight of silicon acid to 2 parts by weight of an allyl halide,

c. agitating said mixture in a closed system and keeping the temperature between 0° and 100° C for about 20 to 40 minutes at ambient pressure; thereby

d. producing poly(allyl halide) polymer.

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**4,020,260**

## NOVEL HYDROCARBON RESINS COMPRISING 1,3-PENTADIENE, 1,5,9-CYCLODODECATRIENE AND OPTIONALLY MONOOLEFIN

**Shozo Shiozaki; Yonesaku Shinohara, both of Yokohama, and Takeo Miyake, Fujisawa, all of Japan, assignors to Nippon Zeon Co., Ltd., Tokyo, Japan**

**Filed Mar. 10, 1975, Ser. No. 557,128**

**Claims priority, application Japan, Mar. 12, 1974, 49-28384**

**Int. Cl.² C08F** *236/04;* **C08L** *7/00;* **C08F** *4/00, 232/00*

**U.S. Cl. 526—237** **5 Claims**

1. A hydrocarbon resin having a softening point of from about 100° to about 160° C and being substantially gel-free comprising about

95–35% by weight of units derived from 1,3-pentadiene,

1–50% by weight of units derived from 1,5,9-cyclododecatriene, and

0–40% by weight of units derived from at least one monoolefin containing 5 carbon atoms, said resin obtained by polymerizing a monomeric mixture comprising about

95–35% by weight of 1,3-pentadiene,

1–50% by weight of 1,5,9-cyclododecatriene, and

0–50% by weight of at least one monoolefin containing 5 carbon atoms,

in the presence of a solvent containing at least 50% by weight of an aromatic hydrocarbon and about 0.1–5 parts by weight, per 100 parts by weight of the monomeric mixture of a Friedel-Crafts type metal halide catalyst selected from aluminum halide and boron trifluoride.

**4,020,261**

## COPY SHEET FOR USE IN PRESSURE SENSITIVE MANIFOLD SHEET

**Shinichi Oda, Amagasaki; Akira Nakanishi, Sakai, and Takio Kuroda, Amagasaki, all of Japan, assignors to Kanzaki Paper Manufacturing Co., Ltd., Tokyo, Japan**

**Filed Mar. 21, 1975, Ser. No. 560,794**

**Claims priority, application Japan, Mar. 26, 1974, 49-34211**

**Int. Cl.² B41M *5/00***

**U.S. Cl. 428—325** **9 Claims**

1. In a copy sheet for use in pressure senstive manifold sheets of a transfer-copy system comprising a support having coated thereon a layer of electron accepting reactant material including a binder, an improvement which is characterized in that said electron accepting reactant material is a calcined activated clay which is pulverized in water to a particle size at least 10% smaller, based on the mean particle size thereof, than before the pulverization and has a resulting mean particle size of 1 to 10 $\mu$.

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**4,020,262**

## METHOD OF APPLYING PHOSPHORAMIDE-HYDROXYMETHYL PHOSPHINE CONDENSATION PRODUCTS FOR TEXTILE FIRE RETARDATION

**Destin A. LeBlanc, and Robert Bruce LeBlanc, both of Wickford, R.I., assignors to LeBlanc Research Corporation, East Greenwich, R.I.**

**Filed Feb. 24, 1975, Ser. No. 552,501**

**Int. Cl.² C09K *3/28*; C09D *5/18***

**U.S. Cl. 428—276** **8 Claims**

2. The process for rendering a textile material flame retardant comprising impregnating said material with a solution containing about 15–60% by weight of a condensation product of (a) at least one hydroxy-methyl phosphorus compound selected from the group consisting of

$(CH_2OH)_4P—Y$ and $(CH_2OH)_3P$

with (b) about 0.33 to 3 times the molar amount of at least one substituted phosphoramide of the formula

$PO(NR^1CH_3)(NR^2CH_3)(NR^3CH_3)$

wherein

$R^1$ and $R^2$ each independently is H or $CH_2OH$,

$R^3$ is H, $CH_2OH$ or $CH_3$, and

Y is an equivalent amount of at least one anion of an acid, said solution further containing at least one member selected from the group consisting of a melamine-formaldehyde resin, urea, and thiourea in about 2 to 50% by weight of the condensation product, drying said material and curing said material by heating.

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**4,020,263**

## PROCESS FOR THE PRODUCTION OF EMULSION POLYVINYL CHLORIDE UNDER AVOIDANCE OF VINYL CHLORIDE EMISSIONS

**Hermann Winter; Alfred Lautsch; Karl-Heinz Schönberg, and Jürgen Walther, all of Marl, Germany, assignors to Chemische Werke Huls Aktiengesellschaft, Marl, Germany**

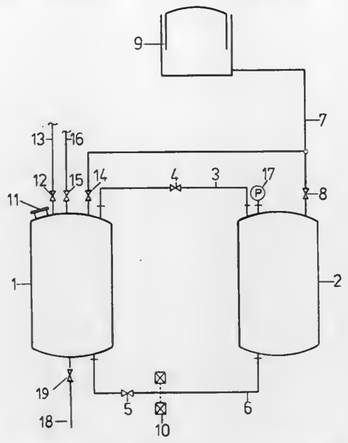
**Filed Sept. 3, 1975, Ser. No. 610,069**

**Claims priority, application Germany, Sept. 5, 1974, 2442575**

**Int. Cl.² C08F *3/30, 1/98, 1/13***

**U.S. Cl. 526—88** **8 Claims**

1. In a process for the batch polymerization of vinyl chloride in which successive large scale chloride emulsion polymerizations are conducted at an emulsifier level of up to 0.9% by weight, based on the vinyl chloride, in a reactor at elevated temperature and pressure to a solids content of at least 48%, in the presence of sufficient excess vinyl chloride to maintain gaseous vinyl chloride in the reactor under pressure at the end of the polymerizations, and the polymerizate is discharged from the reactor between polymerizations, the improvement which comprises reducing vinyl chloride emissions from the gaseous phase of the reactor by discharging the liquid phase only of the polymerizate to a closed discharge zone at a pressure differential of 0.1–2.5 atmospheres lower than the reactor, provided by the residual vinyl chloride in the reactor; maintaining the reactor unopened between polymerizations; and then conducting another vinyl chloride polymerization in the reactor in the presence of the residual gaseous vinyl chloride remaining in the reactor from the prior polymerization.




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**4,020,264**

## CRYSTALLINE POLYOLEFINS AND PRODUCTION THEREOF

**Junichi Hotta, and Masaki Fujii, both of Yokkaichi, Japan, assignors to Mitsubishi Petrochemical Company Limited, Japan**

**Continuation-in-part of Ser. No. 45,269, June 10, 1970, abandoned. This application Dec. 20, 1971, Ser. No. 210,194**

**Claims priority, application Japan, June 19, 1969, 44-48605**

**Int. Cl.² C08F *4/66, 10/06***

**U.S. Cl. 526—142** **15 Claims**

1. A process for producing crystalline propylene polymers which comprises polymerizing propylene in the presence of a catalytic system comprising, in combination, (1) an organoaluminum compound and (2) a modified titanium composition prepared by mill processing for at least one hour (a) a titanium trichloride and (b) methyl methacrylate, the weight ratio of compound (b) to compound (a) being 0.01 to 0.3:1.

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**4,020,265**

## POLYACETYLENE TETRAPOLYMERS

**Dwain M. White, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.**

**Division of Ser. No. 330,497, Feb. 8, 1973, Pat. No. 3,816,374, which is a continuation-in-part of Ser. No. 118,467, Feb. 24. 1971, abandoned. This application Dec. 17, 1973, Ser. No. 425,244**

**Int. Cl.² C08F *38/02***

**U.S. Cl. 526—285** **1 Claim**

1. Polyacetylene tetrapolymers consisting essentially of from about 5% by weight of acetylene units and 95% by weight of a mixture of units consisting essentially of 74 to 86 mole percent of meta-diethynylbenzene units, 4 to 9 mole percent of para-diethynylbenzene units and 5 to 15 mole percent of diethynylalkane units, where the sum of the units in said mixture of units is 100 mole percent.



**4,020,266**

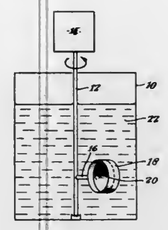
## ORIENTED CRYSTALLIZATION OF POLYMERS

**Frederick Charles Frank, Orchard Cottage, Grove Road, Coombe Dingle; Andrew Keller, 41 Westbury Road, Westbury-on-Trym, both of Bristol 9, and Malcolm Robert Mackley, Springfield Cottage, Richmond Dale, Clifton, Bristol 8, all of England**

**Filed Jan. 23, 1975, Ser. No. 543,355**

**Int. Cl.² C08F *6/06***

**U.S. Cl. 528—498** **5 Claims**




1. A process which comprises causing a solution of a synthetic crystallizable polymer, selected from the group consisting of polyethylene, nylon and polypropylene, to flow through a gauze at a temperature less than the dissolution temperature of the polymer in the solvent but above the temperature at which the polymer crystallizes spontaneously from the solution, and at a flow rate through the gauze producing a longitudinal velocity gradient in the solution, of the order of $10^2$ $sec^{-1}$ or greater, sufficient to produce crystallization of the polymer downstream of the gauze in the form of fibrils having an extended chain molecular core surrounded by folded chain molecular polymer of relatively lower melting point.

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**4,020,267**

## REMOVAL OF RESIDUAL MONOMER IN THE PRESENCE OF WATER BY DIELECTRIC HEATING

**Anthony John Park, South Croydon, England, assignor to The British Petroleum Company Limited, London, England**

**Filed Dec. 11, 1975, Ser. No. 639,968**

**Claims priority, application United Kingdom, Dec. 16, 1974, 54156/74; Apr. 30, 1975, 17967/75**

**Int. Cl.² C08F *6/00***

**U.S. Cl. 528—503** **15 Claims**

1. A process for reducing the residual vinyl halide monomer content of a particulate vinyl halide polymer containing at least 1% by weight of water based on the weight of dry polymer which comprises subjecting the polymer to a radiofrequency dielectric heating step to remove vinyl halide while maintaining the presence of water in the polymer so that not more than 30% by weight of the water present at the beginning of the dielectric heating evaporates during the dielectric heating, and recovering particulate polymer from the radiofrequency dielectric heating step.

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**4,020,268**

## AGAROSE CONTAINING AFFINITY MATRIX MATERIALS

**A. Hirotoshi Nishikawa, and Harry F. Hixson, Jr., both of Webster, N.Y., assignors to Xerox Corporation, Stamford, Conn.**

**Division of Ser. No. 306,241, Nov. 13, 1972, abandoned, which is a division of Ser. No. 141,778, May 12, 1971, Pat. No. 3,746,622. This application Nov. 21, 1974, Ser. No. 526,028**

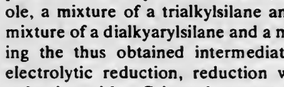
**Int. Cl.² C07H *11/02*; C08B *37/02, 37/06***

**U.S. Cl. 536—1** **1 Claim**

1. An affinity matrix material consisting essentially of an insoluble matrix material consisting essentially of agarose covalently bonded to a leash molecule succinaminohexamethylamine which is covalently bonded to a ligand satisfying the formula:

$$X—A—R$$

wherein X is



(amidinium)

or



(guanidinium)

A is selected from the group consisting of benzoyl, norvalyl, phenyl, hexyl, cyclohexyl, and pentyl and R is

$—(CH_2)_yZ$,

$—O(CH_2)_yZ$,

$—S(CH_2)_yZ$, or

$—S—S(CH_2)_yZ$

where Z is NH, COOH, I, Br, Cl COCl, NCS, NCO, $SO_2Cl$, and where y is 0 to 3.

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**4,020,269**

## EPIMINODEAMINODEOXYAMINOGLYCOSIDE ANTIBIOTICS AND INTERMEDIATES

**Kentaro Hiraga, Kyoto; Tetsuya Okutani, Osaka; Tsunehiko Asako, and Kouichi Yoshioka, both of Kyoto, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan**

**Filed Apr. 8, 1975, Ser. No. 566,519**

**Claims priority, application Japan, Apr. 10, 1974, 49-41367; Apr. 10, 1974, 49-41368; June 25, 1974, 49-72945**

**Int. Cl.² C07H *15/22***

**U.S. Cl. 536—10** **12 Claims**

1. A method for the production of a deoxyaminoglycoside antibiotic selected from the group consisting of (1) 3′-and/or 5′′-deoxyneomycin and (2) 3′-and/or 2′′-deoxykanamycin antibiotics, which comprise reacting the corresponding phosphorylated aminoglycode with a silylating agent selected from the group consisting of halosilanes, silyl compounds of amines, bissilyl compounds of carboxylic acid amides, monosilyl compounds of carboxylic acid amides, silyl derivatives of imidazole, a mixture of a trialkylsilane and a metal catalyst, and a mixture of a dialkyarylsilane and a metal catalyst, and subjecting the thus obtained intermediate to catalytic reduction, electrolytic reduction, reduction with a reducing agent or reduction with a Grignard reagent.

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**4,020,270**

## L-LYXOHEX-1-ENOPYRANOSE DERIVATIVE

**Federico Arcamone, Milan, and Giuseppe Cassinelli, Voghera (Pavia), both of Italy, assignors to Societa' Farmaceutici Italia S.p.A., Milan, Italy**

**Division of Ser. No. 568,437, April 16, 1975. This application Jan. 19, 1976, Ser. No. 650,519**

**Claims priority, application United Kingdom, May 2, 1974, 19209/74**

**Int. Cl.² C07H *5/06***

**U.S. Cl. 536—18** **1 Claim**

1. 1,2,3,6-Tetradeoxy-3-trifluoroacctamido-4-trifluoroacetoxy-L-lyxo-hex-1-enopyranose.

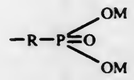
**4,020,271**

## CROSSLINKED PHOSPHONOALKYL CELLULOSE AND ABSORBENT DEVICES INCORPORATING SAME

**Pronoy Kumar Chatterjee, Spotswood, N.J., assignor to Personal Products Company, Milltown, N.J.**

**Filed Jan. 13, 1975, Ser. No. 540,368**
**Int. Cl.² A61F** *13/20;* **C08B** *11/00, 15/00*
**U.S. Cl. 536—88** **22 Claims**

**1.** A crosslinked phosphonoalkyl cellulose having a degree of crosslinking sufficient to make said cellulose essentially insoluble in aqueous media, said cellulose containing



groups wherein R is an alkylene radical of no more than 5 carbon atoms and wherein M is a member selected from the group consisting of alkali metal ions and ammonium ions, said cellulose containing from about 1.5% to about 4.0% phosphorous by weight.

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**4,020,272**

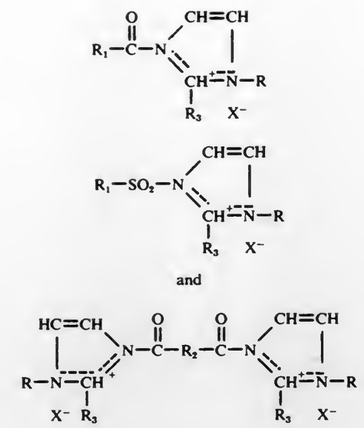
## PREPARATION OF STARCH ESTERS

**Martin M. Tessler, Edison, N.J., assignor to National Starch and Chemical Corporation, Bridgewater, N.J.**

**Filed Dec. 22, 1975, Ser. No. 643,321**
**Int. Cl.² C08B** *31/02*
**U.S. Cl. 536—107** **7 Claims**

**1.** A process for preparing esters of a starch having free reactive hydroxyl groups comprising the steps of:

a. reacting said starch with a N,N′-disubstituted imidazolium salt selected from the group consisting of



wherein R is selected from the group consisting of lower alkyl ($C_1$–$C_4$) and lower alkenyl ($C_2$–$C_4$); $R_1$ is selected from the group consisting of alkyl, substituted alkyl, alkenyl, cycloalkyl, aryl, substituted aryl, and arylalkyl; $R_2$ is selected from the group consisting of alkylene, substituted alkylene, bisalkylene ether, cycloalkylene, arylene and substituted arylene; and $R_3$ is selected from the group consisting of lower alkyl or H; $R_1$ and $R_2$ may each contain between 1 and 20 carbons; and X is $Br^-$ or $Cl^-$; wherein the reaction with the starch is conducted in an aqueous medium at a pH level of from about 5.0 to 12.5 at temperatures of from 5° to 55° C. for a period of from about 10 minutes to 20 hours, employing the N,N′-disubstituted imidazolium salt in an amount of 0.10 to 100 percent on the weight of dry starch; and

b. isolating the resultant starch derivative.

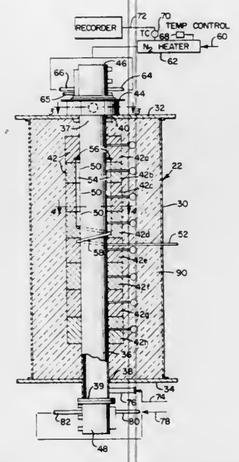


**4,020,273**

## VERTICAL PYROLYSIS FURNACE FOR USE IN THE PRODUCTION OF CARBON FIBERS

**Robert Dix, Wayne, N.J.; Richard F. Markel, Greenville, S.C.; James A. Parker, Charlotte, N.C.; John P. Riggs, New Providence, and Dale T. Vest, Summit, both of N.J., assignors to Celanese Corporation, New York, N.Y.**

**Filed Nov. 26, 1975, Ser. No. 635,515**
**Int. Cl.² H05B** *3/00*
**U.S. Cl. 13—7** **15 Claims**




**1.** In an apparatus for the continuous production of carbon fibers via thermal processing having a stabilization furnace and an improved pyrolysis furnace for pyrolyzing a continuous length of stabilized fibrous material in an inert gaseous atmosphere after treatment in the stabilization furnace, the pyrolysis furnace comprising:

conduit means having an inlet end, an outlet end, operable to receive a continuous length of stabilized fibrous material, and operable to function in a generally vertical posture such that the inlet end is vertically above the outlet end;

a plurality of heating zones longitudinally positioned along the conduit means, being independently controlled so that a predetermined temperature profile may be obtained and being operable to transfer heat to a continuous length of stabilized fibrous material passing downwardly through said conduit means;

insulation means surrounding the plurality of heating zones and the conduit means and operable to minimize heat loss to the environment;

exhaust means having a fiber inlet and a chamber with physical dimensions exceeding the lateral extent of the conduit means, being in fluid communication with the inlet end of the conduit means, and operable to receive toxic gaseous by-products from the conduit means;

environment protecting seal means provided at the fiber inlet of the exhaust means and at the conduit outlet and being operable to prevent toxic gaseous by-products from escaping to the environment while preventing environmental oxygen from entering the pyrolysis furnace; and

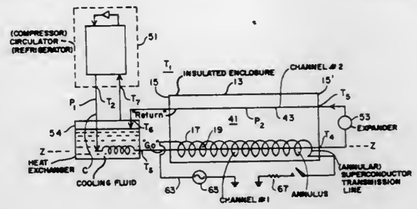
inert atmosphere control means communicating with the seal means, the inlet end, and the outlet end of the conduit means and being operable to maintain an inert gaseous atmosphere in the furnace while convectively sweeping toxic gaseous by-products from the conduit means to the exhaust means.

**4,020,274**

## SUPERCONDUCTING CABLE COOLING SYSTEM BY HELIUM GAS AND A MIXTURE OF GAS AND LIQUID HELIUM

**John W. Dean, Los Alamos, N. Mex., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.**

**Filed Jan. 27, 1976, Ser. No. 649,887**
**Int. Cl.² H01B** *12/00*
**U.S. Cl. 174—15 S** **10 Claims**




**1.** Cryogenic cooling apparatus for a consumer having a source of cryogenic cooling fluid under pressure for use with a longitudinally extending superconducting transmission line having an insulating enclosure with opposite terminals comprising:

a. cryogenic cooling fluid;

b. longitudinally extending superconductor transmission line means forming a first channel for circulating the cryogenic cooling fluid as a gas in a first stream at a first low temperature and a first high pressure in a first go direction;

c. enclosure means encircling the transmission line means and forming a second channel in thermal contact with the first channel and the transmission line means for circulating the cryogenic cooling fluid as a boiling liquid-gas mixture at a second constant temperature and at a reduced, low, constant, second pressure in a second return direction opposite to said first go direction;

d. first means for circulating the cryogenic fluid as a gas in the first channel at said first high pressure;

e. second means for circulating the cryogenic cooling fluid as a liquid-gas mixture in the second channel at said second constant temperature and reduced, low constant second pressure to provide thermally contacting, oppositely streaming, cryogenic fluid streams in the same enclosure in a closed cycle at said different pressures, respectively, and

f. means forming a heat exchanger between the counterstreaming streams in the go and return directions between the transmission line and the first means for maintaining the first and second temperatures nearly equal and at least as low as 4.5 K.

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**4,020,275**

## SUPERCONDUCTING CABLE COOLING SYSTEM BY HELIUM GAS AT TWO PRESSURES

**John W. Dean, Los Alamos, N. Mex., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.**

**Filed Jan. 27, 1976, Ser. No. 649,888**
**Int. Cl.² H01B** *12/00*
**U.S. Cl. 174—15 S** **10 Claims**

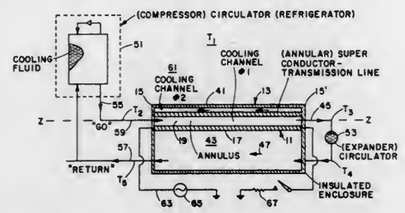
**1.** Cryogenic cooling apparatus for a consumer having a source of cryogenic cooling fluid under pressure for use with a longitudinally extending superconducting transmission line having an insulating enclosure with opposite terminals comprising:

a. cryogenic cooling fluid;

b. longitudinally extending superconductor transmission

line means forming a first channel for circulating the cryogenic cooling fluid in a first stream at a first temperature range and pressure in a first go direction;

c. enclosure means encircling the transmission line means and forming a second channel in thermal contact with the first channel and the transmission line means for circulating the cryogenic cooling fluid at a second temperature range and pressure in a second return direction opposite to said first go direction;




d. first means for circulating the cryogenic fluid as a high pressure gas in the first channel at said first temperature range and pressure; and

e. second means for circulating the cryogenic cooling fluid as a gas in the second channel at said second temperature range and pressure to provide thermally contacting, oppositely streaming, cryogenic fluid streams in the same enclosure in a closed cycle at said different temperatures and pressures, respectively.

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**4,020,276**

## SEALANT BARRIER FOR ELECTRICAL CABLES

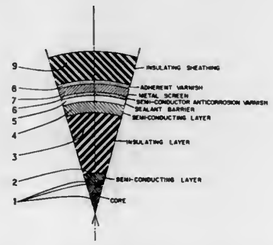
**Jean-Marie Maingueneau, Brignoud, France, assignor to SCAL - Societe de Conditionnements en Aluminum, Paris, France**

**Filed Mar. 19, 1976, Ser. No. 668,620**

**Claims priority, application France, Apr. 11, 1975, 75.12410; June 13, 1975, 75.19156**

**Int. Cl.² H01B** *7/28*

**U.S. Cl. 174—23 R** **8 Claims**




1. In an electrical cable having a metal core, an insulation covering the core, a semiconductive layer over the insulation covering and a metal screen, the improvement comprising a longitudinal sealant barrier between said screen and said semiconductive layer, said barrier comprising a layer of a thermofusible mixture coated on the inner surface of said screen and a plurality of spaced rings formed of the same material between said coating and said semiconductive layer.

**4,020,277**

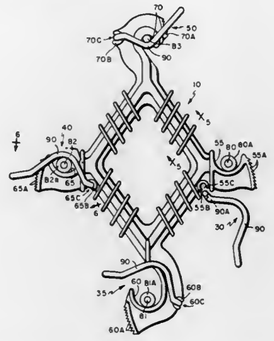
## SPACER FOR AERIAL CABLES

**Ernest Joseph La Chance, Sr., Milford, and Leonard Paul Jean, Nashua, both of N.H., assignors to Hendrix Wire & Cable Corporation, Milford, N.H.**

**Filed Feb. 26, 1976, Ser. No. 661,718**

**Int. Cl.² H02G** *7/12;* **H01B** *17/16;* **F16G** *11/00*

**U.S. Cl. 174—146** **11 Claims**



1. In a spacer for aerial cables comprising,

a body and at least one generally concave seat on said body, said seat being adapted to receive a conductor cable,

the improvement comprising,

first generally arcuate ratchet tooth means on said body located outwardly from said concave seat,

generally arcuate retaining means adapted to engage a surface of a conductor cable positioned in said seat, and pivot means operative independently of the relative position of said retaining means to said body for maintaining a pivotal connection therebetween, said pivot means being located adjacent to the side of said seat which is located opposite to said first ratchet tooth means,

said retaining means comprising second generally arcuate ratchet tooth means spaced from said pivot means for engaging said first ratchet tooth means,

whereby upon rotation of said retaining means to cable engaging position, the teeth of said second ratchet tooth means engage a teeth of said first ratchet tooth means and thereby are adapted to hold a conductor cable in said seat.

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**4,020,278**

## DATA CARRIER FOR OPTICAL READ-OUT

**Bernard Carré; Claude Puech, and Erich Spitz, all of Paris, France, assignors to Thomson-Brandt, Paris, France**

**Filed Oct. 16, 1975, Ser. No. 623,077**

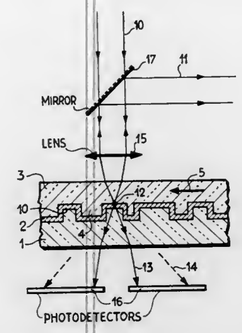
**Claims priority, application France, Oct. 18, 1974, 74.35148**

**Int. Cl.² G11B** *7/24;* **H04N** *5/76;* **G06K** *19/06*

**U.S. Cl. 358—128** **4 Claims**

1. A data carrier for optical read-out with a predetermined radiation, said data carrier comprising: a substrate transparent to said radiation, an embossed pattern representative of said data provided at the surface of said substrate, a thin metal layer deposited upon said embossed pattern and a protective layer transparent to said radiation overlaying said metal layer; the thickness of said thin metal layer being selected for partially reflecting said radiation; said thin metal layer being deposited over the whole of said surface.






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**4,020,279**

## ADJUSTABLE ANAMORPHIC IMAGE CONVERTER

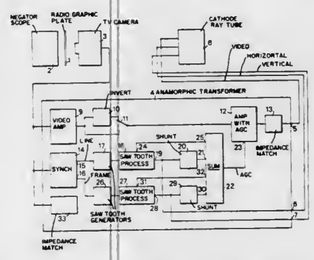
**Christian Jean Gautier, Acigne, and Jean-Marie Pierre Scarabin, Rennes, both of France, assignors to L'Etat Francais, represente par le Ministre des Postes et Telecommunications, Issy-les-Moulineaux; Etablissement Public dit "Telediffusion de France", Paris and Jean-Marie Pierre Scarabin, Rennes, all of, France**

**Filed June 16, 1975, Ser. No. 587,225**

**Claims priority, application France, June 14, 1974, 74.21539**

**Int. Cl.² H04N** *7/18*

**U.S. Cl. 358—160** **8 Claims**




1. In an adjustable anamorphic transformer for images analyzed by a television camera or equivalent, means from transmitting output signals for said camera through said transformer to an image display tube having horizontal and vertical deflection plates, said transformer comprising means for generating saw tooth signals having variable slopes which are between two consecutive points for the horizontal or vertical scannings of the image display tube, comprising means for generating saw tooth signals of fixed slope responsive to synchronization signals taken from signals transmitted by a television camera, a plurality of parallel connected saw tooth processing circuits, means for applying the output of said fixed slope saw tooth generator means to said plurality of saw tooth circuits, each of said processing circuits comprising amplifier means with an adjustable threshold, means for applying the output of said amplifier to a non-inverting current amplifier having gain and to an inverting amplifier of unity gain, means for applying the respective outputs of said non-inverting and said inverting amplifiers to the ends of a potentiometer having a movable slide which is connected to the output of the saw tooth processing circuit, the outputs of the processing circuits being connected to a summing circuit, and means for connecting the output of said summing circuit to horizontal or vertical deflection plates of the image display tube.

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**4,020,280**

## PULSE WIDTH LUMINANCE MODULATION SYSTEM FOR A DC GAS DISCHARGE DISPLAY PANEL

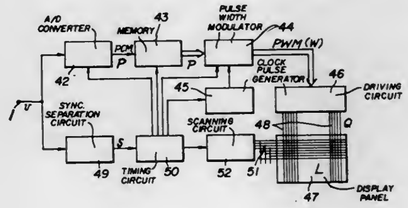
**Ryuichi Kaneko, No. 5956, Ikuta, Tama, Kawasaki; Minori Yokozawa, No. 7-1, 5-chome, Misono, Sagamihara; Shigemitsu Suzuki, No. 5280, Higashi-Shinozaki, Edogawa, Tokyo, and Takeo Kamegaya, No. 10-14, 3-chome, Kyodo, Setagaya, Tokyo, all of Japan**

**Filed Feb. 20, 1974, Ser. No. 444,017**

**Claims priority, application Japan, Feb. 21, 1973, 48-20263; Nov. 2, 1973, 48-122936**

**Int. Cl.² H04N** *3/00*

**U.S. Cl. 358—242** **9 Claims**




1. A pulse width luminance modulation system for controlling the operation of a dc gas discharge display panel having a working time lag, comprising:

a means for converting an input signal to be displayed into a pulse width modulated signal having a pulse width corresponding to the amplitude of the input signal; and

a discharge display panel driving circuit means connected to said converter means, including means for producing a low luminance picture range by making instantaneous irradiation from a discharge cell of said display panel having an intensity corresponding to the pulse width of said modulated signal when the pulse width of the pulse width modulated signal is narrower than a certain value corresponding to the working time lag and for producing a middle to high luminance picture range when said pulse width is wider than said certain value by including means for causing the discharge cell to produce glow discharge whihc is sustained for a duration in proportion to the wider pulse width, and wherein said discharge display panel driving circui means comprises a time constant circuit, of which the time constant is such that the gradient of the characteristics between the pulse width of the modulated signal and the luminance intensity both for the instantaneous irradiation and the glow discharge are a smooth curve.

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**4,020,281**

## ITERATIVE COORDINATE DATA APPROXIMATION SYSTEM FOR PHOTOEMISSIVE PIXEL PATTERN DISPLAYS

**John Ephraim Davis, Jr., San Jose, Calif., assignor to International Business Machines Corporation, Armonk, N.Y.**

**Filed Feb. 13, 1976, Ser. No. 657,788**

**Int. Cl.² G08C** *21/00;* **H01J** *29/46*

**U.S. Cl. 178—18** **15 Claims**

8. An iterative coordinate data approximation system for a cathode ray beam tube contiguous pixel pattern display, comprising

a cathode ray tube having a cathode ray beam forming electron gun assembly, a target assembly spaced at a distance from said gun assembly, electron beam deflecting components arranged along said tube intermediate said assemblies for deflecting the electron beam emanat-

ing from said gun assembly over said target assembly in contiguous lines defining a regular geometrical configuration in two dimensions, and electron beam modulating circuitry arranged in conjunction with said tube for varying the intensity of said electron beam pixel by pixel for displaying information;

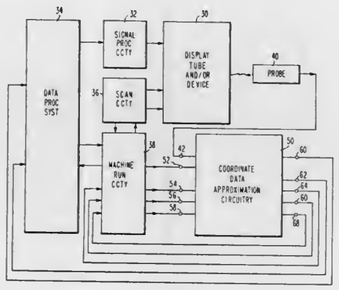
a photoresponsive probe element having a photoemissive aperture stop intercepting a multiple of contiguous pixel in portions of a plurality of contiguous lines having a multiple of contiguous pixel capable of exhibiting a predetermined characteristic level of intensity of photoemission and arranged for receiving photoemission emanating from said target assembly,

circuitry connected to said probe element for the detection of said predetermined characteristic of intensity of photoemission,

circuitry coupled to said detection circuitry and to said electron beam deflecting components for determining the location of said detected photoemission with respect to the whole of said geometrical configuration, comprising

input terminals to which a train of clocking pulse transitions are applied,

gating circuitry connected to said input terminals and to said detection circuitry for producing output pulse transi-




tions at clocking rate during detection only of the presence of said electron beam at the pixel intercepted by said probe element,

counting circuitry coupled to said gating circuitry for counting said pulse transitions,

registering circuitry,

transferring circuitry intercoupling said counting and said registering circuitry for transferring a count from said counting circuitry to said registering circuitry,

comparing circuitry coupled to said counting and said registering circuitry for deriving a comparison of the contents of said counting and registering circuitry,

storing circuitry for storing comparisons,

transfer circuitry coupled to said comparing and said storing circuitry for transferring the resulting comparison to said storing circuitry,

sensing circuitry coupled between said comparing circuitry and said storing circuitry for sensing a change in sign of the difference between the comparisons stored,

further circuitry connected to said sensing circuitry and responsive thereto for delivering coordinate data stored in said counting circuitry at the change of sign sensed by the sensing circuitry and thereby determining said coordinate data substantially at the center pixel of said aperture stop.

**4,020,282**

## HIGH DENSITY DATA PROCESSING SYSTEM

**Peter H. Halpern, Longwood, Fla., assignor to General Dynamics Corporation, St. Louis, Mo.**

**Division of Ser. No. 432,938, Jan. 14, 1974, Pat. No. 3,921,210. This application May 7, 1975, Ser. No. 575,317**
**Int. Cl.² H04L** *15/00*
**U.S. Cl. 178—68** **9 Claims**

| DECIMAL | BINARY A B C D | H — CODE U V W X Y Z | SIGNAL |
|---|---|---|---|
| 0 | 0 0 0 0 | 1 1 1 0 0 0 | S1 |
| 1 | 0 0 0 1 | 0 0 0 1 1 1 | S1 |
| 2 | 0 0 1 0 | 1 1 0 1 0 0 | S2 |
| 3 | 0 0 1 1 | 0 0 1 0 1 1 | S2 |
| 4 | 0 1 0 0 | 1 1 0 0 1 0 | S3 |
| 5 | 0 1 0 1 | 0 0 1 1 0 1 | S3 |
| 6 | 0 1 1 0 | 1 1 0 0 0 1 | S4 |
| 7 | 0 1 1 1 | 0 0 1 1 1 0 | S4 |
| 8 | 1 0 0 0 | 1 0 1 1 0 0 | S5 |
| 9 | 1 0 0 1 | 0 1 0 0 1 1 | S5 |
| 10 | 1 0 1 0 | 1 0 1 0 0 1 | S6 |
| 11 | 1 0 1 1 | 0 1 0 1 1 0 | S6 |
| 12 | 1 1 0 0 | 1 0 0 1 1 0 | S7 |
| 13 | 1 1 0 1 | 0 1 1 0 0 1 | S7 |
| 14 | 1 1 1 0 | 1 0 0 1 0 1 | S8 |
| 15 | 1 1 1 1 | 0 1 1 0 1 0 | S8 |
| FSW | | 1 0 0 0 1 1 | S9 |

ENCODING/DECODING TABLE

1. A system for transmitting digital data in the form of signals having a high density of power in the power spectrum thereof which represents the difference among different signals, said system comprising

means for transmitting signals representing a word of said data in the first plurality of consecutive time slots each occupied by a different bit of said data,

means for translating said word into a plurality of pulses of opposite polarity in a second plurality of consecutive time slots, the sum of the amplitudes of said pulses being equal to zero,

said second plurality of time slots being greater in number than said first plurality thereof,

said transmitting means including means for providing a first clock synchronous with the bits of said digital data and means for synthesizing from said first clock a second clock having a greater repetition rate than said first clock,

means for providing said pulses in synchronism with said second clock,

said translating means comprising an encoder for encoding a word having a first number of bits of said digital data into a format word having a second number of bits which is greater than said first number,

means operated by said second clock for providing the bits of said second word consecutively in synchronism with said second clock,

means operated by said first clock for providing a sync pulse for each frame constituted by a predetermined number of words of said digital data,

means for compressing the rate of said first clock by a number of first clock pulses per second equal to the number of bits in one of said first words, and

means included in said translating means operated by said sync pulse for producing a second word corresponding to a frame sync word.

**4,020,283**

## MSK DIGITAL DATA SYNCHRONIZATION DETECTOR

**Marvin Aaron Epstein, Monsey, N.Y., assignor to International Telephone and Telegraph Corporation, Nutley, N.J.**

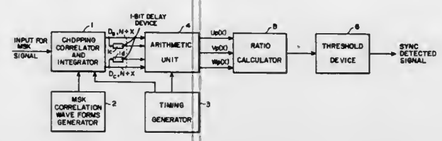
**Filed Nov. 4, 1975, Ser. No. 628,710**
**Int. Cl.² H04L** *27/10*; **H03K** *7/06*
**U.S. Cl. 178—88** **9 Claims**

1. A minimum shift keying (MSK) digital data synchronization detector comprising:

an input for said digital data;

first means coupled to said input to produce five different output signals, a first of said five output signals being a first correlation signal, a second of said five output signals being a second correlation signal shifted in phase by one data bit time, a third of said five output signals being said first correlation signal shifted in phase one data bit time, a fourth of said first output signals being said second correlation signal and a fifth of said five output signals equals a minus one value;

second means coupled to said first means, said second means being responsive to said five output signals to produce third, fourth and fifth correlation signals as a function of assumed bit times; and




third means coupled to said second means, said third means being responsive to said third, fourth and fifth correlation signals to produce a ratio signal proportional to a ratio of a minimum magnitude squared to a maximum magnitude squared for all carrier phase angles for each of said assumed bit times and to produce a synchronization detected signal when the value of said ratio signal is less than a given amplitude threshold.

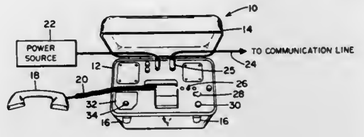


**4,020,285**

## VOICE SECURITY METHOD AND SYSTEM

**Kenneth M. Branscome, Dallas; William M. Feath, Irving; George E. Goode, Richardson; Kenneth W. Heizer, and Barrie O. Morgan, both of Dallas, all of Tex., assignors to Datotek, Inc., Dallas, Tex.**

**Division of Ser. No. 293,412, Sept. 29, 1972, Pat. No. 3,886,313. This application Jan. 29, 1975, Ser. No. 545,084**
**Int. Cl.² H04K** *1/04*
**U.S. Cl. 179—1.5 R** **8 Claims**




1. A voice scrambler system comprising:

means for splitting a voice signal into a plurality of discrete frequency sub-bands;

a random code generator for generating a randomized sequence of digital signals;

means responsive to a preselected first portion of each of said digital signals for randomly rearranging the order of said frequency sub-bands according to a limited subset of all possible combinations of rearrangement of said frequency sub-bands, said subset being chosen to include only the most unintelligible of said possible combinations; and

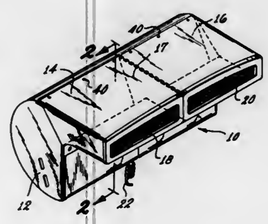
means responsive to a preselected second portion of each of said digital signals for randomly inverting selected ones of said frequency sub-bands.

**4,020,284**

## SPEAKER SYSTEM

**William W. Phillips, Rancho Palos Verdes, Calif., assignor to Shaymar, Inc., Beverly Hills, Calif.**

**Filed Oct. 22, 1975, Ser. No. 624,607**
**Int. Cl.² H04R** *1/32*
**U.S. Cl. 179—1 E** **25 Claims**



1. An enclosed loud speaker system for converting applied electrical signals to sounds and for directing the sounds toward a listener's ears without contacting the listener's ears, comprising:

two loud speaker assemblies, each including at least one loud speaker; and

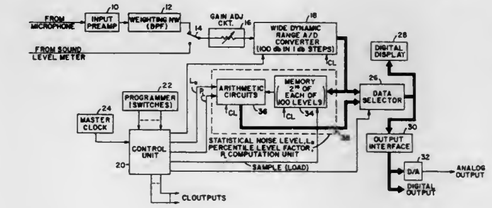
a housing of a rigid material substantially surrounding said speaker assemblies on all sides to form a chamber substantially occupied by said speakers, having two ducts for directing the sounds produced by said speakers. toward the listener's ears each duct defining a passage from said chamber to the space outside said housing, and opening into said chamber at a location adjacent one of said loud speaker assemblies, said housing having positioning portions on its inside surface to define the position of said loud speaker assemblies within said chamber.

**4,020,286**

## SIGNAL ANALYSIS APPARATUS FOR AMPLITUDE STATISTICS

**Barry L. Ceci, Rochester, N.Y., assignor to Metrosonics, Inc., Rochester, N.Y.**

**Filed May 19, 1975, Ser. No. 578,690**
**Int. Cl.² G10L** *1/00*
**U.S. Cl. 179—1.5 A** **24 Claims**




3. A signal analysis system which can analyze the statistical characteristics of signals while they occur in real time which system comprises

a. means for converting in real time an input signal into first digital signals corresponding to the level of said input signal in a multiplicity of steps each representing a different successively higher value of the level of said signals,

b. means operative in real time and responsive to said first digital signals for generating and storing second digital signals each corresponding to a different one of said first digital signals and representing the number of said first digital signals which correspond thereto occurring during a given period of time,

c. means also operative in real time responsive to said second digital signals for providing output signals representing statistical characteristics of said input signals, and

d. said converting means being analog to digital converter

means for continuously following variations in amplitude of said input signal, said analog to digital converter means having a counter for generating said first digital signals.

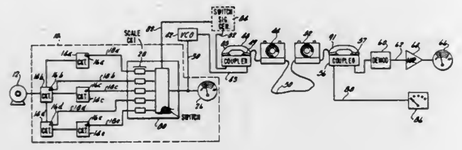
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**4,020,287**

## TELEPHONIC TROUBLESHOOTING CIRCUIT FOR ELECTRIC MOTOR DRIVES

**Alan W. Wilkerson, Thiensville, Wis., assignor to Allen-Bradley Company, Milwaukee, Wis.**

**Filed Mar. 3, 1975, Ser. No. 554,506**
**Int. Cl.² H04M *11/00***
**U.S. Cl. 179—2 A** **6 Claims**



1. An electric motor drive, the operative condition of which may be remotely ascertained with conventional telephone connection means and lines, comprising:

circuitry means for energizing the electric motor, said circuitry means having a plurality of test points providing operative condition responsive signals suitable for diagnosing the condition of the circuitry;

switch means having an input coupled to said test points for obtaining said condition responsive signals and having an output providing a selected condition responsive signal;

signal generating means coupled to the output of said switch means for generating audio tones indicative of the magnitude and polarity of said selected condition responsive signal and having a frequency suitable for transmission over conventional telephone lines;

a first audio telephone coupler connected to said signal generating means and connectable to telephone connection means and lines;

a second audio telephone coupler connectable to said telephone connection means and lines;

converting means having an input connected to said second audio telephone coupler for receiving said transmission signal and having an output, said converting means converting the audio tone transmission signal to an analog electrical output signal corresponding to the selected condition responsive signal;

indicator means coupled to the output of said converting means and operable by the output signal of said converting means for providing a remote indication of the selected condition responsive signal; and

means operatively associated with said couplers for obtaining voice communication over said telephone connection means and lines.

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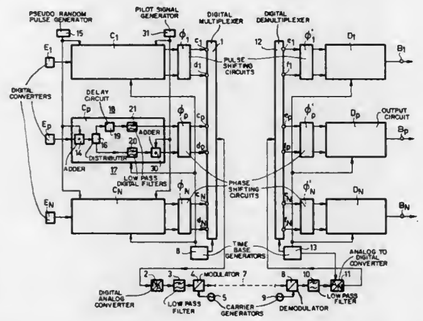
**4,020,288**

## SYSTEM FOR DATA TRANSMISSION THROUGH THE CHANNELS OF A FREQUENCY DIVISION MULTIPLEX SYSTEM

**Maurice Georges Bellanger, Antony, and Jacques Lucien Daguet, St. Maur des Fosses, both of France, assignors to Telecommunications Radioelectriques et Telephoniques T.R.T., Paris, France**

**Filed Oct. 17, 1975, Ser. No. 623,349**
**Claims priority, application France, Oct. 30, 1974, 74.36235**
**Int. Cl.² H04J *1/08***
**U.S. Cl. 179—15 FD** **7 Claims**

1. A parallel data transmission system in which data signals are converted into multilevel digital signals and transmitted through channels of a frequency division multiplex system, which channels are separated by means of digital filters having a linear phase characteristic, each channel comprising two quadrature sub-channels for transmitting two data signals which jointly constitutes a complex data signal transmitted by said channel characterized in that the transmitter side comprises means for adding to the data signal in one of the said sub-channels of each channel a pilot signal whose frequency is half the interval between adjacent center frequencies of the said multiplex channels and in that the receiver side successively comprises filter means at the output of each channel for selecting the complex signal corresponding to the transmitted pilot signal, means for subtacting from the received complex signal in each channel the received complex pilot signal to obtain the received complex data signal, phase shifting means



for shifting the phase of the said received complex data signal over an angle of equal magnitude but of opposite sign of the phase of the received complex pilot signal, and a pair of digital filter circuits for processing the complex data signal supplied by the said phase shifting means, said filter circuits being identical and having the transfer function of a low-pass filter with a cut-off frequency equal to the pilot signal frequency, each filter circuit comprising at least a calculating unit constructed as a digital filter and comprising a first fixed coefficient part at whose input the data signal is multiplied by a predetermined component of the received complex pilot signal, and a second variable coefficient part whose coefficients are derived from the components of the received complex pilot signal.

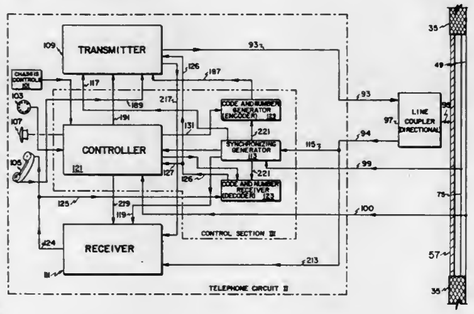
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**4,020,289**

## RANDOM ACCESS, MULTIPLE STATION COMMUNICATION SYSTEM

**Scott K. Anderson, Orem, Utah, assignor to Teleplex, Inc., Orem, Utah**

**Continuation of Ser. No. 253,265, May 15, 1972, abandoned. This application Aug. 4, 1975, Ser. No. 601,363**
**Int. Cl.² H04J *1/06***
**U.S. Cl. 179—15 FD** **5 Claims**




1. A random access, multiple station communication system comprising:



a plurality of stations interconnected by transmit and receive conductors, each of said stations having transmitter means to transmit on various selected bands of transmission frequencies over the said interconnecting transmit and receive conductors a signal consisting of carrier and data components and receiver means adapted to receive transmissions from other stations only in said selected frequency band assigned to and identified with said receiver means;

a signal generator connected by control conductors to the said stations to generate intervaled pulse trains which are impressed on said control conductors evenly spaced over time as radio frequency signals in a frequency band different from the said various selected bands of transmission frequencies;

control means connected to said control conductors to operate and control the said transmitter and receiver means, said control means comprising means to generate coded control pulses and means to impress the said coded control pulses on the said intervaled pulse trains;

each of the said stations including means to achieve synchronization in phase and frequency with the said intervaled pulse train radio frequency signals; and

means to interrupt the transmission of at least one of the said carrier and data components when the said control means receive and send said coded control pulses which consists of electromagnetic pulses or the absence thereof within the said intervaled pulse trains and convey control information between said stations to effect system control functions; and

wherein a first said station including memory means and means to transfer an identity signal of at least one other station transmitted to the said first station to the said memory means.

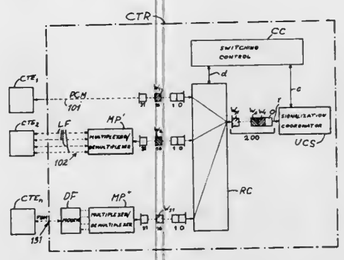
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**4,020,290**

## SIGNALIZATION COORDINATOR FOR PCM SWITCHING SYSTEM

**Aldo Perna, Varese, and Manlio Springolo, Milan, both of Italy, assignors to Societa Italiana Telecomunicazioni Siemens S.p.A., Milan, Italy**

**Filed Dec. 18, 1975, Ser. No. 642,196**
**Claims priority, application Italy, Dec. 19, 1974, 30745/74**
**Int. Cl.² H04J *3/00***
**U.S. Cl. 179—15 AT** **10 Claims**




1. In a telecommunication system wherein an exchange, serving $n$ multichannel links of $m$ channels each, includes switching circuitry for establishing temporary connections between calling lines and called lines, accessible through incoming and outgoing channels of different links, and control means for operating said switching circuitry in response to incoming switching signals in the form of code words occupying predetermined time positions in PCM message frames forming part of incoming channel branches, operation of said switching circuitry giving rise to response signals to be transmitted in the form of code words occupying predetermined time positions in PCM message frames forming part of outgoing channel branches,

the combination therewith of a signalization coordinator in said exchange comprising:

clock means for establishing a recurrent switching cycle divided into a multiplicity of time slots;

first interface means connected to said links for receiving therefrom, in said switching cycle, incoming code words from all said channels in a predetermined sequence whereby each channel is unequivocally identified by the time position of its code words in said switching cycle;

processor means controlled by said clock means and connected to said first interface means for periodically evaluating, in respective time slots of a switching cycle, the incoming code words and generating corresponding binary commands for said switching circuitry;

second interface means inserted between said processor means and said switching circuitry for transmitting said commands to said switching circuitry and receiving binary response signals therefrom, said processor means being connected to said second interface means for conversion of said response signals into outgoing code words; and

circulating memory means connected to said processor means for periodically presenting said outgoing code words to said first interface means for retransmission to the respective channels during corresponding time slots of successive switching cycles.

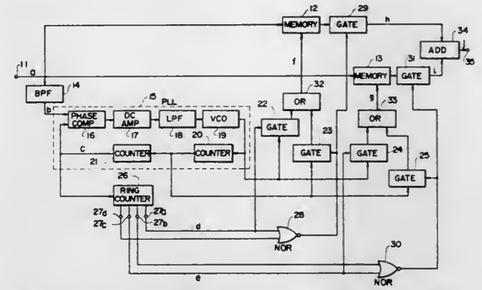
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**4,020,291**

## SYSTEM FOR TIME COMPRESSION AND EXPANSION OF AUDIO SIGNALS

**Masatsugu Kitamura, and Harukuni Kobari, both of Fujisawa, Japan, assignors to Victor Company of Japan, Limited, Yokohama, Japan**

**Filed Aug. 20, 1975, Ser. No. 606,228**
**Claims priority, application Japan, Aug. 23, 1974, 49-96170; Aug. 28, 1974, 49-97981; Aug. 30, 1974, 49-98927; Aug. 23, 1974, 49-100210**
**Int. Cl.² H04B *1/66*; G11B *5/00***
**U.S. Cl. 179—15.55 T** **7 Claims**




1. A system for time compression and expansion of voice signals operating cooperatively with an apparatus for reproducing a tempo $p$ times the tempo at the time of recording, $p$ being a number which is not equal to one, said system comprising:

first and second shift registers having a predetermined number of elements;

means for supplying to said first and second shift registers a voice signal reproduced by the apparatus;

filtering means responsive to the voice signal for selectively passing the fundamental frequency component of the voice signal;

means responsive to the output signal of said filtering means for producing a first clock pulse signal having a frequency a predetermined number times the frequency of the fundamental frequency component and a second clock pulse signal having a frequency $1/p$ times the frequency of the first clock pulse signal, respectively, in synchronism with the output signal of said filtering means;

ring counter means for producing control pulse signals in synchronism with the output signal of said filtering means such a manner that the control pulse signals have a pulse width corresponding to the frequency of the fundamental frequency component and the phases of the control pulse signals are different with each other;

first gating means for passing the first clock pulse signal therethrough to apply to said first and second shift registers;

second gating means for passing the second clock pulse signal therethrough to apply to said first and second shift registers;

third gating means for passing the output signals of the first and second shift registers therethrough;

control means responsive to the control pulse signals for controlling the passing periods of the first, second and third gating means to alternately apply the first clock pulse signal to said first and second shift registers and alternately apply the second clock pulse signal to said first and second shift registers such that said first and second shift registers alternately receive the first clock pulse signal and the second clock pulse signal, and said third gating means passes the output signal of the first shift register only during periods in which the first shift register receives the second clock pulse signal and passes the output signal of the second shift register only during periods in which the second shift register receives the second clock pulse signal; the passing period for said first gating means being equal to the time interval corresponding to the pulse width of the control pulse signals; and

means for extracting a voice signal which has passed through said third gating means as a time compressed or expanded signal.

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**4,020,292**

**BAND-COMPRESSOR DEVICE**

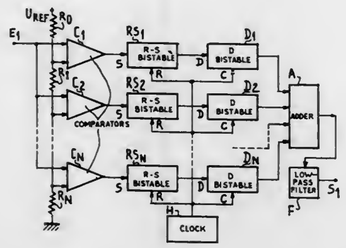
**Jean-Claude Charlot, and Jean-Claude Falconnier, both of Paris, France, assignors to Thomson-CSF, Paris, France**

**Filed Dec. 3, 1975, Ser. No. 637,469**

**Claims priority, application France, Dec. 6, 1974, 74.40034**

**Int. Cl.² H04B** *1/66*

**U.S. Cl. 179—15.55 R** **6 Claims**




1. A band-compression device ocmprising an input terminal designed to receive a signal occupying a frequency range of width W, means for encoding said input signal in the form of N digital signals respectively corresponding to the value of the amplitude of the input signal with respect to N quantizing levels where N is a whole number, a clock circuit for producing pulses having a recurrence frequency less than said width W, N RS-type bistable trigger stages having first inputs respectively connected to the outputs of said encoding means and having second inputs connected to said clock, N D-type bistable trigger stages having first inputs respectively connected to the outputs of said N RS-type bistable stages and having second inputs connected to said clock, and N-input decoding means connected to the outputs of said D-type bistable stages for producing a signal whose bandwidth is compressed.

**4,020,293**

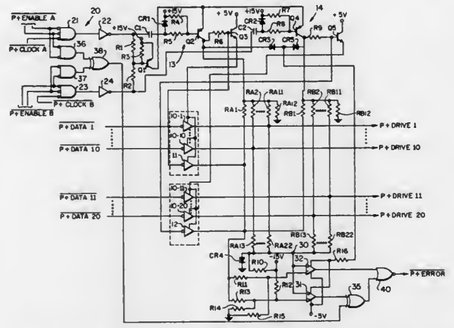
**DRIVE CIRCUITRY WITH ERROR DETECTION AND COMPENSATING THRESHOLD ARRANGEMENT**

**Albert H. Ashley, Holliston, Mass., assignor to GTE Sylvania Incorporated, Stamford, Conn.**

**Filed Feb. 25, 1976, Ser. No. 661,260**

**Int. Cl.² H04M** *3/00;* **G06F** *11/08*

**U.S. Cl. 179—18 GF** **10 Claims**




1. Apparatus for transmitting signals along a plurality of paths and for determining whether or not signals are being transmitted on a predetermined number of the paths, said apparatus including in combination

a plurality of signal paths, each signal path including

an input terminal adapted to receive input signal data,

an output terminal, and

a driving means having an input connection coupled to said input terminal and an output connection coupled to said output terminal;

additional driving means having an input connection and an output connection;

activating means coupled to the driving means of the plurality and to the additional driving means for applying operating potentials to the driving means;

each of said driving means being operable to produce a first output voltage at its output connection in response to a first input condition at its input connection, and being operable to produce a second output voltage at its output connection in response to a second input condition at its input connection when operating potentials are applied thereto by the activating means;

a resistance network comprising an equal plurality of resistances, each resistance having one end connected to the output connection of a different one of the driving means of said plurality and the other end connected to a common juncture, the voltage level produced at the common juncture being proportional to the number of output connections having said first output voltage present thereon;

first comparator means having a first and a second input, the first input being connected to said common juncture;

first threshold setting means connected to the output connection of said additional driving means and to the second input of the first comparator means, said first threshold setting means being operable to produce a voltage at the second input to the first comparator means which is less than the voltage produced at the first input to the first comparator means when a predetermined number (N) of output connections of the driving means of said plurality have said first output voltage present thereon and greater than the voltage produced at the first input to the first comparator means when said predetermined number minus one (N−1) of output connections of the driving means of said plurality have said first output voltage present thereon;

said first comparator means being operable to produce a first output signal when the voltage at its first input is less than that at its second input and to produce a second output signal when the voltage at its first input is more than that at its second input;

second comparator means having a first and a second input, the first input being connected to said common juncture;

second threshold setting means connected to the output connection of said additional driving means and to the second input of thesecond comparator means, said second threshold setting means being operable to produce a voltage at the second input to the second comparator means which is less than the voltage produced at the first input of the second comparator means when said predetermined number plus one ($N+1$) output connections of the driving means of said plurality have said first output voltage present thereon and greater than the voltage produced at the first input to the second comparator means when said predetermined number ($N$) of output connections of the driving means of said plurality have said first output voltage present thereon;

said second comparator means being operable to produce a first output signal when the voltage at its first input is less than that at its second input and to produce a second output signal when the voltage at its first input is more than that at its second input; and

output means coupled to said first and second comparator means for producing an error signal in response to a first output signal from the first comparator means or a second output signal from the second comparator means.



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**4,020,294**

**PRESENCE AND DIRECTION OF LINE CURRENT FLOW DETECTOR**

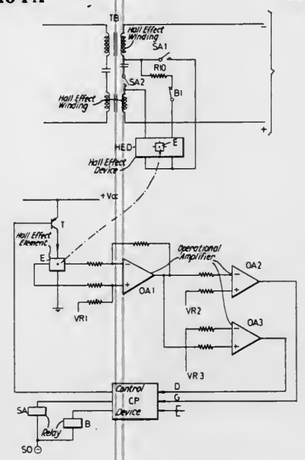
**Ryszard Kitajewski, Broxbourne; Anthony William Sweet, Stortford, and Michael Philip Dyer, Old Harlow, all of England, assignors to International Standard Electric Corporation, New York, N.Y.**

**Filed Mar. 25, 1976, Ser. No. 670,312**

**Claims priority, application United Kingdom, Apr. 1, 1975, 13201/75**

**Int. Cl.² H04B** *3/46;* **H04M** *3/22*

**U.S. Cl. 179—18 FA** **18 Claims**




14. The combination comprising:

a Hall effect device to monitor the presence of and the direction of flow of a current on a conductor, said device having an output signal whose polarity depends on the direction of flow of said current; and

a circuit arrangement connected to said device, said arrangement having two output terminals, one of said output terminals providing a logic level 1 and the other of said output terminals providing a logic level 0 when said output signal has one polarity and said other of said output terminals providing a logic level 1 and said one of said output terminals providing a logic level 0 when said output signal has a polarity opposite to said one polarity.

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**4,020,295**

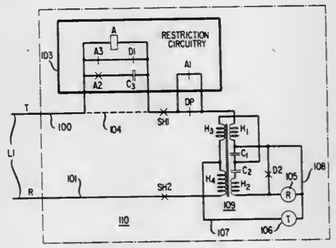
**ROTARY DIAL RESTRICTION CIRCUIT**

**Edward Joseph Vuotto, Katonah, N.Y., assignor to American Telephone and Telegraph Company, New York, N.Y.**

**Filed June 16, 1975, Ser. No. 586,894**

**Int. Cl.² H04M** *1/66*

**U.S. Cl. 179—90 D** **1 Claim**




1. A restricted rotary dial telephone set for use on a telephone line in a telephone system having automated operator services, said set preventing generation of dial pulses corresponding to a called telephone number not prefixed with an initial 0 digit and allowing generation of dial pulses corresponding to an initial dialed 0 digit plus an entire called telephone number to allow said set to operate with said automated operator services for providing public telephone service without deposit of coins, said set comprising:

a rotary dial mechanism having a gear wheel rotatable during dialing operations,

dial pulse contacts connected in series with said line, said contacts being intermittently operable by said gear wheel,

a relay having a winding, said winding having a first and a second terminal and being connected in series with said line and said dial pulse contacts, said relay further having normally-open contacts connected to said first terminal and normally-closed contacts shunting said dial pulse contacts,

a set of normally-closed control contacts bridging said relay winding to prevent operation of said relay,

a pin secured to said gear wheel, said pin arranged to strike and open said control contacts to enable said relay to operate when said dial mechanism is wound into position for dialing a "0" digit, and

a capacitor connected in series with said normally-open contacts and said second terminal to hold said relay operated during dialing of subsequent digits after an initial 0 digit.

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**4,020,296**

**ELECTROACOUSTIC TRANSDUCER**

**Jon G. Dahlquist, 500 E. 85th St., New York, N.Y. 10028**

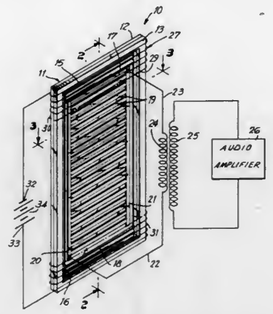
**Filed Jan. 19, 1976, Ser. No. 650,146**

**Int. Cl.² H04R** *9/00*

**U.S. Cl. 179—115.5 PV** **6 Claims**

1. An electroacoustical transducer comprising a substantially planar acoustically transparent solenoid coil member including a plurality of substantially equally spaced-apart individual turns bounding an area in space, a radiating diaphragm movably mounted within said area, a plural path

conductor member on said diaphragm in proximate spaced relation to the turns of said solenoid, and means for impressing




a D.C. voltage on one said member, and an alternating current signal from an audio amplifier on the other said member.

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**4,020,297**

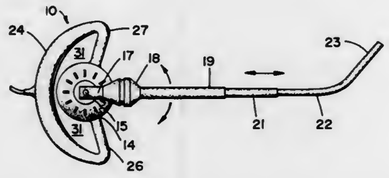
**ADJUSTABLE HEADSET**

**S. Dan Brodie, 8210 Capwell Drive, Oakland, Calif. 94621**

**Filed Jan. 15, 1976, Ser. No. 649,462**

**Int. Cl.² H04M** *1/05*

**U.S. Cl. 179—156 A** **2 Claims**



1. A headset for use with a human ear having an auditory meatus comprising a generally cylindrical housing having an interior, planar end disposed adjacent to the auditory meatus and an exterior end comprising a truncated cone coaxial with said housing; a pair of arms extending radially from said housing, a flexible, arcuate member joined to the distal ends of said arms, said arms, housing, and member defining a slot therebetween through which an ear is received; the entire extent of said arcuate member and said arms including a continuous groove therein; a first transducer disposed within said housing for directing sound into said auditory meatus, a transducer arm pivotally joined to said exterior end of said housing at the axis thereof, said transducer arm including a generally cylindrical portion having truncated conical ends, said cylindrical portion disposed substantially immediately adjacent to said housing; said transducer arm including a first section fixedly secured in the distal end of said cylindrical portion and formed of hollow rigid tubular material, a second hollow rigid tubular section telescopically and rotatably received in the distal end of said first section, and a third, flexible hollow tubular section fixedly secured to the distal end of said second section; a second transducer disposed within said cylindrical portion of said arm and communicating with the bores of said tubular sections: first lead wires extending from said second transducer through said transducer arm, said cylindrical housing, and said groove in one of said arms and a portion of said groove in said arcuate member, and second lead wires extending from said first transducer through said groove in the other of said arms and the remaining portion of said groove in said arcuate member.

**4,020,298**

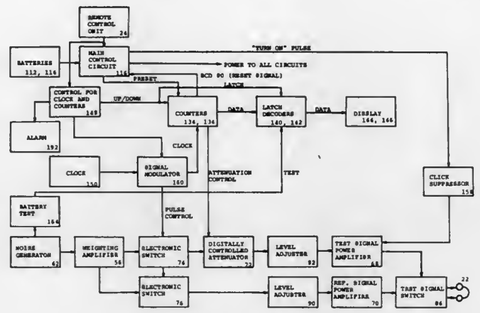
**APPARATUS FOR TESTING ACOUSTICAL ATTENUATION OF HEARING PROTECTORS**

**John M. Epley; Austin F. Leach, and Arnold Frisch, all of Portland, Oreg., assignors to Hearing Evaluation & Acoustic Research, Inc., Portland, Oreg.**

**Filed Sept. 15, 1975, Ser. No. 613,224**

**Int. Cl.² H04R** *29/00*

**U.S. Cl. 179—175** **6 Claims**




3. An apparatus for generating an audio test signal of varying amplitude and displaying a numerical value variably responsive to said amplitude comprising:

a. signal generating means for generating an audio test signal of varying amplitude

b. two-position switch means coupled with said signal generating means for gradually decrementing the amplitude of said test signal in one position and gradually incrementing the amplitude of said test signal in the other position; and

c. display means coupled with said signal generating means for displaying automatically in response to the movement of said switch means, a numerical indication of the relative amplitude of said test signal at a point when said switch means moves from one position to the other.

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**4,020,299**

**ELECTRO-ACOUSTIC TRANSDUCER DIAPHRAGMS**

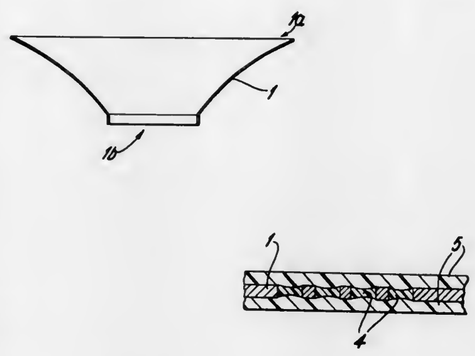
**Alex Victor Garner, Leeds, and Graham Townsend, Shipley, both of England, assignors to The Rank Organisation Limited, London, England**

**Continuation-in-part of Ser. No. 479,495, June 14, 1974, abandoned. This application May 19, 1975, Ser. No. 578,916**

**Claims priority, application United Kingdom, June 16, 1973, 28732/73**

**Int. Cl.² H04R** *7/02*

**U.S. Cl. 179—181 R** **8 Claims**



1. In an electro-acoustic transducer of the type having a diaphragm for the generation of sound and drive means for the diaphragm, and wherein said diaphragm is provided with perforations filled with a damping material having a high level of internal energy absorption to oppose the formation of standing waves in the diaphragm,

the improvement wherein said perforations are located in at least three equally spaced bands extending substantially radially with respect to a common central point and curved in the same direction, at least at the radially outer ends of the band, through a predetermined angle, and wherein the perforations in each band are located in a plurality of parallel rows extending along the length of the band.



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**4,020,300**

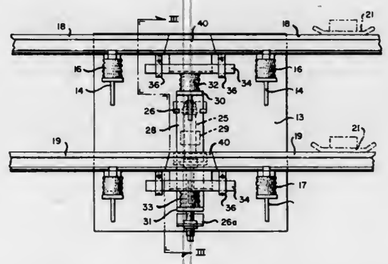
**SECTIONALIZED CRANE COLLECTOR SYSTEMS**

**Harry A. Nassif, Pittsburgh, Pa., assignor to Hanco, Inc., Pittsburgh, Pa.**

**Filed Sept. 25, 1975, Ser. No. 616,648**

**Int. Cl.² B60M** *1/30*

**U.S. Cl. 191—22 R** **5 Claims**



1. In an electrical power rail system, a pair of aligned conductor rails spaced apart longitudinally to form an air gap and having upper surfaces for engagement by a current conductor movable along them a single bridging rail member of the same shape as said air gap and adapted to fit in said air gap flush with the top of said conductor rails, a parallel conductor means fixed to and parallel to said bridging rail and in electrical contact therewith to form an integral unit, said conductor means being longer than the air gap and extending beyond said bridging rail member, resilient conductor means on each aligned conductor rail adjacent the air gap releasably engaging the ends of said parallel conductor means, vertically movable carrier means adjacent said air gap simultaneously carrying said bridging rail member and said parallel conductor means vertically between a first position engaging said resilient conductor means in which the bridging rail member fills the air gap flush with the top of said aligned rails and a second position in which the parallel conductor means is out of engagement with said resilient conductor means and the bridging rail member is removed from the air gap, and drive means acting on said carrier means to move it selectively between said first and second position.

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**4,020,301**

**DRAWOUT APPARATUS HAVING IMPROVED SECONDARY CONTACT MOUNTING PROVISIONS**

**Eric Axel Ericson, Plainville, and Frederick Daniel Kaufhold, Forestville, both of Conn., assignors to General Electric Company, New York, N.Y.**

**Filed Apr. 14, 1975, Ser. No. 567,617**

**Int. Cl.² H01H** *9/20*

**U.S. Cl. 200—50 AA** **10 Claims**

1. Drawout apparatus for racking an electrical device into and out of a compartment in an electrical enclosure, wherein the electrical device and the enclosure are equipped with mating primary disconnect contacts, said drawout apparatus comprising, in combination:

A. a carriage mounting the electrical device;

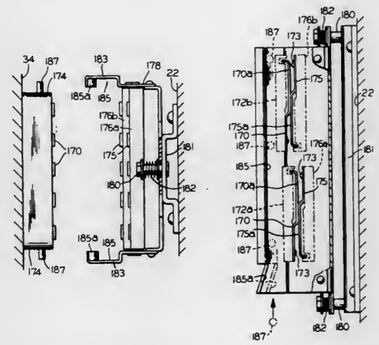
B. a rail assembly mounted to each compartment sidewall and supporting said carriage for movement between an extended position where the primary contacts are disengaged and an engaged position where the primary contacts are engaged;

C. means defining a test position for said carriage intermediate said extended and engaged positions;

D. a first plurality of individually flexibly mounted secondary contacts;

E. first means fixedly mounting said first plurality of secondary contacts en masse to one of said carriage and enclosure;

F. a second plurality of individually flexibly mounted secondary contacts;



G. second means floatingly mounting said second plurality of secondary contacts en masse to the other of said carriage and enclosure;

H. first guide means referenced to said first plurality of secondary contacts; and

I. second guide means referenced to said secondary plurality of secondary contacts, said first and second guide means interacting as said carriage is moved from said extended position to said test position to draw said second plurality of secondary contacts into individual electrical engagement with associated secondary contacts of said first plurality, and to maintain said electrical contacting engagement during movement of said carriage between said test position and said engaged position.

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**4,020,302**

**SENSOR HAVING SPRING BIASING STRUCTURE TO RETAIN CONDUCTIVE BRIDGING INERTIAL MASS IN A NON-OPERATIVE POSITION**

**Akira Hasegawa, Katsuta; Takahiko Tanigami, Mito, and Kenichi Ushiku, Katsuta, all of Japan, assignors to Nissan Motor Co., Ltd. and Hitachi, Ltd., both of Tokyo, Japan**

**Filed Feb. 19, 1976, Ser. No. 659,253**

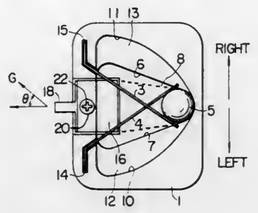
**Claims priority, application Japan, Feb. 21, 1975, 50-20923; June 30, 1975, 50-80017**

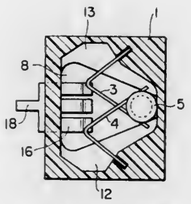
**Int. Cl.² H01H** *35/14*

**U.S. Cl. 200—61.45 R** **10 Claims**

1. In a collision speed detecting sensor having a base structure which is formed with a predetermined space portion, at least one electric contact member which is arranged at one end of the space portion, a spring member which is situated within the space portion and whose one end is supported by the base structure, and a mass which lies within the space portion, which is normally restrained at an inoperative position by the spring member and which, when subjected to an impulsive force greater than a predetermined value, moves to an operative position against the spring member and touches the electric contact member, the improvement comprising a pair of spring means symmetric in shape to constitute said spring member, means to fix one end of each said spring means onto said base structure in such a manner that both said spring means intersect with each other between free ends and fixed parts thereof, and means to hold said mass in engagement with both said spring means in the vicinity of the inter-

secting portion of both said spring means while said intersecting portion moves with said mass toward said at least one




electric contact member when subjected to the impulsive force greater than the predetermined value.

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**4,020,303**

## POLYIMIDES PREPARED FROM AMINE TERMINATED PREPOLYMERS AND OLEFIN CONTAINING ANHYDRIDES

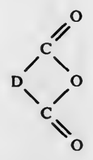
**Richard J. Jablonski, Scotia, and Daniel Kruh, Schenectady, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.**

**Filed Dec. 16, 1971, Ser. No. 208,929**
**Int. Cl.² C08G** *73/10, 73/12*
**U.S. Cl. 260—78 UA** **9 Claims**

**1.** A polymer selected from (a) the reaction product of (1) amine terminated prepolymer prepared by reacting a material selected from dicarboxylic acid, dicarboxylic acid anhydride, tricarboxylic acid and tricarboxylic acid anhydride with simple polyamine having the formula

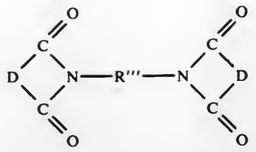
$$I\ X\ -R''-NH_2)$$

where R'' is an organic radical, *n* is at least 2 and X is selected from hydrogen, amino group, substituted organic groups and unsubstituted organic groups and (2) simple olefin selected from the group consisting of



II

where D is an aliphatically unsaturated divalent organic radical and



III

where R''' is a group containing at least two carbon atoms and D is as above, (b) the reaction product of (1) olefin terminated prepolymer prepared by reacting the amine terminated prepolymer of (a) above with simple olefin selected from the olefins of Formulas II and III above and (2) simple polyamine as in Formula I above, (c) the reaction product of amine terminated prepolymer as in (a) above and olefin terminated prepolymer as in (b), about equivalent proportions of the polymer forming reactants being used.

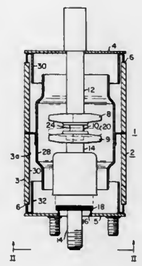
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**4,020,304**

## TWO-MATERIAL VAPOR SHIELD FOR VACUUM-TYPE CIRCUIT INTERRUPTER

**Sidney J. Cherry, Elmira, N.Y., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Continuation of Ser. No. 274,699, July 24, 1972, abandoned. This application Jan. 6, 1976, Ser. No. 646,792**
**Int. Cl.² H01H** *33/66*
**U.S. Cl. 200—144 B** **3 Claims**




**1.** A vacuum-type circuit interrupter including in combination:

a. means defining an evacuated envelope;

b. a pair of separable contacts disposed within the evacuated envelope and separable to establish arcing;

c. a vapor-condensing shield provided interiorly within said evacuated envelope to prevent the deposition of metallic particles emitted from the arcing region toward the outer casing of the envelope; and,

d. said vapor condensing shield being fabricated of two materials, a copper central shield portion about the arcing area, and opposed end shield portions at each end of the central shield portion formed of a metal having a higher breakdown voltage characteristic than copper, which metal is selected from the group of stainless steel, steel, nickel, Monel metal, and aluminum.

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**4,020,305**

## REMOTE ACTUATED SWITCH

**Edwin L. Schwartz, Los Angeles, Calif., assignor to Rite Autotronics Corporation, Los Angeles, Calif.**

**Filed Aug. 25, 1975, Ser. No. 607,253**
**Int. Cl.² H01H** *13/50*
**U.S. Cl. 200—159 R** **5 Claims**

**1.** A remote actuated switch comprising:

a housing;

a plunger movably mounted in said housing;

a contact ring at the end of said plunger for opening and closing said switch;

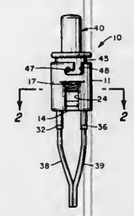


a spring for normally biasing said plunger to the switch open position;

said switch comprising a pair of contacts located in said housing opposite said contact ring;

a pair of external leads, one being attached to each of said contacts through which current flows when said contact ring is moved by said plunger against both said contacts;

each of said contacts comprising a flexible metal spring member having a flat section and an upturned end;




each contact being located over a separate cavity in said housing to permit bending of said contact by movement of said plunger after engagement of said contact with said contact ring;

said upturned ends being the first contact area of said contacts with said contact ring upon initial engagement with said plunger; and

portions of said flat sections of said contacts providing larger, second contact areas with said contact ring when said flat sections bend upon further movement of said plunger against said upturned ends.

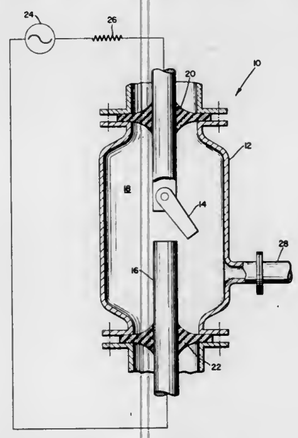
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**4,020,306**

## HIGH VOLTAGE SWITCHING DEVICE WITH CALCIUM-ALUMINUM GLASS FILLED RESIN INSULATOR SUPPORT

**Hansruedi Zahner, Dreizelgenweg 22, CH-5036 Oberfelden, Switzerland, and Gerd Müller, Im Dorfgraben 43, 65 Maint-Laubenheim, Germany**

**Filed Dec. 3, 1974, Ser. No. 529,092**
**Claims priority, application Switzerland, Dec. 7, 1973, 17164/73**
**Int. Cl.² H01H** *9/00, 33/00;* **C08L** *63/00*
**U.S. Cl. 200—293** **12 Claims**




**1.** An electrical device comprising:

A. a container,

B. arc-prone electrical contacts within the container,

C. an arc-resistant, dielectric halogenated gas within the container,

D. a filled resin electrical insulator within the container in contact with the gas, said filled resin comprising:

1. a cured epoxy resin,

2. a filler of particles of calcium-aluminum glass wherein the glass is free of silicon, boron, and alkali metals.

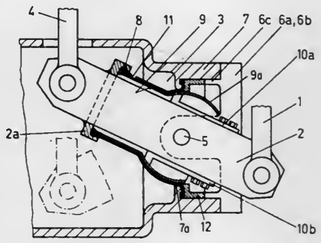
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**4,020,307**

## COMPRESSED GAS ELECTRICAL SWITCH WITH GAS-TIGHT HOUSING

**Harald Strübin, Fislisbach, Switzerland, assignor to BBC Brown Boveri & Company Limited, Baden, Switzerland**

**Filed June 5, 1975, Ser. No. 584,043**
**Claims priority, application Switzerland, June 17, 1974, 8246/74**
**Int. Cl.² H01H** *9/04*
**U.S. Cl. 200—302** **2 Claims**




**1.** In a compressed gas electrical switch structure, the combination comprising a housing and which includes therein a chamber filled with a pressurized gas, said housing being provided with a pass-through opening into said gas-pressurized chamber from the free atmosphere, a lever, said lever being pivotally mounted on intermediate its ends on said housing and extending through said pass-through opening, one end of said lever extending beyond said housing into the free atmosphere and which is connected to an operating rod and the other end extending into said gas-pressurized chamber and which is connected to a switch contact operating member, a sleeve surrounding said pivotally mounted lever and secured thereto, said sleeve including a cylindrical part which is closed at one end thereof within said gas-pressurized chamber and a spherically shaped part at the other end in contact with a complementarily configured part of said housing at said pass-through opening, a gasket of elastic material surrounding and in contact with said sleeve in said gas pressurized chamber, one end of said gasket being secured to the closed end of said sleeve so as to seal off that end of said sleeve from said gas-pressurized chamber and the other end of said gasket which overlies the spherical part of said sleeve being secured to said housing at said pass-through opening to seal off said gas-pressurized chamber from the outside.

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**4,020,308**

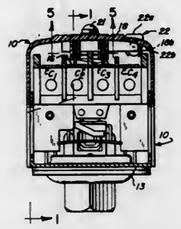
## COVER ASSEMBLY FOR AN ELECTRICAL SWITCH

**Stanley H. Edwards, Jr., Weaverville, and Cleve L. Reese, Arden, both of N.C., assignors to Square D Company, Park Ridge, Ill.**

**Filed Apr. 10, 1975, Ser. No. 566,944**
**Int. Cl.² H01H** *9/16*
**U.S. Cl. 200—310** **4 Claims**

**1.** A switching device comprising an electrical switch provided with a pair of relatively spaced conductors, and a removable cover assembly mounted on said switch and concealing said conductors, said cover assembly including a panel having exterior and interior surfaces, the interior surface being spaced from said conductors; a unitary lens piece mounted on said panel and having an outer portion engaging the panel exterior surface, an inner portion engaging the panel interior surface, and an intermediate portion extending

through an opening formed in said panel; said inner portion including and terminating in spaced gripping fingers, and being normally passable through said opening, illuminating means inserted and secured between and resiliently embraced by said gripping fingers, with the fingers being so spread by said inserted illuminating means as to so expand said inner portion as to preclude passage thereof through said opening,



said illuminating means being mounted by the inner portion of said lens piece to extend parallel to the panel interior surface in a fixed position adjacent to but spaced from the panel interior surface and elongated resilient wire-like contact means carried on the panel interior surface and electrically connected to said illuminating means, said contact means having projecting portions in electrical contact with said switch conductors.

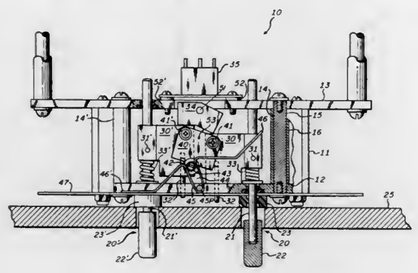
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**4,020,309**

## PUSHBUTTON SWITCH/ANNUNCIATOR FOR AIRCRAFT INSTRUMENTS

**Donald Harder Leinweber, and Thomas Walter Neis, both of Phoenix, Ariz., assignors to Sperry Rand Corporation, New York, N.Y.**

**Filed Oct. 20, 1975, Ser. No. 624,160**
**Int. Cl.² H01H** *9/00*
**U.S. Cl. 200—314** **6 Claims**



1. In an aircraft instrument having an instrument face visible to the pilot of craft, apparatus for performing a desired switching function and providing a high contrast indication thereof comprising,

a supporting frame,

a first transversal member slidably supported by said frame and having an inner section within the apparatus and an outer section accessible to the pilot of the craft and extending from the face of said aircraft instrument,

a second transversal member slidably supported by said frame and having an inner section within the apparatus and an outer section accessible to the pilot of the craft extending from the face of said aircraft instrument,

switching means mounted to the frame forming a part of said apparatus having an actuating member pivotally secured thereto and coupled with the inner sections of said first and second transversal members such that with respect to the face of the aircraft instrument an ingression of said first transversal member results in an egression of said second transversal member and an ingression of said second transversal member results in an egression of said first transversal member and wherein said actuating member in response to the ingressions of said first and second transversal members actuates and restores respectively said switching means,

linking means coupled between said first and second transversal members such that in response to an ingression of said first transversal member said linking means rotates through a fixed angle and, similarly, in response to an ingression of said second transversal member said linking means rotates through an equal and opposite angle,

generally opaque display means disposed in the face of said instrument and visible to the pilot of the craft having a first and second transparency therethrough for indicating to the pilot the status of said first and second transversal members respectively with regard to said switching means, and

indicator means pivotally mounted to said frame having first and second flag members extending therefrom, said flag members having contrasting backgrounds thereon with respect to said first and second transparency and wherein said indicator means communicates with said linking means in a manner such that for an ingression of said first transversal member said first flag member is disposed immediately behind said first transparency providing a contrasting background therefor and simultaneously disposing said second flag member a substantial distance from said second transparency and, similarly, for an ingression of said second transversal member said second flag member is disposed immediately behind said second transparency providing a contrasting background therefor and simultaneously disposing said first flag member a substantial distance from said first transparency.

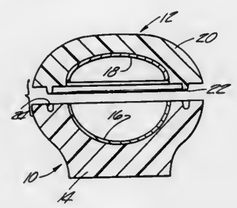
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**4,020,310**

## CONTAINER FOR INDUCTIVELY HEATING FOOD

**James J. Souder, Jr., 630 Archwood, and Lindsey E. Waldorf, 3888 Loch Alpine Drive, both of, Ann Arbor, Mich. 48103**

**Filed Mar. 20, 1975, Ser. No. 560,396**
**Int. Cl.² H05B** *5/08*
**U.S. Cl. 219—10.49** **9 Claims**



5. Apparatus for inductively heating food, comprising: a container for the food having an electrically non-conductive body supporting a pair of substantially opposed sections defining a food supporting volume between them, the sections being formed of electrically conductive material and being spaced from one another so as to be electrically insulated by the body; a compartment for receiving the container including a pair of substantially planar, substantially parallel separated wall sections, spaced so that the container may be supported between the wall sections with the substantially planar sections of the container disposed in substantially parallel alignment with the opposed wall surfaces; a pair of induction heating coils, one supported in each of the wall sections; and alternating electric current generating means connected to the two coils to cause them each to create a separate alternating electromagnetic field, which induces separate electric currents in the two substantially opposed sections of the container whereby each section is independently heated by the current induced in the section.



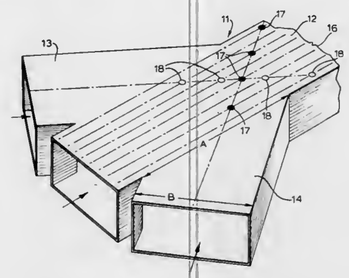
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**4,020,311**

## MICROWAVE POWER APPLICATOR

**Mark T. Churchland, Burnaby, Canada, assignor to MacMillan Bloedel Limited, Vancouver, Canada**

**Filed Sept. 15, 1975, Ser. No. 613,454**
**Int. Cl.² H05B** *5/00*
**U.S. Cl. 219—10.55 A** **10 Claims**



1. Apparatus for applying microwave power to a workpiece comprising a first hollow tube having an inlet end and an outlet end, said first tube being adapted to receive through said inlet end a workpiece to which microwave power is to be applied, said workpiece passing through said first tube where microwave power is applied thereto and exiting through said outlet end; first and second hollow waveguide sections located on opposite sides of said first tube and communicating with said first tube to introduce microwaves into said first tube; and means for supplying microwaves to said first and second sections to the propagated through said first and second sections for introduction into said first tube; the frequency of said microwaves, the width of said first tube measured between said first and second sections and the angles of inclination of said first and second sections with respect to said first tube being chosen such that the peak amplitudes of reflection standing waves created by introduction of microwaves into said first tube via said first and second sections respectively are interleaved, thereby substantially uniformly distributing hot spots created by said standing waves across the width of said first tube.

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**4,020,312**

## METHOD OF MANUFACTURING THICK, HIGH-STRENGTH STEEL PIPE FOR LOW TEMPERATURE SERVICE

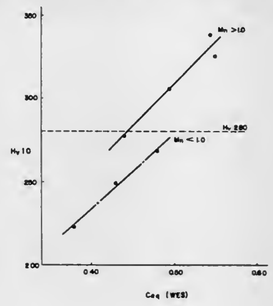
**Mutsuro Araki; Bunshiro Sakai; Itaru Watanabe; Makoto Yamada, all of Yokohama; Koshiro Tsukada, Fukuyama; Tomokazu Godai, Kamakura; Isao Aida, Fujisawa, and Masatoshi Nakagaki, Yokohama, all of Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo and Kobe Steel Ltd., Kobe, both of, Japan**

**Filed Nov. 21, 1975, Ser. No. 634,325**
**Claims priority, application Japan, Nov. 27, 1974, 49-135557**
**Int. Cl.² B23K** *31/06, 9/16, 9/18, 35/34*
**U.S. Cl. 219—61** **4 Claims**

1. A method of manufacturing a thick, low-temperature high-strength steel pipe comprising the steps of:

a. forming into a tubular shape a steel plate having a thickness of over 12 mm and containing: C, 0.01 to 0.15%; Si, 0.02 to 0.50%; Mn, 0.1 to 2.0%, P, less than 0.020%; S, less than 0.020%; at least one element selected from the group consisting of Cu, Ni, Cr, Mo and W in an amount between 0.1 and 1.0% when selecting Cu, Cr, Mo and W, and, in an amount between 0.1 and 9.50% when selecting Ni; at least one element selected from the group consisting of Sol Al, Zr, Ti, V, Nb and B in a total amount between 0.005 and 0.20%, the remainder being Fe and unavoidable impurities, the carbon equivalent of said steel being so adjusted that said carbon equivalent is less than 0.50 when said Mn content is less than 1.0%, whereas said carbon equivalent is less than 0.45 when said Mn content is over 1.0%; and

b. welding said formed steel plate into a steel pipe by subjecting said steel plate to large-current gas shielded arc welding using at least one consumable electrode, one pass per electrode on each side of the seam of said formed steel plate, in an atmosphere of a mixed shielding gas consisting essentially of an inert gas and an active gas



selected from the group consisting of carbon dioxide in an amount less than 30% and oxygen in an amount less than 5% and supplied at an overall flow rate between 50 and 200 l/min wherein said consumable electrode comprises Ti in the range of 0.01 and 0.3%, has a diameter between 3.0 and 6.4 mmϕ operating at a welding current between 600 and 1500 amp, arc voltage between 23 and 36 volts and welding speed between 300 and 1500 mm/min;

and said steel pipe having, in the as-welded condition thereof, mechanical properties such that the yield point of the base metal portion of said steel pipe is over 60,000 psi and the weld zone of said steel pipe has a maximum hardness of less than Hv10-280 and a Charpy test absorbed energy of over 7 Kg.m at −10° F.

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**4,020,313**

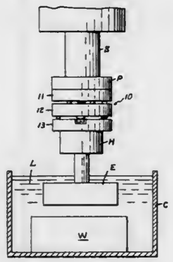
## ADJUSTABLE ELECTRODE POSITIONING DEVICE FOR ELECTRIC SPARK MACHINING APPARATUS

**Mamoru Koga, 9-5 Hon-Komagome 2-chome, Bunkyo, Tokyo, Japan (113), and Masanori Matsunobu, 24 Sakae-cho 1-chome, Matsudo, Chiba, Japan (271)**

**Filed Aug. 27, 1975, Ser. No. 608,221**
**Claims priority, application Japan, Sept. 4, 1974, 49-101706**
**Int. Cl.² B23P** *1/08*
**U.S. Cl. 219—69 E** **3 Claims**

1. In an adjustable electrode positioning device for use with electric spark machining apparatus comprising a first disc adapted to secure said device to a spindle of said apparatus, a second disc, and a third disc adapted to hold an electrode means, said first, second and third discs being coupled to each other in sequential aligned position along a center axis defined by said discs, the improvement comprising: (A) a first clamping screw means having a head disposed adjacent to the peripheral edges of said first and second discs, said first clamping screw means being passed loosely through a hole in said second disc and threaded into said first disc, said head being received together with a washer in a depression formed under the hole in said second disc, (B) a first adjusting means having a head positioned diametrically opposite to said first clamping screw means, said first adjusting means being passed loosely

through a hole in said second disc and threaded into said first disc, the head of said first adjusting means being received together with a washer in a depression formed under the hole in said second disc, a coiled spring being disposed about said first adjusting means between said first and second disc; (C) a pair of balls each in an upper and lower socket positioned symmetrically relative to said first clamping screw means on a line passing through a center of said first clamping screw means and a first line which passes through a center of each of said first clamping screw means and said first adjusting means; (D) a second clamping screw means having a head disposed adjacent to the peripheral edges of said second and third discs and on a second line which intersects perpendicularly with said first line at the center of said second and third discs, said second clamping screw means being passed loosely through a



hole in said third disc and threaded into said second disc, the head of said second clamping screw means being received together with a washer in a depression formed under the hole in said third disc; (E) a second adjusting means having a head positioned diametrically opposite to said second clamping screw means, said second adjusting means being passed loosely through a hole in said second disc and threaded into said third disc, the head of said second adjusting means being received together with a washer in a depression formed in said first disc; a coiled spring being disposed about said second adjusting means between said second and third discs; and (F) a pair of balls each in an upper and lower socket positioned symmetrically relative to said second clamping screw means and on a third line passing through a center of said second clamping screw means and intersecting perpendicularly with said second line.

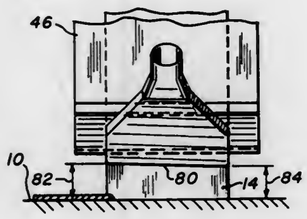
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**4,020,314**

## DELIVERY OF WELDING FLUX IN A METHOD OF SUBMERGED ARC STRIP CLADDING OF METALLIC WORK PIECES

**John Joseph Barger, Ringgold, Ga., assignor to Combustion Engineering, Inc., Windsor, Conn.**

**Filed July 17, 1975, Ser. No. 596,877**
**Int. Cl.² B23K** *9/18, 9/04*
**U.S. Cl. 219—73 R** **1 Claim**



1. A method of submerged arc welding for cladding in which an electric arc is maintained between a consumable strip electrode and a workpiece to be clad, the arc being submerged in flux material, while the tip portion of said consumable strip electrode is being melted off and molten metal of said strip electrode is forming the cladding on the surface of said workpiece, there being a region immediately adjacent said electric arc wherein the deposited material is in a molten state, the depth of the molten metal in said region decreasing as the distance along the deposited material from said electrode strip increases, the molten material in turn being covered by a layer of molten flux which in turn is covered by a layer of unmelted welding flux material, and wherein the welding flux material is at a first depth immediately adjacent said electrode strip and increases substantially linearly to a second flux depth at a position along the deposited weld material intermediate the beginning and end of the region of molten cladding material, characterized in that when said cladding is deposited on said workpiece in partial overlapping fashion with a first cladding deposit, the depth of said welding flux material immediately adjacent said electrode strip is a maximum first depth in the region of said overlap and decreases substantially linearly to a minimum first depth at the edge of said strip not adjacent said first cladding deposit.

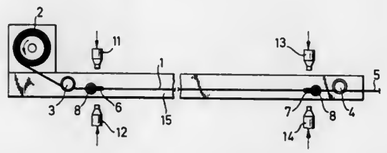
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**4,020,315**

## METHOD OF WELDING MOUNTING MEMBERS TO A WIRE

**Reinhold Euler, Kelkheim, Taunus, Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt, Germany**

**Continuation of Ser. No. 329,555, Feb. 5, 1973, abandoned. This application Aug. 23, 1974, Ser. No. 500,007**
**Claims priority, application Germany, Feb. 7, 1972, 2205602**
**Int. Cl.² B23K** *11/10*
**U.S. Cl. 219—91** **2 Claims**



1. A method of producing a corona discharge wire comprising disposing an electrically conductive wire of high tensile strength between two spaced mounting elements, each mounting element being bent to have two portions in spaced parallel relation surround said corona discharge wire which is passing through the middle of a securing hole provided in each mounting element, pre-stressing said discharge wire across clamping and tensioning points outside and beyond the mounting elements, said clamping and tensioning points being aligned with the mounting elements, and spot-welding said mounting elements to said discharge wire to form a solidified fused mass to include and to fix said discharge wire to the mounting elements.

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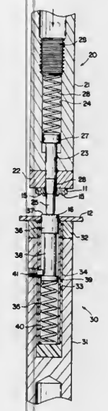
**4,020,316**

## METHOD AND APPARATUS FOR POSITIONING NUTS TO BE WELDED TO A BASE

**Edwin E. Schaft, Berea, and Kenneth A. Yeager, Olmsted Falls, both of Ohio, assignors to Fastener Industries Inc., Cleveland, Ohio**

**Filed Aug. 22, 1975, Ser. No. 606,873**
**Int. Cl.² B23K** *11/02*
**U.S. Cl. 219—103** **7 Claims**

1. A welding apparatus for positioning and welding a nut or the like on a base, comprising a pair of electrode assemblies having opposed contact faces and movable relative to one another between an inward welding position forming electrical welding contact therebetween through said base and said nut, and an outward position, one of said electrode assemblies being adapted for welding contact with said base and the other electrode assembly being adapted for welding contact with said nut, said other electrode assembly having a central bore in its contact face, a nut carrying and locating member slidably received in said base and adapted to extend through and grip a nut positioned thereon, through frictional engagement preventing movement of said nut in an axial direction relative to said member, said member being movable between an outwardly extending nut receiving and carrying position and a retracted nut releasing position within said other electrode



assembly to accommodate welding contact between said electrode contact face and said nut when said nut is positioned by said member on said base, spring means urging said member to its extended position, whereby when said electrode assemblies move relatively toward one another said member is depressed against said spring means during positioning of said nut on said base until said member releases said nut from frictional engagement with said member as said nut is positioned on said base for contact by said contact face of said other electrode assembly.

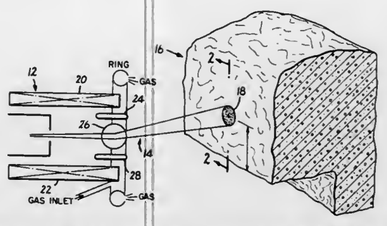
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**4,020,317**

## METHOD OF MINING ROCK WITH AN ELECTRON BEAM

**Stirling A. Colgate, Socorro, N. Mex., assignor to New Mexico Tech Research Foundation, Socorro, N. Mex., a part interest**

**Continuation of Ser. No. 30,912, Dec. 10, 1971, abandoned. This application Nov. 13, 1974, Ser. No. 523,514**
**Int. Cl.² B23K** *15/00*
**U.S. Cl. 219—121 EM** **7 Claims**



1. A method of breaking rock, comprising the steps of directing onto the surface of the rock an electron beam having an energy density of the order $2.5 \times 10^8$ watts/cm² to ablate the rock and produce an ablation pressure normal to the surface of the rock at the zone of impingement of the beam of from about 50,000 to 100,000 psi, such ablation pressure beng sufficient to fracture the rock, and magnetically deflecting the electron beam to move it across the rock surface at a velocity that is in phase with the speed of crack propagation in the rock, namely, about one-third of the dilatational wave speed in the rock.

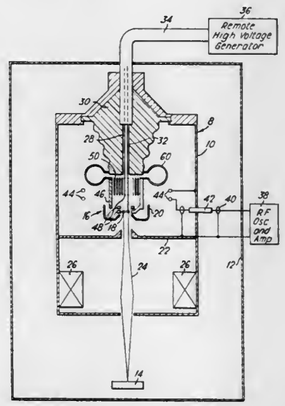
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**4,020,318**

## ELECTRON BEAM GENERATORS

**Allan Sanderson, Balsham, England, assignor to The Welding Institute, Abington, England**

**Filed Jan. 24, 1975, Ser. No. 544,009**
**Int. Cl.² B23K** *9/00*
**U.S. Cl. 219—121 EB** **16 Claims**




1. An electron beam generator system comprising a high voltage generator, an electron beam gun column having a longitudinal axis along which an emitted electron beam is directed, an oscillator for supplying an alternating voltage at a frequency of at least 2 kHz, an inductive coupling means connected to receive the output of the oscillator and comprising a primary coil and a secondary coil, at least the secondary coil being arranged concentrically around the electron beam gun column, the gun column including a cathode connected to the high voltage generator and the coupling means including an output coil so situated with respect to the cathode that when the output coil is energized by a high frequency current, a high frequency current is induced in the cathode and heats the cathode.

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**4,020,319**

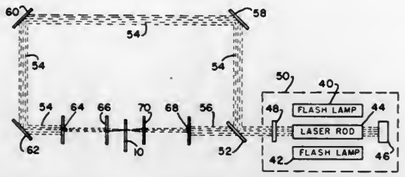
## METHOD OF FORMING A KNITTING NEEDLE LATCH PIVOT

**Richard Wilton Shepard, and Albert Sidney Ashmead, both of Torrington, Conn., assignors to The Torrington Company, Torrington, Conn.**

**Continuation-in-part of Ser. No. 440,459, Feb. 7, 1974, Pat. No. 3,934,109. This application Oct. 28, 1975, Ser. No. 625,837**
**The portion of the term of this patent subsequent to Jan. 20, 1993, has been disclaimed.**
**Int. Cl.² B23K** *9/00*
**U.S. Cl. 219—121 LM** **3 Claims**

1. In a method of forming a latch pivot for a latch needle, having portions of the opposite walls of the slot in the needle displaced into a pivot hole of the latch with a space between the displaced portions and with spaces separating the latch from each of the opposite walls of the slot, the improvement comprising the steps of: simultaneously applying controlled heat from a high energy heat source against both displaced wall portions to at least melt a portion of said displaced wall portions so that molten metal is formed in the space between the two displaced wall portions; the extent of the molten metal

being controlled to substantially fill said space without contacting the latch and allowing the molten metal to solidify to



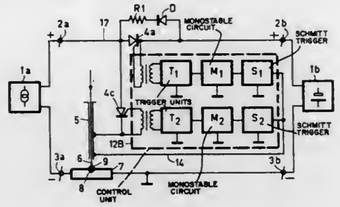

fuse the displaced wall portions together without changing the spaces separating the latch from each of the opposite walls of the slot.

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**4,020,320**
**SHORT-CIRCUIT ARC WELDING WITH CONSTANT BEADS**

**Hermanus Stephanus Josephus Pijls, and Elias Put, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed Jan. 21, 1975, Ser. No. 542,840**
**Claims priority, application Netherlands, Feb. 8, 1974, 741723**
**Int. Cl.² B23K** *9/10*
**U.S. Cl. 219—137 PS** **6 Claims**




1. A method of short-circuit arc welding using at least one electric supply source for the arc current and a consumable welding wire which method comprises, applying an electric voltage between the welding wire and a workpiece by means of the supply source while feeding the welding wire towards the workpiece during a first time interval $T_b$ so that an electric arc is sustained between the welding wire and workpiece of substantially constant power thereby to develop a welding bead of substantially constant size, removing the energy supplied to the welding wire and workpiece while feeding the welding wire towards the workpiece during a second time interval $T_e$ until the welding bead contacts the workpiece to produce a short-circuit, providing a constant delay time $T_d$ following the moment of contact between the welding bead and workpiece, and applying a short-circuit current across the welding wire and workpiece at the end of said delay time so as to separate the welding bead from the welding wire.

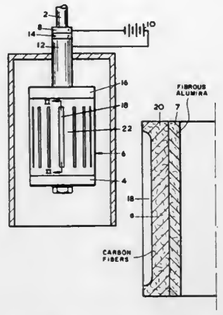
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**4,020,321**
**ELECTRIC HEATERS**

**Roger Derek Oswald, Crawley, England, assignor to BOC Limited, Crawley, England**

**Filed Mar. 11, 1975, Ser. No. 557,368**
**Claims priority, application United Kingdom, Mar. 14, 1974, 11479/74**
**Int. Cl.² H05B** *3/02;* **F24H** *1/10;* **F28B** *1/28*
**U.S. Cl. 219—271** **15 Claims**

1. An element for an electrically energized vaporizer for liquid, including a body of electro-conductive material having one major face defining a liquid inlet and a second major face defining a vapor outlet which body is both thermally and chemically stable and is permeable by a liquid to be vaporized, said body being electrically energizable to heat and vaporize liquid as it flows from said liquid inlet face to said vapor outlet face, and means in the form of a plurality of blind recesses in said body open to said vapor outlet face for providing effective



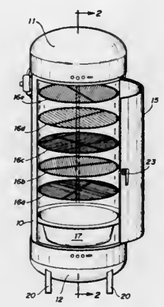

escape routes for earliest produced vapor in said body whereby the entrainment of liquid in vapor issuing from said vapor outlet face is reduced compared with the amount of entrainment of liquid which would result if the escape route means were not present.

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**4,020,322**
**MULTI SMOKER**

**Edward T. Muse, 8514 Chadbourne, Dallas, Tex. 75209**

**Filed May 14, 1976, Ser. No. 686,299**
**Int. Cl.² F27D** *5/00*
**U.S. Cl. 219—392** **2 Claims**




1. A cooking device comprising:
a cylindrical housing having top and bottom closures permanently affixed, said housing having a longitudinal opening of about one-third the circumference thereof extending from about said top to about said bottom supported on legs with the bottom portion in spaced relationship with the ground,
a vertically hinged door cooperable with said housing member to close said opening,
three bracket means each vertically oriented and mounted on the interior walls of said housing adjacent to the margins of said opening and opposite said opening,
a water pan having a peripheral flange adapted to be removably supported by said bracket means,
cooking racks removably supported on said brackets at elevations successively spaced above said pan,
heating means including a resistance heating element disposed in said housing and supported from said bottom closure at an elevation above said bottom closure, said element having several spaced apart parallel sections, and
a removable tray supported by said bracket means adapted to support smoke generating material a predetermined distance above said element.

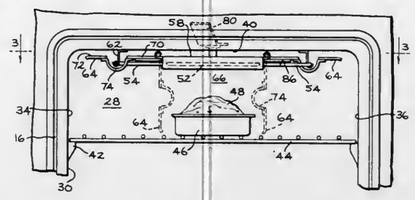


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**4,020,323**
**ENERGY SAVING BROILING OVEN**

**Raymond L. Dills, Louisville, Ky., assignor to General Electric Company, Louisville, Ky.**

**Filed Apr. 28, 1975, Ser. No. 571,982**
**Int. Cl.² H05B** *1/02;* **A47J** *37/00*
**U.S. Cl. 219—405** **10 Claims**



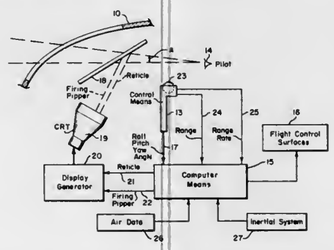

1. A broiling oven comprising an oven cooking cavity formed by a box-like oven liner and an access door, radiant heating means fixed substantially horizontally adjacent a top wall of the oven liner, an oven shelf for supporting food to be cooked thereon, and means for supporting the oven shelf in the top portion of the oven liner, below said heating means an adjustably mounted reflective means at each side of the heating means, each reflective means having a first downward position for forming with the other reflective means a miniature boiling compartment with relation to the said oven shelf and any food that may be placed thereon, so the food is adapted to be located between the two reflective means, and below said heating means the reflective means having a second raised position which enables the radiant heating means to radiate througout much of the oven cooking cavity.

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**4,020,324**
**WEAPON DELIVERY SYSTEM**

**Richard George Buscher, Woodland Hills, and Peter Eugene Carnevale, Canoga Park, both of Calif., assignors to Lear Siegler, Inc., Santa Monica, Calif.**

**Continuation-in-part of Ser. No. 500,531, Aug. 26, 1974, abandoned. This application Feb. 23, 1976, Ser. No. 660,471**
**Int. Cl.² G06F** *15/58;* **B64D** *7/08*
**U.S. Cl. 235—61.5 S** **2 Claims**



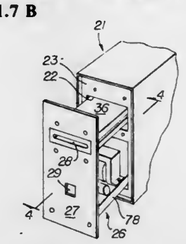

1. An aircraft weapon delivery system wherein the aircraft weapon is fixed to the aircraft fuselage and is pointed in the proper weapon firing direction to hit a target by aligning the fuselage in said direction, comprising, in combination:
a. a manual control means for operation by a pilot for generating command signals for maneuvering the aircraft fuselage in flight and for generating target line of sight information;
b. means for generating range and rate of change of range information of said target;
c. air data means for obtaining the velocity, angle of attack and side slip angle of said aircraft;
d. an inertial system for providing inertial attitude and accelerations of said aircraft;
e. display generating means including a display for observation by the pilot;
f. a display generator for projecting a reticle onto said display along with a firing pipper; and
g. computer means connected to the control means for actuating the aircraft flight controls in response to command signals generated by movement of the control means, said computer means passing said command signals directly to said display generating means to move said reticle without lag time to a registering position with a target viewed by said pilot, said computer means receiving said line of sight information, range and rate of change of range information, and being connected to the outputs of said air data means and inertial system and utilizing the information and outputs in the weapon delivery equations soled by the computer means, whereby the pilot can register and track the target with said reticle until the firing pipper coincides with the target at which time the weapon can then be fired.

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**4,020,325**
**MAGNETIC CARD SUBSTITUTE FOR COINS FOR STARTING APPLIANCES AND THE LIKE**

**Robert Fred Pfost, Los Altos, and Eugene S. Elkus, Atherton, both of Calif., assignors to Service Distributors, Inc., San Francisco, Calif.**

**Filed Apr. 2, 1975, Ser. No. 564,345**
**Int. Cl.² G06K** *5/00*
**U.S. Cl. 235—61.7 B** **27 Claims**

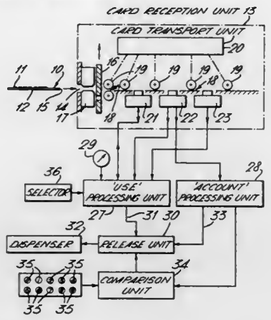



1. A reader for a card substitute for coins in actuating a machine, said card having a longitudinally extending magnetic strip encoded with one or more effective pulses, said reader comprising a casing having plates spaced apart in a longitudinally extending gap slightly greater than the thickness of said card and wide enough to receive said card, said casing having a front formed with a slot in registry with said gap and dimensioned to receive said card, a reversible motor in said casing, a first and second shaft each resiliently mounted transversely and parallel to said plates, a first and second roller each fixed to one of said shafts and extending into said gap to grip and transport a card inserted into said slot through said gap, a first switch in said casing having first switch actuating means extending into said gap positioned to be actuated by the leading edge of a card inserted into said slot to actuate said first switch to energize said motor in a first direction, first drive means interconnecting said motor and said first shaft, second drive means driving said second shaft from said first shaft in a direction opposite said first shaft, a second switch having second switch actuating means extending into said gap a fixed distance inward of said first switch actuating means positioned to be actuated by the leading edge of said card when it has been moved by said rollers into said gap a fixed distance to actuate said second switch to reverse said shafts, a transducer head in said casing positioned along the path of movement of said strip to read pulses on said card and to erase pulses and electrical circuitry for said head to count the pulses on said strip as said card moves inward and then count down the pulses on said strip as said card moves outward, erase one pulse and energize a relay, said circuitry including an up/down counter, a "skip one down pulse" function, and an "erase" function, arranged so that said counter is not actuated in an up direction by the first pulse on said strip as said strip moves inward and the last pulse on said strip is erased as said strip moves outward, said relay adapted to energize said machine.

## 4,020,326
## TOKEN-CONTROL

**Ian James Coulthurst, Maidenhead, England, assignor to Chubb Integrated Systems Limited, London, England**

**Filed Jan. 20, 1975, Ser. No. 542,624**
**Claims priority, application United Kingdom, Jan. 21, 1974, 02699/74**
**Int. Cl.² G06F 7/04; G06K 5/00**
**U.S. Cl. 235—61.7 B** **18 Claims**




1. In a system comprising, in combination, equipment for receiving a token, and a token for use with the equipment, said token bearing recorded information relating to the extent of previous use of the token within one of a succession of periods of time throughout each of which the token is authorized for limited use, and the recorded information also including time-identifying data, said equipment being adapted to receive said token and being operative to perform an operation in dependence upon said recorded information, said equipment including means for reading said recorded information from the token, means for providing reference signals defining a current epoch in time, means for comparing the time-identifying data read from the token with said reference signals, and means for updating the said informatiion recorded on the token in dependence both upon the said operation performed by the equipment and the result of the said comparison between the time-identifying data read from the token and the said reference signals, the improvement wherein the time-identifying data recorded on the token defines the commencement of the authorized-use period which is next to commence following the last use of the token, and the said equipment includes means for up-dating the record of said time-identifying data on the token when the result of said comparison signifies that the next period-commencement is not later than the current time identified by the reference signals.

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## 4,020,327
## APPARATUS FOR READING OPTICAL CODES

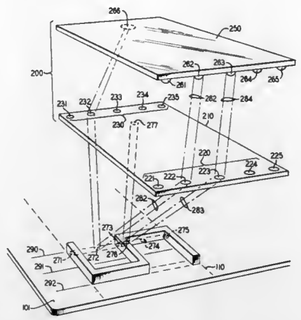
**John Michael Geary, Laurence Harbor, and Hans George Mattes, Ocean Township, Monmouth County, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed Jan. 30, 1976, Ser. No. 653,753**
**Int. Cl.² G06K 7/10, 9/00, 9/04**
**U.S. Cl. 235—61.11 E** **15 Claims**

1. Apparatus for scanning data optically encoded along a track on a record medium, comprising:

a first planar assembly including a linear array of radiant energy transmitting elements and a single detector element;

a lens assembly including (a) a first integral array of lenses each for focusing energy from an associated one of said elements on a particular point on said medium, each of said points forming a line transverse to said track, and (b) a second integral array of lenses each for focusing energy reflected from an associated one of said points on said detection element; and



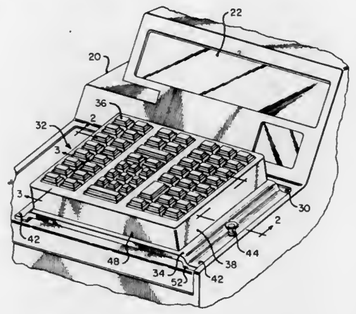
means for sequentially energizing said transmitting elements to scan said encoded data along said line.

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## 4,020,328
## AUXILIARY KEYBOARD APPARATUS

**William R. Bradam, Cambridge, Ohio, assignor to NCR Corporation, Dayton, Ohio**

**Filed Dec. 16, 1975, Ser. No. 641,411**
**Int. Cl.² G06C 7/02**
**U.S. Cl. 235—146** **19 Claims**



1. An auxiliary keyboard apparatus adapted for mounting on a business machine keyboard having key members therein, the auxiliary keyboard apparatus comprising

a. means for slidably supporting a plurality of key means on the keyboard wherein the key means are operatively associated with the key members for actuation thereof;

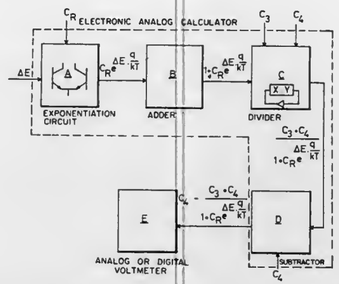
b. and means carried by said supporting means and engaging the keyboard when mounted thereon for sealing the key members from any liquids however deposited on said keyboard.



## 4,020,329
## APPARATUS FOR RADIATION DOSE MEASUREMENT

**Victor Eric Church, Engadine; Herbert James Fraser, Bulli, and Ralph William Matthews, Georges Hall, all of Australia, assignors to Austrailian Atomic Energy Commission, Coogee, Cliffbrook, Australia**

**Continuation-in-part of Ser. No. 300,407, Oct. 20, 1972, abandoned. This application Aug. 4, 1975, Ser. No. 601,704**
**Claims priority, application Australia, Oct. 21, 1971, 6741/71**
**Int. Cl.² G01V 1/28**
**U.S. Cl. 235—151.3** **14 Claims**




1. Apparatus for direct measurement of total radiation dose from the difference in electrochemical potential between an unirradiated solution containing known concentrations of ceric and cerous ions and a gamma irradiated solution initially containing the same known concentrations of ceric and cerous ions comprising:

a. a cell;

b. a removable container for transporting the irradiated ceric and cerous ions solution to the cell;

c. means integral with the cell, for drawing the irradiated solution into the cell;

d. a first section of the cell for drawing thereinto the irradiated solution;

e. a platinum electrode positioned in the first section of the cell such that when the first section of the cell contains solution the electrode is immersed;

f. a second section of the cell contained within the first section for containing said unirradiated solution;

g. a platinum electrode positioned in said second section and immersed in the solution contained therein;

h. a porous frit contained in said second section and immersed in the solution contained in said first section;

i. means connected across said two electrodes of the cell responsive to the produced potential difference between the two said solutions; and

j. automatic converting means for converting the said potential difference into a total radiation dose reading.

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## 4,020,330
## DENSITOMETER

**Hyung Du Bae, Brea, Calif., assignor to International Telephone and Telegraph Corporation, New York, N.Y.**

**Filed May 3, 1976, Ser. No. 682,494**
**Int. Cl.² G01F 15/02; G06F 7/38**
**U.S. Cl. 235—151.3** **4 Claims**

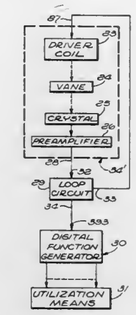
1. A densitometer comprising: a probe assembly having a structure to be vibrated while immersed in both a calibration fluid $i$ and a fluid of use $j$ different from said fluid $i$; a loop circuit connected from and to said probe assembly forming an electromechanical oscillator therewith, said loop circuit having an output lead and first means for producing a rectangular wave thereon of a predetermined frequency directly proportional to the vibrational frequency of said structure, said predetermined frequency being the reciprocal of the period $T_i$ for a density $d_i$ of said fluid $i$ in a first equation,

$$d_i = A_i T_i^2 - B_i$$

where $A_i$ and $B_i$ are constants, said predetermined frequency being the reciprocal of the period $T_j$ for a density $d_j$ of said fluid $j$ in a second equation,

$$d_j = A_j T_j^2 - B_j$$

where $A_j$ and $B_j$ are constants, said first and second equations accurately defining said densities $d_i$ and $d_j$ as functions of said periods $T_i$ and $T_j$, respectively; second means actuable to




produce an output signal $\Delta T_i$ which is a function of the pressure of said fluid $i$; and computer means for solving a third equation,

$$d_j = A_i(T_i - \Delta T_i)^2 - B_i$$

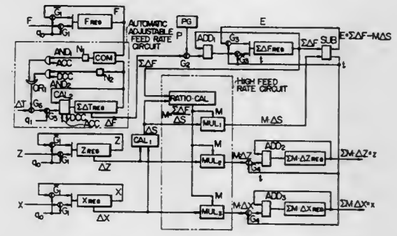
for $d_j$ as a function of $T_i$ and $\Delta T_i$ and to produce an output signal $d_j$ which is effectively the same as said $d_j$ term in said second equation.

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## 4,020,331
## FEED RATE CONTROL SYSTEM FOR NUMERICAL CONTROL MACHINE TOOL

**Toshihiro Kimura, Nagoya, and Yasumasa Narikiyo, Aichi, both of Japan, assignors to Okuma Machinery Works Ltd., Nagoya, Japan**

**Filed Feb. 19, 1976, Ser. No. 659,586**
**Claims priority, application Japan, Aug. 30, 1973, 48-97718**
**Int. Cl.² G05B 19/18**
**U.S. Cl. 235—151.11** **2 Claims**




1. A feed rate control system for a numerical control system having a circuit to produce a unit movement quantity ΔS and a unit feed rate ΔF, a circuit to accumulate the unit feed rate ΔF at each pulse of the pulse generator and to store them, and a circuit to compare the output numerical value ΣΔF of the storage circuit with the unit movement quantity ΔS and to produce an accumulating signal $t$ whenever said ΣΔF is larger than said ΔS, said accumulating signal controlling $t$ the feed rate of the machine tool, which is provided with a high feed rate circuit comprising: a ratio calculator RATIO CAL to obtain the ratio M of said output numerical value ΣΔF to said unit mivement quantity ΔS; and multipliers $MUL_1$, $MUL_2$, and $MUL_3$ to multiply said unit movement quantity ΔS, a Z-axis increment ΔZ of said unit movement quantity ΔS and a X-axis

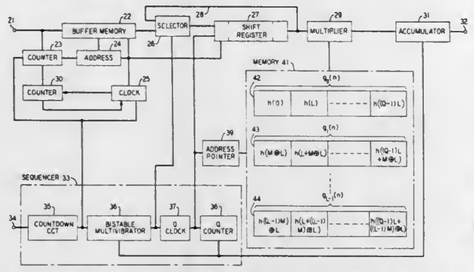
increment ΔX, respectively, by said ratio calculator output M, wherein the output M·ΔZ of said multiplier $MUL_2$ and the output M·ΔX of said multiplier $MUL_3$ are added to the corresponding contents of a Z-axis drive register $\Sigma M\Delta Z_{REG}$ and a X-axis drive register $\Sigma M\cdot\Delta X_{REG}$ register, respectively, in response to the accumulating signal $t$ which is generated when the output E of a subtractor SUB is in the condition $E = \Sigma\Delta F - M\cdot\Delta X \quad O$, the subtractor serving to subtract the output M·ΔS of said multiplier $MUL_1$ from said output numerical value ΣΔF.

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## 4,020,332
## INTERPOLATION-DECIMATION CIRCUIT FOR INCREASING OR DECREASING DIGITAL SAMPLING FREQUENCY

**Ronald Eldon Crochiere, Chatham, and Lawrence Richard Rabiner, Berkeley Heights, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed Sept. 24, 1975, Ser. No. 616,283**
**Int. Cl.² G067 *15/34***
**U.S. Cl. 235—152** **9 Claims**




1. Apparatus for converting the sampling rate of a digital input signal from $f_r$ to (L/m) $)f_r$, where L and M are integers, comprising

means for storing Q consecutive samples of said input signal where Q is a predetermined integer;

multiplier means having first and second input terminals for supplying an output signal which is the product of the signals applied to said first and second input terminals;

coefficient storage means for storing L sets of coefficients, $g_i(n)$, $i$=0, 1, . . . , (L-1), each of said L sets of coefficients having Q elements with the $k^{th}$ element, $k$=0, 1, . . . , (Q—1), equal to $g_i(k) = h(kL + (i$M) modules L), where the function $h$ denotes the coefficients of a direct form FIR filter with unit sample response length N and;

sequencer means for sequentially transferring each coefficient set $g_i(n)$ to said first multiplier input terminal and sequentially transferring each of said consecutive Q input samples to said second multiplier input terminal; and

accumulation means for summing the products supplied by multiplier means over the range $k$=0 to $k$=Q—1.

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## 4,020,333
## DIGITAL FILTER FOR FILTERING COMPLEX SIGNALS

**Henri J. Nussbaumer, LaGaude, France, assignor to International Business Machines Corporation, Armonk, N.Y.**

**Filed Mar. 10, 1976, Ser. No. 665,474**
**Claims priority, application France, May 6, 1975, 75.00065150**
**Int. Cl.² G06F *7/38, 15/34***
**U.S. Cl. 235—156** **35 Claims**

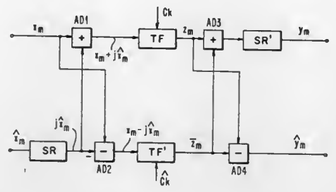
1. Digital filter for filtering complex signals, of the type which is fed with samples of the real and imaginary components of the signal to be filtered and provides separately the components of the filtered signal, characterized in that it includes:

first means for multiplying by j, the —1, said samples of said imaginary component of the signal to be filtered in a system wherein j is represented by a real number;

second means for adding said samples of said real component to those of said imaginary component multiplied by said real number;

third means for subtracting the samples multiplied by said real number from those of the real component;

fourth means for passing separately the signals supplied by said second and third means through transversal filtering means;




fifth means for adding together and for subtracting from each other the samples resulting from the transversal filtering operations; and

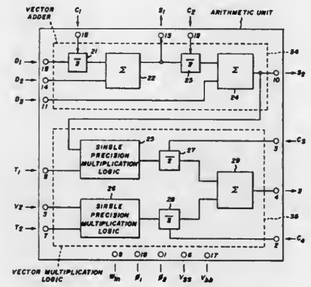
sixth means for multiplying by said real number the terms resulting from the additions performed by said fifth means.

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## 4,020,334
## INTEGRATED ARITHMETIC UNIT FOR COMPUTING SUMMED INDEXED PRODUCTS

**Noble R. Powell, Syracuse, and John M. Irwin, Clay, both of N.Y., assignors to General Electric Company, Syracuse, N.Y.**

**Filed Sept. 10, 1975, Ser. No. 611,923**
**Int. Cl.² G06F *7/48, 15/34***
**U.S. Cl. 235—164** **13 Claims**




1. An arithmetic unit suitable for large scale integration for computing summed indexed products comprising:

1. a vector adder for bit serial, word serial binary data containing sign and magnitude information, comprising:

a. a first sign changing means to which serial binary data is applied from a first data input terminal ($d_1$) and subject to a first sign control input ($c_1$),

b. a first serial summer to which two serial binary data streams are applied respectively from the output of said first sign changing means and from a second data input terminal ($d_2$), said summer producing a first output quantity ($s_1$) where

$$s_1 = (d_2 \pm d_1)$$

c. a second sign changing means to which serial binary data is applied from said first summer and subject to a second sign control input ($c_2$),

d. a second serial summer to which two serial binary data streams are applied respectively from the output of said second sign changing means and from the output of a third data input terminal ($d_3$), said summer producing a second output quantity ($s_2$), where

$$s_2 = [d_3 \pm (d_2 \pm d_1)]$$

2. a vector multiplication logic for bit serial, word serial binary data, containing sign and magnitude information, comprising

a. first multiplication means having a multiplicated input coupled to the output of said second serial summer and a multiplier input coupled to a fourth data input terminal ($t_1$),

b. second multiplication means having a multiplicated input coupled to a fifth data input terminal ($v_2$), and to a multiplier input coupled to a sixth data input terminal ($t_2$),

c. a third sign changing means to which serial binary data is applied from said first multiplication means and subject to a third sign control input ($c_3$),

d. a fourth sign changing means to which serial binary data is applied from said second multiplication means and subject to a fourth sign control input ($c_4$),

e. a third serial summer to which two serial binary data streams are applied respectively from the outputs of said third and fourth sign changing means, said third serial summer producing a third output quantity:

$$\left\{ \pm t_2\ v_2 \pm t_1\ [d_3 \pm (d_2 \pm d_1)] \right\}$$
$$f(c_4)\ f(c_3)\ f(c_2)\ f(c_1)$$

wherein the first sign selection in the expression is dependent on $c_4$,

the second sign selection is dependent on $c_3$

the third sign selection is dependent on $c_2$, and

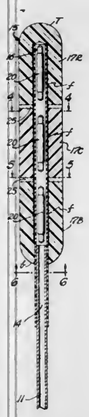
the fourth sign selection is dependent on $c_1$.

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## 4,020,335
## MULTI COLORED LIGHT SIGNAL FOR VEHICLES

**Peter J. Bisceglia, 1901 McBain Ave., San Jose, Calif. 95125**

**Filed July 23, 1975, Ser. No. 598,373**
**Int. Cl.² B60Q *1/00*; F21L *11/00***
**U.S. Cl. 240—7.1 R** **5 Claims**



1. an antenna type light for a vehicle comprising:

1. a tubular shaft having one end adapted to be secured to a vehicle;



2. a clear plastic tube mounted on the upper end of said tubular shaft in axial alignment therewith;

3. incandecent lamp means arranged within said clear plastic tube;

4. an electrical circuit including a source of electrical energy connected by electrical conductive wires to said incandecent lamp means and controlled by a manually operated switch for illuminating said lamp;

5. a plurality of light diffusing translucent bodies mounted on and circumscribing said clear plastic tube in tandum relation one upon the other;

6. a separate thin sheet of colored film wrapped around said clear plastic tube between the latter and each of said translucent bodies for coloring the light emitting from said lamp means for illuminating each of said translucent bodies in a different color; and

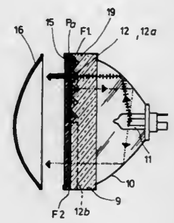
7. opaque means on said clear plastic tube between each of said translucent bodies thereon for preventing blending of the different colors therebetween upon illumination of said lamp means.

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## 4,020,336
## VEHICULAR FOG HEADLIGHT

**Ernst Linder, Muhlacker, Germany, assignor to Robert Bosch G.m.b.H., Stuttgart, Germany**

**Filed Oct. 1, 1975, Ser. No. 618,415**
**Claims priority, application Germany, Oct. 24, 1974, 2450456**
**Int. Cl.² F21V *9/00*; F21M *3/04***
**U.S. Cl. 240—9.5** **9 Claims**




1. Vehicular fog headlight comprising a reflector (10) and a light source (11) located at least approximately at the focal point of the reflector to project light ahead of the vehicle and providing a distance beam directed to illuminate the region substantially in advance of the vehicle; wherein means are provided to direct light emanating from the lower half of the reflector immediately ahead of the vehicle; the distance beam is derived from the upper half of the reflector; and polarization means are provided polarizing at least the part of the light projected from the upper half and forming said distance beam.

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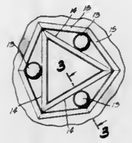
## 4,020,337
## ORNAMENTAL BUBBLE LAMP

**Victor H. Chatten, 1567 W. 215th St., Torrance, Calif. 90501**

**Filed Jan. 8, 1976, Ser. No. 647,556**
**Int. Cl.² A47G *33/16***
**U.S. Cl. 240—10 A** **20 Claims**

1. In an ornamental device, the combination of: an upward extending tube containing a liquid and having a vapor space at its upper end, at least a portion of the tube being transparent, means for heating the liquid in a lower portion of the tube to

cause bubbles to form and to ascend in the liquid, and additional heating means within and at spaced intervals along the length of the tube to preserve the vapor state of the ascending bubbles and prevent their condensation.



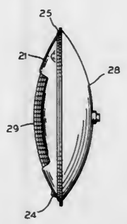
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**4,020,338**

## AUTO HEADLIGHT LENS SHIELD

**Norton M. Kirsch, Chicago, Ill., assignor to Auto Gard, Inc., Chicago, Ill.**

**Filed June 16, 1975, Ser. No. 586,869**
**Int. Cl.² F21V *11/16***
**U.S. Cl. 240—46.53** **4 Claims**



1. A headlight lens shield comprising a convex base plate having a reflective inner surface shaped and dimensioned to fit over the front lens of a circular sealed beam headlight, the outer periphery of the shield being an offset rim step fitting behind and held in place by the rim or door surrounding said headlight, and a rectangular front opening in said shield for passing light transmitted through the headlight lens, the diagonal of said rectangular opening approaching the diameter of said headlight and the area of said rectangular opening being a substantial portion of the area of the circular lens of said sealed beam headlight.

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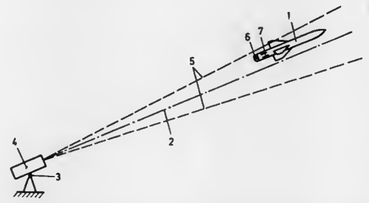
**4,020,339**

## SYSTEM FOR DETERMINING THE DEVIATION OF AN OBJECT FROM A SIGHT LINE

**Kjell Arne Håkan Gustafson, Karlskoga, Sweden, assignor to Aktiebolaget Bofars, Bofors, Sweden**

**Filed May 19, 1975, Ser. No. 578,977**
**Int. Cl.² G05B *1/00***
**U.S. Cl. 250—202** **15 Claims**

1. A system for determining the deviation of an object from a reference line originating and extending from a reference point distant from the object, comprising a transmitter assembly located at said reference point and including a radiation beam projecting device for emitting a radiation beam in the direction of the reference line, said radiation beam projecting device being operative to produce in a plane at right angles to the reference line a radiation pattern composed of two elongated narrow strips of radiation which are mutually at right angles and which sweep alternatingly and periodically with a predetermined sweeping frequency $f_s$ over said reference line in a direction at right angles to their respective longitudinal directions; and a receiver assembly located in said object and including a radiation detector activated by said radiation beam to generate an electric output signal modulated in response to the movement of said strips relative to the radiation detector, and signal processing circuits responsive to said output signal for evaluating the position of the object relative to the reference line, said signal processing circuits including



an automatically reversing first pulse counter driven by a clock pulse series and having a counting capacity of $N_1$ and adapted to be reset on the starting of the operation of the system in response to a signal from the transmitter assembly when a predetermined radiation strip is in a predetermined position relative to the reference line, said clock pulse series having a frequency $f_k$ complying with the condition

$$f_k = 2KN_1 f_s$$

where K is an integer corresponding to the number of times, during a complete sweeping cycle for the radiation strips, that the reference line is passed over by a radiation strip, and registering means for registering, in response to the output signal from the radiation detector, the count in said first counter each time a radiation strip passes over the radiation detector.

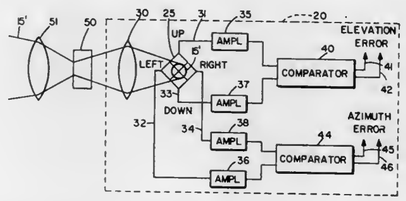
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**4,020,340**

## PRECISION AUTOMATIC TRACKING SYSTEM

**Claude R. Cooke, San Jose, Calif., assignor to GTE Sylvania Incorporated, Mountain View, Calif.**

**Continuation of Ser. No. 126,664, March 22, 1971, abandoned. This application Aug. 11, 1975, Ser. No. 603,601**
**Int. Cl.² G01J *1/20***
**U.S. Cl. 250—203 R** **1 Claim**




1. An automatic system for optically tracking a remote target in the atmosphere comprising

an optical transmitter adapted to generate optical pulses,

means for directing said pulses as a beam through the atmosphere to said target for reflection therefrom, the energy intensity distribution in said pulses being subjected to substantial changes during transmission through the atmosphere due to variations in optical characteristics of the media comprising the atmosphere whereby the reflected pulses are characterized by atmospherically induced variations of spatial energy intensity distribution (scintillation),

a receiver having a photosensitive transducer with a plurality of electrically separate segments symmetrically arranged about the transducer axis, each segment being responsive to the magnitude of photon energy in said reflected pulses and producing an electrical output proportional to said energy,

means for comparing the outputs of said segments for deriving a tracking error signal when the optical axis of the reflected pulse beam is displaced from the transducer axis,

means for compensating for said scintillation in the received reflected pulses comprising

an optical diffuser located in the path of the received pulses adjacent to and on the input side of said transducer for diffusing said received pulses prior to incidence upon said transducer whereby to reduce the effect on said transducer of scintillation in said reflected pulse beam, and

a reducing lens adjacent to the optical input side of said diffuser for reducing the area of incidence of the reflected pulse beam on said diffuser.



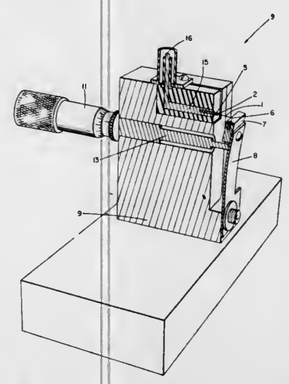
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**4,020,341**

## GENERATING AND USING COHERENT OPTICAL RADIATION

**Ali Javan, Cambridge, Mass., assignor to Massachusetts Institute of Technology, Cambridge, Mass.**

**Continuation of Ser. No. 389,970, Aug. 20, 1973, abandoned, which is a continuation-in-part of Ser. No. 62,380, Aug. 10, 1970, Pat. No. 3,755,678. This application Sept. 11, 1975, Ser. No. 612,264**
**Int. Cl.² H01J *39/12***
**U.S. Cl. 250—211 J** **25 Claims**



1. A method for generating coherent optical radiation comprising providing an antenna connected to a metal-to-metal diode junction having non-linear characteristics, and coupling to said diode junction an input of electromagnetic energy sufficient to interact with said junction to cause generation of current through said junction, causing flow of said current in said antenna, and causing resultant emission of coherent radiation from said antenna, said current and radiation being of an optical frequency which is dependent upon the frequency of said input and absent from said input.

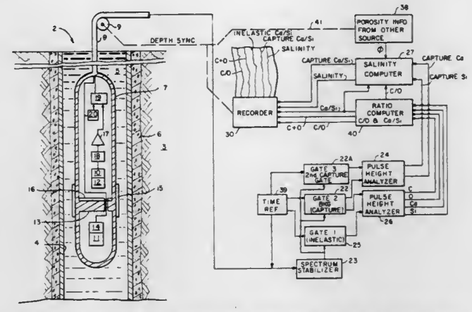
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**4,020,342**

## EARTH FORMATION SALINITY BY COMPARISON OF INELASTIC AND CAPTURE GAMMA RAY SPECTRA

**Harry D. Smith, Jr., and Ward E. Schultz, both of Houston, Tex., assignors to Texaco Inc., New York, N.Y.**

**Filed Dec. 22, 1975, Ser. No. 643,230**
**Int. Cl.² G01V *5/00***
**U.S. Cl. 250—270** **10 Claims**




1. A method for measuring the salinity of earth formations in the vicinity of a well borehole, comprising the steps of:

repetitively irradiating the earth formations in the vicinity of a well borehole with relatively short duration bursts of high energy neutrons;

detecting and counting gamma rays attributable to the inelastic scattering of fast neutron by carbon, oxygen, silicon and calcium, essentially only during said repetitive neutron bursts;

detecting and counting essentially only during the time interval between said neutron bursts, gamma rays attributable to the capture of thermal neutrons by calcium, chlorine and silicon;

detecting and counting just prior to each such repetitive neutron burst background gamma rays attributable to the capture of lingering thermal neutrons from a prior neutron burst and subtracting counts representative of such background gamma rays from counts representative of inelastic neutron scattering gamma rays from carbon, oxgyen, silicon and calcium to correct such representative inelastic scattering gamma ray counts for such background; and

comparing said inelastic scattering counts attributable to silicon and calcium with said capture gamma ray counts attributable to silicon, chlorine and calcium as a function of earth formation porosity to derive an estimate of the salinity of earth formations in the borehole vicinity.

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**4,020,343**

## SCANNING ELECTRON DEVICE

**Takashi Shimaya; Takao Namae, and Kazuo Ishikawa, all of Tokyo, Japan, assignors to Nihon Denshi Kabushiki Kaisha, Tokyo, Japan**

**Filed Apr. 21, 1976, Ser. No. 678,770**
**Claims priority, application Japan, Apr. 23, 1975, 50-49441; Oct. 1, 1975, 50-118562**
**Int. Cl.² H01J *37/26***
**U.S. Cl. 250—311** **6 Claims**

1. An apparatus for changing the field of view of a specimen in a scanning electron beam device comprising:

means for irradiating the specimen surface with the primary electron beam,

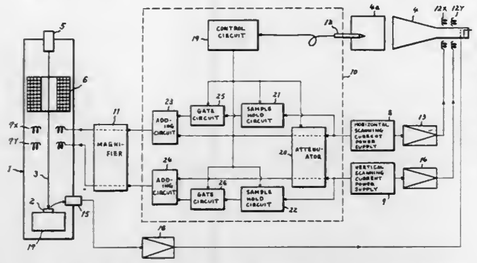
means for generating scanning signals,

means responsive to the scanning signals for deflecting the primary electron beam over the specimen,

means for detecting emissions from the specimen and providing an output signal indicative thereof,

CRT display means responsive to the scanning signals and the detecting means output signal for displaying a scanning image,

the improvement comprising a light pen detecting means for designating a point on the scanning image and creating a signal indicative of said point and means responsive to



said signal from the light pen detecting means for adjusting a fixed signal level applied to said deflection means for shifting the designated point on the specimen image to the center of the field of view displayed on the CRT.

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**4,020,344**

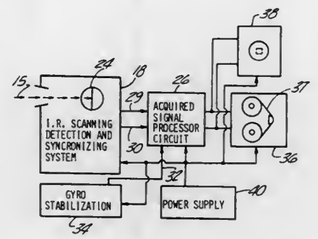
**MOBILE INFRARED APPARATUS FOR MAPPING THERMAL VARIATIONS AND METHOD EMPLOYING SAME**

**Richard Lynn Kerschbaum, Ann Arbor, Mich., assignor to Daedalus Enterprises, Inc., Ann Arbor, Mich.**

**Filed July 7, 1975, Ser. No. 593,208**

**Int. Cl.² G01J *1/02***

**U.S. Cl. 250—330** **16 Claims**




1. The method of detecting and correcting for heat loss in a ground-located structure comprising viewing a thermal ground scene in elevation by scanning said scene along vertical scan lines by means of a thermal detector while simultaneously moving said detector horizontally along said scene to acquire thermal data along vertically adjacent scan lines in a non-raster scan manner so as to provide continuous panoramic coverage of said scene in a horizontal direction corresponding to the horizontal movement of said detector, locating radiation anomalies in said data representing likely areas of high heat loss, physically examining that ground-based structure corresponding to an anomaly so located to confirm the presence or absence of high heat loss and then repairing those portions of said structure where high heat loss has been so confirmed.

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**4,020,345**

**DETECTOR FOR AN INFRARED ANALYZER**

**Emilio G. Meyer, Rozzano (Milan), Italy, assignor to Leeds & Northrup Italiana S.p.A., Milan, Italy**

**Filed Oct. 22, 1975, Ser. No. 624,654**

**Claims priority, application Italy, Oct. 22, 1974, 28656/74**

**Int. Cl.² G01N *21/26***

**U.S. Cl. 250—343** **9 Claims**

1. A detector for use in an IR-ray analyzer of the type particularly adapted for detecting the presence and the concentration of a specific component in a liquid or gaseous sample and wherein the analyzer includes a source of radiant energy adapted to direct a radiations beam onto a sample to be analyzed and a detector for collecting radiations beam downstream of a sample and for supplying a measure of the concentration of a component which is searched for in the sample undergoing the analysis as a function of the IR-frequemcy quantity absorbed by a component during the flow of the radiations beam through a sample, said detector comprising an outer casing having reflecting inner walls, a transparent window formed in said casing for the flow of a radiations beam emerging from a sample being analyzed, an inner body having reflecting outer walls and positioned within said casing, said inner body defining a first chamber having an inlet



confronting said window, said inner body also defining a second chamber having an inlet not confronting said window, an optical filter arranged at the inlet of said first chamber to allow the flow of a radiations beam of a restricted frequency band only lying in the field of the IR-frequencies which can be absorbed by a searched for component, first and second thermistors housed in said first and second chambers, respectively, said first thermistor being positioned for receiving only a radiations beam of said restricted frequency band and said second thermistor being positioned for receiving at the same time a radiations beam unaffected by said filter, and means for electrically connecting said thermistors electrically in separate legs of a bridge circuit which can be balanced and is equipped with an unbalance-measuring instrument.

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**4,020,346**

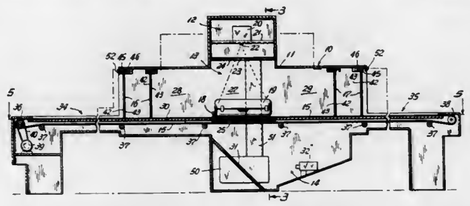
**X-RAY INSPECTION DEVICE AND METHOD**

**Donald A. Dennis, 80 Seaview, Chatham, Mass. 02633**

**Continuation-in-part of Ser. No. 343,566, March 21, 1973, abandoned. This application Feb. 19, 1975, Ser. No. 550,993**

**Int. Cl.² G01N *23/00***

**U.S. Cl. 250—358 R** **4 Claims**



1. Apparatus for the production and visual inspection of the moving fluoroscopic image of an article during movement of said article through said apparatus, comprising a shielded housing, an X-ray exposure station within said housing comprising an X-ray emission station, a fluoroscopic screen shielded against the transmission of X-rays and a baggage inspection station located between said emission station and said screen, said emission station comprising an X-ray emission tube adapted to emit a continuous beam of X-rays of low intensity through said inspection station and onto the surface of said screen, said X-rays being of such low intensity as not to damage photographic film, and a shielded focal member having an opening which focuses all of the X-rays emitted from said emission station as a divergent beams which strikes substantially only the surface of said screen, a television camera



adapted to produce video signals corresponding to fluoroscopic images produced on said screen, intensifier means associated with said camera for converting the weak low-intensity X-ray images present on the fluoroscopic screen to video signals which are intensified by a factor of at least about 1000 times gain, a television monitor which is viewable outside said housing by an operator and is associated with said camera and is adapted to receive said intensified video signals and produce intensified television images on said monitor corresponding to the fluoroscopic images present on the fluoroscopic screen, conveyor means for continuously moving an article to be inspected into said X-ray exposure station through an entrance opening in said shielded housing, into said baggage inspection station and out of said shielded housing through another opposed exit opening therein to provide a continuous moving fluoroscopic image of said article passing through said baggage inspection station, sensing means in the area of said entrance opening to sense the entry of an article to be inspected and to activate the X-ray emission tube until a predetermined period of time after the article passes said means, and shielded flexible curtains means covering each of said opposed openings and adapted to retard the escape of X-rays from said inspection station while permitting said article to be conveyed therethrough, said flexible curtain means comprising two spaced banks, each of which comprises two superposed layers of vertically-slit leaded-vinyl plastic, the slits in one of said layers being offset from the slits in the other of said layers.

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**4,020,347**

**MAMMOGRAPHY**

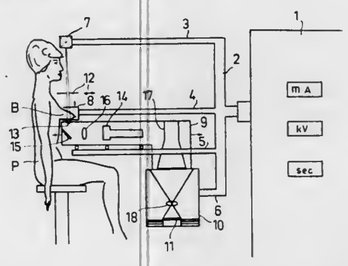
**Ronald Jan Geluk, Nootdorp, Netherlands, assignor to N.V. Optische Industrie de Oude Delft, Delft, Netherlands**

**Filed Mar. 29, 1976, Ser. No. 671,378**

**Claims priority, application Netherlands, Apr. 1, 1975, 7503862**

**Int. Cl.² A61B *6/00*; G01T *1/20***

**U.S. Cl. 250—361 R** **11 Claims**




1. A method of detecting and recording breast cancer, wherein a breast is exposed to X-rays, the transmitted beam of rays is scanned by a moving strip-shaped screen and the image of the strip-shaped screen is picked up by a television pickup tube moving along with the screen and displayed on a monitor tube.

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**4,020,348**

**GANTRY SCANNING CAMERA**

**Ronald E. Turcotte, Ridgefield, Conn.; Jay R. Wolff, Highland Park, Ill.; Anthony P. Del Medico, Niles, Ill., and Paul C. Lee, Palatine, Ill., assignors to G. D. Searle & Co., Skokie, Ill.**

**Filed May 12, 1975, Ser. No. 576,357**

**Int. Cl.² G01T *1/166***

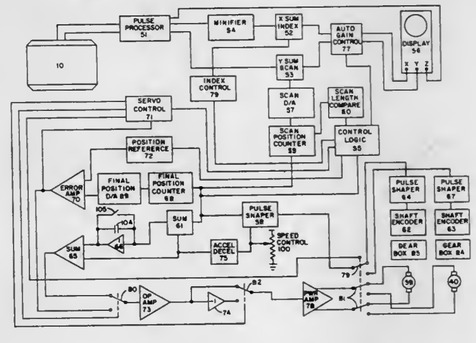
**U.S. Cl. 250—363 S** **18 Claims**

1. A gantry supported scanning scintillation camera system comprising:

a scintillation camera employing a movable detector head and detached signal processing and image recording means;

an elevated gantry support from which said detector head is suspended, said gantry support comprised of a pair of parallel longitudinal rails, a carriage support assembly supported by and spanning the distance between said longitudinal rails and longitudinally positionable with respect thereto and comprising a pair of parallel rails transverse with respect to said longitudinal rails, a carriage assembly supported by said carriage support ssembly and carrying said detector head and positionable along the length of said carriage support assembly, and separate drive units each employing a rotating motor shaft and motion conversion means to convert the rotational motion of the motor shaft to translational movement, said drive units respectively driving said carriage support assembly along said longitudinal rails and driving said carriage along said transverse rails;

translation inducing means for laterally moving said detector head within a viewing area to define an expanded rectilinear field of view bounded by predetermined limits whereby said detector head views a segment of said viewing area which varies with the lateral position of said detector head;




detector position sensing means for generating electrical signals corresponding to the lateral position of said detector head within said viewing area said detector position sensing means comprised of separate shaft encoders each associated with a respective one of said motor shafts and each generating electrical pulses corresponding to revolutions of the associated motor shaft, pulse counting means associated with said shaft encoders for tabulating said electrical pulses in proportion to the number of revolutions of said motor shafts, whereby said pulse counting means is incremented in response to motor shaft rotation in one direction and decremented in response to shaft rotation in the opposite direction, digital to analog conversion means associated with said counting means to collectively and proportionally produce from the tabulated pulse counts therein the aforesaid electrical signals corresponding to the lateral position of the detector head; and

signal combining means receiving input signals from said signal processing unit and from said detector position sensing means to provide composite output signals to said image recording means representing the locations within said expanded field of view fom which radiation emanates.

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**4,020,349**

**APPARATUS FOR READING AND RECHARGING CONDENSER IONIZATION CHAMBERS**

**Richard C. McCall, 170 Hobart Heights, Woodside, Calif. 94062**

**Filed Oct. 28, 1975, Ser. No. 626,188**

**Int. Cl.² G01T *1/18***

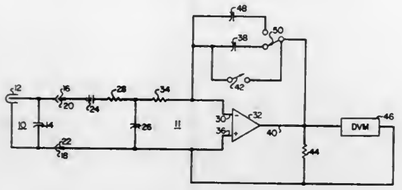
**U.S. Cl. 250—377** **9 Claims**

1. An apparatus for recharging a condenser ionization chamber and simultaneously measuring the amount of charge required to recharge it, comprising:

input means for connection to a condenser ionization chamber;

a source of potential coupled to the input means;

an integrator circuit having an input connected to the source of potential and having an output; and




measuring means coupled to the output of the integrator circuit for measuring the amount of charge stored in the integrator circuit.

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**4,020,350**

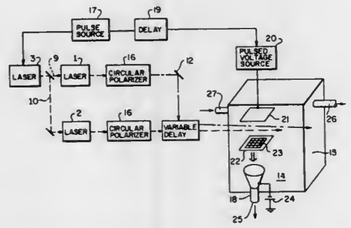
## ISOTOPE SELECTIVE EXCITATION AND SEPARATION METHOD AND APPARATUS UTILIZING CIRCULARLY POLARIZED PULSED RADIATION

**Theodore W. Ducas, Cambridge, Mass., assignor to Massachusetts Institute of Technology, Cambridge, Mass.**

**Filed June 23, 1975, Ser. No. 589,168**

**Int. Cl.² H01J** *27/00;* **B01D** *59/44;* **H01J** *39/34*

**U.S. Cl. 250—423 P** **12 Claims**




1. A method for selectively populating high-lying excited states of atoms or molecules comprising

energizing said atoms or molecules with a first circularly polarized pulsed radiation, the coherent frequency components of said first pulsed radiation have frequencies corresponding to the energy difference between a lower energy level and the frequency split levels of an intermediate energy level, the duration of said pulse being less than $2\pi/\Delta\omega$, where $\Delta\omega$ is the frequency difference of the split levels,

applying a second circularly polarized pulsed radiation energization to said atoms or molecules for a time subsequent to the termination of said first radiation, the coherent frequency components of said second pulsed radiation have frequencies corresponding to the energy difference between the split levels of said intermediate energy level and an upper energy level, the duration of said second pulse being less than $2\pi/\Delta\omega$,

the first and second radiation have the same handedness of circular polarization,

whereby said upper energy level has a greater population than prior to energization by said first and second radiation pulses.

**4,020,351**

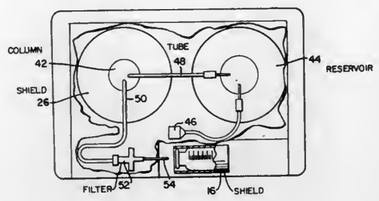
## GENERATOR SYSTEM

**Wayne Joseph Gemmill, Sr., Milford, Pa., and Frank Ernest Cerone, Jr., Marlboro, N.Y., assignors to Union Carbide Corporation, New York, N.Y.**

**Filed June 16, 1975, Ser. No. 587,263**

**Int. Cl.² G01T** *1/00;* **G01N** *21/24*

**U.S. Cl. 250—432 PD** **13 Claims**




1. A self-contained, portable system for dispensing sterile, non-pyrogenic, isotonic solutions containing technetium-99m, which system is comprised of, in combination:

1. A housing fitted with carrying means, and having contained within said housing:

a. A radioisotope generator having disposed therein molybdenum-99, said generator being contained within a shielded container having a bottom portion in which is disposed said generator, and a top portion which is in engagement with said bottom portion, said bottom portion having female channel means on its top surface for ingress and egress of conduit means which carry eluant to said generator and eluate from said generator, said top portion having male protruding means on its bottom surface which engage said channel means to further shield said conduit means, the outermost ends of said top portion and said bottom portion being tapered to a lesser diameter than at said point wherein said top and bottom portions are in engagement,

b. A reservoir of eluant disposed next to said shielded container and having disposed thereon a sterile, one-way check valve communicating to the atmosphere,

c. First conduit means communicating from said reservoir through said female channel means and into one end of said generator, second conduit means communicating from the other end of said generator and through said female channel means to the exterior of said housing,

2. A horizontal shelf traversing the front exterior of said housing, a portion of which is shielded by movable exterior shielding means,

3. A shielded elution vial into which said eluate is dispensed, and

4. Filter means disposed at a point between said vial and said second conduit means.

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**4,020,352**

## SYSTEM FOR IRRADIATING FLOWABLE MATERIAL

**Peter Mahler, Neu-Isenburg; Gerhard Frey, and Gotthard Lerch, both of Bruchkobel, all of Germany, assignors to Leybold-Heraeus GmbH & Co. KG, Cologne, Germany**

**Filed July 10, 1975, Ser. No. 594,677**

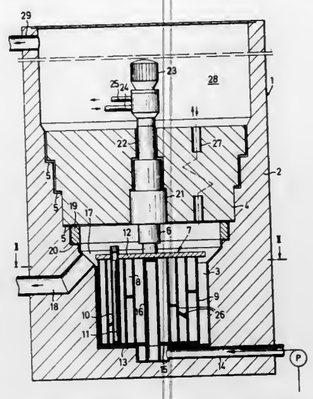
**Claims priority, application Germany, July 18, 1974, 2434504**

**Int. Cl.² G21K** *5/06*

**U.S. Cl. 250—436** **12 Claims**

1. A system for irradiating flowable material, including means defining an irradiation chamber; inlet and outlet conduit means for introducing the flowable material into and discharging it from the irradiation chamber; wherein the improvement comprises wall means defining a spiral passage in said irradiation chamber for guiding the flowable material in a spiral path from said inlet conduit means to said outlet conduit means; a radiation source supported within said irradiation chamber in the zone of said spiral passage for irradiating the material flowing therethrough; and a holding sleeve for accommodating said radiation source; said holding sleeve forming part of said wall means.





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**4,020,353**

## SAMPLE ANALYSIS APPARATUS USING ELECTRON BEAM IRRADIATION

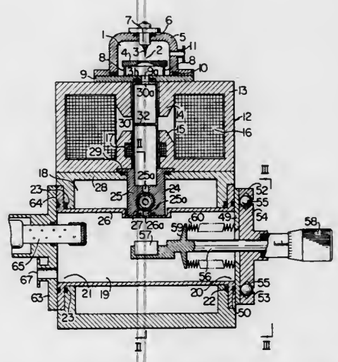
**Syobu Saito, Mito, and Yoshio Sakitani, Katsuta, both of Japan, assignors to Hitachi, Ltd., Japan**

**Filed Sept. 3, 1975, Ser. No. 609,943**

**Claims priority, application Japan, Sept. 6, 1974, 49-102029**

**Int. Cl.² H01J** *37/06*

**U.S. Cl. 250—441** **16 Claims**



1. A sample analysis apparatus using electron beam irradiation, comprising: an electron gun chamber for housing an electron gun therein which is capable of emitting an electron beam along a beam path; a sample chamber for detachably housing therein a sample placed in position along said beam path to be irradiated by the electron beam emitted by said electron gun; an intermediate chamber substantially located between said electron gun chamber and said sample chamber along said beam path and including means to permit said electron beam to pass therethrough and into said sample chamber to said sample to be irradiated; said intermediate chamber having a larger volume than said sample chamber; evacuation means for evacuating said electron gun chamber, said intermediate chamber and said sample chamber; means for controlling said evacuation means to evacuate said intermediate chamber to a degree of vacuum higher than said sample chamber and lower than said electron gun chamber; first valve means for connecting and disconnecting said electron gun chamber with and from said intermediate chamber in vacuum continuum; and second valve means for connecting and disconnecting said intermediate chamber with and from said sample chamber in vacuum continuum; at least that portion of said sample chamber in which said sample is located projecting into said intermediate chamber so that a portion of said sample chamber is closer to said electron gun chamber than a portion of said intermediate chamber.

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**4,020,354**

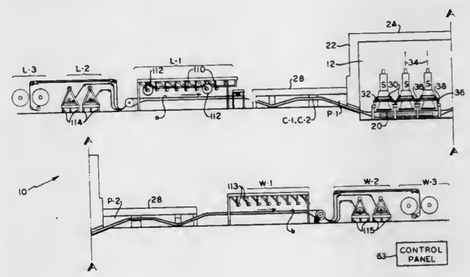
## TREATMENT OF TIRE MAKING COMPONENTS

**Glenn C. Fauss, Seville, Ohio, and Robert J. Scribner, Lynchburg, Va., assignors to The Goodyear Tire & Rubber Company, Akron, Ohio**

**Continuation of Ser. No. 580,003, May 22, 1975, abandoned. This application Sept. 13, 1976, Ser. No. 722,977**

**Int. Cl.² H01J** *37/06*

**U.S. Cl. 250—492 B** **3 Claims**




1. Apparatus for treating tire making components including tire ply and tire gum stock by controlled exposure to high voltage electron beam radiation, including a plurality of sources of said radiation, a walled chamber housing said sources, an entry and an exit each having a labyrinthine passage between said chamber and the surrounding space, conveyor means comprising a plurality of conveyors each having a conveying surface defined by closely spaced rigid bar slats extending normal to the travel direction and cooperable with another of said plurality of conveyors to provide a common conveying surface extending across both said conveyors, said conveyors being in close parallel side-by-side array for carrying said components through said chamber, let-off means for delivering a running length of a selected one of said components to said conveyor means, wind-up means for rewinding said running length as received from said conveyor means after treatment by said radiation, source mounting means respectively supporting each of said sources above and in operative relation to said conveyor means, said mounting means including a pair of spaced parallel rails bridging said conveyor means, a traversing plate supported on said rails for movement across said conveyor means, a support plate fixed rotatably on said traversing plate for rotation about a vertical axis and carrying the respectively associated source thereon, drive means respectively connected to traverse and to rotate the respectively associated said plates, control means situated outside the chamber, and means responsive to said control means to energize said drive means, whereby each said source can be positioned independently of the others thereof relative to said conveyor means.

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**4,020,355**

## RECEPTACLE FOR RADIOACTIVE MATERIAL

**Thomas V. Czaplinski, North Brunswick, and Thomas Albert Haney, East Brunswick, both of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.**

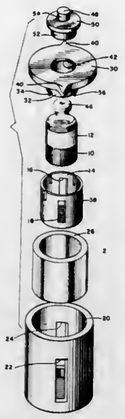
**Continuation-in-part of Ser. No. 333,095, Feb. 16, 1973, abandoned. This application June 30, 1975, Ser. No. 591,990**

**Int. Cl.² G21F** *5/00*

**U.S. Cl. 250—506** **11 Claims**

1. A receptable for storing a radioactive material container

comprising an outer casing of radiation shielding material, an intermediate casing of radiation shielding material, an inner casing of radiation shielding material, said radioactive material container situate in said inner casing, two of said casings being of non-transparent radiation shielding material and the third said casing being of transparent radiation shielding mate-



rial, and means effective to move one of said non-transparent casings with respect to said other non-transparent casing, said non-transparent casings each including viewing means which can be aligned by relative movement of said non-transparent casings to establish a view path into the interior of said inner casing to perceive radioactive material in said container.

## 4,020,356
## ABSORPTION BODY

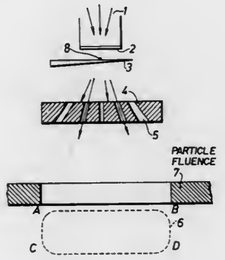
**Anders Sven Brahme, Bromma, Sweden, assignor to Scanditronix, Instrument AB, Uppsala, Sweden**

**Filed Apr. 10, 1975, Ser. No. 567,141**

**Claims priority, application Sweden, Apr. 10, 1974, 7404930**

**Int. Cl.² G21K** *3/00*

**U.S. Cl. 250—510** **10 Claims**



1. Device to be used in the irradiation of a limited volume with high-energy particles, characterized by an absorption body having a pattern of holes for simultaneous and controlled influence of both the energy distribution of the radiation and the spatial distribution of the radiation in the depth direction and transversely throughout the radiated volume.

## 4,020,357
## SIGNAL PROCESSING FOR PRINT SCANNERS

**Giancarlo Punis, Sicklerville, N.J., assignor to Metrologic Instruments, Inc., Bellmawr, N.J.**

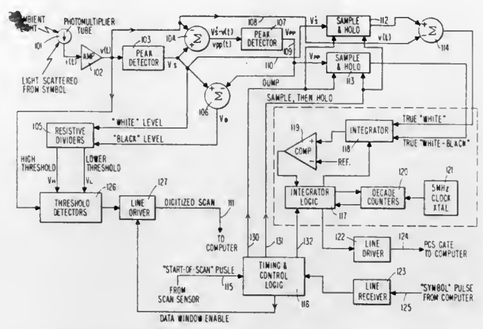
**Filed Jan. 29, 1976, Ser. No. 653,450**

**Int. Cl.² G06K** *7/10*

**U.S. Cl. 250—568** **13 Claims**

5. In a laser scanning system for monitoring and evaluating UPC symbols occurring periodically on a moving web, a method of detecting UPC data comprising:

a. developing a first signal proportional to light scattered from said web plus ambient light;
b. peak detecting said first signal, thereby developing a first peak signal;
c. developing a first difference signal between said first signal and said first peak signal;
d. peak detecting said first difference signal, thereby developing a second peak signal;




e. developing a second difference signal between said first peak signal and said peak signal;
f. processing said frist peak signal and said second difference signal to yield respective upper and lower threshold levels; and
g. comparing said first signal with said thresholds, producing a logical 1 when said first signal exceeds said upper threshold and producing a logical 0 when said first signal falls below said lower threshold.

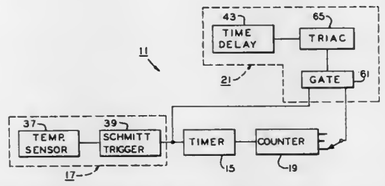
## 4,020,358
## DEVICE SYSTEM AND METHOD FOR CONTROLLING THE SUPPLY OF POWER TO AN ELECTRICAL LOAD

**Alvin D. Wyland, Morrison, Ill., assignor to General Electric Company, Fort Wayne, Ind.**

**Filed Dec. 16, 1975, Ser. No. 641,331**

**Int. Cl.² G05D** *23/00*

**U.S. Cl. 307—39** **36 Claims**




34. A method of statistically staggering power consumption by a plurality of loads comprising the steps of:
a. counting modulo *n* for at least some of the loads at counting rates which differ from one another; and
b. disabling given ones of the loads when its corresponding count exceeds a preselected count individual to the given ones of the loads which number is less than *n*.

## 4,020,359
## ELECTRICAL CONTROL SYSTEM

**Walter Tate, High Wycombe, and Thomas Robertson, Darlington, both of England, assignors to Davy Powergas Limited and Rotraco Systems Limited, both of, England**

**Filed Mar. 24, 1975, Ser. No. 561,432**

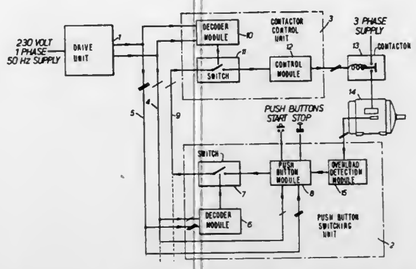
**Int. Cl.² G05B** *11/42*

**U.S. Cl. 307—40** **11 Claims**

1. An electrical control system for controlling a plurality of electrical loads each having a contactor in the electrical supply circuit thereto, said system comprising for each load a switch unit including means for producing electrical signals



representative of the condition of the switch unit, a contactor control unit connected so as to control the operation of the contactor in the supply circuit to the load in response to signals received from the switch unit, and an electrical signal generating unit for producing output signals including a fixed frequency coded electrical interrogator signal, said last mentioned signals being supplied to the units of all the loads, and




an electrical link conductor to which all of the units are connectable, the two units associated with each load being responsive to the same part of the period of the interrogator signal to connect the units to the electrical link conductor and during said part of the period the units of the other loads are non-responsive thereto and said units are not connected to the link conductor.

## 4,020,360
## INVERTER CONTROL SYSTEM

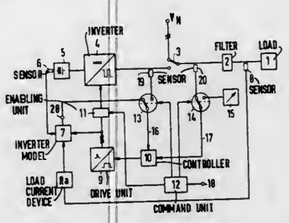
**János Udvardi-Lakos, Erlangen, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany**

**Filed Sept. 26, 1975, Ser. No. 617,176**

**Claims priority, application Germany, Sept. 27, 1974, 2446299; Oct. 8, 1974, 2447951; Feb. 24, 1975, 2507866; July 8, 1975, 2530465; July 17, 1975, 2532056**

**Int. Cl.² H02J** *9/06*

**U.S. Cl. 307—66** **23 Claims**




1. In an inverter supplied with an input voltage and having a power stage including controlled rectifiers controlled by a control unit containing a drive unit and a control device in the form of an integral controller, the drive unit providing output firing pulses for the controlled rectifiers whose firing angle is dependent on a control voltage developed by the integral controller, said inverter being a stand-by controller for taking over a load in the case of an emergency, means for permitting rapid start up of the power stage such that it immediately provides a full output voltage without delay comprising:
a. an enabling unit interposed between the drive unit and power stage which is capable of selectively enabling or blocking the transmission of firing pulses in response to a control input;
b. means for developing and supplying to the control unit a control voltage which is such as to result in a correct voltage at the output of the inverter with the load which it must take over for any starting instant; and
c. a command unit having an input for receiving a starting command and providing an output to the control input of said enabling unit to enable it to transmit firing pulses from said drive unit to the controlled rectifiers of said power stage.

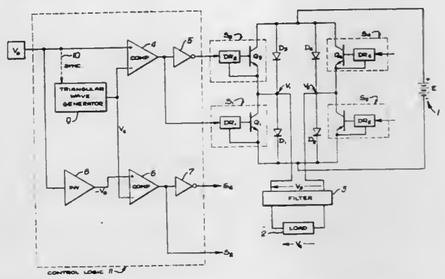
## 4,020,361
## SWITCHING MODE POWER CONTROLLER OF LARGE DYNAMIC RANGE

**Larry R. Suelzle, and Leonard O. Hodges, both of Huntington Beach, Calif., assignors to Delta Electronic Control Corporation, Costa Mesa, Calif.**

**Filed Oct. 4, 1974, Ser. No. 512,059**

**Int. Cl.² H03K** *3/00*

**U.S. Cl. 307—106** **11 Claims**




1. In a circut for producing a three state, PDM output, the combination comprising
a. switches $S_1$ and $S_3$ connected in series and across a voltage source, $S_1$ and $S_3$ being in opposite states of conduction,
b. switches $S_2$ and $S_4$ connected in series and across the voltage source $S_2$ and $S_4$ being in opposite states of conduction,
c. a load with one end connected with the common point between switches $S_1$ and $S_3$ and the other end connected with the common point between switch $S_2$ and $S_4$, and
d. means to produce a short pulse of interval $\Delta t$ across the load by controlling the switches to switch from one of the two states which produce 0 voltage across the load ($S_1$ ON and $S_2$ ON, or $S_3$ ON and $S_4$ ON), to an intermediate state where voltage is produced across the load ($S_1$ ON and $S_4$ ON, or $S_3$ ON and $S_2$ ON), and then to other 0 voltage state, said means including a wave generator and comparator means responsive to the output of the wave generator and to an input signal waveform $V_s$ to produce a first comparison output for controlling $S_1$ and $S_3$, and a second comparison output for controlling $S_2$ and $S_4$.

## 4,020,362
## COUNTER USING AN INVERTER AND SHIFT REGISTERS

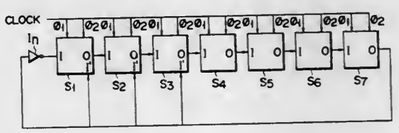
**Yasoji Suzuki, Ayase; Kenshi Manabe, and Masataka Hirasawa, both of Yokohama, all of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Tokyo, Japan**

**Filed July 2, 1975, Ser. No. 592,643**

**Claims priority, application Japan, July 5, 1974, 49-76940**

**Int. Cl.² H03K** *21/36, 23/08*

**U.S. Cl. 307—225 C** **13 Claims**




1. A counter for counting clock signal comprising $2n+1$ cascade-connected stages each having an input and output,

one stage of which is an inverter and the remaining $2n$ stages of which are 1st to $2n$-th half-bit shift registers each operative to produce at the output an output state corresponding to an input data state at the input in response to clock signals to be counted, at least one of the even-numbered stages of the 2nd to $2(n\text{-}2)$-th half-bit shift register stages only or at least one of the odd-numbered stages of the 3rd to $(2n\text{-}3)$-th half-bit shift register stages only having an additional input and being operative to produce at the output an output state corresponding to an input data state on the input when the additional input is at a first voltage level and operative to make the output at a predetermined voltage level when the additional input is at a second voltage level; means for coupling the output of the final stage of said cascade connection and the additional input of at least one of the half-bit shift registers; and means for applying clock signals to each of the $2n$ half-bit shift register stages to operate $n$ odd-numbered half-bit shift register stages and $n$ even-numbered half-bit shift register stages alternately to form $2n\text{-}x$ and $2n\text{-}(x\text{-}1)$ counters, wherein $x$ is a selected stage.

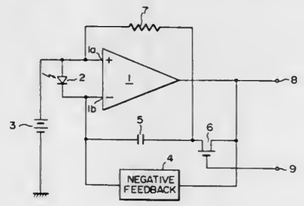
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**4,020,363**

## INTEGRATION CIRCUIT WITH A POSITIVE FEEDBACK RESISTOR

**Saburo Numata, and Shinichiro Fujino, both of Urawa, Japan, assignors to Fuji Photo Optical Co., Ltd., Omiya, Japan**

**Filed Dec. 23, 1975, Ser. No. 643,814**
**Claims priority, application Japan, Dec. 25, 1974, 49-186**
**Int. Cl.² G06G 7/12; H03K 5/00; G06G 7/18**
**U.S. Cl. 307—229** **5 Claims**




1. An integration circuit comprising an operational amplifier, a negative feedback circuit composed of an integrating capacitor and a switch means connected in series therewith, said negative circuit being connected between the output terminal and the negative input terminal of the operational amplifier, a negative feedback element connected in parallel with said negative feedback circuit, and a current limiting means connected between the positive input terminal and the negative input terminal, wherein the improvement comprising a positive feedback resistor connected between the positive input terminal and a connecting point between said integrating capacitor and said switch means, the resistance of said feedback resistor being higher than the resistance of said switch means when the switch means is in its ON-state and lower than the resistance of said switch means when the switch means is in its OFF-state, whereby the potential difference across said integrating capacitor is made substantially zero.

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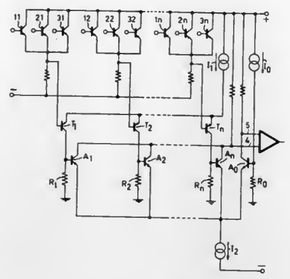
**4,020,364**

## RESISTANCE READ AMPLIFIER

**Karel Elbert Kuijk, Emmasingel, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Sept. 15, 1975, Ser. No. 613,621**
**Claims priority, application Netherlands, Sept. 28, 1974, 7412870**
**Int. Cl.² H03K 17/60**
**U.S. Cl. 307—242** **10 Claims**

1. A circuit for determining at will the resistance of any one resistor of a group of resistors comprising, a current source having a high internal resistance, a plurality of electronic selection switches for selecting one resistor at a time from said group of resistors, output amplifier means coupled to said resistors, means connecting a first resistor in a first series circuit with a first selection switch, a second resistor in a second series circuit with a second selection switch, and so on, and with said series circuits connected in parallel, means



connecting said current source in common to all of said series circuits, and means or operating said selection switches so that the switches cause a current from the current source to flow through one selected resistor only and simultaneously applies to the output amplifier means the voltage developed across the selected resistor and no other resistor.

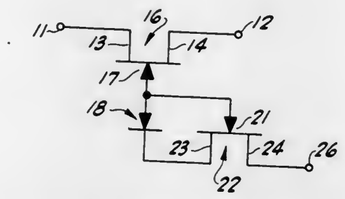
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**4,020,365**

## INTEGRATED FIELD-EFFECT TRANSISTOR SWITCH

**Basil Weir, San Jose, Calif., assignor to Intersil Incorporated, Cupertino, Calif.**

**Filed Mar. 22, 1976, Ser. No. 669,395**
**Int. Cl.² H03K 17/04, 17/60; H01L 29/80, 27/04**
**U.S. Cl. 307—251** **5 Claims**



1. An improved monolithic electronic switch comprising
a junction field-effect transistor having source, drain and gate regions disposed in a single die of semiconducting material,
switch terminals electrically connected to the source and drain regions of said junction field-effect transistor,
a semiconductor diode formed in said single die adjacent said junction field-effect transistor and having an anode region connected to the gate region of said junction field-effect transistor within said die, and
a small field-effect transistor having source, drain and gate regions disposed in said same single die with said source thereof comprising at least a portion of a cathode region of said diode, said gate being connected to the gate region of said junction field-effect transistor and said drain thereof having an external electrical connection for receiving signals to control conduction of said junction field-effect transistor.

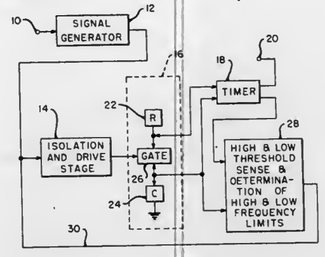


**4,020,366**

## PULSE TRAIN FREQUENCY CONTROL MEANS

**Edward M. Garner, Kettering, and Raymond S. Duley, Centerville, both of Ohio, assignors to NCR Corporation, Dayton, Ohio**

**Filed Apr. 22, 1976, Ser. No. 679,549**
**Int. Cl.² H03K 1/16**
**U.S. Cl. 307—271** **14 Claims**




1. A circuit for providing a pulse train, comprising:
timing means to produce a pulse train of pulses at one of two predetermined upper and lower frequencies or varying therebetween in response to input signals applied thereto;
control means for providing signals representative of said frequencies to said timing means;
signal generating means coupled to said control means to provide an input signal to said control means representative of said upper and lower frequency levels and transitions therebetween in response to the application to said signal generating means of input signals thereto at one of two levels; and
sensing means responsive to threshold levels sensed from said timing means and said control means and coupled to said signal generating means to control said input signal to said control means,
whereby said input signals to the timing means cause said timing means to produce a pulse train varying between the predetermined frequency limits.

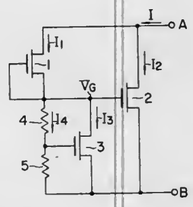
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**4,020,367**

## CONSTANT-CURRENT CIRCUIT

**Osamu Yamashiro, and Shunji Shimada, both of Kodaira, Japan, assignors to Hitachi, Ltd., Japan**

**Filed May 18, 1976, Ser. No. 687,510**
**Claims priority, application Japan, May 28, 1975, 50-62869**
**Int. Cl.² H02J 1/04; G05F 1/52; H03K 1/12**
**U.S. Cl. 307—297** **5 Claims**



1. A constant-current circuit comprising a depletion type FET having its drain adapted for connection to a bias source, first and second impedance means connected in series with each other, one end of the series connection of said first and second impedance means being connected to the source of said depletion type FET while the other end of the series connection of said first and second impedance means being adapted for connection to a common potential source, a first enhancement type FET having its drain and source connected to the drain of said depletion type FET and said other end of the series connection of said first and second impedance means respectively, and a second enhancement type FET having its gate and source connected to the juncture between said first and second impedance means and said other end of the series connection of said first and second impedance means respectively, the gate of said first enhancement type FET and the drain of said second enhancement type FET being connected to the juncture between the source of said depletion type FET and said one end of the series connection of said first and second impedance means, the impedance of said second enhancement type FET in conduction state being negligibly small in comparison with that of said series connection of said first and second impedance means, and the impedance of said first enhancement type FET in conduction state being negligibly small in comparison with the sum of the impedance of said depletion type FET in conduction state and the impedance of said series connection of said first and second impedance means.

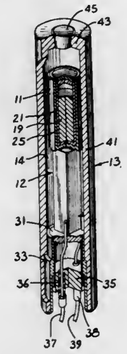
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**4,020,368**

## ELECTRIC POWER GENERATOR

**Homer Charles Carney, Del Mar, Calif., assignor to General Atomic Company, San Diego, Calif.**

**Filed Jan. 23, 1975, Ser. No. 543,413**
**Int. Cl.² H01V 1/30**
**U.S. Cl. 310—4 R** **8 Claims**



1. An electric power generator comprising a heat source, a thermoelectric converter, an encapsulating enclosure enclosing said heat source and said thermoelectric converter, and a transparent thermal insulating medium between said heat source and said enclosure and between said thermoelectric converter and said enclosure; said heat source, said thermoelectric converter, and said enclosure having facing metallized surfaces which are sufficiently heat reflective to substantially inhibit radiation of heat from said heat source and said thermoelectric converter to said enclosure through said transparent medium, said metallized surface of said thermoelectric converter having a thickness of less than about 0.10 microns.

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**4,020,369**

## COMPACT MECHANICALLY-POWERED ELECTRIC GENERATOR FOR A CAMERA OR OTHER APPARATUS

**William E. Shoupp, Pittsburgh, and Walter V. Bratkowski, McKeesport, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Continuation of Ser. No. 488,606, July 12, 1974, abandoned, which is a division of Ser. No. 380,180, July 17, 1973, Pat. No. 3,842,427. This application Sept. 2, 1975, Ser. No. 609,278**
**Int. Cl.² H02K 35/00**
**U.S. Cl. 310—15** **10 Claims**

1. A mechanically-powered generator for producing a pulse

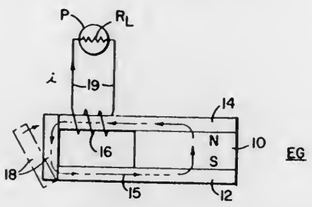
of electrical energy, said generator comprising the combination of;

a permanent magnet,

a pair of spaced pole pieces secured to said magnet and defining therewith a magnetic circuit,

a keeper of ferromagnetic material hingedly coupled to one of said pole pieces and swingable from a cocked position toward and away from the other pole piece,

a spring coupled to said keeper and one of said pole pieces and operative, when placed in tension and then released, to rapidly move the keeper into bridging relationship with said pole pieces, said spring being coupled to the keeper




in a manner such that the spring is in tension when the keeper is disposed at said cocked position in non-bridging relationship with said pole pieces,

latch means for releasably holding said keeper in spring-loaded condition and non-bridging position relative to said pole pieces, and,

a wire coil disposed in inductive relationship with said magnetic circuit and oriented to generate a voltage pulse in response to changes in the reluctance of the magnetic circuit produced by the movement of the keeper from non-bridging to bridging relationship with said pair of spaced pole pieces.

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**4,020,370**

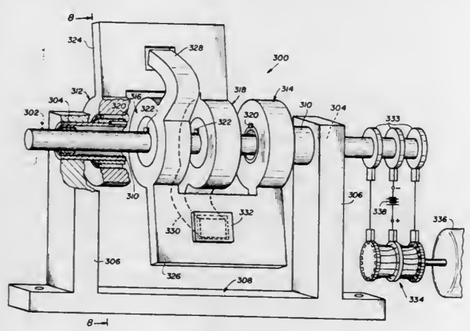
**ELECTRIC MOTOR FOR GENERAL PURPOSES**

**Domenic Borello, 142 Nyack Ave., Pelham, N.Y. 10803**

**Filed Dec. 15, 1975, Ser. No. 640,974**

**Int. Cl.² H02K** *7/06*

**U.S. Cl. 310—37** **4 Claims**




1. In an electric motor of the type including plural stator coils each having a central opening and electrically connected to generate a magnetic field, and a magnetizable rotor adapted to be powered in rotation by said field, the improvements comprising a rotor formed of at least two plunger-like members journalled for rotation and disposed 180° apart, and at least two said stator coils, each of which is operatively arranged in cooperating relation with each said plunger member by being located in a slightly advanced position relative thereto, said coils being operatively arranged to be urged through rotation to thereby correspondingly urge said plunger members through rotation, whereby said generated magnetic field exerts a force on said rotor tending to pull it centrally through, rather than merely past, each said coil.

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**4,020,371**

**ELECTRIC ROTATING MACHINE HAVING A CRYO-INDUCTOR**

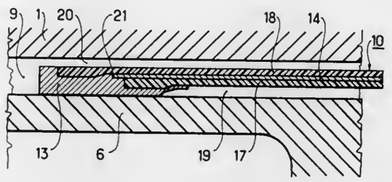
**Roger Gillet, Belfort; Michel Berthet, Gif sur Yvette, and Francois Moisson-Franckhauser, Bretigny, all of France, assignors to Societe Generale de Constructions Electriques et Mecaniques (ALSTHOM), Paris Cedex and Electricite de France, Paris, both of, France**

**Filed Apr. 15, 1975, Ser. No. 568,238**

**Claims priority, application France, Apr. 17, 1974, 74.13314**

**Int. Cl.² H02K** *9/00*

**U.S. Cl. 310—52** **12 Claims**




1. In a rotating electrical machine having a rotatable shaft and a rotor fixed to the shaft, and wherein the rotor includes an inner cryogenic cylindrical inductor structure thermally insulated from an outer non-cryogenic cylindrical member by a cylindrical space for holding a vacuum, said cryogenic inductor structure being mechanically connected in a fluid-tight manner to said non-cryogenic cylindrical member by two cylindrical portions subjected to a temperature gradient, thereby forming the cylindrical space; and a coaxial intermediate cylindrical thermal reflector screen disposed in the space and fixed at its opposite axial ends to said cylindrical portions by thermally conductive elements; the improvement wherein said screen comprises at least one layer of separate thermally conductive strips arranged parallel to one another between said opposite axial ends of said screen.

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**4,020,372**

**COOLING OF DISCOIDAL DYNAMOELECTRIC MACHINES**

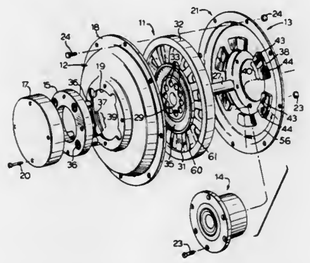
**Eric Whiteley, Peterborough, Canada, assignor to Canadian General Electric Company Limited, Toronto, Canada**

**Filed Sept. 15, 1975, Ser. No. 613,566**

**Claims priority, application Canada, Oct. 9, 1974, 211065**

**Int. Cl.² H02K** *9/00*

**U.S. Cl. 310—61** **6 Claims**




1. A disc-type, axial gap dynamoelectric machine having a magnetic stator structure; a discoidal rotor; an enclosure for the stator structure and rotor; means for supporting said rotor for rotation in axially spaced, flux linking relation with said stator structure; and a cooling fluid in the spaces between the



stator structure and rotor; the electromagnetic portion of said rotor being a rigid, self supporting, resin bonded winding structure consisting essentially of a plurality of coils overlapped in a circular array, interconnected electrically and bonded together with a resinous bonding medium to provide a unitary structure having an annular disc portion containing radially disposed coil sides and coaxial ring portions on the inner and outer edges of the disc portion containing the coil end heads and end conductors; and formations in selected regions of said resinous winding structure interrupting the surface area of the structure exposed to said fluid and thereby enhancing the transfer of heat from the winding conductors to the fluid; said formations comprises discrete bundles of resin bonded conductors disposed radially between said inner and outer ring portions in angular spaced relation so as to resemble spokes of a wheel.

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**4,020,373**

**ROTARY ELECTRIC MACHINE**

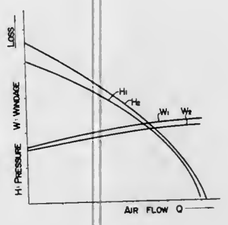
**Hiroe Yamamoto, Ibaraki; Noriyoshi Takahashi, and Masatoshi Watanabe, both of Hitachi, Japan, assignors to Hitachi, Ltd., Japan**

**Filed Oct. 1, 1975, Ser. No. 618,341**

**Claims priority, application Japan, Oct. 4, 1974, 49-113896**

**Int. Cl.² H02K** *1/32*

**U.S. Cl. 310—61** **3 Claims**




1. A rotary electric machine comprising a rotary shaft, a plurality of spider arms projecting radially from said rotary shaft, an electromagnetic rotor device arranged on the outer periphery of said spider arms, an electromagnetic stator device disposed opposite to said electromagnetic rotor device with a predetermined space therebetween, an end cover for covering axial sides of said electromagnetic stator device, said end cover having an inner end thereof arranged midway on the radius of said spider arms in slightly spaced relationship with the side wall of said arms so as to provide a small space therebetween and, a spider cover on the side of said spider arms axially thereof, said spider cover having at least one inner and outer air inlet hole, each air inlet hole being smaller than the space between adjacent ones of said spider arms, said inner air inlet hole being situated at a position on said spider cover a smaller distance from said rotary shaft then said outer air inlet hole, said end cover having an end thereof positioned between said outer air inlet hole and said inner air inlet hole in slightly spaced relation with said spider cover.

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**4,020,374**

**SUPERCONDUCTING ELECTRIC MOTORS**

**Alain Mailfert, Villers les Nancy, and Michel Kant, Paris, both of France, assignors to Agence Nationale de Valorisation de la Recherche (ANVAR), France**

**Filed Mar. 21, 1975, Ser. No. 560,931**

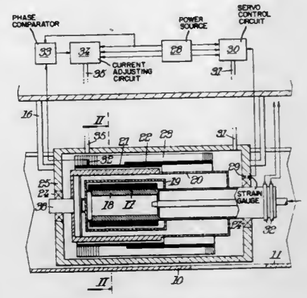
**Claims priority, application France, Mar. 28, 1974, 74.10962**

**Int. Cl.² H02K** *7/06*

**U.S. Cl. 310—80** **12 Claims**

1. Linear electric motor, comprising: a passive, electrically conducting, tubular track,

an assembly movable along the track, said assembly comprising a D.C inductor coil of superconducting material, freely rotatable about an axis close to the track, and at least one normally conducting auxiliary polyphase winding coaxial with the inductor coil, wound so as to create a field rotating in synchronism with the field of the inductor coil, when polyphase A.C. currents delivered by a power source circulate therein,




and means for transmitting driving forces directed parallel to the track from the auxiliary winding to a vehicle to be moved along the track.

the track and the poles of the inductor coil being constituted such that the currents induced in the track by the rotation of the inductor coil exert forces on said auxiliary winding whose resultant has a component parallel to the direction of the track.

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**4,020,375**

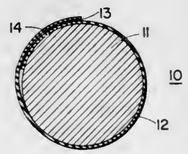
**DYNAMOELECTRIC MACHINE COIL**

**Robert O. Weisz, Fort Wayne, Ind., assignor to Essex International, Inc., Fort Wayne, Ind.**

**Filed June 15, 1973, Ser. No. 370,201**

**Int. Cl.² H02K** *3/04*

**U.S. Cl. 310—208** **4 Claims**




1. In a dynamoelectric machine coil including an insulated electrical conductor which has at least one sharp bend, the improvement which comprises the insulated electrical conductor being a metal conductor having a single ply wrapping of electrical insulation material which will withstand bending of the insulated conductor about a mandrel having a diameter of six times the greatest transverse dimension of the conductor without rupture of the wrapping, the wrapping being a non-woven, non-crepe tape longitudinally wrapped in tubular form around the conductor, said tape at least completely encircling said conductor and having a marginal portion overlapping an inner first-wrapped portion to form a longitudinally extending seam, said tape being stretchable to an extent of at least 12% in a longitudinal direction axially parallel with the conductor and to an extent of at least 8% in a transverse direction normal to the conductor without rupture, an adhesive applied only between said overlapping portions of the tape to securely bond said overlapping portions together, and the tape having its inside surface in contact with the conductor and being free

throughout its length for longitudinal movement on the conductor.

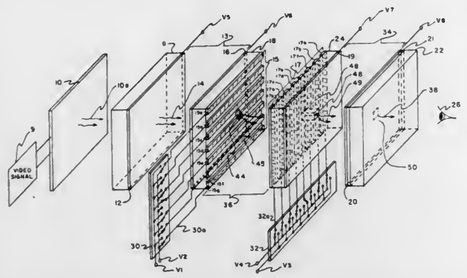
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**4,020,376**

## MINIATURE FLAT PANEL TWO MICROCHANNEL PLATE PICTURE ELEMENT ARRAY IMAGE INTENSIFIER TUBE

**David A. Bosserman, Alexandria, and Charles F. Freeman, Springfield, both of Va., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Mar. 5, 1976, Ser. No. 664,219**
**Int. Cl.² H01J** *43/00, 31/26, 43/04*
**U.S. Cl. 313—103 CM** **5 Claims**



1. A miniature flat panel picture element array image intensifier tube comprising:
- a video picture signal generator for providing a video signal;
- a radiation source, said radiation source being modulated by said video signal for creating a generally uniform flow of photons therefrom with said radiation source mounted on the front of a transparent input faceplate;
- a photocathode layer on the inside of said input faceplate;
- a first microchannel plate electron multiplier having a continuous input electrode in proximity focus with said photocathode layer and having as an output electrode an array of electrically isolated parallel output electrode metallic stripes;
- a second microchannel plate electron multiplier have as an input electrode an array of electrically isolated parallel input electrode metallic stripes that are positioned close to the array of first microchannel plate output electrode metallic stripes and are orthogonal to each other and having a continuous output electrode;
- a metallized phosphor screen mounted on the inside of a transparent output faceplate wherein said metallized phosphor screen is adjacent said second microchannel plate continuous output electrode and in proximity focus therewith;
- a first bias voltage means connected across said photocathode layer and said first microchannel plate continuous input electrode for accelerating photoelectrons emitted from said photocathode layer to said first microchannel-plate;
- a second bias voltage means connected across said second microchannel plate continuous output electrode and said metallized phosphor screen for providing proximity focus between said second microchannel plate and said metallized phosphor screen; and
- an array switching electronic means for switching bias voltages in some selected scan mode over said first microchannel plate array of output electrode metallic stripes and said second microchannel plate array of input electrode metallic stripes for selectively providing accelerating voltages between crossover stripes that have forward bias voltages applied thereto wherein repressive bias voltages exist on all other cross-over stripes that have reverse bias voltages applied thereto whereby electrons multiplied in said first microchannel plate enter the channels of said second microchannel plate in a charge pattern determined by said scan mode whereby the electrons that exit said channels of said second microchannel plate are converted into visible energy on said metallized phosphor screen for producing a visible image of said video signal according to said scan mode.

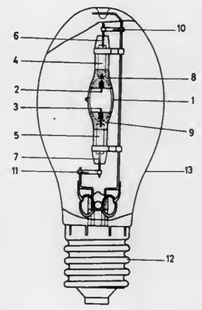
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**4,020,377**

## HIGH PRESSURE MERCURY VAPOR DISCHARGE LAMP

**Hanns-Peter Popp, Hattingen, and Walter Pilz, Wolfratshausen, both of Germany, assignors to Patent-Treuhand-Gesellschaft fur Elektrische Gluhlampen mbH, Munich, Germany**

**Filed Apr. 8, 1976, Ser. No. 674,856**
**Claims priority, application Germany, Apr. 30, 1975, 2519377**
**Int. Cl.² H01J** *61/068, 61/18, 61/33, 61/40*
**U.S. Cl. 313—112** **14 Claims**



1. A high pressure mercury vapor discharge lamp comprising
- a light-transmissive discharge vessel;
- spaced electrodes sealed into the discharge vessel;
- a filling in said discharge vessel comprising
  - mercury as the buffer gas,
  - an inert ignition gas,
  - at least one halide of at least one of the rare-earth metals selected from the group consisting of dysprosium, holmium, thulium, erbium, and terbium to effect excitation of molecular emission in the orange-red spectral region, and
  - thallium halide together with at least one halide of at least one metal selected from the group consisting of alkali and alkaline-earth metals to increase the vapor pressure of said rare-earth metal halides; and
- a filtering agent acting as a filter in the blue spectral region, whereby when said lamp is discharged by passing a current through said electrodes, the lamp has a color temperature less than 4,500 K, a luminous efficacy of more than 70 lm/W, and a color rendering $R_a$ greater than 70.

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**4,020,378**

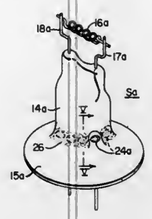
## INTEGRAL MERCURY-VAPOR PRESSURE REGULATING MEANS FOR FLUORESCENT LAMP

**Chalmers Morehead, Upper Montclair, N.J., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Continuation of Ser. No. 293,239, Sept. 28, 1972, abandoned. This application Jan. 26, 1976, Ser. No. 652,360**
**Int. Cl.² H01J** *61/20, 61/28, 61/35, 61/72*
**U.S. Cl. 313—174** **22 Claims**

19. In a low-pressure gaseous discharge lamp having a sealed light-transmitting envelope that contains mercury, the combination comprising;
- a member that constitutes an interior structural part of the lamp and has a surface portion that is indented and defines a recess which is accessible to mercury vapor produced within the envelope when the lamp is energized,
- an electrode supported within said envelope at a location remote from said member,
- a metal disposed within the recess in said member, said metal being of a type that combines with mercury and forms an amalgam, and
- means retaining said metal in the recess defined by said member.





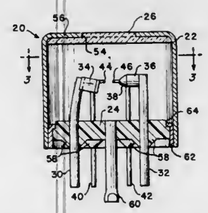
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**4,020,379**

## BULB-SHAPED FLASHTUBE WITH METAL ENVELOPE

**William L. Manning, Walpole, Mass., assignor to EG&G, Inc., Wellesley, Mass.**

**Filed Oct. 2, 1975, Ser. No. 618,852**
**Int. Cl.² E05C** *7/06*
**U.S. Cl. 313—220** **20 Claims**



9. A gaseous-discharge device, comprising:
- an insulating base;
- a plurality of conductors extending through said base;
- a plurality of electrodes mounted on said conductors in a spaced configuration;
- only one envelope sealed to said base to contain said electrodes, said envelope being made of metal and including a window opening; and
- a transparent window sealed to the inside of said envelope at and over said opening for transmitting light therethrough upon an electrical discharge between the electrodes.

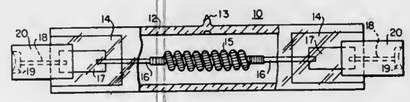
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**4,020,380**

## REGENERATIVE-CYCLE INCANDESCENT LAMP CONTAINING $HgBr_2$ ADDITIVE

**Avinash D. Kulkarni, Montclair, and Ralph E. Newton, Dover, both of N.J., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Continuation-in-part of Ser. No. 565,502, April 7, 1975, abandoned. This application Feb. 4, 1976, Ser. No. 655,306**
**Int. Cl.² H01K** *1/50*
**U.S. Cl. 313—222** **10 Claims**



1. A regenerative-cycle incandescent lamp which is adapted to be operated at a selected voltage and has predetermined design life and efficiency ratings when operated at said voltage, said lamp comprising;
- a sealed envelope of radiation-transmitting material that contains a filament which is composed essentially of tungsten,
- conductor means extending through said envelope and connected to said filament,
- an inert fill gas within said envelope, and
- means in said envelope for establishing and sustaining a bromine-tungsten cycle within the lamp during the operation thereof which inhibits discoloration of the envelope and enhances the useful life of the lamp, said means comprises a quantity of $HgBr_2$ in the range of from about 0.13 to about 0.46 micromole per milliliter of envelope volume which serves as a source of $Br_2$ within the lamp when the filament is energized and the $HgBr_2$ is subjected to the heat and radiant energy generated by the incandescent filament, the amount of $HgBr_2$ initially present within said envelope and the quantity of $Br_2$ provided thereby during lamp operation being correlated with the design life and efficiency ratings of said lamp in a manner such that the initial $HgBr_2$ content and resultant $Br_2$ content both increase as the efficiency rating increases and the design life rating decreases.

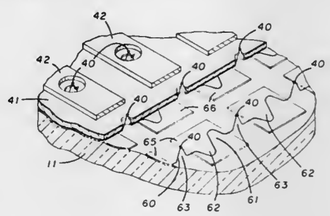
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**4,020,381**

## CATHODE STRUCTURE FOR A MULTIBEAM CATHODE RAY TUBE

**Frederick G. Oess, and Michael Peshock, Jr., both of Richardson, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.**

**Division of Ser. No. 530,624, Dec. 9, 1974, Pat. No. 3,935,500. This application Jan. 15, 1976, Ser. No. 649,288**
**Int. Cl.² H01J** *1/46, 21/10*
**U.S. Cl. 313—302** **7 Claims**



1. A cathode structure for a multibeam cathode ray tube comprising:
- a. an elongated conductor having a peaked riser flanked on each side by deviated portions lying in a common plane perpendicular to the plane of said riser,
- b. structure at the peak of said riser for enhancing electron emission therefrom upon current flow through said conductor, and
- c. planar monolithic conductive structure contacting said deviated portions on said elongated conductor that forms paths for current flow to and from said risers.

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**4,020,382**

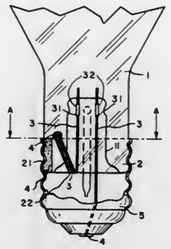
## LAMP HAVING SCREW BASE

**Barry Bolt, Howell, and Petrus Peters, Cranbury, both of N.J., assignors to North American Philips Corporation, New York, N.Y.**

**Filed Dec. 19, 1975, Ser. No. 642,388**
**Int. Cl.² H01J** *5/48, 5/50*
**U.S. Cl. 313—318** **2 Claims**

1. A lamp including a glass bulb having a stem press with sealed-in lead wires, a glass screw base portion and a metal screw shell screwed on the base portion, comprising in said

base portion, a first channel extending across the glass threads, said first channel being relatively deep and broad to receive a sufficient amount of solder filling for mechanical



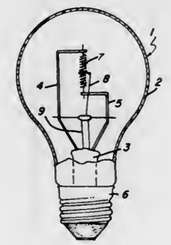
locking of the screw shell, a second channel extending across the glass threads and accomodating one lead wire so that the wire tightly fits into it, and an electrical contact provided by soldering the end of said one lead wire to the rim of said shell.

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**4,020,383**
**METHOD OF PULSING INCANDESCENT LAMP FILAMENTS**

**William M. Labadini, Salisbury; Edmund M. Passmore, Wilmington, and Warren A. Anderson, Danvers, all of Mass., assignors to GTE Sylvania Incorporated, Danvers, Mass.**

**Filed Dec. 31, 1975, Ser. No. 645,485**
**Int. Cl.² H01J** *1/16, 19/06*
**U.S. Cl. 313—344** **4 Claims**



1. In an incandescent lamp of the type having a coiled tungsten wire recrystallized filament mounted on lead-in support wires within a glass envelope and having high electrical contact resistance between the filament and the lead-in support wire, the process of reducing electrical contact resistance between the filament and the lead-in support wires by applying a pulse of electrical energy to the recrystallized filament.

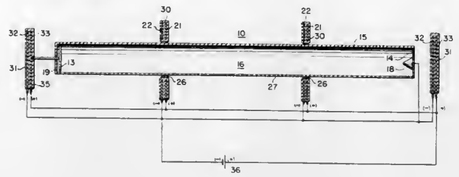
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**4,020,384**
**LINEAR PARTICLE ACCELERATOR**

**John A. Richards, S. Hamilton, Mass., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest**

**Filed Aug. 25, 1975, Ser. No. 607,318**
**Int. Cl.² H05H** *9/00;* **H01J** *23/00, 29/00*
**U.S. Cl. 313—359** **2 Claims**

1. A linear particle accelerator which impells a stream of charged particles against a target comprising
   a sealed evacuated tube of dielectric material,
   a particle source mounted in a first end of the tube and a target mounted in the second end of the tube, and
   a drive unit mounted externally about said tube located between the tube ends, said drive unit consisting of a pair of pierced metal disks, each mounted back-to-back in a plane generally perpendicular to the axis of the tube, with both disks insulated from each other in a common insulated housing, in which the particle source and the target are connected to opposed polarities of an electrical voltage source, with the two disks of the drive unit each connected to opposed polarities of an electrical voltage source, with



the disk of the drive unit that is located nearer the particle source connected to a voltage source of opposed polarity to that of the particle source, and with the other disk of the drive unit connected to a voltage source of similar polarity to that of the particle source.

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**4,020,385**
**FLUORESCENT LAMP HAVING CONDUCTIVE FILM AND PROTECTIVE FILM THEREFOR**

**Costas C. Lagos, Danvers, Mass., assignor to GTE Sylvania Incorporated, Danvers, Mass.**

**Filed Aug. 9, 1976, Ser. No. 713,088**
**Int. Cl.² H01J** *61/35, 61/44*
**U.S. Cl. 313—489** **2 Claims**

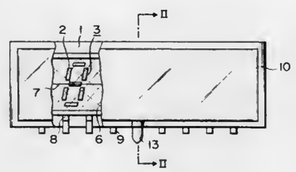
1. In a fluorescent lamp having a glass envelope, electrodes at each end thereof, a fill of starting gas and low pressure mercury vapor, and a transparent electroconductive tin oxide film on the inner surface of the envelope with a phosphor coating thereover, the improvement which comprises a protective film of magnesium fluoride-titanium dioxide directly on the tin oxide film.

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**4,020,386**
**FLAT TYPE DISPLAY TUBE**

**Osamu Yasutome, Taishi; Mitsuo Takeda, Tokyo; Tagayasu Sawamura, Himeji, and Norio Shinoda, Taishi, all of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan**

**Filed Dec. 24, 1975, Ser. No. 644,036**
**Claims priority, application Japan, Dec. 25, 1974, 49-156715[U]**
**Int. Cl.² H01J** *1/62*
**U.S. Cl. 313—496** **10 Claims**





1. A flat-type display tube comprising an insulating substrate, a fluorescent display section consisting of a plurality of anode segments arranged in a predetermined pattern on the insulating substrate, a cathode disposed in a spaced apart relation to the display section, a box-like cover means hermetically sealed to the substrate in a manner to enclose the display section and the cathode, an exhaust tube mounted at the side wall of the cover means to communicate at one end with the interior of the cover means and extending outward in a manner to have the other end sealed, and a plurality of connecting means extending outward in the same direction of the exhaust tube and at least one or two of which are bent downward partway in a position short of the sealed free end of the exhaust tube, said connecting means having one end electrically connected to an external drive circuit and the other end electrically connected within the cover means to the display unit and cathode.

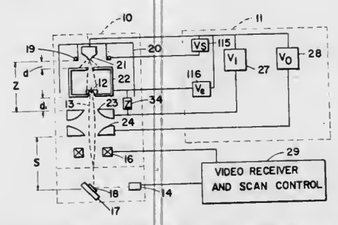


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**4,020,387**
**FIELD EMISSION ELECTRON GUN**

**Vincent J. Coates, Los Altos, and Leonard M. Welter, Saratoga, both of Calif., assignors to American Optical Corporation, Southbridge, Mass.**

**Continuation of Ser. No. 225,970, Feb. 14, 1972, abandoned, which is a continuation-in-part of Ser. No. 46,425, June 15, 1970, Pat. No. 3,678,333. This application Jan. 2, 1975, Ser. No. 537,996**
**Int. Cl.² H01J** *29/56, 37/285*
**U.S. Cl. 315—31 R** **12 Claims**




1. A self-focusing field emission gun for use with a scanning charged particle microprobe systen comprising:
   a housing defining a vacuum chamber;
   a field emission tip disposed in said chamber for generating charged particles;
   electrode means for establishing focusing and accelerating fields, for forming an accelerated and focused beam of said charged particle;
   a separate field electrode disposed intermediate said tip and said focusing and accelerating electrode means, and in juxtaposition to said field emission tip for developing an electric field for generating said charged particles, said field electrode being positioned at a distance from said field emission tip selected to effect a predetermined focal distance and beam intensity;
   voltage means connected to said electrode means, field electrode and field emission tip for supplying electrical potential to establish said focusing and accelerating and said particle generation fields.

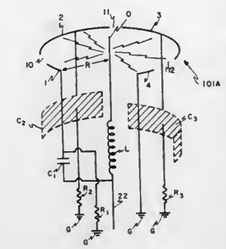
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**4,020,388**
**DISCHARGE DEVICE**

**George W. Pratt, Jr., Wayland, Mass., assignor to Massachusetts Institute of Technology, Cambridge, Mass.**

**Filed Sept. 23, 1974, Ser. No. 508,381**
**Int. Cl.² H01T** *13/20*
**U.S. Cl. 315—58** **18 Claims**

2. A spark plug for igniting a fuel-air mixture, that comprises, corona electrode means for charging fuel droplets in the fuel-air mixture, collecting and sparking electrode means for concentrating the fuel droplets in a collecting mode and for igniting the fuel droplets in a fuel ignition mode, the geometry of the collecting and sparking electrode means being such



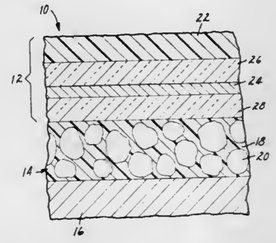
that an enriched region of fuel-air mixture is provided that is extended in space and provides a large ignition zone.

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**4,020,389**
**ELECTRODE CONSTRUCTION FOR FLEXIBLE ELECTROLUMINESCENT LAMP**

**Arthur D. Dickson, St. Paul, and Laurie E. Pruitt, West St. Paul, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

**Filed Apr. 5, 1976, Ser. No. 673,680**
**Int. Cl.² H05B** *33/02;* **H01J** *9/02*
**U.S. Cl. 315—246** **7 Claims**

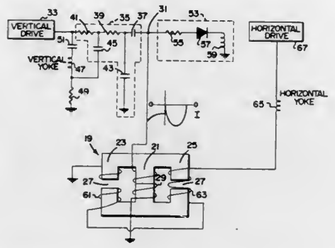


1. A flexible electroluminescent lamp comprising a light transmitting flexible resin body member having opposing faces and a finely divided electroluminescent phosphor embedded therein and electrically conducting electrode layers, one of which is at least substantially transparent, affixed to the opposing faces of the body member, the improvement wherein said substantially transparent electrode layer comprises a transparent polymeric substrate having on a surface thereof a three layer sandwich of a layer of a thin-film of a metal selected from the group including gold, silver, and copper between layers of thin-film dielectric materials generally exhibiting an index of refraction in excess of two, the outer dielectric layer being positioned adjacent the body member, wherein the metal layer has resistivity of less than 30 ohms/square and a thickness in the range between 70 and 180 A, and each of the layers of the thin-film dielectric material have a thickness in the range between 400 and 600 A., wherein the transmissivity of said transparent electrode layer to radiation to be emitted by the phosphor is not less than 70% and wherein the reflectance of said transparent electrode layer to visible radiation is less than 15%, whereby the transparent electrode layer enables the light source to operate at frequencies in excess of 400 Hz while maintaining substantially uniform brightness over the entire transparent electrode layer.

## 4,020,390
## SIDE PIN-CUSHION DISTORTION CORRECTION CIRCUIT

**Rudolph Francis Keinath, LeRoy, and David Eugene Manners, Alexander, both of N.Y., assignors to GTE Sylvania Incorporated, Stamford, Conn.**

**Filed Sept. 29, 1975, Ser. No. 617,984**
**Int. Cl.² H01J** *29/56*
**U.S. Cl. 315—371** **7 Claims**




1. In a television receiver having a cathode ray tube with a deflection angle of at least 90°, a DC potential source, horizontal and vertical deflection signal sources, and horizontal and vertical deflection yoke windings associated with the cathode ray tube and coupled to the horizontal and vertical deflection signal sources, a side pin-cushion distortion correction circuit comprising:

a saturable reactor having a two-window core with a solid center leg member and a pair of outer leg members, each of said outer leg members having an air-gap therein to provide a reluctance to flux flow in said outer leg members twice as great as the reluctance to flux flow in said solid center leg member and one of said outer leg members;

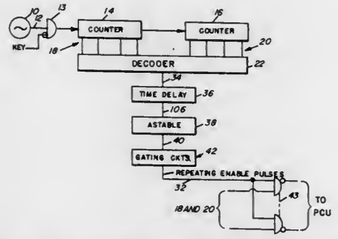
a control winding disposed on said center leg member and coupled to said vertical deflection signal source and to said DC potential source; and

an impedance winding equally disposed on each of said pair of outer leg members and coupled to said horizontal deflection yoke winding and to a potential reference level for providing a substantially parabolic-shaped correction of pin-cushion distortion at said cathode ray tube.

## 4,020,391
## CRT CURSOR SCAN CONTROL CIRCUITS

**William D. Baxter, Seymour, Conn., assignor to Bunker Ramo Corporation, Oak Brook, Ill.**

**Filed Sept. 12, 1975, Ser. No. 612,892**
**Int. Cl.² G01R** *13/30*
**U.S. Cl. 315—377** **10 Claims**




1. A scan control circuit for a CRT cursor comprising:

at least one cursor scan control key positioned in a keyboard;

means connected to the key for producing a unique coded signal in response to depression of the respective key;

first decoding means connected to the output of the signal producing means for decoding the coded signal;

means connected to the output of the first decoding means for detecting the occurrence of the coded signal for a preselected time interval indicative of prolonged cursor scan control key depression;

means connected to the output of the detecting means for generating repeating enable pulse signals during prolonged cursor scan control key depression;

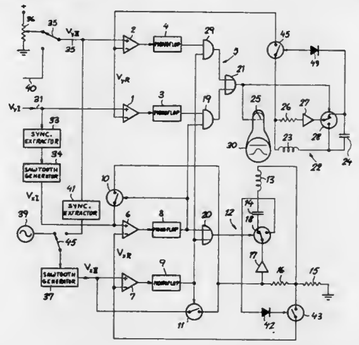
first gating means having first inputs thereof connected to the output of the generating means, second inputs thereof connected to the output of the coded signal producing means, the first gating means producing repeating coded signals at the output thereof, in response to coincidence of signals at the first and second inputs; and

means for connecting the output of the first gating means to a programmable control unit.

## 4,020,392
## METHOD OF AND SYSTEM FOR VISUALLY DISPLAYING SEVERAL PERIODICALLY REPRODUCIBLE INPUT SIGNALS

**Peter Harzer, Eningen u.A., and Hans Funk, Reutlingen, both of Germany, assignors to Wandel u. Goltermann, Reutlingen, Germany**

**Filed June 24, 1976, Ser. No. 699,258**
**Claims priority, application Germany, June 25, 1975, 2528235**
**Int. Cl.² H01J** *29/52*
**U.S. Cl. 315—386** **10 Claims**



1. A method of simultaneously displaying a plurality of periodically reproducible input signals on an oscilloscope screen with the aid of a single electron beam, at least one of said input signals recurring at a predetermined repetition frequency, comprising the steps of:

generating a first and a second periodic raster signal for respectively deflecting said beam in an *x* direction and in a *y* direction orthogonal to said *x* direction, at frequencies substantially higher than the highest repetition frequency of the input signals to be displayed;

generating a plurality of ramp signals, one for each of said input signals, with periodicities corresponding to periods of reproducibility of the associated input signals;

continuously comparing said first raster signal with all said ramp signals;

upon detecting a coincidence between said first raster signal and any one of said ramp signals, temporarily reducing the rate of change of the beam deflection in said *x* direction to a value not greater than the slope of said one of said ramp signals and maintaining said value for an interval equaling at least one cycle of said second raster signal;

comparing, during said interval, said second raster signal with the input signal associated with said one of said ramp signals and, on detecting a coincidence therebetween, substantially halting the deflection of the beam in said *y* direction for the remainder of said interval; and

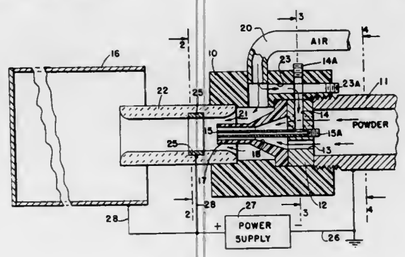
maintaining said beam suppressed except during said remainder of said interval.



## 4,020,393
## ELECTROGASDYNAMIC COATING DEVICE HAVING COMPOSITE NON-CONDUCTIVE FLOW CHANNEL, AND HOLLOW IONIZATION ELECTRODE FOR AN AIR JET

**Donald H. Porter, Carlstadt, N.J., assignor to Estey Dynamics Corporation, Red Bank, N.J.**

**Filed July 16, 1975, Ser. No. 596,465**
**Int. Cl.² B05B** *5/00*
**U.S. Cl. 361—227** **18 Claims**




1. An electrogasdynamic system for applying a coating to an article comprising:

a. a non-conductive conduit for conveying a stream of particles from a reservoir and for directing the particles toward the article to be coated;

b. a conductive needle axially positioned within said conduit for forming a corona discharge to ionize the particles passing through the adjoining space;

c. an electrode adjacent to the needle for forming an electric field between the electrode and the needle;

d. a source of potential connected between the electrode and the needle for creating a corona discharge;

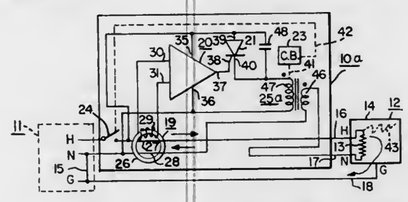
e. an axial flow channel for forming a non-conductive boundary for the ionized particles as they move toward an article to be coated; and

f. an insert of tetrafluoroethylene which is positioned within said flow channel adjacent to said electrode for assuming an electric charge and thereby repulsing the ionized particles.

## 4,020,394
## GROUND FAULT DETECTOR

**Jerome Potash, Flemington, N.J., assignor to OPT Industries, Inc., Phillipsburg, N.J.**

**Filed May 20, 1976, Ser. No. 688,123**
**Int. Cl.² H02H** *3/28*
**U.S. Cl. 361—45** **10 Claims**




1. A ground fault detector for connection between an electrical power source and a load, said source and said load each having a ground connection, a neutral terminal, and at least one other terminal, said detector comprising:

circuit interrupting means comprising a solenoid device having a primary actuating winding and at least one secondary winding;

a differential transformer having at least two primary windings and a secondary winding, said transformer developing a voltage across the secondary winding thereof corresponding to the difference between the currents flowing through the primary windings thereof;

amplifier means coupled between the secondary winding of said differential transformer and said circuit interrupting means for supplying an actuating voltage to the primary winding of said solenoid device when the voltage across said differential transformer secondary winding exceeds a predetermined value;

means for connecting one primary winding of said differential transformer and the secondary winding of said solenoid device in series between the neutral terminal of said power source and the neutral terminal of said load;

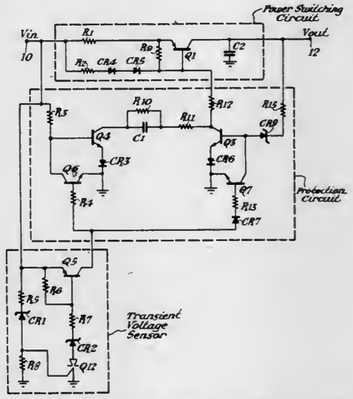
means for connecting another primary winding of said differential transformer between the other terminal of said power source and the other terminal of said load; and

means for supplying an exciting voltage to the primary actuating winding of said solenoid device, said exciting voltage being substantially less than the voltage across said primary actuating winding required to actuate said circuit interrupting means.

## 4,020,395
## TRANSIENT VOLTAGE PROTECTION CIRCUIT FOR A DC POWER SUPPLY

**John M. Erickson, Ocean, and Theodore Redgate, Brielle, both of N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Sept. 17, 1975, Ser. No. 614,272**
**Int. Cl.² H02H** *3/22*
**U.S. Cl. 361—59** **7 Claims**




1. A protective circuit for use with a DC power supply and a load which provides for rapid disconnection of the power supply and the load whenever transient overvoltages are impressed in the power supply circuit comprising:

input means connectable to the DC power supply output;

output supply voltage means connectable to a load;

gating means connected between said input means and said output means, said gating means having conductive and non-conductive states;

control means connected between said input and output means and to said gating means for switching said gating means from the conductive to the non-conductive state; and

transient voltage sensing means connected to said input means and to said control means, said transient voltage sensing means including switching means connected between said input and control means for causing said con-

trol means to switch said gating means to said non-conductive state whenever a transient voltage over a predetermined threshold is sensed whereby the non-conductive state of said gating means disconnects the power supply from the load, and for causing said control means to switch said gating means to said conductive state upon sensing a transient voltage less than said threshold to reconnect the power supply to the load, and further including first means for sensing said transient voltage over said threshold and second means for sensing said transient voltage less than said threshold.

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**4,020,396**

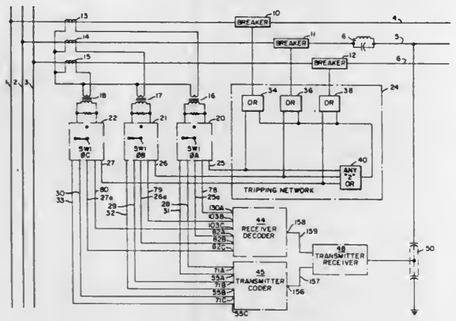
## TIME DIVISION MULTIPLEX SYSTEM FOR A SEGREGATED PHASE COMPARISON RELAY SYSTEM

**John C. Gambale, Livingston, and Roger E. Ray, Parsippany, both of N.J., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Continuation of Ser. No. 548,132, Feb. 7, 1975, abandoned. This application Mar. 10, 1976, Ser. No. 665,650**

**Int. Cl.² H02H** *7/26*

**U.S. Cl. 361—64** **32 Claims**




1. A protective relaying aparatus of the type in which at least two separate line operating conditions which exist at one end of a protected power line section are communicated to the other end of the protected power line section over a single communication channel, said apparatus comprising, a transmitter located at a said one end, a first means associated with said line section at said one end and including a pair of line operating condition sensors arranged to sense a first pair of line operating conditions at said one end, said first means being effective to provide a normal output signal when the line operating condition is normal, each of said sensors being effective to provide a fault output signal when the line operating condition with which it is associated is faulted, a first clock actuated divice providing a first series of repeating periodic clocking signals, a transmitter modulating means interconnecting said clocking device and said transmitter and said sensing means, said modulating means being effective when receiving said normal signals from said first means to time-code said signals into a repeating time-coded normal word, said normal word comprising a plurality of serially arranged data bits, said modulating means being effective when a said fault signal is being received to terminate the time-coding of said normal word and to time-code fault words, each said fault word comprising a plurality of serially arranged data bits, the character of said data bits of said fault word being determined by scanning said output signals of said sensing means in a predetermined sequence, a receiver located at said other end and adapted to receive said words from said transmitter as a series of data bits, a second clocking device associated with said receiver and providing a second series of periodic clocking signals which have substantially the same time periods as the time periods of said first series, a first demodulating network connected to said receiver and to said second clocking device, said demodulating network having first and second output circuits, said demodulating network having a storage device having a predetermined number of output circuits, said storage device being effective when said receiver is sequentially receiving said data bits of said normal word to store said predetermined number of said received data bits in parallel form at its said output circuits, said predetermined number being at least the number of bits in said normal word, said demodulating network being effective each time said normal word is stored in said storage device to provide a synchronizing signal at its said first output circuit, a resetting counting means connected to said second clocking device and having a plurality of sequentially actuated output circuits, said counting means having a resetting input which when actuated resets said counting means to an initial condition in which a predetermined one of its said output circuits is actuated, means interconnecting said first output circuit of said demodulating network to the said resetting input of said counting means whereby said synchronizing pulses are effective to actuate said resetting input of said counting means whereby said counting means is reset by said demodulating network to maintain a desired relationship between the actuation of said output circuits of said counting means and said data bits as received by said receiver by said receiver being effective upon the reception of a said fault word by said receiver to sequentially scan the data bits of said received fault word in a sequence determined by the sequential actuation of said output circuits of said resetting counting means.

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**4,020,397**

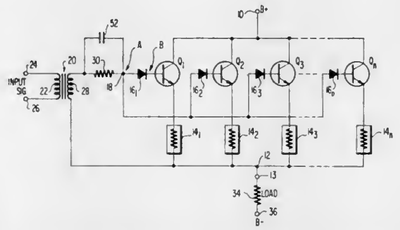
## PARALLEL TRANSISTOR PROTECTION CIRCUIT

**Robert H. Fasulkey, Fairfax, Va., and Vaughn L. Quidort, Lochearn, Md., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed Sept. 25, 1974, Ser. No. 509,175**

**Int. Cl.² H02H** *7/20*

**U.S. Cl. 361—24** **7 Claims**




1. A circuit arrangement for protecting the remainder of a plurality of semiconductor devices operated as a composite group in the event of any one of said devices fails in a shorted condition, comprising in combination;

input means having a common circuit node, adapted to receive an input signal;

a plurality of semiconductor signal translation devices each having at least one control terminal and first and second power terminals;

a respectively relatively slow operating protection diode coupled in series between the control terminal of each of said plurality of devices and said common circuit node of said input means, each said diode being poled to block supply potentials from said circuit node in the event of failure occurring in the respective device, and having a turn-off time greater than the period of the input signal in order to be turned on continuously during normal operation upon application of said input signal; however, said turn-off time being substantially faster than an electrical fuse device and thus preventing any prolonged application of said supply potential to the control terminals of the remainder of said devices;



means commonly coupling said first power terminal of said plurality of devices to a power source;

a load circuit; and

means coupled in series between each second terminal of said plurality of devices and said load circuit, said circuit means having a predetermined resistive impedance value for effecting current balance between said plurality of devices during normal operation and becoming operable after a predetermined time greater than the turn-off time of said diode to electrically remove the respective device from said circuit arrangement upon failure of said device.

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**4,020,398**

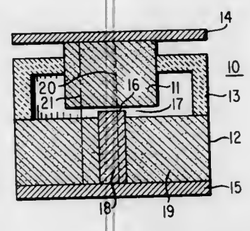
## VOLTAGE SURGE PROTECTOR

**Lee Graves McKnight, Convent Station, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed Dec. 29, 1975, Ser. No. 645,088**

**Int. Cl.² H02H** *9/06*

**U.S. Cl. 361—60** **11 Claims**




1. An overvoltage surge protector comprising a first electrode, a second electrode and a housing including means for maintaining the first electrode and the second electrode in spaced relationship to one another and electrically insulated from one another, the said electrodes each possessing a broad face and an external contact area, the broad face of said electrodes defining a gap therebetween, the gap so defined including at least a narrow portion and a contiguous wider portion CHARACTERIZED IN THAT at least one of the electrodes possesses a higher electrical resistance from the external contact area to the narrow portion of the gap than its electrical resistance from the external contact area to the wider portion of the gap; wherein the difference between the electrical resistance from the external contact area to the narrow portion of the gap and the electrical resistance from the external contact area to the wider portion of the gap is from one Ohm to $10^3$ Ohms.

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**4,020,399**

## VAPOR COOLING DEVICE FOR DISSIPATING HEAT OF SEMICONDUCTOR ELEMENTS

**Toshio Suzuki, and Yoshiro Shikano, both of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

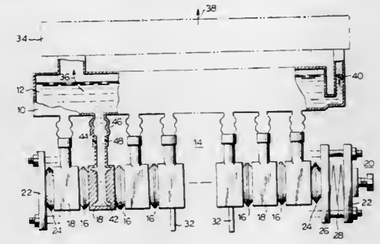
**Filed Mar. 12, 1975, Ser. No. 557,892**

**Claims priority, application Japan, Mar. 15, 1974, 49-30410**

**Int. Cl.² H01L** *23/34*

**U.S. Cl. 361—331** **6 Claims**

1. A vapor cooling device for cooling heat generator means, comprising, in combination, a coolant reservoir having a condensible coolant in the form of a liquid phase therein, at least one heat generation element disposed below said coolant reservoir, at least two heat dissipation blocks abutting against opposite sides of said heat generation element, each of said heat dissipation blocks including a hollow space therein, a fastening mechanism connecting said at least two heat dissipation blocks together into a unitary structure, a plurality of connection tubes, one for each heat dissipation block and connecting said hollow space in each of said heat dissipation blocks to said coolant reservoir, said condensible coolant in its liquid phase filling said connection tubes and said hollow spaces in said heat dissipation blocks, and condenser means disposed in fluid communication relationship with said reservoir above said coolant whereby when said heat generation element generates heat sufficient to boil these portions of said



liquid coolant disposed in said hollow spaces in the adjacent heat dissipation blocks into its vapor phase, said coolant in the form of its vapor phase enter said condenser means through said connection tubes and said coolant reservoir and is condensed into its liquid phase, said condensed coolant being returned to said coolant reservoir.

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**4,020,400**

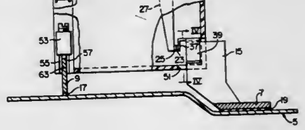
## INTEGRATED CIRCUIT BREAKER PANELBOARD

**George F. Hawkes, Jr., LaPalma, Calif., and Willis A. Speck, Trumbull, Conn., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Continuation of Ser. No. 488,605, July 12, 1974, abandoned. This application Sept. 30, 1975, Ser. No. 618,099**

**Int. Cl.² H02B** *1/04*

**U.S. Cl. 361—353** **2 Claims**



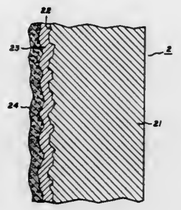
1. An integrated panelboard and circuit breaker system for connection to load conductors comprising a panelboard and at least one circuit breaker, the circuit breaker comprising a neutral terminal clip, a load conductor having a load terminal and a line terminal clip, the load conductor being releasably connected to the line terminal, the circuit breaker also comprising a housing including a bottom edge wall and opposite end walls, the bottom edge wall and one end wall forming a first housing corner and having a first opening extending through the corner portions of the bottom edge and end walls, the bottom edge wall and the other end wall also forming a second housing corner and having a second opening extending through the corner portions of the bottom edge wall and other end wall; the panelboard comprising a line bus bar and a neutral bus bar, each line and neutral bus bar having spaced stab terminals, the stab terminals being planar and disposed in a plane normal to the longitudinal axis of the bus bars, the line and neutral terminal clips being located within the housing and aligned with the corresponding openings and being detachably connected to one stab terminal of the line bus bar and to one stab terminal of the neutral bus bar, said stab terminals extending into the openings of the housing, and the

detachable connections between the stab terminals and the clips comprising the only mounting means of the circuit breaker on the panelboard.

## 4,020,401
## ELECTROLYTIC CAPACITOR HAVING A SILVER PLATED NICKEL CASE

**Henry T. Cannon, Newberry, and Charlie Edwin Taylor, Gilbert, both of S.C., assignors to General Electric Company, Hudson Falls, N.Y.**

**Filed Dec. 19, 1975, Ser. No. 642,375**
**Int. Cl.² H01G 9/00; B01J 17/00; H01G 9/16; H01J 5/00**
**U.S. Cl. 361—433** **10 Claims**

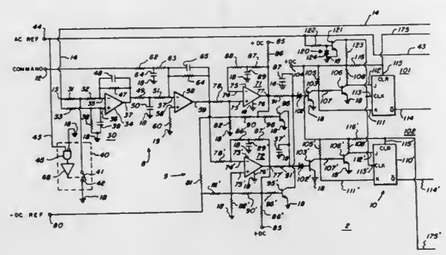



1. A cathode casing for an electrolytic capacitor, said casing comprising:
an outer generally cup-shaped nickel bearing casing member having at least one open end and having a contoured interior surface;
a layer of thin silver plating adhering to said interior surface, said plating substantially following the contour of said interior surface; and
a porous layer of particles of a platinum group metal overlying and bonded to said silver plating, the contour of said interior surface acting to enhance the adhesion of said particles to said silver plating.

## 4,020,402
## AC SWITCH SPEED CONTROL FOR TWO PHASE MOTORS

**John F. Storm, Minneapolis, Minn., assignor to Honeywell Inc., Minneapolis, Minn.**

**Filed Sept. 19, 1975, Ser. No. 615,159**
**Int. Cl.² H02P 5/40**
**U.S. Cl. 318—227** **10 Claims**

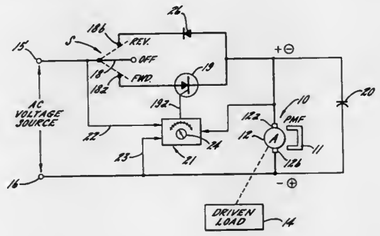


1. In a servomechanism system including condition altering apparatus energizable with current supplied by an alternating voltage source, means for producing a feedback signal indicative of operation of the apparatus, and input means for combining the feedback signal with a command signal indicative of desired operation of the apparatus to produce an error signal, improved circuitry for controlling the average energization current supplied to the apparatus, comprising:
pulse width modulation means connected to receive the error signal and operable to produce a first pulse train in which the ratio of pulse duration to pulse repetition interval varies in accordance with the error signal;
synchronization means connected to receive the first pulse train and operable to produce a second pulse train in which pulse duration and repetition interval are substantially equal to pulse duration and repetition interval in the first pulse train, and in which the leading and trailing edges of the pulses are variably delayed to occur in a fixed time relationship with instants of zero energization voltage; and
current control means connected to receive the second pulse train and operable to supply energization current to the condition altering apparatus only during pulses of the second pulse train, whereby the apparatus is supplied with periodic bursts of alternating energization current beginning and ending in a fixed time relationship with instants of zero energization voltage, the average value of energization current depending on the error signal.

## 4,020,403
## REVERSING CONTROL FOR DC. MOTORS OF THE PERMANENT MAGNET FIELD TYPE

**William A. Means, Rockford, Ill., assignor to Applied Motors, Inc., Rockford, Ill.**

**Filed Jan. 10, 1975, Ser. No. 540,126**
**Int. Cl.² H02P 7/08**
**U.S. Cl. 318—257** **2 Claims**




1. In a reversing control system for operating a dc. motor from an ac. supply, the combination comprising
a. a single pole, double throw switch,
b. means including a controlled half-wave rectifier establishing a first circuit from the ac. supply through the motor armature via said switch when the latter is in a first position,
c. means including a diode half-wave rectifier establishing a second circuit from the ac. supply through the motor armature via said switch when the latter is in a second position, said diode being oppositely poled in relation to said controlled rectifier, and
d. means for applying an adjustable control signal to said controlled rectifier to vary the angle of conduction thereby during forward half waves,
whereby said motor runs at an adjustable speed in one direction when said switch is in its first position but runs at a high speed in the opposite direction when said switch is in its second position.

## 4,020,404
## SYSTEM FOR CONTROLLING MOTOR SPEED

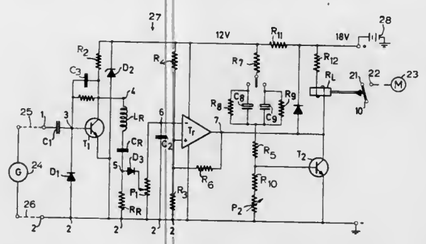
**Richard Wilke, Am Weissenfeld 4, 583 Schwelm, and Helmut Korthaus, Fernblick 3, 56 Wuppertal-Barmen, both of Germany**

**Filed Apr. 23, 1975, Ser. No. 570,583**
**Claims priority, application Germany, Apr. 24, 1974, 2419744**
**Int. Cl.² H02P 5/06**
**U.S. Cl. 318—318** **7 Claims**

1. An apparatus for controlling the rotation speed of a shaft driven by a motor, said apparatus comprising:
a nonmagnetic disk carried on said shaft and having an outer periphery;



a regularly undulated ferromagnetic ring carried on said outer periphery and forming a plurality of magnetically detectable and angularly equispaced regions thereon;
a detector head fixed adjacent said ring and having a magnetic coil, whereby rotation of said shaft displaces said regions past said head and causes said coil to generate a generally sinusoidal signal having a frequency corresponding to the rotation speed of said shaft;
means connected to said head and including a diode for clipping said sinusoidal signal and thereby forming a succession of pulses of like amplitude;
amplifier means connected to the clipping means and including a transistor, a zener diode connected across said transistor, and a capacitor connected between said transistor and said coil increasing the amplitude of said succession of pulses;

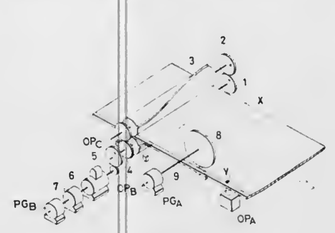



filter means including a resonant circuit connected to said amplifier means and receiving the amplified clipped pulses for producing a sinusoidal output only when the frequency of said amplified clipped pulses lies within a predetermined range;
detector means including a capacitor and a diode connected to said filter means for converting said sinusoidal output into a direct-current voltage signal; and
switch means connected between said detector means and said motor operable by said voltage signal when same exceeds a predetermined threshold value to alter the rotation speed of said motor, said switch means including a Schmitt trigger and a relay connected thereto.

## 4,020,405
## PIPE-CUTTING AND/OR WELDING MACHINE WITH CLAMPING MOTOR TORQUE LIMITING CONTROL

**Günter Schumann, Ober Roden, Messenhausen, and Werner Becker, Liederbach, both of Germany, assignors to Messer Griesheim GmbH, Frankfurt am Main, Germany**

**Filed May 1, 1975, Ser. No. 573,753**
**Claims priority, application Germany, May 25, 1975, 2425349**
**Int. Cl.² B23K 37/04; H02P 7/00**
**U.S. Cl. 318—432** **4 Claims**

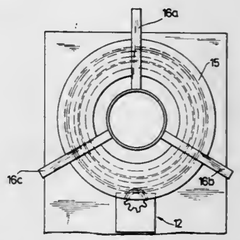



1. In a machine for pipe-cutting or welding and the like including a pipe-turning device having a chuck with pipe engaging jaws operated by an actuating device for moving the jaws into and out of engagement with the pipe, the improvement being said activating device having torque limiting means, said torque limiting means including adjusting means for selectively switching to a low torque value for causing said jaws to clamp the pipe and to a high torque value for causing said jaws to be released from the pipe.

## 4,020,406
## WEB CUTTING CONTROL SYSTEM

**Masateru Tokuno, Nishinomiya; Masayuki Matsuura, Yokohama; Noboru Shinmura, Yokohama, and Masayoshi Kaneko, Yokohama, all of Japan, assignors to Rengo Kabushiki Kaisha and Nippon Riraiansu Kabushiki Kaisha, both of, Japan**

**Filed May 29, 1975, Ser. No. 582,406**
**Claims priority, application Japan, June 7, 1974, 49-65416; Aug. 16, 1974, 49-95260**
**Int. Cl.² G05B 19/26; B26D 5/20, 5/40**
**U.S. Cl. 318—600** **1 Claim**




1. A control system for cutting a web fed at a constant speed by means of a rotary cutter driven by a motor selectively either into predetermined lengths or at fixed positions thereof, said control system comprising in combination:
a. first transducer for generating pulses, the number thereof being proportional to the length of the web which has been fed;
b. a second transducer for generating pulses, the number thereof being proportional to the angle through which said rotary cutter has rotated;
c. a first setting means for setting reference pulses, the number thereof being predetermined by a fixed rotating angle of said rotary cutter;
d. a first sensor for detecting the marks put beforehand on the web to give a mark detection signal;
e. a second sensor for detecting completion of each cutting operation to give a cutting completion detection signal;
f. a third sensor for giving a mark distance discriminating signal for discrimination whether the detection of the next mark occurs before or after the completion of cutting on the last mark;
g. a second setting means for digitally setting selectively either a desired cutting length or the distance between the mark detection point and the cutting completion detection point;
h. a first reversible counting means responsive to a detection signal from said first sensor for counting any difference between the value preset on said first setting means and the value preset on said second setting means;
i. an addition/subtraction discriminating means for comparing the value from said first setting means with the value from said second setting means to couple said difference between said two values to said first reversible counting means as a signal to be added or a signal to be subtracted according to the result of comparison;
j. said first reversible counting means receiving the pulses from said first transducer as a signal to be subtracted and the pulses from said second transducer as a signal to be added as well as the difference between said two values and performing reversible counting thereof;
k. a differentiating means for obtaining any difference be-

tween the result of said reversible counting by said first reversible counting means and a voltage proportional to the web feed speed;

l. a motor speed control means for discriminating the polarity of the output voltage from said differentiating means and controlling the speed of the motor for driving the rotary cutter according to the polarity and quantity of said output voltage; and

m. a second reversible counting means for subtracting from the preset value on said first sensing means a value corresponding to the length of the web which has been fed from the instant of detection by said first sensor to the instant of detection by said second sensor, in case the mark detection signal from said first sensor arrives inn advance of the cutting completion detection signal from said second sensor after the mark distance discriminating signal has come from said third sensor.

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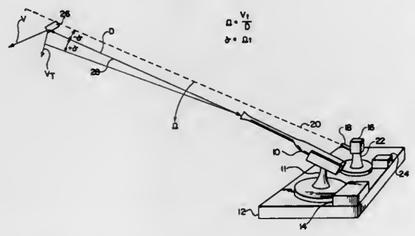
## 4,020,407
## CONTROL SYSTEM FOR TRACKING A MOVING TARGET

**Gilbert L. Clement, Seneac, and Rene F. Buttman, Soues, both of France, assignors to Etat Francais, France**

**Continuation-in-part of Ser. No. 337,572, March 2, 1973, Pat. No. 3,840,794. This application Apr. 15, 1974, Ser. No. 460,997**

**Int. Cl.² G05B *19/29***

**U.S. Cl. 318—632** **7 Claims**



1. Sighting and aiming control apparatus for automatically positioning a system for tracking a moving object, the tracking system including a support, an aiming section rotatably mounted on the support, and a sighting section, having a movable sighting axis, said sighting section being rigidly mounted on and rotated with said aiming section, said sighting and aiming control apparatus comprising a digital electronic means for determing an aiming angle and an aiming angle correction including a frequency generator for producing a pulse output corresponding to the relative angular position of the object; first means controlled by said digital electronic means for positioning the aiming section to the aiming angle determined by said digital electronic means and for varying the position of the aiming section by the aiming angle correction relative to said aiming angle in the direction of the target motion; second means controlled by said digital electronic means for varying the position of the sighting axis of the sighting system by an angle equal to the aiming angle correction in a direction opposite to the direction of the target motion; third means for producing a pulse output corresponding to the angular position of the aiming section; fourth means for comparing the pulse output produced by said frequency generator and said third means and for producing a digital output corresponding to the comparison; fifth means for generating a digital output representative of the desired aiming angle correction; sixth means for comparing the outputs of said fourth means and said fifth means and for applying a signal corresponding to said comparison to said first means for the control thereof; and seventh means for applying said digital output of said fifth means to control said second means.

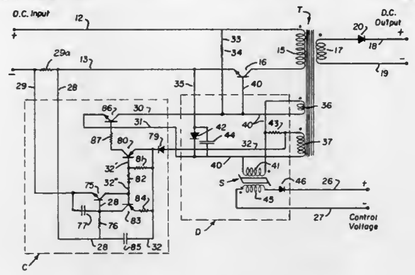
## 4,020,408
## PULSE WIDTH MODULATED DC-TO-DC POWER CONVERTER USING A SINGLE ENDED TRANSFORMER

**Jon H. Grant, Fullerton, Calif., assignor to Etatech, Inc., Placentia, Calif.**

**Filed Oct. 2, 1975, Ser. No. 618,738**

**Int. Cl.² H02P *13/22*; H02M *1/18***

**U.S. Cl. 321—2** **15 Claims**




1. In a DC-to-DC voltage converter having a single-ended transformer having a primary winding with intput leads extending from this primary winding to a DC power source and a secondary winding with output leads extending from this secondary winding to a DC output; a switching transistor in an input lead to switch the transformer on and off responsive to voltage changes at the base of the transistor; a rectifier means in an output lead to restrict the output of a DC voltage and a drive circuit connecting with the base of the switching transistor to produce a cyclic voltage at the transistor base whereby a positive square wave is obtained at the DC output, the improvement comprising:

a. a drive winding at the transformer to initiate voltages in opposite directions as the transformer turns on and off responsive to energy stored in the transformer core;

b. a regenerative winding at the transformer in the drive circuit lead between the aforementioned drive winding and the switching transistor base opposing the drive winding and having fewer turns than the drive winding whereby, when the transistor is "on" the voltage generated by the drive winding overwhelms the voltage generated by the regenerative winding to provide the "on" voltage at the switching transistor base; and

c. a control means including a shunt lead which shunts the drive winding, adapted to actuate in a cyclic manner to first close the shunt lead to drop the drive winding voltage to permit the voltage induced in the regenerative winding to turn "off" the switching transistor and thereafter open the shunt lead to turn "on" the switching transistor, producing the aforementioned positive square wave output.

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## 4,020,409
## RECTIFYING AND SMOOTHING CIRCUIT

**Yukinobu Ishigaki, Yamato, and Kohei Sasamura, Sagamihara, both of Japan, assignors to Victor Company of Japan, Limited, Japan**

**Filed Dec. 24, 1975, Ser. No. 644,169**

**Claims priority, application Japan, Dec. 27, 1974, 49-148934**

**Int. Cl.² H02M *1/14***

**U.S. Cl. 321—10** **4 Claims**

1. A rectifying and smoothing circuit comprising:

a first rectifier for rectifying an input signal voltage;

a first smoothing circuit for smoothing the output voltage of the first rectifier;

an attenuation circuit for attenuating the output voltage of the first smoothing circuit;

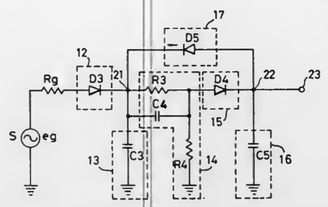
a second rectifier for rectifying voltage passing through the attenuation circuit;

a second smoothing circuit for smoothing the output voltage of the second rectifier; and



a feedback circuit for feeding back to the output voltage of the second smoothing circuit to the first smoothing circuit,

said second smoothing circuit, after being charged at a specific voltage, being held at said charging voltage until



the output voltage of the first smoothing circuit becomes less than the output voltage of the second smoothing circuit,

the output voltage of the second smoothing circuit being derived as the output of the rectifying and smoothing circuit.

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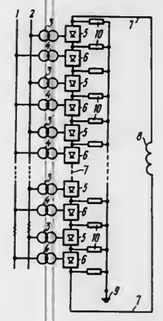
## 4,020,410
## RECTIFIER-INVERTER SYSTEM OF CONVERTER SUBSTATION

**Viktor Ivanovich Emelyanov, prospekt Engelsa, 40, kv. 40; Khaim Shlemovich Grois, Lesnoi prospekt, 15, kv. 38, and Dmitry Evgenievich Kadomsky, prospekt Nauki, 6/1, kv. 58, all of Leningrad, U.S.S.R.**

**Filed Nov. 25, 1975, Ser. No. 635,037**

**Int. Cl.² H02M *1/18***

**U.S. Cl. 321—11** **1 Claim**



1. A rectifier-inverter system of a converter substation for transmitting energy between a.c. networks operating at different frequencies, comprising one or more pairs of rectifier and inverter converters connected in series to a common d.c. circuit so that said rectifier and inverter converters integrate, the poles of at least one rectifier or inverted converter being connected to a protective grounding via resistor-capacitor elements.

## 4,020,411
## STATIC POWER CONVERTER CONTROLLING APPARATUS FOR REDUCING NOISE GENERATED BY PHASE SHIFT CONTROL

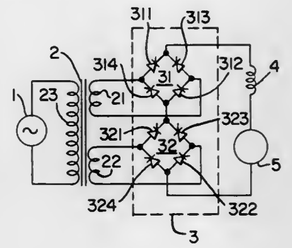
**Takashi Tsuboi, Katsuta; Kyozo Tachibana, Naka; Kaoru Tamura, Hitachi, and Fujimaro Imaizumi, Katsuta, all of Japan, assignors to Hitachi, Ltd., Japan**

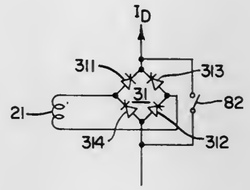
**Filed Feb. 21, 1975, Ser. No. 551,663**

**Claims priority, application Japan, Feb. 21, 1974, 49-20669**

**Int. Cl.² H02M *1/00***

**U.S. Cl. 321—27 R** **4 Claims**





1. In a static power converter comprising a transformer having a number of separate secondary coils, a converter assembly driven to its full output and consisting of a number of thyristor bridges for the bilateral conversion of A. C. power into D. C. power and vice versa, each of which is connected to one of these secondary coils and all of which are connected in series configuration on the D. C. side, the improvement comprising

a device for the phase shift control of the thyristor bridges in dependence on a control voltage, the level of this control voltage being detected by a level detector and a signal generated in accordance with said level by means of which the output D. C. voltage of one thyristor bridge is maintained at zero, whereas another thyristor bridge operates with phase shift control.

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## 4,020,412
## HIGH-EFFICIENCY TRANSFER OF MAGNETIC ENERGY

**Christian Rioux, Cachan, and Michel Legentil, Orsay, both of France, assignors to Agence Nationale de Valorisation de la Recherche (ANVAR), Meuilly Sur Seine, France**

**Filed July 19, 1973, Ser. No. 380,654**

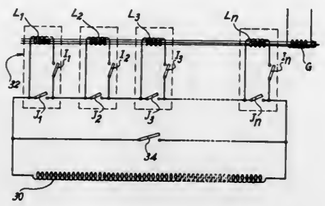
**Claims priority, application France, July 21, 1972, 72.26338**

**Int. Cl.² G05F *7/00***

**U.S. Cl. 323—43.5 R** **20 Claims**

1. A device for the high-efficiency transfer of magnetic energy contained in a storage inductance coil into a load inductance coil, wherein the storage inductance coil has a fixed value L and wherein the load inductance coil is constituted by *n* partial-inductance coils of values $L_1, L_2, \ldots L_n$ which are connected in series and in total coupling by mutual

induction, the value $L_p$ of the $p^{th}$ of the $(n-1)$ first inductance coils $L_1, L_2, \ldots L_{n-1}$ being in the vicinity of:



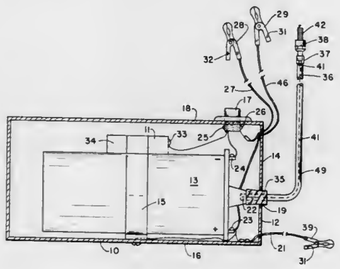
$$L_p = L\left[tg\frac{\pi p}{2n} - tg\frac{\pi(p-1)}{2n}\right]^2$$

where $p$ is an integer index, $1 \quad p \quad n-1$, tg is tangent and $L$ a constant and wherein said device comprises switching means whereby the inductance coils $L_1, L_2, \ldots L_{n-1}$ are progressively put in circuit.

## 4,020,413
## EMERGENCY AUTO IGNITION KIT AND SPARK PLUG TESTER

**Edward P. Wetherbee, Brighton, Mich., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest**

**Filed Nov. 17, 1975, Ser. No. 632,444**
**Int. Cl.² G01R** *13/42*
**U.S. Cl. 324—15** **1 Claim**



1. A device which alternately serves for emergency use as a replacement engine ignition coil or as a spark plug tester, comprising

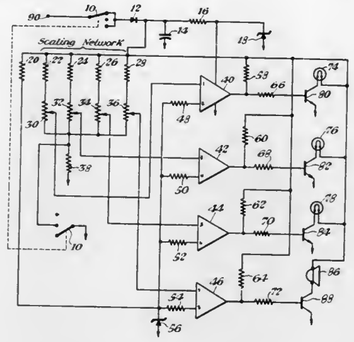
a housing enclosing a condensor and an ignition coil, with a sleeve extending through the housing located adjacent the high tension terminal of the said ignition coil, with a first and a second flexible insulated wire each externally attached to an individual clamp and each wire extending into the housing and connected to both a first low tension lead of the said ignition coil and to a first terminal of the said condenser, together with a third flexible insulated wire externally attached to a clamp and extending into the housing and connected to a first terminal of a normally closed momentary contact switch mounted in a housing wall,

said switch connected through its second terminal to the second terminals respectively of both the coil and condenser, together with a length of flexible high tension insulated ignition cable, one end of which is fastened to a sleeve of a size to fit over a body of a spark plug and the other end of which is shaped to attach to the conductor of the coil when fitted through the sleeve in the housing, so that when a sparkplug is attached in the sleeve of the ignition cable, the conductor of the ignition wire is in contact with the terminal of the sparkplug.

## 4,020,414
## PLURAL COMPARATOR INDICATOR OF BATTERY VOLTAGE

**Alfredo E. Paredes, Miami, Fla., assignor to Konar Corporation, Miami, Fla.**

**Filed Jan. 31, 1975, Ser. No. 546,099**
**Int. Cl.² G01N** *27/42*
**U.S. Cl. 324—29.5** **1 Claim**




1. A battery charge capacity indicator for providing an indication of charge capacity of said battery comprising:

a pair of battery connecting terminals;

voltage divider network means connected to said battery connecting terminal;

a plurality of voltage comparators, each comparator having a first input individually connected to one of said branches of said voltage divider network means;

means connected to said battery connecting terminals for providing a reference voltage, said reference voltage means connected as a second input to each of said volatage comparators;

a plurality of biased switching means, each switching means connected to a different output of each of said voltage comparators which provides an input signal to bias individual switching means;

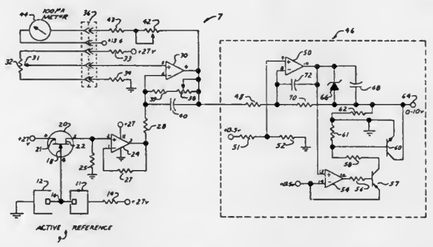
a plurality of indicating means, each individual indicator means connected to a different biased switching means,

circuit switching means connected to said battery connecting terminals having a first, second and third position providing a on-off test position of said circuit.

## 4,020,415
## COMBUSTION PRODUCT INDICATOR

**William Webb, Jr., Denver, Colo., assignor to Unitec, Inc., Denver, Colo.**

**Filed Dec. 30, 1974, Ser. No. 537,300**
**Int. Cl.² G01N** *27/62*; **G08B** *17/12*
**U.S. Cl. 324—33** **8 Claims**



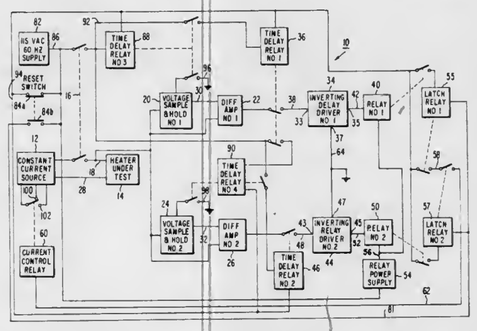
1. A combustion product indicating device, comprising: ionization detection means providing an output indicative of products of combustion sensed by said detection means; a field effect transistor for receiving said output from said ionization detection means and providing an output reflective thereof; at least one operational amplifier connected to receive said output from said field effect transistor, said operational amplifier also receiving a reference voltage; and indicator means connected with said operational amplifier and responsive to an output therefrom indicating the amount of products of combustion sensed by said ionization detection means within predetermined limits, said indicator means including circuitry for providing a variable voltage output indicative of the amount of products of combustion sensed by said ionization means with said circuitry including a pair of series connected operational amplifiers, the latter of which is connected with a pair of series connected transistors.



## 4,020,416
## METHOD OF DETECTING HEATER RESISTANCE INDEPENDENT OF CONTACT RESISTANCE

**James Gunard Ottos, Lancaster, Pa., assignor to RCA Corporation, New York, N.Y.**

**Filed May 20, 1976, Ser. No. 688,475**
**Int. Cl.² G01R** *27/14*
**U.S. Cl. 324—64** **6 Claims**




1. A method of detecting a nominal resistance value of a heater element in an electron tube, independent of measurement connection contact resistance, wherein said heater element has a resistance the value of which is equal to one of at least two nominal values, said method comprising the steps of:

a. applying, at a first time, a first level of constant current through said heater;

b. measuring, at a second time, a first voltage across said heater, said second time following said first time by a predetermined interval;

c. measuring, at a third time, a second voltage across said heater and determining the difference between said first and said second voltage measurements, said third time following said second time by a predetermined interval; and

d. comparing the value of the difference between said first and said second voltage measurements with a predetermined reference value.

## 4,020,417
## SOIL MOISTURE INDICATOR DEVICE

**Alfred W. Brehob, Laguna Beach, and Carlos E. Wheeler, Costa Mesa, both of Calif., assignors to Turf Service Laboratories, Inc., Stanton, Calif.**

**Filed Nov. 26, 1975, Ser. No. 635,389**
**Int. Cl.² G01R** *27/02*; **G01N** *27/02*
**U.S. Cl. 324—65 R** **7 Claims**

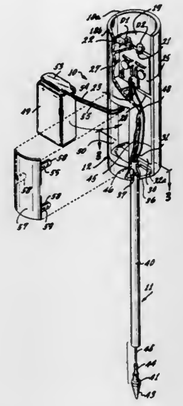
1. An indicating device for testing the moisture content of soil about the roots of a plant comprising:

a power supply,

a first indicator circuit connected across said power supply and including a first semiconductor switching means in series with a first indicator light,

a second indicator circuit connected across said power supply and including a second semiconductor switching means in series with a second indicator light,

control circuit means connected across said power supply with its current path completed through the soil to be tested, said control circuit means comprising an unbalanced resistive bridge having junctions on the opposite sides thereof respectively providing output voltages for controlling said first and second semiconductor switching means,

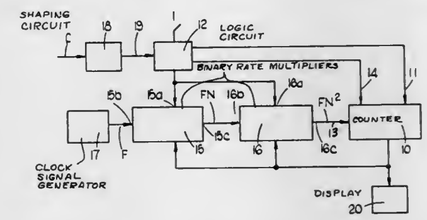


whereby said control circuit means adjusts the output voltages on said junctions in response to the resistivity of the soil to cause one of the semiconductor switching means to conduct to illuminate its associated indicator light if the moisture content of the soil is at least adequate and to cause the other said semiconductor switching means to conduct to illuminate its associated indicator light if the moisture content of the soil is excessive.

## 4,020,418
## APPARATUS FOR GENERATING A DIGITAL COUNT PROPORTIONAL TO AN INPUT FREQUENCY

**Robert Graham Burrage, Solihull, England, assignor to Lucas Industries Limited, Birmingham, England**

**Filed Nov. 14, 1975, Ser. No. 632,001**
**Claims priority, application United Kingdom, Nov. 21, 1974, 50453/74**
**Int. Cl.² G01R** *23/02*
**U.S. Cl. 324—78 D** **12 Claims**




1. An apparatus for generating a digital count which is proportional to the frequency of a pulsed input signal, comprising means for generating a reference signal of a known frequency, a digital counter, two binary rate multipliers each of which is connected to receive the count in said counter as a first signal, a first one of said multipliers having said reference signal as a second input signal and a second one of said multipliers having the output signal from said first multiplier as a second input signal, said second multiplier being responsive to its first and second input signal to provide a first output

signal and being connected to said counter so that the count therein can be altered in response to said first output signal, and control means, responsive to predetermined points in a cycle of said pulsed input signal, for causing said count to be so altered and for arresting the alteration of said count.

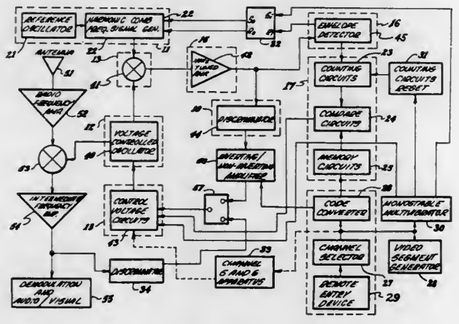
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**4,020,419**

## ELECTRONIC SYSTEM FOR AUTOMATICALLY TUNING TO A SELECTED TELEVISION CHANNEL

**Fred W. Caspari, South Bend, and Wayne C. Johnson, Columbia City, both of Ind., assignors to The Magnavox Company, Fort Wayne, Ind.**

**Filed June 5, 1974, Ser. No. 476,503**
**Int. Cl.² H03B** *3/08*
**U.S. Cl. 325—421** **1 Claim**



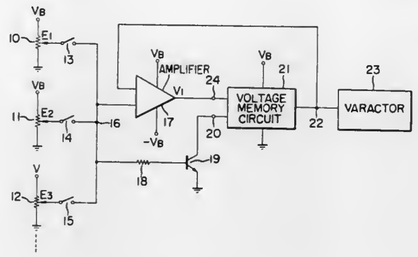

1. An electronic system for tuning a receiver to a selected television channel comprising:
   a. a voltage controlled oscillator;
   b. a voltage signal generator for sweeping and holding the frequency of said oscillator;
   c. a harmonic comb frequency generator for generating a first plurality of signals at 24 MHz frequency intervals, and a second plurality of signals at 6 MHz frequency intervals, said first plurality of signals being generated in response to a channel selection signal, said second plurality of signals being generated in response to a first actuating signal;
   d. a mixing circuit for heterodyning the output signal of said oscillator with the output signal of said harmonic comb frequency generator;
   e. a tuned amplifier connected to said mixing circuit for transmitting beat frequency signals of a predetermined frequency in the output signal of said mixing circuit;
   f. an envelope detector connected to said tuned amplifier for converting said beat frequency signals to pulses, said envelope detector providing said first actuating signal to said harmonic comb frequency generator in response to a first beat frequency signal;
   g. counting circuits connected to said envelope detector for counting said beat frequency signal pulses;
   h. memory circuits for storing an entry number related to said selected television channel;
   i. compare circuits for comparing said beat frequency pulse count in said counting circuits with said entry number in said memory circuits and for applying a second actuating signal to said voltage signal generator for stopping frequency sweeping of said oscillator when a preestablished relationship between said entry number and said pulse count exists; and
   j. a discriminator continuously coupled between said tuned amplifier and said signal generator and cooperative therewith for stabilizing said oscillator frequency.

**4,020,420**

## ELECTRONIC CHANNEL SELECTOR

**Shunji Minami, Katano, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Japan**

**Filed Mar. 17, 1976, Ser. No. 667,560**
**Claims priority, application Japan, Mar. 20, 1975, 50-34158; May 13, 1975, 50-56941**
**Int. Cl.² H04B** *1/16*
**U.S. Cl. 325—464** **3 Claims**




1. An electronic channel selector comprising
   a. at least three variable resistors,
   b. a separate switch each having an input terminal connected to the output terminal of each of said variable resistors and having an output terminal connected to a common junction,
   c. an input resistor having an input terminal connected to said common junction,
   d. a reed relay having an input terminal connected to the output terminal of said input resistor,
   e. a MOS field-effect transistor having a gate connected to the output terminal of said reed relay,
   f. a nonpolarized electrolytic capacitor interconnected between ground and the gate of said field-effect transistor,
   g. an output resistor interconnected between the source of said field-effect transistor and the ground,
   h. switching means having an input terminal connected to the common junction and an output terminal connected to one end of the coil of said reed delay for energizing said relay coil to close said reed relay in response to current through any of said separate switches, and
   i. a varactor responsive to the source-follower voltage of said field-effect transistor.

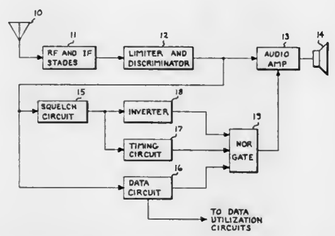
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**4,020,421**

## MUTING CIRCUIT

**James H. Elder, Brookneal, and Hubert A. Patterson, Lynchburg, both of Va., assignors to General Electric Company, Lynchburg, Va.**

**Filed Mar. 23, 1976, Ser. No. 669,634**
**Int. Cl.² H04B** *1/10*
**U.S. Cl. 325—478** **6 Claims**




1. In a radio receiver for receiving radio frequency signals modulated by audio signals or data pulses, said receiver having means for detecting said radio frequency signals, means connected to said detecting means for producing a squelch signal in the absence of radio frequency signals and an unsquelch signal in the presence of radio frequency signals, and means connected to said detecting means for producing output signals in response to said detected audio modulated radio frequency signals, an improved arrangement comprising:
   a. a timing circuit for connection to said squelch signal producing means to produce a timing signal of predetermined time duration in response to an unsquelch signal;
   b. means for connection to said radio frequency detecting means for producing a data signal in response to presence of said data pulses in said detected radio frequency signals;
   c. and means for connecting said timing circuit and said data signal producing means to said output signal producing means for blocking output signal production in response to either said timing signal or said data signal.



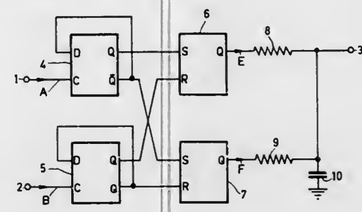
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**4,020,422**

## PHASE AND/OR FREQUENCY COMPARATORS

**Michael James Underhill, Crawley, England, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Sept. 16, 1975, Ser. No. 613,814**
**Claims priority, application United Kingdom, Sept. 26, 1974, 41904/74**
**Int. Cl.² H03B** *3/04*
**U.S. Cl. 328—133** **8 Claims**




1. Apparatus for determining the phase difference between first and second input signals, each having a cyclically repetitive waveform, over a phase difference range of $n \times 360°$ wherein $n$ is an integer greater than one, comprising: a sequence of $n$ phase comparators each responsive to a respective one of $n$ consecutive waveforms of each of the two signals to provide repetitive output pulses having a width representative of the phase difference between the two respective waveforms, and signal combining means which combines the said output pulses of the comparators and provides a combined signal whose time-averaged magnitude is dependent upon the phase difference between the two input signals.

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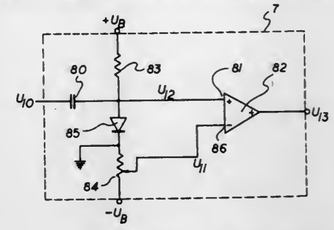
**4,020,423**

## METHOD AND CIRCUIT ARRANGEMENT FOR PRODUCING AND TRANSMITTING ELECTRICAL REFERENCE PULSES

**Volker Guyot, Klein-Gerau; Paul Holdinghausen, and Martin Mueller, both of Bickenbach, all of Germany, assignors to Carl Schenck AG, Darmstadt, Germany**

**Division of Ser. No. 506,108, Sept. 16, 1974, Pat. No. 3,976,947, which is a division of Ser. No. 250,727, May 5, 1972, Pat. No. 3,852,673. This application Apr. 28, 1975, Ser. No. 572,624**
**Claims priority, application Germany, May 10, 1971, 2122967**
**Int. Cl.² H03K** *5/20*
**U.S. Cl. 328—151** **1 Claim**

1. A circuit arrangement for producing electrical reference signals and transmitting such reference signals to an output terminal, comprising a source signal generator, a comparator circuit having a predetermined switching characteristic, an input circuit for connecting said source signal generator to said comparator circuit, said input circuit comprising a capacitor connected between the source signal generator and one input of said comparator circuit, and a diode connected between said one input of the comparator circuit and ground whereby a peak amplitude of a source signal is stored in said




capacitor and supplied sequentially with said source signal to said one input of the comparator circuit, said input circuit further comprising adjustable bias means connected to another input of said comparator circuit for applying a reference signal value to said other input, whereby said reference signals are produced at said output terminal in accordance with said predetermined switching characteristic and in response to the maximum amplitude of a source signal produced by said source signal generator.

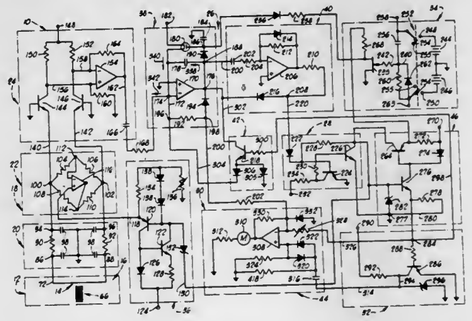
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**4,020,424**

## ACTIVE DIFFERENTIAL FILTER NETWORK

**Neal M. Burdick, 6371 Celia Vista Drive, San Diego, Calif. 92115**

**Continuation-in-part of Ser. No. 421,025, Dec. 3, 1973, Pat. No. 3,914,701, which is a continuation-in-part of Ser. No. 294,380, Dec. 2, 1972, Pat. No. 3,818,341. This application Oct. 20, 1975, Ser. No. 623,915**
**Int. Cl.² H04B** *15/00*
**U.S. Cl. 328—167** **3 Claims**



1. An active differential filter network receiving an input signal and a bias control signal and providing an output signal, comprising:
   bridge network means having a pair of input-output junctions and a pair of control junctions, the input signal and an output signal being connected to the input-output junctions;
   operational amplifier means having an inverting and a non-inverting input and an output, the inverting input being connected to one of the control junctions and the output being connected to the other control junction of the bridge network means, the bias control signal being connected to the non-inverting input of the operational amplifier means.

**4,020,425**

## DIGITAL SETTABLE FREQUENCY GENERATOR WITH PHASE-LOCKING LOOP

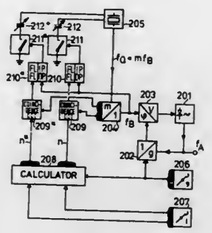
**Günther Hoffmann, and Peter Harzer, both of Eningen, Germany, assignors to Wandel u. Goltermann KG, Reutlingen, Germany**

**Filed Mar. 26, 2976, Ser. No. 670,714**

**Claims priority, application Germany, Mar. 29, 1975, 2513948**

**Int. Cl.² H03B** *3/04*

**U.S. Cl. 331—16** **13 Claims**




1. A frequency generator comprising:

a source of variable reference frequency $f_B$ including an adjustable master oscillator of operating frequency $f_Q = smf_B$, said master oscillator being provided with tuning means, and a fixed first frequency divider with an integral step-down ratio $m$:1 driven by said master oscillator, $s$ being an integer not greater than 2;

a continuously adjustable slave oscillator provided with a phase-locking loop including a phase comparator;

a digitally settable second frequency divider with an integral step-down ratio $g$:1 driven by said slave oscillator, said phase comparator having inputs respectively connected to said first and second frequency dividers for receiving therefrom respective oscillations of said reference frequency $f_B$;

integral selector means connected to said second frequency divider for changing the division factor $g$ thereof to vary the output frequency $f_A = gf_B$ of said slave oscillator; and

interpolating selector means connected to said tuning means for varying said output frequency $f_A$ in fractional increments by changing said operating frequency $f_Q$ between a plurality of different values within every cycle of said reference frequency $f_B$.

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**4,020,426**

## TEMPERATURE COMPENSATION CIRCUIT FOR CRYSTAL OSCILLATOR

**Jacques Hellé, Sartrouville, France, assignor to Compagnie d'Electronique et de Piezoelectricite C.E.P.E., France**

**Filed Sept. 2, 1975, Ser. No. 609,809**

**Claims priority, application France, Sept. 6, 1974, 74.30338**

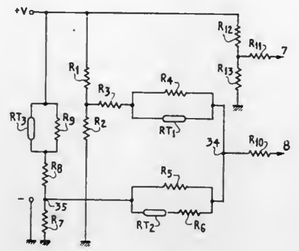
**Int. Cl.² H03B** *5/04*, *5/32*

**U.S. Cl. 331—158** **5 Claims**

1. A crystal-controlled oscillator whose frequency can be regulated within a wide range of temperatures and which comprises:

an oscillating circuit in the form of a feedback loop, comprising an amplifier, a piezo-electric oscillator, and an element with a first pair of terminals, said element having a reactance which is variable as a function of an electrical signal applied to its terminals; and

a compensating circuit with a second pair of terminals comprising temperature-sensitive elements, an electrical characteristic of which depends upon the temperature, said compensating circuit delivering at its terminals a compensating electrical signal, said first pair of terminals being connected to said second pair, wherein one of the terminals of the said second pair, in operation, is maintained at a fixed potential by a voltage divider, and the other is at an applied potential which is variable as a function of the temperature, and a first and second of said temperature-sensitive elements are connected by one of




their ends to said other terminal, their other ends being respectively connected to two voltage dividers, of which one comprises a third one of said elements, the three dividers being adapted to be connected to the terminals of an electrical energy source.

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**4,020,427**

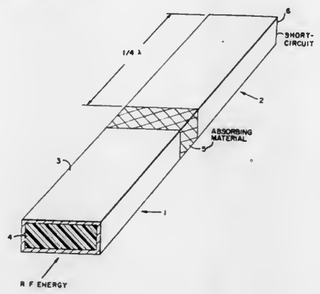
## FOAM MATCHING LOAD

**William R. Connerney, Needham, and Denis L. Bourassa, Methven, both of Mass., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed May 17, 1976, Ser. No. 686,766**

**Int. Cl.² H01P** *1/26*

**U.S. Cl. 333—22 R** **2 Claims**




1. A waveguide matched load device for a predetermined frequency of radiation comprising an elongated, rectangular cross-sectioned polystyrene foam dielectric material; a thin film of metallic material coating the outside of the elongated dimension of said material; one end of said material being shorted-circuited; an energy absorbing means connected at the other end of said material; and further means connected to said energy absorbing means to supply the predetermined frequency of radiation.

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**4,020,428**

## STRIPLINE INTERDIGITAL BAND-PASS FILTER

**Larry O. Friend, Scottsdale, and John J. Lockwood, Tempe, both of Ariz., assignors to Motorola, Inc., Chicago, Ill.**

**Filed Nov. 14, 1975, Ser. No. 631,803**

**Int. Cl.² H01P** *1/20*, *3/08*, *7/00*, *1/16*

**U.S. Cl. 333—73 S** **23 Claims**

1. A high frequency, stripline band-pass filter having a housing member, comprising:

a first ground plane member;



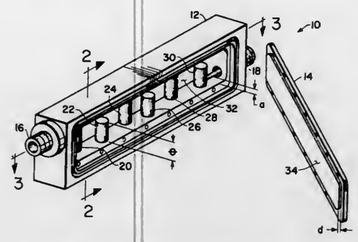
a second ground plane member spaced in parallel relationship to said first ground plane member;

a plurality of parallel-coupled resonators disposed between said first and second ground plane members;

input means for coupling input signals to the filter;

output means for coupling the output of the filter to a load; and

said first ground plane member being removably mounted to the filter housing member to facilitate interchanging of




said first ground plane member with another ground plane member so dimensioned that the spacing between said plurality of parallel-coupled resonators and said first ground plane member is greater or less by a predetermined amount than the spacing between said plurality of parallel-coupled resonators and said second ground plane member whereby said resonators are unsymmetrically disposed between said first and second ground plane member so that the bandwidth of the filter is respectively increased or decreased.

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**4,020,429**

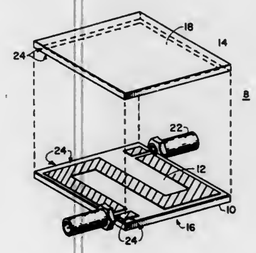
## HIGH POWER RADIO FREQUENCY TUNABLE CIRCUITS

**Robert Henry Bickley, Scottsdale, Ariz., assignor to Motorola, Inc., Chicago, Ill.**

**Filed Feb. 12, 1976, Ser. No. 657,665**

**Int. Cl.² H01P** *1/20*, *7/00*, *3/08*, *5/04*

**U.S. Cl. 333—73 R** **6 Claims**




1. A tunable high power radio frequency circuit apparatus, comprising in combination:

tuned printed circuit resonant means for providing a radio frequency output in response to an electrical input, said tuned printed circuit resonant means being tuned to a first predetermined range of radio frequency signals, said tuned printed circuit means comprising at least one radio frequency feedline means having a predetermined electrical length, said at least one radio frequency feedline means having a characteristic impedance equal to a predetermined external load impedance at a nominal operating frequency and wherein said characteristic impedance of said at least one feedline means is lower than said external load impedance at a frequency lower than said nominal operating frequency;

at least one ferrite substrate means for providing a variable magnetic permeability therein, said at least one ferrite substrate means having two opposed planar surfaces, one of said surfaces having a ground plane disposed thereupon, the other of said opposed planar surfaces being adjacent said tuned printed circuit resonant means; and

magnetic circuit means for producing a magnetic biasing field in said at least one ferrite substrate means and for producing a corresponding magnetic permeability in said at least one ferrite substrate means, said magnetic biasing field bing orthogonal to said at least one ferrite substrate means and to said tuned printed circuit resonant means, said tuned printed circuit resonant means being tunable to frequency ranges other than said first predetermined range of radio frequency signals in response to changes in said magnetic biasing field and in said corresponding magnetic permeability in said at least one ferrite substrate means, said characteristic impedance of said feedline means varying by means of said changes in said permeability of said ferrite substrate means.

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**4,020,430**

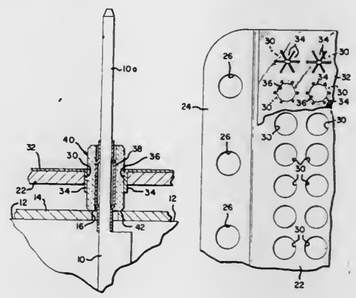
## FILTERED CONNECTOR ASSEMBLY WITH COMPOSITE GROUND PLANE

**Eric Ernest Vander Heyden, Hummelstown, Pa., assignor to AMP Incorporated, Harrisburg, Pa.**

**Continuation of Ser. No. 572,540, April 28, 1975, abandoned. This application Sept. 2, 1976, Ser. No. 720,162**

**Int. Cl.² H03H** *7/14*; **H01R** *15/16*, *15/14*, *17/10*

**U.S. Cl. 333—79** **4 Claims**




1. In a connector having a dielectric housing and at least one cavity in which is mounted a corresponding electrical contact provided thereover with an encircling filter body passing through an eletrically conducting foil sheet which is provided with a plurality of tines circumferentially encircling and electrically engaging a corresponding filter body, the improvement comprising:

a rigid metal plate connected to said housing and connected to said foil sheet to provide a composite ground plane,

said plate having at least one opening through the thickness thereof receiving a corresponding electrical contact and a corresponding filter body,

said tines being bent into receipt within said corresponding plate opening,

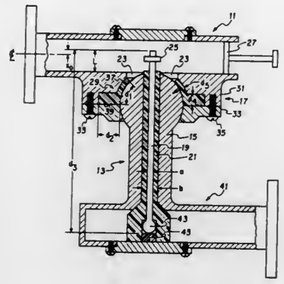
said tines being compressed between and nonyieldingly engaging both the periphery of the corresponding filter body and the thickness of said plate defining the periphery of a corresponding plate opening, the thickness of said plate providing a positive stop against which said tines are nonyieldingly engaged to resist deflection thereof away from said filter body.

**4,020,431**

## MULTIAXIS ROTARY JOINT FOR GUIDED EM WAVES

**Roger A. Saunders, Cedar Rapids, Iowa, assignor to Rockwell International Corporation, El Segundo, Calif.**

**Filed Jan. 15, 1976, Ser. No. 649,756**
**Int. Cl.² H01P** *1/06, 1/16;* **H11P** *5/08*
**U.S. Cl. 333—98 TN** **6 Claims**



1. An electromagnetic wave guiding rotary joint comprising:
a coaxial line section whose outer conductor at one end is rigid and spherically configured to form a spherical journal, and whose inner conductor at the same end extends beyond the outer conductor a predetermined length,
a waveguide section having an aperture in one side,
a bearing member having a spherical race complementary with said spherical journal of said coaxial section, said bearing member being connected to said waveguide section and having an aperture in appropriate alignment with said waveguide side aperture, said bearing receiving said spherical journal such that the inner conductor extension protrudes into said waveguide and provides electromagnetic wave communication between said waveguide section and said coaxial section,
said bearing and journal cooperating to form a joint capable of rotation about two or more axes,
said bearing member comprising a metal housing and a dielectric material, said dielectric material forming at least a part of said spherical race and further, to constitute an RF choke within a predetermined frequency range, being configured to act as substantially a half wavelength shorted transmission line wherein the actual point of sliding metal to metal contact is at or near a current minimum.

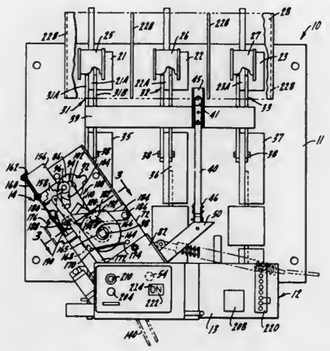
**4,020,432**

## MOTORIZED SHUNT TRIP SWITCH OPERATOR

**John W. Erickson, and James A. Erickson, both of Crystal Lake, Ill., assignors to Boltswitch, Inc., Crystal Lake, Ill.**

**Filed Aug. 25, 1975, Ser. No. 607,352**
**Int. Cl.² H01H** *3/26, 3/28*
**U.S. Cl. 335—76** **4 Claims**

1. In a high-current low-voltage load break switch, of the kind comprising a fixed contact, a movable contact movable between a closed position in bolted pressure contact with the fixed contact and an open position displaced from the fixed contact, and a switch-operator mechanism for opening and closing the switch, the switch-operator mechanism including spring drive means for rapidly driving the movable contact to its closed position and to its open position, a main drive shaft rotationally reciprocable between a switch-closed position and a switch-open position, a drive connection between the main drive shaft and the spring drive means to actuate the spring drive means to close the switch in response to rotation of the main drive shaft through a given arcuate distance in a switch-closing direction toward its switch-closed position, and trip means for actuating the spring drive means to open the switch, a motor assembly for the switch operator mechanism comprising:
an electric motor;
an operating shaft;
first transmission means drivingly connecting the motor to the operating shaft to rotate the operating shaft in a given direction, the first transmission means including a mutilated ratchet element operatively connected to the operating shaft and defining a disengaged condition for the first transmission means at a first angular orientation of the ratchet element;
second transmission means, coupling the operating shaft to the main drive shaft of the switch operator, comprising a first crank member affixed to the operating shaft, a second crank member affixed to the main drive shaft, and a link member connected at its opposite ends to the first



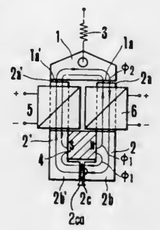
and second crank members to drive the second crank member and the main drive shaft in the switch-closing direction in response to rotation of the operating shaft in said given direction, the crank-link connection at one end of the link member permitting rotation of one crank member through a substantial arcuate distance without rotation of the other crank member;
an engagement device for rotating the mutilated ratchet element a limited distance in said given direction beyond said first angular orientation;
and an electrical circuit for energizing the motor, including a sensing switch for de-energizing the motor at a second angular orientation of the ratchet element.

**4,020,433**

## RELEASE TYPE ELECTROMAGNETIC DEVICE

**Masanori Uchidoi, Kawasaki; Hideaki Miyakawa, Inagi; Tetsuya Taguchi, Kawasaki; Yukio Mashimo, Tokyo, and Satoshi Watanabe, Inagi, all of Japan, assignors to Canon Kabushiki Kaisha, Japan**

**Filed Jan. 7, 1975, Ser. No. 539,048**
**Claims priority, application Japan, Jan. 18, 1974, 49-8308**
**Int. Cl.² H01F** *7/08*
**U.S. Cl. 335—230** **8 Claims**



1. A release type electromagnetic device comprising, in combination, two relatively elongated, substantially rectilinear pole pieces arranged in spaced substantially parallel relation; a permanent magnet positioned between said pole pieces and having its magnetizing direction substantially perpendicular to the longitudinal extent of said pole pieces; a normally deenergized electromagnetic means operatively associated with said pole pieces and operable, when energized, to generate a magnetic flux opposing the magnetic flux of said permanent magnet; a movable magnetizable armature adjacent corresponding first ends of said pole pieces, forming pole faces, and normally attracted against said pole faces by the flux of said permanent magnet when said electromagnetic means is deenergized; spring means biasing said armature to disengage said pole faces; and means forming a magnetizable flux path adjacent said permanent magnet and opposing the flux path including said permanent magnet and said armature; said magnetizable flux path forming means, said pole pieces and said armature forming a closed magnetic circuit for the flux of said electromagnetic means, said closed magnetic circuit by-passing said permanent magnet.

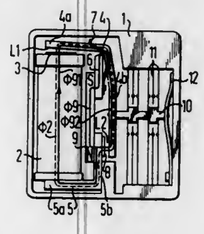


**4,020,434**

## POLARIZED ELECTROMAGNETIC RELAY AND METHOD OF MANUFACTURING THE SAME

**Bruno Jaegle, Munich, and Gerhard Furtwaengler, Unterhaching, both of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany**

**Filed Jan. 23, 1976, Ser. No. 651,912**
**Claims priority, application Germany, Jan. 27, 1975, 2503159**
**Int. Cl.² H01H** *51/22*
**U.S. Cl. 335—230** **14 Claims**



1. In a polarized relay of the type having an operating winding on a core, a two-legged pivotal armature whose first leg forms a first working air gap with one pole of the operating winding and whose second leg forms a second working air gap with an angular yoke, and a permanent magnet arranged parallel to the operating winding and whose magnetic flux is closed partially through the first armature leg and the first working air gap and partially through the second armature leg and the second working air gap, the improvement comprising:
a yoke plate pivotally supporting said armature, the angular yoke including a portion aligned with and separated from said yoke plate, said yoke plate and said portion of the angular yoke extending parallel to the operating winding, said yoke plate and said portion of the angular yoke each including a flat surface parallel to the operating winding, the permanent magnet mounted on said flat surfaces.

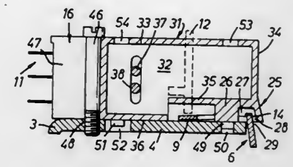
**4,020,435**

## HINGED ARMATURE RELAY

**Holger Nicolaisen; Finn Schnoor Andersen, both of Nordborg, and Jens Peter Jensen, Augustenborg, all of Denmark, assignors to Danfoss A/S, Nordborg, Denmark**

**Filed Oct. 9, 1975, Ser. No. 620,871**
**Claims priority, application Germany, Oct. 28, 1974, 2451188**
**Int. Cl.² H01F** *7/14*
**U.S. Cl. 335—275** **1 Claim**

1. An electromagnetic contact switch relay assembly comprising a magnetic coil, a yoke attached to said coil having a flat plate portion with a knife edge at one end thereof, an insulated contact carrier attached to said plate portion, a generally L-shaped armature having first and first and second legs with the corner therebetween having the inside thereof engaging said knife edge, said first leg of said armature having an inoperative position on said plate while at rest and an operative position while forming an acute angle with respect to said plate, said carrier having an end wall with resilient bifurcated portions engaging the outside of said armature corner and a rigid stop member therebetween for limiting the



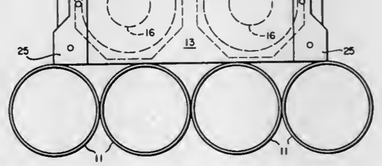
movement of said armature, a slide member for actuating contact switches slidably mounted in said carrier in juxtaposition to said first armature leg for actuation in response to movement by said first armature leg, said carrier having a central wall with a central recess formed therein immediately above said corner of said armature, said second leg of said armature having a lug extending beyond said corner and into said recess for retaining said armature in its installed position.

**4,020,436**

## LIFTING MAGNET FOR LAYERED PIPE

**Donald C. McDonald, Sherborn, Mass., assignor to O. S. Walker Company, Inc., Worcester, Mass.**

**Filed Apr. 11, 1975, Ser. No. 567,242**
**Int. Cl.² H01F** *7/20*
**U.S. Cl. 335—286** **1 Claim**



1. A lifting magnet for layered pipe, said magnet comprising:
a pair of elongate, flat pole pieces, said pole pieces being essentially parallel to each other and to a vertical plane and having flat bottom edge surfaces adapted to lie across a layer of stacked pipe, with the pole pieces oriented horizontally transversely to the length of the pipe so that the effective area of each magnetic contact is thus determined by the curvature of the surface of the pipe and the thickness of the pole piece;
between said pole pieces, at least one coil for generating a magnetomotive potential between the pole pieces, said pole pieces being of essentially uniform thickness over most of their length but having substantially thicker portions adjacent each end providing, to a pipe contacting the ends of the pole pieces, an effective contact area of cross-sectional area substantially equal to the cross-sectional area of the effective contact area presented to a pipe contacting the pole pieces intermediate their ends so that the magnet can exert a substantially equal lifting force on all pipes it contacts.

**4,020,437**

## RELAY HAVING TWO WINDING SUPPORTS

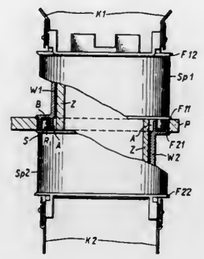
**Josef Kern, Berlin, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany**

**Filed Jan. 27, 1975, Ser. No. 544,514**

**Claims priority, application Germany, Jan. 25, 1974, 2403622**

**Int. Cl.² H01F** *5/00*

**U.S. Cl. 335—299** **3 Claims**




1. In a relay having at least a pair of axially aligned winding supports constituting coil forms, said winding supports comprising:

flange members on at least the adjacent ends of said coil forms, each said flange member having pins and recesses thereon, the said recesses on a given flange member having a configuration and being located as to receive and engage the said pins on an opposing said flange member on an adjacent coil form and

a mounting plate interposed between said adjacent coil forms and having an opening defined therein, said opening being located so that the said engaged pins and recesses extend therethrough, said engaged pins and recesses being substantially entirely within said openings.

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**4,020,438**

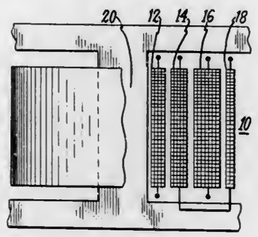
## AUTOTRANSFORMER WITH SERIES AND TERTIARY WINDINGS HAVING SAME POLARITY IMPEDANCE

**Abraham I. Manimalethu, Peru, Mass., assignor to General Electric Company**

**Filed Apr. 1, 1976, Ser. No. 672,544**

**Int. Cl.² H01F** *33/00, 27/28*

**U.S. Cl. 336—5** **5 Claims**




1. In an autotransformer of the type including,

a magnetizable core having at least one leg, inductively coupled tertiary, common and series, layer-wound windings,

of generally cylindrical shape, radially superposed on a leg of said core,

wherein the improvement comprises:

said tertiary winding being the innermost winding; and

said series winding being located between portions of said common winding,

the innermost portion of said common winding containing from 75 to 85 percent of the total turns of said common winding.

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**4,020,439**

## INDUCTIVE STABILIZING BALLAST FOR A GAS AND/OR VAPOR DISCHARGE LAMP

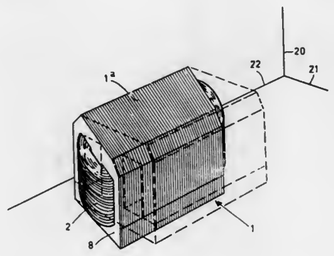
**Alexander Joseph Gerardus Thiessens, and Leonard Woldring, both of Emmasingel, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.**

**Division of Ser. No. 542,838, Jan. 21, 1975, Pat. No. 3,947,955. This application Nov. 13, 1975, Ser. No. 631,737**

**Claims priority, application Netherlands, Feb. 9, 1974, 7401806**

**Int. Cl.² H01F** *27/08, 27/26*

**U.S. Cl. 336—61** **10 Claims**




1. An inductive device comprising an electric coil, at least one pack of substantially identical parallel arranged laminations engaging one another over the largest part of their surface, the inductive device being of the casing type, said pack of laminations being located parallel to the center line of the electric coil so as to engage and clamp said coil to provide substantial surface contact therebetween a flat part of each of said laminations forming an angle of 85° at a maximum with the stacking direction of the laminations.

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**4,020,440**

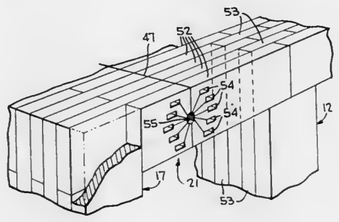
## CONVERSION AND CONTROL OF ELECTRICAL ENERGY BY ELECTROMAGNETIC INDUCTION

**Nathan A. Moerman, 7310 Maple Ave., Chevy Chase, Md. 20015**

**Filed Nov. 25, 1975, Ser. No. 635,007**

**Int. Cl.² H01F** *21/08*

**U.S. Cl. 336—155** **5 Claims**




1. In an electromagnetic induction control means,

laminated magnetic means having magnetic properties compatible with the magnetic properties of the structure in which the control is utilized,

a plurality of aperture means in said laminated magnetic means disposed to form a segmented toroid,

one of said aperture means located along the central axis of sid toroid,

an electrical conducting means disposed through said central aperture and each of said plurality of apertures and around the outside of said magnetic means in diametrically opposed positions,

said conducting means providing a magnetic field of toroidal configuration having minimum field strength at the outside surfaces of said magnetic means,

whereby a radial saturation gradient about said central aperture means and domain rotation is produced in a toroidal configuration with said induction control means.



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**4,020,441**

## ELECTRIC FUSE HAVING UNDULATED FUSIBLE ELEMENT

**Philip C. Jacobs, Jr., Newtonville, Mass., assignor to Gould Inc. Electric Fuse Division, Mass.**

**Filed Mar. 5, 1976, Ser. No. 664,104**

**Int. Cl.² H01H** *85/08*

**U.S. Cl. 337—187** **5 Claims**



1. An electric fuse including

a. a tubular casing of electric insulating material;

b. a pair of terminal elements arranged at the ends of and closing said casing;

c. a granular arc-quenching filler inside of said casing;

d. an undulated fusible element inside said casing, conductively interconnecting said pair of terminal elements and embedded in said filler, said fusible element having a plurality of spaced aligned perforations, and

e. a straight rod of an electric insulating material extending through said plurality of aligned perforations.

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**4,020,442**

## COMPOSITE-TYPE HEAT-SYSTEM FIRE SENSING DEVICE

**Hiroshi Ito; Tadashi Sugiyama; Yoshinori Kaminaka; Yuichiro Yamamoto; Takeshi Tanigawa; Shunichi Shoji, and Yoshifusa Saito, all of Tokyo, Japan, assignors to Hochiki Corporation, Tokyo, Japan**

**Filed Mar. 4, 1975, Ser. No. 555,210**

**Claims priority, application Japan, Mar. 8, 1974, 49-27613; Mar. 12, 1974, 49-28393; Mar. 27, 1974, 49-35571; May 17, 1974, 49-55454; May 22, 1974, 49-58364**

**Int. Cl.² 337** *396;* **H01H** *37/02*

**U.S. Cl. 337—299** **8 Claims**

1. A composite heat-system fire sensing device including differential and constant temperature sensing elements comprising in combination:

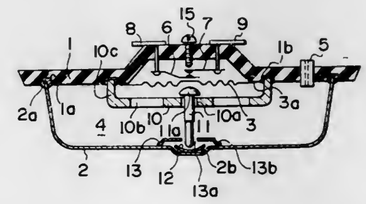
an open-mouthed generally bowl-shaped heat-receiving member having a bottom wall;

a diaphragm positioned across the open mouth of said heat-receiving member and forming a heat-receiving chamber therewith, venting means being provided for venting said chamber to the atmosphere;

a reversible bimetallic element positioned within said chamber adjacent the bottom wall thereof and adapted to reverse shape at a predetermined temperature from a normally concave configuration to a convex configuration;

a pair of electrical contact members mounted in predetermined adjustably spaced relation on one side of said diaphragm remote from said reversible bimetallic element and adapted to be connected to an electrical circuit of an alarm device;

a push rod member mounted within said chamber having one end thereof adjacent said reversible bimetallic element in the normally concave configuration thereof, said push rod member being shiftable by said reversible bimetal element upon reversal of the shape thereof so as to




engage with one side of said diaphragm to displace said diaphragm a distance sufficient to engage with one of said electrical contact members to thereby urge said one electrical contact member into engagement with the other of said electrical contact members;

a gaseous medium being provided within said chamber adapted, upon expansion thereof due to a rise in temperature in excess of a predetermined rate, to displace said diaphragm a distance sufficient to engage with said one of said electrical contact members to thereby urge said one electrical contact member into engagement with the other of said electrical contact members;

said reversible bimetallic element being so dimensioned that the maximum displacement distant thereof from the concave to the convex configurations is greater than the displacement distance of said diaphragm during a predetermined standard period of time;

and means for adjusting the spacing between said electrical contact members to thereby regulate the sensitivity of the device.

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**4,020,443**

## VARIABLE TEMPERATURE SENSOR

**Rodney L. LeRoy, Pointe Claire; David H. Grossman, Mount Royal; R. Douglas McDonald, Baie d'Urfee, and David F. Hemmings, Montreal, all of Canada, assignors to Canada Wire and Cable Limited, Toronto, Canada**

**Filed June 3, 1975, Ser. No. 583,254**

**Claims priority, application Canada, Apr. 18, 1975, 224930**

**Int. Cl.² H01C** *7/04*

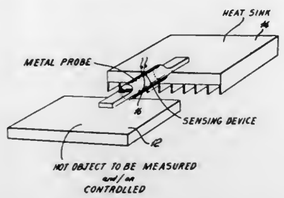
**U.S. Cl. 338—28** **5 Claims**

1. A variable temperature sensor for detecting the temperature of an object comprising:

a. a thermally conductive metal probe having one end thereof adapted to contact an object the temperature of which is to be sensed, and its other end adapted to contact a heat sink so as to create a substantially linear temperature profile between the two ends of the thermally conductive probe; and

b. a fixed temperature switching device having a predetermined switching temperature attached to said thermally

conductive probe at a point along the length of said probe which is substantially at the switching temperature of the switching device when a desired predetermined substantially linear temperature profile is present; whereby, depending on the switching temperature of said fixed temperature switching device, detection of either the temperature of an object which is above the switching tempera-




ture of the temperature switching device when the heat sink temperature is below the switching temperature of the switching device or the temperature of an object which is below the switching temperature of the temperature switching device when the heat sink temperature is above the switching temperature of the switching device is permitted.

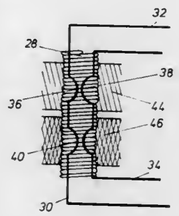
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**4,020,444**

## SLIDER ARRANGEMENT FOR POTENTIOMETERS OR THE LIKE

**Kurt Oelsch, and Klaus Schulz, both of Berlin, Germany, assignors to Fernsteuergerate, Kurt Oelsch KG, Berlin-Britz, Germany**

**Filed Feb. 6, 1976, Ser. No. 655,730**
**Claims priority, application Germany, Feb. 27, 1975, 2508530**
**Int. Cl.² H01C 1/12**
**U.S. Cl. 338—202** **9 Claims**



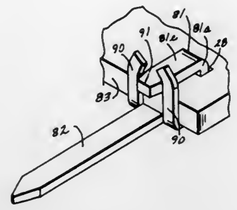

1. In a slider arrangement comprising: electrically conducting means, slider means in the form of a wire helix having an inner side, guiding means for moving said slider means along said electrically conducting means, and contact pressure generating means for urging said slider means into engagement with said electrically conducting means under a contact pressure, the improvement wherein said guiding means comprises a strap, which loosely extends into said wire helix, said contact pressure generating means urging said strap into tight engagement with said inner side of the wire helix under said contact pressure, which is transmitted to said wire helix through said strap.

**4,020,445**

## VARIABLE RESISTANCE CONTROL

**William L. Kelver, Cassopolis, Mich.; Ronald L. Stuckey, Monroe, and Arthur L. Rozema, Elkhart, both of Ind., assignors to CTS Corporation, Elkhart, Ind.**

**Division of Ser. No. 530,749, Dec. 9, 1974, Pat. No. 3,953,821.**
**This application Apr. 26, 1976, Ser. No. 679,924**
**Int. Cl.² H01C 1/012**
**U.S. Cl. 338—312** **5 Claims**




1. In a resistor, the combination of a ceramic substrate provided with an opening, a resistance element carried by the substrate, a conductive pad carried by said substrate and connected to the resistance element, a terminal secured to said substrate, the terminal comprising a head and a tail, the head being received in and extending through the opening, and a projection integral with the terminal and engaging the head extending through the opening and further securing the terminal to the substrate, one of said head and projection engaging the conductive pad.

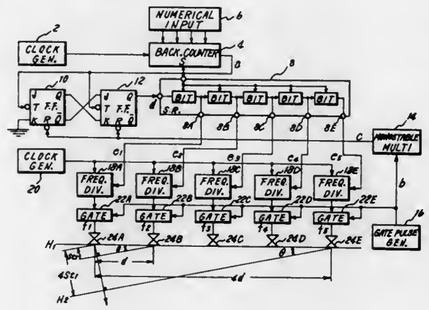
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**4,020,446**

## ULTRASONIC WAVE TRANSMITTING SYSTEM

**Masajiro Iida; Hideharu Morimatsu, both of Takarazuka; Itsuo Fukuoka, and Yoshinari Yoshida, both of Nishinomiya, all of Japan, assignors to Furno Electric Company, Limited, Japan**

**Filed Sept. 16, 1975, Ser. No. 613,963**
**Claims priority, application Japan, Aug. 13, 1975, 50-6684**
**Int. Cl.² G01S 9/66**
**U.S. Cl. 340—5 R** **1 Claim**




1. An ultrasonic wave transmitting system, comprising a plurality of ultrasonic transducers having a common resonance frequency and being arranged side by side in a row at fixed intervals, a first clock pulse generator for generating a first train of clock pulses having a higher harmonic relationship with said common frequency, a plurality of frequency dividers having reset inputs respectively, the inputs of said frequency dividers being supplied from said first clock pulse generator and the outputs thereof being connected to said ultrasonic transducers respectively, a second clock pulse generator having frequency control means for generating a second train of clock pulses, and resetting means connected to said second clock pulse generator for resetting said frequency dividers sequentially at a time interval equal to the period of



said second train of clock pulses, said resetting means comprising a device for generating a reset signal consisting of a sole pulse, and a shift register having a normal input connected to the output of said reset signal generating device, a shift input connected to the output of said second clock pulse generator and parallel outputs connected respectively to said reset inputs of said frequency dividers.

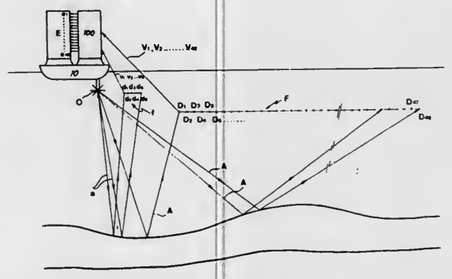
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**4,020,447**

## METHOD AND APPARATUS FOR RECORDING SEISMIC SIGNALS

**Dominique Michon, Paris, and Philippe Staron, Ris-Orangis, both of France, assignors to Compagnie Generale de Geophysique, Massy, France**

**Filed Apr. 28, 1975, Ser. No. 572,088**
**Claims priority, application France, Apr. 30, 1974, 74.15015**
**Int. Cl.² G01V 1/24**
**U.S. Cl. 340—7 R** **7 Claims**




1. A method of marine seismic prospecting comprising the steps of:
emitting a shock wave from at least one marine seismic source means;
detecting said shock wave with a linear long spacing array comprising N detector means and with a linear short spacing array comprising a lower number *n* of detector means, said long spacing array extending farther from said source means than said short spacing array;
producing at each detector means a signal representing said detected shock wave; and
successively recording in a single recording channel first a signal coming from one of said *n* detector means of the short spacing array and then a signal from one of said N detector means of the long spacing array, wherein each of said N signals from said long spacing detector array is recorded in a separate recording channel and whereby the N+*n* signals are recorded on less than N+*n* recording channels.

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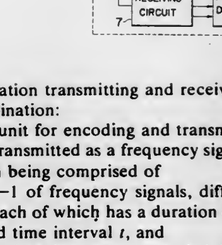
**4,020,448**

## OSCILLATING CRYSTAL TRANSDUCER SYSTEMS

**James Patrick Corbett, The Old Manor House, 21, Station Road, Thames Ditton, England**

**Filed Aug. 22, 1974, Ser. No. 499,489**
**Claims priority, application United Kingdom, Sept. 17, 1973, 43516/73**
**Int. Cl.² H04B 13/00**
**U.S. Cl. 340—8 S** **6 Claims**

1. A force transducer comprising:
a chamber;
a base member within said chamber;
two matched plate-like piezoelectric crystals dispoed within said chamber upright with respect to said base member;
a mounting assembly for said crystals, said mounting assembly consisting of two similar pairs of seats, each pair having a first seat which is supported on said base member and engages an edge portion of a respective one of said crystals and a second seat which engages the diametrically opposite edge portion of the respective crystal;
electrical means for exciting each of said crystals into oscillations;
a spigot extending within said chamber for transmitting a force to be measured to one of said crystals via said second seat of the pair of seats which supports said one crystal;




two spaced apart resilient supports which extend from said spigot to the walls of said chamber; and
at least one further resilient support which is independent of the first-mentioned two spaced apart resilient supports, said further resilient support extending into said chamber from a wall thereof and being connected to said second seat of the pair of seats which supports said other crystal.

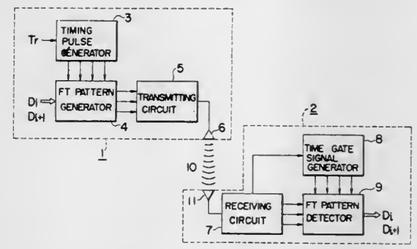
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**4,020,449**

## SIGNAL TRANSMITTING AND RECEIVING DEVICE

**Tetsuo Ito, Hitachi, and Motohisa Nishihara, Katsuta, both of Japan, assignors to Hitachi, Ltd., Japan**

**Filed May 19, 1975, Ser. No. 578,767**
**Claims priority, application Japan, May 22, 1974, 49-56484; June 5, 1974, 49-62884**
**Int. Cl.² H04B 11/00**
**U.S. Cl. 340—15** **5 Claims**



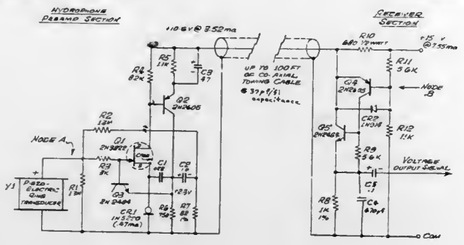

1. An imformation transmitting and receiving device comprising, in combination:
a transmitter unit for encoding and transmitting a piece of data to be transmitted as a frequency signal-time pattern, said pattern being comprised of
a plurality *n*−1 of frequency signals, different from each other and each of which has a duration corresponding to a prescribed time interval *t*, and
an additional time interval *t* occupied by no frequency signal,
so that said frequency signal-time pattern occupies *n* sequential time intervals, *n*−1 of which contain signals of respectively different frequencies, and
wherein the leading interval of time is occupied by one of said plurality *n*−1 of frequency signals; and
a receiver unit for receiving the piece of data encoded and transmitted by said transmitter unit, for detecting the frequency signal-time pattern, and for decoding the order of the frequency signals as contained within said pattern.

**4,020,450**

## TOWED HYDROPHONE PREAMPLIFIER AND RECEIVER

**Serge Kostrukoff, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Jan. 5, 1976, Ser. No. 646,810**
**Int. Cl.² G01V *1/18, 1/38***
**U.S. Cl. 340—15.5 GC** **1 Claim**




1. A circuit for transmitting signals generated by a transducer that are representative of acoustic energy comprising:

means for amplifying the transducer signals and converting them to current modulations, the amplifying means including a direct coupled two stage alternating current amplifier with negative voltage feedback to stabilize the alternating current and a low frequency rolloff network to attenuate spurious inputs;

the two stage alternating current amplifier having a constant current biased field effect transistor which has a voltage clipping element coupled across the gate-source junction to effect negative polarity clipping;

means connected to the amplifying means for supplying power to, conducting the current modulated signal from, and towing the amplifying means and transducer, the towing means including a two conductor coaxial cable having a long length approaching 100 feet;

means coupled to the amplifying and towing means for converting the current modulated components of the amplifying means into voltage signals not affected by the reactive components of the long coaxial cable,

the amplifying means being coupled to translate the transducer voltage signals into responsive current variations which are fed via the towing means to a current to voltage converter; and

means coupled across a portion of the current to voltage converter for preventing damaging potentials from being impressed thereacross which could be caused by a short circuit within the transmitting and towing means.

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**4,020,451**

## METHODS AND APPARATUS FOR RECORDING WELL LOGGING MEASUREMENTS

**Jennings W. Elliott, Friendswood, Tex., assignor to Schlumberger Technology Corporation, New York, N.Y.**

**Division of Ser. No. 378,754, July 12, 1973, Pat. No. 3,916,372. This application Mar. 6, 1975, Ser. No. 556,059**
**Int. Cl.² G01V *1/40***
**U.S. Cl. 340—15.5 DS** **16 Claims**

1. Apparatus for recording data as a vector comprising:

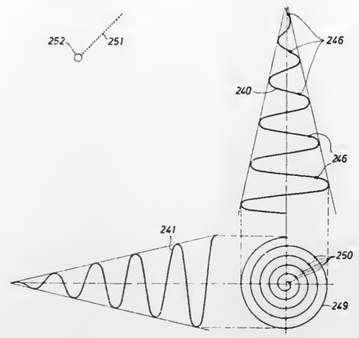
means for generating a first sinusoidal signal having an increasing amplitude;

means for generating a second sinusoidal signal having an increasing amplitude, said second sinusoidal signal having the same frequency as said first signal and being phase shifted 90° from said first signal;

means responsive to said first and second sinusoidal signals adapted for sweeping an energy beam in an increasing spiral pattern;

means for providing data representative of information to be recorded;

means responsive to said data for unblanking said sweeping energy beam during the same angular portion of each cycle of one of said sinusoidal signals; and




means sensitive to said energy beam for recording a plurality of indicia representative of the position of said beam when said beam was unblanked to produce a vector having an orientation representative of said data.

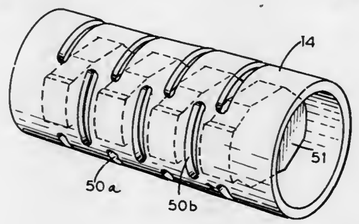
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**4,020,452**

## APPARATUS FOR USE IN INVESTIGATING EARTH FORMATIONS

**Jean-Claude Trouiller, Chaville, and Bernard Vivet, Buc, both of France, assignors to Schlumberger Technology Corporation, New York, N.Y.**

**Continuation of Ser. No. 256,074, May 23, 1972, abandoned. This application Feb. 18, 1975, Ser. No. 550,787**
**Claims priority, application France, May 24, 1971, 71.18637**
**Int. Cl.² G01V *1/40***
**U.S. Cl. 340—17 R** **18 Claims**




1. In apparatus used for investigating earth formations traversed by a borehole, a structure for attenuating and delaying acoustic energy traveling in the structure, comprising:

a substantially rigid longitudinally extending member having interruptions in the longitudinal continuity of the wall of said member over a given section thereof to provide only tortuous paths for the passage of acoustic energy traveling in said structure and through said section of said member; and

a plurality of substantially rigid masses periodically spaced along the interior of said section, each such mass being mechanically integral with opposite sides of the interior of said member at locations relative to said interruptions for effectively (1) enabling said interruptions and masses to cooperate as a mechanical low pass filter over said section to attenuate and delay most acoustic energy attempting to pass through said member and (2) contributing to the mechanical strength of said section.

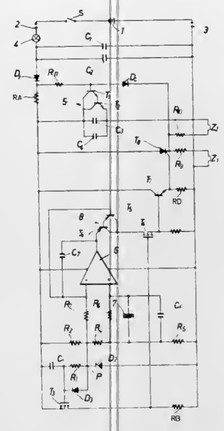


**4,020,453**

## SENSING SYSTEM FOR ACTUATING A SAFETY DEVICE

**Johann Spies, Pfaffenhofen, Ilm, and Alfons Wöhrl, Schrobenhausen, both of Germany, assignors to Messerschmitt-Bolkow-Blohm GmbH, Munich, Germany**

**Filed Nov. 13, 1975, Ser. No. 631,674**
**Claims priority, application Germany, Nov. 16, 1974, 2454424**
**Int. Cl.² B60R *21/00*; H01H *35/14***
**U.S. Cl. 340—52 H** **8 Claims**



1. A sensing circuit for actuating a vehicle safety device, comprising two terminals connectable to a voltage source, an acceleration sensor having two connections, evaluating means coupled to the acceleration sensor for responding to the acceleration sensor, and an output stage coupled to the evaluating means for operating the safety device in response to the evaluating means.

said evaluating means including a differential amplifier having a first input and a second input and an output, a voltage divider having a center point and two end points, constant potential producing means coupled to one of said terminals and having a reference point for producing a reference potential at the point relative to the one of said terminals, an integrating resistor, an integrating capacitor, a threshold value switch having a control electrode, and isolating means for controllably isolating said threshold value switch from said output stage;

one connection of said acceleration sensor being connected to one input of the differential amplifier. the other connection of said acceleration sensor being connected with the center point of the voltage divider, one end point of said voltage divider being coupled to the reference point and the other to the one of said terminals, said integrating resistor connecting the second input of said differential amplifier to the reference point, said integrating capacitor being connected from the output of said differential amplifier to the second input; said second input being connected with the control electrode of said threshold value switch, said threshold value switch having a path main current flow connected in series with the output of said differential amplifier.

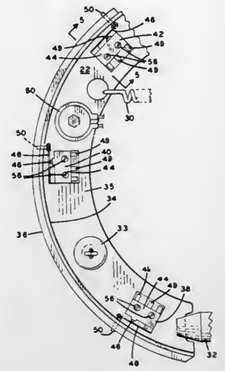
said isolating means being connected between said threshold value switch and said output stage and being responsive to the voltage across said terminals for isolating said threshold value switch from said output stage until the voltage across said terminals reaches a predetermined value. --

**4,020,454**

## BRAKE MONITORING SYSTEM

**Arley L. Malonee, 540 Fresno St., Coalinga, Calif. 93210**

**Filed Feb. 17, 1976, Ser. No. 658,286**
**Int. Cl.² B60T *17/22***
**U.S. Cl. 340—52 B** **1 Claim**



1. A brake monitoring system particularly suited for use in monitoring brake shoe adjustment, brake lining wear and brake temperature for the brake shoes of an expansible brake shoe subassembly circumscribed by a metallic wear plate of an annular brake drum subassembly for one wheel of a wheeled vehicle comprising:

A. at least two groups of normally open electrical switches, each group consisting of a pair of brake adjustment switches and a wear detection switch, each switch of each group being characterized by a resiliently supported shorting bar and an axially movable stem formed of Mylar and connected with the switch for displacing the shorting bar in a circuit closing direction;

B. means for separately mounting the switches of each group in angular spaced relation on a given brake shoe of a radially expansible brake shoe subassembly having a non-metallic lining, the thickness of which is reducible by wear, with the stem of each switch being projected axially into an aperture extended radially through the lining, the stem of each brake adjustment switch being characterized by a length such that the stem extends through the lining for engaging the circumscribing wear plate of a brake drum subassembly as the brake shoe subassembly is expanded, whereby axial motion is imparted to the stem, while the stem of the wear detection switch is characterized by a length such that the stem extends through the lining for engaging the wear plate, as the brake shoe subassembly is expanded, only after the thickness of the lining has been reduced by wear, whereby axial motion is imparted to the stem, subsequent to a reduction in the thickness of the lining;

C. a pair of circuits, each of which includes a pair of pin-receiving sleeves supported in a fixed relationship adjacent to the brake shoe subassembly and singly connected to one brake adjustment switch, and a testing circuit having an alarm signal generator connected with a pair of terminal pins adapted to be received by said pin-receiving sleeves;

D. an alarm circuit connected with the wear detection switch of each group including a remotely related alarm signal generator for generating an alarm signal in response to axial motion imparted to the stem of the wear detection switch; and

E. a pair of temperature responsive switches, each being separately mounted on one brake shoe of said pair of brake shoes and connected in a circuit including an alarm signal generator for completing the electrical circuit in response to changes of determinable magnitude in the

temperature of the brake shoe on which the switch is mounted.

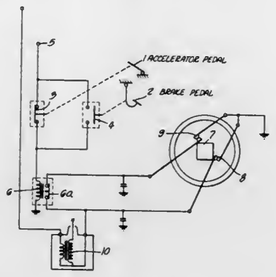
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**4,020,455**

## DECELERATION DETECTOR SYSTEM FOR MOTOR VEHICLES WITH AUTOMATIC TRANSMISSION

**Shoichiro Irimajiri, Kawagoe; Yoshio Tanaka, Tokyo, and Atsushi Kobayashi, Asaka, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed July 24, 1975, Ser. No. 598,863**
**Claims priority, application Japan, Aug. 2, 1974, 49-87990**
**Int. Cl.² F02P** *5/04*
**U.S. Cl. 340—53** **3 Claims**




1. A spark ingition timing control apparatus for retarding ignition timing in response to detection of deceleration of an engine-powered vehicle having an automatic transmission and having an accelerator pedal and a brake pedal, said control apparatus comprising, in combination: a first electric switch for detecting release of pressure from the accelerator pedal, a second electric switch for detecting application of pressure to the brake pedal, a detector device connected to said switches and including a relay actuated by at least one of the two switches, an ignition coil, an ignition timing device including an advance contact point and a retard contact point, said contact points being connected in parallel with said ignition coil, said relay being placed in the circuit including said retard contact point, whereby the ignition timing may be changed from advance to retard on deceleration of the vehicle.

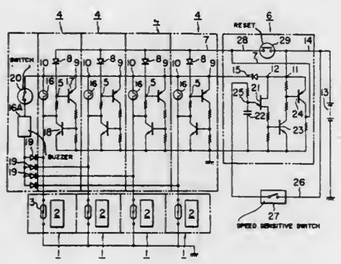
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**4,020,456**

## TIRE AIR PRESSURE SYSTEM FOR AUTOMOTIVE VEHICLES

**Akio Nozi, 2-7-13, Motoasakusa, Taito, Tokyo, Japan**

**Continuation of Ser. No. 447,045, Feb. 28, 1974, abandoned. This application Sept. 18, 1975, Ser. No. 614,597**
**Claims priority, application Japan, July 4, 1973, 48-74866**
**Int. Cl.² B60C** *23/04*
**U.S. Cl. 340—58** **5 Claims**




1. An air-pressure alarm system for automotive vehicles having a number of wheels with pneumatic tires thereon; the system comprising pressure detector means secured to a portion of one of the vehicle wheels fo detecting the reduction in air pressure in the tire of that wheel below a specified level, an alarm signaling circuit, including magnetically operable switch means secured to stationary components of the vehicle in a position opposite to said detector means, to sense the condition of the latter; an alarm device operable when said switch means is closed, thereby signaling to the driver the air-pressure reduction in said wheel below the specified level; alarm holding circuit means activatable in response to the operation of said switch means to continuously energize said alarm device and to keep the same in the energized state; and a circuit for producing a reset signal for intermittently releasing the activated holding circuit means at speeds of the vehicle that exceed a predetermined level.

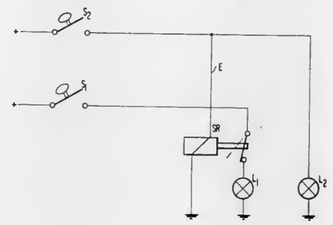
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**4,020,457**

## INSTALLATION FOR INCREASING THE BRIGHTNESS DIFFERENCES IN COMBINED MOTOR VEHICLE LIGHTS

**Klaus Neuffer, Boblingen, Germany, assignor to Daimler-Benz Aktiengesellschaft, Germany**

**Filed Sept. 22, 1975, Ser. No. 615,679**
**Claims priority, application Germany, Sept. 27, 1974, 2446171**
**Int. Cl.² B60Q** *1/38, 1/30*
**U.S. Cl. 340—66** **8 Claims**




1. An installation for controlling lights to render the lights more distinctly visible comprising a pair of light means each including first and second lights, a source of energizing voltage, first means for selectively connecting the first light of each of said pair of light means to said source of energizing voltage, a source of periodic voltage pulses, second means for selectively connecting one of said second lights of said pair of light means to said source of periodic voltage, and control means responsive to connection of one of said second lights to said source of periodic voltage for disconnecting only the first light of the same light means from said source of energizing voltage independently of said first means.

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**4,020,458**

## LIGHT SIGNALLING DEVICE FOR BICYCLES AND SWITCH THEREFOR

**Anthony Jude Windisch, 3882 Walsh St., St. Louis, Mo. 63116**

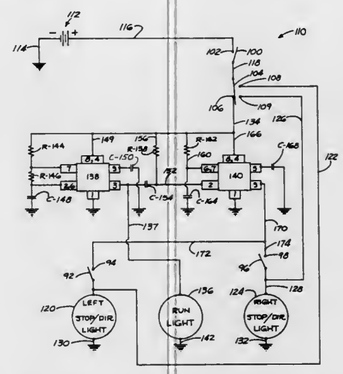
**Filed Feb. 27, 1976, Ser. No. 661,952**
**Int. Cl.² H01H** *3/16, 9/26;* **B60Q** *1/00*
**U.S. Cl. 340—67** **6 Claims**

1. A light signalling device for bicycles comprising, in combination:

a. a housing;
b. a cover mounted on the housing;
c. at least two like-colored light penetrable portions in the cover;
d. at least one light penetrable portion different in color from the like-colored portions; (and)
e. light emitting lamp means mounted in the housing for separately illuminating each light penetrable portion (.) ;
f. the one light penetrable portion, different in color from the two like-colored portions, separates the two like-colored portions;
g. multi-positionable switch means connected for controlling illumination of the light penetrable portions in various arrays and positionable for:
1. simultaneously interrupting illumination for each portion;
2. intermittently illuminating only the one portion;
3. simultaneously illuminating only the two like-colored portions;
4. alternately illuminating the one portion and one of the two like-colored portions; and
5. alternately illuminating the one portion and another of the two like-colored portions.

3. A switch comprising:

a. a first support member;
b. a second support member; (position selection means resiliently mounted for pivotal movement on the support member; and)




c. means for interconnecting and maintaining the first and second support members in relatively parallel spaced relationship; (position selection guide means on and in spaced relationship with the support member for guiding a portion of the position selection means.)
d. a switch lever pivotal at the first support member including first and second ends, the lever extending through the first support member and terminating at the second end in abutting relationship with the second support member;
e. a handle portion on the first end of the switch lever terminating in spaced relationship with the first support member;
f. a striker member on the second end of the switch lever;
g. a beaded member superimposed on and protruding beyond the striker member at the second end of the switch lever;
h. a first resilient member on the switch lever compressed between the handle and the first support member; and
i. a second resilient member on the switch lever compressed between the striker and the first support member.

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**4,020,459**

## PARITY GENERATION AND BUS MATCHING ARRANGEMENT FOR SYNCHRONIZED DUPLICATED DATA PROCESSING UNITS

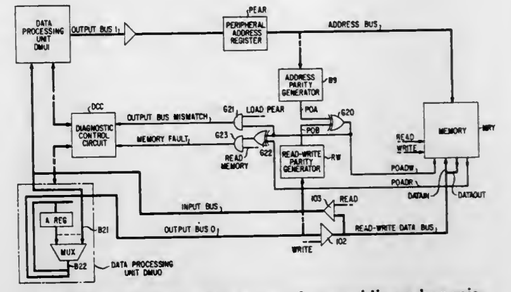
**Stephen Dexter Coomer, Westerville, Ohio, assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed Oct. 28, 1975, Ser. No. 626,338**
**Int. Cl.² G06F** *11/10*
**U.S. Cl. 340—146.1 AG** **7 Claims**

1. A diagnostic arrangement for use with a pair of duplicated processing units operating in synchronism, each of said units including an output bus connected to a memory, one of said output buses connectd to said memory via an address register, said arrangement comprising



a first parity network providing a first parity indication over the contents of said address register,
a second parity network providing a second parity indication over information on the other of said output buses,
means for combining said first and second parity indications to generate a combined parity indication,
means responsive to said combining means and to the loading by one of said processing units via said one output bus of said address register with an address identifying a




storage location in said memory for providing a bus mismatch signal if said first and second parity indications do not match, and
means responsive to the loading by said processing units of said output buses with data to be written in said memory and to said combining means for storing in said memory both said combined parity indication and said data, whereby said combined parity indication now indicates parity over said data and over the address in said address register.

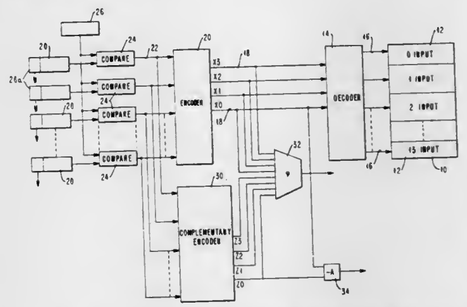
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**4,020,460**

## METHOD AND APPARATUS OF CHECKING TO DETERMINE IF A SIGNAL IS PRESENT ON MORE THAN ONE OF N LINES

**Julius Dwight Jones, Wappingers Falls, and Dale Milton Junod, Highland, both of N.Y., assignors to IBM Corporation, Armonk, N.Y.**

**Filed Nov. 13, 1975, Ser. No. 631,767**
**Int. Cl.² G06F** *11/00;* **H03K** *13/32*
**U.S. Cl. 340—146.1 AB** **4 Claims**

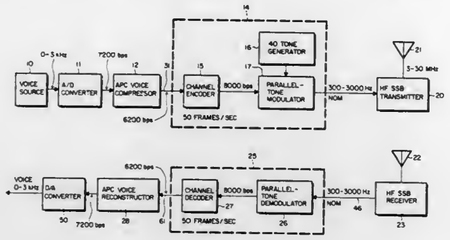



1. A method for determining whether more than one of $n$ lines are up comprising the steps of:
encoding the $n$ lines into $m$ digits where $n = 2^m$ in two complementary sets, $X_0, X_1, \ldots X_m$ and $Z_0, Z_1, \ldots Z_m$,
comparing the two sets together in accordance with the following formula: $(X_0 \quad Z_0) \cdot (X_1 \quad Z_1) \ldots \cdot (X_m \quad Z_m)$; and,
determining if the resultant of comparison is a binary one or a binary zero to indicate whether more than one line is up.

## 4,020,461
## METHOD OF AND APPARATUS FOR TRANSMITTING AND RECEIVING CODED DIGITAL SIGNALS

William B. Adams, Camillus, N.Y.; Douglas R. Anderson, Van Nuys, and Daniel D. Carpenter, Manhattan Beach, both of Calif., assignors to TRW Inc., Redondo Beach, Calif.

Filed Nov. 18, 1975, Ser. No. 633,148
Int. Cl.² G06F *11/12*
U.S. Cl. 340—146.1 AL 15 Claims




1. The method of encoding and transmitting digital signals representing information, the digital signals including at least three groups of most important, next most important and least important bits, the method comprising the steps of:

a. encoding the most important bits represented by electrical signals into an 8-ary Reed Solomon code (7,*k*) where *k* is the dimension of the code and is substantially less than 7;

b. encoding the next most important bits represented by electrical signals into an 8-ary Reed Solomon code (7,*k*+1);

c. encoding the least important bits represented by electrical signals into octal form;

d. generating a plurality of subcarriers corresponding to the number of code words and octal information to be transmitted;

e. differentially phase modulating each of the subcarriers with the respective code words and octal information so that the differential phases of each subcarrier are capable of assuming 8 different values; and

f. transmitting the modulated subcarriers or a carrier;

## 4,020,462
## METHOD AND APPARATUS FOR FORM REMOVAL FROM CONTOUR COMPRESSED IMAGE DATA

Thomas Harvey Morrin, II, San Jose, Calif., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 8, 1975, Ser. No. 638,566
Int. Cl.² G06K *9/00*
U.S. Cl. 340—146.3 AE 6 Claims

1. A method of stripping predetermined background information from a composite image containing a plurality of objects having defined boundaries, said composite image having predetermined background information containing a plurality of objects and variable information containing a plurality of objects comprising the steps of:

encoding object boundaries of said background information into contour data;

storing said encoded object boundaries of said background information in an addressable memory;

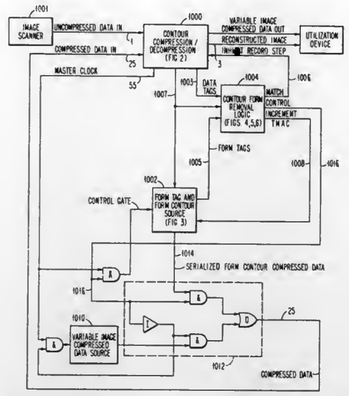
scanning said composite image in such a way as to encounter objects in a fixed order;

encoding object boundaries of said composite image into contour data;

addressing said addressable memory so as to read out said encoded background contour data in the same fixed order as said scanned composite image objects are encountered;

comparing said composite image contour data with said background information contour data; and

inhibiting the transfer to a utilization device of those encoded objects of said composite image whose contour

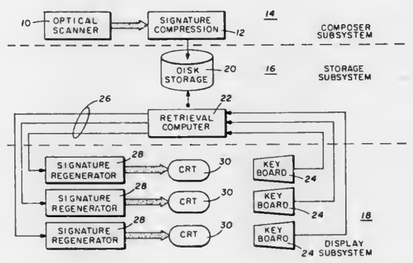



data matches the contour data of said encoded objects of said background information to within a predetermined tolerance.

## 4,020,463
## APPARATUS AND A METHOD FOR STORAGE AND RETRIEVAL OF IMAGE PATTERNS

David P. Himmel, Dallas, Tex., assignor to Recognition Equipment Incorporated, Dallas, Tex.

Filed Feb. 27, 1976, Ser. No. 661,814
Int. Cl.² G06K *9/00*
U.S. Cl. 340—146.3 AE 11 Claims




1. Apparatus for compressing a pattern of digitized input data having a multiple bit width for removal of excess information and converting into a vector pattern, comprising in combination:

an image matrix for storing each value of digitized input data produced by pattern scanning.

a process array within said image matrix through which the digitized input data in the image matrix is shifted,

means for scanning each bit of the input data in the image matrix and generating a boundary signal at a transition between a data bit of a first value and a data bit of a second value,

means for tracing a boundary outlined by the stored input data during a tracing sequence in response to the boundary signal in a single bit sequence,

means for changing the value of excess information bits during the tracing sequence from the first value to the second value,

means responsive to each information bit of the first value after completion of the tracing sequence to generate an encoded representation of vectors having a direction based on surrounding data bits of the first and second values, and

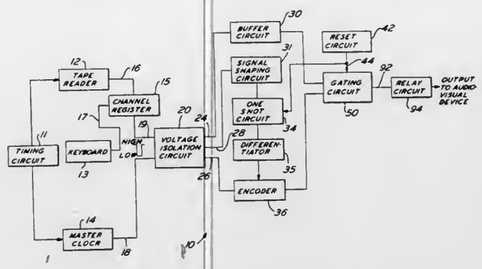


means for storing the encoded representations of the vectors in recoverable memory.

## 4,020,464
## PROGRAMMER EXPANDER FOR A PLURALITY OF DEVICES

William R. Wells, Linewood, N.J., assignor to United Audio Visual Corporation, Mays Landing, N.J.

Filed July 9, 1974, Ser. No. 486,805
Int. Cl.² H04P *3/00*
U.S. Cl. 340—147 P 20 Claims




1. Apparatus for simultaneously controlling the operational states of a plurality, *p*, of devices in response to pre-programmed information stored in *m* channels of a memory device, where *m* is an integer and $m < p$, comprising:

means for generating *m* digital signals in response to said pre-programmed information;

means for combining *n* of said *m* digital signals *j* signals at a time, where *j* is an integer including zero and has a maximum value equal to *n*, and for generating a set of encoded signals representing the combinations of said *n* digital signals;

means for gating said set of encoded signals with the remaining $(m - n)$ digital signals generated in response to said pre-programmed information to produce a plurality, *p*, of output signals, where $p > m$;and

means for simultaneously controlling the operational states of the plurality, *p*, of devices in response to said *p* output signals.

## 4,020,465
## THERMAL LINE PRINTER

Michael J. Cochran, Richardson, and Stephen P. Hamilton, Garland, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Dec. 26, 1973, Ser. No. 428,492
Int. Cl.² G06F *3/12*; H04L *15/24*
U.S. Cl. 340—172.5 10 Claims

1. A semiconductor printer system for a thermal line printer where a plurality of heaters are provided in a linear array arranged in groups, each said group having a first number of heaters and like-positioned heaters in each of said groups having one side thereof electrically connected in common, and where a motor is provided for stepping a second number of times thermally sensitive paper past said linear array during the printing of a line of characters, said system comprising:

a. storage means to store a set of a multibit words, one word for each character to be printed on a given line;

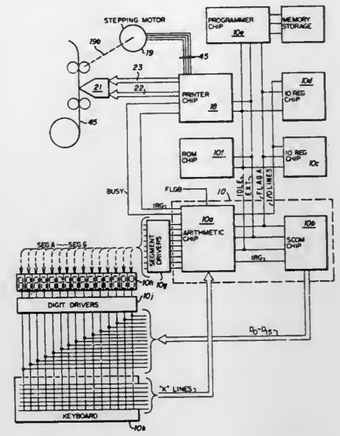
b. commutator means to read cyclically said set of words from said storage means at least a third number of times for each line of characters to be printed, said third number being equal to the product of said first and second numbers;

c. a random access ROM having therein a dot matrix code for each different character;

d. a time sequencer and decoder connected to said ROM and synchronized with said commutator to produce a different one bit output from said ROM each time one of said words is read from said ROM;

e. a set of first enable circuits, each first enable circuit leading from said ROM to one of the groups of said heaters;

f. a set of second enable circuits, each second enable circuit leading from said time sequencer to one of said like-positioned heaters in each of said groups; and

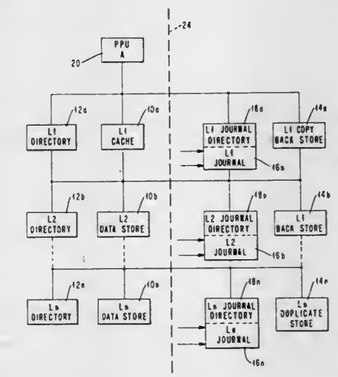



g. decoder means interfacing said time sequencer to said like-positioned heaters and to said motor to enable said heaters, one heater per group for each said set of words read from said storage means, like-positioned heaters being simultaneously energizable, and to step said motor after said set of words has been read from said storage means said first number of times.

## 4,020,466
## MEMORY HIERARCHY SYSTEM WITH JOURNALING AND COPY BACK

Vincent Anthony Cordi, Vestal, and Bruce Adam Edson, Apalachin, both of N.Y., assignors to IBM Corporation, Armonk, N.Y.

Filed July 5, 1974, Ser. No. 486,043
Int. Cl.² G06F *13/00*
U.S. Cl. 340—172.5 6 Claims




1. In a multi-level hierarchical memory system made up of a lowest level with a first data store means for storing the data base of the memory system and a plurality of sequentially higher levels each level having a different first data store means for storing at that level a portion of the data contained in the first data store means at the next lower level in the hierarchy and also changes of addition or modification to units

of said data made by computer instruction from a processing unit to be copied back to said next lower level because said changes are not contained in the first data store means in the next lower level, an improvement in the means of copying back from any given level of the sequentially higher levels into the next lower level said changes at said given level comprising:

a second data store means at said any given level that is coupled to the processing unit for storing a duplicate copy of only those units of the data at said any given level that contain said changes to be copied back down to lower levels;

a journal means coupled to the processing unit for recording the locations of data at the given level in the order in which data units stored in the second data store means at said given level were first altered at that given level by one of said changes that has not been copied back into any lower level; and,

copyback means coupled to the next lower level and to the journal means for copying back the changes made in the data at that given level into the next lower level in the hierarchy in said order recorded in the journal means whereby a change in data made at the given level is reflected in the data at the lower levels of the hierarchy.

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**4,020,467**

## MINIATURIZED KEY ENTRY AND TRANSLATION CIRCUITRY ARRANGEMENT FOR A DATA PROCESSING UNIT

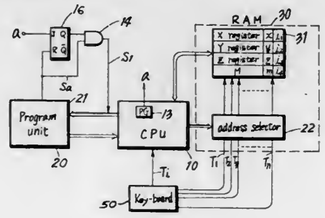
**Shintaro Hashimoto, and Tosaku Nakanishi, both of Nara, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan**

**Filed Sept. 27, 1974, Ser. No. 509,951**

**Claims priority, application Japan, Sept. 28, 1973, 48-109743; Oct. 9, 1973, 48-113661; Nov. 19, 1973, 48-130513**

**Int. Cl.² G06F** *3/02*

**U.S. Cl. 340—172.5** **8 Claims**




1. A circuit arrangement for introducing as identifying signal characterizing a selected key of a keyboard into an electronic calculator, said keyboard including a plurality of digit entry keys and function entry keys each having first and second terminals, said first terminals of which are commonly connected, wherein said calculator includes a data processor unit (CPU), a random access memory (RAM) and a read only memory (ROM), said data processor unit (CPU) including a pulse generator and a counter means consisting of an adder controlled by said pulse generator and an accumulator means, said random access memory (RAM) having first and second modes of operation including means for storing operand data and an address selector means for generating address signals for said data in a first mode of operation and means for generating time-shared key interrogation signals in a second mode of operation, and said read only memory (ROM) including a program storage means for storing program instructions for controlling the data processor unit, said circuit arrangement comprising:

a. means for coupling said address selector means contained within the random access memory (RAM) with said second terminals of the keyboard so that address signals generated in said second mode by said address selector means are respectively coupled as key strobe time-shared key interrogation signals with the respective second terminals of the keys;

b. means for applying the key interrogation signals to said counter means contained in said data processor unit by means of a selected key of said keyboard thereby providing a desired code signal constituting a representation of identity of the selected key;

c. input buffer means contained within said random access memory for storing said code signals representing the identity of a selected key; and

d. means for applying said code signals generated by said counting means to said input buffer means.

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**4,020,468**

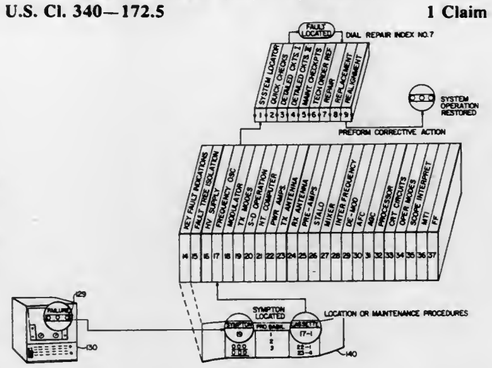
## COMPRESSED INFORMATION SYSTEM

**Paul W. Silver, Bowie; Richard A. Fuselier, Millersville, and William B. Moore, III, Baltimore, all of Md., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed Dec. 10, 1974, Ser. No. 531,491**

**Int. Cl.² G06F** *3/14, 3/16;* **G09B** *7/00*

**U.S. Cl. 340—172.5** **1 Claim**




1. The method of repairing apparatus by utilizing a maintenace system which includes, (a) data storage means wherein coordinated audion and visual data comprising visual and audio presentation of maintenance procedures relate to said apparatus are stored, (b) audio reproduction and visual display means, and (c) data retrieval mean spermitting the selective recovery of said stored data to activate said audio reproduction means and said visual display means, the method comprising the steps pf:

1. utilizing a symptom of a malfunction of said apparatus for the selective recovery of said stored data by index in said data retrieval means to the beginning of one of said maintenance procedures;

2. activating said audio reproduction meas and said visual diaplay means in response to said indexing so as to generate a visual display and audio description of the selected maintenance procedure for use in correcting said malfunction.

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**4,020,469**

## PROGRAMMABLE ARRAYS

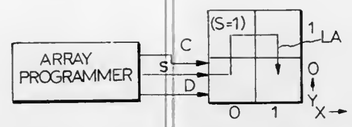
**Frank Manning, Apartment 6, 30 Littell Road, Brookline, Mass. 02146**

**Filed Apr. 9, 1975, Ser. No. 566,304**

**Int. Cl.² G06F** *13/00;* **G11C** *5/02, 5/06, 7/00*

**U.S. Cl. 340—172.5** **27 Claims**

1. An array comprising iterative units in which each of said units includes memory means, plural input and output means, means for storing information in the memory means from selected input means, means dependent upon the information stored in said memory means for selecting output means, and means for transmitting information from selected input means through said unit to the selected output means, each iterative unit having particular output means uniquely connected to particular input means of other predetermined iterative units




discretely, whereby the selection of a particular output means of a unit permits the transmission via that unit of information to be stored in a selected discrete other unit.

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**4,020,470**

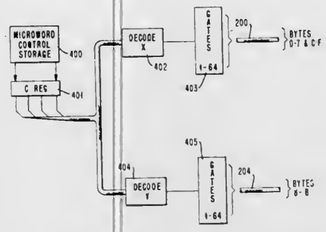
## SIMULTANEOUS ADDRESSING OF DIFFERENT LOCATIONS IN A STORAGE UNIT

**Edward George Drimak, Johnson City, and Thomas Arthur Metz, Endicott, both of N.Y., assignors to IBM Corporation, Armonk, N.Y.**

**Filed June 6, 1975, Ser. No. 584,551**

**Int. Cl.² G11C** *7/00*

**U.S. Cl. 340—172.5** **1 Claim**




1. In a data processing system with a memory system in which data in a block of information is accessed by a control word which has a first section that translates into a portion called the segment field that identifies the block of information containing the data and an entirely different second section that translates into a portion called a displacement field that pinpoints the location of the data within that block, apparatus for receiving that control word and translating it to a real location within the memory system that can be accessed to obtain the data comprising:

a first register for receiving the control word from the data processing system containing a first portion which receives the segment field and a second portion which receives the displacement field;

a local storage unit made up of a plurality of modules each having a plurality of locations containing data for translating control words to actual addresses in the memory system and supplying output signals reprsentative of such data when the local storage unit unit is accessed, said local storage unit including a first group of modules containing data for translating the segment field portion of the control word into part of the actual address and a second group of modules containing data for translating the displacement field portion of the control word into part of the actual address,

a first and second decoding means coupled to the first register and said local storage unit for simultaneously and separately accessing the two separate first and second groups of modules respectively in said local storage unit when supplied with a control word from the first register, said first decoding means being coupled only to the first portion of the first register containing the first section of the control word and to said first group of modules in the local storage unit containing data translating said first section to a segment field and said second decoding means coupled only to the second portion of the first register containing the second section containing a translation of the second section into the displacement field, and;

a second register coupled to both the first and second group of modules in said local storage unit for simultaneously storing the output signals of the local storage unit representative of both the segment and displacement fields to form the address of the accessed data in the memory system whereby the displacement and segment fields are independently supplied to the second register.

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**4,020,471**

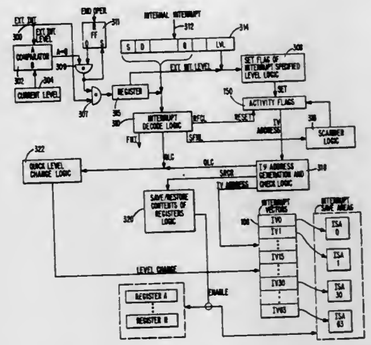
## INTERRUPT SCAN AND PROCESSING SYSTEM FOR A DATA PROCESSING SYSTEM

**William E. Woods, Natick, and Philip E. Stanley, Westboro, both of Mass., assignors to Honeywell Information Systems, Inc., Waltham, Mass.**

**Filed June 30, 1975, Ser. No. 591,905**

**Int. Cl.² G06F** *9/18*

**U.S. Cl. 340—172.5** **16 Claims**




1. In a data processing system having a plurality of interrupt sources, interrupt processing apparatus comprising:

A. means for receiving an interrupt signal from one of said sources, said interrupt signal indicative of one of a plurality of interrupt levels, said levels numbered so that a first number indicates a highest interrupt level and so that a last number indicates a lowest interrupt level, said interrupt signal comprising first, second third and fourth fields, each said field having one or more bits of information, said first, second and third fields each capable of having first and second states for indicating an operation to be provided for said interrupt source from which said interrupt signal is received, and said fourth field indicating the interrupt level number of said interrupt source from which said interrupt signal is received;

B. interrupt flag register means having a plurality of flag locations equal in number to the number of said interrupt levels, said flag locations numbered in correspondence with the respective numbers of said interrupt levels;

C. means, responsive to said interrupt signal, for activating a one of said flag locations corresponding in number to the level number indicated by said interrupt signal;

D. scanning means, responsive to the receipt of said interrupt signal by said means for receiving, for determining which one of said flag locations is an activated location having the highest interrupt level relative to any other activated flag locations; and

E. means, responsive to said scanning means, for enabling interrupt service for a one of said sources associated with the one of said flag locations which is indicative of the highest activated interrupt level as determined by said scanning means.

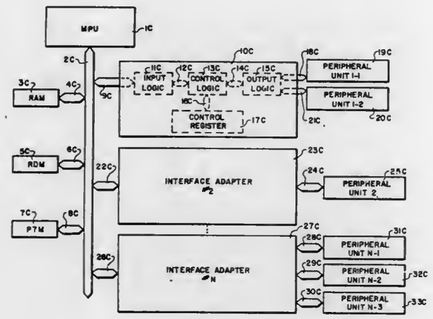
## 4,020,472
## MASTER SLAVE REGISTERS FOR INTERFACE ADAPTOR

**Thomas H. Bennett; Earl F. Carlow, both of Scottsdale; Edward C. Hepworth, Apache Junction, all of Ariz.; Wilbur L. Mathys, Norristown, Pa.; William D. Mensch, Jr., Norristown, Pa.; Rodney H. Orgill, Norristown, Pa.; Charles I. Peddle, Norristown, Pa., and Michael F. Wiles, Phoenix, Ariz., assignors to Motorola, Inc., Chicago, Ill.**

**Division of Ser. No. 519,149, Oct. 30, 1974. This application Sept. 17, 1975, Ser. No. 614,114**

**Int. Cl.² G06F** *3/00*

**U.S. Cl. 340—172.5** **4 Claims**




1. A digital system including a digital storage circuit including a master flip-flop coupled to an input data source and further including a slave flip-flop coupled to said master flip-flop and further including clock selection means coupled to said master and slave flip-flops for controlling transfer of stored data from said master flip-flop to said slave flip-flop and an additional slave flip-flop coupled to said master flip-flop in parallel to said slave flip-flop, said clock selection means also connected to said additional slave flip-flop for controlling the transfer of stored data from said master flip-flop to said additional slave flip-flop.

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## 4,020,473
## AUTOMATIC SYSTEM FOR PROVIDING TELEPHONE NUMBER INFORMATION SERVICE

**Eiji Fujimura, 24-4, Shinohara-dai, Kohuku Yokohama, Japan**

**Continuation-in-part of Ser. No. 396,306, Sept. 11, 1973, abandoned, which is a continuation of Ser. No. 162,236, July 13, 1971, abandoned, which is a continuation-in-part of Ser. No. 834,226, June 11, 1969, abandoned, which is a continuation-in-part of Ser. No. 730,973, April 25, 1968, abandoned, which is a continuation-in-part of Ser. No. 438,325, March 9, 1965, abandoned. This application Dec. 22, 1975, Ser. No. 642,760**

**Claims priority, application Japan, Mar. 11, 1964, 39-13453**

**Int. Cl.² G06F** *7/10, 15/02, 15/40*

**U.S. Cl. 340—172.5** **5 Claims**

1. An apparatus for providing telephone numbers in response to inquiries, comprising:

at least one input device for use by operators to supply inquiry information including a tormat control symbol for an inquiring index;

at least one output device for use by operators to receive information in response to inquiries;

at least one file memory device to which random access can be gained for storing data entries;

at least one central processor for carrying out a mathematical and logical computation, in particular a comparing operation, said central processor having:

an index shaping device coupled to said input device and comprising:

detector switching means to identify the breaks between items in the inquiry information and switch the items to registers for each said item,

register means connnected with said detector switching means for storing each said item, and to limit the number of characters as to any needed one of said items,

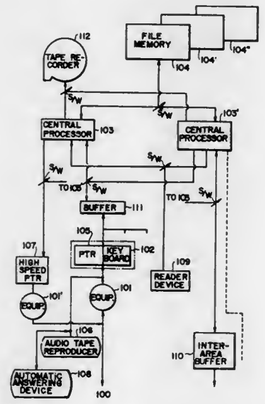
conversion means connected with said detector switching means for converting each of the needed items into a corresponding generic concept code,

a further register means connected with said conversion means for storing each of said generic concept codes,

an integrating register means connected with said register means and further register means to integrate each item to shape a set of inquiry items comprised of the inquiry index, a desk and question number, and a format control symbol, and

a directing means connected to said register means and said further register means parallel with said switching means to recognize a format-control symbol in the inquiry information to control the order of transmission of said generic codes from said further register means to said integrating register means;

a dividing device coupled to said integrating register means to separate the inquiry index from said set of inquiry items and to register said inquiry index;




a joining device coupled to the dividing device and the output channel of said file memory device to receive and combine the set of inquiry items with response data from the file memory device;

a comparison device, which comprises:

random access storage means having storage cells to store keywords that are prepared in the same format as the inquiry index item, and having a control unit,

a further storage means to store area-unit numbers corresponding to said keyboards and having storage cells corresponding to the storage cells in said random access storage means on a one for one basis,

comparing means coupled to both said storage means to determine the position of an inquiry index among a plurality of keywords, stored in the random access storage means, which respectively correspond to the storing areas of the file memory device,

address calculating means connected with the comparing means and the control unit of the random access storage means, to calculate the memory address of the next keyword in accordance with a latest comparison result "larger" or "smaller" than the inquiry index,

keyword registering means coupled between said random access storage means and said comparing means, to receive and store the keyword for the next comparison step, and

area-built number registering means connected to the file memory device to receive and store area-unit numbers corresponding to the keywords, and to transmit the contents thereof to the file memory device at the time of determination of the inquiry index position among the keywords; and

a checking device coupled between the joining device and the output device to determine whether or not a response received from the file memory device coincides with the inquiry index as to some particular items, to pass the coincident data to the output device, and to transmit a signal of "No-answer" to the output device when there is no coincident datum.



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## 4,020,474
## MANIPULATABLE READ-OUT MEMORY

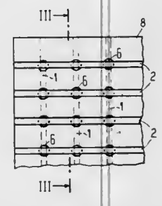
**Juergen Meyer, Taunusstein, and Irmtrud Wendling, Wiesbaden, both of Germany, assignors to Heimann GmbH, Germany**

**Filed May 27, 1975, Ser. No. 580,919**

**Claims priority, application Germany, May 27, 1974, 2425467; Mar. 7, 1975, 7507226**

**Int. Cl.² G11B** *7/24*; **G06K** *7/14*

**U.S. Cl. 340—173 SP** **13 Claims**




1. In a manipulatable read-only memory, particularly a punched card read device, having a group of first conductors and a group of second conductors, one group forming row conductors and the other group forming column conductors, which are disposed in a matrix formation in the manner of a cross-bar distributor, with each first conductor intersecting the second conductors at respective intersection points, the combination of each pair of first and second conductors being operatively connected in the vicinity of their intersection point by a corresponding series connected photo-resistor and a rectifier containing a blocking contact, said blocking contact being formed directly on the first conductor and directly connecting the latter, in blocking manner, to the photo-resistor, the photo-resistor being in the form of a crystal which extends through a monogranular supporting foil, the second conductor being vapor deposited in the form of beam-transmissive strips, upon one of the two sides of the foil, and the first conductor being vapor deposited upon the other of the two sides of the foil.

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## 4,020,475
## MAGNETIC DEVICE OPERATING WITH THE PHOTOMAGNETIC EFFECT

**Frederik Karel Lotgering, and Petrus Helena Gerardus Maria Vromans, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.**

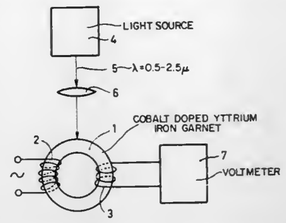
**Filed Oct. 17, 1975, Ser. No. 623,314**

**Claims priority, application Netherlands, Nov. 18, 1974, 7414976**

**Int. Cl.² G11C** *11/02*

**U.S. Cl. 340—174 YC** **7 Claims**

1. A magnetic device having a radiation-sensitive element which comprises a magnetisable matcrial having garnet structure and of which a magnetic parameter can vary under the influence of electromagnetic radiation, the device comprising means to direct electromagnetic radiation onto the radiation-sensitive element, and a magnetic state sensing means to detect a variation in a magnetic parameter of the magnetisable material, said magnetisable material being cobalt doped yttri-




um-iron garnet having at most 0.02 cobalt atoms per formula Unit.

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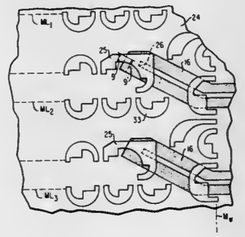
## 4,020,476
## MAGNETIC BUBBLE MEMORIES WITH NONOBSTRUCTING CROSSINGS BETWEEN CONDUCTOR AND PERMALLOY PATTERNS

**Peter Istvan Bonyhard, Edison, and James Lanson Smith, Bedminster, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed Feb. 4, 1976, Ser. No. 655,257**

**Int. Cl.² G11C** *19/08*

**U.S. Cl. 340—174 TF** **10 Claims**




1. A magnetic bubble memory comprising a layer of material in which magnetic bubble patterns representative of information can be moved, a first pattern of electrical conducting material overlaying said layer, a second pattern of magnetically soft elements overlying said conductor pattern and defining a first path along which said bubble patterns move in response to a magnetic field reorienting cyclically in the plane of said layer, said path including a reference position to which a bubble is moved when said in-plane field is oriented in about a first direction, said first and second patterns defining a crossing at said reference position at which magnetic poles inhibitive of the movement of said bubble occur, said first and second patterns having geometries such that said reference position is occupied by a bubble at a time different from that at which said poles occur during each of said cycles.

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## 4,020,477
## RADIO CENTRAL STATION ALARM SYSTEM

**John M. Holland, Shawsville, Va., assignor to American District Telegraph Company, New York, N.Y.**

**Filed Nov. 10, 1975, Ser. No. 630,547**

**Int. Cl.² G08B** *1/08*

**U.S. Cl. 340—224** **15 Claims**

15. A radio central station alarm system including a central station and a plurality of remote stations for transmitting alarm signals to the central station by means of radio signals encoding repetitive data words, each of said remote stations including a plurality of alarm sensors for detecting the occurrence of a respective one of a plurality of alarm conditions at the remote station, each of said data words including a first

plurality of bits identifying the remote station originating it, a second plurality of bits identifying an alarm condition occurring at that remote station, and a frame pulse, each of said bits and frame pulses including a timing pulse, a bit having a first binary value being represented by a timing signal occurring a first predetermined time interval after the preceding timing signal, a bit having a second binary value being represented by a timing signal occurring a second longer time interval after the preceding timing signal, and a frame pulse being represented by a timing signal occurring a third still longer time interval after the preceding timing signal, comprising:

remote station apparatus including:

alarm sensor sequencing means responsive to any of said alarm sensors indicating the occurrence of an alarm condition for cyclically selecting each of said alarm sensors in turn and for producing a plurality of binary coded output signals identifying the selected alarm sensor;

data storage means for storing a plurality of bits identifying said remote station;

a first clock for producing timing signals at predetermined regular intervals;

gate means responsive to the output signal of said first clock for passing said timing signals when enabled and for inhibiting said timing signals when not enabled;

a first counter for counting the timing signals produced by sid first clock which are not passed by said gate means;

data sequencing means for cyclically selecting each of the bits stored by said data storage means and each of the binary signals produced by said alarm sensor sequencing means in turn and for producing a frame pulse initiating output signal intermediate the selection of a predetermined two of said bits and binary signals, said data sequencing means advancing in response to each timing signal passed by said gate means;

gate control means responsive to said data sequencing means and to said first counter for enabling said gate means when the bit or binary signal selected by said data sequencing means has a first binary value, for inhibiting said gate means until one timing signal is counted by said first counter when the bit or binary signal selected by said data sequencing means has a second binary value, and for inhibiting said gate means until two timing signals are counted by said first counter when a frame pulse initiating output signal is being produced; and

radio transmitter means responsive to said alarm sensor sequencing means for transmitting a radio output signal representative of the output signal of said gate means when said alarm sensor sequencing means selects an alarm sensor indicating the occurrence of an alarm condition; and

central station apparatus including:

radio receiver means for receiving said radio output signal and for producing a first data output signal including timing pulses corresponding to the timing signals in the received radio signal;

a shift register having a plurality of output terminals for applying an output signal to successive output terminals as said shift register is shifted;

means for shifting said shift register at a predetermined rate;

first means responsive to the occurrence of a timing pulse in said first data signal for producing a second data output signal having a first binary value if said shift register is applying an output signal to a first output terminal when said timing pulse occurs and having a second binary value if said shift register is applying an output signal to a second output terminal when said timing pulse occurs and for subsequently presetting said shift register;

means for storing said second data output signal as one of the successive bits in a data word being received;

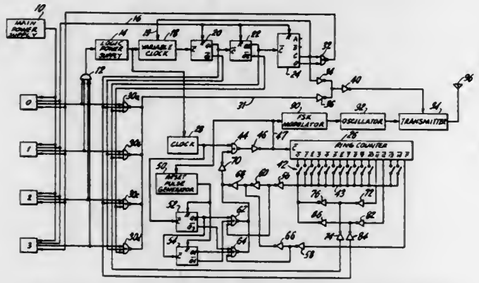
means for counting the timing pulses in said first data output signal;

second means responsive to the occurrence of a timing pulse in said first data output signal for producing an output signal indicating that a frame pulse has been received if said shift register is applying an output signal to a third output terminal when said timing pulse occurs and for subsequently presetting said shift register;

means responsive to the output signal of said second means for producing a control transfer output signal if the number of pulses registered by said means for counting equals said predetermined number and for subsequently resetting said means for counting; and

means responsive to said control transfer output signal for producing an alarm output indication corresponding to the data word stored in said means for storing.

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**4,020,478**

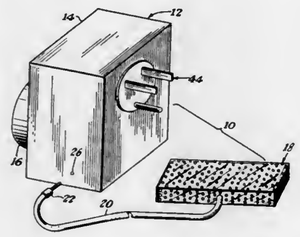
**MOISTURE DETECTING DEVICE**

**Edward S. Hatfield, 1809 Arizona Ave., Fort Pierce, Fla. 33450**

**Filed Sept. 18, 1975, Ser. No. 614,416**

**Int. Cl.² G08B** *21/00*

**U.S. Cl. 340—235** **5 Claims**



1. A device for detecting excessive moisture or absence of moisture in a particular area comprising:

a rigid, closed housing, said housing having a plurality of walls;

an electrical male plug connected to and projecting from one wall of said housing;

step-down transformer within said housing having its primary connected to said electrical plug;

thyristor gate means within said housing connected to the secondary of said transformer;

means for receiving moisture including a circuit connected to said thyristor gate means having a first electrode connected to said transformer secondary and second electrode connected to said thyristor gate means, said first and second electrodes being coupled to said moisture receiving means and spaced apart; and

electrically driven indicating means mounted to said housing connected to said secondary and said thyristor gate means whereby when moisture is received on said moisture receiving means a current across said first and second electrodes will actuate said thyristor gate providing power to said electrically driven indicator means.



**4,020,479**

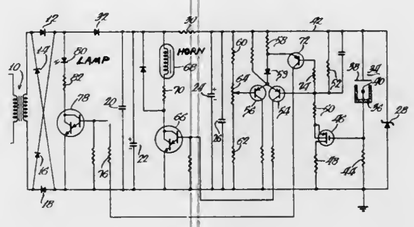
**FIRE DETECTOR**

**Frederick J. Conforti, and Wilbur L. Ogden, both of Aurora, Ill., assignors to Pittway Corporation, Northbrook, Ill.**

**Continuation-in-part of Ser. No. 431,137, Jan. 7, 1974, abandoned. This application Feb. 7, 1975, Ser. No. 548,003**

**Int. Cl.² G08B** *21/00*

**U.S. Cl. 340—237 S** **24 Claims**



1. In a detecting device including:

a power source;

sensor means for providing a sensor signal representative of a predetermined sensed condition, said sensor means being connected in circuit with said power source;

alarm means for providing an alarm when the predetermined condition is sensed, said alarm being connected in circuit with said power source;

the improvement comprising;

adjustable means for providing an adjustable reference signal for varying the sensitivity of said device, said adjustable means being connected in circuit with said power source;

indicator means for indicating the condition of said power source, said indicator means being connected in circuit with said power source;

first comparison means for comparing the amplitudes of the reference signal and the sensor signal, said first comparison means being connected to said power source, said sensor means, said adjustable means and said alarm means, said first comparision means providing a first signal for operating said alarm means when the sensor signal has a first predetermined relationship to the reference signal, said first comparison means providing a second signal when said sensor signal has a second predetermined relationship to the reference signal;

signal offsetting means connected to said first comparison means for increasing the amplitude of said second signal to a third signal; and

second comparison means for comparing the amplitudes of the third signal and the sensor signal, said second comparison means being connected to said signal offsetting means, the interconnection of said first comparison means and said sensing means, and said indicator means, said second comparison means operating said indicator means to indicate improper adjustment of said adjustable means, said first comparison means being incapable of operating said alarm means when the third signal has a predetermined relationship to the sensor signal;

whereby said indicator means indicates improper operation of said device should said power source fail, or should said adjustable means be improperly set.

**4,020,480**

**CATALYTIC DETECTING APPARATUS FOR DETECTING COMBUSTIBLE GASES AND VAPORS**

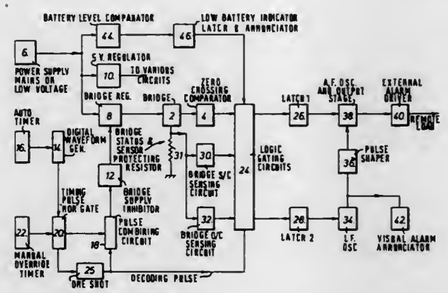
**Paul Gotley, Harlow, and Howard Alfred Buckenham, Brentwood, both of England, assignors to Neotronics Limited, Stansted, United Kingdom**

**Filed Apr. 21, 1975, Ser. No. 570,073**

**Claims priority, application United Kingdom, Apr. 26, 1974, 18386/74**

**Int. Cl.² G08B** *17/10*

**U.S. Cl. 340—237 R** **11 Claims**



1. Detecting apparatus comprising:

a. normally inactive sensing means selectively sensitive to the presence in a given environment of an extraneous constituent and operative to produce an electrical signal representative of the presence of the constituent, said sensing means requiring a period of time after actuation to achieve normal operation;

b. electrical signal translation means responsive on activation to the signal of the sensing means to produce an output signal indicative of the presence of the constituent in a concentration above a predetermined level,

c. activating means connected to the sensing means and arranged automatically and periodically to:

1. generate pulses of a duration sufficient to energize and stabilize the sensing means to normal operation, and

2. subsequently to deactivate the sensing means for a period which is at least as long as the said interval of activation;

d. fault detecting means for producing a fault signal in the event of circuit failure;

e. alarm means for providing a warning in response to the fault signal and in response to the output signal;

f. a one-shot generator means connected to the activating means to generate a one-shot pulse at the end of the pulses received from the activating means, the duration of the pulses of said one-shot generator means being independent of the duration of the pulses generated by the activating means and being insufficiently long to coincide with an external interference signal; and

g. logic gating circuits connected to receive the pulses from said one-shot generator means and to gate signals from said signal translation means and said fault-detecting means simultaneously.

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**4,020,481**

**FLUID LEVEL ALARM DEVICE**

**Tadao Nakagawa, Ueda, Japan, assignor to Nisshin Kogyo Kabushiki Kaisha, Ueda, Japan**

**Filed Jan. 14, 1976, Ser. No. 649,156**

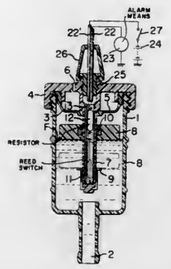
**Claims priority, application Japan, Feb. 25, 1975, 50-26096**[U]

**Int. Cl.² G08B** *21/00*

**U.S. Cl. 340—244 E** **1 Claim**

1. A fluid level alarm device comprising a fluid tank adapted to be connected with a master cylinder, said fluid tank having an open top portion, a cap member detachably secured to said

open top portion, a hollow switch cylinder integrally formed with said cap member and extending therefrom in a generally vertical direction, a float member arranged to float on an operating fluid stored in said fluid tank and fitted over said switch cylinder for vertical sliding movement relative thereto, a magnet carried by said float member, a switch base plate mounted within said switch cylinder and having a lower end abutting against the interior surface of the bottom of said switch cylinder, said plate having a pair of current paths printed on one side thereof and a respective connector terminal formed on each of said current paths in a respective predetermined fixed position, a reed switch having a pair of end




terminals respectively and firmly secured to one of said connector terminals of said current paths and operable to be closed under the influence of the magnetic force exerted by said magnet when said float member falls below a certain predetermined level, a source of electrical energy, an alarm means electrically connected to said source of electrical energy, a first lead line connected at one end to one of said current paths and at the other end to said alarm means, and a second lead line connected at one end to the other of said current paths and at the other end of said source of electrical energy, both of said lead lines extending from said respective current paths through, and fixedly supported by, said cap member.

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**4,020,482**

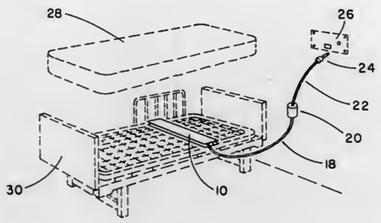
## PATIENT MONITOR

**Erich J. Feldl, 1516 Tenth St. Court, Manhattan, Kans. 66502**

**Filed Apr. 19, 1976, Ser. No. 678,460**

**Int. Cl.² G08B *21/00***

**U.S. Cl. 340—279** **1 Claim**




1. A patient monitor alarm system that is placed below a bed patient and actuated by the weight of the patient so as to be sensitive to major changes in the patient's position to actuate a remote signal when said major changes occur, comprising:

a flexible sealed enclosure which is filled with a fluid and placed under the patient,

a pressure switch responsive to the pressure in said enclosure to close when the pressure is lowered below a preset level,

a remote electrically operated signal that is energized by the closing of said switch, and

wherein the weight of a patient compresses the fluid in the enclosure and raises its pressure above said preset level to hold the switch open, but removal of the patient's weight allows the switch to close, energizing the signal, further comprising:

a pair of pressure plates between which the enclosure is located to give mechanical advantage to said weight by increasing the surface area sensing said weight and thereby raising the pressure in the enclosure.

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**4,020,483**

## CIRCUIT ARRANGEMENT FOR DISPLACING CHARACTERS ON THE SCREEN OF A DATA VIEWING DEVICE

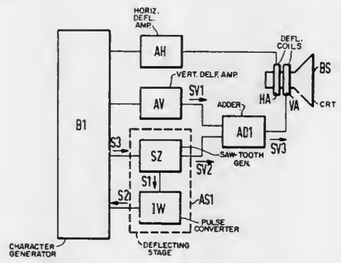
**Heinrich Baumgartner, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany**

**Filed Aug. 19, 1975, Ser. No. 605,915**

**Claims priority, application Germany, Sept. 25, 1974, 2445816**

**Int. Cl.² G06F *3/14***

**U.S. Cl. 340—324 AD** **5 Claims**




1. In a data system in which a circuit arrangement displaces characters representing an image content on the screen of a data viewing device, the characters being produced by a character generator and presented in a plurality of rows and a plurality of columns on the screen, and in which an electron beam is moved over the screen in the vertical direction by a first deflecting signal and in the horizontal direction by a second deflecting signal applied to respective deflection circuits and produced by a respetive first and second deflection stages under the control of the character generator, which may be stepped through a character sequence, the improvement therein comprising:

a third deflection stage connected to the character generator and operable to produce a third, saw-tooth deflection signal having an amplitude which is equal to the value of one of the first and second deflection signals and a repetition rate that is significantly less than the image change frequency, and to produce, at the maximum amplitude of the third deflection signal, a pulse to step the character generator; and

an adder connected between the one of the first and second deflection stages corresonding to the deflection signal having the amplitude equal to that of the third deflection signal and the respective deflection circuit and connected to said third deflection stage to add said third deflection signal with the associated one of said deflection signals to provide a composite signal which causes, in consecutive intervals of time, the uniform addition of parts of the image content at one edge of the screen and the removal of corresonding parts of the image content at the opposite edge of the screen to provide a continuous and uniformly moving image on the screen.



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**4,020,484**

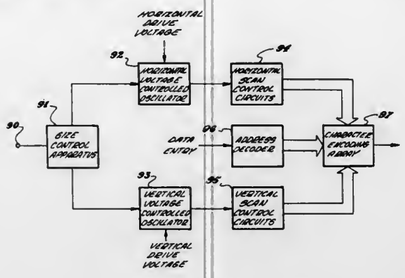
## SEGMENTED CHARACTER GENERATOR FOR USE WITH A TELEVISION RECEIVER

**Fred W. Caspari, South Bend, Ind., assignor to The Magnavox Company, Fort Wayne, Ind.**

**Continuation of Ser. No. 476,481, June 5, 1974, abandoned. This application Dec. 8, 1975, Ser. No. 638,567**

**Int. Cl.² G06F *3/14***

**U.S. Cl. 340—324 AD** **3 Claims**




1. Apparatus for displaying a character indicative of a selected television channel on the screen of a television receiver comprising:

a character generator having a first controllable oscillator and a second controllable oscillator, the frequency of said first controllable oscillator determining the horizontal size of a displayed character and the frequency of the second controllable oscillator determining the vertical size of a displayed character;

means for controlling the frequency of said first controllable oscillator and the frequency of said second controllable oscillator for causing said oscillators to operate at respective initial frequencies for a predetermined time, and at respective increasing frequencies after the predetermined time to cause a character to be displayed for the predetermined time at an initial size, and after the predetermined time to decrease in size, eventually disappearing.

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**4,020,485**

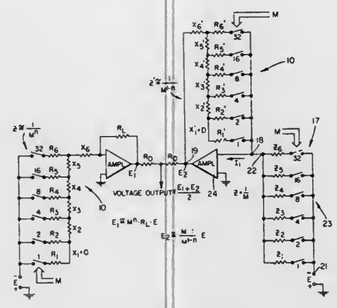
## NON-LINEAR DIGITAL-TO-ANALOG CONVERTER FOR SERVO CIRCUIT

**Edwin Stanley Busby, Menlo Park, Calif., assignor to Ampex Corporation, Redwood City, Calif.**

**Filed Apr. 3, 1972, Ser. No. 240,655**

**Int. Cl.² H03K *13/04***

**U.S. Cl. 340—347 DA** **5 Claims**




4. A non-linear digital to analog converter comprising a first terminal; a second terminal; a first shunt series resistive network connected between said first and second terminals including a plurality of series resistive elements serially connected together and coupled between said first and said second terminals, a plurality of shunt resistive elements each having one of its ends coupled to one of said terminals and the other of its ends coupled in circuit with said series elements so that each shunt element is coupled to the other of said terminals through at least one element, a switching means in said network coupled in series with each of said shunt elements and said one terminal and operative to selectively switch shunt elements into the network in accordance with a digital signal representing a quantity M, each switching means responsive to the state of one digit position of said digital signal, the values of said resistive elements are selected to provide a network impedance that non-linearly varies monotonically as the inverse of the quantity M; an amplifier circuit means defining an input circuit and an output circuit and whose gain is principally determined by the ratio of a first impedance means in said output circuit to a second impedance means in said input circuit, said first shunt series resistive network forming said first impedance means; and an additional shunt series resistive network forming said second impedance means, said switching means in said first named and additional networks coupled to be operable together in accordance with said digital signal, the variation of the network impedance of said first named network relative to the quantity M different from that of said additional network, the values of said resistive elements of said networks are selected so that said ratio of first and second impedance means varies as said selected conversion function.

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**4,020,486**

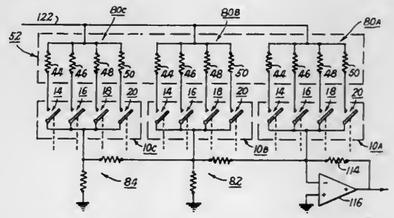
## SOLID STATE DIGITAL-TO-ANALOG CONVERTER

**James J. Pastoriza, Lincoln, Mass., assignor to Analog Devices, Inc., Norwood, Mass.**

**Continuation of Ser. No. 569,576, April 18, 1976, abandoned, which is a continuation of Ser. No. 348,199, April 5, 1973, abandoned, which is a division of Ser. No. 102,854, Dec. 30, 1970, Pat. No. 3,747,088. This application Dec. 22, 1975, Ser. No. 642,692**

**Int. Cl.² H03K *13/04***

**U.S. Cl. 340—347 DA** **8 Claims**




1. A digital-to-analog converter comprising:

a circuit board;

first and second identical substrates mounted on said circuit board, each of said substrates comprising a chip of semiconductor material formed with a set of separate IC transistors;

a third substrate mounted on said circuit board independently of said first and second substrates, said third substrate having first and second identical sets of resistors deposited thereon with each set comprising a set of connection terminals equal in number to the number of transistors of said first and second substrates, respectively, and having ohmic resistances in accordance with a predetermined pattern;

power supply circuit means for supplying electrical power to all of said transistors;

conductive means on said circuit board providing interconnection between said transistors and said power supply circuit means, and also between the sets of transistors of said first and second substrates and said first and second sets of connection terminals, respectively, to connect said transistors as individual current sources and to fix the current through each transistor in accordance with a

preselected binary weighting pattern, said first and second substrates thereby presenting, in combination with said third substrate, first and second identical sets of individually-activatable current sources;

digital input means to receive a digital input and coupled to said transistors to activate said current sources selectively in accordance with the digital input; and

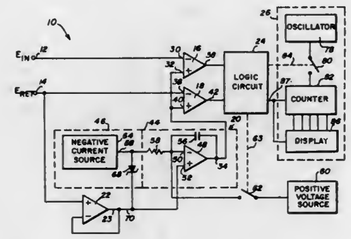
analog output means coupled to said transistors to produce an analog output current representing the sum of currents contributed by all of the current sources activated in accordance with the digital input, said analog output means including attenuation means to reduce the magnitude of current contributions from said second set of current sources by a predetermined factor prior to being combined with the current contributions from said first set of current sources.

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## 4,020,487
## ANALOG-TO-DIGITAL CONVERTER EMPLOYING COMMON MODE REJECTION CIRCUIT

**Arthur J. Winter, Encino, Calif., assignor to Fairchild Camera and Instrument Corporation, Mountain View, Calif.**

**Continuation-in-part of Ser. No. 627,718, Oct. 31, 1975, abandoned. This application Mar. 30, 1976, Ser. No. 671,844**
**Int. Cl.² H03K 13/02**
**U.S. Cl. 340—347 NT** **10 Claims**




1. An analalog-to-digital converter of the single slope detection type comprising:

a first input terminal for receiving a first input signal formed by the superposition of a common mode noise voltage on a first DC voltage;

a second input terminal for receiving a second input signal formed by the superposition of said common mode noise voltage on a second DC voltage;

ramp generating means coupled to said second input terminal and receiving said second input signal; said ramp generating means operative to isolate said common mode noise voltage from said second input signal and to develop a ramp reference signal that is modulated by said common mode noise voltage;

a first comparator having a first input connected to said first terminal for receiving said first input signal, a second input for receiving the modulated ramp reference signal and a first output, said first comparator being responsive to said first input signal and said modulated ramp reference signal and operative to produce a first output signal on said first output which changes state when the voltage level of the modulated ramp reference signal exceeds the voltage level of said first input signal;

a second comparator having a third input connected to said second terminal for receiving said second input signal, a fourth input for receiving the modulated ramp reference signal and a second output, said second comparator being responsive to said second input signal and said modulated ramp reference signal and operative to produce a second output signal on said second output which changes state when the voltage level of the modulated ramp reference signal exceeds the voltage level of said second input signal; and

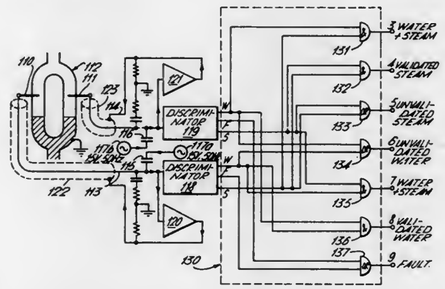
a logic circuit coupled to said first and second outputs, said logic circuit being responsive to said first and second output signals and operative to produce a pulse having a duration that corresponds to the time difference between the changes of state of said first output signal and said second output signal, such duration being indicative of the voltage difference between said first input signal and said second input signal.

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## 4,020,488
## ALARM AND/OR CONTROL APPARATUS

**Robert Edgar Martin, 19 Elles Ave., Merrow, Guildford, Surrey, and Edmond Francis Hasler, 'Pepilea', 75 Oakhill Road, Ashstead, Surrey, both of England**

**Filed May 7, 1973, Ser. No. 358,166**
**Claims priority, application United Kingdom, May 10, 1972, 21929/72**
**Int. Cl.² G08B 19/00; H04Q 3/00; E03B 7/07; F16K 37/00**
**U.S. Cl. 340—412** **7 Claims**




1. Apparatus for indicating a condition of and/or controlling a medium within a system by sensing a presence of a plurality of parameters of said medium and said system comprising:

a. sensing means insulatively carried by said system in contact with said medium including a plurality of sensors having an output means to produce a first output upon sensing a first parameter, a second output upon sensing a second parameter, and a third output upon said sensor having a voltage potential proximating a voltage potential of said system,

b. discriminating means having input means selectively connected to said sensing means to receive said output therefrom, and including a plurality of discriminators, said plurality having a value equal to said plurality of said sensors, said discriminators having a first, second, and third output means, said respective output means producing an output upon said sensor producing said first output, said second output or said third output, and

c. basic logic module means to respond to an output from said discriminator means comprising a plurality of sets of AND and OR gates, said plurality having a value less than said plurality of discriminators, said gates having input means selectively connected to said first, second and third output means of said discriminators and having output means producing an output upon receiving a selected input,

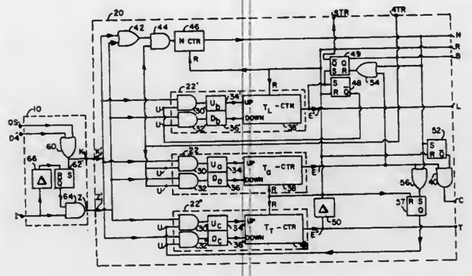
wherein said system can be controlled as a function of said control outputs of said gates.



## 4,020,489
## SEQUENTIAL OBSERVER MULTI-FUNCTIONAL FRIEND ACCEPT DECIDER

**Walton B. Bishop, Oxon Hill, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed July 25, 1975, Ser. No. 599,203**
**Int. Cl.² G01S 9/56**
**U.S. Cl. 343—6.5 LC** **4 Claims**




3. A Friend-Accept decision making system for determining whether a set of replies to valid interrogations from an Identification-Friend-or-Foe system emanate from a friend or enemy, comprising:

first means for generating, upon receipt of a correct reply in response to an interrogation, a first digital signal having a value of one;

second means for generating, upon receipt of other than a correct reply in response to an interrogation, a second digital signal having a value of one;

means coupled to said first and second signal-generating means for counting the number of interrogations transmitted and for producing an N-count signal upon counting a predetermined number N of interrogations;

first multiplying means coupled to said first signal-generating means for forming a first product by multiplying said first signal by a predetermined weighting value $U_a$;

second multiplying means coupled to said second signal-generating means for forming a second product by multiplying said second signal by predetermined weighting value $D_a$;

means coupled to said first and second multiplying means for accumulating an accept decision sum, said accept decision sum comprising said first products from which are subtracted said second products; and

means coupled to the outputs of said accept-decision sum-accumulating means and said counting means for generating a "Friend-Accept" indication signal whenever said accumulated accept decision sum becomes equal to or greater than a predetermined threshold value $T_a$ before said counting means produces said N-count signal, and for producing a "not-accept" indication signal whenever said N-count signal occurs before said accumulated accept decision sum becomes equal to or greater than said predetermined threshold value $T_a$.

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## 4,020,490
## TRAFFIC RADAR AND APPARATUS THEREFOR

**Keith Millard, Decatur, Ill., assignor to Decatur Electronics, Inc., Decatur, Ill.**

**Filed Nov. 20, 1974, Ser. No. 525,477**
**Int. Cl.² G01S 9/44; G01R 23/14**
**U.S. Cl. 343—8** **19 Claims**

9. In doppler radar apparatus for determining the speed of a vehicle the combination comprising:

input means for providing an input signal having a frequency related to the speed of such vehicle,

source means for generating a synthetic signal of variable controllable frequency,

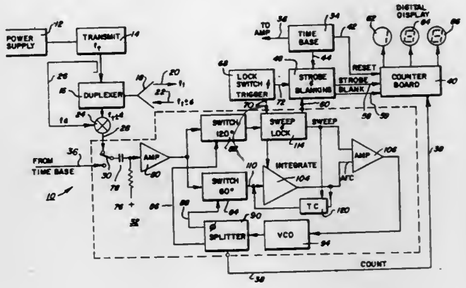
gate means receiving said input signal,

control means energized from said gate means and controlling the frequency of said source means,

sampling means controlled by said source means to control said gate means whereby said gate means applies said input signal to said control means for intermittent periods with a duty cycle less than 50% to equate the periodicity of said synthetic signal to the periodicity of said input signal and eliminate harmonic ambiguities of said input signal,

digital counter and display means energized from said source means to generate a count related to the frequency of said source means, and

a timer means controlling the counting interval of said digital counter and display means whereby said count during said interval represents the speed of such vehicle.

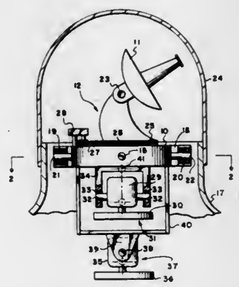



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## 4,020,491
## COMBINATION GYRO AND PENDULUM WEIGHT PASSIVE ANTENNA PLATFORM STABILIZATION SYSTEM

**Albert H. Bieser, Garland; William B. Stuhler, Plano, and Dorsey T. Smith, Garland, all of Tex., assignors to B. E. Industries, Garland, Tex.**

**Filed Oct. 7, 1974, Ser. No. 512,530**
**Int. Cl.² H01Q 1/18**
**U.S. Cl. 343—765** **22 Claims**



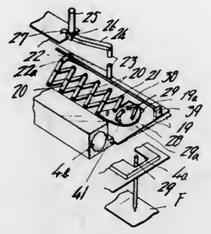
1. In a combination gyro and pendulum weight stabilized passive stabilization system: a platform structure pivotally mounted with respect to one or more pivotal axes lying in a pivotal axis plane and having a center of gravity below said pivotal axis plane; a gyro motor means and rotor means associated with at least one of said pivotal axes and pivotally mounted by pivot means in said platform structure on a gyro mounting pivotal axis substantially parallel to an associated reference axis which is perpendicular to an individual one of the pivotal axes of the pivotal mounting of said platform structure; with said gyro motor means and rotor means having precession restaining means; and when erect, the gyro rotor means being rotational in a plane normal to a vertical axis.

**4,020,492**

## HAND-WRITING TYPE RECORDING DEVICE FOR A CAMERA

**Horikomi Sumio, 5-10-11, Minami Shinagawa, Shinagawa, Tokyo, Japan**

**Filed Feb. 20, 1976, Ser. No. 659,595**
**Claims priority, application Japan, Mar. 20, 1975, 50-33649; Oct. 3, 1975, 50-120053**
**Int. Cl.² G01D 9/42; G03B 17/24**
**U.S. Cl. 346—107 R** **8 Claims**



1. A hand-writing type recording device for use in conjunction with a camera having a hole in the rear plate comprising a rectangular casing having front, rear, end and side walls, said rear wall having a window adapted to be aligned with said hole in the rear plate of the camera, a horizontal partition plate extending to the longitudinal and transverse directions within said casing, information support means secured to the upper surface of said partition plate at a selected area thereof, hand-writing means disposed above said information support means and having a portion contacting the information support means, erasing means pivoted to the upper surface of said partition plate at another selected area thereof for erasing said information supported on the information support means, a resiliently supported carriage plate positioned below said partition plate for resilient vertical movement, information size reduction means pivoted at one end to said hand-writing means and supporting at the other end optical recording means, a display lamp mounted on one of said walls of the casing and electrical circuit means for synchronistrically energizing and deenergizing said optical recording means and display lamp.

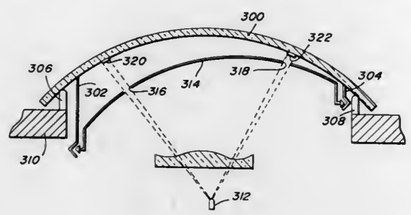
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**4,020,493**

## PHOTOGRAPHIC MASTER FOR USE IN SCREENING A COLOR CATHODE RAY TUBE

**Kazimir Palac, Carpentersville, and Raymond M. Stachniak, Wheaton, both of Ill., assignors to Zenith Radio Corporation, Chicago, Ill.**

**Division of Ser. No. 535,614, Dec. 23, 1974, Pat. No. 3,975,198. This application Nov. 21, 1975, Ser. No. 634,201**
**Int. Cl.² G03B 41/00; G03C 5/00; H01J 29/80**
**U.S. Cl. 354—1** **2 Claims**



1. For use in the manufacture of rectangular color cathode ray tubes, and particularly for use in photoprinting a phosphor screen on a rectangular, three-dimensionally curved faceplate of a color cathode ray tube which has master mounting means in at least three corners thereof, a screening master comprising:

a rectangular, transparent, torsionally flexible substrate having a curvature corresponding substantially to the curvature of the faceplate, on the convex surface of which is disposed a screening master stencil pattern; and

a master suspension element in at least three corresponding corners of said substrate for engaging said master mounting means to suspend said substrate in spaced adjacency to the concave surface of the faceplate, the corner suspension and torsional flexibility of said master being effective to cause the master to flex about a diagonal and conform to a faceplate when mounted thereon.

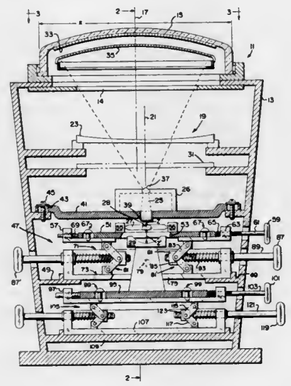
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**4,020,494**

## CRT SCREEN EXPOSURE DEVICE HAVING IMPROVED OPTICAL ALIGNMENT

**Stanley L. Pawlikowski, Seneca Falls, and Carl W. Penird, Waterloo, both of N.Y., assignors to GTE Sylvania Incorporated, Stamford, Conn.**

**Filed Mar. 18, 1976, Ser. No. 668,063**
**Int. Cl.² G03B 41/00**
**U.S. Cl. 354—1** **10 Claims**



1. An improvement in a cathode ray tube screen exposure device having an encompassing enclosure with a central axis therethrough and employing an internally positioned optical system oriented on an optical system axis offset from said central axis, said optical system including a light output area, related light means effecting a source of radiant energy and an associated spatially positioned reflective means, said system providing discrete exposure of a sensitized screen coating disposed on the interior surface of a CRT display panel positioned over an opening in said device, said panel having an $x - y$ plane delineated by $x$ and $y$ axes substantially coincident with the respective major and minor dimensions of the display area thereof and an interiorly oriented multi-apertured grid negative spacedly related to the screen portion thereof, said improvement being optical alignment means comprising:

mechanical means for achieving fine adjustable positional movement of said source of radiant energy relative to said light output area in an $x$ related direction in a plane substantially normal to said optical axis and substantially parallel with the $x - y$ plane of said panel; and

mechanical means for achieving fine adjustable positional movement of said source of radiant energy relative to said light output area in a $y$ related direction in a plane substantially normal to said optical axis and substantially parallel with the $x - y$ plane of said panel; each of said respective adjustable movements being effected by individual linkage means to separate control means located exteriorly of said enclosure whereby said radiant energy source is optionally optically aligned relative to said light output area.



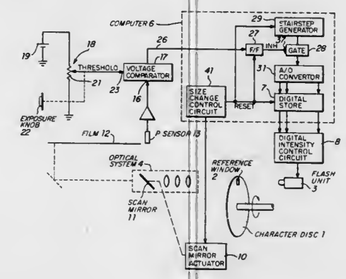
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**4,020,495**

## SELF TESTING PHOTOTYPESETTER FLASH INTENSITY CONTROL SYSTEM

**Peter R. Ebner, South Nashua, and Louis E. Griffith, Hampstead, both of N.H., assignors to Itek Corporation, Lexington, Mass.**

**Filed Dec. 29, 1975, Ser. No. 644,387**
**Int. Cl.² B41B 13/00**
**U.S. Cl. 354—5** **18 Claims**




1. A system for establishing proper character illumination intensities in a phototypesetter for various character sizes comprising:

a. a character projection optical system for imaging a character upon a photosensitive medium;

b. a character image generator including a light source for producing character light images at the input of said character projection optical system;

c. a light intensity measuring means for measuring the intensity of light emerging from said character projection optical system;

d. a reference signal generating means;

e. a comparator for comparing the signal produced by said reference signal generating means and the signal produced by said light intensity measuring means and for producing an output signal when the signal produced by said light intensity measuring means assumes a given relationship with respect to the value of the signal produced by said reference signal generating means;

f. a reference image generating means including said light source for projecting a reference image through said character projection optical system and at said light intensity measuring means;

g. first light source intensity control means for causing said light source to sequentially illuminate said reference image generator at varying intensity levels until the value of the signal produced by said light intensity measuring means assumes said predetermined relationship with respect to the value of the signal produced by said reference signal generating means, thereby to cause said comparator to generate said output signal; and

h. second control means responsive to the generation of said output signal by said comparator for causing said first light source intensity control means to cease changing the intensity of light produced by said light source, thereby to establish the intensity of character images projected upon said photosensitive medium during typesetting.

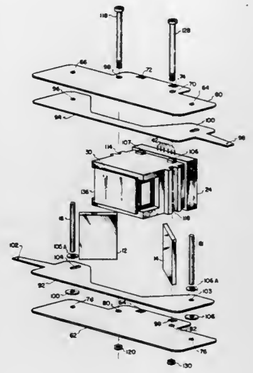
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**4,020,496**

## SUPPORT FOR COMPONENTS OF AN AUTOMATIC FOCUSING SYSTEM

**Dean M. Peterson, and John C. Wittenberger, both of Littleton, Colo., assignors to Honeywell Inc., Minneapolis, Minn.**

**Filed Nov. 11, 1975, Ser. No. 630,794**
**Int. Cl.² G03B 3/10, 13/20**
**U.S. Cl. 354—25** **18 Claims**



1. A support for an automatic focusing system comprising a pair of identical plates that are spaced apart and form an enclosure for said support, one of said plates having a plurality of openings that are in alignment with identical openings formed in the other plate, a pair of shafts positioned between said plates, each of said shafts extending through a different pair of said aligned openings in said plates, a separate image transferring mirror mounted on each of said shafts, and

an image receiving module positioned between said plates, said module having a plurality of plate retaining bosses on its surfaces adjacent said plates, said plates having additional pairs of aligned openings to receive said bosses in snug engagement therewith.

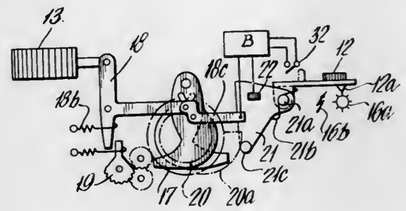
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**4,020,497**

## CAMERA WITH FILM CASSETTE

**Hiroshi Ueda, Nara, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan**

**Filed July 23, 1974, Ser. No. 491,094**
**Claims priority, application Japan, Aug. 1, 1973, 48-86948**
**Int. Cl.² G03B 7/14**
**U.S. Cl. 354—27** **4 Claims**



1. In a camera including:

an objective lens movable along its optical axis for focussing;

a shutter including movable blades relatively slowly movable from their closed to opened position to open said shutter and relatively rapidly movable from their opened to closed position to close said shutter;

means for opening said shutter in response to shutter release operation;
light sensitive means for generating an output commensurate with the brightness of an object to be photographed;
means for closing said shutter when a time period dependent on the output of said light sensitive means has passed after the opening of said shutter;
electronic flash means having an electronic flash tube and a firing circuit for firing said electronic flash tube;
a power source;
a power source switch manually operable to a closed position and an opened position and connected between said power source and said electronic flash means;
a synchronous switch which is closed to cause said firing circuit to fire said electronic flash tube when said shutter is brought into its open position,
the improvement wherein said synchronous switch comprising:
a first contact movable with said movable blades; and
a second contact movable into and out of the path of said first contact respectively when said power source switch is in said closed position and in said open position, said second contact being additionally movable along said path of movement of said first contact in accordance with the position of said objective lens, whereby, when said power source switch is in said closed position, said first and second contacts engage one another during the movement of said movable blades toward their opened position with a timing which depends upon the position of said second contact along said path of movement of said first contact.

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**4,020,498**

## PHOTOGRAPHIC FLUID PROCESSING APPARATUS

**Harvey S. Friedman, Natick, Mass., assignor to Polaroid Corporation, Cambridge, Mass.**

**Filed Nov. 28, 1975, Ser. No. 636,084**
**Int. Cl.² G03B** *17/50*
**U.S. Cl. 354—86** **3 Claims**



1. Photographic apparatus comprising:
means for locating at least one substantially rectangular flat self-processable film unit in position for exposure, the film unit including a pair of superposed sheet elements, a container of processing fluid positioned adjacent the leading edge of the film unit and a pair of binders respectively overlapping and attached to the longitudinal edges of the superposed sheet elements to hold the superposed sheet elements together along their longitudinal edges, the binders thus being adapted to control the thickness of a layer of the processing fluid progressively spread from the container, under an applied pressure, from the leading edge to the trailing edge of the film unit, the film unit including an exposure area having its lateral width defined by the inwardly facing edges of the binders disposed on one side of the superposed sheet elements, the inwardly facing edges of the binders disposed on the other side of the superposed sheet elements being laterally spaced apart a distance wider than the lateral width of the exposure area of the film unit, the film unit thus being adapted to have the layer of processing fluid spread between its superposed sheets extend laterally beyond its exposure area and beyond portions of its binders, the film apparatus defining a line coinciding with the longitudinal centerline of the film unit when the film unit is disposed in its exposure position by said locating means;
first and second elongated pressure applying members mounted i juxtaposed relationship to define an elongated pressure generating gap extending normal to said line of said apparatus and positioned to receive the leading edge of the film unit as the film unit is advanced leading edge first from its exposure position with the exposure area defining edges of the binders facing said first pressure applying member, said pressure applying member serving to apply a compressive force to the film unit effecting first the release of the processing fluid from its container and then the spreading of the released processing fluid between the superposed sheet elements of the film unit as the film unit is advanced through said pressure generating gap; and
means for advancing the film unit leading edge first away from its said exposure position and into said pressure generating gap, said advancing means including means for engaging the film unit adjacent the trailing edge of one of its longitudinal edges causing the leading edge of the film unit to become canted at a predetermined angle with respect to said line of said apparatus as the film unit moves from its exposure position into said pressure generating gap,
said first pressure applying member including means for presenting a pair of laterally spaced apart shallow recesses of substantially equal width to the film unit as it is advanced therepast, said recesses being spaced apart along said first pressure applying member such that their inward edges are separated by a distance less than the lateral width of the film unit's exposure area, said width of said recesses being selected such that their outward edges are separated by a distance less than the width of the film unit, said recesses further being arranged laterally along said first pressure applying member to be asymmetrically disposed with respect to said line of said apparatus to respectively progressively receive the entire length of the exposure area defining edges of the binders as the film unit moves through said pressure generating gap while portions of the film unit binders overlying both sides of the longitudinal edge portions of the film unit's juxtaposed sheet elements being continually disposed between said pressure applying members exteriorly of said recesses at such times and thereby function in combination with the longitudinal edges of the superposed film unit sheets respectively disposed therebetween to space said pressure applying members away from one another as the film unit moves through said pressure generating gap with the processing fluid, as it is released from its container, spreading between th film unit's superposed sheets underneath and laterally beyond the exposure area defining edges of the binding.

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**4,020,499**

## APPARATUS FOR CONTROLLING DRIVE TO PRESSURE ROLLERS IN A CAMERA WITH ELECTRIC MOTOR DRIVE

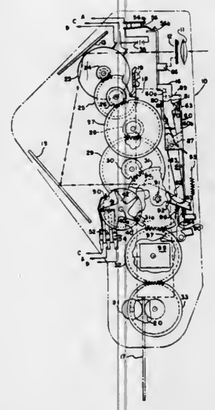
**Clifford G. Vroom, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.**

**Filed Mar. 1, 1976, Ser. No. 662,307**
**Int. Cl.² G03B** *17/50*
**U.S. Cl. 354—86** **5 Claims**

1. In a camera for effecting exposure and processing of a self-processable film unit, the camera including a shutter for exposing the film unit, a movable shutter release member for actuating the shutter, means for restoring the shutter release member to an initial position after movement of the member to actuate the shutter, a pair of opposed pressure members at least one of which is a roller for removing the exposed film unit from the camera, an electric motor, drive means coupling the motor to the roller for drivingly rotating the roller, and control means for controlling electric current to the motor, the improvement wherein the control means comprises:



a star wheel;
means for rotatively supporting the star wheel;
means for rotating the star wheel incrementally through a cycle, the star wheel rotating means also being coupled with the drive means so that one complete revolution of the star wheel is associated with a desired number of rotations of the roller;
means cooperating with the star wheel for selectively furnishing electric current to the motor in accordance with the angular orientation of the star wheel; and



means for mechanically nudging the star wheel from an end-of-cycle position in which position no electric current is furnished to the motor to an angular orientation in which electric current may be furnished to the motor, the nudging means being cooperable with the shutter release member so as to nudge the star wheel from its end-of-cycle position during return of the shutter release member to its initial position.

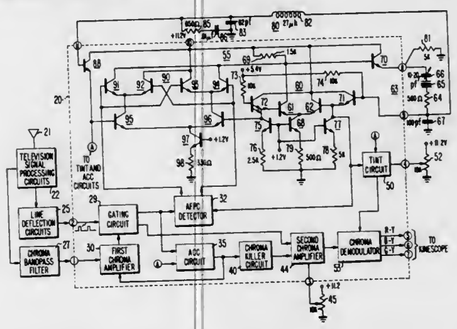
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**4,020,500**

## CONTROLLED OSCILLATOR

**Leopold Albert Harwood, Somerville, N.J., assignor to RCA Corporation, New York, N.Y.**

**Filed Nov. 19, 1975, Ser. No. 633,462**
**Int. Cl.² H04N** *9/46*
**U.S. Cl. 358—19** **15 Claims**




1. A controllable oscillator comprising:
amplifier means having an input and an output;
reactive means having a predetermined resonant frequency response coupled in a closed circuit loop between said input and output of said amplifier means for providing regenerative feedback of sufficient magnitude to produce an oscillatory signal having a reference phase at said output;
means coupled to said output for phase shifting said oscillatory signal a predetermined amount in relation to said reference phase to produce a phase shifted signal;
means for providing control signals representative of the phase and/or frequency of said oscillatory signal with respect to a predetermined reference signal;
control means coupled to said phase shifting means for receiving said phase shifted signal to produce anti-phase signal outputs and responsive to said control signals for providing controllable amounts of said anti-phase output signals;
means for combining said controllable amounts of said anti-phase output signals from said control means with said oscillatory reference signal to produce a combined signal having a resultant phase; and
means for supplying said combined signal to said amplifier means for maintaining said oscillatory signal in desired relation with said predetermined reference signal.

14. In a color television receiver adapted to receive and process a color television signal including a chrominance information component and a color synchronizing burst component having a prescribed phase and frequency, a controlled oscillator comprising:
an oscillation amplifier with an input and an ouput;
a reactive filter network, including a crystal, having a frequency response characteristic centered relatively about said frequency of said burst component, coupled in a closed loop between said input and output of said oscillation amplifier for providing regenerative feedback of sufficient magnitude to produce an oscillatory signal with a frequency substantially equal to said burst component frequency and with a reference phase;
a phase shift network coupled to said output for phase shifting said oscillatory signal and a predetermined amount with respect to said reference phase to produce a phase shifted signal;
a source of control signals representative of the frequency and/or phase of said oscillatory signal with respect to said burst component;
a controllable amplifier supplied with said phase shifted signal to produce anti-phase signal outputs and responsive to said control signals for providing controllable amounts of said anti-phase ouput signals in accordance with the magnitude and polarity of said control signals;
a combining network coupled to said oscillation amplifier and to said controllable amplifier for summing said oscillatory signal and said controllable amounts of said anti-phase output signals to produce a combined signal having a resultant phase; and
means for coupling said combined signal to said reactive filter network to proudce an oscillatory signal in desired frequency and phase synchronism with said burst component.

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**4,020,501**

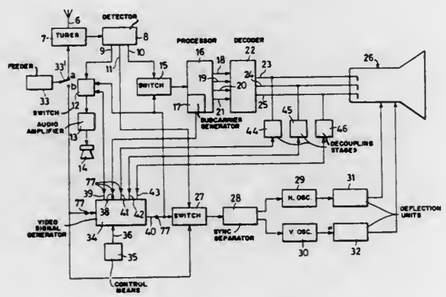
## APPARATUS FOR VISUALIZING ON A KINESCOPE SCREEN VIDEO SIGNALS WHICH ARE EITHER PICKED UP BY AN ANTENNA OR GENERATED IN THE APPARATUS ITSELF

**Horst Hillberger; Dino Masili; Lorenzo Plos, all of Pordenone, and Luigi Ret, Porcia (PN), all of Italy, assignors to Industrie A. Zanussi S.p.A., Pordenone, Italy**

**Filed Feb. 18, 1976, Ser. No. 658,899**
**Claims priority, application Italy, Feb. 27, 1975, 45701/75**
**Int. Cl.² H04N** *9/535;* **G08B** *23/00*
**U.S. Cl. 358—64** **7 Claims**

1. An apparatus for the visualization on a kinescope screen of color video signals alternatively picked up by an antenna and generated in the same apparatus, comprising an audio and video receiving circuit having, in a conventional manner, a

feeding stage, a tuning stage and a detecting stage at medium frequency for the composite antenna signal, said detector having a first output adapted to drive the audio section of said circuit, a second output adapted to drive said kinescope through a section incorporating a generator of a fixed frequency signal, for processing said composite signal chromatically, and a third output adapted to drive the kinescope deflection system through a synchronism separator stage, characterized in that it comprises, additionally, a device for generating, in a manner known per se, additional composite color video signals which are controllable and representative of respective luminous symbols to be visualized on said kinescope, said device having a main input driven by said generator, at least a control input driven by control means, known per se, for said additional signals, a first output for line and picture synchronism signals adapted to drive said synchronism separator, three further outputs for the chrominance components of said additional signals adapted to drive said kinescope though respective decoupling stages, and a fourth output for an audio signal adapted to drive said audio section, the input




of the latter section being alternatively connected to the first output of said detector and to said fifth output through first bistable switching means known per se, the input of said chromatic processing section being alternatively connected to the second output of said detector and to a point at a fixed reference potential through second bistable switching means, the input of said synchronism separator being alternatively driven by the third output of said detector or by the first output of said device through third bistable switching means, and further characterized in that the output of said feeder, through a manually actuable switch, alternatively feeds either said tuner or said device and third switching means when said switch is in a first and a second position, respectively, the first output of said device being further adapted to drive the switching of said first and second switching means, all of these switches being in a first stable state in which the apparatus processes the signal picked up by the antenna, or in a second stable state in which the apparatus processes the signals generated by said device when said switch is in said first or said second position, respectively.

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**4,020,502**

**METHOD AND APPARATUS FOR SEPARATING, COMBINING AND REARRANGING COLORED IMAGES**

**Heijiro Hayami; Hiroaki Kotera; Hiroyoshi Tsuchiya; Ryuzo Kan; Kunio Yoshida; Tsutomu Shibata, and Yukifumi Tsuda, all of Kawasaki, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan**

**Filed Oct. 10, 1975, Ser. No. 621,533**

**Claims priority, application Japan, Oct. 14, 1974, 49-119101**

**Int. Cl.² H04N 9/10; G03F 3/00**

**U.S. Cl. 358—80** **7 Claims**

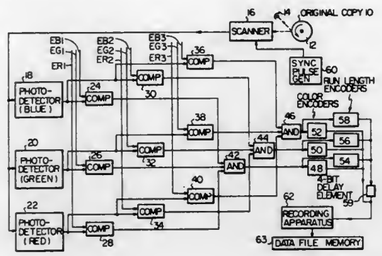
7. A method for separating a colored original into a plurality of colored images and recovering the colored original from the separated images, comprising:

segmenting a colored original into a plurality of line paths;

dividing each of the line paths into one or more line segments of different colors;

characterizing the color of each line segment with a first code;

characterizing the length of each line segment with a second code;




recording the first and second characterizing codes in succession;

detecting one of the recorded first characterizing codes;

decoding into a video signal the second code characterizing the length of the line segment whose color is characterized by the detected first code; and

developing an image in response to the video signal.

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**4,020,503**

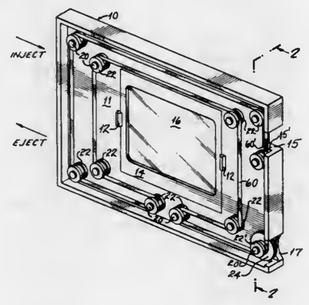
**STILL IMAGE SLIDE WITH SOUND TRACK CONTROL**

**Martin E. Gerry, 13452 Winthrope St., Santa Ana, Calif. 92705**

**Filed Mar. 26, 1976, Ser. No. 671,016**

**Int. Cl.² G11B 23/44**

**U.S. Cl. 360—1** **11 Claims**




1. In a means for providing stationary images from slides and sound related to said images, the combination comprising:

a retainer for one of the slides;

an endless taut magnetic tape mounted for translation within the confines of the retainer circumjacent said one of the slides;

stationary magnetic transducer heads, in cooperation with the tape, communicating non-digital signal information therebetween during operative mode of said means; and

control means connected to the magnetic heads for providing a plural number of individual sound tracks, one of said sound tracks per head in predetermined sequence for each of the stationary images, said control means including first means for enabling each of the sound tracks to have a predetermined time duration and second means for activating each of said heads for a period substantially equal to said predetermined time duration, said first and second means enabling the non-digital signal information to be continued from one of said sound tracks to another.



**4,020,504**

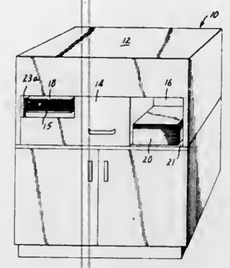
**AUTOMATIC MAGNETIC RECORD SHEET COPYING APPARATUS**

**Arthur Z. Proulx, Birchwood Village, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

**Filed Mar. 24, 1975, Ser. No. 561,611**

**Int. Cl.² G11B 25/04, 5/80**

**U.S. Cl. 360—17** **7 Claims**



1. A magnetic record sheet copying apparatus comprising

a. a copying station including a magnetically permeable top surface having a plurality of alignment pins projecting therefrom for receiving and aligning a master sheet having a master magnetic record thereon and a blank magnetic copy sheet, said sheets having a plurality of openings positioned to match the location of said alignment pins such that said recieved sheets are precisely aligned,

b. means for pressing together said aligned master and copy sheets, and

c. means for impressing a magnetic field on said pressed together sheets to enhance the bulk duplication of the master magnetic record onto a thus recorded copy sheet,

wherein the improvement comprises

d. a supply station including means for receiving, aligning and supporting a stacked supply of blank copy sheets a predetermined horizontal distance from said copying station,

e. means for precisely vertically lifting a top sheet from said stacked supply, for horizontally transporting a said lifted top sheet a said predetermined horizontal distance from said supply station to said copying station, for precisely vertically lowering the transported top sheet onto said copying station and for engaging the openings in a said transported copy sheet with said alignment pins, thereby ensuring that a plurality of said blank copy sheets may repeatedly be transferred said predetermined distance from the top of said stacked supply and to the copying station precisely aligned together with the master sheet thereat,

f. a discharge station including means for receiving, stacking and supporting said recorded copy sheets, and

g. means for transporting a said recorded copy sheet from said copying station to said discharge station,

whereby a said magnetic record positioned at a predetermined location on a said master sheet may be automatically bulk duplicated onto precisely the same relative location on a plurality of copy sheets by repeated transporting, aligning and pressing together of the respective copy sheets and a said master sheet in the presence of said magnetic field.

**4,020,505**

**MAGNETIC SHEET PLAYER WITH AN ADJUSTABLE INCLINED MAGNETIC HEAD**

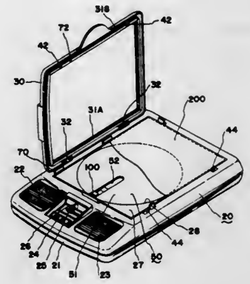
**Masao Iwaoka; Yosuke Igeta; Toyochika Kiku; Fumio Kobayashi, and Tatsuhiko Sugai, all of Tokyo, Japan, assignors to Gakken Co. Ltd., Tokyo, Japan**

**Filed Oct. 20, 1975, Ser. No. 624,128**

**Claims priority, application Japan, Nov. 26, 1974, 49-142333; Dec. 11, 1974, 49-149199; Feb. 22, 1975, 50-24817; Feb. 25, 1975, 50-25679; Feb. 27, 1975, 50-26746**

**Int. Cl.² G11B 21/02, 21/18**

**U.S. Cl. 360—101** **14 Claims**



1. In a magnetic sheet player of the type having a casing with a rectangular platform for supporting a magnetic sheet thereon, said magnetic sheet having a spiral magnetic track on one surface which faces said platform, a turntable constituting a part of said platform and rotatable relative to the same, and a magnetic head movable along a radial guide slot in said turntable in step with the rotation thereof to follow the spiral track on the magnetic sheet, the improvement comprising:

a rectangular holder frame means for immovable holding the magnetic sheet over said platform, with the magnetic sheet being caught only at its marginal edges by said holder frame;

means for yieldably urging said magnetic head into abutting contact with the magnetic sheet held by said holder frame over said platform; and

means for holding said magnetic he d out of the perpendicular to the plane of the magnetic sheet so that said magnetic head is inclined in the forward direction of rotation of said turntable with respect to the plane normal to the plane of said turntable;

whereby said magnetic head maintains intimate contact with the magnetic sheet throughout its travel along the spiral track thereon.

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**4,020,506**

**TAPE CARTRIDGE WITH TRACK POSITION INDICATOR**

**Michael Conan Barrett, and Eric Sigfried Petterson, both of Austin, Tex., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed June 30, 1975, Ser. No. 591,793**

**Int. Cl.² G11B 21/10, 23/38**

**U.S. Cl. 360—137** **5 Claims**

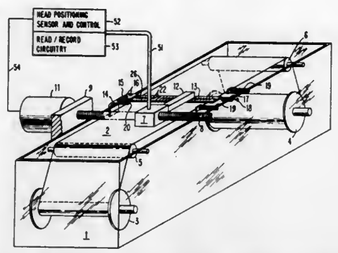
1. A magnetic tape cartridge comprising:

a magnetic tape;

a housing enclosing a portion of said tape and supporting said tape for movement therein;

one end of a track position indicator attached to said housing, said indicator including indicia thereon indicative of track positions of magnetic recording tracks extending longitudinally along said tape and positioned in substantially parallel relation across a width of said tape, said indicator having a coefficient of thermal and hygroscopic expansion closely similar to the coefficient of thermal and hygroscopic expansion of said magnetic tape; and

a reference edge surface contacting one edge of said tape, said reference edge surface attached to said housing of said cartridge and said reference edge surface being perpendicular to said tape, the other edge of said tape being spring biased toward said reference edge surface and exapandable away from said reference edge surface due to temperature and humidity, said indicator being attached to said housing at said reference edge surface, said tape and said indicator expanding substantially the same




amounts in the same direction upon changes in temperature and humidity.

# DESIGN PATENTS

## GRANTED APRIL 26, 1977

### ERRATA

| For CLASS | See PATENT NO. |
|---|---|
| 015–090 | 244,131 |
| 022–027 | 244,132 |
| 022–030 | 244,133 |
| 023–155 | 244,134 |
| 023–057 | 244,135 |
| 023–107 | 244,136 |
| 023–138.1 | 244,137 |
| 025–078 | 244,138 |
| 013–004 | 244,143 |
| 024–064 | 244,152 |
| 024–029 | 244,153 |
| 024–023 | 244,154 |
| 024–017 | 244,155 |

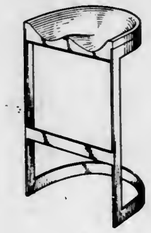
244,106
CHILD'S ROCKING CHAIR
Jeff London, 180 Thimble Islands Road, Stony Creek, Conn. 06405
Filed Sept. 19, 1975, Ser. No. 614,974
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—11



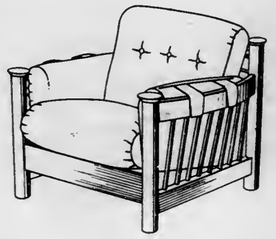
244,107
BAR STOOL
Colman Zola, 58 Tamarack Way, Pleasantville, N.Y. 10570
Filed Oct. 20, 1975, Ser. No. 624,122
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—32



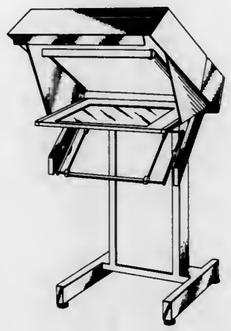
244,108
BAR STOOL
Warren F. Bacon, 1980 Sierra Madre Villa, Pasadena, Calif. 91107
Filed Dec. 16, 1975, Ser. No. 641,303
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—32



244,109
SEAT
Colman Zola, 58 Tamarack Way, Pleasantville, N.Y. 10570
Filed Oct. 20, 1975, Ser. No. 624,245
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—73



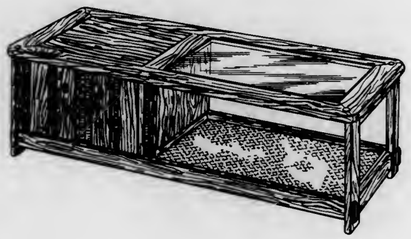
244,110
ELECTRONIC COMPONENT PRODUCTION ASSEMBLY LOCATER
Lewis A. Latanzi, Bethel, Conn., assignor to Contact Systems, Inc., Danbury, Conn.
Filed Sept. 10, 1975, Ser. No. 611,915
Term of patent 14 years
Int. Cl. D6—*99*
U.S. Cl. D6—85



244,111
COMMODE OR SIMILAR ARTICLE
Ira Friedman, Somerset, N.J., assignor to Rowe Furniture Corporation
Filed Jan. 21, 1976, Ser. No. 651,155
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—167



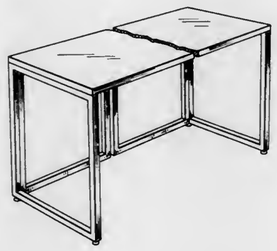
244,112
COCKTAIL TABLE
Ira Friedman, Somerset, N.J., assignor to Rowe Furniture Corporation
Filed Jan. 21, 1976, Ser. No. 650,961
Term of patent 14 years
Int. Cl. D6—*03*
U.S. Cl. D6—175



244,113
TABLE OR THE LIKE
Ira Friedman, Somerset, N.J., assignor to Rowe Furniture Corporation
Filed Jan. 21, 1976, Ser. No. 651,154
Term of patent 14 years
Int. Cl. D6—*03*
U.S. Cl. D6—175

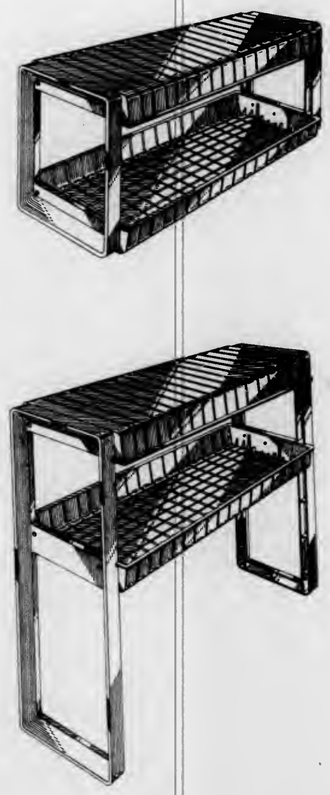


244,114
TABLE
Paul J. Neff, Mississauga, Canada, assignor to Neff Kitchen Manufacturers Limited, Brampton, Canada
Filed July 18, 1975, Ser. No. 597,251
Claims priority, application Canada, June 12, 1975, 1206757
Term of patent 14 years
Int. Cl. D6—*03*
U.S. Cl. D6—177

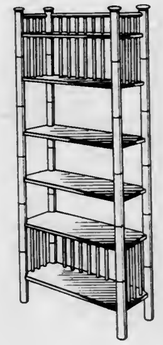




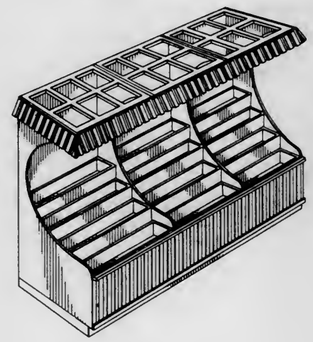
244,115
PLANT STAND
Richard D. Dilyard, Wooster, Ohio, assignor to Rubbermaid Incorporated, Wooster, Ohio
Filed May 10, 1976, Ser. No. 685,084
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—182



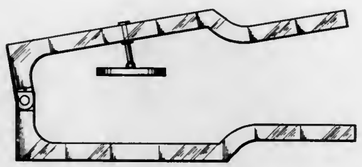
244,116
ETAGERE
Colman Zola, 58 Tamarack Way, Pleasantville, N.Y. 10570
Filed Oct. 20, 1975, Ser. No. 624,841
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—186



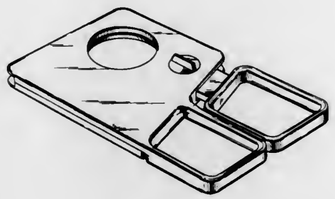
244,117
DISPLAY STAND
Thomas H. Naylor, 1221 W. Lehigh Place, Englewood, Colo. 80110
Filed Jan. 29, 1976, Ser. No. 653,466
Term of patent 14 years
Int. Cl. D20—*02*; D6—*04*
U.S. Cl. D6—188



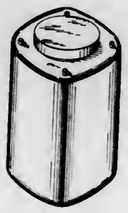
244,118
**RETAINING TOOL FOR A CUT CAN LID**
Larry G. Dick, 324 Hamilton Drive, Suisun, Calif. 94585
Filed Aug. 13, 1975, Ser. No. 604,233
Term of patent 14 years
Int. Cl. D7—*99*
U.S. Cl. D7—105



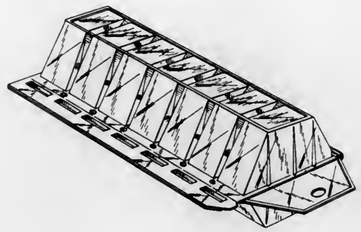
244,119
**EGG-CUTTER**
Hans Forrer, and Max Wegmüller, both of Lyss, Switzerland, assignors to K. Zysset & Co. AG, Lyss, Switzerland
Filed July 10, 1975, Ser. No. 594,946
Claims priority, application Switzerland, Mar. 14, 1975, 60649/75
Term of patent 14 years
Int. Cl. D7—*04*
U.S. Cl. D7—106



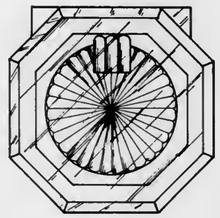
244,120
**PACKAGING CONTAINER OR THE LIKE**
Julius A. Pieper, 5070 N. 35th St., Milwaukee, Wis. 53209
Filed June 13, 1975, Ser. No. 586,566
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—168



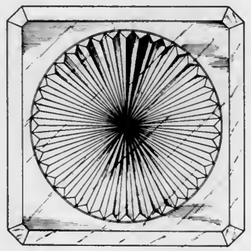
244,121
**RIBBON PACKAGE**
Richard J. Schwartz, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.
Filed Sept. 4, 1975, Ser. No. 610,325
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—183



244,122
**JEWELRY RING BOX**
Jerome Shiffman, 128 Carthage Road, Scarsdale, N.Y. 10583
Filed Aug. 31, 1973, Ser. No. 393,441
Term of patent 7 years
Int. Cl. D9—*03*
U.S. Cl. D9—235



244,123
**WATCH BOX**
Jerome Shiffman, 128 Carthage Road, Scarsdale, N.Y. 10583
Filed Aug. 31, 1973, Ser. No. 393,442
Term of patent 7 years
Int. Cl. D9—*03*
U.S. Cl. D9—235

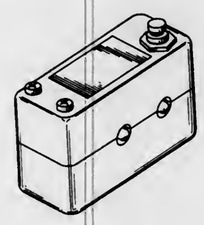




244,124
**DIGITAL THERMOMETER**
Allan L. McLeod, P.O. Box 18484, Wichita, Kans. 67218
Filed Mar. 3, 1975, Ser. No. 554,410
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—57



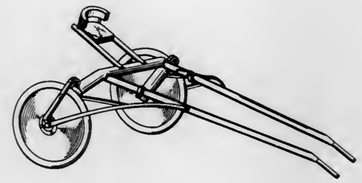

244,125
**BATTERY CHECKER**
Johannes Van Den Haak, Indianapolis, Ind., assignor to Curtis Dyna Products Corporation
Filed June 25, 1975, Ser. No. 590,087
Term of patent 14 years
Int. Cl. D10—*05*
U.S. Cl. D10—77



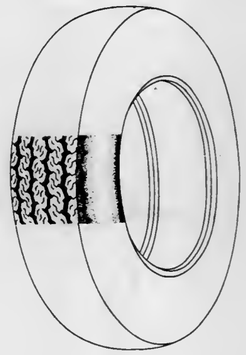
244,126
**EARRING SUSPENDABLE NECKLET**
Wannas Alfred Ladjimi, 24 Mud Road, Setauket, N.Y. 11785
Filed Aug. 27, 1975, Ser. No. 608,169
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D11—8



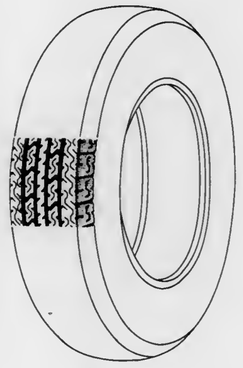
244,127
**SULKY**
Joseph H. King, Box 1731, Ormond Beach, Fla. 32074
Filed Jan. 23, 1976, Ser. No. 651,867
Term of patent 14 years
Int. Cl. D12—*01*
U.S. Cl. D12—19



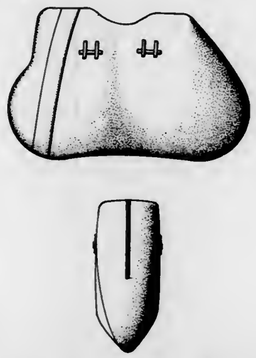
244,128
**TIRE**
Walter W. Hinkel, Massillon; James J. Martell, Cuyahoga Falls, and Pedro F. Perez, Tallmadge, all of Ohio, assignors to The Goodyear Tire & Rubber Company
Filed Dec. 24, 1975, Ser. No. 644,360
Term of patent 14 years
Int. Cl. D12—*15*
U.S. Cl. D12—143



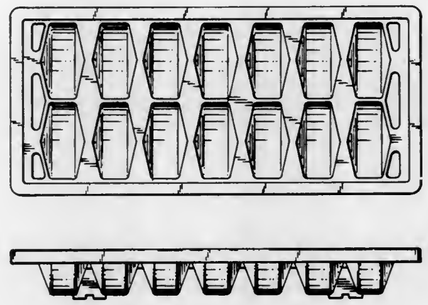
244,129
TIRE
Michael A. Kolowski, Tallmadge, and Charles W. Roberts, Akron, both of Ohio, assignors to The Goodyear Tire & Rubber Company
Filed June 22, 1976, Ser. No. 698,665
Term of patent 14 years
Int. Cl. D12—*15*
U.S. Cl. D12—143



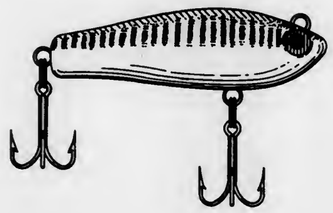
244,130
BICYCLE COVER
Jack R. Blackwell, P.O. Box 1154, Richardson, Tex. 75080
Filed Nov. 7, 1975, Ser. No. 629,717
Term of patent 14 years
Int. Cl. D12—*11*
U.S. Cl. D12—156



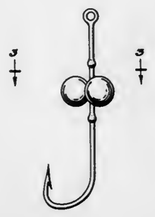
244,131
ICE CUBE TRAY
Michael G. Lalonde, 37 Lutsch Ave., No. 5, Leamington, Ontario, Canada
Filed June 23, 1976, Ser. No. 698,939
Term of patent 14 years
Int. Cl. D15—*07*
U.S. Cl. D15—90



244,132
FISHING LURE
Allen W. Jackson, 1013 Lakemoor Blvd., Rockledge, Fla. 32955
Filed Apr. 12, 1976, Ser. No. 675,986
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—27

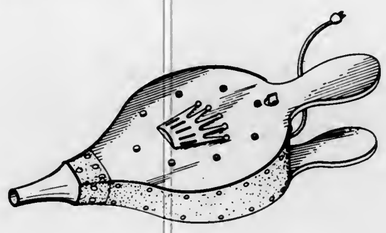


244,133
ORNAMENTAL DESIGN FOR COMBINED FISH HOOK AND ARTIFICIAL FISH EGGS
Thomas N. Tart, 8549 W. Burleigh St., Milwaukee, Wis. 53222
Filed Feb. 9, 1976, Ser. No. 656,610
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—30

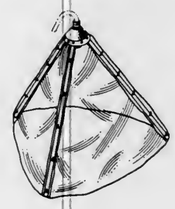




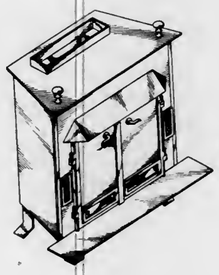
244,134
ELECTRIC FAN
Clifford M. Sturgis, 1213 Westmoreland Road, Colorado Springs, Colo. 80907
Filed Sept. 17, 1975, Ser. No. 614,162
Term of patent 14 years
Int. Cl. D23—*04*; D7—*08*
U.S. Cl. D23—155



244,135
PORTABLE SHOWER
Robert L. Barks, Lot 38, Delaware City Trailer Park, Delaware City, Del. 19706
Filed Dec. 10, 1975, Ser. No. 639,382
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D23—57



244,136
STOVE
Carrol E. Buckner, Weaverville, N.C., assignor to Smoky Mountain Enterprises, Asheville, N.C.
Filed Apr. 9, 1976, Ser. No. 675,413
Term of patent 14 years
Int. Cl. D23—*03*
U.S. Cl. D23—107



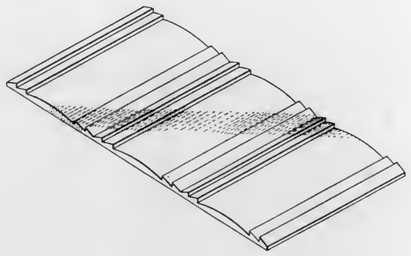
244,137
FIREPLACE MANTEL
Sam Gorman, Chicago, Ill., assignor to Dalton-Gorman Inc., Chicago, Ill.
Filed Jan. 19, 1976, Ser. No. 650,424
Term of patent 14 years
Int. Cl. D23—*03*
U.S. Cl. D23—138.1



244,138
SPINDLE FOR USE IN FORMING ROOM DIVIDERS OR PANELS
Ralph Mondragon, P.O. Box 199, Ranchos de Taos, N. Mex. 87571
Filed Mar. 4, 1975, Ser. No. 555,288
Term of patent 14 years
Int. Cl. D25—*02*
U.S. Cl. D25—78



244,139
CONDENSED MULTIPLE CONVERGENCE LINEAR OPTICAL PLATE FOR INTENSIFICATION OF SOLAR RADIATION OR THE LIKE
Will Clarke England, 7310 Eastcrest Drive, Austin, Tex. 78752
Filed Dec. 1, 1975, Ser. No. 636,778
Term of patent 14 years
Int. Cl. D13—*02*; D26—*05*
U.S. Cl. D13—4



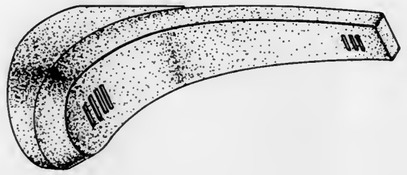
244,140
INTERIOR ACTIVE RECEIVING AUTOMOBILE ANTENNA
Alexandr Alexeevich Zinichev, 15 Parkovaya ulitsa, 24, korpus 1, kv. 59; Nikolai Alexandrovich Strelkovsky, Nikitinskaya ulitsa, 19/1, kv. 57; Oleg Ulyanovich Melnichuk, Chechersky pereulok, 4, korpus 1, kv. 20, and Vladimir Ivanovich Galkin, ulitsa Marshala Tukhachevskogo, 53, kv. 15, all of Moscow, U.S.S.R.
Filed Mar. 13, 1975, Ser. No. 558,116
Term of patent 14 years
Int. Cl. D14—*03*; D12—*16*
U.S. Cl. D14—86

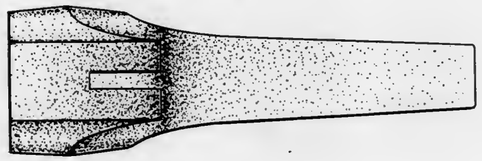


244,141
TELEPHONE
Robert P. Bliven, 5317 1/2 La Cresta Court, Los Angeles, Calif. 90038
Filed Sept. 16, 1975, Ser. No. 613,759
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—53

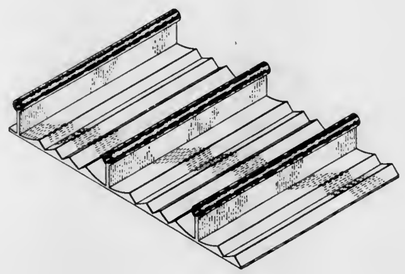


244,142
TELEPHONE
Robert P. Bliven, 5317 1/2 La Cresta Court, Los Angeles, Calif. 90038
Filed Sept. 18, 1975, Ser. No. 614,487
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D26—14 A





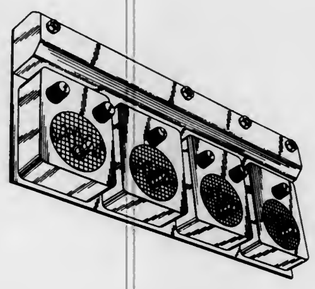
244,143
CONDENSED MULTIPLE CONVERGENCE REFLECTIVE LINEAR OPTICAL AND RECEIVER PLATE FOR SOLAR CONVERSION OR THE LIKE
Will Clarke England, 7310 Eastcrest Drive, Austin, Tex. 78752
Filed Dec. 1, 1975, Ser. No. 636,762
Term of patent 14 years
Int. Cl. D13—*02*; D26—*05*
U.S. Cl. D26—1 R



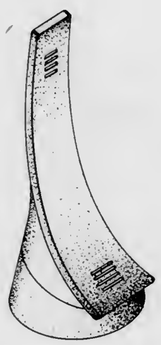


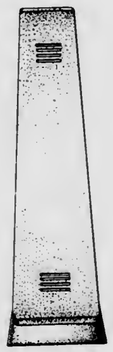
244,144
MODULAR SOUND SYSTEM FOR MUSICAL INSTRUMENTS WITH ELECTRIC PICKUPS
Laurence Anthony Macari, Chorley Wood, England, assignor to Macari's Limited, London, England
Filed Mar. 24, 1976, Ser. No. 669,977
Claims priority, application United Kingdom, Feb. 13, 1976, 974458/76
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—96



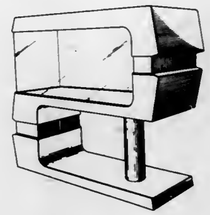


244,145
TELEPHONE
Robert P. Bliven, 5317½ La Cresta Court, Los Angeles, Calif. 90038
Filed Sept. 18, 1975, Ser. No. 614,474
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—53





244,146
AQUARIUM
Luc Chapleau, 3151 Liebert St., Montreal, Quebec, Canada
Filed June 21, 1976, Ser. No. 698,475
Term of patent 7 years
Int. Cl. D30—*02*
U.S. Cl. D30—8



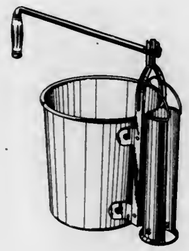
244,147
AQUARIUM
Steven D. Hall, 10455 Ferguson Road, Dallas, Tex. 75228
Filed Apr. 12, 1976, Ser. No. 675,945
Term of patent 14 years
Int. Cl. D30—*02*
U.S. Cl. D30—9



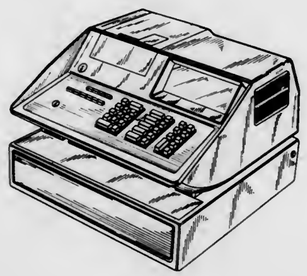
244,148
AQUARIUM COVER
Daniel F. Groth, 14 Brookdale Drive, Wilbraham, Mass. 01095
Filed Dec. 22, 1975, Ser. No. 642,774
Term of patent 14 years
Int. Cl. D30—*02*
U.S. Cl. D30—12



244,149
TENNIS BALL PICKUP
Carl W. Davis, 1182 S. Owens St., Denver, Colo. 80226
Filed Oct. 22, 1975, Ser. No. 624,669
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 ST



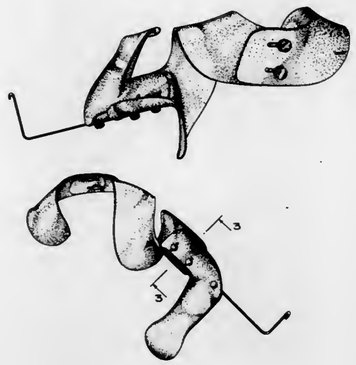
244,150
CASH REGISTER
James M. Rittenhouse, Watchung, N.J., assignor to Sweda International, Inc.
Filed July 18, 1975, Ser. No. 597,193
Term of patent 14 years
Int. Cl. D20—*01*
U.S. Cl. D52—4 A



244,151
FONT OF ARABIC CHARACTERS
Ahmed Lakhdar Ghazal, Ave. Moulay Ali Cherif, Rabat, Morocco ((B.P. 430))
Filed June 26, 1975, Ser. No. 590,701
Claims priority, application Morocco, Dec. 28, 1974, 2356
Term of patent 14 years
Int. Cl. D18—*03*
U.S. Cl. D64—12 B

ابتثجحخدذرزسشصضطظعغفق
كلمنهويءيىةه

244,152
ABDUCTION SPLINT
Johs. Kvittingen, Moholtlia 30, 7001 Trondheim, Norway
Filed Mar. 12, 1975, Ser. No. 557,865
Claims priority, application Norway, Oct. 21, 1974, 56208
Term of patent 14 years
Int. Cl. D24—*04*
U.S. Cl. D24—64

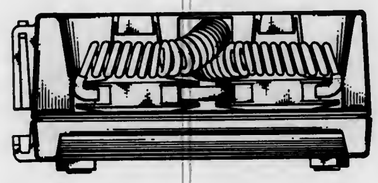


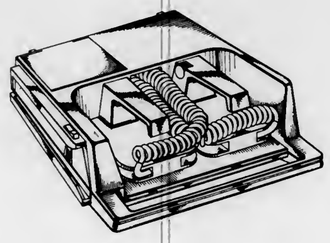
244,153
DEFIBRILLATOR PADDLE ELECTRODE
Paul W. Jones, Bothell, Wash., assignor to Physio-Control Corporation, Redmond, Wash.
Filed Sept. 3, 1976, Ser. No. 720,115
Term of patent 14 years
Int. Cl. D24—*01*
U.S. Cl. D83—1 F



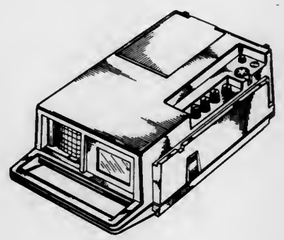


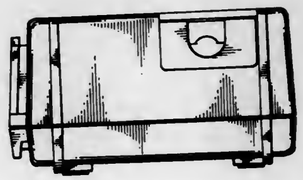
244,154
PORTABLE DEFIBRILLATOR
David B. Smith, Mercer Island; James A. Benson, Bellevue, and Paul W. Jones, Bothell, all of Wash., assignors to Physio-Control Corporation, Redmond, Wash.
Filed Sept. 3, 1976, Ser. No. 720,116
Term of patent 14 years
Int. Cl. D24—*01, 02*
U.S. Cl. D83—1 F





244,155
PORTABLE ELECTROCARDIOGRAM MONITOR AND RECORDER
David B. Smith, Mercer Island, and Douglas J. Hill, Renton, both of Wash., assignors to Physio-Control Corporation, Redmond, Wash.
Filed Sept. 3, 1976, Ser. No. 720,118
Term of patent 14 years
Int. Cl. D24—*01, 02*
U.S. Cl. D83—1 F





# LIST OF PATENTEES

TO WHOM

## PATENTS WERE ISSUED ON THE 26TH DAY OF APRIL, 1977

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A/S Ardal og Sunndal Verk: *See*—
Natvik, Rolf; and Radahl, Rolf, 4,019,973.

AB Akerlund & Rausing: *See*—
Andersson, Rolf; Bjorklund, Bengt; and Hedberg, Tommy, 4,019,675.

AB Karlstadplattan: *See*—
Eriksson, Erik Gustav Lennart, 4,019,936.

Abarotin, Eugene V.; Buckiso, Michael A.; Farley, Daniel T.; and Simko, Stephen R., to United States Steel Corporation. Rail girder for soaking-pit cover. 4,019,446, Cl. 110-173.00A.

Abbott Screw & Mfg. Co.: *See*—
DeHaitre, Lon, 4,019,550.

Abdallah, Abdulmunien H., to Dow Chemical Company, The. Ethanol intoxication with 2[(3-trifluoromethylphenoxy)methyl]-2-imidazoline. 4,020,167, Cl. 424-273.000.

Abolins, Visvaldis; Cooper, Glenn D.; and Lee, Gim F., Jr., to General Electric Company. Blends of a polyphenylene ether resin, alkenyl aromatic resins modified with EPDM rubber and graft polymerized high rubber content polymers. 4,020,124, Cl. 260-876.00R.

Abraham, Nedumparambil A.; Immer, Hans U.; Nelson, Verner R.; and Sestanj, Kazimir, to Ayerst McKenna and Harrison Ltd. Shortened analogs of somatostatin. 4,020,157, Cl. 424-177.000.

Ackerley, Norman; Mack, Peter Albert; and Johnson, David Harold, to Imperial Chemical Industries Limited. Oxime. 4,020,105, Cl. 260-566.00A.

Ackerley, Norman; and Mack, Peter Albert, to Imperial Chemical Industries Limited. Metal extraction process. 4,020,106, Cl. 260-566.00A.

Ackley, Donald M. Vaporizer apparatus. 4,019,476, Cl. 123-119.0DB.

Acme Service Corporation: *See*—
Levine, Fred, 4,019,704.

Acoustic Fiber Sound Systems, Inc.: *See*—
Croup, Robert E., 4,019,708.

Acumeter Laboratories, Inc.: *See*—
McIntyre, Donald B.; and McIntyre, Frederic S., 4,020,194.

Adachi, Kiyoshi: *See*—
Ozawa, Goro; Kosaka, Kenzo; Sato, Kasumi; Ishikawa, Akio; Nanbu, Toshiyuki; Adachi, Kiyoshi; Okaya, Tsutomu; Goto, Takashi; and Kitagawa, Hiroshi, 4,019,228.

Adams, Kenneth Douglas, to Singer Company, The. Feed regulator locks. 4,019,450, Cl. 112-215.000.

Adams, William B.; Anderson, Douglas R.; and Carpenter, Daniel D., to TRW Inc. Method of and apparatus for transmitting and receiving coded digital signals. 4,020,461, Cl. 340-146.1AL.

Addmaster Corporation: *See*—
Busch, Richard E., 4,019,618.

Addressograph Multigraph Corporation: *See*—
Davis, William A., 4,019,435.

Advance Coatings Company: *See*—
Whittum, Howard A.; and Hjelm, Michael J., 4,019,922.

Aebi, Rudolph: *See*—
Vogel, Christian; and Aebi, Rudolph, 4,019,894.

AEG-Kanis Turbinenfabrik GmbH: *See*—
Deinlein-Kalb, Hans, 4,019,713.

Aeroport de Paris: *See*—
Bonnard, Pierre Marcel; Bonnet, Pierre; and Duthion, Louis, 4,019,537.

Agence Nationale de Valorisation de la Recherche (ANVAR): *See*—
Mailfert, Alain; and Kant, Michel, 4,020,374.
Rioux, Christian; and Legentil, Michel, 4,020,412.

Agency of Industrial Science & Technology: *See*—
Ikari, Yoshikatsu; Yokoyama, Shoichiro; Yokoi, Hideharu; and Murakami, Tatsuo, 4,019,982.

Aggarwal, Sundar Lal: *See*—
Hargis, Ivan Glen; Livigni, Russell Anthony; and Aggarwal, Sundar Lal, 4,020,115.

Aida, Isao: *See*—
Araki, Mutsuro; Sakai, Bunshiro; Watanabe, Itaru; Yamada, Makoto; Tsukada, Koshiro; Godai, Tomokazu; Aida, Isao; and Nakagaki, Masatoshi, 4,020,312.

Aikoh Co., Ltd.: *See*—
Yoshida, Hiroshi, 4,019,897.

Air Preheater Company, Inc., The: *See*—
Brzytwa, Tadek, 4,019,568.
Regan, John William; and Rode, Douglas Michael, 4,019,465.
Wixson, Donald F.; and Ostrander, George K., 4,019,567.

Air Products and Chemicals, Inc.: *See*—
Dixon, Dale D.; and Hayes, Larry J., 4,020,223.

Airfix Industries Limited: *See*—
Rumball, Kenneth Francis, 4,020,140.

Aisin Seiki Kabushiki Kaisha: *See*—
Hayashi, Masayuki, 4,019,777.
Kondo, Takeo; Hyodo, Yoichi; Ono, Hiroyuki; and Yuasa, Shiro, 4,019,403.

Akebono Brake Industry Co., Ltd.: *See*—
Hirai, Hiroshi, 4,019,610.

Akita, Masanori: *See*—
Ogasawara, Masafumi; Akita, Masanori; Saito, Kazuhiko; Kikuchi, Yoshikazu; and Shiokawa, Mitsuhiro, 4,019,844.

Aktiebolaget Bofars: *See*—
Gustafson, Kjell Arne Hakan, 4,020,339.

Aktiebolaget Svenska Electromagneter: *See*—
Carlsson, Hans Thorsten Henrik, 4,019,485.

Aktiebolaget Svenska Flaktfabriken: *See*—
Nystrom, Karl Gustav, 4,019,953.

Akunov, Viktor Ivanovich; Blinov, Ivan Timofeevich; Boryakov, Viktor Fedorovich; Ermolaev, Nikolai Evgenievich; Zavadsky, Georgy Vladimirovich; Lopatin, Vladimir Viktorovich; and Rusakov, Gennady Fedorovich. Device for treating loose materials. 4,019,688, Cl. 241-39.000.

Akyuerek, Altan, to BBC Brown Boveri & Company Limited. Method for dip-soldering semiconductor components. 4,019,671, Cl. 228-123.000.

Akzo N.V.: *See*—
Boots, Gerardus Anthonius Maria, 4,019,635.

Akzona Incorporated: *See*—
Herveling, Wilhelm; Birker, Alfred; Daimler, Berthold H.; Vos, Jan G.; and Stapp, Hans, 4,019,326.
Warrick, Ford E., 4,019,312.

Alaimo, Robert J.; and Goldenberg, Marvin M., to Morton-Norwich Products, Inc. 2-Bromo-1-hydroxyquinolizinium bromide substituted anilinium salts. 4,020,075, Cl. 260-296.00B.

Alb. Klein KG: *See*—
Bastgen, Wendel, 4,019,431.

Albrecht, Horst: *See*—
Seiler, Karl; Selke, Martin; Siegling, Oswald; Herzog, Heinz; Albrecht, Horst; and Mohn, Heinrich, 4,019,645.

Albrecht, Leonard N.: *See*—
Moorman, Maurice D.; and Albrecht, Leonard N., 4,019,279.

Albright & Wilson Limited: *See*—
Collins, John Desmond; Coates, Harold; and Siddiqui, Iftikhar Hussain, 4,020,090.
Edwards, Alfred Gerald; and Harris, Glyn Islwyn, 4,020,035.
Golightly, David Stainsley; and Onions, Allan, 4,019,916.

Alfter, Franz-Werner; Becke, Joachim; Breitscheidel, Hans-Ulrich; and Laubenberger, Herbert, to Dynamit Nobel Aktiengesellschaft. Interior covering with reinforcement. 4,020,207, Cl. 428-138.000.

Allard, Jules N.; and Gagnon, Victor J., to Bush Universal, Inc. Method and apparatus for lining safety box toes. 4,019,215, Cl. 12-146.00D.

Allen-Bradley Company: *See*—
Wilkerson, Alan W., 4,020,287.

Allen, Henry C.: *See*—
Cuksee, Marjorie T.; and Allen, Henry C., 4,019,933.

Allen, Richard L.; Benjamin, Benny M.; Lappin, Terry A.; Ridgway, John A., Jr.; and Saunders, Elmer J., to Standard Oil Company (Indiana). Apparatus for aerobic fermentation. 4,019,962, Cl. 195-142.000.

Allied Chemical Corporation: *See*—
Marshall, Robert Moore; and Dardoufas, Kimon Constantine, 4,019,990.
Schulze, Stephen R., 4,020,253.

Allis-Chalmers Corporation: *See*—
Jenness, Raymond C., 4,019,787.

Allmendinger, Norbert, to Richmond Industries, Inc. Fire extinguisher. 4,019,584, Cl. 169-74.000.

Allocco, Andrew, Jr., to Farm Stores, Inc. Leak testing device and method for plastic bottles. 4,019,370, Cl. 73-45.100.

Alloway Manufacturing, Inc.: *See*—
Eisenhardt, Fred W., 4,019,755.

Altares, Timothy, Jr., to ARCO Polymers, Inc. Anti-lumping coating for polystyrene beads. 4,020,133, Cl. 264-53.000.

Altenhof, Jack; Altenhof, John; and Chartier, Robert, to J & J Tool and Mold Ltd.; and Consumers Glass Co., Ltd. Mould for closure caps with intermittent threads undercuts or hold-down lugs. 4,019,711, Cl. 249-59.000.

Altenhof, John: *See*—
Altenhof, Jack; Altenhof, John; and Chartier, Robert, 4,019,711.

Alterman, Israel: *See*—
Rom, Josef; Alterman, Israel; and Schwartz, Joseph, 4,019,331.

Alvares, Antonio: *See*—
Biglione, Gianfranco; Alvares, Antonio; and Bertazzoni, Guido, 4,020,022.

Alza Corporation: *See*—
Roth, Nathan, 4,019,633.

Amaria, Pesi Jal; MacLellan, Roy A.; and Tucker, James W., to Canadian Patents and Development Limited. Removal of meat from crustaceans. 4,019,224, Cl. 17-71.000.

American Can Company: *See—*
Rouse, John W., 4,019,452.

American Color & Chemical Corporation: *See—*
Huffman, Allan M., 4,020,053.

American Cyanamid Company: *See—*
Bernstein, Seymour; Joseph, Joseph Peter; and Nair, Vijay, 4,020,160.
Conger, Joseph Clyde, Sr., 4,019,858.
Suen, Tzeng Jiueq; Begala, Arthur James, Jr.; and Grayson, Martin, 4,020,000.

American Denture Corporation: *See—*
Hazar, Mitchell M., 4,019,253.

American District Telegraph Company: *See—*
Holland, John M., 4,020,477.

American Optical Corporation: *See—*
Coates, Vincent J.; and Welter, Leonard M., 4,020,387.

American Store Equipment Corporation: *See—*
Ernst, Gerhard, 4,019,291.

American Telephone and Telegraph Company: *See—*
Vuotto, Edward Joseph, 4,020,295.

AMF Incorporated: *See—*
Perez, George R., 4,019,771.

AMP Incorporated: *See—*
Hoffman, Ronald Clarence, 4,019,801.
Osman, Lloyd Carl, 4,019,236.
Shannon, Suel Grant; Timmins, Harold Chester; and Gookin, Kenneth Earl, 4,019,802.
Soes, Lucas, 4,019,800.
Vander Heyden, Eric Ernest, 4,020,430.

Ampex Corporation: *See—*
Busby, Edwin Stanley, 4,020,485.

Analog Devices, Inc.: *See—*
Pastoriza, James J., 4,020,486.

Andersen, Delmar Lloyd; Boston, Louis Russell; and Seleen, William H., to Borden, Inc. Starter culture media containing whey. 4,020,185, Cl. 426-36.000.

Andersen, Finn Schnoor: *See—*
Nicolaisen, Holger; Andersen, Finn Schnoor; and Jensen, Jens Peter, 4,020,435.

Anderson, Douglas R.: *See—*
Adams, William B.; Anderson, Douglas R.; and Carpenter, Daniel D., 4,020,461.

Anderson, Frederick H.: *See—*
Suh, Nam P.; Malguarnera, Salvatore C.; and Anderson, Frederick H., 4,019,652.

Anderson, Robert T.; Loy, Henry L.; and Nesbit, William J., to General Electric Company. Recombiner apparatus. 4,019,871, Cl. 23-288.00K.

Anderson, Scott K., to Teleplex, Inc. Random access, multiple station communication system. 4,020,289, Cl. 179-15.0FD.

Anderson, Victor O. Casting support for automatic cast trim machines. 4,019,564, Cl. 164-271.000.

Anderson, Warren A.: *See—*
Labadini, William M.; Passmore, Edmund M.; and Anderson, Warren A., 4,020,383.

Anderson, William G. System and cold cabinet server. 4,019,339, Cl. 62-255.000.

Andersson, Rolf; Bjorklund, Bengt; and Hedberg, Tommy, to AB Akerlund & Rausing. Locking container. 4,019,675, Cl. 229-31.00R.

Ando, Yoshiyuki: *See—*
Suzuki, Hisao; Musashi, Akira; Ando, Yoshiyuki; and Inoue, Tomoyuki, 4,020,125.

Andrianov, Kuzma Andrianovich; Bagrov, Georgy Nikolaevich; Vasilieva, Tatyana Vsevolodovna; Vasjukov, Vladimir Alexandrovich; Lebedev, Sergei Ivanovich; Makarov, Vladimir Alexandrovich; and Khananashvili, Lotari Mikhailovich. Fibrous friction material. 4,020,226, Cl. 428-290.000.

Anezaki, Syoji: *See—*
Shiraiwa, Toshio; Kobayashi, Sumio; Marukawa, Katsukiyo; and Anezaki, Syoji, 4,019,562.

Anfossi, Bartolomeo: *See—*
Koch, Paolo; and Anfossi, Bartolomeo, 4,020,093.

Angell, Charles Leslie: *See—*
Rabo, Jule Anthony; Francis, James Nelson; and Angell, Charles Leslie, 4,019,879.
Rabo, Jule Anthony; Francis, James Nelson; and Angell, Charles Leslie, 4,019,880.

Angstadt, John W.: *See—*
Wright, Edward S.; Angstadt, John W.; and Garrow, Gerald L., 4,020,189.

ANIC S.p.A.: *See—*
Koch, Paolo; and Anfossi, Bartolomeo, 4,020,093.

Annin, Gordon D., to Boeing Company, The. Method and apparatus for guiding a jet aircraft in a noise-abated post-takeoff climb. 4,019,702, Cl. 244-182.000.

Aoki, Kan: *See—*
Okazaki, Ryoji; Aoki, Kan; and Shinagawa, Tomoyuki, 4,020,242.

Aoki, Kazuteru, to Toshiba Kikai Kabushiki Kaisha. Injection apparatus for die cast machines. 4,019,561, Cl. 164-155.000.

Aonuma, Masashi; and Tamai, Yasuo, to Fuji Photo Film Co., Ltd. Process for producing a magnetic material and magnetic recording medium containing the same. 4,020,236, Cl. 428-457.000.

Aoyama, Ryozo; Matsuda, Yukinobu; and Urushima, Mitsuo, to Kabushiki Kaisha Komatsu Seisakusho. Controls for a hydraulically driven vehicle. 4,019,321, Cl. 60-484.000.

Apotheker A. Herbert K.G., Fabrik Pharmazeutischer Praparate Wiesbaden: *See—*
Herrmann, Joseph Peter, 4,020,159.

Appel, Eggert; Geisler, Gottfried; and Seebode, Albert, to Fischer & Porter Co. Unitized electrode assembly for electromagnetic flowmeter. 4,019,386, Cl. 73-194.0EM.

Appleby, Vernon L. Trash disposal system. 4,019,896, Cl. 75-44.00S.

Appleyard, Francis J.; and Stavrinou, Stavros C., to Armstrong Cork Company. Method of treating waste sheet flooring. 4,020,020, Cl. 260-2.300.

Applied Motors, Inc.: *See—*
Means, William A., 4,020,403.

Aquanetics, Inc.: *See—*
Hachadoorian, Robert Haig; and Shyman, Mark Lincoln, 4,019,977.

Araki, Mutsuro; Sakai, Bunshiro; Watanabe, Itaru; Yamada, Makoto; Tsukada, Koshiro; Godai, Tomokazu; Aida, Isao; and Nakagaki, Masatoshi, to Nippon Kokan Kabushiki Kaisha; and Kobe Steel Ltd. Method of manufacturing thick, high-strength steel pipe for low temperature service. 4,020,312, Cl. 219-61.000.

Arayama, Takao: *See—*
Matsudo, Kazuo; Shimomura, Takayoshi; Kurokawa, Teruo; and Arayama, Takao, 4,019,929.

Arcamone, Federico; and Cassinelli, Giuseppe, to Societa' Farmaceutici Italia S.p.A. L-lyxohex-1-enopyranose derivative. 4,020,270, Cl. 536-18.000.

ARCO Polymers, Inc.: *See—*
Altares, Timothy, Jr., 4,020,133.

Ariga, Masahiko: *See—*
Yamauchi, Akira; Kakuma, Tetsu; Yamashita, Hisao; and Ariga, Masahiko, 4,019,226.

Armas, Eduardo Santana. Building modules and structure embodying such modules. 4,019,293, Cl. 52-79.110.

Armco Steel Corporation: *See—*
Cruse, Clyde L., Jr.; and Kerschbaum, Arthur P., 4,019,724.

Armstrong Cork Company: *See—*
Appleyard, Francis J.; and Stavrinou, Stavros C., 4,020,020.

Armstrong, William A., to Canada, Her Majesty the Queen in right of, as represented by the Minister of National Defence. Cathode for hydrazine/air cell. 4,020,239, Cl. 429-42.000.

Arnold, William O., to Union Insulating Company. Electrical wiring box with attached mounting elements. 4,019,647, Cl. 220-3.300.

Arsenault, Joseph A., to Page Belting Company Incorporated. Lug strap. 4,019,542, Cl. 139-153.000.

Artamonoff, Serge: *See—*
Keen, Everett Morgan; Siciliano, Anthony John; Shah, Kiran Chhabildas; Artamonoff, Serge; and Stigen, Leonard Roy, 4,019,461.

Asahi Kogaku Kogyo Kabushiki Kaisha: *See—*
Sugiyama, Takahiro, 4,019,810.

Asai, Kiyokazu; and Takeuchi, Akihiro, to Kabushiki Kaisha Toyota Chuo Kenkyusho. Liquid atomizing apparatus utilizing ultrasonic wave. 4,019,683, Cl. 239-102.000.

Asako, Tsunehiko: *See—*
Hiraga, Kentaro; Okutani, Tetsuya; Asako, Tsunehiko; and Yoshioka, Kouichi, 4,020,269.

Asano, Masaharu, to Nissan Motor Co., Ltd. Closed loop air-fuel ratio control system for use with internal combustion engine. 4,019,470, Cl. 123-32.0EE.

Asculai, Samuel Simon; Kupferberg, Alfred B., deceased; by Kupferberg, Beatrice, coexecutrix; and by Halpern, Meyer, coexecutor, to Ortho Pharmaceutical Corporation. Nonionic surface active antiherpes simplex viral agents. 4,020,183, Cl. 424-341.000.

ASEA Aktiebolag: *See—*
Bergman, Kjell; and Carlsson, Lars, 4,019,563.

Ashley, Albert H., to GTE Sylvania Incorporated. Drive circuitry with error detection and compensating threshold arrangement. 4,020,293, Cl. 179-18.0GF.

Ashmead, Albert Sidney: *See—*
Shepard, Richard Wilton; and Ashmead, Albert Sidney, 4,020,319.

Ashmead, Harvey H.; and Little, Paul A. Increasing metals in biological tissue. 4,020,158, Cl. 424-177.000.

Askew, Herbert Frank: *See—*
Jayne, Gerald John Joseph; and Askew, Herbert Frank, 4,019,991.

Associated Portland Cement Manufacturers Limited, The: *See—*
Murray, Ransom James; and Brown, Arthur William, 4,019,917.

Atasoy, Kaya: *See—*
Ghilardi, Hans Peter; and Atasoy, Kaya, 4,020,162.

Atkinson, William: *See—*
Miller, Arthur William; and Atkinson, William, 4,019,978.

Atlantic Richfield Company: *See—*
Wolgemuth, Larry G., 4,020,023.

Atomic Energy of Canada Limited: *See—*
Feraday, Melville A., 4,020,131.

Augustin, Wilfried, to Jurid Werke GmbH. Frictional material reinforced with carbonaceous fibers. 4,019,912, Cl. 106-36.000.

Austrailian Atomic Energy Commission: *See—*
Church, Victor Eric; Fraser, Herbert James; and Matthews, Ralph William, 4,020,329.

Auto Gard, Inc.: *See—*
Kirsch, Norton M., 4,020,338.

Autrey, William L. Mattress construction and method of making. 4,019,451, Cl. 112-262.000.





Ayerst McKenna and Harrison Ltd.: *See—*
Abraham, Nedumparambil A.; Immer, Hans U.; Nelson, Verner R.; and Sestanj, Kazimir, 4,020,157.

Aylward, Paul T., to Bethlehem Steel Corporation. Deep hardening machinable aluminum killed high sulfur tool steel. 4,019,930, Cl. 148-36.000.

Aziz, Walid Y.; Ball, Lawrence E.; and Li, George S., to Standard Oil Company. Polymerizates of olefinic nitriles and diene rubbers. 4,020,128, Cl. 260-879.000.

B E Industries: *See—*
Bieser, Albert H.; Stuhler, William B.; and Smith, Dorsey T., 4,020,491.

B & J Manufacturing Company: *See—*
Jensen, Wayne E.; and Stanfield, Charles Keith, 4,019,234.

Bae, Hyung Du, to International Telephone and Telegraph Corporation. Densitometer. 4,020,330, Cl. 235-151.300.

Bagby, John P.: *See—*
Weninger, Frank L.; Bagby, John P.; Hapke, Kenyon A.; Hinshaw, Jack W.; Karalus, George C.; Koppensteiner, Eugene F.; and Tomlinson, Roger R., 4,019,815.

Baggett, Joseph M., to Dow Chemical Company, The. Process for controlling the molecular weight of aromatic polycarbonates. 4,020,045, Cl. 260-47.0XA.

Bagrov, Georgy Nikolaevich: *See—*
Andrianov, Kuzma Andrianovich; Bagrov, Georgy Nikolaevich; Vasilieva, Tatyana Vsevolodovna; Vasjukov, Vladimir Alexandrovich; Lebedev, Sergei Ivanovich; Makarov, Vladimir Alexandrovich; and Khananashvili, Lotari Mikhailovich, 4,020,226.

Bailey Meter Company: *See—*
Hall, George R., II; White, Jack M.; and Krechmery, Roger L., 4,019,388.

Baker, Elsie Jennie: *See—*
Baker, Eric Ralph Lloyd, 4,019,223.

Baker, Eric Ralph Lloyd, to Baker, Elsie Jennie. Apparatus for cutting poultry carcass. 4,019,223, Cl. 17-11.000.

Baker, John E.: *See—*
Ellis, Delmar H.; Baker, John E.; Shaffernocker, Wayne M.; and Scott, Ralph W., 4,019,375.

Balhorn, Milo G., to Old Fort International, Inc. Block molding machine having a pallet feeder and ejector. 4,019,848, Cl. 425-443.000.

Ball, John Anthony; Warburton, Keith Arthur; and Carew, Raymond Donald, to Ball, John Anthony. Board games. 4,019,740, Cl. 273-131.0KN.

Ball, Lawrence E.: *See—*
Aziz, Walid Y.; Ball, Lawrence E.; and Li, George S., 4,020,128.

Ballestrazzi, Aris; Tassi, Lamberto; and Tosarelli, Gianni, to Situno Holding SA. Welding and cutting device for packaging machines. 4,019,307, Cl. 53-182.00R.

Ballestrazzi, Aris: *See—*
Tassi, Lamberto; Ballestrazzi, Aris; and Tosarelli, Gianni, 4,019,623.

Bambury, Ronald E.: *See—*
Erickson, Raymond C.; and Bambury, Ronald E., 4,020,060.

Banko, Anton, to Surgical Design Corporation. Surgical system for controlling the infusion of fluid to and the evacuation of fluid and material from an operating field. 4,019,514, Cl. 128-230.000.

Barbier, Jean; and Cachon, Paul, to Goodyear Tire & Rubber Company, The. Process for the manufacture of hose. 4,019,939, Cl. 156-80.000.

Barger, John Joseph, to Combustion Engineering, Inc. Delivery of welding flux in a method of submerged arc strip cladding of metallic work pieces. 4,020,314, Cl. 219-73.00R.

Barmag Barmer Maschinenfabrik Aktiengesellschaft: *See—*
Schippers, Heinz, 4,019,311.

Barrett, Charles Jack: *See—*
Dawson, Peter; and Barrett, Charles Jack, 4,019,749.

Barrett, Michael Conan; and Petterson, Eric Sigfried, to International Business Machines Corporation. Tape cartridge with track position indicator. 4,020,506, Cl. 360-137.000.

Bartos, Josef: *See—*
Seidl, Pavel; Rod, Josef; Deutsch, Jiri; and Bartos, Josef, 4,019,310.

BASF Aktiengesellschaft: *See—*
Hemmer, Gerd; Hess, Klaus; Becker, Rolf; and Liebhaber, Klaus, 4,019,852.
Quadbeck-Seeger, Hans-Juergen; and Hoch, Helmut, 4,020,102.
Zeitler, Gerhard; and Mueller-Tamm, Heinz, 4,020,025.

BASF Wyandotte Corporation: *See—*
Vogt, Herwart C.; Parekh, Manher; and Patton, John T., Jr., 4,020,010.

Bassett, Henry C.; From, Charles A., Jr.; Parker, John F.; and Worley, Ansel A., to Western Electric Company, Inc. Methods of fabricating a connector with a perforable insulative liner. 4,019,250, Cl. 29-629.000.

Bastgen, Wendel, to Alb. Klein KG. Method of dewatering sludge. 4,019,431, Cl. 100-37.000.

Bastings, Petrus Theodorus Cornelis: *See—*
Verhappen, Paulus Jozef Maria; Van Tienen, Antonius Johannes Maria; Feenstra, Johannes; and Bastings, Petrus Theodorus Cornelis, 4,019,888.

Bauer Bros. Co., The: *See—*
Beery, James P., 4,019,980.

Bauer, Richard A.: *See—*
Eidelberg, Jonah; Mooney, Thomas; and Bauer, Richard A., 4,019,762.

Baumgarten, Gerd D., to Heinrich Baumgarten, Eisen- und Blechwarenfabrik. Pan handle. 4,019,221, Cl. 16-114.00A.

Baumgartner, Heinrich, to Siemens Aktiengesellschaft. Circuit arrangement for displacing characters on the screen of a data viewing device. 4,020,483, Cl. 340-324.0AD.

Baxter, William D., to Bunker Ramo Corporation. CRT cursor scan control circuits. 4,020,391, Cl. 315-377.000.

Bayer Aktiengesellschaft: *See—*
Bossert, Friedrich; Wehinger, Egbert; Vater, Wulf; and Stoepel, Kurt, 4,020,178.
Frommer, Werner; Puls, Walter; and Schmidt, Delf, 4,019,960.
Geffers, Hans; Radt, Walter; Schliebs, Reinhard; and Schulz, Hartmut, 4,020,101.
Hocker, Jurgen; and Merten, Rudolf, 4,020,084.
Mayer, Uwe; and Schundehutte, Karl-Heinz, 4,020,063.
Wessling, Diether, 4,020,088.
Witte, Josef; and Lehnert, Gunther, 4,020,257.

Baylor College of Medicine: *See—*
Cornsweet, Tom N.; and Harrison, Richard A., 4,019,813.

BBC Brown Boveri & Company Limited: *See—*
Akyuerek, Altan, 4,019,671.
Strubin, Harald, 4,020,307.

Beaman, Charles A.: *See—*
Burris, William Alan; and Beaman, Charles A., 4,019,986.

Becke, Joachim: *See—*
Alfter, Franz-Werner; Becke, Joachim; Breitscheidel, Hans-Ulrich; and Laubenberger, Herbert, 4,020,207.

Becker, Rolf: *See—*
Hemmer, Gerd; Hess, Klaus; Becker, Rolf; and Liebhaber, Klaus, 4,019,852.

Becker, Werner: *See—*
Schumann, Gunter; and Becker, Werner, 4,020,405.

Beckman Instruments, Inc.: *See—*
Oh, Chan S., 4,020,002.

Beckmann, Jurgen: *See—*
Kalka, Josef; Winter, Hermann; and Beckmann, Jurgen, 4,020,032.

Beed (Dishwashers) Limited: *See—*
Hunt, William Joseph, 4,019,689.

Beery, James P., to Bauer Bros. Co., The. Multiple hydrocyclone arrangement. 4,019,980, Cl. 209-211.000.

Begala, Arthur James, Jr.: *See—*
Suen, Tzeng Jiueq; Begala, Arthur James, Jr.; and Grayson, Martin, 4,020,000.

Beger, Udo; Saillard, Gabriel; and Pasquini, Ari, to Etablissements Morellet-Guerineau GmbH & Co. Handels KG. Foldable pram chassis. 4,019,757, Cl. 280-649.000.

Behar, Isaac; and Genini, Maurice, to Coflexip. Piping apparatus for a floating or semi-submersible platform. 4,019,213, Cl. 9-8.00P.

Behringer, Frederick J.: *See—*
Smith, Millard F.; Behringer, Frederick J.; Doyle, John R.; and McFadden, Daniel P., 4,019,390.

Beil, Martin, to Siemens Aktiengesellschaft. Thick-film circuit on a substrate with through-contacts between conductor paths on opposite sides of the substrate. 4,020,206, Cl. 428-137.000.

Belden Corporation: *See—*
Wise, Thomas Q., 4,019,636.

Bell, Allyn Roy: *See—*
Plant, Howard L.; and Bell, Allyn Roy, 4,019,893.

Bell Telephone Laboratories, Incorporated: *See—*
Bonyhard, Peter Istvan; and Smith, James Lanson, 4,020,476.
Coomer, Stephen Dexter, 4,020,459.
Crochiere, Ronald Eldon; and Rabiner, Lawrence Richard, 4,020,332.
Geary, John Michael; and Mattes, Hans George, 4,020,327.
Marcatili, Enrique Alfredo Jose; and Marcuse, Dietrich, 4,019,805.
McKnight, Lee Graves, 4,020,398.

Bellanger, Maurice Georges; and Daguet, Jacques Lucien, to Telecommunications Radioelectriques et Telephoniques T.R.T. System for data transmission through the channels of a frequency division multiplex system. 4,020,288, Cl. 179-15.0FD.

Bendix Corporation, The: *See—*
Bouvier, Alfred Joseph, 4,019,799.
Ritsema, Irving R., 4,019,611.

Benilite Corporation of America: *See—*
Chen, James H.; and Huntoon, Lewis W., 4,019,898.

Benjamin, Benny M.: *See—*
Allen, Richard L.; Benjamin, Benny M.; Lappin, Terry A.; Ridgway, John A., Jr.; and Saunders, Elmer J., 4,019,962.

Benjamin, Kenneth A.: *See—*
Blessing, Hubert; and Benjamin, Kenneth A., 4,019,447.

Bennett, Thomas H.; Carlow, Earl F.; Hepworth, Edward C.; Mathys, Wilbur L.; Mensch, William D., Jr.; Orgill, Rodney H.; Peddle, Charles I.; and Wiles, Michael F., to Motorola, Inc. Master slave registers for interface adaptor. 4,020,472, Cl. 340-172.500.

Benson, Lyman David, to Fabtek, Inc. Elevating platform apparatus. 4,019,604, Cl. 182-2.000.

Benson, Richard W.; Cherney, Steven D.; and Collier, Everett J., to Procter & Gamble Company, The. Process for preparing a pyrophosphate-silicate detergent product. 4,019,998, Cl. 252-135.000.

Benthos, Inc.: *See—*
Raymond, Samuel O., 4,019,380.

Berglowe, Sven Raymond, Jr.; and Sauer, Earl Salvator, to Western Electric Company, Inc. Manufacturing an insulated conductor and the article produced thereby. 4,020,213, Cl. 428-379.000.

Bergman, Kjell; and Carlsson, Lars, to ASEA Aktiebolag. Method and apparatus for controlling the batching of a melt for pressure tapping furnace. 4,019,563, Cl. 164-155.000.

Berkey, R. Scott. Instant coffee dispenser. 4,019,660, Cl. 222-304.000.

Bernhard, John S., to Xerox Corporation. Coating system having a composite applicator assembly provided with a reciprocating blade. 4,019,816, Cl. 355-3.00P.

Bernstein, Seymour; Joseph, Joseph Peter; and Nair, Vijay, to American Cyanamid Company. Cyclodextrin sulfate salts as complement inhibitors. 4,020,160, Cl. 424-180.000.

Berrange, Aubrey Ralph. Soil compactor. 4,019,825, Cl. 404-133.000.

Bertazzoni, Guido: *See—*
Biglione, Gianfranco; Alvares, Antonio; and Bertazzoni, Guido, 4,020,022.

Bertetto, Donald W.: *See—*
Hanson, Alden B.; Hanson, Chris A.; and Bertetto, Donald W., 4,019,266.

Berthet, Michel: *See—*
Gillet, Roger; Berthet, Michel; and Moisson-Franckhauser, Francois, 4,020,371.

Bertin & Cie: *See—*
Bonnard, Pierre Marcel; Bonnet, Pierre; and Duthion, Louis, 4,019,537.

Bethge, Karin: *See—*
Esper, Friedrich; and Bethge, Karin, 4,019,914.

Bethlehem Steel Corporation: *See—*
Aylward, Paul T., 4,019,930.
Townsend, Herbert E., Jr.; Horton, James B.; and Woodyatt, Louis R., 4,019,901.

Betz Laboratories, Inc.: *See—*
Lavin, Walter M.; McFarlane, James I.; and Rose, Dennis L., 4,019,859.

Beuchat, Roger, to Mefina S.A. Electric firing device for a pyrotechnic charge. 4,019,439, Cl. 102-70.20R.

Bevan, Geoffrey, to Lever Brothers Company. Detergent compositions. 4,020,015, Cl. 252-544.000.

Beyer, Hermann; Biberbach, Peter; and Scondo, Christian, to Duetsche Gold- und Silber-Scheideanstalt vormals Roessler. Process for nitriding iron and steel in salt baths regenerated with triazine polymers. 4,019,928, Cl. 148-15.500.

Beyerlein, Ludwig: *See—*
Lachner, Otto; Beyerlein, Ludwig; and Spelthahn, Klaus, 4,020,137.

BFG Glassgroup: *See—*
Derner, Paul; Sonntag, Hans; and Stehl, Otto, 4,019,295.

Bhalla, Sushil K.: *See—*
Mohr, Richard A.; Bhalla, Sushil K.; and Zeh, Peter H., 4,020,148.

Biberbach, Peter: *See—*
Beyer, Hermann; Biberbach, Peter; and Scondo, Christian, 4,019,928.

Bicking, John B.: *See—*
Cragoe, Edward J., Jr.; and Bicking, John B., 4,020,177.

Bickley, Robert Henry, to Motorola, Inc. High power radio frequency tunable circuits. 4,020,429, Cl. 333-73.00R.

Bienenfeld, Harold: *See—*
Dubner, Robert B.; and Bienenfeld, Harold, 4,019,629.

Bier, Albert: *See—*
Biernot, Oskar; and Bier, Albert, 4,019,360.

Biernot, Oskar; and Bier, Albert. Wire rod rolling mill. 4,019,360, Cl. 72-249.000.

Bieser, Albert H.; Stuhler, William B.; and Smith, Dorsey T., to B E Industries. Combination gyro and pendulum weight passive antenna platform stabilization system. 4,020,491, Cl. 343-765.000.

Biglione, Gianfranco; Alvares, Antonio; and Bertazzoni, Guido, to Montedison Fibre S.p.A. Process for producing particles of expandable styrene polymers and articles of cellular structure formed from said particles. 4,020,022, Cl. 260-2.5HB.

Binstock, Morton H., to Westinghouse Electric Corporation. Valve sequencing startup control system for once-through boiler. 4,019,467, Cl. 122-406.0ST.

Bio/Physics Systems, Inc.: *See—*
Langner, Rene J., 4,019,721.

Birker, Alfred: *See—*
Herveling, Wilhelm; Birker, Alfred; Daimler, Berthold H.; Vos, Jan G.; and Stapp, Hans, 4,019,326.

Birkhofer, Hans; Stohr, Arno; and Schrammel, Werner, to Klockner-Werke AG. Control system for injection-molding machine. 4,019,845, Cl. 425-146.000.

Birt, Dennis Courtney Parsons; Holland, Ronald; and Pearce, Leonard John, to United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defense in Her Britannic Majesty's Government of the. Water activated primary batteries. 4,020,247, Cl. 429-119.000.

Bisceglia, Peter J. Multi colored light signal for vehicles. 4,020,335, Cl. 240-7.10R.

Bishop, Jerald W., to Gilmore-Tatge Manufacturing Co., Inc. Dump truck bed. 4,019,780, Cl. 298-11.000.

Bishop, Walton B., to United States of America, Navy. Sequential observer multi-functional friend accept decider. 4,020,489, Cl. 343-6.5LC.

Bjorklind, Stig Lennart: *See—*
Lejdegard, Sixten Harald; and Bjorklind, Stig Lennart, 4,019,631.

Bjorklund, Bengt: *See—*
Andersson, Rolf; Bjorklund, Bengt; and Hedberg, Tommy, 4,019,675.

Black, Christopher Thurson, to Texas Instruments Incorporated. High voltage junction semiconductor device fabrication. 4,019,248, Cl. 29-583.000.

Blackman, Gerald Gordon; and Matthewson, Michael Derek, to Burroughs Wellcome Co. Method of repelling insects from domestic mammals. 4,020,181, Cl. 424-305.000.

Blaschke, Ludwig, to Braun Aktiengesellschaft. Device for use on a film projector for copying films. 4,019,814, Cl. 352-169.000.

Blaw-Knox Food and Chemical Equipment, Inc.: *See—*
Wright, Edward S.; Angstadt, John W.; and Garrow, Gerald L., 4,020,189.

Blessing, Hubert; and Benjamin, Kenneth A., to Ivanhoe Research Corporation. Apparatus for automatically controlling movement of material with respect to a work point in a machine. 4,019,447, Cl. 112-121.110.

Blinov, Ivan Timofeevich: *See—*
Akunov, Viktor Ivanovich; Blinov, Ivan Timofeevich; Boryakov, Viktor Fedorovich; Ermolaev, Nikolai Evgenievich; Zavadsky, Georgy Vladimirovich; Lopatin, Vladimir Viktorovich; and Rusakov, Gennady Fedorovich, 4,019,688.

Block, James P., to LCOA Laminating Company of America. Method for drilling circuit boards. 4,019,826, Cl. 408-1.00R.

Blodgett, Norman S.: *See—*
Wartman, Lloyd H., 4,019,505.

Blount, David H. Process for the polymerization of allyl halides. 4,020,259, Cl. 526-194.000.

BOC Limited: *See—*
Oswald, Roger Derek, 4,020,321.

Bocchino, Vincent T.: *See—*
Murray, Thomas E.; and Bocchino, Vincent T., 4,020,156.

Bochan, John, to General Electric Company. Belt drive mechanism. 4,019,397, Cl. 74-227.000.

Bockstiegel, Georg Heinrich Artur Gerhard, to Hoganas Aktiebolag. Method of producing magnetite article. 4,019,239, Cl. 29-592.000.

Boehringer Mannheim G.m.b.H.: *See—*
Klose, Sigmar; Wahlefeld, August Wilhelm; and Hagen, Alexander, 4,019,961.

Boeing Company, The: *See—*
Annin, Gordon D., 4,019,702.
Christianson, Merrill Andrew; and Hill, Horace Earl, 4,019,827.
Hirt, William J.; and Grotz, Charles A., 4,019,696.

Bohl, Hans-Erich. Apparatus for the cold working of bar stock. 4,019,356, Cl. 72-30.000.

Bohn, Burkhard W.; Evers, Alfred; and Friederichs, Karl-Heinz, to Hagenuk Vormals Neufeldt & Kunke GmbH. Bar feed control arrangement for bar loading magazines. 4,019,411, Cl. 82-2.700.

Bokuda, Yoshiyuki: *See—*
Karasudani, Isao; Takashima, Toshiyuki; and Bokuda, Yoshiyuki, 4,020,217.

Bolt, Barry; and Peters, Petrus, to North American Philips Corporation. Lamp having screw base. 4,020,382, Cl. 313-318.000.

Bolter, Herbert: *See—*
Vogt, Alfred; and Bolter, Herbert, 4,019,679.

Boltswitch, Inc.: *See—*
Erickson, John W.; and Erickson, James A., 4,020,432.

Bolz, Gunner; Deindoerfer, Fred H.; Hu, Chun P.; Kameda, Naomi; and Wang, Robert, to International Diagnostic Technology, Inc. Method for quantitation of antigens or antibodies on a solid surface. 4,020,151, Cl. 424-1.500.

Bonin, Peter J.: *See—*
Crites, Virgil C., 4,019,971.

Bonnard, Pierre Marcel; Bonnet, Pierre; and Duthion, Louis, to Bertin & Cie; and Aeroport de Paris. Arrangement for mounting guide vanes or other transverse objects inside a conduit. 4,019,537, Cl. 138-37.000.

Bonnet, Pierre: *See—*
Bonnard, Pierre Marcel; Bonnet, Pierre; and Duthion, Louis, 4,019,537.

Bonnot, Pierre Edmond Michel. Collapsible shipping container. 4,019,634, Cl. 206-386.000.

Bonyhard, Peter Istvan; and Smith, James Lanson, to Bell Telephone Laboratories, Incorporated. Magnetic bubble memories with nonobstructing crossings between conductor and permalloy patterns. 4,020,476, Cl. 340-174.0TF.

Boots, Gerardus Anthonius Maria, to Akzo N.V. Pallet-container for transporting bulk material. 4,019,635, Cl. 206-386.000.

Borden, Inc.: *See—*
Andersen, Delmar Lloyd; Boston, Louis Russell; and Seleen, William H., 4,020,185.
Messervey, Harry Clifford, 4,019,622.

Borel, Joseph; Lacour, Jacques; and Merckel, Gerard, to Commissariat a l'Energie Atomique. Fabrication of a charge-coupled device. 4,019,247, Cl. 29-578.000.

Borello, Domenic. Electric motor for general purposes. 4,020,370, Cl. 310-37.000.

Borg-Warner Corporation: *See—*
Krueger, Robert Harold, 4,019,992.
Mathews, George P.; and Lech, Thaddeus, Jr., 4,019,612.

Borman, Willem F. H.; and Rock, John A., to General Electric Company. Process for the preparation of polyester compositions having increased melt elasticity. 4,020,122, Cl. 260-835.000.

Boryakov, Viktor Fedorovich: *See—*
Akunov, Viktor Ivanovich; Blinov, Ivan Timofeevich; Boryakov, Viktor Fedorovich; Ermolaev, Nikolai Evgenievich; Zavadsky, Georgy Vladimirovich; Lopatin, Vladimir Viktorovich; and Rusakov, Gennady Fedorovich, 4,019,688.





Bosico, David F.: *See—*
Bosico, Joseph F.; and Bosico, David F., 4,019,294.

Bosico, Joseph F.; and Bosico, David F., to Bosico Precast Company. Marker support arrangement. 4,019,294, Cl. 52-103.000.

Bosico Precast Company: *See—*
Bosico, Joseph F.; and Bosico, David F., 4,019,294.

Bosniack, David S., to Exxon Research and Engineering Company. Method for removal of gaseous sulfur and nitrogen compounds from gas streams. 4,020,144, Cl. 423-226.000.

Bosniack, David S., to Exxon Research and Engineering Company. Process for the production of sulfur. 4,020,149, Cl. 423-575.000.

Bosserman, David A.; and Freeman, Charles F., to United States of America, Army. Miniature flat panel two microchannel plate picture element array image intensifier tube. 4,020,376, Cl. 313-103.0CM.

Bossert, Friedrich; Wehinger, Egbert; Vater, Wulf; and Stoepel, Kurt, to Bayer Aktiengesellschaft. 1,4-Dihydropyridine esters used as coronary dilators and anti-hypertensives. 4,020,178, Cl. 424-266.000.

Bosshard, Rene; and Brechbuhler, Hans U., to Ciba-Geigy Corporation. Formylamino-2-triazines. 4,020,066, Cl. 260-249.600.

Bosshard, Rene; and Brechbuhler, Hans U., to Ciba-Geigy Corporation. Triazinyl-amidines. 4,020,067, Cl. 260-249.600.

Boston, Louis Russell: *See—*
Andersen, Delmar Lloyd; Boston, Louis Russell; and Seleen, William H., 4,020,185.

Boswell, Donald D.; Grinberg, Jan; Jacobson, Alexander D.; and Myer, Gary D., to Hughes Aircraft Company. Reflective liquid crystal light valve with hybrid field effect mode. 4,019,807, Cl. 350-160.0LC.

Boswell, George Albert, Jr.; and Tullock, Charles William, to Du Pont de Nemours, E. I., and Company. Oxidative fluorination of phenols. 4,020,112, Cl. 260-612.00R.

Boswell, Vance F.; and Shoemaker, Robert L., to United States of America, Navy. Underwater vehicle. 4,019,453, Cl. 114-16.00R.

Bourassa, Denis L.: *See—*
Connerney, William R.; and Bourassa, Denis L., 4,020,427.

Bouvaist, Jean Marie Amedee, to Societe de Vente de l'Aluminium Pechiney. Products forged in aluminum alloys with improved mechanical characteristics and a method for obtaining same. 4,019,927, Cl. 148-11.50A.

Bouvier, Alfred Joseph, to Bendix Corporation, The. Electrical connector. 4,019,799, Cl. 339-59.00R.

Bradam, William R., to NCR Corporation. Auxiliary keyboard apparatus. 4,020,328, Cl. 235-146.000.

Brader, Wilbur Thomas: *See—*
Taylor, John Sebring; and Brader, Wilbur Thomas, 4,020,204.

Brahme, Anders Sven, to Scanditronix, Instrument AB. Absorption body. 4,020,356, Cl. 250-510.000.

Brand, Warren H., to Yarway Corporation. Modulating flow control valve. 4,019,527, Cl. 137-115.000.

Branscome, Kenneth M.; Feath, William M.; Goode, George E.; Heizer, Kenneth W.; and Morgan, Barrie O., to Datotek, Inc. Voice security method and system. 4,020,285, Cl. 179-1.50R.

Bratkowski, Walter V.: *See—*
Shoupp, William E.; and Bratkowski, Walter V., 4,020,369.

Braun Aktiengesellschaft: *See—*
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Port, Werner; and Schmieder, Christian, 4,019,252.

Braun, Anton: *See—*
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Brechbuhler, Hans U.: *See—*
Bosshard, Rene; and Brechbuhler, Hans U., 4,020,066.
Bosshard, Rene; and Brechbuhler, Hans U., 4,020,067.

Breda, Antoine Georges Leon Jacques, to Produits Chimiques Ugine Kuhlmann. Process for the coloration of hydrophobic chemical fibers by metalliferous dyestuffs of cationic character. 4,019,857, Cl. 8-42.00C.

Bredholt, Olaf: *See—*
McGhie, Russell P.; Bredholt, Olaf; and Rockefeller, Winston G., 4,019,305.

Breglia, Denis R.; Rodemann, Alfred H.; and Long, David T., to United States of America, Navy. Direct fire weapon trainer incorporating hit and data delay responses. 4,019,262, Cl. 35-25.000.

Brehob, Alfred W.; and Wheeler, Carlos E., to Turf Service Laboratories, Inc. Soil moisture indicator device. 4,020,417, Cl. 324-65.00R.

Breitscheidel, Hans-Ulrich: *See—*
Alfter, Franz-Werner; Becke, Joachim; Breitscheidel, Hans-Ulrich; and Laubenberger, Herbert, 4,020,207.

Brendley, William H., Jr.: *See—*
Martorano, Richard; Brendley, William H., Jr.; and Haag, Thomas H., 4,020,219.

Brennan, John F., to UOP Inc. Catalytic composite for treating exhaust gases from an internal combustion engine. 4,020,013, Cl. 252-466.0PT.

Breston, Michael P.: *See—*
Finch, William C., 4,019,576.

Bridger, Floyd R., Jr.: *See—*
Starr, George N.; and Robertson, Boyd C., Jr., 4,019,651.

Briggs, William Scott; and Kjargaard, Niels J., to Georgia-Pacific Corporation. Lignosulfonate composition and process for its preparation. 4,019,995, Cl. 252-62.530.

Brindell, Gordon D.; and Macander, Rudy F., to Quaker Oats Company, The. 4,4'-Methylenebis(2,6-diisobutylphenol). 4,020,113, Cl. 260-619.00A.

Briskin, Theodore S., to Philip Morris Incorporated. Smokable material and method for preparing same. 4,019,521, Cl. 131-2.000.

British Cast Iron Research Association, The: *See—*
Nicholas, Kenneth Ernest Lewis; and Morley, John Glyn, 4,020,027.

British Petroleum Company Limited, The: *See—*
Groszek, Aleksander Jerzy; Parkes, Colin Walter; and Crump, Ronald Alfred, 4,020,200.
Park, Anthony John, 4,020,267.

Brodie, S. Dan. Adjustable headset. 4,020,297, Cl. 179-156.00A.

Brown, Arthur William: *See—*
Murray, Ransom James; and Brown, Arthur William, 4,019,917.

Brown Boveri Sulzer Turbomachinery Ltd.: *See—*
Franklin, Clifford John; and Melliger, Hans, 4,019,831.

Brown, Edgar D., Jr.; and Traver, Frank J., to General Electric Company. Silicone fluid useful as a brae fluid. 4,019,997, Cl. 252-78.300.

Brown & Williamson Tobacco Corporation: *See—*
Strubel, David G.; and Johnson, Robert R., 4,019,520.

Browning, Calvin W., to Garrett Corporation, The. Hydraulically actuated split stirling cycle refrigerator. 4,019,335, Cl. 62-6.000.

Brunswick Corporation: *See—*
Hungerford, Daniel Comstock, 4,019,455.

Brzytwa, Tadek, to Air Preheater Company, Inc., The. Rotor centering device. 4,019,568, Cl. 165-8.000.

Buchalla, Artur, to Hoechst Aktiengesellschaft. Sealing device. 4,019,788, Cl. 308-187.100.

Buckenham, Howard Alfred: *See—*
Gotley, Paul; and Buckenham, Howard Alfred, 4,020,480.

Buckethal, Paul J., to Globe-Union Inc. Material selector system. 4,019,535, Cl. 137-625.150.

Buckiso, Michael A.: *See—*
Abarotin, Eugene V.; Buckiso, Michael A.; Farley, Daniel T.; and Simko, Stephen R., 4,019,446.

Budnick, Edward G., to Plains Chemical Development Co. Chelation. 4,020,091, Cl. 260-429.700.

Bullis, Robert H.: *See—*
Wiegand, Walter J., Jr.; Bullis, Robert H.; and Mongeon, Robert J., 4,019,383.

Bulten-Kanthal Aktiebolag: *See—*
Lejdegard, Sixten Harald; and Bjorklind, Stig Lennart, 4,019,631.

Bunker Ramo Corporation: *See—*
Baxter, William D., 4,020,391.

Bunzer, George J. Wind driven apparatus. 4,019,828, Cl. 415-122.00R.

Burdick, Neal M. Active differential filter network. 4,020,424, Cl. 328-167.000.

Burkard, Edward A.; and Kossuth, Donald A., to National Gypsum Company. Gypsum set accelerator. 4,019,920, Cl. 106-114.000.

Burkhardt, Joseph A.: *See—*
Sinclair, Albert R.; Daughtry, Arthur C.; Childers, Thomas W.; and Burkhardt, Joseph A., 4,019,334.

Burland, Oliver John. Emergency vehicle light. 4,020,047, Cl. 240-46.590.

Burlington AG: *See—*
Schmidt, Walter Richard, 4,019,350.

Burrage, Robert Graham, to Lucas Industries Limited. Apparatus for generating a digital count proportional to an input frequency. 4,020,418, Cl. 324-78.00D.

Burris, William Alan; and Beaman, Charles A. Portable water purifier. 4,019,986, Cl. 210-139.000.

Burroughs Wellcome Co.: *See—*
Blackman, Gerald Gordon; and Matthewson, Michael Derek, 4,020,181.

Burt, Leo E.; and Frazier, Stephen E., to Burt, Leo E. Pesticidal formaldehyde concentrate. 4,020,182, Cl. 424-327.000.

Busby, Edwin Stanley, to Ampex Corporation. Non-linear digital-to-analog converter for servo circuit. 4,020,485, Cl. 340-347.0DA.

Busch, Richard E., to Addmaster Corporation. Reversible ribbon drive mechanism. 4,019,618, Cl. 197-161.000.

Buscher, Richard George; and Carnevale, Peter Eugene, to Lear Siegler, Inc. Weapon delivery system. 4,020,324, Cl. 235-61.50S.

Bush Universal, Inc.: *See—*
Allard, Jules N.; and Gagnon, Victor J., 4,019,215.

Buttman, Rene F.: *See—*
Clement, Gilbert L.; and Buttman, Rene F., 4,020,407.

Butz, Hans: *See—*
Gruner, Hans; Diederich, Gerd; Butz, Hans; Wahls, Peter; and Weins, Engelbert, 4,019,560.

C.A.V. Limited: *See—*
Lakra, Paul, 4,019,481.
Skinner, Robert Thomas John, 4,019,835.

C. G. Doris: *See—*
Lamy, Jacques Edouard, 4,019,332.

C. L. Frost & Son, Inc.: *See—*
Rosin, Walter M.; VanDerMeulen, Douglas J.; and Frost, Charles C., 4,019,789.

C. P. Hall Company, The: *See—*
Kuceski, Vincent P., 4,020,099.

Cachon, Paul: *See—*
Barbier, Jean; and Cachon, Paul, 4,019,939.

Calini, Anthony J. Construction joint for reinforced concrete structures. 4,020,132, Cl. 264-34.000.

Calistrat, Michael Mircea, to Koppers Company, Inc. Symetrical sealed gear coupling. 4,019,344, Cl. 64-9.00R.

Camillo, Charles Carl, to Illinois Tool Works Inc. Electrical switch for ignition in gas appliances. 4,019,855, Cl. 431-256.000.

Camillo Corvi S.p.A.: *See—*
Mora, Camillo Corvi, 4,020,074.

Canada, Her Majesty the Queen in right of, as represented by the Minister of National Defence: *See—*
Armstrong, William A., 4,020,239.
Canada Wire and Cable Limited: *See—*
Dudley, Michael Alan, 4,020,028.
LeRoy, Rodney L.; Grossman, David H.; McDonald, R. Douglas; and Hemmings, David F., 4,020,443.
Canadian General Electric Company Limited: *See—*
Freeman, David Lewis; and Flemons, Ralph Seymour, 4,019,373.
Whiteley, Eric, 4,020,372.
Canadian Patents and Development Limited: *See—*
Amaria, Pesi Jal; MacLellan, Roy A.; and Tucker, James W., 4,019,224.
Szabo, Ervin I., 4,019,558.
Szabo, Ervin I., 4,019,559.
Cannon, Henry T.; and Taylor, Charlie Edwin, to General Electric Company. Electrolytic capacitor having a silver plated nickel case. 4,020,401, Cl. 361-433.000.
Canon Kabushiki Kaisha: *See—*
Matsumoto, Kazuya, 4,019,817.
Uchidoi, Masanori; Miyakawa, Hideaki; Taguchi, Tetsuya; Mashimo, Yukio; and Watanabe, Satoshi, 4,020,433.
Caputo, William R.; and Pisatowski, Albert J., to Westinghouse Electric Corporation. Elevator system. 4,019,606, Cl. 187-29.00R.
Carborundum Company, The: *See—*
Sears, Arthur H.; and Siuta, August J., Jr., 4,019,853.
Stoia, John Z.; and Wright, Clarence E., 4,019,445.
Carew, Raymond Donald: *See—*
Ball, John Anthony; Warburton, Keith Arthur; and Carew, Raymond Donald, 4,019,740.
Carl Schenck AG: *See—*
Guyot, Volker; Holdinghausen, Paul; and Mueller, Martin, 4,020,423.
Keller, Guenter; Klinger, Friedrich; Pohl, Andreas; Schimanski, Gerhard; and Zuber, Guenter, 4,019,378.
Carlow, Earl F.: *See—*
Bennett, Thomas H.; Carlow, Earl F.; Hepworth, Edward C.; Mathys, Wilbur L.; Mensch, William D., Jr.; Orgill, Rodney H.; Peddle, Charles I.; and Wiles, Michael F., 4,020,472.
Carlson, Alden J., to Warwick Electronics Inc. Electrical musical instrument with chord generation. 4,019,417, Cl. 84-1.010.
Carlson, Elmer A.; Raffaelli, Joseph G.; and Gann, Ronald A., to International Telephone and Telegraph Corporation. Direct spark ignition system utilizing gated oscillator. 4,019,854, Cl. 431-80.000.
Carlsson, Hans Thorsten Henrik, to Aktiebolaget Svenska Electromagneter. Flywheel magneto having capacitive ignition system. 4,019,485, Cl. 123-148.00E.
Carlsson, Lars: *See—*
Bergman, Kjell; and Carlsson, Lars, 4,019,563.
Carmet Company: *See—*
Hansen, Lloyd B.; and Smarrella, Eugene R., 4,019,590.
Carmichael, James W., to Haja, Inc. Portable cart-mounted propulsion unit. 4,019,597, Cl. 180-11.000.
Carnevale, Peter Eugene: *See—*
Buscher, Richard George; and Carnevale, Peter Eugene, 4,020,324.
Carney, Homer Charles, to General Atomic Company. Electric power generator. 4,020,368, Cl. 310-4.00R.
Carnine, Elmo. Rearview mirror assembly with rotatable mirrors. 4,019,812, Cl. 350-304.000.
Carpenter, Daniel D.: *See—*
Adams, William B.; Anderson, Douglas R.; and Carpenter, Daniel D., 4,020,461.
Carre, Bernard; Puech, Claude; and Spitz, Erich, to Thomson-Brandt. Data carrier for optical read-out. 4,020,278, Cl. 358-128.000.
Carrier Corporation: *See—*
Cobb, George E., 4,019,566.
Cartmill, George Bowen. Safety apparatus for engines. 4,019,489, Cl. 123-198.00D.
Case Western Reserve University: *See—*
Martin, William O.; and Derda, Harry, 4,019,727.
Casey, Thomas P., to Caterpillar Tractor Co. Tilting means for bulldozer blades. 4,019,588, Cl. 172-804.000.
Cashin Systems Corporation: *See—*
Spooner, Robert J.; and Dillon, Oscar W., 4,019,286.
Caspari, Fred W.; and Johnson, Wayne C., to Magnavox Company, The. Electronic system for automatically tuning to a selected television channel. 4,020,419, Cl. 325-421.000.
Caspari, Fred W., to Magnavox Company, The. Segmented character generator for use with a television receiver. 4,020,484, Cl. 340-324.0AD.
Cassella Farbwerke Mainkur Aktiengesellschaft: *See—*
Raabe, Thomas; Grawinger, Otto; Scholtholt, Josef; Nitz, Rolf-Eberhard; and Schraven, Eckhard, 4,020,071.
Cassinelli, Giuseppe: *See—*
Arcamone, Federico; and Cassinelli, Giuseppe, 4,020,270.
Castanis, George. Edifice for playing word game. 4,019,743, Cl. 273-135.00D.
Castanis, George: *See—*
Handweiler, Martin; and Castanis, George, 4,019,436.
Caterpillar Tractor Co.: *See—*
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Herr, Charles H., 4,019,406.
Master, Ralph E.; Ritter, Arthur J., Jr.; and Perry, David L., 4,019,600.
Matzelle, Ralph Anthony, 4,019,425.
Meisel, Thomas C., Jr., 4,019,587.
Unruh, Dale H.; and Yates, Jan B., 4,019,603.
Zook, Donald G.; Miller, Kenneth J.; and Patton, Eugene K., 4,019,242.
Zuhn, Arthur A., 4,019,323.
Cauffiel, Ford B. Apparatus for descaling metal strips. 4,019,282, Cl. 51-75.000.
Cavrich, George. Method and apparatus for developing a garment pattern. 4,019,257, Cl. 33-17.00R.
Ceci, Barry L., to Metrosonics, Inc. Signal analysis apparatus for amplitude statistics. 4,020,286, Cl. 179-1.50A.
Cegedur Societe de Transformation de l'Aluminium Pechiney: *See—*
Ohta, Motomu, 4,019,342.
Celanese Corporation: *See—*
Davis, Howard J.; and Thomas, Norman W., 4,020,142.
Dix, Robert; Markel, Richard F.; Parker, James A.; Riggs, John P.; and Vest, Dale T., 4,020,273.
Soehngen, John W.; and Williams, Albert G., 4,020,145.
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Centralny Osrodek Badawxzorozwojowy Maszyn Wlokienniczych "Centamatex": *See—*
Wroclawski, Zbigniew; Kedzia, Stanislaw; and Pawlowski, Tadeusz, 4,019,691.
Centre Technique des Industries Mecaniques: *See—*
Wartelle, Claude; and Leveque, Michel, 4,019,379..
Cerone, Frank Ernest, Jr.: *See—*
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Champion International Corporation: *See—*
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Chandroga, Issabhai I., to Raymond Lee Organization, Inc., The, a part interest. Chemical diluting system. 4,019,530, Cl. 137-334.000.
Chaplin, Gervase M.; and Childers, Thomas W., to Exxon Production Research Company. Apparatus and method for externally testing conduit connections. 4,019,371, Cl. 73-46.000.
Charlot, Jean-Claude; and Falconnier, Jean-Claude, to Thomson-CSF. Band-compressor device. 4,020,292, Cl. 179-15.55R.
Charlson, Richard A.: *See—*
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Chartier, Robert: *See—*
Altenhof, Jack; Altenhof, John; and Chartier, Robert, 4,019,711.
Chase, V. Lindsay, to J. P. Stevens & Co., Inc. Dyeable rubber products. 4,020,135, Cl. 264-78.000.
Chastang, Pelham D., to Monsanto Company. Yarn texturing apparatus. 4,019,229, Cl. 28-1.600.
Chatten, Victor H. Ornamental bubble lamp. 4,020,337, Cl. 240-10.00A.
Chatterjee, Pronoy Kumar, to Personal Products Company. Crosslinked phosphonoalkyl cellulose and absorbent devices incorporating same. 4,020,271, Cl. 536-88.000.
Chemische Werke Huls Aktiengesellschaft: *See—*
Kalka, Josef; Winter, Hermann; and Beckmann, Jurgen, 4,020,032.
Winter, Hermann; Lautsch, Alfred; Schonberg, Karl-Heinz; and Walther, Jurgen, 4,020,263.
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Chen, Chi-Sin: *See—*
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Chen, James H.; and Huntoon, Lewis W., to Benilite Corporation of America. Beneficiation of ilmenite ore. 4,019,898, Cl. 75-101.00R.
Cherney, Steven D.: *See—*
Benson, Richard W.; Cherney, Steven D.; and Collier, Everett J., 4,019,998.
Cherry, Sidney J., to Westinghouse Electric Corporation. Two-material vapor shield for vacuum-type circuit interrupter. 4,020,304, Cl. 200-144.00B.
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Chesner, Jack B. Method of making pizza bread analog. 4,020,184, Cl. 426-19.000.
Chevron Research Company: *See—*
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Chicago Pneumatic Tool Company: *See—*
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Childers, Thomas W.: *See—*
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Chissoasahi Fertilizer Co., Ltd.: *See—*
Fujita, Toshio; Takahashi, Chigo; Ohshima, Masanari; Ushioda, Tsunezo; and Shimizu, Hirozo, 4,019,890.
Choporis, Peter N.; and Choporis, Robert N. Portable conditioned air breathing device. 4,019,511, Cl. 128-212.000.
Choporis, Robert N.: *See—*
Choporis, Peter N.; and Choporis, Robert N., 4,019,511.





Christianson, Merrill Andrew; and Hill, Horace Earl, to Boeing Company, The. Drill stop. 4,019,827, Cl. 408-202.000.
Christie, George, Jr.: *See—*
Service, Alfred Lewis; and Christie, George, Jr., 4,020,014.
Christmann, Harold F.; and Miklas, Edward J., to Petro-Tex Chemical Corporation. Modified zinc ferrite oxidative dehydrogenation catalysts. 4,020,120, Cl. 260-680.00D.
Christopher, Walter S., to Chicago Lock Co. Keeper lock for a slide fastener. 4,019,353, Cl. 70-68.000.
Christy, Charles A. Positive displacement vane type rotary pump. 4,019,840, Cl. 418-241.000.
Christy, Marcia Elizabeth, to Merck & Co., Inc. 10,11,Dihydro-N-alkoxycarbonyl-10,10,11,11-tetrafluoro-5H-dibenzo[a,d]cycloheptene-5-methylamines. 4,020,096, Cl. 260-471.00C.
Chromalloy American Corporation: *See—*
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Chrysler Corporation: *See—*
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Chubb Integrated Systems Limited: *See—*
Coulthurst, Ian James, 4,020,326.
Chuilli, Antonio. Magnetic bingo markers. 4,019,747, Cl. 273-137.0AE.
Church, Victor Eric; Fraser, Herbert James; and Matthews, Ralph William, to Australian Atomic Energy Commission. Apparatus for radiation dose measurement. 4,020,329, Cl. 235-151.300.
Churchland, Mark T., to MacMillan Bloedel Limited. Microwave power applicator. 4,020,311, Cl. 219-10.55A.
Ciba-Geigy AG: *See—*
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Ciba-Geigy Corporation: *See—*
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Bosshard, Rene; and Brechbuhler, Hans U., 4,020,067.
Ghilardi, Hans Peter; and Atasoy, Kaya, 4,020,162.
Gosteli, Jacques, 4,020,098.
Hiestand, Armin; and Jager, Horst, 4,020,087.
Parkin, Charles Stephen, 4,019,684.
Rathgeb, Paul, 4,020,065.
Vogel, Christian; and Aebi, Rudolph, 4,019,894.
Claflin, Warren E.; and Watson, Francis M., III, to Philip Morris Incorporated. Variable parameter smoking machine. 4,019,366, Cl. 73-23.000.
Clark, Justin S.; and Wallace, Wm. Dean. Method and apparatus for mixing gases. 4,019,523, Cl. 137-7.000.
Clement, Gilbert L.; and Buttman, Rene F., to Etat Francais. Control system for tracking a moving target. 4,020,407, Cl. 318-632.000.
Clements, Thomas W.; and Waters, E. Craig, to Will Ross, Inc. Needle valve assembly. 4,019,534, Cl. 137-614.180.
Clements, William: *See—*
Vork, William D.; and Clements, William, 4,019,395.
Cless, Gerhard; and Kaplan, Edward L., to Extel Corporation. Tape punch machine. 4,019,676, Cl. 234-115.000.
Cluett, Peabody & Co., Inc.: *See—*
Morton, Kenneth O., 4,019,729.
Clyma, Grady L.: *See—*
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Coal Industry (Patents) Limited: *See—*
Urquhart, Donald Bremner, 4,019,975.
Coates, Harold: *See—*
Collins, John Desmond; Coates, Harold; and Siddiqui, Iftikhar Hussain, 4,020,090.
Coates, Vincent J.; and Welter, Leonard M., to American Optical Corporation. Field emission electron gun. 4,020,387, Cl. 315-31.00R.
Cobb, George E., to Carrier Corporation. Air conditioning system. 4,019,566, Cl. 165-2.000.
Cochran, Michael J.; and Hamilton, Stephen P., to Texas Instruments Incorporated. Thermal line printer. 4,020,465, Cl. 340-172.500.
Cocker, John Derek; and Sutherland, Derek Ronald, to Glaxo Laboratories Limited. Improvements in or relating to cephalosporin antibiotics. 4,020,058, Cl. 260-243.00C.
Coflexip: *See—*
Behar, Isaac; and Genini, Maurice, 4,019,213.
Hoffmann, Daniel; and Reynard, Remi, 4,019,539.
Cohen, Abraham Bernard; and Roos, Leo, to Du Pont de Nemours, E. I., and Company. Photohardenable vesicular image-forming elements. 4,019,909, Cl. 96-115.00P.
Cohen, Julia Winter, legal representative: *See—*
Winter, Carl E., deceased; and Cohen, Julia Winter, legal representative, 4,019,405.
Cohen, Morton; and Silverman, Elliott. Dental apparatus for cheek retraction and saliva collection. 4,019,255, Cl. 32-33.000.
Colgate-Palmolive Company: *See—*
McGhie, Russell P.; Bredholt, Olaf; and Rockefeller, Winston G., 4,019,305.
Perla, Giulio; Mannara, Giuseppe; and Milesi, Domenico, 4,020,154.
Colgate, Stirling A., to New Mexico Tech Research Foundation, a part interest. Method of mining rock with an electron beam. 4,020,317, Cl. 219-121.0EM.
Collier, David Thomas, to Hawker Siddeley Dynamics Limited. Optical scanning systems with image curvature correcting means. 4,019,804, Cl. 350-7.000.
Collier, Everett J.: *See—*
Benson, Richard W.; Cherney, Steven D.; and Collier, Everett J., 4,019,998.
Collin, Andre: *See—*
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Collins, John Desmond; Coates, Harold; and Siddiqui, Iftikhar Hussain, to Albright & Wilson Limited. Organotin compounds. 4,020,090, Cl. 260-429.700.
Colombo, Peter: *See—*
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Combi Co., Ltd.: *See—*
Nakao, Shinroku, 4,019,276.
Nakao, Shinroku, 4,019,751.
Combustion Engineering, Inc.: *See—*
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McAllister, Owen Earl, 4,019,303.
Miles, Bert Benton, 4,019,468.
Smith, Donald Arthur; and Marshall, John Joseph, 4,019,851.
Commissariat a l'Energie Atomique: *See—*
Borel, Joseph; Lacour, Jacques; and Merckel, Gerard, 4,019,247.
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Compagnie d'Electronique et de Piezoelectricite C.E.P.E.: *See—*
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Compagnie Generale de Geophysique: *See—*
Michon, Dominique; and Staron, Philippe, 4,020,447.
Conforti, Frederick J.; and Ogden, Wilbur L., to Pittway Corporation. Fire detector. 4,020,479, Cl. 340-237.00S.
Conger, Joseph Clyde, Sr., to American Cyanamid Company. Concentrated direct dye solution and process therefor. 4,019,858, Cl. 8-85.00R.
Conklin, Hale, to Divajex. Thermal enclosure and method. 4,019,340, Cl. 62-371.000.
Connerney, William R.; and Bourassa, Denis L., to United States of America, Army. Foam matching load. 4,020,427, Cl. 333-22.00R.
Consaul, Kenneth E. Combination shower head and toiletries mixing and dispensing apparatus. 4,019,658, Cl. 222-144.500.
Consumers Glass Co., Ltd.: *See—*
Altenhof, Jack; Altenhof, John; and Chartier, Robert, 4,019,711.
Consupak, Inc.: *See—*
Farrell, John Jerome, 4,019,849.
Continental Can Company, Inc.: *See—*
Down, Alfred G.; and Nebeling, Robert L., 4,019,427.
Continental Group, Inc., The: *See—*
Khoury, Nick S., 4,019,648.
Continental Oil Company: *See—*
Gawel, Len J.; and Chen, Chi-Sin, 4,019,959.
Cook, Martin Christopher; and Laundon, Brian, to Glaxo Laboratories Limited. Antibiotics. 4,020,077, Cl. 260-306.70C.
Cooke, Claude R., to GTE Sylvania Incorporated. Precision automatic tracking system. 4,020,340, Cl. 250-203.00R.
Coomer, Stephen Dexter, to Bell Telephone Laboratories, Incorporated. Parity generation and bus matching arrangement for synchronized duplicated data processing units. 4,020,459, Cl. 340-146.1AG.
Cooper, Glenn D.: *See—*
Abolins, Visvaldis; Cooper, Glenn D.; and Lee, Gim F., Jr., 4,020,124.
Coors Container Company: *See—*
Frenkel, Robert Leland; Vischer, Peter; and Gulka, James Allen, 4,019,620.
Corbett, James Patrick. Oscillating crystal transducer systems. 4,020,448, Cl. 340-8.00S.
Cordi, Vincent Anthony; and Edson, Bruce Adam, to International Business Machines Corporation. Memory hierarchy system with journaling and copy back. 4,020,466, Cl. 340-172.500.
Cornelius, James W.; and Mallon, Robert T., to Eagle-Picher Industries, Inc. Preventing formation of excessive bead of coating material on metal can rims. 4,020,198, Cl. 427-336.000.
Corning Glass Works: *See—*
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Dahms, Harald, 4,019,862.
Elmer, Thomas H.; and Walters, Helen, 4,019,884.
Cornsweet, Tom N.; and Harrison, Richard A., to Baylor College of Medicine. Optical apparatus for obtaining measurements of portions of the eye. 4,019,813, Cl. 351-14.000.
Cosyns, Jean; Franck, Jean-Pierre; Guibet, Jean-Claude; and Jacquin, Yves, to Institut Francais du Petrole. Process for hydrogenating highly unsaturated heavy hydrocarbon cuts. 4,019,976, Cl. 208-57.000.
Cota, George R.: *See—*
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Cote, Toussaint, to Noranda Mines Limited. Gas seal and silencer for use on tuyere body. 4,019,725, Cl. 266-169.000.
Cottman, Kirkwood S., to Goodyear Tire & Rubber Company, The. Phenolic antioxidants. 4,020,042, Cl. 260-45.85H.
Coulthard, Douglas Currie: *See—*
Dunn, John Robert; and Coulthard, Douglas Currie, 4,020,039.
Coulthurst, Ian James, to Chubb Integrated Systems Limited. Token-control. 4,020,326, Cl. 235-61.70B.
Covey, Rupert A.: *See—*
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Cox, Paul R., Jr., to Hercules Incorporated. Multi-cavity filaments. 4,020,229, Cl. 428-372.000.
Coxon, John R. Internal combustion engine. 4,019,324, Cl. 60-624.000.

CPC Engineering Corporation: *See—*
Reid, Robert A., 4,019,830.
Cragoe, Edward J., Jr.; and Bicking, John B., to Merck & Co., Inc. Substituted phenoxy-tridecanoic acids. 4,020,177, Cl. 260-399.000.
Craig, Paul George, to Dresser Industries, Inc. Removable drill bit nozzle. 4,019,593, Cl. 175-340.000.
Creusot-Loire Vallourec: *See—*
Mola, Michel, 4,019,565.
Crites, Virgil C., to Bonin, Peter J. Method of recovering fine gold from ore. 4,019,971, Cl. 204-130.000.
Crochiere, Ronald Eldon; and Rabiner, Lawrence Richard, to Bell Telephone Laboratories, Incorporated. Interpolation-decimation circuit for increasing or decreasing digital sampling frequency. 4,020,332, Cl. 235-152.000.
Croll-Reynolds Company, Inc.: *See—*
Gilbert, William J., Jr., 4,019,870.
Crossan, Irvin D.; and Toporcer, Louis H., to Dow Corning Corporation. Method of increasing the molecular weight of hydroxyl end-blocked polydiorganosiloxanes. 4,020,044, Cl. 260-46.5UA.
Croup, Robert E., to Acoustic Fiber Sound Systems, Inc. Latchable swivel mount for loudspeaker. 4,019,708, Cl. 248-137.000.
Crown Zellerbach Corporation: *See—*
Michaylov, Lubomir, 4,020,215.
Croxall, Derek Francis; Kell, Robert Christopher; and Lambert, Robert, to General Electric Company Limited, The. Crystals and their manufacture. 4,019,950, Cl. 156-623.00R.
CRS Industries, Inc.: *See—*
Norsworthy, Ross W., 4,019,367.
Crull, Stanley W., to Sundstrand Corporation. Synchronous control system. 4,019,596, Cl. 180-6.480.
Crump, Ronald Alfred: *See—*
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Cruse, Clyde L., Jr.; and Kerschbaum, Arthur P., to Armco Steel Corporation. Apparatus for the direct reduction of iron ores. 4,019,724, Cl. 266-156.000.
Crystal, Richard G., to Xerox Corporation. Planographic printing master. 4,019,437, Cl. 101-466.000.
CTS Corporation: *See—*
Kelver, William L.; Stuckey, Ronald L.; and Rozema, Arthur L., 4,020,445.
Cuksee, Marjorie T.; and Allen, Henry C., to United States of America, Army. Pot life extension of isocyanate cured propellants by aziridine compounds. 4,019,933, Cl. 149-19.400.
Cummings, Richard Daniel, to Daystar Corporation. Collecting solar energy. 4,019,496, Cl. 126-271.000.
Cunningham, Marion L.: *See—*
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Cushman, Robert Holbrook; and Stirner, Kurt R., deceased (by Stirner, Genevieve E., executrix), to Gould Inc. Self-balancing positive displacement casting system. 4,019,670, Cl. 228-45.000.
Cutri, Frank J., deceased; and by Cutri, Louise, administratrix. Pattern transfer machine. 4,019,433, Cl. 101-132.500.
Cutri, Louise, administratrix: *See—*
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Cyphert, Gilbert G., to Chemko Industries, Inc. Carpet soil extractor. 4,019,218, Cl. 15-321.000.
Czaplinski, Thomas V.; and Haney, Thomas Albert, to E. R. Squibb & Sons, Inc. Receptacle for radioactive material. 4,020,355, Cl. 250-506.000.
D. H. Baldwin Company: *See—*
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Daguet, Jacques Lucien: *See—*
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Dahle, Norman A., to Gulf Oil Corporation. 3-Benzyl-2-methylimino-5-phenyl-delta-4-1,3,4-thiadiazolines. 4,020,078, Cl. 260-306.80D.
Dahlquist, Jon G. Electroacoustic transducer. 4,020,296, Cl. 179-115.5PV.
Dahms, Harald, to Corning Glass Works. Method and apparatus for measurement of $CO_2$ and chloride in body fluids. 4,019,861, Cl. 23-230.00B.
Dahms, Harald, to Corning Glass Works. $CO_2$ measurement and reagents therefor. 4,019,862, Cl. 23-230.00B.
Dai Nippon Printing Company Limited: *See—*
Noshiro, Atsumi; Takamizawa, Minoru; Yamamoto, Yasushi; Inoue, Yoshio; and Fujii, Hitoshi, 4,019,904.
Daido Seiko Kabushiki Kaisha: *See—*
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Dana Corporation: *See—*
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d'Andrea, Gilbert: *See—*
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Dannels, Bobby F., to Hooker Chemicals & Plastics Corporation. Polythioether sealant compositions. 4,020,033, Cl. 260-31.80Z.
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Branscome, Kenneth M.; Feath, William M.; Goode, George E.; Heizer, Kenneth W.; and Morgan, Barrie O., 4,020,285.
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D'Auria, Rosemarie, to Raymond Lee Organization, Inc., The, a part interest. Eye shield device. 4,019,516, Cl. 128-268.000.
Davies, Robert William; and Wager, Leonard Richard, to Molins Limited. Packing machines. 4,019,413, Cl. 83-88.000.
Davis, Howard J.; and Thomas, Norman W., to Celanese Corporation. Chemical modification of polybenzimidazole semipermeable. 4,020,142, Cl. 264-347.000.
Davis, John Ephraim, Jr., to International Business Machines Corporation. Iterative coordinate data approximation system for photoemissive pixel pattern displays. 4,020,281, Cl. 178-18.000.
Davis, William A., to Addressograph Multigraph Corporation. Sheet inverting. 4,019,435, Cl. 101-232.000.
Davy Powergas Limited: *See—*
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Dawson, Peter; and Barrett, Charles Jack, to Taylor Woodrow Construction Limited. Seals. 4,019,749, Cl. 277-58.000.
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Daystar Corporation: *See—*
Cummings, Richard Daniel, 4,019,496.
Dean, John W., to United States of America, Energy Research and Development Administration. Superconducting cable cooling system by helium gas and a mixture of gas and liquid helium. 4,020,274, Cl. 174-15.00S.
Dean, John W., to United States of America, Energy Research and Development Administration. Superconducting cable cooling system by helium gas at two pressures. 4,020,275, Cl. 174-15.00S.
De Bartolomeis, Francesco: *See—*
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Decatur Electronics, Inc.: *See—*
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Deinlein-Kalb, Hans, to AEG-Kanis Turbinenfabrik GmbH. Rapid shutoff extraction check valve. 4,019,713, Cl. 251-28.000.
De Jonge, Albert Klaas: *See—*
Mijnheer, Andries; and De Jonge, Albert Klaas, 4,019,336.
Del Monte Corporation: *See—*
Ross, Edward E., 4,019,547.
Del Medico, Anthony P.: *See—*
Turcotte, Ronald E.; Wolff, Jay R.; Del Medico, Anthony P.; and Lee, Paul C., 4,020,348.
Delta Electronic Control Corporation: *See—*
Suelzle, Larry R.; and Hodges, Leonard O., 4,020,361.
Dempster Industries, Inc.: *See—*
Tangeman, Lawrence N.; and Linsenmeyer, Arthur, 4,019,685.
Deneen, William F. Solids level indicator. 4,019,659, Cl. 222-193.000.
Dennis, Donald A. X-ray inspection device and method. 4,020,346, Cl. 250-358.00R.
De Nora, Vittorio: *See—*
Giuffre, Luigi; De Nora, Vittorio; and Spaziante, Placido, 4,020,235.
Derby, Robert L., to Dow Chemical Company, The. Disposal system. 4,019,628, Cl. 206-524.400.
Derda, Harry: *See—*
Martin, William O.; and Derda, Harry, 4,019,727.
DeRee, Alvia K. Tool for disassembling hydraulic valve lifters. 4,019,237, Cl. 29-213.00E.
Der Estephanian, Estephan; Foreman, Robert E.; Scott, Robert D.; and Friis, Odd, to Research Development Systems, Inc. Wearable, self-contained fully mobile personal breathing apparatus for surgeons and operating room personnel. 4,019,508, Cl. 128-142.700.
Derner, Paul; Sonntag, Hans; and Stehl, Otto, to BFG Glassgroup. Light transmitting panel with sound damping properties. 4,019,295, Cl. 52-171.000.



DeSalvo, Joseph L. Full strength, low density concrete. 4,019,919, Cl. 106-90.000.
Desse, Pierre; and Trezeguet, Jean-Pierre, to Les Cables de Lyon. Centering and fixing means and method for its fabrication. 4,019,538, Cl. 138-108.000.
Deters, Elmer M., to Weil-McLain Co., Inc. Plastic motor-pump base for a submersible pump unit. 4,019,836, Cl. 417-360.000.
Detrick, John Kent, to Du Pont de Nemours, E. I., and Company. Treatment of aromatic amines with gas mixtures derived from the oxidation of ammonia to effect diazotization/coupling. 4,020,052, Cl. 260-140.00R.
Deutsch, Jiri: *See—*
Seidl, Pavel; Rod, Josef; Deutsch, Jiri; and Bartos, Josef, 4,019,310.
Dezelan, Joseph Edward, to Caterpillar Tractor Co. Combined automatic and manual hydraulic control for motor grader blade. 4,019,585, Cl. 172-4.500.
Diamond International Corporation: *See—*
Harvey, Albert J., 4,019,935.
Keen, Everett Morgan; Siciliano, Anthony John; Shah, Kiran Chhabildas; Artamonoff, Serge; and Stigen, Leonard Roy, 4,019,461.
Diamond, Martin J.: *See—*
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Diamond Shamrock Corporation: *See—*
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Trocki, Julian Robert, 4,020,103.
Dickson, Arthur D.; and Pruitt, Laurie E., to Minnesota Mining and Manufacturing Company. Electrode construction for flexible electroluminescent lamp. 4,020,389, Cl. 315-246.000.
Diederich, Gerd: *See—*
Gruner, Hans; Diederich, Gerd; Butz, Hans; Wahls, Peter; and Weins, Engelbert, 4,019,560.
Diepeveen, John C. Mechanism and method for moving tool or the like. 4,019,668, Cl. 228-3.100.
Diggs, Richard E. Metal building with combined temperature control and firefighting system. 4,019,581, Cl. 169-16.000.
Di Giovanni, Italo. Automatic container-bearer bar for motor vehicles. 4,019,601, Cl. 180-90.000.
Digital Dynamics, Inc.: *See—*
Jerde, James B.; and van Blerk, Victor B., 4,019,533.
Dillon, Oscar W.: *See—*
Spooner, Robert J.; and Dillon, Oscar W., 4,019,286.
Dills, Raymond L., to General Electric Company. Energy saving broiling oven. 4,020,323, Cl. 219-405.000.
DiRocco, Nicholas. No down draft chimney throat. 4,019,491, Cl. 126-120.000.
Dittner, Adam: *See—*
Prenzel, Karl; and Dittner, Adam, 4,019,614.
Dittrich, Ferdinand J.; Durmann, George J.; and Ingham, Herbert S., Jr., to Metco, Inc. Aluminum-coated nickel or cobalt core flame spray materials. 4,019,875, Cl. 428-570.000.
Divajex: *See—*
Conklin, Hale, 4,019,340.
Dix, Robert; Markel, Richard F.; Parker, James A.; Riggs, John P.; and Vest, Dale T., to Celanese Corporation. Vertical pyrolysis furnace for use in the production of carbon fibers. 4,020,273, Cl. 13-7.000.
Dixie-Narco, Inc.: *See—*
Oden, Kenneth W., 4,019,650.
Dixon, Dale D.; and Hayes, Larry J., to Air Products and Chemicals, Inc. Fluorination of polyolefin and polyacrylonitrile fibers. 4,020,223, Cl. 428-224.000.
Dong, Poy; and Fahey, James P. Swing spout faucet. 4,019,536, Cl. 137-625.410.
Dorofix Design Establishment: *See—*
Sadler, Marc, 4,019,267.
Dotschkal, Anton A.; and Massaro, James J. Heating system for building structures. 4,019,677, Cl. 236-9.00A.
Dougherty, Lawrence W., to Zenith Radio Corporation. Method for attaching a shadow or photographic mask to a flangeless, curved faceplate of a color television picture tube. 4,019,231, Cl. 29-25.150.
Dow Chemical Company, The: *See—*
Abdallah, Abdulmunien H., 4,020,167.
Baggett, Joseph M., 4,020,045.
Derby, Robert L., 4,019,628.
Freiter, Edward R., 4,020,034.
Harris, Robert F.; and Tefertiller, Nancy B., 4,020,030.
Jochmann, Ludwig V., 4,019,296.
Mahoney, Robert D.; and Schneider, Stephen E., 4,020,230.
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Dow Corning Corporation: *See—*
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Schroeder, Fred, 4,019,932.
Down, Alfred G.; and Nebeling, Robert L., to Continental Can Company, Inc. Partition assembler. 4,019,427, Cl. 93-37.00R.
Downer, Jason K. Boat cover apparatus. 4,019,212, Cl. 9-1.500.
Downey, Robert Andrew: *See—*
Kirkbride, Bernard James; Downey, Robert Andrew; Thomasson, Charles Victor; and Lewis, Joseph Earle, 4,019,887.
Doyle, John R.: *See—*
Smith, Millard F.; Behringer, Frederick J.; Doyle, John R.; and McFadden, Daniel P., 4,019,390.
Drackett Company, The: *See—*
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Dragerwerk Aktiengesellschaft: *See—*
Oetjen, Georg-Wilhelm; and Warncke, Ernst, 4,019,507.
Drake & Fletcher Limited: *See—*
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Dressen, A. Louise: *See—*
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Dresser Industries, Inc.: *See—*
Craig, Paul George, 4,019,593.
Drimak, Edward George; and Metz, Thomas Arthur, to International Business Machines Corporation. Simultaneous addressing of different locations in a storage unit. 4,020,470, Cl. 340-172.500.
Drone, Gary Alan, to Fiat-Allis Construction Machinery, Inc. Dual pivot axis control lever. 4,019,401, Cl. 74-471.0XY.
Du Pont of Canada Limited: *See—*
Jaswal, Iqbalsingh; and Pugi, Kalev, 4,019,866.
Dubner, Robert B.; and Bienenfeld, Harold. Pressurized tennis ball container. 4,019,629, Cl. 206-315.00B.
DuBois, R. Clark: *See—*
Vijayendran, Bheema R.; and DuBois, R. Clark, 4,019,911.
Ducas, Theodore W., to Massachusetts Institute of Technology. Isotope selective excitation and separation method and apparatus utilizing circularly polarized pulsed radiation. 4,020,350, Cl. 250-423.00P.
Dudley, Michael Alan, to Canada Wire and Cable Limited. Process and bath composition for increasing the rate of polymer deposition in electrocoating. 4,020,028, Cl. 260-18.0EP.
Duetsche Gold- und Silber-Scheideanstalt vormals Roessler: *See—*
Beyer, Hermann; Biberbach, Peter; and Scondo, Christian, 4,019,928.
Duley, Raymond S.: *See—*
Garner, Edward M.; and Duley, Raymond S., 4,020,366.
Dumser, Josef; and Korner, Wilhelm. Thermal distributing unit. 4,019,681, Cl. 237-63.000.
Dunkin, Albert. Rivet making machine. 4,019,432, Cl. 10-13.000.
Dunlop Australia Limited: *See—*
Prince, Eric Victor Donald; Lewis, Kenneth Llewellyn; and Ralph, Leonard John Michael, 4,019,941.
Dunn, John Robert; and Coulthard, Douglas Currie, to Polysar Limited. Vulcanizable elastomeric compositions. 4,020,039, Cl. 260-42.370.
Du Pont de Nemours, E. I., and Company: *See—*
Boswell, George Albert, Jr.; and Tullock, Charles William, 4,020,112.
Cohen, Abraham Bernard; and Roos, Leo, 4,019,909.
Detrick, John Kent, 4,020,052.
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Herkes, Frank Edward, 4,020,051.
Kosak, John R., 4,020,107.
Miller, Lester I., 4,020,216.
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Quinn, James Maurice; and Kirk, Allen Gregg, 4,020,141.
Ross, Roger Allen; and Strachan, Donald Rittler, 4,020,139.
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Schell, Mark Samuel, 4,019,803.
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Woo, Lecon, 4,019,365.
Yuan, Edward Lung, 4,020,209.
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E. R. Squibb & Sons, Inc.: *See—*
Czaplinski, Thomas V.; and Haney, Thomas Albert, 4,020,355.
Hoehn, Hans, 4,020,072.
Wade, Peter C.; and Vogt, Berthold Richard, 4,020,064.
Eagle-Picher Industries, Inc.: *See—*
Cornelius, James W.; and Mallon, Robert T., 4,020,198.
Earl, T. Desmond, to Textron, Inc. Air cushion undercarriage brake system. 4,019,698, Cl. 244-110.00A.
Earley, John J. Emergency temporary door cover. 4,019,557, Cl. 160-354.000.
Earsley, James L.: *See—*
Earsley, Melvin L.; Earsley, Stephen L.; and Earsley, James L., 4,019,790.
Earsley, Melvin L.; Earsley, Stephen L.; and Earsley, James L. Ball separator for ball bearings. 4,019,790, Cl. 308-201.000.
Earsley, Stephen L.: *See—*
Earsley, Melvin L.; Earsley, Stephen L.; and Earsley, James L., 4,019,790.
Eastes, Frank E., to W. R. Grace & Co. Gel composition, heat sealable substrates, and process for heat sealing. 4,020,228, Cl. 428-347.000.
Eastman Kodak Company: *See—*
Hunt, Clayton Edward, Jr.; and Spooner, Donald James, 4,019,732.
Irick, Gether, Jr.; and Kelly, Charles A., 4,020,041.
Irick, Gether, Jr.; and Kelly, Charles A., 4,020,080.
Montalto, Michael Samuel, 4,019,733.

Vroom, Clifford G., 4,020,499.
Ebata, Hiroyuki, to Yoshida Kogyo Kabushiki Kaisha. Slide fastener stringers. 4,019,227, Cl. 24-205.16R.
Ebert, Michael: *See—*
Wysor, Michael S., 4,020,150.
Ebner, Peter R.; and Griffith, Louis E., to Itek Corporation. Self testing phototypesetter flash intensity control system. 4,020,495, Cl. 354-5.000.
Edson, Bruce Adam: *See—*
Cordi, Vincent Anthony; and Edson, Bruce Adam, 4,020,466.
Edwards, Alfred Gerald; and Harris, Glyn Islwyn, to Albright & Wilson Limited. Resin compositions. 4,020,035, Cl. 260-38.000.
Edwards, Dalma Therman; and Strickland, Gene. Quickly attachable and detachable tine frame for a tobacco box rack. 4,019,767, Cl. 294-5.500.
Edwards, John L., to Kraftco Corporation. Method for manufacture of Ricotta cheese. 4,020,186, Cl. 426-36.000.
Edwards, Stanley H., Jr.; and Reese, Cleve L., to Square D Company. Cover assembly for an electrical switch. 4,020,308, Cl. 200-310.000.
Edwin Cooper & Company Limited: *See—*
Jayne, Gerald John Joseph; and Askew, Herbert Frank, 4,019,991.
Efroymson, John S.: *See—*
Kornblum, Daniel; and Efroymson, John S., 4,019,515.
EG&G, Inc.: *See—*
Manning, William L., 4,020,379.
Eggert, Glenn J.; and Lee, Phillip L., to Rexnord Inc. Turntable. 4,019,627, Cl. 198-786.000.
Ehmann, William J., to SCM Corporation. Selective hydrogenation of unsaturated compounds. 4,020,108, Cl. 260-586.00P.
Eidelberg, Jonah; Mooney, Thomas; and Bauer, Richard A., to I-T-E Imperial Corporation. Raintight connector for electrical conduit. 4,019,762, Cl. 285-340.000.
Eigenmann, Ludwig. Anti-skid and wear resistant road surface marking material. 4,020,211, Cl. 428-323.000.
Eilberg, Ralph G.: *See—*
Soldati, Gianluigi; Eilberg, Ralph G.; Melger, Helga; and Wooding, William M., 4,020,019.
Eisenhardt, Fred W., to Alloway Manufacturing, Inc. Hitch assembly for mounting a transverse beam on a three-point hitch. 4,019,755, Cl. 280-490.00A.
Elbreder, Charles H. Dental hygiene package. 4,019,522, Cl. 132-90.000.
Elder, James H.; and Patterson, Hubert A., to General Electric Company. Muting circuit. 4,020,421, Cl. 325-478.000.
Electricite de France: *See—*
Gillet, Roger; Berthet, Michel; and Moisson-Franckhauser, Francois, 4,020,371.
El-Gammal, Hussein Mokhtar, to Ferraris Development and Engineering Company Limited. Apparatus for use in the measurement of the flow rate of fluid flow. 4,019,382, Cl. 73-194.00R.
Elitex, koncern textilniho strojirenstvi: *See—*
Seidl, Pavel; Rod, Josef; Deutsch, Jiri; and Bartos, Josef, 4,019,310.
Elitex, Zavody textilniho strojirenstvi generalni reditalstvi: *See—*
Kouklik, Ivo, 4,019,349.
Elkins, Christopher W., to Teledyne Water Pik. Hydrotherapy devices. 4,019,502, Cl. 128-65.000.
Elkus, Eugene S.: *See—*
Pfost, Robert Fred; and Elkus, Eugene S., 4,020,325.
Elliott, Jennings W., to Schlumberger Technology Corporation. Methods and apparatus for recording well logging measurements. 4,020,451, Cl. 340-15.5DS.
Ellis, Delmar H.; Baker, John E.; Shaffernocker, Wayne M.; and Scott, Ralph W., to General Electric Company. Means for inducing vibration in an airfoil. 4,019,375, Cl. 73-71.50R.
Ellis, Franklin Hammond, to Sybron Corporation. Therapeutic method of using low intensity direct current generator with polarity reversal. 4,019,510, Cl. 128-172.100.
Elmer, Frank J., to United States of America, Army. Transparent optical power meter. 4,019,381, Cl. 73-190.0EW.
Elmer, Thomas H.; and Walters, Helen, to Corning Glass Works. Method for providing porous broad-band antireflective surface layers on chemically-durable borosilicate glasses. 4,019,884, Cl. 65-30.00R.
Emelyanov, Viktor Ivanovich; Grois, Khaim Shlemovich; and Kadomsky, Dmitry Evgenievich. Rectifier-inverter system of converter substation. 4,020,410, Cl. 321-11.000.
Emenaker, Leo J., to Printronix, Inc. Paper feed sensing mechanism for printer. 4,019,619, Cl. 197-189.000.
Enami, Kazuyuki: *See—*
Nenno, Soji; and Enami, Kazuyuki, 4,019,925.
Energy Development Associates: *See—*
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Engineering Enterprises, Inc.: *See—*
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Fox, Fred K., 4,019,592.
Englund, Gosta R.; and Lindelow, Ernst C-G, to Svenska Dataregister AB. Printing device. 4,019,617, Cl. 197-133.00R.
Enomoto, Nizo: *See—*
Hobo, Nobuhito; Enomoto, Nizo; Suzuki, Yutaka; Kawamoto, Itsushi; Iyoda, Michio; Tsuzuki, Yoshihiko; Sekino, Kenro; and Nukata, Hironari, 4,019,478.
Environ Mechanical Services Pty. Limited: *See—*
Gangell, David Bruce, 4,019,582.
Envirotech Corporation: *See—*
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Epley, John M.; Leach, Austin F.; and Frisch, Arnold, to Hearing Evaluation & Acoustic Research, Inc. Apparatus for testing acoustical attenuation of hearing protectors. 4,020,298, Cl. 179-175.000.
Epstein, Louis S. Universal size disposable shoe cover. 4,019,265, Cl. 36-7.10R.
Epstein, Marvin Aaron, to International Telephone and Telegraph Corporation. MSK digital data synchronization detector. 4,020,283, Cl. 178-88.000.
Erickson, James A.: *See—*
Erickson, John W.; and Erickson, James A., 4,020,432.
Erickson, John M.; and Redgate, Theodore, to United States of America, Army. Transient voltage protection circuit for a DC power supply. 4,020,395, Cl. 361-59.000.
Erickson, John W.; and Erickson, James A., to Boltswitch, Inc. Motorized shunt trip switch operator. 4,020,432, Cl. 335-76.000.
Erickson, Raymond C.; and Bambury, Ronald E., to Richardson-Merrell Inc. 7-[α-Amino-ω-(3,4-methylenedioxyphenyl)acylamido]-cephalosporanic acid derivatives. 4,020,060, Cl. 260-243.00C.
Erickson, Wayne K., to Phillips Petroleum Company. Polyolefin fibers useful as fiberfill treated with finishing agent comprising an organopolysiloxane and a surface active softener. 4,020,212, Cl. 428-361.000.
Ericson, Eric Axel; and Kaufhold, Frederick Daniel, to General Electric Company. Drawout apparatus having improved secondary contact mounting provisions. 4,020,301, Cl. 200-50.0AA.
Eriksson, Erik Gustav Lennart, to AB Karlstadplattan. Method for flooring on a closed underlayer. 4,019,936, Cl. 156-71.000.
Ermolaev, Nikolai Evgenievich: *See—*
Akunov, Viktor Ivanovich; Blinov, Ivan Timofeevich; Boryakov, Viktor Fedorovich; Ermolaev, Nikolai Evgenievich; Zavadsky, Georgy Vladimirovich; Lopatin, Vladimir Viktorovich; and Rusakov, Gennady Fedorovich, 4,019,688.
Ernst, Gerhard, to American Store Equipment Corporation. Wall system. 4,019,291, Cl. 52-36.000.
Eschmann, Peter. Rigid supporting bandage and method for applying same. 4,019,506, Cl. 128-90.000.
Esper, Friedrich; and Bethge, Karin, to Robert Bosch G.m.b.H. Method of manufacturing α-alumina. 4,019,914, Cl. 106-62.000.
Essex International, Inc.: *See—*
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Establissement Public dit "Telediffusion de France": *See—*
Gautier, Christian Jean; and Scarabin, Jean-Marie Pierre, 4,020,279.
Estey Dynamics Corporation: *See—*
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Etablissements Morellet-Guerineau GmbH & Co. Handels KG: *See—*
Beger, Udo; Saillard, Gabriel; and Pasquini, Ari, 4,019,757.
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Clement, Gilbert L.; and Buttman, Rene F., 4,020,407.
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Euler, Reinhold, to Hoechst Aktiengesellschaft. Method of welding mounting members to a wire. 4,020,315, Cl. 219-91.000.
Eull, Marvin J., to Graco Inc. Pressure unloading apparatus for a diaphragm pump. 4,019,837, Cl. 417-386.000.
Evans, Clifford A.: *See—*
Kamin, Arthur; and Evans, Clifford A., 4,019,841.
Evans, Stephen F., to Procter & Gamble Company, The. Apparatus for forming tampon sacks and filling same with aggregate. 4,019,306, Cl. 53-124.00A.
Evans, William Price; and Naik, Appayya Raghunath, to Lever Brothers Company. Hydroxamic betaines. 4,020,100, Cl. 260-501.130.
Evers, Alfred: *See—*
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Evers, William John, to International Flavors & Fragrances Inc. Certain 3-furyl sulfides. 4,020,175, Cl. 260-347.200.
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Ritter, Klaus; Gott, Hans; Ritter, Gerhard; and Ritter, Josef, 4,019,665.
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Fabbrica Italiana Magneti Marelli, S.p.A.: *See—*
Zoppi, Bruno, 4,019,526.
Fabian, Hans, to Nukem G.m.b.H. Apparatus for the continuous purification of gases contaminated with tritium. 4,019,867, Cl. 23-260.000.
Fabtek, Inc.: *See—*
Benson, Lyman David, 4,019,604.
Facet Enterprises, Inc.: *See—*
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Fahey, James P.: *See—*
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Fairchild Camera and Instrument Corporation: *See—*
Winter, Arthur J., 4,020,487.
Falconnier, Jean-Claude: *See—*
Charlot, Jean-Claude; and Falconnier, Jean-Claude, 4,020,292.
Falomo, Lodovico. Machine for conveying a material in web form through treatment tubs. 4,019,667, Cl. 226-171.000.
Farber, Sheldon, to NCR Corporation. Di-vinyl phthalides color formers. 4,020,056, Cl. 260-240.00D.
Farber, Sheldon, to NCR Corporation. Chromogenic furoquinoxalines. 4,020,068, Cl. 260-250.00Q.
Fare, Carlo; and De Bartolomeis, Francesco, to Honeywell Information Systems Italia. Semiautomatic loading of tape transports. 4,019,694, Cl. 242-182.000.
Farley, Daniel T.: *See—*
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Farrar, Ralph C., to Phillips Petroleum Company. Addition of coupling agent during organolithium initiated polymerizations. 4,020,258, Cl. 526-178.000.
Farrell, John Jerome, to Consupak, Inc. Rapid parison cooling in injection blow molding. 4,019,849, Cl. 425-445.000.
Fastener Industries Inc.: *See—*
Schaft, Edwin E.; and Yeager, Kenneth A., 4,020,316.
Fasulkey, Robert H.; and Quidort, Vaughn L., to Westinghouse Electric Corporation. Parallel transistor protection circuit. 4,020,397, Cl. 361-24.000.
Fauss, Glenn C.; and Scribner, Robert J., to Goodyear Tire & Rubber Company, The. Treatment of tire making components. 4,020,354, Cl. 250-492.00B.
Faust, Raimund Josef, to Hoechst Aktiengesellschaft. Photopolymerizable copying compositions containing biuret-based polyfunctional monomers. 4,019,972, Cl. 204-159.150.
Faxen, Per Torsten; and Karlsson, Frans Harry, to Hykon-Patent Aktiebolag. Valve with roller. 4,019,529, Cl. 137-218.000.
Feath, William M.: *See—*
Branscome, Kenneth M.; Feath, William M.; Goode, George E.; Heizer, Kenneth W.; and Morgan, Barrie O., 4,020,285.
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Felauer, Ethel E.: *See—*
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Feldmuhle Anlagen- und Produktionsgesellschaft mit beschrankter Haftung: *See—*
Ploetz, Theodor, deceased; Hasse, Adelbert, administrator; and Franzen, Volker, 4,019,952.
Fellows, Daniel; Zemon, Stanley; Sturk, Phillip A.; and Stone, Samuel M., to GTE Laboratories Incorporated. Eccentric optical fiber coupler. 4,019,806, Cl. 350-96.00C.
Fenity, Nancy, executrix: *See—*
Hagenbach, Robert J.; and Fenity, Robert D., deceased, 4,019,903.
Fenity, Robert D., deceased: *See—*
Hagenbach, Robert J.; and Fenity, Robert D., deceased, 4,019,903.
Feraday, Melville A., to Atomic Energy of Canada Limited. Preparation of mixed oxide nuclear fuel. 4,020,131, Cl. 264-.500.
Fernsteuergerate, Kurt Oelsch KG: *See—*
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Ferraris Development and Engineering Company Limited: *See—*
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Drone, Gary Alan, 4,019,401.
Fickel, R. Gene, to Universal Oil Products Company. Method for controlling the reboiler section of a dual reboiler distillation column. 4,019,964, Cl. 203-1.000.
Filion, Arnold J. Screen gripper. 4,019,769, Cl. 294-19.00R.
Finch, William C., to Finch, William C.; and Breston, Michael P., part interest to each. Oil recovery from an oil-water well. 4,019,576, Cl. 166-250.000.
Firm Josef Frohling: *See—*
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Fischer, Artur. Anchoring device for use in masonry and like structures and having protection against deleterious influences. 4,019,420, Cl. 85-74.000.
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Fischer, Wolfgang; and Linck, Renate, to Merck Patent Gesellschaft mit beschrankter Haftung. Analytical reagent for cyanide. 4,019,860, Cl. 23-230.00R.
Fitch, John L.; and Strubhar, Malcolm K., to Mobil Oil Corporation. Thermal energy production by in situ combustion of coal. 4,019,577, Cl. 166-259.000.
Fitzgerald, Martin Bruce, to Heyer-Schulte Corporation. Compression implant for urinary incontinence. 4,019,499, Cl. 128-1.00R.
Fleck, Raymond N.; and Young, Donald C., to Union Oil Company of California. Stabilizing alkanals. 4,020,109, Cl. 260-601.00R.
Flemons, Ralph Seymour: *See—*
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Fluck, Henry T. Air pressure-actuated double-acting diaphragm pump with means to produce a selected start-up position. 4,019,838, Cl. 417-393.000.
FMC Corporation: *See—*
Garrett, Michael R., 4,019,580.
Leon, Denny; and Stewart, Frederick M., 4,019,752.
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Stock, David K.; and Wech, Robert J., 4,019,947.
Taylor, John Sebring; and Brader, Wilbur Thomas, 4,020,204.
Thuse, Erik, 4,019,579.
Fodor, Lawrence M., to Phillips Petroleum Company. Impact resistant high vinyl polydiene thermosetting compositions containing fibrous sulfur-containing organic polymer. 4,020,054, Cl. 260-23.70M.
Ford Motor Company: *See—*
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Forgensi, Rudolph; and Hagenbach, Robert J., to Xerox Corporation. Apparatus for forming magnetite electrostatographic carriers. 4,019,842, Cl. 425-7.000.
Forkner, John H. Cooked dough having a frozen dessert filling and method therefor. 4,020,188, Cl. 426-95.000.
Forrester, Harry, to United States Mineral Products Company. Apparatus and process for manufacturing insulation board. 4,019,938, Cl. 156-78.000.
Fosroc A.G.: *See—*
Plaisted, Anthony Cecil, 4,019,630.
Foults, Jonathan Asa, to Scovill Manufacturing Company. Fastener attaching machine having means for orienting caps, buttons, and the like. 4,019,666, Cl. 227-119.000.
Fox, Douglas L. Corrosion-resistant encasement for structural members. 4,019,301, Cl. 52-725.000.
Fox, Fred K., to Engineering Enterprises, Inc. Well drilling tool. 4,019,591, Cl. 175-107.000.
Fox, Fred K., to Engineering Enterprises, Inc. By-pass tool. 4,019,592, Cl. 175-234.000.
Fozzard, George B., to Phillips Petroleum Company. Separation of phenol, cyclohexanone, and cyclohexylbenzene containing mixtures employing dialkyl and dicycloalkyl phthalates. 4,019,965, Cl. 203-60.000.
Francis, James Nelson: *See—*
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Frank, Dudley B.: *See—*
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Frank, Frederick Charles; Keller, Andrew; and Mackley, Malcolm Robert. Oriented crystallization of polymers. 4,020,266, Cl. 528-498.000.
Franklin, Clifford John; and Melliger, Hans, to Brown Boveri Sulzer Turbomachinery Ltd. Cooled rotor blade for a gas turbine. 4,019,831, Cl. 416-97.00R.
Franzen, Volker: *See—*
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Fraser, Herbert James: *See—*
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Fraunhofer-Gesellschaft zur Forderung der Angewandten Forschung e.V.: *See—*
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Frazier, Clive A.; and Cunningham, Marion L. Control system for solar heater. 4,019,495, Cl. 126-271.000.
Frazier, Stephen E.: *See—*
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Frechette, Alphonse A. Powered wheel system. 4,019,396, Cl. 74-63.000.
Frederick, Henry E.: *See—*
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Freedman, Bernard; and Diamond, Martin J., to United States of America, Agriculture. Photodegradable polyolefins containing haloalkyl- or halobenzene-sulfonyl halides. 4,020,249, Cl. 526-3.000.
Freedman, Mark B.: *See—*
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Freeman, Charles F.: *See—*
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Freeman, David Lewis; and Flemons, Ralph Seymour, to Canadian General Electric Company Limited. Ultrasonic transducer mounting and coupling assembly. 4,019,373, Cl. 73-71.5US.
Freiburger, Thomas William, to Deere & Company. Winch cable drum mounting and drive connection. 4,019,717, Cl. 254-187.800.

Freiburger, Thomas William, to Deere & Company. Winch constructed specially for easy lubrication thereof. 4,019,718, Cl. 254-187.500.
Freiter, Edward R., to Dow Chemical Company, The. Epoxy resin coating composition. 4,020,034, Cl. 260-32.8EP.
Frenkel, Robert Leland; Vischer, Peter; and Gulka, James Allen, to Coors Container Company. Method and apparatus for separating a palletized array of containers into single file line. 4,019,620, Cl. 198-399.000.
Fresmann, Karl Heinz; and Herscovici, Saul, to Deere & Company. Articulated tractor. 4,019,598, Cl. 180-51.000.
Frey, Gerhard: *See*—
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Friedrich Wilhelm Schwing GmbH: *See*—
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Friend, Larry O.; and Lockwood, John J., to Motorola, Inc. Stripline interdigital band-pass filter. 4,020,428, Cl. 333-73.00S.
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Fritz, Heinz Peter; Wabner, Dietrich; and Huss, Rainer, to Rheinisch-Westfalisches-Elektrizitatswerk Aktiengesellschaft. Process for making titanium-supported lead electrode. 4,019,970, Cl. 204-32.00R.
Frohling, Josef; and Wiedemer, Karl, to Firm Josef Frohling. Rolling mill. 4,019,358, Cl. 72-189.000.
From, Charles A., Jr.: *See*—
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Frommer, Werner; Puls, Walter; and Schmidt, Delf, to Bayer Aktiengesellschaft. Process for the production of a saccharase inhibitor. 4,019,960, Cl. 195-80.00R.
Frost, Charles C.: *See*—
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Fuhrmeister, Ralph, to Furma Manufacturing Co. Pty. Ltd. Apparatus for riveting. 4,019,238, Cl. 29-243.530.
Fuji Chemical Industry Co., Ltd.: *See*—
Ikari, Yoshikatsu; Yokoyama, Shoichiro; Yokoi, Hideharu; and Murakami, Tatsuo, 4,019,982.
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Fujita, Toshio; Takahashi, Chigo; Ohshima, Masanari; Ushioda, Tsunezo; and Shimizu, Hirozo, to Chissoasahi Fertilizer Co., Ltd. Method for producing coated fertilizer. 4,019,890, Cl. 71-64.00F.
Fujiwara, Hiroshi; and Suzuki, Hiroshi, to Maruzen Oil Co. Ltd. Metal clad laminate composed of flame resistant thermosetting resin composition. 4,020,225, Cl. 428-251.000.
Fukuda, Kazuichi, to Kanto Special Steel Works, Ltd. Flexible coupling for rotating shafts. 4,019,345, Cl. 64-12.000.
Fukuda, Kazuichi, to Kanto Special Steel Works Ltd. Flexible coupling for rotating shafts. 4,019,346, Cl. 64-12.000.
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Fuller, Matthew H.; and Deever, William R., to Texaco Inc. Methods for fluidizing a filter media. 4,019,985, Cl. 210-80.000.
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Gale, Anthony George, to Rolls-Royce (1971) Limited. Means for retaining blades to a disc or like structure. 4,019,833, Cl. 416-220.00R.
Gall, Henry Matthew. Photographic teaching apparatus utilizing a three-coordinate reference system. 4,019,264, Cl. 35-53.000.
Gall, Martin, to Upjohn Company, The. 1-(α-Amino-α-phenyl-o-tolyl-)imidazoles. 4,020,085, Cl. 260-309.000.
Galle, Edward Milburn: *See*—
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Gambale, John C.; and Ray, Roger E., to Westinghouse Electric Corporation. Time division multiplex system for a segregated phase comparison relay system. 4,020,396, Cl. 361-64.000.
Gander, Frederick W.; Hoegger, Erhard F.; and Kane, William P., to Du Pont de Nemours, E. I., and Company. Polyethylene terephthalate/terpolymer blends; films, sheets, and articles made using such blends; and method of making trays using such sheets. 4,020,126, Cl. 260-873.000.
Gangell, David Bruce, to Environ Mechanical Services Pty. Limited. Sprinkler systems. 4,019,582, Cl. 169-37.000.
Gann, Ronald A.: *See*—
Carlson, Elmer A.; Raffaelli, Joseph G.; and Gann, Ronald A., 4,019,854.
Garabedian, Arthur, to Frank, Dudley B. Apparatus for modifying an internal combustion engine. 4,019,479, Cl. 123-198.00F.
Gardner, Richard A., to International Business Machines Corporation. High-alumina content compositions containing $BaO$-$MgO$-$SiO_2$ glass and sintered ceramic articles made therefrom. 4,020,234, Cl. 428-433.000.
Garner, Albert Y., to Monsanto Research Corporation. Flame retardant method. 4,020,224, Cl. 428-272.000.
Garner, Alex Victor; and Townsend, Graham, to Rank Organisation Limited, The. Electro-acoustic transducer diaphragms. 4,020,299, Cl. 179-181.00R.
Garner, Edward M.; and Duley, Raymond S., to NCR Corporation. Pulse train frequency control means. 4,020,366, Cl. 307-271.000.
Garrett Corporation, The: *See*—
Browning, Calvin W., 4,019,335.
Tippetts, Thomas B., 4,019,697.
Garrett, Michael R., to FMC Corporation. Apparatus and method for running, setting and testing a compression-type well packoff. 4,019,580, Cl. 166-315.000.
Garrow, Gerald L.: *See*—
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Gass, William R.; Scala, Luciano C.; and Phillips, David C., to Westinghouse Electric Corporation. Method for coating of polyimide by electrodeposition. 4,019,877, Cl. 428-626.000.
Gauri, Kailash Kumar, to Robugen GmbH. Alkyl-substituted 6-chloro-2-thiouracils. 4,020,070, Cl. 260-251.00R.
Gautier, Christian Jean; and Scarabin, Jean-Marie Pierre, to L'Etat Francais, represente par le Ministre des Postes et Telecommunications; Establissement Public dit "Telediffusion de France"; and Scarabin, Jean-Marie Pierre. Adjustable anamorphic image converter. 4,020,279, Cl. 358-160.000.
Gawel, Len J.; and Chen, Chi-Sin, to Continental Oil Company. Bacterial production of lipase and pyocyanine from n-paraffins. 4,019,959, Cl. 195-66.00R.
Geary, John Michael; and Mattes, Hans George, to Bell Telephone Laboratories, Incorporated. Apparatus for reading optical codes. 4,020,327, Cl. 235-61.11E.
Geer, Loren E., to Xerox Corporation. Encapsulated water paper. 4,020,210, Cl. 428-307.000.
Geerling, Leonardus Johannes, to Neuvex, Inc. Nerve stimulating device. 4,019,519, Cl. 128-422.000.
Geffers, Hans; Radt, Walter; Schliebs, Reinhard; and Schulz, Hartmut, to Bayer Aktiengesellschaft. α-Alkyl-phosphonosuccinic acid compounds and sequestering compositions containing them. 4,020,101, Cl. 260-502.40R.
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Gemmill, Wayne Joseph, Sr.; and Cerone, Frank Ernest, Jr., to Union Carbide Corporation. Generator system. 4,020,351, Cl. 250-432.0PD.
General Atomic Company: *See*—
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Gerding, Paul W. Pharmaceutical dosage distribution apparatus. 4,019,793, Cl. 312-209.000.
Germano, Victor V., to Diamond Shamrock Corporation. Composite coating having enhanced corrosion resistance. 4,020,220, Cl. 428-472.000.
Germanton, Charles E. Pushbutton combination lock. 4,019,355, Cl. 70-278.000.
Gerry, Martin E. Low inertia impact printing means. 4,019,615, Cl. 197-53.000.
Gerry, Martin E. Still image slide with sound track control. 4,020,503, Cl. 360-1.000.
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Ghilardi, Hans Peter; and Atasoy, Kaya, to Ciba-Geigy Corporation. Oxytetracycline solution for parenteral, peroral and local administration and processes for the production thereof. 4,020,162, Cl. 424-227.000.
Giannini, Nunzio E., to Packaging Corporation of America. Packing insert and blank therefor. 4,019,672, Cl. 229-14.00C.
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Gillet, Roger; Berthet, Michel; and Moisson-Franckhauser, Francois, to Societe Generale de Constructions Electriques et Mecaniques (ALSTHOM); and Electricite de France. Electric rotating machine having a cryo-inductor. 4,020,371, Cl. 310-52.000.
Gilmore-Tatge Manufacturing Co., Inc.: *See*—
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Giordano, Fernand; Marmonier, Pierre; and Vayra, Jean, to Commissariat a l'Energie Atomique. Safety device for a nuclear reactor and especially a fast reactor. 4,019,954, Cl. 176-38.000.
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Glassman, Jacob A. Disposable diaper. 4,019,517, Cl. 128-284.000.
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Gleason, John G., to SmithKline Corporation. 7β-Acyloxy cephalosporins. 4,020,057, Cl. 260-243.00C.
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Goebel, Franz, to GTE Laboratories Incorporated. Primary electrochemical cell capable of high discharge rates. 4,020,248, Cl. 429-164.000.
Goering, Lowell J.; and Voth, Harold William, to Hesston Corporation. Spiral knife sharpener. 4,019,287, Cl. 51-249.000.
Gokyu, Isao, to Nippon Concrete Industries Co. Ltd. Method of making reinforcements for concrete. 4,019,357, Cl. 72-130.000.
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Golebiowski, Andrzej; Paluch, Stanislawa; Janecki, Zdzislaw; Polanski, Alfred; Hennel, Waclaw; Zielinski, Jerzy; Warzec, Cezary; and Lisowski, Wojciech, to Instytut Nawozow Sztucznych. Method of manufacturing catalytic tubes with wall-supported catalyst, particularly for steam reforming of hydrocarbons and methanation. 4,019,969, Cl. 204-26.000.
Golightly, David Stainsley; and Onions, Allan, to Albright & Wilson Limited. Air entraining agents. 4,019,916, Cl. 106-88.000.
Goode, George E.: *See*—
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Gordon, Ronald S.; Sutton, Ralph W.; and Tennenhouse, Gerald J., to Ford Motor Company. Method for preparing shaped, green ceramic compacts. 4,020,134, Cl. 264-63.000.
Gosteli, Jacques, to Ciba-Geigy Corporation. Process for the preparation of 5-substituted resorcinols and related intermediates. 4,020,098, Cl. 260-473.00S.
Gotley, Paul; and Buckenham, Howard Alfred, to Neotronics Limited. Catalytic detecting apparatus for detecting combustible gases and vapors. 4,020,480, Cl. 340-237.00R.
Goto, Takashi: *See*—
Ozawa, Goro; Kosaka, Kenzo; Sato, Kasumi; Ishikawa, Akio; Nanbu, Toshiyuki; Adachi, Kiyoshi; Okaya, Tsutomu; Goto, Takashi; and Kitagawa, Hiroshi, 4,019,228.
Gott, Hans: *See*—
Ritter, Klaus; Gott, Hans; Ritter, Gerhard; and Ritter, Josef, 4,019,665.
Gottfried Bischoff Bau Kompl.: *See*—
Kleeberg, Ulrich; Leimkuhler, Jurgen; and Kautz, Johannes, 4,019,444.
Gould Inc.: *See*—
Cushman, Robert Holbrook; and Stirner, Kurt R., deceased, 4,019,670.
Gould Inc. Electric Fuse Division: *See*—
Jacobs, Philip C., Jr., 4,020,441.
Graco Inc.: *See*—
Eull, Marvin J., 4,019,837.
Scherer, William C.; and Vincent, Raymond A., 4,019,653.
Vork, William D.; and Clements, William, 4,019,395.
Graham, Bruce A.; Puttock, Michael A.; Felauer, Ethel E.; and Neidermyer, Robert W., to Uniroyal Inc.; and Uniroyal, Ltd. Substituted 2,3-dihydro-1,4-oxathiin plant growth. 4,020,168, Cl. 260-327.00P.
Graham Magnetics Incorporated: *See*—
Newton, Gerald S.; and Deffeyes, Robert J., 4,020,227.

Grahame, Robert E., Jr.: *See—*
Hubbard, Winchester L.; Grahame, Robert E., Jr.; Covey, Rupert A.; and Jancis, Elmar H., 4,020,165.

Grant, Jon H., to Etatech, Inc. Pulse width modulated DC-to-DC power converter using a single ended transformer. 4,020,408, Cl. 321-2.000.

Gravell, George William, to Raphael's Limited. Devices for mounting lenses for edge grinding. 4,019,285, Cl. 51-216.0LP.

Grawinger, Otto: *See—*
Raabe, Thomas; Grawinger, Otto; Scholtholt, Josef; Nitz, Rolf-Eberhard; and Schraven, Eckhard, 4,020,071.

Grayson, Martin: *See—*
Suen, Tzeng Jiueq; Begala, Arthur James, Jr.; and Grayson, Martin, 4,020,000.

Green, Edward H. Aerosol valve and sprayhead. 4,019,687, Cl. 239-573.000.

Green, Paul D.: *See—*
Ladin, Eli M.; and Green, Paul D., 4,019,784.

Greenberger, Joseph Irwin, to Wean United, Inc. Rolls in a briquetting machine or like machines. 4,019,846, Cl. 425-194.000.

Greenlee, Hugh T., to Wright Tool & Forge Co., The. Tool handle display and hanger device. 4,019,632, Cl. 206-349.000.

Greenwald, Richard B., to Polaroid Corporation. Highly fluorinated diazides and process therefor. 4,020,176, Cl. 260-349.000.

Gregg, Leonard. Piston puller. 4,019,235, Cl. 29-280.000.

Gregory, Marion B.: *See—*
Kimble, Thomas E.; and Gregory, Marion B., 4,019,418.

Greisman, Samuel, to Thames Sack and Bag Company Limited, The. Heat sealing apparatus. 4,019,946, Cl. 156-497.000.

Greisman, Samuel, to Thames Sack and Bag Company Limited, The. Heat sealing apparatus. 4,019,949, Cl. 156-582.000.

Griffith, Louis E.: *See—*
Ebner, Peter R.; and Griffith, Louis E., 4,020,495.

Grinberg, Jan: *See—*
Boswell, Donald D.; Grinberg, Jan; Jacobson, Alexander D.; and Myer, Gary D., 4,019,807.

Griswold, James L. Trench shoring assembly. 4,019,329, Cl. 61-41.00A.

Griswold, James L. Trench shoring assembly with abrasion protection device. 4,019,330, Cl. 61-41.00A.

Grobman, William, to Molins Machine Company, Inc. Quick-set slotter knife. 4,019,428, Cl. 93-58.20R.

Grois, Khaim Shlemovich: *See—*
Emelyanov, Viktor Ivanovich; Grois, Khaim Shlemovich; and Kadomsky, Dmitry Evgenievich, 4,020,410.

Grossbach, Alfred; and Mertin, Ralf, to Lunke & Sohn GmbH. Sliding door for vehicles, especially automobiles. 4,019,775, Cl. 296-155.000.

Grossman, David H.: *See—*
LeRoy, Rodney L.; Grossman, David H.; McDonald, R. Douglas; and Hemmings, David F., 4,020,443.

Groszek, Aleksander Jerzy; Parkes, Colin Walter; and Crump, Ronald Alfred, to British Petroleum Company Limited, The. Process of protecting underwater surfaces with a wax coating containing biocides. 4,020,200, Cl. 427-416.000.

Grotz, Charles A.: *See—*
Hirt, William J.; and Grotz, Charles A., 4,019,696.

Grous, Philip P.: *See—*
Mohrbacher, Richard J.; and Grous, Philip P., 4,020,055.

Grubelich, Francis Thomas, to Combustion Engineering, Inc. Vessel steam relief system for a nuclear reactor. 4,019,955, Cl. 176-38.000.

Grumman Aerospace Corporation: *See—*
Kosson, Robert L.; and Quadrini, John A., 4,019,571.

Gruner, Hans; Diederich, Gerd; Butz, Hans; Wahls, Peter; and Weins, Engelbert, to Mannesmann Aktiengesellschaft. Spray cooling of continuously cast ingots. 4,019,560, Cl. 164-89.000.

GSW Appliances Limited: *See—*
Veraart, Pierre H., 4,019,259.

GTE Laboratories Incorporated: *See—*
Fellows, Daniel; Zemon, Stanley; Sturk, Phillip A.; and Stone, Samuel M., 4,019,806.
Goebel, Franz, 4,020,248.

GTE Sylvania Incorporated: *See—*
Ashley, Albert H., 4,020,293.
Cooke, Claude R., 4,020,340.
Hedler, Robert A.; and Slobbe, W. Wentworth, 4,020,231.
Keinath, Rudolph Francis; and Manners, David Eugene, 4,020,390.
Kurtz, Joseph M., 4,019,637.
Labadini, William M.; Passmore, Edmund M.; and Anderson, Warren A., 4,020,383.
Lagos, Costas C., 4,020,385.
Pawlikowski, Stanley L.; and Penird, Carl W., 4,020,494.

Guenther, William D., to Dana Corporation. Rotary valve seal assembly. 4,019,487, Cl. 123-190.00E.

Guibet, Jean-Claude: *See—*
Cosyns, Jean; Franck, Jean-Pierre; Guibet, Jean-Claude; and Jacquin, Yves, 4,019,976.

Guillermin, Rene; Joly, Jean; and Sangalli, Sylvio, to Rhone-Poulenc-Textile. Process for treating filamentary products. 4,020,196, Cl. 427-248.00G.

Gujer Peter; and Wust, Olivier, to Rieter Machine Works, Ltd. Winding device for automatically changing bobbin tubes. 4,019,690, Cl. 242-18.00A.

Gulf Oil Corporation: *See—*
Dahle, Norman A., 4,020,078.

Gulka, James Allen: *See—*
Frenkel, Robert Leland; Vischer, Peter; and Gulka, James Allen, 4,019,620.

Gulla, Michael, to Shipley Company, Inc. Catalyst composition and method of preparation. 4,020,009, Cl. 252-429.00R.

Gustafson, Kjell Arne Hakan, to Aktiebolaget Bofars. System for determining the deviation of an object from a sight line. 4,020,339, Cl. 250-202.000.

Gustav F. Gerdts KG: *See—*
Schittek, Friedrich, 4,019,532.

Gutman, Arnold D., to Stauffer Chemical Company. Thiolophosphoramidates and their use as insecticides. 4,020,161, Cl. 424-211.000.

Guyer, Robert R.: *See—*
Nettesheim, Raphael Daniel; and Guyer, Robert R., 4,020,138.

Guyot, Volker; Holdinghausen, Paul; and Mueller, Martin, to Carl Schenck AG. Method and circuit arrangement for producing and transmitting electrical reference pulses. 4,020,423, Cl. 328-151.000.

Haag, Thomas H.: *See—*
Martorano, Richard; Brendley, William H., Jr.; and Haag, Thomas H., 4,020,219.

Habiger, Cyril W., to Caterpillar Tractor Co. Seat actuated fluid drive neutralizing arrangement. 4,019,602, Cl. 180-101.000.

Habuda, Blair A., Sr.; and Kopatich, Anthony. Pipe hanging apparatus. 4,019,705, Cl. 248-58.000.

Hachadoorian, Robert Haig; and Shyman, Mark Lincoln, to Aquanetics, Inc. Demister-coalescer in a process for removing water from oil. 4,019,977, Cl. 208-188.000.

Hagen, Alexander: *See—*
Klose, Sigmar; Wahlefeld, August Wilhelm; and Hagen, Alexander, 4,019,961.

Hagenbach, Robert J.; and Fenity, Robert D., deceased (by Fenity, Nancy, executrix), to Xerox Corporation. Electrostatic development. 4,019,903, Cl. 96-1.0SD.

Hagenbach, Robert J.: *See—*
Forgensi, Rudolph; and Hagenbach, Robert J., 4,019,842.

Hagenuk Vormals Neufeldt & Kunke GmbH: *See—*
Bohn, Burkhard W.; Evers, Alfred; and Friederichs, Karl-Heinz, 4,019,411.

Hahnke, Manfred; Papenfuhs, Theodor; and Teige, Wolfgang, to Hoechst Aktiengesellschaft. Process for the spin-dyeing of polymers or copolymers of acrylonitrile. 4,020,037, Cl. 260-42.210.

Haino, Kozo: *See—*
Kohmura, Isao; Futaki, Kiyoshi; and Haino, Kozo, 4,020,232.

Haja, Inc.: *See—*
Carmichael, James W., 4,019,597.

Hall, Andrew D. Setting means for doorlock assemblies. 4,019,766, Cl. 292-350.000.

Hall, George R., II; White, Jack M.; and Krechmery, Roger L., to Bailey Meter Company. Glass to metal seal. 4,019,388, Cl. 73-398.0AR.

Halpern, Meyer, coexecutor: *See—*
Asculai, Samuel Simon; Kupferberg, Alfred B., deceased; Kupferberg, Beatrice, coexecutrix; and Halpern, Meyer, coexecutor, 4,020,183.

Halpern, Peter H., to General Dynamics Corporation. High density data processing system. 4,020,282, Cl. 178-68.000.

Hamilton, Stephen P.: *See—*
Cochran, Michael J.; and Hamilton, Stephen P., 4,020,465.

Hammar, Bengt-Olof. Loading device. 4,019,642, Cl. 214-77.00R.

Hanco, Inc.: *See—*
Nassif, Harry A., 4,020,300.

Handweiler, Martin; and Castanis, George. Technique for producing a pre-distorted design format for use in transfer printing. 4,019,436, Cl. 101-463.000.

Haney, Thomas Albert: *See—*
Czaplinski, Thomas V.; and Haney, Thomas Albert, 4,020,355.

Hanley, John F., Jr., to Envirotech Corporation. Coke discharging system. 4,019,963, Cl. 202-263.000.

Hansen, Barton: *See—*
Sauer, Gale E.; and Hansen, Barton, 4,019,300.

Hansen, Lloyd B.; and Smarrella, Eugene R., to Carmet Company. Method of roof drilling. 4,019,590, Cl. 175-57.000.

Hanson, Alden B.; Hanson, Chris A.; and Bertetto, Donald W., to Hanson Industries Inc. Ankle pad for footwear. 4,019,266, Cl. 36-119.000.

Hanson, Chris A.: *See—*
Hanson, Alden B.; Hanson, Chris A.; and Bertetto, Donald W., 4,019,266.

Hanson, Douglas R. Dough placer improvements. 4,019,621, Cl. 198-432.000.

Hanson Industries Inc.: *See—*
Hanson, Alden B.; Hanson, Chris A.; and Bertetto, Donald W., 4,019,266.

Hanson, Wallace E., to Champion International Corporation. Reinforced reel. 4,019,692, Cl. 242-71.800.

Hapke, Kenyon A.: *See—*
Weninger, Frank L.; Bagby, John P.; Hapke, Kenyon A.; Hinshaw, Jack W.; Karalus, George C.; Koppensteiner, Eugene F.; and Tomlinson, Roger R., 4,019,815.

Harbert, Earl W., to Whittaker Corporation. Marine wet exhaust system and improvements in powered marine vessel. 4,019,456, Cl. 115-73.000.

Hardtmann, Goetz E., to Sandoz, Inc. N-(Substituted carbonylmethyl) isatoic anhydrides. 4,020,062, Cl. 260-244.00A.

Hare, Herbert K. Set of game pieces. 4,019,746, Cl. 273-137.0AB.





Hargis, Ivan Glen; Livigni, Russell Anthony; and Aggarwal, Sundar Lal, to General Tire & Rubber Company, The. Alkaline barium alcoholates. 4,020,115, Cl. 260-632.00A.

Harlan, Larry R.; and Thiel, Patrick L., to Westinghouse Electric Corporation. Radiator assembly for fluid filled electrical apparatus. 4,019,572, Cl. 165-106.000.

Harris, David J.: *See—*
Salemme, Charles T.; Ravenhall, Richard; and Harris, David J., 4,019,832.

Harris, Glyn Islwyn: *See—*
Edwards, Alfred Gerald; and Harris, Glyn Islwyn, 4,020,035.

Harris, Jack R. CPR Breastplate compression aid. 4,019,501, Cl. 128-24.00R.

Harris, Louis Selig; Pars, Harry George; Razdan, Raj Kumar; Sheehan, John Clark; and Terris, Barbara Zitko, to Sharps Associates. Use of heterocyclic esters of 5H-[1]benzopyrano [3,4-b]pyridines as analgesics. 4,020,163, Cl. 424-248.550.

Harris, Robert F.; and Tefertiller, Nancy B., to Dow Chemical Company, The. Reaction products of epoxy resins, organic sulfides and protic acids. 4,020,030, Cl. 260-29.2EP.

Harrison, Anthony William, to Girling Limited. Discs for disc brakes. 4,019,613, Cl. 188-218.0XL.

Harrison, Richard A.: *See—*
Cornsweet, Tom N.; and Harrison, Richard A., 4,019,813.

Harrop, William H., to Rohm and Haas Company. Tackifier for rubber. 4,020,048, Cl. 260-51.500.

Hartlapp, Gerhard: *See—*
Roszinski, Hilmar; Lippsmeier, Bernd; and Hartlapp, Gerhard, 4,020,129.

Harvey, Albert J., to Diamond International Corporation. Automatic feeding of labels for application to bottles or other containers. 4,019,935, Cl. 156-64.000.

Harwood, Leopold Albert, to RCA Corporation. Controlled oscillator. 4,020,500, Cl. 358-19.000.

Harzer, Peter; and Funk, Hans, to Wandel u. Goltermann. Method of and system for visually displaying several periodically reproducible input signals. 4,020,392, Cl. 315-386.000.

Harzer, Peter: *See—*
Hoffmann, Gunther; and Harzer, Peter, 4,020,425.

Hasegawa, Akira; Tanigami, Takahiko; and Ushiku, Kenichi, to Nissan Motor Co., Ltd.; and Hitachi, Ltd. Sensor having spring biasing structure to retain conductive bridging inertial mass in a non-operative position. 4,020,302, Cl. 200-61.45R.

Haselbauer, Philip J., to United States of America, Army. Structural cores. 4,020,205, Cl. 428-116.000.

Hashimoto, Shintaro; and Nakanishi, Tosaku, to Sharp Kabushiki Kaisha. Miniaturized key entry and translation circuitry arrangement for a data processing unit. 4,020,467, Cl. 340-172.500.

Hasler, Edmond Francis: *See—*
Martin, Robert Edgar; and Hasler, Edmond Francis, 4,020,488.

Hasse, Adelbert, administrator: *See—*
Ploetz, Theodor, deceased; Hasse, Adelbert, administrator; and Franzen, Volker, 4,019,952.

Hastrup, Niels E., to F. L. Smidth & Co. Rotary packer and method of filling bags. 4,019,546, Cl. 141-10.000.

Hatfield, Edward S. Moisture detecting device. 4,020,478, Cl. 340-235.000.

Hattori, Seiji, to Daido Seiko Kabushiki Kaisha. Ram type steel bar coupling apparatus. 4,019,232, Cl. 29-282.000.

Hauf, Robert Conrad, to Singer Company, The. Automatic buttonholing sizing device. 4,019,449, Cl. 112-158.00B.

Hauser, Hans, to J. B. Foote Foundry Co., The. Shift dog for transmission. 4,019,586, Cl. 192-48.910.

Hawker Siddeley Dynamics Limited: *See—*
Collier, David Thomas, 4,019,804.

Hawkes, George F., Jr.; and Speck, Willis A., to Westinghouse Electric Corporation. Integrated circuit breaker panelboard. 4,020,400, Cl. 361-353.000.

Hawtrey, Charles E.; and Vervais, Paul Walter, to University of Iowa Research Foundation, The. Device for control of female urinary incontinence. 4,019,498, Cl. 128-1.00R.

Hayami, Heijiro; Kotera, Hiroaki; Tsuchiya, Hiroyoshi; Kan, Ryuzo; Yoshida, Kunio; Shibata, Tsutomu; and Tsuda, Yukifumi, to Matsushita Electric Industrial Co., Ltd. Method and apparatus for separating, combining and rearranging colored images. 4,020,502, Cl. 358-80.000.

Hayashi, Masayuki, to Aisin Seiki Kabushiki Kaisha. Lumbar support regulating apparatus. 4,019,777, Cl. 297-284.000.

Hayes, Larry J.: *See—*
Dixon, Dale D.; and Hayes, Larry J., 4,020,223.

Hazar, Mitchell M., to American Denture Corporation. Means and method for producing custom artificial dentures. 4,019,253, Cl. 32-19.000.

Hazewindus, Nicolaas; and van Nieuwland, Jacob Maria, to U.S. Philips Corporation. Wien filter. 4,019,989, Cl. 250-396.0ML.

Healey, Gerald P. Method of playing a golf game. 4,019,748, Cl. 273-176.0AB.

Hearing Evaluation & Acoustic Research, Inc.: *See—*
Epley, John M.; Leach, Austin F.; and Frisch, Arnold, 4,020,298.

Hedberg, Tommy: *See—*
Andersson, Rolf; Bjorklund, Bengt; and Hedberg, Tommy, 4,019,675.

Hedler, Robert A.; and Slobbe, W. Wentworth, to GTE Sylvania Incorporated. Pigmented phosphors and method of making. 4,020,231, Cl. 428-403.000.

Heidemann, Gerrit, to Industriele Onderneming Wavin N.V. Connection for foam insulated pipes. 4,019,761, Cl. 285-47.000.

Heimann GmbH: *See—*
Meyer, Juergen; and Wendling, Irmtrud, 4,020,474.

Heinrich Baumgarten, Eisen- und Blechwarenfabrik: *See—*
Baumgarten, Gerd D., 4,019,221.

Heinz, Henry, Jr., to Union Carbide Corporation. Galvanic cell having a resealable vent closure. 4,020,241, Cl. 429-54.000.

Heitz, Fernand Alfred Desire, to Thann & Mulhouse. Barium titanate and barium zirconate in radiological contrast products. 4,020,152, Cl. 424-4.000.

Heizer, Kenneth W.: *See—*
Branscome, Kenneth M.; Feath, William M.; Goode, George E.; Heizer, Kenneth W.; and Morgan, Barrie O., 4,020,285.

Hell, Hans; Peschke, Gunter; Oppermann, Horst; Kaufung, Rudolf; Funke, Siegfried; and Stuhmer, Werner, to Kali-Chemie Pharma GmbH. Continuous process of producing pancreatin and product thereof. 4,019,958, Cl. 195-62.000.

Helle, Jacques, to Compagnie d'Electronique et de Piezoelectricite C.E.P.E. Temperature compensation circuit for crystal oscillator. 4,020,426, Cl. 331-158.000.

Heller, William C., Jr.; and Shatzkin, Leonard, to Heller, William C., Jr. Book binding process. 4,019,758, Cl. 281-21.00R.

Hemmer, Gerd; Hess, Klaus; Becker, Rolf; and Liebhaber, Klaus, to BASF Aktiengesellschaft. Quiet and smokeless flaring of off-gases containing hydrocarbons. 4,019,852, Cl. 431-5.000.

Hemmings, David F.: *See—*
LeRoy, Rodney L.; Grossman, David H.; McDonald, R. Douglas; and Hemmings, David F., 4,020,443.

Hendrix Wire & Cable Corporation: *See—*
La Chance, Ernest Joseph, Sr.; and Jean, Leonard Paul, 4,020,277.

Hennel, Waclaw: *See—*
Golebiowski, Andrzej; Paluch, Stanislawa; Janecki, Zdzislaw; Polanski, Alfred; Hennel, Waclaw; Zielinski, Jerzy; Warzec, Cezary; and Lisowski, Wojciech, 4,019,969.

Hennessy, Douglas J. Propynyloxy alkyl arene insecticides. 4,020,111, Cl. 260-611.00A.

Hepworth, Edward C.: *See—*
Bennett, Thomas H.; Carlow, Earl F.; Hepworth, Edward C.; Mathys, Wilbur L.; Mensch, William D., Jr.; Orgill, Rodney H.; Peddle, Charles I.; and Wiles, Michael F., 4,020,472.

Heraeus-Schott Quarzschmelze GmbH: *See—*
Seiler, Karl; Selke, Martin; Siegling, Oswald; Herzog, Heinz; Albrecht, Horst; and Mohn, Heinrich, 4,019,645.

Hercules Incorporated: *See—*
Cox, Paul R., Jr., 4,020,229.

Herkes, Frank Edward, to Du Pont de Nemours, E. I., and Company. Control of nitrogen oxide reactions in off-gases from the diazotization/coupling of aromatic amines. 4,020,051, Cl. 260-140.00R.

Herman, Richard: *See—*
Morgen, Melvin; Herman, Richard; and Wolski, Raymond A., 4,019,441.

Herr, Charles H., to Caterpillar Tractor Co. Modular power transmission with self-energizing clutch. 4,019,406, Cl. 74-766.000.

Herrera, Andres. Stack gas clarifier. 4,019,882, Cl. 55-220.000.

Herriman, Straud D. Game with mechanical capture means. 4,019,741, Cl. 273-131.0BA.

Herrmann, Joseph Peter, to Apotheker A. Herbert K.G., Fabrik Pharmazeutischer Praparate Wiesbaden. Methods of and medications for treating cardiac disorders by using strophanthin. 4,020,159, Cl. 424-180.000.

Herscovici, Saul: *See—*
Fresmann, Karl Heinz; and Herscovici, Saul, 4,019,598.

Herveling, Wilhelm; Birker, Alfred; Daimler, Berthold H.; Vos, Jan G.; and Stapp, Hans, to Akzona Incorporated. Nonwoven horizontal drainage system. 4,019,326, Cl. 61-11.000.

Herzl, Peter J., to Fischer & Porter Co. Digital read-out system for external-sensor vortex flowmeter. 4,019,384, Cl. 73-194.0VS.

Herzog, Heinz: *See—*
Seiler, Karl; Selke, Martin; Siegling. Oswald; Herzog, Heinz; Albrecht, Horst; and Mohn, Heinrich, 4,019,645.

Herzog, Josef; Woods, Kenneth K.; and Hubble, William S., to General Electric Company. Moisture separator for a nuclear steam turbine. 4,019,881, Cl. 55-185.000.

Hess, Klaus: *See—*
Hemmer, Gerd; Hess, Klaus; Becker, Rolf; and Liebhaber, Klaus, 4,019,852.

Hesston Corporation: *See—*
Goering, Lowell J.; and Voth, Harold William, 4,019,287.

Hestermann, Klaus: *See—*
Lippsmeier, Bernd; Hestermann, Klaus; and Reuter, Martin, 4,020,110.

Heubeck, Erich, to Siemens Aktiengesellschaft. Dental patients' chair with a parallelogram supporting arm. 4,019,778, Cl. 297-346.000.

Heyer-Schulte Corporation: *See—*
Fitzgerald, Martin Bruce, 4,019,499.

Hiestand, Armin; and Jager, Horst, to Ciba-Geigy Corporation. N-imidazolidinone perfluoroalkylcarboxylic acid ester. 4,020,087, Cl. 260-309.700.

Hileman, Fred Lee, Jr. Self-contained sandblasting apparatus. 4,019,284, Cl. 51-9.00M.

Hill, Horace Earl: *See—*
Christianson, Merrill Andrew; and Hill, Horace Earl, 4,019,827.

Hillberger, Horst; Masili, Dino; Plos, Lorenzo; and Ret, Luigi, to Industrie A. Zanussi S.p.A. Apparatus for visualizing on a kinescope

screen video signals which are either picked up by an antenna or generated in the apparatus itself. 4,020,501, Cl. 358-64.000.
Himmel, David P., to Recognition Equipment Incorporated. Apparatus and a method for storage and retrieval of image patterns. 4,020,463, Cl. 340-146.3AE.
Hinckley, John A. Vehicle connecting device. 4,019,754, Cl. 280-456.00R.
Hinshaw, Jack W.: *See—*
Weninger, Frank L.; Bagby, John P.; Hapke, Kenyon A.; Hinshaw, Jack W.; Karalus, George C.; Koppensteiner, Eugene F.; and Tomlinson, Roger R., 4,019,815.
Hirabayashi, Satoshi: *See—*
Kattoh, Tsutomu; Kumabe, Junichi; and Hirabayashi, Satoshi, 4,020,040.
Hiraga, Kentaro; Okutani, Tetsuya; Asako, Tsunehiko; and Yoshioka, Kouichi, to Takeda Chemical Industries, Ltd. Epiminodeaminodeoxyaminoglycoside antibiotics and intermediates. 4,020,269, Cl. 536-10.000.
Hirai, Hiroshi, to Akebono Brake Industry Co., Ltd. Floating caliper disc brake. 4,019,610, Cl. 188-73.300.
Hirakawa, Hiroshi: *See—*
Sugiyama, Iwao; Furuhama, Teruhide; Nagano, Fumiaki; and Hirakawa, Hiroshi, 4,020,252.
Hirasawa, Masataka: *See—*
Suzuki, Yasoji; Manabe, Kenshi; and Hirasawa, Masataka, 4,020,362.
Hirt, William J.; and Grotz, Charles A., to Boeing Company, The. Method of and apparatus for enhancing Coanda flow attachment over a wing and flap surface. 4,019,696, Cl. 244-42.0CD.
Hitachi, Ltd.: *See—*
Hasegawa, Akira; Tanigami, Takahiko; and Ushiku, Kenichi, 4,020,302.
Ito, Tetsuo; and Nishihara, Motohisa, 4,020,449.
Miyauchi, Katsuki; Matsuyama, Iwao; and Toda, Gyozo, 4,019,915.
Mori, Yasunori, 4,019,484.
Nagashiro, Waichi; Okabe, Tadao; Sumioka, Atsushi; and Oikawa, Mitsuru, 4,020,191.
Nishimiya, Torazo; and Sasayama, Takao, 4,019,474.
Saito, Syobu; and Sakitani, Yoshio, 4,020,353.
Tanimoto, Michio; and Taniguchi, Yuzo, 4,019,669.
Tomita, Yoshifumi; Miura, Kiyoshi; and Nakai, Hiromitu, 4,019,905.
Tsuboi, Takashi; Tachibana, Kyozo; Tamura, Kaoru; and Imaizumi, Fujimaro, 4,020,411.
Yamamoto, Hiroe; Takahashi, Noriyoshi; and Watanabe, Masatoshi, 4,020,373.
Yamashiro, Osamu; and Shimada, Shunji, 4,020,367.
Hitachi Shipbuilding and Engineering Co., Ltd.: *See—*
Oda, Noriyuki; Yoshida, Takashi; Nakanishi, Takeshi; and Yoshikawa, Kensuke, 4,019,319.
Hixson, Harry F., Jr.: *See—*
Nishikawa, A. Hirotoshi; and Hixson, Harry F., Jr., 4,020,268.
Hjelm, Michael J.: *See—*
Whittum, Howard A.; and Hjelm, Michael J., 4,019,922.
Hobo, Nobuhito; Enomoto, Nizo; Suzuki, Yutaka; Kawamoto, Itsushi; Iyoda, Michio; Tsuzuki, Yoshihiko; Sekino, Kenro; and Nukata, Hironari, to Nippondenso Co., Ltd.; and Toyota Jidosha Kogyo Kabushiki Kaisha. Fuel injection timing control system for internal combustion engine. 4,019,478, Cl. 123-139.0AP.
Hoch, Helmut: *See—*
Quadbeck-Seeger, Hans-Juergen; and Hoch, Helmut, 4,020,102.
Hochiki Corporation: *See—*
Ito, Hiroshi; Sugiyama, Tadashi; Kaminaka, Yoshinori; Yamamoto, Yuichiro; Tanigawa, Takeshi; Shoji, Shunichi; and Saito, Yoshifusa, 4,020,442.
Hocker, Jurgen; and Merten, Rudolf, to Bayer Aktiengesellschaft. Cyclic aminals of aromatic aldehydes. 4,020,084, Cl. 260-308.00A.
Hodges, Leonard O.: *See—*
Suelzle, Larry R.; and Hodges, Leonard O., 4,020,361.
Hodgson, James H.: *See—*
Kampman, Lester R.; and Hodgson, James H., 4,019,643.
Hodogaya Chemical Co., Ltd.: *See—*
Tsunoda, Takahiro; Ozutsumi, Minoru; Maeda, Shigeo; Suzuka, Susumu; Komiya, Hidetoshi; and Shinohara, Hideaki, 4,019,907.
Hoechst Aktiengesellschaft: *See—*
Buchalla, Artur, 4,019,788.
Euler, Reinhold, 4,020,315.
Faust, Raimund Josef, 4,019,972.
Hahnke, Manfred; Papenfuhs, Theodor; and Teige, Wolfgang, 4,020,037.
Lippsmeier, Bernd; Hestermann, Klaus; and Reuter, Martin, 4,020,110.
Roszinski, Hilmar; Lippsmeier, Bernd; and Hartlapp, Gerhard, 4,020,129.
Hoegger, Erhard F.: *See—*
Gander, Frederick W.; Hoegger, Erhard F.; and Kane, William P., 4,020,126.
Hoehn, Hans, to E. R. Squibb & Sons, Inc. 5-Aminomethyl-1H-pyrazolo[3,4-b]pyridines. 4,020,072, Cl. 260-293.600.
Hoexter, Rolf, to Mosstype Corporation. Mounting-proofing machine for flexographic plates. 4,019,434, Cl. 101-216.000.
Hoffman, Arthur Rowland; Kendall, Arthur Harry; and Rohr, Robert Lewis, to International Business Machines Corporation. Method of manufacture of multiple glass nozzle arrays. 4,019,886, Cl. 65-43.000.
Hoffman, Ronald Clarence, to AMP Incorporated. Electrical splice. 4,019,801, Cl. 339-98.000.
Hoffmann, Daniel; and Reynard, Remi, to Societe des Hauts Fourneaux de la Chiers; Coflexip; and Institut Francais du Petrole, des Carburants et Lubrifiants et Entreprise de Recherches et d'Activities Petrolieres Elf. Hollow flexible tubular body, process and apparatus for making the same. 4,019,539, Cl. 138-118.000.
Hoffmann, Gunther; and Harzer, Peter, to Wandel u. Goltermann KG. Digital settable frequency generator with phase-locking loop. 4,020,425, Cl. 331-16.000.
Hofmann, Heinz: *See—*
Wetzler, Josef; Gaschler, August; and Hofmann, Heinz, 4,019,457.
Hogan, Gerard T., to Universal Oil Products Company. Laminated armrest. 4,019,779, Cl. 297-411.000.
Hoganas Aktiebolag: *See—*
Bockstiegel, Georg Heinrich Artur Gerhard, 4,019,239.
Hoklar, Ivan Konstantinov: *See—*
Stoilov, Nikola Dimov; and Hoklar, Ivan Konstantinov, 4,019,245.
Hokushin Electric Works, Ltd.: *See—*
Watanabe, Masayasu, 4,019,385.
Holdinghausen, Paul: *See—*
Guyot, Volker; Holdinghausen, Paul; and Mueller, Martin, 4,020,423.
Holland, John M., to American District Telegraph Company. Radio central station alarm system. 4,020,477, Cl. 340-224.000.
Holland, Ronald: *See—*
Birt, Dennis Courtney Parsons; Holland, Ronald; and Pearce, Leonard John, 4,020,247.
Holman, Harry A.; Kallmeyer, Albert W.; Paulsen, Henry C.; and Weaver, William W., to McDonnell Douglas Corporation. Loom for producing three dimensional weaves. 4,019,540, Cl. 139-20.000.
Holson Company, The: *See—*
Holson, Sheldon, 4,019,937.
Holson, Sheldon, 4,019,943.
Holson, Sheldon, to Holson Company, The. Sleeved photo album page and means and method for making same. 4,019,937, Cl. 156-73.100.
Holson, Sheldon, to Holson Company, The. Photographic album page and method of making same. 4,019,943, Cl. 156-227.000.
Honda Giken Kogyo Kabushiki Kaisha: *See—*
Imai, Masahiro; and Ishikawa, Satoshi, 4,019,595.
Irimajiri, Shoichiro; Tanaka, Yoshio; and Kobayashi, Atsushi, 4,020,455.
Koyama, Mikihiro, 4,019,594.
Tsukahara, Takeshi; Morioka, Minoru; Oguma, Yoichi; and Omori, Yoshitaka, 4,019,774.
Honeywell Inc.: *See—*
Peterson, Dean M.; and Wittenberger, John C., 4,020,496.
Storm, John F., 4,020,402.
Honeywell Information Systems, Inc.: *See—*
Woods, William E.; and Stanley, Philip E., 4,020,471.
Honeywell Information Systems Italia: *See—*
Fare, Carlo; and De Bartolomeis, Francesco, 4,019,694.
Honjo, Satoru: *See—*
Tamai, Yasuo; Osawa, Sadao; and Honjo, Satoru, 4,019,993.
Hood, Henry Alexander, to Wall Industries, Inc. Method of manufacturing parallel yarn rope. 4,019,940, Cl. 156-148.000.
Hooker Chemicals & Plastics Corporation: *See—*
Dannels, Bobby F., 4,020,033.
Hordyk, Roger P.: *See—*
Lenderink, Thomas A.; and Hordyk, Roger P., 4,019,548.
Horowitz, Alexandre: *See—*
Poelma, Cornelis Frederikus; Horowitz, Alexandre; and Verschure, Petrus Joseph Marie, 4,019,770.
Horowitz, Charles, to Sloan Valve Company. Tractor protection valve. 4,019,525, Cl. 137-107.000.
Horowski, Reinhard: *See—*
Rahtz, Dieter; Schroder, Eberhard; Horowski, Reinhard; Paschelke, Gert; Palenschat, Dieter; Wachtel, Helmut; and Kehr, Wolfgang, 4,020,164.
Horton, James B.: *See—*
Townsend, Herbert E., Jr.; Horton, James B.; and Woodyatt, Louis R., 4,019,901.
Hosokawa, Manabu: *See—*
Tomita, Tamaki; and Hosokawa, Manabu, 4,019,246.
Hotta, Junichi; and Fujii, Masaki, to Mitsubishi Petrochemical Company Limited. Crystalline polyolefins and production thereof. 4,020,264, Cl. 526-142.000.
Houdaille Industries, Inc.: *See—*
Mandt, Mikkel G., 4,019,983.
Hsieh, Henry L., to Phillips Petroleum Company. Alkene oxide or acrylate polymerization or copolymerization catalyzed by organoaluminum-organophosphine-metal salt of a beta-diketone. 4,020,018, Cl. 260-2.00A.
Hsieh, Henry L., to Phillips Petroleum Company. 1,3-Cyclodiene-acyclic conjugated diene copolymers. 4,020,251, Cl. 526-20.000.
Hu, Chun P.: *See—*
Bolz, Gunner; Deindoerfer, Fred H.; Hu, Chun P.; Kameda, Naomi; and Wang, Robert, 4,020,151.
Hubbard, Winchester L.; Grahame, Robert E., Jr.; Covey, Rupert A.; and Jancis, Elmar H., to Uniroyal Inc. Control of acarids using certain benzothiazoles or benzothiazolines. 4,020,165, Cl. 424-270.000.
Hubble, William S.: *See—*
Herzog, Josef; Woods, Kenneth K.; and Hubble, William S., 4,019,881.
Huber, Ludwig Konrad, to Pennwalt Corporation. Process for controlling algae with tetrahydro-1,3-thiazinium salts. 4,019,891, Cl. 71-67.000.
Hudalla, Mark G.; and Schultz, Steven C., to Minnesota Mining and Manufacturing Company. Applicator for heat-activatable tape. 4,019,948, Cl. 156-519.000.
Hudson Products Corporation: *See—*
Monroe, Robert C., 4,019,792.
Huffman, Allan M., to American Color & Chemical Corporation. Phenylazo-(N-alkylanilino)-m-toluene sulfonic acid or sulfonamide acid dyes for polyamide fiber materials. 4,020,053, Cl. 260-205.000.
Hughes Aircraft Company: *See—*
Boswell, Donald D.; Grinberg, Jan; Jacobson, Alexander D.; and Myer, Gary D., 4,019,807.
Hughes Tool Company: *See—*
Stinson, Leon Berthal; and Galle, Edward Milburn, 4,019,785.
Hungerford, Daniel Comstock, to Brunswick Corporation. Shank mounted fouled anchor release. 4,019,455, Cl. 114-298.000.
Hunt, Clayton Edward, Jr.; and Spooner, Donald James, to Eastman Kodak Company. Sheet registration mechanism. 4,019,732, Cl. 271-245.000.
Hunt, William Joseph, to Beed (Dishwashers) Limited. Food material chopper. 4,019,689, Cl. 241-282.100.
Huntoon, Lewis W.: *See—*
Chen, James H.; and Huntoon, Lewis W., 4,019,898.
Huss, Rainer: *See—*
Fritz, Heinz Peter; Wabner, Dietrich; and Huss, Rainer, 4,019,970.
Hydril Company: *See—*
Mott, James D., 4,019,574.
Hykon-Patent Aktiebolag: *See—*
Faxen, Per Torsten; and Karlsson, Frans Harry, 4,019,529.
Hyodo, Yoichi: *See—*
Kondo, Takeo; Hyodo, Yoichi; Ono, Hiroyuki; and Yuasa, Shiro, 4,019,403.
I-T-E Imperial Corporation: *See—*
Eidelberg, Jonah; Mooney, Thomas; and Bauer, Richard A., 4,019,762.
ICL/Scientific: *See—*
Parker, James E., 4,020,006.
Idel, Vladimir Viktorovich. Method of grinding band saw teeth. 4,019,408, Cl. 76-112.000.
Idemitsu, Kosan Kabushiki-Kaisha (Idemitsu Kosan Co., Ltd.): *See—*
Matsumoto, Takeshi; Kaji, Hidehiko; Isogai, Osamu; and Tomikawa, Masami, 4,019,822.
Igeta, Yosuke: *See—*
Iwaoka, Masao; Igeta, Yosuke; Kiku, Toyochika; Kobayashi, Fumio; and Sugai, Tatsuhiko, 4,020,505.
Iida, Masajiro; Morimatsu, Hideharu; Fukuoka, Itsuo; and Yoshida, Yoshinari, to Furno Electric Company, Limited. Ultrasonic wave transmitting system. 4,020,446, Cl. 340-5.00R.
Ikari, Yoshikatsu; Yokoyama, Shoichiro; Yokoi, Hideharu; and Murakami, Tatsuo, to Agency of Industrial Science & Technology; and Fuji Chemical Industry Co., Ltd. Method for treatment of waste water containing organic pollutants. 4,019,982, Cl. 210-30.00R.
Ikebata, Shigeki: *See—*
Kusakawa, Hideaki; Takahashi, Kenzoo; and Ikebata, Shigeki, 4,020,221.
Ikeda, Masaru: *See—*
Negishi, Akira; Takayanagi, Kiyoshi; Ikeda, Masaru; and Kousaka, Shinji, 4,019,899.
Ikelheimer-Ernst, Inc.: *See—*
Ikelheimer, Gerald S.; and d'Andrea, Gilbert, 4,019,674.
Ikelheimer, Gerald S.; and d'Andrea, Gilbert, to Ikelheimer-Ernst, Inc. Rigid walled structures for containers, furniture and the like. 4,019,674, Cl. 229-23.00R.
Ilford Limited: *See—*
Wright, Peter John, 4,019,908.
Illinois Tool Works Inc.: *See—*
Camillo, Charles Carl, 4,019,855.
Imai, Hiroyuki; Itoi, Hidenobu; Shimizu, Hiromu; and Kuroda, Yukio, to Nippon Steel Corporation. Apparatus for forming a refractory lining for a container. 4,019,847, Cl. 425-421.000.
Imai, Masahiro; and Ishikawa, Satoshi, to Honda Giken Kogyo Kabushiki Kaisha. Radiator apparatus in a motorized two-wheeled vehicle. 4,019,595, Cl. 180-33.00R.
Imaizumi, Fujimaro: *See—*
Tsuboi, Takashi; Tachibana, Kyozo; Tamura, Kaoru; and Imaizumi, Fujimaro, 4,020,411.
Imamura, Masanaga, to Ricoh Co., Ltd. Cap with inside stopper for receptacle. 4,019,646, Cl. 215-329.000.
Immer, Hans U.: *See—*
Abraham, Nedumparambil A.; Immer, Hans U.; Nelson, Verner R.; and Sestanj, Kazimir, 4,020,157.
Imoco-Gateway Corporation: *See—*
Weiland, George N., Sr., 4,019,706.
Imperial Chemical Industries Limited: *See—*
Ackerley, Norman; Mack, Peter Albert; and Johnson, David Harold, 4,020,105.
Ackerley, Norman; and Mack, Peter Albert, 4,020,106.
King, Terence; and Rose, John Brewster, 4,020,046.
Peel, Richard Philip; and Sutherland, James Kenneth, 4,020,172.
Industrial Tectonics, Inc.: *See—*
Loberg, Grant M., 4,019,791.
Industrie A. Zanussi S.p.A.: *See—*
Hillberger, Horst; Masili, Dino; Plos, Lorenzo; and Ret, Luigi, 4,020,501.
Industriele Onderneming Wavin N.V.: *See—*
Heidemann, Gerrit, 4,019,761.
Ingham, Herbert S., Jr.: *See—*
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Inoue, Kunihiro: *See—*
Otake, Tsutomu; Takeshita, Hiroshi; Kouchi, Akihiko; and Inoue, Kunihiro, 4,019,809.
Inoue, Masayoshi: *See—*
Tsuchihashi, Shoji; Kawamoto, Yoji; and Inoue, Masayoshi, 4,019,967.
Inoue, Tomoyuki: *See—*
Suzuki, Hisao; Musashi, Akira; Ando, Yoshiyuki; and Inoue, Tomoyuki, 4,020,125.
Inoue, Yoshio: *See—*
Noshiro, Atsumi; Takamizawa, Minoru; Yamamoto, Yasushi; Inoue, Yoshio; and Fujii, Hitoshi, 4,019,904.
Institut Francais du Petrole: *See—*
Cosyns, Jean; Franck, Jean-Pierre; Guibet, Jean-Claude; and Jacquin, Yves, 4,019,976.
Institut Francais du Petrole, des Carburants et Lubrifiants et Entreprise de Recherches et d'Activities Petrolieres Elf: *See—*
Hoffmann, Daniel; and Reynard, Remi, 4,019,539.
Institute za Metalloobrabotvashti Machini: *See—*
Stoilov, Nikola Dimov; and Hoklar, Ivan Konstantinov, 4,019,245.
Institutul National Pentru Creatie Stinifica si Tehnica: *See—*
Teodorescu, Constantin, 4,019,834.
Instytut Nawozow Sztucznych: *See—*
Golebiowski, Andrzej; Paluch, Stanislawa; Janecki, Zdzislaw; Polanski, Alfred; Hennel, Waclaw; Zielinski, Jerzy; Warzec, Cezary; and Lisowski, Wojciech, 4,019,969.
Interliz Anstalt: *See—*
Vogt, Alfred; and Bolter, Herbert, 4,019,679.
Intermountain Research and Development Corporation: *See—*
Walden, John, 4,019,872.
International Business Machines Corporation: *See—*
Barrett, Michael Conan; and Petterson, Eric Sigfried, 4,020,506.
Cordi, Vincent Anthony; and Edson, Bruce Adam, 4,020,466.
Davis, John Ephraim, Jr., 4,020,281.
Drimak, Edward George; and Metz, Thomas Arthur, 4,020,470.
Gardner, Richard A., 4,020,234.
Hoffman, Arthur Rowland; Kendall, Arthur Harry; and Rohr, Robert Lewis, 4,019,886.
Jones, Julius Dwight; and Junod, Dale Milton, 4,020,460.
Morrin, Thomas Harvey, II, 4,020,462.
Nussbaumer, Henri J., 4,020,333.
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International Diagnostic Technology, Inc.: *See—*
Bolz, Gunner; Deindoerfer, Fred H.; Hu, Chun P.; Kameda, Naomi; and Wang, Robert, 4,020,151.
International Flavors & Fragrances Inc.: *See—*
Evers, William John, 4,020,175.
International Harvester Company: *See—*
Wesemeier, Reinhard, 4,019,398.
International Standard Electric Corporation: *See—*
Kitajewski, Ryszard; Sweet, Anthony William; and Dyer, Michael Philip, 4,020,294.
International Telephone and Telegraph Corporation: *See—*
Bae, Hyung Du, 4,020,330.
Carlson, Elmer A.; Raffaelli, Joseph G.; and Gann, Ronald A., 4,019,854.
Epstein, Marvin Aaron, 4,020,283.
Intersil Incorporated: *See—*
Weir, Basil, 4,020,365.
IPEC, Inc.: *See—*
Krauss, Edward W., 4,019,416.
Irick, Gether, Jr.; and Kelly, Charles A., to Eastman Kodak Company. Polymers stabilized with bis-heterocyclic benzoates. 4,020,041, Cl. 260-45.8NZ.
Irick, Gether, Jr.; and Kelly, Charles A., to Eastman Kodak Company. Oxadiazolylphenyl aromatic ester compounds and their use as ultraviolet stabilizer in organic compositions. 4,020,080, Cl. 260-307.00G.
Irimajiri, Shoichiro; Tanaka, Yoshio; and Kobayashi, Atsushi, to Honda Giken Kogyo Kabushiki Kaisha. Deceleration detector system for motor vehicles with automatic transmission. 4,020,455, Cl. 340-53.000.
Irvin, Charles F., to Westinghouse Electric Corporation. Method and fixture for the assembly of dynamoelectric machines. 4,019,249, Cl. 29-596.000.
Irvine, John L., to Richardson-Merrell Inc. 7-Substituted-2-indolinones. 4,020,179, Cl. 424-274.000.
Irwin, John M.: *See—*
Powell, Noble R.; and Irwin, John M., 4,020,334.
Ishida, Hajime, to Tomy Kogyo Co., Ltd. Baby walker. 4,019,756, Cl. 280-649.000.
Ishigaki, Yukinobu; and Sasamura, Kohei, to Victor Company of Japan, Limited. Rectifying and smoothing circuit. 4,020,409, Cl. 321-10.000.
Ishikawa, Akio: *See—*
Ozawa, Goro; Kosaka, Kenzo; Sato, Kasumi; Ishikawa, Akio; Nanbu, Toshiyuki; Adachi, Kiyoshi; Okaya, Tsutomu; Goto, Takashi; and Kitagawa, Hiroshi, 4,019,228.
Ishikawa, Kazuo: *See—*
Shimaya, Takashi; Namae, Takao; and Ishikawa, Kazuo, 4,020,343.

Ishikawa, Satoshi: *See—*
Imai, Masahiro; and Ishikawa, Satoshi, 4,019,595.

Isogai, Osamu: *See—*
Matsumoto, Takeshi; Kaji, Hidehiko; Isogai, Osamu; and Tomikawa, Masami, 4,019,822.

Issler, Jorg; and Gerber, Richard, to Robert Bosch G.m.b.H. Separable contact and connection arrangement for ignition cables to a fixed terminal, for example the distributor cap of a distributor-breaker assembly. 4,019,796, Cl. 339-12.00R.

Itek Corporation: *See—*
Ebner, Peter R.; and Griffith, Louis E., 4,020,495.

Ito, Hiroshi; Sugiyama, Tadashi; Kaminaka, Yoshinori; Yamamoto, Yuichiro; Tanigawa, Takeshi; Shoji, Shunichi; and Saito, Yoshifusa, to Hochiki Corporation. Composite-type heat-system fire sensing device. 4,020,442, Cl. 337-299.000.

Ito, Tetsuo; and Nishihara, Motohisa, to Hitachi, Ltd. Signal transmitting and receiving device. 4,020,449, Cl. 340-15.000.

Itoh, Takuji: *See—*
Nishikawa, Eiichiroh; Itoh, Takuji; and Miura, Tadashi, 4,020,011.

Itoi, Hidenobu: *See—*
Imai, Hiroyuki; Itoi, Hidenobu; Shimizu, Hiromu; and Kuroda, Yukio, 4,019,847.

Ivanhoe Research Corporation: *See—*
Blessing, Hubert; and Benjamin, Kenneth A., 4,019,447.

Iwai, Tadayoshi, to Mutoh Industry Ltd. Device for attaching rollers to a carriage adapted to move along a rail. 4,019,258, Cl. 33-79.00R.

Iwaoka, Masao; Igeta, Yosuke; Kiku, Toyochika; Kobayashi, Fumio; and Sugai, Tatsuhiko, to Gakken Co. Ltd. Magnetic sheet player with an adjustable inclined magnetic head. 4,020,505, Cl. 360-101.000.

Iwasaki, Moritaka. Heat exchanging process of refrigerant gas in refrigerator. 4,019,341, Cl. 62-277.000.

Iwasaki, Shozo, to Kabushiki Kaisha Akashi Seisakusho. Hardness tester. 4,019,376, Cl. 73-81.000.

Iyoda, Michio: *See—*
Hobo, Nobuhito; Enomoto, Nizo; Suzuki, Yutaka; Kawamoto, Itsushi; Iyoda, Michio; Tsuzuki, Yoshihiko; Sekino, Kenro; and Nukata, Hironari, 4,019,478.

J. B. Foote Foundry Co., The: *See—*
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J & J Tool and Mold Ltd.: *See—*
Altenhof, Jack; Altenhof, John; and Chartier, Robert, 4,019,711.

J & L Tool & Machine, Inc.: *See—*
Landwerlen, Joseph E., 4,019,454.

J. P. Stevens & Co., Inc.: *See—*
Chase, V. Lindsay, 4,020,135.

Jablonski, Richard J.; and Kruh, Daniel, to General Electric Company. Polyimides prepared from amine terminated prepolymers and olefin containing anhydrides. 4,020,303, Cl. 260-78.0UA.

Jacobs, Philip C., Jr., to Gould Inc. Electric Fuse Division. Electric fuse having undulated fusible element. 4,020,441, Cl. 337-187.000.

Jacobson, Alexander D.: *See—*
Boswell, Donald D.; Grinberg, Jan; Jacobson, Alexander D.; and Myer, Gary D., 4,019,807.

Jacquin, Yves: *See—*
Cosyns, Jean; Franck, Jean-Pierre; Guibet, Jean-Claude; and Jacquin, Yves, 4,019,976.

Jaegle, Bruno; and Furtwaengler, Gerhard, to Siemens Aktiengesellschaft. Polarized electromagnetic relay and method of manufacturing the same. 4,020,434, Cl. 335-230.000.

Jager, Horst: *See—*
Hiestand, Armin; and Jager, Horst, 4,020,087.

Jaggi, Hans; Lehmann, Ernesto; and Rechsteiner, Hugo, to Georg Fischer Aktiengesellschaft. Apparatus for forming a continuous wire into a mat. 4,019,544, Cl. 140-112.000.

Jancis, Elmar H.: *See—*
Hubbard, Winchester L.; Grahame, Robert E., Jr.; Covey, Rupert A.; and Jancis, Elmar H., 4,020,165.

Janecki, Zdzislaw: *See—*
Golebiowski, Andrzej; Paluch, Stanislawa; Janecki, Zdzislaw; Polanski, Alfred; Hennel, Waclaw; Zielinski, Jerzy; Warzec, Cezary; and Lisowski, Wojciech, 4,019,969.

Janssen, Frits W.; and Sinclair, Edward A., to Goodyear Tire & Rubber Company, The. Plasticity index improvers and method of use. 4,020,026, Cl. 260-3.000.

Japan Exlan Company Limited: *See—*
Nomura, Katsuaki; and Fujimatsu, Masaaki, 4,020,199.

Jaswal, Iqbalsingh; and Pugi, Kalev, to Du Pont of Canada Limited. Recirculating reaction apparatus for continuous preparation of a polyamide. 4,019,866, Cl. 23-260.000.

Javan, Ali, to Massachusetts Institute of Technology. Generating and using coherent optical radiation. 4,020,341, Cl. 250-211.00J.

Jay, Pierre; and Schwachhofer, Ghislain, to Rhone-Poulenc Industries. Dielectric compositions. 4,019,996, Cl. 252-63.700.

Jayne, Gerald John Joseph; and Askew, Herbert Frank, to Edwin Cooper & Company Limited. Sulphur containing lubricating oil additives. 4,019,991, Cl. 252-48.200.

Jean, Leonard Paul: *See—*
La Chance, Ernest Joseph, Sr.; and Jean, Leonard Paul, 4,020,277.

Jenkins, Anthony; and Lovelock, James Ephraim. Selective detection of a constituent in an atmosphere. 4,019,863, Cl. 23-232.00E.

Jenness, Raymond C., to Allis-Chalmers Corporation. Method of equalizing radial load on plurality of pivoted bearing pads. 4,019,787, Cl. 308-73.000.

Jensen, Jens Peter: *See—*
Nicolaisen, Holger; Andersen, Finn Schnoor; and Jensen, Jens Peter, 4,020,435.

Jensen, Wayne E.; and Stanfield, Charles Keith, to B & J Manufacturing Company. Tire rasp having reversible blade holder assemblies. 4,019,234, Cl. 29-79.000.

Jerde, James B.; and van Blerk, Victor B., to Digital Dynamics, Inc. Digital valve assembly. 4,019,533, Cl. 137-599.000.

Jex Co., Ltd.: *See—*
Yamauchi, Akira; Kakuma, Tetsu; Yamashita, Hisao; and Ariga, Masahiko, 4,019,226.

Jirele, James E., to Owatonna Tool Company. Puller apparatus and method for disassembling universal joints. 4,019,233, Cl. 29-261.000.

Jochmann, Ludwig V., to Dow Chemical Company, The. Facade clad buildings and method. 4,019,296, Cl. 52-268.000.

John Zink Company: *See—*
Reed, Robert D., 4,019,466.

Johnson, David Harold: *See—*
Ackerley, Norman; Mack, Peter Albert; and Johnson, David Harold, 4,020,105.

Johnson, Donald S.; and Relles, Howard M., to General Electric Company. Preparation of aromatic tetracarboxylic acids. 4,020,069, Cl. 260-520.00E.

Johnson, Dwight N., to Singer Company, The. Inlet orifice device to control thruput flow for pressure regulators. 4,019,531, Cl. 137-504.000.

Johnson, James H. Automatic or semi-automatic firearm. 4,019,423, Cl. 89-178.000.

Johnson, John J., IV. Beam suspension system. 4,019,298, Cl. 52-594.000.

Johnson, Lance A. Guide for tool or instrument. 4,019,256, Cl. 33-79.00A.

Johnson, Marvin M.; Tabler, Donald C.; and Nowack, Gerhard P., to Phillips Petroleum Company. Selective hydrogenation process. 4,020,119, Cl. 260-677.00A.

Johnson, Norman Allen. Lever actuated caliper brake. 4,019,608, Cl. 188-59.000.

Johnson, Robert R.: *See—*
Strubel, David G.; and Johnson, Robert R., 4,019,520.

Johnson, Wayne C.: *See—*
Caspari, Fred W.; and Johnson, Wayne C., 4,020,419.

Joly, Jean: *See—*
Guillermin, Rene; Joly, Jean; and Sangalli, Sylvio, 4,020,196.

Jones, Ferris E. Table. 4,019,443, Cl. 108-137.000.

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Junod, Dale Milton: *See—*
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Kabushiki Kaisha Komatsu Seisakusho: *See—*
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Kabushiki Kaisha Suwa Seikosha: *See—*
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Kadomsky, Dmitry Evgenievich: *See—*
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Kalil, Eugene J.: *See—*
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Kalka, Josef; Winter, Hermann; and Beckmann, Jurgen, to Chemische Werke Huls Aktiengesellschaft. Continuous process for the removal of monomeric impurities from aqueous dispersions of homo- and copolymers of vinyl chloride. 4,020,032, Cl. 260-29.60R.

Kallmeyer, Albert W.: *See—*
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Kamin, Arthur; and Evans, Clifford A. Yoke mechanism for fluid displacement device. 4,019,841, Cl. 418-257.000.

Kaminaka, Yoshinori: *See—*
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Hayami, Heijiro; Kotera, Hiroaki; Tsuchiya, Hiroyoshi; Kan, Ryuzo; Yoshida, Kunio; Shibata, Tsutomu; and Tsuda, Yukifumi, 4,020,502.

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Kaneko, Ryuichi; Yokozawa, Minori; Suzuki, Shigemitsu; and Kamegaya, Takeo. Pulse width luminance modulation system for a DC gas discharge display panel. 4,020,280, Cl. 358-242.000.

Kaniecki, Janeck, to Lissot, Jean. Automated apparatus for shaping the beak or bill of young fowl. 4,019,513, Cl. 128-223.000.

Kant, Michel: *See—*
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Karasudani, Isao; Takashima, Toshiyuki; and Bokuda, Yoshiyuki, to Sekisui Kagaku Kogyo Kabushiki Kaisha. Laminated glass structures and process for production thereof. 4,020,217, Cl. 428-429.000.

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Faxen, Per Torsten; and Karlsson, Frans Harry, 4,019,529.

Karsan, Demir I. Apparatus and method for buffering submerged conduits. 4,019,333, Cl. 61-110.000.

Kasley, Samuel J.: *See—*
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Kathawala, Faizulla G., to Sandoz, Inc. 5-(2-Aminophenyl)-s-triazoles. 4,020,083, Cl. 260-308.00R.

Kato, Kimpei: *See—*
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Kattoh, Tsutomu; Kumabe, Junichi; and Hirabayashi, Satoshi, to Dainippon Ink and Chemicals, Incorporated. Coloring compositions of powder form. 4,020,040, Cl. 260-42.560.

Kauffman, Robert N.: *See—*
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Kaufhold, Frederick Daniel: *See—*
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Kausche, Helmold; and Schauer, Alois, to Siemens Aktiengesellschaft. Thin film circuit. 4,020,222, Cl. 428-209.000.

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Kawamoto, Itsushi: *See—*
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Kawamoto, Yoji: *See—*
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Kay, James A., Jr., to Philip Morris Incorporated. Maintaining plasticizer temperature in tobacco filter rod formation, and apparatus therefor. 4,019,942, Cl. 156-180.000.

Kayser, Lutz Tilo. Process and apparatus for continuously conveying particulate material. 4,019,783, Cl. 302-25.000.

Kazitani, Shiro: *See—*
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Kealy, Joseph P., to Swift Chemical Company. Slow acting fertilizer. 4,019,889, Cl. 71-29.000.

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Keen, Everett Morgan; Siciliano, Anthony John; Shah, Kiran Chhabildas; Artamonoff, Serge; and Stigen, Leonard Roy, to Diamond International Corporation. System for controlling feed of livestock. 4,019,461, Cl. 119-18.000.

Kehr, Wolfgang: *See—*
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Kell, Robert Christopher: *See—*
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Keller, Andrew: *See—*
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Keller, Guenter; Klinger, Friedrich; Pohl, Andreas; Schimanski, Gerhard; and Zuber, Guenter, to Carl Schenck AG. Hydraulic chucking head. 4,019,378, Cl. 73-103.000.

Kelley, Jack R., to Georgia-Pacific Corporation. Process for the preparation of aqueous magnetic material suspensions. 4,019,994, Cl. 252-62.520.

Kelly, Charles A.: *See—*
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Kelly, Robert C.; and Nelson, Norman A., to Upjohn Company, The. 4α,6-Dihydroxy-2β-carboxaldehyde-3α-tetrahydropyranacetic acid γ-lactone, 6-alkyl ethers. 4,020,173, Cl. 260-343.600.

Kelver, William L.; Stuckey, Ronald L.; and Rozema, Arthur L., to CTS Corporation. Variable resistance control. 4,020,445, Cl. 338-312.000.

Kemmerer, Marlin. Valve construction. 4,019,714, Cl. 251-138.000.

Kempster, Edward, to Thyssen (Great Britain) Limited. Mining. 4,019,327, Cl. 61-35.000.

Kenaio, Abdulwahab. Pneumatically operated spear gun. 4,019,480, Cl. 124-61.000.

Kendall, Arthur Harry: *See—*
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Kenkelen, Charles W., to Rabin, Melvin G. Combined fan and noisemaker. 4,019,277, Cl. 46-175.00R.

Kennecott Copper Corporation: *See—*
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Kennedy, Joseph P.; and Vidal, Alain, to University of Akron, The. Bigraft copolymers and process for the preparation thereof. 4,020,127, Cl. 260-878.00R.

Kern, Josef, to Siemens Aktiengesellschaft. Relay having two winding supports. 4,020,437, Cl. 335-299.000.

Kerschbaum, Arthur P.: *See—*
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Kerschbaum, Richard Lynn, to Daedalus Enterprises, Inc. Mobile infrared apparatus for mapping thermal variations and method employing same. 4,020,344, Cl. 250-330.000.

Kerz, Phillip D. Identification marker. 4,019,272, Cl. 40-316.000.

Kestel, Frederick J. Adjustable three-point tractor hitch. 4,019,753, Cl. 280-415.00A.

Khananashvili, Lotari Mikhailovich: *See—*
Andrianov, Kuzma Andrianovich; Bagrov, Georgy Nikolaevich; Vasilieva, Tatyana Vsevolodovna; Vasjukov, Vladimir Alexandrovich; Lebedev, Sergei Ivanovich; Makarov, Vladimir Alexandrovich; and Khananashvili, Lotari Mikhailovich, 4,020,226.

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Kibler, Ralph J.; and Wolfe, Otho C., to United States of America, Army. Three-barrel pistol, electrode fired. 4,019,273, Cl. 42-1.00R.

Kiku, Toyochika: *See—*
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Kimble, Thomas E.; and Gregory, Marion B., to D. H. Baldwin Company. Organ stop tablet mechanism. 4,019,418, Cl. 84-343.000.

Kimura, Toshihiro; and Narikiyo, Yasumasa, to Okuma Machinery Works Ltd. Feed rate control system for numerical control machine tool. 4,020,331, Cl. 235-151.110.

King, David W.: *See—*
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King, Herbert R., to Milliken Research Corporation. Beam creel. 4,019,700, Cl. 242-131.100.

King, Terence; and Rose, John Brewster, to Imperial Chemical Industries Limited. Aromatic polysulphone coated article and bonded structure. 4,020,046, Cl. 260-900.000.

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Kister, Albert T.; and Lutz, Eugene F., to Shell Oil Company. Oligomerization reaction system. 4,020,121, Cl. 260-683.15D.
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Kitajewski, Ryszard; Sweet, Anthony William; and Dyer, Michael Philip, to International Standard Electric Corporation. Presence and direction of line current flow detector. 4,020,294, Cl. 179-18.0FA.
Kitamura, Masatsugu; and Kobari, Harukuni, to Victor Company of Japan, Limited. System for time compression and expansion of audio signals. 4,020,291, Cl. 179-15.55T.
Kitchen, Earl M. Leash with slip loop. 4,019,463, Cl. 119-109.000.
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Kleeberg, Ulrich; Leimkuhler, Jurgen; and Kautz, Johannes, to Gottfried Bischoff Bau Kompl. Method of and apparatus for incinerating refuse. 4,019,444, Cl. 110-7.00R.
Klein, Schanzlin & Becker Aktiengesellschaft: *See—*
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Klomp, Edward D., to General Motors Corporation. Vortex sulfuric acid separator. 4,019,883, Cl. 55-264.000.
Klose, Sigmar; Wahlefeld, August Wilhelm; and Hagen, Alexander, to Boehringer Mannheim G.m.b.H. Analytical enzymatic determination. 4,019,961, Cl. 195-103.50R.
Knopfel, Hans-Dieter; and Matthias, Heinz-Bernd, to Klein, Schanzlin & Becker Aktiengesellschaft. Centrifugal pump with inducer. 4,019,829, Cl. 415-143.000.
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Koebner, Adolf. Chemical condensation products, their preparation and use. 4,019,921, Cl. 106-238.000.
Koehl, Jean Marie Gerard Rene. Arrangement for making a prefabricated wall. 4,019,328, Cl. 61-41.00A.
Koga, Mamoru; and Matsunobu, Masanori. Adjustable electrode positioning device for electric spark machining apparatus. 4,020,313, Cl. 219-69.00E.
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Kolowski, Michael A.; and Siefert, George J., to Goodyear Tire & Rubber Company, The. Chipperless radial ply tire. 4,019,551, Cl. 152-354.000.
Kolterer, Franz, to Koltron Corporation. Resist application for selective plating of etched sheets of precision chemical machined components. 4,019,458, Cl. 118-321.000.
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Konomi, Toshiaki; Nurita, Jyoji; and Masuda, Takeshi, to Toyota Jidosha Kogyo Kabushiki Kaisha. Fuel system for multicylinder engines. 4,019,483, Cl. 123-141.000.
Koons, Margaret R. Frying pan grease shield. 4,019,497, Cl. 126-299.00C.
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Kremer, Alphonse E. Rotary valve engine with lubricator. 4,019,488, Cl. 123-190.0BB.
Kropf, Frederic F. Food delivery system for restaurants. 4,019,605, Cl. 186-1.00R.
Krude, Werner, to Lohr & Bromkamp GmbH. Ball grooves for a constant velocity universal joint. 4,019,347, Cl. 64-21.000.
Krueger, Robert Harold, to Borg-Warner Corporation. Corrosion inhibitors for absorption refrigeration systems. 4,019,992, Cl. 252-68.000.
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Kuijk, Karel Elbert, to U.S. Philips Corporation. Resistance read amplifier. 4,020,364, Cl. 307-242.000.



Kulkarni, Avinash D.; and Newton, Ralph E., to Westinghouse Electric Corporation. Regenerative-cycle incandescent lamp containing $HgBr_2$ additive. 4,020,380, Cl. 313-222.000.
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Kurth, William T., to Mobil Tyco Solar Energy Corporation. Solar cell mounting and interconnecting assembly. 4,019,924, Cl. 136-89.00P.
Kurtz, Joseph M., to GTE Sylvania Incorporated. Cathode ray tube packaging. 4,019,637, Cl. 206-418.000.
Kusakawa, Hideaki; Takahashi, Kenzoo; and Ikebata, Shigeki, to Mitsubishi Denki Kabushiki Kaisha. Thin film device. 4,020,221, Cl. 428-166.000.
Kust, Roger N.: *See—*
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Kyowa Hakko Kogyo Kabushiki Kaisha: *See—*
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Labadini, William M.; Passmore, Edmund M.; and Anderson, Warren A., to GTE Sylvania Incorporated. Method of pulsing incandescent lamp filaments. 4,020,383, Cl. 313-344.000.
La Chance, Ernest Joseph, Sr.; and Jean, Leonard Paul, to Hendrix Wire & Cable Corporation. Spacer for aerial cables. 4,020,277, Cl. 174-146.000.
Lachner, Otto; Beyerlein, Ludwig; and Spelthahn, Klaus, to Lever Brothers Company. Method of injection moulding hollow preforms. 4,020,137, Cl. 264-90.000.
Lacour, Jacques: *See—*
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Lacroix, Jean R. Oil lamp. 4,019,856, Cl. 431-298.000.
Ladin, Eli M.; and Green, Paul D., to Federal-Mogul Corporation. High-impact capacity bail bearing assembly. 4,019,784, Cl. 308-6.00R.
Lagos, Costas C., to GTE Sylvania Incorporated. Fluorescent lamp having conductive film and protective film therefor. 4,020,385, Cl. 313-489.000.
Lahouste, Jean; Lemattre, Maurice; Muller, Jean-Claude; and Stein, Claude, to Societe Chimique des Charbonnages. Process for manufacturing polymers of bicyclo [2.2.1] heptene-2 and its substitution derivatives. 4,020,021, Cl. 260-2.50H.
Lakra, Paul, to C.A.V. Limited. Fuel injection systems. 4,019,481, Cl. 123-139.00E.
Lal, Joginder, to Goodyear Tire & Rubber Company, The. Preparation of halogenated polymers. 4,020,250, Cl. 526-13.000.
Lambert, Robert: *See—*
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Lamons Metal Gasket Company: *See—*
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Lamy, Jacques Edouard, to C. G. Doris. Devices for protecting the bases of structures immersed in a volume of water against undermining. 4,019,332, Cl. 61-86.000.
Landell, Harper; and Michel, John M., to Woodstream Corporation. Trolling bucket with loading latch means. 4,019,274, Cl. 43-55.000.
Landwerlen, Joseph E., to J & L Tool & Machine, Inc. Boat plug apparatus. 4,019,454, Cl. 114-197.000.
Lang, John L. Gelled reagent materials. 4,020,005, Cl. 252-316.000.
Langner, Rene J., to Bio/Physics Systems, Inc. Flowing fluid mixing device and method. 4,019,721, Cl. 259-4.0AC.
Laporte Industries Limited: *See—*
Miller, Arthur William; and Atkinson, William, 4,019,978.
Lappin, Terry A.: *See—*
Allen, Richard L.; Benjamin, Benny M.; Lappin, Terry A.; Ridgway, John A., Jr.; and Saunders, Elmer J., 4,019,962.
Lapson, Lawrence B.: *See—*
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LaSala, Jerry Frank; and Krupick, Walter Joseph, to Singer Company, The. Viscous damper. 4,019,389, Cl. 73-430.000.
Latimer, Kenneth James. Method for manufacturing a display portion thereof. 4,019,271, Cl. 40-125.00H.
Laubenberger, Herbert: *See—*
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Lawrence Peska Associates, Inc.: *See—*
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LCOA Laminating Company of America: *See—*
Block, James P., 4,019,826.
Leach, Austin F.: *See—*
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LeBlanc, Destin A.; and LeBlanc, Robert Bruce, to LeBlanc Research Corporation. Method of applying phosphoramide-hydroxymethyl phosphine condensation products for textile fire retardation. 4,020,262, Cl. 428-276.000.
LeBlanc Research Corporation: *See—*
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Leder, Lewis B.; Schottmiller, John C.; and Schroeder, Harold H., to Xerox Corporation. Photoreceptor fabrication. 4,019,902, Cl. 96-1.500.
Lee, Earnest M.; and Clyma, Grady L., to Roll-O-Matic Chain Company. Bulkhead assembly and counterbalance mechanism therefor. 4,019,442, Cl. 105-376.000.
Lee, Gim F., Jr.: *See—*
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Lee, Wayne; and Richardson, John. Elastic pull type isotonic/isometric exerciser. 4,019,734, Cl. 272-137.000.
Leeds & Northrup Italiana S.p.A.: *See—*
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Lefgren, James I. Method for mounting and inflating tubeless tires. 4,019,553, Cl. 157-1.100.
Legentil, Michel: *See—*
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Lehew, Donald L. Protective device for rackets. 4,019,736, Cl. 273-73.00R.
Lehmann, Ernesto: *See—*
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Leinweber, Donald Harder; and Neis, Thomas Walter, to Sperry Rand Corporation. Pushbutton switch/annunciator for aircraft instruments. 4,020,309, Cl. 200-314.000.
Lejdegard, Sixten Harald; and Bjorklind, Stig Lennart, to Bulten-Kanthal Aktiebolag. Screw package. 4,019,631, Cl. 206-347.000.
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Lenderink, Thomas A.; and Hordyk, Roger P., to Lenderink, Inc. Machine for shear-slicing wood. 4,019,548, Cl. 144-175.000.
Leon, Denny; and Stewart, Frederick M., to FMC Corporation. Wheelchair restraint device. 4,019,752, Cl. 280-179.00R.
Leon, Rudolph Cesar, Sr.: *See—*
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Leonheart, William Henry, to Leonheart, William Henry. Motorcycle throttle twist-grip control. 4,019,402, Cl. 74-489.000.
Lerch, Gotthard: *See—*
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LeRoy, Rodney L.; Grossman, David H.; McDonald, R. Douglas; and Hemmings, David F., to Canada Wire and Cable Limited. Variable temperature sensor. 4,020,443, Cl. 338-28.000.
Les Cables de Lyon: *See—*
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Lesage, Jean. Fishing reel. 4,019,693, Cl. 242-84.20B.
L'Etat Francais, represente par le Ministre des Postes et Telecommunications: *See—*
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van den Ouweland, Godefridus Antonius Maria; and Peer, Hendricus Gerardus, 4,020,170.

Levesque, Gerard A.; and Saidla, Glen E. W., to Exxon Research and Engineering Company. Method and apparatus for mixing viscous materials. 4,019,720, Cl. 259-4.00R.

Levine, Fred, to Acme Service Corporation. Motor mounting structure. 4,019,704, Cl. 248-16.000.

Levy, Emanuel Edward; and Wolff, Martin Jay, to Sperry Rand Corporation. Hair treatment method and device. 4,019,260, Cl. 34-97.000.

Lewis, Joseph Earle: *See—*
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Lewis, Kenneth Llewellyn: *See—*
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Leybold-Heraeus GmbH & Co. KG: *See—*
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Li, George S.: *See—*
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Li, Yi-Sheng; Leon, Rudolph Cesar, Sr.; and Perry, Eugene Norman, to Lockheed Missiles & Space Company, Inc. Self-rescue breathing apparatus. 4,019,509, Cl. 128-147.000.

Libbey-Owens-Ford Company: *See—*
Snow, Richard R., 4,019,885.

Liclican, Rafael A. Apparatus and shingled strip formed therefrom. 4,019,728, Cl. 270-58.000.

Lieberman, Sidney, to Reading Door Closer Corporation. Piston assembly for door closer. 4,019,220, Cl. 16-59.000.

Liebhaber, Klaus: *See—*
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Lindelow, Ernst C-G: *See—*
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Linder, Ernst, to Robert Bosch G.m.b.H. Vehicular fog headlight. 4,020,336, Cl. 240-9.500.

Lindsay, Frederick H. Floor frame assembly for a mobile building. 4,019,299, Cl. 52-648.000.

Linsenmeyer, Arthur: *See—*
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Lippsmeier, Bernd; Hestermann, Klaus; and Reuter, Martin, to Hoechst Aktiengesellschaft. Production of tertiary methylphosphine oxides. 4,020,110, Cl. 260-606.50P.

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Ljung, Bo Hans Gunnar, to Singer Company, The. Vibratory gyroscope. 4,019,391, Cl. 73-505.000.

Lloyd, Geoffrey Oliver; Rhoades-Brown, John Ernest; and Saunders, Stuart Richard John, to United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Industry in Her Britannic Majesty's Government of the. Prevention of corrosion of metals. 4,019,926, Cl. 148-6.350.

Loberg, Grant M., to Industrial Tectonics, Inc. Ball bearing retention construction. 4,019,791, Cl. 308-217.000.

Lockheed Missiles & Space Company, Inc.: *See—*
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Lodzinski, Fred P., to Nekoosa Papers Inc. Optical property measurement and control system. 4,019,819, Cl. 356-73.000.

Logan, Maurus C., to Thomas & Betts Corporation. Method of splicing elongate members. 4,019,241, Cl. 29-407.000.

Lohr & Bromkamp GmbH: *See—*
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Long, David T.: *See—*
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Look, Thomas F.; Podvin, Richard T.; and Weigel, Carlyle A., to Minnesota Mining and Manufacturing Company. Strip applying device. 4,019,945, Cl. 156-405.000.

Lopatin, Vladimir Viktorovich: *See—*
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Lorah, Lawrence D.; Stresau, Richard W.; Lapson, Lawrence B.; and van Vloten, Curtis P., to Rapifax Corporation. Optical scanner. 4,019,811, Cl. 350-274.000.

Lord, Thomas J., to United Aircraft Products, Inc. Mixing valve. 4,019,678, Cl. 236-12.00A.

Lotgering, Frederik Karel; and Vromans, Petrus Helena Gerardus Maria, to U.S. Philips Corporation. Magnetic device operating with the photomagnetic effect. 4,020,475, Cl. 340-174.0YC.

Lotz, Alexander: *See—*
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Lueders, Robert E.; Kust, Roger N.; and Szabo, Lester J., to Kennecott Copper Corporation. Use of raw manganese nodules for oxidation leaching of reductively roasted manganese nodules. 4,020,143, Cl. 423-32.000.

Lundell, Vernon J. Round bale forming machine. 4,019,309, Cl. 56-341.000.

Lunke & Sohn GmbH: *See—*
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Lutz, Eugene F.: *See—*
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Mabuchi, Kenichi; and Tsuchimochi, Yoshihisa, to Mabuchi Motor Co. Ltd. Cell adapter. 4,020,245, Cl. 429-100.000.

Mabuchi Motor Co. Ltd.: *See—*
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MacFee, Norman W., to Textron, Inc. Process for gapping slide fastener chain. 4,019,240, Cl. 29-408.000.

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Ackerley, Norman; and Mack, Peter Albert, 4,020,106.

MacKay, Kenneth D.; and Rogier, Edgar R., to General Mills Chemicals, Inc. Certain benzoxazoles and the use thereof as metal extractants. 4,020,081, Cl. 260-307.00D.

MacKenzie, Burton Thornley, Jr., to General Electric Company. Method of making an insulated electrical conductor using pressureless curing of filled ethylene containing polymeric compositions, and an insulated conductor formed thereby. 4,020,214, Cl. 428-389.000.

Mackley, Malcolm Robert: *See—*
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MacMillan Bloedel Limited: *See—*
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Maddox, Harry L., to Western Electric Company, Inc. Method and apparatus for testing welds between dissimilar metals by using the seebeck effect. 4,019,364, Cl. 73-15.0FD.

Maeda, Isamu; Koike, Hiroshi; and Ohara, Takashi, to Nippon Shokubai Kagaku Kogyo Co., Ltd. Process for preparing tertiary amines. 4,020,059, Cl. 260-243.00B.

Maeda, Shigeo: *See—*
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Magnuson, Roland A., to Paccar Inc. Vehicular mounted tow missile system. 4,019,422, Cl. 89-1.815.

Mahe, Jean, to Produits Chimiques Ugine Kuhlmann. Polydispersible pigment compositions. 4,019,923, Cl. 106-308.00Q.

Mahler, Peter; Frey, Gerhard; and Lerch, Gotthard, to Leybold-Heraeus GmbH & Co. KG. System for irradiating flowable material. 4,020,352, Cl. 250-436.000.

Mahoney, Robert D.; and Schneider, Stephen E., to Dow Chemical Company, The. Microporous polyethylene hollow fibers and process of preparing them. 4,020,230, Cl. 428-398.000.

Mailfert, Alain; and Kant, Michel, to Agence Nationale de Valorisation de la Recherche (ANVAR). Superconducting electric motors. 4,020,374, Cl. 310-80.000.

Maingueneau, Jean-Marie, to SCAL - Societe de Conditionnements en Aluminum. Sealant barrier for electrical cables. 4,020,276, Cl. 174-23.00R.





Makarov, Vladimir Alexandrovich: *See—*
Andrianov, Kuzma Andrianovich; Bagrov, Georgy Nikolaevich; Vasilieva, Tatyana Vsevolodovna; Vasjukov, Vladimir Alexandrovich; Lebedev, Sergei Ivanovich; Makarov, Vladimir Alexandrovich; and Khananashvili, Lotari Mikhailovich, 4,020,226.

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Mallory, Glenn O., Jr., to Richardson Chemical Company, The. Electroless nickel polyalloy plating baths. 4,019,910, Cl. 106-1.000.

Malmin, Oscar. Endodontic operating instrument. 4,019,254, Cl. 32-57.000.

Malonee, Arley L. Brake monitoring system. 4,020,454, Cl. 340-52.00B.

Manabe, Kenshi: *See—*
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Mandel, Alan F.; and Vercellotti, Leonard C., to Westinghouse Electric Corporation. Signal input devices and systems. 4,019,607, Cl. 187-29.00R.

Mandt, Mikkel G., to Houdaille Industries, Inc. Disinfection system and method. 4,019,983, Cl. 210-62.000.

Manimalethu, Abraham I., to General Electric Company. Autotransformer with series and tertiary windings having same polarity impedance. 4,020,438, Cl. 336-5.000.

Mannara, Giuseppe: *See—*
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Manners, David Eugene: *See—*
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Manning, Frank. Programmable arrays. 4,020,469, Cl. 340-172.500.

Manning, William L., to EG&G, Inc. Bulb-shaped flashtube with metal envelope. 4,020,379, Cl. 313-220.000.

Manty, Bruce R., to Lawrence Peska Associates, Inc., a part interest. Gutter protector. 4,019,290, Cl. 52-11.000.

Marcatili, Enrique Alfredo Jose; and Marcuse, Dietrich, to Bell Telephone Laboratories, Incorporated. Optimized parabolic-index optical fiber communication system with incoherent light source. 4,019,805, Cl. 350-96.00C.

Marchetti, Enzo. 2-Aminomethyl- and 2-(2-aminoethyl)-substituted 4,5-diphenyloxazoles. 4,020,082, Cl. 260-307.00R.

Marcuse, Dietrich: *See—*
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Marforio, Nerino, to Rockwell-Rimoldi S.p.A. Workpiece guide for sewing machines. 4,019,448, Cl. 112-153.000.

Marin, M. James; and Mersereau, Robert E., to Pitney-Bowes, Inc. Sheet material stacking and transfer apparatus. 4,019,640, Cl. 214-6.00H.

Markel, Richard F.: *See—*
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Markezich, Ronald L., to General Electric Company. Method for making n-alkylphthalimides. 4,020,089, Cl. 260-326.00R.

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Marshall, John Joseph: *See—*
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Marshall, Robert Moore; and Dardoufas, Kimon Constantine, to Allied Chemical Corporation. Production of polyester tire yarn polyglycol ether spin finish composition. 4,019,990, Cl. 252-8.900.

Martin, Harry F., to Westinghouse Electric Corporation. Positive closure system for free floating disc valve. 4,019,712, Cl. 251-26.000.

Martin, Keith Fraser: *See—*
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Martin Marietta Corporation: *See—*
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Martin, Robert Edgar; and Hasler, Edmond Francis. Alarm and/or control apparatus. 4,020,488, Cl. 340-412.000.

Martin, William O.; and Derda, Harry, to Case Western Reserve University. Head support and restraining apparatus. 4,019,727, Cl. 269-328.000.

Martorano, Richard; Brendley, William H., Jr.; and Haag, Thomas H., to Rohm and Haas Company. Metal decorating method involving mechanical shaping. 4,020,219, Cl. 428-460.000.

Marukawa, Katsukiyo: *See—*
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Masili, Dino: *See—*
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Mason, Daniel W.; and Walton, Richard S., to Motorola, Inc. Liquid crystal watch module. 4,019,313, Cl. 58-23.00R.

Mason, Harold F. Drum stand. 4,019,709, Cl. 248-150.000.

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Master, Ralph E.; Ritter, Arthur J., Jr.; and Perry, David L., to Caterpillar Tractor Co. Anti-noise mounting means for transmissions. 4,019,600, Cl. 180-70.00R.

Masuda, Takeshi: *See—*
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Matburn (Holdings) Limited: *See—*
Lee, Norman John, 4,019,772.

Mathews, George P.; and Lech, Thaddeus, Jr., to Borg-Warner Corporation. Automatic slack adjuster with internal reference point. 4,019,612, Cl. 188-196.0BA.

Mathys, Wilbur L.: *See—*
Bennett, Thomas H.; Carlow, Earl F.; Hepworth, Edward C.; Mathys, Wilbur L.; Mensch, William D., Jr.; Orgill, Rodney H.; Peddle, Charles I.; and Wiles, Michael F., 4,020,472.

Matrka, Miroslav: *See—*
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Matsuda, Yukinobu: *See—*
Aoyama, Ryozo; Matsuda, Yukinobu; and Urushima, Mitsuo, 4,019,321.

Matsudo, Kazuo; Shimomura, Takayoshi; Kurokawa, Teruo; and Arayama, Takao, to Nippon Kokan Kabushiki Kaisha. Enameling cold rolled steel sheet with a high enamel adhesive property. 4,019,929, Cl. 148-31.500.

Matsumoto, Kazuya, to Canon Kabushiki Kaisha. Method of color image recording. 4,019,817, Cl. 355-132.000.

Matsumoto, Takeshi; Kaji, Hidehiko; Isogai, Osamu; and Tomikawa, Masami, to Idemitsu, Kosan Kabushiki-Kaisha (Idemitsu Kosan Co., Ltd.). Pencils not requiring sharpening. 4,019,822, Cl. 401-96.000.

Matsunobu, Masanori: *See—*
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Matsushita Electric Industrial Co., Ltd.: *See—*
Hayami, Heijiro; Kotera, Hiroaki; Tsuchiya, Hiroyoshi; Kan, Ryuzo; Yoshida, Kunio; Shibata, Tsutomu; and Tsuda, Yukifumi, 4,020,502.
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Matsuyama, Iwao: *See—*
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Matthias, Heinz-Bernd: *See—*
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Matzelle, Ralph Anthony, to Caterpillar Tractor Co. Piston pump with floating port plate providing variable force balance for hydrostatic balance. 4,019,425, Cl. 91-487.000.

Maurer, Donald D.; and Sorenson, Paul D., to Medtronic, Inc. Electrical stimulation system. 4,019,518, Cl. 128-419.00R.

Maxitrol Company: *See—*
McMann, Wilbur S.; and Stang, Charles, Jr., 4,019,569.

Mayer, Uwe; and Schundehutte, Karl-Heinz, to Bayer Aktiengesellschaft. Oxadiazepine cationic dyestuffs. 4,020,063, Cl. 260-247.50H.

McAllister, Owen Earl, to Combustion Engineering, Inc. Adjustable split door jamb. 4,019,303, Cl. 52-745.000.

McCall, Richard C. Apparatus for reading and recharging condenser ionization chambers. 4,020,349, Cl. 250-377.000.

McCole, Thomas P., to Polaroid Corporation. Flat battery and method of manufacture. 4,019,251, Cl. 29-623.200.

McCollough, John K., Jr.; and Stewart, William H., Jr., to Milliken Research Corporation. Apparatus for the application of liquids to moving materials. 4,019,352, Cl. 68-205.00R.

McCreary, Norman B.: *See—*
Meredith, Robert Wayne; and McCreary, Norman B., 4,019,703.

McCulloch, Michael G.; and Nelson, Woodrow E., to Theracon, Inc. Method of producing dry pet food. 4,020,187, Cl. 426-72.000.

McCullough, Edward R. Guard fixture for a fireplace grate. 4,019,493, Cl. 126-165.000.
McCullough, Robert W., to Milliken Research Corporation. Tension control. 4,019,701, Cl. 242-152.100.
McDonald, Donald C., to O. S. Walker Company, Inc. Lifting magnet for layered pipe. 4,020,436, Cl. 335-286.000.
McDonald, R. Douglas: *See—*
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McDonnell Douglas Corporation: *See—*
Holman, Harry A.; Kallmeyer, Albert W.; Paulsen, Henry C.; and Weaver, William W., 4,019,540.
McFadden, Daniel P.: *See—*
Smith, Millard F.; Behringer, Frederick J.; Doyle, John R.; and McFadden, Daniel P., 4,019,390.
McFarlane, James I.: *See—*
Lavin, Walter M.; McFarlane, James I.; and Rose, Dennis L., 4,019,859.
McGhie, Russell P.; Bredholt, Olaf; and Rockefeller, Winston G., to Colgate-Palmolive Company. Methods and apparatus for foldably closing the ends of laminated metal-plastic tubes. 4,019,305, Cl. 53-39.000.
McIntyre, Donald B.; and McIntyre, Frederic S., to Acumeter Laboratories, Inc. Process for discontinuous coating of a web by periodic deflection thereof against a fluid coating. 4,020,194, Cl. 427-172.000.
McIntyre, Frederic S.: *See—*
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McKeever, Carl W., to Lyall Electric, Inc. Terminal crimping machine. 4,019,362, Cl. 72-421.000.
McKeever, Carl William, to Lyall Electric, Inc. Stripping and defillering method and apparatus. 4,019,409, Cl. 81-9.510.
McKillop, Alexander: *See—*
Taylor, Edward C.; and McKillop, Alexander, 4,020,073.
McKirdy, James A. Device for the application of chemicals to field crops and/or other plant concentrations. 4,019,278, Cl. 47-1.500.
McKnight, Lee Graves, to Bell Telephone Laboratories, Incorporated. Voltage surge protector. 4,020,398, Cl. 361-60.000.
McMann, Wilbur S.; and Stang, Charles, Jr., to Maxitrol Company. Burner control circuit. 4,019,569, Cl. 165-26.000.
McNeil Laboratories, Incorporated: *See—*
Mohrbacher, Richard J.; and Grous, Philip P., 4,020,055.
Means, William A., to Applied Motors, Inc. Reversing control for DC. motors of the permanent magnet field type. 4,020,403, Cl. 318-257.000.
Medtronic, Inc.: *See—*
Maurer, Donald D.; and Sorenson, Paul D., 4,019,518.
Mefina S.A.: *See—*
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Meijer, Roelf Jan, to U.S. Philips Corporation. Hot-gas reciprocating engine. 4,019,322, Cl. 60-525.000.
Meisel, Thomas C., Jr., to Caterpillar Tractor Co. Work vehicle having variable curvature blade assembly. 4,019,587, Cl. 172-802.000.
Melger, Helga: *See—*
Soldati, Gianluigi; Eilberg, Ralph G.; Melger, Helga; and Wooding, William M., 4,020,019.
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Mensch, William D., Jr.: *See—*
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Mercer, Frank Brian; and Martin, Keith Fraser, to Netlon Limited. Extruded plastic mesh. 4,020,208, Cl. 428-255.000.
Merck & Co., Inc.: *See—*
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Cragoe, Edward J., Jr.; and Bicking, John B., 4,020,177.
Remy, David C.; and Freedman, Mark B., 4,020,169.
Merck Patent Gesellschaft mit beschrankter Haftung: *See—*
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Merckel, Gerard: *See—*
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Meredith, Robert Wayne; and McCreary, Norman B. Trolling motor safety mount. 4,019,703, Cl. 248-4.000.
Merrill, R. F., to Phillips Petroleum Company. Poly(arylene sulfide) coating compositions containing alkali metal alkylbenzenesulfonate. 4,020,031, Cl. 260-29.20R.
Mersereau, Robert E.: *See—*
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Mertin, Ralf: *See—*
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Merz, Walter, to Schweizerische Aluminium AG. Elevating and conveying system for unloading vessels or the like. 4,019,641, Cl. 214-14.000.
Messer Griesheim GmbH: *See—*
Schumann, Gunter; and Becker, Werner, 4,020,405.
Messerschmitt-Bolkow-Blohm GmbH: *See—*
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Messervey, Harry Clifford, to Borden, Inc. Dual wheel discharge for can tester. 4,019,622, Cl. 198-441.000.
Metco, Inc.: *See—*
Dittrich, Ferdinand J.; Durmann, George J.; and Ingham, Herbert S., Jr., 4,019,875.
Metrologic Instruments, Inc.: *See—*
Punis, Giancarlo, 4,020,357.
Metrosonics, Inc.: *See—*
Ceci, Barry L., 4,020,286.
Metz, Thomas Arthur: *See—*
Drimak, Edward George; and Metz, Thomas Arthur, 4,020,470.
Meyer, Emilio G., to Leeds & Northrup Italiana S.p.A. Detector for an infrared analyzer. 4,020,345, Cl. 250-343.000.
Meyer, Juergen; and Wendling, Irmtrud, to Heimann GmbH. Manipulatable read-out memory. 4,020,474, Cl. 340-173.0SP.
Meyer, Leon J. Metal flange web connection. 4,019,302, Cl. 52-730.000.
Michaylov, Lubomir, to Crown Zellerbach Corporation. Extrusion of polyolefin onto paper at decreased temperatures. 4,020,215, Cl. 428-420.000.
Michel, John M.: *See—*
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Michon, Dominique; and Staron, Philippe, to Compagnie Generale de Geophysique. Method and apparatus for recording seismic signals. 4,020,447, Cl. 340-7.00R.
Mijnheer, Andries; and De Jonge, Albert Klaas, to U.S. Philips Corporation. Refrigerator. 4,019,336, Cl. 62-6.000.
Miklas, Edward J.: *See—*
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Miles, Bert Benton, to Combustion Engineering, Inc. Support for furnace tubes. 4,019,468, Cl. 122-510.000.
Milesi, Domenico: *See—*
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Millard, Keith, to Decatur Electronics, Inc. Traffic radar and apparatus therefor. 4,020,490, Cl. 343-8.000.
Miller, Arthur William; and Atkinson, William, to Laporte Industries Limited. Process for the production of alumina. 4,019,978, Cl. 208-213.000.
Miller, Jeanne Marylyn. Artificial tree. 4,020,201, Cl. 428-8.000.
Miller, Kenneth J.: *See—*
Zook, Donald G.; Miller, Kenneth J.; and Patton, Eugene K., 4,019,242.
Miller, Lester I., to Du Pont de Nemours, E. I., and Company. Coating composition for flexible substrates. 4,020,216, Cl. 428-425.000.
Miller, Matt. Hanging jar cap with storing unit. 4,019,638, Cl. 211-74.000.
Miller, Thomas G. Animal size sorting and control gate. 4,019,464, Cl. 119-155.000.
Milliken Research Corporation: *See—*
Dana, Paul Robert, 4,019,662.
King, Herbert R., 4,019,700.
McCollough, John K., Jr.; and Stewart, William H., Jr., 4,019,352.
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Mineral Research & Development Corporation: *See—*
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Minnesota Mining and Manufacturing Company: *See—*
Dickson, Arthur D.; and Pruitt, Laurie E., 4,020,389.
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Look, Thomas F.; Podvin, Richard T.; and Weigel, Carlyle A., 4,019,945.
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Wharam, John L., 4,019,695.
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Miura, Tadashi; Nomura, Tomio; and Kubota, Kohei, to Toa Nenryo Kogyo Kabushiki Kaisha. Method for preparing hydrocarbon conversion catalyst. 4,020,012, Cl. 252-441.000.
Miura, Tadashi: *See—*
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Miyakawa, Hideaki: *See—*
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Miyauchi, Katsuki; Matsuyama, Iwao; and Toda, Gyozo, to Hitachi, Ltd. Method of producing optically transparent ceramics. 4,019,915, Cl. 106-73.310.



Mizutani, Hiroshi; and Ono, Hitoshi, to Nihon Senshoku Kikai Kabushiki Kaisha; and Takeni Senka Kabushiki Kaisha. Apparatus for fluid treatment of a fiber product. 4,019,351, Cl. 68-177.000.
Mobil Oil Corporation: *See—*
Fitch, John L.; and Strubhar, Malcolm K., 4,019,577.
Mobil Tyco Solar Energy Corporation: *See—*
Kurth, William T., 4,019,924.
Modine, Arthur B., to Modine Manufacturing Company. Heat exchanger. 4,019,573, Cl. 165-175.000.
Modine Manufacturing Company: *See—*
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Moeller, Wolfgang W. Mechanical dispenser. 4,019,655, Cl. 222-96.000.
Moerman, Nathan A. Conversion and control of electrical energy by electromagnetic induction. 4,020,440, Cl. 336-155.000.
Mohn, Heinrich: *See—*
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Mohn, Helmuth, to Gesellschaft fur Strahlen- und Umweltforschung mbH. Continuous filter with pressing means. 4,019,984, Cl. 210-66.000.
Mohr, Richard A.; Bhalla, Sushil K.; and Zeh, Peter H., to FMC Corporation. Process for drying sodium carbonate peroxide. 4,020,148, Cl. 423-415.00P.
Mohrbacher, Richard J.; and Grous, Philip P., to McNeil Laboratories, Incorporated. Intermediates for 2-aminobenzodiazepine-5-ones. 4,020,055, Cl. 260-239.30D.
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Mongeon, Robert J.: *See—*
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Monsanto Company: *See—*
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Moorman, Maurice D.; and Albrecht, Leonard N. Root control planter. 4,019,279, Cl. 47-25.000.
Mora, Camillo Corvi, to Camillo Corvi S.p.A. Nitrolamines. 4,020,074, Cl. 260-293.580.
Morehead, Chalmers, to Westinghouse Electric Corporation. Integral mercury-vapor pressure regulating means for fluorescent lamp. 4,020,378, Cl. 313-174.000.
Morgan, Barrie O.: *See—*
Branscome, Kenneth M.; Feath, William M.; Goode, George E.; Heizer, Kenneth W.; and Morgan, Barrie O., 4,020,285.
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Morgan, Charles Robert, to W. R. Grace & Co. Heat activated ethylenically unsaturated-polythiol compositions. 4,020,233, Cl. 428-419.000.
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Morgen, Melvin; Herman, Richard; and Wolski, Raymond A., to United States of America, Army. Warhead enable switch for use in a missile. 4,019,441, Cl. 102-70.20R.
Mori, Yasunori, to Hitachi, Ltd. Ignition apparatus for internal combustion engine. 4,019,484, Cl. 123-148.00E.
Morikawa, Hiroyuki; Sato, Takahiro; and Okada, Isao, to Mitsubishi Petrochemical Company Limited. Process for producing isoprene trimers. 4,020,118, Cl. 260-666.00B.
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Morrin, Thomas Harvey, II, to International Business Machines Corporation. Method and apparatus for form removal from contour compressed image data. 4,020,462, Cl. 340-146.3AE.
Morris, J. Wayne, to UOP Inc. Combination reactor-separator apparatus. 4,019,869, Cl. 23-288.00R.
Mortensen, Harold Richard, to Facet Enterprises, Inc. Engine starter gearing. 4,019,393, Cl. 74-6.000.
Morton, Kenneth O., to Cluett, Peabody & Co., Inc. Apparatus for controllably lowering and lifting a ply picking unit. 4,019,729, Cl. 271-18.300.
Morton-Norwich Products, Inc.: *See—*
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Mrugala, Theodore A., to Warner & Swasey Company, The. Grinding machine loader assembly. 4,019,283, Cl. 51-103.00C.
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Murphy, Paschal H., Jr. Energy converter. 4,019,325, Cl. 60-643.000.
Murphy, William F., to Munnis, David V., a part interest. Construction panel. 4,019,297, Cl. 52-309.200.
Murray, Ransom James; and Brown, Arthur William, to Associated Portland Cement Manufacturers Limited, The. Early strength cements. 4,019,917, Cl. 106-89.000.
Murray, Thomas E.; and Bocchino, Vincent T., to Norda Incorporated. Controlled fragrance releasing crystal beads. 4,020,156, Cl. 424-76.000.
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Nakao, Shinroku, to Combi Co., Ltd. Multi-purpose infant's wheeled chair. 4,019,751, Cl. 280-31.000.
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Narikiyo, Yasumasa: *See—*
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Natvik, Rolf; and Radahl, Rolf, to A/S Ardal og Sunndal Verk. Crust-breaking machine. 4,019,973, Cl. 204-194.000.
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NBS Incorporated: *See—*
Niece, Melvin L., 4,019,768.
Summers, James B., 4,019,280.
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Neff, Gregor N. Amphibian culture by insect feeding. 4,019,459, Cl. 119-3.000.
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Nelson, Verner R.: *See—*
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Nenno, Soji; and Enami, Kazuyuki, to Osaka University. Metal articles having a property of repeatedly reversible shape memory effect and a process for preparing the same. 4,019,925, Cl. 148-2.000.
Neotronics Limited: *See—*
Gotley, Paul; and Buckenham, Howard Alfred, 4,020,480.
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Nesvadba, Hans; and Reinshagen, Hellmuth, to Sandoz, Ltd. Haloalkyl esters of 5-nitroimidazole-1-carboxylic acid derivatives. 4,020,166, Cl. 424-273.000.
Netlon Limited: *See—*
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Nettesheim, Raphael Daniel; and Guyer, Robert R., to Schwaab, Inc. Cast impregnated molding plate for molding printing plates. 4,020,138, Cl. 264-130.000.
Neuffer, Klaus, to Daimler-Benz Aktiengesellschaft. Installation for increasing the brightness differences in combined motor vehicle lights. 4,020,457, Cl. 340-66.000.
Neuvex, Inc.: *See—*
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Newton, Gerald S.; and Deffeyes, Robert J., to Graham Magnetics Incorporated. Magnetic tape. 4,020,227, Cl. 428-306.000.
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Ney, Karl Heinz; Wirotama, I. Poetoe Gde; and Freytag, Wolfram Gustav, to Lever Brothers Company. Cheese flavor containing alkyl amines and process of flavoring. 4,020,190, Cl. 426-534.000.
Nichola-Vern, Inc.: *See—*
Nichola, Vernon A., 4,019,765.
Nichola, Vernon A., to Nichola-Vern, Inc. Door security guard. 4,019,765, Cl. 292-338.000.
Nicholas, Kenneth Ernest Lewis; and Morley, John Glyn, to British Cast Iron Research Association, The. Foundry moulding materials. 4,020,027, Cl. 260-17.200.
Nicolaisen, Holger; Andersen, Finn Schnoor; and Jensen, Jens Peter, to Danfoss A/S. Hinged armature relay. 4,020,435, Cl. 335-275.000.
Niece, Melvin L., to NBS Incorporated. Device for sanitary pickup of ground deposited excrement. 4,019,768, Cl. 294-19.00R.
Nihon Denshi Kabushiki Kaisha: *See—*
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Nippon Steel Corporation: *See—*
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Nippon Zeon Co., Ltd.: *See—*
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Nishikawa, A. Hirotoshi; and Hixson, Harry F., Jr., to Xerox Corporation. Agarose containing affinity matrix materials. 4,020,268, Cl. 536-1.000.
Nishikawa, Eiichiroh; Itoh, Takuji; and Miura, Tadashi, to Toa Nenryo Kogyo Kabushiki Kaisha. Method for preparing hydrocarbon conversion catalyst. 4,020,011, Cl. 252-441.000.
Nishimiya, Torazo; and Sasayama, Takao, to Hitachi, Ltd. Air-fuel ratio regulating apparatus for an internal combustion engine with exhaust gas sensor characteristic compensation. 4,019,474, Cl. 123-32.0EE.
Nishiyama, Yumiko: *See—*
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Nolley, John P., Jr., to UOP Inc. Fractionation of hydrocarbons. 4,019,979, Cl. 208-353.000.
Nomura, Katsuaki; and Fujimatsu, Masaaki, to Japan Exlan Company Limited. Process for producing acrylic fibers having animal hair-like hand. 4,020,199, Cl. 427-334.000.
Nomura, Tomio: *See—*
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Murray, Thomas E.; and Bocchino, Vincent T., 4,020,156.
Norris, Orlin R. Steam generating system including means for reinitiating the operation of a steam bound boiler feed pump. 4,019,680, Cl. 237-9.00R.
Norsworthy, Ross W., to CRS Industries, Inc. Linearized odor transducer. 4,019,367, Cl. 73-23.000.
North American Philips Corporation: *See—*
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Noshiro, Atsumi; Takamizawa, Minoru; Yamamoto, Yasushi; Inoue, Yoshio; and Fujii, Hitoshi, to Dai Nippon Printing Company Limited; and Shin-Etsu Chemical Company Limited. Planographic printing plates and a method of preparing them using photopolymerizable organopolysiloxanes with maleimido groups. 4,019,904, Cl. 96-33.000.
Nowack, Gerhard P.: *See—*
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Nozaki, Toll, to Fuji Xerox Co., Ltd. Xerographic reproduction process and toner carrier for use therewith. 4,020,192, Cl. 427-19.000.
Nozi, Akio. Tire air pressure system for automotive vehicles. 4,020,456, Cl. 340-58.000.
Nukata, Hironari: *See—*
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Numata, Saburo; and Fujino, Shinichiro, to Fuji Photo Optical Co., Ltd. Integration circuit with a positive feedback resistor. 4,020,363, Cl. 307-229.000.
Nurita, Jyoji: *See—*
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Nuss, Christopher, to Chrysler Corporation. Automobile acceleration control for fuel economy. 4,019,475, Cl. 123-103.00E.
Nussbaumer, Henri J., to International Business Machines Corporation. Digital filter for filtering complex signals. 4,020,333, Cl. 235-156.000.
N.V. Optische Industrie de Oude Delft: *See—*
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Oberg, Hans-Jurgen: *See—*
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O'Connor, Chadwell; and Charlson, Richard A., to O'Connor, Chadwell. Instrument support socket. 4,019,710, Cl. 248-181.000.
Oda, Noriyuki; Yoshida, Takashi; Nakanishi, Takeshi; and Yoshikawa, Kensuke, to Hitachi Shipbuilding and Engineering Co., Ltd. Apparatus for generating high-pressure gas. 4,019,319, Cl. 60-39.46S.
Oda, Shinichi; Nakanishi, Akira; and Kuroda, Takio, to Kanzaki Paper Manufacturing Co., Ltd. Copy sheet for use in pressure sensitive manifold sheet. 4,020,261, Cl. 428-325.000.
O'Dell, Marvin, to Raymond Lee Organization, Inc., The, a part interest. Motorcycle chain lock. 4,019,354, Cl. 70-236.000.
Oden, Kenneth W., to Dixie-Narco, Inc. Tandem column vender apparatus. 4,019,650, Cl. 221-116.000.
Oelsch, Kurt; and Schulz, Klaus, to Fernsteuergerate, Kurt Oelsch KG. Slider arrangement for potentiometers or the like. 4,020,444, Cl. 338-202.000.
Oess, Frederick G.; and Peshock, Michael, Jr., to Texas Instruments Incorporated. Cathode structure for a multibeam cathode ray tube. 4,020,381, Cl. 313-302.000.
Oetjen, Georg-Wilhelm; and Warncke, Ernst, to Dragerwerk Aktiengesellschaft. Protective breathing device having a filtering apparatus and additional oxygen supply for emergency use. 4,019,507, Cl. 128-142.00R.
Ofstead, Eilert A., to Goodyear Tire & Rubber Company, The. Metathesis polymerization of cycloolefins. 4,020,254, Cl. 526-128.000.
Ogasawara, Masafumi; Akita, Masanori; Saito, Kazuhiko; Kikuchi, Yoshikazu; and Shiokawa, Mitsuhiro, to Toray Industries, Inc. Apparatus for producing multiple layers conjugate fibers. 4,019,844, Cl. 425-131.500.
Ogden, Wilbur L.: *See—*
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Oguma, Yoichi: *See—*
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Ogura, Katsuyuki: *See—*
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Oh, Chan S., to Beckman Instruments, Inc. Non-schiff base field effect liquid crystal composition. 4,020,002, Cl. 252-299.000.
Ohara, Takashi: *See—*
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Ohren, Tom H.; and Kingry, Gary W., to Procter & Gamble Co., The. Spray-dried granular detergent containing aluminosilicate, silicate, and pyrophosphate. 4,019,999, Cl. 252-140.000.
Ohshima, Masanari: *See—*
Fujita, Toshio; Takahashi, Chigo; Ohshima, Masanari; Ushioda, Tsunezo; and Shimizu, Hirozo, 4,019,890.
Ohta, Motomu, to Cegedur Societe de Transformation de l'Aluminium Pechiney. Compressor for a refrigerant gas. 4,019,342, Cl. 62-469.000.
Oikawa, Mitsuru: *See—*
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Okada, Isao: *See—*
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Okamura, Kouichi, to Matsushita Electric Industrial Co., Ltd. Clamping device adapted to clamp plate-like members. 4,019,764, Cl. 292-288.000.
Okaya, Tsutomu: *See—*
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Okazaki, Ryoji; Aoki, Kan; and Shinagawa, Tomoyuki, to Matsushita Electric Industrial Co., Ltd. Primary-cells. 4,020,242, Cl. 429-66.000.
Okuma Machinery Works Ltd.: *See—*
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Oldford, William G. Electrical measuring system for testing electrical components. 4,020,243, Cl. 429-93.000.
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Raghavan, Mathur; and Shapiro, Eugene, 4,019,900.
Olson, Bradford A.: *See—*
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O'Mahoney, Joseph F., Jr., to Goodyear Tire & Rubber Company, The. Paintable rubber composition and products prepared therefrom. 4,020,038, Cl. 260-42.330.
Omark Industries, Inc.: *See—*
Penberthy, Robert J., 4,019,407.
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Saby, Carnot E. A. R., 4,019,956.
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Asculai, Samuel Simon; Kupferberg, Alfred B., deceased; Kupferberg, Beatrice, coexecutrix; and Halpern, Meyer, coexecutor, 4,020,183.
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Oshiro, Seiri. Window with ventilating capability. 4,019,555, Cl. 160-371.000.
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Osman, Lloyd Carl, to AMP Incorporated. Crimping press clamp for electrical connectors. 4,019,236, Cl. 29-753.000.
Ostrander, George K.: *See—*
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Oswald, Roger Derek, to BOC Limited. Electric heaters. 4,020,321, Cl. 219-271.000.
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Ottos, James Gunard, to RCA Corporation. Method of detecting heater resistance independent of contact resistance. 4,020,416, Cl. 324-64.000.
Ovard, John C. Splash bar for cooling tower fill assembly. 4,020,130, Cl. 261-111.000.
Overton, Delbert L. Duel fuel system for internal combustion engine. 4,019,477, Cl. 123-127.000.
Ovutime, Inc.: *See—*
Kopito, Louis; and Schuster, Samuel R., 4,019,820.
Owatonna Tool Company: *See—*
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Owen, A. B.; and Gifford, Bruce M., to Lamons Metal Gasket Company. Spiral wound gasket assembly method. 4,019,244, Cl. 29-520.000.
Owens-Illinois, Inc.: *See—*
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Zielinski, Eugene J., 4,019,798.

Ozawa, Goro; Kosaka, Kenzo; Sato, Kasumi; Ishikawa, Akio; Nanbu, Toshiyuki; Adachi, Kiyoshi; Okaya, Tsutomu; Goto, Takashi; and Kitagawa, Hiroshi, to Mitsubishi Rayon Co., Ltd. Crimping apparatus. 4,019,228, Cl. 28-1.300.

Ozutsumi, Minoru: *See—*
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Palenschat, Dieter: *See—*
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Palfalvy, Paul. Bird feeder, water and bath hanging support. 4,019,462, Cl. 119-51.500.

Palma, Florencio Neto. Water sprinkler operated by regularly varying water pressure. 4,019,686, Cl. 239-205.000.

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Golebiowski, Andrzej; Paluch, Stanislawa; Janecki, Zdzislaw; Polanski, Alfred; Hennel, Waclaw; Zielinski, Jerzy; Warzec, Cezary; and Lisowski, Wojciech, 4,019,969.

Pancoe, Edward G., to Singer Company, The. Motion system for a flight simulator. 4,019,261, Cl. 35-12.00P.

Papenfuhs, Theodor: *See—*
Hahnke, Manfred; Papenfuhs, Theodor; and Teige, Wolfgang, 4,020,037.

Paredes, Alfredo E., to Konar Corporation. Plural comparator indicator of battery voltage. 4,020,414, Cl. 324-29.500.

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Parkell, Erwin C.; and Stamm, John A., to Du Pont de Nemours, E. I., and Company. Chromatographic detector system. 4,019,372, Cl. 73-61.10C.

Parker, Earl E.: *See—*
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Parker, James A.: *See—*
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Parker, James E., to ICL/Scientific. Fluid containing dispersed particles simulating leukocytes and method for producing same. 4,020,006, Cl. 252-408.000.

Parker, John F.: *See—*
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Parkin, Charles Stephen, to Ciba-Geigy Corporation. Atomizer. 4,019,684, Cl. 239-145.000.

Pars, Harry George: *See—*
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Partenheimer, Walter, to Standard Oil Company (Indiana). Reactivation of maleic anhydride producing phosphorus-vanadium-oxygen complex oxidation catalysts by treatment with halide containing materials. 4,020,174, Cl. 260-346.80A.

Paschelke, Gert: *See—*
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Passmore, Edmund M.: *See—*
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Pastoriza, James J., to Analog Devices, Inc. Solid state digital-to-analog converter. 4,020,486, Cl. 340-347.0DA.

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Patrick, Charles T., Jr.; and King, David W., to NDM Corporation. Sponge retaining cup for medical electrode. 4,019,500, Cl. 128-2.10E.

Patterson, Hubert A.: *See—*
Elder, James H.; and Patterson, Hubert A., 4,020,421.

Patterson, Richard G.; and Fuller, Thaddeus W., to Muskin Corporation. Water-inflated portable spa. 4,019,210, Cl. 4-172.000.

Patton, Eugene K.: *See—*
Zook, Donald G.; Miller, Kenneth J.; and Patton, Eugene K., 4,019,242.

Patton, John T., Jr.: *See—*
Vogt, Herwart C.; Parekh, Manher; and Patton, John T., Jr., 4,020,010.

Paulsen, Henry C.: *See—*
Holman, Harry A.; Kallmeyer, Albert W.; Paulsen, Henry C.; and Weaver, William W., 4,019,540.

Pawlikowski, Stanley L.; and Penird, Carl W., to GTE Sylvania Incorporated. CRT screen exposure device having improved optical alignment. 4,020,494, Cl. 354-1.000.

Pawlowski, Tadeusz: *See—*
Wroclawski, Zbigniew; Kedzia, Stanislaw; and Pawlowski, Tadeusz, 4,019,691.

PDI, Inc.: *See—*
Gorbunow, Walter, 4,020,029.

Pearce, Leonard John: *See—*
Birt, Dennis Courtney Parsons; Holland, Ronald; and Pearce, Leonard John, 4,020,247.

Peddle, Charles I.: *See—*
Bennett, Thomas H.; Carlow, Earl F.; Hepworth, Edward C.; Mathys, Wilbur L.; Mensch, William D., Jr.; Orgill, Rodney H.; Peddle, Charles I.; and Wiles, Michael F., 4,020,472.

Pedro, Enrique. Rotary structure for the support of loads. 4,019,292, Cl. 52-65.000.

Peel, Richard Philip; and Sutherland, James Kenneth, to Imperial Chemical Industries Limited. Lactone aldehydes. 4,020,172, Cl. 260-343.20R.

Peer, Hendricus Gerardus: *See—*
van den Ouweland, Godefridus Antonius Maria; and Peer, Hendricus Gerardus, 4,020,170.

Penberthy, Robert J., to Omark Industries, Inc. Saw chain grinder fixture. 4,019,407, Cl. 76-37.000.

Penird, Carl W.: *See—*
Pawlikowski, Stanley L.; and Penird, Carl W., 4,020,494.

Pennwalt Corporation: *See—*
Huber, Ludwig Konrad, 4,019,891.

Percy, Vernon L. Positive ring retaining system. 4,019,824, Cl. 403-261.000.

Perez, George R., to AMF Incorporated. Releasable connector having improved load carrying and releasing capability. 4,019,771, Cl. 294-83.00R.

Perla, Giulio; Mannara, Giuseppe; and Milesi, Domenico, to Colgate-Palmolive Company. Manufacture of gas-free dentifrice. 4,020,154, Cl. 424-49.000.

Perna, Aldo; and Springolo, Manlio, to Societa Italiana Telecomunicazioni Siemens S.p.A. Signalization coordinator for PCM switching system. 4,020,290, Cl. 179-15.0AT.

Perronnet, Jacques; and Taliani, Laurent, to Roussel-UCLAF. Novel phosphoryloxy-thiazoles. 4,020,076, Cl. 260-302.00E.

Perry, David L.: *See—*
Master, Ralph E.; Ritter, Arthur J., Jr.; and Perry, David L., 4,019,600.

Perry, Eugene Norman: *See—*
Li, Yi-Sheng; Leon, Rudolph Cesar, Sr.; and Perry, Eugene Norman, 4,019,509.

Personal Products Company: *See—*
Chatterjee, Pronoy Kumar, 4,020,271.

Peschke, Gunter: *See—*
Hell, Hans; Peschke, Gunter; Oppermann, Horst; Kaufung, Rudolf; Funke, Siegfried; and Stuhmer, Werner, 4,019,958.

Peshock, Michael, Jr.: *See—*
Oess, Frederick G.; and Peshock, Michael, Jr., 4,020,381.

Peters, Petrus: *See—*
Bolt, Barry; and Peters, Petrus, 4,020,382.

Peterson, Dean M.; and Wittenberger, John C., to Honeywell Inc. Support for components of an automatic focusing system. 4,020,496, Cl. 354-25.000.

Petro-Tex Chemical Corporation: *See—*
Christmann, Harold F.; and Miklas, Edward J., 4,020,120.

Petterson, Eric Sigfried: *See—*
Barrett, Michael Conan; and Petterson, Eric Sigfried, 4,020,506.

Peytavin, Pierre, to Vallourec. Drive device for clamp holder carriages of a continuously operating pilger mill. 4,019,394, Cl. 74-27.000.

Pfefferle, William C., to Engelhard Minerals & Chemicals Corporation. Method of starting a combustion system utilizing a catalyst. 4,019,316, Cl. 60-39.020.

Pfost, Robert Fred; and Elkus, Eugene S., to Service Distributors, Inc. Magnetic card substitute for coins for starting appliances and the like. 4,020,325, Cl. 235-61.70B.

Philip, Morris. Method and apparatus for selectively rendering needles operative and inoperative on a circular knitting machine. 4,019,348, Cl. 66-24.000.

Philip Morris Incorporated: *See—*
Briskin, Theodore S., 4,019,521.
Claflin, Warren E.; and Watson, Francis M., III, 4,019,366.
Kay, James A., Jr., 4,019,942.

Phillips, David C.: *See—*
Gass, William R.; Scala, Luciano C.; and Phillips, David C., 4,019,877.

Phillips Petroleum Company: *See—*
Erickson, Wayne K., 4,020,212.
Farrar, Ralph C., 4,020,258.
Fodor, Lawrence M., 4,020,054.
Fozzard, George B., 4,019,965.
Hsieh, Henry L., 4,020,018.
Hsieh, Henry L., 4,020,251.





Johnson, Marvin M.; Tabler, Donald C.; and Nowack, Gerhard P., 4,020,119.
Merrill, R. F., 4,020,031.
Naylor, Floyd E., 4,020,007.
Naylor, Floyd E., 4,020,008.
South, Aubrey, Jr., 4,020,036.
Vinatieri, James E., 4,019,545.
Whitson, Bobbie L.; and Morgan, John A., 4,019,524.

Phillips, William W., to Shaymar, Inc. Speaker system. 4,020,284, Cl. 179-1.00E.

Phone-Ducs, Inc.: *See—*
Streit, Kenneth F., 4,019,760.

Pickwell, Robert J.: *See—*
Ranney, Maurice W.; and Pickwell, Robert J., 4,020,218.

Pijls, Hermanus Stephanus Josephus; and Put, Elias, to U.S. Philips Corporation. Short-circuit arc welding with constant beads. 4,020,320, Cl. 219-137.0PS.

Pilgram, Kurt H. G., to Shell Oil Company. Herbicidal heterocyclic compounds. 4,019,892, Cl. 71-88.000.

Pilkington Brothers Limited: *See—*
Kirkbride, Bernard James; Downey, Robert Andrew; Thomasson, Charles Victor; and Lewis, Joseph Earle, 4,019,887.

Pilz, Walter: *See—*
Popp, Hanns-Peter; and Pilz, Walter, 4,020,377.

Pisatowski, Albert J.: *See—*
Caputo, William R.; and Pisatowski, Albert J., 4,019,606.

Pisio, Peter; and Kirkvold, Charles F., to Chevron Research Company. System for recovering viscous petroleum from thick tar sand. 4,019,575, Cl. 166-61.000.

Pitney-Bowes, Inc.: *See—*
Marin, M. James; and Mersereau, Robert E., 4,019,640.
Staudinger, Frederick J.; and Montagnino, James G., 4,019,730.
Vijayendran, Bheema R.; and DuBois, R. Clark, 4,019,911.

Pittway Corporation: *See—*
Conforti, Frederick J.; and Ogden, Wilbur L., 4,020,479.

Pizur, Stephen J., Sr. Multiple bingo game apparatus. 4,019,744, Cl. 273-135.00B.

Plains Chemical Development Co.: *See—*
Budnick, Edward G., 4,020,091.

Plaisted, Anthony Cecil, to Fosroc A.G. Cartridge containing a self-setting composition. 4,019,630, Cl. 206-219.000.

Planatolwerk Willy Hesselmann: *See—*
Wetzler, Josef; Gaschler, August; and Hofmann, Heinz, 4,019,457.

Plant, Howard L.; and Bell, Allyn Roy, to Uniroyal Inc. Herbicidal method using 2-sulfinyl or 2-sulfonyl pyridine N-oxide derivatives. 4,019,893, Cl. 71-94.000.

Ploetz, Theodor, deceased; by Hasse, Adelbert, administrator; and Franzen, Volker, to Feldmuhle Anlagen- und Produktionsgesellschaft mit beschrankter Haftung. Method of purifying the waste water of paper mills. 4,019,952, Cl. 162-29.000.

Plos, Lorenzo: *See—*
Hillberger, Horst; Masili, Dino; Plos, Lorenzo; and Ret, Luigi, 4,020,501.

Podvin, Richard T.: *See—*
Look, Thomas F.; Podvin, Richard T.; and Weigel, Carlyle A., 4,019,945.

Poelma, Cornelis Frederikus; Horowitz, Alexandre; and Verschure, Petrus Joseph Marie, to Varitrac A.G. Hoisting hook assembly and method for hoisting a load. 4,019,770, Cl. 294-78.00R.

Pohl, Andreas: *See—*
Keller, Guenter; Klinger, Friedrich; Pohl, Andreas; Schimanski, Gerhard; and Zuber, Guenter, 4,019,378.

Polanski, Alfred: *See—*
Golebiowski, Andrzej; Paluch, Stanislawa; Janecki, Zdzislaw; Polanski, Alfred; Hennel, Waclaw; Zielinski, Jerzy; Warzec, Cezary; and Lisowski, Wojciech, 4,019,969.

Polaroid Corporation: *See—*
Friedman, Harvey S., 4,020,498.
Greenwald, Richard B., 4,020,176.
McCole, Thomas P., 4,019,251.
Weninger, Frank L.; Bagby, John P.; Hapke, Kenyon A.; Hinshaw, Jack W.; Karalus, George C.; Koppensteiner, Eugene F.; and Tomlinson, Roger R., 4,019,815.

Pollard, Melville R. Reciprocating powered bicycle. 4,019,230, Cl. 280-214.000.

Polysar Limited: *See—*
Dunn, John Robert; and Coulthard, Douglas Currie, 4,020,039.

Popp, Hanns-Peter; and Pilz, Walter, to Patent-Treuhand-Gesellschaft fur Elektrische Gluhlampen mbH. High pressure mercury vapor discharge lamp. 4,020,377, Cl. 313-112.000.

Port, Werner; and Schmieder, Christian, to Braun Aktiengesellschaft. Electric shaver. 4,019,252, Cl. 30-43.920.

Porter, Donald H., to Estey Dynamics Corporation. Electrogasdynamic coating device having composite non-conductive flow channel, and hollow ionization electrode for an air jet. 4,020,393, Cl. 361-227.000.

Potash, Jerome, to OPT Industries, Inc. Ground fault detector. 4,020,394, Cl. 361-45.000.

Poteet, Everett E. Heating and cooling system. 4,019,338, Cl. 62-238.000.

Powell, James E.: *See—*
Roman, Steven A.; and Powell, James E., 4,020,061.

Powell, Noble R.; and Irwin, John M., to General Electric Company. Integrated arithmetic unit for computing summed indexed products. 4,020,334, Cl. 235-164.000.

PPG Industries, Inc.: *See—*
Schimmel, Karl F.; and Wismer, Marco, 4,020,050.
Wismer, Marco; and Parker, Earl E., 4,020,193.

Praml, Henry W. System including household connector plug for split wire receptacle. 4,019,797, Cl. 339-14.00P.

Pratt, George W., Jr., to Massachusetts Institute of Technology. Discharge device. 4,020,388, Cl. 315-58.000.

Prenzel, Karl; and Dittner, Adam, to Frieseke & Hoepfner GmbH Erlangen-Bruck. Vehicle electronic clutch control. 4,019,614, Cl. 192-103.00F.

Priesemuth, Wolfgang. Windshield wiper. 4,019,216, Cl. 15-250.030.

Primault, Andre, to Societe Generale de Fonderie. Method for enamelling the edges of sanitary articles. 4,020,195, Cl. 427-193.000.

Prince, Eric Victor Donald; Lewis, Kenneth Llewellyn; and Ralph, Leonard John Michael, to Dunlop Australia Limited. Method of constructing conveyor belting. 4,019,941, Cl. 156-179.000.

Printronix, Inc.: *See—*
Emenaker, Leo J., 4,019,619.

Procter & Gamble Company, The: *See—*
Benson, Richard W.; Cherney, Steven D.; and Collier, Everett J., 4,019,998.
Evans, Stephen F., 4,019,306.
Ohren, Tom H.; and Kingry, Gary W., 4,019,999.

Produits Chimiques Ugine Kuhlmann: *See—*
Breda, Antoine Georges Leon Jacques, 4,019,857.
Mahe, Jean, 4,019,923.

Proulx, Arthur Z., to Minnesota Mining and Manufacturing Company. Automatic magnetic record sheet copying apparatus. 4,020,504, Cl. 360-17.000.

Pruitt, Laurie E.: *See—*
Dickson, Arthur D.; and Pruitt, Laurie E., 4,020,389.

Pruzansky, Jacob: *See—*
Steinberg, Meyer; Colombo, Peter; and Pruzansky, Jacob, 4,020,003.

Pryor, Michael J.: *See—*
Setzer, William C.; Cheskis, Harvey P.; and Pryor, Michael J., 4,019,931.

Puech, Claude: *See—*
Carre, Bernard; Puech, Claude; and Spitz, Erich, 4,020,278.

Pugi, Kalev: *See—*
Jaswal, Iqbalsingh; and Pugi, Kalev, 4,019,866.

Pugliese, Rocco. Fuel separator. 4,019,482, Cl. 123-141 000.

Pullukat, Thomas J., to Chemplex Company. Compounds bis(tributyltin)chromate and bis(triphenyltin)chromate. 4,020,092, Cl. 260-429.700.

Puls, Walter: *See—*
Frommer, Werner; Puls, Walter; and Schmidt, Delf, 4,019,960.

Punis, Giancarlo, to Metrologic Instruments, Inc. Signal processing for print scanners. 4,020,357, Cl. 250-568.000.

Put, Elias: *See—*
Pijls, Hermanus Stephanus Josephus; and Put, Elias, 4,020,320.

Puttock, Michael A.: *See—*
Graham, Bruce A.; Puttock, Michael A.; Felauer, Ethel E.; and Neidermyer, Robert W., 4,020,168.

Quadbeck-Seeger, Hans-Juergen; and Hoch, Helmut, to BASF Aktiengesellschaft. Production of 2-hydroxynaphthalene-3-carboxylic acid. 4,020,102, Cl. 260-520.00A.

Quadrini, John A.: *See—*
Kosson, Robert L.; and Quadrini, John A., 4,019,571.

Quaker Oats Company, The: *See—*
Brindell, Gordon D.; and Macander, Rudy F., 4,020,113.

Quick, Donald J., to Massey-Ferguson Services N.V. Base cutting apparatus for sugar cane harvesters. 4,019,308, Cl. 56-13.900.

Quidort, Vaughn L.: *See—*
Fasulkey, Robert H.; and Quidort, Vaughn L., 4,020,397.

Quinn, David G.; and Rauschenberger, Richard A., to Will Ross, Inc. Device for supporting fluid receptacles. 4,019,707, Cl. 248-95.000.

Quinn, James Maurice; and Kirk, Allen Gregg, to Du Pont de Nemours, E. I., and Company. Method of making heat-sealable, heat-shrinkable, biaxially oriented polyester film. 4,020,141, Cl. 264-289.000.

Raabe, Thomas; Grawinger, Otto; Scholtholt, Josef; Nitz, Rolf-Eberhard; and Schraven, Eckhard, to Cassella Farbwerke Mainkur Aktiengesellschaft. Derivatives of 1-phenoxy-3-amino-propan-2-ol. 4,020,071, Cl. 260-256.40R.

Rabin, Melvin G.: *See—*
Kenkelen, Charles W., 4,019,277.

Rabiner, Lawrence Richard: *See—*
Crochiere, Ronald Eldon; and Rabiner, Lawrence Richard, 4,020,332.

Rabo, Jule Anthony; Francis, James Nelson; and Angell, Charles Leslie, to Union Carbide Corporation. Selective adsorption of carbon monoxide from gas streams. 4,019,879, Cl. 55-68.000.

Rabo, Jule Anthony; Francis, James Nelson; and Angell, Charles Leslie, to Union Carbide Corporation. Adsorption of carbon monoxide using silver zeolites. 4,019,880, Cl. 55-68.000.

Radahl, Rolf: *See—*
Natvik, Rolf; and Radahl, Rolf, 4,019,973.

Radt, Walter: *See—*
Geffers, Hans; Radt, Walter; Schliebs, Reinhard; and Schulz, Hartmut, 4,020,101.

Raffaelli, Joseph G.: *See—*
Carlson, Elmer A.; Raffaelli, Joseph G.; and Gann, Ronald A., 4,019,854.

Raghavan, Mathur; and Shapiro, Eugene, to Olin Corporation. High strength oxidation resistant nickel base alloys. 4,019,900, Cl. 75-171.000.

Rahtz, Dieter; Schroder, Eberhard; Horowski, Reinhard; Paschelke, Gert; Palenschat, Dieter; Wachtel, Helmut; and Kehr, Wolfgang, to Schering Aktiengesellschaft. Benzomorphan derivatives. 4,020,164, Cl. 424-267.000.

Ralph, Leonard John Michael: *See—*
Prince, Eric Victor Donald; Lewis, Kenneth Llewellyn; and Ralph, Leonard John Michael, 4,019,941.

Rank Organisation Limited, The: *See—*
Garner, Alex Victor; and Townsend, Graham, 4,020,299.

Ranney, Maurice W.; and Pickwell, Robert J., to Union Carbide Corporation. Polysulfide sealant and caulk compositions. 4,020,218, Cl. 428-447.000.

Raphael's Limited: *See—*
Gravell, George William, 4,019,285.

Rapifax Corporation: *See—*
Lorah, Lawrence D.; Stresau, Richard W.; Lapson, Lawrence B.; and van Vloten, Curtis P., 4,019,811.

Rasmussen, Max Otto Henri. Thermal insulating curtain, especially for use in greenhouses. 4,019,554, Cl. 160-84.00R.

Rathgeb, Paul, to Ciba-Geigy Corporation. 1,3,4-Thiadiazolyl-(2)-hexahydro-triazinones. 4,020,065, Cl. 260-248.0NS.

Rauschenberger, Richard A.: *See—*
Quinn, David G.; and Rauschenberger, Richard A., 4,019,707.

Ravenhall, Richard: *See—*
Salemme, Charles T.; Ravenhall, Richard; and Harris, David J., 4,019,832.

Ray, Louis M. Hydraulic hoist for pickup bed. 4,019,781, Cl. 298-22.00J.

Ray, Richard E.; and Wagner, Hans A., to G. D. Searle & Co. Anti-inflammatory sydnones. 4,020,079, Cl. 260-307.00A.

Ray, Roger E.: *See—*
Gambale, John C.; and Ray, Roger E., 4,020,396.

Raymond Lee Organization, Inc., The: *See—*
Chandroga, Issabhai I., 4,019,530.
D'Auria, Rosemarie, 4,019,516.
O'Dell, Marvin, 4,019,354.
Richards, John A., 4,020,384.
Turner, Lester Willis, 4,019,726.
Wetherbee, Edward P., 4,020,413.
Willenborg, Robert A., 4,019,219.

Raymond, Samuel O., to Benthos, Inc. Underwater sampler. 4,019,380, Cl. 73-170.00A.

Razdan, Raj Kumar: *See—*
Harris, Louis Selig; Pars, Harry George; Razdan, Raj Kumar; Sheehan, John Clark; and Terris, Barbara Zitko, 4,020,163.

RCA Corporation: *See—*
Harwood, Leopold Albert, 4,020,500.
Ottos, James Gunard, 4,020,416.
Shidlovsky, Igal, 4,020,147.
Vilkomerson, David Herman Raphael, 4,019,818.

Reading Door Closer Corporation: *See—*
Lieberman, Sidney, 4,019,220.

Rechsteiner, Hugo: *See—*
Jaggi, Hans; Lehmann, Ernesto; and Rechsteiner, Hugo, 4,019,544.

Recognition Equipment Incorporated: *See—*
Himmel, David P., 4,020,463.

Redgate, Theodore: *See—*
Erickson, John M.; and Redgate, Theodore, 4,020,395.

Redinger, Ira H., Jr.; Sadowsky, David; and Stripinis, Philip S., to United Technologies Corporation. External gas turbine engine cooling for clearance control. 4,019,320, Cl. 60-226.00R.

Reed, Robert D., to John Zink Company. Apparatus for radiant heat transfer. 4,019,466, Cl. 122-367.00R.

Reese, Cleve L.: *See—*
Edwards, Stanley H., Jr.; and Reese, Cleve L., 4,020,308.

Reese, Paul T., to Tecumseh Products Company. Pull-rope recoil starter. 4,019,490, Cl. 123-185.00A.

Regan, John William; and Rode, Douglas Michael, to Air Preheater Company, Inc., The. Furnace design for pulverized coal and stoker firing. 4,019,465, Cl. 122-240.00A.

Reid, Robert A., to CPC Engineering Corporation. Cone pump. 4,019,830, Cl. 415-72.000.

Reinshagen, Hellmuth: *See—*
Nesvadba, Hans; and Reinshagen, Hellmuth, 4,020,166.

Reiter, Norbert, to Fried. Krupp Gesellschaft mit beschrankter Haftung. Coated hard metal body. 4,019,873, Cl. 428-217.000.

Relles, Howard M.: *See—*
Johnson, Donald S.; and Relles, Howard M., 4,020,069.

Remes, Miroslav; Matrka, Miroslav; and Sagner, Zdenek, to Vyzkumny ustav organickych syntex. Method of amperometric determination of the concentration of arendiazonium salts. 4,019,966, Cl. 204-1.00T.

Remy, David C.; and Freedman, Mark B., to Merck & Co., Inc. Process for preparing aryl trifluoromethylsulfides. 4,020,169, Cl. 260-328.000.

Rengo Kabushiki Kaisha: *See—*
Tokuno, Masateru; Matsuura, Masayuki; Shinmura, Noboru; and Kaneko, Masayoshi, 4,020,406.

Reppert, Merlyn R., to W. R. Grace & Co. Automotive wire wheel and manufacturing method. 4,019,782, Cl. 301-58.000.

Rescalli, Carlo; and Ginnasi, Alessandro, to Snam Progetti S.p.A. Process for separating butadiene from $C_4$ hydrocarbons streams obtained by stream-cracking. 4,020,114, Cl. 260-681.50R.

Research Development Systems, Inc.: *See—*
Der Estephanian, Estephan; Foreman, Robert E.; Scott, Robert D.; and Friis, Odd, 4,019,508.

Ret, Luigi: *See—*
Hillberger, Horst; Masili, Dino; Plos, Lorenzo; and Ret, Luigi, 4,020,501.

Reuter, Martin: *See—*
Lippsmeier, Bernd; Hestermann, Klaus; and Reuter, Martin, 4,020,110.

Rexnord Inc.: *See—*
Eggert, Glenn J.; and Lee, Phillip L., 4,019,627.

Reynard, Remi: *See—*
Hoffmann, Daniel; and Reynard, Remi, 4,019,539.

Reynolds, George L., to United States of America, Army. Cartridge soft feed mechanism with magazine interrupter. 4,019,424, Cl. 89-137.000.

Rheinisch-Westfalisches-Elektrizitatswerk Aktiengesellschaft: *See—*
Fritz, Heinz Peter; Wabner, Dietrich; and Huss, Rainer, 4,019,970.

Rhoades-Brown, John Ernest: *See—*
Lloyd, Geoffrey Oliver; Rhoades-Brown, John Ernest; and Saunders, Stuart Richard John, 4,019,926.

Rhone-Poulenc Industries: *See—*
Jay, Pierre; and Schwachhofer, Ghislain, 4,019,996.

Rhone-Poulenc-Textile: *See—*
Guillermin, Rene; Joly, Jean; and Sangalli, Sylvio, 4,020,196.

Richards, John A., to Raymond Lee Organization, Inc., The, a part interest. Linear particle accelerator. 4,020,384, Cl. 313-359.000.

Richardson Chemical Company, The: *See—*
Mallory, Glenn O., Jr., 4,019,910.

Richardson, John: *See—*
Lee, Wayne; and Richardson, John, 4,019,734.

Richardson-Merrell Inc.: *See—*
Erickson, Raymond C.; and Bambury, Ronald E., 4,020,060.
Irvine, John L., 4,020,179.

Richmond Industries, Inc.: *See—*
Allmendinger, Norbert, 4,019,584.

Richter, Reinhard H., to Upjohn Company, The. Process for isomerizing cis,cis- and cis,trans-isomers of di-(p-aminocyclohexyl)methane to the corresponding trans,trans-isomer. 4,020,104, Cl. 260-563.00B.

Rickards, Michael A., to Rohr Industries, Inc. Elastomer strain gage. 4,019,377, Cl. 73-88.50R.

Ricoh Co., Ltd.: *See—*
Imamura, Masanaga, 4,019,646.

Ridgway, John A., Jr.: *See—*
Allen, Richard L.; Benjamin, Benny M.; Lappin, Terry A.; Ridgway, John A., Jr.; and Saunders, Elmer J., 4,019,962.

Ridley, Kenneth Arthur, to Ciba-Geigy AG. Curtain coating method. 4,019,906, Cl. 96-68.000.

Rieter Machine Works, Ltd.: *See—*
Gujer Peter; and Wust, Olivier, 4,019,690.

Riggs, John P.: *See—*
Dix, Robert; Markel, Richard F.; Parker, James A.; Riggs, John P.; and Vest, Dale T., 4,020,273.

Rinehart, Verne R., to Goodyear Tire & Rubber Company, The. Process for preparing polyester resin. 4,020,049, Cl. 260-75.00M.

Ringlien, James A., to Owens-Illinois, Inc. Passive alignment of laser mirrors. 4,019,795, Cl. 316-1.000.

Rioux, Christian; and Legentil, Michel, to Agence Nationale de Valorisation de la Recherche (ANVAR). High-efficiency transfer of magnetic energy. 4,020,412, Cl. 323-43.50R.

Rite Autotronics Corporation: *See—*
Schwartz, Edwin L., 4,020,305.

Ritsema, Irving R., to Bendix Corporation, The. Disc brake. 4,019,611, Cl. 188-73.300.

Ritter, Arthur J., Jr.: *See—*
Master, Ralph E.; Ritter, Arthur J., Jr.; and Perry, David L., 4,019,600.

Ritter, Gerhard: *See—*
Ritter, Klaus; Gott, Hans; Ritter, Gerhard; and Ritter, Josef, 4,019,665.

Ritter, Josef: *See—*
Ritter, Klaus; Gott, Hans; Ritter, Gerhard; and Ritter, Josef, 4,019,665.

Ritter, Klaus; Gott, Hans; Ritter, Gerhard; and Ritter, Josef, to Evg Entwicklungs-u Verwertungsgesellschaft, Firma. Feed device for rod or striplike material. 4,019,665, Cl. 226-112.000.

Robert Bosch G.m.b.H.: *See—*
Esper, Friedrich; and Bethge, Karin, 4,019,914.
Issler, Jorg; and Gerber, Richard, 4,019,796.
Linder, Ernst, 4,020,336.
Siegle, Gert, 4,019,486.
Weyl, Helmut; and Steinke, Leo, 4,019,974.

Robert Krause KG: *See—*
Kleinert, Heinz; and Schudy, Karl-Heinz, 4,019,823.

Roberts, Edward S. Refrigeration system using enthalpy converting liquid turbines. 4,019,343, Cl. 62-510.000.

Robertson, Boyd C., Jr.: *See—*
Starr, George N.; and Robertson, Boyd C., Jr., 4,019,651.

Robertson, Thomas: *See—*
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Roblin Industries, Inc.: *See—*
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Rolls-Royce (1971) Limited: *See—*
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Rom, Josef; Alterman, Israel; and Schwartz, Joseph, to Technion Research and Development Foundation Ltd.; and Alterman, Israel, part interest to each. Formation of load-bearing foundations by laser-beam irradiation of the soil. 4,019,331, Cl. 61-53.540.

Roman, Steven A.; and Powell, James E., to Shell Oil Company. 3-Oxomethyl-2-(1-nitro-2-oxoethylidene)-tetrahydro-2H-1,3-thiazines. 4,020,061, Cl. 260-243.00R.

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Rosin, Walter M.; VanDerMeulen, Douglas J.; and Frost, Charles C., to C. L. Frost & Son, Inc. Trolley wheel. 4,019,789, Cl. 308-190.000.

Ross, Edward E., to Del Monte Corporation. Can filling method and apparatus. 4,019,547, Cl. 141-11.000.

Ross, Roger Allen; and Strachan, Donald Rittler, to Du Pont de Nemours, E. I., and Company. Process for melt spinning a plurality of eccentric sheath-core filaments. 4,020,139, Cl. 264-171.000.

Roszinski, Hilmar; Lippsmeier, Bernd; and Hartlapp, Gerhard, to Hoechst Aktiengesellschaft. Production of dithiophosphoric acid-O,O-diesters. 4,020,129, Cl. 260-983.000.

Roth, Nathan, to Alza Corporation. Cartoned medical instrument package. 4,019,633, Cl. 206-364.000.

Rotraco Systems Limited: *See—*
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Rouse, John W., to American Can Company. Can end feed mechanism. 4,019,452, Cl. 113-114.0BE.

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Rowe, Richard A., to General Electric Company. Roller for dishwasher rack. 4,019,794, Cl. 312-311.000.

Rowsell, David G.; and Spring, David J., to Wilkinson Sword Limited. Cyclic sulphonamides and sulphinamides having a physiological cooling effect. 4,020,153, Cl. 424-49.000.

Rozema, Arthur L.: *See—*
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Ruppe, George T. Fishing sinker. 4,019,275, Cl. 43-44.960.

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Rush, Joseph A. Method and apparatus for automatic furnace. 4,019,492, Cl. 126-121.000.

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Saby, Carnot E. A. R., to Omnium de Prospective Industrielle, S.A. Process for recovering hair by dissolving the skin or hide. 4,019,956, Cl. 195-6.000.

Sadler, Marc, to Dorofix Design Establishment. Ski boot structure. 4,019,267, Cl. 36-120.000.

Sado, Yukio, to Yoshida Kogyo Kabushiki Kaisha. Ventilator. 4,019,429, Cl. 98-37.000.

Sadowsky, David: *See—*
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Safdari, Yahya B. Solar air heater assembly. 4,019,494, Cl. 126-270.000.

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Saito, Syobu; and Sakitani, Yoshio, to Hitachi, Ltd. Sample analysis apparatus using electron beam irradiation. 4,020,353, Cl. 250-441.000.

Saito, Tomo; Watanabe, Kazuo; Nishiyama, Yumiko; and Morikawa, Naotake, to Sagami Chemical Research Center. Method for measuring radioactivities of tritium and carbon-14 in sample air and apparatus for performing the same method. 4,019,864, Cl. 23-253.0PC.

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Salemme, Charles T.; Ravenhall, Richard; and Harris, David J., to General Electric Company. Platform for a turbomachinery blade. 4,019,832, Cl. 416-135.000.

Salomons, Arnold, to Gladu A.G. Cardboard box. 4,019,673, Cl. 229-17.00R.

Sanderson, Allan, to Welding Institute, The. Electron beam generators. 4,020,318, Cl. 219-121.0EB.

Sandner, Helmut Gustav, to Du Pont de Nemours, E. I., and Company. Apparatus for toning tack surfaces. 4,019,821, Cl. 401-4.000.

Sandoz, Inc.: *See—*
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SAPAL Societe Anonyme des Plieuses Automatiques: *See—*
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Sasaki, Kichiro; Takeuchi, Kazuo; Kazitani, Shiro; Shimizu, Kazuo; and Yoshida, Yoshiteru, to Kobe Steel Ltd. Method of fixing an end portion of a line to a reel. 4,019,543, Cl. 140-111.000.

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Scheffer, Terry James, to Fraunhofer-Gesellschaft zur Forderung der Angewandten Forschung e.V. Arrangement for a polychrome display. 4,019,808, Cl. 350-160.0LC.
Scheier, Donald J.; and Frederick, Henry E., to Gordon Johnson Company. Poultry eviscerating method and apparatus. 4,019,222, Cl. 17-11.000.
Schell, Mark Samuel, to Du Pont de Nemours, E. I., and Company. Solder substrate clip. 4,019,803, Cl. 339-275.00B.
Scherer, William C.; and Vincent, Raymond A., to Graco Inc. Automatic proportioning paint spray system. 4,019,653, Cl. 222-1.000.
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Schinke, Otto, to Theodor Hymmen KG. Cleaning apparatus for rollers. 4,019,217, Cl. 15-256.530.
Schippers, Heinz, to Barmag Barmer Maschinenfabrik Aktiengesellschaft. Process for the production of a multifilament texturized yarn. 4,019,311, Cl. 57-140.0BY.
Schittek, Friedrich, to Gustav F. Gerdts KG. Flap valve. 4,019,532, Cl. 137-527.000.
Schlaikjer, Carl R., to P. R. Mallory & Co., Inc. Electrochemical cell with clovoborate salt in electrolyte and method of operation and composition of matter. 4,020,240, Cl. 429-50.000.
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Schulze, Stephen R., to Allied Chemical Corporation. Stress-crack resistant ethylene-perhaloethylene copolymers. 4,020,253, Cl. 526-89.000.
Schumann, Gunter; and Becker, Werner, to Messer Griesheim GmbH. Pipe-cutting and/or welding machine with clamping motor torque limiting control. 4,020,405, Cl. 318-432.000.
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Sebacher, Daniel I.; and Sabol, Alexander P., to United States of America, National Aeronautics and Space Administration. Solar hydrogen generator. 4,019,868, Cl. 23-281.000.
Sebardt, Carl, to Siftelsen for Metallurgisk Forskning. Manipulator for rolling mill. 4,019,361, Cl. 72-252.000.
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Shiokawa, Mitsuhiro: *See—*
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Shiozaki, Shozo; Shinohara, Yonesaku; and Miyake, Takeo, to Nippon Zeon Co., Ltd. Novel hydrocarbon resins comprising 1,3-pentadiene, 1,5,9-cyclododecatriene and optionally monoolefin. 4,020,260, Cl. 526-237.000.
Shipley Company, Inc.: *See—*
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Shiraiwa, Toshio; Kobayashi, Sumio; Marukawa, Katsukiyo; and Anezaki, Syoji, to Sumitomo Metal Industries, Ltd. Automatic molding apparatus with means for controlling pouring rate. 4,019,562, Cl. 164-155.000.
Shoemaker, Robert L.: *See—*
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Shohet, Albert J., to Littleford Bros. Inc. High intensity mixer utilizing a single speed motor. 4,019,722, Cl. 259-105.000.
Shoji, Shunichi: *See—*
Ito, Hiroshi; Sugiyama, Tadashi; Kaminaka, Yoshinori; Yamamoto, Yuichiro; Tanigawa, Takeshi; Shoji, Shunichi; and Saito, Yoshifusa, 4,020,442.
Shoupp, William E.; and Bratkowski, Walter V., to Westinghouse Electric Corporation. Compact mechanically-powered electric generator for a camera or other apparatus. 4,020,369, Cl. 310-15.000.
Shyman, Mark Lincoln: *See—*
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Siciliano, Anthony John: *See—*
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Siefert, George J.: *See—*
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Siefken, Mark W., to Minnesota Mining and Manufacturing Company. Vulcanizable alkoxysilyl capped polymer composition. 4,020,043, Cl. 260-46.50G.
Siegel, Sidney. Heating and cooling apparatus. 4,019,570, Cl. 165-67.000.
Siegel, William A., to Fischer & Porter Co. Temperature compensated liquid level transmitter. 4,019,387, Cl. 73-299.000.
Siegle, Gert, to Robert Bosch G.m.b.H. Motor ignition system with magnetically selectable gas discharge devices. 4,019,486, Cl. 123-148.00E.
Siegling, Oswald: *See—*
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Silver, Paul W.; Fuselier, Richard A.; and Moore, William B., III, to Westinghouse Electric Corporation. Compressed information system. 4,020,468, Cl. 340-172.500.
Silverman, Elliott: *See—*
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Simko, Stephen R.: *See—*
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Simon, Sidney. Safety tank and fire extinguisher. 4,019,583, Cl. 169-62.000.
Simon, Sidney. Safety tank system. 4,019,649, Cl. 220-88.00B.
Sinclair, Albert R.; Daughtry, Arthur C.; Childers, Thomas W.; and Burkhardt, Joseph A., to Exxon Production Research Company. Method and apparatus for making subsea pipe connections. 4,019,334, Cl. 61-110.000.
Sinclair, Edward A.: *See—*
Janssen, Frits W.; and Sinclair, Edward A., 4,020,026.
Sinclair, Robin A.; and Glasspoole, Eileen A., to Minnesota Mining and Manufacturing Company. $H_2S$ indicator. 4,019,865, Cl. 23-253.0TP.
Singer Company, The: *See—*
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Hauf, Robert Conrad, 4,019,449.
Johnson, Dwight N., 4,019,531.
LaSala, Jerry Frank; and Krupick, Walter Joseph, 4,019,389.
Ljung, Bo Hans Gunnar, 4,019,391.
Pancoe, Edward G., 4,019,261.
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Situno Holding S.A.: *See—*
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Siuta, August J., Jr.: *See—*
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Skaggs, William Dale. Water injection device for internal combustion engines. 4,019,472, Cl. 123-25.00L.
SKF Industrial Trading and Development Company, B.V.: *See—*
Santen, Sven, 4,019,895.
Skinner, Robert Thomas John, to C.A.V. Limited. Liquid fuel injection pumping apparatus. 4,019,835, Cl. 417-253.000.
Sloan Valve Company: *See—*
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Slobbe, W. Wentworth: *See—*
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Smith, Anthony Pawson, to Drake & Fletcher Limited. Orchard spraying machines. 4,019,682, Cl. 239-77.000.
Smith, Donald Arthur; and Marshall, John Joseph, to Combustion Engineering, Inc. High energy arc ignitor for burner. 4,019,851, Cl. 431-2.000.
Smith, Dorsey T.: *See—*
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Smith, Eugene C. Foldable self-leveling tripod shaped vehicle bumper jack. 4,019,716, Cl. 254-139.000.
Smith, Harry D., Jr.; and Schultz, Ward E., to Texaco Inc. Earth formation salinity by comparison of inelastic and capture gamma ray spectra. 4,020,342, Cl. 250-270.000.
Smith, James D. B.; and Kauffman, Robert N., to Westinghouse Electric Corporation. Epoxides containing organo-tin compounds and electrical members insulated therewith. 4,020,017, Cl. 260-2.0EC.
Smith, James Lanson: *See—*
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Smith, Millard F.; Behringer, Frederick J.; Doyle, John R.; and McFadden, Daniel P., to Westinghouse Electric Corporation. System and method for complete on line testing of a mechanical overspeed trip channel associated with an electrohydraulic emergency trip system for a turbine power plant. 4,019,390, Cl. 73-432.00R.
Smith, Trevor Stanley, to Lucas Industries Limited. Fluid flow control valve for gas turbine engine fuel control system. 4,019,317, Cl. 60-39.28R.
Smith, Trevor Stanley, to Lucas Industries Limited. Fluid flow control valves. 4,019,318, Cl. 60-39.28R.
Smith, William, to Steel Company of Canada, Limited, The. Method of hot rolling metal strip. 4,019,359, Cl. 72-231.000.
Smith, Willie R. Cradle assembly. 4,019,503, Cl. 128-83.500.
SmithKline Corporation: *See—*
Gleason, John G., 4,020,057.
Snam Progetti S.p.A.: *See—*
Rescalli, Carlo; and Ginnasi, Alessandro, 4,020,114.
Snow, Richard R., to Libbey-Owens-Ford Company. Removing metal deposits from the superstructure of a float glass chamber. 4,019,885, Cl. 65-32.000.
Societa' Farmaceutici Italia S.p.A.: *See—*
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Societa Italiana Telecomunicazioni Siemens S.p.A.: *See—*
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Societe Anonyme dite: L'Oreal: *See—*
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Societe Chimique des Charbonnages: *See—*
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Societe Generale de Constructions Electriques et Mecaniques (ALSTHOM): *See—*
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Societe Generale de Fonderie: *See—*
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Soes, Lucas, to AMP Incorporated. Uniplanar electrical contact. 4,019,800, Cl. 339-97.00R.
Sokol, Charles S., to Drackett Company, The. Cleaning compositions effective in dissolving soap curd. 4,020,016, Cl. 252-546.000.
Soldati, Gianluigi; Eilberg, Ralph G.; Melger, Helga; and Wooding, William M. Anticaries agents. 4,020,019, Cl. 260-2.0EN.
Solvay & Cie: *See—*
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Sonntag, Hans: *See—*
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Sorenson, Paul D.: *See—*
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Souder, James J., Jr.; and Waldorf, Lindsey E. Container for inductively heating food. 4,020,310, Cl. 219-10.490.
South, Aubrey, Jr., to Phillips Petroleum Company. Thermosetting polyester composition containing normally solid carboxy-containing diene polymer. 4,020,036, Cl. 260-40.00R.
Spaziante, Placido: *See—*
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Spaziante, Placido M.; and Traini, Carlo, to Parel Societe Anonyme. Electrochemical cell. 4,019,968, Cl. 204-23.000.
Spears, Cecil Julius. Collapsible tube squeezing device. 4,019,656, Cl. 222-103.000.
Speck, Willis A.: *See—*
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Spelthahn, Klaus: *See—*
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Spence, Wayman R., to Spenco Medical Corporation. Artificial breast form and method of forming. 4,019,209, Cl. 3-36.000.
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Seymour, Shaun A., 4,019,644.
Spies, Johann; and Wohrl, Alfons, to Messerschmitt-Bolkow-Blohm GmbH. Sensing system for actuating a safety device. 4,020,453, Cl. 340-52.00H.
Spitz, Erich: *See—*
Carre, Bernard; Puech, Claude; and Spitz, Erich, 4,020,278.
Spitz, Melvin P. Bedframe with unitized adjustable crossbar. 4,019,211, Cl. 5-181.000.
Spitzer, Joseph George; Small, Marvin; Osipow, Lloyd I.; and Marra, Dorothea C. Aerosol containers for foaming and delivering aerosols. 4,019,657, Cl. 222-136.000.
Spooner, Donald James: *See—*
Hunt, Clayton Edward, Jr.; and Spooner, Donald James, 4,019,732.
Spooner, Robert J.; and Dillon, Oscar W., to Cashin Systems Corporation. Hone for involute knife. 4,019,286, Cl. 51-248.000.
Spring, David J.: *See—*
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Stanton, Bernard M. Indexing system. 4,019,759, Cl. 283-42.000.
Stapp, Hans: *See—*
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Starr, George N.; and Robertson, Boyd C., Jr., to Bridger, Floyd R., Jr. Seed planter with a suction pickup mechanism. 4,019,651, Cl. 221-211.000.
Staszkiewicz, Rudolf. Rotary support for use in a machine tool. 4,019,410, Cl. 82-2.500.
Stauble, Georg: *See—*
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Staudinger, Frederick J.; and Montagnino, James G., to Pitney-Bowes, Inc. Envelope stacking system. 4,019,730, Cl. 271-181.000.
Stauffer Chemical Company: *See—*
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Steffen, Horst, to Kollmorgen Technologies Corporation. Process for the catalytic sensitization of non-metallic surfaces for subsequent electroless metallization. 4,020,197, Cl. 427-304.000.
Stehl, Otto: *See—*
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Stein, Claude: *See—*
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Steinberg, Meyer; Colombo, Peter; and Pruzansky, Jacob, to United States of America, Energy Research and Development Administration. Fixation of tritium in a highly stable polymer form. 4,020,003, Cl. 252-301.10W.
Steinke, Leo: *See—*
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Sterling, Robert E. Medical splint kit. 4,019,504, Cl. 128-88.000.
Stern, Hanns; and Lotz, Alexander, to Klockner-Humboldt-Deutz Aktiengesellschaft. Method and apparatus for the preparation of mineral mixtures on a jig controlled by compressed air. 4,019,981, Cl. 209-455.000.
Stewart, Frederick M.: *See—*
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Stewart, William H., Jr.: *See—*
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Stinson, Leon Berthal; and Galle, Edward Milburn, to Hughes Tool Company. Drill bit utilizing lubricant thermal expansion and relief valve for pressure control. 4,019,785, Cl. 308-8.200.
Stirner, Genevieve E., executrix: *See—*
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Stirner, Kurt R., deceased: *See—*
Cushman, Robert Holbrook; and Stirner, Kurt R., deceased, 4,019,670.
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Stobb, Walter John, 4,019,639.
Stobb, Walter John, to Stobb, Inc. Automatic palletizer and method for bundled stacks of sheets. 4,019,639, Cl. 214-6.00C.
Stock, David K.; and Wech, Robert J., to FMC Corporation. Multipurpose sealing and severing method and mechanism. 4,019,947, Cl. 156-510.000.
Stockel, Dieter; and Oberg, Hans-Jurgen, to G. Rau. Electrical contact element and method of producing the same. 4,019,876, Cl. 428-621.000.
Stoddard, Xerxes T.: *See—*
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Stoepel, Kurt: *See—*
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Stoia, John Z.; and Wright, Clarence E., to Carborundum Company, The. Studded hearth. 4,019,445, Cl. 110-10.000.
Stoilov, Nikola Dimov; and Hoklar, Ivan Konstantinov, to Institute za Metalloobrabotvashti Machini. Device for clamping tools in the seat of a tool magazine. 4,019,245, Cl. 29-568.000.
Stone, Samuel M.: *See—*
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Storm, John F., to Honeywell Inc. AC switch speed control for two phase motors. 4,020,402, Cl. 318-227.000.
Strachan, Donald Rittler: *See—*
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Strickland, Gene: *See—*
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Strike, Robert, to General Dynamics, Pomona Division. Impact discriminating apparatus for missiles and the like, and method for impact discrimination. 4,019,440, Cl. 102-70.20R.
Stripinis, Philip S.: *See—*
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Strom, Johan Paul, to U.S. Philips Corporation. Arrangement for selective firing of so-called IR-torches. 4,019,421, Cl. 89-1.50R.
Strubel, David G.; and Johnson, Robert R., to Brown & Williamson Tobacco Corporation. Tobacco substitute containing boric oxide, boron oxyacids, and ammonium, alkali metal, or alkaline earth metal salts of boron oxyacids. 4,019,520, Cl. 131-2.000.
Strubhar, Malcolm K.: *See—*
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Strubin, Harald, to BBC Brown Boveri & Company Limited. Compressed gas electrical switch with gas-tight housing. 4,020,307, Cl. 200-302.000.
Strunk, Larry E., to Tenneco Inc. Spring type pipe support. 4,019,599, Cl. 180-64.00A.
Stuckey, Ronald L.: *See—*
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Stump, James M. Auxiliary two-speed transmission. 4,019,400, Cl. 74-333.000.
Sturk, Phillip A.: *See—*
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Suelzle, Larry R.; and Hodges, Leonard O., to Delta Electronic Control Corporation. Switching mode power controller of large dynamic range. 4,020,361, Cl. 307-106.000.
Suen, Tzeng Jiueq; Begala, Arthur James, Jr.; and Grayson, Martin, to American Cyanamid Company. Control of corrosion and scale in circulating water systems by means of partial esters of polyfunctional organic acids. 4,020,000, Cl. 252-180.000.
Sugai, Tatsuhiko: *See—*
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Sugiyama, Iwao; Furuhama, Teruhide; Nagano, Fumiaki; and Hirakawa, Hiroshi, to Yokohama Rubber Co., Ltd., The. Vulcanization accelerator system for rubber compositions. 4,020,252, Cl. 526-30.000.
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Sugiyama, Takahiro, to Asahi Kogaku Kogyo Kabushiki Kaisha. Photographic wide angle lens. 4,019,810, Cl. 350-214.000.
Suh, Nam P.; Malguarnera, Salvatore C.; and Anderson, Frederick H., to Massachusetts Institute of Technology. Fluid delivery and mixing systems. 4,019,652, Cl. 222-1.000.
Sumio, Horikomi. Hand-writing type recording device for a camera. 4,020,492, Cl. 346-107.00R.
Sumioka, Atsushi: *See—*
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Suzuki, Hisao; Musashi, Akira; Ando, Yoshiyuki; and Inoue, Tomoyuki, to Nippon Soda Company Limited. Thermosetting resin. 4,020,125, Cl. 260-859.00R.
Suzuki, Shigemitsu: *See—*
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Suzuki, Takeo; and Nakanishi, Toshihide, to Kyowa Hakko Kogyo Kabushiki Kaisha. Process for producing (2'-amino-2'-deoxypentofuranosyl) guanine. 4,019,957 Cl. 195-28.00N.
Suzuki, Toshio; and Shikano, Yoshiro, to Mitsubishi Denki Kabushiki Kaisha. Vapor cooling device for dissipating heat of semiconductor elements. 4,020,399, Cl. 361-331.000.
Suzuki, Yasoji; Manabe, Kenshi; and Hirasawa, Masataka, to Tokyo Shibaura Electric Co., Ltd. Counter using an inverter and shift registers. 4,020,362, Cl. 307-225.00C.
Suzuki, Yutaka: *See—*
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Svenska Dataregister AB: *See—*
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Swanson, Floyd R., Jr., to Swanson Engineering, Inc. Sleeving and sleeving stand apparatus and method. 4,019,438, Cl. 102-24.00R.
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Sybron Corporation: *See—*
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Symons, Philip C., to Energy Development Associates. Control of generation of chlorine feed from chlorine hydrate for use in a metal chlorine electric energy storage device. 4,020,238, Cl. 429-15.000.
Syntex (U.S.A.) Inc.: *See—*
Nelson, Peter H.; and Untch, Karl G., 4,020,094.
Szabo, Ervin I., to Canadian Patents and Development Limited. Method of forming foundry moulds. 4,019,558, Cl. 164-26.000.
Szabo, Ervin I., to Canadian patents and Development Limited. Method of forming a foundry mold. 4,019,559, Cl. 164-26.000.
Szabo, Janos. Liquid dispenser for selective upside down or right side up use. 4,019,661, Cl. 222-376.000.
Szabo, Lester J.: *See—*
Lueders, Robert E.; Kust, Roger N.; and Szabo, Lester J., 4,020,143.
Tabler, Donald C.: *See—*
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Tachibana, Kyozo: *See—*
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Taguchi, Tetsuya: *See—*
Uchidoi, Masanori; Miyakawa, Hideaki; Taguchi, Tetsuya; Mashimo, Yukio; and Watanabe, Satoshi, 4,020,433.

Takahashi, Chigo: *See—*
Fujita, Toshio; Takahashi, Chigo; Ohshima, Masanari; Ushioda, Tsunezo; and Shimizu, Hirozo, 4,019,890.

Takahashi, Kenzoo: *See—*
Kusakawa, Hideaki; Takahashi, Kenzoo; and Ikebata, Shigeki, 4,020,221.

Takahashi, Noriyoshi: *See—*
Yamamoto, Hiroe; Takahashi, Noriyoshi; and Watanabe, Masatoshi, 4,020,373.

Takamatsu, Ikuo, to Yoshida Kogyo Kabushiki Kaisha. Replaceable seat cover. 4,019,776, Cl. 297-219.000.

Takamizawa, Minoru: *See—*
Noshiro, Atsumi; Takamizawa, Minoru; Yamamoto, Yasushi; Inoue, Yoshio; and Fujii, Hitoshi, 4,019,904.

Takashima, Toshiyuki: *See—*
Karasudani, Isao; Takashima, Toshiyuki; and Bokuda, Yoshiyuki, 4,020,217.

Takayama, Taro; and Kakegawa, Eiya. Inorganic gel-ammonium nitrate composite material and method of manufacturing the same. 4,019,934, Cl. 149-43.000.

Takayanagi, Kiyoshi: *See—*
Negishi, Akira; Takayanagi, Kiyoshi; Ikeda, Masaru; and Kousaka, Shinji, 4,019,899.

Takeda Chemical Industries, Ltd.: *See—*
Hiraga, Kentaro; Okutani, Tetsuya; Asako, Tsunehiko; and Yoshioka, Kouichi, 4,020,269.

Takeda, Mitsuo: *See—*
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Takeni Senka Kabushiki Kaisha: *See—*
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Takeuchi, Akihiro: *See—*
Asai, Kiyokazu; and Takeuchi, Akihiro, 4,019,683.

Takeuchi, Kazuo: *See—*
Sasaki, Kichiro; Takeuchi, Kazuo; Kazitani, Shiro; Shimizu, Kazuo; and Yoshida, Yoshiteru, 4,019,543.

Taliani, Laurent: *See—*
Perronnet, Jacques; and Taliani, Laurent, 4,020,076.

Tallonneau, Georges, to S.T. Dupont. Method for the storage of liquefied gas in the presence of a fibrous adsorbant support. 4,019,850, Cl. 431-12.000.

Tamai, Yasuo; Osawa, Sadao; and Honjo, Satoru, to Fuji Photo Film Co., Ltd. Manufacturing process for liquid developer. 4,019,993, Cl. 252-62.100.

Tamai, Yasuo: *See—*
Aonuma, Masashi; and Tamai, Yasuo, 4,020,236.

Tamura, Kaoru: *See—*
Tsuboi, Takashi; Tachibana, Kyozo; Tamura, Kaoru; and Imaizumi, Fujimaro, 4,020,411.

Tanaka, Yoshio: *See—*
Irimajiri, Shoichiro; Tanaka, Yoshio; and Kobayashi, Atsushi, 4,020,455.

Tangeman, Lawrence N.; and Linsenmeyer, Arthur, to Dempster Industries, Inc. Apparatus for synchronizing the speed of a material spreader or the like with the speed of a vehicle upon which it is mounted. 4,019,685, Cl. 239-156.000.

Tanigami, Takahiko: *See—*
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Tanigawa, Takeshi: *See—*
Ito, Hiroshi; Sugiyama, Tadashi; Kaminaka, Yoshinori; Yamamoto, Yuichiro; Tanigawa, Takeshi; Shoji, Shunichi; and Saito, Yoshifusa, 4,020,442.

Taniguchi, Yuzo: *See—*
Tanimoto, Michio; and Taniguchi, Yuzo, 4,019,669.

Tanimoto, Michio; and Taniguchi, Yuzo, to Hitachi, Ltd. Wire bonding apparatus. 4,019,669, Cl. 228-4.500.

Tassi, Lamberto; Ballestrazzi, Aris; and Tosarelli, Gianni, to Situno Holding S.A. Conveyance unit with crossing, especially for the conveyance and switching of newspapers, magazines and other articles composed by superposed sheets. 4,019,623, Cl. 198-457.000.

Tassi, Lamberto: *See—*
Ballestrazzi, Aris; Tassi, Lamberto; and Tosarelli, Gianni, 4,019,307.

Tate, Walter; and Robertson, Thomas, to Davy Powergas Limited; and Rotraco Systems Limited. Electrical control system. 4,020,359, Cl. 307-40.000.

Taylor, Charlie Edwin: *See—*
Cannon, Henry T.; and Taylor, Charlie Edwin, 4,020,401.

Taylor, Edward C.; and McKillop, Alexander. Process for O-acylating thallus salts of 2-pyridone. 4,020,073, Cl. 260-294.80R.

Taylor, John Sebring; and Brader, Wilbur Thomas, to FMC Corporation. Vinyl transfer sheet material and method for applying same to vinyl substrate. 4,020,204, Cl. 428-40.000.

Taylor Woodrow Construction Limited: *See—*
Dawson, Peter; and Barrett, Charles Jack, 4,019,749.

Technion Research and Development Foundation Ltd.: *See—*
Rom, Josef; Alterman, Israel; and Schwartz, Joseph, 4,019,331.

Tecumseh Products Company: *See—*
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Tefertiller, Nancy B.: *See—*
Harris, Robert F.; and Tefertiller, Nancy B., 4,020,030.

Teige, Wolfgang: *See—*
Hahnke, Manfred; Papenfuhs, Theodor; and Teige, Wolfgang, 4,020,037.

Telecommunications Radioelectriques et Telephoniques T.R.T.: *See—*
Bellanger, Maurice Georges; and Daguet, Jacques Lucien, 4,020,288.

Teledyne Ryan Aeronautical a Division of Teledyne Industries, Inc.: *See—*
Wintersdorff, Robert W.; and Cota, George R., 4,019,699.

Teledyne Water Pik: *See—*
Elkins, Christopher W., 4,019,502.

Teleplex, Inc.: *See—*
Anderson, Scott K., 4,020,289.

Tenczar, Francis J. Adhesively activated sterile connector. 4,019,512, Cl. 128-214.00R.

Tenneco Inc.: *See—*
Strunk, Larry E., 4,019,599.

Tennenhouse, Gerald J.: *See—*
Gordon, Ronald S.; Sutton, Ralph W.; and Tennenhouse, Gerald J., 4,020,134.

Teodorescu, Constantin, to Institutul National Pentru Creatie Stinifica si Tehnica. Gas extraction apparatus for thermal installations. 4,019,834, Cl. 417-84.000.

Terris, Barbara Zitko: *See—*
Harris, Louis Selig; Pars, Harry George; Razdan, Raj Kumar; Sheehan, John Clark; and Terris, Barbara Zitko, 4,020,163.

Terry, Alvah B.: *See—*
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Terry, Ruel C.; and Stoddard, Xerxes T. Recovery of petroleum from tar and heavy oil sands. 4,019,578, Cl. 166-267.000.

Tessler, Martin M., to National Starch and Chemical Corporation. Preparation of starch esters. 4,020,272, Cl. 536-107.000.

Texaco Inc.: *See—*
Fuller, Matthew H.; and Deever, William R., 4,019,985.
Smith, Harry D., Jr.; and Schultz, Ward E., 4,020,342.

Texas Instruments Incorporated: *See—*
Black, Christopher Thurson, 4,019,248.
Cochran, Michael J.; and Hamilton, Stephen P., 4,020,465.
Oess, Frederick G.; and Peshock, Michael, Jr., 4,020,381.

Textron, Inc.: *See—*
Earl, T. Desmond, 4,019,698.
MacFee, Norman W., 4,019,240.

Thames Sack and Bag Company Limited, The: *See—*
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Greisman, Samuel, 4,019,949.

Thann & Mulhouse: *See—*
Heitz, Fernand Alfred Desire, 4,020,152.

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Theracon, Inc.: *See—*
McCulloch, Michael G.; and Nelson, Woodrow E., 4,020,187.

Thiel, Patrick L.: *See—*
Harlan, Larry R.; and Thiel, Patrick L., 4,019,572.

Thiessens, Alexander Joseph Gerardus; and Woldring, Leonard, to U.S. Philips Corporation. Inductive stabilizing ballast for a gas and/or vapor discharge lamp. 4,020,439, Cl. 336-61.000.

Thomas & Betts Corporation: *See—*
Logan, Maurus C., 4,019,241.

Thomas, Dorsey O., Jr.; and Terry, Alvah B., to Monsanto Company. Strand granulation machine. 4,019,414, Cl. 83-356.300.

Thomas, Norman W.: *See—*
Davis, Howard J.; and Thomas, Norman W., 4,020,142.

Thomasson, Charles Victor: *See—*
Kirkbride, Bernard James; Downey, Robert Andrew; Thomasson, Charles Victor; and Lewis, Joseph Earle, 4,019,887.

Thompson, James E. Football kicking tee with vacuum ball retainer. 4,019,735, Cl. 273-55.00B.

Thompson, Lee W. Board game apparatus. 4,019,742, Cl. 273-134.0CA.

Thomson-Brandt: *See—*
Carre, Bernard; Puech, Claude; and Spitz, Erich, 4,020,278.

Thomson-CSF: *See—*
Charlot, Jean-Claude; and Falconnier, Jean-Claude, 4,020,292.

Thorne, William Duncan, to International Business Machines Corporation. Linear motion drive apparatus for a printer carriage. 4,019,616, Cl. 197-90.000.

Thuler, Oscar. Luminous marking in an indentation of an object. 4,020,203, Cl. 428-35.000.

Thuse, Erik, to FMC Corporation. Apparatus for running, setting and testing a compression-type well packoff. 4,019,579, Cl. 166-123.000.

Thyssen (Great Britain) Limited: *See—*
Kempster, Edward, 4,019,327.

Tierney, William S.; and Wright, James E., to TRW Inc. Electromagnetic impulser for dynamically loading a structure. 4,019,374, Cl. 73-71.50R.

Timm, Rolando E. Method of temporarily water-proofing parts of buildings in anticipation of floods. 4,019,304, Cl. 52-746.000.

Timmins, Harold Chester: *See—*
Shannon, Suel Grant; Timmins, Harold Chester; and Gookin, Kenneth Earl, 4,019,802.

Tippetts, Thomas B., to Garrett Corporation, The. Fluidic approach power compensator control system. 4,019,697, Cl. 244-78.000.

Toa Nenryo Kogyo Kabushiki Kaisha: *See—*
Miura, Tadashi; Nomura, Tomio; and Kubota, Kohei, 4,020,012.
Nishikawa, Eiichiroh; Itoh, Takuji; and Miura, Tadashi, 4,020,011.





Toda, Gyozo: *See—*
Miyauchi, Katsuki; Matsuyama, Iwao; and Toda, Gyozo, 4,019,915.

Tokuno, Masateru; Matsuura, Masayuki; Shinmura, Noboru; and Kaneko, Masayoshi, to Rengo Kabushiki Kaisha; and Nippon Riraiansu Kabushiki Kaisha. Web cutting control system. 4,020,406, Cl. 318-600.000.

Tokyo Shibaura Electric Co., Ltd.: *See—*
Suzuki, Yasoji; Manabe, Kenshi; and Hirasawa, Masataka, 4,020,362.
Yasutome, Osamu; Takeda, Mitsuo; Sawamura, Tagayasu; and Shinoda, Norio, 4,020,386.

Tomikawa, Masami: *See—*
Matsumoto, Takeshi; Kaji, Hidehiko; Isogai, Osamu; and Tomikawa, Masami, 4,019,822.

Tomita, Keiji, to Kabushiki Kaisha Tomita Sangyo. Method of and high frequency welder assembly for binding a cover material onto a base material. 4,019,944, Cl. 156-380.000.

Tomita, Tamaki; and Hosokawa, Manabu, to Toyoda Koki Kabushiki Kaisha. Machine tool with automatic tool changer. 4,019,246, Cl. 29-568.000.

Tomita, Yoshifumi; Miura, Kiyoshi; and Nakai, Hiromitu, to Hitachi, Ltd. Method for forming fluorescent screen of color cathode ray tubes using filter layer. 4,019,905, Cl. 96-36.100.

Tomlinson, Roger R.: *See—*
Weninger, Frank L.; Bagby, John P.; Hapke, Kenyon A.; Hinshaw, Jack W.; Karalus, George C.; Koppensteiner, Eugene F.; and Tomlinson, Roger R., 4,019,815.

Tomy Kogyo Co., Ltd.: *See—*
Ishida, Hajime, 4,019,756.

Tong, Te-Kong. Game device and game. 4,019,738, Cl. 273-106.00R.

Toporcer, Louis H.: *See—*
Crossan, Irvin D.; and Toporcer, Louis H., 4,020,044.

Toray Industries, Inc.: *See—*
Ogasawara, Masafumi; Akita, Masanbri; Saito, Kazuhiko; Kikuchi, Yoshikazu; and Shiokawa, Mitsuhiro, 4,019,844.

Torres, Jean, to SAPAL Societe Anonyme des Plieuses Automatiques. Device for intermittently receiving and continuously delivering objects. 4,019,624, Cl. 198-459.000.

Torrington Company, The: *See—*
Shepard, Richard Wilton; and Ashmead, Albert Sidney, 4,020,319.

Tosarelli, Gianni: *See—*
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Tassi, Lamberto; Ballestrazzi, Aris; and Tosarelli, Gianni, 4,019,623.

Toshiba Kikai Kabushiki Kaisha: *See—*
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Towmotor Corporation: *See—*
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Townsend, Graham: *See—*
Garner, Alex Victor; and Townsend, Graham, 4,020,299.

Townsend, Herbert E., Jr.; Horton, James B.; and Woodyatt, Louis R., to Bethlehem Steel Corporation. Ultra-high strength steel having improved resistance to environmental stress corrosion cracking. 4,019,901, Cl. 75-206.000.

Toyo Kogyo Co., Ltd.: *See—*
Shimoji, Masaharu; Satow, Haruhiko; and Yamasaki, Atsumichi, 4,019,471.
Yamamoto, Kenichi; and Kakui, Kuniaki, 4,019,469.

Toyoda Koki Kabushiki Kaisha: *See—*
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Toyota Jidosha Kogyo Kabushiki Kaisha: *See—*
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Kondo, Takeo; Hyodo, Yoichi; Ono, Hiroyuki; and Yuasa, Shiro, 4,019,403.
Konomi, Toshiaki; Nurita, Jyoji; and Masuda, Takeshi, 4,019,483.

Traini, Carlo: *See—*
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Trapasso, Louis E., to Celanese Corporation. Polyamine coating compositions. 4,020,123, Cl. 260-837.00R.

Traver, Frank J.: *See—*
Brown, Edgar D., Jr.; and Traver, Frank J., 4,019,997.

Trezeguet, Jean-Pierre: *See—*
Desse, Pierre; and Trezeguet, Jean-Pierre, 4,019,538.

Trocki, Julian Robert, to Diamond Shamrock Corporation. Recovery of calcium pantothenate. 4,020,103, Cl. 260-534.00A.

Trouiller, Jean-Claude; and Vivet, Bernard, to Schlumberger Technology Corporation. Apparatus for use in investigating earth formations. 4,020,452, Cl. 340-17.00R.

Trowbridge, Leonard D. Mitre frame clamp. 4,019,270, Cl. 40-155.000.

TRW Inc.: *See—*
Adams, William B.; Anderson, Douglas R.; and Carpenter, Daniel D., 4,020,461.
Seo, Eddie T.; Silverman, Herbert P.; and Day, Robert J., 4,020,246.
Tierney, William S.; and Wright, James E., 4,019,374.

Tsuboi, Takashi; Tachibana, Kyozo; Tamura, Kaoru; and Imaizumi, Fujimaro, to Hitachi, Ltd. Static power converter controlling apparatus for reducing noise generated by phase shift control. 4,020,411, Cl. 321-27.00R.

Tsuchihashi, Genichi; and Ogura, Katsuyuki, to Sagami Chemical Research Center. Cyclic ketone mercaptal S-oxides. 4,020,171, Cl. 260-340.500.

Tsuchihashi, Shoji; Kawamoto, Yoji; and Inoue, Masayoshi, to Minolta Camera Kabushiki Kaisha. Method of using vitreous solid elecrolyte. 4,019,967, Cl. 204-1.00T.

Tsuchimochi, Yoshihisa: *See—*
Mabuchi, Kenichi; and Tsuchimochi, Yoshihisa, 4,020,245.

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Tsukahara, Takeshi; Morioka, Minoru; Oguma, Yoichi; and Omori, Yoshitaka, to Honda Giken Kogyo Kabushiki Kaisha. Motorcycle fairing. 4,019,774, Cl. 296-78.100.

Tsunoda, Takahiro; Ozutsumi, Minoru; Maeda, Shigeo; Suzuka, Susumu; Komiya, Hidetoshi; and Shinohara, Hideaki, to Hodogaya Chemical Co., Ltd.; and Oji Paper Co., Ltd. Photosensitive azido color-forming element. 4,019,907, Cl. 96-75.000.

Tsuruta, Yasuo. Remote control of pneumatic tire pressure and its apparatus. 4,019,552, Cl. 152-417.000.

Tsuzuki, Yoshihiko: *See—*
Hobo, Nobuhito; Enomoto, Nizo; Suzuki, Yutaka; Kawamoto, Itsushi; Iyoda, Michio; Tsuzuki, Yoshihiko; Sekino, Kenro; and Nukata, Hironari, 4,019,478.

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Turcotte, Ronald E.; Wolff, Jay R.; Del Medico, Anthony P.; and Lee, Paul C., to G. D. Searle & Co. Gantry scanning camera. 4,020,348, Cl. 250-363.00S.

Turf Service Laboratories, Inc.: *See—*
Brehob, Alfred W.; and Wheeler, Carlos E., 4,020,417.

Turner, Lester Willis, to Raymond Lee Organization, Inc., The, a part interest. Cam lock jaws for machinist vise. 4,019,726, Cl. 269-261.000.

Tyrrell, James Robert, to Braun, Anton. Fluid mixing apparatus. 4,019,528, Cl. 137-209.000.

Uchidoi, Masanori; Miyakawa, Hideaki; Taguchi, Tetsuya; Mashimo, Yukio; and Watanabe, Satoshi, to Canon Kabushiki Kaisha. Release type electromagnetic device. 4,020,433, Cl. 335-230.000.

Udvardi-Lakos, Janos, to Siemens Aktiengesellschaft. Inverter control system. 4,020,360, Cl. 307-66.000.

Ueda, Hiroshi, to Minolta Camera Kabushiki Kaisha. Camera with film cassette. 4,020,497, Cl. 354-27.000.

Underhill, Michael James, to U.S. Philips Corporation. Phase and/or frequency comparators. 4,020,422, Cl. 328-133.000.

Union Carbide Corporation: *See—*
Gemmill, Wayne Joseph, Sr.; and Cerone, Frank Ernest, Jr., 4,020,351.
Heinz, Henry, Jr., 4,020,241.
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Union Oil Company of California: *See—*
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United Aircraft Products, Inc.: *See—*
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United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defense in Her Britannic Majesty's Government of the: *See—*
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Urbanczyk, Marvin L. Manure treatment apparatus and process. 4,019,723, Cl. 259-183.000.
Urquhart, Donald Bremner, to Coal Industry (Patents) Limited. Hydrogenation of coal. 4,019,975, Cl. 208-10.000.
Urushima, Mitsuo: *See—*
Aoyama, Ryozo; Matsuda, Yukinobu; and Urushima, Mitsuo, 4,019,321.
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van den Ouweland, Godefridus Antonius Maria; and Peer, Hendricus Gerardus, to Lever Brothers Company. Certain lower alkyl 4,5-dihydrothiophene-3-thiols. 4,020,170, Cl. 260-329.00S.
Vander Heyden, Eric Ernest, to AMP Incorporated. Filtered connector assembly with composite ground plane. 4,020,430, Cl. 333-79.000.
VanDerMeulen, Douglas J.: *See—*
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Vanderspurt, Thomas H., to Celanese Corporation. Vapor phase catalytic process for preparing alpha, beta-ethylenically unsaturated alcohols. 4,020,116, Cl. 260-638.00B.
Vanlerberghe, Guy: *See—*
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van Nieuwland, Jacob Maria: *See—*
Hazewindus, Nicolaas; and van Nieuwland, Jacob Maria, 4,019,989.
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Vehling, Floyd W. Mobile carpet display center. 4,019,773, Cl. 296-21.000.
Veraart, Pierre H., to GSW Appliances Limited. Automatic regulation of drying time in a clothes drying machine. 4,019,259, Cl. 34-48.000.
Vercellotti, Leonard C.: *See—*
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Verhappen, Paulus Jozef Maria; Van Tienen, Antonius Johannes Maria; Feenstra, Johannes; and Bastings, Petrus Theodorus Cornelis, to U.S. Philips Corporation. Method of melting a raw bath and a glass furnace for performing the method. 4,019,888, Cl. 65-135.000.
Verschure, Petrus Joseph Marie: *See—*
Poelma, Cornelis Frederikus; Horowitz, Alexandre; and Verschure, Petrus Joseph Marie, 4,019,770.
Vervais, Paul Walter: *See—*
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Vijayendran, Bheema R.; and DuBois, R. Clark, to Pitney-Bowes, Inc. Toner compositions. 4,019,911, Cl. 106-23.000.
Vilkomerson, David Herman Raphael, to RCA Corporation. Interferometric technique for determining ultrasonic wave intensity. 4,019,818, Cl. 356-106.00R.
Vinatieri, James E., to Phillips Petroleum Company. Sample fraction collector. 4,019,545, Cl. 141-130.000.
Vincent, Raymond A.: *See—*
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Vits, Hilmar, to Vits-Maschinenbau GmbH. Device for placement of rhythmically conveyed sheets on a stack. 4,019,731, Cl. 271-183.000.
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Vogel, Christian; and Aebi, Rudolph, to Ciba-Geigy Corporation. Plant growth regulating agent. 4,019,894, Cl. 71-118.000.
Vogt, Alfred; and Bolter, Herbert, to Interliz Anstalt. Thermostatically controlled heating arrangement including a heat pump. 4,019,679, Cl. 237-2.00B.
Vogt, Berthold Richard: *See—*
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Vogt, Herwart C.; Parekh, Manher; and Patton, John T., Jr., to BASF Wyandotte Corporation. Tin titanium complexes as esterification/-transesterification catalysts. 4,020,010, Cl. 252-431.00C.



von Hazmburg, Romulis S., to United States Gypsum Company. Paper covered gypsum board and process of manufacture. 4,020,237, Cl. 428-535.000.
Voplex Corporation: *See—*
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Vos, Jan G.: *See—*
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Vroom, Clifford G., to Eastman Kodak Company. Apparatus for controlling drive to pressure rollers in a camera with electric motor drive. 4,020,499, Cl. 354-86.000.
Vugrek, Andrija, to Western Electric Company, Inc. Cable block. 4,019,715, Cl. 254-134.30R.
Vuotto, Edward Joseph, to American Telephone and Telegraph Company. Rotary dial restriction circuit. 4,020,295, Cl. 179-90.00D.
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Wagner, Kelly B. Brake apparatus for use in rappelling. 4,019,609, Cl. 188-65.400.
Wahlefeld, August Wilhelm: *See—*
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Wahls, Peter: *See—*
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Waite, Eric L. Shovel game. 4,019,739, Cl. 273-95.00D.
Walden, John, to Intermountain Research and Development Corporation. Producing sodium carbonate monohydrate from carbonate solution including addition of aluminum ions. 4,019,872, Cl. 23-300.000.
Waldorf, Lindsey E.: *See—*
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Wallace, William K., to Chicago Pneumatic Tool Company. Pulse motor nut runner. 4,019,589, Cl. 173-12.000.
Wallace, Wm. Dean: *See—*
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Walraevens, Rene; and Collin, Andre, to Solvay & Cie. Halogenated polyether-polyols and polyurethane foams manufactured from the latter. 4,020,024, Cl. 260-2.5AP.
Walser, Joseph G., Jr.; and Ferrell, John O. Panty stocking and combination panty hose garment. 4,019,208, Cl. 2-240.000.
Walters, Helen: *See—*
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Warner & Swasey Company, The: *See—*
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Warren, William H. Vacuum egg lifting and penetrating means. 4,019,430, Cl. 99-485.000.
Warrick, Ford E., to Akzona Incorporated. Method of combining synthetic yarns. 4,019,312, Cl. 57-157.00S.
Wartelle, Claude; and Leveque, Michel, to Centre Technique des Industries Mecaniques. Pneumatic roughness measurer. 4,019,379, Cl. 73-105.000.
Wartman, Lloyd H., to Blodgett, Norman S. Method of forming an orthopedic cast. 4,019,505, Cl. 128-90.000.
Warwick Electronics Inc.: *See—*
Carlson, Alden J., 4,019,417.
Warzec, Cezary: *See—*
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Watanabe, Masatoshi: *See—*
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Watanabe, Satoshi: *See—*
Uchidoi, Masanori; Miyakawa, Hideaki; Taguchi, Tetsuya; Mashimo, Yukio; and Watanabe, Satoshi, 4,020,433.
Waterman, Donald Herbert, to Valley Engineering, Inc. Apparatus for compacting snow for skiing. 4,019,268, Cl. 37-10.000.
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Weaver, Gerald Q.; and Olson, Bradford A., to Norton Company. Process for fabricating silicon carbide articles. 4,019,913, Cl. 106-44.000.
Weaver, William W.: *See—*
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Webb, William, Jr., to Unitec, Inc. Combustion product indicator. 4,020,415, Cl. 324-33.000.
Webb, William David, Sr., to Du Pont de Nemours, E. I., and Company. Safety locking mechanism. 4,019,763, Cl. 292-207.000.
Wech, Robert J.: *See—*
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Weil-McLain Co., Inc.: *See—*
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Weiland, George N., Sr., to Imoco-Gateway Corporation. Pipe hanger. 4,019,706, Cl. 248-62.000.
Weiler, Ray C. Quick release window guard. 4,019,281, Cl. 49-56.000.
Weiler, Raywood C. Wheel and tire carrier for attachment to motor vehicle doors. 4,019,664, Cl. 224-42.240.
Weins, Engelbert: *See—*
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Weir, Basil, to Intersil Incorporated. Integrated field-effect transistor switch. 4,020,365, Cl. 307-251.000.
Weisz, Robert O., to Essex International, Inc. Dynamoelectric machine coil. 4,020,375, Cl. 310-208.000.
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Wells, William R., to United Audio Visual Corporation. Programmer expander for a plurality of devices. 4,020,464, Cl. 340-147.00P.
Welter, Leonard M.: *See—*
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Weninger, Frank L.; Bagby, John P.; Hapke, Kenyon A.; Hinshaw, Jack W.; Karalus, George C.; Koppensteiner, Eugene F.; and Tomlinson, Roger R., to Polaroid Corporation. Film handling apparatus blower system. 4,019,815, Cl. 353-61.000.
Wesemeier, Reinhard, to International Harvester Company. V-Belt pulley with automatic tensioning device. 4,019,398, Cl. 74-230.17C.
Wessling, Diether, to Bayer Aktiengesellschaft. Conditioning of perhalogeno-copper phthalocyanines. 4,020,088, Cl. 260-314.500.
Western Electric Company, Inc.: *See—*
Bassett, Henry C.; From, Charles A., Jr.; Parker, John F.; and Worley, Ansel A., 4,019,250.
Berglowe, Sven Raymond, Jr.; and Sauer, Earl Salvator, 4,020,213.
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Gambale, John C.; and Ray, Roger E., 4,020,396.

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Harlan, Larry R.; and Thiel, Patrick L., 4,019,572.
Hawkes, George F., Jr.; and Speck, Willis A., 4,020,400.
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Knudsen, Irving E., 4,020,146.
Kulkarni, Avinash D.; and Newton, Ralph E., 4,020,380.
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Smith, James D. B.; and Kauffman, Robert N., 4,020,017.
Smith, Millard F.; Behringer, Frederick J.; Doyle, John R.; and McFadden, Daniel P., 4,019,390.
Yannone, Robert A.; and Shields, James J., 4,019,315.

Wetherbee, Edward P., to Raymond Lee Organization, Inc., The, a part interest. Emergency auto ignition kit and spark plug tester. 4,020,413, Cl. 324-15.000.

Wetzler, Josef; Gaschler, August; and Hofmann, Heinz, to Planatolwerk Willy Hesselmann. Apparatus for applying hot-melt glue to edge of sheet stack. 4,019,457, Cl. 118-35.000.

Weyl, Helmut; and Steinke, Leo, to Robert Bosch G.m.b.H. Electrochemical sensor construction. 4,019,974, Cl. 204-195.00S.

Wharam, John L., to Minnesota Mining and Manufacturing Company. Tape cartridge with movable guide member. 4,019,695, Cl. 242-199.000.

Wheeler, Carlos E.: *See—*
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White, Dwain M., to General Electric Company. Polyacetylene tetrapolymers. 4,020,265, Cl. 526-285.000.

White, Jack M.: *See—*
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White, John R., to Goodyear Tire & Rubber Company, The. Diol curative for polyurethane. 4,020,001, Cl. 252-182.000.

Whiteley, Eric, to Canadian General Electric Company Limited. Cooling of discoidal dynamoelectric machines. 4,020,372, Cl. 310-61.000.

Whitson, Bobbie L.; and Morgan, John A., to Phillips Petroleum Company. Use of equalization chamber in discontinuous venting of vessel. 4,019,524, Cl. 137-14.000.

Whittaker Corporation: *See—*
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Whittum, Howard A.; and Hjelm, Michael J., to Advance Coatings Company. Fire-resistant resin. 4,019,922, Cl. 106-271.000.

Wich, Horst W. Key cutting machine. 4,019,415, Cl. 83-413.000.

Wiedemer, Karl: *See—*
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Wiegand, Walter J., Jr.; Bullis, Robert H.; and Mongeon, Robert J., to United Technologies Corporation. Four-collector flux sensor. 4,019,383, Cl. 73-194.00F.

Wiegard, Klaus, to Daimler-Benz Aktiengesellschaft. Bearing support of the heat-exchanger disk of a regenerative heat-exchanger. 4,019,750, Cl. 267-160.000.

Wiese, Hans Holger. Bucket conveyor. 4,019,625, Cl. 198-708.000.

Wiles, Michael F.: *See—*
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Wilke, Richard; and Korthaus, Helmut. System for controlling motor speed. 4,020,404, Cl. 318-318.000.

Wilkerson, Alan W., to Allen-Bradley Company. Telephonic troubleshooting circuit for electric motor drives. 4,020,287, Cl. 179-2.00A.

Wilkinson Sword Limited: *See—*
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Willenborg, Robert A., to Raymond Lee Organization, Inc., The, a part interest. Trash compactor apparatus. 4,019,219, Cl. 15-339.000.

Williams, Albert G.: *See—*
Soehngen, John W.; and Williams, Albert G., 4,020,145.

Williams, Thurston V. Wood splitting apparatus. 4,019,549, Cl. 144-193.00A.

Wills, Milton Herman, Jr., to Martin Marietta Corporation. Portland cement compositions. 4,019,918, Cl. 106-90.000.

Windisch, Anthony Jude. Light signalling device for bicycles and switch therefor. 4,020,458, Cl. 340-67.000.

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Winter, Arthur J., to Fairchild Camera and Instrument Corporation. Analog-to-digital converter employing common mode rejection circuit. 4,020,487, Cl. 340-347.0NT.

Winter, Carl E., deceased; and by Cohen, Julia Winter, legal representative. Variable speed positive gear transmission. 4,019,405, Cl. 74-691.000.

Winter, Hermann; Lautsch, Alfred; Schonberg, Karl-Heinz; and Walther, Jurgen, to Chemische Werke Huls Aktiengesellschaft. Process for the production of emulsion polyvinyl chloride under avoidance of vinyl chloride emissions. 4,020,263, Cl. 526-88.000.

Winter, Hermann: *See—*
Kalka, Josef; Winter, Hermann; and Beckmann, Jurgen, 4,020,032.

Wintersdorff, Robert W.; and Cota, George R., to Teledyne Ryan Aeronautical a Division of Teledyne Industries, Inc. Aircraft of low observability. 4,019,699, Cl. 244-121.000.

Wirotama, I. Poetoe Gde: *See—*
Ney, Karl Heinz; Wirotama, I. Poetoe Gde; and Freytag, Wolfram Gustav, 4,020,190.

Wise, Thomas Q., to Belden Corporation. Strand package and carton therefor. 4,019,636, Cl. 206-396.000.

Wismer, Marco; and Parker, Earl E., to PPG Industries, Inc. Method of forming a non-glossy film. 4,020,193, Cl. 427-54.000.

Wismer, Marco: *See—*
Schimmel, Karl F.; and Wismer, Marco, 4,020,050.

Wisotsky, Max J., to Exxon Research and Engineering Company. Additive combination for cold flow improvement of middle distillate fuel oil. 4,019,878, Cl. 44-62.000.

Witte, Josef; and Lehnert, Gunther, to Bayer Aktiengesellschaft. Catalysts. 4,020,257, Cl. 526-143.000.

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Wixson, Donald F.; and Ostrander, George K., to Air Preheater Company, Inc., The. Lens holder. 4,019,567, Cl. 165-5.000.

Woerner, Hans, to Mineral Research & Development Corporation. Noncorrosive cuprammonia fungicide and method for using same. 4,020,180, Cl. 424-294.000.

Wohrl, Alfons: *See—*
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Wolfe, Otho C.: *See—*
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Wolgemuth, Larry G., to Atlantic Richfield Company. Additives for increasing the density of urethane foams prepared from ADNC. 4,020,023, Cl. 260-2.50A.

Wolski, Raymond A.: *See—*
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Woo, Lecon, to Du Pont de Nemours, E. I., and Company. Thermomechanical analyzer. 4,019,365, Cl. 73-15.600.

Wooding, William M.: *See—*
Soldati, Gianluigi; Eilberg, Ralph G.; Melger, Helga; and Wooding, William M., 4,020,019.

Woods, Kenneth K.: *See—*
Herzog, Josef; Woods, Kenneth K.; and Hubble, William S., 4,019,881.

Woods, William E.; and Stanley, Philip E., to Honeywell Information Systems, Inc. Interrupt scan and processing system for a data processing system. 4,020,471, Cl. 340-172.500.

Woodstream Corporation: *See—*
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Woodyatt, Louis R.: *See—*
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Worley, Ansel A.: *See—*
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Wosegien, Bernd; and Stauble, Georg, to Knorr-Bremse GmbH. Hand brake for a brake cylinder. 4,019,426, Cl. 92-113.000.

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Wright, Edward S.; Angstadt, John W.; and Garrow, Gerald L., to Blaw-Knox Food and Chemical Equipment, Inc. Process for deep-fat cooking. 4,020,189, Cl. 426-438.000.

Wright, James E.: *See—*
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Yamamoto, Kenichi; and Kakui, Kuniaki, to Toyo Kogyo Co., Ltd. Intake means for rotary piston engines. 4,019,469, Cl. 123-8.130.

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# LIST OF REISSUE PATENTEES

TO WHOM

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NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

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Anderson, Raymond F.; Mackes, Ronald C.; Andrews, Richard Edwin; and Mawe, Patrick Maurice, to BQP Industries, Inc. Slip pallet. Re. 29,192, Cl. 108-51.300.

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Carlyle, Lance John, to Economics Laboratory, Inc. Fluid metering device. Re. 29,193, Cl. 137-99.000.

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Ulery, Dale W., to Ulery Greenhouse Company. Dieffenbachia named Uleryii. 4,045, 4-26-77, Cl. 88.000.

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Bacon, Warren F. Bar stool. 244,108, 4-26-77, Cl. D6-32.000.

Barks, Robert L. Portable shower. 244,135, 4-26-77, Cl. D23-57.000.

Benson, James A.: *See—*
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Blackwell, Jack R. Bicycle cover. 244,130, 4-26-77, Cl. D12-156.000.

Bliven, Robert P. Telephone. 244,141, 4-26-77, Cl. D14-53.000.

Bliven, Robert P. Telephone. 244,142, 4-26-77, Cl. D26-14.00A.

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Davis, Carl W. Tennis ball pickup. 244,149, 4-26-77, Cl. D34-5.0ST.

Dick, Larry G. Retaining tool for a cut can lid. 244,118, 4-26-77, Cl. D7-105.000.

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Friedman, Ira, to Rowe Furniture Corporation. Commode or similar article. 244,111, 4-26-77, Cl. D6-167.000.

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Gröth, Daniel F. Aquarium cover. 244,148, 4-26-77, Cl. D30-12.000.

Hall, Steven D. Aquarium. 244,147, 4-26-77, Cl. D30-9.000.

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Ladjimf, Wannas Alfred. Earring suspendable necklet. 244,126, 4-26-77, Cl. D11-8.000.

Lalonde, Michael G. Ice cube tray. 244,131, 4-26-77, Cl. D15-90.000.

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Mondragon, Ralph. Spindle for use in forming room dividers or panels. 244,138, 4-26-77, Cl. D25-78.000.

Naylor, Thomas H. Display stand. 244,117, 4-26-77, Cl. D6-188.000.

Neff Kitchen Manufacturers Limited: *See—*
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Rittenhouse, James M., to Sweda International, Inc. Cash register. 244,150, 4-26-77, Cl. D52-4.00A.

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Tart, Thomas N. Ornamental design for combined fish hook and artificial fish eggs. 244,133, 4-26-77, Cl. D22-30.000.

Van Den Haak, Johannes, to Curtis Dyna Products Corporation. Battery checker. 244,125, 4-26-77, Cl. D10-77.000.

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41 A 4,019,328
4,019,329
4,019,330
53.54 4,019,331
86 4,019,332
110 4,019,333
4,019,334

**CLASS 62**

6 4,019,335
4,019,336
113 4,019,337
238 4,019,338
255 4,019,339
277 4,019,341
371 4,019,340
469 4,019,342
510 4,019,343

**CLASS 64**

9 R 4,019,344
12 4,019,345
4,019,346
21 4,019,347

**CLASS 65**

30 R 4,019,884
32 4,019,885
43 4,019,886
60 C 4,019,887
135 4,019,888

**CLASS 66**

24 4,019,348
154 A 4,019,349
196 4,019,350

**CLASS 68**

177 4,019,351
205 R 4,019,352

**CLASS 70**

68 4,019,353
236 4,019,354
278 4,019,355

**CLASS 71**

29 4,019,889
64 F 4,019,890
67 4,019,891
88 4,019,892
94 4,019,893
118 4,019,894

**CLASS 72**

30 4,019,356
130 4,019,357
189 4,019,358
231 4,019,359
249 4,019,360
252 4,019,361
421 4,019,362

**CLASS 73**

1 R 4,019,363
15 FD 4,019,364
15.6 4,019,365
23 4,019,366
4,019,367
37 4,019,369
45.1 4,019,370
46 4,019,371
61.1 C 4,019,372
71.5 R 4,019,374
4,019,375
71.5 US 4,019,373
81 4,019,376
88.5 R 4,019,377
103 4,019,378
105 4,019,379
170 A 4,019,380
190 EW 4,019,381
194 EM 4,019,385
4,019,386
194 F 4,019,383
194 R 4,019,382
194 VS 4,019,384
299 4,019,387
356 4,019,368
398 AR 4,019,388
430 4,019,389
432 R 4,019,390
505 4,019,391

**CLASS 74**

5 R 4,019,392
6 4,019,393
27 4,019,394
49 4,019,395
63 4,019,396
227 4,019,397
230.17 C 4,019,398
231 C 4,019,399
333 4,019,400
471 XY . 4,019,401
489 4,019,402
492 4,019,403
687 4,019,404
691 4,019,405
766 4,019,406

**CLASS 75**

11 4,019,895
44 S 4,019,896
58 4,019,897
101 R 4,019,898
134 F 4,019,899
171 4,019,900
206 4,019,901
241 4,019,874

**CLASS 76**

37 4,019,407
112 4,019,408

**CLASS 81**

9.51 4,019,409
52.4 R 4,019,412

**CLASS 82**

2.5 4,019,410
2.7 4,019,411

**CLASS 83**

88 4,019,413
356.3 4,019,414
413 4,019,415
437 4,019,416

**CLASS 84**

1.01 4,019,417
343 4,019,418
454 4,019,419

**CLASS 85**

74 4,019,420

**CLASS 89**

1.5 R 4,019,421
1.815 4,019,422
137 4,019,424
178 4,019,423

**CLASS 91**

487 4,019,425

**CLASS 92**

113 4,019,426

**CLASS 93**

37 R 4,019,427
58.2 R 4,019,428

**CLASS 96**

1 SD 4,019,903
1.5 4,019,902
33 4,019,904
36.1 4,019,905
68 4,019,906
75 4,019,907
114 4,019,908
115 P 4,019,909

**CLASS 98**

37 4,019,429

**CLASS 99**

485 4,019,430

**CLASS 100**

37 4,019,431

**CLASS 101**

132.5 4,019,433
216 4,019,434
232 4,019,435
463 4,019,436
466 4,019,437

**CLASS 102**

24 R 4,019,438
70.2 R 4,019,439
4,019,440
4,019,441

**CLASS 105**

376 4,019,442

**CLASS 106**

1 4,019,910
23 4,019,911
36 4,019,912
44 4,019,913
62 4,019,914
73.31 4,019,915
88 4,019,916
89 4,019,917
90 4,019,918
4,019,919
114 4,019,920
238 4,019,921
271 4,019,922
308 Q 4,019,923

**CLASS 108**

51.3 Re.29,192
137 4,019,443

**CLASS 110**

7 R 4,019,444
10 4,019,445
173 A 4,019,446

**CLASS 112**

121.11 4,019,447
153 4,019,448
158 B 4,019,449
215 4,019,450
262 4,019,451

**CLASS 113**

114 BE 4,019,452

**CLASS 114**

16 R 4,019,453
197 4,019,454
298 4,019,455

**CLASS 115**

73 4,019,456

**CLASS 118**

35 4,019,457
321 4,019,458

**CLASS 119**

3 4,019,459
18 4,019,461
51.5 4,019,462
109 4,019,463
155 4,019,464

**CLASS 122**

240 A 4,019,465
367 R 4,019,466
406 ST 4,019,467
510 4,019,468

**CLASS 123**

8.09 4,019,471
8.13 4,019,469
25 L 4,019,472
32 EE 4,019,470
4,019,474
32 ST 4,019,473
103 E 4,019,475
119 DB 4,019,476
127 4,019,477
139 AP 4,019,478
139 E 4,019,481
141 4,019,482
4,019,483
148 E 4,019,484
4,019,485
4,019,486
185 A 4,019,490
190 BB 4,019,488
190 E 4,019,487
198 D 4,019,489
198 F 4,019,479

**CLASS 124**

61 4,019,480

**CLASS 126**

120 4,019,491
121 4,019,492
165 4,019,493
270 4,019,494
271 4,019,495
4,019,496
299 C 4,019,497

**CLASS 128**

1 R 4,019,498
4,019,499
2.1 E 4,019,500
24 R 4,019,501
65 4,019,502
83.5 4,019,503
88 4,019,504
90 4,019,505
4,019,506
142 R 4,019,507
142.7 4,019,508
147 4,019,509
172.1 4,019,510
212 4,019,511
214 R 4,019,512
223 4,019,513
230 4,019,514
246 4,019,515
268 4,019,516
284 4,019,517
419 R 4,019,518
422 4,019,519

**CLASS 131**

2 4,019,520
4,019,521

**CLASS 132**

90 4,019,522

**CLASS 136**

89 P 4,019,924

**CLASS 137**

7 4,019,523
14 4,019,524
99 Re.29,193
107 4,019,525
110 4,019,526
115 4,019,527
209 4,019,528
218 4,019,529
334 4,019,530
504 4,019,531
527 4,019,532
599 4,019,533
614.18 4,019,534
625.15 4,019,535

625.41 4,019,536

**CLASS 138**

37 4,019,537
108 4,019,538
118 4,019,539

**CLASS 139**

20 4,019,540
94 4,019,541
153 4,019,542

**CLASS 140**

111 4,019,543
112 4,019,544

**CLASS 141**

10 4,019,546
11 4,019,547
130 4,019,545

**CLASS 144**

175 4,019,548
193 A 4,019,549

**CLASS 148**

2 4,019,925
6.35 4,019,926
11.5 A 4,019,927
4,019,931
15.5 4,019,928
31.5 4,019,929
36 4,019,930

**CLASS 149**

19.1 4,019,932
19.4 4,019,933
43 4,019,934

**CLASS 151**

7 4,019,550

**CLASS 152**

354 4,019,551
417 4,019,552

**CLASS 156**

64 4,019,935
71 4,019,936
73.1 4,019,937
78 4,019,938
80 4,019,939
148 4,019,940
179 4,019,941
180 4,019,942
227 4,019,943
380 4,019,944
405 4,019,945
497 4,019,946
510 4,019,947
519 4,019,948
582 4,019,949
623 R 4,019,950

**CLASS 157**

1.1 4,019,553

**CLASS 159**

4 CC 4,019,951

**CLASS 160**

84 R 4,019,554
238 4,019,556
354 4,019,557
371 4,019,555

**CLASS 162**

29 4,019,952
272 4,019,953

**CLASS 164**

26 4,019,558
4,019,559
89 4,019,560
155 4,019,561
4,019,562
4,019,563
271 4,019,564
283 M 4,019,565

**CLASS 165**

2 4,019,566
5 4,019,567
8 4,019,568
26 4,019,569
67 4,019,570
105 4,019,571
106 4,019,572
175 4,019,573

**CLASS 166**

.5 4,019,574
61 4,019,575
123 4,019,579
250 4,019,576
259 4,019,577
267 4,019,578
315 4,019,580

**CLASS 169**

16 4,019,581
37 4,019,582
62 4,019,583
74 4,019,584

**CLASS 172**

4.5 4,019,585
802 4,019,587
804 4,019,588

**CLASS 173**

12 4,019,589

**CLASS 174**

15 S 4,020,274
4,020,275
23 R 4,020,276
146 4,020,277

**CLASS 175**

57 4,019,590
107 4,019,591
234 4,019,592
340 4,019,593

**CLASS 176**

38 4,019,954
4,019,955

**CLASS 178**

18 4,020,281
68 4,020,282
88 4,020,283

**CLASS 179**

1 E 4,020,284
1.5 A 4,020,286
1.5 R 4,020,285
2 A 4,020,287
15 AT 4,020,290
15 FD 4,020,288
4,020,289
15.55 R 4,020,292
15.55 T 4,020,291
18 FA 4,020,294
18 GF 4,020,293
90 D 4,020,295
115.5 PV 4,020,296
156 A 4,020,297
175 4,020,298
181 R 4,020,299

**CLASS 180**

6.48 4,019,596
11 4,019,597
33 A 4,019,594
33 R 4,019,595
51 4,019,598
64 A 4,019,599
70 R 4,019,600
90 4,019,601
101 4,019,602
134 4,019,603

**CLASS 182**

2 4,019,604

**CLASS 186**

1 R 4,019,605

**CLASS 187**

29 R 4,019,606
4,019,607

**CLASS 188**

59 4,019,608
65.4 4,019,609
73.3 4,019,610
4,019,611
196 BA 4,019,612
218 XL 4,019,613

**CLASS 191**

22 R 4,020,300

**CLASS 192**

48.91 4,019,586
103 F 4,019,614

**CLASS 195**

6 4,019,956
28 N 4,019,957
62 4,019,958
66 R 4,019,959
80 R 4,019,960
103.5 R 4,019,961
142 4,019,962

**CLASS 197**

53 4,019,615
90 4,019,616
133 R 4,019,617
161 4,019,618
189 4,019,619

**CLASS 198**

399 4,019,620
432 4,019,621
441 4,019,622
457 4,019,623
459 4,019,624
708 4,019,625
750 4,019,626
786 4,019,627

**CLASS 200**

50 AA 4,020,301
61.45 R 4,020,302
144 B 4,020,304
159 R 4,020,305
293 4,020,306
302 4,020,307
310 4,020,308
314 4,020,309

**CLASS 202**

263 4,019,963

**CLASS 203**

1 4,019,964
60 4,019,965

**CLASS 204**

1 T 4,019,966
4,019,967
23 4,019,968
26 4,019,969
32 R 4,019,970
130 4,019,971
159.15 4,019,972
194 4,019,973
195 S 4,019,974

**CLASS 206**

219 4,019,630
315 B 4,019,629
347 4,019,631
349 4,019,632
364 4,019,633
386 4,019,634
4,019,635
396 4,019,636
418 4,019,637
524.4 4,019,628

**CLASS 208**

10 4,019,975
57 4,019,976
188 4,019,977
213 4,019,978
353 4,019,979

**CLASS 209**

211 4,019,980
455 4,019,981

**CLASS 210**

30 R 4,019,982
62 4,019,983
66 4,019,984
80 4,019,985
139 4,019,986
232 4,019,987
494 R 4,019,988

**CLASS 211**

74 4,019,638

**CLASS 214**

6 C 4,019,639
6 H 4,019,640
14 4,019,641
77 R 4,019,642
505 4,019,643
506 4,019,644

**CLASS 215**

1 R 4,019,645
329 4,019,646

**CLASS 219**

10.49 4,020,310
10.55 A 4,020,311
61 4,020,312
69 E 4,020,313
73 R 4,020,314
91 4,020,315
103 4,020,316
121 EB 4,020,318
121 EM 4,020,317
121 LM 4,020,319
137 PS 4,020,320
271 4,020,321
392 4,020,322
405 4,020,323

**CLASS 220**

3.3 4,019,647
88 B 4,019,649
273 4,019,648

**CLASS 221**

116 4,019,650
211 4,019,651

**CLASS 222**

1 4,019,652
4,019,653
4,019,654
96 4,019,655
103 4,019,656
136 4,019,657
144.5 4,019,658
193 4,019,659
304 4,019,660
376 4,019,661
414 4,019,662
529 4,019,663

**CLASS 224**

42.24 4,019,664

**CLASS 226**

112 4,019,665
171 4,019,667

**CLASS 227**

119 4,019,666

**CLASS 228**

3.1 4,019,668
4.5 4,019,669
45 4,019,670
123 4,019,671

**CLASS 229**

14 C 4,019,672
17 R 4,019,673
23 R 4,019,674
31 R 4,019,675

**CLASS 234**

115 4,019,676

**CLASS 235**

61.11 E 4,020,327
61.5 S 4,020,324
61.7 B 4,020,325
4,020,326
146 4,020,328
151.11 4,020,331
151.3 4,020,329
4,020,330
152 4,020,332
156 4,020,333
164 4,020,334

**CLASS 236**

9 A' 4,019,677
12 A 4,019,678

**CLASS 237**

2 B 4,019,679
9 R 4,019,680
63 4,019,681

**CLASS 239**

77 4,019,682
102 4,019,683
145 4,019,684
156 4,019,685
205 4,019,686
573 4,019,687

**CLASS 240**

7.1 R 4,020,335
9.5 4,020,336
10 A 4,020,337
46.53 4,020,338
46.59 4,020,047

**CLASS 241**

39 4,019,688
282.1 4,019,689

**CLASS 242**

18 A 4,019,690
45 4,019,691
71.8 4,019,692
84.2 B 4,019,693
131.1 4,019,700
152.1 4,019,701
182 4,019,694
199 4,019,695

**CLASS 244**

42 CD 4,019,696
78 4,019,697
110 A 4,019,698
121 4,019,699
182 4,019,702

**CLASS 248**

4 4,019,703
16 4,019,704
58 4,019,705
62 4,019,706
95 4,019,707
137 4,019,708
150 4,019,709
181 4,019,710

**CLASS 249**

59 4,019,711

**CLASS 250**

202 4,020,339
203 R 4,020,340
211 J 4,020,341
270 4,020,342
311 4,020,343
330 4,020,344
343 4,020,345
358 R 4,020,346
361 R 4,020,347
363 S 4,020,348
377 4,020,349
396 ML 4,019,989
423 P 4,020,350
432 PD 4,020,351
436 4,020,352
441 4,020,353
492 B 4,020,354
506 4,020,355
510 4,020,356
568 4,020,357

**CLASS 251**

26 4,019,712
28 4,019,713
138 4,019,714

**CLASS 252**

8.9 4,019,990
48.2 4,019,991
62.1 4,019,993
62.52 4,019,994
62.53 4,019,995
63.7 4,019,996
68 4,019,992
78.3 4,019,997
135 4,019,998
140 4,019,999
180 4,020,000
182 4,020,001
299 4,020,002
301.1 W 4,020,003
4,020,004
316 4,020,005
408 4,020,006
429 B 4,020,007
4,020,008
429 R 4,020,009
431 C 4,020,010
441 4,020,011
4,020,012
466 PT 4,020,013
511 4,020,014
544 4,020,015
546 4,020,016

**CLASS 254**

134.3 R 4,019,715
139 4,019,716
187.5 4,019,718
187.8 4,019,717

**CLASS 259**

4 AB 4,019,719
4 AC 4,019,721
4 R 4,019,720
105 4,019,722
183 4,019,723

**CLASS 260**

2 A 4,020,018
2 EC 4,020,017
2 EN 4,020,019
2.3 4,020,020
2.5 A 4,020,023
2.5 AP 4,020,024
2.5 H 4,020,021
2.5 HB 4,020,022
4,020,025
3 4,020,026
17.2 4,020,027
18 EP 4,020,028
23.7 M 4,020,054
24 4,020,029
29.2 EP 4,020,030
29.2 R 4,020,031
29.6 R 4,020,032
31.8 Z 4,020,033
32.8 EP 4,020,034
38 4,020,035
40 R 4,020,036
42.21 4,020,037
42.33 4,020,038
42.37 4,020,039
42.56 4,020,040
45.8 NZ 4,020,041
45.85 H 4,020,042
46.5 G 4,020,043
46.5 UA 4,020,044
47 XA 4,020,045
51.5 4,020,048
75 M 4,020,049
78 TF 4,020,050
78 UA 4,020,303
140 R 4,020,051
4,020,052
205 4,020,053
239.3 D 4,020,055
240 D 4,020,056
243 B 4,020,059
243 C 4,020,057
4,020,058
4,020,060
243 R 4,020,061
244 A 4,020,062
247.5 E 4,020,064
247.5 H 4,020,063
248 NS Re.29,195
4,020,065
249.6 4,020,066
4,020,067
250 Q 4,020,068
251 R 4,020,070
256.4 R 4,020,071
293.58 4,020,074
293.6 4,020,072
294.8 R 4,020,073
296 B 4,020,075
302 E 4,020,076
306.7 C 4,020,077
306.8 D 4,020,078
307 A 4,020,079
307 D 4,020,081
307 G 4,020,080
307 R 4,020,082
308 A 4,020,084
308 R 4,020,083
309 4,020,085
309.5 4,020,086
309.7 4,020,087
314.5 4,020,088
326 R 4,020,089
327 P 4,020,168
328 4,020,169
329 S 4,020,170
340.5 4,020,171
343.2 R 4,020,172
343.6 4,020,173
346.8 A 4,020,174
347.2 4,020,175
349 4,020,176
399 4,020,177
429.7 4,020,090
4,020,091
4,020,092
455 A 4,020,093
469 4,020,094
470 4,020,095
471 C 4,020,096
473 A 4,020,097
473 S 4,020,098
475 PN 4,020,099
501.13 4,020,100
502.4 R 4,020,101
520 A 4,020,102
520 E 4,020,069
534 A 4,020,103
563 B 4,020,104
566 A 4,020,105
4,020,106
580 4,020,107
586 P 4,020,108
601 R 4,020,109
606.5 P 4,020,110
611 A 4,020,111
612 R 4,020,112
619 A 4,020,113
632 A 4,020,115
638 B 4,020,116
652 P 4,020,117
666 B 4,020,118
677 A 4,020,119
680 D 4,020,120
681.5 R 4,020,114
683.15 D 4,020,121
835 4,020,122
837 R 4,020,123
859 R 4,020,125
873 4,020,126
876 R 4,020,124
878 R 4,020,127
879 4,020,128
900 4,020,046
983 4,020,129

**CLASS 261**

111 4,020,130

**CLASS 264**

.5 4,020,131
34 4,020,132
53 4,020,133
63 4,020,134
78 4,020,135
89 4,020,136
90 4,020,137
130 4,020,138
171 4,020,139
261 4,020,140



289 4,020,141
347 4,020,142

**CLASS 266**

156 4,019,724
169 4,019,725

**CLASS 267**

160 4,019,750

**CLASS 269**

261 4,019,726
328 4,019,727

**CLASS 270**

58 4,019,728

**CLASS 271**

18.3 4,019,729
181 4,019,730
183 4,019,731
245 4,019,732
4,019,733

**CLASS 272**

137 4,019,734

**CLASS 273**

55 B 4,019,735
73 R 4,019,736
94 R 4,019,737
95 D 4,019,739
106 R 4,019,738
131 BA 4,019,741
131 KN 4,019,740
134 CA 4,019,742
135 B 4,019,744
135 D 4,019,743
136 A 4,019,745
137 AB 4,019,746
137 AE 4,019,747
176 AB 4,019,748

**CLASS 277**

58 4,019,749

**CLASS 280**

31 4,019,751
179 R 4,019,752
214 4,019,230
415 A 4,019,753
456 R 4,019,754
490 A 4,019,755
649 4,019,756
4,019,757

**CLASS 281**

21 R 4,019,758

**CLASS 283**

42 4,019,759

**CLASS 285**

3 4,019,760
47 4,019,761
340 4,019,762

**CLASS 292**

207 4,019,763
288 4,019,764
338 4,019,765
350 4,019,766

**CLASS 294**

5.5 4,019,767
19 R 4,019,768
4,019,769
78 R 4,019,770
83 R 4,019,771

**CLASS 296**

20 4,019,772
21 4,019,773
78.1 4,019,774
155 4,019,775

**CLASS 297**

219 4,019,776
284 4,019,777
346 4,019,778
411 4,019,779

**CLASS 298**

11 4,019,780
22 J 4,019,781

**CLASS 301**

58 4,019,782

**CLASS 302**

25 4,019,783

**CLASS 307**

39 4,020,358
40 4,020,359
66 4,020,360
106 4,020,361
225 C 4,020,362
229 4,020,363
242 4,020,364
251 4,020,365
271 4,020,366
297 4,020,367

**CLASS 308**

6 R 4,019,784
4,019,786
8.2 4,019,785
73 4,019,787
187.1 4,019,788
190 4,019,789
201 4,019,790
217 4,019,791
219 4,019,792

**CLASS 310**

4 R 4,020,368
15 4,020,369
37 4,020,370
52 4,020,371
61 4,020,372
4,020,373
80 4,020,374
208 4,020,375

**CLASS 312**

209 4,019,793
311 4,019,794

**CLASS 313**

103 CM 4,020,376
112 4,020,377
174 4,020,378
220 4,020,379
222 4,020,380
302 4,020,381
318 4,020,382
344 4,020,383
359 4,020,384
489 4,020,385
496 4,020,386

**CLASS 315**

31 R 4,020,387
58 4,020,388
246 4,020,389
371 4,020,390
377 4,020,391
386 4,020,392

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1 4,019,795

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227 4,020,402
257 4,020,403
318 4,020,404
432 4,020,405
600 4,020,406
632 4,020,407

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10 4,020,409
11 4,020,410
27 R 4,020,411

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43.5 R 4,020,412

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15 4,020,413
29.5 4,020,414
33 4,020,415
64 4,020,416
65 R 4,020,417
78 D 4,020,418

**CLASS 325**

421 4,020,419
464 4,020,420
478 4,020,421

**CLASS 328**

133 4,020,422
151 4,020,423
167 4,020,424

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16 4,020,425
158 4,020,426

**CLASS 333**

22 R 4,020,427
73 R 4,020,429
73 S 4,020,428
79 4,020,430
98 TN 4,020,431

**CLASS 335**

76 4,020,432
230 4,020,433
4,020,434
275 4,020,435
286 4,020,436
299 4,020,437

**CLASS 336**

5 4,020,438
61 4,020,439
155 4,020,440

**CLASS 337**

187 4,020,441
299 4,020,442

**CLASS 338**

28 4,020,443
202 4,020,444
312 4,020,445

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12 R 4,019,796
14 P 4,019,797
17 F 4,019,798
59 R 4,019,799
97 R 4,019,800
98 4,019,801
177 R 4,019,802
275 B 4,019,803

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7 R 4,020,447
8 S 4,020,448
15 4,020,449
15.5 DS 4,020,451
15.5 GC 4,020,450
17 R 4,020,452
52 B 4,020,454
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53 4,020,455
58 4,020,456
66 4,020,457
67 4,020,458
146.1 AB 4,020,460
146.1 AG 4,020,459
146.1 AL 4,020,461
146.3 AE 4,020,462
4,020,463
147 P 4,020,464
172.5 4,020,465
4,020,466
4,020,467
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174 YC 4,020,475
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324 AD 4,020,483
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8 4,020,490
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14 4,019,813

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5 4,020,495
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73 4,019,819
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64 4,020,501
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128 4,020,278
160 4,020,279
242 4,020,280

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1 4,020,503
17 4,020,504
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45 4,020,394
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**CLASS 403**

261 4,019,824

**CLASS 404**

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1 R 4,019,826
202 4,019,827

**CLASS 415**

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**CLASS 416**

97 R 4,019,831
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**CLASS 417**

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517 4,019,839

**CLASS 418**

241 4,019,840
257 4,019,841

**CLASS 423**

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226 4,020,144
261 4,020,146
329 4,020,147
415 P 4,020,148
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305 4,020,181
327 4,020,182
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7 4,019,842
72 R 4,019,843
131.5 4,019,844
146 4,019,845
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421 4,019,847
443 4,019,848
445 4,019,849

**CLASS 426**

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36 4,020,185
4,020,186
72 4,020,187
95 4,020,188
438 4,020,189
534 4,020,190

**CLASS 427**

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19 4,020,192
54 4,020,193
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248 G 4,020,196
304 4,020,197
334 4,020,199
336 4,020,198
416 4,020,200

**CLASS 428**

8 4,020,201
33 4,020,202
35 4,020,203
40 4,020,204
116 4,020,205
137 4,020,206
138 4,020,207
166 4,020,221
209 4,020,222
217 4,019,873
224 4,020,223
251 4,020,225
255 4,020,208
257 4,020,209
272 4,020,224
276 4,020,262
290 4,020,226
306 4,020,227
307 4,020,210
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325 4,020,261
347 4,020,228
361 4,020,212
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425 4,020,216
429 4,020,217
433 4,020,234
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447 4,020,218
457 4,020,236
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570 4,019,875
621 4,019,876
626 4,019,877

**CLASS 429**

15 4,020,238
42 4,020,239
50 4,020,240
54 4,020,241
66 4,020,242
93 4,020,243
100 4,020,244
4,020,245
104 4,020,246
119 4,020,247
164 4,020,248

**CLASS 431**

2 4,019,851
5 4,019,852
12 4,019,850
67 4,019,853
80 4,019,854
256 4,019,855
298 4,019,856

**CLASS 526**

3 4,020,249
13 4,020,250
20 4,020,251
30 4,020,252
88 4,020,256
4,020,263
89 4,020,253
128 4,020,254
133 4,020,255
142 4,020,264
143 4,020,257
178 4,020,258
194 4,020,259
237 4,020,260
285 4,020,265

**CLASS 528**

498 4,020,266
503 4,020,267

**CLASS 536**

1 4,020,268
10 4,020,269
18 4,020,270
88 4,020,271
107 4,020,272

## CLASSIFICATION OF DESIGNS

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| D6— | 11 | 244,106 | | 182 | 244,115 | D10— | 57 | 244,124 | D14— | 53 | 244,141 | | 107 | 244,136 | | 9 | 244,147 |
| | 32 | 244,107 | | 186 | 244,116 | | 77 | 244,125 | | | 244,145 | | 138.1 | 244,137 | | 12 | 244,148 |
| | | 244,108 | | 188 | 244,117 | D11— | 8 | 244,126 | | 86 | 244,140 | | 155 | 244,134 | D34— | 5 ST | 244,149 |
| | 73 | 244,109 | D7— | 105 | 244,118 | D12— | 19 | 244,127 | | 96 | 244,144 | D24— | 64 | 244,152 | D52— | 4 A | 244,150 |
| | 85 | 244,110 | | 106 | 244,119 | | 143 | 244,128 | D15— | 90 | 244,131 | D25— | 78 | 244,138 | D64— | 12 B | 244,151 |
| | 167 | 244,111 | D9— | 168 | 244,120 | | | 244,129 | D22— | 27 | 244,132 | D26— | 1 R | 244,143 | D83— | 1 F | 244,153 |
| | 175 | 244,112 | | 183 | 244,121 | | 156 | 244,130 | | 30 | 244,133 | | 14 A | 244,142 | | | 244,154 |
| | | 244,113 | | 235 | 244,122 | | | | | | | | | | | | |
| | 177 | 244,114 | | | 244,123 | D13— | 4 | 244,139 | D23— | 57 | 244,135 | D30— | 8 | 244,146 | | | 244,155 |

## CLASSIFICATION OF PLANTS

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P.— | 20 | 4,043 | | 24 | 4,044 | | 88 | 4,045 | | | | | | | | | |

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| 1 : | 4,019,229 | | 4,019,660 | | 4,020,454 | | 4,019,367 | | 4,019,636 | | 4,019,596 |
| | 4,019,933 | | 4,019,664 | | 4,020,462 | | 4,019,370 | | 4,019,648 | | 4,019,598 |
| 4 : | 4,019,218 | | 4,019,668 | | 4,020,485 | | 4,019,423 | | 4,019,659 | | 4,019,643 |
| | 4,019,253 | | 4,019,699 | | 4,020,487 | | 4,019,455 | | 4,019,676 | | 4,019,717 |
| | 4,019,313 | | 4,019,710 | | 4,020,503 | | 4,019,480 | | 4,019,687 | | 4,019,718 |
| | 4,019,501 | | 4,019,734 | 8 : | Re.29,192 | | 4,019,495 | | 4,019,706 | | 4,019,836 |
| | 4,019,697 | | 4,019,735 | | 4,019,266 | | 4,019,503 | | 4,019,707 | | 4,019,848 |
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| | 4,020,472 | | 4,019,807 | | 4,019,886 | | 4,019,709 | | 4,019,841 | | 4,019,780 |
| 5 : | 4,019,703 | | 4,019,826 | | 4,020,201 | | 4,019,812 | | 4,019,855 | | 4,020,078 |
| 6 : | 4,019,210 | | 4,019,854 | | 4,020,415 | | 4,019,828 | | 4,019,869 | | 4,020,187 |
| | 4,019,211 | | 4,019,892 | | 4,020,496 | | 4,019,871 | | 4,019,964 | | 4,020,482 |
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| | 4,019,279 | | 4,019,910 | | 4,019,286 | | 4,020,047 | | 4,019,983 | | 4,019,418 |
| | 4,019,281 | | 4,019,932 | | 4,019,320 | | 4,020,108 | | 4,019,992 | | 4,019,520 |
| | 4,019,335 | | 4,019,971 | | 4,019,383 | | 4,020,282 | | 4,020,013 | | 4,019,535 |
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| | 4,019,451 | | 4,020,246 | | 4,019,937 | | 4,019,270 | | 4,020,490 | | 4,019,918 |
| | 4,019,456 | | 4,020,249 | | 4,019,943 | | 4,019,272 | | 4,020,493 | | 4,020,086 |
| | 4,019,458 | | 4,020,259 | | 4,019,955 | | 4,019,297 | 18 : | 4,019,362 | | 4,020,130 |
| | 4,019,462 | | 4,020,281 | | 4,020,000 | | 4,019,323 | | 4,019,409 | | 4,020,213 |
| | 4,019,463 | | 4,020,284 | | 4,020,104 | | 4,019,353 | | 4,019,454 | | 4,020,233 |
| | 4,019,472 | | 4,020,297 | | 4,020,132 | | 4,019,401 | | 4,019,477 | | 4,020,440 |
| | 4,019,476 | | 4,020,305 | | 4,020,165 | | 4,019,406 | | 4,019,487 | | 4,020,468 |
| | 4,019,479 | | 4,020,324 | | 4,020,214 | | 4,019,416 | | 4,019,572 | | 4,020,489 |
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